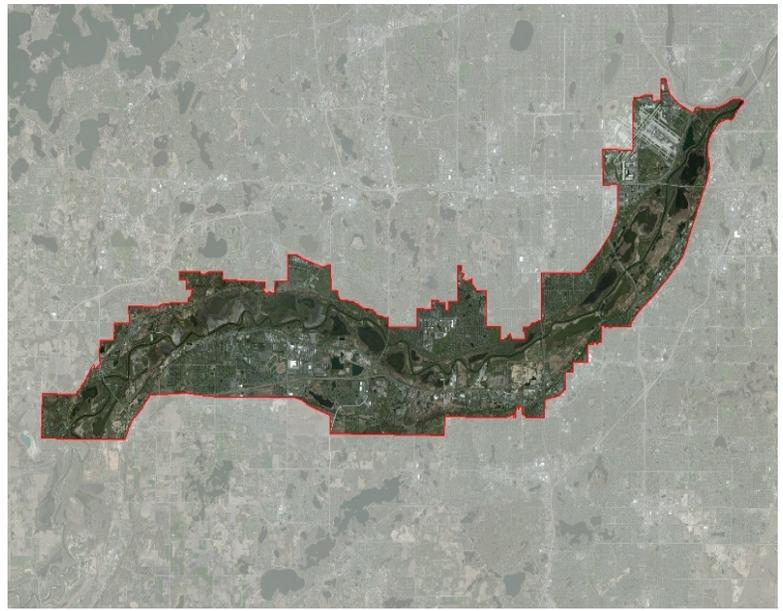


Appendix M: Strategic Resource Evaluation of the Lower Minnesota River Watershed

STRATEGIC RESOURCES EVALUATION OF THE LOWER MINNESOTA RIVER WATERSHED



LOWER MINNESOTA RIVER
WATERSHED DISTRICT

Managing and protecting the Minnesota
River, lakes, streams, wetlands, and
groundwater, and assisting and
facilitating in providing river navigation

January 2014

Prepared for the
Lower Minnesota River
Watershed Management District

By
HDR, Engineering Inc.

HDR

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Executive Summary

A comprehensive survey and review of on-going resource management and monitoring efforts in the Lower Minnesota River Watershed Management District (District) was performed to assess critical resource areas and recommend management strategies. This effort was undertaken as an extension of the District's third Water Management Plan and associated implementation program, prepared for the District by HDR, Inc. in 2011.

The Strategic Resources Evaluation (SRE) reviewed nineteen lakes, sixteen streams (including six trout streams), nine wetlands and seven fens as critical resource areas within the District's boundaries. Using the data collected, each critical resource area was classified as either Category 1 or Category 2. Category 1 represents resource areas needing additional information to determine the best approach to improve, protect or preserve the resource. Category 2 characterizes resource areas with enough data for a feasibility study of management strategies. Using the District's prioritization process, an implementation matrix was developed for the District's reference in managing these critical resource areas over the next three to five years.

The results of the SRE categorized fifteen lakes, seven streams, all nine wetlands and two fens as Category 1 strategic resources requiring more data before a feasibility study of management needs and options can be made. The water bodies designated as Category 2 critical resource areas should proceed with a feasibility study of management strategies. Recommendations for both categories are presented in this report and also summarized in an implementation plan (Appendix F) to be amended into the District's Third Generation Watershed Plan.

Introduction

The Lower Minnesota River Watershed District (District) is located in the southwest portion of the Minneapolis-St. Paul metropolitan area and covers an area of approximately 80 square miles. The District's boundary generally follows the bluff line along both banks of the Minnesota River for approximately 32 river miles from the City of Carver and Louisville Township in the west, and to the Minnesota River's confluence with the Mississippi River in the east. The District's jurisdiction covers twelve cities, three townships, and five counties in the Twin Cities metro area (Figure 1 and Figure 2).

In 2004, the District adopted the *Guidance to Implementation* (LMRWD, 2004) in order to move the implementation agenda from their second Water Management Plan (WMP) (LMRWD, 1999) forward. As part of that report, a comprehensive survey and review of on-going water resource management and monitoring efforts in the District was performed to assess critical areas. This included a written survey and follow-up discussions with the cities, counties, agencies and other individual stakeholders working on resource management in the District. Implementation strategies in the second WMP were then reviewed in the context of the resource management assessment. Specific strategies were refined and prioritized, and additional actions were added based on discussions with the District's stakeholders. The result was a prioritized list of critical water resources, which allowed the District to move its implementation agenda forward in a proactive, systematic fashion (LMRWD, 2004). Recently, the District completed its Third Generation Watershed Plan (Plan). One implementation strategy identified in the Plan (and the subject of this report) is to conduct a strategic resource evaluation (SRE) building on the 2004 *Guidance to Implementation* (LMRWD, 2004). This document presents the process and results of the SRE.

Methods

The SRE assessed surface waters within the District (Table 1). Available data for each water body was collected from a variety of sources. The complete results of the data review are included in data summary sheets for lakes (Appendix A), streams (Appendix B), wetlands (Appendix C) and fens (Appendix D). Data collected for each resource included:

- *Designated use*
- *Location, watershed land use*
- *Percentage of watershed within the District*
- *Water quality and/or quantity monitoring data, State of Minnesota water quality standards, 303(d) listed impairments*
- *Recreational access point(s)*
- *Fisheries information*
- *Natural resources information*

Using the data collected, each critical surface water resource was reviewed and classified as either Category 1 or Category 2 resource. Category 1 represents water features needing additional information to determine the best approach to improve, protect or preserve them. Category 2 characterizes surface waters with enough data for a comprehensive assessment: an analysis of existing conditions to determine an appropriate management action (e.g., a feasibility study or explicit management action). Using the District's prioritization process, an implementation plan was developed and is included as Appendix F. The implementation plan prioritizes actions the District will take to manage its resources over the next three to five years.

Because each water body has unique hydrologic conditions, the final recommendations to move forward with more monitoring (Category 1 resource) or a feasibility study/management strategy (Category 2 resource) needed to be considered with distinct criteria. Each resource type's evaluation criteria and recommended District actions are described in the remainder of the report.

Lakes

The resource assessment process for lakes is based on the *Guidance Manual for Assessing the Quality of Minnesota Surface Waters for Determination of Impairment: 305(b) Report and 303(d) List* (MPCA, 2012). Existing data for each lake was reviewed to determine if a sufficient assessment of water quality could be made. If the minimum data criterion discussed below was not met, the lake was classified as a Category 1 resource. The following information was used in making this determination.

Data Requirements for a Category 2 Lake Classification

- At least eight samples for each lake for total phosphorus, chlorophyll-a, and secchi transparency collected over two years during the June-September period (typically one sampling event per month);
- The lake must be located outside the Minnesota River floodplain; and

- The lake must be accessible to the public and have either:
 - Recreational access; or
 - Is bordered by private or public areas (making the lake highly accessible and/or visible to the public)

Lakes that did not have the necessary data required for assessment or did not meet the visibility conditions were assigned a Category 1 status. Category 1 lakes are presented in Table 2 and data summary sheets of each lake are presented in Appendix A.

Streams

The resource assessment process for streams is also based on the *Guidance Manual for Assessing the Quality of Minnesota Surface Waters for Determination of Impairment: 305(b) Report and 303(d) List* (MPCA, 2012). The Minnesota River downstream of the City of Jordan is impaired for dissolved oxygen (DO) and turbidity. DO was only considered in the water quality assessment for trout streams, since DO levels from non-trout streams don't significantly contribute to the Minnesota River's DO impairment. Existing data for each stream was reviewed to determine if a proper assessment of water quality could be made. If the minimum data criterion was not met, the stream was classified as a Category 1 resource. The following information was used in making this determination.

Data Requirements for a Category 2 Stream Classification

- At least twenty samples each with turbidity measurements collected between June and October;

Streams that did not have the data required for assessment were assigned Category 1 status. Category 1 streams are presented in Table 3 and data summary sheets of each resource are presented in Appendix B

Wetlands and Fens

The resource assessment process for wetlands and fens consisted of reviewing existing studies, data sources, and maps of wetland complexes within the District. Project research also included correspondence with City, County and State agencies. All information obtained regarding each unique water resource was compiled and is contained in the data summary sheets (Appendix C and Appendix D). Provided below is a description of the sources utilized as well as a short synopsis of the data provided.

