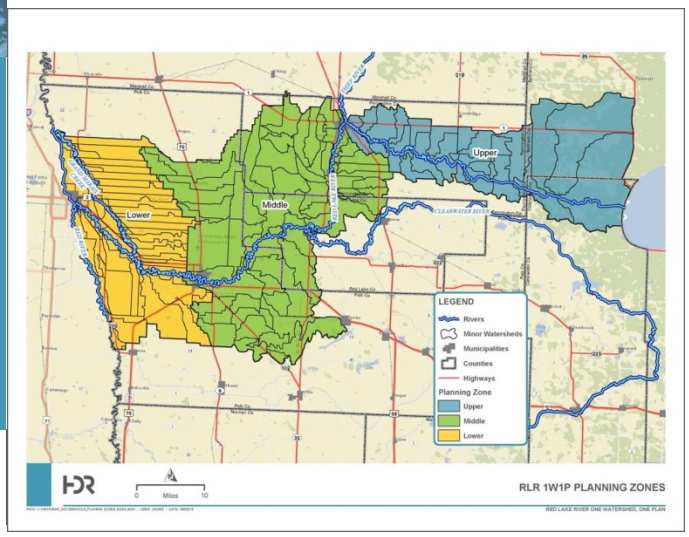
Red Lake River
One Watershed One Plan

January 2017



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1. Executive Summary

Purpose of the Plan

The Red Lake River One Watershed One Plan was developed as a single, concise, and coordinated approach to watershed management. The plan consolidates policies, programs and implementation strategies from existing data, studies and plans, and incorporates input from multiple planning partners to provide a single plan for management of the watershed. This Plan serves to replace County and Watershed District planning by combining existing and new content within one document. The plan focuses on targeted and measurable implementation efforts and lays out specific actions to manage water quantity, protect and restore water quality, natural habitat, recreational uses and drinking water sources in the watershed.

Planning Boundaries

The Red Lake River One Watershed One Plan area is located within the Red Lake River subwatershed in northwestern Minnesota. The planning area, shown in **Figure 1-1** includes both the Red Lake River 8-Digit Hydrologic Unit (HUC-8) as well as the Grand Marais Creek watershed. Portions of Pennington, Polk, Red Lake, Marshall, and Beltrami counties are covered in the planning area which extends from the west outlet of Lower Red Lake to the Red River of the North.

The size, physical makeup, and diverse land use of the planning area led to the need for its division into three distinct planning zones, shown in **Figure 1-2**. The Upper Planning Zone sits on a plain above the Red River Valley with extensive wetlands along its eastern side. The Middle Planning Zone is roughly overlaid onto the gently rolling topography dropping to the Red River Valley with abundant ridges formed from Glacial Lake Agassiz. The Lower Planning Zone is within the Red River Valley and includes a portion of the Grand Marais Creek drainage area that discharges directly to the Red River of the North.

Management areas are smaller divisions within each planning zone that were used to define and organize goals and implementation actions around individual resources of concern. Each management area is the subwatershed upstream of a resource of concern. Twenty three management areas were defined in the planning area including 7 in the Lower Planning Zone, 11 in the Middle Zone, and 5 in the Upper Zone. The relationship between the watershed, planning zones, and management areas is shown in **Figure 1-2**.

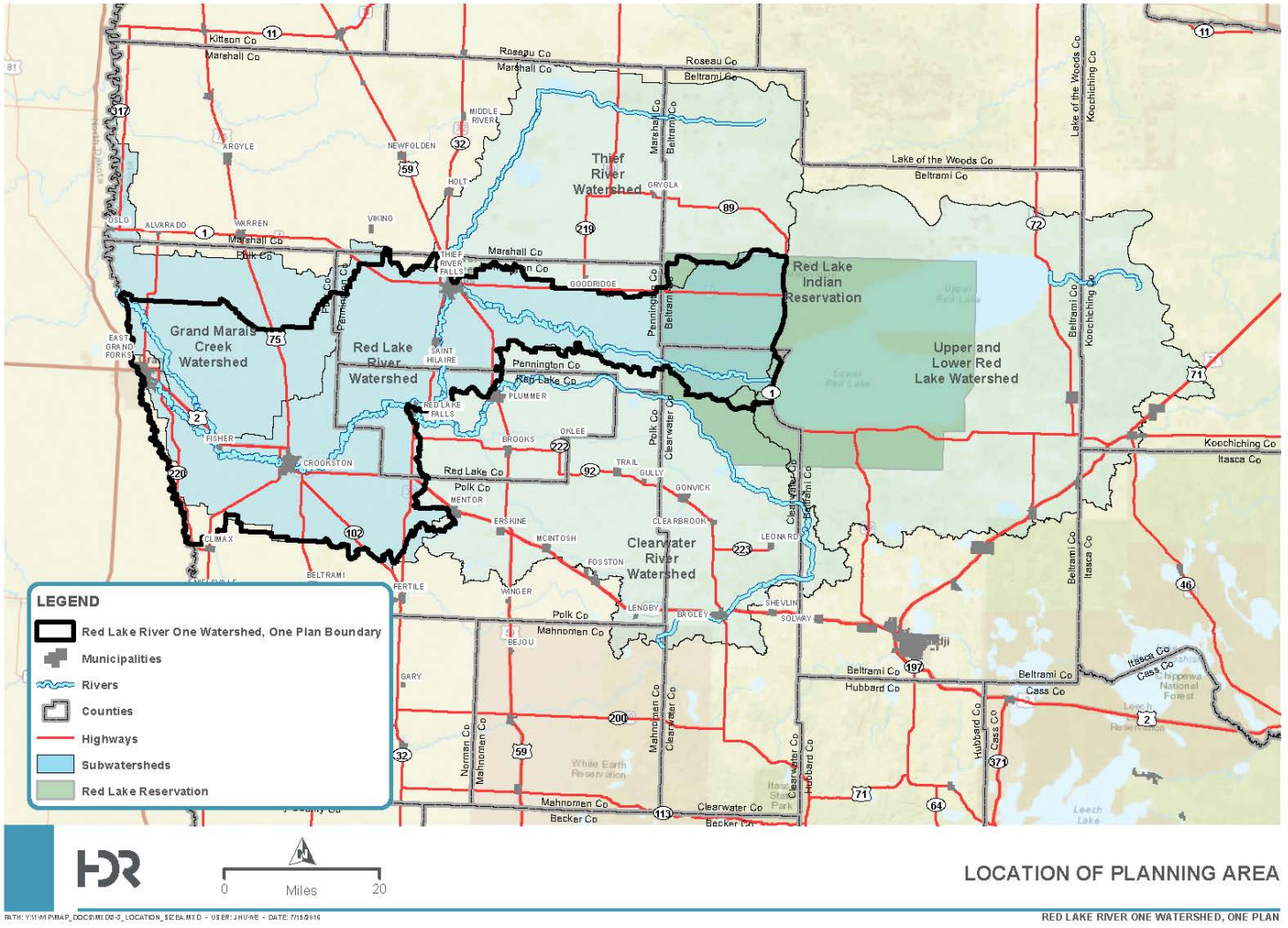

Figure 1 - 1 Red Lake River One Watershed One Plan Comprehensive Planning Area

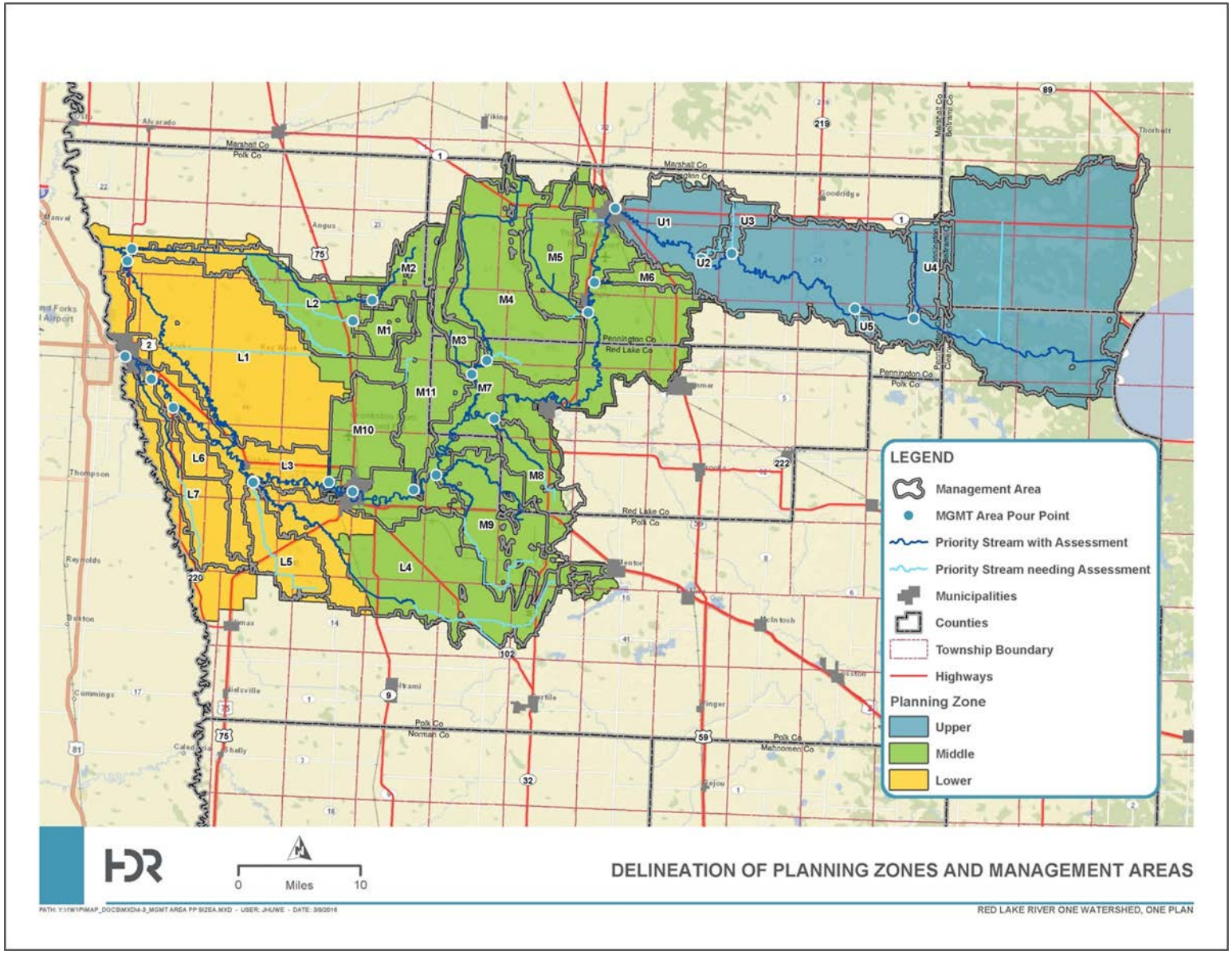

Figure 1 - 2 Red Lake River One Watershed One Plan Management Areas

The Planning Process

The 1W1P planning process included five main steps, each completed with input from the planning partners. The first step was to identify *resources of concern* in the watershed, which included water resources and other natural resources. In general, surface waters that either had been defined as having poor water quality, or those that had adequate concerning water quality data were considered surface water-related *resources of concern*. The next step involved the identification of *issues of concern* facing those resources. *Prioritization statements* were developed to more fully define each issue. Next, *resources of concern* were aligned with *prioritization statements*. The planning partners then developed *measurable goals* for each *resource of concern.* Lastly, implementation plans were developed to specify actions and timelines for watershed protection and restoration activities that have the highest potential to meet defined goals. The overall planning process is shown in **Figure 1-3**.

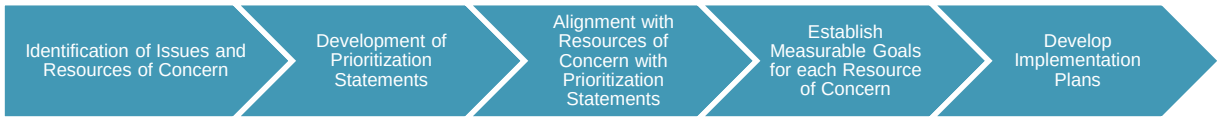

Figure 1-3. The Planning Process for the Red Lake River 1W1P

Summary of Watershed Issues

Through a review of existing studies and reports, and with input from state and local agencies, the planning partners identified important resources and watershed issues. Using a public survey and evaluation by various stakeholders, resources and issues were ranked, resulting in and a list of *issues of concern* relevant to all three planning zones within the watershed planning area and specific *resources of concern* that would become the focus of the planning effort. The *issues of concern* identified through this process were:

- Surface Water Quality
- Soil Erosion and Sedimentation
- Altered Hydrology
- Drainage System Management
- Flood Damage Reduction
- Habitat
- Shoreland and Riparian Management
- Groundwater Protection
- Source Water Protection

Because not all issues and resources can be addressed in the timeframe of a 10-year plan, *prioritization statements* were developed to help set goals and design implementation plans that would maximize benefits for the highest priority resources. P*rioritization statements* that were developed for each of the nine *issues of concern* are listed in **Table 1-1**.

Table 1-1. Prioritization Statements for each Issue of Concern

Issue of Concern: Surface Water Quality
• Restore impaired waters that are closest to meeting state water quality standards. • Protect high-quality unimpaired waters at greatest risk of becoming impaired. • Continue long-term monitoring efforts at key locations to provide sufficient data for water quality, hydrologic, hydraulic and biotic analysis. • Restore or improve other impaired waters.
Issue of Concern: Soil Erosion and Sedimentation
• Reduce runoff-driven sediment transport to impaired waters that are closest to meeting state water quality standards by targeting implementation in subwatersheds with highest export. • Reduce wind erosion with priority on highly erodible soils by targeting implementation in subwatersheds with highest export. • Reduce runoff-driven sediment transport to high-quality unimpaired waters at greatest risk of becoming impaired by targeting implementation in subwatersheds with highest export. • Protect priority stream and river channels (those most susceptible to altered hydrology effects on bank and bed stability). • Inventory and evaluate the severity of erosion problems and risks in terms of the local resource as well as downstream resources to guide implementation strategy. • Reduce runoff-driven sediment transport to other impaired waters by targeting implementation in subwatersheds with highest export. • Identify, quantify and plan for agricultural practices that promote conservation.
Issue of Concern: Altered Hydrology
• Reduce runoff rates by targeting implementation in subwatersheds with high runoff. • Identify ideal locations for flood control structures that include multifunctional design (buffer strips, side water inlets and dikes to ditches and waterways, floodwater retention structures such as retention ponds, dams and diversions). • Protect disconnected, non-contributing drainage areas from future altered hydrology leading to a connection to water resources downstream. • Restore or modify natural water course morphology where feasible to promote adequate drainage as well as channel equilibrium to ensure reduced bank failure, bed aggradation or degradation and allow for natural meander migration and habitat. • Assure long-term maintenance of multi-purpose flood control structures. • Promote infiltration, retention, and extended detention practices in new and existing urban developments based on current stormwater best management practices.
Issue of Concern: Drainage System Management
• Utilize information collected from the drainage ditch inventories to prioritize and install side water inlets and buffer strips to ensure adequate support of agriculture without negative downstream ecological and economic impacts. • Use current drainage water management practices on retrofits or installation of new surface and subsurface drainage. • Retrofit or install new subsurface drainage using current drainage water management practices.
Issue of Concern: Flood Damage Reduction
• Reduce the risk of flood damage in accordance with the 20% Red River Basin Commission's Long Term Flood Solutions and Technical Paper #11. • Reduce flood flows and breakout flows to reduce damages to local communities, infrastructure, rural homes, and agricultural fields.
Issue of Concern: Habitat
• Protect or restore aquatic habitat of DNR priority reaches. • Protect, restore, and enhance grasslands and wetlands with special emphasis on prairie core areas and corridor complexes. • Identify areas that provide both unique ecological values and recreational opportunities and develop an implementation and management plan. • Expand aquatic and terrestrial non-native and invasive species control programs. • Restore longitudinal connectivity of priority reaches.

Issue of Concern: Shoreland and Riparian Management
• Protect riparian corridors and wetlands with existing quality vegetated buffers. • Restore or enhance quality vegetated buffers adjacent to natural, altered and artificial watercourses and wetlands.
Issue of Concern: Groundwater Protection
• Maintain a safe and adequate drinking water supply for residents in order to protect the public's health, safety and general welfare of the community. • Protect Drinking Water Supply Management Areas (DWSMAs). Special consideration will be given for DWSMAs with a moderate or high vulnerability. • Implement MN Department of Ag's Nitrogen Fertilizer Management Plan • Implement strategies to conserve ground water supply quality. • Implement strategies to conserve ground water supply quantity. • Conduct sub-surface sewage treatment system (SSTS) inventory and upgrades. • Work collaboratively with public water suppliers to implement their Wellhead Protection Plans. • Groundwater appropriations do not adversely impact fish habitat, fens other groundwater dependent surface water features, or other groundwater dependent biological communities.
Issue of Concern: Source Water Protection
• Partnership with the East Grand Forks and Thief River Falls public water suppliers to protect and maintain a safe and adequate drinking water supply. • Reduce runoff-driven sediment and pollutant (total organic carbon, haloacetic acid, and Trihalomethanes) transport to surface waters by targeting implementation in subwatersheds with highest export. • Conserve surface water drinking supplies. • Maintain a safe and adequate drinking water supply for residents in order to protect the public's health, safety and general welfare of the community. • Protect Thief River Falls Source Water Assessment Area (SWAA). • Protect East Grand Forks Source Water Assessment Area (SWAA). • Protect surface water quality and quantity of East Grand Forks drinking water supply.

Summary of Measurable Goals

Measurable goals were developed to address issues on a resource-by-resource basis. State Rules, along with existing plans and studies were used as a source for establishing long-term goals related to each of the nine issues of concern. Where plans or studies did not exist, measurable goals were developed to address data gaps, assessment, and other needs in the future. The goals developed for each planning area and specific resource, as appropriate, were then used as the basis for the implementation plans.

Measurable goals were developed to capture common objectives where appropriate. The issues of concern and measurable goals included:

- **Surface Water Quality Goals**

  Because load allocations from TMDL studies had not been completed for the resources of concern at the time the plan was written, goals for surface water quality were based on state water quality standards. These included State standards related to total suspended solids, E. coli, dissolved oxygen, indices of biologic integrity, and several others. Stakeholders selected management strategies appropriate for working to meet water quality standards, and then further refined the implementation options by identifying specific best management practices (BMPs) that would be appropriate, effective, and feasible within in each management area. In addition, both the Red River Basin Commission and MPCA are developing a nutrient reduction strategy for the Red

River Basin. Once this strategy and its reduction goals are completed by subwatershed, they may be incorporated into future planning efforts and updates.

- **Soil Erosion and Sedimentation Goals**

  Measurable goals for soil erosion were crafted through review of goals established in existing plans, and by estimating the total number of BMPs that could feasibly be installed within individual management areas. The results of PTMApp for soil erosion reduction related practices were reviewed and an estimate of total number of best management practices or watershed management strategies that could feasibly be installed within individual management areas in the 10-year time period was used to assist with goal setting.

- **Drainage Management System Goals**

  In the case of field-scale drainage management systems, programs such as buffer strip implementation, ditch maintenance and inventory activities were identified. The results of PTMApp for storage-related practices were reviewed and an estimate of total number of best management practices or watershed management strategies that could feasibly be installed within individual management areas in the 10-year time period was set as the goal.

- **Altered Hydrology Goals**

  In the case of mitigation for altered hydrology, programs such as buffer strip implementation, ditch maintenance and inventory activities were identified. The results of PTMApp for soil erosion reduction related practices were reviewed and an estimate of total number of best management practices or watershed management strategies that could feasibly be installed within individual management areas in the 10-year time period was used to assist with goal setting.

- **Flood Damage Reduction Goals**

  Goal setting for flood damage reduction were adopted from the results of a distributed detention study for the region as well as input from local governing unit's understanding of local issues and needs. That study identified a total of 17 off-channel, tributary, and main-channel sites for detention. In addition, a Red Lake Watershed peak flow reduction goal of 35 percent at Crookston was identified.

- **Habitat Goals**

  Goals related to the issue of habitat for aquatic and terrestrial species were formed by referencing existing plans, current study findings and soliciting input from local governing units. These goals are recommendations from the MnDNR to target riparian restoration and instream habitat reaches for restoration or protection were adopted as 1W1P goals. The goals include continuation of monitoring biologic integrity in resources of concern, performing the recommended fish passage retrofit feasibility studies at dam structures within the watershed, and investigation of the barriers to fish passage in tributaries.

  Terrestrial habitat goals were developed from the Minnesota Prairie Conservation Plan which identifies opportunities for restoration of prairie areas, including habitat corridors and percentage goals for specific land types within core areas and corridors.

- **Shoreland and Riparian Management Goals**

  Shoreland and riparian management goals were formed using input based on the MnDNR analysis of the Red Lake River Watershed, and the Minnesota Buffer Initiative. Goals include riparian and instream habitat restoration and protection efforts for specific resources of concern derived from the Red Lake River watershed analysis. Goals for this issue of concern should be updated in future iterations of the 1W1P to reflect the total amount of riparian buffer required by the Buffer Initiative within each management area.

- **Groundwater Protection and Source Water Protection Goals**

  Several surface and groundwater management plans (including MN Dept. of Health and Mn Dept. of Agriculture NFMP) were referenced for development of measurable goals for protection of surface and groundwater drinking water supplies. Measurable goals in the 1W1P for these issues of concern are related to implementation of surface runoff control practices to protect surface water quality, and protection of groundwater recharge areas, and carrying out education and outreach activities relative to water conservation, well management, well sealing, septic maintenance, and groundwater education, etc.

Summary of Implementation Actions and Programs

An implementation plan, which consists of implementation actions and an implementation schedule, was developed for each planning zone. The implementation plan includes actions designed to work towards meeting the established measurable goals for each resource of concern. Implementation plans are specific to issues and management areas, and include an estimate of the costs associated with implementation, and consideration for how the actions will be measured. It should be noted that development and refinement of measurable goals and targeted implementation actions will, in practice, be an iterative process over the life of a 1W1P plan.

The development of an implementation plan for each planning zone involved an evaluation of cost-effective, targeted, and measurable actions necessary to achieve established goals. In planning sessions, the planning partners reviewed the issues of concern, prioritization statements, and measurable goals for each resource of concern to develop specific implementation actions and timelines. Actions included implementation of structural best management practices, as well as non-structural field assessment, implementation, data collection, study or outreach activities.

To address the water quality and quantity, and soil erosion and sedimentation issues of concern within each planning zone, stakeholders designed implementation strategies and timelines around the number of BMP installations that were defined as goals for each management area (**Table 1-2**). The assessment of BMPs was made using the Prioritize, Target and Measure Application (PTMApp), a tool that allows users to build and measure the cost-effectiveness of prioritized and targeted implementation scenarios for improving conditions in the watershed.

Table 1-2. Best Management Practice Implementation Summary Estimate by Planning Zone.

Best Management Practices	Number of BMPs by Planning Zone		
	Lower	Middle	Upper
Ag Waste Storage (ea)		4	1
Alternative Tile Intakes (ea)		8	1
Channel Bed and Stream Channel Stabilization (miles)	5	4.1	2

Best Management Practices	Number of BMPs by Planning Zone		
	Lower	Middle	Upper
Channel Stabilization (miles)		1	1
Conservation Cover (acres)	7,400	9,040	2,240
Cover Crop (acres)	7,400	13,400	960
Critical Area Planting (acres)	23	266	94
Diversion (each)	15	45	
Drainage Water Management (acres)	320	1,070	600
Field Borders (miles)		71	62
Filter Strips (miles)	135	87	62
Grade Stabilization Structure (each)	56	327	340
Grass Waterways (miles)	66	16.25	4
Gravel Pit Reclamation (acres)	43	7	
Impoundment (ac-ft)	5,000	5,000	5,000
Milkhouse Waste Storage Treatment (each)		1	
Multi-Stage Ditch (miles)		5	2
Nutrient Management (acres)	10,680	9,680	3,240
Precision Ag Practices (acres)	0	520	1,200
Prescribed Burning (acres)	1,100	1,560	930
Raingardens (each)		11	5
Residue and Tillage Management (acres)	11,480	12,120	2,400
Restoration & Management of Rare/Declining Habitat (acres)	620	1,375	530
Riparian Buffers (miles)	25.5	80	30
Rotational and Prescribed Grazing (acres)	5,280	4,560	960
Septic System Upgrades (each)	23	56	19
Stormwater Detention Basins (each)		10	4
Streambank, Shoreland, and Roadside Protection (miles)	7	11.2	6
Tree/Shrub Establishment (acres)	105	80	59
Upland Wildlife Habitat Management Including CRP (acres)	19,950	24,900	6,630
Wastewater and Feedlot Runoff Control (each)	1	7	6
Water and Sediment Control Basins (each)	48	71	3
Water Control Structures (each)	42	76	1
Well Sealing (each)	36	86	48
Wetland Restoration (acres)	65	690	640
TOTAL ESTIMATED COSTS	$22,500,000	$35,000,000	$20,000,000

Given that no official load allocations had been published at the time of plan development, no attempt was made to correlate sediment reductions to in-stream pollutant concentrations or to estimates of the total number of sediment control practices or BMPs required to meet water quality thresholds. Goals and implementation actions can be refined as load allocations are defined in future iterations of the plan. PTMApp, HSPF, and other available surface water modeling tools may also be used to focus estimates as implementation progresses.

Implementation strategies for the remaining issues of concern were developed using a combination of results from published studies and stakeholder input from various water and natural resource agencies. For the altered hydrology and drainage management issues, focused implementation strategies were mainly related to flood damage reduction, primarily using the results of an earlier distributed detention study undertaken by the Red Lake Watershed District. The study identified several off channel and in channel locations for detention basin implementation. To address the instream, riparian and terrestrial habitat issues, implementation goals and strategies referenced current work underway by the MnDNR as well as the Minnesota Native Prairie Plan. While instream habitat implementation was primarily focused in the Lower and Middle planning zones, implementation of prairie re-establishment was identified in the Middle planning zone as well. Riparian habitat and buffer strip establishment was not exclusive to any planning zone.

Similarly, the implementation strategies for all three planning zones include the need for additional scientific and technical studies to assess, prioritize and subsequently implement strategies across all three planning zones for certain issues and priorities. For example, the need for a wind erosion analysis was also identified, given that a very large portion of gross particulate transport from the Red Lake River Watershed is in the form of wind-generated erosion and deposition. Another example of this system-wide approach was the strategy of identifying all locations in each of the planning zones where non-contributing lower areas in the landscape do not overflow to a receiving water body during a 10-year storm event. These locations are recommended to either be protected from installation of subsurface drain tile or for extended detention via gate valve-operated tile systems in order to maintain natural watershed hydrology.

Some implementation strategies were policy-related as opposed to structural or restorative in nature. For example, implementation of strategies to address drinking water protection issues or groundwater protection issues limited to identification of areas of risk, such as the Middle Zone given its designation by the MN DNR as a groundwater sensitive region.

Specific implementation plans for the Lower, Middle and Upper Planning Zones are included in **Sections 5, 6** and **7** of this document.

Outline of Responsibilities of Participating Local and Regional Governments

One of the guiding principles of the One Watershed One Plan process is that it “must involve a broad range of stakeholders to ensure an integrated approach to watershed management.” Stakeholders in the Red Lake River One Watershed One Plan included representatives from watershed districts, soil and water conservation districts, counties included in the planning area, townships, federal and state agencies, landowners and interested citizens. These stakeholders were assigned to either the One Watershed One Plan Planning Group, Planning Workgroup or to the Policy Committee or Technical and Citizen Advisory Committees. The Planning Workgroup and committees met several times over an 18-month period to guide and provide input into the planning process.

Moving forward, the stakeholders will be an important part of implementation actions, measurement of progress toward goals, and future planning iterations. Actual implementation of the plan will be the responsibility of Polk County, West Polk SWCD, Pennington County, Pennington SWCD, Red Lake County, Red Lake SWCD, and the Red Lake Watershed District.

2. KEY TERMS & ACRONYMS

KEY TERMS

Assessment Unit Identifier (AUID): A unique identification code assigned to each waterbody segment. For a river or stream reach it is comprised of the United State Geological Survey 8-digit hydrologic unit code for that subwatershed plus a 3-digit unique reach number. The code for lakes and wetlands follows the Minnesota Department of Natural Resources (DNR) identification system, which includes a county identifying number. Usually stream reaches are divided into separate AUIDs when either their hydrologic characteristics change (i.e. another stream/river enters or there is a physical barrier such as a dam) or the stream/river classification changes.

Aquatic life impairment: The presence and vitality of aquatic life is indicative of the overall water quality of a stream. A stream is considered impaired for aquatic life if the fish Index of Biotic Integrity (IBI), macroinvertebrate IBI, dissolved oxygen, turbidity, or certain chemical standards are not met.

Aquatic recreation impairment: Streams are considered impaired for impacts to aquatic recreation if E. Coli bacteria standards are not met or if River Eutrophication standards are not met. Lakes are considered impaired for impacts to aquatic recreation if total phosphorus, and either chlorophyll-a or Secchi disc depth standards are not met.

Aquifer: Naturally-occurring subsurface storage of water within rock and soil spaces that is drawn on for human water supply.

Best Management Practice (BMP): A practice, or combination of practices, that is determined to be an effective and practicable (including technological, economic, and institutional considerations) means of preventing or reducing the amount of pollution generated by nonpoint sources to a level compatible with water quality goals.

Catchment: For the purposes of this plan, the term catchment refers to the surface area of the landscape draining to a potential best management practice location. Its area fits within a larger drainage area called a subwatershed. **(***see* Watershed and Subwatershed)

DWSMA: Drinking Water Supply Management area. Area that typically delineates a ten year time of travel of groundwater to reach the public water supply wells.

Filtration: Filtration practices generally provide treatment by allowing water to infiltrate and by slowing the velocity of water to allow for sedimentation and nutrient reduction processes to occur. The effectiveness of filtration BMPs are therefore a function of the velocity design standard and the velocity of runoff delivered across the surface of the BMP.

Ground water: Naturally occurring subsurface water within rock and soil spaces. Water can be in shallow or deep aquifers and interconnected with surface water.

Hydrologic Unit Code (HUC): A Hydrologic Unit Code (HUC) is assigned by the USGS for each watershed. HUCs are organized in a nested hierarchy by size.

Impairment: Water bodies are listed as impaired if water quality standards are not met for designated beneficial uses including: aquatic life (e.g. water clarity, total suspended solids, dissolved oxygen, index of biotic integrity), aquatic recreation (E. coli bacteria), and aquatic

consumption (mercury). Rivers can occasionally violate a water quality standard without becoming impaired. The magnitude and frequency of violations are factored into the water quality assessment process.

Index of Biotic Integrity (IBI): A method for determining water quality and habitat using characteristics of aquatic communities, such as the types of fish and invertebrates found in the waterbody. It is expressed as a numerical value between 0 (lowest quality) to 100 (highest quality). IBI's for both fish and macroinvertebrates are determined.

Infiltration: Infiltration practices generally provide treatment by allowing water to infiltration through the soil or other media.

Issues: All identified stressors on water and natural resources related to either/all ecological, economic or social benefits.

Issues of Concern: The agreed upon set of top issues in the planning area.

Management Area: An area in each planning zone identified for plan implementation purposes that is part of a resource of concern watershed, which contributes hydrologically through a common pour point.

Measurable goals: A set of standards with which to gauge the performance or level of progress of various implementation strategies over time. They are intended to represent what feasibly can be accomplished in a 10-year time frame.

Mitigation: For every authorized discharge, the adverse impacts to wetlands, streams and other aquatic resources must be avoided and minimized to the extent practicable. For unavoidable impacts, compensatory mitigation is required to replace the loss of wetland and aquatic resource functions in the watershed. Compensatory mitigation refers to the restoration, establishment, enhancement, or in certain circumstances preservation of wetlands, streams or other aquatic resources for the purpose of offsetting unavoidable adverse impacts.

Nonpoint Source Pollution: Pollutants that come from diffuse sources; most of these sources are not regulated. Non-point source include: agricultural field runoff, agricultural drain tile discharge, stormwater from smaller cities and roads, bank, bluff and ravine failures, atmospheric deposition, internal nutrient recycling in lakes, failing septic systems, animals and other sources.

Point Source Pollution: Point source pollutants are pollutants that can be directly attributed to one location; generally, these sources are regulated by permit. Point sources include: wastewater treatment plants, industrial dischargers, stormwater discharge from larger cities, and stormwater runoff from construction activity.

Pour Point: The physical location in the landscape where a watershed, subwatershed drainage area or catchment discharges runoff. This is typically considered at the confluence of two river or stream channels in order to delineate a watershed, subwatershed or catchment.

Prioritization Statement: A statement designed to focus implementation strategies towards resources of concern in relation to their issues of concern.

Planning Area: For the purposes of this plan, the complete Red Lake River One Watershed, One Plan area.

Planning Zone: One of the three zones (Lower, Middle, Upper) defined in the broader planning area. These zones are divided further into management areas as defined above.

Protection: The practice of protecting or maintaining intact ecosystems and habitats in the environment by active human actions.

Prioritize, Target and Measure Application (PTMApp): A Web based tool for estimating the water quality benefits of nonpoint source practices.

Restoration: The practice of returning degraded ecosystems and habitats in the environment to their natural background condition by human actions.

Resource: All identified water and natural resources or infrastructure having ecological, economic or social values.

Resource Management Classification: A classification scheme related to the condition of a resource used to assign varying management levels of financial and staffing resources. 1) High Quality - Un-impaired stream segments furthest from the impairment listing standard for any given parameter; 2) Needs Protection - Un-impaired stream segments closest to the impairment listing standard for any given parameter; 3) Impaired stream segments closest to the impairment listing standard for any given parameter; 4) Impaired stream segments furthest from the impairment listing standard for any given parameter; 5) No monitoring data available at the time of plan writing.

Resource of Concern: The agreed upon set of resources in the planning area having the highest need/priority for protection, maintenance, or enhancement.

Storage: BMPs or projects that are generally used for sedimentation to reduce Total Suspended Solids (TSS) (definition below) in the water and also for water retention to reduce flooding and flood damages.

Source (or Pollutant Source): This term is distinguished from 'stressor' to mean only those actions, places or entities that deliver/discharge pollutants (e.g., sediment, phosphorus, nitrogen, pathogens).

Source Reduction: BMPs or projects put in place that reduce pollutants from a particular source (e.g. sediment from field runoff) from entering a water body for the protection of its designated beneficial use. Source reduction practices generally provide treatment by reducing the amount of water quality parameters (typically TP and TN) applied to the landscape.

Stressor (or Biological Stressor): This is a broad term that includes both pollutant sources and non-pollutant sources or factors (e.g., altered hydrology, dams preventing fish passage) that adversely impact aquatic life.

Subwatershed: For the purposes of this plan, the term subwatershed refers to the surface area of the landscape draining to a significant tributary to the main channel of the Red Lake River. It can also refer to the area of the landscape contributing to a point on the Red Lake River. Its area fits within a larger drainage area called a watershed. (*see* Watershed and Catchment)

Surface Waters: Water occurring on the surface in the landscape within lakes, wetlands, streams and rivers.

Total Maximum Daily Load (TMDL): A calculation of the maximum amount of a pollutant that may be introduced into a surface water and still ensure that applicable water quality standards for that water are met. A TMDL is the sum of the wasteload allocation for point sources, a load allocation for nonpoint sources and natural background, an allocation for future growth (i.e., reserve capacity), and a margin of safety as defined in the Code of Federal Regulations.

Watershed: the entire physical area or basin drained by a distinct stream or riverine system, physically separated from other watersheds by ridgetop boundaries. There are 81 Major Watersheds (HUC8) covering the state and around 5600 Minor Watersheds (subdivisions) that comprise Major Watersheds. For the purposes of this plan, the term watershed refers to the surface area of the landscape draining to the Red River by the Red Lake River and Grand Marais Outlet channel. This represents the complete One Watershed, One Plan area of interest. (*see* Subwatershed and Catchment)

Watershed Approach: An approach to watershed analysis and management that incorporates water quality assessment, watershed analysis, civic engagement, planning, implementation, and measurement of results into a 10-year cycle that addresses both restoration and protection. It is 1) hydrologically defined, 2) involves stakeholders and 3) strategically addresses priority water resources goals. This approach integrates water monitoring efforts to provide a more complete assessment of water quality and facilitates data collection for the development of Total Maximum Daily Loads (TMDLs) and Watershed Restoration and Protection Strategies (WRAPS). The idea behind the watershed approach is to intensively monitor the streams and lakes within a major watershed to determine the overall health of the water resources, identify impaired waters, and identify those waters in need of additional protection efforts to prevent impairments. Follow up monitoring is then done in biologically impaired subwatersheds to determine the cause(s) of the impairments (the "stressors" impacting the biological community) and to begin to identify pollutant sources. The watershed approach has four components: 1) Monitor water bodies and collect data 2) Assess the data 3) Develop strategies to restore and protect the watershed's water bodies. 4) Conduct restoration and protection projects in the watershed.

Watershed Restoration and Protection Strategy (WRAPS): A watershed condition and management report based on the Watershed Approach that informs comprehensive watershed management plans, ongoing implementation activities and future monitoring and assessment. Information from the WRAPS may inform the One Watershed One Plan implementation planning for a given watershed.

Water Quality Standard: Water quality standards are thresholds established by the state that determine whether or not a body of water is adequately supporting aquatic life, aquatic recreation, or aquatic consumption. If a waterbody is failing to meet a particular water quality standard (e.g. E. coli), the stream is deemed to be impaired for the use (e.g. aquatic recreation) that is affected by that parameter.

State or Federal law or regulation consisting of a designated use or uses for the waters of the United States, water quality criteria for such waters based upon such uses, and an anti-degradation policy and implementation procedures. The Clean Water Act requires states to designate beneficial uses for all waters of the United States and develop water quality standards to protect each use. Water quality standards include the following: (1) beneficial uses - identification of how people, aquatic communities and wildlife use our waters, (2) numeric standards - allowable concentrations of specific pollutants in a water body, established to protect the beneficial uses, (3) narrative standards - statements of unacceptable conditions in and on the water, and (4) non-degradation - extra protection for high-quality or unique waters and existing uses.

ACRONYMS

AGENCIES

STATE

BWSR: Board of Water and Soil Resources

DNR: Department of Natural Resources

DOER: Department of Employee Relations

LCCMR: Legislative-Citizen Commission on Minnesota Resources

LOHC: Lessard Outdoor Heritage Council

LSOHC: Lessard-Sams Outdoor Heritage Council

MDA: Minnesota Department of Agriculture

MDH: Minnesota Department of Health

MDOT: Minnesota Department of Transportation

MGS: Minnesota Geological Service

MMB: Minnesota Office of Management and Budget

MPCA: Minnesota Pollution Control Agency

FEDERAL

ACOE: Army Corps of Engineers

CFSA: Consolidated Farm Services Agency

EPA: Environmental Protection Agency

FEMA: Federal Emergency Management Agency

FSA: Farm Service Agency

NRCS: Natural Resources Conservation Service

RC&D: Resource Conservation & Development

RECD: Rural Economic and Community Development

USDA: United States Department of Agricultural

USF&WS: United States Fish & Wildlife Service

USGS: United States Geological Survey

REGIONAL/LOCAL

CAC: Citizen Advisory Committee

CHS: Community Health Service

JPB: Joint Powers Board

LGU: Local Government Unit

RDC: Regional Development Commission

SWCD: Soil and Water Conservation District

TAC: Technical Advisory Committee

TSA: Technical Service Area

WD: Watershed District

WMO: Watershed Management Organization

ASSOCIATIONS

STATE

ADA: Association of (Watershed) District Administrators

AMC: Association of Minnesota Counties

AMT: Association of Minnesota Townships

AMWRAP: Association of Minnesota Water Resources Administrators and Planners

LMC: League of Minnesota Cities

MACDE: Minnesota Association of Conservation District Employees

MACPZA: Minnesota Association of County Planning and Zoning Administrators

MARC&D: Minnesota Association of Resource Conservation and Development

MASWCD: Minnesota Association of Soil and Water Conservation Districts

MAWD: Minnesota Association of Watershed Districts

NATIONAL

NACD: National Association of Conservation Districts

NWF: National Wildlife Federation

SWCS: Soil and Water Conservation Society

PROGRAMS

STATE

1W1P: One Watershed One Plan

AIG: Accelerated Implementation Grant

CLMP: Citizens Lake Monitoring Program

CLWP: Comprehensive Local Water Planning

CREP: Conservation Reserve Enhancement Program

C-S: Cost-Share Program

CWL: Clean Water Legacy

CWMA: Cooperative Weed Management Area

CWP: Clean Water Partnership

eLINK: Web based system used in tracking conservation projects and grants

HSPF: Hydrologic Simulation Program Fortran

LAP: Lake Assessment Program

LWRPMP: Local Water Resources Protection and Management Program

NPEA: Nonpoint Engineering Assistance

NRBG: Natural Resources Block Grant

PFM: Private Forestry Management

PRAP: Program Review and Assistance Program

PWP: Permanent Wetland Preserve

RIM: Reinvest in Minnesota

SEDLC: Soil Erosion and Drainage Law Compliance

SLR: Streambank, Lakeshore, and Roadside Program

SRF: State Revolving Fund

WCA: Wetland Conservation Act

WREP: Wetlands Reserve Enhancement Program

FEDERAL

ACP: Agricultural Conservation Program

CRP: Conservation Reserve Program

EQIP: Environmental Quality Incentive Program

FDR: Flood Damage Reduction

FEMA: Federal Emergency Management Act

WBP: Water Bank Program

WRP: Wetland Reserve Program

ADDITIONAL ACRONYMS

CAC: Citizens Advisory Committee

FDR: Flood Damage Reduction

FDRWG: Flood Damage Reduction Work Group

FEMA: Federal Emergency Management Agency

GIS: Geographic Information Systems

ISTS: Individual Sewage Treatment System

Managers: Red Lake Watershed District Board of Managers

NPDES: National Pollution Discharge Elimination System

NRE: Natural Resource Enhancement

NWI: National Wetlands Inventory

NWR: National Wildlife Refuge

PT: Project Team

RLWD: Red Lake Watershed District

RRWMB: Red River Watershed Management Board

TAC: Technical Advisory Committee

TSAC: Technical and Scientific Advisory Committee

TERMS

BBR: Biennial Budget Request

BMP: Best Management Practice

CEFW: Conservation Easement Financial Worksheet

CWF: Clean Water Fund

CWM: Cooperative Weed Management

EAW: Environmental Assessment Worksheet

GIS: Geographic Information System

GPS: Geographic Positioning System

GRAPS: Groundwater Restoration and Protection Strategy

NPFP: Nonpoint Priority Funding Plan

NPS: Nonpoint Source Pollution

PTM: Prioritized, Targeted and Measurable

SWAT: Modeling: Soil and Water Assessment Tool

TDML: Total Daily Maximum Load

WRAPS: Watershed Restoration and Protection Strategy

3. INTRODUCTION

3.1. One Watershed One Plan Background

Minnesota has a long history of water management by local governments. One Watershed One Plan (1W1P) is rooted in this history and the idea that the local governments responsible for water management should organize and develop focused implementation plans on a watershed scale. Recent legislation permits the Board of Water and Soil Resources (BWSR) to adopt methods that allow comprehensive plans, local water management plans, or watershed management plans to serve as substitutes for one another; or to be replaced with one comprehensive watershed management plan. This legislation is referred to as One Watershed One Plan. The Red Lake River 1W1P was developed to consolidate existing policies, programs and implementation strategies from multiple stakeholders to provide a single, concise, and coordinated approach to watershed management.

The State's One Watershed One Plan program is grounded in recommendations from the Minnesota Local Government Water Roundtable, which suggested that local governments charged with water management responsibility should organize and develop comprehensive implementation plans on a watershed scale. In 2012, the Minnesota Legislature gave BWSR the authority to work with local governments to develop and implement this comprehensive watershed management plan approach. BWSR's vision for this program is to align planning efforts along major watershed boundaries with prioritized, targeted, and measurable implementation actions that will be developed and implemented locally.

The State allocated Clean Water Fund grants to fund five pilot projects to address comprehensive water management on a watershed basis (**Figure 3-1**). BWSR developed guidelines to assist planning groups with carrying out the One Watershed One Plan process, referred to as the *Operating Procedures for Pilot Watersheds* (BWSR 2015a). The general framework for the process is summarized in Appendix C.

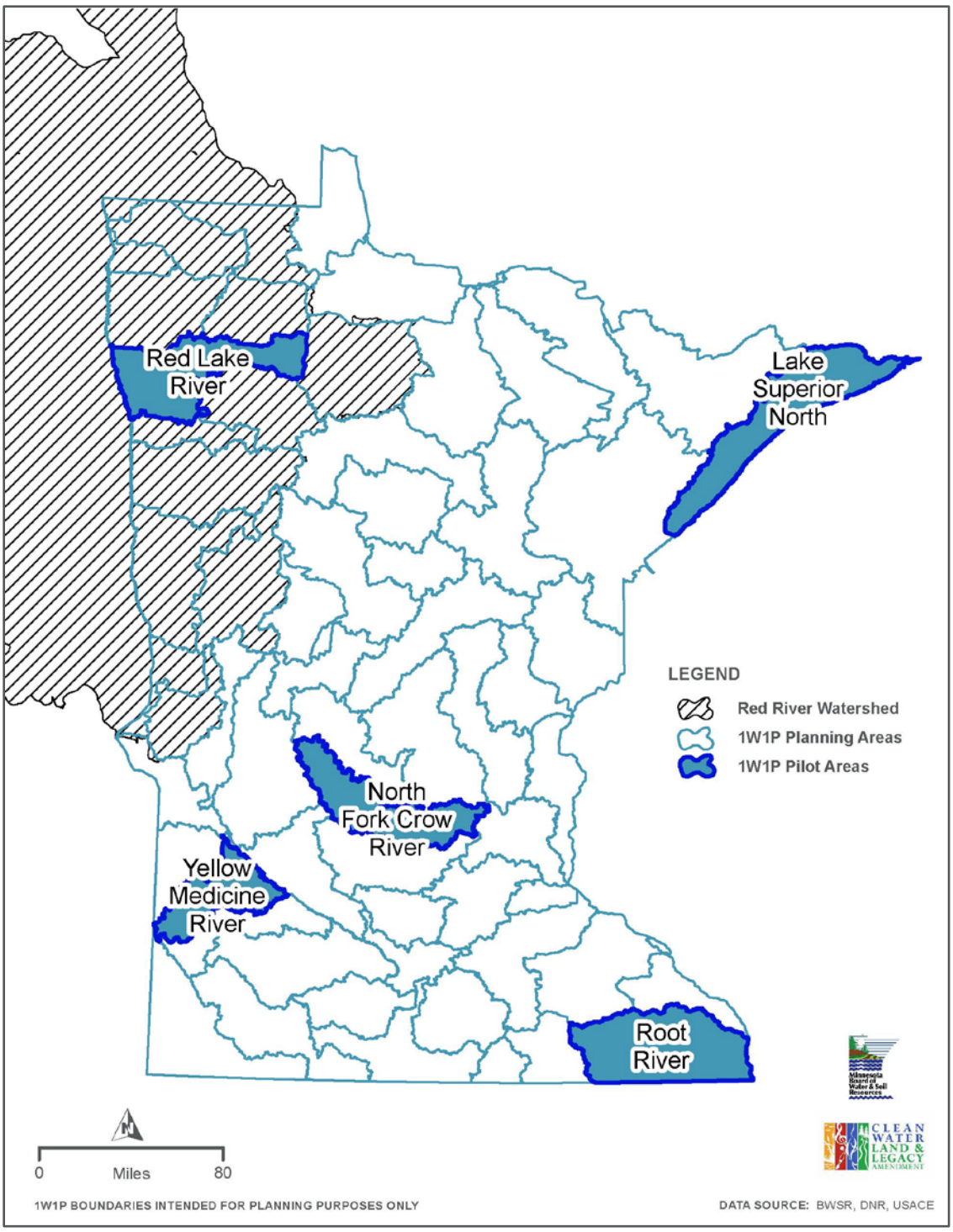

Figure 3 - 1 One Watershed One Plan Planning Area

The Red Lake River One Watershed One Plan is one of the five pilot plans funded by the State. The plans will build on existing efforts, using current local water plans, state and local knowledge and a systematic, science-based approach to watershed management. The planning process involves a broad range of stakeholders, including local governments, state agencies, and community members as partners in the planning process, representing a holistic and coordinated approach to addressing comprehensive water management issues **(Figure 3-2)**.

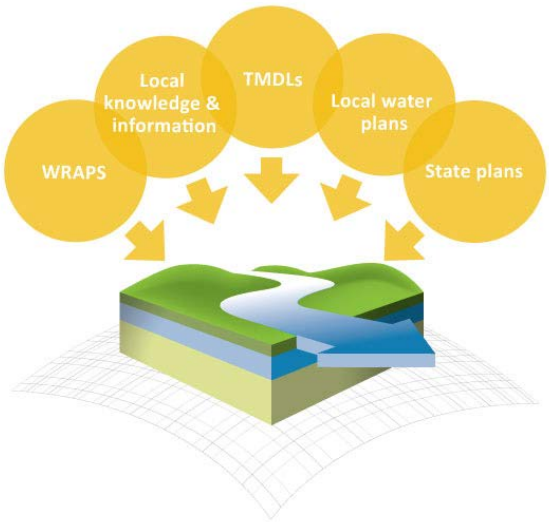

Figure 3 - 2 An example of various plans input into the comprehensive One Watershed One Plan (*Source: BWSR 2015a*.)

3.2. Red Lake River 1W1P Background

BWSR's vision for 1W1P is to align local watershed planning with state strategies towards prioritized, targeted and measurable implementation plans. Guiding principles for development of the Red Lake River 1W1P are:

- The Red Lake River 1W1P will prioritize, target, and outline measurable goals and implementation actions that meet or exceed current water plan content standards.
- The Red Lake River 1W1P is not an effort to change local governance.
- The Red Lake River 1W1P strives for a systematic, watershed-wide, science-based approach to watershed management; driven by the participating local governments.
- The Red Lake River 1W1P uses the state's delineated major watersheds (8-digit hydrologic unit codes or HUC8) as the starting point for defining the preferred scale for local watershed management planning.
- The Red Lake River 1W1P involves a broad range of stakeholders to ensure an integrated approach to watershed management.
- The Red Lake River 1W1P embraces the concept of multiple benefits in the development and prioritization of implementation strategies and actions.

- The Red Lake River 1W1P implementation will be accomplished through formal agreements among participating local governments on how to manage and operate the watershed.
- The Red Lake River 1W1P planning and implementation efforts recognize local commitment and contribution.
- The Red Lake River 1W1P is not intended to be a one size fits all model.

The Red Lake River 1W1P was developed under a Memorandum of Agreement (Appendix A) between project partners including Red Lake, Pennington and Polk Counties; Pennington, Red Lake County and West Polk Soil and Water Conservation Districts; and The Red Lake Watershed District.

The following resulted from the Red Lake River 1W1P:

- Development of a shared understanding of the issues and resources of concern in the planning area.
- Watershed management strategies informed by existing science, studies and projects.
- Established measurable goals to address specific issues on a resource-by-resource basis.
- Identification of specific strategies and actions needed to achieve established restoration and protection targets.
- Short-term and long-term goals, including 10-year milestones.
- Identification of the implementing authorities, established timelines, and cost estimates based on milestones.
- May serve to coordinate the collection, ranking, and submission of requests for funding to the State and other resources.

3.3. Watershed and Planning Boundary Description

3.3.1. Location

The Red Lake River One Watershed One Plan boundary is part of the Red Lake River Watershed in northwestern Minnesota. The Red Lake River flows from east to west from Lower Red Lake through the cities of Thief River Falls, Red Lake Falls and Crookston before it converges with the Red River of the North at East Grand Forks. The greater Red Lake River Watershed consists of five subwatersheds including the Clearwater River, Thief River, Grand Marais Creek, Upper/Lower Red Lake and Red Lake River watersheds. The Thief River flows from the north into the Red Lake River at Thief River Falls. Red Lake Falls marks the confluence of the Clearwater River and the Red Lake River. Grand Marais Creek, which begins in Polk County, flows northwest to the Red River of the North.

The Red Lake River 1W1P Planning Area includes both the Red Lake River 8-Digit Hydrologic Unit (HUC-8) as well as the Grand Marais Creek watershed. It covers portions of Beltrami, Clearwater, Polk, Pennington and Red Lake counties and includes the cities of East Grand Forks, Fisher, Crookston, Red Lake Falls, Saint Hilaire and Thief River Falls. Other jurisdictions within the planning boundary include the Red Lake Watershed

District, Red Lake Band of Chippewa Reservation, the Red Lake County Soil and Water Conservation District (SWCD), the Pennington SWCD, and the West Polk SWCD. The boundary is shown in **Figure 3-3**.

The Red Lake River 1W1P planning area covers a portion of the entire Red Lake River Watershed. The remaining tributary areas within the Red Lake River Watershed will be addressed in other 1W1P efforts to be conducted in the future.

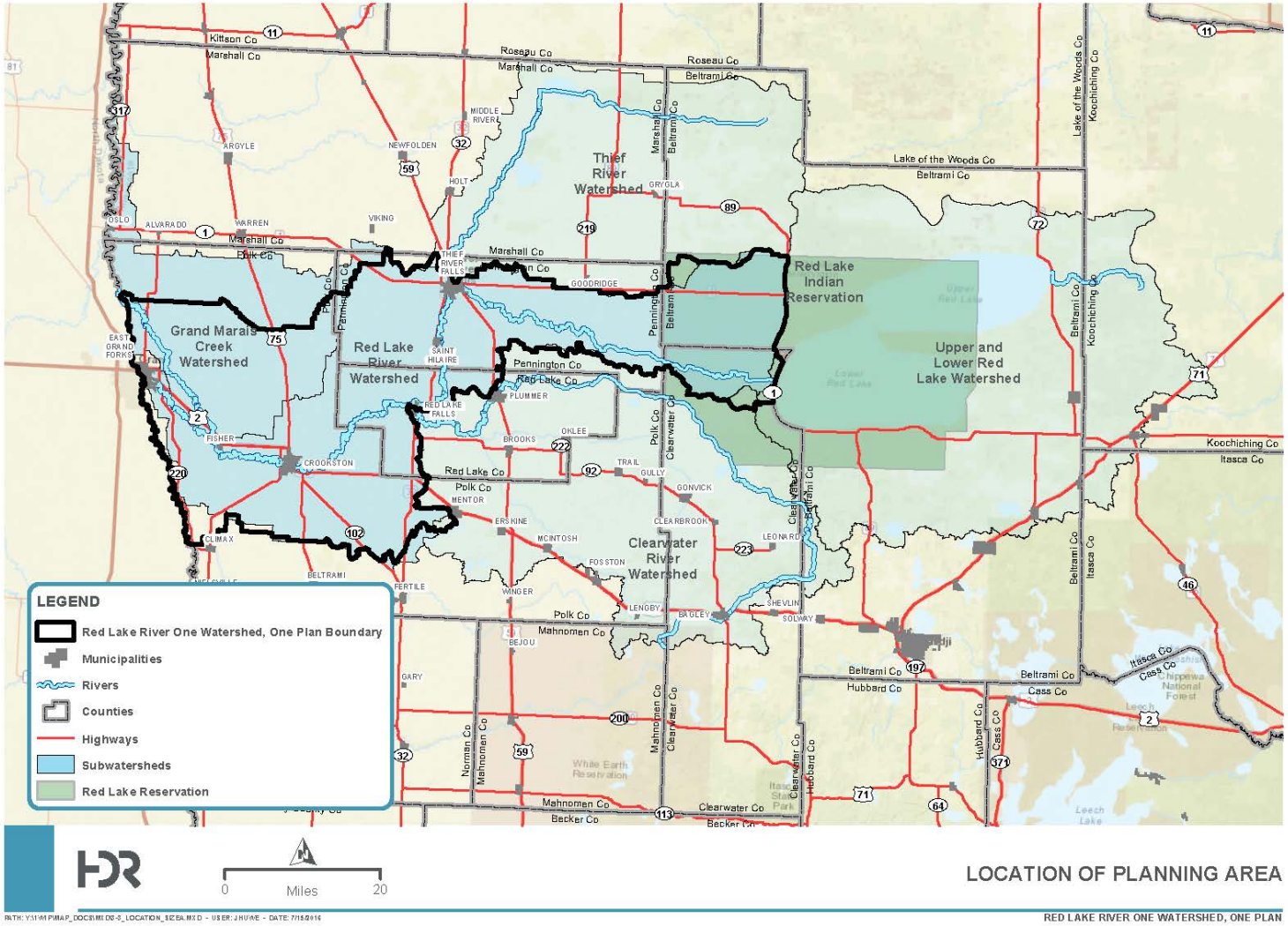

Figure 3 - 3 Location of Planning Area within Red Lake Watershed District

3.3.2. Watershed Characteristics and Features

The Red Lake River Watershed is a diverse landscape that has changed substantially since the area was settled. The watershed includes large areas where land use is almost entirely row crop agriculture with intensive artificial surface drainage and altered natural watercourses and also areas with dominated by wetlands and natural watercourses. Historically, there has been frequent flooding in areas of the watershed. This flooding can have significant negative impact on agricultural and urban infrastructure, as well as natural resources.

Resources of concern in the watershed include but are not limited to surface water quality, soil erosion and sedimentation, altered hydrology, drainage system management, flood damage reduction, habitat, shoreland and riparian management, groundwater protection, and source water protection. Many of the resource concerns relate directly to flooding and increased sediment and pollutant loadings to surface waters. Above-normal amounts of precipitation in the late fall of the year or from May to October lead to high levels of soil moisture, periodically producing the snow-melt and summer floods that are known to affect the further reaches of the overall Red River of the North Basin.

Soils in the greater watershed consists of the Lacustrine soils in the lower and middle regions, and the Peat and Till soils in the easternmost upper region of the watershed. The predominant land uses in the greater Red Lake River Watershed include row crops (61%), wetlands (17%), forest (10%), grass/pasture/hay (7%), and residential/commercial development (5%). Development pressure is moderate in most areas, with occasional farms, woodlands, and shorelines being parceled out for recreation, river, or country homes.

There are two major mainstem high-head dams (Schirrick Dam and Thief River Falls Dam) and numerous impoundments (Good Lake – located within the Red Lake Band of Chippewa boundaries, Brandt Impoundment, Euclid East Impoundment, and Parnell Impoundment) within the Planning Area boundary. These structures and an inventory of dams in the area are shown in **Figure 3-4**.

More detail on various land and water resources within the Red Lake River One Watershed One Plan boundary is included in Appendix B.

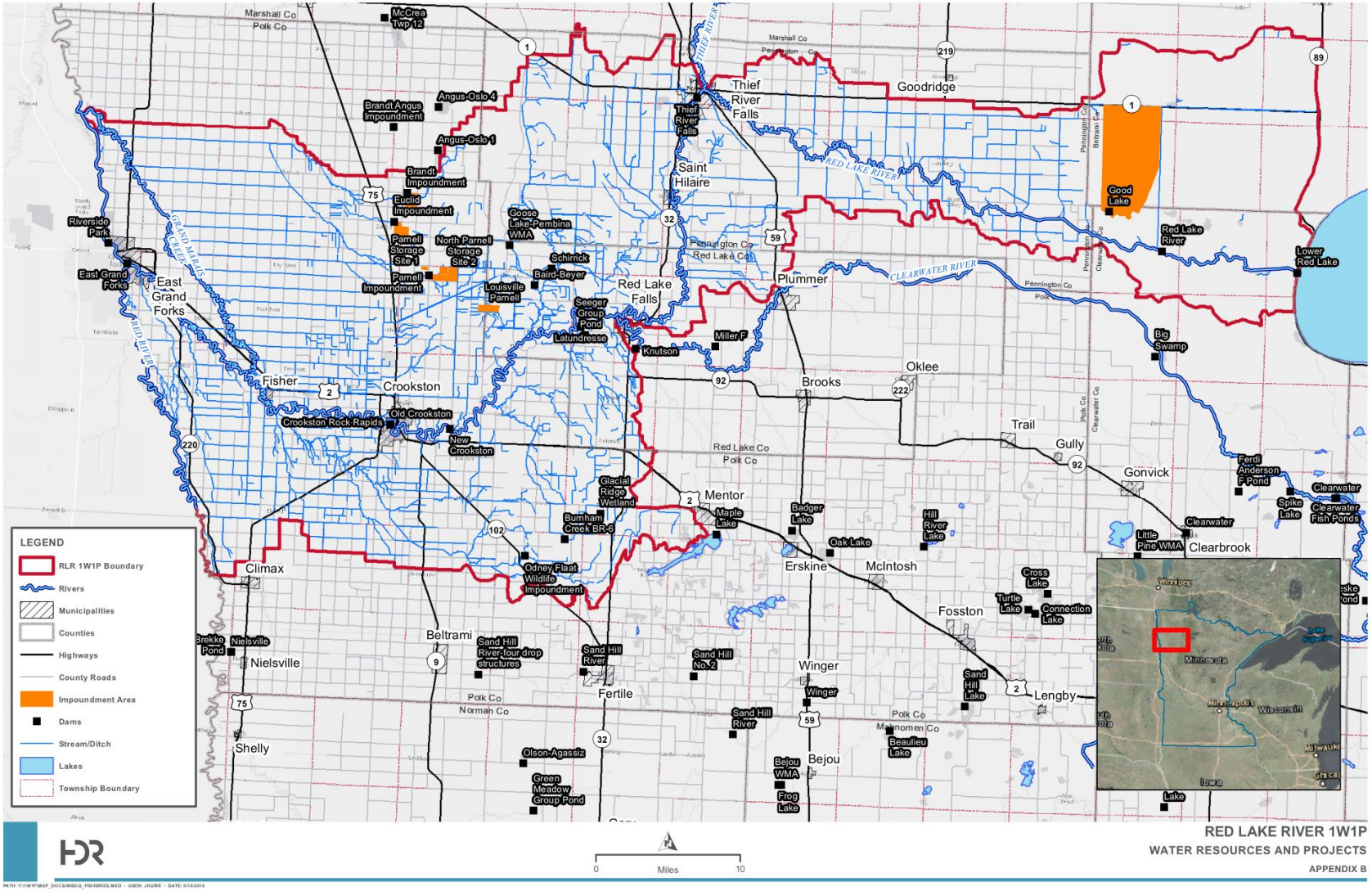

Figure 3 - 4 Red Lake River One Watershed One Plan Watershed Features

3.3.3. Planning Zones

The Red Lake River 1W1P planning area's varying physical characteristics and corresponding runoff and sediment transport processes led to the need for its division into three distinct planning zones shown in **Figure 3-5**. In general, geomorphic divisions within the landscape were used as the basis for defining the planning zones. In delineating the planning zones, the actual planning zone boundaries followed minor subwatershed boundaries.

The Upper Zone sits on a plain above the Red River Valley with extensive wetlands along its eastern side. The Middle Zone reflects the gently rolling topography dropping to the Red River Valley with abundant ridges formed from Glacial Lake Agassiz. The Lower Zone lies within the Red River Valley with a portion of the drainage area discharging to the Grand Marais Creek instead of the Red Lake River. It should be noted that the planning zones, though partially derived from minor subwatersheds, are not necessarily tributary to the Red Lake River through a common outlet.

Additional detail on the delineation of the three planning zones is included in Appendix D.

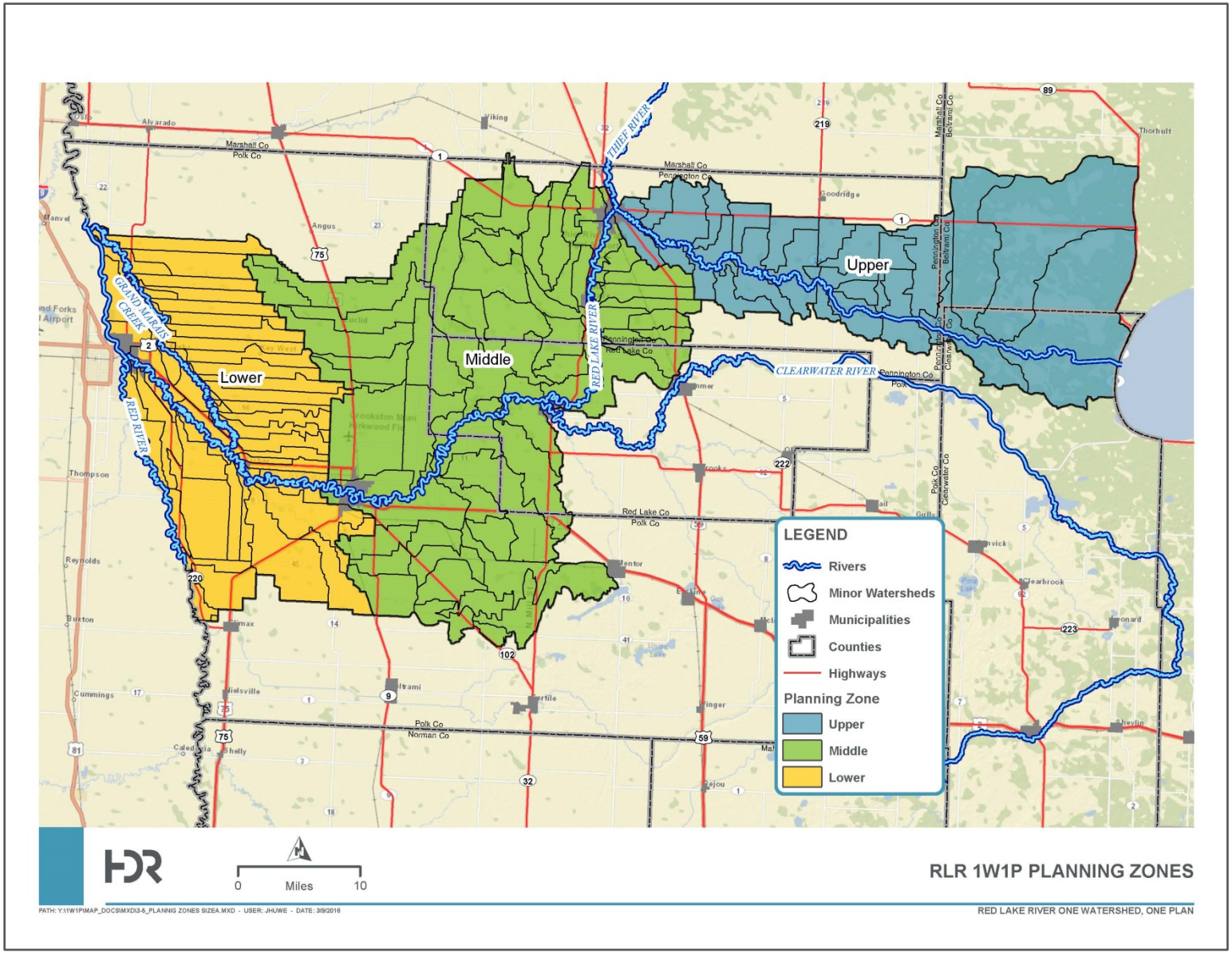

Figure 3 - 5 Red Lake River One Watershed One Plan Planning Zones

3.4. Planning Partners

One of the guiding principles of the One Watershed One Plan process is that it "must involve a broad range of stakeholders to ensure an integrated approach to watershed management". Stakeholders involved in this plan included representatives from watershed districts, soil and water conservation districts, the counties included in the planning area, townships, federal and state agencies, landowners and interested citizens.

Stakeholders within the Red Lake River One Watershed One Plan area were either appointed or volunteered to serve on the planning workgroup or committees. The groups that were formed for this project included:

- Planning Workgroup – A small workgroup of local agency and government staff, the BWSR Board Conservationist, and the project's consultant. This group was formed for the purposes of logistical (not policy) and process decision-making in the plan development process and in formulating recommendations for consideration by the Advisory Committees.
- Policy Committee – A committee of local plan authorities for the purposes of making final decisions about the content of the plan and its submittal, and regarding expenditure of funds allocated for plan development. The committee membership and the committee's decision-making process was part of the formal agreement for planning and associated bylaws. This committee will continue after plan adoption as described in Section 8 of this plan.
- Citizen Advisory (CAC) and Technical Advisory (TAC) Committees – A committee formed in order to meet public and stakeholder participation goals and requirements identified in rule and statute for existing local water plans. The purpose of the advisory committees was to make recommendations on the plan contents and plan implementation to the Policy Committee. CAC members are typically interested citizens and landowners, whereas TAC members are typically local, state, and federal agency representatives with technical related experience.

Participation by various entities in the planning workgroup and various committees is summarized in **Table 3-1**.

Table 3-1. Red Lake River One Watershed One Plan - Summary of Stakeholder Involvement

Group/Committee	Representatives
Planning Workgroup	Pennington SWCD Red Lake County SWCD West Polk SWCD Red Lake Watershed District BWSR
Policy Committee	Red Lake County Red Lake County SWCD Polk County West Polk SWCD Pennington County Pennington SWCD Red Lake Watershed District

Group/Committee	Representatives
Citizen Advisory and Technical Advisory Committees	Townships (v) Landowners(v) Citizens(v) Polk County West Polk SWCD Pennington County Pennington SWCD Red Lake County Red Lake County SWCD Red Lake Watershed District MN Department of Health MN Department of Natural Resources MN Pollution Control Agency MN Department of Agriculture U.S. Department of Agriculture (NRCS) BWSR East Polk SWCD U.S. Fish and Wildlife Service Middle Snake Tamarac Rivers Watershed District Beltrami SWCD

Note: (v) designates volunteer. All others are appointed representatives.

Stakeholders were involved in the watershed planning process mainly through a series of committee meetings and public meetings, summarized in **Table 3-2**. Numerous coordination and planning meetings were held throughout the planning process. More than fifteen (15) conference calls / webinars / face-to-face meetings were held by the Planning Workgroup alone, and/or with the Consultant in addition to the public meetings listed below.

Table 3-2. Red Lake River One Watershed One Plan - Summary of Stakeholder Meetings

Meeting Date	Participant Group	Meeting Purpose
November 19, 2014	Policy Committee; Planning Workgroup	Establishment of official planning group including bylaws and officers; discussion of planning procedures and policies; development of request for proposal to hire engineering consultant; notification of plan initiation; future meeting schedule.
January 21, 2015	Policy Committee; Planning Workgroup	Approval of contract for engineering consultant; kick-off meeting planning; discussion of grant-eligible expenses, workplan and project budget; discussion of Advisory Committee membership.
March 18, 2015	Policy Committee; Planning Workgroup; CAC; TAC; Public	Red Lake River 1W1P Open House – Kickoff Meeting
April 15, 2015	Policy Committee; Planning Workgroup; CAC; TAC	Discussion of Priority Resources of Concern and next planning steps; Advisory Committee interaction with Policy Committee.
May 20, 2015	Policy Committee; Planning Workgroup; CAC; TAC	Resources and Issues
June 17, 2015	Policy Committee; Plan Workgroup; CAC; TAC	Prioritization

Meeting Date	Participant Group	Meeting Purpose
July 15, 2015	Policy Committee; Planning Workgroup	Project status update; discussion of Draft Plan outline.
November 18, 2015	Policy Committee; Planning Workgroup; TAC	Project status update; discuss review and submittal process
December 16, 2015	Policy Committee; Planning Workgroup; TAC	Goal setting
March 16, 2016	Policy Committee; Planning Workgroup; CAC; TAC	First draft plan review
July 20, 2016	Policy Committee; Planning Workgroup; CAC; TAC	Second draft plan review
December 7, 2016	Policy Committee; Planning Workgroup; CAC; TAC	Final draft plan and comment review

4. Defining Issues, Resources, and Goals

4.1. Introduction

A focused effort to clearly define issues, resources, and goals for the watershed was conducted in order to identify strategies that would comprehensively restore or protect natural resources and water quality, and to develop an effective and meaningful implementation plan. The process for considering and prioritizing both natural resources and issues affecting those resources acknowledges that not all resources and not all issues can be addressed within the timeframe of a 10-year plan. Resources and relevant watershed issues were collected from a variety of sources, including existing plans and studies, and through direct input from public, local and regional agency stakeholders. A set of concise prioritization statements for each watershed issue were developed to assist in developing an enhanced understanding of each of the issues and to provide a framework for developing goals and implementation activities.

Resources of concern and prioritization statements were aligned with management areas within the lower, middle, and upper planning zones. Existing plans and studies were reviewed to identify measurable goals relevant to 1W1P implementation. Where none were identified, a set of measurable goals was developed to fill gaps in relation to various issues and/or prioritization statements. The overall process for identifying and prioritizing resources and issues, and developing measurable goals for each zone is shown in **Figure 4-1** below.

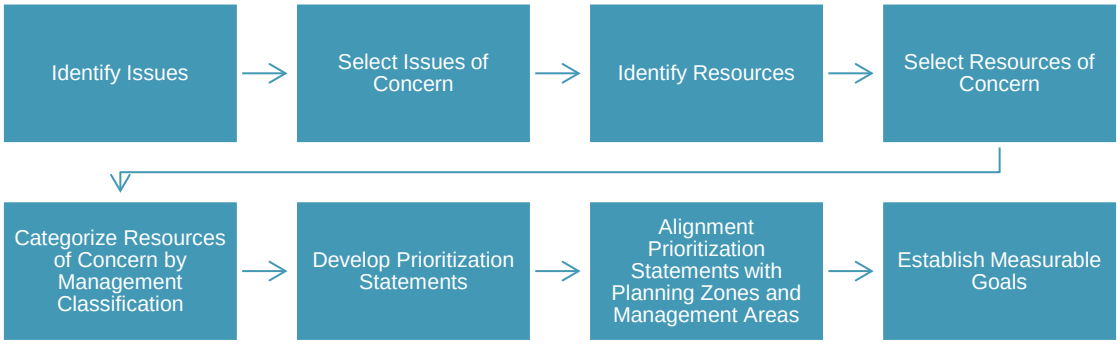

Figure 4 - 1 Resource, Issue and Goal Identification and Prioritization Process

The following sections provide detail of the process used to identify issues and resources of concern and to establish measurable goals. The summary and implementation schedule for each planning zone are documented in separate sections of the plan to facilitate location-specific implementation planning.

4.2. Definitions

The following list defines terms and concepts that were used throughout the 1W1P development process.

Issues: *Identified stressors on water and natural resources related to either/all ecological, economic or social benefits.*

Issues of Concern: *The agreed upon set of top issues in the planning area.*

Resources: *All identified water and natural resources or management infrastructure related to either/all ecological, economic or social values.*

Resources of Concern: *The agreed upon set of resources in the planning area having the highest need/priority for protection, maintenance, or enhancement.*

Impairment: *Water bodies are listed as impaired if water quality standards are not met for designated beneficial uses including: aquatic life (e.g. water clarity, total suspended solids, dissolved oxygen, index of biotic integrity), aquatic recreation (E. coli bacteria), and aquatic consumption (mercury). Rivers can occasionally violate a water quality standard without becoming impaired. The magnitude and frequency of violations are factored into the water quality assessment process.*

Resource Management Classification: *A classification scheme related to the condition of a resource used to assign varying management levels of financial and staffing resources. 1) High Quality - Un-impaired stream segments furthest from the impairment listing standard for any given parameter; 2) Needs Protection - Un-impaired stream segments closest to the impairment listing standard for any given parameter; 3) Impaired stream segments closest to the impairment listing standard for any given parameter; 4) Impaired stream segments furthest from the impairment listing standard for any given parameter; 5) No monitoring data available at the time of plan writing.*

Prioritization Statements: *A statement designed to focus implementation strategies towards resources of concern in relation to their issues of concern.*

Measurable goals: *A set of standards with which to gauge the performance or level of progress of various implementation strategies over time. They are intended to represent what feasibly can be accomplished in a 10 year time frame.*

4.3. Issues

A combination of existing plan review and input from federal, state and local resource agencies and public input was used to identify and prioritize watershed issues. An initial list of issues was developed from the BWSR 1W1P guidance, from County Water Plans for Beltrami, Clearwater, Marshall, Pennington, Polk and Red Lake Counties, and from plans and documents from the Red Lake Watershed District. Summaries of these plans are included in Appendix E. In addition, State and regional plans were reviewed to identify documented recommendations and priorities for the watershed. A list of these plans is included in Appendix F. The Board of Water and Soil Resources (BWSR), the Minnesota Pollution Control Agency (MPCA), the Minnesota Department of Natural Resources (MnDNR), the Minnesota Department of Health (MDH), the Minnesota Department of Agriculture (MDA), and the Red Lake Watershed District provided a response to the initial list of issues to establish issues of concern for the watershed. The relevance of each issue to these planning partners is summarized in **Table 4-1**. Manually entered comments from the Priority Issues Survey are provided in Appendix G.

Table 4-1. Issues by Agency as identified either within County Water Plans, Watershed District Plans or via formal response from State Agencies during the 1W1P process.

Issue	BWSR	DNR	MDA	MDH	MPCA	Beltrami Co	Pennington Co.	Polk Co.	Red Lake Co.	MSTRWD	RLWD	Total
Soil erosion and sedimentation	1	1	1		1	1	1	1	1	1	1	10
Water quality	1	1	1		1	1	1	1	1	1	1	10
Altered hydrology	1	1		1		1	1	1	1	1	1	9
Drainage system management	1	1	1			1	1	1	1	1	1	9
Flood damage reduction	1	1	1			1	1	1	1	1	1	9
Habitat for fish and wildlife/natural resources	1	1	1			1	1	1	1	1	1	9
Shoreland and riparian management	1	1			1	1	1	1	1	1	1	9
Groundwater (drinking water supply, source water protection, conservation)		1	1	1		1	1	1	1	1	1	9
Wetland management	1	1				1	1	1	1	1	1	8
Education, Outreach, Civic Engagement			1			1	1	1	1	1	1	7
Impaired waters/TMDLS					1			1	1	1	1	5
Maintenance of core services						1	1		1	1		4
Invasive Species						1		1	1			3
Wastewater management			1		1							2
Emerging Issues (e.g., land cover change, climate)	1					1						2
Feedlots					1					1		2
Recreational Uses									1		1	2
Contaminants of emerging concern				1								1
Soil health			1									1
Subsurface soil treatment systems					1							1
Drought mitigation												0

In addition to agency input, the public was surveyed to identify perceived watershed issues in the Red Lake River 1W1P planning area. A news release and mailer was developed to describe the 1W1P planning process and to provide a link to a public survey of issues and to gather input into the identification of resources of concern. Both an electronic web survey and paper survey was provided via the Red Lake Watershed District website as well as during public informational meetings early in the planning process. Hard copy surveys were later entered into the web survey so that all entries could be analyzed. Information collected from the surveys is summarized in Appendix G.

The technical advisory committee finalized a list of issues of concern to be addressed within the 1W1P development by comparing responses from the agencies and the public surveys. The public and agency responses regarding issues of concern were closely matched. Where it made sense to do so, issues were consolidated with the understanding that each particular facet would be addressed in the development of implementation strategies. Priority was then given to issues ranking in the top half of the combined responses. The agreed upon list of issues of concern is shown in **Table 4-2**. No further ranking or prioritization among issues was performed.

Table 4-2. Issues of Concern Identified Through Public and Agency Input

Issues of Concern
Surface Water Quality
Soil Erosion and Sedimentation
Altered Hydrology
Drainage System Management
Flood Damage Reduction
Habitat
Shoreland and Riparian Management
Groundwater Protection
Source Water Protection

4.4. Resources

Both the agencies and the public were asked to identify natural resources in the planning area that should be targets for management based on the list of issues of concern. The public survey included a list of various forms of soil and water resources found in the Red Lake River watershed. Instruction was given to rank each in terms of priority. Overall, when considering the types of resources most valued by survey respondents, surface waters ranked highest, more specifically, rivers and streams. Survey responses related to resource priorities are summarized in Appendix G. Overall ranking is shown in **Table 4-3**.

Table 4-3. Responses to the question "In your opinion, which resource is the most threatened in your area?"

Resource	Ranking
Surface Water (in general)	1
Rivers and Streams	2
Groundwater	3
Soil	4
Wetlands	5

Water resources identified from local and state agency input were divided into two categories: 1) those with either existing surface water quality monitoring data or with likely poor water quality (based on modeling or agency input); 2) Resources not meeting these criteria. Water resources with water quality monitoring data were prioritized, as were existing drinking water supply management areas. Resources that fell in the

second category can be addressed in future 1W1P processes, or as financial and/or technical resources allow during the first 10-year planning phase. Existing water quality data that was collected during the years of 2004 through 2014, and available in the State's EQuIS database, was used to categorize each segment of monitored stream/river into five management classes, from high quality to not assessed. The classifications were based on data for several water quality parameters including E. coli, total suspended solids and dissolved oxygen. Descriptions of each classification are listed in **Table 4-4**.

Table 4-4. Water Resource Management Classes

Management Class	Class Description
High Quality	Un-impaired stream segments that meet water quality standards and do not qualify for the "Needs Protection" category for a given parameter.
Needs Protection	Un-impaired stream segments that are within the top 5 segments that are closest to the impairment threshold for a given parameter.
Impaired, Restorable	Impaired stream segments among the top 5 segments that are closest to the impairment threshold for a given parameter.
Impaired, Low Quality	Impaired stream segments that violate water quality standards by a greater margin than that of the 5 most restorable segments for a parameter.
Not Assessed	Insufficient monitoring data at the time of plan writing prevented an assessment for the stream segment.

Other natural resources were identified by the stakeholders to be considered for management strategies. These included fish habitat, and protection and restoration of riparian corridors and buffers.

4.5. Prioritization Statements

Because not all issues and resources can be addressed in the timeframe of a 10-year plan, Prioritization Statements were developed to help focus management efforts on goals that would maximize benefits for the highest priority resources. These statements helped to identify and prioritize specific resources of concern and led directly to the establishment of specific measurable goals. Ultimately, these prioritization statements will guide allocation of financial and staff resources in implementation.

The development of prioritization statements in the Red Lake River 1W1P was accomplished using the following process:

1. A table was constructed listing planning zones, issues of concern and prioritization statements.
2. Language from County Water Plans, Watershed District plans, State and Federal plans, and other documents that could be interpreted as prioritization statements was assembled and aligned to the various issues of concern.
3. A memorandum identifying a master set of draft prioritization statements for each issue of concern was presented to the planning partners for review and input.

4. A workshop was held to further develop the prioritization statement language and to assign prioritization statements to each of the three planning zones based on their relevance to each zone's issues.
5. Local, state and federal agency representatives were asked to match prioritization statements with issues of concern through an interactive ranking and alignment exercise. Votes were tallied in three ways: local resource governing participants; state and federal resource governing participants; and combined (total) votes. The rankings are summarized in Appendix G.
6. Prioritization statements for each issue of concern were then ranked from highest to lowest. Statements with no votes were eliminated from further consideration.
7. Prioritization statements were then aligned with issues of concern based on their relevance to each resource of concern in each of the three planning zones.

The result was a list of Prioritization Statements that addressed each of the nine issues of concern. Prioritization statements were then either included or excluded from consideration based on their relevance to resources and issues in each planning zone. The list of Prioritization Statements is located in **Table 4-5**.

Table 4-5. Prioritization Statements.

Issue of Concern: Surface Water Quality
• Restore impaired waters that are closest to meeting state water quality standards. • Protect high-quality unimpaired waters at greatest risk of becoming impaired. • Continue long-term monitoring efforts at key locations to provide sufficient data for water quality, hydrologic, hydraulic and biotic analysis. • Restore or improve other impaired waters.
Issue of Concern: Soil Erosion and Sedimentation
• Reduce runoff-driven sediment transport to impaired waters that are closest to meeting state water quality standards by targeting implementation in subwatersheds with highest export. • Reduce wind erosion with priority on highly erodible soils by targeting implementation in subwatersheds with highest export. • Reduce runoff-driven sediment transport to high-quality unimpaired waters at greatest risk of becoming impaired by targeting implementation in subwatersheds with highest export. • Protect priority stream and river channels (those most susceptible to altered hydrology effects on bank and bed stability). • Inventory and evaluate the severity of erosion problems and risks in terms of the local resource as well as downstream resources to guide implementation strategy. • Reduce runoff-driven sediment transport to other impaired waters by targeting implementation in subwatersheds with highest export. • Identify, quantify and plan for agricultural practices that promote conservation.
Issue of Concern: Altered Hydrology
• Reduce runoff rates by targeting implementation in subwatersheds with high runoff. • Identify ideal locations for flood control structures that include multifunctional design (buffer strips, side water inlets and dikes to ditches and waterways, floodwater retention structures such as retention ponds, dams and diversions). • Protect disconnected, non-contributing drainage areas from future altered hydrology leading to a connection to water resources downstream. • Restore or modify natural water course morphology where feasible to promote adequate drainage as well as channel equilibrium to ensure reduced bank failure, bed aggradation or degradation and allow for natural meander migration and habitat. • Assure long-term maintenance of multi-purpose flood control structures. • Promote infiltration, retention, and extended detention practices in new and existing urban developments based on current stormwater best management practices.

Issue of Concern: Drainage System Management
• Utilize information collected from the drainage ditch inventories to prioritize and install side water inlets and buffer strips to ensure adequate support of agriculture without negative downstream ecological and economic impacts. • Use current drainage water management practices on retrofits or installation of new surface and subsurface drainage. • Retrofit or install new subsurface drainage using current drainage water management practices.
Issue of Concern: Flood Damage Reduction
• Reduce the risk of flood damage in accordance with the 20% Red River Basin Commission's Long Term Flood Solutions and Technical Paper #11. • Reduce flood flows and breakout flows to reduce damages to local communities, infrastructure, rural homes, and agricultural fields.
Issue of Concern: Habitat
• Protect or restore aquatic habitat of DNR priority reaches. • Protect, restore, and enhance grasslands and wetlands with special emphasis on prairie core areas and corridor complexes. • Identify areas that provide both unique ecological values and recreational opportunities and develop an implementation and management plan. • Expand aquatic and terrestrial non-native and invasive species control programs. • Restore longitudinal connectivity of priority reaches.
Issue of Concern: Shoreland and Riparian Management
• Protect riparian corridors and wetlands with existing quality vegetated buffers. • Restore or enhance quality vegetated buffers adjacent to natural, altered and artificial watercourses and wetlands.
Issue of Concern: Groundwater Protection
• Maintain a safe and adequate drinking water supply for residents in order to protect the public's health, safety and general welfare of the community. • Protect Drinking Water Supply Management Areas (DWSMAs). Special consideration will be given for DWSMAs with a moderate or high vulnerability. • Implement strategies to conserve ground water supply quality. • Implement strategies to conserve ground water supply quantity. • Conduct sub-surface sewage treatment system (SSTS) inventory and upgrades. • Work collaboratively with public water suppliers to implement their Wellhead Protection Plans. • Groundwater appropriations do not adversely impact fish habitat, fens other groundwater dependent surface water features, or other groundwater dependent biological communities.
Issue of Concern: Source Water Protection
• Partnership with the East Grand Forks and Thief River Falls public water suppliers to protect and maintain a safe and adequate drinking water supply. • Reduce runoff-driven sediment and pollutant (total organic carbon, haloacetic acid, and Trihalomethanes) transport to surface waters by targeting implementation in subwatersheds with highest export. • Conserve surface water drinking supplies. • Maintain a safe and adequate drinking water supply for residents in order to protect the public's health, safety and general welfare of the community. • Protect Thief River Falls Source Water Assessment Area (SWAA). • Protect East Grand Forks Source Water Assessment Area (SWAA). • Protect surface water quality and quantity of East Grand Forks drinking water supply.

4.6. Management Areas

Management areas are smaller divisions within each planning zone that were used to define and organize goals and implementation actions around individual resources. Each management area is essentially a drainage area around one or more of the resources of concern. Twenty-three management areas were defined in the Red Lake River 1W1P.

There are 7 management areas in the Lower Planning Zone, 11 in the Middle Zone, and 5 in the Upper Zone.

The delineation of management areas was accomplished using subwatershed pour points (outlets) at confluences of major tributaries with the Red Lake River as well as at dams or reservoirs at resources of concern. Using pour point locations allowed the effects of various management strategies to be effectively assessed using the Prioritize, Target and Measure Application (PTMApp). Management areas encapsulate at least one water resource of concern, and often several. Within each management area, PTMApp assessed the suitability of various management strategies.

The relationship between the watershed, planning zones, and management areas is shown in **Figure 4-2.** More detailed information on each of the management areas are shown in **Table 4-6** and the association of planning zones, management areas and resources of concern is shown in **Figure 4-3**.

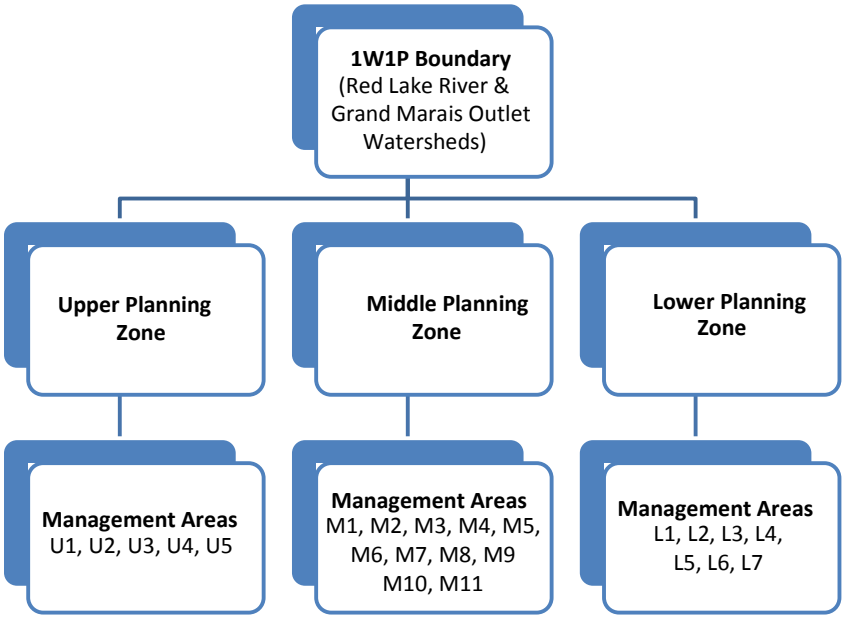

Figure 4 - 2. Relationship between the Overall 1W1P Watershed, the Three Planning Zones and Each of their Management Areas.

Table 4-6. Management Area Descriptions

Management Area	Description	Pour Point Location	Planning Zone(s)	HUC10 Subwatershed
L1	Grand Marais Creek	110th St. NW Crossing of Grand Marais Creek	Lower, Middle	0902030602
L2	Polk County Ditch 2 and RLWD Ditch 15 downstream of impoundments	Hwy. 220 crossing of Polk County Ditch 2	Lower, Middle	0902030601
L3	(Lower) Red Lake River downstream of Crookston	Louis A. Murray Bridge over the Red Lake River in East Grand Forks	Lower	0902030307
L4	Burnham Creek	Confluence with the Red Lake River	Lower, Middle	0902030306
L5	Polk County Ditch 100/74/10/28	Confluence with the Red Lake River	Lower	0902030307
L6	Polk County Ditch 115/123/124/107/163	Confluence with the Red Lake River	Lower	0902030307
L7	Heartsville Coulee	Confluence with the Red Lake River, upstream side of the dike along the Red Lake River	Lower	0902030307
M1	Euclid East Impoundment	Euclid East Impoundment outlet	Middle	0902030601
M2	Brandt Impoundment	Brandt Impoundment inlet at 260th Ave SW	Middle	0902030601
M3	Little Black River	Outlet of the dam on the Little Black River	Middle	0902030304
M4	Black River upstream of Schirrick Dam	Schirrick Dam outlet	Middle	0902030304
M5	Pennington County Ditch 96	Confluence with the Red Lake River	Middle	0902030303
M6	Pennington County Ditch 21	Confluence with the Red Lake River	Middle	0902030303
M7	(Middle) Red Lake River between the Thief River and Crookston	Woodland Avenue crossing of the Red Lake River in Crookston, at the 05079000 USGS Gage	Middle	0902030303 0902030305
M8	Cyr Creek	Confluence with the Red Lake River	Middle	0902030305
M9	Gentilly River and Kripple Creek Drainage Area	Confluence with the Red Lake River	Middle	0902030305
M10	Polk County Ditch 1	Confluence with the Red Lake River	Middle	0902030305
M11	Judicial Ditch 60	Confluence with the Red Lake River	Middle	0902030305
U1	(Upper) Red Lake River upstream of the Thief River confluence	Thief River and Red Lake River confluence	Upper	0902030302
U2	Pennington County Ditch 35	Confluence with the Red Lake River	Upper	0902030302
U3	Pennington County Ditch 44	Confluence with the Red Lake River	Upper	0902030302
U4	Pennington County Ditch 43	Confluence with the Red Lake River	Upper	0902030302
U5	Pennington County Ditch 55	Confluence with the Red Lake River	Upper	0902030302

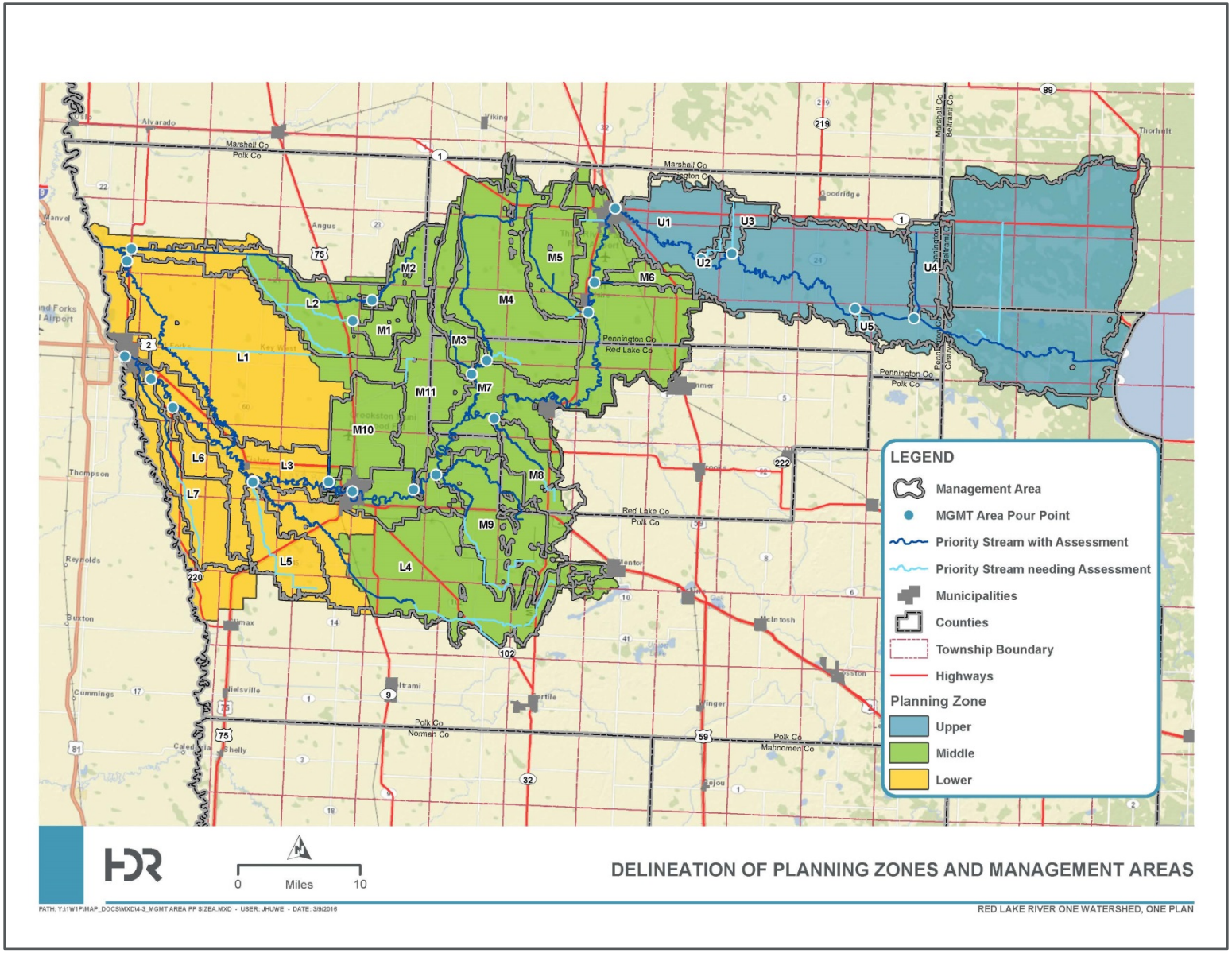

Figure 4 - 3 Delineation of the Planning Zones and Management Areas

4.7. Measurable Goals

Measurable goals were developed to address issues of concern on a resource-by-resource basis. Goals were used as the basis for the recommended implementation actions within each management zone and, as appropriate, for specific water resources. State Rules, existing plans and studies, planning partner input and data gap analysis were used to formulate long-term goals related to not only each of the nine issues of concern, but also in relation to their prioritization statements. Where existing plans or studies were not available for reference, measurable goals were crafted to address data gaps and future targeting, prioritization and implementation. Measurable goals are intended to represent what can be achieved in the 10-year timeframe of this first generation plan.

Measurable goals were designed around clusters of issues to capture common objectives. The issues of concern and measurable goals included:

Surface Water Quality Goals

Because load allocations from TMDL studies had not been completed for the resources of concern at the time the plan was written, goals for surface water quality were based on state water quality standards. These included State standards related to total suspended solids, E. coli, dissolved oxygen, indices of biologic integrity, and several others. Stakeholders selected management strategies appropriate for working to meet water quality standards, and then further refined the implementation options by identifying specific best management practices (BMPs) that would be appropriate, effective and feasible within in each management area.

Soil Erosion and Sedimentation Goals

Measurable goals for soil erosion were crafted through review of goals established in existing plans, by estimating the total number of BMPs that could feasibly be installed within individual management areas, and by evaluating draft WRAPs information. The results of PTMApp for soil erosion reduction related practices were reviewed and an estimate of total number of best management practices or watershed management strategies that could feasibly be installed within individual management areas in the 10-year time period was used to assist with goal setting.

Drainage Water Management System Goals

In the case of field-scale drainage management systems, programs such as buffer strip implementation, ditch maintenance and inventory activities were identified. The results of PTMApp for storage-related practices were reviewed and an estimate of total number of best management practices or watershed management strategies that could feasibly be installed within individual management areas in the 10-year time period was set as the goal.

Altered Hydrology Goals

In the case of mitigation for altered hydrology, programs such as buffer strip implementation, ditch maintenance and inventory activities were identified. The results of PTMApp for storage-related practices were reviewed and an estimate of total number of best management practices or watershed management strategies that could feasibly be installed within individual management areas in the 10-year time period was considered along with draft WRAPs information to help set the goals.

Flood Damage Reduction Goals

Goal setting for flood damage reduction were adopted from the results of a distributed detention study for the region as well as input from local governing unit's understanding of local issues and needs. That study identified a total of 17 off-channel, tributary, and main-channel sites for detention. In addition, a Red Lake Watershed peak flow reduction goal of 35 percent at Crookston was identified.

Habitat Goals

Goals related to the issue of habitat for aquatic and terrestrial species were formed by referencing existing plans, current study findings and soliciting input from local governing units. These goals are recommendations from the MnDNR to target riparian restoration and instream habitat reaches for restoration or protection were adopted as 1W1P goals. The goals include continuation of monitoring biologic integrity in resources of concern, performing the recommended fish passage retrofit feasibility studies at dam structures within the watershed, and investigation of the barriers to fish passage in tributaries.

Terrestrial habitat goals were developed from the Minnesota Prairie Conservation Plan which identifies opportunities for restoration of prairie areas, including habitat corridors and percentage goals for specific land types within core areas and corridors.

Shoreland and Riparian Management Goals

Shoreland and riparian management goals were formed using input based on the MnDNR analysis of the Red Lake River watershed, and the Minnesota Buffer Initiative. Goals include riparian and instream habitat restoration and protection efforts for specific resources of concern derived from the Red Lake River watershed analysis. Goals for this issue of concern should be updated in future iterations of the 1W1P to reflect the total amount of riparian buffer required by the Buffer Initiative within each management area.

Groundwater Protection and Source Water Protection Goals

Several surface and groundwater management plans were referenced for development of measurable goals for protection of surface and groundwater drinking water supplies. Measurable goals in the 1W1P for these issues of concern are related to implementation of surface runoff control practices to protect surface water quality, and protection of groundwater recharge areas, and carrying out education and outreach activities relative to water conservation.

Watershed Restoration and Protection Strategies

The WRAPS process evaluates watershed conditions based on biological and chemical data, assesses waters against state water quality standards, identifies waters that are impaired for their designated uses, establishes priorities and goals for watershed improvement, and suggests strategies designed to restore and protect water quality. Based on the watershed assessments, a WRAPS report and a Total Maximum Daily Load (TMDL) report are completed. These reports will provide details on water quality issues and further identify implementation strategies to address impairments to streams and lakes, and to protect high quality waters as well as those that are at significant risk of becoming impaired. Finally, the WRAPS report will in many cases, inform measurable goals establishment in the 1W1P plan.

At the time this plan was written, Watershed Restoration and Protection Strategies (WRAPS) Plans were being developed for the Grand Marais Outlet and Red Lake River watersheds, but were not completed. As a result, specific goals and implementation strategies were not available from the WRAPS plan. Development of the this 1W1P, then, will rely on local units of government, including watershed districts, municipalities, and soil and water conservation districts, to take the lead in establishing goals and developing and carrying out implementation strategies based on input from other water and natural resources plans, studies, stakeholders and public input. Future iterations of the 1W1P plan can use the results of the WRAPS process, including Total Maximum Daily Load (TMDL) targets ("load allocations" for non-point sources and "waste load allocations" for point sources) in establishing measurable goals and designing implementation strategies. This first generation plan can be amended to record progress that the 10-year strategies have achieved toward meeting resource-specific goals established in the WRAPS process.

Additional water quality planning and goal setting efforts are underway in the Red Lake River subwatershed as well. The Red River Basin Commission is evaluating phosphorus reduction goals for the Red River Basin. Specifics on the RRBC plan will be forthcoming in future years. The Minnesota Department of Ag Nutrient Reduction Strategy also lists phosphorus and nitrogen reduction goals. These efforts will be evaluated and incorporated into future iterations of the plan.

In absence of TMDLs or specific water quality goals for the resources in the 1W1P planning area, state water quality criteria were used as the basis for water quality-related goals. These were defined using standards from Minnesota State Administrative Rules, Chapter 7050, Waters of the State (MN 7050) and the MPCA's Minnesota River Nutrient Criteria. This Rule applies to all waters of the state, both surface water and groundwater. It provides a classification system of beneficial uses, narrative and numeric water quality standards that protect specific beneficial uses, non-degradation provisions, and other provisions to protect the physical, chemical, and biological integrity of waters of the state and defines water quality goals relative to resource use classification. These criteria are summarized in **Table 4-7, Table 4-8, and Table 4-9**.

Table 4-7. Draft River Water Quality Criteria Ranges for the North Region of Minnesota

Water Quality Parameter	Criteria or Limit – by River Nutrient Region		
	North Nutrient Region	Central Nutrient Region	South Nutrient Region
TP (µg/L)	≤50 µg/l	≤100 µg/l	≤150 µg/l
Chl-a (µg/L)	≤7 µg/l	≤18 µg/l	≤35 µg/l
DO Flux (mg/L)	≤3.0 mg/l	≤3.5 mg/l	≤4.5 mg/l
BOD5 (mg/L)	≤1.5 mg/l	≤2.0 mg/l	≤3.0 mg//l
TSS (mg/L)	<15 mg/l mg/l	<30 mg/l	<65 mg/l
	Must not be exceeded more than 10% of the time over a multiyear data window; the assessment season is April through September.		
Dissolved Oxygen	>90% of daily minimums are >5 mg/l		
pH	Warm Water 6.5-9.0		
E. coli (cfu/100mL)	126 monthly geometric mean, and a 1,260 acute standard .		

The standards apply April through October.

Table 4-8. Aquatic Life Indices of Biologic Integrity (IBI) for Stream Classes Found in the Red Lake River Watershed (MPCA 2015[1])

Class[2] (Use[3])	Macroinvertebrate IBI Threshold	Fish IBI Threshold
LG (GU)	-	42
LG (MU)	-	15
NH (GU)	-	42
NH (MU)	-	23
HR (GU)	-	38
NS (GU)	51	47
PR (GU)	31	-
PS (GU)	41	-
PS (MU)	22	-
SH (MU)	-	33
SR (GU)	-	49
SS (GU)	37	50
SS (MU)	24	35

1 Source: Red Lake River Watershed Stressor Identification Report: A study of the stressors limiting the aquatic biological communities in the Red Lake River, MPCA 2015.

2 Classes: Northern Forest Streams (NS), Prairie Forest Rivers (PR), Prairie Streams-Glide/Pool Habitats (PS), and Southern Streams-Riffle/Run Habitats (SS)

3 Tiered Aquatic Life Use framework designations: General Use (GU) and Modified Use (MU)

Table 4-9. Prioritization of Impaired and Unimpaired Waters (1-5 ranking where 1 is highest priority)

Restore Impaired Waters that are Closest to Meeting State Water Quality Standards (Ranking based upon 2004-2014 data)																									
Lower Planning Zone								Middle Planning Zone								Upper Planning Zone									
Stream	AUID	M-AREA	TSS	E. coli	DO	F-IBI	M-IBI	Stream	AUID	M-AREA	TSS	E. coli	DO	F-IBI	M-IBI	Stream	AUID	M-AREA	TSS	E. coli	DO	F-IBI	M-IBI		
Red Lake R.	3-506	L3	1					Kripple Crk.	3-526	M9				2	1	Penn. CD 43	3-547	U4				1			
Burnham Crk.	3-515	L4					4	Black River	3-558	M4		1	3			Red Lake R.	3-560	U1			1				
Polk CD 2	6-515	L2				5	5	Red Lake R.	3-504	M7	2														
								JD60	3-542	M11			2												
								Burnham Crk.	3-551	L4					2										
								Gentilly R.	3-554	M9		2		3											
								Penn. CD96	3-505	M5		3													
								Red Lake R.	3-502	M7	3														
								Kripple Crk.	3-525	M9				4	3										
								Black River	3-529	M7		4													
								Little Black R.	3-527	M3			4												
								RLWD Ditch 15	6-509	L2			5												
Protect High-Quality Unimpaired Waters at Greatest Risk of Becoming Impaired (Ranking based upon 2004-2014 data)																									
Lower Planning Zone								Middle Planning Zone								Upper Planning Zone									
Stream	AUID	M-AREA	TSS	E. coli	DO	F-IBI	M-IBI	Stream	AUID	M-AREA	TSS	E. coli	DO	F-IBI	M-IBI	Stream	AUID	M-AREA	TSS	E. coli	DO	F-IBI	M-IBI		
CD 53 (RLWD Ditch 12)	3-549	L7					1	Red Lake R.	3-504	M7		1				Red Lake R.	3-561	U1	1		1				
Red Lake R.	3-506	L3				1	4	Br. C CD 66	6-510	L2			2			Red Lake R.	3-562	U1	2			4	3		
Burnham Crk.	3-515	L4	6	5				Black River	3-557	M4	4	2		3	2	Red Lake R.	3-560	U1	5						
Red Lake R.	3-501	L3				5		RLWD Ditch 15	6-509	L2		3													
								Gentilly R.	3-554	M9			3												
								Black River	3-529	M7	3			2	5										
								Red Lake R.	3-502	M7		4													
								Cyr Creek	3-556	M8			4												
								Polk CD 1	3-536	M10			5												
Restore or improve other impaired waters (on draft 2016 List of Impaired Waters)																									
Lower Planning Zone								Middle Planning Zone								Upper Planning Zone									
Stream	AUID	M-AREA	TSS	E. coli	DO	F-IBI	M-IBI	Stream	AUID	M-AREA	TSS	E. coli	DO	F-IBI	M-IBI	Stream	AUID	M-AREA	TSS	E. coli	DO	F-IBI	M-IBI		
Burnham Crk.	3-515	L4				X		Black River	3-558	M4				X	X	Penn. CD 43	3-547	U4					X		
Red Lake R.	3-501	L3	X					Cyr Creek	3-556	M8		X		X											
Red Lake R.	3-503	L3	X					Gentilly R.	3-554	M9					X										
Heartsville Coulee	3-550	L7			X			Little Black R.	3-528	M3				X											
Grand Marais Crk.	6-507	L1			X			Br. 5 CD 96	3-545	M5				X											
Polk CD 2	6-515	L2		X				Kripple Creek	3-525	M9		X													
								Burnham Crk.	3-551	L4				X											

Use of PTMApp

To define goals related to implementation of best management strategies (protection, source reduction, storage, filtration and infiltration), the Prioritize, Target and Measure Application (PTMApp) was used to assess the suitability, treatment potential, and costs of various strategies. PTMApp is a tool that allows users to build and measure the cost-effectiveness of prioritized and targeted implementation scenarios for improving water quality. This information was used to identify the expected total number of various best management practices (BMPs) to be implemented over the 10-year cycle of the 1W1P, the expected reduction in sediment delivery to the resource of concern, and the expected costs. Detailed information on PTMApp is included in Appendix I.

Measurable goals for the water quality and soil erosion and sedimentation issues of concern were defined as the number of various BMPs that could be implemented within the planning timeframe for each management area. Given that no published load allocations were available at the time of plan development, no attempt was made to correlate sediment reductions to in-stream pollutant concentrations or to estimates of the total number of sediment control practices required to meet water quality thresholds. Goals and implementation actions can be refined as load allocations are defined in future iterations of the plan.

Flood Damage Reduction, Drainage Management Systems and Altered Hydrology Goal Formation

Goal setting for flood damage reduction considerations within this 1W1P focused on the results of a distributed detention study for the region as well as input from local governing unit's understanding of local issues and needs. The distributed detention study (RLWD 2013; **Figure 4-4**) was the most rigorous modeling effort reviewed at the time of the development of this 1W1P, using HEC-HMS (Hydrologic Modeling System from the Hydrologic Engineering Center of the U.S. Army Corps of Engineers) to investigate spatial and temporal relationships relative to watershed discharge and Red River Valley flooding as well as contributing watershed areas most greatly impacting flooding. This study investigated opportunities and potential hydrologic effects of new distributed detention basins to supplement the existing detention facilities currently within the entire Red Lake Watershed. In total, 4 off-channel and tributary proposed sites were identified in the Upper Planning Zone and 11 in the Middle Planning Zone. Two main channel detention locations were identified within the Middle Planning Zone. A Red Lake Watershed District peak flow reduction goal of 35 percent at Crookston was identified which the current 1W1P can help achieve provided it implements the targeted distributed detention practices (**Table 4-10**, **Table 4-11** and **Table 4-12**). For a complete listing of applicable flood damage reduction strategies under consideration, Appendix L outlines the RLWD's comprehensive flood damage reduction approach, which is based upon the regionally accepted early-middle-late methodology identified in Flood Damage Reduction Work Group TSAC Paper #11.

Table 4-10. Upper Planning Zone Proposed Tributary and Off-channel Distributed Detention Performance Estimates (RLWD 2013)

Upper Planning Zone	Peak Inflow (cfs)	Peak Outflow (cfs)	Reduction (cfs)	Peak Flow Reduction	Inflow Volume (ac-ft)	Outlflow Volume (ac-ft)	Reduction (ac-ft)	Volume Reduction
URLR-1	323	0	323	100.0%	4588	0	4588	100.0%
URLR-2	310	185	125	40.4%	3436	1221	2215	64.5%
URLR-3	240	165	75	31.3%	3447	1345	2102	61.0%
URLR-4	156	110	46	29.5%	1750	1014	736	42.1%
Total	**1029**	**460**	**569**	**55.3%**	**13221**	**3580**	**9641**	**72.9%**
Average	**257**	**115**	**142**	**55.3%**	**3305**	**895**	**2410**	**72.9%**

Note: The labeling convention (URLR-X) is taken from the referenced study.

Table 4-11 Middle Planning Zone Proposed Tributary and Off-channel Distributed Detention Performance Estimates (RLWD 2013)

Middle Planning Zone	Peak Inflow (cfs)	Peak Outflow (cfs)	Reduction (cfs)	Peak Flow Reduction	Inflow Volume (ac-ft)	Outlflow Volume (ac-ft)	Reduction (ac-ft)	Volume Reduction
LRLR-1	168	0	168	100.0%	931	0	931	100
LRLR-2	428	0	428	100.0%	3563	0	3563	100
LRLR-3	198	0	198	100.0%	1938	0	1938	100
LRLR-4	229	0	229	100.0%	1917	0	1917	100
LRLR-5	635	0	635	100.0%	5090	0	5090	100
LRLR-6	385	164	221	57.4%	3478	876	2602	74.8
LRLR-7	736	0	736	100.0%	6687	0	6687	100
LRLR-8	228	0	228	100.0%	1760	0	1760	100
LRLR-9	195	0	195	100.0%	1172	0	1172	100
LRLR-10	1099	687	412	37.5%	11811	5475	6336	53.6
LRLR-11	840	763	77	9.2%	6250	4987	1263	20.2
Total	5141	1614	3527	68.6%	44597	11338	33259	74.6%
Average	467	147	321	68.6%	4054	1031	3024	74.6%

Note: The labeling convention (LRLR-X) is taken from the referenced study.

Table 4-12. Middle Planning Zone Proposed Main Stem Distributed Detention Performance Estimates (RLWD 2013)

Middle Planning Zone	Peak Inflow (cfs)	Peak Outflow (cfs)	Reduction (cfs)	Peak Flow Reduction	Inflow Volume (ac-ft)	Outlflow Volume (ac-ft)	Reduction (ac-ft)	Volume Reduction
LRLR Mainstem 1	13876	13608	268	1.9%	467619	458008	9611	2.1%
LRLR Mainstem 2	22979	21946	1033	4.5%	752314	725987	26327	3.5%
Total	**36855**	**35554**	**1301**	**3.5%**	**1219933**	**1183995**	**35938**	**2.9%**
Average	**18428**	**17777**	**651**	**3.5%**	**609967**	**591998**	**17969**	**2.9%**

Note: The labeling convention (LRLR-X) is taken from the referenced study.

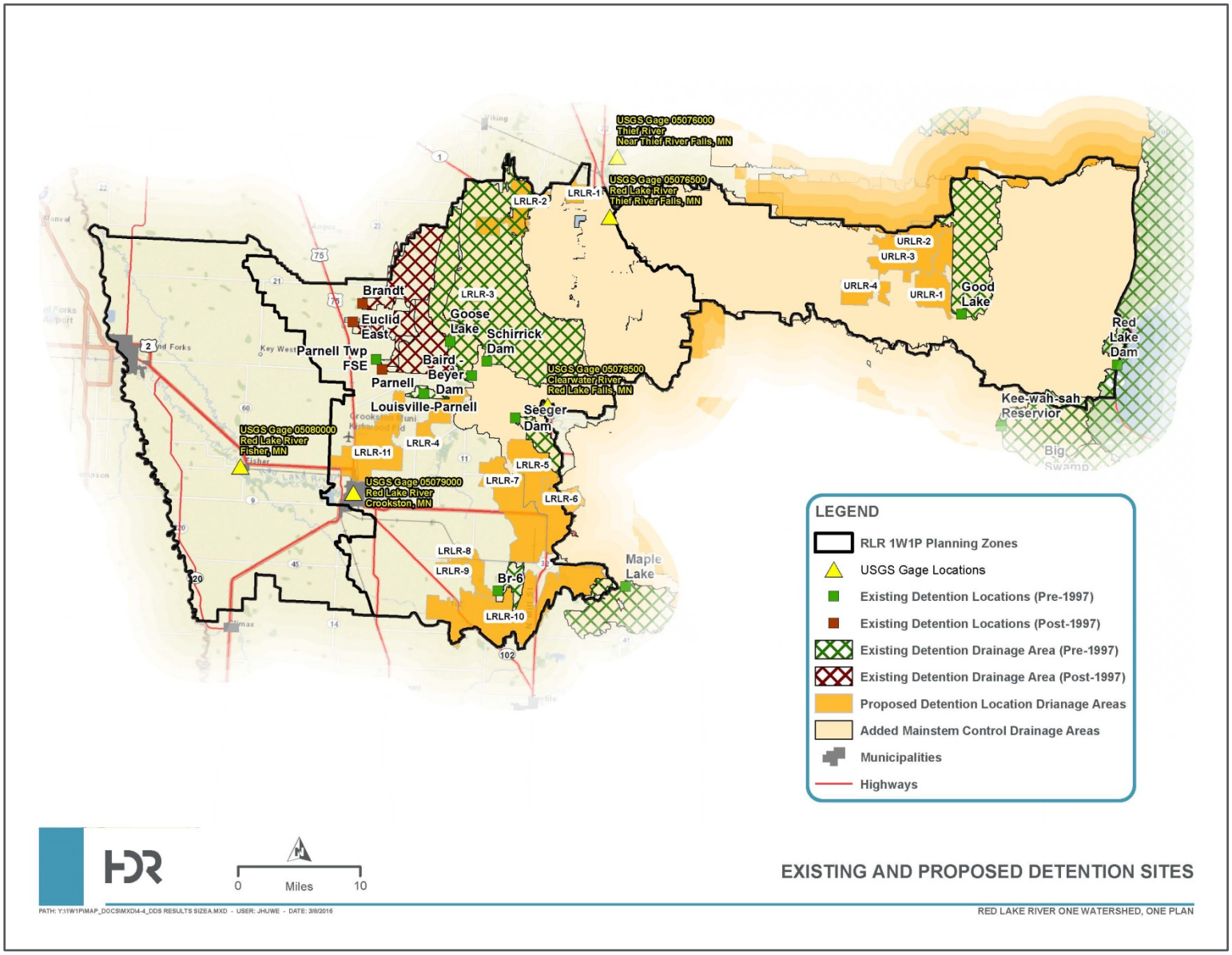

Figure 4 - 4 Existing and Proposed Detention Sites

In the case of field-scale drainage management systems and mitigation for altered hydrology, no known plans or studies were available. The results of PTMApp for storage-related practices were reviewed and an estimate of total number of practices deemed implementable in the 10-year period was made for goal setting.

Habitat Goal Formation

Measurable goals related to aquatic and terrestrial habitat were formed by referencing existing plans, findings from published studies, and local governing unit input. At the time this plan was written, the MnDNR was in the process of analyzing the Red Lake River watershed to make recommendations for prioritizing watercourses and riparian habitats for protection, restoration, and enhancement. Preliminary results from this effort were used to target riparian restoration and instream habitat reaches for restoration or protection. The preliminary work cited the following recommendations:

1. Priority reaches for aquatic habitat protection (Index of Biologic Integrity (IBI) > 70 on the main stem of the Red Lake River as well as primary spawning areas for a range of species, especially sturgeon).
    a) Reach from Red Lake Falls to just upstream of Huot.
    b) Reach from Huot to just downstream of Crookston.
    c) Assessment of riparian and in-stream habitat of tributaries.
2. Priority reaches for restoration of longitudinal connectivity.
    a) The goal is to assess fish passage conditions in the reach.
        i) Main stem of the Red Lake River
        ii) Black River
        iii) Burnham Creek
    b) The goal is to determine the feasibility of fish passage.
        i) Thief River Dam
        ii) Lower Red Lake Outlet Dam
        iii) Low head dam downstream of Lower Red Lake
3. Reaches for restoration of channel form and stability. The goal is to perform an assessment for all reaches to identify reaches that are most at risk for bed and bank instability.

    The *Red Lake River Watershed Recommendations for Streamflow and Habitat Protection* (MnDNR 1997) studied the effects of streamflow on habitat availability for fish assemblages in the Red Lake River using the Instream Flow Incremental Methodology (IFIM) (Bovee 1982). IFIM was developed by the U.S. Fish and Wildlife Service and is a standard method used for addressing instream flow issues and uses the Physical Habitat Simulation System (PHABSIM) program to combine several hydraulic simulation procedures with species-specific habitat suitability criteria to predict changes in available physical habitat with changes in flow. Flow-dependent physical habitat features are critical to the distribution and abundance of fish and macroinvertebrates thereby affecting IBI scores and biologic impairment status. The 1997 study, though dated, provides guidance for the regulation of community-based

flows (CBF) which represents the flow which provides the most habitat for all considered species life stages modeled for a particular season. Recommendations for seasonal CBF at the Crookston gage station are provided in **Table 4-13**. Similar recommendations are made for the Clearwater River at USGS gage 05078500 in Red Lake Falls.

Table 4-13. Recommendations for streamflow protection and allowable appropriation for the Red Lake River applied at the USGS Gage at Crookston, MN (Gage number 05079000; from MnDNR 1997)

Season	CBF at Crookston gage	If flow at Crookston gage is…	…then the action is…
April 17 to May 29	676 cfs	>1014 cfs	appropriators may take their total permitted amount
		338 to 1014 cfs	appropriators may take a combined total of 135 cfs or the total their total permitted amount, whichever is less
		<338 cfs	suspend all appropriations
May 30 to April 16	413 cfs	>620 cfs	appropriators may take their total permitted amount
		207 to 619 cfs	appropriators may take a combined total of 135 cfs or the total their total permitted amount, whichever is less
		<207	suspend all appropriations

In addition, the Minnesota Prairie Conservation Plan was referenced for development of measurable goals related to terrestrial habitat improvements (MnDNR 2011; **Figure 4-5**). Opportunities for restoration of prairie areas were identified in this plan through a 25-year strategy. The plan identifies three approaches to conservation:

1. Core areas and complexes with a high concentration of native prairie, other grasslands, and wetlands: work to ensure a minimum of 40% grassland and 20% wetland with the remainder in cropland or other uses.
2. Habitat corridor connecting core areas that include grassland/wetland assemblages of nine square miles in size at six mile intervals along and within the corridors: Within the corridor complexes a goal of 40% grassland and 20% wetland was set and for the remainder of the corridors, 10% of each legal land section is to be maintained in permanent perennial cover.
3. Remainder of the Prairie Region: a goal to maintain 10% of each Land Type Association in perennial native vegetation was established.

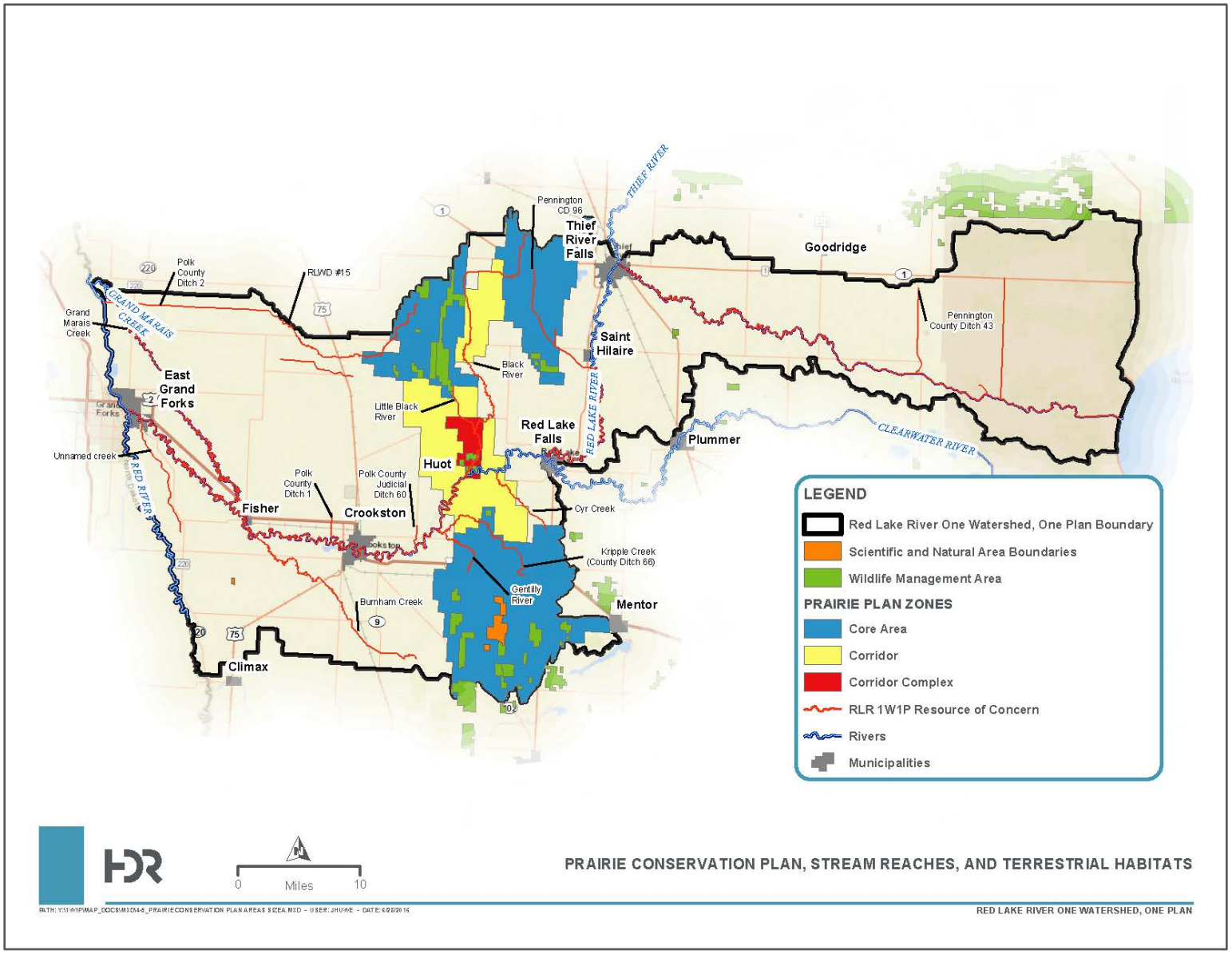

Figure 4 - 5 Prairie Conservation Plan, Stream Reaches, and Terrestrial Habitat Areas

Shoreland and Riparian Management Goal Formation

Shoreland and riparian measurable goals were formed using input from the MnDNR analysis of the Red Lake River Watershed, and prioritizing watercourses and riparian habitats in the Red Lake River Watershed for protection, restoration, and enhancement. Preliminary results from this effort were used to target riparian restoration and instream habitat reaches for restoration or protection. Preliminary work by MnDNR cited the following recommendations for areas to focus on for shoreland and riparian management:

1. Main stem of the Red Lake River:
    a) Crookston to Huot
    b) Downstream of Crookston
    c) Upstream of Huot reach, particularly in Red Lake Falls and Thief River Falls where development along river is increasing
    d) The rest of the main stem
2. Other Water Courses and Tributaries:
    a) Grand Marais Creek
    b) Lower Black River
    c) Burnham Creek
    d) Gentilly Creek
    e) Black River
    f) Cyr Creek
    g) Kripple Creek
    h) Browns Creek

The Minnesota Buffer Initiative was signed into law during the 2015 Legislative session. The law is intended to establish new perennial vegetation buffers of 50-feet average (30-foot minimum) along public waters, public water wetlands and public ditches with a Shoreland classification. It also requires buffers of 16.5 feet on public 103E ditches with no Shoreland classification. Approved alternative practices may be implemented in lieu of buffers as well. The implementation schedule for the Buffer Initiative is listed in **Table 4-14**. A map showing buffer locations within the 1W1P boundary is shown in **Figure 4-6**.

Table 4-14. Buffer Initiative Scheduled Implementation and History

Actions	Key Dates
The DNR used existing digital data to identify public waters that require a buffer.	Fall 2015
The DNR will coordinate with counties and watershed districts to transfer local information on public ditches within the benefited areas of public drainage systems into digital data. This will be used to identify public ditches that require a buffer.	Winter 2015 - 2016
BWSR Board review the implementation plan and authorize seeking request for input	March 23, 2016
The DNR will take the combined public water data and public ditch system data and produce a preliminary buffer protection map. Local units of government will review the preliminary map and provide comments to the DNR. The DNR will provide an efficient process for public comment on the preliminary buffer protection map.	Spring 2016
BWSR Board considers approval of preliminary policies and guidance	June 22, 2016
The DNR Commissioner will approve the buffer protection map that results from Phase III comments and refinements. The DNR will deliver buffer protection maps to the Board of Water and Soil Resources (BWSR), Soil and Water Conservation Districts (SWCDs), Drainage Authorities and other local governments for use in the implementation process.	July 12, 2016
BWSR Board considers approval of final policies and guidance	August 25, 2016
Counties and/or Watershed Districts must notice BWSR on their decision to assume jurisdiction	March 31, 2017
SWCDs provide a summary of watercourses to be included in 1W1P plans	July 2017
Buffers required for lands adjacent to public waters	November 2017
Buffers required on lands adjacent to public drainage ditches	November 2018

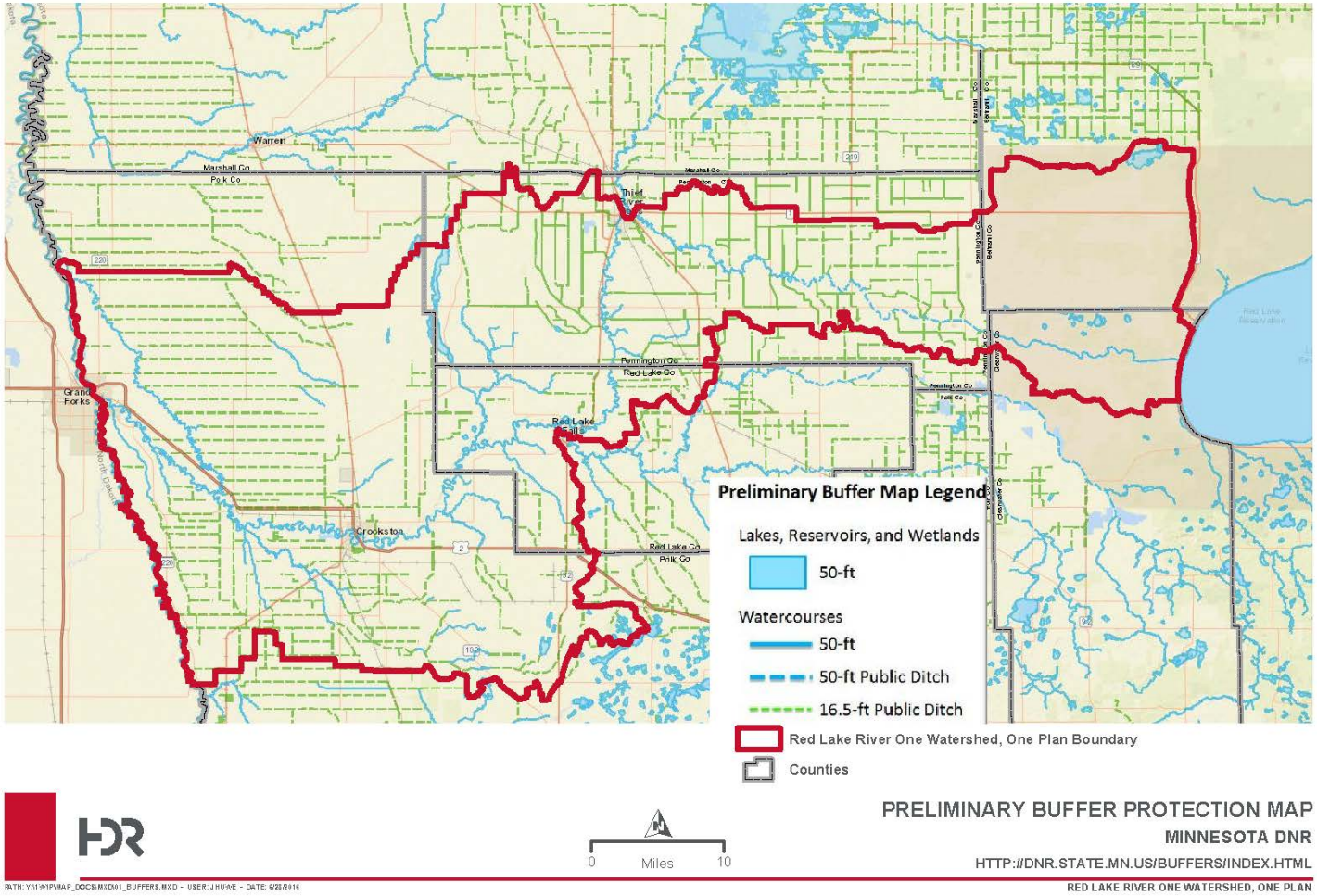

Figure 4 - 6 Preliminary Buffer Protection Map

Groundwater Protection and Source Water Protection Goal Formation

Several surface and groundwater management, wellhead protection, and surface water assessment plans were referenced for development of measurable goals. The ways that local governing unit staff can support these goals as part of the 1W1P will likely be limited to implementation of surface runoff practices, assisting public water suppliers with implementing wellhead protection plan activities and carrying out education and outreach activities relative to consumptive uses of water, well management, well sealing, septic maintenance, and groundwater education, etc.

The *Strategic Plan for the MnDNR Groundwater Management Program* (MnDNR 2013) identifies objectives, strategies and progress performance measures that aid in the process of identification of measurable goals for local governing units. These are listed in **Table 4-15**.

Table 4-15 Select strategies from the MnDNR Groundwater Management Plan applicable to Watershed District and SWCD implementation strategies.

MnDNR Groundwater Management Program Language	Key Goals
Improve communication and education for users, stakeholders, partners, and the general public about the importance of groundwater resources and the challenges facing groundwater management	• Increase understanding of groundwater resources and groundwater issues among users, stakeholders, partners, and the public • Improve the distribution and utility of County Geologic Atlas information in order to increase understanding of aquifers and hydrogeology among users, stakeholders, partners, and the public • Continue to work with partner organizations to develop important information on groundwater and disseminate to users, stakeholders, partners, and the public • More actively engage users, stakeholders, partners, and the general public in discussions about Minnesota groundwater resources • Work with land use authorities and other partners to adopt policies and practices and procedures that preserve groundwater recharge areas, minimize risk of groundwater contamination and ensure plentiful supplies of high quality groundwater
Promote the wise use of groundwater and the implementation of water conservation practices	• Ensure information on state-of-the-art water conservation practices is accessible to permitted groundwater users • Incorporate appropriate water conservation practices as a feature of all appropriation permits • Communicate the importance and practical benefits of water conservation through public awareness campaigns, workshops, media strategies, websites, and social media

4.8. Targeted Implementation Plan

A targeted implementation plan, which consists of an implementation action and an implementation schedule, was developed for each planning zone. The implementation plans include individual actions designed to meet the established goals for each resource of concern. Implementation plans also include an estimate of the costs

associated with implementation, consideration for how the actions will be measured, a timeline for implementation and identification of a lead agency for each action. It should be noted that development of measurable goals and targeted implementation actions will, in practice, be an iterative process over the life of a 1W1P plan.

To address the water quality, and soil erosion and sedimentation issues of concern stakeholders reviewed maps that illustrated the potential sediment removal performance of best management practices placed at optimal locations within management areas, along with the cost-effectiveness of these scenarios to develop an implementation strategy. These assessments were made using the Prioritize, Target and Measure Application (PTMApp). PTMApp defines various implementation-based management strategies including storage, filtration, biofiltration, infiltration, protection, source (load) reduction and a user defined category (defined below). Stakeholders selected management strategies appropriate for the established goals, and then further refined the implementation options by identifying specific best management practices (BMPs) that would be appropriate, effective and feasible within in each management area. The management strategies and BMPs considered in this plan are listed in **Table 4-16**. Other BMPs have been included throughout the plan that were not included in the PTMApp analyses. The NRCS Practice Code for each BMP is listed in the table for reference.

Storage: *Storage BMPs generally provide treatment through sedimentation processes. The effectiveness of sedimentation processes are therefore related to the volume of dead storage (i.e., water stored within a permanent pool) and the volume of water delivered to the BMP.*

Filtration: *Filtration practices generally provide treatment by allowing water to infiltrate and by slowing the velocity of water to allow for sedimentation processes to occur. The effectiveness of filtration BMPs are therefore a function of the velocity design standard and the velocity of runoff delivered across the surface of the BMP.*

Infiltration: *Infiltration practices generally provide treatment by allowing water to infiltrate through the soil or other media.*

Protection: *Protection practices generally provide treatment by physically armoring the landscape in areas with high potential for erosion. This could include natural materials (e.g. tree, shrub, grass plantings) and/or manmade materials (e.g. rock filled gabion baskets).*

Source reduction: *Source reduction practices generally provide treatment by reducing the amount of water quality constituents (typically TP and TN) applied to the landscape. For example, nutrient management plans usually reduce the amount of fertilizer applied to agricultural areas.*

Table 4-16. PTMApp Management Strategies and Best Management Practices Identified for Implementation in the Red Lake River One Watershed One Plan

	PTMApp Management Strategy				
	Protection	**Source Reduction**	**Storage**	**Filtration**	**Infiltration**
Best Management Strategy (BMP)	Channel Bed & Stream Channel Stabilization (NRCS 584[1])	Conservation Tillage	Drainage Water Management (NRCS 554[1])	Conservation Cover (NRCS 327[1])	Multi-Stage Ditch
	Critical Area Planting (NRCS 342[1])	Nutrient Management (NRCS 590[1])	Storm Water Retention Basins	Cover Crop (NRCS 340[1])	
	Grade Stabilization Structure (NRCS 410[1])	Rotational Grazing	Water and Sediment Control Basin (NRCS 638[1])	Filter Strips (NRCS 393[1])	
	Streambank and Shoreline Protection (NRCS 580[1])		Wetland Restoration (NRCS 657[1])	Grassed Waterway and Swales (NRCS 412[1])	
	Tree/Shrub Establishment (NRCS 612[1])				

[1] Electronic Field Office Technical Guide (EFOTG), Section IV-Conservation Practices, https://efotg.sc.egov.usda.gov/treemenuFS.aspx

Implementation strategies were built around the number of various BMPs that could be implemented within the planning timeframe for each management area. Given that no published load allocations were available at the time of plan development, no attempt was made to correlate sediment reductions to in-stream pollutant concentrations or to estimate the total number of sediment control practices required to meet water quality thresholds. Goals and implementation actions can be refined in future iterations of the plan as load allocations are defined.

Implementation strategies for the remaining issues of concern were developed using a combination of results from published studies and stakeholder input from various water and natural resource agencies. For the altered hydrology and drainage management issues, focused implementation strategies were mainly related to flood damage reduction, primarily using the results of an earlier distributed detention study undertaken by the Red Lake Watershed District. The study identified several off-channel and in-channel locations for detention basin implementation. To address the in-stream, riparian and terrestrial habitat issues, implementation goals and strategies referenced current work underway by the MnDNR as well as the Minnesota Native Prairie Plan. While instream habitat implementation was primarily focused in the Lower and Middle planning zones, implementation of prairie re-establishment was exclusively identified in the Middle planning zone. Riparian habitat and filter buffer establishment was not exclusive to any planning zone.

Similarly, all three planning zones called for implementation of studies to assess, prioritize and subsequently implement strategies across all three zones for certain issues and priorities. For example, the need for a system-wide analysis of relative risk of channel migration, degradation and aggradation was identified to inform which reaches

were most sensitive to upstream watershed and channel modifications. The need for a wind erosion analysis was also identified, given that a portion of sediment transport from the Red Lake River watershed is in the form of wind-generated erosion and deposition. Another example of this system-wide approach was the strategy of identifying all locations in each of the planning zones where pockets in the landscape do not overflow, across the surface, to a receiving water body during a 10-year storm event. These locations are recommended to either be protected from installation of subsurface drain tile or for extended detention via gate valve operated tile systems in order to aid in restoration of natural watershed hydrology.

Some implementation strategies were policy-related as opposed to structural or restorative in nature. For example, implementation of strategies to address drinking water protection issues or groundwater protection issues was limited to identification of areas of risk, such as the Middle Zone given its designation by the DNR as a groundwater sensitive region.

Implementation plans for the Lower, Middle and Upper Planning Zones are listed in **Sections 5, 6** and **7** of this document.

5. Lower Planning Zone

The Lower Planning Zone includes the Heartsville Coulee, Burnham Creek, Grand Marais Creek and other lower Red Lake River minor subwatersheds. The zone is dominated by lands in agricultural production. Small patches of woodland and grassland habitat exist near waterways and along the Red Lake River and Red River. These areas provide limited habitat to terrestrial species. The lower Red Lake River and Red River riparian corridors provide diverse fish and wildlife habitats year round and important refuge for aquatic species during drought periods. The tributaries and ditches within this planning zone provide some seasonal habitat for fish. Many tributaries (natural, altered, and artificial watercourse) are unstable with large amounts of active erosion. This section includes detailed information on Resources, Issues, Goals, and Implementation Strategies for the Lower Planning Zone.

The implementation strategies outlined in this section may be undertaken by planning partners as time and funding allow. Some amount of prioritization and project screening may be required to focus staff and financial resources on the highest priority actions. **Table 5-1** shows relevant water quality issues established for each resource of concern in the planning zone. **Table 5-2** lists the goals established for each resource of concern relevant to specific issues and prioritization statements. **Table 5-3.1** lists structural implementation and targeted number of BMPs to be installed in each management area. **Table 5-4** lists non-structural implementation strategies relevant to the entire planning zone. Management areas identify priority locations where BMPs are to be installed but will not limit installation of BMPs in other Management Areas.

To use the information presented in this section, users should first reference **Table 5-1** to get a background of the resources of concern in the planning zone including known impairments and management classification for each water quality parameter. Users should then reference **Table 5-2** to see how those resources of concern align with the issues and prioritization statements, and the measurable goals that have been set for each resource of concern. The prioritization statements are listed from high to low priority under each issue so the user should work from the top down for each issue. Users may also want to focus on resources of concern that show up under multiple issues as a way to target implementation that will achieve multiple benefits. After the user selects the resource(s) of concern to address, they should note the management area(s). The user can then find the structural implementation strategies identified for each management area in **Table 5-3.1**. These structural implementation strategies should be looked at as the suite of options and an estimate of the number of BMPs for each management area, but those numbers will likely need to be refined during implementation using PTMApp and/or other project selection and screening criteria as described below. **Table 5-4** includes non-structural actions that will further prioritize, target and measure structural implementation actions identified in this plan and future plans. Users should consider the targeted timeframe of implementation as these actions have been organized so that the highest priority items will occur first.

To evaluate site specific opportunities for the structural BMPs and refine structural implementation strategies, users can conduct evaluations using the PTMApp Web Tool

(http://ptmapp.rrbdin.org/) or other project selection and screening criteria. To use PTMApp, users should reference measurable goals for the chosen resource(s) of concern (**Table 5-2**), the prescribed set of management strategies for that management area (source reduction, storage, infiltration, filtration, or protection) and the implementation timeframe (**Table 5-3.1**). The user can then reference paired maps to assess relative load reductions and cost effectiveness of treatment options. Examples of sediment load reduction mapping are shown in **Figures 5-3** and **Figure 5-4**. The user then finalizes the set of BMPs to investigate in PTMApp (or by other means) which determines the specific locations to target and landowners to approach.

5.1. Resources of Concern

Figure 5-1 shows resources of concern in the 1W1P planning area. A more detailed look at resources of concern and their orientation within the Lower Planning Zone management areas is shown in **Figure 5-2**, and summarized in **Table 5-1**. The table lists the specific resource of concern, a brief description of the resource, the unique assessment unit identifier (AUID), known impairments, and a listing of specific water quality parameters and their management classification.

Table 5-1. Lower Planning Zone Resources of Water Quality Concern

Resource of Concern	Description	MGMT Area	AUID	Impairment*	Management Class by Water Quality Parameter*
Red Lake River	Burnham Creek to Red River	L3	3-501	HgF, TSS	E. coli: High Quality TSS: Imp., Low Quality DO: High Quality IBI: Needs Protection (Fish)
Red Lake River	Unnamed creek to Red River Section 1, Rhinehart Twp.	L3	3-503	HgF, TSS	E. coli: High Quality TSS: Imp., Low Quality DO: High Quality IBI: High Quality
Red Lake River	County Ditch 99 to Burnham Creek	L3 M7	3-506	HgF, TSS	E. coli: High Quality TSS: Imp. Restorable DO: Assess IBI: Needs Protection
Burnham Creek	Polk County Ditch 15 to Red Lake River	L4	3-515	Fish, MI	E. coli: Needs Protection TSS: Needs Protection DO: Needs Protection IBI: Imp., Restorable
Heartsville Coulee	County Ditch 115 to Red Lake River	L7	3-550	DO	E. coli: High Quality TSS: Assess DO: Imp., Low Quality IBI: Assess
Grand Marais Creek	Headwaters to County Ditch 2	L1	6-507	DO	E. coli: High Quality TSS: High Quality DO: Imp., Low Quality IBI: Assess
Grand Marais Creek	County Ditch 2 to Red River	West of L1	6-513	Not assessed	E. coli: Assess TSS: Assess DO: Assess IBI: Assess
County Ditch 2	County Ditch 66 to Grand Marais Creek	L2	6-515	E. coli, Fish, MI	E. coli: Imp. Low Quality TSS: High Quality DO: High Quality IBI: Imp., Restorable

Resource of Concern	Description	MGMT Area	AUID	Impairment*	Management Class by Water Quality Parameter*
Polk County Ditch 115/123/ 124/107/163	SWAT model identified a relatively high potential for sediment erosion reductions with the application of buffer strips along this ditch.	L6	Not assessed	Not assessed	Not assessed
Polk County Ditch 100/74/ 10/28	SWAT Model identified that this ditch has relatively high sediment loading.	L4	Not assessed	Not assessed	Not assessed
Polk County Ditch 126	SWAT Model identified that this ditch has relatively high sediment loading.	L1	Not assessed	Not assessed	Not assessed
Polk County Ditch 31	SWAT Model identified that this ditch has relatively high sediment loading.	L1	Not assessed	Not assessed	Not assessed
Polk County Ditch 36	SWAT model identified a relatively high potential for sediment erosion reductions with the application of buffer strips along this ditch.	L1	Not assessed	Not assessed	Not assessed
Polk County Ditch 38	SWAT Model identified that this ditch has relatively high sediment loading.	L1	Not assessed	Not assessed	Not assessed
Polk County Ditch 69/120/96/ 117/116	SWAT Model identified that this ditch has relatively high sediment loading.	L5	Not assessed	Not assessed	Not assessed
East Grand Forks Surface Water Assessment Area					High susceptibility
Marshall-Polk Rural Water					Low vulnerability

Chl-a = Chlorophyll-a; DO = Dissolved Oxygen; E. coli = Escherichia coli; HgF = Mercury; IBI = Index of Biological Integrity; pH = acidic/basic; MI = Macroinvertebrates; T = Turbidity; TSS = Total Suspended Sediment; Imp - Impaired

5.2. Issues of Concern and Measurable Goals

Measurable goals developed for the resources of concern in the Lower Planning Zone are listed in **Table 5-2**. The first two columns show the alignment of prioritization statements, listed from high to low priority, with each of the 1W1P issues of concern for the Lower Planning Zone. The last three columns list measurable goals that were established for specific resources of concern within the various management areas or at specific locations to address each of the prioritization statements. Goals include numeric targets, implementation of structural best management practices, non-structural field assessments, implementation, data collection, studies and outreach activities. Index of biotic integrity (IBI) restoration goals are based upon impairment thresholds. IBI protection goals establish thresholds based upon 2012 sampling results (reach minimum) to avoid degradation and promote improvement.

Table 5-2. Lower Planning Zone Issues of Concern and Measurable Goals

Issue	Prioritization Statements	MGMT Area	Resource of Concern	Measurable Goal
Surface Water Quality	Restore impaired waters that are closest to meeting state water quality standards.	L2	6-515 (Polk CD 2)	Increase F-IBI to > 35; Increase M-IBI to > 22
		L3 M7	3-506 (Red Lake River)	Reduce annual sediment loads by 39.2% or 30,776 tons
		L4	3-515 (Burnham Creek)	Increase M-IBI to > 41
	Protect high-quality unimpaired waters at greatest risk of becoming impaired.	L4	3-515 (Burnham Creek)	Reduce monthly geometric mean E. coli concentrations by 10% Decrease sediment loads by 10% to assure that no more than 10% of TSS samples exceed 65 mg/l in future assessments (Burnham downstream of Polk County Ditch 15) Exceed 5 mg/l as a daily minimum
		L3	3-501 (Red Lake River)	Maintain F-IBI > 55
		L3 M7	3-506 (Red Lake River)	Maintain M-IBI > 43
	Continue long-term monitoring efforts at key locations to provide sufficient data for water quality, hydrologic, hydraulic and biotic analysis.	All	All	See Section 8.2.5 for watershed-wide measurable goals.
	Restore or improve other impaired waters.	L1	6-507 (Grand Marais Cr)	Exceed 5.0 mg/L DO as a daily minimum
		L7	3-550 (Heartsville Coulee)	Exceed 5.0 mg/L DO as a daily minimum
		L3	6-515 (County Ditch 2)	Reduce monthly geometric mean E. coli concentrations by 10%
			3-501 (Red Lake River)	Decrease annual sediment loads by 62.2% or 127,453 tons
			3-503 (Red Lake River)	Decrease annual sediment loads by 34.5% or 28,538 tons to assure that no more than 10% of TSS samples exceed 65 mg/l in future assessments
		L4	3-515 (Burnham Creek)	Increase Fish IBI to above 50

Issue	Prioritization Statements	MGMT Area	Resource of Concern	Measurable Goal
Soil Erosion and Sedimentation	Reduce runoff-driven sediment transport to impaired waters that are closest to meeting state water quality standards by targeting implementation in subwatersheds with highest export.	L3	3-506 (Red Lake River)	Reduce total sediment export as modeled at management area pour point in PTMApp by 40% to assure that no more than 10% of TSS samples exceed 65 mg/l in future assessments
	Reduce wind erosion with priority on highly erodible soils by targeting implementation in subwatersheds with highest export.	TBD	TBD	WEPS Plan and Implementation
	Reduce runoff-driven sediment transport to high-quality unimpaired waters at greatest risk of becoming impaired by targeting implementation in subwatersheds with highest export.	L4	3-515 (Burnham Creek)	Reduce total sediment export as modeled at management area pour point in PTMApp by 10% to assure that no more than 10% of TSS samples exceed 65 mg/l in future assessments
	Inventory, evaluate and assign management class to stream and river reaches, and prioritize those most susceptible to altered hydrology effects on bank and bed stability.	TBD	TBD	Reach Assessment Classification, Prioritization and Implementation Plan
	Reduce runoff-driven sediment transport to other impaired waters by targeting implementation in subwatersheds with highest export.	L3	3-501 (Red Lake River)	Reduce total sediment export as modeled at management area pour point in PTMApp by 10% (20,330 tons) to assure that no more than 10% of TSS samples exceed 65 mg/l in future assessments (long term reduction goal of 127,453 tons)
		L3	3-503 (Red Lake River)	Reduce total sediment export as modeled at management area pour point in PTMApp by 10% (8,270 tons) to assure that no more than 10% of TSS samples exceed 65 mg/l in future assessments (long term reduction goal of 28,538 tons)
	Reduce runoff-driven sediment transport to potentially-impaired waters by targeting implementation in subwatersheds with highest export (SWAT model results).	L4 L4 L1 L1 L1 L5 L5 L4	Polk CD 10 Polk CD 28 Polk CD 31 Polk CD 36 Polk CD 38 Polk CD 69 Polk CD 96 Polk CD 100	Reduce total sediment export as modeled at management area pour point in PTMApp by 10% to assure that no more than 10% of TSS samples exceed 65 mg/l in future assessments

Issue	Prioritization Statements	MGMT Area	Resource of Concern	Measurable Goal
Soil Erosion and Sedimentation	Reduce runoff-driven sediment transport to potentially-impaired waters by targeting implementation in subwatersheds with highest export (SWAT model results).	L6 L6 L5 L5 L5 L6 L6 L6 L4	Polk CD 107 Polk CD 115 Polk CD 116 Polk CD 117 Polk CD 120 Polk CD 123 Polk CD 124 Polk CD 163 Burnham Creek (3-515)	Reduce total sediment export as modeled at management area pour point in PTMApp by 10% to assure that no more than 10% of TSS samples exceed 65 mg/l in future assessments
Altered Hydrology	Reduce runoff rates by targeting implementation in subwatersheds with high runoff.	TBD	TBD in PTMApp Web	Reduce runoff rates as modeled at management area pour point in PTMApp by 25%
	Identify ideal locations for flood control structures that include multifunctional design.	L4 L2	TBD TBD	Map of suitable potential flood control projects
	Protect disconnected, non-contributing drainage areas from future altered hydrology leading to a connection to water resources downstream.	All	All	No new drainage from 10-yr non-contributing areas
	Restore or modify natural water course morphology where feasible to promote adequate drainage as well as channel equilibrium	TBD	TBD	Reach Assessment Classification, Prioritization and Implementation Plan
	Assure long-term maintenance of multi-purpose flood control structures.	All	All	Develop and adopt a Flood Damage Reduction Control Structure Operation and Maintenance Policy and Guidance
	Promote infiltration, retention, extended-detention practices in new and existing urban developments based on current stormwater best management practices.	East Grand Forks, Fisher, Crookston	Red Lake River	Urban BMP retrofit assessment and implementation plan (Non-infiltration practices will be prioritized in DWSMAs. Existing infiltration basins in vulnerable DWSMAs will be mitigated where feasible.)
Drainage System Management	Utilize information collected from the drainage ditch inventories to prioritize and install side water inlets to ensure adequate support of agriculture without negative downstream ecological and economic impacts.	All	All	Side water inlet prioritization and implementation plan
	Retrofit or install new surface and subsurface drainage using current conservation drainage practices.	All	All	Develop or enhance incentive program as well as regulatory language; #BMPs (see 5.3 Implementation Plan)

Issue	Prioritization Statements	MGMT Area	Resource of Concern	Measurable Goal
Flood Damage Reduction	Reduce the risk of flood damage in accordance with the 20% Red River Basin Commission's Long Term Flood Solutions and Technical Paper # 11.	All	All	#BMPs (see 5.3.1 Implementation Plan)
	Reduce flood flows and breakout flows to reduce damages to local communities, infrastructure, rural homes, and agricultural fields.	All	All	#BMPs (see 5.3.1 Implementation Plan)
Habitat	Protect or restore aquatic habitat of priority reaches.	L4 L2 Crookston Gauge (see Table 4-13)	3-515 (Burnham Creek) 6-515 (County Ditch 2) 3-501 (Red Lake River)	Increase Fish IBI to above 25 Macroinvertebrate IBI > 41 Increase Fish IBI by 25% Increase Macroinvertebrate IBI by 25% ≥676 cfs
	Protect, restore, and enhance grasslands and wetlands with special emphasis on prairie core areas and corridor complexes.	All	All	Prairie Core: 40% grassland and 20% wetland within remainder of cropland or other uses Prairie Corridor: 10% of each legal land section is to be maintained in permanent perennial cover Remainder of Prairie Region: maintain 10% of each Land Type Association in perennial native vegetation
	Identify areas that provide both unique ecological values and recreational opportunities and develop an implementation and management plan.	All	All	Habitat Evaluation Procedures Analysis and Hydrogeomorphic Analysis
	Expand aquatic and terrestrial non-native and invasive species control programs.	All	All	Revised AIS and Terrestrial Non-native/Invasives Plan
	Restore longitudinal connectivity of priority reaches.	L4 L3 L7	3-515 (Burnham Creek) 3-501 (Red Lake River) 3-506 (Red Lake River) 3-550 (Heartsville Coulee)	Assess fish passage issues and complete a prioritization plan for installation of fish passage at blocked sites

Issue	Prioritization Statements	MGMT Area	Resource of Concern	Measurable Goal
Shoreland and Riparian Mgmt	Protect riparian corridors and wetlands with existing quality vegetated buffers.	All	All	Update Education and Outreach Program to include MN Buffer Initiative details
	Restore or enhance quality vegetated buffers adjacent to natural, altered and artificial water courses and wetlands.	All	All	100% compliance for Public Waters buffers under MN Buffer Initiative 100% compliance for Public Drainage Ditch buffers under MN Buffer Initiative
Groundwater Protection	Implement strategies to conserve and maintain ground water supply quality.	All	Marshall-Polk Rural Water (low vulnerability), public water systems, domestic wells	Update Education and Outreach Program to include MNDNR and Department of Health groundwater protection, well management, well sealing, and conservation information. Distribute annual newsletters and newspaper articles Distribute annual groundwater reports and direct mailings Annually update Website Update Education and Outreach Program to include MNDNR and Department of Health Plan information
	Implement strategies to conserve and maintain ground water supply quantity	All	Groundwater	Develop a wellhead protection plan and sealing program Conduct a feasibility study for alternatives related to ground water conservation, regional recharge potential and groundwater use offsets via rainwater and grey water harvesting for irrigation Implement MDA Nitrogen Fertilizer Management Plan
	Maintain a safe and adequate drinking water supply for residents in order to protect the public's health, safety and general welfare of the community.	All	Groundwater	Provide cost-share assistance to landowners for sealing 8-10 unused wells per year Conduct an unused, unsealed well inventory Educate the public on safe drinking water standards and how to protect our groundwater resources Conduct additional monitoring as needed for drinking water protection
	Protect Drinking Water Supply Management Areas (DWSMAs). Special consideration will be given for DWSMAs with a moderate or high vulnerability.	All	Groundwater	Relocate or change the design of proposed stormwater infiltration projects Develop education/outreach materials of proper well management and well sealing

Issue	Prioritization Statements	MGMT Area	Resource of Concern	Measurable Goal
Groundwater Protection	Conduct sub-surface sewage treatment system (SSTS) inventory and upgrades.	All	Groundwater	Conduct an SSTS inventory Develop and implement a SSTS Tracking System to include: Inspection Records and Maintenance and Upgrades Educate the public on proper septic system maintenance and operation
	Work collaboratively with public water suppliers to implement their Wellhead Protection Plans.	All	Groundwater	Provide technical and educational assistance to the public as it relates to Wellhead Protection Plans
Source Water Protection	Prioritize inner and outer surface water assessment areas to: o Improve surface water quality o Reduce runoff, soil erosion, and sedimentation Reduce runoff driven sediment and pollution transport to surface waters	All	East Grand Forks SWAA (high susceptibility)	Reduce turbidity and TSS levels as specified under Surface Water Quality Reduce Total Organic Carbon (TOC) to less than 12/mg/L. Reduce five haloacetic acids (HAA5) to less than 60ug/L. Reduce Trihalomethanes (TTHM) to less than 80 ug/L. Install riparian buffers along streams and ditches as per 5.3 Implementation Plan
	Partnership with the East Grand Forks public water supplier to protect and maintain a safe and adequate drinking water supply.	All	East Grand Forks Source Water Assessment Area (SWAA)	Continue to support and encourage Class I Use designation for Red Lake River Source Water Protection Areas
	Reduce runoff-driven sediment and pollutant (total organic carbon, haloacetic acid, and Trihalomethanes) transport to surface waters by targeting implementation in subwatersheds with highest export.	All	All	Reduce turbidity and TSS levels as specified under Surface Water Quality Reduce Total Organic Carbon (TOC) to less than 12/mg/L. Reduce five haloacetic acids (HAA5) to less than 60ug/L. Reduce Trihalomethanes (TTHM) to less than 80 ug/L
	Maintain a safe and adequate drinking water supply for residents in order to protect the public's health, safety and general welfare of the community.	All	East Grand Forks Source Water Assessment Area (SWAA) All	Conduct additional monitoring as needed for drinking water protection
	Protect East Grand Forks Source Water Assessment Area (SWAA).	All	East Grand Forks SWAA (high susceptibility)	Educate the public on Best Management Practices to protect East Grand Forks SWAA
	Conserve surface water drinking supplies.	All	East Grand Forks Source Water Assessment Area (SWAA) All	Educate the public on how to conserve and protect our surface water resources

5.3. Implementation Schedule

Table 5-3.1 and **Table 5-4** show the implementation plan for each management area in the Lower Planning Zone. **Table 5-3.1** lists the structural best management practices (BMPs) and **Table 5-4** lists non-structural activities. For each, a lead entity and target schedule are listed.

The following assumed pricing was applied to generate estimates of implementation costs.

Table 5-3.0. Lower Planning Zone Implementation Cost Estimate

NRCS Practice ID	Practice Name	Unit Cost[1]
-	Ag Waste Storage (ea)	$1,000
-	Alternative Tile Intakes (ea)	$500
584	Channel Bed and Stream Channel Stabilization (miles)	$126,300 [2]
327	Conservation Cover (acres)	$640
340	Cover Crop (acres)	$107
342	Critical Area Planting (acres)	$868
362	Diversion (each)	$1,900
554	Drainage Water Management (up to 160 acres)	$63,360
386	Field Borders (4 acres per mile)	$670
393	Filter Strips or Riparian Buffer (16.5-ft buffer, sides of channel = 4 acres per mile)	$2,716
410	Grade Stabilization Structure (each)	$8,566
412	Grass Waterways (miles)	$28,076
342	Gravel Pit Reclamation (acres)	$868
-	Impoundment (ac-ft)	$1,000
-	Milkhouse Waste Storage Treatment (each)	$1,000
-	Multi-Stage Ditch (miles)	$311,520 [3]
590	Nutrient Management (acres)	$1.00 [4]
338	Prescribed Burning (acres)	$100
-	Raingardens (each)	$5,000
329	Residue and Tillage Management (acres)	$17
643	Restoration & Management of Rare/Declining Habitat (acres)	$868
528/382	Rotational and Prescribed Grazing (acres)	$487
-	Septic System Upgrades (each)	$8,000 [5]
-	Stormwater Detention Basins (each)	$75,000 [6]
580	Streambank, Shoreland, and Roadside protection (miles)	$429,937
612	Tree/Shrub Establishment (acres)	$453
645	Upland Wildlife Habitat Management (acres)	$20
-	Wastewater and Feedlot Runoff Control (each)	$1,000
638	Water and Sediment Control Basins (each)	$10,250
-	Water Control Structures (each)	$1,000

NRCS Practice ID	Practice Name	Unit Cost[1]
-	Well Sealing (each)	$500
657	Wetland Restoration (acres)	$6,735

[1] Costs for NRCS practices were derived from the 75th percentile of 2016 NRCS EQIP costs.

[2] Unit costs for construction of rock cross veins, rock weirs, rock vortex weirs and step pools (The Virginia Stream Restoration and Stabilization Best Management Practices Guide, 2004). Burnham Creek was used as a representative stream to estimate 15 structures per mile, 25'x3'x3' structures; a 3% cost of inflation for materials costs was applied to the 2004 cost per cubic yard of $90. Construction was estimated by multiplying 4 times the material unit cost given the complexity of stream work. For the same reason, design and engineering was assumed to be 30% of the total costs. Final unit costs, above, represent the estimated year 2025 costs.

[3] Per Powell et al, 2007 and Kramer, 2011 as presented by University of Minnesota Two-Stage Ditch Economics. Low end linear foot cost data disregarded for calculation of the unit costs, above.

[4] Derived from the NRCS publication Costs associated with Development and Implementation of Comprehensive Nutrient Management Plans, Part 1. The average annual costs per farm for farms within the Corn Belt was $973. The average farm size in 2012 was 1700 acres in the Red River Valley (Red River Valley Farm Financial Performance presentation by Andrew Swenson, Department of Agribusiness and Applied Economics, North Dakota State University; 2013).

[5] Unit costs provided by Red Lake Soil and Water Conservation District as per recent project experience.

[6] Urban Subwatershed Restoration Series, Chapter 3: Urban Stormwater Retrofit Practices, Center for Watershed Protection (pricing for a 0.3-acre extended detention pond for a 10-acre drainage area = Base Costs + Design and Engineering. Base cost of new construction assumes storage up to the water quality event as follows: Permanent Pool Volume (1800 * Acres) + Water Quality Pool (0.0833 * Impervious cover-averaging 80%). Design and Engineering costs assumed to be an additional 25%.

Table 5-3.1 Structural Implementation Plan for the Lower Planning Zone

MGMT Area	Strategy	Best Management Practice	Total	Unit	Cost	Lead Entity	Year(s)
L1: Grand Marais	Protection	Critical Area Planting	5	Acres	$ 4,340	West Polk SWCD	2017-2026
		Grade Stabilization Structure	15	Each	$ 128,490	West Polk SWCD	2017-2026
		Tree/Shrub Establishment	25	Acres	$ 11,316	West Polk SWCD	2017-2026
		Well Sealing	10	Each	$ 5,000	West Polk SWCD	2017-2026
		Septic System Upgrades	5	Each	$ 40,000	Environmental Services	2017-2026
		Upland Wildlife Habitat Management	5,300	Acres	$ 106,000	SWCD/Pheasants Forever/RLWD	2017-2026
		Restoration & Management of Rare/Declining Habitat	200	Acres	$ 173,600	SWCD/Pheasants Forever/RLWD	2017-2026
		Prescribed Burning	300	Acres	$ 30,000	SWCD/Pheasants Forever/RLWD	2017-2026
		Gravel Pit Reclamation	20	Acres	$ 17,360	Environmental Services	2017-2026
	Source Reduction	Residue and Tillage Management	480	Acres	$ 8,160	NRCS	2017-2026
		Nutrient Management	480	Acres	$ 480	NRCS	2017-2026
	Storage	Drainage Water Management (Tile)	40	Acres	$ 63,360	NRCS/RLWD	2017-2026
		Wetland Restoration	10	Acres	$ 67,350	W Polk SWCD/RLWD	2017-2026
		Water Control Structures	5	Each	$ 5,000	NRCS/RLWD	2017-2026
		Water and Sediment Control Basins	5	Each	$ 51,250	W Polk SWCD RLWD	2017-2026
		Diversion	1	Each	$ 1,900	W Polk SWCD/RLWD	2017-2026
	Filtration	Conservation Cover	2,400	Acres	$ 1,536,270	NRCS	2017-2026
		Cover Crop	2,400	Acres	$ 257,115	NRCS	2017-2026
		Filter Strips	50	Miles	$ 135,800	W Polk SWCD/RLWD	2017-2026
		Grassed Waterway	30	Miles	$ 842,280	W Polk SWCD/RLWD	2017-2026
		Riparian Buffers	10	Miles	$ 27,160	W Polk SWCD/RLWD	2017-2026
L2: Euclid	Protection	Critical Area Planting	5	Acres	$ 4,340	W Polk SWCD	2016-2025
		Grade Stabilization Structure	10	Each	$ 85,660	W Polk SWCD	2017-2026
		Tree/Shrub Establishment	10	Acres	$ 4,526	W. Polk SWCD	2017-2026
		Well Sealing	5	Each	$ 2,500	W Polk SWCD	2017-2026
		Septic System Upgrades	3	Each	$ 24,000	Environmental Services	2017-2026
		Upland Wildlife Habitat Management	4,000	Acres	$ 80,000	SWCD/Pheasants Forever/RLWD	2017-2026
		Restoration & Management of Rare/Declining Habitat	100	Acres	$ 86,800	W Polk SWCD/ Pheasants Forever/RLWD	2017-2026
		Prescribed Burning	200	Acres	$ 20,000	W Polk SWCD/ Pheasants Forever/RLWD	2017-2026
	Source Reduction	Residue and Tillage Management	800	Acres	$ 13,600	NRCS	2017-2026
		Nutrient Management	800	Acres	$ 800	NRCS	2017-2026
		Rotational and Prescribed Grazing	320	Acres	$ 155,846	NRCS	2017-2026

MGMT Area	Strategy	Best Management Practice	Total	Unit	Cost	Lead Entity	Year(s)
L2: Euclid	Storage	Drainage Water Management (Tile)	40	Acres	$ 63,360	NRCS/RLWD	2017-2026
		Wetland Restoration	20	Acres	$ 134,700	W Polk SWCD/ NRCS/RLWD	2017-2026
		Water Control Structures	5	Each	$ 5,000	NRCS/RLWD	2017-2026
		Water and Sediment Control Basins	10	Each	$ 125,000	W Polk SWCD/RLWD	2017-2026
		Diversion	1	Each	$ 1,900	W Polk SWCD/RLWD	2017-2026
	Filtration	Conservation Cover	1,600	Acres	$ 1,024,180	NRCS	2017-2026
		Cover Crop	1,,600	Acres	$ 171,410	NRCS	2017-2026
		Filter Strips	10	Miles	$ 27,160	W Polk SWCD/RLWD	2017-2026
		Grassed Waterway	10	Miles	$ 280,760	W Polk SWCD/RLWD	2017-2026
		Riparian Buffers	5	Miles	$ 13,580	W Polk SWCD/RLWD	2017-2026
L3: Red Lake River	Protection	Critical Area Planting	2	Acres	$ 1,736	W Polk SWCD	2017-2026
		Grade Stabilization Structure	5	Each	$ 42,830	W Polk SWCD	2017-2026
		Tree/Shrub Establishment	10	Acres	$ 4,526	W Polk SWCD	2017-2026
		Well Sealing	5	Each	$ 2,500	W Polk SWCD	2017-2026
		Septic System Upgrades	3	Each	$ 24,000	Environmental Services	2017-2026
		Upland Wildlife Habitat Management	1,000	Acres	$ 20,000	W Polk SWCD/ Pheasants Forever/RLWD	2017-2026
		Restoration & Management of Rare/ Declining Habitat	50	Acres	$ 43,400	W Polk SWCD/ Pheasants Forever/RLWD	2017-2026
		Prescribed Burning	200	Acres	$ 20,000	W Polk SWCD/ Pheasants Forever/RLWD	2017-2026
		Gravel Pit Reclamation	20	Acres	$ 17,360	Polk County	2017-2026
	Source Reduction	Residue and Tillage Management	320	Acres	$ 5,440	NRCS	2017-2026
		Nutrient Management	320	Acres	$ 320	NRCS	2017-2026
	Storage	Drainage Water Management (Tile)	40	Acres	$ 63,360	NRCS/RLWD	2017-2026
		Wetland Restoration	10	Acres	$ 67,350	W. Polk SWCD/NRCS/RLWD	2017-2026
		Water Control Structures	5	Each	$ 5,000	NRCS/RLWD	2017-2026
	Storage	Water and Sediment Control Basins	5	Each	$ 51,250	W Polk SWCD/ RLWD	2017-2026
		Diversion	1	Each	$ 1,900	W Polk SWCD/ RLWD	2017-2026
	Filtration	Conservation Cover	320	Acres	$ 204,836	NRCS	2017-2026
		Cover Crop	320	Acres	$ 34,282	NRCS	2017-2026
		Filter Strips	20	Miles	$ 54,320	W Polk SWCD/ RLWD	2017-2026
		Grassed Waterway	10	Miles	$ 280,760	W Polk SWCD/ RLWD	2017-2026
		Riparian Buffers	2	Miles	$ 5,432	W Polk SWCD/ RLWD	2017-2026

MGMT Area	Strategy	Best Management Practice	Total	Unit	Cost	Lead Entity	Year(s)
L4: Burnham Creek	Protection	Channel Bed and Stream Channel Stabilization	3	Miles	$ 378,900	W Polk SWCD	2017-2026
		Critical Area Planting	5	Acres	$ 4,340	W Polk SWCD	2017-2026
		Grade Stabilization Structure	15	Each	$ 128,490	W Polk SWCD	2017-2026
		Streambank, Shoreland, and Roadside protection	4	Miles	$ 1,719,748	W Polk SWCD	2017-2026
		Tree/Shrub Establishment	25	Acres	$ 11,316	W Polk SWCD	2017-2026
		Well Sealing	5	Each	$ 2,500	W Polk SWCD	2017-2026
		Septic System Upgrades	5	Each	$ 40,000	Environmental Services	2017-2026
		Upland Wildlife Habitat Management	6,500	Acres	$ 130,000	W Polk SWCD/ Pheasants Forever/ RLWD	2017-2026
		Restoration & Management of Rare/Declining Habitat	200	Acres	$ 173,600	W Polk SWCD/ Pheasants Forever/ RLWD	2017-2026
		Prescribed Burning	200	Acres	$ 20,000	W Polk SWCD/ Pheasants Forever/ RLWD	2017-2026
		Gravel Pit Reclamation	3	Acres	$ 2,604	Polk County	2017-2026
	Source Reduction	Residue and Tillage Management	6,240	Acres	$ 106,080	NRCS	2017-2026
		Nutrient Management	5,440	Acres	$ 5,440	NRCS	2017-2026
		Rotational and Prescribed Grazing	4,960	Acres	$ 2,415,613	NRCS	2017-2026
	Storage	Drainage Water Management (Tile)	60	Acres	$ 63,360	NRCS/RLWD	2017-2026
		Wetland Restoration	20	Acres	$ 134,700	W Polk SWCD/ NRCS/RLWD	2017-2026
		Water Control Structures	15	Each	$ 15,000	NRCS/RLWD	2017-2026
		Water and Sediment Control Basins	20	Each	$ 205,000	W Polk SWCD	2017-2026
		Diversion	10	Each	$ 19,000	W Polk SWCD	2017-2026
	Filtration	Conservation Cover	1,600	Acres	$ 1,024,180	NRCS	2017-2026
		Cover Crop	1,600	Acres	$ 171,410	NRCS	2017-2026
		Filter Strips	30	Miles	$ 81,480	W Polk SWCD/RLWD	2017-2026
		Grassed Waterway	5	Miles	$ 140,380	W Polk SWCD/RLWD	2017-2026
		Riparian Buffers	5	Miles	$ 13,580	W Polk SWCD/RLWD	2017-2026
	FDR	Impoundment	5,000	ac-ft	$ 5,000,000	RLWD	2017-2026
L5: Eldred	Protection	Critical Area Planting	2	Acres	$ 1,736	W Polk SWCD	2017-2026
		Grade Stabilization Structure	7	Each	$ 59,962	W Polk SWCD	2017-2026
		Tree/Shrub Establishment	10	Acres	$ 4,526	W Polk SWCD	2017-2026

MGMT Area	Strategy	Best Management Practice	Total	Unit	Cost	Lead Entity	Year(s)
L5: Eldred	Protection	Well Sealing	5	Each	$ 2,500	W Polk SWCD	2017-2026
		Septic System Upgrades	3	Each	$ 24,000	Environmental Services	2017-2026
		Upland Wildlife Habitat Management	150	Acres	$ 3,000	W Polk SWCD/ Pheasants Forever/ RLWD	2017-2026
		Restoration & Management of Rare/Declining Habitat	10	Acres	$ 8,680	W Polk SWCD/ Pheasants Forever/ RLWD	2017-2026
		Prescribed Burning	50	Acres	$ 5,000	W Polk SWCD/ Pheasants Forever/ RLWD	2017-2026
	Source Reduction	Residue and Tillage Management	320	Acres	$ 5,440	NRCS	2017-2026
		Nutrient Management	320	Acres	$ 320	NRCS	2017-2026
	Storage	Drainage Water Management (Tile)	60	Acres	$ 63,360	NRCS/RLWD	2017-2026
		Wetland Restoration	5	Acres	$ 33,675	W Polk SWCD/ NRCS/RLWD	2017-2026
		Water Control Structures	5	Each	$ 5,000	NRCS/ RLWD	2017-2026
		Water and Sediment Control Basins	5	Each	$ 51,250	W Polk SWCD/RLWD	2017-2026
		Diversion	1	Each	$ 1,900	W Polk SWCD/RLWD	2017-2026
	Filtration	Conservation Cover	160	Acres	$ 102,418	NRCS	2017-2026
		Cover Crop	160	Acres	$ 17,141	NRCS	2017-2026
		Filter Strips	10	Miles	$ 27,160	W Polk SWCD/RLWD	2017-2026
		Grassed Waterway	5	Miles	$ 140,380	W Polk SWCD/RLWD	2017-2026
		Riparian Buffers	2	Miles	$ 5,432	W Polk SWCD/RLWD	2017-2026
L6: Fisher	Protection	Streambank, Shoreland, and Roadside protection	1	Miles	$ 429,937	W Polk SWCD	2017-2026
		Tree/Shrub Establishment	5	Acres	$ 2,263	W Polk SWCD	2017-2026
		Critical Area Planting	2	Acres	$ 1,736	W Polk SWCD	2017-2026
		Grade Stabilization Structure	1	Each	$ 8,566	W Polk SWCD	2017-2026
		Tree/Shrub Establishment	5	Acres	$ 2,263	W Polk SWCD	2017-2026
		Well Sealing	3	Each	$ 1,500	W Polk SWCD	2017-2026
		Septic System Upgrades	1	Each	$ 8,000	Environmental Services	2017-2026
		Upland Wildlife Habitat Management	1,000	Acres	$ 20,000	W Polk SWCD/ Pheasants Forever/RLWD	2017-2026
		Restoration & Management of Rare/Declining Habitat	10	Acres	$ 8,680	W Polk SWCD/ Pheasants Forever/RLWD	2017-2026
		Prescribed Burning	50	Acres	$ 5,000	W Polk SWCD/ Pheasants Forever/RLWD	2017-2026

MGMT Area	Strategy	Best Management Practice	Total	Unit	Cost	Lead Entity	Year(s)
L6: Fisher	Source Reduction	Residue and Tillage Management	320	Acres	$ 5,440	NRCS	2017-2026
		Nutrient Management	320	Acres	$ 320	NRCS	
	Storage	Drainage Water Management (Tile)	60	Acres	$ 63,360	NRCS/RLWD	2017-2026
		Water Control Structures	5	Each	$ 5,000	NRCS/RLWD	2017-2026
		Water and Sediment Control Basins	1	Each	$ 10,250	W Polk SWCD/RLWD	2017-2026
		Diversion	1	Each	$ 1,900	W Polk SWCD/RLWD	2017-2026
	Filtration	Conservation Cover	320	Acres	$ 204,836	NRCS	2017-2026
		Cover Crop	320	Acres	$ 34,282	NRCS	2017-2026
		Filter Strips	5	Miles	$ 13,580	W Polk SWCD/RLWD	2017-2026
		Grassed Waterway	5	Miles	$ 140,380	W Polk SWCD/RLWD	2017-2026
		Riparian Buffers	1	Miles	$ 2,716	W Polk SWCD/RLWD	2017-2026
L7: Bygland	Protection	Channel Bed and Stream Channel Stabilization	2	Miles	$ 252,600	W Polk SWCD	2017-2026
		Critical Area Planting	2	Acres	$ 1,736	W Polk SWCD	2017-2026
		Grade Stabilization Structure	3	Each	$ 25,698	W Polk SWCD	2017-2026
		Streambank, Shoreland, and Roadside protection	2	Miles	$ 859,874	W Polk SWCD	2017-2026
		Tree/Shrub Establishment	15	Acres	$ 6,790	W Polk SWCD	2017-2026
		Well Sealing	3	Each	$ 1,500	W Polk SWCD	2017-2026
		Septic System Upgrades	3	Each	$ 24,000	Environmental Services	2017-2026
		Upland Wildlife Habitat Management	2,000	Acres	$ 40,000	W Polk SWCD/ Pheasants Forever/RLWD	2017-2026
	Protection	Restoration & Management of Rare/Declining Habitat	50	Acres	$ 43,400	W Polk SWCD/ Pheasants Forever/RLWD	2017-2026
		Prescribed Burning	100	Acres	$ 10,000	W Polk SWCD/ Pheasants Forever/RLWD	2017-2026
	Source Reduction	Residue and Tillage Management	3,000	Acres	$ 51,000	NRCS	2017-2026
		Nutrient Management	3,000	Acres	$ 3,000	NRCS	2017-2026
	Storage	Drainage Water Management (Tile)	20	Acres	$ 63,360	NRCS/RLWD	2017-2026
		Wastewater and Feedlot Runoff Control	1	Each	$ 1,000	W Polk SWCD/ NRCS/RLWD	2017-2026
		Water Control Structures	2	Each	$ 2,000	NRCS/RLWD	2017-2026
		Water and Sediment Control Basins	2	Each	$ 20,500	W Polk SWCD/RLWD	2017-2026
	Filtration	Conservation Cover	1,000	Acres	$ 640,113	NRCS	2017-2026
		Cover Crop	1,000	Acres	$ 107,131	NRCS	2017-2026
		Filter Strips	10	Miles	$ 27,160	W. Polk SWCD/RLWD	2017-2026
		Grassed Waterway	1	Miles	$ 28,076	W. Polk SWCD/RLWD	2017-2026
		Riparian Buffers	0.5	Miles	$ 1,358	W Polk SWCD/RLWD	2017-2026

Table 5-4. Non-structural Implementation Plan for the Lower Planning Zone

Action	Cost	Lead Entity	Year(s)
Wind Erosion Prediction System (WEPS) Plan	$30,000 - $60,000 for 1W1P Watershed	W Polk SWCD	2017
Protect unprotected highly wind-erodible soils	TBD	W Polk SWCD, Polk County, RLWD	2017-2026
Conserve protected highly wind-erodible soils	TBD		2017-2026
Reach Assessment Classification, Prioritization and Implementation Plan	$30,000 - $60,000 for 1W1P Watershed	DNR, W Polk SWCD, RLWD	2017
Protect stable, at-risk reaches	TBD	DNR, W Polk SWCD, RLWD	2017-2026
Restore unstable, at-risk reaches	TBD	DNR, W Polk SWCD, RLWD	2017-2026
Delineate 10-yr non-contributing areas and develop policy and practices to detain runoff	$10,000 - $20,000 for 1W1P Watershed	W Polk SWCD, RLWD	2017
Urban BMP retrofit assessment and implementation plan	$10,000 - $15,000 for one priority City	W Polk SWCD, RLWD	2018
Conduct a County Drainage Ditch Inventory for Side Water Inlets and Buffers and develop a side water inlet prioritization and implementation plan	$130,000 for Planning Zone	W Polk SWCD	2017-2020
Habitat Evaluation Procedures Analysis and Hydrogeomorphic Analysis	$50,000 - $100,000 for 1W1P Watershed	DNR, W Polk SWCD, RLWD	2020-2021
Protect high value habitats	TBD	DNR, W Polk SWCD, RLWD	2022-2025
Restore at risk or moderately degraded habitats	TBD	DNR, W Polk SWCD, RLWD	2022-2025
Revised AIS Plan	$10,000 - $20,000	W Polk County /RLWD	2018
Fish passage field assessment and implementation	$30,000 - $60,000	DNR, W Polk SWCD/RLWD	2017-2026
Update Education and Outreach Program to include MN Buffer Initiative details and MNDNR and Department of Health Plan well management and well sealing information	$5,000	W Polk SWCD, RLWD	2017
Public Waters buffers under MN Buffer Initiative	$100,000/yr.	W Polk SWCD	2017-2021
Public Drainage Ditch buffers under MN Buffer Initiative	$100,000/yr.	W Polk SWCD, RLWD	2017-2021
Formal agreement for partnership roles and funding acquisition and implementation management	N/A	W Polk SWCD	2017
Long-Term Water Quality Monitoring Program	$250,000	RLWD, SWCD	2017-2026
RLWD Support of the River Watch Program	$460,000 for all RLWD	RLWD	2017-2026
Stage and flow monitoring	$63,000	USGS, MPCA, RLWD	2017-2026
Continuous dissolved oxygen monitoring	$21,000	RLWD	2017-2026
Erosion site inventories, updates, and sharing of information	$32,000	SWCDs, RLWD	2017-2026
Assist the MNDNR with geomorphological assessments	$19,000 for the entire RLR Planning Area	RLWD	2022
Aerial data collection (drone technology) to measure channel stability and erosion rates along river channels	$500,000	RLWD, SWCDs	2017-2026

Action	Cost	Lead Entity	Year(s)
Aerial data collection (drone technology) to inspect ditch systems	$500,000	RLWD, SWCDs	2017-2026
Identify new and/or closed registered feedlots or ag waste systems	$10,000	SWCD's	2023-2026
Conduct a culvert inventory with location, sizing, and fish passage. Plan for systematic replacement of culverts based upon inventory results.	$180,000	SWCD's RLWD	2017-2023
Inventory of legal ditch outlets and natural waterway outlets for grade stabilization structures	$150,000	SWCD's and RLWD	2020-2026
Update existing inventories with the new information as needed	$30,000	All LGU's	2017-2026
Conduct observation well monitoring and participate in well head protection and well sealing education	$50,000	SWCD's	2017-2026
Develop map of groundwater recharge and contamination areas	$10,000	DNR, SWCD's	2017-2026
Conduct a regional hydrogeological assessment of groundwater resources	$10,000	DNR, SWCD's	2017-2026
Update or develop new County Ordinances	$50,000	All LGU's	2017-2026
Update Education and Outreach Programs	$500,000	All LGU's	2017-2026

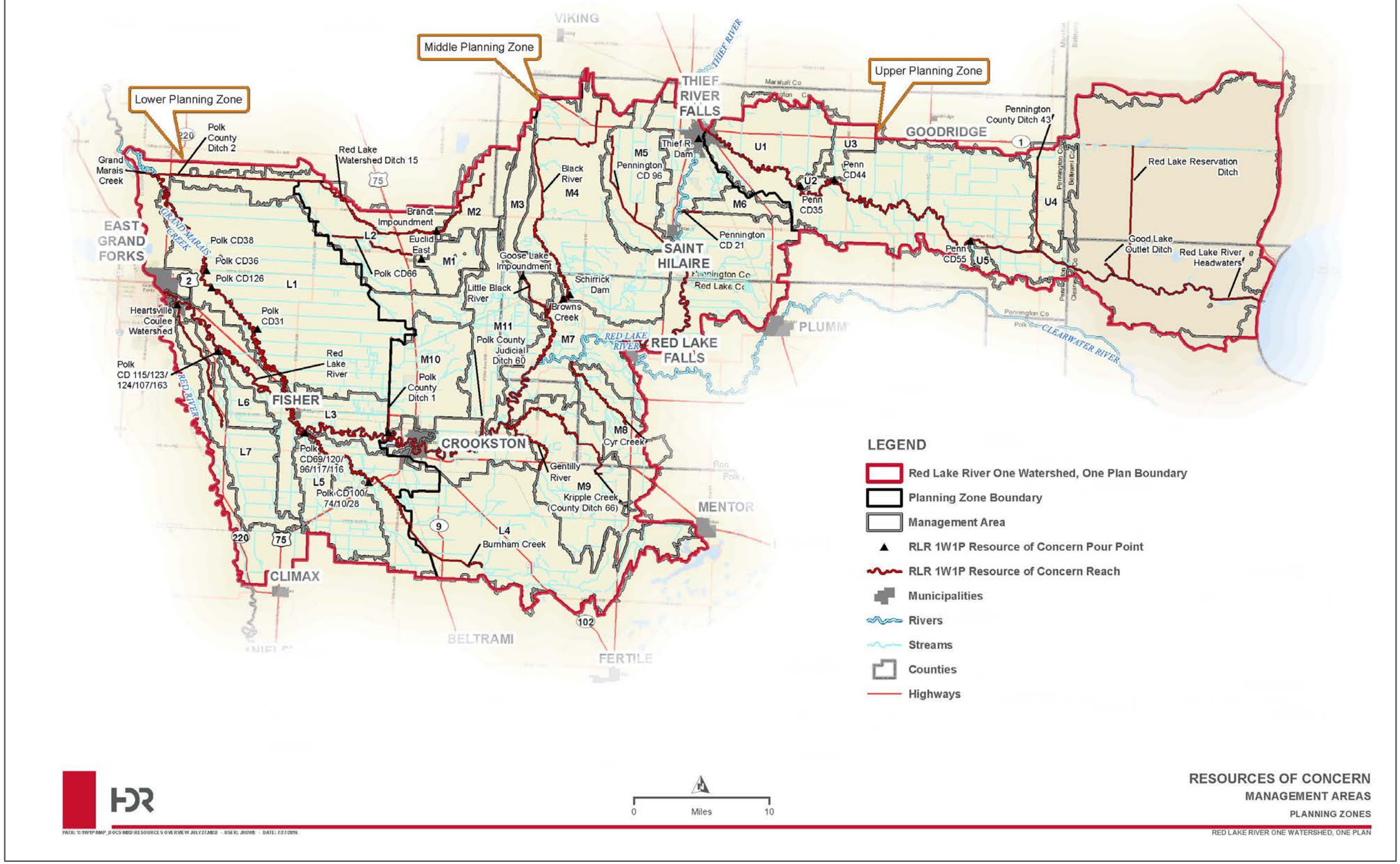

Figure 5 - 1 Overview of Planning Area and Resources of Concern

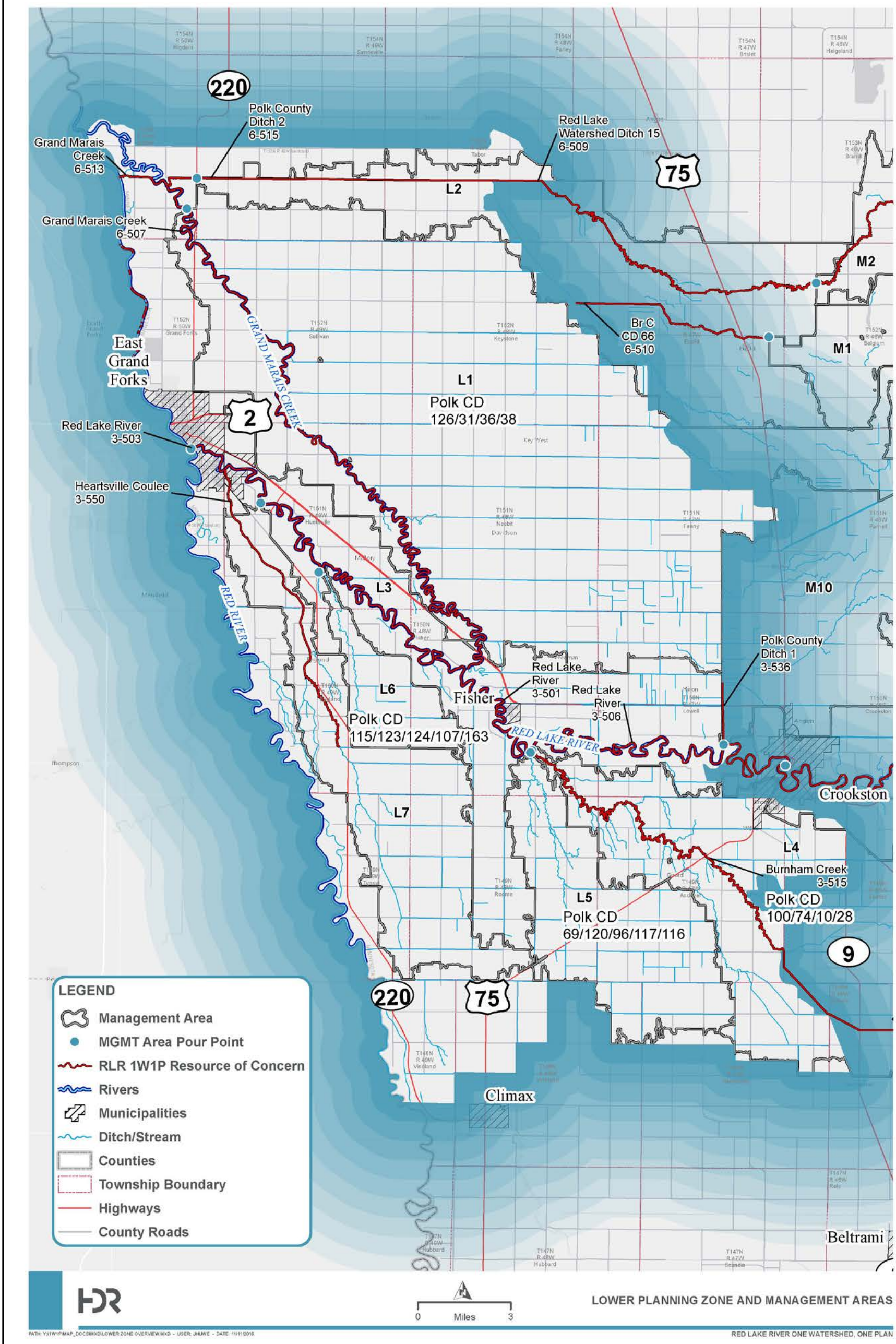

Figure 5 - 2 Lower Planning Zone Resources of Concern and Management Areas

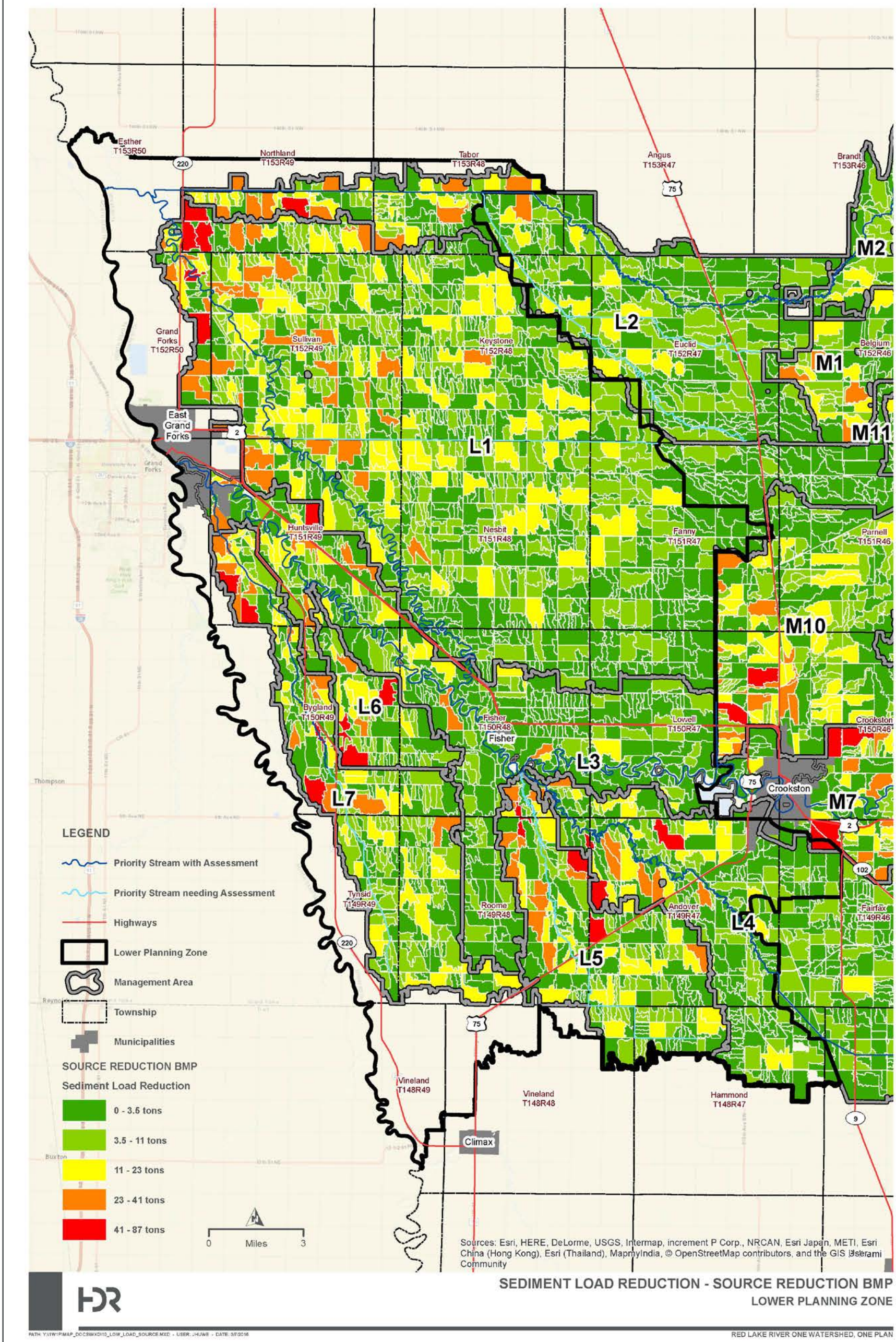

Figure 5 - 3 Sediment Load Reduction by Source BMP

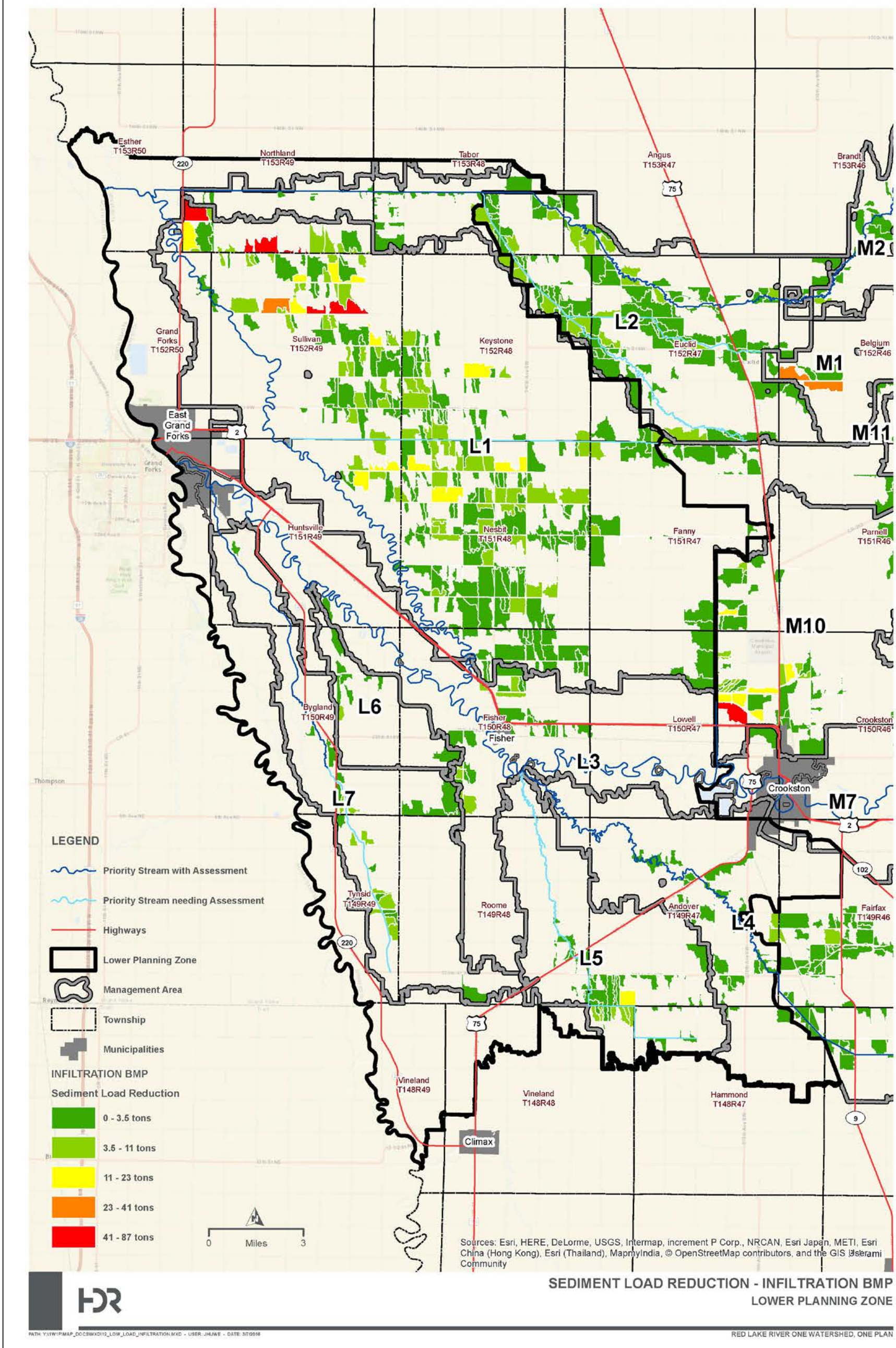

Figure 5 - 4 Sediment Load Reduction by Infiltration BMP

6. MIDDLE PLANNING ZONE

The Middle Planning Zone is located within the Red River Valley and Glacial Lake Agassiz/Aspen Parklands ecoregions. Pronounced beach ridges divide the ecoregions as well as provide topographic relief and diversity of habitat. Soil textures range from fine loam in the western portion to coarse loam in the eastern portion of the zone. The Middle Planning Zone includes the lands within the Red Lake River watershed from Thief River Falls to near Crookston. The zone has diverse habitats including agriculture, grasslands, wetlands, and woodlands. The areas adjacent to the Red Lake River also provide a habitat corridor with a mix of woodlands and pasture. This section includes detailed information on Resources, Issues, Goals, and Implementation Strategies for the Middle Planning Zone.