- Minnesota County Biological Survey (MCBS) – DNR Ecological Services provided data for all surveys performed within the District. Most of the data was limited to the 1990's and early 2000's. This information provided was then compiled and condensed into a brief description, summarizing the findings.
- Natural Heritage Information System (NHIS) – NHIS staff provided field survey data and individual reports produced by DNR staff relating to

distinct features of the water resources within the District. This data includes descriptions of threatened and endangered species locations and NHIS community descriptions. Most of the data was limited to the 1990's and early 2000's.

- Minnesota Land Cover Classification System (MLCCS) study – Geographic Information System (GIS) land coverage data and reports from the available counties were retrieved and compiled. Reports from the MLCCS study were examined to assess whether the GIS coverage provided additional detailed descriptions relating to the quality of fen and marshes, as well as invasive species presence.
- DNR Ecological Services – DNR Ecological Services staff were contacted and any additional reports or data with detailed studies regarding the fens and wetlands within the District were requested. One report by Fred Harris, a 2006 survey of conditions at Seminary Fen was provided.
- Additional DNR contacts – Jeanette Leete and Doug Norris, DNR calcareous fen experts, were contacted for updated information regarding wetland and fen resources within the District. Available data was provided and compiled.
- City Governments – Surface water management plans were retrieved from city government web pages for all of the cities within the District. Where specific information regarding water resources was available, data was recorded and compiled within the data summary sheets.
- County Sources – County sources were contacted and inquires concerning additional studies were made. For each of the wetlands and fens within the District, additional data was available from web-based sites, and the data retrieved was compiled and recorded within the data summary sheets provided.
- Lower Minnesota River Watershed District - The District website was searched in an effort to retrieve studies and reports relating to any potential factors that could affect the water resources within its jurisdiction. Available reporting information was recorded and can be found within the data sheets provided.

Category 1 Resources

District water resources classified as Category 1 are presented in this section along with recommended actions that serve to enhance understanding of their condition prior to further management actions (Tables 2-4).

Lakes

Results

Fifteen of the nineteen lakes evaluated in the SRE were classified as Category 1 resources. Most of the Category 1 lakes have limited or no public access and are within the Minnesota River floodplain. However, Snelling Lake, located in Fort Snelling State Park, does have public access and contains a seasonal swimming beach and fishing pier.

Monitoring Plan and Recommendations

Although there is the potential for flooding from the Minnesota River, Snelling Lake is heavily used by the public and is recommended for further monitoring. The remaining lakes are not recommended for future monitoring because there is no public access.

It is recommended that Snelling Lake be assessed for nutrient impairment during the summers of 2014 and 2015 (one sampling event per month, June-September period) using the standard measures of secchi depth, chlorophyll-*a*, and total phosphorus. Cooperation with Fort Snelling State Park staff and training them to conduct the lake monitoring is recommended. A canoe is available on-site for collecting samples at a mid-lake location. Chlorophyll-*a* and total phosphorus sample bottles will be acquired from a state-approved analytical laboratory. Field samples should be collected just below the lake surface using the provided bottles. A secchi disk reading should be recorded during each visit. Sample bottles must be kept at 39 degrees F (4 degrees C) until delivery to the analytical laboratory. Before implementing these monitoring actions for Snelling Lake, the following pre-monitoring tasks will need to be completed:

1. Develop a project monitoring plan
2. Develop a quality assurance project plan (QAPP) in conjunction with Minnesota Pollution Control Agency (MPCA) requirements for determination of impairment
3. Train Fort Snelling State Park staff as lake monitors
4. The District will then review data from the field and analytical laboratory and develop draft and final reports based on 2014 and 2015 lake data. Upon completion of these tasks, Snelling Lake should change from a Category 1 to a Category 2 resource

Flooding from the Minnesota River has the potential to occur in the Category 1 floodplain lakes on an annual basis. Because the Minnesota River typically contains significant amounts of sediment and nutrients (e.g. nitrogen and phosphorus) during spring flood conditions, there is the potential for annual deposition of sediment and nutrients to these lakes. Projects implemented by the District to maintain or improve water quality conditions in Category 1 lakes need to consider this situation.

Streams

Results

Seven of the sixteen streams evaluated in the SRE, including five of the six trout streams, were classified as Category 1 resources due to a lack of turbidity data. The remaining nine streams are classified as Category 2 streams.

Monitoring Plan and Recommendations

The monitoring plan recommended for trout streams in the District include DO, temperature, turbidity, specific conductivity and pH sampling on a bi-weekly basis from April through October each monitoring year, resulting in 12 to 14 samples annually.

DO probes typically contain a temperature sensor as well as conductivity and pH sensors. Monitoring/sampling events are required to take place before 9AM because DO levels are typically lowest in the early morning. During each visit a monitoring probe should be used to record temperature, DO, conductivity, and pH. A "secchi tube" should then be used to measure turbidity. In order for this to be successful, it is recommended that the District coordinate this effort with Minnesota Department of Natural Resources (DNR) staff specializing in trout streams and use of volunteers to take the samples. Before starting this monitoring plan, the following pre-monitoring tasks will need to be completed:

1. Develop a project monitoring plan
2. Develop a QAPP in conjunction with MPCA requirements for determination of impairment
3. Train volunteer stream monitors
4. The District will then review data from the field and analytical laboratory and develop draft and final reports based on 2014 and 2015 stream monitoring data. Upon completion of these tasks, the trout streams will change from Category 1 to Category 2 resources

Quantitative monitoring efforts should be paired with subwatershed assessments for each stream. Hydrologic changes that result from changes to a stream's subwatershed (e.g., land use) can lead to noticeable water quality trends. Projects considered and prioritized by the District should incorporate monitoring results as well as current and anticipated subwatershed characteristics.

Wetlands and Fens

Results

Results of the SRE showed that all of the wetlands and two of the fens in the District have inconsistent data. In most of the wetland and fen locations, there have not been updated quality, value, and function assessments since the 1990s. An overall, consistent and focused assessment of all of the wetlands and fens listed in Table 4 is required to categorize the wetland and fen resources. The following is a plan, which has been vetted by DNR staff, for completing the assessment.

Wetland and Fen Assessment Recommendations

1. Update the MLCCS study data for the large wetland complexes in the Minnesota River Valley (MLCCS is the DNR land cover mapping tool for both native and non-native dominated plant communities). This would involve reviewing the initial delineations accuracy. Where there are discrepancies, the delineations should be updated to reflect changes since the MLCCS study. In most cases, the MLCCS data did not gather or show plant community makeup, nor did it indicate the presence (dominance) of invasives or provide a Floristic Quality Assessment (FQA).

This initial step would provide the District with updated and consistent baseline data needed to perform a feasibility study of management strategies. Detailed field forms summarizing plant community types by MLCCS definitions should be used for each of the “natural” remnant communities (plant communities with little or no historical human disturbance) within the wetland complexes. This would not be required for land covers that would no longer be considered “natural” due to absolute dominance by non-native invasive species, farming, or development.

2. Perform an FQA of each of the fens, identifying three sampling points (with a 25' radius) in each fen. An FQA is a vegetation-based ecological assessment approach that can be used for wetland quality monitoring and assessment. The FQA sampling locations should be provided to the District and the DNR in a GIS format in order to act as baseline data for future assessments. Performing this detailed plant analysis provides a picture of the relative quality and/or degradation within these rare plant communities. The DNR has performed qualitative assessments over the years, but does not appear to have established a way to monitor the fens in the District. To that extent, some of the fens (Black Dog North in particular) may be too degraded for restoration. An FQA is needed in order to provide a quality, consistent baseline for each of the fens and allows a comparison of quality and degradation of these communities across the valley.