The implementation strategies outlined in this section may be undertaken by planning partners as time and funding allow. Some amount of prioritization and project screening may be required to focus staff and financial resources on the highest priority actions. **Table 6-1** shows relevant water quality issues established for each resource of concern in the planning zone. **Table 6-2** lists the goals established for each resource of concern relevant to specific issues and prioritization statements. **Table 6-3.1** lists structural implementation and targeted number of BMPs to be installed in each management area. **Table 6-4** lists non-structural implementation strategies relevant to the entire planning zone. Management areas identify priority locations where BMPs are to be installed but will not limit installation of BMPs in other Management Areas.

To use the information presented in this section, users should first reference **Table 6-1** to get a background of the resources of concern in the planning zone including known impairments and management classification for each water quality parameter. Users should then reference **Table 6-2** to see how those resources of concern align with the issues and prioritization statements, and the measurable goals that have been set for each resource of concern. The prioritization statements are listed from high to low priority under each issue so the user should work from the top down for each issue. Users may also want to focus on resources of concern that show up under multiple issues as a way to target implementation that will achieve multiple benefits. After the user selects the resource(s) of concern to address, they should note the management area(s). The user can then find the structural implementation strategies identified for each management area in **Table 6-3.1**. These structural implementation strategies should be looked at as the suite of options and an estimate of the number of BMPs for each management area, but those numbers will likely need to be refined during implementation using PTMApp and/or other project selection and screening criteria as described below. **Table 6-4** includes non-structural actions that will further prioritize, target and measure structural implementation actions identified in this plan and future plans. Users should consider the targeted timeframe of implementation as these actions have been organized so that the highest priority items will occur first.

To evaluate site specific opportunities for the structural BMPs and refine structural implementation strategies, users can conduct evaluations using the PTMApp Web Tool (http://ptmapp.rrbdin.org/) or other project selection and screening criteria. To use PTMApp,

users should reference measurable goals for the chosen resource(s) of concern (Table 6-2), the prescribed set of management strategies for that management area (source reduction, storage, infiltration, filtration, or protection) and the implementation timeframe (Table 6-3.1). The user can then reference paired maps to assess relative load reductions and cost effectiveness of treatment options. Examples of sediment load reduction mapping are shown in Figures 6-3 and Figure 6-4. The user then finalizes the set of BMPs to investigate in PTMApp (or by other means) which determines the specific locations to target and landowners to approach.

6.1 Resources of Concern

Figure 6-1 shows resources of concern in the 1W1P planning area. A more detailed look at resources of concern and their orientation within the Middle Planning Zone management areas is shown in **Figure 6-2**, and summarized in **Table 6-1**. The table lists the specific resource of concern, a brief description of the resource, the unique assessment unit identifier (AUID), known impairments, and a listing of specific water quality parameters and their management classification.

Table 6-1. Middle Planning Zone Resources of Water Quality Concern

Resource of Concern	Description	MGMT Area	AUID	Impairment*	Management Class by Water Quality Parameter
Red Lake River	Black River to Gentilly River	M7	3-502	HgF TSS	E. coli: Needs Protection TSS: Imp. Restorable DO: Assess IBI: High Quality
Red Lake River	Pennington CD 96 to Clearwater River	M7	3-504	HgF TSS	E. coli: Needs Protection TSS: Imp., Restorable DO: Assess IBI: High Quality
Pennington County Ditch 96	Headwaters to Red Lake River	M5	3-505	E. Coli	E. coli: Imp., Restorable TSS: High Quality DO: Assess IBI: High Quality
Red Lake River	Thief River to Thief River Falls Dam	M7	3-509	None	E. coli: Needs Protection TSS: High Quality DO: High Quality IBI: Assess
Red Lake River	Clearwater River to Black River	M7	3-510 3-511	TSS impairments upstream and downstream	E. coli: Assess TSS: Imp, Restorable DO: Assess IBI: High Quality
Red Lake River	Gentilly River to County Ditch 99	M7	3-512	HgF, TSS impairments upstream and downstream	E. coli: Assess TSS: Imp, Restorable DO: Assess IBI: High Quality
Red Lake River	Thief River Falls Dam to Pennington County Ditch 96	M7	3-513	None	E. coli: High Quality TSS: High Quality DO: High Quality IBI: High Quality
Kripple Creek	Unnamed creek to Gentilly River Section 20, Gentilly Twp.	M9	3-525	E. coli, Fish, Macroinvertebrates	E. coli: Imp. Low Quality TSS: High Quality DO: High Quality IBI: Imp., Restorable
Kripple Creek (Judicial Ditch 66)	120th Ave SW to Unnamed creek Section 24, Gentilly Twp.	M9	3-526	Fish, Macroinvertebrates	E. coli: Assess TSS: Assess DO: Assess IBI: Imp. Restorable
Unnamed ditch (Little Black River)	Unnamed ditch to Little Black River Section 4, Louisville Twp.	M3	3-527	E. coli	E. coli: Imp., Restorable TSS: Assess DO: Assess IBI: Assess
Little Black River	Unnamed ditch to Black River Section 4, Louisville Twp.	M3	3-528	Fish	E. coli: Assess TSS: Assess DO: Assess IBI: Low Quality

Chl-a = Chlorophyll-a; DO = Dissolved Oxygen; E. coli = Escherichia coli; HgF = Mercury; IBI = Index of Biological Integrity; pH = acidic/basic; MI = Macroinvertebrates; T = Turbidity; TSS = Total Suspended Sediment; Imp - Impaired

Resource of Concern	Description	MGMT Area	AUID	Impairment*	Management Class by Water Quality Parameter
Black River	Little Black River to Red Lake River	M7	3-529	E. Coli	E. coli: Imp. Restorable TSS: Needs Protection DO: High Quality IBI: Needs Protection
Polk County Ditch 1	CD 60 to Red Lake R	M10	3-536	Not Assessed	E. coli: High Quality TSS: Assess DO: Needs Protection IBI: Assess
County Ditch 21	County Ditch 21, Pennington County	M6	3-541	Not listed for DO or E. coli due to lack of flow	E. coli: Assess TSS: High Quality DO: Assess IBI: Assess
Judicial Ditch 60	Lateral Ditch 4 to Red Lake River	M11	3-542	DO	E. coli: High Quality TSS: High Quality DO: Imp., Restorable IBI: Assess
Branch 5 of Penn. CD96	Headwaters to Br.3 CD 96	M5	3-545	Fish, SWAT model identified a relatively high potential for sediment erosion reductions through buffer strip implementation.	E. coli: Assess TSS: Assess DO: Assess IBI: Imp., Low Quality
Burnham Creek	County Ditch 106 to Polk County Ditch 15	L4	3-551	Fish, Macroinvertebrates	E. coli: Assess TSS: Assess DO: Assess IBI: Imp., Low Quality (fish) IBI: Imp., Restorable (MI)
Gentilly River	County Ditch 140 to Red Lake River	M9	3-554	E. coli, Fish, Macroinvertebrates	E. coli: Imp., Restorable TSS: High Quality DO: Needs Protection IBI: Imp., Restorable (fish) IBI: Imp., Low Quality (MI)
Cyr Creek	County Ditch 14 to Red Lake River	M8	3-556	E. coli, Fish	E. coli: Imp., Low Quality TSS: High Quality DO: Needs Protection IBI: Imp., Restorable
Black River	Headwaters to – channelized portion	M4	3-557	Not officially listed, but continuous DO data indicates that the reach fails to meet the standard	E. coli: Needs Protection TSS: Needs Protection DO: Needs Protection IBI: Needs Protection
Black River	End of channelized reach to Little Black River	M4 M7	3-558	E. coli, Fish, Macroinvertebrates, DO	E. coli: Imp., Restorable TSS: High Quality DO: Imp., Restorable IBI: Low Quality
Red Lake Watershed Ditch 15	Headwaters to County Ditch 66	M1 L2	6-509	DO	E. coli: Needs Protection TSS: High Quality DO: Imp., Restorable IBI: Assess
Branch C of CD 66	Headwaters to County Ditch 66	L2	6-510	No official impairment	E. coli: Assess TSS: Assess DO: Needs Protection IBI: Assess
County Ditch 65	Burnham Cr Section 21, Onstad Twp.	L4	3-523	Not assessed	Not assessed

Chl-a = Chlorophyll-a; DO = Dissolved Oxygen; E. coli = Escherichia coli; HgF = Mercury; IBI = Index of Biological Integrity; pH = acidic/basic; MI = Macroinvertebrates; T = Turbidity; TSS = Total Suspended Sediment; Imp - Impaired

Resource of Concern	Description	MGMT Area	AUID	Impairment*	Management Class by Water Quality Parameter
County Ditch 140	Lateral Ditch 6 of CD 140 to Gentilly R	M9	3-524	Not assessed	Not assessed
Browns Creek	Unnamed ditch to Black R Section 35, Wylie Twp.	M4	3-539	Not assessed	Not assessed
Browns Creek	Unnamed ditch to Unnamed ditch Section 36, Wylie Twp.	M4	3-540	Not assessed	Not assessed
County Ditch 96 Branch 1	Branch 2 of CD96 to CD 96 main stem	M5	3-548	Not assessed	Not assessed
Burnham Creek	Branch 1 of Polk CD 72) to CD 106	L4	3-552	Not assessed	Not assessed
Cyr Creek	Headwaters to CR 14	M8	3-555	Not assessed	Not assessed
Penn. CD70	T154 R43W S31 to Red Lake R	M7	3-902	Not assessed	Not assessed
County Ditch 66	Headwaters to CD 2	L2	6-514	Not assessed	Not assessed
Brandt Impoundment	Minimization of sediment and nutrient loads entering the impoundment to preserve the effectiveness of the impoundment and minimize eutrophication.	M2	n/a	Not assessed	Not assessed
Euclid East	Minimization of sediment and nutrient loads entering the impoundment to preserve the effectiveness of the impoundment and minimize eutrophication.	M1	n/a	Not assessed	Not assessed
Goose Lake Impoundment	Goose Lake Impoundment	M3	n/a	Not assessed	Not assessed
Schirrick Dam	Schirrick Dam	M4	n/a	Not assessed	Not assessed
Crookston East DWSMA		M9			Vulnerable
Crookston Southeast DWSMA		M8			Vulnerable
Red Lake Falls DWSMA		M7			Low Vulnerability
St. Hilaire DWSMA		M7			Low Vulnerability
Aaseby Court DWSMA		M7			TBD

Chl-a = Chlorophyll-a; DO = Dissolved Oxygen; E. coli = Escherichia coli; HgF = Mercury; IBI = Index of Biological Integrity; pH = acidic/basic; MI = Macroinvertebrates; T = Turbidity; TSS = Total Suspended Sediment; Imp - Impaired

6.2 Issues of Concern and Measurable Goals

Measurable goals developed for the resources of concern in the Middle Planning Zone are listed in **Table 6-2**. The first two columns show the alignment of prioritization statements, listed from high to low priority, with each of the 1W1P issues of concern for the Middle Planning Zone. The last three columns list measurable goals that were established for specific resources of concern within the various management areas or at specific locations to address each of the prioritization statements. Goals include numeric targets, implementation of structural best management practices, non-structural field assessment, implementation, data collection, studies and outreach activities.

Table 6-2. Middle Planning Zone Issues of Concern and Measurable Goals.

Issue	Prioritization Statements	MGMT Area	Resource Of Concern	Measurable Goal
Surface Water Quality	Restore impaired waters that are closest to meeting state water quality standards.	L4*Activities listed in Chp 5	3-551 (Burnham Cr)	Increase M - IBI to above 35
		M1	6-509 (RLWD #15)	Improve dissolved oxygen levels to meet water quality standards.
		M3	3-527 (Unnamed ditch of the Little Black River)	Improve dissolved oxygen levels to meet water quality standards. Decrease July E-coli geomean by > 69 MPN/100ml and September geomean by >36 MPN/100ml
		M7	3-502 (Red Lake River)	Decrease sediment loads by 62% or 51,324 tons at Fisher to assure that no more than 10% of TSS samples exceed 65 mg/l in future assessments
			3-504 (Red Lake River)	Decrease sediment loads by 55% or 21,943 tons at CSAH 13 in Red Lake Falls to assure that no more than 10% of TSS samples exceed 65 mg/l in future assessments
			3-510 (Red Lake River)	Decrease sediment loads by 10% to assure that no more than 10% of TSS samples exceed 30 mg/l in future assessments
			3-512 (Red Lake River)	Reduce annual sediment loads by 39.2% or 30,776 tons
			3-529 (Black River)	Decrease June E-coli geomean by > 152 MPN/100ml and September geomean by >28 MPN/100ml
		M11	3-542 (Judicial Ditch 60)	Exceed 5.0 mg/L DO as a daily minimum.
		M7 M4	3-558 (Black River)	Exceed 5.0 mg/L DO as a daily minimum in > 90% of measurements Decrease July E-coli geomean by > 27 MPN/100ml

Issue	Prioritization Statements	MGMT Area	Resource Of Concern	Measurable Goal
Surface Water Quality	Restore impaired waters that are closest to meeting state water quality standards	M5	3-505 (Penn. CD 96)	Decrease July E-coli geomean by > 138 MPN/100ml
		M8	3-556 (Cyr Cr)	Increase F-IBI by 100%
		M9	3-525 (Kripple Cr)	Increase Fish IBI to above 42 for Station 05RD077 and 50 for Station 12RD022 Increase Macroinvertebrate IBI to > 41
			3-526 (Kripple Cr – Ditch 66)	Increase Fish IBI to above 42 Increase Macroinvertebrate IBI to > 41
			3-554 (Gentilly River)	Increase Fish IBI to above 42 Decrease June E-coli geomean by > 16 MPN/100ml and September geomean by >7 MPN/100ml and August by > 75 MPN/100ml
	Protect high-quality unimpaired waters at greatest risk of becoming impaired.	L2 *Activities listed in Chp 5	6-509 (RLWD Ditch 15)	Reduce monthly geometric mean E. coli concentrations by 10%
			6-510 (CD 66 Br. C)	Decrease the rate at which DO levels fall below 5.0 mg/L by 10%
		M7	3-502 (Red Lake River)	Reduce monthly geometric mean E. coli concentrations by 10%
			3-504 (Red Lake River)	Reduce monthly geometric mean E. coli concentrations by 10%
			3-509 (Red Lake River)	Reduce monthly geometric mean E. coli concentrations by 10%
			3-529 (Black River)	Exceed 5.0 mg/L DO as a daily minimum Increase F-IBI and M-IBI by 10% Decrease sediment by 10%
		M8	3-556 (Cyr Cr)	Exceed 5.0 mg/L DO as a daily minimum
		M9	3-554 (Gentilly River)	Exceed 5.0 mg/L DO as a daily minimum
		M10	3-536 (County Ditch 1)	Exceed 5.0 mg/L DO as a daily minimum
		M4	3-557 (Black River/ JD 25)	Exceed 5.0 mg/L DO as a daily minimum Reduce monthly geometric mean E. coli concentrations by 10% Decrease sediment loads by 10% to assure that no more than 10% of TSS samples exceed 65 mg/l in future assessments Increase F-IBI and M-IBI by 10%
	Continue long-term monitoring efforts at key locations to provide sufficient data for analysis.	All	All	**See Section 8.2.5 for watershed-wide measureable goals.**

Issue	Prioritization Statements	MGMT Area	Resource Of Concern	Measurable Goal
Surface Water Quality	Restore or improve other impaired waters.	L4 *Activities listed in Chp 5	3-551 (Burnham Cr)	Increase Fish IBI to above 35
		M3	3-528 (Little Black River)	Increase Fish IBI by 25%
		M5	3-545 (Branch 5 of Pennington County Ditch 96)	Increase Fish IBI to above 23
		M4 M7	3-558 (Black River)	Increase Fish IBI to above 47 **Increase Macroinvertebrate IBI to above 41**
		M8	3-556 (Cyr Cr)	Reduce monthly geomean of E. coli by 50%
		M4	3-539 (Browns Creek)	Reduce monthly geometric mean E. coli concentrations by 10% Decrease sediment loads by 10% to assure that no more than 10% of TSS samples exceed 65 mg/l in future assessments
		M9	3-554 (Gentilly River)	Increase Macroinvertebrate IBI to above 41
			3-525 (Kripple Cr)	Reduce monthly geometric mean E. coli concentrations by 40%
Soil Erosion and Sedimentation	Reduce runoff-driven sediment transport to high-quality unimpaired waters at greatest risk of becoming impaired by targeting implementation in subwatersheds with highest export.	M4	3-557 (Black River)	Reduce total sediment export as modeled at management area pour point in PTMApp by 10% to assure that no more than 10% of TSS samples exceed 65 mg/l in future assessments
		M5 M7	3-529 (Black River)	
	Reduce wind erosion with priority on highly erodible soils by targeting implementation in subwatersheds with highest export.	All	All	WEPS Plan and Implementation

Issue	Prioritization Statements	MGMT Area	Resource Of Concern	Measurable Goal
Soil Erosion and Sedimentation	Reduce runoff-driven sediment transport to impaired waters that are closest to meeting state water quality standards by targeting implementation in subwatersheds with highest export.	M7	3-502 (Red Lake River)	Reduce total sediment export as modeled at management area pour point in PTMApp by 25% (20,660 tons) to assure that no more than 10% of TSS samples exceed 65 mg/l in future assessments (long term reduction goal of 51,324 tons)
			3-504 (Red Lake River)	Reduce total sediment export as modeled at management area pour point in PTMApp by 25% (9,900 tons) to assure that no more than 10% of TSS samples exceed 65 mg/l in future assessments (long term reduction goal of 31,943 tons)
	Inventory and evaluate the severity of erosion problems and risks in terms of the local resource as well as downstream resources to guide implementation strategy.	All	All	Reach Assessment Classification, Prioritization and Implementation Plan
	Protect priority stream and river channels (those most susceptible to altered hydrology effects on bank and bed stability.	All	All	Reduce total sediment export as modeled at management area pour point in PTMApp by 25% to assure that no more than 10% of TSS samples exceed 65 mg/l in future assessments.
	Identify, quantify and plan for agricultural practices that promote conservation.	All	All	Reduce total sediment export as modeled at management area pour point in PTMApp by 25% to assure that no more than 10% of TSS samples exceed 65 mg/l in future assessments.
Altered Hydrology	Reduce runoff rates by targeting implementation in subwatersheds with high runoff.	TBD in PTMApp Web	TBD in PTMApp Web	Reduce runoff rates as modeled at management area pour point in PTMApp by 25%
	Identify ideal locations for flood control structures that include multifunctional design.	All	All	Map of suitable potential flood control projects
	Protect disconnected, non-contributing drainage areas from future altered hydrology leading to a connection to water resources downstream.	All	All	Educate landowners on water resource concerns as they relate to altered hydrology and private drainage systems.

Issue	Prioritization Statements	MGMT Area	Resource Of Concern	Measurable Goal
Altered Hydrology	Restore or modify natural water course morphology where feasible to promote adequate drainage as well as channel equilibrium to ensure reduced bank failure, bed aggradation or degradation and allow for natural meander migration and habitat.	TBD	TBD	Reach Assessment Classification, Prioritization and Implementation Plan
	Assure long-term maintenance of multi-purpose flood control structures.	All	All	Develop and adopt a Flood Damage Reduction Control Structure Operation and Maintenance Policy and Guidance
	Promote infiltration, retention, and extended detention practices in new and existing urban developments based on current stormwater best management practices.	Thief River Falls, St. Hilaire, Red Lake Falls, Crookston	Red Lake River	Urban BMP retrofit assessment and implementation plan (Non-infiltration practices will be prioritized in DWSMAs. Existing infiltration basins in vulnerable DWSMAs will be mitigated where feasible.)
Drainage System Management	Utilize information collected from the drainage ditch inventories to prioritize and install side water inlets and buffer strips to ensure adequate support of agriculture without negative downstream ecological and economic impacts.	All	All	Prioritize and target the installation of Buffer Strips and Side Water Inlet Structures based on information obtained from the Drainage Ditch Inventory and Inspection Grant.
	Retrofit or install new subsurface drainage using current drainage water management practices.	All	All	Develop or enhance incentive programs as well as regulatory language; # BMPs (see 6.3.1 Implementation Plan)
	Use current conservation drainage practices on retrofits or installation of new surface and subsurface drainage.	All	All	Develop or enhance incentive program as well as regulatory language; #BMPs (see 6.3.1 Implementation Plan)

Issue	Prioritization Statements	MGMT Area	Resource Of Concern	Measurable Goal
Flood Damage Reduction	Reduce flood flows and breakout flows to reduce damages to local communities, infrastructure, rural homes, and agricultural fields.	All	All	#BMPs (see 6.3.1 Implementation Plan)
	Reduce the risk of flood damage in accordance with the 20% Red River Basin Commission's Long Term Flood Solutions and Technical Paper # 11	All	Distributed detention basins chosen from LRLR1 – LRLR11 (Figure 4-4; Tables 4-11 and 4-12)	10,000 Ac-ft of gated storage in distributed detention basins (10-year goal)
Habitat	Protect, restore, and enhance grasslands and wetlands with special emphasis on prairie core areas and corridor complexes.	All	All	Prairie Core: 40% grassland and 20% wetland within remainder of cropland or other uses
				Prairie Corridor: 10% of each legal land section is to be maintained in permanent perennial cover
				Remainder of Prairie Region: maintain 10% of each Land Type Association in perennial native vegetation
	Protect or restore aquatic habitat of priority reaches.	L4*Activities listed in Chp 5	3-551 (Burnham Cr)	Increase Fish IBI to >24 (long term goal >35) Increase Macroinvertebrate IBI to >22
		M3	3-528 (Little Black River)	Increase Fish IBI to >42 (long term goal >42)
		M4	3-558 (Black River)	Increase Fish IBI to >47 (long term goal >47) Increase Macroinvertebrate IBI to >41 for station 12RD0012 (long term goal >41) and >37 for station 12RD102 (long term goal >37)
			3-557 (Black River)	Maintain or improve on 2015 Fish IBI (stations 07RD022 = 51, 10EM176 = 38, 12RD01450 = 27) Maintain 2015 Macroinvertebrate IBI's at both stations (stations 10EM176 >42 and 12RD014 >23)
		M5	3-545 (CD 96 Br. 5)	Increase Fish IBI to >12 (long term goal >23)
		M7	3-510 (Red Lake River)	Maintain 2015 Fish IBI (stations 10EM048 = 65 and 12RD113 = 74) Maintain 2015 Macroinvertebrate IBIs (stations 10EM048 >53 and 12RD113 >57)
			3-511 (Red Lake River)	Maintain 2015 Fish IBI (61) Maintain 2015 Macroinvertebrate IBI to >66
			3-512 (Red Lake River)	Maintain 2015 Fish IBI (83) Maintain 2015 Macroinvertebrate IBIs to >57
			3-529 (Black River)	Maintain 2015 Fish IBI (50) Maintain 2015 Macroinvertebrate IBIs to >45

Issue	Prioritization Statements	MGMT Area	Resource Of Concern	Measurable Goal
Habitat	Protect or restore aquatic habitat of priority reaches.	M8	3-556 (Cyr Cr)	Increase Fish IBI to >25 (long term goal >42)
		M9	3-525 (Kripple Cr)	Increase Fish IBI to >32 (long term goal >42) Increase Macroinvertebrate IBI to >41 (long term goal >41)
			3-526 (Kripple Creek – County Ditch 60)	Increase Fish IBI to >42 (long term goal >42) Increase Macroinvertebrate IBI to >28 for station 07RD006 (long term goal >41) and >41 for station 12RD044 (long term goal >41)
			3-554 (Gentilly River)	Maintain or exceed Fish IBI of >50 Increase Macroinvertebrate IBI to >41 for both stations (long term goal >41)
		M7	Red Lake River – Crookston gauge	676 cfs April 17 to May 29 413 cfs May 30 to April 16
	Identify areas that provide both unique ecological values and recreational opportunities and develop an implementation and management plan.	All	All	Habitat Evaluation Procedures Analysis and Hydrogeomorphic Analysis
	Expand aquatic and terrestrial non-native and invasive species control programs.	All	All	Revised AIS and Terrestrial Non-Native/invasive Plan
	Restore longitudinal connectivity of priority reaches.	M9 M7, U1 M4	3-554 (Gentilly River) Thief River Dam 3-557 (Black River)	Assess fish passage issues and complete a prioritization plan for installation of fish passage at blocked sites
Shoreland and Riparian Management	Restore or enhance quality vegetated buffers adjacent to natural, altered and artificial watercourses and wetland	All	All	100% compliance for Public Waters buffers under MN Buffer Initiative
				100% compliance for Public Drainage Ditch buffers under MN Buffer Initiative
	Protect riparian corridors and wetlands with existing quality vegetated buffers.	All	All	Update Education and Outreach Program to include MN Buffer Initiative details
Groundwater Protection	Maintain a safe and adequate drinking water supply for residents in order to protect the public's health, safety and general welfare of the community.	All	Groundwater	Provide cost-share assistance to landowners for sealing 8-10 unused wells per year Conduct an unused, unsealed well inventory Educate the public on safe drinking water standards and how to protect our groundwater resources Conduct additional monitoring as needed for drinking water protection

Issue	Prioritization Statements	MGMT Area	Resource Of Concern	Measurable Goal
Groundwater Protection	Protect Drinking Water Supply Management Areas (DWSMAs). Special consideration will be given for DWSMAs with a moderate or high vulnerability.	All	Crookston DWSMA (moderate vulnerability)	Relocate or change the design of proposed stormwater infiltration projects Develop education/outreach materials of proper well management and well sealing
	Implement strategies to conserve ground water supply quality.		DWSMA's Basswood Mobile Home Park (low vulnerability), St. Hilaire (low vulnerability), Red Lake Falls (low vulnerability), Crookston (moderate vulnerability), public well systems, domestic well systems	Update Education and Outreach Programs to include MN DNR and Department of Health information on groundwater protection and conservation Distribute newspaper articles, an annual newsletter, and direct mailings on groundwater conservation Update websites annually Assist public water suppliers with the development of Wellhead Protection Plans Conduct a feasibility study for alternatives related to groundwater conservation, regional recharge potential and groundwater use offsets via rain water and grey water harvesting for irrigation
	Implement strategies to conserve ground water supply quantity.		All	Educate the public on how to conserve and protect our groundwater resources Implement MDA Nitrogen Fertilizer Management Plan
	Conduct sub-surface sewage treatment system (SSTS) inventory and upgrades.	All	All	Conduct an SSTS inventory Develop and implement a SSTS Tracking System to include: Inspection Records and Maintenance and Upgrades Educate the public on proper septic system maintenance and operation
	Work collaboratively with public water suppliers to implement their Wellhead Protection Plans.			Provide technical and educational assistance to the public as it relates to Wellhead Protection Plans

Issue	Prioritization Statements	MGMT Area	Resource Of Concern	Measurable Goal
Source Water Protection	Partnership with the East Grand Forks and Thief River Falls public water suppliers to protect and maintain a safe and adequate drinking water supply.	All	East Grand Forks SWAA; Thief River Falls SWAA	Continue to support and encourage Class I Use designation for Red Lake River, and the Red Lake and Thief Rivers (Thief River Falls) Source Water Protection Areas
	Reduce runoff-driven sediment and pollutant (total organic carbon, haloacetic acid, and Trihalomethanes) transport to surface waters by targeting implementation in subwatersheds with highest export.			Reduce turbidity and TSS levels as specified under Surface Water Quality Reduce Total Organic Carbon (TOC) to less than 12/mg/L Reduce five haloacetic acids (HAA5) to less than 60ug/L Reduce Trihalomethanes (TTHM) to less than 80 ug/L
	Maintain a safe and adequate drinking water supply for residents in order to protect the public's health, safety and general welfare of the community.			Conduct additional monitoring as needed for drinking water protection
	Protect East Grand Forks Source Water Assessment Area (SWAA).		East Grand Forks SWAA (high susceptibility)	Educate the public on Best Management Practices to protect East Grand Forks SWAA
	Conserve surface water drinking supplies.		East Grand Forks SWAA; Thief River Falls SWAA	Educate the public on how to conserve and protect our surface water resources
	Protect surface water quality and quantity of EGF drinking water supply		All	Educate the public, install BMPs

6.3 Implementation Schedule

Table 6-3.1 and **Table 6-4** show the implementation plan for each management area in the Middle Planning Zone. **Table 6-3.1** lists the structural best management practices (BMPs) and **Table 6-4** lists non-structural activities. For each, a lead entity and target schedule are listed.

The following assumed pricing was applied to generate estimates of implementation costs.

Table 6-3.0. Middle Planning Zone Implementation Cost Estimate

NRCS Practice ID	Practice Name	Unit Cost[1]
-	Ag Waste Storage (ea)	$1,000
-	Alternative Tile Intakes (ea)	$500
584	Channel Bed and Stream Channel Stabilization (miles)	$126,300[2]
327	Conservation Cover (acres)	$640
340	Cover Crop (acres)	$107
342	Critical Area Planting (acres)	$868
362	Diversion (each)	$1,900
554	Drainage Water Management (up to 160 acres)	$63,360
386	Field Borders (4 acres per mile)	$670
393	Filter Strips or Riparian Buffer (16.5-ft buffer, sides of channel = 4 acres per mile)	$2,716
410	Grade Stabilization Structure (each)	$8,566
412	Grass Waterways (miles)	$28,076
-	Gravel Pit Reclamation (acres)	$868
-	Impoundment (ac-ft)	$1,000
-	Milkhouse Waste Storage Treatment (each)	$1,000
-	Multi-Stage Ditch (miles)	$311,520[3]
590	Nutrient Management (acres)	$1.00[4]
	Precision Ag (acres)	$20
338	Prescribed Burning (acres)	$100
-	Raingardens (each)	$5,000
329	Residue and Tillage Management (acres)	$17
643	Restoration & Management of Rare/Declining Habitat (acres)	$868
528/382	Rotational and Prescribed Grazing (acres)	$487
-	Septic System Upgrades (each)	$8,000[5]
-	Stormwater Detention Basins (each)	$75,000[6]
580	Streambank, Shoreland, and Roadside protection (miles)	$429,937
612	Tree/Shrub Establishment (acres)	$453
645	Upland Wildlife Habitat Management (acres)	$20
-	Wastewater and Feedlot Runoff Control (each)	$1,000

NRCS Practice ID	Practice Name	Unit Cost[1]
638	Water and Sediment Control Basins (each)	$10,250
-	Water Control Structures (each)	$1,000
-	Well Sealing (each)	$500
657	Wetland Restoration (acres)	$6,735

[1] Costs for NRCS practices were derived from the 75th percentile of 2016 NRCS EQIP costs.

[2] Unit costs for construction of rock cross veins, rock weirs, rock vortex weirs and step pools (The Virginia Stream Restoration and Stabilization Best Management Practices Guide, 2004). Burnham Creek was used as a representative stream to estimate 15 structures per mile, 25'x3'x3' structures; a 3% cost of inflation for materials costs was applied to the 2004 cost per cubic yard of $90. Construction was estimated by multiplying 4 times the material unit cost given the complexity of stream work. For the same reason, design and engineering was assumed to be 30% of the total costs. Final unit costs, above, represent the estimated year 2025 costs.

[3] Per Powell et al, 2007 and Kramer, 2011 as presented by University of Minnesota Two-Stage Ditch Economics. Low end linear foot cost data disregarded for calculation of the unit costs, above.

[4] Derived from the NRCS publication Costs associated with Development and Implementation of Comprehensive Nutrient Management Plans, Part 1. The average annual costs per farm for farms within the Corn Belt was $973. The average farm size in 2012 was 1700 acres in the Red River Valley (Red River Valley Farm Financial Performance presentation by Andrew Swenson, Department of Agribusiness and Applied Economics, North Dakota State University; 2013).

[5] Unit costs provided by Red Lake Soil and Water Conservation District as per recent project experience.

[6] Urban Subwatershed Restoration Series, Chapter 3: Urban Stormwater Retrofit Practices, Center for Watershed Protection (pricing for a 0.3-acre extended detention pond for a 10-acre drainage area = Base Costs + Design and Engineering. Base cost of new construction assumes storage up to the water quality event as follows: Permanent Pool Volume (1800 * Acres) + Water Quality Pool (0.0833 * Impervious cover-averaging 80%). Design and Engineering costs assumed to be an additional 25%.

Table 6-3.1. Structural Implementation Plan for the Middle Planning Zone

MGMT Area	Strategy	Best Management Practice	Total	Unit	Cost	Lead Entity	Year(s)
M1/M2: Brandt Imp.	Protection	Grade Stabilization Structure	1	Each	$ 8,566	SWCDs/NRCS	2017-2026
		Critical Area Planting	2	Acres	$ 1,736	SWCDs	2017-2026
		Tree/Shrub Establishment	30	Acres	$ 13,579	SWCDs	2017-2026
		Well Sealing	3	Each	$ 1,500	SWCDs	2017-2026
		Alternative Tile Intakes	2	Each	$ 1,000	NRCS	2017-2026
		Septic System Upgrades	1	Each	$ 8,000	SWCDs/Environmental Services	2017-2026
		Upland Wildlife Habitat Management	3,000	Acres	$ 60,000	SWCDs/Pheasants Forever/RLWD	2017-2026
		Restoration & Management of Rare/Declining Habitat	500	Acres	$ 434,000	SWCDs/Pheasants Forever/RLWD	2017-2026
		Prescribed Burning	200	Acres	$ 20,000	SWCDs/Pheasants Forever/RLWD	2017-2026
	Source Reduction	Residue and Tillage Management	3,000	Acres	$ 51,000	NRCS	2017-2026
		Nutrient Management	3,000	Acres	$ 3,000	NRCS	2017-2026
		Precision Ag Practices	40	Acres	$ 800	NRCS	2017-2026
	Storage	Drainage Water Management (Tile)	60	Acres	$ 63,360	NRCS/RLWD	2017-2026
	Filtration	Conservation Cover	3,000	Acres	$1,920,338	NRCS	2017-2026
		Cover Crop	10,000	Acres	$1,071,313	NRCS	2017-2026
		Filter Strips	5	Miles	$ 13,580	SWCDs/NRCS/RLWD	2017-2026
		Grass Waterways	0.25	Miles	$ 7,019	SWCDs/NRCS/RLWD	2017-2026
		Field Borders	4	Miles	$ 2,680	NRCS	2017-2026
M3: Little Black River	Protection	Critical Area Planting	80	Acres	$ 69,432	SWCDs	2017-2026
		Grade Stabilization Structure	35	Each	$ 299,810	SWCDs	2017-2026
		Streambank, Shoreland, and Roadside protection	2	Miles	$ 859,874	SWCDs	2017-2026
		Tree/Shrub Establishment	4	Acres	$ 1,811	SWCDs	2017-2026
		Well Sealing	7	Each	$ 3,500	SWCDs	2017-2026
		Alternative Tile Intakes	5	Each	$ 2,500	NRCS	2020-2026
		Septic System Upgrades	4	Each	$ 32,000	SWCDs/Environmental Services	2017-2026
		Upland Wildlife Habitat Management	800	Acres	$ 16,000	SWCDs/Pheasants Forever/RLWD	2020-2026
		Restoration & Management of Rare/Declining Habitat	30	Acres	$ 26,040	SWCDs/Pheasants Forever/RLWD	2020-2026
		Prescribed Burning	200	Acres	$ 20,000	Pheasants Forever/RLWD	2020-2026
		Gravel Pit Reclamation	1	Acres	$ 868	Counties	2020-2026

MGMT Area	Strategy	Best Management Practice	Total	Unit	Cost	Lead Entity	Year(s)
M3: Little Black River	Source Reduction	Residue and Tillage Management	640	Acres	$ 10,880	NRCS	2017-2026
		Nutrient Management	320	Acres	$ 320	NRCS	2017-2026
		Rotational and Prescribed Grazing	320	Acres	$ 155,846	NRCS	2017-2026
		Precision Ag Practices	40	Acres	$ 800	NRCS	2017-2026
	Storage	Water and Sediment Control Basins	10	Each	$ 102,500	SWCDs/RLWD	2020-2026
		Wetland Restoration	20	Acres	$ 134,700	SWCDs/RLWD	2020-2026
		Wastewater and Feedlot Runoff Control	2	Each	$ 2,000	SWCDs/NRCS	2020-2026
		Diversion	5	Each	$ 9,500	SWCDs	2020-2026
	Filtration	Conservation Cover	320	Acres	$ 204,836	NRCS	2017-2026
		Cover Crop	320	Acres	$ 34,282	NRCS	2017-2026
		Filter Strips	7	Miles	$ 19,012	SWCDs/NRCS/RLWD	2017-2026
		Grass Waterways	2	Miles	$ 56,152	SWCDs/NRCS/RLWD	2017-2026
		Field Borders	5	Miles	$ 3,350	NRCS	2017-2026
		Riparian Buffers	10	Miles	$ 27,160	SWCDs/RLWD	2017-2026
M4: Black River	Protection	Channel Bed and Stream Channel Stabilization	1	Miles	$ 126,300	SWCDs	2017-2026
		Critical Area Planting	45	Acres	$ 39,056	SWCDs	2017-2026
		Grade Stabilization Structure	80	Each	$ 685,280	SWCDs	2017-2026
		Streambank, Shoreland, and Roadside protection	2	Miles	$ 859,874	SWCDs	2017-2026
		Tree/Shrub Establishment	10	Acres	$ 4,526	SWCDs	2017-2026
		Well Sealing	15	Each	$ 7,500	SWCDs	2017-2026
		Septic System Upgrades	10	Each	$ 80,000	SWCDs/Environmental Services	2017-2026
		Upland Wildlife Habitat Management	6,000	Acres	$ 120,000	SWCDs/Pheasants Forever/RLWD	2020-2026
		Restoration & Management of Rare/Declining Habitat	45	Acres	$ 39,060	SWCDs/Pheasants Forever/RLWD	2020-2026
		Prescribed Burning	300	Acres	$ 30,000	Pheasants Forever/RLWD	2020-2026
		Gravel Pit Reclamation	2	Acres	$ 1,736	Counties	2020-2026
	Source Reduction	Residue and Tillage Management	960	Acres	$ 16,320	NRCS	2017-2026
		Nutrient Management	640	Acres	$ 640	NRCS	2017-2026
		Rotational and Prescribed Grazing	1,760	Acres	$ 857,153	NRCS	2017-2026
		Precision Ag Practices	40	Acres	$ 800	NRCS	2017-2026

MGMT Area	Strategy	Best Management Practice	Total	Unit	Cost	Lead Entity	Year(s)
M4: Black River	Storage	Drainage Water Management (Tile)	320	Acres	$ 126,270	NRCS/RLWD	2020-2026
		Water and Sediment Control Basins	10	Each	$ 102,500	SWCDs/RLWD	2020-2026
		Wetland Restoration	160	Acres	$1,077,600	SWCDs/NRCS/RLWD	2020-2026
		Wastewater and Feedlot Runoff Control	1	Each	$ 1,000	SWCDs/NRCS/RLWD	2020-2026
		Water Control Structures	2	Each	$ 2,000	NRCS/RLWD	2020-2026
		Ag Waste Storage	1	Each	$ 1,000	SWCDs/NRCS/RLWD	2020-2026
		Diversion	5	each	$ 9,500	SWCDs/RLWD	2020-2026
	Filtration	Conservation Cover	800	Acres	$ 512,090	NRCS	2017-2026
		Cover Crop	320	Acres	$ 34,282	NRCS	2017-2026
		Filter Strips	15	Miles	$ 40,740	SWCDs/NRCS	2017-2020
		Grass Waterways	2.5	Miles	$ 70,190	SWCDs/NRCS/RLWD	2017-2020
		Riparian Buffers	25	Miles	$ 67,900	SWCDs/RLWD	2017-2020
		Field Borders	10	Miles	$ 6,700	NRCS/RLWD	2017-2020
	Infiltration	Multi-Stage Ditch	1	Miles	$ 311,520	Counties/RLWD	2017-2026
	FDR	Impoundment	5000	ac-ft	$5,000,000	RLWD	2017-2026
M5: Penn CD 96	Protection	Channel Bed and Stream Channel Stabilization	1	Miles	$ 126,300	SWCDs	2017-2026
		Critical Area Planting	40	Acres	$ 34,716	SWCDs	2017-2026
		Grade Stabilization Structure	50	Each	$ 428,300	SWCDs/NRCS	2017-2026
		Streambank, Shoreland, and Roadside protection	1	Miles	$ 429,937	SWCDs	2017-2026
		Tree/Shrub Establishment	10	Acres	$ 4,526	SWCDs/NRCS	2017-2026
		Well Sealing	10	Each	$ 5,000	SWCDs	2017-2026
		Septic System Upgrades	5	Each	$ 40,000	SWCDs	2017-2026
		Upland Wildlife Habitat Management	1,500	Acres	$ 30,000	SWCDs/Pheasants Forever/RLWD	2017-2026
		Restoration & Management of Rare/Declining Habitat	20	Acres	$ 17,360	SWCDs/Pheasants Forever/RLWD	2017-2026
		Prescribed Burning	50	Acres	$ 5,000	SWCDs/Pheasants Forever/RLWD	2017-2026
		Gravel Pit Reclamation	2	Acres	$ 1,736	Counties	2017-2026
	Source Reduction	Residue and Tillage Management	320	Acres	$ 5,440	NRCS	2017-2026
		Nutrient Management	320	Acres	$ 320	NRCS	2017-2026
		Rotational and Prescribed Grazing	160	Acres	$ 77,923	NRCS	2017-2026
		Precision Ag Practices	40	Acres	$ 800	NRCS	2017-2026

MGMT Area	Strategy	Best Management Practice	Total	Unit	Cost	Lead Entity	Year(s)
M5: Penn CD 96	Storage	Drainage Water Management (Tile)	160	Acres	$ 63,360	NRCS/RLWD	2017-2026
		Water and Sediment Control Basins	10	Each	$ 102,500	SWCDs/NRCS/RLWD	2017-2026
		Wetland Restoration	80	Acres	$ 538,800	SWCDs/NRCS/RLWD	2017-2026
		Wastewater and Feedlot Runoff Control	1	Each	$ 1,000	SWCDs/NRCS/RLWD	2017-2026
		Water Control Structures	2	Each	$ 2,000	NRCS/RLWD	2017-2026
		Ag Waste Storage	1	Each	$ 1,000	SWCDs/NRCS/RLWD	2017-2026
	Filtration	Conservation Cover	640	Acres	$ 409,672	NRCS	2017-2026
		Cover Crop	160	Acres	$ 17,141	NRCS	2017-2026
		Filter Strips	10	Miles	$ 27,160	SWCDs/NRCS/RLWD	2017-2020
		Grass Waterways	0.5	Miles	$ 14,038	SWCDs/NRCS/RLWD	2017-2020
		Field Borders	10	Miles	$ 6,700	NRCS	2017-2020
	Infiltration	Multi-Stage Ditch	1	Miles	$ 311,520	Counties/RLWD	2017-2026
M6: Penn CD 21	Protection	Channel Stabilization	1	Miles	$ 126,300	SWCDs	2017-2026
		Critical Area Planting	40	Acres	$ 34,716	SWCDs/NRCS	2017-2026
		Grade Stabilization Structure	30	Each	$ 256,980	SWCDs/NRCS	2017-2026
		Streambank, Shoreland, and Roadside protection	1	Miles	$ 429,937	SWCDs/NRCS	2017-2026
		Tree/Shrub Establishment	3	Acres	$ 1,358	SWCDs	2017-2026
		Well Sealing	3	Each	$ 1,500	SWCDs	2017-2026
		Septic System Upgrades	3	Each	$ 24,000	SWCDs	2017-2026
		Upland Wildlife Habitat Management	200	Acres	$ 4,000	SWCDs/Pheasants Forever/RLWD	2017-2026
		Restoration and Management of Rare and Declining Habitat	20	Acres	$ 17,360	SWCDs/Pheasants Forever/RLWD	2017-2026
		Prescribed Burning	10	Acres	$ 1,000	SWCDs/Pheasants Forever/RLWD	2017-2026
	Source Reduction	Residue and Tillage Management	160	Acres	$ 2,720	NRCS	2017-2026
		Nutrient Management	160	Acres	$ 160	NRCS	2017-2026
		Rotational and Prescribed Grazing	80	Acres	$ 38,962	NRCS	2017-2026
		Precision Ag Practices	80	Acres	$ 1,600	NRCS	2017-2026
	Storage	Drainage Water Management (Tile)	160	Acres	$ 63,360	NRCS/RLWD	2017-2026
		Water and Sediment Control Basins	1	Each	$ 10,250	SWCDs/NRCS/RLWD	2017-2026
		Wetland Restoration	10	Acres	$ 67,350	SWCDs/NRCS/RLWD	2017-2026

MGMT Area	Strategy	Best Management Practice	Total	Unit	Cost	Lead Entity	Year(s)
M6: Penn CD 21	Storage	Wastewater and Feedlot Runoff Control	1	Each	$ 1,000	SWCDs/NRCS/RLWD	2017-2026
		Ag Waste Storage	1	Each	$ 1,000	SWCDs/NRCS/RLWD	2017-2026
	Filtration	Conservation Cover	160	Acres	$ 102,418	NRCS	2017-2026
		Cover Crop	160	Acres	$ 17,141	NRCS	2017-2026
		Filter Strips	5	Miles	$ 13,580	SWCDs/NRCS/RLWD	2017-2020
		Grass Waterways	0.5	Miles	$ 14,038	SWCDs/NRCS/RLWD	2017-2020
		Field Borders	5	Miles	$ 3,350	NRCS	2017-2020
M7: Middle Red Lake River	Protection	Channel Bed and Stream Channel Stabilization	2	Miles	$ 252,600	SWCDs	2017-2026
		Critical Area Planting	45	Acres	$ 39,056	SWCDs	2017-2026
		Grade Stabilization Structure	100	Each	$ 856,600	SWCDs/NRCS	2017-2026
		Streambank, Shoreland, and Roadside protection	4	Miles	$1,719,748	SWCDs	2017-2026
		Tree/Shrub Establishment	15	Acres	$ 6,790	SWCDs	2017-2026
		Well Sealing	35	Each	$ 17,500	SWCDs	2017-2026
		Alternative Tile Intakes	1	Each	$ 500	NRCS	2020-2026
		Septic System Upgrades	25	Each	$ 200,000	SWCDs/Environmental Services	2017-2026
		Upland Wildlife Habitat Management	3,000	Acres	$ 60,000	SWCDs/ Pheasants Forever/RLWD	2020-2026
		Restoration & Management of Rare/Declining Habitat	80	Acres	$ 69,440	SWCDs/ Pheasants Forever/ RLWD	2020-2026
		Prescribed Burning	250	Acres	$ 25,000	SWCDs/ Pheasants Forever/ RLWD	2020-2026
	Source Reduction	Residue and Tillage Management	3,040	Acres	$ 51,680	NRCS	2017-2026
		Nutrient Management	2,240	Acres	$ 2,240	NRCS	2017-2026
		Rotational and Prescribed Grazing	1,760	Acres	$ 857,153	NRCS	2017-2026
		Precision Ag Practices	40	Acres	$ 800	NRCS	2017-2026
	Storage	Drainage Water Management (Tile)	320	Acres	$ 126,720	NRCS/RLWD	2020-2026
		Stormwater Detention Basins	10	Each	$ 750,000	SWCDs/RLWD	2020-2026
		Raingardens	10	Each	$ 50,000	SWCDs/RLWD	2020-2026
		Water and Sediment Control Basins	30	Each	$ 307,500	SWCDs/NRCS/RLWD	2020-2026
		Wetland Restoration	320	Acres	$2,155,200	SWCDs/RLWD	2020-2026
		Water Control Structures	50	Each	$ 50,000	NRCS/RLWD	2020-2026
		Diversion	20	Each	$ 38,000	SWCDs/RLWD	2020-2026
		Milkhouse Waste Storage Treatment	1	Each	$ 1,000	SWCDs/NRCS	2020-2026

MGMT Area	Strategy	Best Management Practice	Total	Unit	Cost	Lead Entity	Year(s)
M7: Middle Red Lake River	Filtration	Conservation Cover	2,560	Acres	$1,638,688	NRCS	2017-2026
		Cover Crop	960	Acres	$ 102,846	NRCS	2017-2026
		Filter Strips	30	Miles	$ 81,480	NRCS/RLWD	2017-2020
		Grass Waterways	3.5	Miles	$ 98,266	SWCDs/NRCS/RLWD	2017-2020
		Riparian Buffers	10	Miles	$ 27,160	SWCDs/NRCS/RLWD	2017-2020
		Field Borders	25	Miles	$ 16,750	NRCS	2017-2026
	Infiltration	Multi-Stage Ditch	1	Miles	$ 311,520	Counties/RLWD	2017-2026
M8: Cyr Creek	Protection	Critical Area Planting	5	Acres	$ 4,340	SWCDs	2017-2026
		Grade Stabilization Structure	20	Each	$ 171,320	SWCDs	2017-2026
		Streambank, Shoreland, and Roadside protection	1	Miles	$ 429,937	SWCDs	2017-2026
		Tree/Shrub Establishment	1	Acres	$ 453	SWCDs	2017-2026
		Well Sealing	3	Each	$ 1,500	SWCDs	2017-2026
		Septic System Upgrades	3	Each	$ 24,000	Environmental Services	2017-2026
		Upland Wildlife Habitat Management	3,500	Acres	$ 70,000	SWCDs/Pheasants Forever/RLWD	2017-2026
		Restoration & Management of Rare/Declining Habitat	300	Acres	$ 260,400	SWCDs/ Pheasants Forever/RLWD	2017-2026
		Prescribed Burning	200	Acres	$ 20,000	SWCDs/Pheasants Forever/RLWD	2017-2026
	Source Reduction	Residue and Tillage Management	1,000	Acres	$ 17,000	NRCS	2017-2026
		Nutrient Management	1,000	Acres	$ 1,000	NRCS	2017-2026
		Rotational and Prescribed Grazing	160	Acres	$ 77,923	NRCS	2017-2026
		Precision Ag Practices	160	Acres	$ 3,200	NRCS	2017-2026
	Storage	Drainage Water Management (Tile)	10	Acres	$ 63,360	NRCS/RLWD	2020-2026
		Wetland Restoration	20	Acres	$ 134,700	SWCDs/NRCS/RLWD	2020-2026
		Water Control Structures	15	Each	$ 15,000	NRCS/RLWD	2020-2026
		Water and Sediment Control Basins	10	Each	$ 102,500	SWCDs/RLWD	2020-2026
		Diversion	10	Each	$ 19,000	SWCDs/RLWD	2020-2026
	Filtration	Conservation Cover	320	Acres	$ 204,836	NRCS	2017-2026
		Cover Crop	160	Acres	$ 17,141	NRCS	2017-2026
		Filter Strips	6	Miles	$ 16,296	SWCDs/NRCS/RLWD	2017-2020
		Grass Waterways	3	Miles	$ 84,228	SWCDs/NRCS/RLWD	2017-2020
		Riparian Buffers	15	Miles	$ 40,740	SWCDs/RLWD	2017-2020
		Field Borders	5	Miles	$ 3,350	NRCS	2017-2020

MGMT Area	Strategy	Best Management Practice	Total	Unit	Cost	Lead Entity	Year(s)
M8: Cyr Creek	Infiltration	Multi-Stage Ditch	1	Miles	$ 311,520	Counties/RLWD	2017-2026
M9: Gentilly Creek	Protection	Channel Bed and Stream Channel Stabilization	0.1	Miles	$ 12,630	SWCDs	2017-2026
		Critical Area Planting	4	Acres	$ 3,472	SWCDs	2017-2026
		Grade Stabilization Structure	3	Each	$ 25,698	SWCDs	2017-2026
		Streambank, Shoreland, and Roadside protection	0.1	Miles	$ 42,994	SWCDs	2017-2026
		Tree/Shrub Establishment	2	Acres	$ 905	SWCDs	2017-2026
		Well Sealing	5	Each	$ 2,500	SWCDs	2017-2026
		Septic System Upgrades	2	Each	$ 16,000	Environmental Services	2017-2026
		Upland Wildlife Habitat Management	3,500	Acres	$ 70,000	SWCDs/Pheasants Forever/RLWD	2020-2026
		Restoration & Management of Rare/Declining Habitat	300	Acres	$ 260,400	SWCDs/Pheasants Forever/RLWD	2020-2026
		Prescribed Burning	200	Acres	$ 20,000	SWCDs/Pheasants Forever/RLWD	2020-2026
		Gravel Pit Reclamation	1	Acre	$ 868	Counties	2020-2026
	Source Reduction	Residue and Tillage Management	1,000	Acres	$ 17,000	NRCS	2017-2026
		Nutrient Management	1,000	Acres	$ 1,000	NRCS	2017-2026
		Rotational and Prescribed Grazing	200	Acres	$ 97,404	NRCS	2017-2026
		Precision Ag Practices	40	Acres	$ 800	NRCS	2017-2026
	Storage	Raingardens	1	Each	$ 5,000	SWCDs/RLWD	2020-2026
		Wetland Restoration	40	Acres	$ 269,400	SWCDs/NRCS/RLWD	2020-2026
		Wastewater and Feedlot Runoff Control	1	Each	$ 1,000	SWCDs/NRCS	2020-2026
		Water Control Structures	3	Each	$ 3,000	NRCS/RLWD	2020-2026
		Diversion	5	Each	$ 9,500	SWCDs/RLWD	2020-2026
		Ag Waste Storage	1	Each	$ 1,000	SWCDs/NRCS	2020-2026
	Filtration	Conservation Cover	640	Acres	$ 409,672	NRCS	2017-2026
		Cover Crop	320	Acres	$ 34,282	NRCS	2017-2026
		Filter Strips	8	Miles	$ 21,728	SWCDs/NRCS/RLWD	2017-2020
		Grass Waterways	3	Miles	$ 84,228	SWCDs/RLWD	2017-2020
		Riparian Buffers	20	Miles	$ 54,320	SWCDs/RLWD	2017-2020
		Field Borders	2	Miles	$ 1,340	NRCS	2017-2020

MGMT Area	Strategy	Best Management Practice	Total	Unit	Cost	Lead Entity	Year(s)
M9: Gentilly Creek	Infiltration	Multi-Stage Ditch	1	Miles	$ 311,520	Counties/RLWD	2017-2026
M10/M11: PCD1 and JCD 60	Protection	Critical Area Planting	5	Acres	$ 4,340	SWCDs	2017-2026
		Grade Stabilization Structure	8	Each	$ 68,528	SWCDs	2017-2026
		Streambank, Shoreland, and Roadside protection	0.1	Miles	$ 42,994	SWCDs	2017-2026
		Tree/Shrub Establishment	5	Acres	$ 2,263	SWCDs	2017-2026
		Well Sealing	5	Each	$ 2,500	SWCDs	2017-2026
		Septic System Upgrades	3	Each	$ 24,000	Environmental Services	2017-2026
		Upland Wildlife Habitat Management	3,400	Acres	$ 68,000	SWCDs/Pheasants Forever/RLWD	2020-2026
		Restoration & Management of Rare/Declining Habitat	100	Acres	$ 86,800	SWCDs/Pheasants Forever/RLWD	2020-2026
		Prescribed Burning	150	Acres	$ 15,000	SWCDs/Pheasants Forever/RLWD	2020-2026
		Gravel Pit Reclamation	1	Acres	$ 868	Counties	2020-2026
	Source Reduction	Residue and Tillage Management	2,000	Acres	$ 34,000	NRCS	2017-2026
		Nutrient Management	1,000	Acres	$ 1,000	NRCS	2017-2026
		Rotational and Prescribed Grazing	120	Acres	$ 58,442	NRCS	2017-2026
		Precision Ag Practices	40	Acres	$ 800	NRCS	2017-2026
	Storage	Drainage Water Management (Tile)	40	Acres	$ 63,360	NRCS/RLWD	2020-2026
		Wetland Restoration	40	Acres	$ 269,400	SWCDs/NRCS/RLWD	2020-2026
		Wastewater and Feedlot Runoff Control	1	Each	$ 1,000	SWCDs/NRCS	2020-2026
		Water Control Structures	4	Each	$ 4,000	NRCS/RLWD	2020-2026
	Filtration	Conservation Cover	600	Acres	$ 384,068	NRCS	2017-2026
		Cover Crop	1,000	Acres	$ 107,131	NRCS	2017-2026
		Filter Strips	1	Miles	$ 2,716	SWCDs/RLWD	2017-2020
		Grass Waterways	1	Miles	$ 28,076	SWCDs/RLWD	2017-2020
		Field Borders	5	Miles	$ 3,350	NRCS	2017-2020

Table 6-4. Non-structural Implementation Plan for the Middle Planning Zone

Action	Cost	Lead Entity	Year(s)
Wind Erosion Prediction System (WEPS) Plan	$30,000 - $60,000 for 1W1P Watershed	RLWD	2017
Protect unprotected highly wind-erodible soils	TBD	SWCDs	2017-2026
Conserve protected highly wind-erodible soils	TBD	SWCDs	2017-2026
Reach Assessment Classification, Prioritization and Implementation Plan	$30,000 - $60,000 for 1W1P Watershed	DNR, RLWD	2017
Protect stable, at-risk reaches	TBD	DNR, SWCDs	2017-2026
Restore unstable, at-risk reaches	TBD	DNR, SWCDs	2017-2026
Delineate 10-yr non-contributing areas and develop policy and practices to detain runoff	$10,000 - $20,000 for 1W1P Watershed	RLWD	2017
Map of suitable potential flood control projects	$5,000 - $10,000for 1W1P Watershed	RLWD	2017
Urban BMP retrofit assessment and implementation plan	$10,000 - $15,000 for one City	SWCDs	2017-2020
Conduct Stormwater Assessment	TBD	SWCDs	2020-2026
Buffer and side water inlet prioritization and implementation plan	$10,000 for Planning Zone	SWCDs	2017-2020
Drainage System Management incentive (grant) program development and implementation	$200,000	RLWD	2017-2026
Habitat Evaluation Procedures Analysis and Hydrogeomorphic Analysis	$50,000 - $100,000 for 1W1P Watershed	DNR, RLWD	2020-2021
Protect high value habitats	TBD	DNR, SWCDs	2020-2026
Restore at risk or moderately degraded habitats	TBD	DNR, SWCDs	2020-2026
Revised AIS and Terrestrial Non-Native/invasive Plan	$10,000 - $20,000	SWCDs/RLWD	2017-2026
Fish passage field assessment and implementation	$30,000 - $60,000	DNR/SWCDs/ RLWD	2017-2026
Update Education and Outreach Program to include MN Buffer Initiative details, MNDNR and Department of Health Plan information related to source water, AIS and SSTS	$5,000 - $10,000	SWCDs	2017-2026

Action	Cost	Lead Entity	Year(s)
Participate in wellhead protection and plan development Develop a geologic county atlas. Inventory unused, unsealed wells Seal known unused wells Distribute education/outreach materials of proper well management and well sealing Implement a cost share program to financially assist property owners in sealing unused, unsealed wells on their property, including the public water suppliers in the watershed	$100,000	MDH/RLWD/ SWCDs	2017-2026
Ground water conservation feasibility study	$100,000	Env Services/ SWCDs	2017-2022
Conduct a regional hydrogeological assessment of groundwater resources; map areas of groundwater contamination	$10,000	DNR, SWCD's	2017-2026
SSTS • Inventory SSTS • Develop and implement a SSTS tracking system	$25,000-$35,000	Env Services /SWCDs	2017-2020
Public Waters buffers under MN Buffer Initiative	$100,000	SWCDs	2017-2020
Public Drainage Ditch buffers under MN Buffer Initiative	State Allocation	SWCDs	2017-2020
RLWD Long-Term Water Quality Monitoring Program	$215,000	RLWD	2017-2026
RLWD Support of the River Watch Program	$460,000 for the entire RLWD	RLWD	2017-2026
Stage and flow monitoring	$63,000	USGS, MPCA, RLWD	2017-2026
Red Lake County Water Quality Monitoring	$30,000	Red Lake SWCD	2017-2026
Pennington County Water Quality Monitoring	$60,000	Penn SWCD	2017-2026
Continuous dissolved oxygen monitoring	$102,000	RLWD	2017-2026
Erosion site inventories, updates, and sharing of information	$48,000 (RLWD) + $48,000 (SWCDs)	SWCDs, RLWD	2017-2026
Assist the MNDNR with geomorphological assessments	$19,000 for the entire RLR watershed	RLWD	2022
Aerial data collection (drone technology) to measure channel stability and erosion rates along river channels	$500,000	RLWD, SWCDs	2017-2026
Surface Water Assessment Grant Sampling (SCWDs)	$97,500 for entire watershed	RLWD	2022
Pursue aerial data collection (drone technology) to inspect ditch systems and/or ID BMP opportunities	$500,000	RLWD, SWCDs	2017-2026

Action	Cost	Lead Entity	Year(s)
Conduct a culvert inventory that includes location, sizing, and fish passage. Plan for systematic replacement of culverts based upon inventory results.	$180,000	SWCDs, RLWD	2017-2020
Inventory of legal ditch outlets and natural waterway outlets for grade stabilization structures	$150,000	SWCDs	2020-2026
Identify new and/or closed registered feedlots or ag waste systems	$10,000	SWCDs	2023-2026
Update existing inventories with the new information as needed	$30,000	LGU	2017-2026
Observation well monitoring	$50,000	SWCDs	2017-2026
Update or develop new County Ordinances	$50,000	LGU	2017-2026
Update Education and Outreach Programs	$500,000	LGU	2017-2026

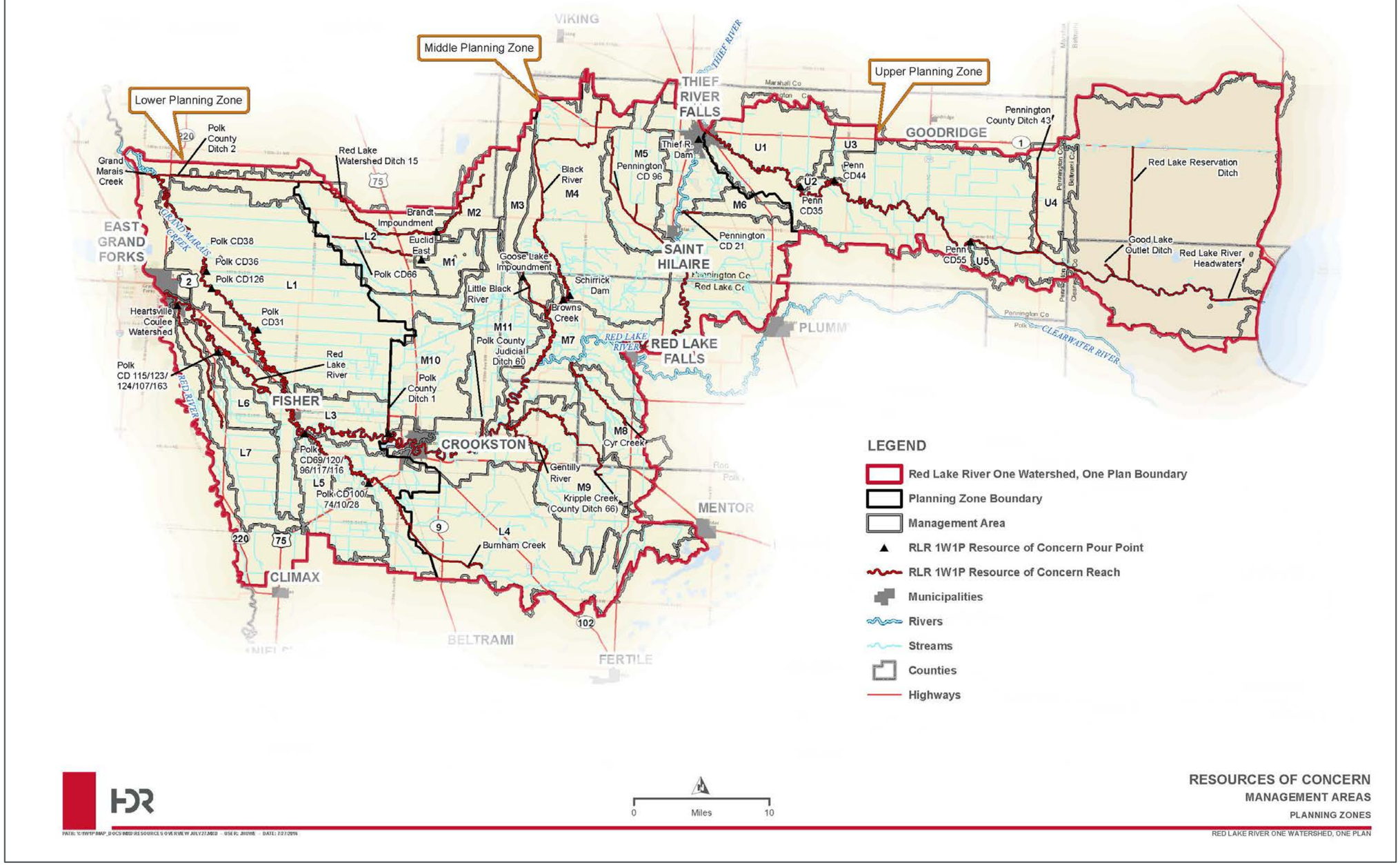

Figure 6 - 1 Overview of Planning Area and Resources of Concern

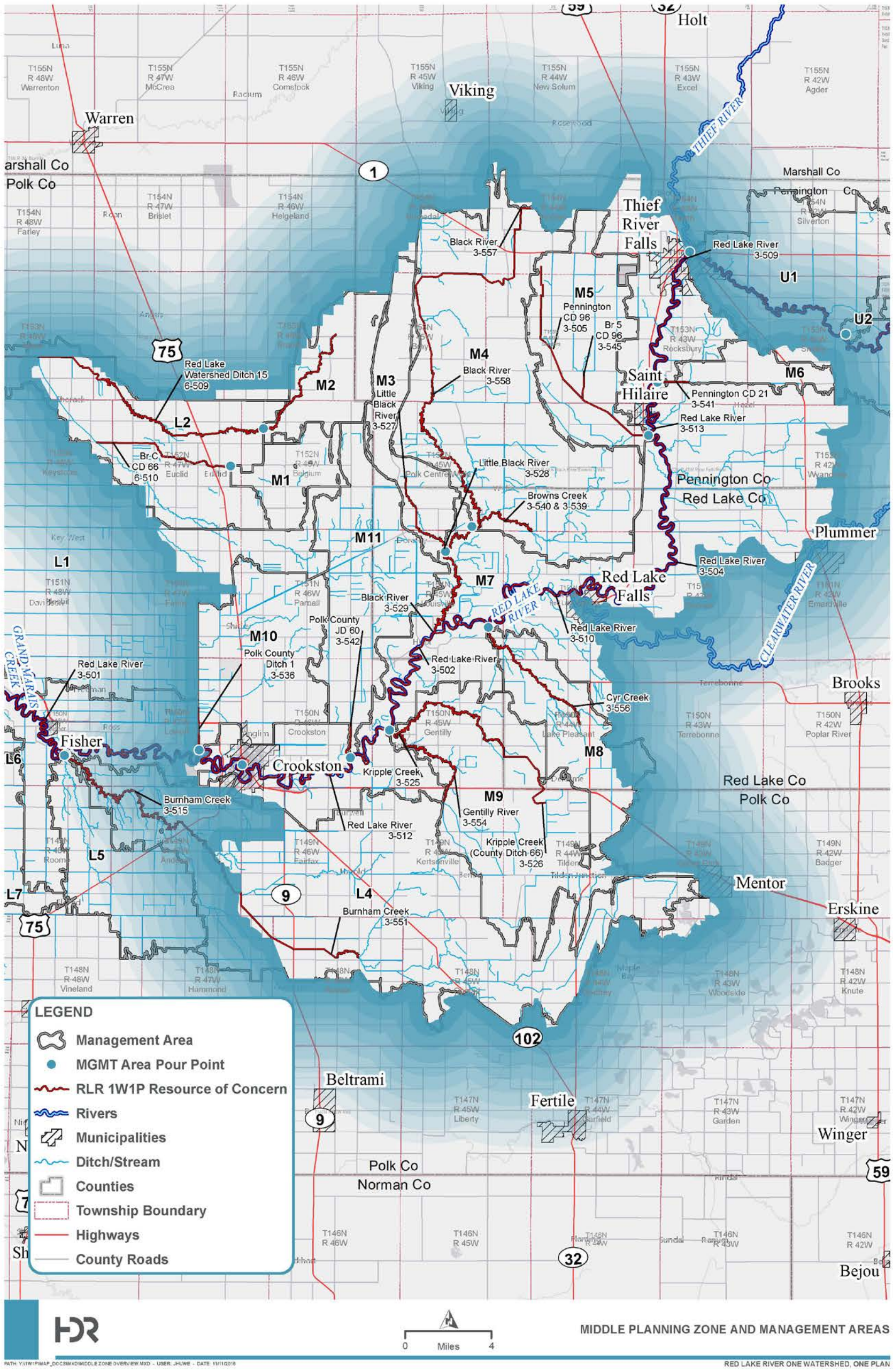

Figure 6 - 2 Middle Planning Zone Resources of Concern and Management Areas

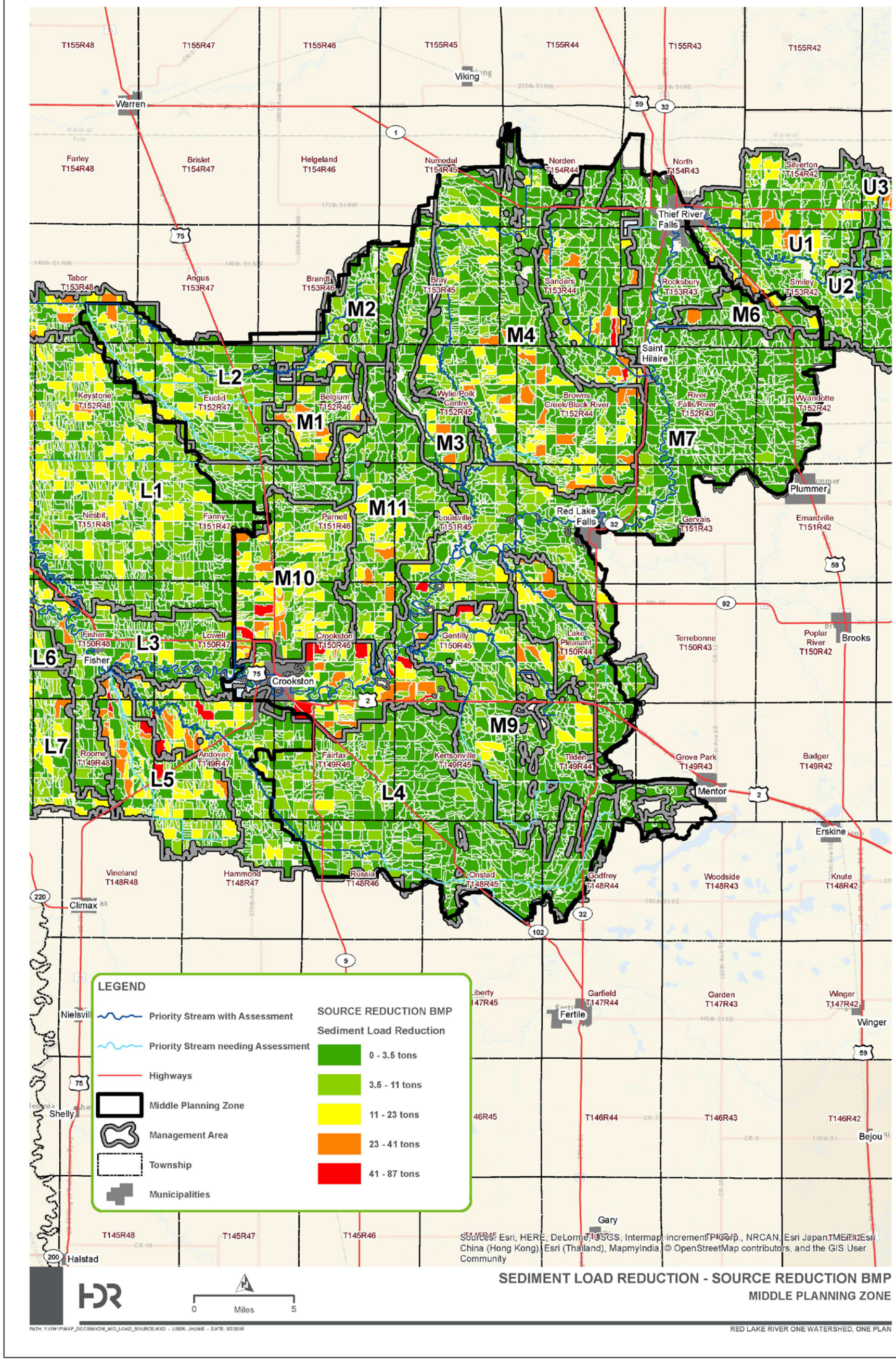

Figure 6 - 3 Sediment Load Reduction by Source BMP

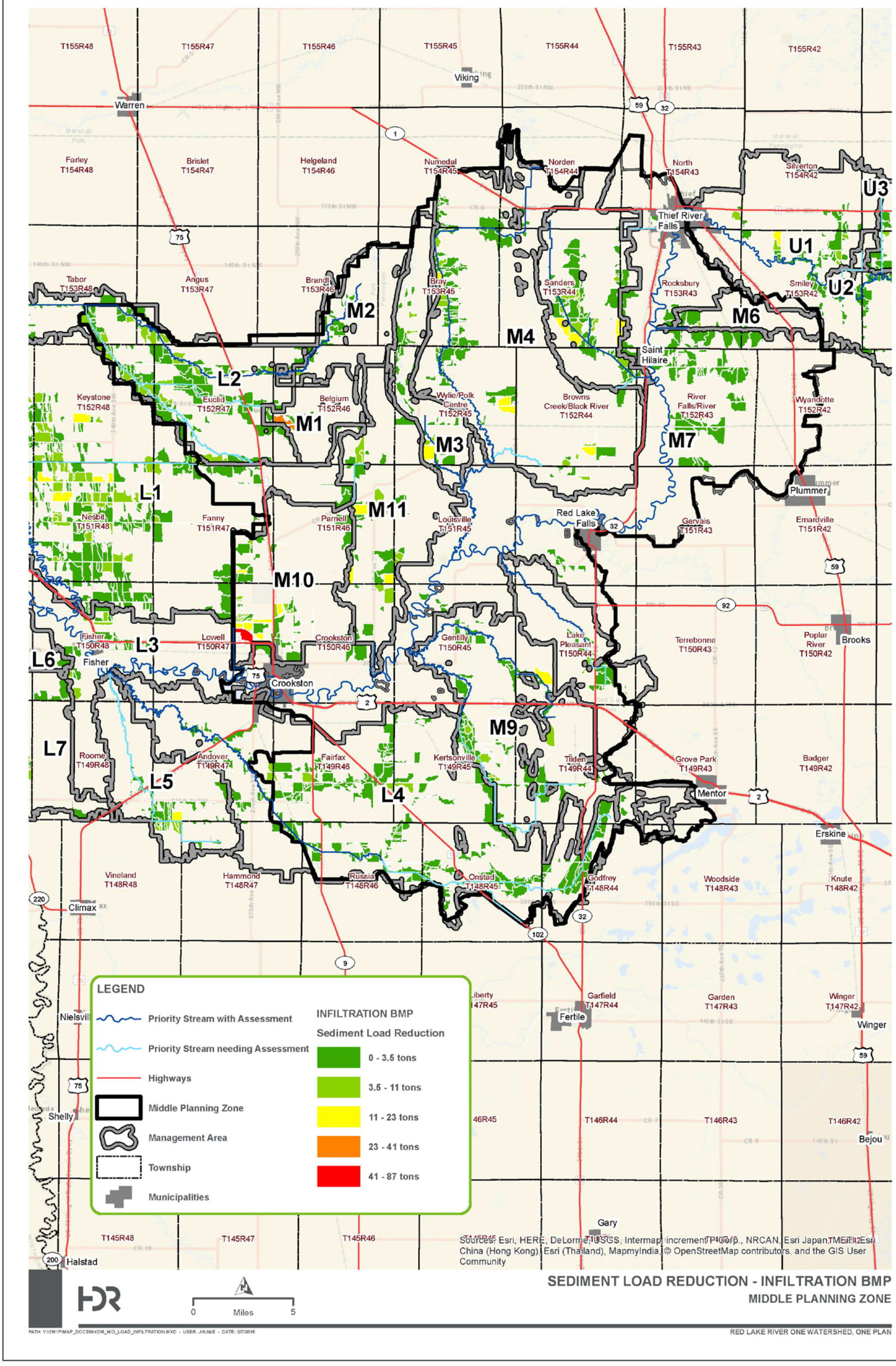

Figure 6 - 4 Sediment Load Reduction by Infiltration BMP

7. Upper Planning Zone

The Upper Planning Zone Watershed outlets at Thief River Falls, and begins at Lower Red Lake. The zone is located within the Glacial Lake Agassiz/Aspen Parklands and the Northern Minnesota Peatlands ecoregions. The western and central portions of this watershed have diverse habitats including agriculture, grasslands, wetlands, brushlands and woodlands. The eastern portion of this watershed, located in the Red Lake Reservation, is dominated by wetlands. Public lands are not common in this subwatershed. The areas adjacent to the Red Lake River also provide a habitat corridor with a mix of woodlands and pasture. This section includes detailed information on Resources, Issues, Goals, and Implementation Strategies for the Upper Planning Zone.

The implementation strategies outlined in this section may be undertaken by planning partners as time and funding allow. Some amount of prioritization and project screening may be required to focus staff and financial resources on the highest priority actions. **Table 7-1** shows relevant water quality issues established for each resource of concern in the planning zone. **Table 7-2** lists the goals established for each resource of concern relevant to specific issues and prioritization statements. **Table 7-3.1** lists structural implementation and targeted number of BMPs to be installed in each management area. **Table 7-4** lists non-structural implementation strategies relevant to the entire planning zone. Management areas identify priority locations where BMPs are to be installed but will not limit installation of BMPs in other Management Areas.

To use the information presented in this section, users should first reference **Table 7-1** to get a background of the resources of concern in the planning zone including known impairments and management classification for each water quality parameter. Users should then reference **Table 7-2** to see how those resources of concern align with the issues and prioritization statements, and the measurable goals that have been set for each resource of concern. The prioritization statements are listed from high to low priority under each issue so the user should work from the top down for each issue. Users may also want to focus on resources of concern that show up under multiple issues as a way to target implementation that will achieve multiple benefits. After the user selects the resource(s) of concern to address, they should note the management area(s). The user can then find the structural implementation strategies identified for each management area in **Table 7-3.1**. These structural implementation strategies should be looked at as the suite of options and an estimate of the number of BMPs for each management area, but those numbers will likely need to be refined during implementation using PTMApp and/or other project selection and screening criteria as described below. **Table 7-4** includes non-structural actions that will further prioritize, target and measure structural implementation actions identified in this plan and future plans. Users should consider the targeted timeframe of implementation as these actions have been organized so that the highest priority items will occur first.

To evaluate site specific opportunities for the structural BMPs and refine structural implementation strategies, users can conduct evaluations using the PTMApp Web Tool (http://ptmapp.rrbdin.org/) or other project selection and screening criteria. To use PTMApp,

users should reference measurable goals for the chosen resource(s) of concern (Table 7-2), the prescribed set of management strategies for that management area (source reduction, storage, infiltration, filtration, or protection) and the implementation timeframe (Table 7-3). The user can then reference paired maps to assess relative load reductions and cost effectiveness of treatment options. Examples of sediment load reduction mapping are shown in Figures 7-3 and Figure 7-4. The user then finalizes the set of BMPs to investigate in PTMApp (or by other means) which determines the specific locations to target and landowners to approach.

7.1. Resources of Concern

Figure 7-1 shows resources of concern in the 1W1P planning area. A more detailed look at resources of concern and their orientation within the Upper Planning Zone management areas is shown in **Figure 7-2**, and summarized in **Table 7-1**. The table lists the specific resource of concern, a brief description of the resource, the unique assessment unit identifier (AUID), known impairments, and a listing of specific water quality parameters and their management classification.

Table 7-1. Upper Planning Zone Resources of Water Quality Concern

MGMT Area	Resource of Concern	Description	AUID	Impairment	Management Class by Water Quality Parameter
U1	Red Lake River	Headwaters to Clearwater / Pennington County Line, Sec. 7, T152N, R38W	3-560	DO	E. coli: High Quality TSS: Needs Protection DO: Imp. Restorable IBI: High Quality
U1	Red Lake Nation Reservation Ditch to Red Lake River	Unnamed ditch to Red Lake River Section 14, T152N, R38W	3-543	Not assessed	E. coli: Assess TSS: Assess DO: Assess IBI: High Quality
U1	Good Lake outlet ditch	Headwaters to Red Lake River, Sec. 9 T152, R38W	3-544	Not assessed	E. coli: Assess TSS: Assess DO: Assess IBI: High Quality
U4	County Ditch 43*	Road ditch to Red Lake River, Sec. 10, T152N, R39W	3-547	Fish, Macro-invertebrate	E. coli: Assess TSS: Assess DO: Assess IBI: Low Quality
U1	Red Lake River	Clearwater/Pennington Co. line to CD 39	3-561	Meets 30 mg/l TSS standard but exceeds 15 mg/l TSS	E. coli: High Quality TSS: Needs Protection DO: Needs Protection IBI: High Quality
U1	Red Lake River	CD 39 to Thief River	3-562	Meets 30 mg/l TSS standard but exceeds 15 mg/l TSS	E. coli: High Quality TSS: Needs Protection DO: High Quality IBI: Needs Protection
U1	Thief River Dam	Thief River Dam-City of Thief River Drinking Water Reservoir	Not assessed	Not assessed	Protect

Chl-a = Chlorophyll-a; DO = Dissolved Oxygen; E. coli = Escherichia coli; HgF = Mercury; IBI = Index of Biological Integrity; pH = acidic/basic; MI = Macroinvertebrates; T = Turbidity; TSS = Total Suspended Sediment; Imp - Impaired

MGMT Area	Resource of Concern	Description	AUID	Impairment	Management Class by Water Quality Parameter
U2	Penn County Ditch 35	SWAT model identified a relatively high potential for sediment erosion reductions with the application of buffer strips along this ditch.	Not assessed	Not assessed	Assess
U3	Penn County Ditch 44	SWAT model identified a relatively high potential for sediment erosion reductions with the application of buffer strips along this ditch.	Not assessed	Not assessed	Assess
U5	Penn County Ditch 55	SWAT model identified a relatively high potential for sediment erosion reductions with the application of buffer strips along this ditch.	Not assessed	Not assessed	Assess

*This Resource is not a naturally-occurring channel but was used by the MPCA as a biological monitoring site

Chl-a = Chlorophyll-a; DO = Dissolved Oxygen; E. coli = Escherichia coli; HgF = Mercury; IBI = Index of Biological Integrity; pH = acidic/basic; MI = Macroinvertebrates; T = Turbidity; TSS = Total Suspended Sediment; Imp - Impaired

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7.2. Issues of Concern and Measurable Goals

Measurable goals developed for the resources of concern in the Upper Planning Zone are listed in **Table 7-2**. The first two columns show the alignment of prioritization statements, listed from high to low priority, with each of the 1W1P issues of concern for the Upper Planning Zone. The last three columns list measurable goals that were established for specific resources of concern within the various management areas or at specific locations to address each of the prioritization statements. Goals include numeric targets, implementation of structural best management practices, non-structural field assessment, implementation, data collection, studies and outreach activities.

Table 7-2. Upper Planning Zone Issues of Concern and Measurable Goals

Issue	Prioritization Statements	MGMT Area	Resources of Concern	Measurable Goal
Surface Water Quality	Restore impaired waters that are closest to meeting state water quality standards.	U1	3-560	Exceed 5.0 mg/L DO as a daily minimum
		U4	3-547 (County Ditch 43)	Increase F-IBI to above 20
	Protect high-quality unimpaired waters at greatest risk of becoming impaired.	U1	3-562	Decrease sediment loads by 10% to assure that no more than 10% of TSS samples exceed 30 mg/l in future assessments Reduce exceedance rate of the 15 mg/l TSS standard by 40% Increase F-IBI and M-IBI by 10%
			3-560	Decrease sediment loads by 10%
			3-561	Exceed 5.0 mg/L DO as a daily minimum Reduce exceedance rate of the 15 mg/l standard by 60% Decrease sediment loads by 2,000 tons/year (22%)
	Continue long-term monitoring efforts at key locations to provide sufficient data for analysis.	All	All	See Section 8.2.5 for watershed-wide measurable goals.
	Restore or improve other impaired waters	U4	3-547 (County Ditch 43)	Increase M-IBI to > 22
Soil Erosion and Sedimentation	Reduce runoff-driven sediment transport to high-quality unimpaired waters at greatest risk of becoming impaired by targeting implementation in subwatersheds with highest export.	U1	3-561 (Red Lake River) 3-562 (Red Lake River)	Reduce total sediment export as modeled at management area pour point in PTMApp by 10% to assure that no more than 10% of TSS samples exceed 30 mg/l in future assessments
	Reduce wind erosion with priority on highly erodible soils by targeting implementation in subwatersheds with highest export.	TBD	TBD	WEPS Plan and Implementation

Issue	Prioritization Statements	MGMT Area	Resources of Concern	Measurable Goal
Soil Erosion and Sedimentation	Reduce runoff-driven sediment transport to other impaired waters by targeting implementation in subwatersheds with highest export.	U2	Penn CD35	Reduce total sediment export as modeled at management area pour point in PTMApp by 10%
		U3	Penn CD44	Reduce total sediment export as modeled at management area pour point in PTMApp by 10%
		U4/U5	Penn CD55	Reduce total sediment export as modeled at management area pour point in PTMApp by 10%
	Inventory, evaluate and assign management classes to stream and river reaches and prioritize those most susceptible to altered hydrology effects on bank and bed stability.	TBD	TBD	Reach Assessment Classification, Prioritization and Implementation Plan
	Protect priority stream and river channels (those most susceptible to altered hydrology effects on bank and bed stability).	TBD	TBD	Reach Assessment Classification, Prioritization and Implementation Plan
	Inventory and evaluate the severity of erosion problems and risks in terms of the local resource as well as downstream resources to guide implementation strategies.	TBD	TBD	Reach Assessment Classification, Prioritization and Implementation Plan
Altered Hydrology	Reduce runoff rates by targeting implementation in subwatersheds with high runoff.	TBD in PTMApp Web	TBD in PTMApp Web	Reduce runoff rates as modeled at management area pour point in PTMApp by 25%
	Restore or modify natural water course morphology where feasible to promote adequate drainage as well as channel equilibrium	TBD	TBD	Reach Assessment Classification, Prioritization and Implementation Plan
		Upstream channelized reach of the Red Lake River	3-561 (Red Lake River) 3-562 (Red Lake River)	Restoration of complete reach
	Protect disconnected, non-contributing drainage areas from future altered hydrology leading to a connection to water resources downstream.	All	All	Educate landowners on water resource concerns as they relate to altered hydrology on private drainage systems
	Identify ideal locations for flood control structures that include multifunctional design.	All	All	Map of suitable potential flood control projects

Issue	Prioritization Statements	MGMT Area	Resources of Concern	Measurable Goal
Altered Hydrology	Assure long-term maintenance of multi-purpose flood control structures	All	All	Develop and adopt a Flood Damage Reduction Control Structure Operation and Maintenance Policy and Guidance
	Promote infiltration, retention, extended detention practices in new and existing urban developments based on current stormwater best management practices.	Thief River Falls	Red Lake River	Urban BMP retrofit assessment and implementation plan (Non-infiltration practices will be prioritized in DWSMAs. Existing infiltration basins in vulnerable DWSMAs will be mitigated where feasible.)
Drainage System Management	Utilize information collected from the drainage ditch inventories to prioritize and install side water inlets and buffer strips to ensure adequate support of agriculture without negative downstream ecological and economic impacts.	All	All	Side water inlet prioritization and implementation plan
	Retrofit or install new surface and subsurface drainage using current conservation drainage practices.	All	All	Develop or enhance incentive program as well as regulatory language (*see* 7.3.1 Implementation Plan); #BMPs
Flood Damage Reduction	Reduce the risk of flood damage in accordance with the 20% Red River Basin Commission's Long Term Flood Solutions and Technical Paper # 11	All	Distributed detention basins chosen from URLR1 – URLR4 (Figure 4-4; Table 4-10)	5,000 Ac-ft of gated storage in distributed detention basins
	Reduce flood flows and breakout flows to reduce damages to local communities, infrastructure, rural homes, and agricultural fields.	All	All	#BMPs (*see* 7.3.1 Implementation Plan)
Habitat	Protect, restore, and enhance grasslands and wetlands with special emphasis on prairie core areas and corridor complexes.	All	All	Prairie Core: 40% grassland and 20% wetland within remainder of cropland or other uses Prairie Corridor: 10% of each legal land section is to be maintained in permanent perennial cover Remainder of Prairie Region: maintain 10% of each Land Type Association in perennial native vegetation
	Protect or restore aquatic habitat of priority reaches.	U1	3-561 (Red Lake River) 3-562 (Red Lake River)	1. Maintain or improve Fish IBI's at each station (05RD034 = 63; 05RD129 = 58; 10EM149 = 59; 12RD007 = 61; 12RD008 = 71; 12RD018 = 48; 12RD104 = 44) 2. Maintain or improve Macroinvertebrate IBI's at each station (05RD034 P = 62; 05RD129 = 42; 12RD008 = 47; 12RD018 = 57; 12RD104 = 33)

Issue	Prioritization Statements	MGMT Area	Resources of Concern	Measurable Goal
Habitat	Identify areas that provide both unique ecological values and recreational opportunities and develop an implementation and management plan.	All	All	Habitat Evaluation Procedures Analysis and Hydrogeomorphic Analysis
	Expand aquatic and terrestrial non-native and invasive species control programs.	All	All	Revised AIS and Terrestrial Non-native/Invasives Plan
	Restore longitudinal connectivity of priority reaches.	U1	3-561 (Red Lake River) 3-562 (Red Lake River)	Assess fish passage issues and complete a prioritization plan for installation of fish passage at blocked sites (e.g., low-head dam)
	Restore aquatic habitat of other reaches where feasible.	U1	3-561 (Red Lake River) 3-562 (Red Lake River)	Assess in-stream fish habitat issues and complete a prioritization plan for restoration of fish habitat at key sites
Shoreland and Riparian Management	Restore or enhance quality vegetated buffers adjacent to natural, altered and artificial watercourses and wetlands	All	All	100% compliance for Public Waters buffers under MN Buffer Initiative
		All	All	100% compliance for Public Drainage Ditch buffers under MN Buffer Initiative
	Protect riparian corridors and wetlands with existing quality vegetated buffers	All	All	Update Education and Outreach Program to include MN Buffer Initiative details
Groundwater Protection	Implement strategies to protect and maintain the quality of ground water supply with special consideration given for DWSMAs with a moderate or high vulnerability	U1 (potential for lateral groundwater drift to Middle Zone)		Relocate or change the design of proposed storm water infiltration projects in highly vulnerable DWSMAs Coordinate with municipal water suppliers to develop a wellhead protection plan and sealing program Develop a geologic county atlas Inventory unused, unsealed wells Seal known unused wells Develop education/outreach materials of proper well management and well sealing Implement a cost share program to financially assist property owners in sealing unused, unsealed wells on their property, including the public water suppliers in the watershed

Issue	Prioritization Statements	MGMT Area	Resources of Concern	Measurable Goal
Groundwater Protection	Implement strategies to conserve and maintain ground water supply quality	All	All	Update Education and Outreach Program to include MNDNR and Department of Health Plan information groundwater protection and conservation Distribute quarterly newsletters and newspaper articles Distribute annual groundwater reports and direct mailings Annually update Website Develop a wellhead protection plan and sealing program (as per above)
	Implement strategies to conserve and maintain ground water supply quantity.			Conduct a feasibility study for alternatives related to ground water conservation, regional recharge potential and groundwater use offsets via rainwater and grey water harvesting for irrigation
	Maintain a safe and adequate drinking water supply for residents in order to protect the public's health, safety and general welfare of the community.	All	Groundwater	Provide cost-share assistance to landowners for sealing 8-10 unused wells per year Conduct an unused, unsealed well inventory Educate the public on safe drinking water standards and how to protect our groundwater resources Conduct additional monitoring as needed for drinking water protection
	Implement strategies to conserve ground water supply quality.	All	Public well systems, domestic well systems	Update Education and Outreach Programs to include MN DNR and Department of Health information on groundwater protection and conservation Distribute newspaper articles, an annual newsletter, and direct mailings on groundwater conservation Update websites annually Assist public water suppliers with the development of Wellhead Protection Plans Conduct a feasibility study for alternatives related to groundwater conservation, regional recharge potential and groundwater use offsets via rain water and grey water harvesting for irrigation
	Implement strategies to conserve ground water supply quantity.	All	Public well systems, domestic well systems	Educate the public on how to conserve and protect our groundwater resources

Issue	Prioritization Statements	MGMT Area	Resources of Concern	Measurable Goal
Groundwater Protection	Conduct sub-surface sewage treatment system (SSTS) inventory and upgrades.	All	All	Conduct an SSTS inventory Develop and implement a SSTS Tracking System to include: Inspection Records and Maintenance and Upgrades Educate the public on proper septic system maintenance and operation
	Work collaboratively with public water suppliers to implement their Wellhead Protection Plans.	All	All	Provide technical and educational assistance to the public as it relates to Wellhead Protection Plans
Source Water Protection	Prioritize inner and outer surface water assessment areas to: o Improve surface water quality o Reduce runoff, soil erosion, and sedimentation	All	All	Reduce turbidity and TSS levels as specified under Surface Water Quality Reduce Total Organic Carbon (TOC) to less than 12/mg/L Reduce five haloacetic acids (HAA5) to less than 60ug/L Reduce Trihalomethanes (TTHM) to less than 80 ug/L Install riparian buffers along streams and ditches as per 7.3 Implementation Plan
	Maintain a safe and adequate drinking water supply for residents in order to protect the public's health, safety and general welfare of the community.	Thief River Falls Source Water Assessment Area (SWAA)	All	Conduct additional monitoring as needed for drinking water protection Support land use controls and decisions that result in surface water protection Support farming best management practices for nutrient reduction
	Partnership with Thief River Falls public water supplier to protect and maintain a safe and adequate drinking water supply.	All	All	Continue to support and encourage Class I Use designation for Red Lake River, and the Red Lake and Thief Rivers (Thief River Falls) Source Water Protection Areas
	Reduce runoff-driven sediment and pollutant (total organic carbon, haloacetic acid, and Trihalomethanes) transport to surface waters by targeting implementation in subwatersheds with highest export.	All	All	Reduce turbidity and TSS levels as specified under Surface Water Quality Reduce Total Organic Carbon (TOC) to less than 12/mg/L Reduce five haloacetic acids (HAA5) to less than 60ug/L Reduce Trihalomethanes (TTHM) to less than 80 ug/L
	Conserve surface water drinking supplies.	All	All	Educate the public on how to conserve and protect our surface water resources

7.3 Implementation Schedule

Table 7-3.1 and Table 7-4 show the implementation plan for each management area in the Upper Planning Zone. **Table 7-3.1** lists the structural best management practices (BMPs) and **Table 7-4** lists non-structural activities. For each, a lead entity and target schedule are listed.