The best time to perform the FQA, is mid June through July. Planning (i.e. identification of sampling points) should take place in advance (could happen with MLCCS work). Creating standardized methods for the FQA is an

important step in ensuring that the work is applicable and replicable in the future. The value of the FQA for the fen assessments, but not wetlands is that the tool is very plant and detail intensive, requiring identification of *all* species to the species level. It is also a quantitative method that provides a strong baseline assessment.

3. Perform Minnesota Routine Assessment Methodology (MnRAM) on all of the large wetland complexes. This should be done in conjunction with the MLCCS surveys, and as such should not add a significant additional effort to the process.
4. Baseline water level measurements were collected from 2007 to 2010 in Gun Club Lake North (two wells), Gun Club Lake South (13 wells) and Nichols Meadow (14 wells) fens. These locations should be monitored (or at least periodically updated) to verify that conditions have not changed since previous monitoring. The preferred method of data collection is using a submersible data-logging pressure transducer.

Category 2 Resources

Those resources with sufficient quantity and quality of data to perform a more detailed evaluation of their condition were deemed Category 2 resources. The results of the SRE related to these resources as well as additional assessments are discussed in this section (Tables 5-8).

Lakes

Results

Three lakes in the City of Chaska, as well as Dean Lake, in Shakopee, Minnesota were classified as Category 2 resources and are summarized in Table 6. Currently, only Dean Lake is listed as impaired, triggering the start of the Total Maximum Daily Load (TMDL) process in 2014. MPCA will begin monitoring the Dean Lake with the support of Scott Watershed Management Organization (Scott WMO) in 2014-2015 (*pers. comm.* with Brooke Asleson, MPCA).

Chaska Lakes

The City of Chaska has three quarry lakes, all DNR protected waters, somewhat unique to the Metro area. Brickyard Clayhole Lake, Courthouse Lake and Firemen's Clayhole are deep and high quality lakes with important cultural, historical and human values. Brickyard Clayhole's watershed is predominantly developed with stormwater runoff being routed either around the lake or through a series of stormwater detention ponds prior to discharging into the lake. Courthouse Lake is one of six lakes in the metro area that are stocked with trout with a watershed that is predominantly urban. Firemen's Clayhole has a watershed comprised of predominantly park and open space with a portion comprised of agriculture landuse. Firemen's Clayhole supports a beach and recreational area along its south side and a diversion manhole along its eastern flank that routes flow away from the lake.

A review of water quality data suggests that there are no apparent negative trends in water quality. For Courthouse Lake, this is likely due to the fact that the City of Chaska estimates less than one pound per year of total phosphorus and 810 pounds per year of total suspended solids are entering the lake. In the case of Courthouse Lake and Firemen's Clayhole, the current, apparent clear stable-state is likely due to active bypasses and re-routing of stormwater executed by the City of Chaska with significant reported load reductions (City of Chaska Local Surface Water Management Plan, 2007).

Dean Lake

Dean Lake is a basin influenced by groundwater, surface and channelized inflow. The lake is scheduled for the initiation of a TMDL study in 2014, but the MPCA expects to begin monitoring in the spring of 2014 with the assistance of the Scott WMO. Information on the lake starts, in earnest, with a report in 1975

characterizing the lake and providing some historical context (Samstad, 1975). A more detailed analysis of hydrology, hydrologic modification and channel hydraulics was published five years later (Molsather, 1980). Current DNR and MPCA water quality and lake levels data from 2002 to present exists. In addition, the Prior Lake-Spring Lake Watershed District (PLSLWD) has several monitoring stations along its outlet channel that enters the lake along its eastern edge. No in-lake core samples, vegetation or fish surveys were located. These data (reports, plan sets, etc.) were reviewed followed by an in-field reconnaissance to estimate the efficacy of implementing stormwater retrofits and channel stabilization projects tributary to Dean Lake.

Recommendations

Chaska Lakes

After a review of the water quality data, discussions with Bill Monk, Chaska City Engineer, and a rapid in-field review, a limited non-degradation approach to the watersheds is recommended. Below are two recommendations for consideration: Gully Stabilization and Iron-enhanced Sand Filters.

1. Gully Stabilization – The 2011 District Watershed Management Plan identifies un-funded gully stabilization projects for the north bluff of Brickyard Clayhole Lake. It also identifies a partially vegetated sediment delta along the north shore of Firemen’s Clayhole is present; the result of an actively-eroding gully within the bluff line. Runoff from the upland agricultural field appears to be concentrated down a gully in the bluff line wooded area. It is recommended that these projects be considered before implementing additional strategies.

2. Iron-enhanced Sand Filters – The University of Minnesota's Saint Anthony Falls Research Lab, the City of Prior Lake and Prior Lake Spring Lake Watershed District (PLSLWD) in recent years, have been studying the efficacy of using iron as a means of stripping dissolved phosphorous from stormwater runoff within sand filter benches along nine detention ponds in the City of Prior Lake. Both bench testing and in-field results at these installations in the City of Prior Lake show tremendous promise for the “Minnesota Filter” (iron-enhanced sand filter; IESF). To use IESF, existing ponds feeding into Brickyard Clayhole would have to be retrofitted by creation of primary overflow filtration (lined) trenches that route the water quality flow behind a weir within the riser structures designed for larger flow conveyance.

Dean Lake

Given the current unknowns of the Dean Lake system, it is recommended that a thorough analysis of the lake and its watershed and tributary streams be performed. Data collection should be supportive of a lake and watershed model such as sediment cores, inflow outflow chemistry and rates and vegetation and fish communities. Once sufficient data have been collected, hydrologic and water quality models analysis can be run to define the lake/wetland behavior over time under different management scenarios. Currently, the District and

Scott County have begun reviewing existing data for the lake, inlet channel and watershed to begin the TMDL study.

Streams

Results

Nine of the sixteen streams evaluated are classified as Category 2 streams with sufficient turbidity measurements. Category 2 streams are summarized in Table 7. The only trout stream that has enough data for Category 2 designation is Eagle Creek, which has a long-term monitoring station run by Metropolitan Council Environmental Services (MCES). The stream reaches within the District were examined in greater detail in a feasibility study (Appendix E).

Recommendations

The primary water quality parameter of concern for the Category 2 streams is turbidity. Adjacent watershed districts and management organizations are assessing sources of turbidity and implementing relevant BMPs within their respective watersheds for Category 2 streams.

Table 8 illustrates potential actions to address erosion in four of the creeks examined in this study.

Wetlands and Fens

Results

None of the wetlands were designated Category 2 resources. Five of the seven fens had sufficient data for Category 2 classification, including Gun Club Lake North Fen, Gun Club Lake South Fen, Nicols Meadow Fen, Savage Fen, and Seminary Fen. A summary with proposed actions for preservation and protection of two critical fens is illustrated below. Additional courses of action for the remaining Category 2 fens is provided in Appendix E.

Recommendations

Seminary Fen

Seminary Fen has been described as one of the highest quality fens in Southern Minnesota. It contains several rare species plants, is in excellent condition and has been characterized as one of the most significant natural areas in the Twin Cities Metropolitan area. This unique resource's survival is dependent on maintaining its hydrology (primarily groundwater) and its species diversity. Groundwater levels are being monitored as part of the District's monitoring program outlined in the Plan. Surface hydrology does have the potential to adversely impact these unique resources, although not the primary concern for fens. Change in the quality, quantity and rate of delivery of surface water from its watershed can have a direct affect on the biodiversity of this unique resource.

The District has partnered with the City of Chaska to address the quality, quantity and rate of surface water reaching the fen and to restore the in-fen hydrology and native plant community. Phase One of the Seminary Fen restoration involved restoring a wetland on top of the bluff that had experienced hydrologic stress leading to outlet failure. The outlet experienced a blow out causing the rapid discharge of water from the wetland down the bluff line exacerbating the already present erosion problem in a long gully leading to the fen. Restoration of the outlet successfully controls effluent rates thereby metering out the wetland volume over a longer period resulting in less erosive force in the destabilized gully. In addition, the restoration of the bluff-top wetland likely provides water quality benefits given the extended detention effect on particle de-siltation as well as potentially providing a small portion of groundwater recharge beneficial to fen hydrology.

Phase Two of the project involves breaking drain tiles, removing invasive species and collecting and dispersing native seed from a source adjacent to the site. This project restores 6-acres of the fen with hydrologic and plant stressors to its system.

Phase Three of the project involves a partnership with the City of Chaska, and may include the Carver Soil and Water Conservation District. The eroding gully falling from the Phase One wetland down the bluff to the fen has deposited a substantial sediment plume along the northern boundary of the fen. Sedimentation of the fen will adversely affect its plant communities by switching it from its natural composition to an invasive-dominated community via elevated nutrients, alteration of the mineral and organic composition of the soils and through a change in hydrologic regime specific to the plume site. Controlling flows within the gully paired with soil stabilization efforts aspires to minimize sediment mobilization from the gully thereby alleviating sedimentation stress to the fen.

In addition to these projects, the District has implemented surface water management standards for new and redevelopment projects that will provide strong benefits to the wetland related to the quality, quantity and rate of upland stormwater runoff.

Savage Fen

As with Seminary Fen, groundwater levels are being monitored as part of the District's monitoring program outlined in the 2011 Water Management Plan. At this time no actions, outside of the surface water management standard outlined in Plan, are recommended.

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Tables

Table 1: Lower Minnesota River Watershed District: Surface Water Resources

Streams and Rivers	Lakes	Wetlands	Fens
Minor streams (32)	Black Dog Lake	Blue Marsh	Black Dog
Bluff Creek	Blue Lake	Chaska Marsh	Preserve Fen
Carver Creek	Brickyard Clayhole	Coleman Marsh	Fort Snelling Fen
Chaska Creek	Chaska Lake	Fisher Marsh	Nicols Fen
Credit River	Coleman Lake	Grass Marsh	Savage Fen
East Chaska Creek	Courthouse Lake	Gun Club Marsh	Seminary Fen
Minnesota River	Dean Lake	Long Meadow Marsh	
Nine Mile Creek	Firemen's Clayhole	Rice Marsh (Hennepin Co.)	
Purgatory Creek	Fisher lake	Rice Marsh (Scott Co.)	
Riley Creek	Gifford Lake		
Spring Creek	Grass Lake		
*Assumption Creek	Gun Club Lake		
*Eagle Creek	Lake Cy Ess		
*Kennaley's Creek	Long Meadow Lake		
*Unnamed Stream #1 (Harnack Creek)	Nyssens Lake		
*Unnamed Stream #4 (One Mile Creek)	Overlook Lake		
*Unnamed Stream #7	Rice Lake (Hennepin Co.)		
	Rice Lake (Scott Co.)		
	Snelling Lake		

*Trout stream

Table 2: Lower Minnesota River Watershed District: Category 1 Lakes

Lake	Floodplain Lake?	Public Access?
Chaska Lake	Y	N
Black Dog Lake	Y	N
Gun Club Lake	Y	N
Rice Lake (Hennepin County)	Y	N
Coleman (Nine Mile) Lake	Y	N
Grass Lake	Y	N
Long Meadow Lake	Y	N
Overlook Lake	N	N
Snelling Lake	Y	Y
Blue Lake	Y	N
Fisher Lake	Y	N
Gifford Lake	Y	N
Nyssens Lake	Y	N
Rice Lake (Scott County)	Y	N
Lake Cy Ess	Y	N

Table 3: Lower Minnesota River Watershed District: Category 1 Streams

Stream
Nine Mile Creek
Purgatory Creek
*Assumption Creek
*Kennaley's Creek
*Unnamed Stream #1 (Harnack Creek)
*Unnamed Stream #4 (One Mile Creek)
*Unnamed Stream #7

*Trout stream

Table 4: Lower Minnesota River Watershed District: Category 1 Wetlands and Fens

Wetland	Fen
Chaska Marsh	Black Dog Fen
Gun Club Marsh	Black Dog Lake North Fen
Rice Marsh (Hennepin County)	
Blue Marsh	
Coleman (Nine Mile) Marsh,	
Grass Marsh	
Fisher Marsh	
Long Meadow Marsh	
Rice Marsh (Scott County)	

Table 5. Lower Minnesota River Watershed District: Category 2 Fens

Fen
Gun Club Lake North Fen
Gun Club Lake South Fen
Nicols Meadow Fen
Savage fen
Seminary Fen

Table 6: Lower Minnesota River Watershed District: Category 2 Lakes

Lake	Listed as Impaired on 2012 303(d) List?
Brickyard Clayhole	N
Courthouse Lake	N
Firemen's Clayhole	N
Dean Lake	Y

Table 7: Lower Minnesota River Watershed District: Category 2 Streams

Stream	Percent of Watershed Within the District	Impaired for Turbidity on 2012 303(d) List?
Bluff Creek	37%	Y
Carver Creek	<1%	Y
Chaska Creek	2%	N
Credit River	1%	Y
East Chaska Creek	7%	Y
Minnesota River	<1%	Y
Riley Creek	56%	Y
Spring Creek	56%	Y
*Eagle Creek	98%	N

*Trout stream

Table 8: Lower Minnesota River Watershed District: Category 2 Stream Recommendations

Stream	Suggested Action
Bluff Creek	Provide an energy dissipation structure at the tunnel exit. Apply bank stabilization measures along outside creek bends. Re-direct runoff coming off of the North Hwy 101 Bridge. Stabilize the areas around the bridge abutments.
Riley Creek	Provide an energy dissipation structure below CR 61. Redirect flows away from outside creek meanders to prevent future erosion during runoff events.
Carver Creek	Stabilize outer bends with toe protection. Grade banks to a more stable slope. Stabilize the gully to prevent future sediment from being transported downstream.
East Chaska Creek - Reach A and Reach B	<i>General:</i> Remove debris and dead trees from the channel, address localized problems at outfalls and crossings. <i>Specific suggestions are as follows:</i> Outfall A – remove log jam, stabilize right bank at outfall, revegetate bank, remove sediment deposit. Outfall B – stabilize outfall with rock, step down the outfall, toe protection 10-ft upstream & 40-ft downstream. Outfall C – stabilize outfall with rock, step down the outfall, toe protection 10-ft upstream & 40-ft downstream. Pedestrian Bridge – re-direct runoff from bridge to channel bed, stabilize abutments 5-ft upstream and 15-ft downstream. Crosstown Blvd. Bridge – grade control/energy dissipation structures to step the channel down and dissipate energy away from the bridge and vulnerable banks; re-direct runoff from bridge.
East Chaska Creek - Reach C	Remove debris and dead trees in the channel where possible. Insert grade control structures.
East Chaska Creek - Reach D	<i>General:</i> Remove debris and dead trees in the channel, and address localized problems at outfalls and crossings. <i>Specific suggestions include:</i> Near Beech Street Bridge – apply grade control throughout the reach, along with toe protection and left bank stabilization. Upstream of E. 6 th Street Bridge – repair the left bank abutment (currently presents a safety hazard).
East Chaska Creek - Reach E	Selective clearing, excavation, toe protection, erosion control (jute mesh), topsoil replacement and grading for approximately 2,000 feet

Figures

Figure 1: Lower Minnesota River Watershed District, west

Figure 2: Lower Minnesota River Watershed District, east

Figure 3: Category 1 resources within Lower Minnesota River Watershed District, west

Figure 4: Category 1 resources within Lower Minnesota River Watershed District, east

Figure 5: Category 2 resources within Lower Minnesota River Watershed District, west

Figure 6: Category 2 resources within Lower Minnesota River Watershed District, east