The following assumed pricing was applied to generate estimates of implementation costs.

Table 7-3.0. Upper Planning Implementation Cost Estimate

NRCS Practice ID	Practice Name	Unit Cost[1]
-	Ag Waste Storage (ea)	$1,000
-	Alternative Tile Intakes (ea)	$500
584	Channel Bed and Stream Channel Stabilization (miles)	$126,300 [2]
327	Conservation Cover (acres)	$640
340	Cover Crop (acres)	$107
342	Critical Area Planting (acres)	$868
362	Diversion (each)	$1,900
554	Drainage Water Management (up to 160 acres)	$63,360
386	Field Borders (4 acres per mile)	$670
393	Filter Strips or Riparian Buffer (16.5-ft buffer, sides of channel = 4 acres per mile)	$2,716
410	Grade Stabilization Structure (each)	$8,566
412	Grass Waterways (miles)	$28,076
-	Gravel Pit Reclamation (acres)	$868
-	Impoundment (ac-ft)	$1,000
-	Milkhouse Waste Storage Treatment (each)	$1,000
-	Multi-Stage Ditch (miles)	$311,520 [3]
590	Nutrient Management (acres)	$1 [4]
-	Precision Ag (acres)	$20
338	Prescribed Burning (acres)	$100
-	Raingardens (each)	$5,000
329	Residue and Tillage Management (acres)	$17
643	Restoration & Management of Rare/Declining Habitat (acres)	$868
528/382	Rotational and Prescribed Grazing (acres)	$487
-	Septic System Upgrades (each)	$8,000 [5]

NRCS Practice ID	Practice Name	Unit Cost[1]
-	Stormwater Detention Basins (each)	$75,000 [6]
580	Streambank, Shoreland, and Roadside protection (miles)	$429,937
612	Tree/Shrub Establishment (acres)	$453
645	Upland Wildlife Habitat Management (acres)	$20
-	Wastewater and Feedlot Runoff Control (each)	$1,000
638	Water and Sediment Control Basins (each)	$10,250
-	Water Control Structures (each)	$1,000
-	Well Sealing (each)	$500
657	Wetland Restoration (acres)	$6,735

[1] Costs for NRCS practices were derived from the 75th percentile of 2016 NRCS EQIP costs.

[2] Unit costs for construction of rock cross veins, rock weirs, rock vortex weirs and step pools (The Virginia Stream Restoration and Stabilization Best Management Practices Guide, 2004). Burnham Creek was used as a representative stream to estimate 15 structures per mile, 25'x3'x3' structures; a 3% cost of inflation for materials costs was applied to the 2004 cost per cubic yard of $90. Construction was estimated by multiplying 4 times the material unit cost given the complexity of stream work. For the same reason, design and engineering was assumed to be 30% of the total costs. Final unit costs, above, represent the estimated year 2025 costs.

[3] Per Powell et al, 2007 and Kramer, 2011 as presented by University of Minnesota Two-Stage Ditch Economics. Low end linear foot cost data disregarded for calculation of the unit costs, above.

[4] Derived from the NRCS publication Costs associated with Development and Implementation of Comprehensive Nutrient Management Plans, Part 1. The average annual costs per farm for farms within the Corn Belt was $973. The average farm size in 2012 was 1700 acres in the Red River Valley (Red River Valley Farm Financial Performance presentation by Andrew Swenson, Department of Agribusiness and Applied Economics, North Dakota State University; 2013).

[5] Unit costs provided by Red Lake Soil and Water Conservation District as per recent project experience.

[6] Urban Subwatershed Restoration Series, Chapter 3: Urban Stormwater Retrofit Practices, Center for Watershed Protection (pricing for a 0.3-acre extended detention pond for a 10-acre drainage area = Base Costs + Design and Engineering. Base cost of new construction assumes storage up to the water quality event as follows: Permanent Pool Volume (1800 * Acres) + Water Quality Pool (0.0833 * Impervious cover-averaging 80%). Design and Engineering costs assumed to be an additional 25%.

Table 7-3.1. Structural Implementation Plan for the Upper Planning Zone

MGMT Area	Strategy	Best Management Practice	Total	Unit	Cost	Lead Entity	Year(s)
U1: Upstream of TRF	Protection	Channel Bed and Stream Channel Stabilization	1	Miles	$ 126,300	Penn. SWCD/RLWD	2017-2026
		Critical Area Planting	40	Acres	$ 34,716	NRCS	2017-2026
		Grade Stabilization Structure	300	Each	$ 2,569,800	Penn. SWCD/ NRCS/RLWD	2017-2026
		Streambank, Shoreland, and Roadside protection	2	Miles	$ 859,874	Penn. SWCD/RLWD	2017-2026
		Tree/Shrub Establishment	50	Acres	$ 22,632	Penn. SWCD	2017-2026
		Well Sealing	30	Each	$ 15,000	Penn. SWCD	2017-2026
		Alternative Tile Intakes	1	Each	$ 500	Penn. SWCD/NRCS	2017-2026
		Septic System Upgrades	10	Each	$ 80,000	Penn. SWCD	2017-2026
		Upland Wildlife Habitat Management	6,000	Acres	$ 120,000	Penn. SWCD /Pheasants Forever/ RLWD	2017-2026
		Restoration & Management of Rare/Declining Habitat	50	Acres	$ 43,400	Penn. SWCD /Pheasants Forever/RLWD	2017-2026
		Prescribed Burning	400	Acres	$ 40,000	SWCD/Pheasants Forever/RLWD	2017-2026
	Source Reduction	Residue and Tillage Management	1600	Acres	$ 27,200	NRCS	2017-2026
		Nutrient Management	2600	Acres	$ 2,600	NRCS	2017-2026
		Rotational and Prescribed Grazing	480	Acres	$ 233,769	NRCS	2017-2026
		Precision Ag Practices	640	Acres	$ 12,800	NRCS	2017-2026
	Storage	Drainage Water Management (Tile)	320	Acres	$ 126,720	NRCS/RLWD	2017-2026
		Stormwater Detention Basins	4	Each	$ 300,000	SWCD/RLWD	2021-2026
		Raingardens	5	Each	$ 25,000	SWCD/RLWD	2021-2026
		Wetland Restoration	320	Acres	$ 2,155,200	SWCD/NRCS/RLWD	2017-2026
		Wastewater and Feedlot Runoff Control	2	Each	$ 2,000	SWCD/NRCS	2017-2026
		Water Control Structures	1	Each	$ 1,000	NRCS/RLWD	2017-2026
		Ag Waste Storage	1	Each	$ 1,000	NRCS	2017-2026
	Filtration	Conservation Cover	1600	Acres	$ 1,024,180	NRCS	2017-2026
		Cover Crop	320	Acres	$ 34,282	NRCS	2017-2026
		Filter Strips	30	Miles	$ 81,480	SWCD/NRCS/RLWD	2017-2020
		Grass Waterways	2	Miles	$ 56,152	SWCD/NRCS/RLWD	2017-2020
		Riparian Buffers	30	Miles	$ 81,480	SWCD/RLWD	2017-2020
		Field Borders	30	Miles	$ 20,100	NRCS	2017-2020

MGMT Area	Strategy	Best Management Practice	Total	Unit	Cost	Lead Entity	Year(s)
U1: Upstream of TRF	Infiltration	Multi-Stage Ditch	1	Miles	$ 311,520	County/RLWD	2020-2026
	FDR	Impoundment	5000	ac-ft	$ 5,000,000	RLWD	2017-2026
U2: Penn CD 35	Protection	Critical Area Planting	2	Acres	$ 1,736	SWCD/NRCS	2020-2026
		Grade Stabilization Structure	10	Each	$ 85,660	SWCD/NRCS/RLWD	2017-2026
		Streambank, Shoreland, and Roadside protection	1	Miles	$ 429,937	SWCD	2017-2026
		Tree/Shrub Establishment	2	Acres	$ 905	SWCD	2017-2026
		Well Sealing	5	Each	$ 2,500	SWCD	2017-2026
		Septic System Upgrades	2	Each	$ 16,000	SWCD	2017-2026
		Upland Wildlife Habitat Management	160	Acres	$ 3,200	SWCD/Pheasants Forever/RLWD	2017-2026
		Restoration & Management of Rare/Declining Habitat	160	Acres	$ 138,880	SWCD/Pheasants Forever/RLWD	2017-2026
		Prescribed Burning	160	Acres	$ 16,000	SWCD/Pheasants Forever/RLWD	2017-2026
	Source Reduction	Residue and Tillage Management	160	Acres	$ 2,720	NRCS	2017-2026
		Nutrient Management	160	Acres	$ 160	NRCS	2017-2026
		Rotational and Prescribed Grazing	160	Acres	$ 77,923	NRCS	2017-2026
		Precision Ag Practices	160	Acres	$ 3,200	NRCS	2017-2026
	Storage	Drainage Water Management (Tile)	40	Acres	$ 63,360	NRCS/RLWD	2017-2026
		Water and Sediment Control Basins	1	Each	$ 10,250	SWCD/NRCS/RLWD	2017-2026
		Wetland Restoration	80	Acres	$ 538,800	SWCD/NRCS/RLWD	2017-2026
		Wastewater and Feedlot Runoff Control	1	Each	$ 1,000	SWCD/NRCS	2017-2026
	Filtration	Conservation Cover	160	Acres	$ 102,418	NRCS	2017-2026
		Cover Crop	160	Acres	$ 17,141	NRCS	2017-2026
		Filter Strips	6	Miles	$ 16,296	SWCD/NRCS/RLWD	2017-2020
		Grass Waterways	0.5	Miles	$ 14,038	SWCD/NRCS/RLWD	2017-2020
		Field Borders	6	Miles	$ 4,020	NRCS	2017-2020
U3: Penn. CD 44	Protection	Channel Bed and Stream Channel Stabilization	1	Miles	$ 126,300	SWCD/RLWD	2017-2026
		Critical Area Planting	10	Acres	$ 8,680	SWCD/NRCS	2017-2026
		Grade Stabilization Structure	10	Each	$ 85,660	SWCD/NRCS	2017-2026
		Streambank, Shoreland, and Roadside protection	1	Miles	$ 429,937	SWCD/RLWD	2017-2026

MGMT Area	Strategy	Best Management Practice	Total	Unit	Cost	Lead Entity	Year(s)
U3: Penn. CD 44	Protection	Tree/Shrub Establishment	2	Acres	$ 905	SWCD	2017-2026
		Well Sealing	5	Each	$ 2,500	SWCD	2017-2026
		Septic System Upgrades	2	Each	$ 16,000	SWCD	2017-2026
		Upland Wildlife Habitat Management	160	Acres	$ 3,200	SWCD/Pheasants Forever/RLWD	2017-2026
		Restoration & Management of Rare/Declining Habitat	160	Acres	$ 138,880	SWCD/Pheasants Forever/RLWD	2017-2026
		Prescribed Burning	160	Acres	$ 16,000	SWCD/Pheasants Forever/RLWD	2017-2026
	Source Reduction	Residue and Tillage Management	160	Acres	$ 2,720	NRCS	2017-2026
		Nutrient Management	160	Acres	$ 160	NRCS	2017-2026
		Precision Ag Practices	160	Acres	$ 3,200	NRCS	2017-2026
	Storage	Drainage Water Management (Tile)	40	Acres	$ 63,360	NRCS/RLWD	2017-2026
		Wetland Restoration	80	Acres	$ 538,800	SWCD/NRCS/RLWD	2017-2026
		Water and Sed. Control Basin	1	Each	$ 10,250	SWCD/NRCS/RLWD	2017-2026
	Filtration	Conservation Cover	160	Acres	$ 102,418	NRCS	2017-2026
		Cover Crop	160	Acres	$ 17,141	NRCS	2017-2026
		Filter Strips	10	Miles	$ 27,160	SWCD/NRCS/RLWD	2017-2020
		Grass Waterways	0.5	Miles	$ 14,038	SWCD/NRCS/RLWD	2017-2026
		Field Borders	10	Miles	$ 6,700	NRCS	2017-2020
U4: Penn CD 43	Protection	Channel Bed and Stream Channel Stabilization	1	Miles	$ 126,300	SWCD/RLWD	2017-2026
		Critical Area Planting	40	Acres	$ 34,716	SWCD	2017-2026
		Grade Stabilization Structure	10	Each	$ 85,660	SWCD/NRCS/RLWD	2021-2026
		Streambank, Shoreland, and Roadside protection	1	Miles	$ 429,937	SWCD/RLWD	2017-2026
		Tree/Shrub Establishment	3	Acres	$ 1,358	SWCD	2017-2026
		Well Sealing	3	Each	$ 1,500	SWCD	2017-2026
		Septic System Upgrades	3	Each	$ 24,000	SWCD	2017-2026
		Upland Wildlife Habitat Management	150	Acres	$ 3,000	SWCD/Pheasants Forever	2017-2026
		Prescribed Burning	50	Acres	$ 5,000	SWCD/Pheasants Forever	2017-2026
	Source Reduction	Residue and Tillage Management	320	Acres	$ 5,440	NRCS	2017-2026
		Nutrient Management	160	Acres	$ 160	NRCS	2017-2026
		Rotational and Prescribed Grazing	160	Acres	$ 77,923	NRCS	2017-2026
		Precision Ag Practices	80	Acres	$ 1,600	NRCS	2017-2026

MGMT Area	Strategy	Best Management Practice	Total	Unit	Cost	Lead Entity	Year(s)
U4: Penn CD 43	Storage	Drainage Water Management (Tile)	160	Acres	$ 63,360	NRCS/RLWD	2017-2026
		Wetland Restoration	80	Acres	$ 538,800	SWCD/NRCS/RLWD	2017-2026
		Wastewater and Feedlot Runoff Control	2	Each	$ 2,000	SWCD/NRCS	2017-2026
	Filtration	Conservation Cover	160	Acres	$ 102,418	NRCS	2017-2026
		Cover Crop	160	Acres	$ 17,141	NRCS	2017-2026
		Filter Strips	10	Miles	$ 27,160	SWCD/NRCS/RLWD	2017-2020
		Grass Waterways	0.5	Miles	$ 14,038	SWCD/NRCS/RLWD	2017-2026
		Field Borders	10	Miles	$ 6,700	NRCS	2017-2020
	Infiltration	Multi-Stage Ditch	1	Miles	$ 311,520	County/RLWD	2017-2026
U5: Penn CD 55	Protection	Critical Area Planting	2	Acres	$ 1,736	SWCD	2017-2026
		Grade Stabilization Structure	10	Each	$ 85,660	SWCD/NRCS	2017-2026
		Streambank, Shoreland, and Roadside Protection	1	Miles	$ 429,937	SWCD/RLWD/RLWD	2017-2026
		Tree/Shrub Establishment	2	Acres	$ 905	SWCD	2017-2026
		Well Sealing	5	Each	$ 2,500	SWCD	2017-2026
		Septic System Upgrades	2	Each	$ 16,000	SWCD	2017-2026
		Upland Wildlife Habitat Management	160	Acres	$ 3,200	SWCD/Pheasants Forever	2017-2026
		Restoration & Management of Rare/Declining Habitat	160	Acres	$ 138,880	SWCD/Pheasants Forever	2017-2026
		Prescribed Burning	160	Acres	$ 16,000	SWCD/Pheasants Forever	2017-2026
	Source Reduction	Residue and Tillage Management	160	Acres	$ 2,720	NRCS	2017-2026
		Nutrient Management	160	Acres	$ 160	NRCS	2017-2026
		Rotational and Prescribed Grazing	160	Acres	$ 77,923	NRCS	2017-2026
		Precision Ag Practices	160	Acres	$ 3,200	NRCS	2017-2026
	Storage	Drainage Water Management (Tile)	40	Acres	$ 63,360	NRCS/RLWD	2017-2026
		Water and Sediment Control Basins	1	Each	$ 10,250	SWCD/NRCS/RLWD	2017-2026
		Wetland Restoration	80	Acres	$ 538,800	SWCD/NRCS/RLWD	2017-2026
		Wastewater and Feedlot Runoff Control	1	Each	$ 1,000	SWCD/NRCS	2017-2026
	Filtration	Conservation Cover	160	Acres	$ 102,418	NRCS	2017-2026
		Cover Crop	160	Acres	$ 17,141	NRCS	2017-2026
		Filter Strips	6	Miles	$ 16,296	SWCD/NRCS/RLWD	2017-2020
		Grass Waterways	0.5	Miles	$ 14,038	SWCD/NRCS/RLWD	2017-2026
		Field Borders	6	Miles	$ 4,020	NRCS	2017-2020

Table 7-4. Non-structural Implementation Plan for the Upper Planning Zone

Action	Cost	Lead Entity	Year(s)
Wind Erosion Prediction System (WEPS) Plan	$30,000 - $60,000 for 1W1P Watershed	Penn. SWCD/RLWD	2017-2020
Protect unprotected highly wind-erodible soils	TBD	Penn. SWCD	2017-2026
Conserve protected highly wind-erodible soils	TBD	Penn. SWCD	2017-2026
Reach Assessment Classification, Prioritization and Implementation Plan	$30,000 - $60,000 for 1W1P Watershed	DNR, Penn. SWCD and RLWD	2017
Protect stable, at-risk reaches	TBD	DNR, Penn. SWCD and RLWD	2017-2026
Restore unstable, at-risk reaches	TBD	DNR, Penn. SWCD and RLWD	2017-2026
Delineate 10-yr non-contributing areas and develop policy and practices to detain runoff	$10,000 - $20,000 for 1W1P Watershed	RLWD	2017
Map suitable potential flood control projects	$5,000 - $10,000 for 1W1P Watershed	RLWD	2017
Urban BMP retrofit assessment and implementation plan	$10,000 - $15,000 per City	Penn. SWCD	2018
Conduct stormwater assessment for Thief River Falls	$95,000	Penn. SWCD	2019-2020
Develop side water inlet prioritization and implementation plan	$10,000 for Planning Zone	Penn. SWCD	2017
Drainage System Management incentive (grant) program development and implementation	$200,000	RLWD	2017-2026
Habitat Evaluation Procedures Analysis and Hydrogeomorphic Analysis	$50,000 - $100,000 for 1W1P Watershed	DNR, Penn. SWCD and RLWD	2020-2021
Protect high value habitats	TBD	DNR, Penn. SWCD and RLWD	2022-2025
Restore at risk or moderately degraded habitats	TBD	DNR, Penn. SWCD and RLWD	2022-2025
Revise AIS and Terrestrial Non-Native/invasive Plan	$10-,000 - $20,000	Penn. SWCD/RLWD	2018
Fish passage field assessment and implementation	$30,000 - $60,000	DNR, Penn. SWCD/RLWD	2022
Update Education and Outreach Program to include MN Buffer Initiative details, MNDNR and Department of Health Plan information related to well management, well sealing, AIS and SSTS	$5,000	Penn. SWCD	2017

Action	Cost	Lead Entity	Year(s)
Conduct a regional hydrogeological assessment of groundwater resources; map locations of potential groundwater contamination	$10,000	DNR, SWCD's	2017-2026
• Implement a wellhead protection and sealing program ▪ Develop a county geologic atlas. ▪ Inventory unused, unsealed wells ▪ Seal known unused wells ▪ Distribute education/outreach materials of proper well management and well sealing ▪ Implement a cost share program to financially assist property owners in sealing unused, unsealed wells on their property, including the public water suppliers in the watershed	$100,000	Penn. SWCD	2017-2026
SSTS • Inventory SSTS • Develop and implement a SSTS tracking system	$25,000-$35,000	Penn. SWCD	2017-2020
Public Waters buffers under MN Buffer Initiative	State Allocation	Penn. SWCD	2017-2026
Public Drainage Ditch buffers under MN Buffer Initiative	State Allocation	Penn. SWCD	2017-2026
RLWD Long-Term Water Quality Monitoring Program	$215,000	RLWD	2017-2026
RLWD Support of the River Watch Program	$460,000 for the entire RLWD	RLWD	2017-2026
Stage and flow monitoring	$63,000	USGS, MPCA, RLWD	2017-2026
Pennington County Water Quality Monitoring	$60,000	Penn SWCD	2017-2026
Continuous dissolved oxygen monitoring	$102,000	RLWD	2017-2026
Erosion site inventories, updates, and sharing of information	$48,000 (RLWD) + $48,000 (SWCDs)	Penn. SWCD, RLWD	2017-2026
Assist the MNDNR with geomorphological assessments	$19,000 for the entire RLR watershed	RLWD	2022
Aerial data collection (drone technology) to measure channel stability and erosion rates along river channels	$500,000	RLWD, Penn. SWCD	2017-2026
Surface Water Assessment Grant Sampling (SCWDs)	$97,500 for entire watershed	Penn. SWCD	2017-2026
Pursue aerial data collection (drone technology) to inspect ditch systems and/or ID BMP opportunities	$500,000	RLWD, Penn. SWCD	2017-2026
Identify new and/or closed registered feedlots or ag waste systems	$10,000	Penn. SWCD	2023-2026
Conduct a culvert Inventory that includes location, sizing, and fish passage. Plan for systematic replacement of culverts based upon inventory results.	$180,000	Penn. SWCD	2017-2023
Inventory of legal ditch outlets and natural waterway outlets for grade stabilization structures	$150,000	Penn. SWCD/RLWD	2020-2026
Update existing inventories with the new information as needed	$30,000	LGU	2017-2026
Observation well monitoring	$50,000	Penn. SWCD	2017-2026
Update or develop new County Ordinances	$50,000	Counties	2017-2026

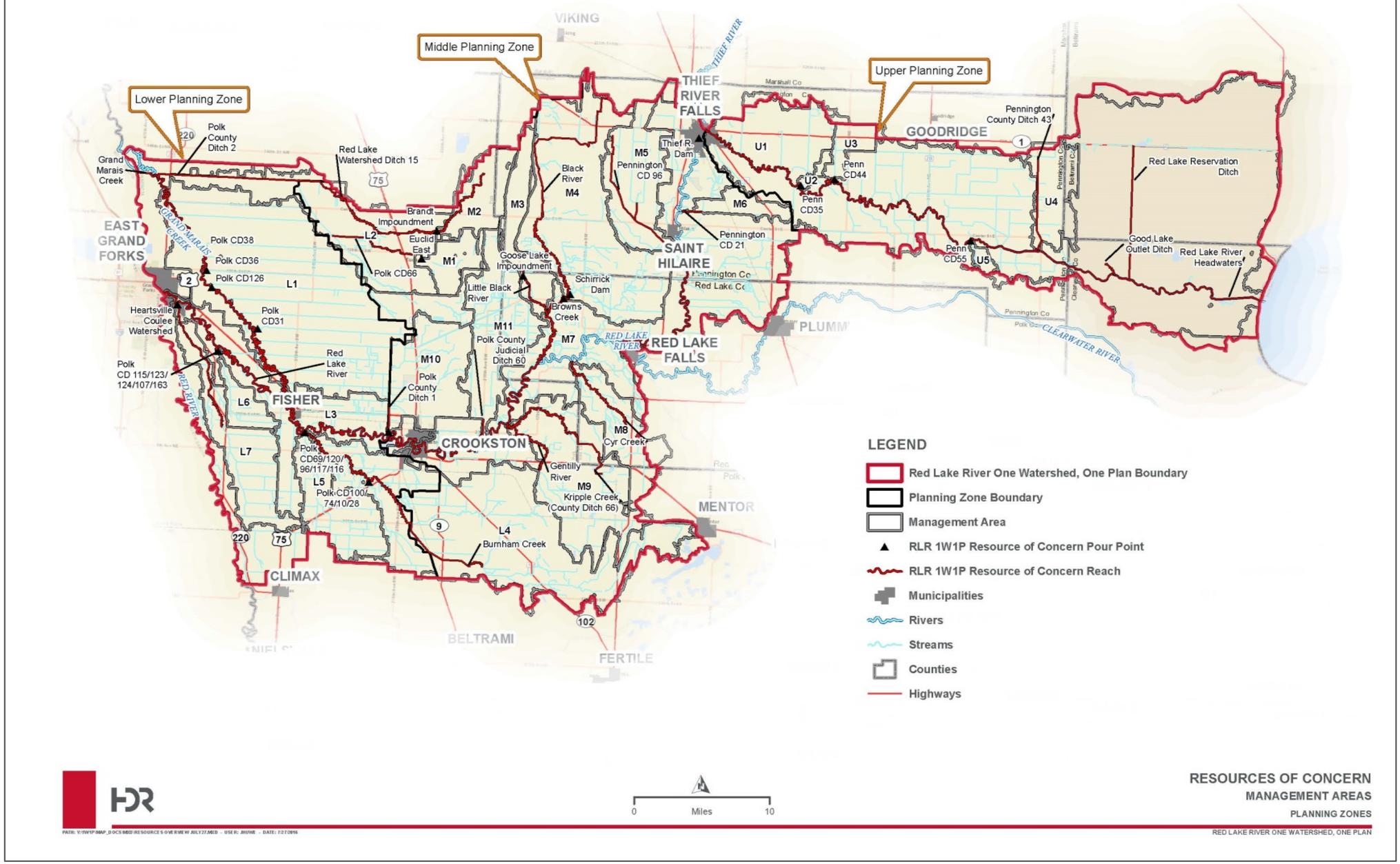


Figure 7 - 1 Overview of Planning Area and Resources of Concern

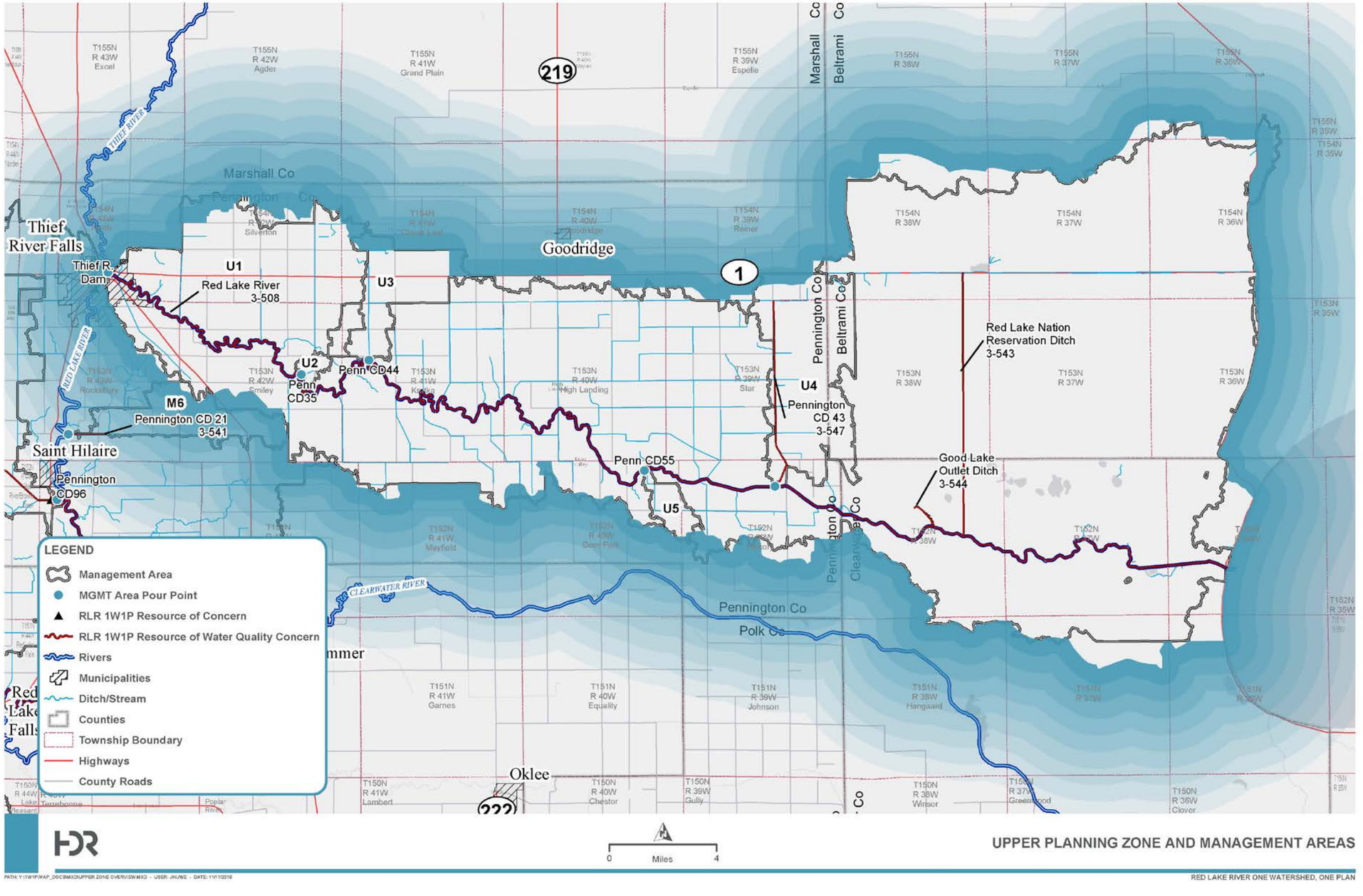


Figure 7 - 2 Upper Planning Zone Resources of Concern and Management Areas

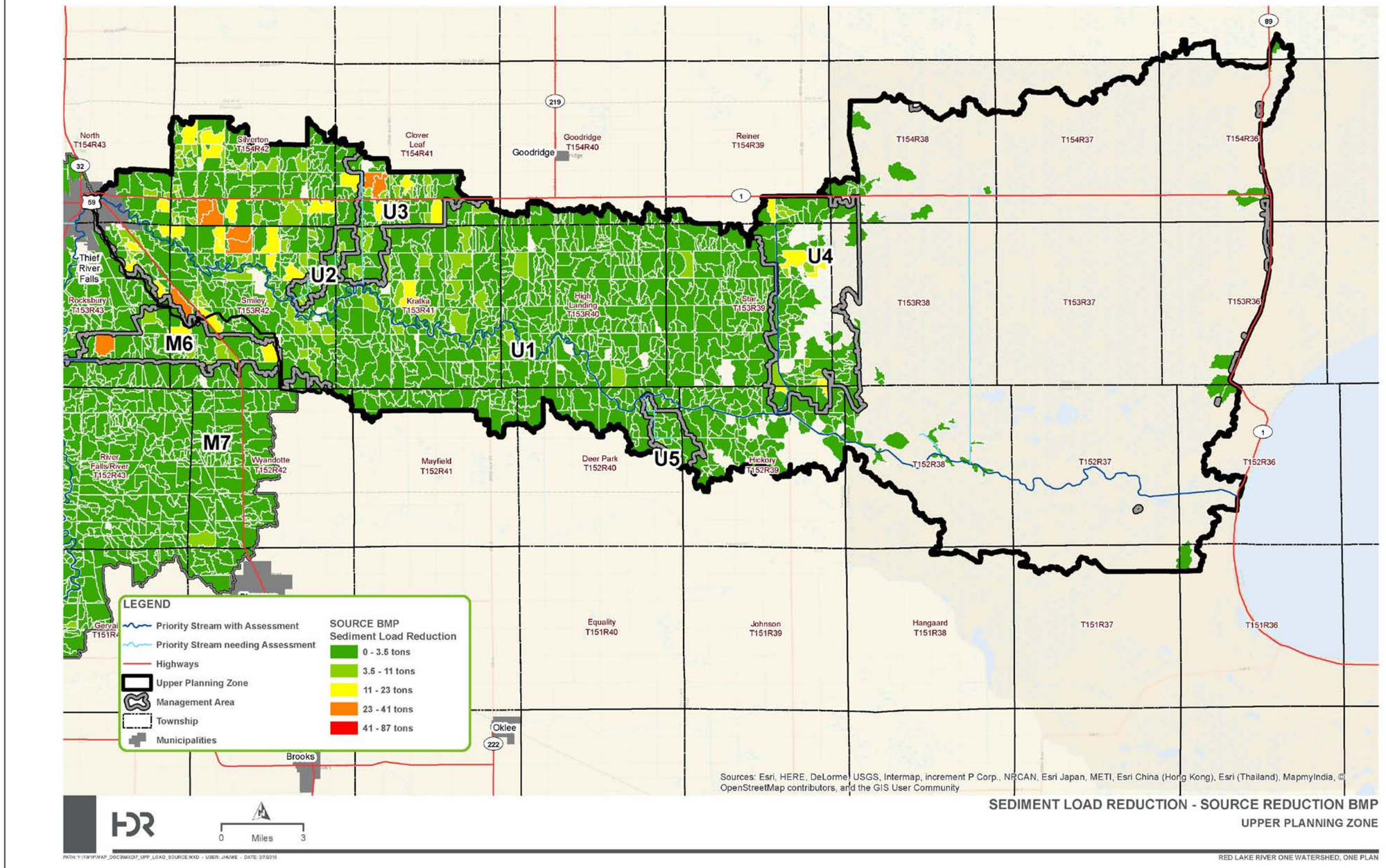


Figure 7 - 3 Sediment Load Reduction by Source BMP

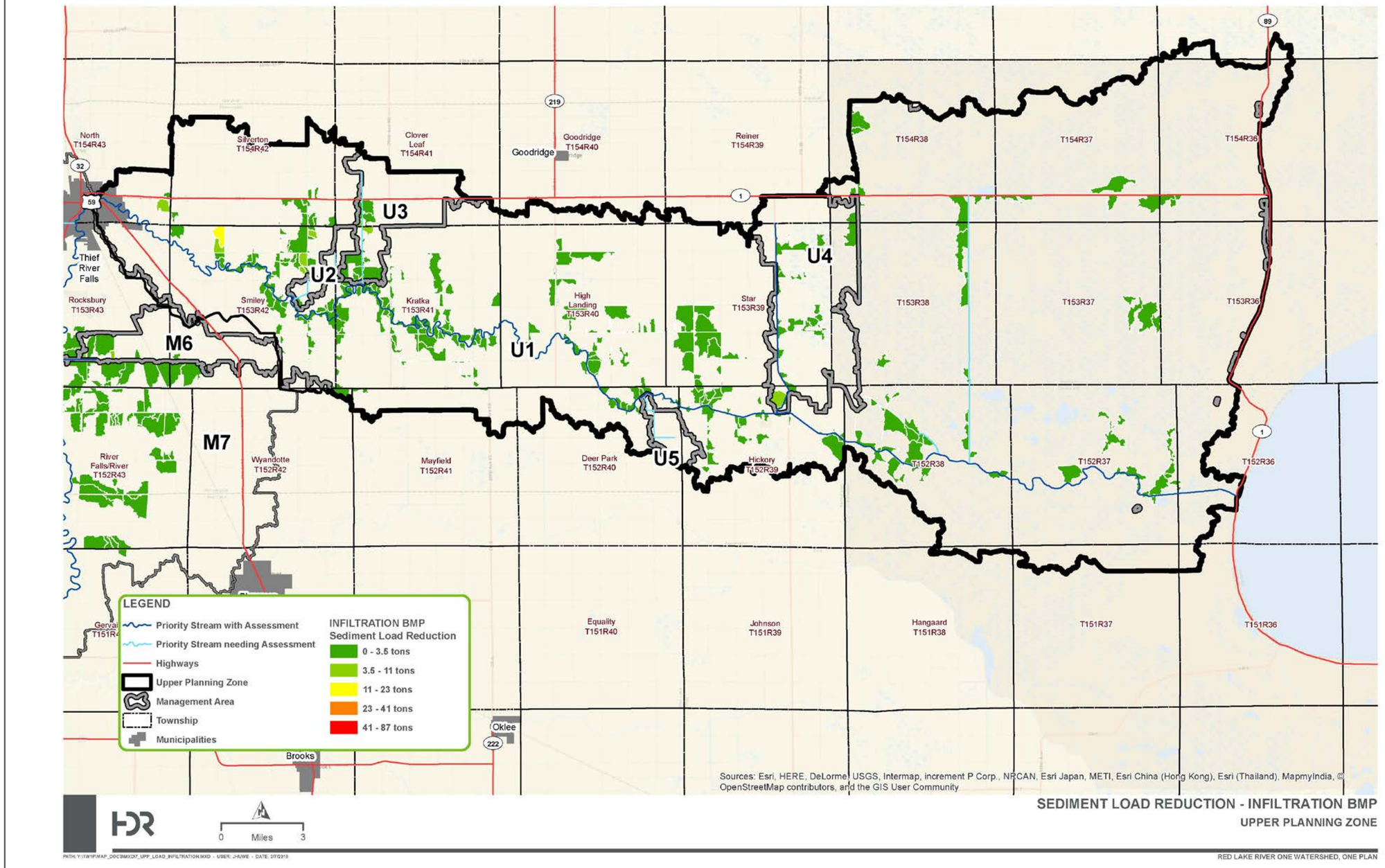


Figure 7 - 4 Sediment Load Reduction by Infiltration BMP

8. Implementation Programs

8.1. Plan Administration and Coordination

The Planning Group (RLWD, Pennington SWCD, West Polk SWCD, Red Lake County SWCD and Counties) will coordinate their plan administration activities. The Planning Workgroup (RLWD, Pennington SWCD, West Polk SWCD, and Red Lake County SWCD) will meet quarterly, or as needed, and collaborate when possible to prevent overlap in planning activities and reduce any duplication of efforts. To support the Planning Group, a "One Watershed One Plan Coordinator" will be appointed annually by the Policy Committee to handle the administrative work of the Red Lake River One Watershed One Plan. Cooperation will also allow for shared funding while implementing conservation activities. The Policy Committee will also appoint annually a fiscal agent for the Red Lake River One Watershed One Plan.

8.1.1. Decision Making and Staffing

POLICY FOR DECISION MAKING

The Planning Workgroup will individually perform day to day coordination of their respective programs and duties, which include administration and implementation of the Red lake River One Watershed One Plan. Projects that involve multiple jurisdictions will be brought before the Policy Committee on an as needed basis. Decisions regarding the plan will be voted on by the Policy Committee. Anticipated roles are as shown in **Table 8-1**.

Table 8-1. Roles for Plan implementation

Committee Name	Primary Role
Policy Committee	• Approving the annual work plan • Approving annual fiscal reports • Approving annual reports submitted to BWSR • Annual review and confirmation of Planning Group priorities • Direction to Planning Group on addressing emerging issues • Approve plan amendments • Approve grant applications
Technical Advisory Committee	• Review of and input on annual work plan • Identification of collaborative funding opportunities • Recommendations to Planning Group on implementation • Assist with execution of the targeted implementation schedule
Planning Workgroup	• Identify funding needs for implementation • Prepare the annual work plan / assessment • Prepare annual fiscal reports • Prepare annual reports submitted to BWSR • Annual review and confirmation of resources of concern • Evaluate and recommend response to emerging issues • Prepare Plan amendments • Prepare and submit grant applications • Implement the targeted implementation schedule

COMMITTEES

The Policy Committee and the Technical Advisory Committee will meet quarterly, or as necessary, after the adoption of the 1W1P. The meetings will address topics such as progress of the 1W1P, CWF Grants, other State, Federal, and non-governmental grants, Plan Amendments, and new projects. The Planning Workgroup will continue to meet after plan adoption as well. Meetings will be quarterly or as needed. The One Watershed One Plan Coordinator will be responsible for coordinating the Planning Group and Planning Workgroup meetings.

IDENTIFICATION AND COORDINATION OF SHARED SERVICES (STAFFING)

The Planning Group anticipates opportunities for shared services and staff such as Engineers, WCA Technician, and a Farm Bill Biologist. The Planning Workgroup will coordinate on staffing/programs such as ditch inventories and maintenance, buffer technician, MN Ag Water Quality Certification Program (MNAWQCP), and surveying or engineering services. More shared services will be determined after plan implementation begins.

8.1.2. Collaborations with other units of government (not part of the Planning Group)

The Planning Group will maintain individual LGU identity, not a joint powers entity. Collaborations with other units of government will occur as needed and a contract for services will be agreed upon by two or more parties. Collaboration with cities, townships, Federal, State, and County partnerships will continue forward on an ongoing basis.

8.1.3. Funding

Funding for programs will be pursued through a variety of sources as shown in **Table 8-2** and **Table 8-3**.

Table 8-2. Programs and funding sources for implementing the 1W1P.

Programs	Local	State	Private Grants	Federal	Private (Fee for Service)
Tree Planting	x	x		x	x
Water Plan	x	x	x		
Public/Legal Ditch Systems	x	x	x		x
WCA	x	x			x
Shoreland	x	x			x
AIS	x	x			
Ag Inspection	x	x			
Flood Damage Reduction	x	x		x	
Water Quality Monitoring	x	x	x		
RLWD Permitting	x				
SSTS	x	x			
Well Sealing	x	x		x	
Ag BMP Loan	x	x			
Easement	x	x		x	
Feedlots	x	x			
Ag WQ Cert	x	x		x	
Clean Water Fund	x	x		x	
Rainfall Monitoring	x	x			
Education and Outreach	x	x	x		
Buffer	x	x		x	
Cost Share	x	x		x	
Cooperative Weed Management	x	x			

Table 8-3: Programs and related funding sources.

Source	Organization	Program/ Grant Name	Primary Assistance Type
FEDERAL	NRCS	Conservation Innovation Grant (CIG)	Financial
		Conservation Stewardship Program (CSP)	Financial/Technical
		Environmental Quality Incentives Program (EQIP)	Financial/Technical
		Agricultural Conservation Easement Program (ACEP)	Easement
	FSA	Conservation Reserve Program (CRP)	Easement
		Conservation Reserve Enhancement Program (CREP)	Easement
		Farmable Wetlands Program (FWP)	Easement
		Grasslands Reserve Program (GRP)	Easement
	FSA/USDA/NRWA	Source Water Protection Program (SWPP)	Technical
	PCA	Federal Clean Water Act Section 319 Grants	Financial
	EPA	Water Pollution Control Program Grants(Section 106)	Financial
		State Revolving Fund (SRF)	Loan
		Drinking Water State Revolving Fund	Loan
		(DWSRF)Aquatic Invasive Species Control Grant Program	Financial/Technical
STATE	MnDNR	Conservation Partners Legacy Grant Program	Financial
		Working Lands Initiative	Financial
		Flood Hazard Mitigation Grant Assistance	Financial
		Forest Stewardship Program	Technical
		Reinvest in Minnesota (RIM)	Financial/Easement
		Outdoor Heritage	Easement
		Lessard Sams	Financial
		Observation well Funding	Financial
	BWSR	Clean Water Fund Grants	Financial/Technical
		Erosion Control and Management Program	Financial/Technical
		SWCD Local Capacity	Financial/Technical
		Cooperative Weed Management Area	Financial/Technical
		Buffer Law	Financial/Technical
		Natural Resources Block Grant	Financial
		Reinvest in Minnesota (RIM)	Easement/Financial
	MPCA	Surface Water Assessment Grants (SWAG)	Financial
		Clean Water Partnership	Financial
	MDH	Source Water Protection Grant Program	Financial
	MDA	Agriculture Best Mgmt Practices (BMP) Loan Program, Sustainable Ag Demo grants, and Minnesota Agricultural Water Quality Cert. Program	Loan / Financial

SWCD AND COUNTY FUNDING

SWCDs funding comes from a variety of sources that include local funding sources that fall under Minnesota Statute 103B.331 subd. 3 and 4 and 103C.331 subd. 14. Local funds are obtained through fee for services, County appropriations, permit fees, governmental or non-governmental grants, partnership agreements, and other conservation organizations. Although the Natural Resources Block Grant (NRBG) is State funded, the money is passed through Counties to SWCDs. Districts report the NRBG funding as County revenue. NRBG funding includes Water Plan, WCA, Shoreland, SSTS, Feedlot, and SSTS Incentive and Upgrade grants. Other funding that is passed through the County to SWCDs is Aquatic Invasive Species. Also, under Minnesota Statute 103B.335 local governing bodies may assert taxing authority for local water planning and management. 103B.335 Subd. 2 includes the counties authority to levy amounts necessary to pay Districts to administer and implement priority programs identified in a comprehensive watershed management plan.

WATERSHED DISTRICT FUNDING

Red River Watershed Management Board

The RRWMB was created by an act of the Minnesota legislature in 1976 to provide an organization with a basin-wide perspective concerning flooding. The mission of the RRWMB is to institute, coordinate, and finance projects and programs to alleviate flooding and assure the beneficial use of water in the watershed of the Red River of the North and its tributaries.

Petitioned Projects

The RLWD will accept petitions from the public for projects to be constructed under Minnesota Statute 103D.705. That petition must meet the requirements of the statute and also be submitted with the required bond. When considering a petitioned project, the Managers will consider not only the statutory requirements, but also will consider whether the proposed project is in keeping with the RLWD's goals, policies and objectives, as well as the Red River Mediation Agreement and other considerations.

Water Management Districts

The RLWD may create a Water Management District to provide a mechanism for funding watershed projects addressing local resource concerns and priorities. Fee and funding formulas are developed on the basis of a benefit or contribution with respect to how the project addresses a flood problem or water resource issue. Appendix J includes information on establishment of a new Water Management District and Appendix N includes information for three established Water Management Districts within the Red Lake River subwatershed.

Other Project Ideas

Individuals and organizations will be invited to bring project ideas to the Managers for review and discussion. After preliminary review by the Managers, they may direct the engineer to review further in order to gather additional information and report back. Then the Managers will decide if they wish to establish this proposed project by resolution of

the Managers, if they should require a petition for the project or if they should dismiss it altogether. Project opportunities will be reviewed annually and updated as necessary.

STATE FUNDING EXAMPLES

LGUs will pursue funding for implementation projects. There are many different funding sources and each one is designed to support certain types of projects. Funding sources include, but are not limited to State cost-share, Conservation Delivery, RIM: Delivery and Implementation, Farm Bill Assistance Grant, Clean Water Funds, Watershed Pollutant Load Monitoring Grants, Surface Water Assessment Grants, DNR Observation well Funding, Lessard Sams Outdoor Heritage (DNR), Flood Damage Reduction (DNR), Working Lands Initiative (DNR), Conservation Partnership Legacy Grant (DNR) as well as any future funding sources that are made available.

The Clean Water Land and Legacy Amendment was passed MN Legislature in 2008. The Amendment increases the sales and use tax rate by three-eighths of one percent on taxable sales, starting July 1, 2009, continuing through 2034. Those dollars are dedicated to four funds: Outdoor Heritage Fund, Clean Water Fund, Parks and Trails Fund, and Arts and Cultural Heritage Fund. Clean Water Funding is currently a competitive process that includes Accelerated Implementation, Projects and Practices, Community Partners, and Multi-Purpose Drainage Management. LGUs will continue to seek funding for projects through any current or future Clean Water Fund category.

BWSR - Clean Water Fund

Clean Water Fund project examples include but are not limited to, groundwater protection projects, streambank and shoreland protection projects, grade stabilization structures, water and sediment basins, buffers, raingardens, habitat improvement, grassed waterways, inventory and assessment, conservation drainage, SEDLCP (Drainage Ditch Inventory and Inspection), pollinator habitat projects, and DRONE technology.

MPCA – Clean Water Fund

The MPCA appropriates funding from the Clean Water, Land, and Legacy Amendment for monitoring (Surface Water Assessment Grants), assessment (Watershed Restoration and Protection Projects), restoration (Clean Water Partnership), and protection of water resources.

BWSR – Pollinator Initiative Program

The decline of pollinator populations (honey bees, native bees, butterflies, etc.) and other beneficial insects from a variety of factors including habitat loss, pesticides, and parasites has led to significant concern by bee keepers, conservation professionals, legislators, and the public. These species provide a foundation for food production, food webs and native plant populations. The BWSR Pollinator Initiative will provide leadership on the issue to more effectively support pollinator populations. The initiative will also help meet legislative requirements to provide pollinator habitat throughout the growing seasons for all prairie restorations on state land or funded with state dollars (Minn. Stat., Chap. 84.973).

MN Prairie Conservation Plan/Glacial Ridge Local Technical Team and the Tallgrass Aspen Parkland Local Technical Team

The Prairie Conservation Plan focuses efforts on grassland and wetland, and demonstrates unprecedented cooperation between federal agencies, state agencies and the state's most active conservation organizations. The plan identifies core conservation areas and creates a vision of a connected landscape from Canada to Iowa. The Glacial Ridge Local Technical Team and the Tallgrass Aspen Parkland Local Technical Team identifies specific projects to help landowners select the best conservation options for their land. The team also seeks and assists with funding incentives and mechanisms for each project.

MNDNR Conservation Partnership Legacy Grant

The MNDNR uses money generated by the Clean Water, Land, & Legacy Amendment to support habitat restoration projects. The Conservation Partners Legacy (CPL) Grant Program funds conservation projects that restore, enhance, or protect forests, wetlands, prairies, and habitat for fish, game, and wildlife in Minnesota. Funding for the CPL grant program is from the Outdoor Heritage Fund, created by the people of Minnesota. The CPL Program has been recommended by the L-SOHC to (and approved by) the MN Legislature annually since 2009.

MNDNR Working Lands Initiative

Under this initiative, state and federal agencies will work with conservation groups to identify, map and protect the most productive wetland areas in the most effective manner possible. The emphasis will be on voluntary, non-regulatory, incentive based programs compatible with agriculture and conservation which includes funding for the Conservation Reserve Enhancement Program, Wetlands Reserve Enhancement Program and designation of the Glacial Ridge National Wildlife Refuge.

Collaborative Grants

Depending on such things as location in the watershed, resource of concern, funding, landowner cooperation, and workload, LGUs will work together as they see necessary. LGUs in the Red Lake River watershed have established strong partnerships and have collaborated on projects and grants in the past. High priority areas identified in the 1W1P process will allow for efficient collaboration among LGUs.

Federal Funding

Federal funding sources may include NRCS, FSA, USFWS, FEMA, and USACE. These Federal funding sources will be incorporated into local implementation plans as funds are applied for and made available for projects.

Conservation Partners Program (USFW)

Grants funded through Conservation Partners provide staff and technical assistance to private landowners in regions where some of the nation's most crucial conservation issues can be addressed through Farm Bill programs. Through these regional grants, this conservation program has begun to place expert staff ("boots-on-the-ground") where they can maximize outreach to the private landowner. In this way, Farm Bill conservation dollars can be utilized most efficiently and effectively.

Other Funding Sources

Miscellaneous funding sources may include new grant opportunities from local, state, and federal organizations as well as the NW MN Foundation Grants, Ducks Unlimited, The Nature Conservancy, MN Ground Water Quality Association Foundation Grants, non-governmental grants, and the Enbridge Eco footprint grant.

8.1.4. Work Planning

Plan Implementation, progress, and projects will be discussed by the Planning Workgroup at quarterly meetings. The planning Workgroup will provide information and recommendations to the combined technical and policy committees at the annual meeting. New projects will be identified and prioritized at the annual meeting, a progress report or summary of the years' projects will also be presented at the annual meeting. The 1W1P will be used by LGUs to develop individual work plans, annual plans, and Biennial Budget Requests with consideration for shared services and collaboration with other LGUs.

8.1.5. Assessment and Evaluation

The Assessment and Evaluation of plan implementation will be made by the Planning Workgroup at quarterly meetings. The planning Workgroup will continue to meet after the adoption of the Red Lake River 1W1P. One member of the Planning Workgroup will be responsible for organizing and hosting the quarterly meetings on a rotating annual basis. New programs, laws, funding, projects, and duties of LGUs can change quickly and needs may be amended in the 1W1P. A more detailed evaluation and assessment will need to be discussed that meets the measurability requirement stated in the targeted implementation schedule.

ANNUAL EVALUATION

Annual evaluation of progress will be made by the Planning Workgroup at quarterly meetings. The Planning Workgroup will report to the combined TAC/Policy Committee at the annual meeting. The Planning Workgroup will prepare a summary of progress and projects completed or in progress for the watershed. Monitoring data may be used to show reductions in pollutants. BWSR Level 1 PRAP reporting requirements will be followed as appropriate.

BIENNIAL EVALUATION

Same process as annual evaluation.

FIVE-YEAR EVALUATION

Evaluation of progress and goals will be made by the Planning Workgroup with recommendation to TAC/Policy Committee. Completed projects such as WRAPS, TMDLs, and RRBC Phosphorus Reduction Plan will be incorporated. Given the continued development of new monitoring and goal setting information identified in Chapter 4, evaluation of the initial goals will be evaluated to determine whether they continue to be realistic or need to be updated. The results of completed inventories, studies, and assessments will be used to further refine goals and actions.

REPORTING

LGUs are required to complete annual reporting to BWSR. Responsibilities are outlined in **Table 8-4**. A plan to collaboratively report watershed based outcomes is addressed in the Memorandum of Agreement in Appendix A.

Table 8-4. Annual LGU Reporting Responsibilities

Report	Local Governmental Unit Responsibility
Annual Reports	RLWD and SWCDs
Ditch Buffer Strip Annual Report	Drainage Authority
Farm Bill Assistance Report	SWCDs and NRCS
Financial Reports	SWCDs
Technical Approval Authority (TAA)	SWCDs and NRCS
Website Compliance: (Checklist)	All Grantees
WCA, Shoreland, SSTS, and Feedlot	Counties and SWCDs
E-link Reporting	RLWD and SWCDs

8.1.6. Plan Amendments

Plan amendments will be made as necessary. Criteria for implementing an amendment will be evaluated upon request, or when portions of the plan become inaccurate or unclear based upon reception of new data or information. Given the continuation of the Policy Committee, plan amendments will be voted on and approved by the Policy Committee.

8.1.7. Formal Agreements

Formal agreements will be developed as necessary. A memorandum of agreement (MOA) is included in Appendix A that documents the formal 1W1P agreement between the planning partners. This MOA reflects a commitment by all parties with regards to plan implementation.

8.2. Plan Implementation Programs

PURPOSE: Local Government Units (LGUs) implement a variety of programs that provide information, outreach and education; regulation and enforcement; data collection and monitoring; financial and technical assistance; capital improvements and operation and maintenance. Projects are determined using multiple prioritization factors such as project feasibility, cost benefit, landowner cooperation, and available financing. One Watershed One Plan prioritizes issues of concern and resources of concern, targets locations for projects, and determines measurable goals to implement projects.

8.2.1. Incentive Programs

TYPES OF ASSISTANCE

The incentive based initiatives described in this section envision the use of a variety of types of assistance. Landowners are provided an incentive towards the use of various initiatives with the result being movement toward achieving the measurable goals. The

selection criteria for prioritizing, targeting, and measuring BMPs will be determined by the various tools and studies as described above.

FINANCIAL INCENTIVE

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 participant upon certification of project completion. In general, cost share assistance is provided at a rate of up to 75% of the total cost of the project which includes Administration, project development, technical and engineering, and construction. However, in certain circumstances, cost share assistance may be provided at a higher rate, based on the funding sources. Flat rate payments are another financial incentive option. A local match by the participant in the form of a cash or in-kind match is often required to receive the incentive.

TECHNICAL ASSISTANCE

Technical assistance often includes needs and assessments, survey and design support, engineering, installation guidance, inspection or answering general landowner questions. Technical assistance is generally provided through a SWCD, Technical Service Area (TSA), County or Watershed District within the plan area. Technical staff with appropriate expertise, skills, and training may be designated to assist in project implementation and completion.

TAX EXEMPTION

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 LGU staff. A tax exemption is the type of financial assistance used to convert low-productivity land back to its natural state. Land occupiers with qualifying parcels of land may be eligible for enrollment in these tax exemption programs.

CONSERVATION EASEMENTS

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 retains responsibility for maintenance and upkeep, paying applicable real estate taxes, and other obligations associated with ownership.

The types of assistance described above will be used for a variety of BMPs as identified in Sections 5, 6, and 7 (Table 5-3, Tables 6-3, Table 7-3). These BMPs will help achieve the measurable goals. **Table 8-5** shows the multiple benefits of BMPs by aligning them with the issues of concerns they will address.

Table 8-5. BMP alignment with Issues of Concern

Best Management Practices (BMPs)	Issues of Concern								
	Surface Water Quality	Soil Erosion and Sedimentation	Altered Hydrology	Drainage Systems Management	Flood Damage Reduction	Habitat	Shoreland and Riparian Management	Groundwater Protection	Source Water Protection
Alternative Tile Intakes	x	x		x					
CSP Precision Agriculture Practices	x							x	x
Channel Bed and Stream Channel Stabilization	x	x				x	x	x	x
Conservation Crop Rotation	x	x							
Conservation Cover	x	x						x	x
Conservation Tillage	x	x							
Cover Crop	x	x				x		x	x
Critical Area Planting	x	x		x		x	x	x	x
Diversions	x		x	x	x				
Drainage Water Management	x	x	x	x	x				x
Field Borders	x	x				x			
Filter Strips	x	x				x		x	x
Grade Stabilization Structures	x	x		x					x
Grassed Waterways	x	x							x
Milk House Waste Treatment	x							x	x
Multi-stage ditch	x	x		x					
Noxious Weed Management						x			
Nutrient Management	x							x	x
Pest Control						x			
Prescribed Burning						x			
Raingardens	x	x						x	x
Restoration and Management of rare or declining habitat						x			
Riparian Buffers	x	x				x	x	x	x

Best Management Practices (BMPs)	Issues of Concern								
	Surface Water Quality	Soil Erosion and Sedimentation	Altered Hydrology	Drainage Systems Management	Flood Damage Reduction	Habitat	Shoreland and Riparian Management	Groundwater Protection	Source Water Protection
Rotational and Prescribed Grazing	x	x							
Septic System Upgrades	x							x	x
Stormwater Management BMPs	x	x			x			x	x
Stormwater Retention Basins	x	x	x	x	x			x	x
Streambank, Shoreland, and Roadside Protection	x	x					x	x	x
Tree and Shrub Establishment		x				x			
Upland Wildlife Habitat Management						x			
Waste Storage Facility	x							x	x
Wastewater and Feedlot Runoff Control	x	x						x	x
Water Control Structures	x	x	x	x	x				
Water and Sediment Control Basins	x	x	x	x	x			x	x
Wetland Restorations	x	x	x	x	x	x		x	x
Well Sealing	x							x	x

8.2.2. Capital Improvements

Watershed District projects are developed using the concept of a "Project Team" outlined in the Red River Basin Flood Damage Reduction Work Group Mediation Agreement. This agreement outlines a project development process for reducing flood damages and improving natural resources in the Minnesota portion of the Red River Basin. The agreement provides for a collaborative approach to planning and implementing both flood damage reduction and natural resource protection and enhancement projects, which involves early consultation and collaboration among all stakeholders and a cooperative approach to permitting projects. A Project Team consists of appropriate stakeholders (watershed districts, state, federal and tribal agency personnel, local government officials, affected landowners and interested citizen group representatives), including at least one designated contact person from each agency. Members of the Project Team are appointed by the watershed board of managers. Project Teams are responsible for working with a project from development of a project concept through project construction and monitoring. **Table 8-6** lists capital improvement projects that are in the planning or implementation phases in the watershed.

Table 8-6. Capital Improvement Projects (CIPs) for Watershed Districts –

Capital Improvement Project	Description	Program	Status	Estimated Cost
Pine Lake Watershed	Development of upstream storage areas and potential modification to Pine Lake Dam – tributary to Red Lake River	FDR	Planning	$2,000,000
Four Legged Lake Watershed	Development of multi-purpose flood damage reduction and natural resource enhancement project in conjunction with legal ditch – tributary to Red Lake River	FDR	Planning	$750,000
Legal Ditch Improvements	Improvement of legal ditches under County jurisdiction	Ditches	TBD	$1,000,000
Structure Maintenance and Rehabilitation	Maintenance of water control structures throughout the subwatershed	FDR	Design and Construction	$250,000
Buffer Strip Initiative	Installation of riparian buffers to improve water quality and habitat, within the Red Lake River Watershed	Buffers	Concept	$500,000
Distributed Detention Site #1	Development and implementation of distributed detention storage within the Red Lake River subwatershed	FDR	Planning Level Analysis	$5,000,000
Distributed Detention Site #2	Development and implementation of distributed detention storage within the Red Lake River subwatershed	FDR	Planning Level Analysis	$5,000,000
Lake and River Erosion Stabilization	RLWD policy to support LGU efforts to stabilize erosion problems throughout the watershed	Various MN Clean Water Grant Programs	Ongoing	$12,500/yr. per County RLWD cost share

8.2.3. Operation and Maintenance

The authority for maintaining public ditch systems lies with various authorities including Pennington County, Polk County, Red Lake County and RLWD. The RLWD is responsible for annual inspection and maintenance of impoundments and small dams. Other water management authorities include Cities, Counties, DNR, USFWS, Red Lake Band of Chippewa, USACE, Utilities, and private landowners. The location and authority for public ditches and other water management facilities within the planning area are listed in Appendix K. **Figure 8-1** shows ditch locations.

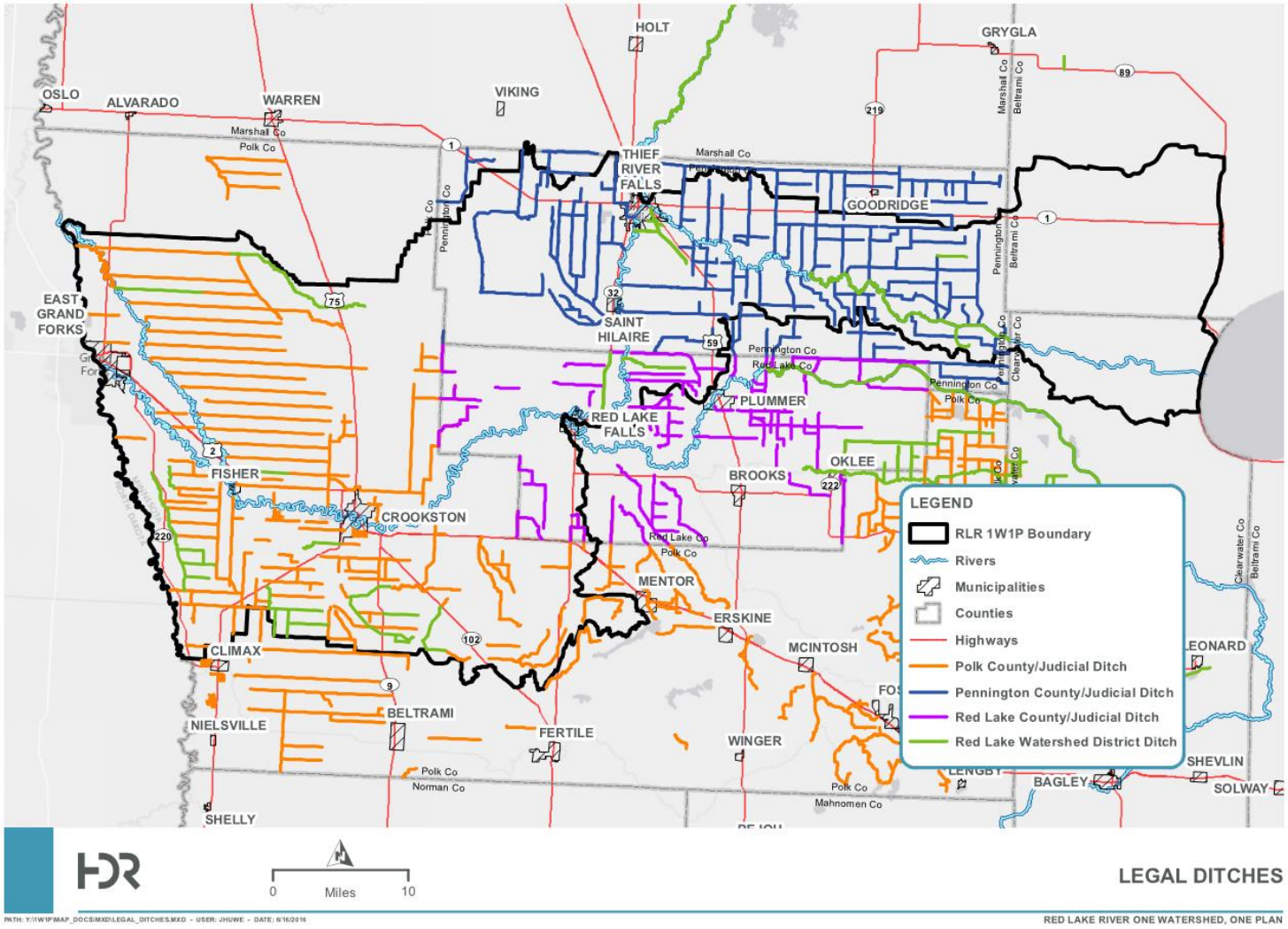


Figure 8-1 Public Ditch Locations

8.2.4. Regulation and Enforcement

This section provides a description of local regulation activities and administrative roles and responsibilities for implementation of local ordinances. Each respective organization is to provide technical assistance to landowners including education and outreach. New ordinances may be developed as agreed upon by counties and the RLWD.

COUNTY ORDINANCES

- Solid Waste
- Animal Feedlot and Manure Management
- Shoreland
- Subsurface Sewage Treatment Systems (includes Penn. Co. Sewage and Wastewater Treatment Ordinance)
- Floodplain
- Wind Energy Conversion System
- Soil Loss
- Zoning

Subsurface Sewage Treatment Systems (SSTS) Program:

Implement SSTS Program duties as pursuant to the following:

These regulations detail:

1. Minimum technical standards for individual and mid-size SSTS (Chapter 7080 and 7081);

2. A framework for local administration of SSTS programs (Chapter 7082) and;

3. Statewide licensing and certification of SSTS professionals, SSTS product review and registration, and establishment of the SSTS Advisory Committee. (Chapter 7083).

The goal of the SSTS program is to protect the public health and the environment through adequate dispersal and treatment of domestic sewage from dwellings or other establishments generating volumes less than 10,000 gallons per day.

SSTS Administrator duties include:

- SSTS Administrator provides educational materials to landowners.
- Continuing Education Training.
- Monitoring & Data Collection at locations before construction.
- Permitting requirements and site investigation before, during, and after construction.
- Seek funding opportunities to assist with septic systems compliance issues.
- Work with the County Attorney to enforce the SSTS Ordinance, State Rules and Statutes.
- Respond to citizen complaints.
- Report SSTS Program activities, time tracking, and fund accountability.

- Coordinate County SSTS Ordinance updates so ordinances are similar across county boundaries.

Wetland Conservation Act (WCA) Program:

Implement WCA Program duties as pursuant to MN 8420 Rules.

Purpose: To maintain and protect Minnesota's wetlands and the benefits they provide. To retain the benefits of wetlands and reach the legislation's goal of no-net-loss of wetlands, the Wetland Conservation Act requires anyone proposing to drain, fill, or excavate a wetland first to try to avoid disturbing the wetland; second, to try to minimize any impact on the wetland; and, finally, to replace any lost wetland acres, functions, and values. Certain wetland activities are exempt from the act, allowing projects with minimal impact or projects located on land where certain pre-established land uses are present to proceed without regulation.

Each County delegated their local SWCD to administer the Wetland Conservation Act.

WCA Coordinator duties include:

- WCA Coordinator provides educational materials to landowners regarding the MN State WCA Rules and Regulations.
- Attends WCA training opportunities.
- Provides wetland site investigations, including but not limited to, wetland delineation, wetland mitigation and wetland restoration requests.
- Assists landowners with technical/administrative assistance requirements of wetland replacement/no loss/exemptions.
- Coordinates with Federal/State/Local agencies on wetland technical issues.
- Uses soil/vegetation/hydrology for wetland determinations and review wetland delineations.
- Report WCA Program activities, time tracking, and fund accountability.
- Serve on Technical Evaluation Panel (TEP).
- Protect existing wetlands to retain water storage, calcareous fen protection, provide filtration of sediment and pollutants.

PROJECTS: Wetland Restoration, Mitigation, State and Ag Wetland Banking Program, Monitoring efforts, Contribution Agreements

DNR - Shoreland and Floodplain Management Programs:

Implement Shoreland Program duties pursuant to Shoreland Management Program (Minnesota Rules 6120.2500 - 3900).

This program provides the backbone of statewide standards that local governmental units must adopt into their own land use controls to provide for the orderly development and protection of Minnesota's shorelands (both rivers and lakes).

Shoreland Officer Duties include:

- Provide educational materials regarding the State Shoreland Statues and Rules along with the County Ordinances.
- Attend Shoreland training.
- Conduct site reviews and issues permits when needed.
- Conduct permit compliance checks.
- Work with the County Attorney & County Commissioners to enforce state statutes and rules and the county ordinance.
- Determine setback and compliance relating to bluff and shoreland setbacks with assistance from the RRV CSA Engineer.
- Assist landowners and coordinate with the County Commissioners on variance requests.
- Report Shoreland Program activities, time tracking, and fund accountability.
- Coordinate County Shoreland Ordinance updates so ordinances are similar across county boundaries.

Floodplain:

Administer the Floodplain Ordinance pursuant to MN Statutes Chapter 104 & 394.

- Provide floodplain maps to landowners.
- Provide assistance to landowners with determining floodplain boundaries and base flood elevations when requested.
- Provide other technical assistance to landowners regarding floodplain questions.
- Coordinate County Floodplain Ordinance updates so ordinances are similar across county boundaries.
- Use new LiDAR data to update floodplain maps.

Risk Mapping, Assessment, and Planning (Risk MAP) is a Federal Emergency Management Agency (FEMA) program that helps communities identify, assess, and reduce their flood risk. By combining quality engineering with updated flood hazard data, FEMA provides accurate and easy-to-use information to enhance local mitigation plans, improve community outreach, and increase local awareness to flood hazards. As a part of this initiative, FEMA is collaborating with the Minnesota Department of Natural Resources (MNDNR) to develop new floodplain data for Pennington and Red Lake counties in need of modernized Flood Insurance Rate Maps (FIRMs). The Risk Analysis Branch of FEMA's Chicago Regional Office will be leading an effort to detail more about plans to initiate a flood study to update the countywide FIRM and Flood Insurance Study (FIS) report for Pennington and Red Lake Counties. The LGUs will participate and share any information about data that may be available that could be utilized to more accurately map flood risk.

MPCA Feedlot Program:

Each county has directed their local SWCD to administer the Minnesota Pollution Control Agency Feedlot Program pursuant to MN Chapter 7020 Rules.

The Minnesota Pollution Control Agency administers rules regulating livestock feedlots in Minnesota. In addition, counties may be delegated by the MPCA to administer the program for feedlots that are not required to have a state or federal operating permit.

The feedlot rule (Minnesota Rules Chapter 7020) regulates the collection, transportation, storage, processing and disposal of animal manure and livestock processing activities, and provides assistance to counties and the livestock industry. The rules apply to all aspects of livestock production areas including the location, design, construction, operation and management of feedlots, feed storage, stormwater runoff and manure handling facilities.

Feedlot Officer Duties include:

- Provide educational information and technical assistance to producers in regards to MPCA Feedlot Program Statutes and Rules.
- Provide information on the Registration, Re-registration, Inspection, and Permitting Process as requested.
- Attend Feedlot training.
- Conduct inspections and issue permits in accordance with MPCA Inspection policies and procedures.
- Provide technical assistance for: manure management plans and manure application.
- Implement grazing management strategies.
- Enter data into TEMPO.
- Respond to citizen complaints.
- Coordinate with producers, SWCD, NRCS, and other funding sources to provide financial assistance to achieve compliance.
- Report Feedlot Program activities, time tracking, and fund accountability.
- Coordinate County Feedlot Ordinance updates so ordinances are similar across county boundaries.
- seek cost share assistance to assist with feedlot compliance.

Riparian Buffer Program: Governor Mark Dayton's new landmark buffer initiative was recently signed into law, designating an estimated 110,000 acres of land for water quality buffer strips statewide. The law establishes new perennial vegetation buffers of up to 50 feet along rivers, streams, and ditches that will help filter out phosphorus, nitrogen, and sediment. The new law provides flexibility and financial support for landowners to install and maintain buffers, and boost compliance with buffer laws across Minnesota.

SWCD Roles and Responsibilities

A. May issue a validation of compliance when requested by a landowner. (Subd. 3(d)).

B. In consultation with local water management authorities, must develop, adopt and submit to each local water management authority a summary of watercourses by July 1, 2017 for inclusion in the local water management authorities' plan. (Subd. 4).

C. Must assist landowners with implementation of the water resource riparian protection requirements including: planning, technical assistance, implementation of approved alternative practices, and tracking progress towards compliance with the requirements provided in Minnesota Statutes 103F.48, Subd. 3. (Subd. 6).

D. Must notify the county or watershed district with jurisdiction and BWSR when it determines a landowner is not in compliance. (Subd. 7).

E. Must grant a conditional waiver to a landowner: (a) who has applied for and maintained eligibility for financial assistance within one year of the compliance dates in Minnesota Statutes 103F.48, subd. 3(e); or (b) are subject to a drainage proceeding. (Laws of Minnesota 2015, 1st Special Session, Chapter 4, Article 4, Section 146).

Watershed Districts Roles and Responsibilities

A. Must amend its comprehensive watershed management plan to incorporate the SWCD recommendations. (Subd. 4).

B. Must provide the landowner with a list of corrective actions needed to come into compliance and a practical timeline to meet the riparian protection requirements when notified by the SWCD that a landowner is not in compliance. A copy of the corrective action must be provided to BWSR. (Subd. 7(a)).

C. May adopt an administrative penalty order plan. (Subd. 7(b)).

Table 8-7 lists various regulation and enforcement programs within the watershed.

Table 8-7. Summary of Regulation and Enforcement Programs and LGUs authorities

Programs	Administrator	Authority
SSTS	Pennington SWCD, Red Lake County, Polk County	Pennington County, Red Lake County, Polk County
Shoreland	Pennington SWCD, Red Lake County SWCD, Polk County	Pennington County, Red Lake County, Polk County
Floodplain	Pennington SWCD, Red Lake County SWCD, Polk County	Pennington County, Red Lake County, Polk County
WCA	Pennington SWCD, Red Lake County SWCD, West Polk SWCD	Pennington County, Red Lake County, Polk County
Tile and Surface Drainage Permitting	RLWD	RLWD
Feedlot	Pennington SWCD, Red Lake County SWCD, West Polk SWCD	Pennington County, Red Lake County, Polk County
Household Hazardous Waste	Polk County	Polk County
Ditch Law	Ditch Authorities: Counties and RLWD	Ditch Authorities: Counties and RLWD
Buffer Law	Pennington SWCD, Red Lake County SWCD, West Polk SWCD	Counties and RLWD and BWSR
Solid Waste Program	Pennington County, Red Lake County, Polk County	Pennington County, Red Lake County, Polk County
Planning and Zoning – Polk County and Townships	Polk County, Andover Twp., City of Crookston, Esther Twp., Grand Forks Twp., Huntsville Twp., Liberty Twp., Lowell Twp., Northland Twp., Onstad Twp., Parnell Twp., Rhinehart Twp., Sullivan Twp., Bygland Twp.	Polk County, Andover Twp., City and Twp. of Crookston, Esther Twp., Grand Forks Twp., Huntsville Twp., Liberty Twp., Lowell Twp., Northland Twp., Onstad Twp., Parnell Twp., Rhinehart Twp., Sullivan Twp., Bygland Twp.
Planning and Zoning – Pennington County Townships	Norden Twp., City of Thief River Falls, North Twp., Numedal Twp., Rocksbury Twp., Sanders Twp., Hickory Twp. (feedlot), and Polk Centre Twp.	Norden Twp., City of Thief River Falls, North Twp., Numedal Twp., Rocksbury Twp., Sanders Twp., Hickory Twp. (feedlot), and Polk CentreTwp.
Soil Loss	SWCDs	Counties
Fuels and Hazardous Materials Storage and Transportation	Counties	Counties

Regulation and Enforcement for Watershed Districts

Permits and Rules Program

The RLWD requires a permit application to be submitted for the following activities:

- Installation of tile drainage systems
- Water is to be diverted from one watershed to another
- Water is to be drained into a legal ditch
- A ditch is to be repaired
- A marsh is to be drained
- A dike is to be constructed or altered
- A reservoir is to be drained or constructed
- A bridge, culvert or drain is to be installed or changed
- A natural waterway, lake or marsh is to be changed
- Construction is to be done near a waterway, lake or marsh

The RLWD inspects each permit site for compliance with permit conditions. The intent of the permit program is to effectively manage and protect the resources of the RLWD while allowing for reasonable use. The RLWD feels that it has been effective in accomplishing these missions and will continue to work with the other natural resource management agencies to further these goals. The RLWD rules and regulations are included in Appendix J.

Comprehensive or land use plans

Polk County has county wide planning and zoning and participates in cooperative joint zoning with those Townships that want to retain local control of township specific issues. Pennington and Red Lake Counties currently do not have county wide planning and zoning. LGU's will coordinate with adjacent counties, cities, and townships to develop similar planning and zoning rules and regulations.

In addition, there will be an effort to utilize emergency response plans to minimize damage from accidents or spills. Hazard mitigation and emergency response plans will be administered by the Counties. **Table 8-7** lists various regulation and enforcement programs within the watershed.

8.2.5. Data Collection and Monitoring

MONITORING PLAN

Planning partners will coordinate monitoring activities where possible in an effort to share responsibilities and outcomes from this important ongoing effort. Monitoring Goals are listed in **Table 8-8**. The Monitoring Plan developed for the Red Lake River Planning Area follows the table of goals.

Table 8-8. Water Quality Monitoring Goals

Water Quality Monitoring Goals	
Issue: Surface Water Quality	
Priority Statement: Continue long-term monitoring efforts at key locations to provide sufficient data for water quality, hydrologic, hydraulic, and biotic analysis.	
Goal	**Measures of Success**
Strategically conduct long-term monitoring efforts to maximize the extent to which future water quality assessments are complete, representative, and comprehensive.	Maintain or increase the number of reaches that are assessed in the 2024 assessment compared to the 2015 assessment.
	LGUs remain equipped with properly functioning multi-parameter sondes and sampling equipment
	LGUs participate in annual training sessions.
	LGUs collaborate on monitoring efforts that are of mutual interest.
	>5 E. coli samples are collected for each site during each calendar month within a 10-year period.
	>20 days with dissolved oxygen measurements from each AUID
	>20 days with pre-9am dissolved oxygen measurements from each AUID
	>20 days of unbiased TSS samples from each AUID
	LGU water quality data is submitted to the MPCA for entry into the EQuIS database prior to each annual deadline.
Conduct intensive monitoring efforts to answer specific questions about water quality issues.	Data provides sufficient proof to guide actions that minimize the influence of specific pollutant sources.
	Document and share information about the locations of pollutant sources
Monitor the effectiveness of significant projects.	Sufficient pre-project data is collected to characterize water quality conditions prior to the project.
	Regular sampling continues after the completion of the project.
	Data is analyzed to determine pre/post-project changes in water quality

Water Quality Monitoring Goals	
Support and Expand River Watch Monitoring Programs	Existing River Watch programs continue to regularly collect water quality data.
	Local River Watch programs participate in the River Watch forum and win awards.
	Water quality data from River Watch schools is submitted annually to the MPCA for the EQuIS database prior to the data submission deadline.
Collect stage and flow data for Red Lake River tributaries, Grand Marais Creek, and Polk County Ditch 2	>10 years of stage and flow data from each site. See Section below for a complete list of sites.
	Robust flow rating curves are developed through regular flow measurements.

Red Lake River Planning Area Monitoring Plan

Local, State, and Federal agencies combine efforts to collect a large amount of environmental data within the Red Lake River watershed. Water quality in rivers and streams is monitored using specialized equipment and laboratory analysis. Stage and flow levels are monitored along the Red Lake River and its tributaries. SWCDs monitor groundwater levels. The State conducts biological (aquatic and terrestrial) monitoring. Compliance monitoring is also important for the protection of natural resources. **Figures 8-2, 8-3, and 8-4** provide additional information regarding sites and data monitoring efforts.

Water quality monitoring can be conducted for multiple purposes. Much of the data is collected for the purpose of monitoring the condition of waterways over time, assessing current water quality conditions, or calculating pollutant loads. Official water quality assessments require a minimum number of water quality measurements in order to determine whether a waterway is meeting or violating water quality standards. The number of parameters and the frequency at which they are measured depends upon the project goals, the budget of the monitoring project, available equipment, and available staff time. Monitoring programs may be short-term or long-term. Short-term monitoring efforts may aim to achieve a minimal snapshot of water quality conditions (SWAG Grants), diagnose the source of a water quality problem, or measure the effectiveness of a project. Long-term monitoring should be sufficient to measure trends over time and to compile sufficient data for the assessment of whether or not waterways support aquatic life and recreation. All data that is collected following proper procedures needs to be submitted to the MPCA for entry and storage in the State's EQuIS water quality database. The State uses data stored in EQuIS during the official water quality assessments. Data compiled in EQuIS is also used for many other purposes, like writing TMDLs.

The parameters that are measured for long-term monitoring projects may vary slightly among organizations and monitoring sites. Basic parameters that can be measured on-site while monitoring (field parameters) include water temperature, dissolved oxygen, pH, specific conductivity, stage, transparency, turbidity, and observations/comments. Water samples are shipped overnight to a lab that is certified by the Minnesota Department of Health for analysis. Typically, samples are analyzed for a basic set of parameters that includes total phosphorus, orthophosphorus, total suspended solids, ammonia nitrogen, total Kjeldahl nitrogen, nitrates & nitrites, and E. coli. Additional parameters like chemical oxygen demand, biochemical oxygen

demand, sulfates, total organic carbon, and/or chlorophyll-a may be collected, dependent upon project needs. Total organic carbon from the mainstem of the Red Lake River and its major tributaries is useful to public water suppliers along the river in Thief River Falls and East Grand Forks. Oxygen demand data is collected at sites on reaches that are impaired by low dissolved oxygen levels (either officially or suspected). Chlorophyl-a has been collected for the MPCA from the lower end of major subwatersheds to measure eutrophication levels.

The RLWD has been collecting water quality samples in the Red Lake River Watershed for its long-term monitoring program since 1980. Newer sites that were monitored for the Red Lake River Watershed Restoration and Protection Project were added to the RLWD long-term monitoring program. The monitoring program collects data from the significant waterways within the watershed, including multiple reaches of the Red Lake River and its significant tributaries. Field measurements of dissolved oxygen, temperature, turbidity, specific conductivity, pH, and stage are collected during each site visit (if there is water). Four rounds of samples are also collected at and analyzed for TP, OP, TSS, total dissolved solids, TKN, ammonia nitrogen, nitrates + nitrites, and E. coli at most of the sites. For the past few years, biochemical oxygen demand (BOD) analysis and chemical oxygen demand (COD) have been added for the sites that are located on reaches that have had low dissolved oxygen levels. Sampling months are alternated each year with the goal of collecting at least 5 samples per calendar month within a 10-year period. Within the Red Lake River Watershed planning area, the RLWD monitors:

1. Red Lake River at the Louis Murray Bridge in East Grand Forks (S002-963)
2. Red Lake River at Woodland Ave. in Crookston (S002-080)
3. Red Lake River at CSAH 13 near Red Lake Falls (S003-172)
4. Red Lake River at Greenwood Street in Thief River Falls (S006-225)
5. Red Lake River at the Smiley (CSAH 7) Bridge, east of Thief River Falls (S007-063)
6. Red Lake River at Highlanding (S002-077)
7. Red Lake River at CSAH 27 (S007-234)
8. Heartsville Coulee at 210th St. SW (S007-061)
9. Burnham Creek at 320th Ave SW (S007-058)
10. Burnham Creek at 210th Ave SW (Polk County Road 48, S007-644)
11. Gentilly River at CSAH 11 (S004-058)
12. Kripple Creek at 180th Ave SW (S004-835)
13. Black River at CSAH 18 (S002-132)
14. Little Black River at Red Lake County Road 102 (S008-111)
15. Browns Creek at Red Lake County Road 101 (S007-609)
16. Cyr Creek at Red Lake County Road 110 (S004-818)
17. Grand Marais Creek at Polk County Road 35 (130th St. NW, S008-903)
18. Grand Marais Creek at 110th St. NW (S008-902)
19. Polk County Ditch 2 at Polk County Road 62 (S004-131)

The Red Lake County and Pennington County SWCDs have long-term monitoring programs in which monthly samples and field measurements are collected at strategic sites. The SWCD long-term monitoring program sites within the Red Lake River subwatershed include:

1. Red Lake River at Red Lake County Road 3 near Huot (S002-976)
2. Red Lake River at Pennington County Road 3 near St. Hilaire (S003-942)
3. Red Lake River at 1st Street in Thief River Falls (S002-076)
4. County Ditch 70 near the Greenwood Street Bridge (S004-964)

5. Red Lake River at 250th Ave NE ("Kratka Bridge," S003-947)
6. Red Lake River at 420th Ave SE ("East Line," S003-944)
7. Black River at CSAH 18 (S002-132)
8. Black River at 140th St. SW ("Black River South," S003-943)
9. Black River at 120th St. NW ("Black River North," S003-948)

Local monitoring staff will monitor contributions from the Thief River and Clearwater River major sub-watersheds that flow into the Red Lake River. Pour-point monitoring sites include;

- Clearwater River at the Klondike Bridge
- Thief River at the Golf Course Bridge and near the USGS gage

River Watch is a volunteer monitoring program that gives high school students the opportunity to collect water quality data. This data is collected using the same methods that are used by professionals and is stored in the EQuIS database along with all other data that is collected within the watershed. Students in East Grand Forks (Sacred Heart High School), Fisher, Crookston, Red Lake Falls, and Thief River Falls have participated in the program. The Thief River Falls River Watch program is active periodically, but is currently inactive. Reviving this program and keeping it active is a recommended goal.

The Red Lake River Monitoring sites that are co-located with USGS gauging stations have been intensively monitored for other projects, including the Major Watershed Pollutant Load Monitoring Network (WPLMN). Frequent sampling may continue for the MPCA's WPLMN. The International Water Institute has worked with the MPCA to conduct that sampling.

A few additional data collection efforts and adjustments that could be considered for future monitoring efforts. LGUs could stablish Regional Assessment Location monitoring sites on the Red Lake River and its most significant tributaries. Additional intensive sampling during runoff events will help shed light upon the causes of water quality problems in the watershed.

The collection of continuous dissolved oxygen data is essential, at most sites, for the collection of dissolved oxygen measurements prior to 9:00 am. The MPCA requires a record of pre-9am dissolved oxygen readings in order to declare that the waterway contains enough dissolved oxygen to fully support aquatic life. Dissolved oxygen logging equipment can collect regular dissolved oxygen measurements (e.g. every 30 minutes) while deployed in a waterway. Equipment is deployed for a maximum of two weeks at a time before it is retrieved for data retrieval, cleaning, and re-calibration. Prior to the next State water quality assessment of the Red Lake River, continuous dissolved oxygen monitoring should be conducted to fully assess the capacity of key reaches in the watershed to support aquatic life. Priority should be given to reaches and sites that are too remotely located from LGU offices for pre-9am measurements.

Bolstered data collection efforts at key sites would aid with pre/post project evaluation:

1. RLWD Ditch 15 (Brandt Channel) at Highway 75 (S004-132) for evaluation of the effects of the Brandt Impoundment and outlet restoration project.
2. Polk County Ditch 2 at Polk County Road 62 (S004-131)to evaluate the effects of the Brandt Impoundment, Euclid Impoundment, Brandt Outlet Channel Restoration Project, and the Ditch 15 project.

3. Grand Marais Creek at Polk County Road 35 (130th St. NW, S008-903) to evaluate the effects of the Grand Marais Creek Outlet Restoration Project.

4. Burnham Creek at Polk County Road 48 (210th Ave SW, S007-644) to evaluate the effects of erosion control and channel restoration efforts along the upper reaches of the Burnham Creek watershed.

Robust water chemistry data collection at long-term stream gaging sites improves the quality of water quality models (SWAT, HSPF) by providing a record of measured water quality that can be compared to the simulated conditions during the model calibration process. Key monitoring sites where more frequent data collection would aid future model calibration efforts include:

1. Red Lake River at 252nd St. SW in Fisher (S000-031)
2. Red Lake River at Woodland Ave. in Crookston (S002-080)
3. Red Lake River at the Smiley (CSAH 7) Bridge, east of Thief River Falls (S007-063)
4. Burnham Creek at 320th Ave SW (S007-058)
5. Gentilly River at CSAH 11 (S004-058)
6. Kripple Creek at 180th Ave SW (S004-835)
7. Black River at CSAH 18 (S002-132)
8. Cyr Creek at Red Lake County Road 110 (S004-818)

Long-term monitoring programs can evolve to include different or additional sites that have a strategic value that is equal to or greater than existing long-term monitoring sites. Sites that should be added to long-term monitoring efforts include:

1. The Red Lake River at 252nd Street SW in Fisher (S000-031) is a strategic location in the watershed because it is the furthest downstream USGS gaging stations. Samples are currently being collected frequently at the site for the WPLMN. If that program ever ends, local monitoring efforts should ensure that data collection at the site continues. If there is a need for additional parameters (like total organic carbon) beyond those that are being collected for the WPLMN, the site could be added to a local water monitoring program immediately.

2. The Little Black River, upstream of the dam, is strategic because it is the furthest downstream monitoring site prior to the dam. High E. coli concentrations were found at the site during investigative sampling conducted throughout the Black River watershed for the Red Lake River WRAP. It would also be a good site for monitoring water quality in a reach that is disconnected from the rest of the Black River by an impoundment. Data from the Little Black River would aid water quality model calibration.

3. The Red Lake River at CSAH 11 (S000-042) has been monitored by the Crookston River Watch program, but lab samples have only rarely been collected at the site. Because of the way that the Red Lake River is sectioned into assessment units, it is the only monitoring site on an 11.77 mile reach of the Red Lake River (09020303-506).

4. Pennington County Ditch 96 has been monitored by several short-term monitoring efforts. Being a ditch system without perennial flow, it hasn't been included in a long-term monitoring program. Now that water quality issues have been identified in the ditch, long-term monitoring is recommended.

5. Judicial Ditch 60 is another ditch system without perennial flow. Long-term stage/flow and water quality monitoring are recommended until the reach is removed from the 303(d) List of Impaired Waters.
6. Polk County Ditch 1 is a ditch with intermittent flow, but serious erosion problems. This channel should be a high priority for a stabilization project. Gather pre-project and post-project data from the Polk County Road 61 (S007-059).
7. Because of the erosion control, channel stabilization, and channel restoration work being conducted in the upper reaches of the Burnham Creek watershed, additional monitoring should take place there. Historically, monitoring activity has been focused on the lower end of the watershed.

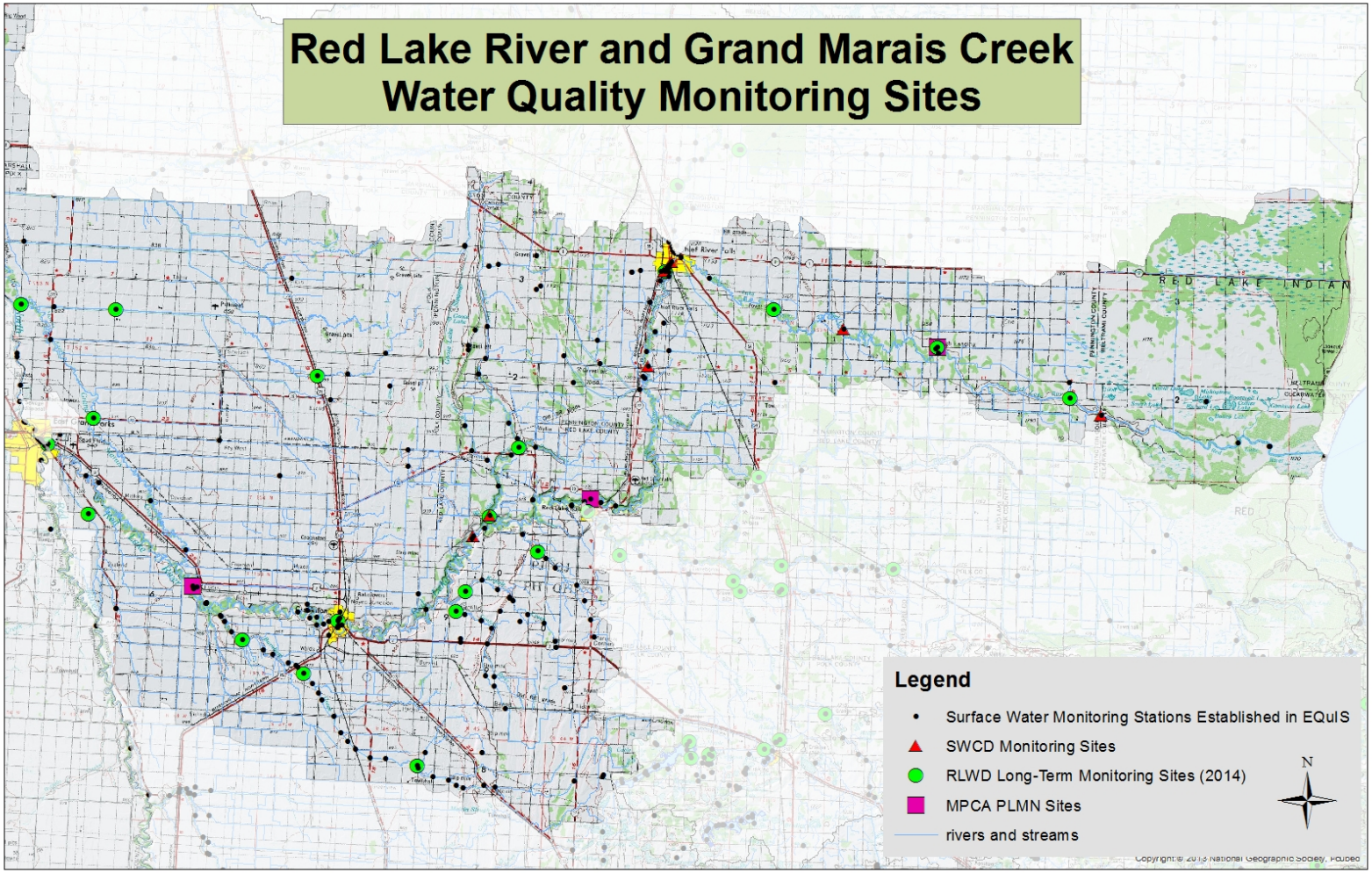


Figure 8-2. Red Lake River and Grand Marais Creek Long-Term Water Quality Monitoring Sites

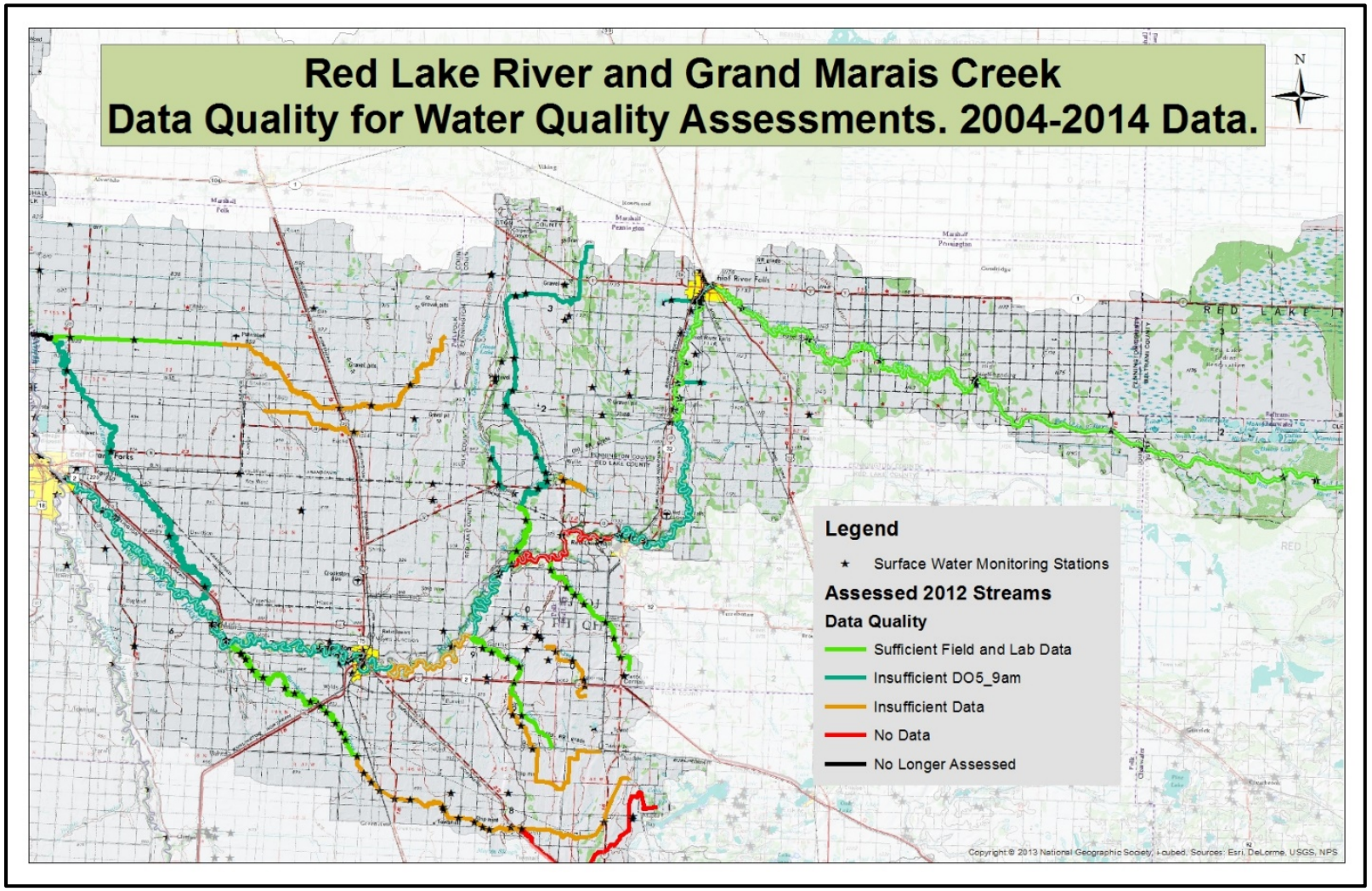


Figure 8-3. Map showing the quality of data that was available for the 2015 assessment.

The MPCA plans to conduct an assessment of the Red Lake River and Grand Marais Creek watersheds once every 10 years. The RLWD water quality staff will use the latest MPCA assessment methods to assess conditions once every two years, at a minimum. Tracking water quality conditions is important for finding reaches that can be recommended for delisting (post-restoration removal from the 303(d) List of Impaired Waters), tracking progress toward delisting, identifying new problems so they can be addressed sooner, and identifying areas that need additional data.

Real-time stage and discharge monitoring stations have been installed in several locations along the Red Lake River. The DNR/MPCA Cooperative Gauging Program also monitors several sites without the use of telemetry. These other significant reaches of the watershed are monitored with HOBO water level loggers by the RLWD.

1. USGS Gauge on the Red Lake River at Fisher
   - USGS gaging station
   - USGS# 05080000
   - EQuIS ID# S000-031
   - http://waterdata.usgs.gov/mn/nwis/uv?05080000
2. Red Lake River at Crookston
   - USGS gaging station
   - USGS# 05079000
   - EQuIS ID# S002-080
   - http://waterdata.usgs.gov/mn/nwis/uv?05079000
3. Red Lake River at CSAH 13 near Red Lake Falls
   - DNR/MPCA Cooperative Stream Gaging station
   - USGS ID# 05076650
   - EQuIS ID# S003-172
   - http://www.dnr.state.mn.us/waters/csg/site_report.html?mode=getsitereport&site=63025001
4. Red Lake River at the Smiley (CSAH 7) Bridge, east of Thief River Falls
   - DNR/MPCA Cooperative Stream Gaging station
   - EQuIS ID# S007-063
5. Red Lake River at Highlanding
   - USGS gaging station
   - USGS ID# 05075000
   - EQuIS ID# S002-077
   - http://waterdata.usgs.gov/mn/nwis/uv?05075000
6. Red Lake River at CSAH 27
   - RLWD HOBO Water Level Logger station
   - EQuIS ID# S007-234
7. Red Lake River at the outlet of Lower Red Lake
   - USGS gaging station operated in cooperation with the U.S. Army Corps of Engineers
   - EQuIS ID# S000-064

- http://www.dnr.state.mn.us/waters/csg/site_report.html?mode=get_site_report&site=62021001

Stage logging stations and water level loggers are installed without telemetry or real-time data at the following locations on tributaries of the Red Lake River and in the Grand Marais Creek watershed:

1. Heartsville Coulee at 210th St. SW (S007-061)
   - RLWD HOBO Water Level Logger station
2. Burnham Creek at 320th Ave SW (S007-058)
   - DNR/MPCA Cooperative Stream Gaging station
3. Polk County Ditch 1 at Polk County Road 61 (S007-059)
   - RLWD HOBO Water Level Logger station
4. Gentilly River at CSAH 11 (S004-058)
   - RLWD HOBO Water Level Logger station
5. Kripple Creek at 180th Ave SW (S004-835)
   - RLWD HOBO Water Level Logger station
6. Black River at CSAH 18 (S002-132)
   - RLWD HOBO Water Level Logger station
7. Cyr Creek at Red Lake County Road 110 (S004-818)
   - RLWD HOBO Water Level Logger station
8. Pennington County Ditch 96 at MN Hwy. 32 (S005-683)
   - RLWD HOBO Water Level Logger station
9. Grand Marais Creek at Polk County Road 65 (S008-903)
   - DNR/MPCA Cooperative Stream Gaging station
10. Polk County Ditch 2 at Polk County Road 62 (S004-131)
    - DNR/MPCA Cooperative Stream Gaging station

The process of gathering data for water quality model calibration revealed a need for flow data from significant reaches that are separated from downstream reaches by an impoundment. The Little Black River and the Black River upstream of the Shirrick Dam are two reaches on which additional stage monitoring stations could be established.

Stage had been monitored at the Polk County Road 64 crossing of the cut-channel portion of Grand Marais Creek by the DNR/MPCA cooperative stream gaging program until October 8, 2014. That channel now only carries a limited amount of flow after completion of the Grand Marais Creek Outlet Restoration project. A new stage monitoring station will be established upstream of the confluence of Grand Marais Creek and Polk County Ditch 2 at the 110th Street NW crossing of Grand Marais Creek (S008-902). RLWD staff acquired permission from the landowner to access a former stream crossing north of the bridge that provides a good, flowing cross-section for flow measurements.

Stage and flow near the outlets of the Thief River and Clearwater River major subwatersheds that flow into the Red Lake River are also monitored by USGS gaging stations

1. Thief River near Thief River Falls
    - USGS gaging station
    - USGS ID# 05076000
    - EQuIS ID# S002-079
    - http://waterdata.usgs.gov/mn/nwis/uv?05076000
2. Clearwater River in Red Lake Falls
    - USGS gaging station
    - USGS ID# 05078500
    - EQuIS ID# S002-118

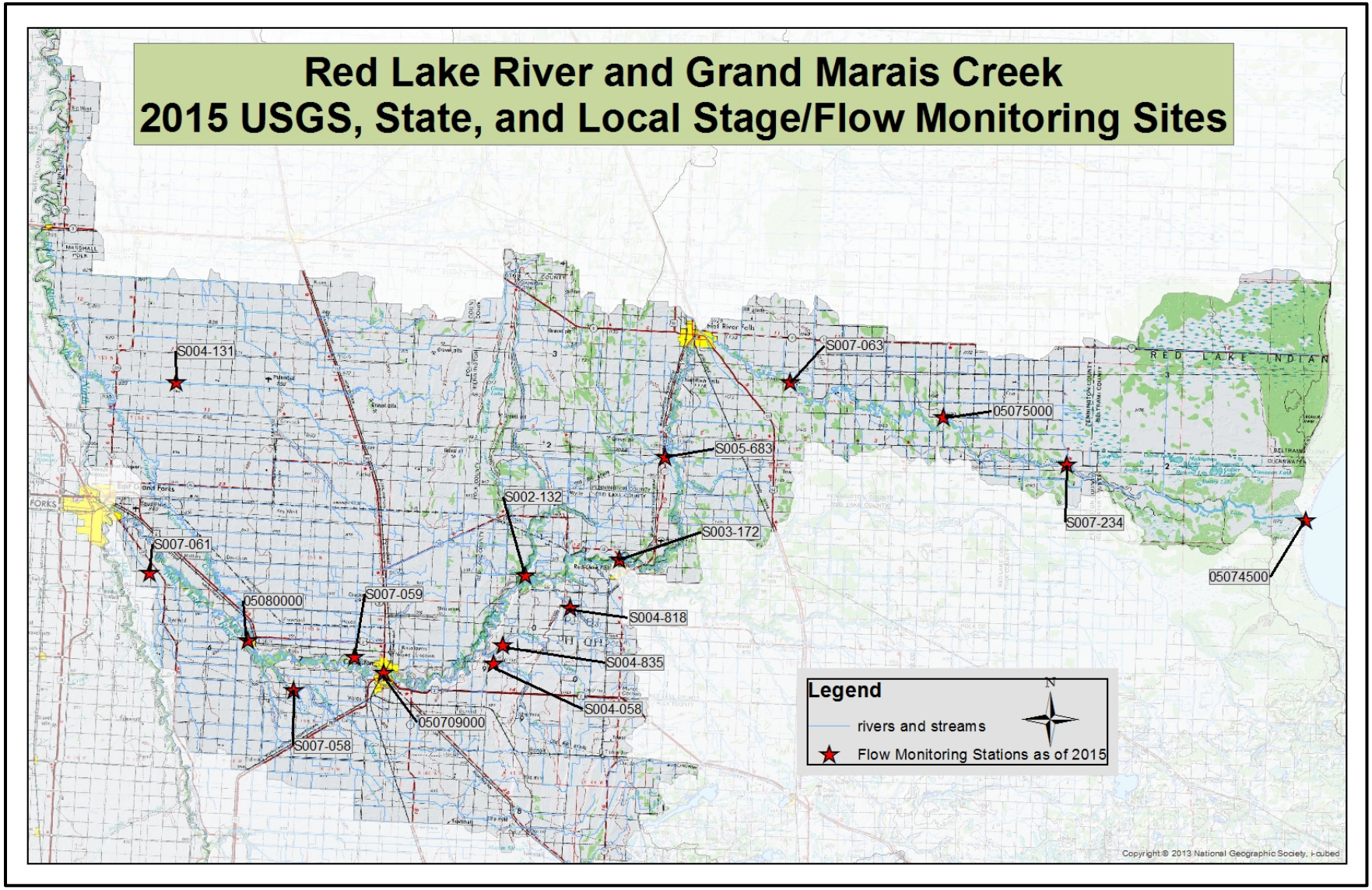


Figure 8-4. Stage and Flow Monitoring Sites in the Thief River Watershed

Other forms of monitoring are also important for the protection of natural resources in the Red Lake River Watershed.

- An intensive geomorphological study of the watershed was completed in conjunction with the Red Lake River WRAP. The process can be repeated at least once every ten years to measure erosion rates and assess the accuracy of Bank Erosion Hazard Index (BEHI) ratings.
- The findings of drainage ditch inventories can be used to identify areas that need to be addressed with BMPs to reduce erosion and sedimentation within ditches.
- Traveling along navigable streams in a kayak or canoe and documenting conditions is one of the best ways to find erosion problems, finding other sources of water quality problems, and assessing the quality of habitat along a waterway.
- The Northland Community and Technical College Aerospace Program inspecting ditch systems and identifying the sources of water quality problems. Drones are now capable of collecting high resolution three-dimensional images that can be used to find and measure erosion problems along rivers and streams.

Rainfall Monitoring Program/Climatology Program (volunteer program):

The Rainfall Monitoring/Climatology Program exists to gather, archive, manage, and disseminate historical climate data in order to address questions involving the impact of climate on Minnesota and its citizens. The clientele are varied and many. Clientele include academics, state agencies, federal agencies, local governments, private sector professionals, and members of the public needing climate information for planning or investigative purposes. The State Climatology Office serves its clientele by offering regularly prepared climate summaries, maps, and data sets. Also, the State Climatology Office produces customized climate data sets, summaries, and maps to honor specific requests. Data are distributed via the Minnesota Climatology Working Web Site, electronic mail, postal mail, telephone, and DNR and University of Minnesota publications. SWCD's act as an administration hub for those volunteers within their county. Reporting and submittal of all completed forms and active volunteering members are corresponded with the Office of State Climatology.

DNR Observation Well Monitoring Program:

a) Continue to monitor existing and any new DNR observation wells

b) Continue to update DNR website monthly with new groundwater levels

Red Lake County DNR Wells:

DNR Well #	Well Name	Location
63001	USGS NW MN Study # 11	T150 R44 S23 ABBB
63002	USGS NW MN Study # 12	T150 R44 S23 DCDD
63003	USGS NW MN Study # 16	T150 R44 S34 DDDD

Pennington County DNR Wells

DNR Well #	Well Name	Location
57002	USGS NW MN Study #21	T152 R45 S17 CCCD
57003	USGS NW MN Study #22	T153 R44 S06 DDD
57004	USGS NW MN Study #23	T153 R44 S20 BBBB
57005	USGS NW MN Study #24	T153 R45 S09 ABAA
57006	USGS NW MN Study #25	T153 R45 S21 AAAA
57007	USGS NW MN Study #26	T153 R45 S28 AABA
57008	USGS NW MN Study #27	T154 R44 S20 CCC

Inventory

LGUs in the Red Lake River Watershed conduct ongoing inventories and will seek new inventory opportunities to address natural resource concerns. Completed inventories will be used to plan projects. Inventories gather new data and information on priority issues in the Red Lake River Watershed which allow staff to identify and target locations for BMPs. Inventories will identify priority locations for the protection and improvement of natural resources and will assist in land use planning and compliance. LGUs will continue to conduct on-going inventories, implement identified inventories, and seek new inventory opportunities to address priority issues in the Red Lake River Watershed.

Surface Water Quality, Altered Hydrology and Drainage Ditch Management

- Conduct a County Drainage Ditch Inventory for Side Water Inlets and Buffers
  - LGUs - Pennington SWCD, Red Lake County SWCD, and West Polk SWCD
  - ArcGIS Mapping: Stream Power Index, County Drainage Ditches
- Inventory of legal ditch outlets and natural waterway outlets for grade stabilization structures where needed
  - LGUs – Pennington SWCD, Red Lake County SWCD, and West Polk SWCD
- Identify new and/or closed registered feedlots or ag waste systems
  - LGUs – Pennington SWCD, Red Lake County SWCD, West Polk SWCD
- Conduct a culvert Inventory that includes location, sizing, and fish passage. Plan for systematic replacement of culverts based upon inventory results.
  - Pennington SWCD, West Polk SWCD, Red Lake County SWCD, and RLWD
- Update County Drainage records including benefited areas
  - LGUs – RLWD, Pennington SWCD, Red Lake County SWCD, West Polk SWCD
- Conduct an inventory of natural resource enhancement opportunities including; buffers strips, grassed waterways, etc.
  - LGUs – RLWD, Pennington SWCD, Red Lake County SWCD, West Polk SWCD

Shoreland and Riparian Management

- Conduct a shoreland buffer inventory to identify areas where buffers are needed
  - LGUs – Pennington SWCD, Red Lake County SWCD, and West Polk SWCD, and RLWD
- Conduct an inventory of the Red Lake River and its tributaries to identify priority locations for streambank stabilization projects. Utilize existing inventories and geomorphological assessments to plan projects.
  - LGUs – RLWD, Pennington SWCD, Red Lake County SWCD, West Polk SWCD
- Conduct an inventory for restorations of meandering channels
  - Pennington SWCD, Red Lake County SWCD, and West Polk SWCD

Ground Water Protection

- Identify and map any existing or new irrigation wells
  - LGUs – Pennington SWCD, Red Lake County SWCD, West Polk SWCD

- Conduct an abandoned well inventory. Target unsealed abandoned wells according to each planning zone's priority
  - LGUs – Pennington SWCD, Red Lake County SWCD, West Polk SWCD
- Continue to update the Drilled Well Inventory
  - County Well Index
  - Develop County Geological Atlas
  - LGUs – Pennington SWCD, Red Lake County SWCD, West Polk SWCD
- Conduct a Subsurface Sewage Treatment System (SSTS) Inventory
  - Red Lake County SWCD
- Conduct a Gravel Pit Inventory
  - LGU's – Pennington SWCD, Red Lake County SWCD, West Polk SWCD
- SSTS Inventory of Chief's Coulee drainage area
  - Pennington SWCD
- SSTS inventory in shoreland areas and high population areas such as trailer courts and small communities
  - Pennington SWCD, Red Lake County SWCD, Polk County
- Sealed abandoned well inventory
  - Red Lake County SWCD, Pennington SWCD, West Polk SWCD

Soil Erosion and Sedimentation

- Conduct regular inventories of erosion sites, share information with other LGU's and plan projects to address the erosion problems.
  - Red Lake County SWCD, Pennington SWCD, West Polk SWCD, and RLWD
- Work with Township, County, and State officials to Inventory high priority areas for living snowfences and field windbreaks
  - LGUs – Pennington SWCD, Red Lake County SWCD, West Polk SWCD

Flood Damage Reduction

- Conduct an inventory of natural resource enhancement opportunities including wetland restorations, sediment basins, etc.
  - RLWD, Pennington SWCD, Red Lake County SWCD, West Polk SWCD

Habitat

- Work with the County agricultural inspector to inventory locations for invasive or noxious weeds
  - LGUs – Pennington SWCD, Red Lake County SWCD, West Polk SWCD

Source Water Protection

- Assist Cities with Stormwater Assessments and identify priority locations for urban BMPs
  - Stormwater Assessments for Crookston, EGF, Red Lake Falls
  - LGUs- Pennington SWCD, Red Lake County SWCD, West Polk SWCD

Multiple Issues of Concern

- Watershed / Sub-watershed Needs Assessment Inventory
  - Red Lake County SWCD, Pennington SWCD, West Polk SWCD, and RLWD
- Update existing inventories with the new information as needed.
  - Red Lake County SWCD, Pennington SWCD, West Polk SWCD and RLWD

8.2.6. Information, Education, and Outreach Programs

LGUs in the Red Lake River watershed will continue ongoing education and outreach programs and activities. Information, outreach, and education is provided to the general public, stakeholders, and K-12th grade students, etc. **Table 8-9** lists current educational events and programs along with the responsible LGUs. LGUs will provide information, outreach, and educational material for any new programs that arise throughout the Red Lake River Watershed.

Table 8-9. Summary of Education and Outreach Programs

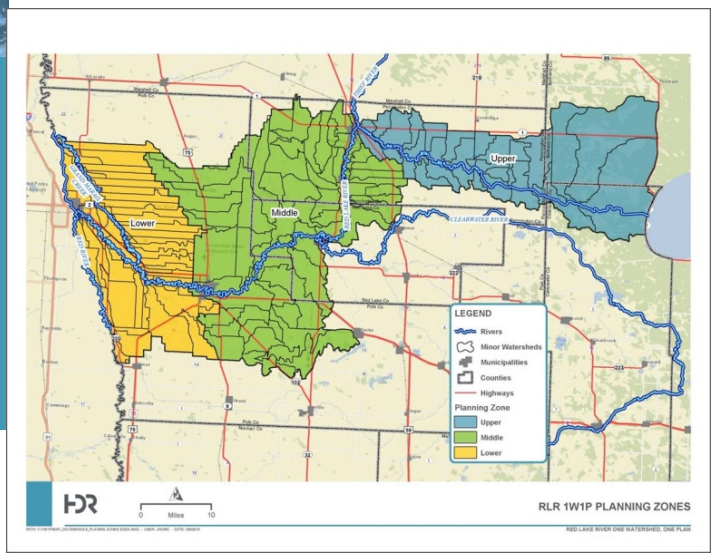
Event/Program	LGUs/Notes
K-12th Grade	
NW MN Water Festival	Pennington SWCD, Red Lake County SWCD, West Polk SWCD, RLWD, Local, State and Federal Agencies and other LGU's
Outdoor Education Day	Pennington SWCD, Red Lake County SWCD, West Polk SWCD, RLWD
Envirothon	Pennington SWCD, Red Lake County SWCD, West Polk SWCD
Poster Contest	Pennington SWCD
Arbor Day	Pennington SWCD, W. Polk SWCD
Long Lake Conservation Camp	Pennington SWCD, Red Lake County SWCD, West Polk SWCD
Science Fair	SWCD, NRCS, and RLWD staff participate in judging and awarding projects related to soil/water conservation
Science Museum	Sponsor Bemidji Science museum presentation for local elementary students
New Opportunities	All LGUs
General Public	
Banquet	Pennington SWCD
Presentations	W. Polk SWCD (UMC, Townships, DNR Firearm Safety Course)
Climatology Program	Pennington SWCD, Red Lake County SWCD, West Polk SWCD
Well Water Testing Clinic	Pennington SWCD
Well Testing Kits	Provide for private landowners to test well water year round
Nitrate Testing Clinic	Red Lake County SWCD
Aquatic Invasive Species Program (AIS)	Pennington SWCD, Red Lake County SWCD, Polk County

Event/Program	LGUs/Notes
MAWQCP	Pennington SWCD, Red Lake County SWCD, West Polk SWCD
WRAPS	Civic Engagement-Red Lake Watershed District
Newsletters, Reports, and Websites	RLWD – www.redlakewatershed.org www.rlwdwatersheds.org www.facebook.com/Red-Lake-Watershed-District-26652173412008 https://redlakeriver.wordpress.com Pennington SWCD – www.penningtonswcd.org Red Lake SWCD – www.reedlakecountyswcd.org West Polk SWCD – www.westpolkswcd.com 1W1P – http://westpolkswcd.com/1w1p/html
Social media	All LGUs
Tile Drainage	Red Lake Watershed District
News Releases/Publications	All LGU's
Field Days / Tours / Demonstration Workshops	All LGUs
River Watch	The RLWD provides technical and financial support River Watch programs within the District
Open House Events	The RLWD, and possibly other LGU's may hold open-house events to promote attitudes toward the river.
County Fair Booths	All LGU's
Thief River Falls Community Expo	Pennington SWCD, RLWD
Red Lake River Corridor Enhancement Project	The RLWD is a member of the RLRCE Joint Powers Board and supports the work of the group, improving connections with rivers will help improve attitudes towards the river.
Water Resource Advisory Committee	The Pennington County SWCD organizes the meetings and the RLWD is represented among the regular attendees.

Red Lake River
One Watershed One Plan

Appendices

January 2017



APPENDICES

Table of Contents

Appendix A

Memorandum of Agreement

MEMORANDUM OF COOPERATIVE AGREEMENT
RED LAKE RIVER PLANNING GROUP

This cooperative agreement (Agreement) is made and entered into by and between:

The Counties of Polk, Red Lake, and Pennington (Counties) by and through their respective County Board of Commissioners, and

The West Polk, Red Lake County, and Pennington Soil and Water Conservation Districts (SWCDs), by and through their respective Soil and Water Conservation District Board of Supervisors, and

The Red Lake Watershed District (RLWD), by and through its Board of Managers,

Collectively referred to as the "parties."

WHEREAS, the Counties of this Agreement are political subdivisions of the State of Minnesota, with authority to carry out environmental programs and land use controls, pursuant to Minnesota Statutes Chapter 375 and as otherwise provided by law; and

WHEREAS, the Soil and Water Conservation Districts of this Agreement are political subdivisions of the State of Minnesota, with statutory authority to carry out erosion control and other soil and water conservation programs, pursuant to Minnesota Statutes Chapter 103C and as otherwise provided by law; and

WHEREAS, the Watershed District of this Agreement is a political subdivision of the State of Minnesota, with statutory authority to conserve the natural resources of the state by land use planning, flood control, and other conservation projects by using sound scientific principles for the protection of the public health and welfare and the provident use of the natural resources, pursuant to Minnesota Statutes Chapter 103B, 103D, 103E and as otherwise provided by law; and

WHEREAS, the parties to this Agreement have a common interest and statutory authority to prepare, adopt, and assure implementation of a comprehensive watershed management plan in the Red Lake River Watershed to conserve soil and water resources through the implementation of practices, programs, and regulatory controls that effectively control or prevent erosion, sedimentation, siltation and related pollution in order to preserve natural resources, ensure continued soil productivity, protect water quality, reduce damages caused by floods, preserve wildlife, protect the tax base, and protect public lands and waters; and

WHEREAS, with matters that relate to coordination of water management authorities pursuant to Minnesota Statutes Chapters 103B, 103C, and 103D and with public drainage systems pursuant to Minnesota Statutes Chapter 103E, this Agreement does not change the rights or obligations of the public drainage system authorities; and

WHEREAS, pursuant to Minnesota Statutes Section 103B.101 Subd. 14, the Board of Water and Soil Resources (BWSR) "may adopt resolutions, policies, or orders that allow a comprehensive plan, local water management plan, or watershed management plan, developed or amended, approved and adopted, according to chapter 103B, 103C, or 103D to serve as substitutes for one another or be replaced with a comprehensive watershed management plan," also known as the "One Watershed, One Plan"; and

WHEREAS, the parties previously entered into a Memorandum of Agreement for the purpose of planning the One Watershed, One Plan for the Red Lake River Watershed, and the parties have now formed this Agreement for the specific goal of implementing the One Watershed, One Plan for the Red Lake River Watershed.

NOW, THEREFORE, the parties hereto agree as follows:

1. **Purpose:** The parties to this Agreement recognize that a guiding principle of One Watershed, One Plan is that "One Watershed, One Plan implementation will be accomplished through formal agreements among participating local governments on how to manage and operate the watershed." The parties to this Agreement acknowledge "that the purpose of this principle is to provide assurances that decision-making spanning political boundaries is supported by an in-writing commitment from participants." [The quoted sections are from *One Watershed One Plan Operating Procedures for Pilot Watersheds,* Page 13 BWSR June 25, 2014 document.]

   The parties working together for the purpose of planning the One Watershed, One Plan for the Red Lake River Watershed (Attachment A), known collectively as the "Red Lake River Planning Group" under the Memorandum of Agreement, now establish, through this Agreement, the process for governance of the implementation of the plan as they continue to recognize the importance of partnerships to plan and implement, protection and restoration efforts for the Red Lake River Watershed. Parties signing this Agreement will continue to be collectively referred to as the "Red Lake River Planning Group" and are partnering together in the form of this Agreement pursuant of the cooperative authority contained in Minnesota Statutes Section 471.59.

   This Agreement does not establish a joint powers entity but set outs the terms and provisions by which the parties "may jointly or cooperatively exercise any power common to the contracting parties or any similar powers, including those which are the same except for the territorial limits within which they may be exercised." Minnesota Statutes Section 471.59. As is permitted under the joint exercise of powers statute, Minnesota Statutes Section 471.59, the parties agree that under this Agreement, and as agreed upon and directed by the Policy Committee, one or more of the parties may exercise any power common to them on behalf of the other participating units, such as they have done under the Memorandum of Agreement where the Red Lake Watershed District has provided the day-to-day administrative duties of the Red Lake River Planning Group and the Pennington SWCD has been the fiscal agent.

2. **Term:** This Agreement is effective upon signature of all parties in consideration of the BWSR Participation Requirements for One Watershed, One Plan; and will remain in effect until canceled according to the provisions of this Agreement, unless earlier terminated by law.

3. **Adding Additional Parties:** A qualifying party within the Red Lake River Watershed that is responsible for water planning and resource management according to Minnesota State Statutes desiring to become a member of this Agreement shall indicate its intent by adoption of a governing board resolution that includes a request to the Policy Committee to join the Red Lake River Planning Group, a representative appointed to the Policy Committee, and a statement that the qualifying party agrees to abide by the terms and conditions of this Agreement; including but not limited to the bylaws, policies, and procedures adopted by the Policy Committee.

4. **Procedure for Parties to Leave Membership of the Agreement:** A party desiring to leave the membership of this Agreement shall indicate its intent in writing to the Policy Committee in the form of an official board resolution. Notice must be made 180 days in advance of leaving the Red Lake River Planning Group. A party that leaves the membership of the Agreement remains obligated to complying with the terms of any grants the Red Lake River Planning Group has at the time of the party's notice to leave membership and is obligated until the grant has ended.

5. **General Provisions**:

   a. **Compliance with Laws/Standards:** The parties agree to abide by all Federal, State or local laws; statutes, ordinances, rules and regulations now in effect or hereafter adopted pertaining to this Agreement.

   b. **Indemnification:** Each party to this Agreement shall be liable for the acts of its officers, employees or agents and the results thereof to the extent authorized or limited by law and shall not be responsible for the acts of any other party, its officers, employees or agents. The provisions of the Municipal Tort Claims Act, Minnesota Statutes Chapter 466 and other applicable laws govern liability of the parties. To the full extent permitted by law, actions by the parties, their respective officers, employees and agents, pursuant to this Agreement are intended to be and shall be construed as a "cooperative activity" and it is the intent of each party that this Agreement does not create any liability or exposure of one party for the acts or omissions of any other party pursuant to Minnesota Statutes Section 471.59, Subd. 1a. (a). If a party is found responsible for any liability associated with the actions of the Group, said party agrees to indemnify and hold harmless any of the other non-liable parties of the Group for any defense costs and expenses associated with any such claim.

   c. **Employee Status:** The parties agree that the respective employees or agents of each party shall remain the employees or agents of each individual respective party.

   d. **Data Practices and Records Retention:** The parties agree that each respective party will be responsible for complying with the Minnesota Government Data Practices Act (Minnesota Statutes Chapter 13), and the Official Records Act (Minnesota Statutes Section 15.17) for the data collected, created, received, maintained, disseminated or stored by each respective party pursuant to the terms of this Agreement. The Group will designate a responsible data official to collect and comply with all data requests associated with grants awarded or projects undertaken by the Group.

   e. **Timeliness:** The parties agree to perform obligations under this Agreement in a timely manner and keep each other informed about any delays that may occur.

   f. **Termination:** The parties anticipate that this Agreement will remain in full force and effect until canceled by all parties, unless otherwise terminated in accordance with law or other provisions of this Agreement. The parties acknowledge their respective and applicable obligations, if any, under Minnesota Statutes Section 471.59, Subd. 5 after the purpose of the Agreement has been completed.

g. **Distribution of Property:** At the time of termination, any property acquired as the result of such cooperative exercise of powers and any surplus monies remaining shall be divided pro-rata in proportion to the contributions of the several contracting parties. If no contributions have been made, the assets and surplus monies shall be divided equally among the parties.

6. **Structure:** To carry out the planning, development, implementation and governance of the Red Lake River One Watershed, One Plan, the parties agree to continue the structure established under the Memorandum of Agreement, which includes the Policy Committee, the Advisory Committee, and the Planning Workgroup.

   a. **Policy Committee.** The parties agree that the Policy Committee established under the Memorandum of Agreement for the purpose of developing the One Watershed, One Plan shall continue to operate cooperatively, but not as a single entity, for the purpose of implementation of the Red Lake River Watershed plan. Membership on the Policy Committee shall remain as each party's designated representative. That individual who serves as their respective party's designated representative must be an elected or appointed member of that party's governing board. The governing boards may choose alternates to serve on the Policy Committee from their boards as needed. The Policy Committee will meet quarterly or as needed.

      i. Authority of Policy Committee Members: Each representative on the Policy Committee shall have one vote, and shall have the authority to act on behalf of the party they represent in the following matters: grant applications for grants the Policy Committee has voted to apply for/request on behalf of the Red Lake River Planning Group; report review and approval, payments under Red Lake River Planning Group grant(s), the implementation of the plan, plan amendments, and the governance of the plan. The Policy Committee will follow the bylaws adopted by the Policy Committee and will have the power to modify the bylaws.

      ii. Policy Committee Member Duties: Each Policy Committee member will serve as a liaison to their respective governing boards and has the responsibility to inform their governing board on actions taken by the Policy Committee.

   b. **The Advisory Committee**. The parties agree that the Advisory Committee shall continue to provide technical support on the plan implementation to the Policy Committee, including identification of priorities. The Advisory Committee will remain as consisting of the local Planning Workgroup, the state's main water agencies, citizens, and other identified stakeholders. The Advisory Committee will meet quarterly or as needed.

   c. **The Planning Workgroup**. The parties agree that the Planning Workgroup shall continue and shall consist of the One Watershed One Plan Coordinator, local water planners, and the WD Administrator for the purposes of logistical and day-to-day decision-making in the implementation process. The Planning Workgroup will meet quarterly or as needed.

7. **Implementation of the Plan.** The parties agree to adopt and begin implementation of the plan within 120 days of state approval and provide notice of plan adoption pursuant to Minnesota Statutes Chapter 103B and 103D.

8. **Fiscal Agent.** The Policy Committee shall appoint annually one of the parties to the Agreement to be the Fiscal Agent for the Red Lake River One Watershed One Plan. The Fiscal Agent agrees to:

    a. Accept all fiscal responsibilities associated with grant agreements applied for and received by the Red Lake River Planning Group.

    b. Perform financial transactions as part of contract implementation.

    c. Pursuant to Minnesota Statutes Section 471.59, Subd. 3, provide for strict accountability of all funds and report of all receipts and disbursements and annually provide a full and complete audit report.

    d. Provide the Policy Committee and the Planning Workgroup with such records as are necessary to describe the financial condition of the grant agreements the Policy Committee oversees.

    e. Responsible for fiscal records retention consistent with the Fiscal Agent's records retention schedule until termination of this Agreement. At that time, the fiscal records will be turned over to the One Watershed One Plan Coordinator.

9. **One Watershed One Plan Coordinator**. The Policy Committee shall appoint annually a "One Watershed One Plan Coordinator" to handle the administrative work of the Red Lake River One Watershed One Plan. "In the circumstance that the One Watershed One Plan Coordinator position is vacated, the Policy Committee shall appoint one of the parties to the Agreement to fill this role until the position is re-filled." The party that is the One Watershed One Plan Coordinator handling the administration agrees to provide the following to the Red Lake River Planning Group for the purposes of this Agreement:
    a. Handle administrative responsibilities associated with the implementation of the Red Lake River One Watershed One Plan and any subsequent grant(s), if any, the Red Lake River Planning Group applies for and receives to implement the watershed-based plan.

    b. Be the contact for the Red Lake River One Watershed One Plan and grant agreements, if any, the Red Lake River Planning Group applies for/requests and receives.

    c. Be responsible for the BWSR and other grant reporting requirements.

    d. Assist the Policy Committee and the Planning Workgroup with the administrative details to oversee implementation of the watershed-based plan.

    e. Maintain the Red Lake River One Watershed One Plan webpage

    f. Perform other duties to keep the Policy Committee, the Advisory Committee, and the Planning Workgroup informed about the implementation of the watershed-based plan.

10. **Authorized Representatives:** The following persons will be the primary contacts for all matters concerning this Agreement:

Polk County

County Administrator
612 N Broadway
Crookston, MN 56716
Telephone: (218) 281-2554

Red Lake County

County Auditor
124 Langevin Ave.
Red Lake Falls, MN 56750
Telephone: (218) 253-2598

Pennington County

County Auditor
101 Main Ave. North
Thief River Falls, MN 56701
Telephone: (218) 683-7000

Pennington SWCD

District Manager
201 Sherwood Ave. S
Thief River Falls, MN 55965
Telephone: (218) 683-7075

Red Lake County SWCD
District Manager
2602 Wheat Drive
Red Lake Falls, MN 56750
Telephone: (218) 253-2593 ext. 4

West Polk SWCD
District Manager
525 Strander Ave.
Crookston, MN 56716
Telephone: (218) 281-6070 ext. 122

Red Lake Watershed District
District Administrator
1000 Pennington Ave. South
Thief River Falls, MN 56701
Telephone: (218) 681-5800

11. **Counterparts.** This Agreement may be executed in any number of counterparts, each of which shall constitute one and the same instrument.

[Remainder of page intentionally left blank]

IN TESTIMONY WHEREOF the parties have duly executed this Agreement by their duly authorized officers.

Partner: Polk County

APPROVED:

BY: _____
Board Chair Date

BY: _____ 1-24-2017
Administrator Date

APPROVED AS TO EXECUTION

BY: _____ 1-30-17
County Attorney Date

IN TESTIMONY WHEREOF the parties have duly executed this Agreement by their duly authorized officers.

Partner: Red Lake County

APPROVED:

BY: _____ 12/27/16
Board Chair Date

BY: _____ 12-27-16
Auditor Date

APPROVED AS TO EXECUTION

BY: _____ 01/28/2017
County Attorney Date

IN TESTIMONY WHEREOF the parties have duly executed this Agreement by their duly authorized officers.

Partner: Pennington County

APPROVED:

BY: _____ Vice Chair 1/24/17
Board Chair Date

BY: _____ 1/24/17
Auditor Date

APPROVED AS TO EXECUTION

BY: _____ 1-24-17
County Attorney Date

IN TESTIMONY WHEREOF the parties have duly executed this Agreement by their duly authorized officers.

Partner: Pennington SWCD

APPROVED:

BY: _____ 1-19-17
Board Chair Date

BY: Bryan E Malone 1/26/17
District Manager Date

APPROVED AS TO EXECUTION

BY: _____ 1-24-17
County Attorney Date

IN TESTIMONY WHEREOF the parties have duly executed this Agreement by their duly authorized officers.

Partner: Red Lake County SWCD

APPROVED:

BY: Dwd Miller 1-09-17
Board Chair Date

BY: Tonya Hanson 1-9-17
District Manager Date

APPROVED AS TO EXECUTION

BY: Michael LaCoursiere 01/28/2017
County Attorney Date

IN TESTIMONY WHEREOF the parties have duly executed this Agreement by their duly authorized officers.

Partner: West Polk SWCD

APPROVED: 1/19/17

BY: _____ 1-19-17
Board Chair Date

BY: _____ 1/19/17
District Manager Date

APPROVED AS TO EXECUTION

BY: _____
County Attorney Date

IN TESTIMONY WHEREOF the parties have duly executed this Agreement by their duly authorized officers.

Partner: Red Lake Watershed District

APPROVED:

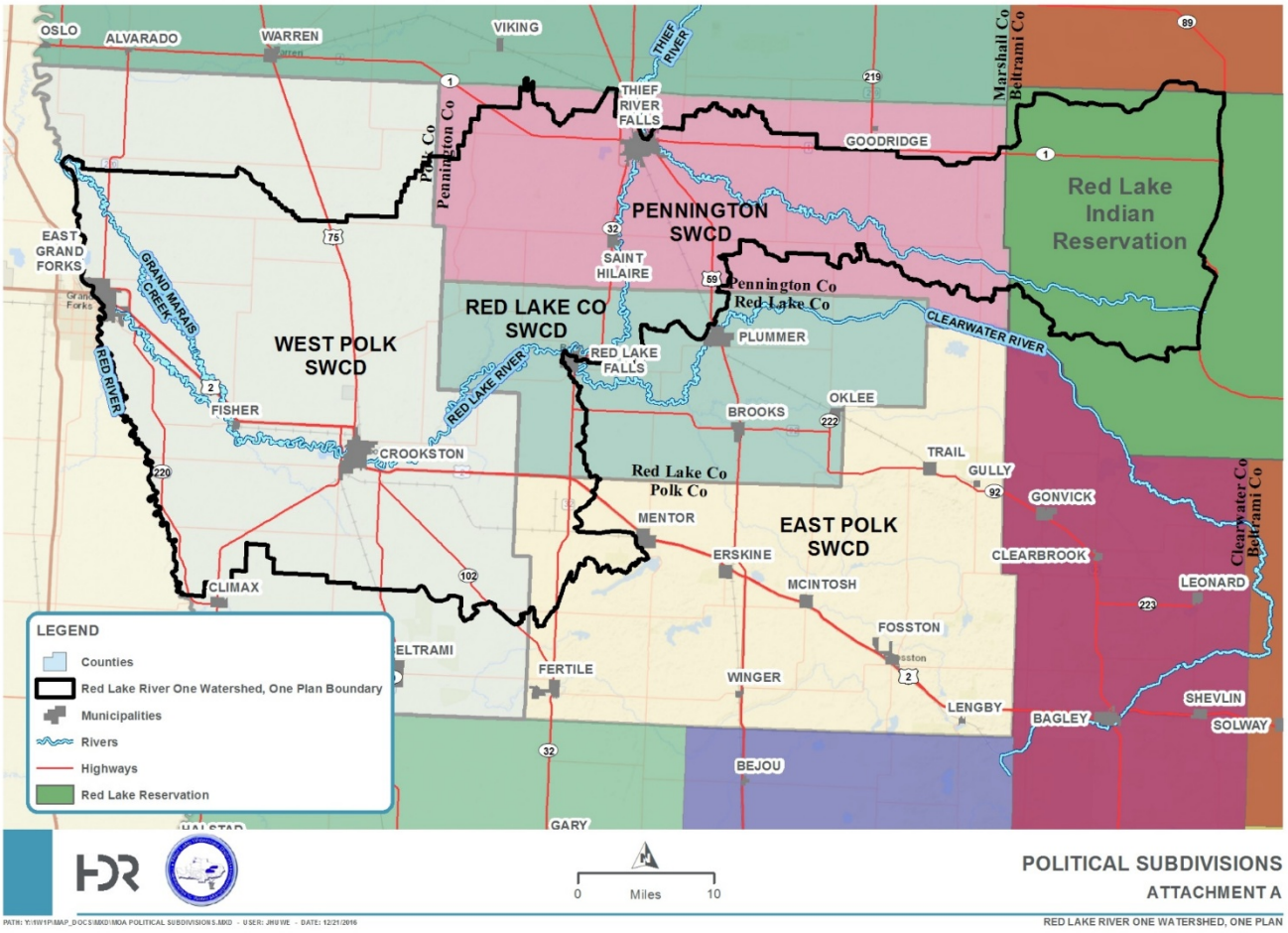
BY: _____ 1-12-17
Board Chair Date

BY: _____ 1-12-17
District Administrator Date

APPROVED AS TO EXECUTION

BY: _____ 1-12-17
District Attorney Date

Attachment A



MEMORANDUM OF AGREEMENT

This agreement (Agreement) is made and entered into between:

The Counties of Pennington, Red Lake and Polk, by and through their respective County Board of Commissioners, and

The Pennington, Red Lake County and West Polk Soil and Water Conservation District, by and through their respective Soil and Water Conservation District Board of Supervisors, and

The Red Lake Watershed District, by and through its Board of Managers.

WHEREAS, the Counties of this agreement are political subdivisions of the State of Minnesota, with authority to carry out environmental programs and land use controls, pursuant to Minnesota Statutes Chapter 375 and as otherwise provided by law; and

WHEREAS, the Soil and Water Conservation Districts (SWCDs) of this agreement are political subdivisions of the State of Minnesota, with statutory authority to carry out erosion control and other soil and water conservation programs, pursuant to Minnesota Statutes Chapter 103C and as otherwise provided by law; and

WHEREAS, the Watershed District of this agreement is a political subdivision of the State of Minnesota, with statutory authority to carry out conservation of the natural resources of the state by land use controls, flood control, and other conservation projects for the protection of the public health and welfare and the provident use of the natural resources, pursuant to Minnesota Statutes Chapter 103B, 103D and 103E as otherwise provided by law; and

WHEREAS, the parties to this agreement have a common interest and statutory authority to prepare, adopt, and assure implementation of a comprehensive watershed management plan in the Red Lake River Watershed to conserve soil and water resources through the implementation of practices, programs, and regulatory controls that effectively control or prevent erosion, sedimentation, siltation and related pollution in order to preserve natural resources, ensure continued soil productivity, protect water quality, reduce damages caused by floods, preserve wildlife, protect the tax base, and protect public lands and waters; and

WHEREAS, with matters that relate to coordination of water management authorities pursuant to Minnesota Statutes 103B, 103C, and 103D with public drainage systems pursuant to Minnesota Statutes 103E, this agreement does not change the rights or obligations of the public drainage system authorities.

WHEREAS, joining together in a collaborative process in establishing respective water plans will save time, monies and resources for each of the entities involved herein.

NOW, THEREFORE, the parties hereto agree as follows:

1. **Purpose:** The parties to this agreement recognize the importance of partnerships to plan and implement protection and restoration efforts for the Red Lake River Watershed as shown in Attachment A. Parties signing this agreement will be collectively referred to as the "Red Lake River Planning Group".

2. **Term:** This agreement is effective upon signature of all parties in consideration of the Board of Water and Soil Resources Participation Requirements for *One Watershed, One Plan*; and will remain in effect until December 31, 2017, unless it is canceled according to the provisions of this Agreement, or earlier terminated by law.

3. **Adding Additional Parties:** A party desiring to become a member of this agreement shall indicate its intent by adoption of a board resolution prior to January 1, 2015, authorizing appropriate parties to sign on its behalf, and agree to abide by the terms and conditions of the Agreement; including but not limited to the bylaws, policies and procedures adopted by the policy committee.

4. **General Provisions**:

    a. **Compliance with Laws/Standards:** The parties agree to abide by all Federal, State or local laws; statutes, ordinances, rules and regulations now in effect or hereafter adopted pertaining to this Agreement or to the facilities, programs and staff for which the Agreement is responsible.

    b. **Indemnification:** Each party to this Agreement shall be liable for the acts of its officers, employees or agents and the results thereof to the extent authorized or limited by law and shall not be responsible for the acts of the other party, its officers, employees or agents. The provisions of the Municipal Tort Claims Act, Minnesota Statute Chapter 466 and other applicable laws govern liability of the parties. To the full extent permitted by law, actions by the parties, their respective officers, employees and agents, pursuant to this Agreement are intended to be and shall be construed as a "cooperative activity" and it is the intent of the parties that they shall be deemed a "single governmental unit" for the purpose of liability, as set forth in Minnesota Statutes Section 471.59, Subd. 1a(a), provided further that for purposes of that statute it is the intent of each party that this Agreement does not create any liability or exposure of one party for the acts or omissions of the other party.

    c. **Records Retention:** The parties agree that records created pursuant to the terms of this Agreement will be retained in a manner that meets their respective entity's records retention schedules that have been reviewed and approved by the State in accordance with Minn. Stat. §138.17.

    d. **Timeliness:** The parties agree to perform obligations under this Agreement in a timely manner and keep each other informed about any delays that may occur.

e. **Termination:** The parties anticipate that this Agreement will remain in full force and effect through the term of the grant agreement with BWSR or until canceled by all parties, unless otherwise terminated in accordance with law or other provisions of this Agreement.

f. This agreement may be amended from time to time if said amendment is agreed to in writing by all parties to this agreement.

5. **Administration:**

   a. **Development of the Plan.** The parties agree to designate one representative, who must be an elected or appointed member of the governing board, to a policy committee for development of the watershed-based plan. The committee will meet monthly or as needed to decide on the content of the plan. Each representative shall have one vote. The Policy Committee will establish bylaws by December 31, 2014. Parties agree to designate one or more technical representatives to an advisory committee for development of the watershed-based plan. The committee will meet monthly or as needed to make recommendations on the content of the plan.

   b. **Submittal of the Plan.** The policy committee will recommend the plan to the parties of this agreement. Each party will be responsible for initiating a local review and comment process that conforms to Minnesota Statutes 103B and 103D including required public hearings. Upon completion of local review and comment, and approval of the plan for submittal by each party, the policy committee will submit the watershed-based plan jointly to the Board of Water and Soil Resources for review and approval.

   c. **Adoption of the Plan.** The parties agree to adopt and begin implementation of the plan within 120 days of state approval and provide notice of plan adoption pursuant to Minnesota Statutes Chapter 103B and 103D.

6. **Fiscal Agent:** Pennington SWCD will act as the fiscal agent for the purposes of this agreement and agrees to:

   a. Accept all responsibilities associated with the implementation of the BWSR grant agreement for developing a watershed-based plan.

   b. Perform financial transactions as part of contract implementation.

   c. Annually provide a full and complete audit report to all parties hereto and any other applicable entity.

   d. Provide the policy committee with such records as are necessary to describe the financial condition of the BWSR grant agreement.

7. **Coordination of Policy and Advisory Committee meetings:** Red Lake Watershed District will provide meeting room and staff to complete the following tasks:
    a. Provide advance notice of meetings
    b. Prepare and Distribute the Agenda and related materials
    c. Prepare and Distribute Policy Committee Minutes
    d. Maintain all records and documentation of the Policy Committee
    e. Provide public notices to the counties and watershed district for publication

8. **Primary Contacts:** The following persons will be the primary contacts for all matters concerning this Agreement:

Polk County
County Auditor
612 N Broadway
Crookston, MN 56716
Telephone: 218-281-2554

Red Lake County
County Auditor
124 Langevin Ave
Red Lake Falls, MN 56750
Telephone: 218-253-2598

Pennington County
County Auditor
101 Main Ave. North
PO Box 616
Thief River Falls, MN
Telephone: 218-683-7000

Pennington SWCD
Peter Nelson or successor
201 Sherwood Ave. S
Thief River Falls, MN
Telephone: 218-683-7075

Red Lake County SWCD
Tanya Hanson or successor
District Manager
2602 Wheat Drive
Red Lake Falls, MN 56750
Telephone: 218-253-2593 ext. 4

West Polk SWCD
Nicole Bernd or successor
District Manager
525 Strander Ave.
Crookston, MN 56716
Telephone: 218-281-6070 ext. 122

Red Lake Watershed District
Myron Jesme or successor
District Administrator
1000 Pennington Ave. S
Thief River Falls, MN 56701
Telephone: 218-681-5800

IN TESTIMONY WHEREOF the parties have duly executed this agreement by their duly authorized officers.

PARTNER: POLK COUNTY

APPROVED:

BY: _____ 10-8-14
Board Chair Date

BY: _____ 10-9-14
Board Member/Administrator Date

APPROVED AS TO FORM

BY: _____ 10/20/14
County Attorney Date

IN TESTIMONY WHEREOF the parties have duly executed this agreement by their duly authorized officers.
(Repeat this page for each participant)

PARTNER: RED LAKE COUNTY

APPROVED:

BY: _____ 9-23-14
Board Chair Date

BY: _____ 9-23-14
~~Board Member/Administrator~~ Date
County Auditor - Board Clerk

APPROVED AS TO FORM *(use if necessary)*

BY: Michael LaCourciere 9/26/14
County Attorney Date

PARTNER: Pennington County

APPROVED:

BY: _____
Board Chair Date

BY: _____ 10/14/14
Board Member/Administrator Date

APPROVED AS TO FORM *(use if necessary)*

BY: _____ 10-14-14
County Attorney Date

IN TESTIMONY WHEREOF the parties have duly executed this agreement by their duly authorized officers.

PARTNER: Pennington SWCD

APPROVED:

BY: _____ 10-K-14
Board Chair Date

BY: Bryan L. Malone 10/16/14
District Manager/Administrator Date

APPROVED AS TO FORM *(use if necessary)*

BY: _____ 10-14-14
County Attorney Date

IN TESTIMONY WHEREOF the parties have duly executed this agreement by their duly authorized officers.

IN TESTIMONY WHEREOF the parties have duly executed this agreement by their duly authorized officers.
(Repeat this page for each participant)

PARTNER: Red Lake County SWCD

APPROVED:

BY: David Miller 10/20/14
Board Chair Date

BY: Tanya Hanson 10/20/14
District Manager/Administrator Date

APPROVED AS TO FORM *(use if necessary)*

BY: Michael LaCoursiere 9/26/14
County Attorney Date

IN TESTIMONY WHEREOF the parties have duly executed this agreement by their duly authorized officers.
(Repeat this page for each participant)

PARTNER: RED LAKE WATERSHED DISTRICT

APPROVED:

BY: _____ 10-24-14
Board Chair Date

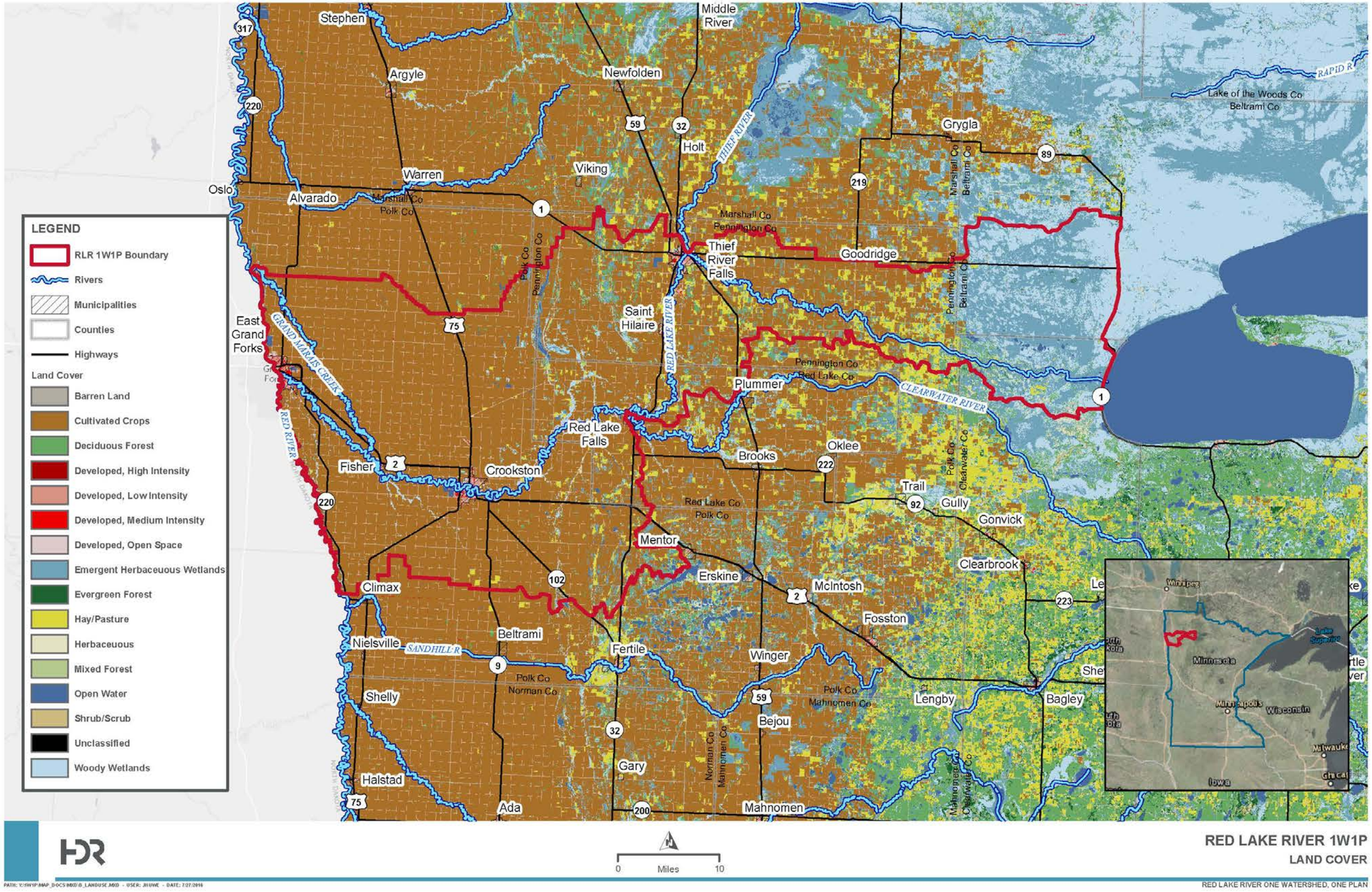
BY: _____ 10-24-14
District Manager/Administrator Date

APPROVED AS TO FORM *(use if necessary)*

BY: _____
District Attorney Date

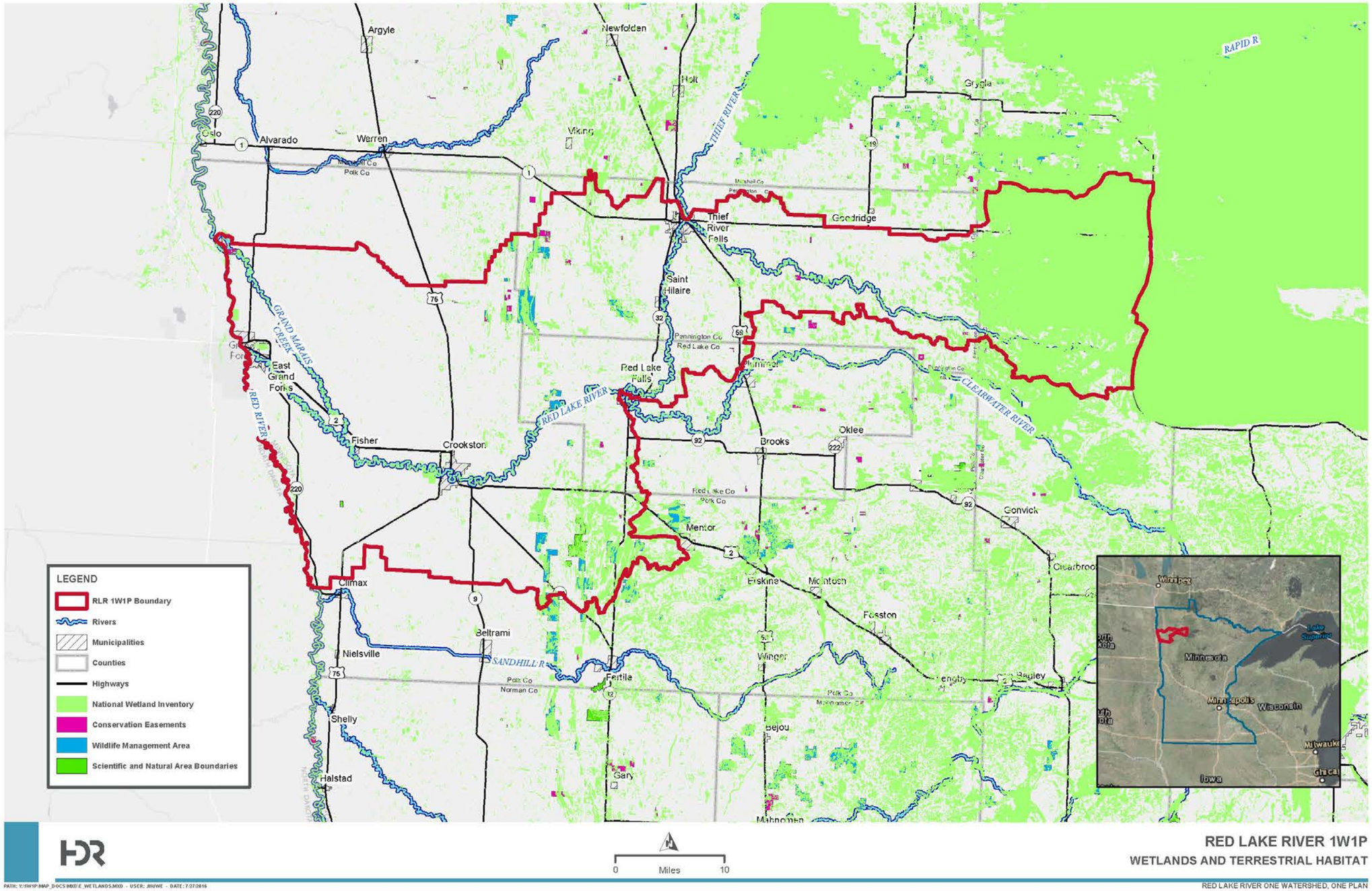
Appendix B

Land and Water Resources



RED LAKE RIVER 1W1P
LAND COVER

RED LAKE RIVER ONE WATERSHED, ONE PLAN



RED LAKE RIVER 1W1P

WETLANDS AND TERRESTRIAL HABITAT

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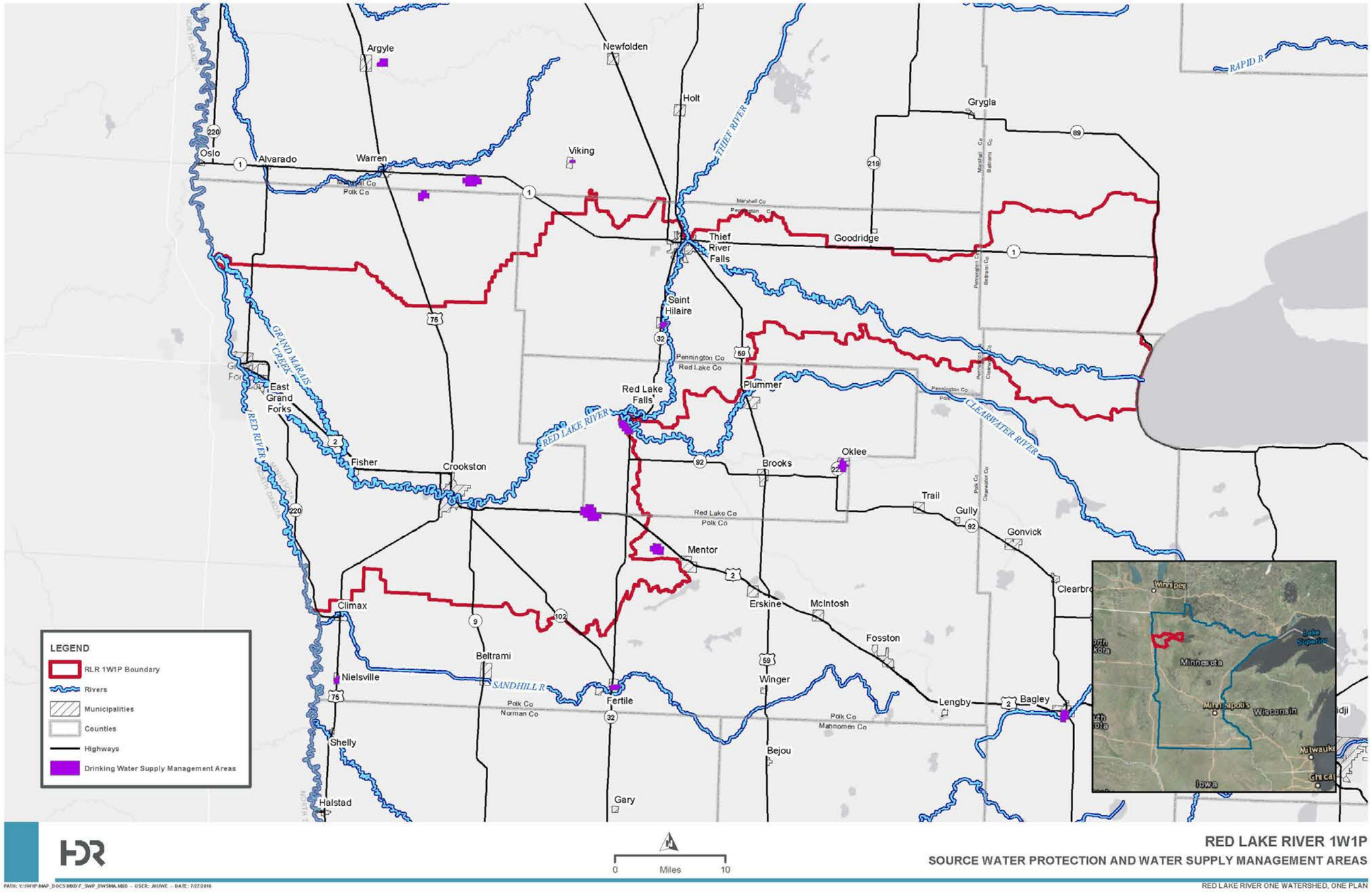
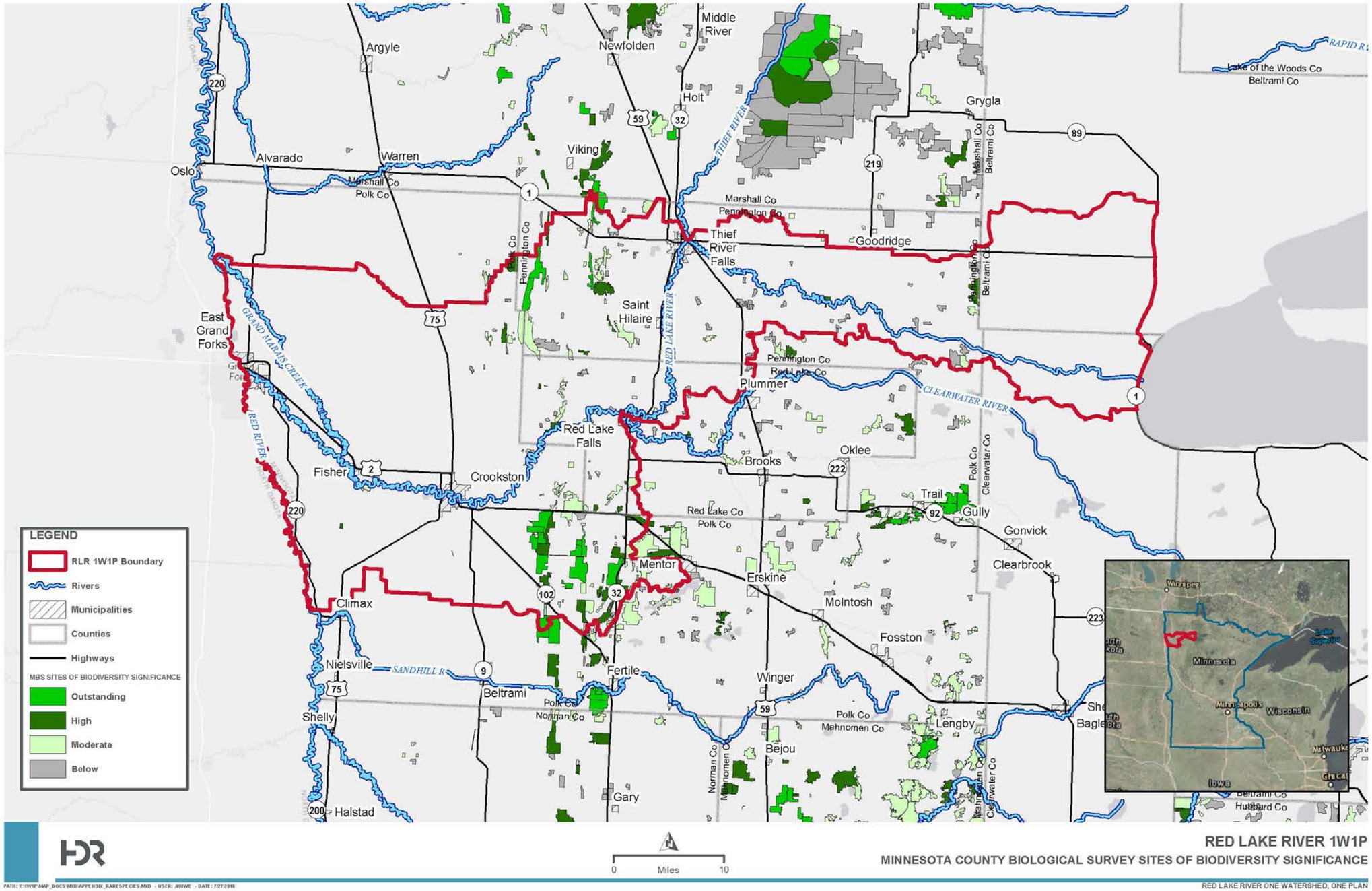
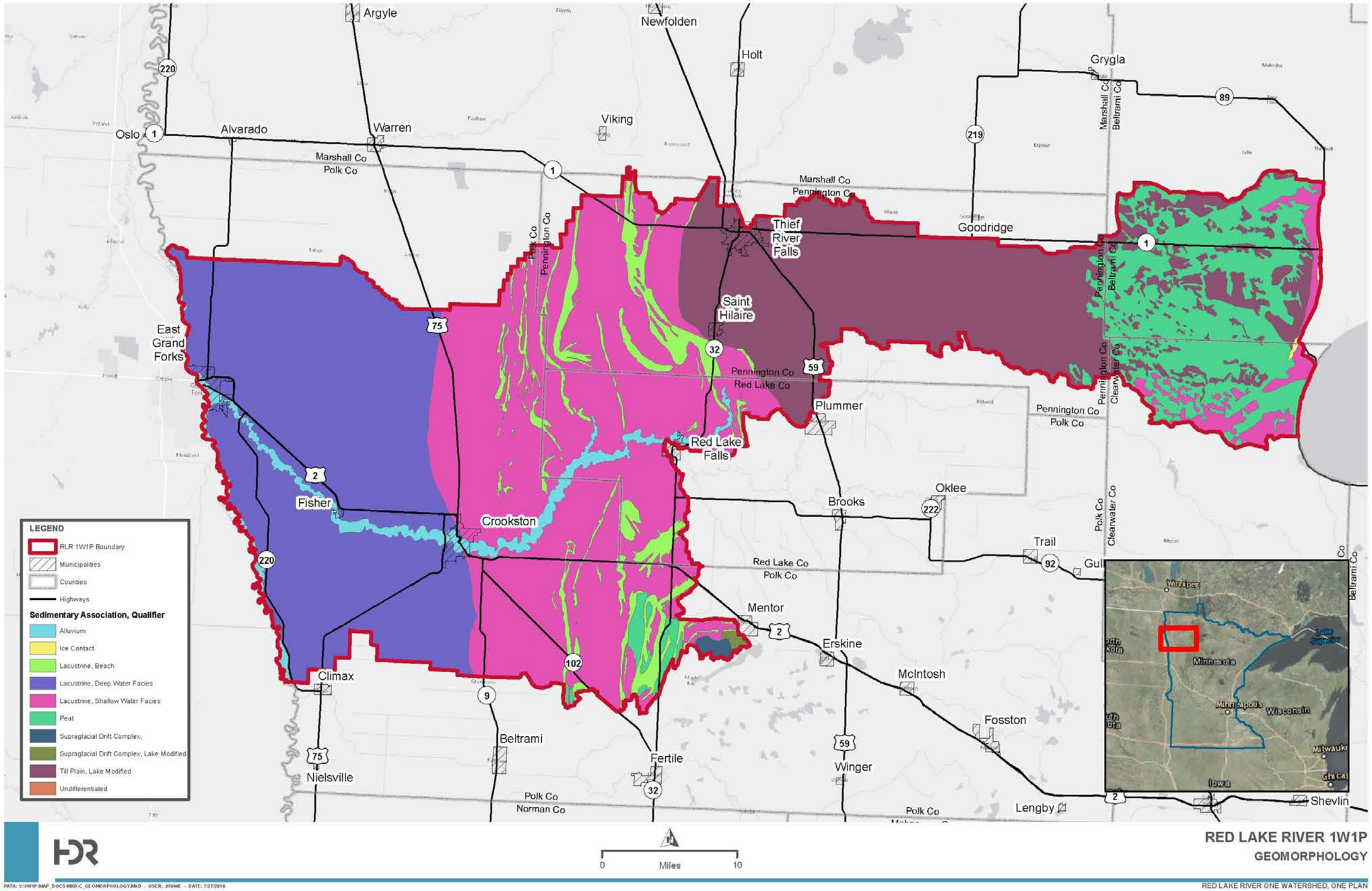
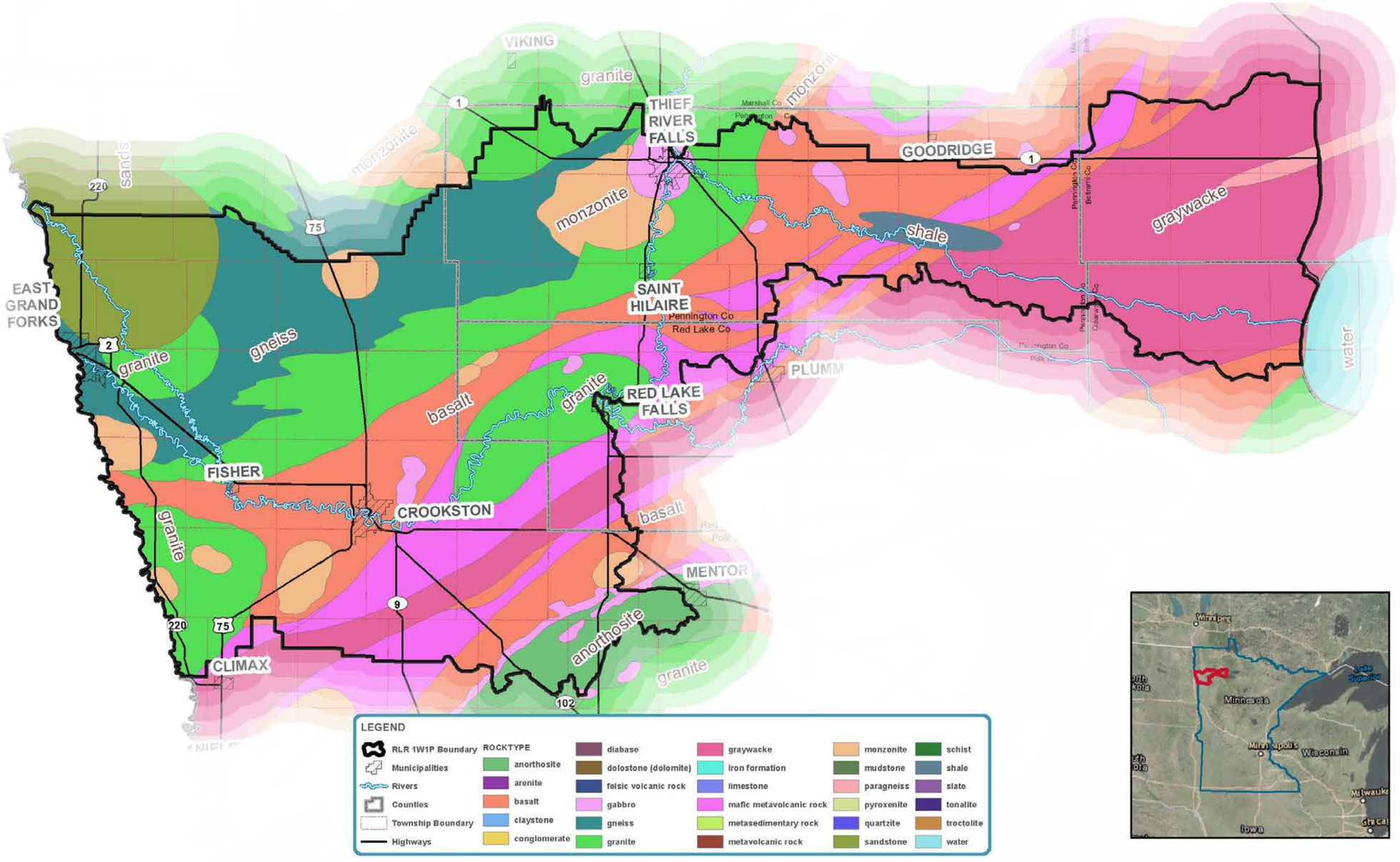
RED LAKE RIVER ONE WATERSHED, ONE PLAN


Argyle
Newfolden
Holt
Grygla
RAPID R
THIEF RIVER
Oslo
Alvarado
Warren
Viking
Marshall Co
Polk Co
Pennington Co
Goodridge
Thief River Falls
Saint Hilaire
GRAND MARAIS CREEK
RED RIVER
East Grand Forks
Red Lake Falls
Plummer
RED LAKE RIVER
CLEARWATER RIVER
Fisher
Crookston
Brooks
Oklee
Trail
Gully
Gonvick
Red Lake Co
Mentor
Clearbro
Climax
Erskine
McIntosh
Fosston
Beltrami
Nielsville
SANDHILL R
Fertile
Winger
Lengby
Bagley
Norman Co
Mahnomen Co
Shelly
Bejou
Halstad
Gary
LEGEND
RLR 1W1P Boundary
Rivers
Municipalities
Counties
Highways
Drinking Water Supply Management Areas
Winnipeg
Minnesota
Minneapolis
Wisconsin
Iowa
0
Miles
10
RED LAKE RIVER 1W1P
SOURCE WATER PROTECTION AND WATER SUPPLY MANAGEMENT AREAS
RED LAKE RIVER ONE WATERSHED, ONE PLAN


Middle River
Argyle
Newfolden
Holt
Grygla
Lake of the Woods Co
Beltrami Co
Viking
Alvarado
Warren
Oslo
Marshall Co
Polk Co
Pennington Co
Thief River Falls
Goodridge
Saint Hilaire
East Grand Forks
GRAND MARAIS CREEK
RED LAKE RIVER
CLEARWATER RIVER
Plummer
Red Lake Co
Red Lake Falls
Brooks
Oklee
Fisher
Crookston
RED RIVER
Trail
Gully
Gonvick
Clearbrook
Red Lake Co
Polk Co
Mentor
Erskine
McIntosh
Fosston
Climax
Nielsville
SANDHILL R
Fertile
Winger
Beltrami
Polk Co
Norman Co
Mahnomen Co
Lengby
Bejou
Shelly
Gary
Halstad
Hubbard Co
Minnesota
Minneapolis
Wisconsin
Iowa
LEGEND
RLR 1W1P Boundary
Rivers
Municipalities
Counties
Highways
MBS SITES OF BIODIVERSITY SIGNIFICANCE
Outstanding
High
Moderate
Below
0
Miles
10
RED LAKE RIVER 1W1P
MINNESOTA COUNTY BIOLOGICAL SURVEY SITES OF BIODIVERSITY SIGNIFICANCE
RED LAKE RIVER ONE WATERSHED, ONE PLAN


Argyle
Newfolden
Holt
Grygla
Oslo
Alvarado
Warren
Viking
Marshall Co
Polk Co
Marshall Co
Pennington Co
Goodridge
Thief River Falls
Saint Hilaire
East Grand Forks
Pennington Co
Red Lake Co
Plummer
Pennington Co
Polk Co
Red Lake Falls
Fisher
Crookston
Brooks
Oklee
Trail
Gull
Red Lake Co
Polk Co
Mentor
Erskine
McIntosh
Fosston
Climax
Beltrami
Fertile
Winger
Nielsville
Polk Co
Norman Co
Polk Co
Lengby
Shevlin
Minnesota
Minneapolis
Wisconsin
Iowa
LEGEND
RLR 1W1P Boundary
Municipalities
Counties
Highways
Sedimentary Association, Qualifier
Alluvium
Ice Contact
Lacustrine, Beach
Lacustrine, Deep Water Facies
Lacustrine, Shallow Water Facies
Peat
Supraglacial Drift Complex,
Supraglacial Drift Complex, Lake Modified
Till Plain, Lake Modified
Undifferentiated
0
Miles
10
RED LAKE RIVER 1W1P
GEOMORPHOLOGY
RED LAKE RIVER ONE WATERSHED, ONE PLAN



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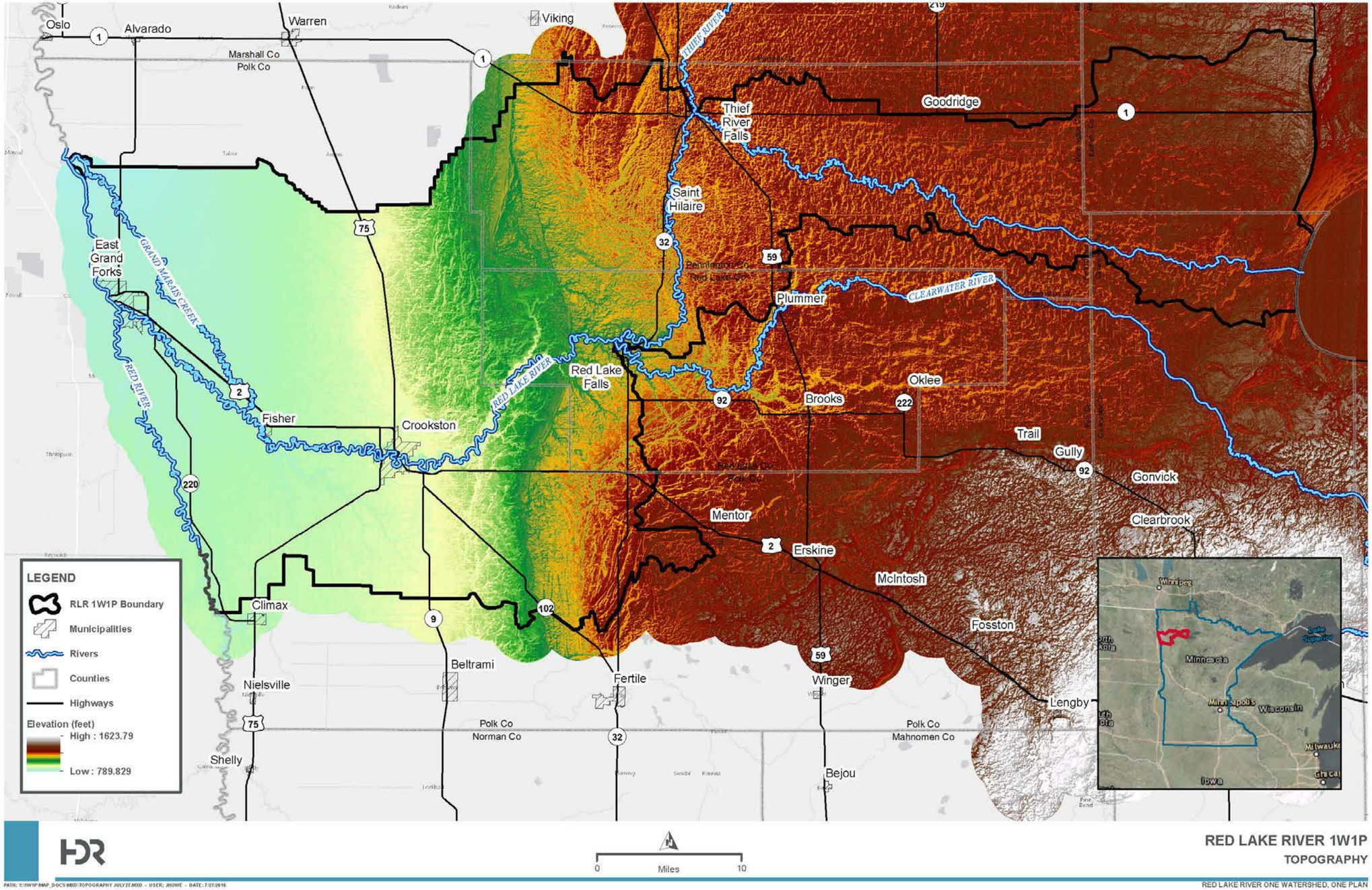
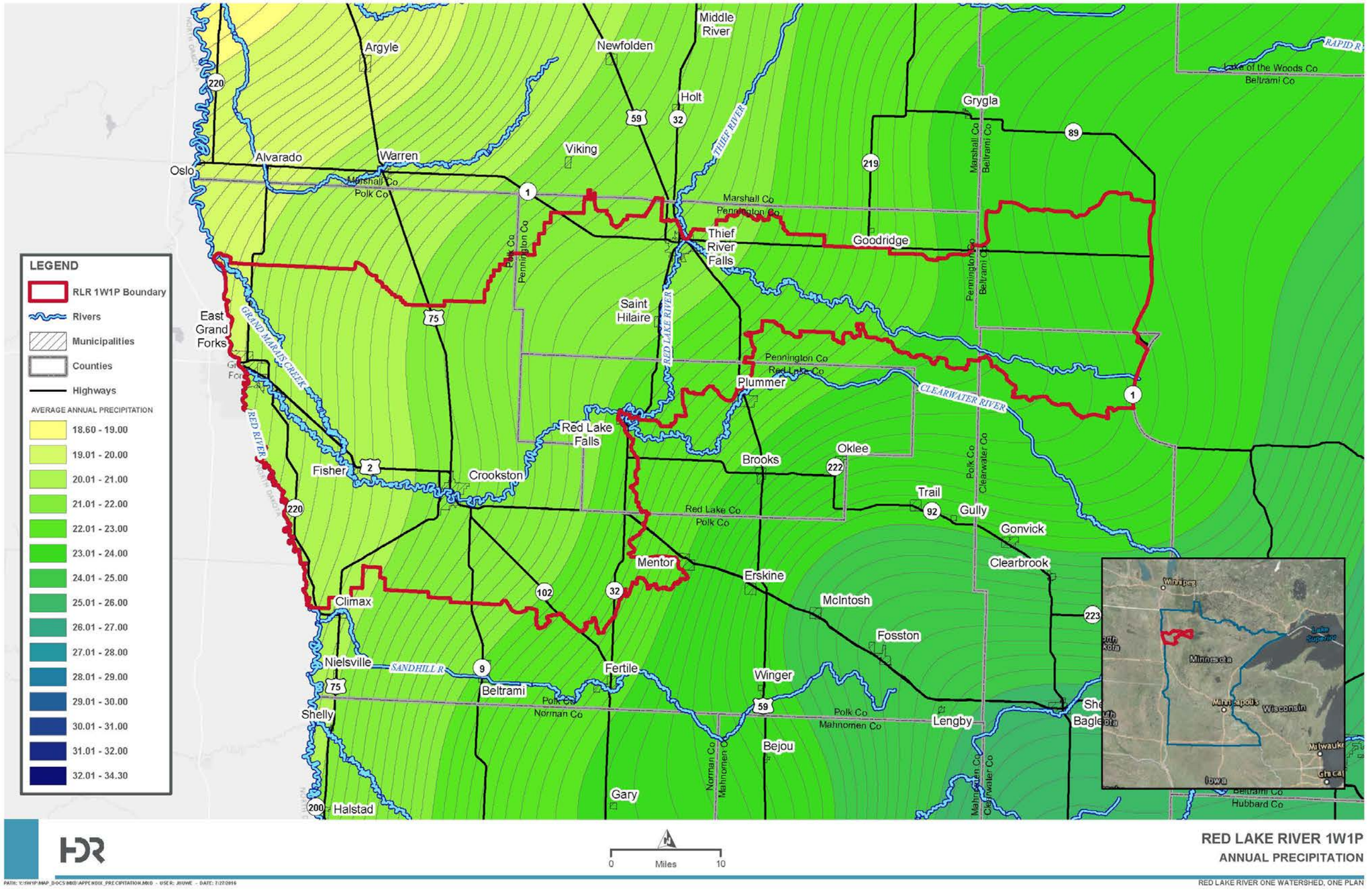
GEOLOGY
RED LAKE RIVER ONE WATERSHED, ONE PLAN


Oslo
Alvarado
Warren
Viking
Marshall Co
Polk Co
THIEF RIVER
Goodridge
Thief River Falls
Saint Hilaire
East Grand Forks
GRAND MARAIS CREEK
RED RIVER
Pennington Co
Red Lake Co
Plummer
CLEARWATER RIVER
Red Lake Falls
RED LAKE RIVER
Oklee
Brooks
Fisher
Crookston
Trail
Gully
Gonvick
Clearbrook
Mentor
Erskine
McIntosh
Fosston
Climax
Nielsville
Beltrami
Fertile
Winger
Lengby
Polk Co
Norman Co
Polk Co
Mahnomen Co
Shelly
Bejou
LEGEND
RLR 1W1P Boundary
Municipalities
Rivers
Counties
Highways
Elevation (feet)
High : 1623.79
Low : 789.829
Minnesota
Iowa
0
Miles
10
RED LAKE RIVER 1W1P
TOPOGRAPHY
RED LAKE RIVER ONE WATERSHED, ONE PLAN