Figure 1. Lower Minnesota River Watershed District, west

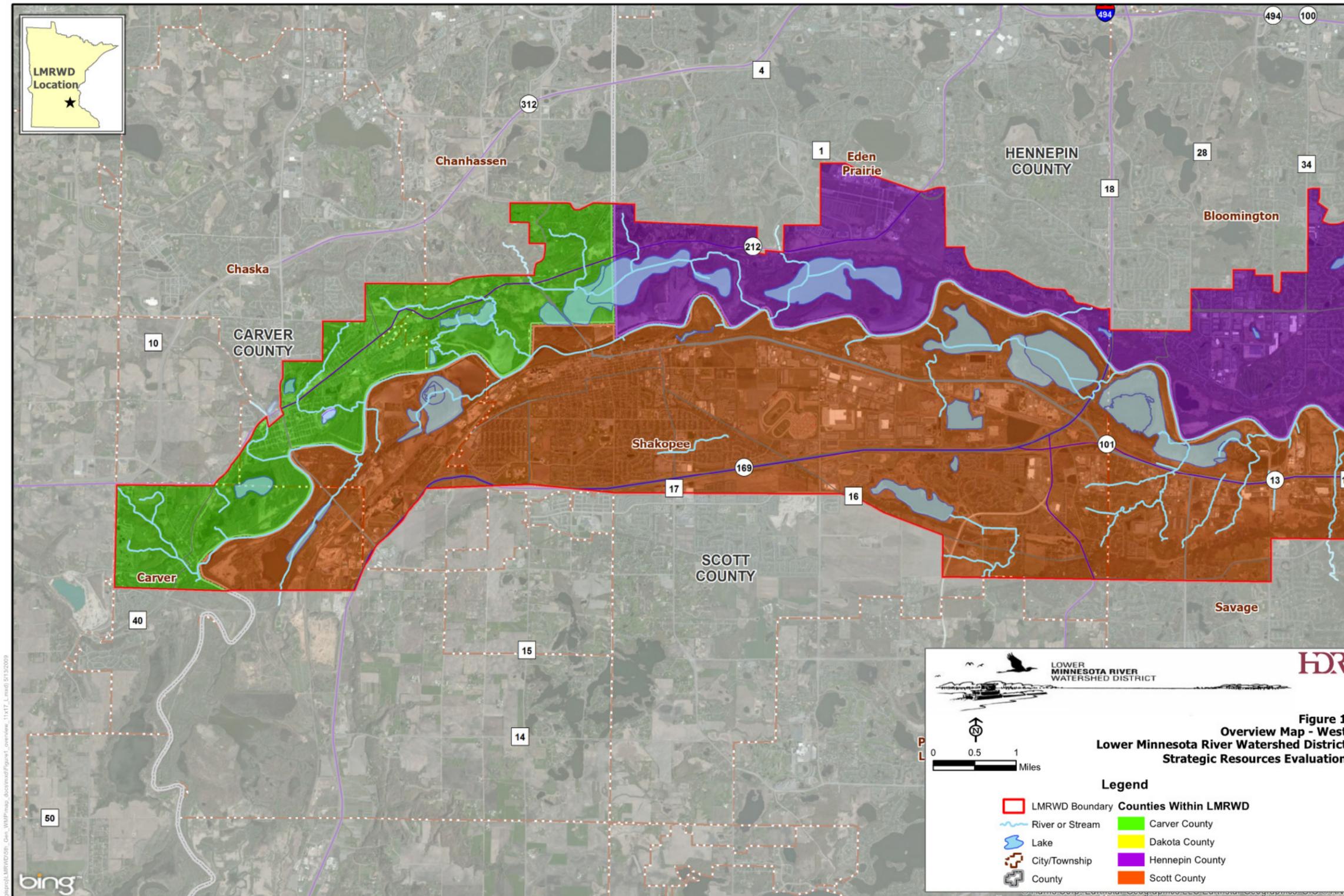


Figure 2. Lower Minnesota River Watershed District, east

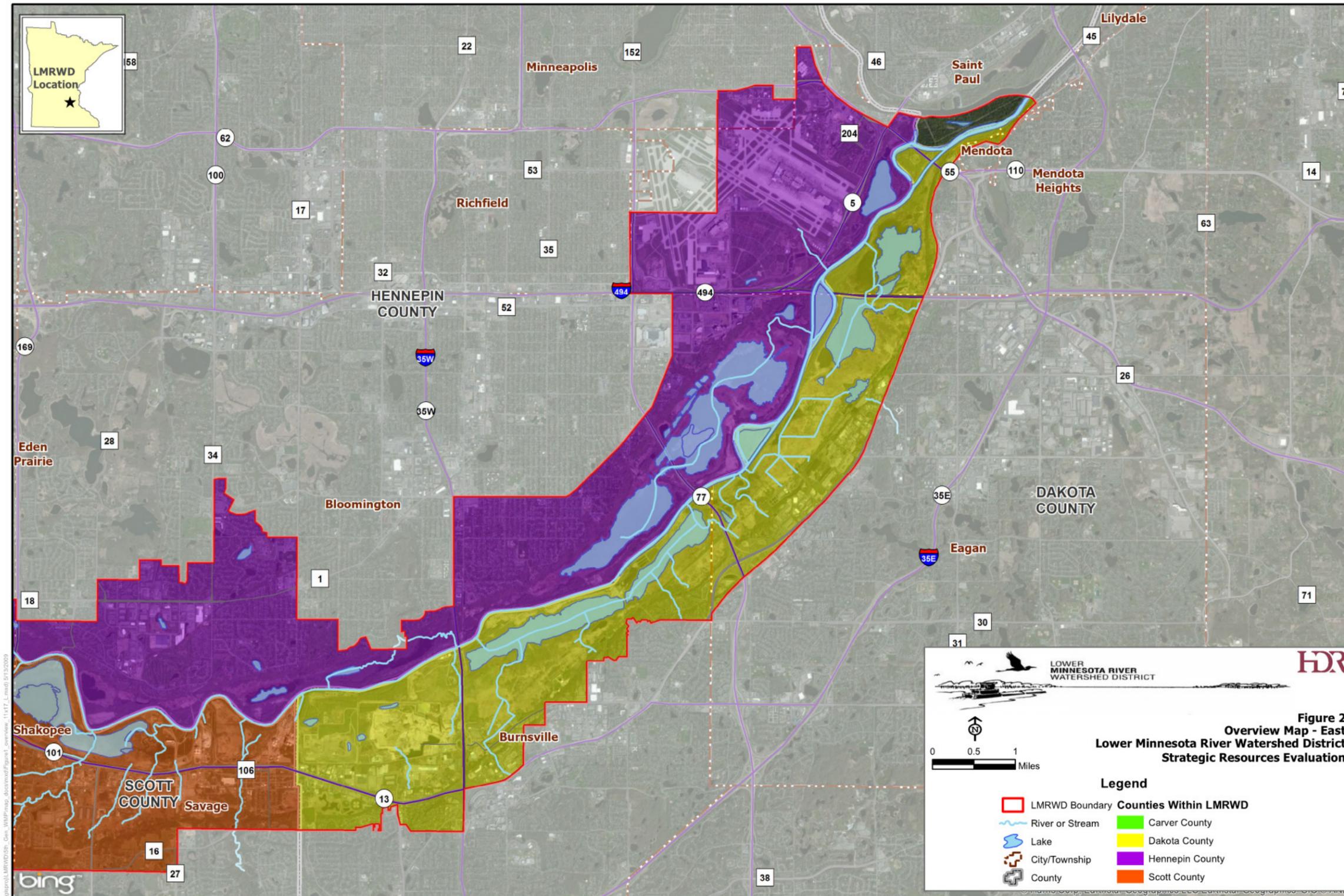


Figure 3. Category 1 resources within Lower Minnesota River Watershed District, west