RED LAKE RIVER 1W1P
ANNUAL PRECIPITATION

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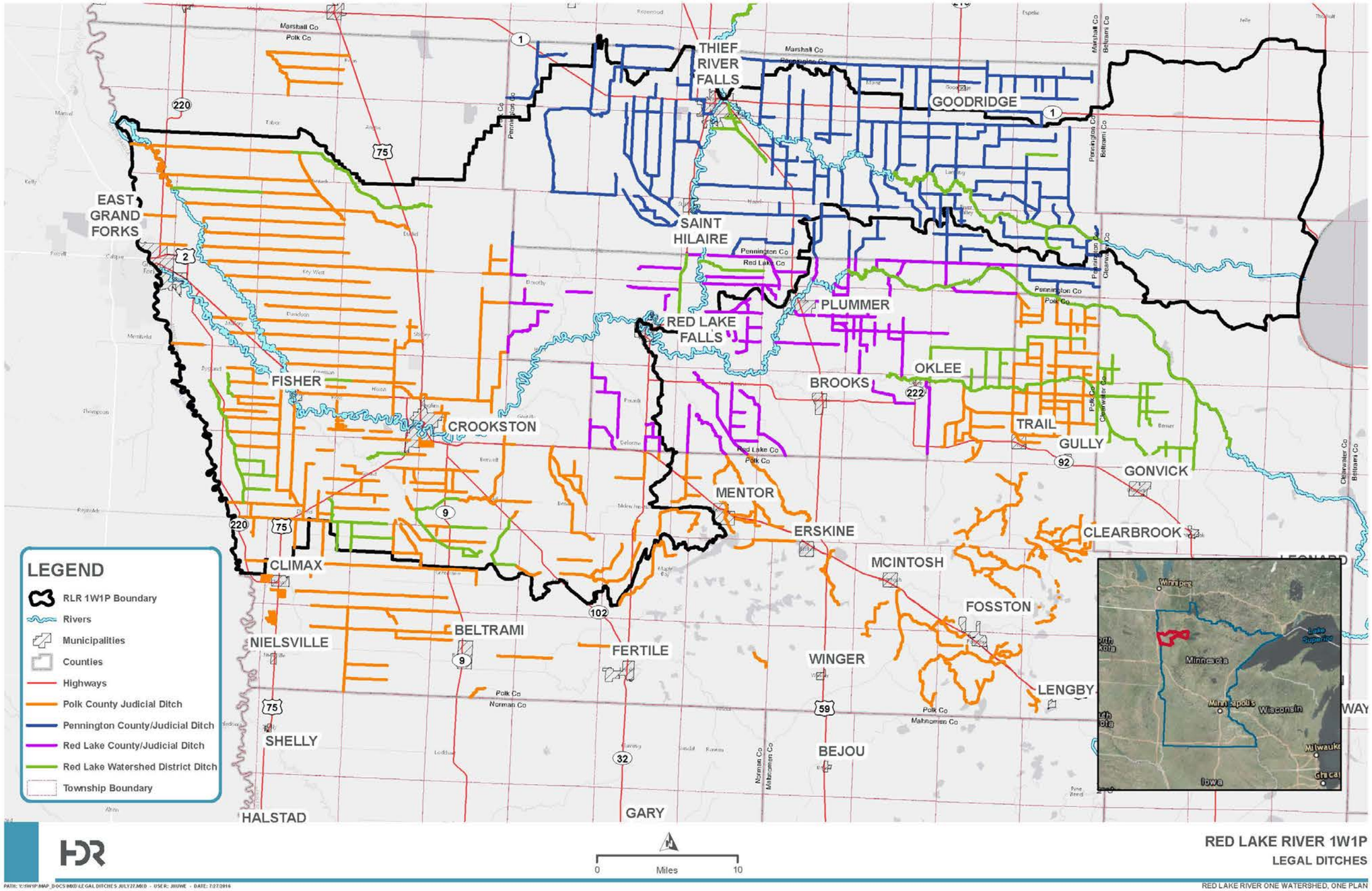
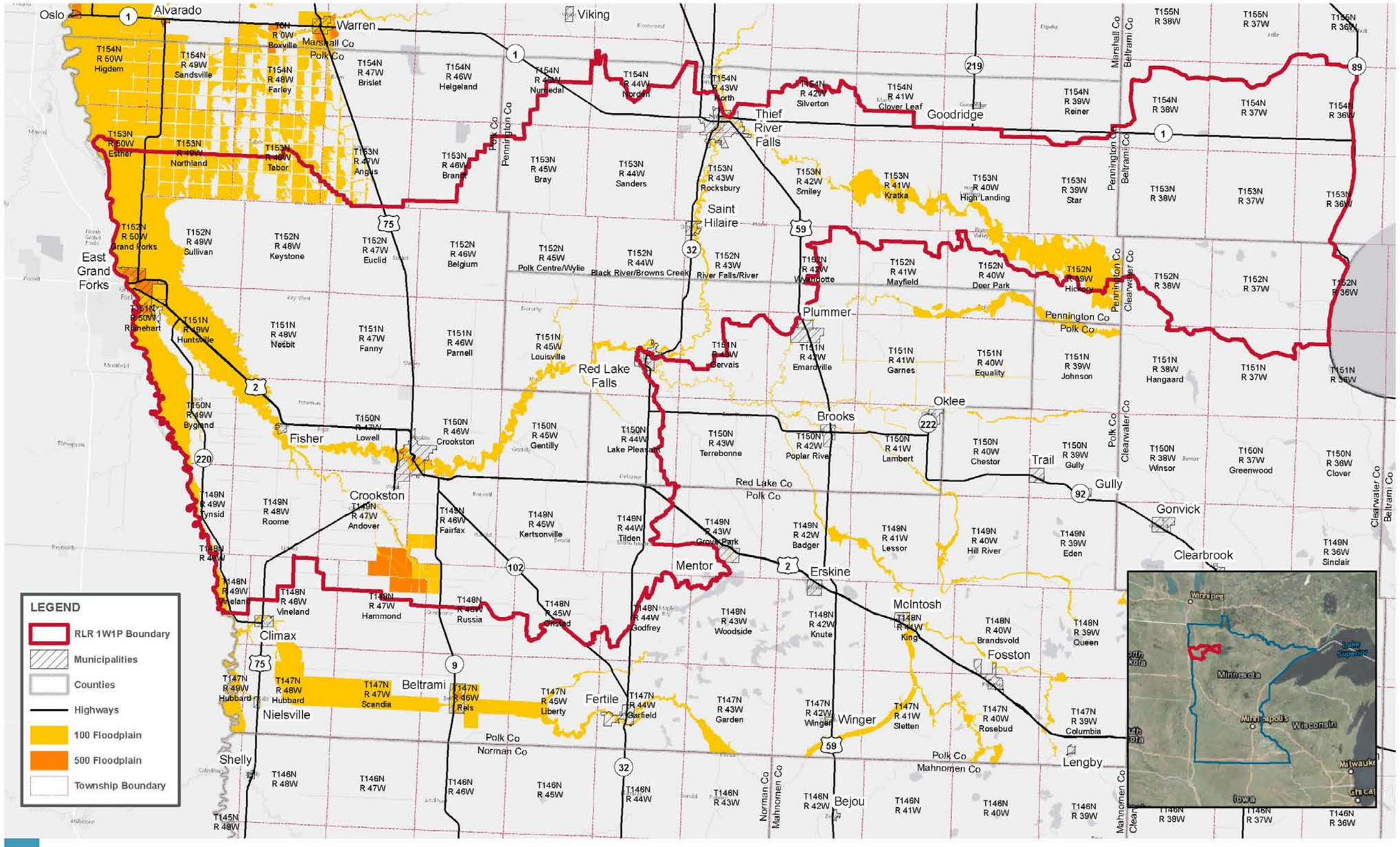
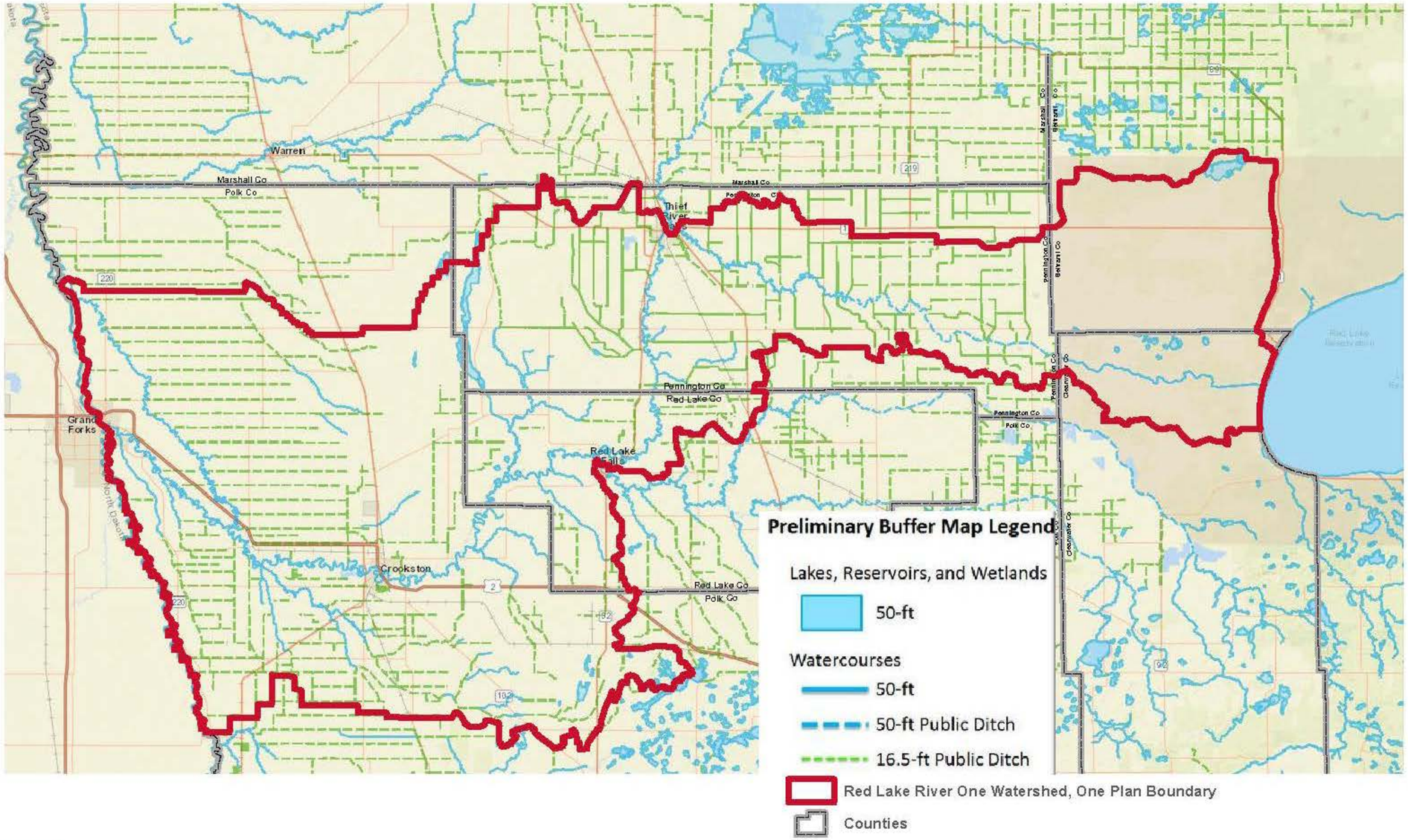
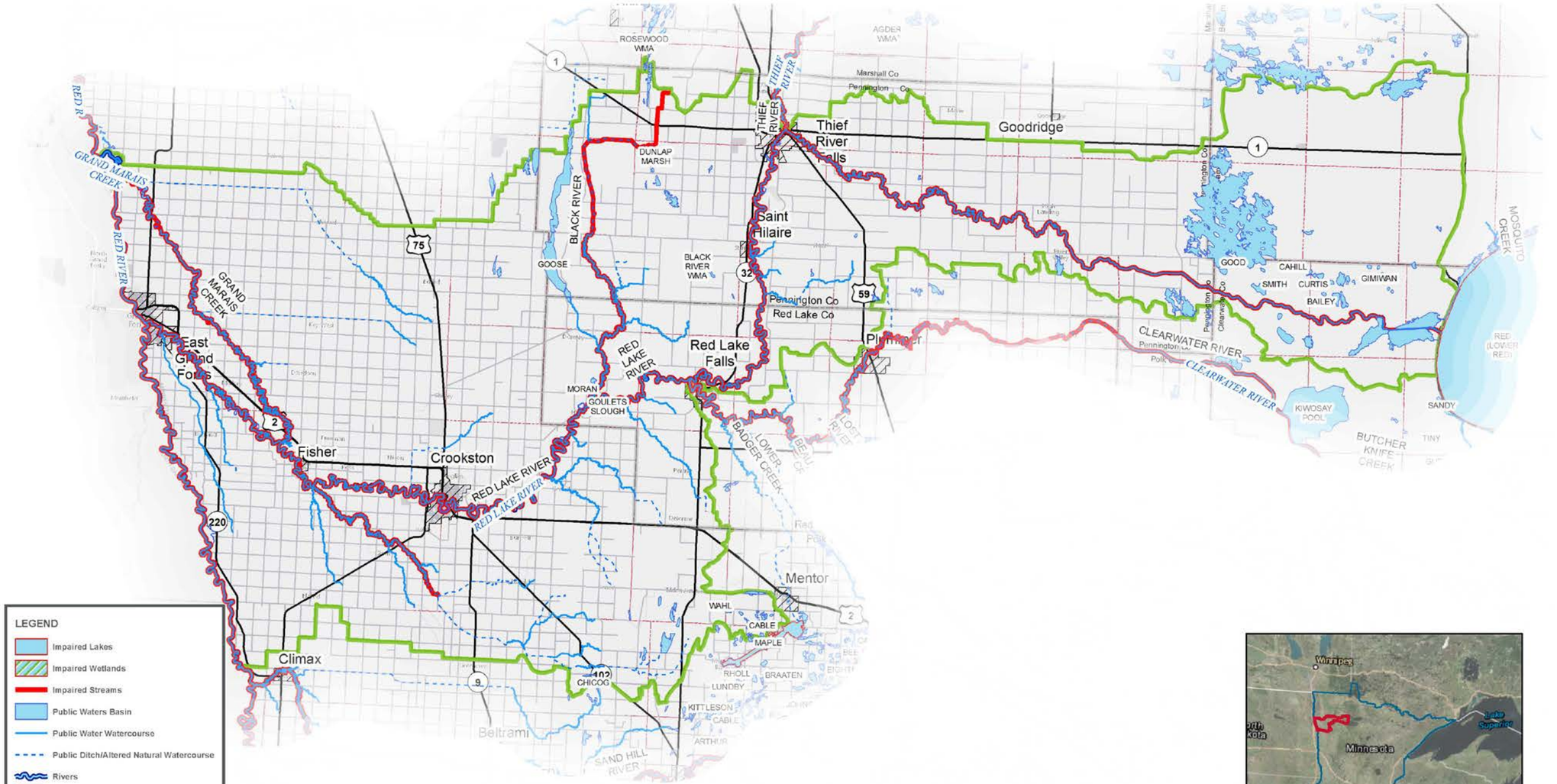

THIEF RIVER FALLS
GOODRIDGE
EAST GRAND FORKS
SAINT HILAIRE
PLUMMER
RED LAKE FALLS
OKLEE
BROOKS
FISHER
CROOKSTON
TRAIL
GULLY
GONVICK
MENTOR
ERSKINE
CLEARBROOK
MCINTOSH
FOSSTON
CLIMAX
BELTRAMI
NIELSVILLE
FERTILE
WINGER
LENGBY
SHELLY
BEJOU
HALSTAD
GARY
LEGEND
RLR 1W1P Boundary
Rivers
Municipalities
Counties
Highways
Polk County Judicial Ditch
Pennington County/Judicial Ditch
Red Lake County/Judicial Ditch
Red Lake Watershed District Ditch
Township Boundary
0
Miles
10
RED LAKE RIVER 1W1P
LEGAL DITCHES
RED LAKE RIVER ONE WATERSHED, ONE PLAN


Oslo
Alvarado
Warren
Viking
Marshall Co
Polk Co
Pennington Co
Thief River Falls
Goodridge
Saint Hilaire
East Grand Forks
Plummer
Red Lake Falls
Oklee
Brooks
Fisher
Crookston
Red Lake Co
Polk Co
Trail
Gully
Gonvick
Clearbrook
Mentor
Erskine
McIntosh
Fosston
Climax
Nielsville
Beltrami
Fertile
Winger
Polk Co
Norman Co
Mahnomen Co
Lengby
Shelly
Bejou
Clearwater Co
Beltrami Co
LEGEND
RLR 1W1P Boundary
Municipalities
Counties
Highways
100 Floodplain
500 Floodplain
Township Boundary
Minnesota
Wisconsin
Iowa
0
Miles
10
RED LAKE RIVER 1W1P
FEMA FLOODPLAIN
RED LAKE RIVER ONE WATERSHED, ONE PLAN


Warren
Marshall Co
Polk Co
Thief River
Pennington Co
Red Lake Co
Grand Forks
Red Lake Falls
Crookston
Red Lake Co
Polk Co
Preliminary Buffer Map Legend
Lakes, Reservoirs, and Wetlands
50-ft
Watercourses
50-ft
50-ft Public Ditch
16.5-ft Public Ditch
Red Lake River One Watershed, One Plan Boundary
Counties
0
Miles
10
PRELIMINARY BUFFER PROTECTION MAP
MINNESOTA DNR
HTTP://DNR.STATE.MN.US/BUFFERS/INDEX.HTML
RED LAKE RIVER ONE WATERSHED, ONE PLAN



LEGEND

- Impaired Lakes
- Impaired Wetlands
- Impaired Streams
- Public Waters Basin
- Public Water Watercourse
- Public Ditch/Altered Natural Watercourse
- Rivers
- Counties
- RLR 1W1P Boundary
- Municipalities
- Highways
- County Roads
- Township Boundary

0 Miles 10

RED LAKE RIVER 1W1P
TMDL IMPAIRED WATERS
PUBLIC WATERS INVENTORY

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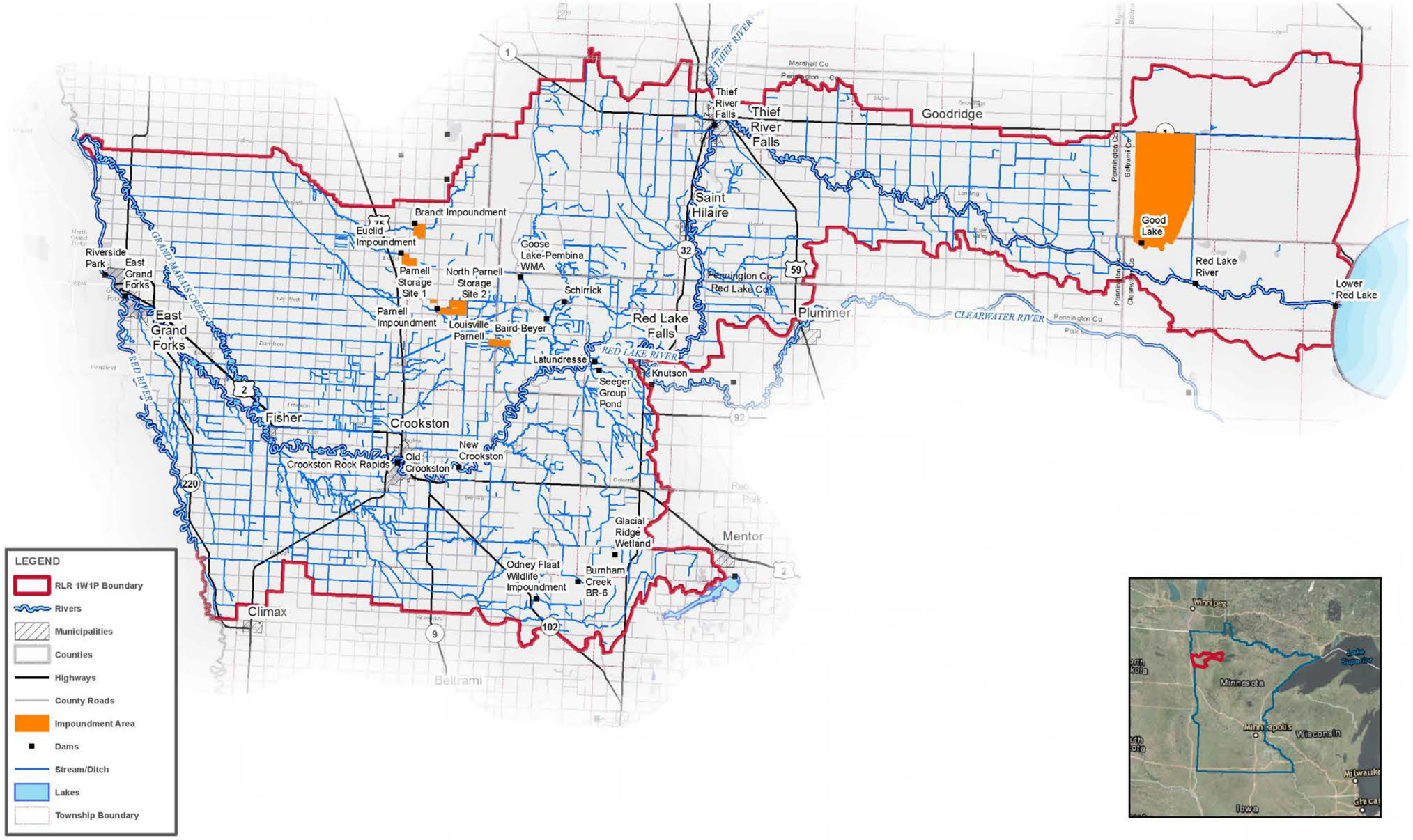

RED LAKE RIVER 1W1P
WATER RESOURCES AND PROJECTS

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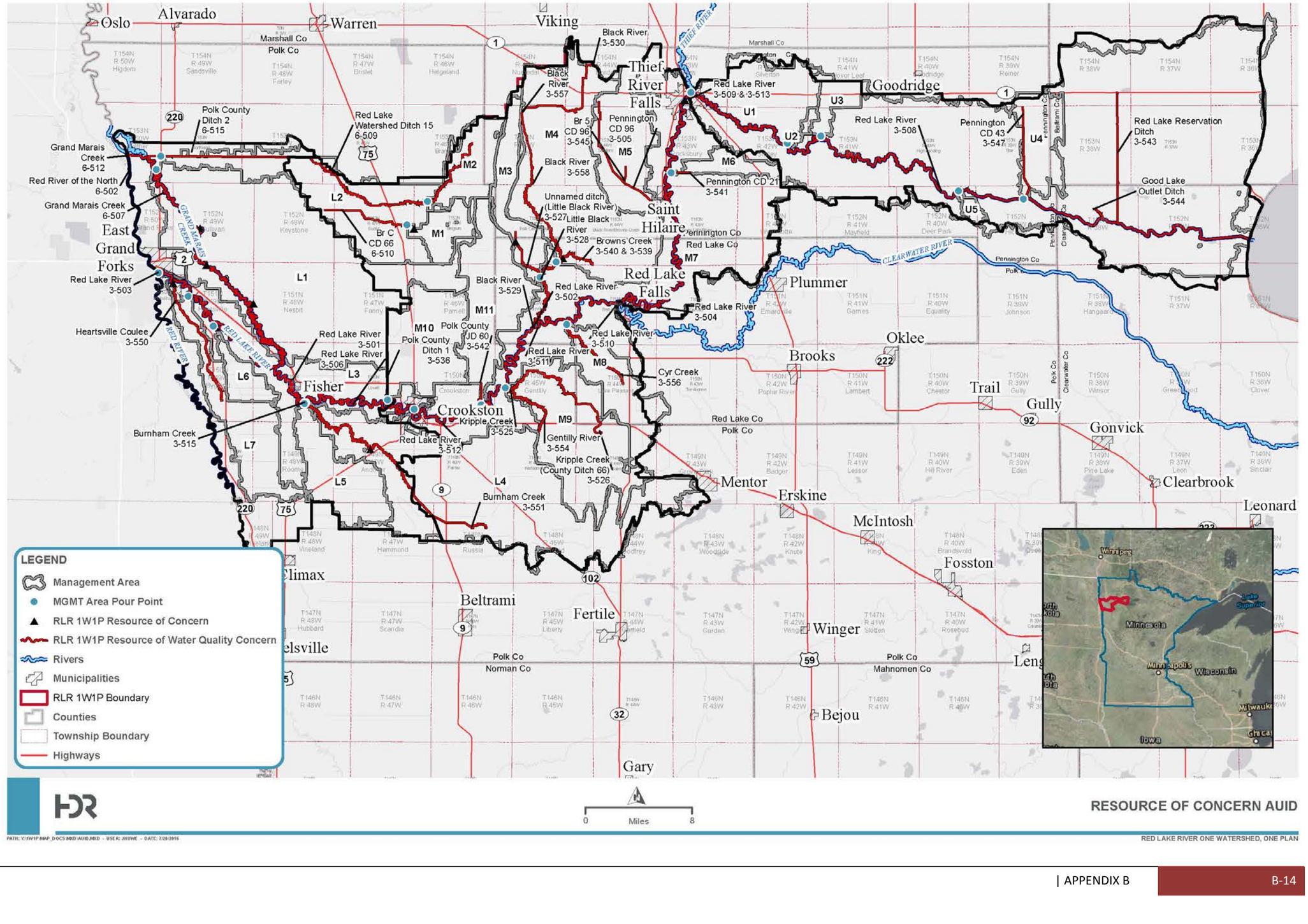
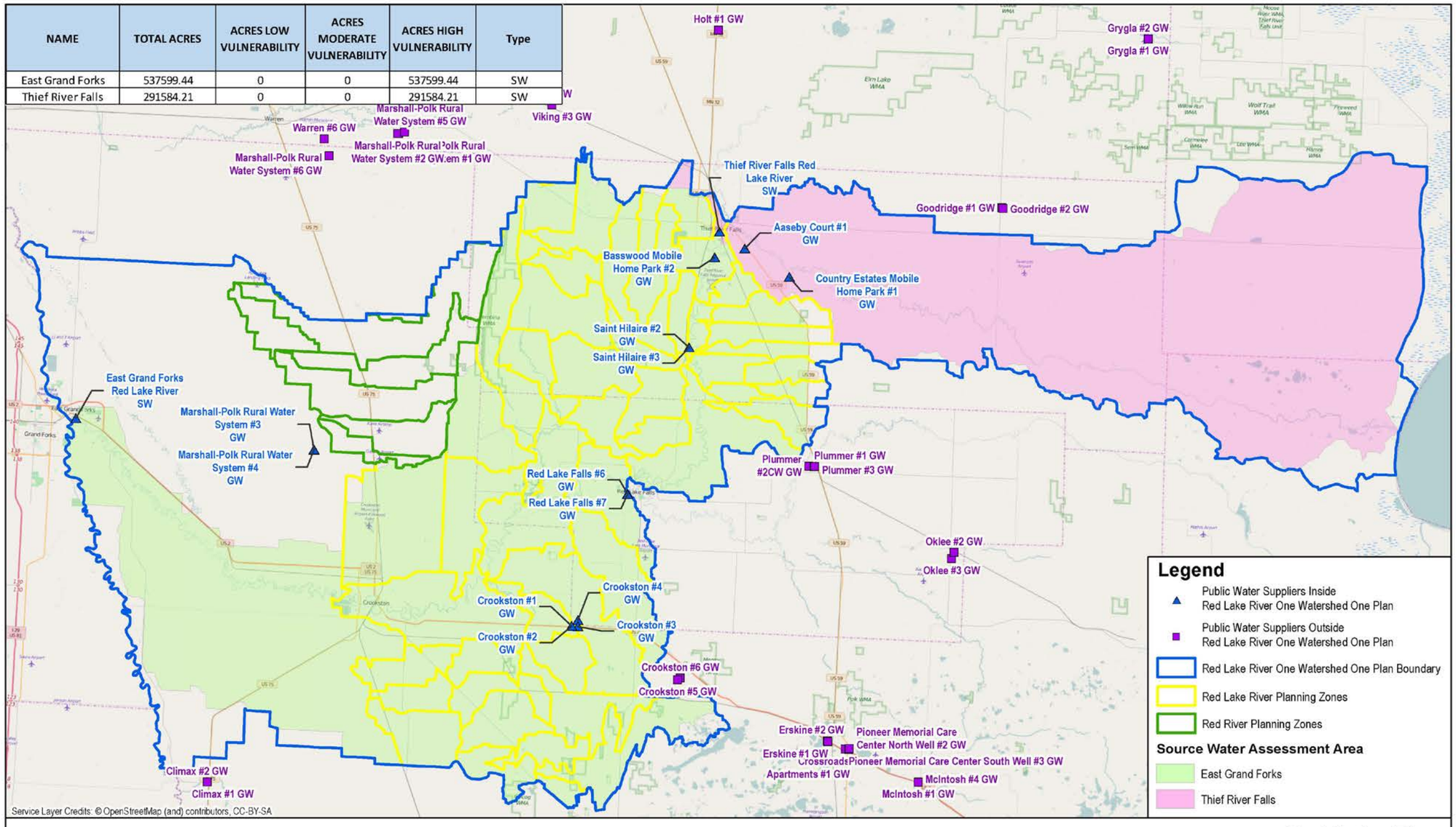
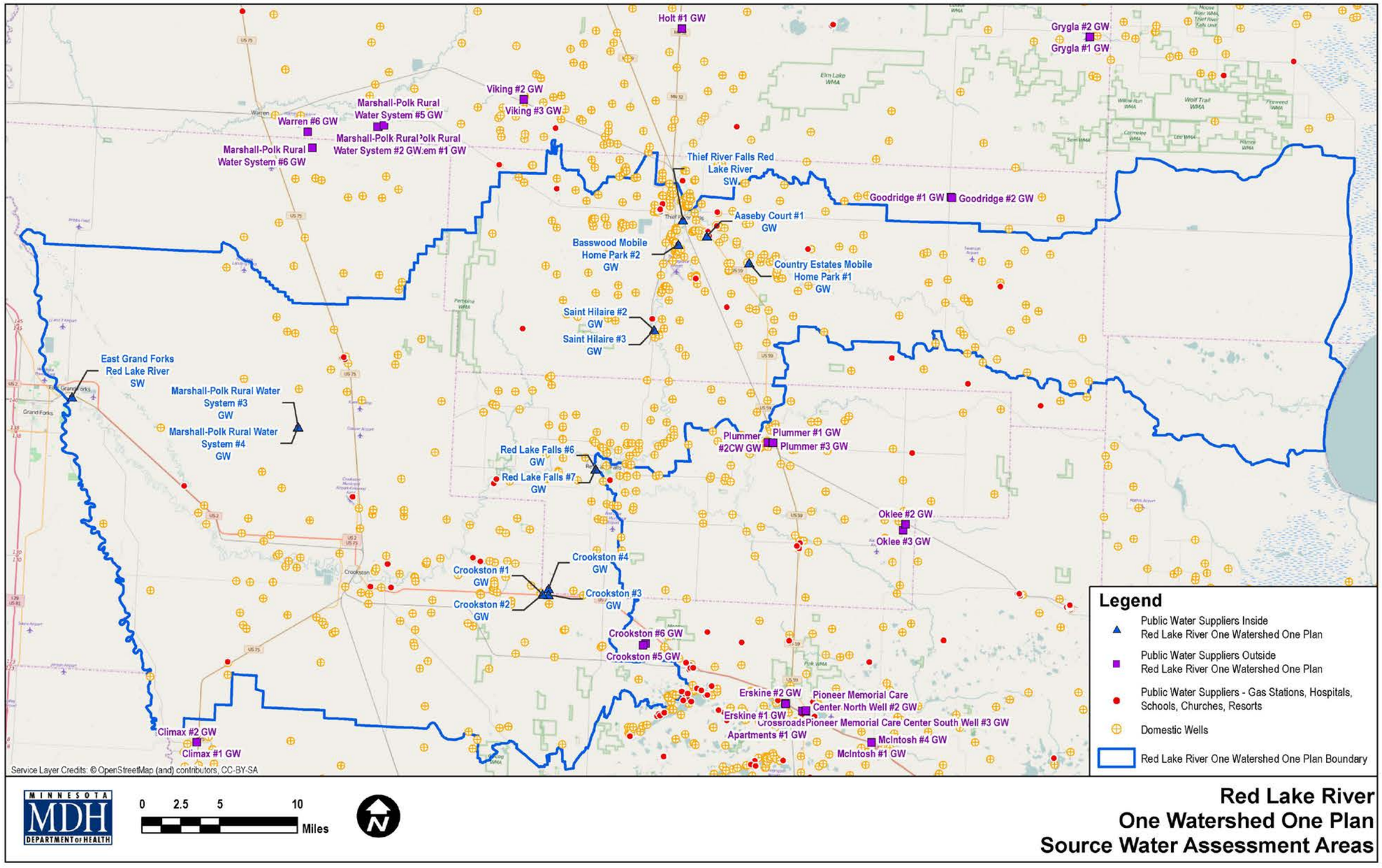
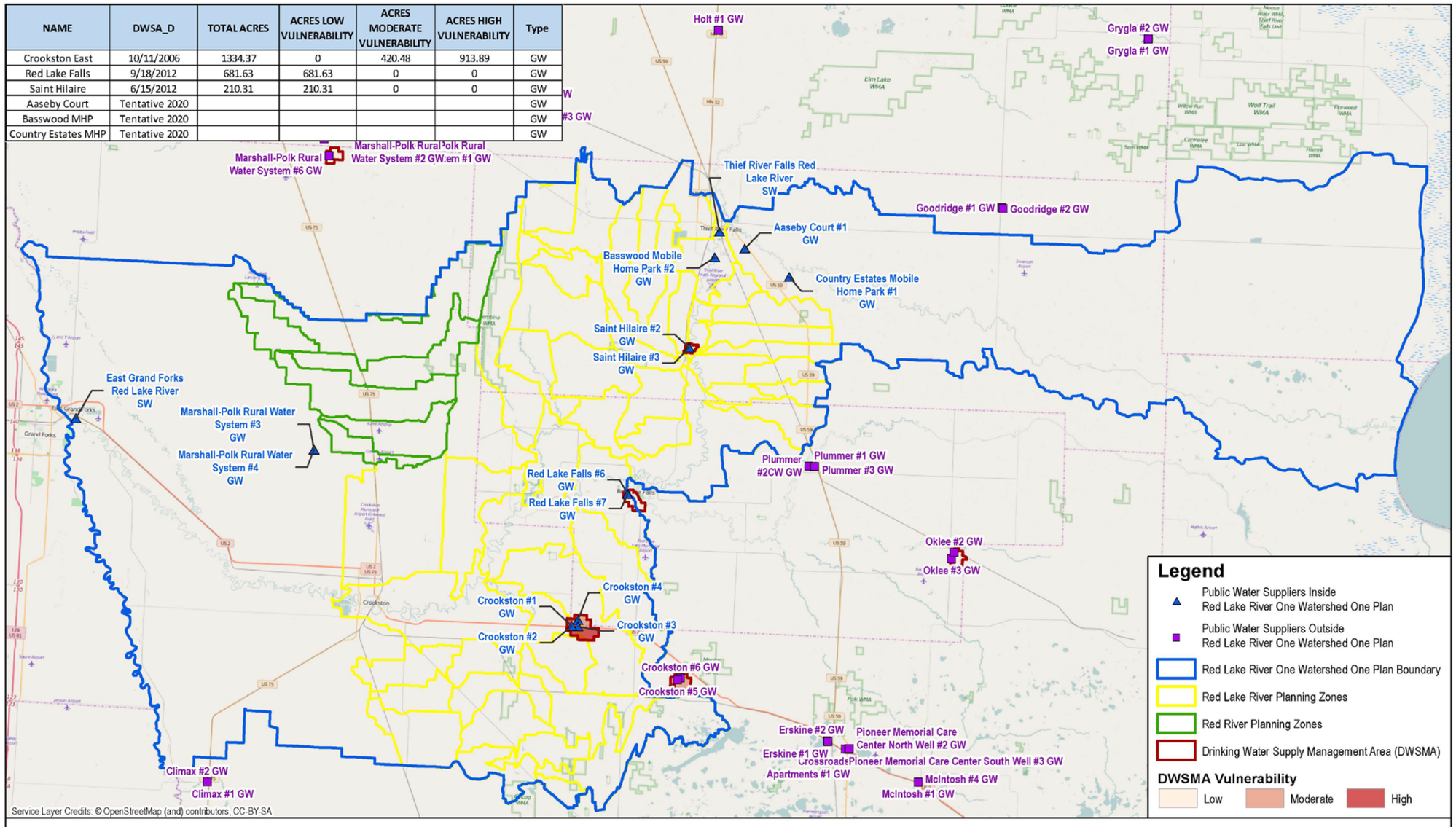

Oslo
Alvarado
Warren
Viking
Marshall Co
Polk Co
Black River 3-530
Thief River Falls
Red Lake River 3-509 & 3-513
Goodridge
Red Lake River 3-508
Pennington CD 43 3-547
Red Lake Reservation Ditch 3-543
Good Lake Outlet Ditch 3-544
Polk County Ditch 2 6-515
Red Lake Watershed Ditch 15 6-509
Grand Marais Creek 6-512
Red River of the North 6-502
Grand Marais Creek 6-507
East Grand Forks
Red Lake River 3-503
Br 5 CD 96 3-545
Pennington CD 96 3-505
Black River 3-557
Black River 3-558
Pennington CD 21 3-541
Unnamed ditch (Little Black River) 3-527
Little Black River 3-528
Browns Creek 3-540 & 3-539
Saint Hilaire
Pennington Co
Red Lake Co
Br C CD 66 6-510
Red Lake Falls
Red Lake River 3-502
Red Lake River 3-504
Plummer
CLEARWATER RIVER
Black River 3-529
Heartsville Coulee 3-550
Red Lake River 3-501
Red Lake River 3-506
Polk County Ditch 1 3-536
Polk County JD 60 3-542
Red Lake River 3-510
Red Lake River 3-511
Cyr Creek 3-556
Oklee
Brooks
Trail
Gully
Gonvick
Fisher
Crookston
Kripple Creek 3-525
Red Lake River 3-512
Gentilly River 3-554
Kripple Creek (County Ditch 66) 3-526
Burnham Creek 3-515
Burnham Creek 3-551
Red Lake Co
Polk Co
Mentor
Erskine
McIntosh
Fosston
Clearbrook
Leonard
Climax
Beltrami
Fertile
Winger
Polk Co
Norman Co
Mahnomen Co
Bejou
Gary
L1
L2
L3
L4
L5
L6
L7
M1
M2
M3
M4
M5
M6
M7
M8
M9
M10
M11
U1
U2
U3
U4
U5
LEGEND
Management Area
MGMT Area Pour Point
RLR 1W1P Resource of Concern
RLR 1W1P Resource of Water Quality Concern
Rivers
Municipalities
RLR 1W1P Boundary
Counties
Township Boundary
Highways
0
Miles
8
RESOURCE OF CONCERN AUID
RED LAKE RIVER ONE WATERSHED, ONE PLAN

NAME	TOTAL ACRES	ACRES LOW VULNERABILITY	ACRES MODERATE VULNERABILITY	ACRES HIGH VULNERABILITY	Type
East Grand Forks	537599.44	0	0	537599.44	SW
Thief River Falls	291584.21	0	0	291584.21	SW




Holt #1 GW
Grygla #2 GW
Grygla #1 GW
Viking #2 GW
Viking #3 GW
Marshall-Polk Rural Water System #5 GW
Warren #6 GW
Marshall-Polk Rural Water System #2 GW.em #1 GW
Marshall-Polk Rural Water System #6 GW
Thief River Falls Red Lake River SW
Goodridge #1 GW
Goodridge #2 GW
Aaseby Court #1 GW
Basswood Mobile Home Park #2 GW
Country Estates Mobile Home Park #1 GW
Saint Hilaire #2 GW
Saint Hilaire #3 GW
East Grand Forks Red Lake River SW
Marshall-Polk Rural Water System #3 GW
Marshall-Polk Rural Water System #4 GW
Plummer #2CW GW
Plummer #1 GW
Plummer #3 GW
Red Lake Falls #6 GW
Red Lake Falls #7 GW
Oklee #2 GW
Oklee #3 GW
Crookston #1 GW
Crookston #2 GW
Crookston #4 GW
Crookston #3 GW
Crookston #6 GW
Crookston #5 GW
Erskine #2 GW
Pioneer Memorial Care Center North Well #2 GW
Erskine #1 GW
Pioneer Memorial Care Center South Well #3 GW
Crossroads Apartments #1 GW
McIntosh #4 GW
McIntosh #1 GW
Climax #2 GW
Climax #1 GW
Service Layer Credits: © OpenStreetMap (and) contributors, CC-BY-SA
Legend
Public Water Suppliers Inside Red Lake River One Watershed One Plan
Public Water Suppliers Outside Red Lake River One Watershed One Plan
Public Water Suppliers - Gas Stations, Hospitals, Schools, Churches, Resorts
Domestic Wells
Red Lake River One Watershed One Plan Boundary
MINNESOTA MDH DEPARTMENT of HEALTH
0 2.5 5 10
Miles
N
Red Lake River
One Watershed One Plan
Source Water Assessment Areas

NAME	DWSA_D	TOTAL ACRES	ACRES LOW VULNERABILITY	ACRES MODERATE VULNERABILITY	ACRES HIGH VULNERABILITY	Type
Crookston East	10/11/2006	1334.37	0	420.48	913.89	GW
Red Lake Falls	9/18/2012	681.63	681.63	0	0	GW
Saint Hilaire	6/15/2012	210.31	210.31	0	0	GW
Aaseby Court	Tentative 2020					GW
Basswood MHP	Tentative 2020					GW
Country Estates MHP	Tentative 2020					GW



Red Lake River One Watershed One Plan Drinking Water Supply Management Areas

Appendix C

One Watershed One Plan Process

Appendix C: One Watershed One Plan Process

The Board of Water and Soil Resources developed guidelines to assist planning groups with carrying out the One Watershed One Plan process, referred to as the *Operating Procedures for Pilot Watersheds* (BWSR 2015a). Although the sequencing of the steps may be tailored to meet specific planning group goals and needs, the general framework for the planning process includes the following nine steps. It should also be noted that Steps 1 – 3 were, for the most part, completed in the nomination and selection of the pilot areas.

Step 1. Review the Suggested Boundary Map and gather potential local government participants based on the watershed selected.

Step 2. Initiate discussions with potential participants and BWSR. This step may include multiple and variable sub-steps such as a number of formal and informal meetings and discussions between participants. The sub-steps will vary by the local governments involved, their history of partnership and/or collaboration, and other potential factors.

Informally notify BWSR staff of intent to explore developing a plan through the One Watershed One Plan process.

Convene potential local government participants to consider the following items.

Select a lead, shared lead, and/or a procedure for convening participants through this step.
Confirm intended planning boundary with participants and BWSR staff. Invite additional local government participants if necessary.
Confirm the plan type the participants are interested in developing.
Discuss the requirement for formal agreement between partners.
Consider requesting resolutions from the boards of the participating local governments as a means of confirming support.

Consider applying for a BWSR Plan Development grant as available.

Step 3. Finalize discussions with potential participants and BWSR by:

a. Formally notifying BWSR of intent to initiate planning. Formal notification can be made electronically and must include confirmation of the:
    i. Local government participants or partners;
    ii. Plan type intended to be developed;
    iii. Planning boundary; and
    iv. Include requested plan extensions and waivers for participants' existing plans as applicable.
b. Finalizing formal agreements between local governments.

Step 4. Formally initiate planning. A thorough stakeholder process is required and should not be any less than procedures of water plans being substituted for or replaced.

a. Identify stakeholders, notify state agencies, and establish committees.
b. Gather preliminary issues and priorities through review of existing plans and information and response from stakeholders and agencies.

c. Hold initial planning meeting to review and discuss the information gathered and input received.

Step 5. Draft Plan. Steps may be iterative and will include input from stakeholders.

a. Review and aggregate information from existing plans, land and water resource inventories, and WRAPS. Use the process to identify commonalities and gaps.

b. Consider the aggregated information in setting priorities and targets.

c. Develop implementation plan and schedule. Assess if implementation actions are capable of producing measurable results.

d. Finalize draft plan. Consider informal review by stakeholders if time allows and/or unresolved issues.

Step 6. Submit draft plan for formal review and hold public hearing.

a. After the plan has been drafted, submit the plan to plan review authorities.

b. Schedule and hold a public hearing on the draft plan after the 60-day review period of the draft plan. A summary of comments received in the review period and the responses to those comments should be made available to all stakeholders and commenters prior to the hearing.

Step 7. Approval by BWSR

a. Submit the final plan to the plan review agencies.

b. The board will review the plan for conformance with the plan content requirements, and take action within 90 days.

c. Appeals and dispute of plan decision follow existing authorities and procedures of BWSR Board.

Step 8. Adopt the plan. Local adoption is required within 120 days of BWSR Board approval.

Step 9. Implement, evaluate, and update the plan.

a. Local development and use of an annual and/or biennial work plan and report between partners is recommended for accountability, e.g. holding an annual meeting in the watershed to discuss previous year's accomplishments and confirm direction for the next year.

b. Five year evaluation of performance is required and update of implementation plan and schedule as needed.

c. Revisions required every 10 years. Depth of revision dependent on evidence that implementation is occurring. BWSR can issue 'findings' when a plan is good enough such that complete revision is not required.

Appendix D

Planning Zone Delineation

Appendix D: Planning Zone Delineation

The Red Lake River One watershed One Plan boundary was divided into three distinct planning zones. In general, geomorphic divisions within the landscape were used as the basis for defining the planning zones. In delineating the planning zones, the actual planning zone boundaries followed minor subwatershed boundaries.

The Red Lake River planning areas differ to various extents in geomorphological characteristics, land cover, soils, average slope and stream order and gradient. These characteristics drive both hillslope and channel sediment transport processes in varying degrees. The upper headwaters region's eastern extent is primarily wetlands with slow, low gradient channels low in dissolved oxygen draining to the City of Thief River falls. West of the wetlands, low sloped agricultural land is drained via ditch networks and stream channels that feed the meandering headwaters of the Red Lake River. Sediment transport is via lower angled topography dominated by row crops and ditches that have altered the original hydrology to the river and its tributaries, likely causing a divergence from its original cross section, slope and sediment transport capacity.

The middle region of the watershed is defined by the beach ridge formations of glacial Lake Agassiz, dominated by rolling topography formed by gravels and sands. Hillslope sediment transport processes are expected to be more important to channel sediment budgets in this region as the result of its greater average slope combined with row cropping. This gravel-sand dominant region serves as a shallow surface groundwater recharge area important to fens located along its western terminus. For much the same reasons, the area is classified as a sensitive area for potential groundwater contamination. The Red Lake River and its tributaries in this region have a higher gradient likely resulting in greater stream power and capacity to move sediment to the western region of the watershed, though it is likely there is risk of stream bed degradation and channel confinement by both valley form and channel incision. Though no fluvial geomorphological assessments and sediment balances were found in existing plans, it is likely that upstream and local hydrologic alteration, hydraulic scouring and mass wasting of banks along the Red Lake River as well as in ravines and gullies both significantly contribute to the Red Lake River's sediment budget in this segment.

The western region flattens significantly and is subject to flooding from the Red River, overbanking of the Red Lake River, aggradation and degradation of various reaches and likely increased sediment loading from banks attributable to altered hydrology of the overall watershed. The Red Lake River main channel is therefore considered a response channel in the stream network given its position and its low gradient. Upstream alterations in hydrology and sediment supply likely adversely affect the lower Red Lake River's width, depth, roughness, scour depth grain size, slope and sediment storage.

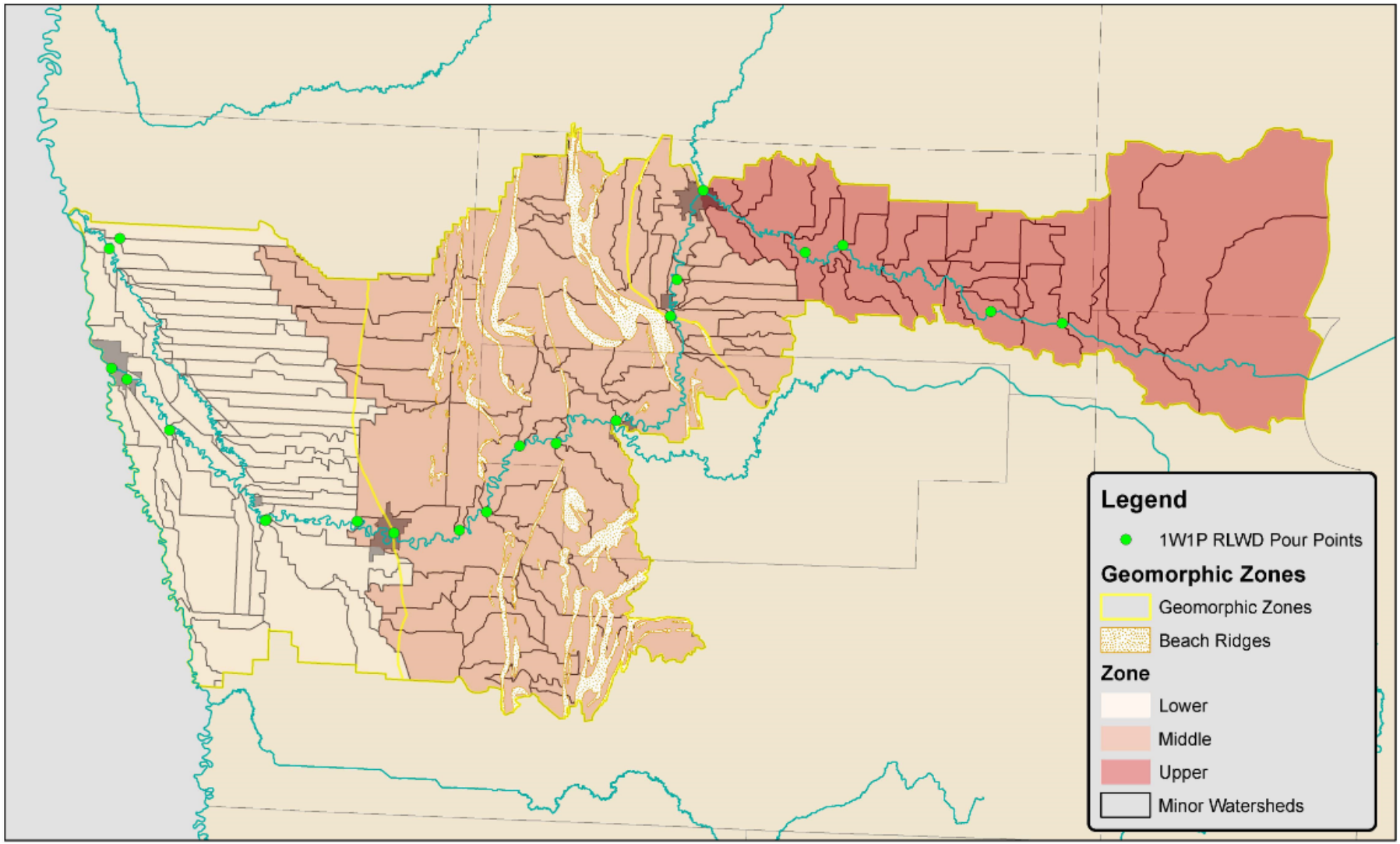


Figure D-1. Red Lake River One Watershed One Plan delineation of geomorphic regions and planning zones

Appendix E

County and Watershed District Plan Review Summaries

Appendix E: County and Watershed District Plan Summaries

As part of the planning process, existing County and Watershed District plans, studies and data sources were reviewed to collect information on how broad issue areas are addressed within existing plans, and to identify stated priorities, recommendations and actions that could inform the planning process.

Six County and Watershed District Plans were reviewed as part of the Red Lake River 1W1P planning effort. Results of these reviews are summarized in this section including a review of how various 1W1P issues are addressed in existing plans. Priorities identified in County and Watershed District plans are shown in **Figure E-1**.

Issue: Drainage System Management

Proper drainage system management will provide both water quality and water quantity benefits. The RLR 1W1P should prioritize ditch systems and target implementation of drainage water quality management practices such as buffers, side water inlets, controlled drainage, saturated buffers, and 2-stage ditches. The RLR 1W1P should also attempt to lay out a coordinated approach for how implementation of drainage water quality management can be coordinated with and/or integrated into proceeding initiated by the drainage authorities when undertaking drainage system work. This issue was addressed in all six plans.

SWCD/WD Plan	Drainage System Management Actions
Beltrami	Manage ditch banks and stream banks to reduce erosion losses
Pennington	Ensure drainages; county, township, watershed, and private ditch systems address needs to support farming without negatively affecting water quality, natural resources and landowners downstream as result of poor maintenance or flooding
Polk	Ensure that county, township, watershed and private ditch systems adequately address the drainage needed to support agriculture without negatively impacting water quality and other natural resources, as well as economic impacts to county infrastructure
Red Lake	Ensure the application of proper drainage related BMPs such as stable ditch design, buffers, and side water inlet structures
MSTRWD	Manage legal drainage systems in accordance with MSA 103E, while recognizing the need for agricultural drainage and sensitivity to environmental concerns
RLWD	Stabilize stream banks in areas of accelerated erosion

Issue: Drinking Water Supply

Like groundwater protection, drinking water supply concerns include water quality. However, here we are directly concerned with water for human consumption. Water quality criteria might be more restrictive for human consumption than, say, irrigation uses. Supply is also concerned with water quantity. Overuse of groundwater might cause shortages of drinking water during extended periods of drought. This issue was not identified as a priority in any plan.

Issue: Drought Mitigation

Drought mitigation means taking actions before, or at the beginning of, drought to help reduce the impacts (or effects) of drought. Examples include making drought plans, conserving water, building dams and other structures that help us store water, and learning about drought and your environment. This issue was not identified as a priority in any of the plans.

Issue: Education, Outreach, and Civic Engagement

Educating stakeholders regarding how their actions might be impacting resources in the Red Lake River watershed is a very important function of state and local agencies. Stakeholders can then be provided with information/support regarding how their current and/or past actions can be addressed to help protect or restore RLR watershed resources. This issue was addressed in all six plans.

SWCD/WD Plan	Education, Outreach, and Civic Engagement Actions
Beltrami	Promote local groups that are aware of and can manage the impacts to a particular resource (concern: a lack of individualized tailored management plans).
Pennington	Educate the public and promote water quality and erosion control. Educate the public about water and soil stewardship and encourage BMPs. Educate the public about flooding and provide technical and financial assistance when needed. Educate citizens about the importance of source water protection. Educate citizens on preserving groundwater resources and quality.
Polk	Promote and educate the citizens of Polk County about the wise use of our natural resources as it pertains to water quality. Education on reducing aquatic/ terrestrial invasive species.
Red Lake	Promote and educate the citizens of Red Lake County about BMPs and the wise-use of our natural resources, especially as it pertains to wind and water erosion.
MSTRWD	Angus-Oslo: Develop information book for landowners with culvert information and contact numbers. District-Wide: Exchange of information and communication to benefit the District and its residents.
RLWD	Upper: Improve District website and education programs.

Issue: Emerging Issues (e.g. Land Cover, Climate Change, etc.)

There are a number of emerging issues that could have an effect on water quality and quantity in the Red Lake River watershed. These include, but are not limited to, climate change, subsurface drainage, conversion of grassland, and changes in crop rotations. The RLR 1W1P could assess strategies related to their resiliency based on expected changes in climate, land use, etc. This includes an understanding of precipitation frequency as per NOAA Atlas 14. This issue was not identified as a priority in any of the plans.

Issue: Flood Damage Reduction

Flood damage issues are not only significant to the Red Lake River watershed, but to the Red River Basin as a whole. Reducing flood damages will provide economic and social benefits, and can also provide natural resource enhancements. The RLR 1W1P should prioritize flood damage reduction projects to not only reduce local flooding problems, but also work towards the 20% peak flow reduction goal for the Red River of the North which includes a 35% peak flow reduction goal for the Red Lake River at Crookston. This issue was addressed in all six plans.

SWCD/WD Plan	Flood Damage Reduction Actions
Beltrami	Reduce the flow of stormwater directly entering water bodies and thus minimize adverse impacts of storm water run-off on water quality. For all new developments, implement infiltration requirements based on projected rather than current stormwater levels.
Pennington	Identify problem reaches to ensure watershed, county, township, and private drainage systems adequately address drainage needs to support agriculture without threatening water quality. Encourage and promote Best Management Practices (BMPs) to deal with stormwater management. Encourage landowners to control run-off from their lands with the use of buffer strips, side water inlets and dikes to ditches and waterways. Encourage floodwater retention structures such as retention ponds, dams, and diversions.
Polk	Manage waters in Polk County in a manner that reduces flood damages within the County as well as the Red River Basin. Construction/ maintenance of flood control structures (levees, floodwalls, ring dikes, etc.). Ensure that county, township, watershed and private ditch systems adequately address the drainage needed to support agriculture without negatively impacting water quality and other natural resources, as well as economic impacts to the infrastructure of Polk County.
Red Lake	Focus on the quantity of water passing through Red Lake by inventorying, assessing, and evaluating the drainage infrastructure of the County. Ensure that ditch systems adequately address the drainage needed to support agricultural activities without negatively impacting water quality and other natural resources, as well as economic impacts to the infrastructure of Red Lake County (drainage records, culvert inventory, etc.). Ensure the application of proper drainage related BMPs such as stable ditch design, buffers, and side water inlet structures.
MSTRWD	Angus-Oslo: address runoff contribution and flooding problems from overbank flows with ditch improvements, storage projects. Angus-Oslo: Construct levee to prevent floodwaters from overflowing. District-Wide: Construct floodwater impoundments, management of ditch systems.
RLWD	Upper & Lower: Create additional flood storage within eastern portions of subwatershed to reduce agricultural and residential flooding. Reduce bank erosion and provide adequate agricultural drainage. Respond to petitions and other requests for ditches actively managed by RLWD.

Issue: Groundwater Protection

Groundwater provides a significant source of water to stakeholders in the RLR watershed. Uses include drinking water, livestock watering, and irrigation. Protecting the water quality of groundwater is important to sustain these uses in the long term. Water quality parameters such as nutrients, pesticides, heavy metals, and other anthropogenic chemicals may threaten these waters. This issue was addressed in all six plans.

SWCD/WD Plan	Groundwater Protection Actions
Beltrami	Develop a comprehensive approach to monitoring and protection of groundwater resources. Identify and characterize known/suspected groundwater contamination sites. Continue to encourage well-head protection plans in developing areas. Encourage proper procedures for well abandonment and seek cost share funds to help pay sealing costs. Pursue funding to help landowners bring non-compliant sanitary sewer systems up to code within one year of identification of problem.
Pennington	Monitor groundwater quality to acquire information on nitrate sensitive areas. Promote well sealing program. Develop wellhead protection plans. Assist landowners with compliance of the County Sewage and Wastewater Treatment Ordinance.

SWCD/WD Plan	Groundwater Protection Actions
Polk	Continue observation well readings. Provide financial support to seal priority wells. Conduct sub subsurface sewage treatment system (SSTS) inventory and upgrades as needed on priority lakes.
Red Lake	Priority: Groundwater quality. Provide assistance to encourage private well testing. Complete and implement Wellhead Protection Plans. Continue to promote and provide cost-share assistance for the Abandoned Well Sealing Program.
MSTRWD	District-Wide: Counties discuss groundwater planning.
RLWD	Upper & Lower: Support efforts of municipalities to identify and protect recharge areas and to improve surface water quality.

Issue: Habitat, Wildlife, and Fisheries

Protection and restoration of key habitat complexes and corridors can provide water quality benefits for groundwater and surface water, protection for pollinators, and climate resiliency. The plan should address the protection and restoration of key habitat complexes and corridors throughout the watershed. This issue was identified as a priority in all plans, with the exception of the Beltrami County plan.

SWCD/WD Plan	Habitat, Wildlife, and Fisheries Actions
Beltrami	Not addressed.
Pennington	Identify and implement natural resource enhancement opportunities.
Polk	Recognize areas that are unique to the County such as native prairie sites. Protect and identify areas of threatened or endangered species.
Red Lake	Wildlife viewing, hunting, and fishing are assets of promoting tourism in Red Lake County.
MSTRWD	Participate in the restoration, conservation, and protection of key areas providing unique ecological values and recreational opportunities.
RLWD	Upper & Lower: Enhance/protect existing grassland and prairie habitats. Improve fish riverine habitat conditions. Connect existing / re-establish habitat corridors.

Issue: Invasive Species Management

Terrestrial and aquatic invasive species can cause significant harm to the ecosystems if they become established. They may outcompete native species for resources, causing reduced numbers of natives and loss of ecosystem functions and services. This issue was identified as a priority in the Beltrami County, Polk County and Red Lake County plans, but not in the Pennington County, MSTRWD or RLWD plans.

SWCD/WD Plan	Invasive Species Management Actions
Beltrami	Minimize probability of introductions, extent of invasions, and intensity of ecological impacts of invasive species.
Pennington	Not addressed.
Polk	Reduce invasive species impacts within Polk County. Aquatic and terrestrial invasive control.
Red Lake	Weed management to remove invasives is an on-going activity in the county.

SWCD/WD Plan	Invasive Species Management Actions
MSTRWD	Not addressed.
RLWD	Not addressed.

Issue: Maintenance of Core Services; Understanding of Local Capacity

Counties and watershed districts may have limited resources (staff, equipment, budget) to complete their missions, so understanding how such limitations may affect their involvement in the 1W1P for the Red Lake River and other 1W1Ps in the future is very important. This issue was identified in four of the six plans. It was not included as a priority in the Polk County or RLWD plans.

SWCD/WD Plan	Maintenance of Core Services; Understanding of Local Capacity Actions
Beltrami	Move toward more explicitly watershed-based management strategies.
Pennington	Coordinate and cooperate with other agencies and jurisdictions on plans and projects. Coordinate and cooperate with other agencies and jurisdictions on plans and implementing projects to reduce damages by flooding.
Polk	Not addressed.
Red Lake	Red Lake County will focus on ongoing District activities.
MSTRWD	Update WMP every 10 years, develop a systems approach for managing District resources.
RLWD	Not addressed.

Issue: Shoreland and Riparian Management

Shoreland and riparian management is important because uncontrolled land uses and unplanned development can cause degradation to water quality, increased risk of flooding, and scenic degradation. The RLR 1W1P should aim to provide consistency to local land use controls across the watershed, along with implementation strategies for targeting where buffers and riparian corridor management is most needed and can help achieve plan objectives. This issue was identified as a priority in all six plans.

SWCD/WD Plan	Shoreland and Riparian Management Actions
Beltrami	Identify riparian habitats and take additional steps beyond current activities to protect them.
Pennington	Streambank restoration and buffers to prevent soil and water erosion. Revise the County Shoreland Ordinance to incorporate the revised "Minnesota Shoreland Rules: Standards for Lake and River Conservation". Work with agencies to establish an updated setback requirement.
Polk	Priorities around the lakes region include educating shoreland owners on lakescaping.
Red Lake	Assist landowners with compliance of the County's Shoreland Ordinance to protect and enhance water quality. Identify and prioritize streambank erosion sites in the county to identify target areas for streambank protection and stabilization.
MSTRWD	Angus-Oslo: Channel restoration work to address farmed riparian areas.
RLWD	Upper & Lower: Partner with USDA, NRCS, USACE, MPCA, and SWCDs to implement projects to reduce bank erosion.

Issue: Soil, Erosion, and Sedimentation

Protecting soil from both water and wind erosion has multiple benefits such as reducing sedimentation, maintaining/improving soil quality, meeting nutrient reduction goals, increasing water storage on the landscape via increased soil organic matter content and water holding capacity, and improving surface water quality. The RLR 1W1P should identify high priority areas for wind and water erosion and sedimentation concerns using available data, inventories, and models/tools, and target implementation efforts to those areas. This issue was identified as a priority in all six plans.

SWCD/WD Plan	Soil, Erosion, and Sedimentation Actions
Beltrami	Reduce soil erosion to protect water quality
Pennington	Reduce the extent of turbidity and sedimentation in the Thief River and Red Lake River. Assist landowners and government entities with the reduction of water and wind erosion through BMPs (streambank restoration, runoff pond, tree matting, living snowfence, native buffers, rain gardens, etc.).
Polk	Identify areas of agricultural land use, especially in those areas with sensitive ground water and surface water resources for the installation of erosion and sediment control practices to reduce sedimentation.
Red Lake	Red Lake County will continue to focus on trying to address, work on, and prevent erosion and sedimentation. Identify and prioritize water and wind erosion sites for land application of BMPs
MSTRWD	Angus-Oslo: Erosion control projects, field windbreaks, buffer strips, sediment basins, increased maintenance efforts to reduce sediment. District-Wide: Set aside land from farm production to reduce soil erosion.
RLWD	Upper & Lower: Seek partnerships with landowners, SWCD, and USDA NRCS to implement BMPs to reduce agricultural erosion and slow water down. Seek grant opportunities to conduct an erosion assessment on the entire Red Lake River from the Red Lake outlet on the reservation to the Red River.

Issue: Soil Health

Soil health, also referred to as soil quality, is defined as the continued capacity of soil to function as a vital living ecosystem that sustains plants, animals, and humans. This definition speaks to the importance of managing soils so they are sustainable for future generations. Soil contains living organisms that when provided the basic necessities of life - food, shelter, and water - perform functions required to produce food and fiber. This issue was not identified as a priority in the Beltrami, Polk, MSTRWD or RLWD plans.

SWCD/WD Plan	Soil Health Actions
Beltrami	Not addressed.
Pennington	Educate the public about water and soil stewardship and encourage BMPs.
Polk	Not addressed.
Red Lake	Information and education activities: soil stewardship
MSTRWD	Not addressed.
RLWD	Not addressed.

Issue: Wastewater Management

Wastewater from surface sources may pose a threat to the beneficial uses of surface waters. Identification and remediation of problem areas are in the best interests of stakeholders before health is threatened and the problem gets worse. This issue was not identified as a priority in any of the plans.

Issue: Water Quality

Surface water has many uses in the RLR watershed including drinking water, fishing, swimming, irrigation, and industrial purposes. Protecting and improving water quality provides economic, social, and environmental benefits. The RLR 1W1P should use the information from the WRAPS study and other water quality data available to prioritize specific water resources and/or subwatersheds needing land treatments/projects for protection and restoration, set measurable reduction goals, including reasonable timelines, to address those priority resources, and target implementation activities to meet those goals. This issue was addressed in all six plans.

SWCD/WD Plan	Water Quality Actions
Beltrami	Collect additional surface water priority data, and manage it effectively for use in making water resource management decisions (monitoring, aggregating, etc.). Promote and utilize BMPs for conservation application in areas of the County identified as potential sites of concern.
Pennington	Monitor surface water quality. Develop/ implement TMDLs. Source water protection for the City of Thief River Falls to protect drinking water. Address high hydrogen sulfide within the reservoir for Thief River Falls to protect drinking water.
Polk	Improve the water quality of rivers and streams from the point they enter Polk County. Attain/maintain a fishable/swimmable status of all lakes in the county, with the overall goal for all waters in Polk County to meet or exceed state water quality standards. Monitor water quality. TMDL development/ implementation. Adhere to MPCA Animal Feedlot and Manure Management Plan. Limit phosphorus loading into lakes.
Red Lake	Focus on surface water quality and impaired waters; especially as it relates to human impacts for recreational use and as a downstream domestic use of the water supply. New and continued monitoring of the river systems located within the county- achieve watershed wide monitoring system. Provide informational, technical, and financial support to landowners to implement BMP's for the protection and improvement of surface water quality. Work with Federal, State, and local agencies in regards to Impaired Waters status of county rivers. Assist landowners with compliance of the County's Animal Feedlot and Manure Management Ordinance to protect and enhance water quality.
MSTRWD	Monitor surface water. Minimize stormwater runoff impacts by meeting MS4 requirements. Implement BMPs to address impaired waters (TMDLs).
RLWD	Upper & Lower: Partner with USDA, NRCS, USACE, MPCA, and SWCDs to implement projects to reduce agricultural and bank erosion and improve water quality, support efforts of municipalities to identify and protect recharge areas and to improve surface water quality. Upper: Increase number of water quality monitoring sites, develop/ Implement TMDL strategies.

Issue: Water Supply: Protect, Provide, Conserve

While Minnesotan's might be blessed with a water-rich state, expanding needs for water (e.g. irrigation, drinking water) are always a concern. Over-pumping of groundwater has forced communities to drill deeper drinking water wells in parts of the state. This issue was not mentioned as a priority in the Beltrami County or RLWD plans.

SWCD/WD Plan	Water Supply: Protect, Provide, Conserve Actions
Beltrami	Not addressed.
Pennington	Monitor movement and depth to the groundwater table for the purpose of treating septic system effluent.
Polk	Continue observation well readings.
Red Lake	Continue to monitor water level of the three DNR Observation Wells.
MSTRWD	Work to implement measures to conserve existing water supply and increase the quantity to water available for use.
RLWD	Not addressed.

Issue: Wetland Management

Protection and restoration of wetlands provides benefits for water quality, flood damage reduction, habitat, and wildlife. The RLR 1W1P should support the continued implementation of the Wetland Conservation Act and look for opportunities to improve coordination across jurisdictional boundaries. The RLR 1W1P should also identify high priority areas for wetland restoration and strategically target restoration projects in those areas. This issue was addressed in all six plans.

SWCD/WD Plan	Wetland Management Actions
Beltrami	Identify wetlands and take additional steps beyond current activities to protect them.
Pennington	Increase grassland and wetland habitats within the river corridors of the Thief, Black and Red Lake Rivers utilizing programs such as EQIP, Red River Valley Set-a-Side, CCRP, RIM, CREP, WRP, Native Buffer Program. Administer WCA to reduce the loss of wetlands and encourage wetland restoration.
Polk	Identify site for water retention through land retirement programs such as the RIM/WRP or Agricultural Wetland Banking programs. Preserve high quality wetlands within Polk County for their best functional values.
Red Lake	Coordinate activities to ensure the County meets the requirements for administering the Wetland Conservation Act.
MSTRWD	Set aside land from farm production to reduce soil erosion. Reinvest in Minnesota (RIM), Wetlands Reserve Enhancement Program (WREP), etc.
RLWD	Protect existing wetland habitats, support WCA enforcement, enhance existing wetland habitats, target wetland restorations in areas near existing restorations, encourage vegetation management that maintains wetland quality.

Issue: Altered Hydrology

Altered hydrology in the RLR watershed has accelerated bed and bank erosion and caused a loss of aquatic habitat and organisms. The RLR 1W1P should use existing data and inventories to prioritize areas to restore natural hydrology. This issue was addressed in all six plans.

SWCD/WD Plan	Altered Hydrology Actions
Beltrami	For all new developments, implement infiltration requirements based on projected rather than current stormwater levels.
Pennington	Encourage landowners to control run-off from their lands with the use of buffer strips, side water inlets and dikes to ditches and waterways. Encourage floodwater retention structures such as retention ponds, dams, and diversions.
Polk	Ensure absentee landowners are maintaining the natural water courses so water movement isn't impeded. Construction/ maintenance of flood control structures (levees, floodwalls, ring dikes, etc.)
Red Lake	Ensure that ditch systems adequately address the drainage needed to support agricultural activities without negatively impacting water quality and other natural resources, as well as economic impacts to the infrastructure of Red Lake County (drainage records, culvert inventory, etc.). Ensure the application of proper drainage related BMPs such as stable ditch design, buffers, and side water inlet structures.
MSTRWD	Angus-Oslo: Construct levee to prevent floodwaters from overflowing. District-Wide: Construct floodwater impoundments, management of ditch systems.
RLWD	Upper & Lower: Create additional flood storage within eastern portions of subwatershed to reduce agricultural and residential flooding. Upper & Lower: Respond to petitions and other requests for ditches actively managed by RLWD.

Issue: Contaminants of Emerging Concern

Chemicals are being discovered in water that previously had not been detected or are being detected at levels that may be significantly different than expected. These are often generally referred to as "contaminants of emerging concern" (CECs) because the risk to human health and the environment associated with their presence, frequency of occurrence, or source may not be known. Examples include pharmaceuticals and personal care products that may enter surface and/or ground waters through home and business sewage pathways. This issue was not addressed in any of the six plans.

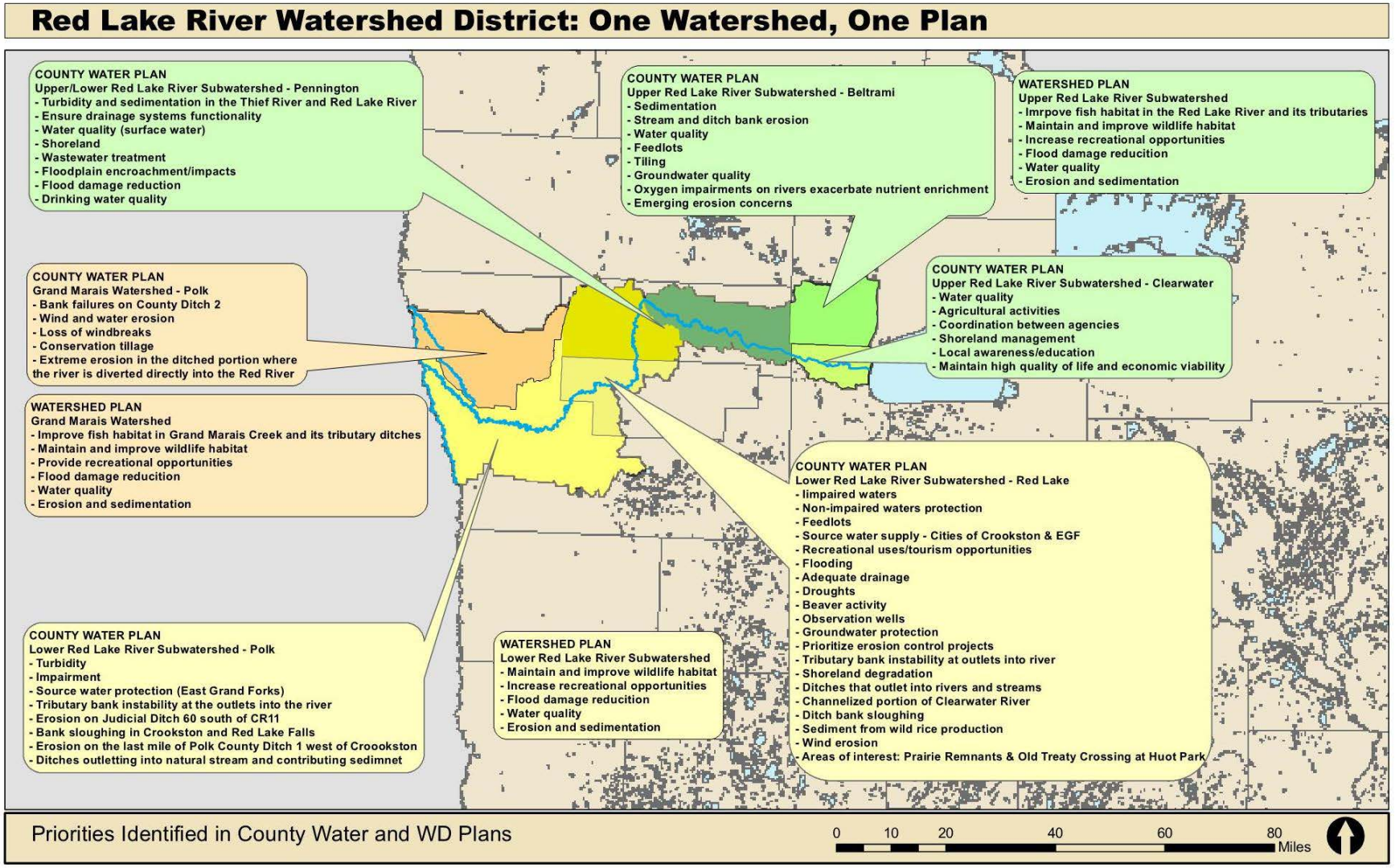


Figure E-1 Priorities in County and Watershed District Plan

Appendix F

State and Regional Plan Summaries

Appendix F: State and Regional Plan Summaries

As part of the planning process, State and regional plans/documents that are relevant to the Red Lake River 1W1P project were reviewed (**Table F-1**).

Table F-1. Relevant Regional and State Plans.

Document	Author
Non-Point Priority Funding Plan	BWSR, 2014
Minnesota's Nonpoint Source Management Program Plan	MPCA, 2013
Minnesota Prairie Conservation Plan	DNR, 2011a
(Draft) Minnesota Nutrient Reduction Strategy	MPCA, 2014
Nitrogen Fertilizer Management Plan	MDA, 2013
(Draft) Groundwater Management Program Strategic Plan	DNR, 2013
Fish Habitat Plan	DNR, 2013
Long Range Duck Recovery Plan	DNR, 2006a
Long-Range Plan for the Ring-Necked Pheasant in Minnesota	DNR, 2005
Long-Range Plan for Wild Turkey in Minnesota	DNR, 2006b
Muskie and Large Northern Pike Long Range Plan	DNR, 2008
Tomorrow's Habitat for the Wild & Rare	DNR, 2005
Statewide Conservation and Preservation Plan	UMN, 2008
Long Term Flood Solutions	RRBC, 2011
Natural Resource Framework Plan	RRBC, 2005
User's Guide to Natural Resource Enhancement in the Red River Basin	RRBFDRWG, 2011
Conservation Area Plans for the Ecological Subsections	DNR, 2006c, 2006d
Ecological Subsection Forest Management Plan	DNR, 2015b
A Fifty Year Vision: Conservation for Minnesota's Future	Belwin Conservancy, 2006
North American Waterfowl Plan	PPJV, 2012
Minnesota Water Sustainability Framework	UMN, 2011
Red River Basin Water Quality Plan	MPCA, 1999
Impaired Waters Listing	MPCA, ongoing
TMDL Plans	MPCA, ongoing
WRAPS Documents	MPCA, ongoing
Watershed Health Assessment Framework Resources	DNR, ongoing
Fisheries Related Surveys and Management Plans	DNR, ongoing
Stream Morphology Related Reports	DNR, ongoing
HAPET Resources	USFWS, 2009
Red River Basin Mediation Agreement	RRBFDRWG, 1998
Source Water Protection Plans	MDH, 2002, 2003, 2006, 2012a, 2012b, 2015
MN Forests for the Future	DNR, 2008
Conservation Agenda	DNR, 2014
SNA Program Long Range Plan	DNR, 2004

Document	Author
Floodplain Related Plans	FEMA, 1990, 2014
Pollinator Plan	BWSR, 2014
Rapid Watershed Assessments	NRCS, 2009a, 2009b, 2015
Grand Marais Creek WRAPS	EOR, 2013, 2014a, 2014b
WAP – Wildlife Action Plan	DNR
Goose Lake Management Plan	DNR
Glacial Ridge Comprehensive Conservation Plan	USFW
Red River Corridor Plan	RLR Corridor.org

Appendix G

Public Survey Results

Appendix G: Public Survey Results

Information was collected from public surveys to capture comments on issues and priorities for the planning process. Ranked responses and unedited comments are listed in the tables below.

Responses to the public survey question, "What do you feel are the top 5 problems related to watershed health in your area?"

Issue	Ranking
Wetland loss and/or impacts	1
Drinking water quality	2
Soil erosion and sedimentation	3
Invasive species	4
Drainage system effectiveness (e.g., ditches)	5
Flood damage	6
Runoff into lakes, streams, etc.	7
Water quality	8
Public understanding of watershed issues	9
Drinking water supply sustainability	10
Soil health	11
Contaminants and pollutants	12
Effects of land use change (e.g., field to homes)	13
Drought	14
Irrigation water supply sustainability	15
Wildlife habitat loss	16
Climate trend issues (precipitation, temperature fluctuation, etc.)	17

Responses to the public survey question, "What do you feel are top 5 SOLUTIONS to watershed health in your area?"

Solutions	Ranking
Drought mitigation planning	1
Invasive species management	2
Contaminant and pollutant reduction (water quality)	3
Wetland management	4
Drainage system management	5
Surface water retention via ponds, wetlands, etc.	6
Shoreland and riparian management	7
Using NRCS soil erosion and sedimentation best practices	8
Education, outreach and civic engagement	9
Groundwater study, management, and protection	10
Flood risk assessment and management	11
Maintain watershed district core services	12
Nutrient management planning	13
Water supply (protect, provide and conserve)	14
Habitat, wildlife and fisheries management	15
Wastewater management	16
Feedlot management	17
Climate trend risk management	18

Comments on general threatened Resources of Concern (unedited)

Manual comment entry	ROC	IOC	Strategy	General Comment
“Local input from the start to solve some trouble”				•
“The main concern be soil retention and maintain water quality”		•		
“Vegetative buffers along water recourses”			•	
“Native grasslands”	•			
“I do not like having to rank the above as all are intertwined and each merits its' own high priority”				•
“Invasive species both terrestrial and aquatic”		•		
“Ditchbank to ditchbank farming”		•		
“Subsurface Septic Treatment Systems”		•		
“Land use conversion (loss of permanent cover types)”		•		
“Economic viability of the people who live here and pay taxes”		•		
“Air quality”		•		

Comments on specific natural resources that should be considered a priority (unedited)

Manual comment entry	ROC	IOC	Strategy	General Comment
“JD 96 in Pennington County”	•			
“Buffers along all water courses including intermittent streams...”			•	
“Red Lake River water quality”	•			
“Wetlands”	•			
“Red Lake River”	•			
“Groundwater management. Irrigation by deep well drilling for crops is taking a toll on residential wells. Also, contaminants from fertilizers.”	•	•		
“Agassiz NWR Wetlands; Thief Lake Wetlands, Thief River, Red Lake River”	•			
“Red Lake River, Clearwater River”	•			
“Surface Water Quality and Impaired Waters; Surface Water Quantity; Groundwater Quality/Quantity; Erosion and Sedimentation; Wetlands; and Soil Health.”		•		
“Not a specific location, but in general farming up to the edge of road ditches, drainage ditches, watercourses and wetlands. Also land conversion from permanent cover to urban area or farm fields - loss of CRP and conversion of woodlots and other odd parcels that were left previously.”		•		
“Red Lake River”	•			
“Red Lake River (Crookston DWSMA), Red Lake River (East Grand Forks Surface Water Assessment Area), Red Lake River and Thief River (Thief River Falls Surface Water Assessment Area), St Hilaire Drinking Water Supply Management Area (DWSMA), Red Lake Falls DWSMA, Nielsville DWSMA”	•			

Manual comment entry	ROC	IOC	Strategy	General Comment
“Grand Marais flooding”		•		
“Wetlands, wet prairies, prairies, streams, rivers, lakes, oak savannahs, habitat in general.”	•			
“Eventually, everything runs into the Red Lake River. The most specific I can be is the general landscape should be a priority.”		•	•	
“Thief River/ditch 83, Aggassi and Thief Lake refuges,Red Lake River, Clearwater River”	•			
“Black river”	•			
“Red Lake River itself since it's a drinking water source for those downstream of some cities/ag., Ground Water, we are getting more irrigation systems going up, this can have an affect on domestic wells. Better management of tile and ag drainage, we are seeing more water coming faster than in the past and precip Is not the main contributor!!”	•	•	•	
“All of them. They are all connected in some way.”				•
“Groundwater management, grassland protection, buffers for ag ditches”			•	

Additional comments and suggestions

Manual comment entry	ROC	IOC	Strategy	General Comment
“Focus on fixing the problems, not scheduling meetings with multiple agencies to discuss the problems continually.”				•
“Do it right”				•
“Need better public awareness of climate change implications on soil and water resources.”				•
“We need natural functioning wetlands back on the landscape. These resources reduce runoff, sediment and transportation of contaminants while protecting and replenishing our ground water. Most of our watershed problems can be traced back to the drainage of wetlands, failure to address the root of the problem will only allow for controversial and expensive man made solutions to our watershed problems.”		•	•	•
“More public outreach and education - report on existing projects and how things have improved with them in place”			•	•
“Our water supply is in serious danger of being compromised from chemicals, irrigation practices and run off. There must be a better inspection and monitoring practice put into place! Wet lands are disappearing too. Wet lands that have been in areas are now just gone, because of some farming practices that seem to have been totally unmonitored referencing wet land protections.”		•		•
“Existing regulations such as buffer zones on all waterways should be enforced; buffer strips should be expanded to 75' or more; tile drainage should be regulated through countywide permit system; sediment fingerprinting has been done in certain areas of the watershed and reveal that we are loosing a lot of soil (which is filling important wetlands). We will lose the wetlands not to mention the soil for future generations.”			•	•

Manual comment entry	ROC	IOC	Strategy	General Comment
“Public needs more education”			•	
“Make sure the watersheds do not issue permits for drainage where they should not issue permits. If someone wants to drain private land and another land owner does not agree to that---there should be discussion ---not to have the permit issued to drain the owners land---putting undue stress on the recipient of the water.”			•	•
“Would like to see more discussion on long-term impacts of tile drainage on groundwater, nearby wetlands, and downstream flooding. Also believe there probably needs to be some regulation/permitting implemented soon to get a handle on where and how much is going in and additional volume being discharged into the drainage system.”		•	•	•
“I didn’t see sealing unused wells as a solution for protection groundwater.”			•	
“Keep up the local communication”			•	•
“Heavy sediment loads in rivers and ditches is a major problem. Mandatory buffer strips would be a good start.”		•	•	•
“I realize my answer to No. 6 was broad but what I have witnessed the past 3 years in Polk County causes me to answer in the broadest terms. Agricultural intensification has more dirt blowing (2014-15 = the Winter of Black Snow) and more soil erosion than I have ever witnessed coupled with removal of ditch and flowage buffers, wetlands, etc. This in a time almost 100 years from the Dirty Thirties when we supposedly learned our lessons on land mgmt and agriculture. Obviously, Best Mgmt Practices are failing badly OR they are being ignored and not policed. I have witnessed so many shelter belts going down. Many of these were more than likely paid in a generous "cost share" using dollars from U.S. citizens to aid farmers in better caring for the land for all Americans. However, when a generation or two later removed them, I never saw any inquiry for the general public to ask if we wanted them removed. Currently, we are not managing our vast American landscape for the better of all society.”				
“Grasslands and vegetative buffer strips are essential to water quality”				
“Look forward to your sharing of results of your survey and community reaction...and hopeful engagement”				
“Promote tile drainage as solution”				
“I couldn't fill out question 5 directly. We need education. That's the foundation to everything we do. Programs mean nothing if people don't understand why and how they work. Most practices NRCS and others promote are band-aids to the real problem. They are treating the systems without solving the problem. Soil health, in my opinion, should be the main focus. If your soils are functioning, everything else falls into place. Mismanagement of our soils (tillage, monocultures, synthetic fertilizers, herbicides, pesticides, etc.) is the true cause of all of our resource concerns. No amount of cement or engineering can fix that.”				

Appendix H

Prioritization Statement Rankings

Appendix H. Prioritization statement ranking within each planning zone by relevant issues

PLANNING ZONE 1 – LOWER

Prioritization Statements	LGU Votes	Agency Votes	Total Votes
Surface Water Quality			
Restore impaired waters that are closest to meeting state water quality standards.	**9**	**7**	**16**
Protect high-quality unimpaired waters at greatest risk of becoming impaired.	**7**	**7**	**14**
Continue long-term monitoring efforts at key locations to provide sufficient data for water quality, hydrologic, hydraulic and biotic analysis.	**8**	**3**	**11**
Restore or improve other impaired waters.	**3**	**1**	**4**
Soil Erosion and Sedimentation			
Reduce runoff-driven sediment transport to *impaired waters that are closest to meeting state water quality standards* by targeting implementation in subwatersheds with highest export.	**7**	**4**	**11**
Reduce wind erosion with priority on highly erodible soils by targeting implementation in subwatersheds with highest export.	**7**	**4**	**11**
Reduce runoff-driven sediment transport to *high-quality unimpaired waters at greatest risk of becoming impaired* by targeting implementation in subwatersheds with highest export.	**4**	**3**	**7**
Protect priority stream and river channels (those most susceptible to altered hydrology effects on bank and bed stability).	**2**	**4**	**6**
Inventory and evaluate the severity of erosion problems and risks in terms of the local resource as well as downstream resources to guide implementation strategy.	**1**	**3**	**4**
Reduce runoff-driven sediment transport to *other impaired waters* by targeting implementation in subwatersheds with highest export.	**1**	**0**	**1**

Prioritization Statements	LGU Votes	Agency Votes	Total Votes
Altered Hydrology			
Reduce runoff rates by targeting implementation in subwatersheds with high runoff.	**9**	**6**	**15**
Identify ideal locations for flood control structures that include multifunctional design (buffer strips, side water inlets and dikes to ditches and waterways, floodwater retention structures such as retention ponds, dams, and diversions).	**9**	**2**	**11**
Protect disconnected, non-contributing drainage areas from future altered hydrology leading to a connection to water resources downstream.	**3**	**4**	**7**
Restore or modify natural water course morphology where feasible to promote adequate drainage as well as channel equilibrium to ensure reduced bank failure, bed aggradation or degradation and allow for natural meander migration and habitat.	**2**	**4**	**6**
Assure long-term maintenance of multi-purpose flood control structures	**2**	**1**	**3**
Promote infiltration, retention, extended detention practices in new and existing urban developments based on current stormwater best management practices.	**1**	**1**	**2**
Drainage System Management			
Utilize information collected from the drainage ditch inventories to prioritize and install side water inlets and buffer strips to ensure adequate support of agriculture without negative downstream ecologial and economic impacts.	**12**	**11**	**23**
Use current conservation drainage practices on retrofits or installation of new surface and subsurface drainage.	**7**	**7**	**14**
Flood Damage Reduction			
Reduce flood flows and breakout flows to reduce damages to local communities, infrastructure, rural homes, and agricultural fields.	**18**	**9**	**27**
Reduce the risk of flood damage in accordance with the 20% Red River Basin Commission's Long Term Flood Solutions and Technical Paper #11.	**6**	**5**	**11**

Prioritization Statements	LGU Votes	Agency Votes	Total Votes
Habitat			
Protect or restore aquatic habitat of priority reaches.	**6**	**7**	**13**
Protect, restore, and enhance grasslands and wetlands with special emphasis on prairie core areas and corridor complexes.	**2**	**6**	**8**
Identify areas that provide both unique ecological values and recreational opportunities and develop an implementation and management plan.	**5**	**2**	**7**
Expand aquatic and terrestrial non-native and invasive species control programs.	**4**	**1**	**5**
Restore longitudinal connectivity of priority reaches .	**3**	**0**	**3**
Restore aquatic habitat of other reaches where feasible.	**0**	**2**	**2**
Shoreland and Riparian Management			
Protect riparian corridors with existing quality vegetated buffers.	**8**	**8**	**16**
Restore or enhance quality vegetated buffers adjacent to natural, altered and artificial watercourses and wetlands.	**6**	**10**	**16**
Groundwater Protection			
Maintain a safe and adequate drinking water supply for residents in order to protect the public's health, safety and general welfare of the community.	**11**	**8**	**19**
Protect Drinking Water Supply Management Areas (DWSMAs). Special consideration will be given for DWSMAs with a moderate or high vulnerability.	**2**	**5**	**7**
Implement strategies to conserve ground water supply quantity.	**6**	**1**	**7**
Implement strategies to conserve ground water supply quality.	**3**	**2**	**5**
Work collaboratively with public water suppliers to implement their Wellhead Protection Plans.	**0**	**2**	**2**
Surface Drinking Water Protection			
Maintain a safe and adequate surface drinking water supply for residents in order to protect the public's health, safety and general welfare of the community.	**8**	**8**	**16**
Reduce runoff-driven sediment and pollutant transport to surface waters of East Grand Forks by targeting implementation in subwatersheds with highest export.	**8**	**8**	**16**
Conserve surface water drinking supplies.	**3**	**2**	**5**

PLANNING ZONE 2 – MIDDLE

Prioritization Statements	LGU Votes	Agency Votes	Total Votes
Surface Water Quality			
Restore impaired waters that are closest to meeting state water quality standards.	**10**	**7**	**17**
Protect high-quality unimpaired waters at greatest risk of becoming impaired.	**8**	**7**	**15**
Continue long-term monitoring efforts at key locations to provide sufficient data for water quality, hydrologic, hydraulic and biotic analysis.	**5**	**3**	**8**
Restore or improve other impaired waters.	**3**	**1**	**4**
Soil Erosion and Sedimentation			
Reduce runoff-driven sediment transport to high-quality unimpaired waters at greatest risk of becoming impaired by targeting implementation in subwatersheds with highest export.	**5**	**6**	**11**
Reduce wind erosion with priority on highly erodible soils by targeting implementation in subwatersheds with highest export.	**6**	**3**	**9**
Reduce runoff-driven sediment transport to *impaired waters that are closest to meeting state water quality standards* by targeting implementation in subwatersheds with highest export.	**5**	**4**	**9**
Protect priority stream and river channels (those most susceptible to altered hydrology effects on bank and bed stability).	**5**	**3**	**8**
Inventory and evaluate the severity of erosion problems and risks in terms of the local resource as well as downstream resources to guide implementation strategy.	**2**	**2**	**4**
Reduce runoff-driven sediment transport to *other impaired waters* by targeting implementation in subwatersheds with highest export.	**0**	**0**	**0**
Altered Hydrology			
Reduce runoff rates by targeting implementation in subwatersheds with high runoff.	**12**	**5**	**17**

Prioritization Statements	LGU Votes	Agency Votes	Total Votes
Identify ideal locations for flood control structures that include multifunctional design (buffer strips, side water inlets and dikes to ditches and waterways, floodwater retention structures such as retention ponds, dams, and diversions).	**11**	**2**	**13**
Protect disconnected, non-contributing drainage areas from future altered hydrology leading to a connection to water resources downstream.	**4**	**5**	**9**
Restore or modify natural water course morphology where feasible to promote adequate drainage as well as channel equilibrium to ensure reduced bank failure, bed aggradation or degradation and allow for natural meander migration and habitat.	**4**	**4**	**8**
Assure long-term maintenance of multi-purpose flood control structures.	**6**	**1**	**7**
Promote infiltration, retention, extended detention practices in new and existing urban developments based on current stormwater best management practices.	**1**	**1**	**2**
Drainage System Management			
Utilize information collected from the drainage ditch inventories to prioritize and install side water inlets and buffer strips to ensure adequate support of agriculture without negative downstream ecologial and economic impacts.	**19**	**10**	**29**
Retrofit or install new subsurface drainage using current conservation drainage practices.	**7**	**8**	**15**
Flood Damage Reduction			
Reduce flood flows and breakout flows to reduce damages to local communities, infrastructure, rural homes, and agricultural fields.	**12**	**8**	**20**
Reduce the risk of flood damage in accordance with the 20% Red River Basin Commission's Long Term Flood Solutions and Technical Paper #11.	**11**	**4**	**15**
Habitat			
Protect, restore, and enhance grasslands and wetlands with special emphasis on prairie core areas and corridor complexes.	**9**	**5**	**14**
Protect or restore aquatic habitat of priority reaches.	**6**	**5**	**11**
Identify areas that provide both unique ecological values and recreational opportunities and develop an implementation and management plan.	**5**	**2**	**7**
Expand aquatic and terrestrial non-native and invasive species control programs.	**3**	**0**	**3**

Prioritization Statements	LGU Votes	Agency Votes	Total Votes
Restore longitudinal connectivity of priority reaches.	1	1	2
Restore aquatic habitat of other reaches where feasible.	0	2	2
Shoreland and Riparian Management			
Restore or enhance quality vegetated buffers adjacent to natural, altered and artificial watercourses and wetlands.	14	5	19
Protect riparian corridors with existing quality vegetated buffers.	6	6	12
Groundwater Protection			
Maintain a safe and adequate drinking water supply for residents in order to protect the public's health, safety and general welfare of the community.	12	6	18
Protect Drinking Water Supply Management Areas (DWSMAs). Special consideration will be given for DWSMAs with a moderate or high vulnerability.	6	5	11
Implement strategies to conserve ground water supply quality.	3	1	4
Implement strategies to conserve ground water supply quantity.	3	1	4
Conduct sub subsurface sewage treatment system (SSTS) inventory and upgrades.	2	1	3
Work collaboratively with public water suppliers to implement their Wellhead Protection Plans.	1	1	2
Groundwater appropriations do not adversely impact fish habitat, fens, other groundwater-dependent surface water features, or other groundwater-dependent biological communities.	0	2	2
Source Water Protection			
Protect East Grand Forks Source Water Assessment Area (SWAA).	13	6	19
Protect surface water quality and quantity of East Grand Forks drinking water supply.	10	6	16
Maintain a safe and adequate drinking water supply for residents in order to protect the public's health, safety and general welfare of the community.	1	2	3

PLANNING ZONE 3 – UPPER

Prioritization Statements	LGU Votes	Agency Votes	Total Votes
Surface Water Quality			
Restore impaired waters that are closest to meeting state water quality standards.	**8**	**6**	**14**
Protect high-quality unimpaired waters at greatest risk of becoming impaired.	**6**	**8**	**14**
Continue long-term monitoring efforts at key locations to provide sufficient data for water quality, hydrologic, hydraulic and biotic analysis.	**2**	**3**	**5**
Restore or improve other impaired waters.	**2**	**1**	**3**
Soil Erosion and Sedimentation			
Reduce runoff-driven sediment transport to *impaired waters that are closest to meeting state water quality standards* by targeting implementation in subwatersheds with highest export.	**6**	**3**	**9**
Reduce runoff-driven sediment transport to *high-quality unimpaired waters at greatest risk of becoming impaired* by targeting implementation in subwatersheds with highest export.	**3**	**4**	**7**
Reduce wind erosion with priority on highly erodible soils by targeting implementation in subwatersheds with highest export.	**3**	**3**	**6**
Reduce runoff-driven sediment transport to *other impaired waters* by targeting implementation in subwatersheds with highest export.	**2**	**1**	**3**
Identify, quantify and plan for agricultural practices that promote conservation.	**2**	**2**	**4**
Protect priority stream and river channels (those most susceptible to altered hydrology effects on bank and bed stability).	**1**	**3**	**4**
Inventory and evaluate the severity of erosion problems and risks in terms of the local resource as well as downstream resources to guide implementation strategy.	**1**	**2**	**3**
Altered Hydrology			
Reduce runoff rates by targeting implementation in subwatersheds with high runoff.	**9**	**6**	**15**
Restore or modify natural water course morphology where feasible to promote adequate drainage as well as channel equilibrium to ensure reduced bank failure, bed aggradation or degradation and allow for natural meander migration and habitat.	**9**	**3**	**12**
Protect disconnected, non-contributing drainage areas from future altered hydrology leading to a connection to water resources downstream.	**6**	**5**	**11**

Prioritization Statements	LGU Votes	Agency Votes	Total Votes
Identify ideal locations for flood control structures that include multifunctional design (buffer strips, side water inlets and dikes to ditches and waterways, floodwater retention structures such as retention ponds, dams, and diversions).	**6**	**2**	**8**
Assure long-term maintenance of multi-purpose flood control structures	**4**	**1**	**5**
Promote infiltration, retention, extended detention practices in new and existing urban developments based on current stormwater best management practices.	**1**	**1**	**2**
Drainage System Management			
Utilize information collected from the drainage ditch inventories to prioritize and install side water inlets and buffer strips to ensure adequate support of agriculture without negative downstream ecologial and economic impacts.	**15**	**9**	**24**
Retrofit or install new subsurface drainage using current conservation drainage practices.	**5**	**9**	**14**
Flood Damage Reduction			
Reduce the risk of flood damage in accordance with the 20% Red River Basin Commission's Long Term Flood Solutions and Technical Paper #11.	**10**	**8**	**18**
Reduce flood flows and breakout flows to reduce damages to local communities, infrastructure, rural homes, and agricultural fields.	**5**	**10**	**15**
Habitat			
Protect, restore, and enhance grasslands and wetlands with special emphasis on prairie core. areas and corridor complexes.	**8**	**5**	**13**
Protect or restore aquatic habitat of priority reaches.	**6**	**5**	**11**
Identify areas that provide both unique ecological values and recreational opportunities and develop an implementation and management plan.	**3**	**3**	**6**
Restore aquatic habitat of other reaches where feasible.	**1**	**0**	**1**
Restore longitudinal connectivity of priority reaches.	**0**	**1**	**1**
Expand aquatic and terrestrial non-native and invasive species control programs.	**1**	**1**	**2**
Shoreland and Riparian Management			
Restore or enhance quality vegetated buffers adjacent to natural, altered and artificial watercourses and wetlands.	**10**	**10**	**20**
Protect riparian corridors with existing quality vegetated buffers	**7**	**5**	**12**

Prioritization Statements	LGU Votes	Agency Votes	Total Votes
Groundwater Protection			
Maintain a safe and adequate drinking water supply for residents in order to protect the public's health, safety and general welfare of the community.	**11**	**5**	**16**
Protect Drinking Water Supply Management Areas (DWSMAs). Special consideration will be given for DWSMAs with a moderate or high vulnerability	**4**	**5**	**9**
Implement strategies to conserve ground water supply quality	**3**	**2**	**5**
Implement strategies to conserve ground water supply quantity	**2**	**0**	**2**
Groundwater appropriations do not adversely impact fish habitat, fens, other groundwater-dependent surface water features, or other groundwater-dependent biological communities	**0**	**2**	**2**
Work collaboratively with public water suppliers to implement their Wellhead Protection Plans.	**0**	**1**	**1**
Conduct sub subsurface sewage treatment system (SSTS) inventory and upgrades	**1**	**0**	**1**
Source Water Protection			
Maintain a safe and adequate drinking water supply for residents in order to protect the public's health, safety and general welfare of the community.	**11**	**9**	**20**
Protect Thief River Falls Source Water Assessment Area (SWAA)	**7**	**5**	**12**
Work collaboratively with Thief River Falls public water supplier in managing the SWAA	**4**	**3**	**7**
Protect surface water quality and quantity of East Grand Forks drinking water supply.	**0**	**1**	**1**

Appendix I

PTMApp Tool Description

Appendix I: PTMApp

TOOL DESCRIPTION

The Prioritization, Targeting and Measuring Water Quality Improvement Application, or PTMApp, was developed for the state of Minnesota as an operational tool for prioritizing subwatersheds and targeting fields for the implementation of nonpoint source Best Management Practices (BMPs) and Conservation Practices (CPs) based on water quality. It was also intended to compare and quantify the effectiveness of BMPs and CVs in reducing nutrient and sediment loads.

PTMApp was not designed to replace hydrologic, hydraulic or water quality modeling. It is principally designed to be a prioritization tool in that its results allow a relative comparison between subwatershed loading and BMP treatment efficacy and costs. It uses readily available GIS data, a 10-year storm hydrograph, the Revised Universal Soil Loss Equation and generalized treatment equations by mechanism (not specific BMP) over a user-defined gridded landscape. Each cell of the landscape can receive and export runoff and pollutant load for routing purposes. Although it attempts to simulate a distributed, physically-based model, it does not calculate runoff dynamically using physical laws. Therefore, its principle utility is in siting specific types of BMPs based on suitability and estimating their relative treatment potential in terms of the cost per unit of load reduction. It is recommended that each subwatershed analyzed in PTMApp be calibrated with monitoring data, or calibrated modeling results from a refined hydrologic model, for hydrologic parameters then for water quality. This will empower the watershed manager to provide more accurate measurable goals related to any estimation of the total number of BMPs needed to meet point-source Waste Load Allocations and non-point source Load Allocations.

Detailed information describing PTMApp's development, modeling assumptions and calculations can be found at http://www.rrbdin.org/prioritize-target-measure-application-ptmapp.

PTMApp is comprised of two components: 1) a GIS Toolbar that performs calculations on watershed runoff and pollutant export, BMP suitability, BMP treatment and BMP costs and 2) a web-tool interface for watershed managers to query and view these data. The Red Lake River One Watershed One Plan used the first component to establish a planning-level analysis related to BMP implementation. The analysis stopped short of explicitly specifying strategies comprised of selected locations in the landscape and measuring their effect. The reasoning for this was that until actual landowner agreements are procured and site-specific details are included to inform a higher resolution of design, any attempt at development of such a detailed strategy was more likely to never come to implementation. Rather, this analysis identifies optimal locations in the landscape, and their relative effects (excluding future potential for treatment train effects) on sediment transport. The results empower the watershed manager to direct negotiation efforts with landowners in a targeted and prioritized fashion. Once agreements and implementation occurs, measurement of the effects on sediment transport to resources can be made.

USE OF PTMAPP IN THE RED LAKE RIVER WATERSHED 1W1P PROCESS

For the purposes of developing this plan, PTMApp was used in the following ways:

1. Source loading assessment – To begin to inform the questions of where to locate specific forms of watershed best management practices in the landscape, where not to, what the expected treatment of said practices would be relative to their location as well as their expected costs, subwatershed loading as estimated by PTMApp needed to be calculated. 2X subwatershed pour points were chosen to analyze the landscape for sediment transport as well as for the sake of developing measurable goals. All priority resources are contained within one of these subwatersheds. Therefore, these subwatersheds represent priority management area/zones in that they are the topographic land surface that drains to a previously identified priority resource. A balance was struck between too few subwatersheds to be useful and too many to justify, in relation to analysis assumptions and implementation utility. Given that the PTMApp Web-Tool can be used to query inflow and outflow parameters at any given potential BMP location, this number of subwatersheds was deemed an appropriate level of resolution for planning purposes.

2. Evaluation of practice suitability – Six potential agricultural physical/structural management strategies were considered for the watershed based on their pollutant removal mechanism. Each of these contains several potential BMPs that PTMApp uses to screen GIS data for suitability, referencing NRCS Practice Standard language for each management strategy BMP to form a generalized set of suitability criteria. Given the overwhelming dominance on land cover by agricultural land use, no analysis was performed for urban areas.

   Additional criteria were used to cull obviously less efficient, individual potential management strategies to aid in prioritizing implementation. Any management strategy that PTMApp sized less than 0.25-acres was omitted from the results given the overwhelming number of potential practices across the landscape it identified as well as their relatively low individual reduction in sediment treatment compared to opportunities where larger drainage areas (PTMApp uses a generalized drainage-area-to-management strategy coefficient derived from published coefficients for each of its BMPs). Any management strategy that did not treat greater than 50% of its inflow as similarly discarded, thereby prioritizing opportunities to implement practices where a greater portion of the source of sediment can be treated (see #3). Of the six strategies, source reduction, storage, infiltration and protection provided the greatest value. Bio-infiltration was not deemed suitable for the watershed both by the PTMApp and by stakeholder input.

   The screening metrics described above eliminated 90% of all suitable locations for Protection as a priority management strategy. When no management strategy sizing criteria was applied, but the 50% runoff treatment criteria was kept, more promising results were evident.

   Management strategy suitability is displayed on a drainage area basis, meaning that within each priority management area there are many smaller subwatershed divisions

representing individual drainage areas serviced by any given form of management strategy deemed suitable for the landscape in that area.

3. Estimation of individual management strategy treatment performance – Once sediment export under existing conditions and management strategy suitability were determined, an estimate of potential load reductions by management strategies relative to the receiving resource of concern was made. Though it will be possible to "measure" the expected sediment removal of any given management strategy at its outlet, relative to its drainage area inflow, the true measure of its treatment is best measured at the spill-point to the water resource (not the management strategy outlet) as there is potential for existing treatment between the management strategy and the receiving water body. Existing treatment can occur either naturally in the landscape through sedimentation, filtration or infiltration processes or via constructed management strategy with similar mechanisms of sediment removal.

   PTMApp makes generalizations in order to process the vast amount of data and its high grid resolution when it calculates load reductions. PTMApp estimates load reductions for management strategies by applying a generalized treatment coefficient to inflow loads calculated from published treatment efficiency estimates for various BMPs. Individual BMP performance is not calculated by PTMApp (e.g., the treatment associated solely by nutrient management) but rather by the management strategy is (e.g., the treatment mechanism associated with Source Reduction; Error! Reference source not found.**A.I-1**).

   PTMApp tabulates and displays estimated treatment performance within the same drainage areas defined in the preceding step (management strategy suitability).

4. Cost versus performance evaluation – Lastly, the relative costs associated with each management strategy in order to generate the means to compare the value of management strategies relative to each other via a standardized metric (dollars per ton of sediment reduction at downstream priority resource). PTMApp assigns a generalized cost for each management strategy via published costs per unit area for each of their BMPs.

Table I-1. Best Management Practices for each PTMApp management strategy considered for the Red Lake River One Watershed One Plan

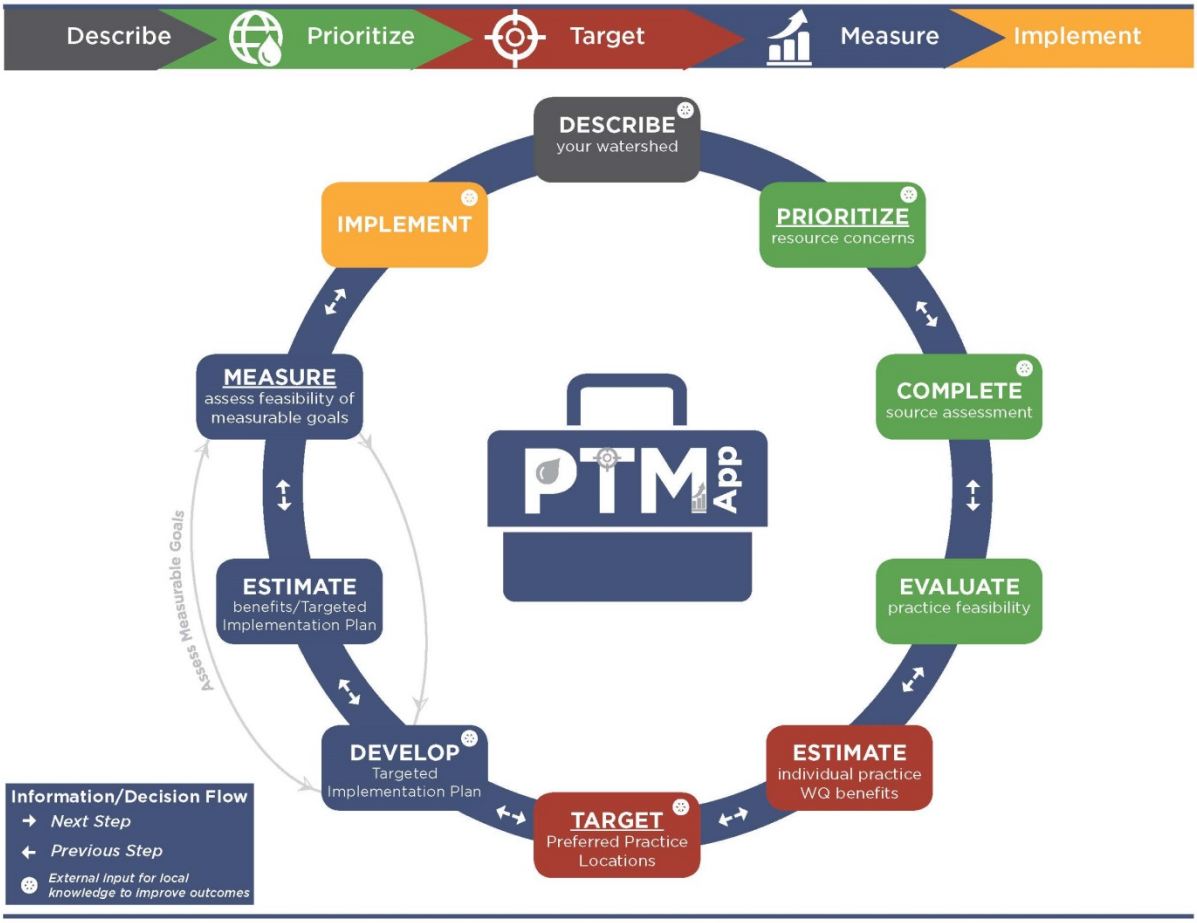
PTMApp Management Strategy	Best Management Practice
Source (Load) Reduction	• Conservation Tillage • Contour Farming • Forage and Biomass Planting • Irrigation Water Management • Nutrient Management • Prescribed Grazing • Rotational Grazing
Storage	• Alternative Tile Intake - Perforated Riser Intake • Constructed Wetlands • Culvert Sizing • Dam • Drainage Water Management • Pond for Water Use • Sediment Basin • Storm Water Retention Basins • Structure for Water Control • Water and Sediment Control Basin • Water Reuse • Wetland Creation • Wetland Restoration
Infiltration	• Alternative Tile Intake - Dense Pattern Tiling • Infiltration Trench • Lined Waterway or Outlet • Multi-Stage Ditch • Strip Cropping
Filtration	• Alternative Tile Intake - Gravel Inlet • Alternative Tile Intake - Blind Intake • Alternative Tile Intake - Perforated Riser Intake • Conservation Cover • Contour Buffer Strips • Cover Crop • Filter Strips • Grassed Waterway and Swales • Riparian Forest Buffer • Riparian Herbaceous Cover • Terrace
Protection	• Critical Area Planting • Grade Stabilization Structure • Channel Bed & Stream Channel Stabilization • Streambank and Shoreline Protection • Tree/Shrub Establishment

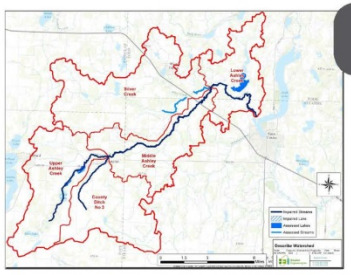
PTMApp Management Strategy	Best Management Practice
Bio-filtration	• Bioretention Basin • Saturated Buffer

PTMApp Products and Business Workflow

The Prioritize, Target, Measure Application (PTMApp) is an innovative new tool that will help users with aspects of surface water quality planning from describing the watershed to developing implementation plans. Learn more about how you can use the application to improve every day decisions for more accurate results.

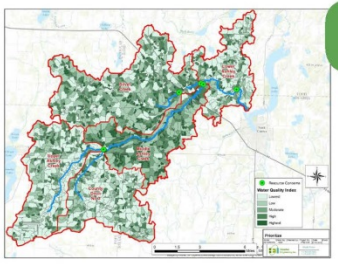
Available for free download: www.rrbdin.org/prioritize-target-measure-application-ptmapp





DESCRIBE your watershed

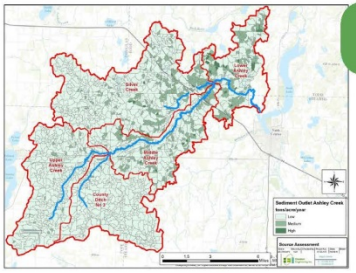
Identify and describe important resources, features, and factors associated with your watershed. PTMApp contains a pre-packaged publicly available watershed data set to the boundary of your watershed. This simplifies the process of gathering and summarizing GIS and resource data needed for your watershed. Data from PTMApp can help visualize and summarize the number of impaired waters and assessed waters in the study area.



PRIORITIZE resource concerns

Establish the relative importance of resources within the area you manage. Lakes, streams and wetlands are frequently potential resource concerns included in prioritization processes. Use PTMApp products in conjunction with other models and Zonation to help prioritize resource concerns. PTMApp can help select resources that are a priority and locations where management actions should be taken.

Continued ▶

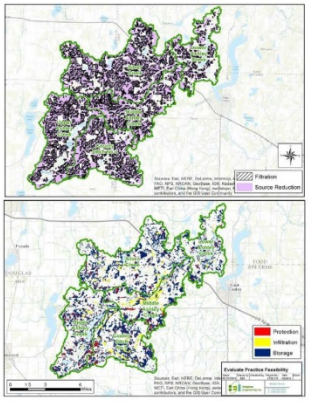


COMPLETE
source assessment

Identify the magnitude and spatial distribution of potential pollution sources across the landscape. Understand how various parts of the watershed contribute sediment, total phosphorus, and total nitrogen loads to downstream locations including impaired waters. Use PTMApp to identify the highest areas of sediment loading and show the best areas for practices.

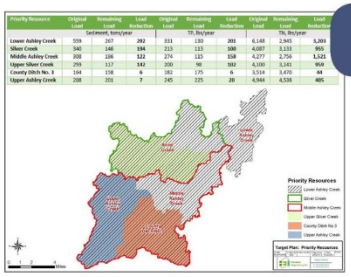
DEVELOP
Targeted Implementation Plan

Specific locations to place practices must also be targeted based on practical and social factors. PTMApp data can incorporate additional information to refine the practices targeted. It is likely that many areas in the watershed may already have numerous Best Management Practices implemented, lack willing landowners, or have benefits beyond water quality that would impact the targeted locations for practices. PTMApp can adjust scenarios to restrict targeting to certain areas.



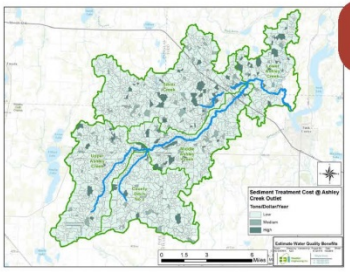
EVALUATE
practice feasibility

The feasibility of placing best management practices (BMPs) on the landscape depends on several factors: the size of contributing drainage area, land slope, and flow regime. Feasibility is often based on technical factors and excludes societal factors. PTMApp creates products to facitilate these conversations: BMP opportunities can be combined with the source assessment data to estimate the "measurable" water quality benefits for implementing the practices.



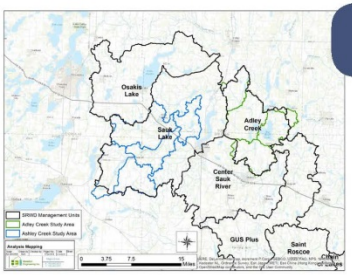
ESTIMATE
benefits/Targeted Implementation Plan

Combined benefits can be compared to a measurable goal. PTMApp can use the combined benefits of many practices to assess the effectiveness of the targeted implementation plan. Annual load reduction estimates can be calculated at each priority resource point within a study area and used to assess progress toward a measurable water quality goal. This information can be used directly within a Targeted Implementation Plan.



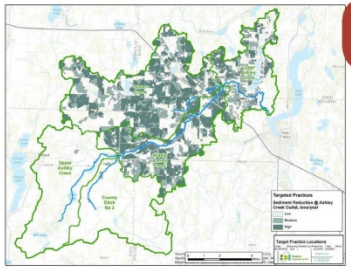
ESTIMATE
individual practice WQ benefits

Selecting specific practices to implement is based on their probable benefits, ranging from pollutants removed or the related cost. PTMApp can help estimate benefits at the location of the practice or resource. Outputs from PTMApp can show areas that provide the most bang for your buck and can help target practice locations to provide the most cost-effective ways to create measurable progress.



MEASURE
assess feasibility of measurable goals

A measurable goal may be the load reduction needed to restore a lake or river reach, or a maximum load to protect a resource. PTMApp can compare the estimated benefits of the Targeted Implementation Plan to water quality goals. Results of this analysis can show the scenarios that will provide the reductions needed to reach your planning goals.



TARGET
preferred practice locations

Once possible BMP locations are identified for feasibility, potential locations must be evaluated for their combined effectiveness. PTMApp can generate data to provide feasible locations for implementing practices that will provide measurable water quality improvements for priority resources. There are a number of factors that might influence preferred practices, including existing practices in place and landowner participation.

IMPLEMENT

By running various scenarios in PTMApp, managers can identify scenarios to implement the best, targeted solutions. PTMApp can analyze various practices and estimate the largest load reductions for specific areas within the watershed. This information helps users implement the best possible practices in the most effective locations.

For more information, contact: Chuck Fritz, Administrator—International Water Institute, 701.388.0861, charles@iwinst.org

Appendix J

RLWD Rules, Regulations, Guidance for Water Management Districts, and SWCD Statute 103C Table of Chapters

RED LAKE WATERSHED DISTRICT

RULES AND GUIDANCE DOCUMENT

Amended Rules

Adopted: August 27, 2015

RED LAKE WATERSHED DISTRICT

DISTRICT RULES
AND GUIDANCE DOCUMENT

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FOR QUESTIONS, COMMENTS, OR FURTHER INFORMATION:
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RED LAKE WATERSHED DISTRICT
DISTRICT RULES

PERMITTING PROCEDURES, FEES AND FINANCIAL ASSURANCES RULE

Adopted August 27, 2015
Effective September 30, 2015

1. POLICY. The District permit requirement is not intended to delay or inhibit development. Rather permits are needed so that the managers are kept informed of planned projects, can advise and in some cases provide assistance, and can ensure that land disturbing activity and development occurs in an orderly manner and in accordance with the overall plan for the District. All interpretations of these rules and permit decisions under these rules will incorporate and be consistent with District purposes set forth in Minnesota Statutes section 103D.201.

2. PERMIT REQUIREMENT. Any person or agency of the State of Minnesota or political subdivision undertaking an activity for which a permit is required by the District rules must first submit a permit application. The application must be submitted on the form provided by the District or the substantial equivalent, and must include all exhibits required by the applicable District rule(s). Application forms are available on the District web site at: www.redlakewatershed.org.

   A. All permit applications must bear the original signature of the landowner.

   B. No land-disturbing activity to which a District permit requirement applies may be commenced prior to receiving authority from the District, its administrator or staff.

   C. Permit decisions will be made by the Board of Managers, except as specified in 3. PERMIT decisions may be delegated by the Board of Managers to staff or the District administrator for decision after consultation and review by the Board member representing that particular area of the District. If a permit is approved by staff or administrator, the permit will still be approved by the Board before being issued. The Board will review a staff or administrator permit decision at the applicant's request. Permit decisions may approve or deny an application and may impose reasonable conditions on approval. Conditions may include, consistent with the rules, requirements for financial assurances and maintenance agreements or declarations, and may require that these documents be properly executed or recorded before permit issuance.

   D. A permit is valid for one year from the date the permit is approved, with or without conditions, unless specified otherwise or the permit is suspended or revoked.

   E. To request an extension or transfer of a permit, the permittee must notify the District in writing prior to the permit expiration date and provide an explanation for the extension or transfer request. The District may impose different or additional conditions on an extension or deny the extension in the event of a material change in circumstances, except that on the first extension, a permit will not be subject to additional or different requirements solely because of a change in District rules. New or revised rule requirements will not be imposed on an extension of a permit where the permittee has made substantial progress toward completion of the permitted work. If the activities subject to the permit have not substantially commenced, no more than one extension may

be granted. An applicant wishing to continue to pursue a project for which permit approval has expired must reapply for a permit from the District and pay applicable fees.

F. A permittee may transfer a permit to another party only upon approval of the District, which will be granted if:

1) the proposed transferee agrees in writing to assume responsibility for compliance with all terms, conditions and obligations of the permit as issued;
2) there are no pending violations of the permit or conditions of approval; and
3) the proposed transferee has provided any required financial assurance necessary to secure performance of the permit.

The District may impose different or additional conditions on the transfer of a permit or deny the transfer if it finds that the proposed transferee has not demonstrated the ability to perform the work under the terms of the permit as issued. Permit transfer does not extend the permit term. The District may suspend or revoke a permit issued under these rules wherever the permit is issued on the basis of incorrect information supplied to the District by the applicant,

G. A permit applicant consents to entry and inspection of the subject property by the District and its authorized agents at reasonable times as necessary to evaluate the permit application or determine compliance with the requirements of a District permit or rule(s).

H. A District permit is permissive. Obtaining a permit from the District does not relieve the applicant from responsibility to comply with any procedures or approvals that may be required by Minnesota Statutes chapter 103E or any other rules, regulations, requirements or standards of any applicable federal, state, county, township, local government or subdivision thereof, or local agency.

I. The District further requires as a condition of all permits that they be notified when said permitted work is completed.

3. DISTRICT WIDE PERMITS. The District may issue District-wide permits, approving certain routine activities or specific classes of projects where a standard design has been approved by the District, as long as the work is conducted in compliance with applicable District-wide rule requirements.

A. Each District-wide permit activity or project classification will be subject to such specific requirements as the Board may establish.

B. A hearing will be held before any District-wide permit activities or project classification are issued or established.

4. RECONSIDERATION.

A. Before a permit decision is final for the purpose of appeal under Minnesota Statutes §103D.537, an applicant may request that the Board of Managers reconsider its decision. The applicant may submit a notice of reconsideration on a form provided by the District that includes concurrence in an extension of the time for District permit action under Minnesota Statutes §15.99. The notice must be submitted within 10 days of the permit

decision and at least one day before the date by which a permit decision must be rendered under §15.99. Within 10 days of submitting the notice, the applicant must in writing enumerate for the District the specific findings or conditions for which reconsideration is requested, along with any additional submittals or argument supporting applicant's request.

B. The District will give the applicant due notice of when the Board of Managers will reconsider the permit decision. The Board of Managers will adopt findings on reconsideration. The District will not take longer than 120 days to issue a final decision including reconsideration, unless a further extension is approved by the applicant.

C. The permit decision is final if an applicant fails to timely file notice under paragraph 4.A, if the applicant otherwise waives the right of reconsideration, or if the Board of Managers is unable to reconsider the permit decision before the expiration of the District's time for review under §15.99. Otherwise, the Board of Managers' decision on reconsideration is the final decision.

D. District costs incurred for reconsideration are permit administration costs for which an applicant may be responsible under Section 5 of this rule.

5. "AFTER THE FACT" PERMIT. An "After The Fact" permit may be considered by the District and granted to an individual, if the "After The Fact" permit submission is the first submission provided to the District by said person or entity for the work that has been done. If a person or entity has had a prior written warning given to them in regard to their failure to follow the permitting rule requirements, a $500.00 late filing fee shall be assessed against said person or entity for the "After The Fact" permit submission. Said late filing fee assessment is in addition to any other conditions or requirements that may ordered by the District in regard to repair or restoration of non-permitted work by said persons or entity in regard to an approval or disapproval of an "After The Fact" permit application. In addition to the remedies provided in Minnesota Statute 103D.545 and other remedies provided for in these rules, in those instances where work has been performed before a permit has been approved, the District may require that the property be returned to its original condition before consideration of the "After The Fact" permit application. The District may also require the applicant to pay actual engineering and attorney's fees, allowed by law, incurred by the District in dealing with the un-permitted work.

6. FINANCIAL ASSURANCE. The managers, at their discretion, may require an applicant to file a bond, letter of credit or other escrow deposit in a form approved by the District as a condition of permit issuance. The amount of the financial assurance required will be set in accordance with a schedule established and maintained the Board of Managers by resolution. When the permitted activities are certified as having been completed in compliance with the District permit and rules, the financial assurance will be released.

A. If the District determines that the permitted activities have not been completed in compliance with the permit and District rules, the Board of Managers may determine that the assurance is forfeited and the District may use the funds to take such actions the District deems necessary to bring the subject property into compliance with the permit and District rules, to prevent or mitigate harm to protected resources or other property, to abate or restore damages, or otherwise to ensure conditions in compliance with an applicable District permit and/or the District rules. If financial assurance funds prove insufficient to complete necessary work, the District may complete the work and assess the permit holder and/or property owner for any excess costs.

B. No financial assurance will be required of any agency of the United States or of any governmental unit or political subdivision of the State of Minnesota. The District may require that the District be named as a beneficiary in the financial assurance of the agency's contractor.

PERMITTING PROCEDURES, FEES AND FINANCIAL ASSURANCES

Guidance to District Rule

The Permitting Procedures, Fees and Financial Assurances District Rule sets forth the basic process for property owners to apply for watershed district permits and for district processing of applications. These procedures are intended to assure that the District's process is fair, thorough, and effective.

A. Policy

The policy statement at section 1 of the rule states that the District's regulatory program is intended to balance two interests. First, the District has an interest, and indeed a statutory mandate - Minnesota Statutes §103D.341 - to reasonably regulate and monitor activities within its boundaries that may affect water resources. Second, it wishes to do so without unnecessary burdens on those who wish to make use of their property responsibly. A District and its staff will keep both of these interests in mind in carrying out its regulatory program.

B. Application Submittal

Key elements of the rule for application submittal, at section 2, are as follows:

- The rule states explicitly that activity subject to District rules may not occur until a permit has been applied for and issued or authority given by the District to proceed.

- The landowner must sign the application form. The applicant and permittee should always be the party who is indicated in the county land records as the owner of the property on which the activity is to occur. If another party (such as a contractor or intended property buyer) is the District's contact, it should be identified as the agent for the landowner and the District should document its authority to represent the landowner. This insures: (a) that any activity pursuant to a District permit occurs with the knowledge of the landowner and (b) that if compliance action is necessary, the District or the contractor will have access to the property.

- The application must be made on a form supplied by the District. State law (Minnesota Statute §15.99) stipulates that once an application is submitted, the District must approve or deny the application within a specified time frame (60 days) or else the permit is deemed granted. Therefore it is important that an application be clearly identified as an application, and not, for example, merely a pre-application inquiry. The time limit in Minnesota Statute §15.99 begins upon the District's receipt of a written request containing all information required by law or by a previously adopted rule, ordinance, or policy of the District, including the applicable application fee. If the District receives a written request that does not contain all required information, the 60-day limit starts over only if the District sends written notice within 15 business days of receipt of the request telling the requester what information is missing. Additional information associated with an incomplete application is available for review per Minn. Stat. §15.99.

- When a landowner submits an application, it operates as a grant of permission for the District to enter the property. Entry typically will be needed for the District to evaluate the permit application and, once a permit is issued, to monitor activity for permit compliance. The watershed law (Minnesota Statutes §103D.335, subdivision 14) already authorizes the District to enter lands "to make surveys and investigations to accomplish the purposes of the watershed district." This

appears to give the District adequate legal authority to enter private property, outside of constitutionally protected areas such as those in or adjacent to homesteads. The rule language is consistent with this authority.

- A permit may be approved subject to certain conditions that must be fulfilled before the permit is valid. (While other conditions may apply to the manner in which the work itself is conducted after a permit is issued). The District rule states that a permit extends for one year after permit approval and/or issuance. To state it another way, all activity on the land that is subject to the permit (not including subsequent ongoing maintenance) must be completed within a year. This means that it is the permittee's burden to, as soon as possible, meet any conditions that must be fulfilled before permit issuance. This prevents the situation wherein an approved permit is indefinitely open because the permittee has never fulfilled such pre-conditions and the permit has never actually issued.

C. Permit Extension and Transfer

However, because it may take time for pre-issuance conditions to be met, and because even without such conditions a project may take more than a year to complete, the District rules include a process for a permit to be extended. An applicant must request extension before the permit has expired. An extension presents a situation where there is a need for balancing of interests as described earlier. On the one hand, once a District has evaluated an application and determined that proposed work can be done in compliance with the District's rules, a landowner should be able to complete the work without unexpected new costs or barriers. On the other hand, the District does not want land in a disturbed state indefinitely and, as an administrative matter, does not want a permit open indefinitely. Further, because the District's rules may evolve over time to reflect new knowledge and policies, the District has an interest in limiting the extent to which future land disturbance is "grandfathered" under old rules and does not have to meet new standards.

The model permit extension terms balance these considerations as follows:

- A permit may be extended for an indefinite number of years, at the District's discretion, provided the work has been "substantially commenced." However, if the work has not been substantially commenced by the end of the second permit year (two years), it may not be extended and the landowner will need to make a new application.

- The District may deny or place new conditions on an extended permit for a "material change in circumstances." This allows the District to ensure that the permit continues to protect water resources if there is new knowledge or information relevant to the work since the permit was approved or last extended. The term "material" is intended to give some protection to the landowner, and means that the District will not change the "rules of the game" unless the change is both significant and relevant.

- Further, on the first extension, a change in the District's rules occurring since permit approval will not count as a "material" change. This insulates a permittee from a change in the rules for a two-year period of time after a permit is approved. If a permittee seeks a second extension and the District rules have changed in the interim, the District may apply new conditions as needed for the work to conform to the new rules.

- However, once the permittee has made "substantial progress" on the work, a request for permit extension will not be subject to a rule change occurring since permit approval or the prior extension.

Similarly, the District rule allows for a permittee to transfer the permit to a third party. It is advised that the permit always "runs with the land," so the typical reason for a permit to be transferred is because the property is being conveyed. The general principle that the rule reflects is that permit transfer should not be burdened. However, the rule conditions this principle on the following:

- The transferee, in writing, must assume all permit obligations. This avoids the situation where a permittee is excused from permit obligations and ceases to have authority over the land, but the new landowner disclaims knowledge of the permit responsibilities.

- At the time of permit transfer, the work must comply with the permit. First, it is important to document that the site was in compliance when a permit transferee assumes compliance responsibility. This precludes the transferee's later claim that the site was non-compliant on the earlier permittee's watch, and that the transferee was unaware of or should not be responsible for it. Also, practically speaking, property transfer is an effective moment to require that site condition be corrected, as it will be made a condition of sale.

- If the District holds a financial assurance, it will need a substitute assurance from the permit transferee and will return the existing one to the transferor permittee.

Finally, the District rule allows the District to deny or impose conditions on a permit transfer if it has doubts about the proposed transferee that are relevant to whether the transferee can perform the work in compliance with the permit. This clause probably won't apply very often, but gives the District the ability to exercise its judgment if certain work is sensitive or the proposed transferee has been shown to be irresponsible in the past. The District will have to decide what is sufficient evidence to support special conditions in this circumstance.

D. Standards Without Need for Permit Process

The District rule, at section 3, creates the authority for a District to issue what are termed "District-wide permits." A District-wide permit can be an efficient mechanism for a District to impose standards on a certain type of activity without requiring everyone performing that activity to navigate the ordinary permit process. Typically this would apply to a class of activity that does not create a large risk of water resource impact and that, because it is simple or straightforward, does not generally require project-specific evaluation and project-specific conditions.

A District-wide permit may allow the District to do three things: (a) apply a set of standard conditions to the defined activity sufficient to provide basic necessary water resource protection (for example, if the activity involves minor land disturbance, the general permit may require basic erosion and sediment control); (b) make a record of where in the watershed the work is occurring, allowing for the work to be monitored as necessary and also giving the District information about cumulative effects; and (c) exercise jurisdiction over the work in the event a particular case does create a risk of water resource harm.

E. Reconsideration

At section 4, the District rule includes a process for an applicant to ask the board of managers to reconsider a District permit decision. This reconsideration is intended as a requirement before the applicant may appeal the decision to a court under Minnesota Statutes §103D.537.

If an applicant challenges a permit action, the District will always be in the strongest position to defend its decision if there are detailed findings to support a permit denial, or to support conditions included in a permit approval. The United States Supreme Court underscored this point in its decision in *Koontz v St. Johns River Water Management District*, U.S. No. 11-1447; 570 U.S. (2013). The Court held that land-use agencies imposing conditions on the issuance of development permits must have a rational relationship and rough proportionality with the impacts of the proposed development.

Because most permit actions are not contested, it doesn't make sense for every such action to rest on extensive staff or consultant work and detailed findings. The reconsideration process is intended to allow for the District to devote the resources to such efforts only as to those aspects of a permit that are in fact contested. The District rule requires an applicant to give a District fair notice of its objection to the denial or conditions, and ensures that the applicant has a full opportunity to address the board of managers in that regard. The District rule also provides that a District may recover its additional permit review costs incurred in the reconsideration process.

This process must be carefully managed so that the District does not violate Minnesota Statutes §15.99, which as noted places a strict deadline on a District's final permit decision. The District rule states that if the reconsideration process cannot be completed within the section 15.99 (120 days) time frame, then the applicant is not required to complete the reconsideration step before exercising its appeal right. It is especially important for Districts to manage the permit process so that decisions are timely within these deadlines, and adequate time is anticipated for reconsideration of contentious permit conditions.

F. Permit Fee

Minnesota Statutes §103D.345, subdivision 2, states that a watershed district may require a permit fee that covers the actual cost for the District to process a permit application and then to monitor compliance with the issued permit. This includes staff and consultant costs (including attorney costs, as allowed by law) and related administrative costs. At section 5, the rule basically incorporates the statutory language. However if all rules are followed by the applicant while applying for a District permit, all fees will be waived and there will be no charge for the permit.

G. Financial Assurance

Section 6 of the district rule incorporates the Minnesota Statutes §103D.345, subdivision 4, authority given to watershed districts to require that a permittee give a bond to ensure its performance under the permit. The District rule uses the term "financial assurance" rather than "bond" to allow a permittee to use other means of assurance including letters of credit and cash escrows. As is recommended for the permit fee, the required amount of financial assurance for a particular type and scale of project would be set in a schedule that could be reviewed and adjusted by the board of managers as needed, without a formal rulemaking.

The rule further sets forth fairly straightforward terms for how the assurance will be used by the District, the enforcement costs that the assurance may be used to fund, and the release and return of unused funds once the work is completed in accordance with the permit terms. The rule explicitly states that if District costs exceed the amount of a financial assurance, the permittee will be responsible to reimburse for those excess costs. The District would have to pursue such a claim by an independent legal action, if necessary.

The rule provides that a financial assurance will not be required if the permittee is a federal, state or local unit of government. The watershed law does not specifically exempt governmental agencies from the District's authority to require a financial assurance. However, the practice of watershed districts

generally is not to impose such a requirement. It is reasoned that public permittees, in general, are more reliable in meeting permit requirements and that where a particular permittee is not, it remains accessible and is not going to disappear or go into bankruptcy. Further, the cost of a bond or letter of credit would just be an additional taxpayer cost. Notwithstanding, the rule states that if the public permittee requires a bond of its contractor, the District is to be named a beneficiary. The reasoning here is that this gives protection to the District without measurable added cost.

H. Permit Approval Authority

Finally, section 2 of the District rule states that the board of managers will decide permits, except as may be delegated to the administrator or staff. A district board of managers may be quite comfortable delegating the authority for permit decisions to its administrator or staff for simpler permits or those likely to be less controversial. Allowing the administrator or staff to approve certain permits reduces the time and cost for applicants and frees the board of managers agenda for other matters. The delegation would occur by a board resolution that defines the limits of the delegation.

With the reconsideration process at section 4, if a permittee objects to a permit decision of the administrator or staff, it will come before the board for review. A district can include other procedures in its rules, or in the delegation resolution, that would, for example, allow a board member or an interested member of the public other than the applicant to ask that the board consider an application in a given instance.

RED LAKE WATERSHED DISTRICT
RULES AND REGULATIONS

SURFACE DRAINAGE AND FLOOD MITIGATION

Adopted August 27, 2015
Effective September 30, 2015

DEFINITIONS

Board of Managers shall mean Board of Managers of the Red Lake Watershed District

District shall mean the Red Lake Watershed District

Dike shall mean a bank or mound of earth, berm or obstruction that is built or placed in a manner which will affect the flow of water and especially to protect an area from flooding.

Drainage Way shall mean a natural or artificial channel which provides a course for the flow of water, whether that flow be continuous or intermittent.

Flood Mitigation shall mean managing and control of flood water movement, such as redirecting flood run-off through the use of floodwalls and flood gates, rather than trying to prevent floods altogether.

Improve has the meaning set forth at Minnesota Statutes §103E.215, subdivision 2, which states that improvement means tiling, enlarging, extending, straightening, or deepening of an established and constructed drainage system.

Managers shall means the Red Lake Watershed District Board of Managers

Private Drainage Way shall mean a drainage way other than a public drainage way, which includes but is not limited to private tile drainage and surface drainage systems constructed along roadways.

Public or Legal Drainage Way shall mean a drainage way under the jurisdiction of the drainage authority pursuant to Minnesota Statutes chapter 103E.

Surface Drainage shall mean removal of surface water by development of the slope of the land utilizing systems of drains to carry away the surplus water.

Tile Drainage shall mean an agriculture practice that removes excess water from soil subsurface.

1. POLICY. It is the policy of the Board of Managers to promote the use of the waters and related resources within the District in a provident and orderly manner to improve the general welfare and public health for the benefit of the District's present and future residents. Further, it is the policy of the Board of Managers to regulate new construction, improvement, repair and maintenance of public and private drainage ways for the following purposes:

A. To preserve the capacities of drainage systems to accommodate future needs.

B. To improve water quality and minimize localized flooding.

C. To minimize the loss of drainage capacity.

D. To avoid drainage conditions that cause or aggravate erosion or sedimentation of downstream drainage ways or waterbodies.

E. To ensure that parties responsible for accumulation of debris, soil and sediment in drainage ways maintain those drainage ways.

2. REGULATION

A. A permit must be obtained from the District before undertaking any of the following:
   i. Excavation of a new private drainage way located within any public right of way;
   ii. Work below the top of bank of an existing public, legal or private drainage way located within any public right of way that disturbs soil or alters the dimensions or hydraulic profile of the channel;
   iii. Constructing, installing or altering a road or utility crossing beneath or over a public or legal drainage way; or
   iv. Constructing, altering or removing a dike which alters the flow of water.

B. Section A notwithstanding, no permit from the District is required:
   i. To construct, establish or perform maintenance on an existing private drainage way, as long as the private drainage way is located outside of any public right of way.
   ii. To repair or replace tile drainage to the same size of tile as previously existed.
   iii. To perform emergency work on any private drainage way located within a public right of way to avoid substantial property damage due to flooding, subsidence or other cause, in which case the District must be notified of the work and the reasons for the emergency action, as soon as possible. If at all possible, efforts to notify the District should be made before performing any emergency work. Any emergency work performed without the District's and governmental roadway authority's permission is performed at the owners own risk.
   iv. To disturb surface soils in the course of ordinary cultivation or other agricultural activity. This may include general field ditching.

C. The requirements of this rule are in addition to other applicable laws and procedures, including those of Minnesota Statutes chapter 103E. This rule is to provide for management of waters in the public interest and does not displace in whole or part any private legal rights a property owner or other person may have with respect to the use and drainage of waters.

D. A contractor or equipment operator is responsible to ascertain whether a permit is required by this rule and, if so, that it has been obtained.

3. SURFACE DRAINAGE. The following criteria apply to applications under this rule other than those for the construction, alteration or removal of a dike:

A. An applicant may not dispose of or alter the flow of surface water so as to unreasonably burden another landowner with surface flow.

B. Surface water will not be artificially directed from upper land to and across lower land without adequate provision on the lower land for its passage.

C. Surface water will not be artificially directed into a legal drainage system from land not assessed to that system unless express authority from the drainage authority is obtained as defined under Minnesota Statutes 103E.401.

D. Temporary storage and retention basins on the parcel or parcels proposed to be drained will be used to the extent feasible for upstream storage and to maintain peak flows, prevent erosion and avoid increased demand on public drainage systems.

E. An applicant shall control erosion and downstream siltation by the following means:
   i. All work involving exposed or stockpiled soil or materials subject to erosion will conform to an erosion and sediment control plan approved by the District.
   ii. Open drainage ways will be stabilized with vegetation above the low water mark or other best management practices to reduce channel erosion.
   iii. To reduce sediment transport, where feasible drainage will be discharged through marsh lands, swamps, retention basins or other treatment facilities prior to release into the receiving public water. Where feasible, a retention basin will overflow to a wide, shallow grassed waterway.
   iv. Drainage ways will be constructed with side slopes designed in accordance with proper engineering practice to minimize erosion, giving due consideration to the intended capacity of the drainage way; its depth, width and elevation; and the character of the soils to be drained.
   v. Water inlets, culvert openings and bridge approaches must have adequate shoulder and bank protection to minimize land and soil erosion.
   vi. Channels and outfalls must be designed to be stable.
   vii. Consideration for establishment of a grass filter strip 16.5 feet in width where possible and maintained on each side of a new private drainage way and on each side of an existing private drainage way which is subject to work for which a permit is required by this rule.

F. The proposed activity may not adversely affect downstream water quality or quantity.

4. DIKES. The following criteria apply to the construction, alteration or removal of a dike:

A. The dike may not unreasonably restrict flow onto down gradient property.

B. The dike may not be constructed or maintained within the 100-year floodplain unless plans and specifications, signed by a registered engineer, are submitted showing that:

i. The work will not impede 100-year flood flows outside of the delineated retention area, or raise the 100-year flood level or increase flood peak downstream;
ii. Overflow sections are designed to handle overtopping during major floods without significant erosion or risk of failure and without sandbagging or other manual measures before or during a flood; and
iii. The capacity of pumping facilities to remove surface water stored behind a dike is consistent with Minnesota Hydrology Guide criteria.

C. Operational procedures must prohibit pumping when the agricultural dike is overtopped during a rain or snow-melt event until downstream flood peaks have occurred.

D. Outlet drainage must be sized to the applicable capacity in the Minnesota Hydrology Guide (Curve 1) for agricultural drainages, or other technical specifications established by the District.

E. A permit to construct or maintain an agricultural dike will be conditioned on the applicant's granting the District the right in perpetuity to:
i. Enter onto property to assure landowner has installed and is maintaining traps/gates to restrict or eliminate outflow from the diked area during and after overtopping flood events; and
ii. Enter on the subject property to inspect traps/gates during and after an overtopping flood event.

5. EXHIBITS. The following exhibits may be requested to accompany the permit application. Two copies, (standard paper size of 8.5 inches by 11 inches), which include:

A. Map showing location of project and tributary area.

B. Plans and specifications for the project.

C. Existing and proposed cross sections and profile of affected area.

D. Description of bridges or culverts required.

E. List of owners of properties benefitted or affected by the proposed work.

F. Such other submittals as the District reasonably may require to evaluate whether the proposed activity meets the standards of this rule.

SURFACE DRAINAGE AND FLOOD MITIGATION

Guidance to District Rule

The Surface Drainage and Flood Mitigation district rule identifies the changes to surface water flows that will require a permit from the watershed district, and sets forth the standards it will apply in order to determine whether those changes are permitted. A watershed district's consideration of this district rule in particular will benefit from the district engineer's advice to assure that critical water management concerns in the local watershed are addressed.

A. Policy

The policy statement at section 1 serves several purposes. First, it communicates to property owners why the watershed district is choosing to regulate surface drainage and assists those owners in designing their proposed surface drainage alterations in a way that will be consistent with district goals. Second, when the board of managers must exercise judgment during permitting decisions, it will refer to the policy statement in order to align its decisions with the stated policies. Third, in the event of a legal challenge to a permit decision, the underlying policies of the rule will guide the judge. If the permit decision aligns with those policies, the judge will give greater deference to the board's decision and the district's legal position will be stronger.

The proposed policies reflect the following goals for surface drainage management:

- To preserve capacity in public drainage systems into which lands assessed benefits for those systems discharge. Note that the drainage law (Minnesota Statutes chapter 103E) does not control the volume that may flow from assessed benefited lands into the system or the rate of that flow. However, a watershed district under its regulatory authority (Minnesota Statutes chapter 103D) may regulate both volume and peak flow off of lands benefited into a drainage system to provide drainage benefits equitably to all lands paying into the system.

- To limit the movement of soils into channels and preserve the integrity of channel banks, in order to limit maintenance costs for public ditch systems and limit the transport of sediment, nutrients and other pollutants to downstream receiving waters.

- To protect the structural integrity of public drainage systems from destabilizing hydraulic forces.

- To prevent unassessed benefited lands from draining into public or private drainageway systems, in order to preserve system capacity for those property owners bearing the cost of those systems, and in the interest of equity.

B. Regulation

The regulation section identifies proposed changes to the landscape that require a permit from the watershed district. The separation between those activities that require a permit from those that don't is made with reference to the four policies identified in the preceding section. What this section does is identify those activities that, if not done properly, can cause impacts to public drainage systems and downstream waters that, as the policies spell out, the watershed district is trying to prevent. The goal is to exercise watershed district oversight of those activities while, to the extent possible, avoiding imposing permitting burdens on other activities that don't pose a substantial risk of impact.

In addition, this section strives to define activities that require permits, and those that don't, as precisely as possible. Ambiguity in knowing what does and does not require a permit is a burden on property owners and can be a source of legal conflict. This doesn't mean that all ambiguity can be eliminated, but where possible it should be minimized.

The District rule first describes the activities that require a permit, and then carves out from those descriptions certain exemptions. The District rule sets forth specific descriptions of activities that require a permit. In summary, they include:

- diking.
- Any work in or over a public surface drainage system or within any right of way of a governmental roadway.

The following activities that otherwise would meet one of these criteria are exempted from the permit requirement:

- Ordinary maintenance of a private drainage way.
- Emergency work on a non-public drainageway or channel necessary to avoid significant property damage. The District rule requires advance notice to and approval from the watershed district for work in a private drainage way located within a public right of way. Notice to and approval from the proper governmental roadway entity is also necessary. However, it is recognized that certain situations may arise which require immediate action. In these cases, any emergency work performed without proper notice and approval is done at the owner's own risk.
- Ordinary cultivation or other ordinary agricultural activity.

The District rule contains an explicit reminder that it does not eliminate any other legal requirements or constraints applicable to the proposed work. As regards the drainage code, this means, for example, that a landowner performing work in a public channel may not obstruct flows; that a new outlet into a public system or the connection of unassessed lands is prohibited without drainage authority approval; and that the drainage authority retains all authority under the drainage law to do work within public systems and assess the costs.

The rule also explicitly affirms that it does not displace any private property rights in water flow, or any rights to be protected from such flows. The rule reflects the responsibility of the watershed district to manage surface drainage for the general public benefit. But the District does not act as an arbiter, for example, as between adjacent property owners. So if a property owner excavates a channel or alters their land in a way that affects the flow of water onto adjacent property, property owner may need a permit from the watershed district, but the property owner will be responsible to ensure that they are not infringing on the rights of the adjacent owner by increasing, relocating or diverting flows across the neighboring property.

Finally, this section of the District rule states that a contractor or equipment operator is equally responsible to ensure that there is compliance with the rule. If there is enforcement, this protects a watershed district against claims by a property owner that it wasn't aware of what a contractor was doing, or claims of a contractor that the property owner had assured it that all permits and approvals were in order. It allows a watershed district to look to the property owner, or the party actually doing the work on the land, or both, to restore and remediate the impacts of any unpermitted work. The property owner and the contractor then can sort out responsibility and cost between themselves.

C. Criteria for Surface Drainage Changes

This section applies to all activities subject to permits except for diking and subsurface tile drainage, and states the criteria against which a permit application will be evaluated.

The criteria in the District rule relate back to the policies enumerated in Section 1 of the rule. They are as follows:

- Flows - volume or peak - onto adjacent property may not unreasonably increase.
- Unassessed lands may not be drained into a public system without obtaining express permission from the drainage authority in accordance with 103E.401.
- To the extent reasonable, flows resulting from proposed changes must be retained on-site before discharge, or discharged to off-site retention - natural or artificial - in order to mitigate flow changes and limit downstream sediment transport.
- Erosion and sedimentation in drainage systems will be minimized through a number of means, as feasible:
    - An erosion and sediment control plan must be submitted and approved;
    - Channels must be vegetated above low-water mark;
    - Channel banks must be designed with proper slopes;
    - Hydraulic forces must be assessed and provided for in the design;
    - Grass filter strips establishment should be considered wherever channel work is conducted.
- Finally, there is a general requirement that downstream flows or water quality may not be adversely affected.

The last criterion, in particular, is general, which leaves discretion in the hands of the District. However, risk of impact or adverse effects can be very specific to each particular situation, and this criterion rests on the need for a watershed district to be able to protect surface drainage systems as necessary in the context of each specific set of circumstances.

Note that the procedural rules include a step by which an applicant may ask the board of managers to reconsider a permit decision before it is appealed. Where the board denies a permit, or includes certain conditions in the permit, this reconsideration step is the opportunity for the District, through its engineer, to re-examine the facts of their decision and to closely review their findings about potential impacts.

D. Criteria for Dikes

This section states the criteria against which a permit application for a dike will be evaluated. These criteria, as well, related back to Section 1 and are as follows:

- Flows onto adjacent property may not be diverted to an unreasonable extent.
- Retention may not contribute to an increase in down gradient flood peak, and there must be downstream capacity for any change in the hydrograph of flow.
- The dike structure must be designed so that, without additional stabilizing measures, it will withstand flood conditions without erosion or risk of failure.
- The structure outlet, and basin drawdown pumping capacity, must be sized and designed in accordance with the criteria contained in the Minnesota Hydrology Guide.
- The applicant must submit and follow operational procedures that prohibit drawdown pumping during a flood event until downstream flood peaks have receded.

The District rule also provides that as a condition of a permit, the property owner must grant the watershed district a perpetual right to install, maintain and operate traps or gates to prevent outflows from the diked area during and after flood events that cause the dike to be overtopped.

It is noted that here, too, there will be a need to assess the specific circumstances and to apply some judgment in applying these criteria in each case. Again, the reconsideration step in the procedural rule allows for the level of analysis that is necessary if the District and an applicant do not reach concurrence on a given proposal.

E. Exhibits

This section lists application submittal requirements. The basic submittal requirements that may be requested are: (a) maps and information to locate the project; (b) topographic, elevation, dimensional and flow data necessary to evaluate the hydrologic, hydraulic and flood impact of a proposed change in the landscape; and (c) a listing of potentially affected owners.

A watershed district may require any other submittals that it reasonably needs to evaluate a proposed activity for compliance with the rule criteria. This allows the district to keep its mandatory submittals reasonably limited, and to tailor the submittal burden on an applicant to what is needed in order to evaluate the applicant's specific proposal. This presumes that district staff will work with an applicant to identify necessary submittals. If an applicant fails or refuses to supply what the district requests, the district may be unable to properly evaluate an application, and this may be a legal basis to deny the permit.

Minnesota Statutes §15.99 requires a permitting agency, including a watershed district, to act on a permit application within the time specified in the statute. This time starts to run when the district receives the application, unless within 15 business days of receipt, the district advises the applicant that the application is incomplete. In light of this statute, it always is important that a district promptly review an application and determine whether it is complete. This becomes even more important if the district relies on a "catch-all" provision, since an application that otherwise contains required submittals is complete unless and until the district identifies other information that is necessary.

F. Definitions

This section defines certain terms used in the rule. Specifically, it defines "drainage way" as pertaining only to surface drainage systems, which may include tile portions, and establishes the terminology to distinguish between public and private systems. It also: (a) defines drainage system "improvement" as having the same meaning as under Minnesota Statutes chapter 103E.

RED LAKE WATERSHED DISTRICT
DISTRICT RULE

SUBSURFACE TILE DRAINAGE

Adopted August 27, 2015
Effective September 30, 2015

1. POLICY. It is the policy of the Board of Managers to promote the sound construction and management of subsurface tile drainage systems in order to minimize downstream flooding and maximize soil storage and agricultural productivity.

2. REGULATION

A. No person shall install or construct any non-incidental subsurface tile drainage system, **after the effective date** of adoption of these rules, without obtaining a required permit from the Watershed District.

3. CRITERIA. An application for a permit must meet the following requirements:

A. All subsurface tile drainage systems must protect from erosion and include RLWD approved erosion control measures.

B. All subsurface tile outlets including lift station pumps, must be located out of a legal drainage system and governmental roadway right of way unless approved by District and must be visibly marked.

C. It is recommended that after harvest, tile outlet controls, including lift station pumps, be opened or turned on to remove water from the system unless downstream culverts are freezing.

D. Obtaining a permit from the RLWD Managers does not relieve the applicant from the responsibility of obtaining any other additional authorization or permits required by law. (Ex: NRCS, SWCD, Township, County, State, etc.)

E. Upon completion of the project, "As Built" plans must be provided to the District.

F. Consideration must be made for turning off pumps for short period of times during the summer so maintenance can be performed on public, legal and private drainageways, such as road ditches or private natural field drains.

4. EXHIBITS. The following exhibits may be requested to accompany the permit application. Two copies, (standard paper size of 8.5 inches by 11 inches), which include:

A. Legal description and site map and/or GPS coordinates to accurate scale showing location of all tiles, surface water inlets, outlet(s), lift stations, pumps, and flow control devices;

B. Land area to be tiled (acres);

RED LAKE WATERSHED DISTRICT
DISTRICT RULE

Pursuant to authority granted by Minnesota Statutes section 103D.341

RULE XX
ENFORCEMENT RULE

Adopted August 27, 2015
Effective September 30, 2015

1. MANNER OF ENFORCEMENT. In the event of a violation or threatened violation of a District rule, permit, order or stipulation, or a provision of Minnesota Statutes chapter 103D, the District may take action to prevent, correct or remedy the violation or any harm to water resources resulting from it. Enforcement action includes but is not limited to injunction; action to compel performance, abatement or restoration; and prosecution as a criminal misdemeanor in accordance with Minnesota Statutes sections 103D.545 and 103D.551.

2. INVESTIGATION OF NONCOMPLIANCE. The District's authorized representatives may enter and inspect a property in the watershed to determine the existence of a violation or threatened violation as described in section 1, above.

3. ADMINISTRATIVE COMPLIANCE ORDER. The District may issue a preliminary compliance order without notice or hearing when it finds a violation or threatened violation as described in section 1, above, and that the violation or threatened violation presents a serious threat of adverse effect on water resources. A preliminary compliance order may require that the property owner or responsible contractor cease the land-disturbing activity; apply for an after-the-fact permit; and take corrective or restorative action. A preliminary compliance order is not effective for more than ten days. The Board of Managers by resolution may delegate to District staff the authority to issue preliminary compliance orders.

A. BOARD HEARING. After due notice and a hearing at which evidence may be presented, the Board of Managers shall make findings. If the Board finds a violation as described in section 1, above, it may issue a compliance order of indefinite duration that may require the property owner or responsible contractor to cease land-disturbing activity; apply for an after-the-fact permit; take corrective or restorative action; reimburse the District for costs under Minnesota Statutes section 103D.345, subdivision 2; and/or be subject to any other remedy within the District's authority. A compliance order may supersede a preliminary order or may be issued without a prior preliminary order.

4. LIABILITY FOR ENFORCEMENT COSTS. To the extent provided for by Minnesota Statutes section 103D.345, subdivision 2, a property owner or responsible contractor is liable for investigation and response costs incurred by the District under this rule, including but not limited to the costs to inspect and monitor compliance, engineering and other technical analysis costs, legal fees and costs, and administrative expenses.

5. CONTRACTOR LIABILITY. Any individual, firm, corporation, partnership, association or other legal entity contracting to perform work subject to one or more District rules will be responsible to ascertain that the necessary permit has been obtained and that the work complies with the permit, rules and statutes and any applicable District orders or stipulations. A contractor that, itself or through a subcontractor, engages in an activity constituting a violation or threatened violation under section 1, above, is a

responsible contractor for purposes of this rule.

ENFORCEMENT

Guidance to District Rule

The Enforcement district rule advises property owners and contractors of the steps the watershed district may take to address a violation or threatened violation of a district rule, permit or other binding district requirement.

1. Manner of Enforcement

This paragraph states the scope of watershed district authority to take enforcement action, and the forms that action may take. Largely, it restates §§103D.545 and 103D.551 of the Minnesota Statutes, the two provisions of the watershed law that provide the foundation for district enforcement. In short, watershed districts may bring action to stop or prevent a violation, to require compliance and action to fix the consequences of a violation, to recover enforcement expenditures, and to charge a violation as a criminal misdemeanor. Notably, apart from a small fine that may be imposed for a misdemeanor, watershed districts do not have the authority to impose or recover a financial penalty.

Note that the paragraph refers not only to a violation of a district rule, permit, or other regulatory requirement, but also to a threatened violation. If a threatened violation does not lead to an actual violation, the district would not be entitled to an order requiring the responsible party to take action. However, if the facts are supportive, the District may issue an order, or obtain a court injunction, to stop the action that threatens violation. The proposed text allows for a district, in consultation with its legal counsel, to determine in any given case the available and preferred remedies.

2. Investigation of Noncompliance

This paragraph advises that the district's duly authorized and delegated representatives, without prior notice to or permission of the property owner, may enter land within the watershed to inspect for compliance with district rules, permits and other regulatory requirements. This re-states Minnesota Statutes §103D.335, subdivision 14, which states:

> The managers may enter lands inside or outside the watershed district to make surveys and investigations to accomplish the purposes of the watershed district. The watershed district is liable for actual damages resulting from entry.

The district need not know or even suspect that a violation is occurring, nor is its authority limited to lands on which activity taking place is subject to a district permit. The statute permits entry onto any lands as the district finds appropriate in order to effectively carry out its regulatory function.

Note that the statute gives this authority to "[t]he managers." We believe it is reasonable to read the term "managers" as meaning, more broadly, the district's representatives - managers, staff, contract personnel -

both because the term "managers" is used elsewhere in the watershed law simply to refer to the district as a whole and because, as a matter of common sense and necessity, it is not only the district managers themselves who are in the field performing regulatory inspections and oversight on behalf of the district.

The statutory authority under subdivision 14 to enter private property cannot override the U.S. and Minnesota Constitutions, and therefore is limited by the constraints those documents place on entry. Specifically, except under certain limited circumstances, district representatives cannot enter enclosed structures or outside areas that directly surround a residence and its associated structures (garage, shed, etc.). Also, while the statute authorizes entry without notice to or agreement of the landowner, a district may adopt procedures under which it limits the practice of unannounced entry for reasons such as inspector safety and landowner relations. In implementing its inspection authority, a district should coordinate closely with its legal counsel to establish its inspection procedures and practices.

3. Administrative Compliance Order

Under the watershed law, a district board of managers is given the power to issue orders relating to permits and permit compliance. This authority is implemented in paragraph 4, described further below.

However, a condition that is causing or threatening harm to water resources may need attention immediately, or at least before the board of managers practically can be convened to hear a matter and issue an order. For that reason, it is desirable for district staff to be able to exercise the authority to issue an order at the time a violation is observed.

There are two concerns about staff's issuance of legally binding orders in the field. One is a "due process" concern: that the authority of a public agency to issue a legally binding order without giving the recipient notice and a chance to be heard is legally limited. The second is that the authority to issue orders lies in the board of managers and must be specifically delegated to district staff. Historically, court cases have limited the ability of a public decision-making body to delegate its authority to staff. The law is concerned when, by doing so, the body is transferring its broad judgment and discretion to staff.

The model language attempts to address both of these concerns:

- With respect to the due process concern, the district rule requires the district to find that there is a violation or imminent violation that poses a serious water resource threat. In other words, order authority is to be exercised only when it is necessary to avert an important impact that otherwise would occur if no action could be taken until the managers were able to meet.

  Also, the rule states that a staff order has effect only for ten days. The intent is that a staff order allows for harm to be prevented and the status quo to be maintained, only until the board of managers has a reasonable opportunity to convene and hear the facts with notice to, and participation of, the affected property owner. The "ten days" in the district rule is not a specific legal requirement; a board of managers may choose a different duration based on the frequency of its regular meetings and its ability to convene for a special meeting. However, the longer this period is, the more legally vulnerable the delegation to staff may be. Optimal practice is for the district administrator to coordinate with the board president so that the time and place of the board hearing can be included in the staff order itself.

- Regarding the delegation concern, the rule requires that delegation be accomplished by written resolution of the board. In this resolution, the board should consider spelling out constraints on

staff's authority so that the level of discretion given to staff is only so much as is absolutely necessary to achieve the purpose of the delegation, that is, to protect the resource until the board is able to give notice and hold a hearing. This may include, for example, requiring that an order contain specific findings as to what the violation is, what the actual or threatened impact is, and why that impact is serious. The resolution also may direct that permittee action demanded by the order be only what is necessary to prevent the resource impact until the board has the opportunity to hear the matter.

If a board of managers is not comfortable delegating order authority to its staff, there are options. For example, the district may simply institute a structured procedure for staff to issue a formal document in the nature of a "notice of probable violation" in place of a legally binding order. The notice would identify the apparent violation and impact, and would advise of recommended compliance actions, but would not purport to order that those actions be taken. Instead, it would advise of a compliance hearing by the board of managers and notify that the hearing will occur unless the suggested actions are timely taken. If the responsible party did not agree with staff's determination that there was a violation, it could choose not to take the recommended action, and wait to present its case to the board.

While a watershed district order is legally binding, a district can enforce that order only by going to a state district court judge. To have the strongest legal position in front of the judge, a district is always advised to have an order issued not just by its staff, but by its board of managers. This means that even if staff has issued a field order, the board will want to hold a hearing and issue a superseding order before going to court. Therefore there is not always a great difference between a staff order and a staff notice.

A. Board Hearing

This paragraph provides for a board hearing before a district compliance order (other than a preliminary order) may be issued. Because a district order may impose substantial cost on a property owner or contractor - by delaying work, requiring restoration action or imposing district costs - the law requires that the potential recipient of an order be given notice and an opportunity to appear and present evidence to the board before the board makes findings. The law does not specify how many days' notice must be given, how notice must be given, or the specific procedures that must be afforded at the hearing beyond an "opportunity to be heard." District legal counsel should be consulted on these details, and whether they should be included in the rule language or simply followed as district practice.

The paragraph also makes clear that on the basis of a finding of violation, a board of managers may order any remedy "within the District's authority." These remedies include: (a) a directive to cease and desist until an after-the-fact permit is applied for and issued: (b) a requirement that the responsible party bring the activity into compliance and/or take steps to remediate impacts from a violation; and (c) reimbursement of the district for its costs incurred in compliance monitoring and enforcement. As noted previously, a watershed district cannot impose a monetary penalty. Also, of course, the district cannot itself conduct criminal proceedings; a misdemeanor action would need to be brought in state district court by the proper law enforcement agency.

Finally, the paragraph makes clear that the board has the authority to consider and issue an order, whether or not there is a preliminary, staff-issued field order. If there is not actual or threatened harm to justify a staff order, then the district may simply notice and hold a board compliance hearing. Typically, this will follow staff efforts to work with a violator to secure compliance, but it can occur whenever the board of managers deems appropriate and need not follow informal or formal staff action.

4. Liability for Enforcement Costs

Paragraph 5 of the district rule states that a property owner or responsible contractor will be responsible for district costs to investigate and respond to a violation of a district rule, permit or other regulatory requirement to the extent that Minnesota Statutes §103D.345, subdivision 2, allows. This statute says that a watershed district may charge an "inspection fee." It then states how the fee may be calculated:

> The inspection fee must be used to cover actual costs related to a field inspection. Inspection costs include investigation of the area affected by the proposed activity, analysis of the proposed activity, services of a consultant, and any required subsequent monitoring of the proposed activity. Costs of monitoring an activity authorized by permit may be charged and collected as necessary after issuance of the permit.

Accordingly, if there has been an inspection, then the cost of the inspection, any analysis related to it, and any subsequent monitoring related to it may be recovered from the property owner or other responsible party. It further says that consultant costs related to the inspection, and to subsequent analysis and monitoring, are recoverable costs as well. This would include engineering and other technical consultants, but also may be read to include fees paid to district legal counsel for assistance in evaluating compliance and carrying out enforcement procedures. To recover these costs, it is important for a district to keep careful records of them.

Enforcement may result in a variety of costs to a district - staff hours, administrative and consultant costs, sampling and analysis costs, manager per diems for special meetings, contract costs for restoration work undertaken by the district, and potentially costs for court proceedings. The proposed rule language does not take a position on the precise extent to which each of these falls within the scope of the statute. Each district should determine its position with the advice of district legal counsel (for example, attorney fees for court proceedings may be excluded from the scope of §103D.345, subdivision 2, by virtue of separate treatment in §103D.545, subdivision 3). Note also that in the absence of the authority to impose a fine, a watershed district's ability to require that a responsible party reimburse its costs may be a measurable financial incentive for early compliance.

5. Contractor Liability

The watershed law requires that watershed districts adopt and apply rules governing activities that may injure water resources, but it does not anywhere state who is subject to enforcement in the event a rule, or a permit issued under the rules, is not followed. It is good practice to require the property owner of record to be the named permit applicant, so that the authority to perform the proposed work is established and the district always has an official location where the permittee can be located. Further, in the event of noncompliance, it will be necessary for the property owner to be accountable for the violation to ensure that there is legal access to the property for any compliance work that is needed. In this case, it is reasoned that if a contractor has actually performed the work that does not comply, the property owner has a contract relationship with the contractor that will allow the property owner to demand that the contractor address the violation and hold the property owner harmless for costs.

However, there is nothing in the watershed law that prevents a district from also holding directly accountable the contractor that, itself or through its subcontractor, is responsible for the violation. A district may decide that it will have more leverage to gain compliance if both the property owner and the

contractor are directly subject to district orders and enforcement proceedings. If the district encounters a situation where the property owner appears to be innocent of the violation, holding the contractor responsible as well allows the district to take enforcement action directly against the contractor with minimum imposition on the property owner.

Paragraph 6 establishes that a contractor also is responsible for a violation if it, or its subcontractor, performed the activity constituting the violation. This section defines the term "responsible contractor" as it is used throughout the rule to denote a contractor that may be subject to enforcement.

WATER MANAGEMENT DISTRICTS

Guidelines for Watershed Districts Creating and Implementing Water Management Districts

Purpose

Create Water Management Districts within Watershed District Watershed Management Plans to provide an equitable mechanism for funding targeted and specific watershed "Projects" addressing local resource concerns and priorities.

How Water Management Districts Work

Fee and funding mechanism is developed on the basis of benefitor contribution as it relates to a particular pollution characteristic or to a particular water resource issue. For example, the fee can be based on land contribution of water volume if it is a flooding or water storage issue or it can be based on phosphorus contribution if it is a water quality issue that is being addressed in the "Project".

Principles/Clarifications:

- Water Management Districts and their charge systems must be established under M.S. § 103D.729.
- Water Management District charges may only be used to pay the costs of "Projects" initiated under M.S. §§ 103B.231, 103D.601, 103D.605, or 103D.611.
- Stormwater "Projects" under M.S. § 103D.730 must be initiated and ordered to be implemented through formal hearing and adoption processes.
- The mechanisms and principles of M.S. § 444.075 must be followed for the development of Water Management District charges established through M.S. § 103D.729.
- For Water Management Districts established in perpetuity, Watershed Districts must establish a local appeal process and evaluate the Water Management District in each ten-year plan amendment.

Water Management Districts ***must:***

- Be established only for "Projects" that are **initiated and ordered to be implemented** through formal hearing and adoption processes.

Water Management Districts ***should:***

- Be closely tied to hydrologic boundaries, but may consider ecological, economic, social, geopolitical and land use factors for creation purposes.
- Be defined by an area of "Project" need or benefit.

Water Management Districts ***should not:***

- Contain more area than is reasonably related to the need, purpose, benefit or outcome of the "Project" for which it is established.
- Overlap or cover the entire watershed district, except in unique circumstances.

Water Management District Charges ***should:***

- Be considered as an option to fund "Projects" that are initiated and ordered to be implemented through formal hearing and adoption processes.
- Utilize a contribution basis as the mechanism for fee structures.
- Define the total "Project" amount to be raised, or define the annual cap of charges to be collected.
- Be of defined duration.

Water Management District Charges ***should not:***

- Resemble an ad valorem tax or be based on property values.
- Be collected in anticipation of "Projects" that 'might happen' or for "Projects" not formally established and ordered by the WD managers.

Implementing Water Management Districts and Water Management District Charge Systems - M.S. § 103D.729

Step 1 **Amend Watershed District Plan to create a water management district.**
Amendment must include:
- A description of area to be in the water management district.
- The amount to be raised by charges (total amount is necessary if fixed time for water management district to be in force, otherwise annual maximum (cap) amount if water management district is established in perpetuity).
- The method that will be used to determine the charges.
- The length of time the water management district will be in force (perpetuity is acceptable).

Step 2 **Approval of Plan amendment under M.S. § 103D.411 or as part of a revised Plan under M.S. § 103D.405.**
- Revised Plan, or petition and amendment, sent to BWSR.
- BWSR gives legal notice, and holds hearing if necessary.
- BWSR approves plan or amendment.
- BWSR notifies Watershed District managers, counties, cities and SWCDs.
- Watershed District maintains file of all properties within the water management district.

Step 3 **Watershed District establishes project(s) in the water management district.**
- Projects implemented must be ordered by the Watershed District managers.
- Order for "Project" must specify funding method(s).
- Watershed District must notify counties, cities and towns within the affected area at least 10 days prior to a hearing or decision on "Projects" implemented under this section of statute.

Step 4 **Watershed District refines methodology for computing charges based on final "Project" scope.**

Step 5 **Watershed District determines and sets charges** for all properties within the water management district after identifying scope of "Project" and deciding method(s) of funding "Project".

Step 6 **Watershed District develops collection mechanism.**
- Request county to collect.
- Contract with private vendor (e.g. electric cooperative).
- Billing and collection by Watershed District.

Step 7 **Watershed District establishes a separate revenue fund** for proceeds collected from the fee or stormwater utility charges.

Step 8 **Resolution of Disputes.** Local governments may request BWSR to resolve disputes pursuant to M.S. § 103D.729, Subd. 4, except a local appeal process must be completed first for disputes involving water management districts established in perpetuity.

BWSR Guidelines, December, 2010

The primary authors of this guidance are:
- Julie Blackburn, Assistant Director
- Jim Haertel, Supervisor, Metro Region

This document is available on the BWSR website and may be revised periodically. Check the website for the most current version.
www.bwsr.state.mn.us/planning

For additional information contact:
Travis Germundson, 651-297-4958,
travis.germundson@state.mn.us.

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Memo

To:	Red Lake Watershed District Board of Managers		
From:	Nate Dalager, P.E.	Project:	Plan Amendment – Water Management District
cc:			
Date:	November 10, 2010	Job No:	131515

Re: Plan Amendment - Establishment of a Water Management District for the Thief River Falls Flood Damage Reduction Project

Introduction

Pennington County Ditch #1 (CD 1) has been a source of agricultural and urban flooding problems for years. Since its construction 100 or more years ago, the ditch has routinely flooded out of its banks in spite of cleanouts and culvert replacements. In 2005, the Pennington County Board of Commissioners, Thief River Falls City Council, RLWD, and others requested that HDR Engineering conduct a drainage study and provide a report of findings. Due to funding limitations and procedural uncertainties related to Minnesota (MN) ditch law, no entity was able to advance the project forward until a landowner ditch improvement petition was received by the Red Lake Watershed District (RLWD) in 2009.

In response to the landowner petition, the RLWD has approved the Preliminary Survey Report and Detailed Survey Report in accordance with MN Statute 103E. These reports explain the project in detail and are available for review from the RLWD upon request.

Because of the severity of the flooding problem and the complexity and cost of the proposed CD 1 improvement within the urban environment, the RLWD established the Thief River Falls Flood Damage Reduction (FDR) Project in accordance with MN Statute 103D.605. As part of the funding strategy for the project, the RLWD is hereby proposing to amend Section 7.1.6.2 of its watershed plan in accordance with MN Statute 103D.411 to establish a Water Management District (MN Statute 103D.729) with the purpose of collecting revenue and paying for a portion of the costs of the Thief River Falls Flood Damage Reduction Project. This memo will outline the following as required by the amendment procedure:

- Area included in the Water Management District (WMD)
- The amount of the necessary charges
- The method used to determine the charges
- The length of time that the Water Management District will remain in force

HDR Engineering, Inc. | 324 2nd St. East, Thief River Falls, MN 56701 | Phone (218) 681-6100, Fax (218) 681-6262, www.hdrinc.com

Water Management District Area

The area encompassed by the proposed Water Management District extends from CSAH 8 at the south (upstream) end, to the northern extents of CD 1 outletting into the Red Lake River within the City of Thief River Falls. The outer boundary of the WMD follows property lines, because any property that has partial drainage or protection benefits from the project will be included in the Water Management District. The WMD is approximately 1,070 acres in area and is a mix of agricultural, commercial, industrial, and residential properties. See Figure 1 below for a map of the WMD boundary.

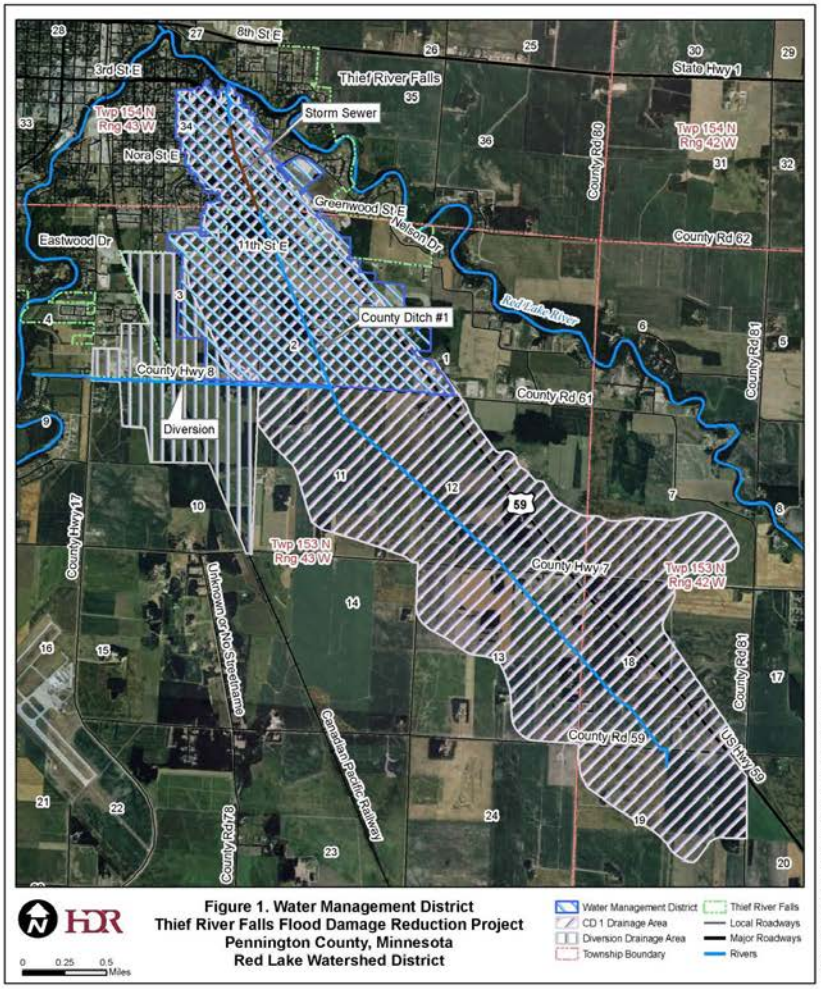

Figure 1. Water Management District
Thief River Falls Flood Damage Reduction Project
Pennington County, Minnesota
Red Lake Watershed District

Amount of Charges

The project has been estimated to cost $3 million, and is broken down into two distinct components:

- ditch improvement; and
- flood damage reduction project

The ditch improvement consists of an improvement of the ditch grade, cross-section, and culverts, and is estimated to cost approximately $1,000,000. The ditch improvement component of the project will be paid for by benefitted landowners as determined by the viewers in the re-determination of benefits process.

The flood damage reduction component is estimated to cost $2,000,000, and consists of a diversion down the CSAH 8/Challenger roadside ditch and the installation of storm sewer through the City, from Greenwood Street to the TH 59/1st St E intersection. The FDR project component will be paid for by contributions from the RLWD, the State of Minnesota FDR program, and the funds that the Water Management District would ultimately collect. The charges collected by the Water Management District for the construction of its portion of the flood damage reduction component shall consist of 30% of all costs associated with the FDR project, not to exceed $700,000.

Table 1 below describes the breakdown of the project funding.

Table 1. Project Funding Breakdown

Project Component	Funding Source
Ditch Improvement	Benefitted Landowners
Flood Damage Reduction	35% Red Lake Watershed District
	35% State of MN - FDR Program
	30% WMD charges

Method for Determining Charges

The method used to determine the amount of charges each parcel will pay to the Water Management District will closely follow the method that the City of Thief River Falls uses to determine its monthly storm water utility charges. The monthly charge is determined by an approximation of the volume of storm water runoff from a parcel. Runoff volume is a factor of the parcel's area, and the portion of the area that has impervious surfaces, such as rooftops, parking lots, driveways, and sidewalks. Each parcel that falls within the WMD boundaries will be placed into a land use classification, and assigned a Residential Equivalency Factor (REF) for each classification as follows in Table 2 below.

Table 2. Residential Equivalency Factor (REF)

Land Use Classification	Residential Equivalency Factor (REF)
Single Family	1.0
Manufactured Home	1.0
Multi-Family Residential	1.5
Commercial/Industrial	1.5
Schools/Churches/Institutional	1.5
City-Owned Land	1.0
Vacant/Vegetative/Agricultural/Unimproved	0.1 with cap

Then, the formula for determining the monthly charge is as follows:

Water Management District Charge = (REF) x size of parcel (acres) x fee per acre

The fee per acre will be determined upon a more detailed analysis of the final charges.

Length of Time in Force

The initial charges for the WMD for construction of the TRF FDR Project shall be assessed and recovered over a period not to exceed 20 years. In addition to the initial cost recovery period of 20 years, the WMD will remain in-place perpetually in order to assess fees for maintaining the WMD's share of the flood damage reduction portion of the project. The managers may assess all the parcels of property and municipal corporations previously assessed for project construction of the TRF FDR project, to establish a maintenance fund for the project. The assessment for the WMD maintenance fund may not be made when the fund exceeds 20 percent of the original cost of construction for the Thief River Falls Flood Damage Reduction project.

Conclusion

In accordance with MN Statute 103D.729, this plan amendment proposal shall be forwarded to the City of Thief River Falls, Pennington County, and appropriate state agencies for review and comment. The Board of Water and Soil Resources will hold a public hearing in conjunction with the RLWD to receive testimony on the proposed plan amendment providing for the establishment of a Water Management District.

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CHAPTER 103C. SOIL AND WATER CONSERVATION DISTRICTS

Appendix K

Public Ditch System and Other Water Management Facility Authorities

Appendix K:

Ditch System or Water Management Facility	Responsible Agency/ Authority	County	Township
CD1	County	Pennington	Rocksbury
CD16	County	Pennington	River Falls/Wyandotte
CD21	County	Pennington	Rocksbury/Smiley
CD32	County	Pennington	Mayfield/Wyandotte
CD32 BR1	County	Pennington	Mayfield
CD32 BR2	County	Pennington	Kratka
CD32 BR3	County	Pennington	Smiley/Kratka
CD33	County	Pennington	Silverton/North/Smiley/Rocksbury
CD35	County	Pennington	Silverton/Smiley/Kratka
CD35 BR1	County	Pennington	Smiley
CD36	County	Pennington	Smiley/Wyandotte
CD36 BR1	County	Pennington	Smiley
CD36 BR2	County	Pennington	Rocksbury/Smiley
CD38	County	Pennington	High Landing/Star
CD38 BR4	County	Pennington	Star
CD39	County	Pennington	Clover Leaf/Kratka/High Landing
CD39 BR1	County	Pennington	Clover Leaf/Kratka/Goodridge/High Landing
CD39 BR2	County	Pennington	Kratka/High Landing
CD39 BR3	County	Pennington	Kratka
CD41	County	Pennington	Goodridge/High Landing/Star/Reiner
CD41 BR2	County	Pennington	High Landing
CD42	County	Pennington	Kratka/Mayfield
CD43	County	Pennington	Star/Hickory
CD44	County	Pennington	Clover Leaf/Kratka
CD44 BR1	County	Pennington	Clover Leaf
CD45	County	Pennington	Kratka
CD47	County	Pennington	Kratka/High Landing/Mayfield/Deer Park
CD53	County	Pennington	High Landing/Deer Park
CD55	County	Pennington	Deer Park/Hickory
CD57	County	Pennington	Star/Hickory

Ditch System or Water Management Facility	Responsible Agency/ Authority	County	Township
CD58	County	Pennington	Hickory
CD59	County	Pennington	Kratka
CD62	County	Pennington	Wyandotte/River Falls
CD70	County	Pennington	Norden/North/Rocksbury
CD70 BR1	County	Pennington	North
CD70 BR2	County	Pennington	North
CD70 BR3	County	Pennington	North
CD71	County	Pennington	Silverton/Smiley
CD73	County	Pennington	Star/Hickory
CD74	County	Pennington	Hickory
CD75	County	Pennington	Star/Hickory
CD77	County	Pennington	Silverton/Smiley
CD96	County	Pennington	Norden/Sanders/Black River
CD96 BR1	County	Pennington	Sanders/Black River
CD96 BR2	County	Pennington	Black River
CD96 BR3	County	Pennington	Norden/Sanders
CD96 BR4	County	Pennington	Norden/Sanders
CD96 BR5	County	Pennington	Norden/Sanders
CD96 BR6	County	Pennington	Norden/Sanders/Black River
JD13	RLWD	Pennington	Reiner
JD14	RLWD	Pennington	Norden
JD18	RLWD	Pennington	Clover Leaf/Goodridge
JD25	RLWD	Pennington	Numedal/Norden/Sanders/Bray
JD25 BR3	RLWD	Pennington	Bray/Polk Centre/Sanders/Black River
JD60	RLWD	Pennington	Belgium
RLWD 13	RLWD	Pennington	Star
RLWD 14 - TRF WMD	RLWD	Pennington	North/Rocksbury/Smiley
RLWD Proj109 - Arveson Petition	RLWD	Pennington	Hickory
RLWD Proj122 - Challenger Ditch	RLWD	Pennington	Rocksbury
Red Lake River	RLWD	Pennington/Clearwater	Kratka/Deer Park/Hickory/High Landing/Red Lake Nation
Baatz Petition	RLWD	Polk	Russia
Burnham Creek - CD15	RLWD	Polk	Fairfax/Russia/Hammond/Andover

Ditch System or Water Management Facility	Responsible Agency/ Authority	County	Township
Burnham Creek - Main 2	RLWD	Polk	Russia/Kertsonville
Ditch 107 - Krostue Petition	RLWD	Polk	Bygland
Ditch 33	RLWD	Polk	Fisher
Ditch 63 Improvement	RLWD	Polk	Andover
Johnson Petition	RLWD	Polk	Russia
PCD 1	County	Polk	Fanny/Lowell/Crookston
PCD 1 Br 1	County	Polk	Fanny
PCD 1 Br 2	County	Polk	Fanny
PCD 1 Br 3	County	Polk	Fanny
PCD 1 Br 3	County	Polk	Lowell
PCD 1 Br 4	County	Polk	Fanny
PCD 10	County	Polk	Andover/Hammond
PCD 100	County	Polk	Andover/Hammond
PCD 103	County	Polk	Tynsid/Roome
PCD 103 Out. 2	County	Polk	Roome
PCD 106	County	Polk	Kertsonville
PCD 106 Br 1	County	Polk	Fairfax/Kertsonville
PCD 107	County	Polk	Bygland/Fisher
PCD 11	County	Polk	Russia/Onstad
PCD 110	County	Polk	Tynsid/Roome
PCD 112	County	Polk	Andover
PCD 115	County	Polk	Bygland/Fisher
PCD 116	County	Polk	Roome
PCD 117	County	Polk	FisherRoome
PCD 118	County	Polk	Roome/Andover
PCD 118 Br 1	County	Polk	Andover
PCD 120	County	Polk	Roome
PCD 123	County	Polk	Bygland/Fisher
PCD 124	County	Polk	Bygland/Fisher
PCD 125	County	Polk	Lowell
PCD 126	County	Polk	Sullivan/Keystone/Euclid/Huntsville/Nesbit/Fanny/Parnell
PCD 129	County	Polk	Onstad

Ditch System or Water Management Facility	Responsible Agency/ Authority	County	Township
PCD 13	County	Polk	Fairfax
PCD 130	County	Polk	Hammond/Russia
PCD 130 Br	County	Polk	Russia
PCD 131	County	Polk	Tynsid/Roome
PCD 132	County	Polk	Fisher/Lowell
PCD 132 Br 1	County	Polk	Lowell
PCD 132 Br 2	County	Polk	Lowell
PCD 132 Br 3	County	Polk	Lowell
PCD 132 Br 4	County	Polk	Lowell
PCD 132 Br 5	County	Polk	Lowell
PCD 132 Br 6	County	Polk	Lowell
PCD 132 Br 7	County	Polk	Lowell
PCD 132 Br 8	County	Polk	Lowell
PCD 132 Br 9	County	Polk	Lowell
PCD 134	County	Polk	Fisher/Lowell
PCD 135	County	Polk	Vineland
PCD 139	County	Polk	Russia
PCD 140	County	Polk	Kertsonville/Onstad
PCD 140 Br 1	County	Polk	Kertsonville
PCD 140 Lat A	County	Polk	Tilden/Godfrey
PCD 140 Lat B	County	Polk	Kertsonville
PCD 140 Lat C	County	Polk	Kertsonville
PCD 140 Lat F	County	Polk	Kertsonville
PCD 142	County	Polk	Lowell/Crookston/Fairfax
PCD 142 Lat A	County	Polk	Fairfax
PCD 142 Lat B	County	Polk	Fairfax
PCD 142 Lat C	County	Polk	Fairfax
PCD 142 Lat D	County	Polk	Fairfax
PCD 142 Lat E	County	Polk	Fairfax
PCD 143	County	Polk	Andover/Fairfax
PCD 143 Br 1	County	Polk	Andover
PCD 144	County	Polk	Andover/Fairfax
PCD 144 Br 4	County	Polk	Fairfax

Ditch System or Water Management Facility	Responsible Agency/ Authority	County	Township
PCD 147	County	Polk	Belgium
PCD 147 Br	County	Polk	Belgium
PCD 15	County	Polk	Fairfax/Kertsonville
PCD 155	County	Polk	Roome
PCD 158	County	Polk	Crookston/Gentilly/Fairfax/Kertsonville
PCD 158 Br 1	County	Polk	Gentilly
PCD 161	County	Polk	Vineland
PCD 161 Br 1	County	Polk	Vineland
PCD 163	County	Polk	Bygland/Fisher
PCD 169	County	Polk	Fisher
PCD 19	County	Polk	Roome/Vineland
PCD 19 Br 1	County	Polk	Vineland
PCD 2	County	Polk	Esther/Northland/Tabor
PCD 20	County	Polk	Fisher/Roome
PCD 24	County	Polk	Nesbit/Fanny
PCD 25	County	Polk	Huntsville/Nesbit/Fanny
PCD 26	County	Polk	Fisher/Lowell
PCD 27	County	Polk	Nesbit/Fisher/Lowell
PCD 28	County	Polk	Hammond
PCD 30	County	Polk	Nesbit/Fanny
PCD 31	County	Polk	Nesbit/Fanny
PCD 32	County	Polk	Huntsville/Nesbit/Fanny
PCD 33	County	Polk	Lowell
PCD 34	County	Polk	Fisher/Lowell
PCD 36	County	Polk	Sullivan/Keystone/Euclid
PCD 37	County	Polk	Sullivan/Keystone/Euclid
PCD 38	County	Polk	Sullivan/Keystone
PCD 39	County	Polk	Sullivan/Keystone
PCD 40	County	Polk	Sullivan/Keystone
PCD 41	County	Polk	Grand Forks/Sullivan/Keystone
PCD 50	County	Polk	Grand Forks/Sullivan
PCD 51	County	Polk	Bygland/Fisher
PCD 54	County	Polk	Grand Forks

Ditch System or Water Management Facility	Responsible Agency/ Authority	County	Township
PCD 56	County	Polk	Huntsville
PCD 58	County	Polk	Huntsville
PCD 62	County	Polk	Andover
PCD 63	County	Polk	Andover/Fairfax
PCD 64	County	Polk	Andover/Fairfax
PCD 64 Br 1	County	Polk	Andover
PCD 66	County	Polk	Tabor/Keystone
PCD 66 Br 1	County	Polk	Keystone/Euclid
PCD 67	County	Polk	Huntsville/Bygland
PCD 69	County	Polk	Roome/Andover
PCD 69 Br 1	County	Polk	Andover
PCD 70	County	Polk	Roome
PCD 72	County	Polk	Tilden/Grove Park/Onstad/Godfrey
PCD 72 Br 3	County	Polk	Onstad/Godfrey
PCD 74	County	Polk	Andover/Hammond
PCD 78	County	Polk	Lowell
PCD 79, Seg. 1	County	Polk	Onstad
PCD 79, Seg. 4	County	Polk	Andover/Fairfax
PCD 94	County	Polk	Andover
PCD 96	County	Polk	Roome
PCD 99	County	Polk	Crookston
PCD 99 Br 1	County	Polk	Crookston
PCD 99 Br 2	County	Polk	Crookston
PCD Grand Marais	County	Polk	Esther/Grand Forks
PCJD 60	RLWD	Polk	Belgium
PCJD 60	RLWD	Polk	Parnell/Crookston
PCJD 60	RLWD	Polk	BelgiumPolk Centre/Wylie
PCJD 60	RLWD	Polk	BelgiumPolk Centre/Wylie
PCJD 60	RLWD	Polk	Crookston
PCJD 60 Lat 2	RLWD	Polk	Louisville
PCJD 60 Lat 2	RLWD	Polk	Parnell/Louisville
PCJD 60 Lat 2	RLWD	Polk	Polk Centre/WylieLouisville
PCJD 60 Lat 2 Br 1	RLWD	Polk	Louisville

Ditch System or Water Management Facility	Responsible Agency/ Authority	County	Township
PCJD 60 Lat 4	RLWD	Polk	Parnell/Louisville/Crookston
PCJD 66	RLWD	Polk	Lake Pleasant
PCJD 66	RLWD	Polk	Gentilly/Lake Pleasant
PCJD 66 Br 1	RLWD	Polk	Tilden
PCJD 66 Br 5	RLWD	Polk	Lake Pleasant
PCJD 66 Br 9	RLWD	Polk	Lake Pleasant/Tilden
PCJD 66 Lat B	RLWD	Polk	Lake Pleasant/Tilden
PCJD 66 Lat B	RLWD	Polk	Lake Pleasant
Proj119 - Polk Improvement 104_61_47_94	RLWD	Polk	Hammond/Andover/Roome/Vineland
RLWD 15 - Proj175	RLWD	Polk	Tabor/Angus/Belgium/Euclid
RLWD Ditch 11	RLWD	Polk	Grand Forks
RLWD Ditch 12 - CD108	RLWD	Polk	Tynsid
RLWD Ditch 12 - CD53	RLWD	Polk	Tynsid
RLWD Ditch 12 - CD53 BR1	RLWD	Polk	Roome/Tynsid
RLWD Ditch 12 - CD53 BR2	RLWD	Polk	Roome/Tynsid
RLWD Ditch 12 - Lateral Extension	RLWD	Polk	Bygland/Tynsid
CD-12	County	Red Lake	Red Lake Falls
CD-24	County	Red Lake	River
CD-28	County	Red Lake	Red Lake Falls
CD-30	County	Red Lake	River
CD-60	County	Red Lake	Wylie/Louisville
CD-62	County	Red Lake	River/Gervais/Emardville
CD-62 BR-1	County	Red Lake	Emardville
CD-62 BR-2	County	Red Lake	Emardville
CD-69	County	Red Lake	Louisville
CD-70	County	Red Lake	Gervais
JCD-15	RLWD	Red Lake	Emardville (North)/River
JCD-60	RLWD	Red Lake	Louisville
JCD-66	RLWD	Red Lake	Lake Pleasant
RLWD 10	RLWD	Red Lake	River/Gervais
RLWD 3	RLWD	Red Lake	River/Emardville (North)
JCD-13	RLWD	Red Lake/ Pennington	Browns Creek

Ditch System or Water Management Facility	Responsible Agency/ Authority	County	Township
Brandt Impoundment	RLWD	Polk	Belgium
Euclid East Impoundment	RLWD	Polk	Euclid/Blegium
Parnell Impoundment	RLWD	Polk	Parnell
North Parnell Storage Site 1	RLWD	Polk	Parnell
North Parnell Storage Site 2	RLWD	Polk	Parnell
Louisville Parnell	RLWD	Polk/Red Lake	Louisville/Parnell
Good Lake Dam	Red Lake Indian Reservation	Clearwater/ Beltrami	Red Lake Nation
Lower Red Lake Dam	USCOE	Clearwater	Red Lake Nation
Thief River Falls Dam	City of Thief River Falls	Pennington	North
Old Crookston	City of Crookston	Polk	Lowell
East Grand Forks	City of East Grand Forks	Polk	Rhinehart
Seeger Group Pond	Seeger, Wallace	Red Lake	Red Lake Falls
Thief River Falls	City of Thief River Falls	Pennington	North
Red Lake River Dam	Red Lake Indian Reservation	Clearwater	Red Lake Nation
Schirrick Dam	WD of Red Lake	Red Lake	Wylie
New Crookston Dam	Ottertail Power Co	Polk	Crookston
Odney Flaat Wildlife Impoundment	Flaat, Odney	Polk	Onstad
Glacial Ridge Wetland	USF&W	Polk	Tilden
Burnham Creek BR-6	RLWD	Polk	Onstad
Riverside Park Dam	City of Grand Forks, ND	Polk	Grand Forks
Latundresse Dam	Hanson, Paul & Kathleen	Red Lake	Red Lake Falls
Baird-Beyer Dam	Luke & Jessie Forness	Red Lake	Louisville
Crookston Rock Rapids	City of Crookston	Polk	Lowell
Goose Lake-Pembina WMA	MNDNR-Fisheries and Wildlife	Red Lake	Wylie

Appendix L

Agency Responses

Minnesota Board of Water & Soil Resources

February 13, 2015

Red Lake River Planning Group
C/O Nicole Bernd, West Polk SWCD
528 Strander Ave
Crookston, MN 56716

RE: Response to request for priority issues and plan expectations (One Watershed, One Plan).

Dear Red Lake River Planning Group,

Thank you for providing the opportunity to provide priority issues and plan expectations for the development of the Red Lake River watershed, One Watershed One Plan, under Minnesota Statutes section 103B.101, Subd. 14. We appreciate the partner's willingness to participate in development of a watershed-based plan.

The Board of Water and Soil Resources (BWSR) has the following overarching expectations for the plan:

Process

- The planning process must follow the requirements outlined in the *One Watershed, One Plan – Operating Procedures for Pilot Watersheds* document, approved by the BWSR Board on June 25, 2014 and available on the BWSR website: www.bwsr.state.mn.us/planning/1W1P/index.html. More specifically, the planning process must:
    - Involve a broad range of stakeholders to ensure an integrated approach to watershed management.
    - Reassess the agreement established for planning purposes when finalizing the implementation schedule and programs in the plan, in consultation with the Minnesota Counties Intergovernmental Trust and/or legal counsel of the participating organizations, to ensure implementation can occur efficiently and with minimized risk. This step is critical if the plan proposes to share services and/or submit joint grant applications.