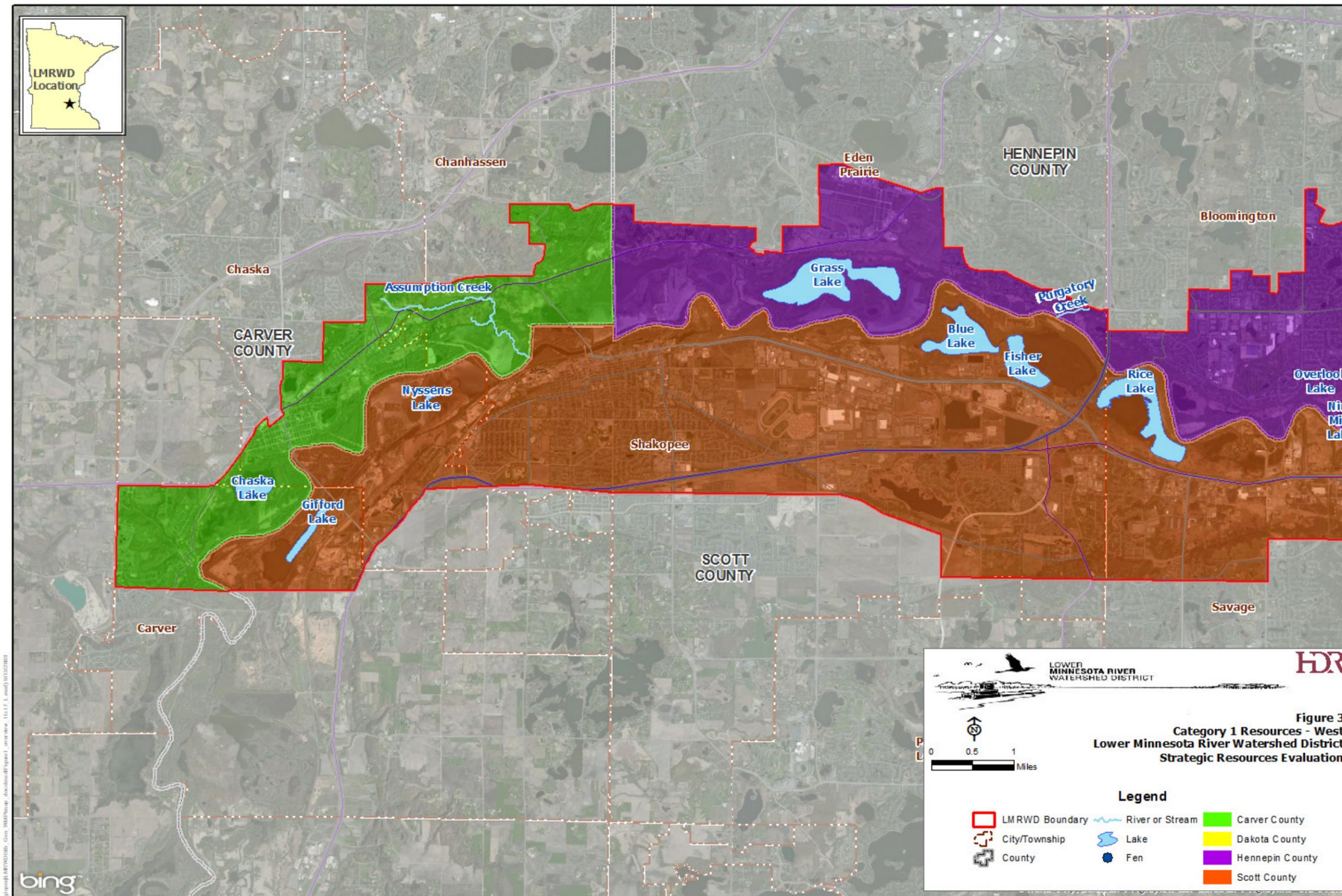


Figure 4. Category 1 resources within Lower Minnesota River Watershed District, east

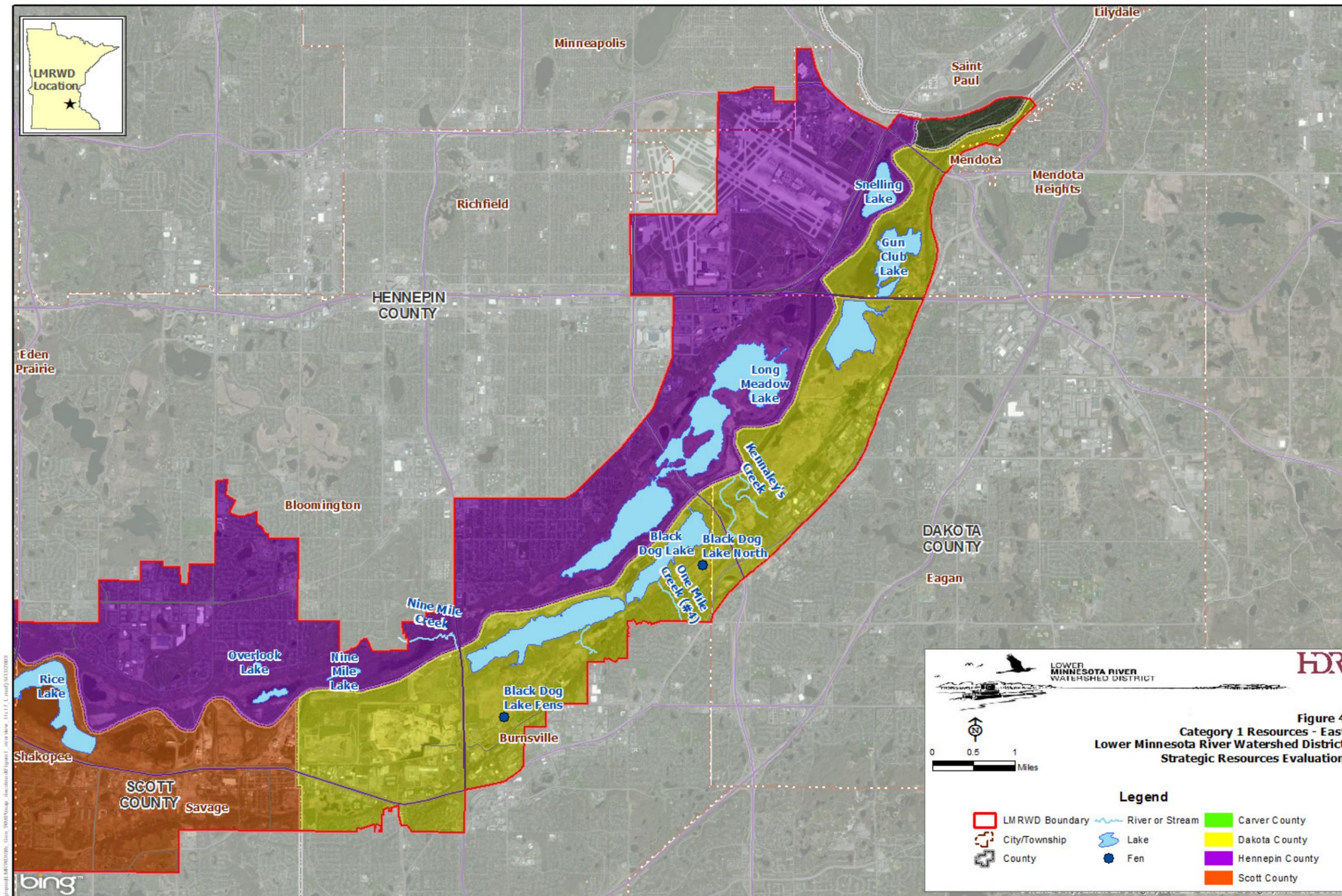


Figure 5. Category 2 resources within Lower Minnesota River Watershed District, west