Plan Content

- The plan must meet the requirements outlined in the *One Watershed, One Plan – Plan Content Requirements for Pilot Watersheds* document, approved by the BWSR Board on September 24, 2014 and available on the BWSR website: www.bwsr.state.mn.us/planning/1W1P/index.html. More specifically, the plan must have:

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403 Fourth Street NW Suite 200 Bemidji, MN 56601 (218) 755-2600	1601 Minnesota Drive Brainerd, MN 56401 (218) 828-2383	26624 N. Tower Road Detroit Lakes, MN 56501 (218) 846-8400	394 S. Lake Avenue Suite 403 Duluth, MN 55802 (218) 723-4752	12 Civic Center Plaza Suite 3000B Mankato, MN 56001 (507) 344-2821	1400 East Lyon Street Marshall, MN 56258 (507) 537-6060	261 Highway 15 South New Ulm, MN 56073 (507) 359-6074	3555 9th Street NW Suite 350 Rochester, MN 55901 (507) 206-2889

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- A thorough analysis of issues, using available science and data, in the selection of priority resource concerns.
- Sufficient measurable goals to indicate an intended pace of progress for addressing the priority issues.
- A targeted and comprehensive implementation schedule, sufficient for meeting the identified goals.
- A thorough description of the programs and activities required to administer, coordinate, and implement the actions in the schedule; including work planning (i.e. shared services, collaborative grant-making, decision making as a watershed group and not separate entities) and evaluation.

You have selected to develop a Comprehensive Watershed Management Plan, which is an all-inclusive plan that will address surface and groundwater, water quality and quantity, and land use. Implementation actions in the plan will need to consider a broad range of tools, including capital improvements, official controls, and other tools and programs necessary to achieve the goals of the plan. Because of this being a comprehensive plan, the list of priority issues we identify below is quite long, however, it is important to note that there is overlap between many of these issues and addressing any one of them will likely have a positive effect on others.

BWSR has the following specific priority issues:

Soil Erosion and Sedimentation: Protecting soil from both water and wind erosion has multiple benefits such as reducing sedimentation, maintaining/improving soil quality, meeting nutrient reduction goals, increasing water storage on the landscape via increased soil organic matter content and water holding capacity, and improving surface water quality. The plan should identify high priority areas for wind and water erosion and sedimentation concerns using available data, inventories, and models/tools, and target implementation efforts to those areas.

Flood Damage Reduction: Flood damage issues are not only significant to the Red Lake River watershed, but to the Red River Basin as a whole. Reducing flood damages will provide economic and social benefits, and can also provide natural resource enhancements. The plan should prioritize flood damage reduction projects to not only reduce local flooding problems, but also work towards the 20% peak flow reduction goal for the Red River of the North which includes a 35% peak flow reduction goal for the Red Lake River at Crookston.

Water Quality: Surface water has many uses in the Red Lake River watershed including drinking water, fishing, swimming, irrigation, and industrial purposes. Protecting and improving water quality provides economic, social, and environmental benefits. The plan should use the information from the WRAPS study and other water quality data available to prioritize specific water resources and/or sub-watersheds needing land treatments/projects for protection and restoration, set measurable reduction goals, including reasonable timelines, to address those priority resources, and target implementation activities to meet those goals.

Drainage System Management: Proper drainage system management will provide both water quality and water quantity benefits. The plan should prioritize ditch systems and target implementation of

drainage water quality management practices such as buffers, side water inlets, controlled drainage, saturated buffers, and 2-stage ditches. The plan should also attempt to lay out a coordinated approach for how implementation of drainage water quality management can be coordinated with and/or integrated into proceedings initiated by the drainage authorities when undertaking drainage system work.

Altered Hydrology: Altered hydrology in the Red Lake River watershed has accelerated bed and bank erosion and caused a loss of aquatic habitat and organisms. The plan should use existing data and inventories to prioritize areas to restore natural hydrology.

Shoreland and Riparian Management: Shoreland and riparian management is important because uncontrolled land uses and unplanned development can cause degradation to water quality, increased risk of flooding, and scenic degradation. The plan should aim to provide consistency of local land use controls across the watershed, along with implementation strategies for targeting where buffers and riparian corridor management is most needed and can help achieve plan objectives.

Wetland Management: Protection and restoration of wetlands provides benefits for water quality, flood damage reduction, habitat and wildlife. The plan should support the continued implementation of the Wetland Conservation Act and look for opportunities to improve coordination across jurisdictional boundaries. The plan should also identify high priority areas for wetland restoration and strategically target restoration projects to those areas.

Habitat and Wildlife: Protection and restoration of key habitat complexes and corridors can provide water quality benefits for groundwater and surface water, protection for pollinators, and climate resiliency. The plan should address the protection and restoration of key habitat complexes and corridors throughout the watershed.

Emerging issues: There are a number of emerging issues that could have an effect on water quality and quantity in the Red Lake River watershed. These include, but are not limited to climate change, subsurface drainage, conversion of grassland, and changes in crop rotations. The plan should assess strategies related to their resiliency based on expected changes in climate, land use, etc. This includes an understanding of precipitation frequency as per National Oceanic and Atmospheric Administration (NOAA) Atlas 14.

We commend the partners for their participation in the pilot. We look forward to working with you through the rest of the plan development process. The state's main water management agencies have committed to the One Watershed One Plan approach and will be available to assist you in this process. Do not hesitate to call on them to participate and provide information. If you have any questions, please feel free to contact Matt Fischer at 218-755-2683.

Sincerely,

Matthew J. Fischer

Matt Fischer
Board Conservationist

cc: Ron Shelito, BWSR (via email)
Doug Thomas, BWSR (via email)
Brett Arne, BWSR (via email)
Brian Dwight, BWSR (via email)
Henry Van Offelen, MDNR (via email)
Luke Stuewe, MDA (via email)
Jenilynn Marchand, MDH (via email)
Denise Oakes, PCA (via email)
Nate Dalager, HDR Engineering (via email)
Chuck Fritz, IWI (via email)
Myron Jesme, Red Lake WD (via email)
Tanya Hanson, Red Lake SWCD (via email)
Peter Nelson, Pennington SWCD (via email)

Prioritizing Watercourse and Riparian Habitats in the Red Lake River Watershed for Protection, Restoration, and Enhancement for One Watershed One Plan

Henry Van Offelen, Red River Basin Coordinator, February 23, 2016

Purpose: This project will characterize the channel, floodplain, and riparian features within the Red Lake River watershed and designate priority watercourses and riparian habitats for protection, restoration, and enhancement.

Rationale: The Red Lake Watershed One Watershed One Plan (1W1P) provides an opportunity for DNR to engage local governments and provide them with priority natural resources for protection, restoration, and enhancement. Natural resource prioritization is critical to resource management internally and empowers local implementers to target their actions to improve watershed health over the next 10 years. DNR has already developed methods to identify and prioritize grasslands and drained wetland basins for protection and restoration based on their ability to meet flood damage reduction, wildlife habitat, and sediment reduction goals. In addition, methods have been developed to identify and prioritize channel inlets for best management practices (e.g. side inlets). Watercourses and riparian areas are the only substantial type of natural resource left to prioritize in this watershed. Prioritizing all watercourses and riparian areas will provide strategic information to secure funding for resource protection, restoration, and enhancement.

Approach: LiDAR and digital imagery will be processed with standard spatial analysis and remote sensing techniques to identify and quantify the characteristics of in-channel and riparian features on all watercourses (> 2 sq. mi) within the Red Lake watershed. Once characterized, indices of channel and riparian condition will be developed which have significant predictive relationships with existing monitoring data (e.g. existing Bank Erosion Hazard Index, MPCA Stream Habitat Assessment). Channel and riparian habitat scores will then be developed for reaches of natural, altered, and artificial watercourses to establish priorities. A proof of concept demonstration will first be completed in one tributary watershed of the Red Lake River. If successful, the methods will be applied to the entire Red Lake watershed.

Methods (Also see Table 1):

Channel feature characterization – Channel features will be quantified and characterized using the River Bathymetry Toolkit (RBT) and spatial analyst tools. All watercourses with more than two square miles in drainage area will be detrended (slope removed) and the detrended DEM will be used to delineate inundation zones along all stream reaches. A series of geomorphic attributes will be derived and summarized for watercourse reaches throughout the watershed.

Riparian feature characterization – Standard remote sensing techniques will be combined with LiDAR data analysis to classify riparian area vegetation. Normalized Difference Vegetation Index (NDVI), LiDAR intensity, and maximum height of LiDAR first returns data will be derived for all riparian areas. These three factors will be combined using methods similar to those currently in use for the new National Wetlands Inventory (NWI) to classify 3m cells within riparian area as: no vegetation, low vegetation, medium height vegetation, and tall vegetation.

Channel and riparian condition indices – Statistical modeling will be used to develop channel and riparian indices which have significant relationships with existing empirical data that characterize channel and riparian habitats.

Watercourse and riparian habitat scoring – Statistical modeling will be used to develop channel and riparian habitat scoring systems for natural, altered, and artificial watercourses. Channel and riparian condition indices will be combined with existing biological and hydrologic conditions information to score watercourses and riparian areas. High scoring areas will be designated for protection, moderate scoring areas will be designated for enhancement, and low scoring areas will be designated for restoration.

Table 1. Examples of available data and data to be derived for establishing watercourse and riparian habitat priorities.

Channel Reach Attributes/Characteristics		
Total reach length	Straight line length	Sinuosity
Centerline slope	Valley slope	Mean bankfull surface slope
Mean width at bankfull	Mean width at 2x bankfull	Total water volume to bankfull
Total water volume to 2x bankfull	Bankfull volume to 2x bankfull volume ratio	Mean slope of channel banks from water surface to bankfull
Mean slope of banks - water surface to 2x bankfull	Mean slope of banks – bankfull to 2x bankfull	Mean drainage area
Riparian Area Attributes/Characteristics		
Mean ndvi from water surface to bankfull	Mean ndvi from water surface to 2x bankfull	Mean ndvi from bankfull to 2x bankfull
Mean/std of LiDAR first return height from water to bankfull	Mean/std of LiDAR first return height from water surface to 2x bankfull	Mean/std of LiDAR first return height from bankfull to 2x bankfull
Mean/std of LiDAR intensity from water surface to bankfull	Mean/std of LiDAR intensity from water surface to 2x bankfull	Mean/std of LiDAR intensity from bankfull to 2x bankfull
Data Available for Establishing Channel and Riparian Condition Indices		
Bankfull elevation	2x Bankfull elevation	Entrenchment Index
MN Stream Habitat Assessment	Pfankuch channel stability components	Bank Erosion Hazard Index
Data Available for Establishing Channel and Riparian Habitat Scores		
Fish IBI scores	Invertebrate IBI scores	Connectivity
Reach watershed sediment loading	Reach watershed mean curve number	Reach watershed surface water storage
MN Stream Habitat Assessment	Potential sturgeon spawning habitat	Risk of upstream watershed degradation

Outcomes:

1. Watercourse and riparian feature characterized using scientifically sound methods at a watershed scale and methods which will have statewide applicability for DNR watershed work.
2. Channel and riparian condition indices developed for natural, altered, and artificial watercourse reaches.
3. A watershed-based roadmap of priority watercourse and riparian habitats for DNR and local governments to guide implementation of protection, restoration, and enhancement activities.
4. Quantification of riparian vegetation presence/absence at a 3m scale for use in identifying areas where buffers are needed to comply with current law within the pilot area.
5. Leveraging the State's investment in LiDAR data to help set water quality and habitat priorities at the watershed scale.
6. Leveraging the State's investment in site-specific geomorphology monitoring and assessment data to help set water quality and habitat priorities at the watershed scale.
7. Provide DNR staff with new information to inform the stressor identification process and assist local governments in securing clean water implementation funds for priority resources.

Funding: All channel related and statistical work will be completed by Henry Van Offelen. Remote sensing work will be completed by Division of Forestry Resource Assessment staff in Grand Rapids. $5,000 is needed to complete the proof of concept phase of the project. An additional $5,000 to $10,000 will be needed to complete the remote sensing work for the entire watershed.

Timeline: Proof of concept - March 1 – April 30, 2016. Watershed wide – May 1 – June 30, 2016.

General framework for DNR goals for Red Lake River Pilot Watershed

Goals

- Protect Existing Upland, Wetland, Riparian, and Aquatic Habitats
- Improve Hydrologic Conditions
- Improve Conditions of Existing Upland and Wetland Habitats
- Improve conditions of watercourses, lakes, and riparian areas
- Improve water quality
- Reduce flood damages
- Protect groundwater resources
- Improve recreational opportunities (maybe – depends on direction of the group)

These statements were crafted around improving watershed health/conditions and are not population specific. Species specific goals could also be considered (e.g. fish ibi score) but it does not change the list of actions. I would prefer to list things like species goals as indicators or how to measure whether these goals are being achieved.

List of actions relevant to the goal: ***Protect Existing Upland, Wetland, Riparian, and Aquatic Habitats***

Action	Responsibility (landowner, LGU, Agency, NGO)	Primary priority/target areas
Acquisition through public ownership	DNR, USFWS, County, Municipality	At and adjacent to areas of High Biodiversity Significance, prairie plan core, low CPI, high priority natural channel reaches
Acquisition by fee by NGO (private)	NGO's (e.g. TNC acquisitions)	At and adjacent to areas of High Biodiversity Significance, prairie plan core, low CPI, high priority natural channel reaches
Private land temporary easement (e.g. conservation programs)	NRCS, SWCD, NGO	At and adjacent to areas of High Biodiversity Significance, prairie plan core, low CPI, high priority natural channel reaches
Private land permanent easement	NRCS, SWCD, NGO	At and adjacent to areas of High Biodiversity Significance, prairie plan core, low CPI, high priority natural channel reaches
Other Incentives	WD, NGO	At and adjacent to areas of High Biodiversity Significance, prairie plan core, low CPI, high priority natural channel reaches
Regulatory approaches		
Shoreland ordinance	DNR, County	50 foot buffer areas public waters, shoreland zones of priority riparian areas
Floodplain ordinance	DNR, County	
Public water works permitting	DNR	Existing public waters
Wetland Conserv. Act	DNR, County, BWSR	
404 permitting	USACE	
Land Use Zoning	County	
Storm water permitting	Municipality, WD	Municipalities
Soil Loss Ordinance	County	Areas with high sediment loading

Questions for DNR staff

What are the priority areas for upland habitat protection (grass, forest, brush) ?

What are the priority areas for wetland habitat protection?

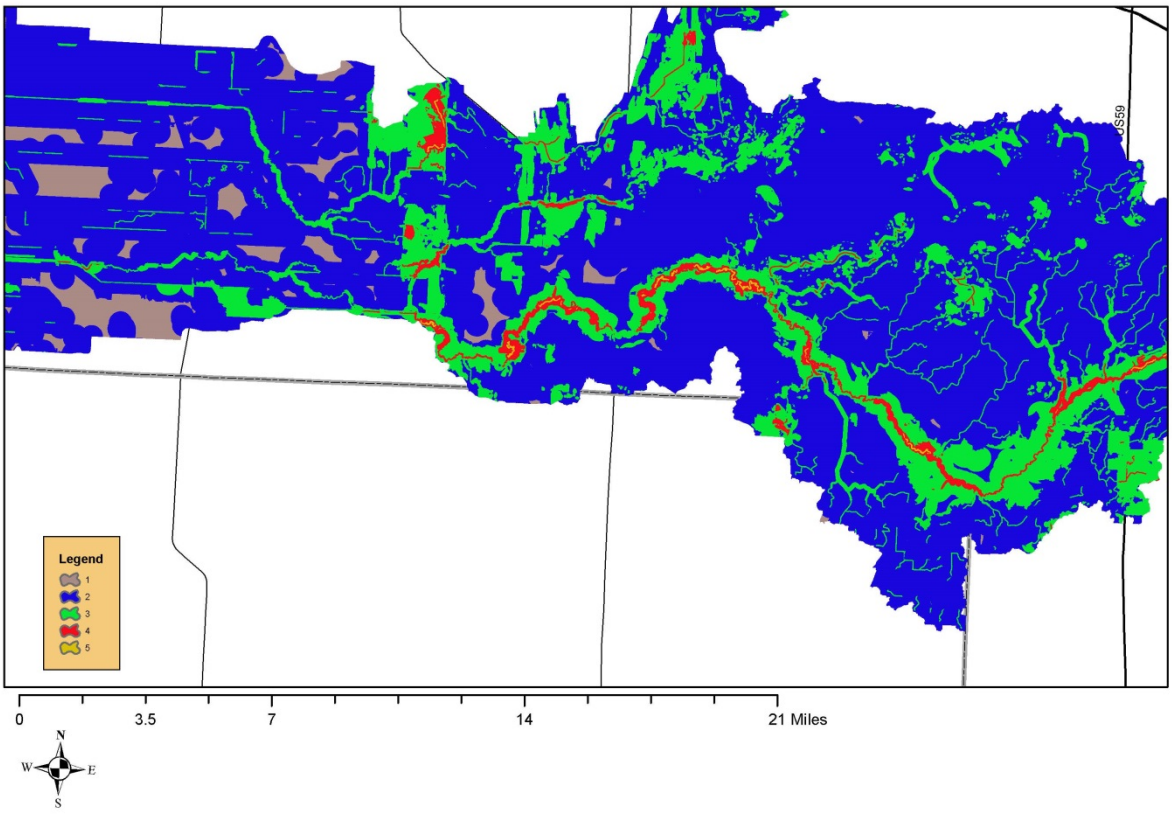
What are the priority areas for riparian habitat protection?

What are the priority areas for aquatic habitat protection? *Must factor in Lake sturgeon*

Has anyone else developed relevant priority areas for this goal?

If we cannot establish a full set of priorities, what information is needed to develop them?

Example of Natural Resource Protection Zones



List of actions relevant to the goal: ***Improve Hydrologic Conditions***

Action	Responsibility (landowner, LGU, Agency, NGO)	Primary priority/target areas
Land Use Change	Landowners	Areas contributing to peak flow +/- 4 days, high priority catchments for peak flows, groundwater recharge areas, all riparian areas of all watercourses
Land Use Practice Change	Landowners	Areas contributing to peak flow +/- 4 days, high priority catchments for peak flows, groundwater recharge areas, all riparian areas of all watercourses
Practices that improve soil health	Landowners	Areas contributing to peak flow +/- 4 days, high priority catchments for peak flows, groundwater recharge areas, all riparian areas of all watercourses
Water storage		
Protect non-contributing areas from being drained	Landowners, WD, no one really	Identify them and implement policy to protect
Sediment basins	NRCS, SWCD,	High sediment delivery catchments
Wetland Restoration and Enhancement	NRCS, SWCD, NGO	Wetland basins in areas contributing to peak flow +/- 4 days, high priority catchments for peak flows, groundwater recharge areas.
Impoundments	WD, NRCS, SWCD	Areas contributing to peak flow +/- 4 days, high priority catchments for peak flows, groundwater recharge areas.
Artificial drainage system strategic sizing, improvements, abandonment, and BMPs	WDs, County	
Regulatory approaches		
Wetland Conservation Act	County, DNR	
Land Use Zoning	County	
Storm water permitting	Municipality	
Soil Loss Ordinance	County	

Questions for DNR staff

What are hydrologic conditions and how have they changed?

What changes to the hydrology do we want, specifically?

What are the priority areas for actions to reduce peak flows?

What are the priority areas for actions to improve low flow conditions?

What are the priority areas for actions to groundwater recharge?

Has anyone else developed relevant priority areas for this goal?

If we cannot establish a full set of priorities, what information is needed to develop them?

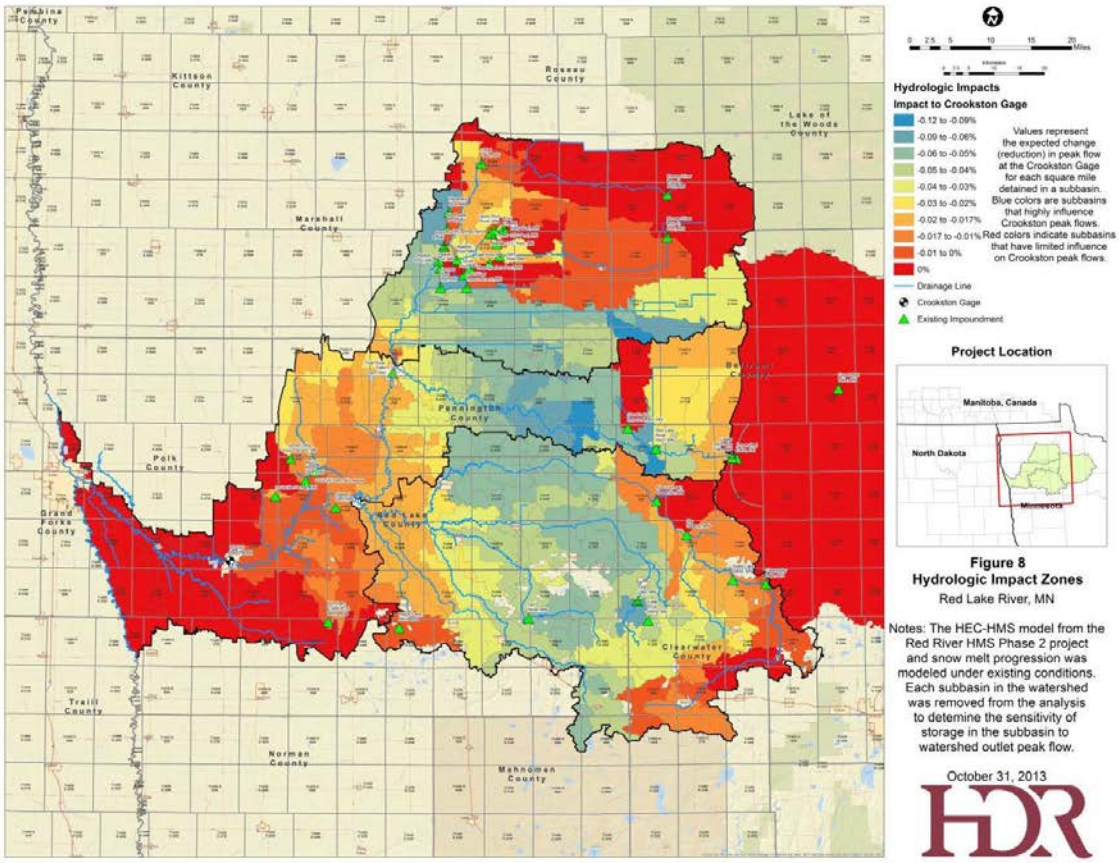


Figure 8
Hydrologic Impact Zones
Red Lake River, MN

Notes: The HEC-HMS model from the Red River HMS Phase 2 project and snow melt progression was modeled under existing conditions. Each subbasin in the watershed was removed from the analysis to detemine the sensitivity of storage in the subbasin to watershed outlet peak flow.

October 31, 2013

HDR

List of actions relevant to the goal: ***Improve Conditions of Existing Upland and Wetland Habitats***

Action	Responsibility (landowner, LGU, Agency, NGO)	Primary priority/target areas
Intensive management of vegetation on public lands	DNR, USFWS, County	Prairie core areas, other wildlife and forestry designated priority areas
Intensive management of vegetation on private lands	Landowners, easement holders, NRCS grazing program, *forestry stewardship plans sfia tax credit.*	Existing private lands in temporary and permanent conservation programs, riparian areas of all watercourses
Reduce connectivity for fish among wetland basins and shallow lakes	WD, County DNR	Wetland basins and shallow lakes identified by wildlife staff
Water storage	WD, NRCS, SWCD	Watershed areas above high priority wetlands basins and shallow lakes
Artificial drainage system strategic sizing, abandonment, and BMPs	WDs, County	Watershed areas above high priority wetlands basins and shallow lakes
Regulatory approaches		
Land Use Zoning	County	
Storm water permitting	Municipality	
Soil Loss Ordinance	County	

Questions for DNR staff

What are the priority areas for intensive vegetation management on public lands?

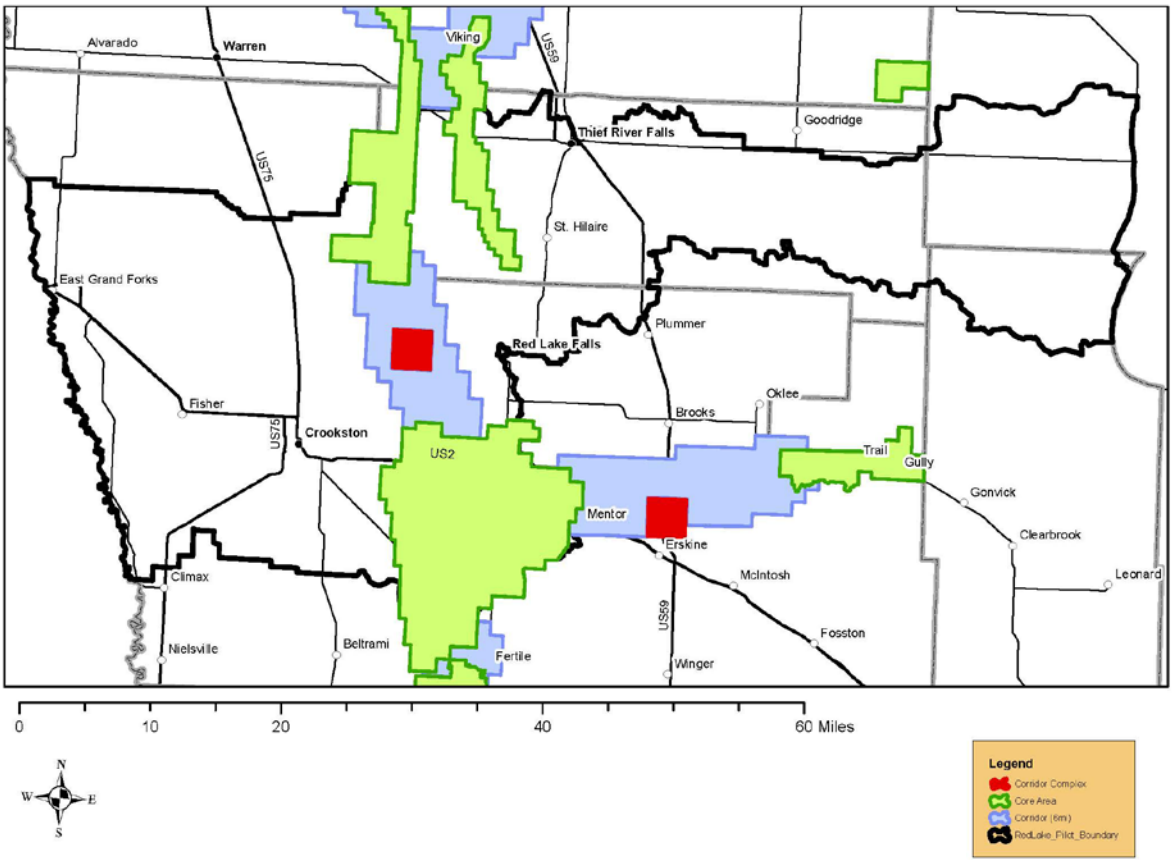
What are the priority areas for intensive vegetation management on private lands?

What are the priority wetlands and shallow lakes where fish should be excluded? No.

Has anyone else developed relevant priority areas for this goal?

If we cannot establish a full set of priorities, what information is needed to develop them?

Red Lake River 1W1P Watershed: Prairie Plan Areas



List of actions relevant to the goal: ***Improve Conditions of Natural, Altered, and Artificial Watercourses and Riparian Areas***

Action	Responsibility (landowner, LGU, Agency, NGO)	Primary priority/target areas
Natural and Altered Watercourses		
Establish functional riparian areas	Landowners, easement holders, agencies	Priority watercourse reaches for improved stability. Near-channel areas ranked high for SPI.
Install side water inlets and other appropriate drainage BMPs	Landowners, NRCS, SWCD	Priority watercourse reaches for improved stability. Near-channel areas ranked high for SPI.
Stream channel rehabilitation		High priority reaches for channel rehabilitation
Install effective grade control	Landowners, NRCS, SWCD	Priority watercourse reaches for grade control.
Install effective bank erosion control	Landowners, NRCS, SWCD, DNR	Priority watercourse reaches for bank erosion control.
Drainage water Best Management Practices	Landowners, NRCS, SWCD	Watershed areas above priority watercourses for improved stability.
Install/replace culverts and bridges to promote channel stability	WD, County, road authorities	Priority watercourse reaches for improved stability
Remove or modify barriers to fish passage	WD, County, road authorities, DNR, barrier owners	Priority watercourses for fish passage improvement
Implement actions that will improve hydrologic conditions (see hydrology actions)		Watershed areas above priority watercourses for improved stability.
Regulatory approaches		
Achieve compliance with shoreland buffer rules	DNR	Priority watercourse reaches for improved stability
Public water works permitting	DNR	Proposed channel cleanout areas
Drainage law	WD, County	Channels that outlet into natural watercourses. Outlet adequacy.
Soil Loss Ordinance	County	Watershed areas above priority watercourses for improved stability.
Artificial Watercourses		

Action	Responsibility (landowner, LGU, Agency, NGO)	Primary priority/target areas
Install side water inlets and other drainage system BMPS	Landowners, WDs, County, SWCD, NRCS	Priority areas for drainage water BMPs, High priority SPI and sediment areas.
Install effective grade control	Landowners, NRCS, SWCD	Priority artificial watercourse reaches for grade control.
Install/replace culverts and bridges to promote channel stability	WD, County, road authorities	Priority artificial watercourse reaches for improved stability
Regulatory Approaches		
Achieve compliance with ditch buffer rules		Identify areas of non-compliance, establish priority reaches for compliance
Public water works permitting	DNR	Proposed channel cleanout areas
DNR advisory review of drainage projects and repairs	DNR	All drainage projects and repairs. Particularly related to review under 103E.015.
Drainage law	WD, County	Channels that outlet into natural watercourses. Outlet adequacy.
Soil Loss Ordinance	County	Watershed areas above priority watercourses for improved stability.

Questions for DNR staff

What are the priority natural and altered watercourse reaches for improved stability?

What are the priority natural and altered watercourse reaches for grade stabilization?

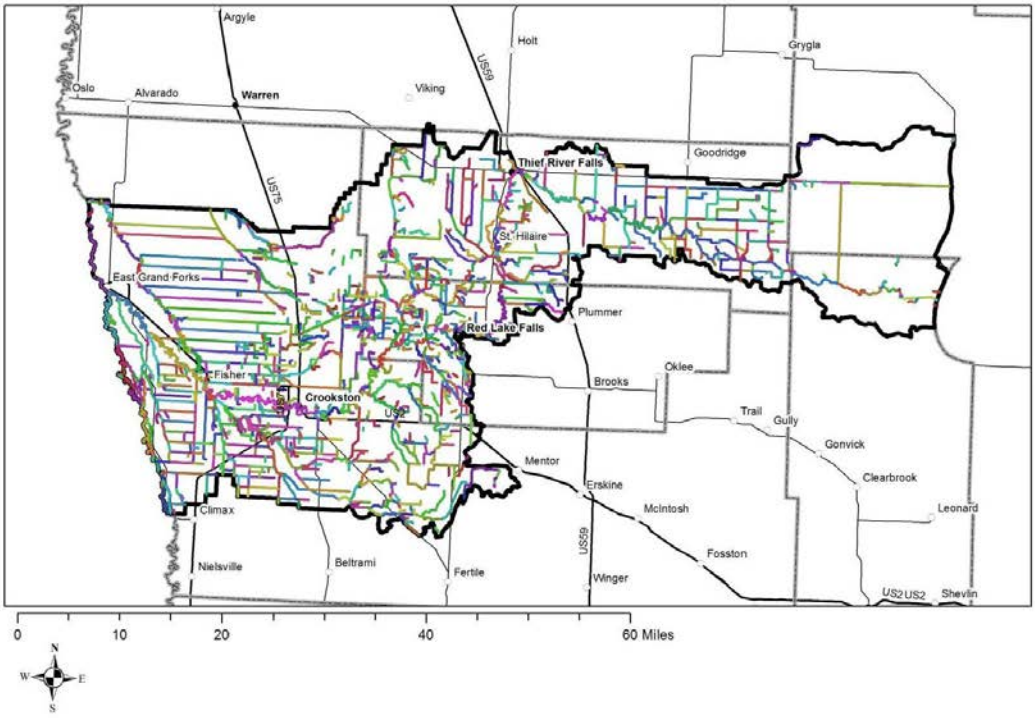
What are the priority natural and altered watercourse reaches for side inlets and BMPs?

What are the priority artificial watercourse reaches for improved stability?

What are the priority artificial watercourse reaches for grade stabilization?

What are the priority artificial watercourse reaches for side inlets and BMPs?

Red Lake 1W1P Watershed: Priority Watercourse reaches for protection, rehabilitation, bank stabilization, and bed stabilization,



List of actions relevant to the goal:

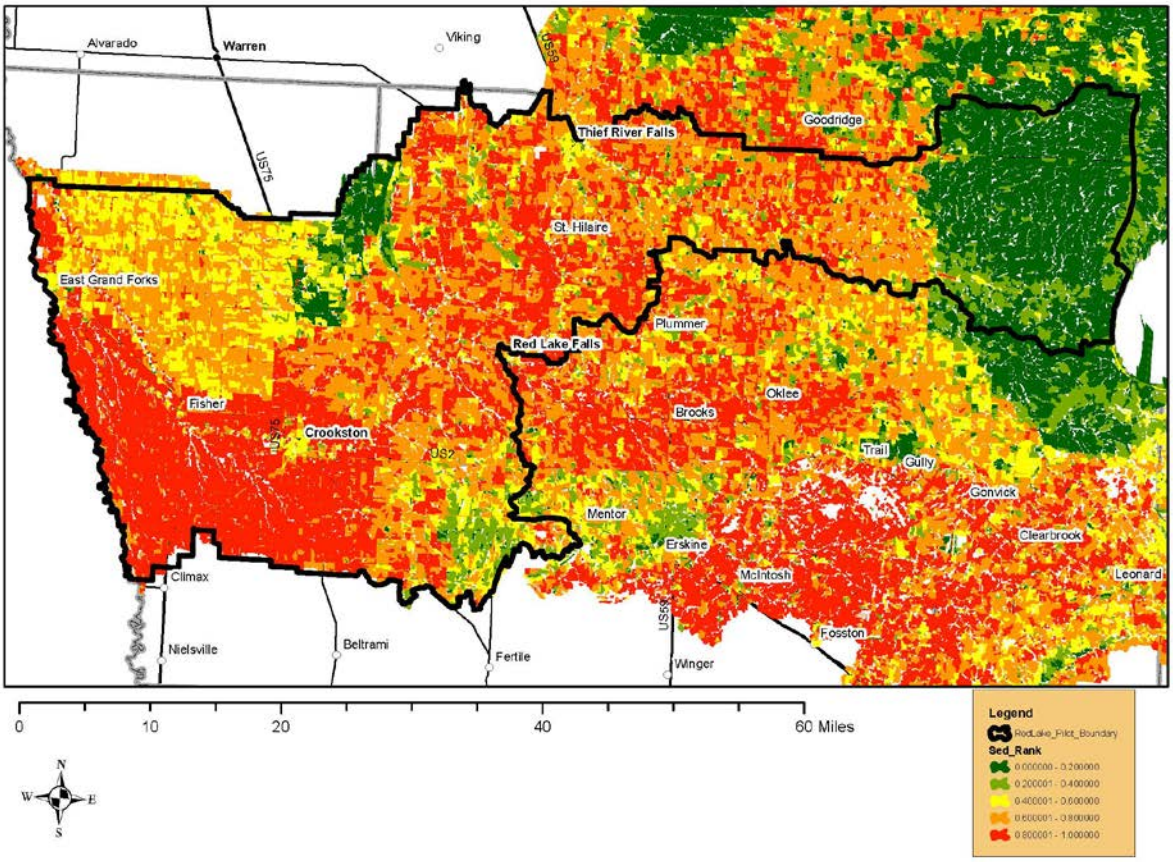
Improve Water Quality

Action	Responsibility (landowner, LGU, Agency, NGO)	Primary priority/target areas
Land Use Change	Landowners	High priority areas for water quality improvement
Land Use Practice Change	Landowners	High priority areas for water quality improvement
Practices that improve soil health	Landowners	High priority areas for water quality improvement
Practices that improve conditions of watercourses	Landowners, WDs, NRCS, SWCD	High priority areas for water quality improvement
Water storage		
Sediment basins	NRCS, SWCD,	High sediment delivery catchments
Wetland Restoration and Enhancement	NRCS, SWCD, NGO	Wetland basins in areas high priority areas for WQ improvement.
Impoundments	WD, NRCS, SWCD	Areas downstream of high priority WQ improvement areas
Artificial drainage system strategic sizing, abandonment, and BMPs	WDs, County	Watershed areas above high priority wetlands basins and shallow lakes
See all actions under improve watercourse stability		
Regulatory approaches		
Wetland Conservation Act	County, DNR	
Land Use Zoning	County	
Storm water permitting	Municipality	
Soil Loss Ordinance	County	

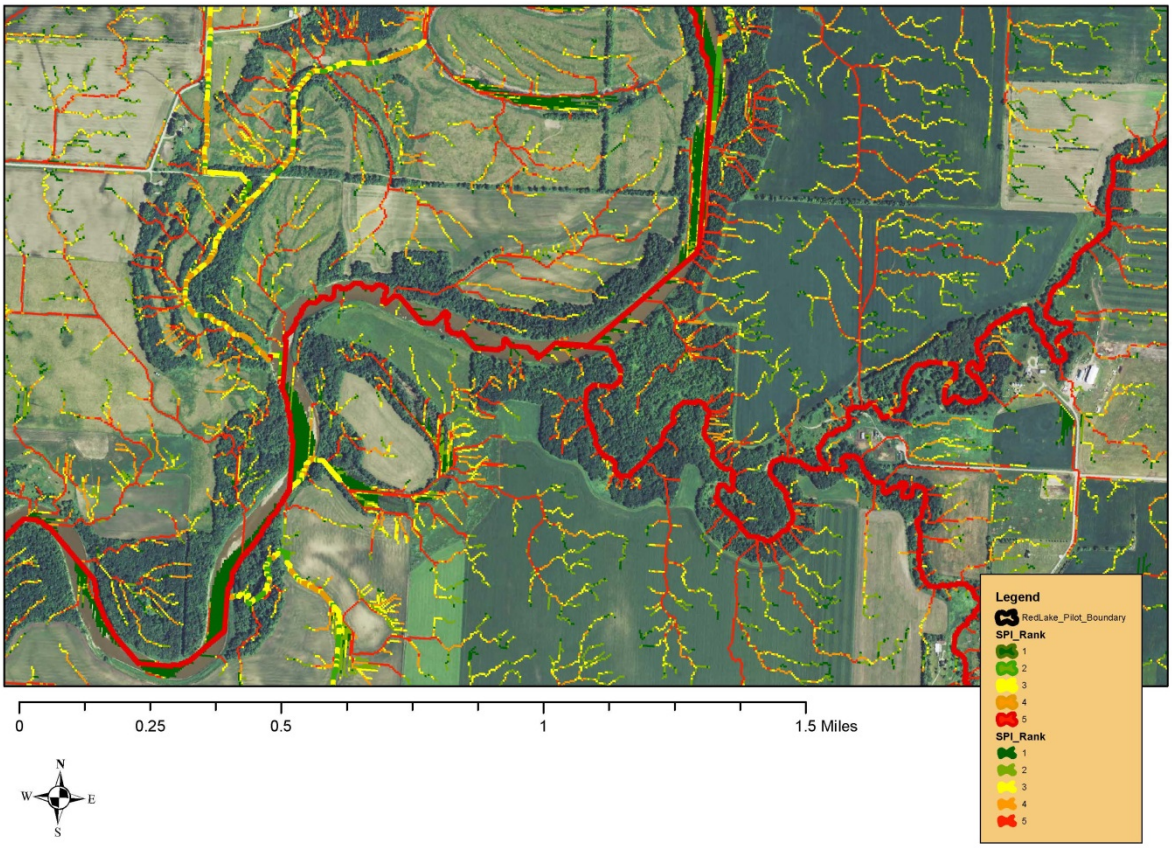
<u>Questions for DNR staff</u>

Anything else?

Red Lake River 1W1P Watershed: Sediment Loading Rank of Catchments



Red Lake River 1W1P Watershed: Ranked Overland and In-Channel Stream Power Index (SPI) - Example 4



List of actions relevant to the goal:

Reduce Flood Damages

Action	Responsibility (landowner, LGU, Agency, NGO)	Primary priority/target areas
Land Use Change	Landowners	Frequently flooded areas
Land Use Practice Change	Landowners	Frequently flooded areas
Water storage		
Sediment basins	NRCS, SWCD,	High priority areas for peak flow reduction
Wetland Restoration and Enhancement	NRCS, SWCD, NGO	High priority areas for peak flow reduction
Impoundments	WD, NRCS, SWCD	High priority areas for peak flow reduction
Artificial drainage system strategic sizing, abandonment, and BMPs	WDs, County	High priority areas for peak flow reduction
Improved road crossing design	WDs, County, road authorities	High priority areas for road damages
Regulatory approaches		
Wetland Conservation Act	County, DNR	
Floodplain Ordinance	County, DNR	
Public water works permitting	DNR	Road crossing related.
Storm water permitting	Municipality	
Land Use Zoning	County	

Questions for DNR staff

Anything else?

List of actions relevant to the goal:

Protect Groundwater Resources

Watershed protection, restoration and enhancement actions related to the goals (P indicates an action is considered a "primary" action associated with achieving a goal because it was listed under a goal. S indicates an action is secondary or supporting of a goal)

		Goal					
Action		**Protection**	**Hydrology**	**Improve wetland & uplands**	**Improve watercourses & riparian**	**Improve WQ**	**FDR**
1	Public ownership	P		S			
2	Acquisition by fee by NGO	P					
3	Private land temporary easement	P					
4	Private land permanent easement	P					
5	Tax Incentives	P					
6	Other Incentives	P					
7	Land Use Change		P	S	S	P	P
8	Land Use Practice Change		P	S	S	P	P
9	Practices that improve soil health		P	S	S	P	P
10	Water storage						
10a	Sediment basins		P	P	S	P	P
10 b	Wetland Restoration and Enhancement		P	P	S	P	P
10c	Impoundments		P	P	S (+ or -)	P	P
11	Artificial drainage system strategic sizing, improvements, abandonment, and BMPs		P	P	P	P	P
12	Intensive management of vegetation on public lands		S	P			S
13	Intensive management of vegetation on private lands		S	P			S
14	Reduce connectivity for fish among wetland basins and shallow lakes			P	S (+ or -)		S
15	Establish functional riparian areas		S	S	P	P	

		Goal					
Action		Protection	Hydrology	Improve wetland & uplands	Improve watercourses & riparian	Improve WQ	FDR
16	Install side water inlets and other appropriate drainage BMPs		S		P	P	
17	Install effective grade control				P	P	
18	Install effective bank erosion control				P	P	
19	Drainage water Best Management Practices		S	S	P	P	
20	Install/replace culverts and bridges to promote channel stability		S (+ or -)		P	P	
21	Remove or modify barriers to fish passage		S (+ or -)		P	P	
22	Install/replace culverts and bridges to promote artificial channel stability		S (+ or -)		P	P	
23	Improve drainage water management		S (+ or -)	S	P	P	
24	Improved Road crossing design		S (+ or -)		P	P	P
25	Regulatory approaches						
26	Shoreland ordinance	P	S	S	S	S	
27	Floodplain ordinance	P		S	S	S	P
28	Public water works permitting	P	S	S	P	S	P
29	Drainage Law	P	S (+ or -)	S	P	S	
30	Wetland Conservation Act	P	P	S	S	P	P
31	404 permitting	P	S	S	S	S	
32	Land Use Zoning	P	P	P		P	P
33	Storm water permitting	P	P	P		P	P
34	Soil Loss Ordinance	P	P	P	P	P	S
35	ISTS					P	

Goal	Factors Which Achieving the Goal will influence				
	Hydrology	Connectivity	Biology	Geomorphology	Water Quality
Protect Existing Upland, Wetland, Riparian, and Aquatic Habitats	X	X	X	X	X
Improve Hydrologic Conditions	X	X	X	X	X
Improve Conditions of Existing Upland and Wetland Habitats	X	X	X	X	X
Improve Condition of Natural, Altered, and Artificial Watercourses and Riparian Areas	X	X	X	X	X
Improve Water Quality			X		X
Reduce flood damages	X	X	X	X	X
Protect existing groundwater resources					

Appendix M

RLWD Flood Damage Reduction Strategy

Appendix M: RLWD Flood Damage Reduction Strategy

Flooding is a major problem within much of the RLWD. This problem is primarily related to geology, topography, weather and land use. The Flood Damage Reduction Work Group (FDRWG) in Minnesota seeks to provide PTs and others with science-based and consensus-based tools to enable more effective FDR within the basin.

A fundamental premise is that FDR along the main stem of the Red River and the lower reaches of its major tributaries (glacial lakebed region) is substantially dependent on the types and locations of FDR and related measures implemented upstream. Flooding in the glacial lakebed region of the basin is substantially affected by runoff timing and volume from upstream areas. Runoff timing and volume are, in turn, substantially affected by the topography, soils, precipitation and land use within different regions of the basin, as well as by the types and locations of FDR and NRE measures that may be implemented. [*A basin-wide FDR framework is outlined in FDRWG Technical and Scientific Advisory Committee (TSAC) Paper #11, which will better enable a coordinated approach to integrate various FDR and associated NRE measures that are most effective for achieving the overall goals envisioned by the Red River Basin Mediation Agreement adopted in December 1998.]*

The goal of this framework identified in TSAC Paper #11 is to implement various types of FDR measures individually, or in concert, at locations for which they are best suited to achieve FDR benefits locally and in the watershed, while also contributing to reduction of main stem flooding risk. This framework includes FDR measures that are also NRE measures and promotes multi-purpose projects as outlined below.

There are critical concepts about runoff timing and volume in relation to flood peaks on the main stem of the Red River and facts about variations in topography, soils, precipitation and evaporation within the Minnesota portion of the basin, as foundations for defining the expected peak flow reduction effects of implementing various FDR measures within different areas of the RLWD. Available geologic, topographic, meteorologic and historical flood data, as well as computed runoff travel times, are used to illustrate these concepts and to define “early,” “middle,” and “late” runoff areas within the RLWD.

A wide array of alternative FDR measures are identified, categorized and discussed, including pros, cons and general recommendations for the best areas in which to implement these measures to optimize overall FDR benefits. A summary table is presented for the identified array of FDR measures with ratings of potential for peak flow reduction on the main stem when these measures are implemented in early, middle, or late runoff areas relative to the main stem. It should be noted that there are a number of measures, such as abandonment of flood-prone areas and the retirement of flood-prone lands that can be implemented within these areas. Such measures should be given careful consideration when evaluating the overall effectiveness of proposed solutions.

Summary of Flood Damage Reduction Measures

FDR measures can be grouped into the four general categories outlined below. These categories and measures are listed here and discussed in more detail in subsequent sections.

Reduce Flood Volume

- Restore or create wetlands (providing infiltration and evapotranspiration)
- Use cropland best management practices (BMPs) to increase infiltration and evapotranspiration
- Convert cropland to prairie or other types of perennial grassland (e.g., Conservation Reserve Program (CRP) and Reinvest in Minnesota (RIM), to increase infiltration and evapotranspiration)
- Convert land use to forest (forested areas generally have the lowest runoff coefficients, due to high interception and evapotranspiration)
- Other beneficial uses of stored runoff

Increase Conveyance Capacity

- Channelization (increasing the flow capacity of existing channels or flowages)
- Drainage (creating new or improved conveyance capacity)
- Diversions (of flood waters around a current damage area)
- Setting back existing levees (to restore floodway capacity)
- Increasing road crossing capacity

Increase Temporary Flood Storage

- Impoundments (with or without a normal pool, to detain water in excess of downstream channel capacity)
- Restored or created wetlands (functioning as impoundments)
- Drainage (to lower surface water and groundwater levels, which increases infiltration and temporary storage in the upper soil horizons)
- Culvert sizing (to increase temporary storage by widespread metering of runoff close to its source)
- Setting back existing levees (to restore floodplain storage areas)
- Overtopping levees (to utilize diked floodplain storage capacity when critically needed)

Protection/Avoidance

- Urban levees
- Farmstead levees
- Agricultural levees
- Evacuation of the floodplain (removing people and flood-prone facilities and converting to more flood-compatible land uses)
- Floodproofing
- Flood warning and emergency response planning

Many projects will combine two or more of these methods. Specific application of each method is dependent on design and location.

- Reducing runoff volume is always beneficial, especially if done in the middle and upper parts of a watershed.
- Increasing flood storage is most beneficial in the middle and upper parts of a watershed.
- Increasing conveyance is most beneficially done in the lower parts of a watershed.

- Protection measures are most beneficially applied in the middle and lower parts of a watershed.

Many of these methods have been used extensively throughout the RLWD. Most still have application as part of future FDR projects. The challenge for watershed district managers is to develop projects containing one or more of these methods while adhering to the flood damage and natural resource protection goals and principles established by the working group. Similarly, the challenge for natural resource managers, especially in the Red River Basin, is to incorporate FDR goals to the greatest extent possible in their development and operational plans.

Flood Damage Reduction Strategies

Accomplishing the broad FDR described above will require consideration of a full range of structural and non-structural strategies. Specialized strategies such as adequate flood warning systems and ring dikes will help prevent loss of human life and damage to farm structure, homes and communities. Meeting other goals will require strategies that reduce overland flooding, provide storage and/or maintain or provide adequate conveyance. The work group agreed that a combination of strategies may be needed to maximize the effectiveness of any particular strategy. These strategies potentially include:

Wet Dams

- A dam constructed to maintain a permanent pool of water while providing temporary storage of stream flows for flood control. It may also provide wildlife habitat and recreation.
- Can be designed with gated or automatic draw-down control outlet structures.
- A constant source of inflow is needed for pool maintenance.
- A management plan incorporating downstream predicted peak-flows is essential to maximize FDR potential.

Dry Dams

- A dam constructed for temporary storage of stream flows during flood events.
- Can be designed with gated or automatic draw-down control outlet structures.
- Duration of designed storage depends on downstream channel capacity.
- A management plan incorporating downstream predicted peak-flows is essential to maximize FDR potential.

On-stream Storage

- A structure placed across the cross-section of a stream's topography causing flood flows to form a pool.
- Utilizes existing landscape features to maximize control capability.
- May cause alterations to pre-project plant communities in a summer storm event.
- Allows for control of flows from entire watershed above the point of construction.

Off-stream Storage

- A storage structure placed adjacent to a water course to receive diverted flood flows.
- Potential for construction and effectiveness dependent on the area topography.
- Allows for maintaining a free-flowing stream in non-flood flow conditions and can ensure a stream flow during flood events.

- Duration of storage can be extended to ensure maximum downstream benefits.
- Allows for control of flows from entire watershed above the point of construction.

Note: On/off stream storage can have either gated or un-gated outlet controls. With gated storage the project's management plan can adapt to future conditions. With fixed draw-down features, the release of stored water is pre-determined.

Flood Storage Wetlands

- An outlet control structure is constructed on previously drained wetland which may contain a permanent pool.
- Some natural wetland functions can be restored and maintained.
- Can reduce the runoff from a watershed's contributing area in direct relation to the size of the temporary pool created thereby reducing downstream discharges.
- Secondary goals may be wildlife enhancement, water quality improvement, stream flow stabilization, provide infiltration for groundwater recharge and reduce erosion.

Wetland Restoration

- Wetlands restored to pre-drainage hydrology and appropriate native vegetation.
- May provide flood storage benefits based on hydrologic setting, outlet configuration and antecedent moisture conditions.

River Corridor Restoration

- The area adjacent to a stream is restricted to non-rotational farming practices or within a city is designated as a green belt and zoned against building activity.
- Effectiveness based on degree of flow control accomplished.
- Can be effective in reducing streambank erosion and downstream sediment deposition.
- Provide a haven and travel route for wildlife.
- Reduces downstream flow velocities and allows for restoration of natural ecosystem.
- May provide additional floodplain storage during flood events.

Setback Levees

- Levees (dikes) are built parallel to and a reasonable distance (e.g., meander belt width) away from water courses to contain flows and increase riparian storage of above-bank flows.
- Can prevent flooding of adjacent land and resulting cross-country sheet-flooding.
- May increase downstream flows by removing traditional routing and storage.
- May create an impediment to drainage of adjacent land and minor watershed outlets.

Riparian Buffer Strips

- The land adjacent to streams is permanently seeded/planted to appropriate vegetation.
- Reduces erosion and filter runoff from affected land.
- Reduces cropland losses by taking land out of annual production.
- Provides a haven/travel corridor for wildlife and access for stream maintenance.

Dredging and Channelization

- Channel modification or removal of accumulated sediment to increase channel capacity.
- May increase downstream flows.
- May reduce flooding due to increased channel flow efficiency and timing of discharge.
- Disrupts stream ecology and equilibrium and may cause downstream erosion and sedimentation.

Storage Easement

- Compensation is paid to landowners for the public or private benefit of storing water on their land.
- Offsets lost land value do to required land use change.
- Provides and incentive for project development where needed.

Retirement of Land

- Converts land from agricultural production to permanent vegetation.
- Reduces surface runoff during and/or after precipitation storm events.
- Significantly reduces erosion of soil from affected area.
- Provides for wildlife habitat.

Land Use

- Land use changes may alter downstream flows.
- Increased areas of intensively cultivated crops may increase storm event runoff.
- Land use changes are influenced by economics and federal, state and local policy.
- Flood plain land uses compatible with periodic flooding may accomplish FDR.

Best Management Practices

- A practice or combination of practices that are determined to be the most effective and practicable means of treating a resource problem at levels compatible with environmental quality goals.

Gating Ditches

- Adjustable controls are placed on culverts in channels to regulate stream flow.
- Topography of the affected area determines the technically appropriate control used.

Culvert Sizing

- Graduated sizing of culverts within a ditch system to provide a degree of control.
- Equity is an important consideration.
- The smaller the drainage area is, the more effective culvert sizing can be in accomplishing meaningful, effective control.

Drainage

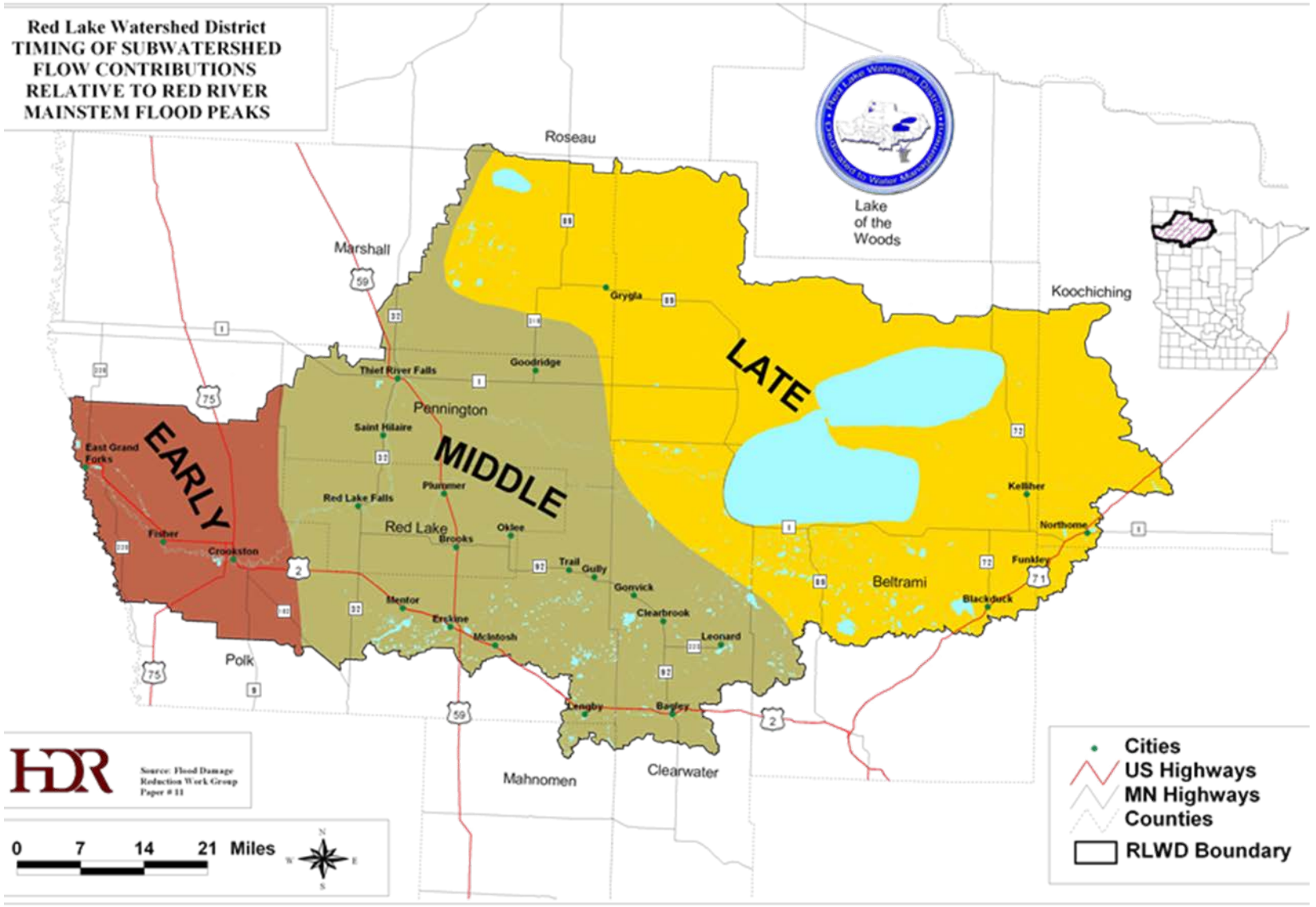
- Modification of the hydrology of the land by providing drainage-ways to convey surface or subsurface water from cultivated or occupied areas.
- Water conveyed by drainage of agricultural land in the higher elevation areas of a watershed may increase downstream flows.

In **Table M1**, FDR measures are rated in terms of appropriateness for local and downstream FDR, based on location in the watershed in relation to timing of runoff to the main stem. A plus sign (+) indicates application of a particular FDR measure would normally have a positive effect downstream on the main stem of the Red River or the lower reaches of its major tributaries (i.e., it would result in a reduction in downstream peak flows). A minus sign (-) indicates a likely negative effect on downstream flooding, and a zero (0) indicates a likely insignificant effect on downstream flooding. Double plus signs (++) and double negative signs (--) indicate more substantial positive or negative effects on downstream flooding.

Table M-1 Expected Peak Flow Reduction Effects on the Red River Main Stem of FDR Measures Applied in Early, Middle and Late Areas Upstream

Flood Damage Reduction Measure	Early* Upstream Area	Middle* Upstream Area	Late* Upstream Area
1) Reduce Flood Volume	+	++	++
a) Wetlands	+	+	++
b) Cropland BMPs	+	++	++
c) Conversion to grassland	+	++	++
d) Conversion to forest	+	++	++
e) Other beneficial uses of stored water	+	++	++
2) Increase Conveyance Capacity	+	-	--
a) Channelization	+	-	--
b) Drainage	+	-	--
c) Diversion	+	Variable	-
d) Setting back existing levees (to increase conveyance capacity)	+	-	--
e) Increasing bridge capacity	+	-	-
3) Increase Temporary Flood Storage	Variable	++	+
a) Gated impoundments	+	++	++
b) Ungated impoundments	-	+	+
c) Restored or created wetlands	-	+	+
d) Drainage	-	+	++
e) Culvert sizing	-	+	+
f) Setting back existing levees (to increase floodplain storage)	+	++	+
g) Overtopping levees	++	+	Variable
4) Protection/Avoidance	Variable	Variable	Variable
a) Urban levees	-	-	-
b) Farmstead levees	-	-	-
c) Agricultural levees	-	-	-
d) Evacuation of the floodplain	-	-	-
e) Floodproofing	-	-	-
f) Warning and emergency response	-	-	-

**Location of FDR measure relative to the Red River main stem at the international border*


Red Lake Watershed District
TIMING OF SUBWATERSHED
FLOW CONTRIBUTIONS
RELATIVE TO RED RIVER
MAINSTEM FLOOD PEAKS
Roseau
Lake
of the
Woods
Marshall
Koochiching
Grygla
Goodridge
Thief River Falls
Pennington
Saint Hilaire
East Grand
Forks
EARLY
MIDDLE
LATE
Plummer
Red Lake Falls
Red Lake
Oklee
Brooks
Fisher
Crookston
Trail
Gully
Gonvick
Mentor
Erskine
McIntosh
Clearbrook
Leonard
Beltrami
Kelliher
Northome
Funkley
Blackduck
Polk
Mahnomen
Clearwater
Cengby
Bagley
HDR
Source: Flood Damage
Reduction Work Group
Paper # 11
0 7 14 21 Miles
Cities
US Highways
MN Highways
Counties
RLWD Boundary

Appendix N - Water Management Districts

Section 1 – General Authority and Process

Overview

Pursuant to section 8.1.3 of this plan, the Red Lake Watershed District (RLWD) plans on using Water Management Districts (WMD) as one of several funding mechanisms for the implementation of activities to solve local and regional problems and issues. The provisions for collection of charges (MS 103D.729 and 444.075) allow a watershed district, through the amendment of its plan or during a plan update, the authority to establish one or more WMDs for the purpose of collecting revenues and paying the costs of projects initiated under MS 103B.231, 103D.601, 103D.605, 103D.611, or 103D.730. Appendix J of this plan contains the Board of Water and Soil Resources (BWSR) guidance for the establishment of WMDs and includes the previously established Thief River Falls Flood Damage Reduction Project Water Management District. Appendix J, however, includes several unrelated items of importance to this plan including RLWD Rules and Soil and Water Conservation District (SWCD) statutory authority, chapter 103C. This appendix N is dedicated solely to WMDs established or to be established by further amendment to this plan. Section 1 of this appendix N outlines the authority and processes for establishment of WMDs, including review of proposed WMDs and plan amendments by the One Watershed One Plan (1W1P) planning and policy committees. Current and future WMDs will be included as subsequent sections to this appendix N.

To establish a WMD, a plan update or amendment must describe the area to be included, the amount of the necessary charges, the methods used to determine the charges, and the length of time the WMD will remain in effect. After adoption, the plan update or amendment must be filed with the county auditor and county recorder of each county affected by the WMD. The WMD may be dissolved by the same procedures as prescribed for the establishment of the WMD – i.e. by plan update or amendment.

A distinguishing element of the WMD charge over an assessment, or ad valorem tax is that the watershed district exercises authority, similar to that of a municipality, to establish and impose a system of charges based on a prescribed method, such as a property's contribution of storm water and/or pollutants to a receiving body of water, conveyance or management system; or the extent of relief or protection afforded to property by an impoundment, conveyance or diversion. Thus, funds generated by utilizing a WMD charge can be based upon a mechanism related to the cost of the project in managing a burden created by the property or in providing protection to the property rather than the value of the property (ad valorem tax) or special economic benefit conferred (assessment). Ultimately the WMD provides a supplemental financing tool, within a prescribed area, for the RLWD and is especially useful in situations where project components are required to address a locally generated need or problem.

Review and Establishment Process

Because this plan is a 1W1P based plan, WMD establishment, whether as part of a 10-year plan update or as a plan amendment, must follow the guidance provided in the BWSR One Watershed, One Plan Operating Procedures, version 2.0, effective 3-28-2018 (Board Decision #18-14) or its successor. The amendment process must also be consistent with the Operating Agreement for this plan which specifies the role of the Planning Workgroup and Policy Committee, confers upon the Planning Workgroup authority to develop and recommend plan amendments and confers upon the Policy Committee authority to review and adopt amendments as approved by the BWSR.

For WMD establishment by amendment, the following procedure will be followed:

1. **Initial Review by the Planning Workgroup:** The Planning Workgroup, as established in the Operating Agreement for this plan, consists of representatives from each SWCD partially or wholly within the 1W1P area and representatives of the RLWD. The Planning Workgroup shall either develop or be provided a copy of the proposed amendment for initial review. After review, the Planning Workgroup shall provide notice of the proposed amendment to the Plan Review Authorities and the public.

2. **Notice to Plan Review Authorities and Public:** Plan Review Authorities, including the Department of Agriculture, the Department of Health, the Department of Natural Resources, the Pollution Control Agency, the Board of Water and Soil Resources, SWCDs, other watershed districts and counties, cities, and towns partially or wholly within the One Watershed Plan area shall be provided notice and a copy of the proposed amendment along with a request for comments to be provided to the Planning Workgroup within 60 days of the notice. The public shall be noticed of the proposed amendment by publication in a newspaper in general circulation within the 1W1P area. The publication must state the general nature of the proposed amendment, provide the public information on how to obtain or view a copy of the proposed amendment and state that comments on the proposed amendment may be provided to the Planning Workgroup.

3. **Final review and referral by the Planning Workgroup:** Upon expiration of the 60 day comment period, the Planning Workgroup will conduct a final review of the proposed amendment and make necessary revisions based on the comments received, if any. The Planning Workgroup may adopt responses to the comments received. After final review and revisions, the Planning Workgroup shall refer the proposed amendment, along with all comments and responses, to the Policy Committee along with the Planning Workgroup's recommendation on approval. A copy of the Planning Workgroup's referral shall also be transmitted to the BWSR.

4. **Hearing of the Policy Committee:** The Policy Committee, as established in the Operating Agreement for this plan, will schedule and hold a public hearing on the proposed amendment no sooner than 14 days after receiving the Planning Workgroup's referral and recommendation. Notice of the public hearing shall be given by mail to the BWSR, Plan Review Authorities and the Planning Workgroup. Notice of the public hearing shall also be published in a newspaper in general circulation within the 1W1P area. A record shall be kept of the hearing to include an audio recording of the proceedings and copies of all written correspondence, comments or responses generated in the proceedings.

5. **Notice to Plan Review Authorities:** Following the public hearing, the Policy Committee shall provide a copy of the final proposed amendment along with its findings and recommendation regarding plan approval to the Plan Review Authorities and request that final comments, if any, be submitted to BWSR in advance of the BWSR consideration of the proposed amendment.

6. **Referral and Recommendation to BWSR:** Following the public hearing, the Policy Committee shall submit the final proposed amendment to BWSR for final review and approval. The submittal to BWSR must include the audio recording of the public hearing, a copy of all written comments and responses received on the proposed amendment and the Policy Committee's findings and recommendation on approval of the proposed amendment. After review, the BWSR Board, or a committee thereof, shall render a decision approving or disapproving the amendment in accordance with its operating procedures.

7. **Local Adoption:** If BWSR approves the proposed amendment, the Policy Committee, according to the authorities granted to it in the Operating Agreement for this plan, shall adopt a resolution, within 120 days of BWSR Board approval, adopting the amendment. A copy of the resolution to adopt the amendment must be sent to BWSR. Notice of the adopted amendment shall be published in a newspaper in general circulation within the 1W1P area along with notice of appeal rights as outlined below. Unless appealed, the plan amendment is effective 30 days after first publication of the Policy Committee resolution adopting the amendment.

Implementation of Charges

Prior to implementing any charges within a WMD established in this plan, the Policy Committee must file a copy of the WMD plan amendment with the county auditor and county recorder of each county affected by the water management district. Along with the amendment, the Policy Committee may provide additional information to the auditors or recorders that is necessary to identify properties subject to charges within the water management district. With the consent of a city, charges to properties within the jurisdictional boundary of a city may be consolidated and presented to the city for payment.

Prior to the imposition of charges, the RLWD shall hold a public hearing in conjunction with a project's establishment. At the public hearing, the RLWD Board shall present the amount of the necessary charges, the methods used to determine charges, and the length of time the WMD will remain in force. The RLWD Board shall also provide information on the amount of charges to individual parcels within the WMD. In addition to other notices required by statute, the RLWD Board must, ten days prior to a hearing or decision on projects to be paid in whole or in part by WMD charges, provide notice to the city, town, or county within the WMD. The city, town, or county receiving notice shall submit to the managers concerns relating to the implementation of the project. The managers shall consider the concerns of the city, town, or county in the decision on the project.

WMDs established under this plan are intended to be perpetual for the life of this plan and any subsequent revisions, unless dissolved by plan amendment or update. Initial charges, if any, will be effective for a duration consistent with the time necessary to repay the capital cost of projects to be paid for, in whole or in part by charges within the WMD. Thereafter and upon hearing, WMD charges may be reinitiated to generate revenue to pay for project maintenance.

Local Appeal

Local Appeal Procedure: Because WMDs established under this plan are proposed to be perpetual, the following local appeal procedure is established from the resolution adopting a plan amendment establishing a WMD:

1. Upon receipt of the Order of the BWSR authorizing a plan amendment establishing a WMD, the Policy Committee shall publish notice of its resolution adopting the plan amendment in a newspaper in general circulation in the part of the 1W1P area where the WMD is located.

2. Any landowner affected by the WMD may, within 30 days of first publication of notice of the resolution, appeal the establishment of the WMD to the Policy Committee by filing a letter stating the basis for the appeal.

3. Within 30 days of receiving a letter of appeal, the Policy Committee shall hold a hearing on the appeal, giving the appellant an opportunity to be heard and to present evidence why the WMD should not be established. The hearing shall be noticed as required for a special meeting under statutes chapter 103D.

4. The hearing shall be recorded in order to preserve a record for further review. The record of the appeal shall include the recording, any documentary evidence provided by the appellant and all records related to the establishment of the WMD.

5. Within 30 days of the hearing, the Policy Committee shall adopt and mail findings and an order on the appeal to the appellant and the BWSR.

6. Further appeal, if any, shall be as provided in Statutes Chapter 103D and existing authorities and procedures of the BWSR Board.

Section 2 – Thief River Falls Flood Damage Reduction Project Water Management District

The following is reprinted from Appendix J, pages J-29 to J-32

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Memo

To:	Red Lake Watershed District Board of Managers		
From:	Nate Dalager, P.E.	Project:	Plan Amendment – Water Management District
cc:			
Date:	November 10, 2010	Job No:	131515

Re: Plan Amendment - Establishment of a Water Management District for the Thief River Falls Flood Damage Reduction Project

Introduction

Pennington County Ditch #1 (CD 1) has been a source of agricultural and urban flooding problems for years. Since its construction 100 or more years ago, the ditch has routinely flooded out of its banks in spite of cleanouts and culvert replacements. In 2005, the Pennington County Board of Commissioners, Thief River Falls City Council, RLWD, and others requested that HDR Engineering conduct a drainage study and provide a report of findings. Due to funding limitations and procedural uncertainties related to Minnesota (MN) ditch law, no entity was able to advance the project forward until a landowner ditch improvement petition was received by the Red Lake Watershed District (RLWD) in 2009.

In response to the landowner petition, the RLWD has approved the Preliminary Survey Report and Detailed Survey Report in accordance with MN Statute 103E. These reports explain the project in detail and are available for review from the RLWD upon request.

Because of the severity of the flooding problem and the complexity and cost of the proposed CD 1 improvement within the urban environment, the RLWD established the Thief River Falls Flood Damage Reduction (FDR) Project in accordance with MN Statute 103D.605. As part of the funding strategy for the project, the RLWD is hereby proposing to amend Section 7.1.6.2 of its watershed plan in accordance with MN Statute 103D.411 to establish a Water Management District (MN Statute 103D.729) with the purpose of collecting revenue and paying for a portion of the costs of the Thief River Falls Flood Damage Reduction Project. This memo will outline the following as required by the amendment procedure:

- Area included in the Water Management District (WMD)
- The amount of the necessary charges
- The method used to determine the charges
- The length of time that the Water Management District will remain in force

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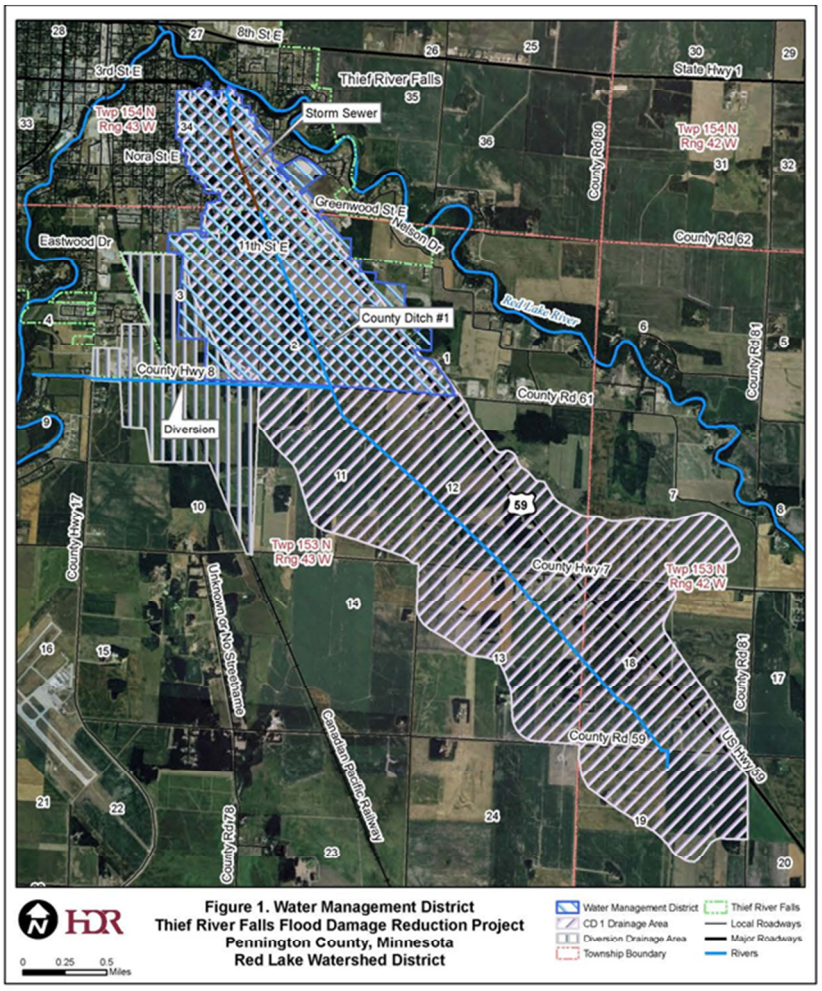
Water Management District Area

The area encompassed by the proposed Water Management District extends from CSAH 8 at the south (upstream) end, to the northern extents of CD 1 outletting into the Red Lake River within the City of Thief River Falls. The outer boundary of the WMD follows property lines, because any property that has partial drainage or protection benefits from the project will be included in the Water Management District. The WMD is approximately 1,070 acres in area and is a mix of agricultural, commercial, industrial, and residential properties. See Figure 1 below for a map of the WMD boundary.



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Amount of Charges

The project has been estimated to cost $3 million, and is broken down into two distinct components:

- ditch improvement; and
- flood damage reduction project

The ditch improvement consists of an improvement of the ditch grade, cross-section, and culverts, and is estimated to cost approximately $1,000,000. The ditch improvement component of the project will be paid for by benefitted landowners as determined by the viewers in the re-determination of benefits process.

The flood damage reduction component is estimated to cost $2,000,000, and consists of a diversion down the CSAH 8/Challenger roadside ditch and the installation of storm sewer through the City, from Greenwood Street to the TH 59/1st St E intersection. The FDR project component will be paid for by contributions from the RLWD, the State of Minnesota FDR program, and the funds that the Water Management District would ultimately collect. The charges collected by the Water Management District for the construction of its portion of the flood damage reduction component shall consist of 30% of all costs associated with the FDR project, not to exceed $700,000.

Table 1 below describes the breakdown of the project funding.

Table 1. Project Funding Breakdown

Project Component	Funding Source
Ditch Improvement	Benefitted Landowners
Flood Damage Reduction	35% Red Lake Watershed District
	35% State of MN - FDR Program
	30% WMD charges

Method for Determining Charges

The method used to determine the amount of charges each parcel will pay to the Water Management District will closely follow the method that the City of Thief River Falls uses to determine its monthly storm water utility charges. The monthly charge is determined by an approximation of the volume of storm water runoff from a parcel. Runoff volume is a factor of the parcel's area, and the portion of the area that has impervious surfaces, such as rooftops, parking lots, driveways, and sidewalks. Each parcel that falls within the WMD boundaries will be placed into a land use classification, and assigned a Residential Equivalency Factor (REF) for each classification as follows in Table 2 below.

Table 2. Residential Equivalency Factor (REF)

Land Use Classification	Residential Equivalency Factor (REF)
Single Family	1.0
Manufactured Home	1.0
Multi-Family Residential	1.5
Commercial/Industrial	1.5
Schools/Churches/Institutional	1.5
City-Owned Land	1.0
Vacant/Vegetative/Agricultural/Unimproved	0.1 with cap

Then, the formula for determining the monthly charge is as follows:

Water Management District Charge = (REF) x size of parcel (acres) x fee per acre

The fee per acre will be determined upon a more detailed analysis of the final charges.

Length of Time in Force

The initial charges for the WMD for construction of the TRF FDR Project shall be assessed and recovered over a period not to exceed 20 years. In addition to the initial cost recovery period of 20 years, the WMD will remain in-place perpetually in order to assess fees for maintaining the WMD's share of the flood damage reduction portion of the project. The managers may assess all the parcels of property and municipal corporations previously assessed for project construction of the TRF FDR project, to establish a maintenance fund for the project. The assessment for the WMD maintenance fund may not be made when the fund exceeds 20 percent of the original cost of construction for the Thief River Falls Flood Damage Reduction project.

Conclusion

In accordance with MN Statute 103D.729, this plan amendment proposal shall be forwarded to the City of Thief River Falls, Pennington County, and appropriate state agencies for review and comment. The Board of Water and Soil Resources will hold a public hearing in conjunction with the RLWD to receive testimony on the proposed plan amendment providing for the establishment of a Water Management District.

Section 3 – Thief River Falls – West Side Flood Damage Reduction Project Water Management District

Introduction

Pennington County Ditch #70 (CD 70) is located north and west of the City of Thief River Falls (City). The system drains areas north and west of the City, as well as areas within the City. CD 70 currently provides an estimated 2-year or less level of service for drainage in agricultural areas and an estimated 10-year level of service for drainage in residential/commercial areas. Currently, much of the system does not completely drain following wet weather events due the inconsistent grade, channel size, and excess vegetation in the ditch. These conditions result in long periods of inundation on adjacent agricultural and commercial land from minor rainfall events. Although much of the area may be located outside of the 100-year floodplain, there are vital properties within the 11 mile drainage area that must be protected from a 100 year event.

In 2017 the Red Lake Watershed District (RLWD) partnered with the City and Pennington County (County) to study alternatives that would alleviate the flooding along CD 70. Upon the completion of the Flood Damage Reduction Analysis, the City and County filed petitions under Minnesota Statute 103D.705 to the RLWD for the design and construction of a proposed flood damage reduction project.

The RLWD established the Thief River Falls Westside Flood Damage Reduction Project in accordance with Minnesota Statute 103D.605. As part of the funding strategy for the Project, the RLWD proposes to establish a Water Management District (WMD) for the project in order to provide an efficient mechanism for collecting a local share of project costs. This section outlines the following requirements for the establishment of a WMD:

- Area included in the Water Management District;
- The amount of the necessary charges;
- The method used to determine the charges; and
- The length of time that the Water Management District will remain in force.

Water Management District Area

The area encompassed by the proposed Thief River Falls-West Side Flood Damage Reduction Project WMD extends from the north (upstream) end of CD 70, to the outlet into the Red Lake River, as well as portions of the County Ditch 1 drainage area. The outer boundary of the WMD follows the drainage area boundaries or the benefitted area property lines, whichever is greater, because any property that has partial drainage or protection benefits from the Project will be included in the WMD. The WMD is approximately 10,670 acres in area and is a mix of agricultural, commercial, industrial, and residential properties. See Figure N-1 for a map of the WMD location. A listing of parcels affected by the WMD is included under a separate heading below.

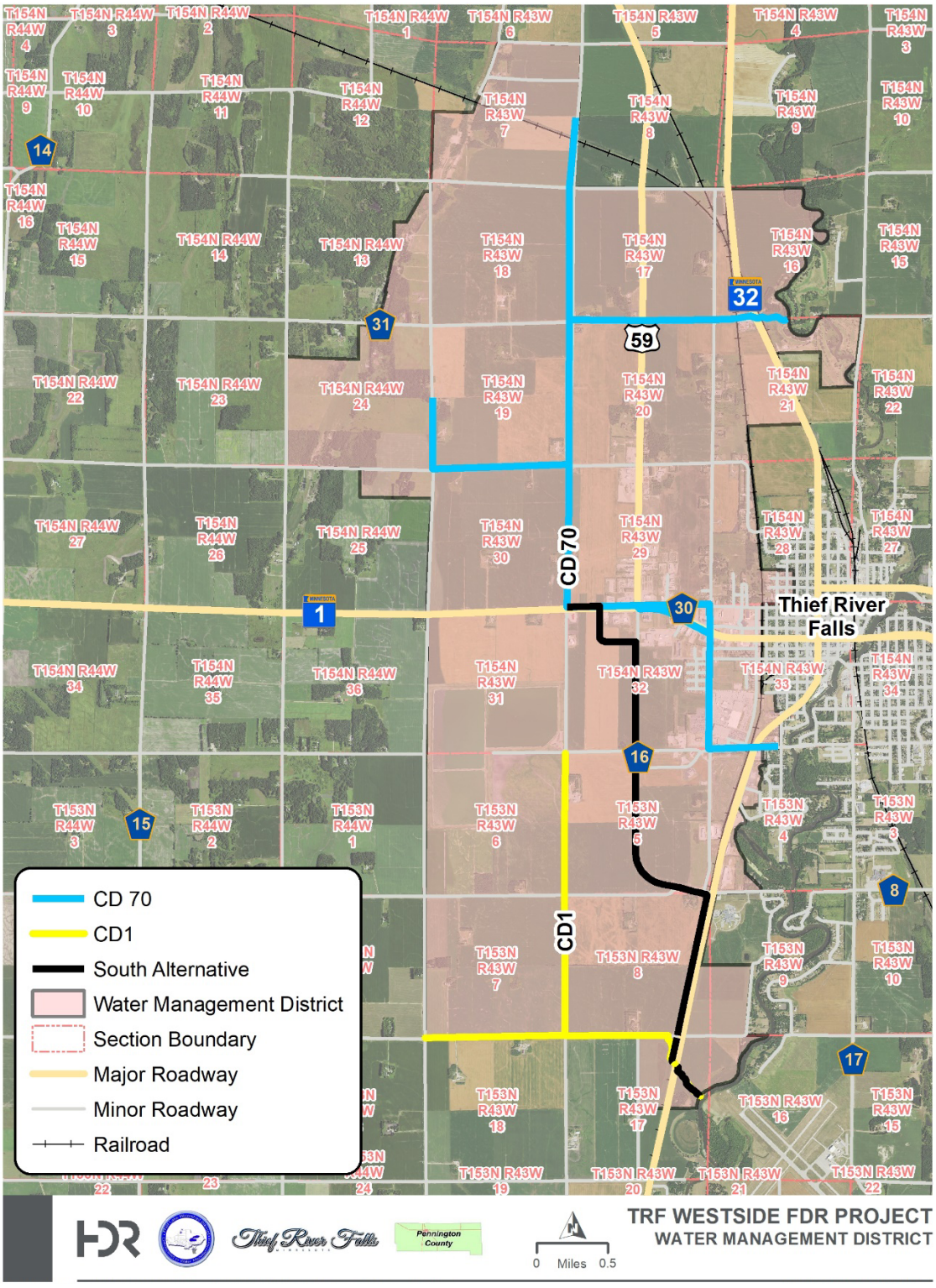

Figure N-1: Water Management District Location

Amount of Charges

The Project has been estimated to cost $6 million. The Project will be paid for by contributions from the RLWD, the State of Minnesota FDR program, Pennington County, the City of Thief River Falls, Minnesota Department of Transportation, and the funds collected from the WMD. The charges collected by the WMD for the construction of its portion of the flood damage reduction component shall consist of approximately 17% of all costs associated with the Project, not to exceed $1,000,000. Table N-1 describes the breakdown of the Project funding.

Table N-1: Project Funding Breakdown

Funding Source	Project Participation
RLWD, City, County, MnDOT	$2.5 Million (41.6%)
State of MN – FDR Program	$1.5 Million (25%)
Red River Water Management Board	$1.0 Million (16.7%)
Water Management District	$1.0 Million (16.7%)

Method for Determining Charges

The method used to determine the amount of charges each parcel will be assessed towards the WMD is based on the Pre-Project and Post-Project flood damage protection conditions (level of service) for each acre or fraction thereof in the water management district. The level of service is defined as the ability for a area of land to drain 12 hours after the storm event has ended. Subwatersheds within the drainage area of the Project were analyzed for a 2-year (2.49 inches), 10-year (3.77 inches), and 25-year (4.69 inches) 24 hour duration summer storm event. Based on the pre- and post-project level of service, a level of service factor (LSF) was assigned.

Table N-2: Level of Service Improvement Categories

Level of Service Improvement (LSI)	Level of Service Factor (LSF)
2 Year – 2 Year	Outlet Improvement (Base Rate = 1.0)
10 Year – 10 Year	Outlet Improvement (Base Rate = 1.0)
25 Year – 25 Year	Outlet Improvement (Base Rate = 1.0)
10 Year – 25 Year	2.0
2 Year – 10 Year	3.0
2 Year – 25 Year	4.0

The base rate will be determined by the following formula:

(Base Rate x (Outlet Improvement LSF) x Total LSI Parcels (Acres)) + (Base Rate x (10Yr-25Yr LSF) x Total LSI Parcels (Acres)) + (Base Rate x (2Yr-10Yr LSF) x Total LSI Parcels (Acres)) + (Base Rate x (2Yr-25Yr LSF) x Total LSI Parcels (Acres)) = $1.0 Million Max

The formula used for determining the total charge per parcel is as follows:

Water Management District Charge = (LSF) x Base Rate x Size of Parcel in Acres Contributing to the Project Drainage Area

**Parcels outside of the City of Thief River Falls are capped at a maximum assessment of 20 acres per parcel.*

**The minimum LSF within the City limits is 2.0 due to urban impervious surface and associated drainage benefits provided by the Project.*

Perpetual District; Duration of Charges, Subsequent Charges

The water management district shall be perpetual for the life of this plan and any subsequent revisions, unless dissolved by plan amendment or revision. The initial charges for the WMD for construction of the Project shall be extended and recovered over a period not to exceed 20 years. In addition to the initial cost recovery period of 20 years. Subsequent maintenance charges within the WMD may be extended to establish and maintain a maintenance fund. The balance of a maintenance fund may not exceed 20 percent of the original cost of construction for the Project, consistent with the limitations found in statutes section 103D.631.

Affected Parcels

A list of parcels of record that are located in the WMD are located in the office of the Red Lake Watershed District and the Pennington County Recorder.

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Section 4 – Black River Impoundment Project Water Management District

Introduction

The Black River Impoundment Project's primary purpose is to provide flood damage reduction within the Black River sub-watershed. Reducing peak flows will reduce risk of flood damage to local public transportation facilities, erosion of agricultural and private lands upstream and downstream of the impoundment site, improve water quality, and improve the operation efficiency of the downstream Schirrick Dam on the Black River.

The Red River Watershed Management Board (RRWMB) funded a comprehensive plan for expanded distributed detention strategies for Minnesota membered watershed districts throughout the Red River Basin. This plan is summarized in the Red River Basin Commission's (RRBC) Long Term Flood Solutions (LTFS) Basin Wide Flow Reduction Strategy Report, and it concluded with a goal to reduce the Red River of the North (Red River) peak flow and volume by 20% during a flooding event comparable to the 1997 flood. To accomplish this, the report set forth guidelines while working with each of the watersheds to develop district specific strategies.

The Red Lake Watershed District's Expanded Distributed Detention Strategy recommended 58 locations of off channel retention and 8 locations of on channel retention to help achieve the goals set forth in the RRBC LTFS Basin Wide Flow Reduction Strategy Report. The Black River Sub-Watershed encompasses several of the identified 58 locations. To begin the development of a flood control impoundment project, the RLWD investigated preliminary alternatives for the Black River sub-watershed. Four preliminary impoundment site alternatives were reviewed within the Black River sub-watershed. The selected alternative was carried forward due to cooperation from local landowners and the potential storage capabilities of the site. Privately owned agricultural lands were made available by either fee title or permanent flowage easements to the RLWD for the impoundment site. The RLWD board proceeded with further engineering investigation of the selected alternative.

In addition to the impoundment site and associated structures, approximately 12 miles of diversion ditches are being proposed to efficiently direct runoff into the impoundment site; maximizing the impoundments contributing drainage area. All project costs associated with the impoundment and diversion ditches will be funded as part of the overall flood damage reduction project. The RLWD is proposing to establish a Water Management District (WMD) as part of an overall funding strategy for long term operation and maintenance of the project. See Figure N-2 for the locations of the project facilities and properties effected by the WMD.

The following section outlines the requirements for the establishment of a WMD:

- Define Water Management District Area
- Establish the amount of necessary charges
- Describe the method for determining charges
- Establish the length of time the WMD will remain in force

Water Management District Area

The WMD area proposed for this project is generally bounded at the northerly limits by CSAH 7 and CSAH 12, a width approximately 1 mile east and 1 mile west of the intersection with CSAH 7, CSAH 13 and CSAH 12. The southerly limits are generally bounded by Pennington County Road 55 from the intersection with Pennington County Road 68, east for approximately 4 miles. The westerly limits of the proposed WMD is approximately Pennington County Road 68 from the intersection with CSAH 3, north approximately 3 miles, east 1 mile and north 1 mile along CSAH 12. The easterly limits follow the ridge line approximately 3 miles east

of Pennington County Road 68. The WMD area is bounded by either the limits of the drainage area or the limits of the benefitted area, whichever is greater. This is due to the opinion that any property having partial drainage or protection benefits will be include in the WMD. The WMD is approximately 10,288 acres of predominant agricultural land. Figure N-2 displays a more detailed boundary of the WMD area. A listing of parcels affected by the WMD is included under separate heading below.

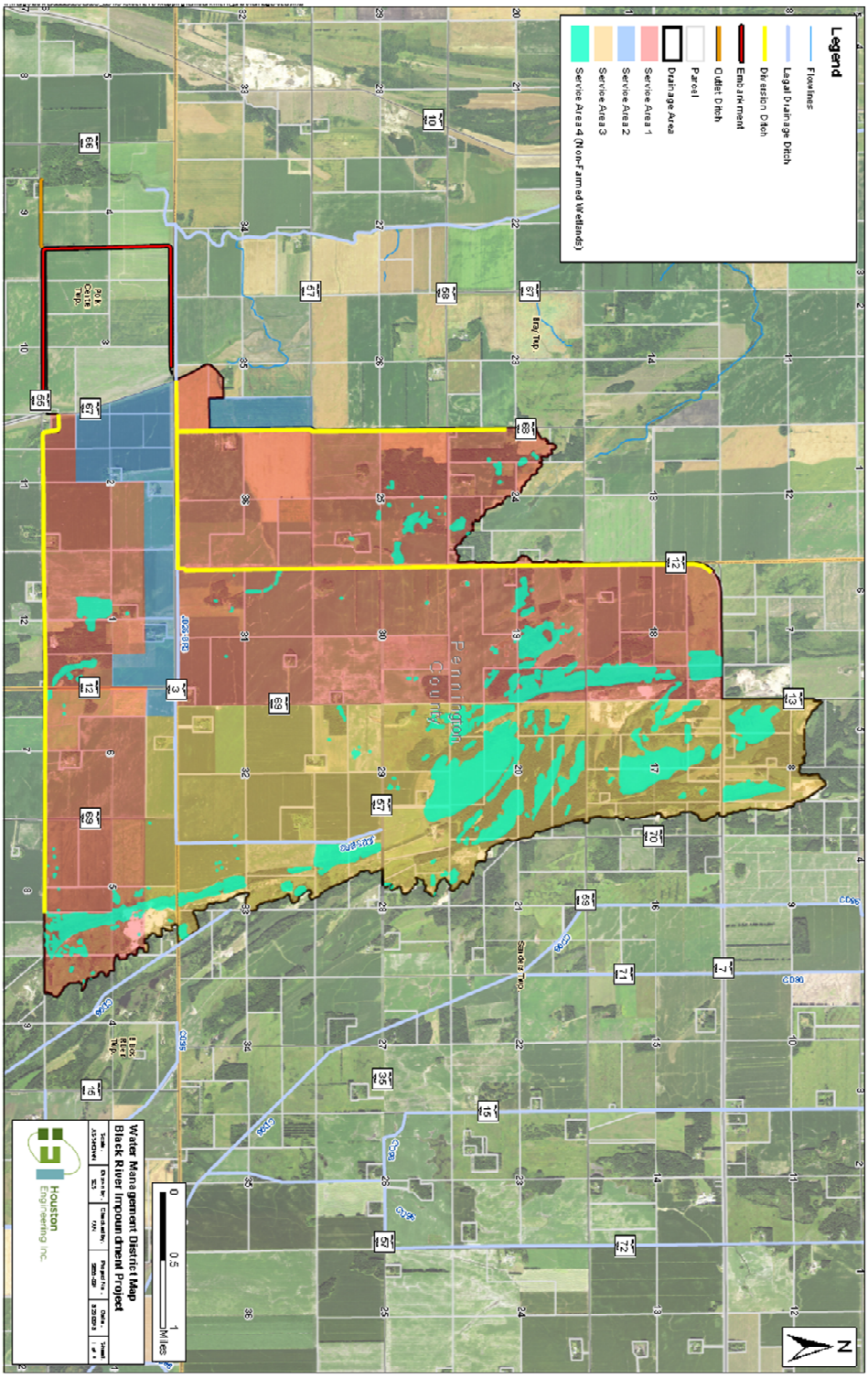

Figure N-2: Water Management District Location

Amount of Necessary Charges

The construction of the Black River Impoundment Project is being proposed for funding through a combination of sources other than WMD Charges. These funding sources include the RLWD, State of Minnesota Flood Damage Reduction Program, and the RRWMB. However, for long term operations and maintenance of the project, the RLWD is proposing to use WMD charges as the primary funding mechanism.[1] Operations and maintenance is anticipated to include, but not be limited to, administration, inspection, vegetation management and mowing, repair, component replacement and reconstruction, and any other work deemed necessary by the RLWD to protect or preserve the function of the project. The RLWD anticipates a maximum annual operation and maintenance cost not exceed $75,000 for the project. Thus, the total of annual WMD charges will not exceed $75,000 during the life of the project.

Method for Determining Charges

Landscape level land modification has contributed to the rate and volume of run-off within the project area and has created the need for regional rate and volume control in order to meet the rate and volume reduction goals of the RRBC LTFS Basin Wide Flow Reduction Strategy. Relative contribution to the need for the project was determined based on parcel proximity and parcel land use in relation to various conveyance infrastructure (diversion ditches) to the impoundment area. Parcel proximity with direct drainage to the diversion ditches are classified as Service Area 1. Service Area 1 reflects the highest level of service for the project, which correlates to the highest charge rate. Reduced charge rates were determined for parcels with limited access as outlined below. Parcels that have indirect drainage to the diversion ditches through culverts or modified drainage are classified as Service Area 2. Parcels that have no direct access to the diversion ditches but have indirect drainage along CSAH 3 or CSAH 12 are classified as Service Area 3. Parcels within Service Area 1 through 3 that are designated non-farmed wetlands as referenced under the National Wetland Inventory (NWI) are classified as Service Area 4. The WMD level of service summary is outlined in Table N-3 and Figure N-2.

Table N-3: Level of Service Summary Black River Impoundment

Service Area	Level of Service Factor (LSF)
1	5.33
2	4.00
3	2.67
4	1.00

The base rate will be determined by the following formula:

(Base Rate x 5.33 x Service Area 1 (Acres)) + (Base Rate x 4.00 x Service Area 2 (Acres)) + (Base Rate x 2.67 x Service Area 3 (Acres)) + (Base Rate x 1.00 x Service Area 4 (Acres)) = $75,000 Maximum

The formula used for determining the total charge per parcel is as follows:

Water Management District Charge = LSF Value x Base Rate x Size of Parcel Contributing to the Project Drainage Area (Acres)

[1] Long term operations and maintenance funding may be supplemented with other revenue sources as deemed appropriate by the RLWD Board of Managers.

Length of Time Water Management District Will Remain in Force

No charged assessment will be made to the WMD for the initial project cost. In order to generate revenue for future operation and maintenance, the WMD shall be perpetual for the life of this plan and any subsequent revisions, unless dissolved by plan amendment or revision. The imposition of charges for future operations and maintenance is subject to the fund limitations found in Minnesota Statute 103D.631.

Affected Parcels

A list of parcels of record that are located in the WMD are located in the office of the Red Lake Watershed District and the Pennington County Recorder.

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