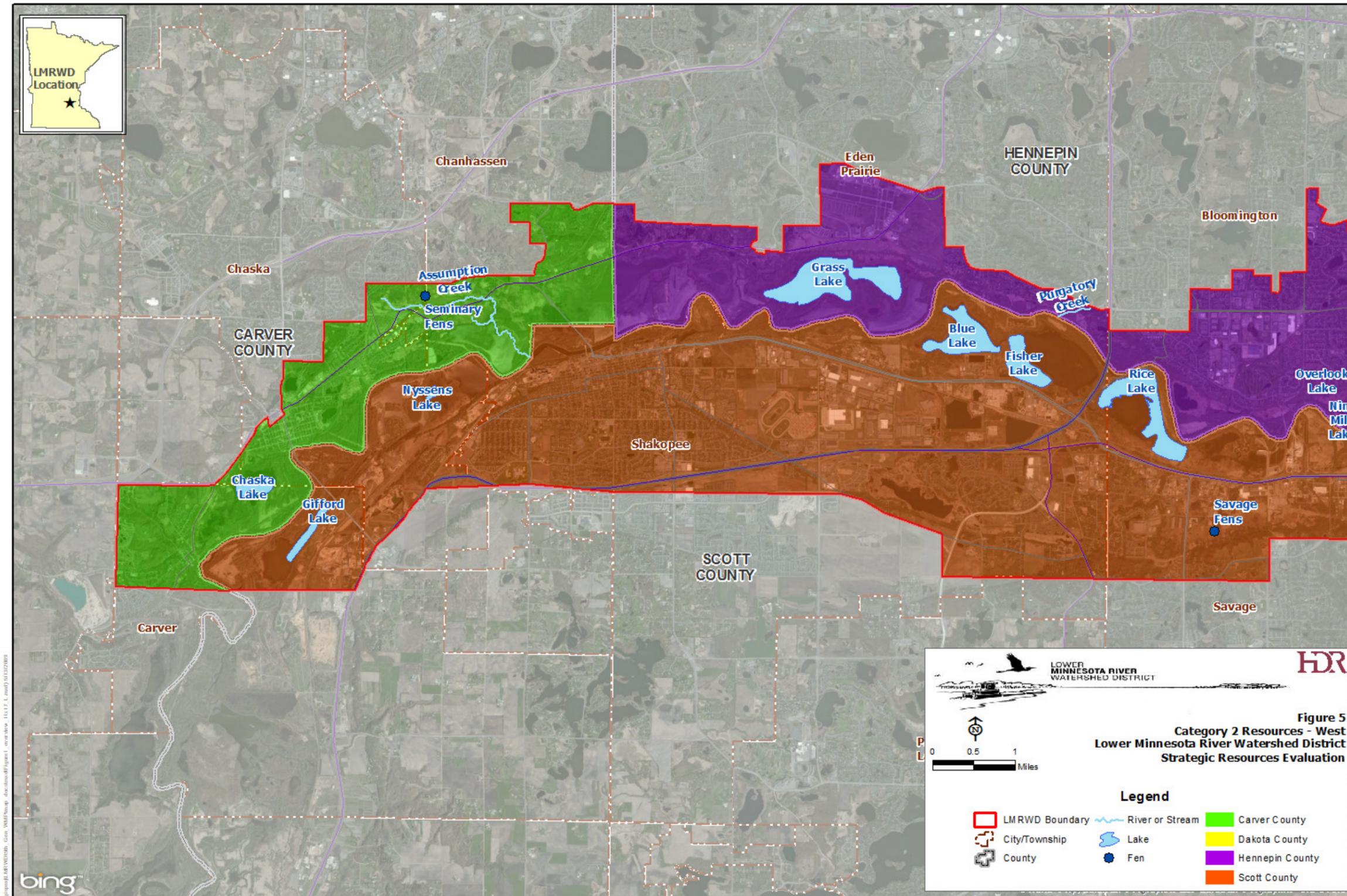
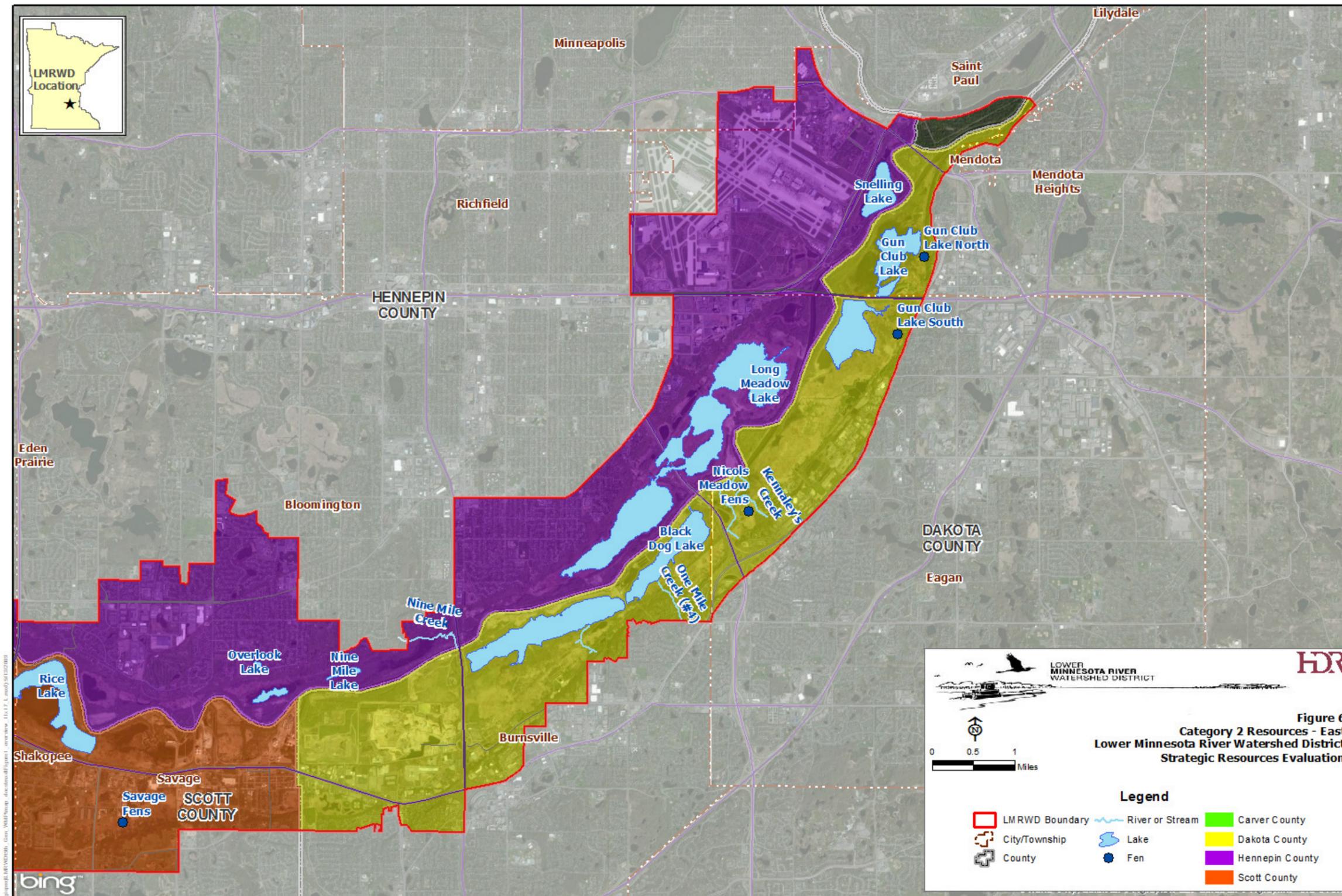


Figure 6. Category 2 resources within Lower Minnesota River Watershed District, east



Appendices

Appendix A: Lakes Data Summary Sheets

Appendix B: Streams Data Summary Sheets

Appendix C: Wetlands Data Summary Sheets

Appendix D: Fens Data Summary Sheets

Appendix E: Category 2 Streams Feasibility Study

Appendix F: Implementation Plan

Appendix A - LAKES

Black Dog Lake	2
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Brickyard Clayhole	6
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Colman (Nine Mile) Lake	9
Courthouse Lake	10
Lake Cy Ess	12
Dean Lake	13
Firemen's Clayhole	15
Fisher Lake	17
Gifford Lake	18
Grass Lake	19
Gun Club Lake	20
Long Meadow Lake	22
Nyssens Lake	23
Overlook Lake	23
Rice Lake (Hennepin County)	25
Rice Lake (Scott County)	26
Snelling Lake	27

Name	Black Dog Lake		
Water Body Type	Lake		
County	Dakota		
City	Burnsville		
% of Watershed Within Lower Minnesota River Watershed District (LMRWD)	74%		
Watershed Land Use	51% Park, Recreational, or Preserve - 20% Water - 29% Other		
Use Classification	2B, 3C		
PWI #	19-83P		
Size	391 acres		
Depth:	Average	1.5 ft	
	Maximum	4.0 ft	
Lake Type	Floodplain/groundwater, used by Xcel for cooling water		
Water Supply	Springs, seepage, intermittent surface drainage		
Jurisdictional Entities	United States Army Corps of Engineers (USACE): <ul style="list-style-type: none"> - Administers Clean Water Act (CWA), Section 404 Minnesota Pollution Control Agency (MPCA): <ul style="list-style-type: none"> - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 - MN Rule 7050 (non-degradation rule) Wetland Conservation Act (WCA): <ul style="list-style-type: none"> - Minnesota Department of Natural Resources (DNR), enforces WCA - Board of Water and Soil Resources (BWSR), oversees administration of WCA - County/City, administer WCA 		
Recreational Access	N/A		
Fisheries Information	N/A		
Impaired Water	Insufficient data to assess		
Summary of Available Chemical Data:			
Monitoring Station ID	S003-455		
Latitude	44.80139		
Longitude	-93.2851		
Date(s) Collected	Apr 2004 through Sep 2009		
Collected By	Citizen Stream Monitoring Program; Minnesota River Modeling and Total Maximum Daily Load (TMDL) Study		
Parameters	2004	# of Samples	# of Samples
	Parameter		Parameter
	Chlorophyll <i>a</i> (corrected)	0	Phosphorus, as P
	Transparency, tube with disk	15	0
	2005	# of Samples	# of Samples
	Parameter		Parameter
	Chlorophyll <i>a</i> (corrected)	0	Phosphorus, as P
	Transparency, tube with disk	17	0
	2006	# of Samples	# of Samples
	Parameter		Parameter
	Chlorophyll <i>a</i> (corrected)	0	Phosphorus, as P
	Transparency, tube with disk	44	0
	2007	# of Samples	# of Samples
	Parameter		Parameter
	Chlorophyll <i>a</i> (corrected)	0	Phosphorus, as P
	Transparency, tube with disk	21	0
	2008	# of Samples	# of Samples
	Parameter		Parameter
	Chlorophyll <i>a</i> (corrected)	0	Phosphorus, as P
			6

Name	Black Dog Lake			
	Transparency, tube with disk	13		
	2009	# of		# of
	Parameter	Samples	Parameter	Samples
	Chlorophyll <i>a</i> (corrected)	1	Phosphorus, as P	0
	Transparency, tube with disk	0		
Data Steward	MPCA			
Monitoring Station ID	N/A			
Latitude	N/A			
Longitude	N/A			
Date(s) Collected	1975-2008			
Collected By	Satellite imagery			
Parameters	Year	Lake Clarity (m)	Year	Lake Clarity (m)
	~1975	0.56	2003	0.25
	~1985	0.36	2004	0.25
	~1990	0.43	2005	0.25
	~1995	0.32	~2005	0.38
	~2000	0.33	2008	0.33
Data Steward	University of Minnesota (Minnesota LakeBrowser, Twin Cities LakeBrowser)			
Strategic Resource Evaluation:				
Required Metrics	Parameter		Minnesota Eutrophication Standard	
	Chlorophyll-a (µg/L)		<20	
	Total Phosphorus (µg/L)		<60	
	Secchi Depth (m)		>1.0	
Data Required for Assessment	Eight (8) samples each for Chlorophyll-a, Total Phosphorus, and Secchi Depth data collected over 2+ years during the June-September period (typically one sampling event per month)			
Resource Category:				
Category 1 – Additional Chlorophyll-a, Total Phosphorus, and Secchi Depth data is needed to confirm if projects could be completed to improve, protect, or preserve the resource.				

Name	Blue Lake		
Water Body Type	Lake		
County	Scott		
City	Shakopee		
% of Watershed Within Lower Minnesota River Watershed District (LMRWD)	100%		
Watershed Land Use	54% Park, Recreational, or Preserve - 31% Water - 11% Industrial and Utility - 4% Other		
Use Classification	2B, 3C		
PWI #	70-88P		
Size	203 acres		
Depth:	Average	1.5 ft	
	Maximum	3 ft	
Lake Type	Floodplain/groundwater/marsh		
Water Supply	Natural springs, seepage and intermittent surface drainage		
Jurisdictional Entities	United States Army Corps of Engineers (USACE): <ul style="list-style-type: none"> - Administers Clean Water Act (CWA) Section 404 Minnesota Pollution Control Agency (MPCA): <ul style="list-style-type: none"> - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 - MN Rule 7050 (non-degradation rule) Wetland Conservation Act (WCA): <ul style="list-style-type: none"> - Minnesota Department of Natural Resources (DNR), enforces WCA - Board of Water and Soil Resources (BWSR), oversees administration of WCA - County/City, administer WCA 		
Recreational Access	N/A		
Fisheries Information	N/A		
Impaired Water	Insufficient data to assess		
Summary of Available Chemical Data:			
Monitoring Station ID	S000-303		
Latitude	44.8052778		
Longitude	-93.443		
Date(s) Collected	August 1974		
Collected By	MPCA Intensive Survey 742701 on Minnesota River		
Parameters	1974	# of Samples	Parameter
	Parameter		# of Samples
	Chlorophyll <i>a</i> , corrected	0	Phosphorus, as P
	Depth, Secchi disk depth	0	1
Data Steward	MPCA		
Monitoring Station ID	N/A		
Latitude	N/A		
Longitude	N/A		
Date(s) Collected	1975-2008		
Collected By	Satellite imagery		
Parameters	Year	Lake Clarity (m)	Year
	~1975	No Data	2003
	~1985	No Data	2004
	~1990	2.3	2005
	~1995	No Data	~2005
	~2000	No Data	2008
			0.5
			No Data
			No Data
			0.55
			0.71
Data Steward	University of Minnesota (Minnesota LakeBrowser, Twin Cities LakeBrowser)		
Strategic Resource Evaluation:			
Required Metrics	Parameter	Minnesota Eutrophication Standard	

Name	Blue Lake	
	Chlorophyll-a (µg/L)	<20
	Total Phosphorus (µg/L)	<60
	Secchi Depth (m)	>1.0
Data Required for Assessment	Eight (8) samples each for Chlorophyll-a, Total Phosphorus, and Secchi Depth data collected over 2+ years during the June-September period (typically one sampling event per month)	
Resource Category:	Category 1 – Additional Chlorophyll-a, Total Phosphorus, and Secchi Depth data is needed to confirm if projects could be completed to improve, protect, or preserve the resource.	

Name	Brickyard Clayhole		
Water Body Type	Lake		
County	Carver		
City	Chaska		
% of Watershed Within Lower Minnesota River Watershed District (LMRWD)	60%		
Watershed Land Use	38% Water - 26% Multifamily - 16% Undeveloped - 20% Other		
Use Classification	2B, 3C		
PWI #	10-225W		
Size	11 acres		
Depth:	Average	25 ft	
	Maximum	41 ft	
Lake Type	Quarry		
Water Supply	Springs		
Jurisdictional Entities	<p>United States Army Corps of Engineers (USACE):</p> <ul style="list-style-type: none"> - Administers Clean Water Act (CWA), Section 404 <p>Minnesota Pollution Control Agency (MPCA):</p> <ul style="list-style-type: none"> - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 - MN Rule 7050 (non-degradation rule) <p>Wetland Conservation Act (WCA):</p> <ul style="list-style-type: none"> - Minnesota Department of Natural Resources (DNR), enforces WCA - Board of Water and Soil Resources (BWSR), oversees administration of WCA - County/City, administer WCA 		
Recreational Access	N/A		
Fisheries Information	Sunfish, Crappie, Bass observed. Bluegill Sunfish stocked in 2010. (Source: DNR)		
Impaired Water	No		
Summary of Available Chemical Data:			
Monitoring Station ID	10-0225-00-201		
Latitude	44.793969		
Longitude	-93.5999		
Date(s) Collected	Apr 2002 through Oct 2010		
Collected By	Citizen Lake Monitoring Program, MCES Citizen-Assisted Lake Monitoring Program		
Parameters	2002	# of Samples	# of Samples
	Parameter		Parameter
	Chlorophyll <i>a</i> (corrected)	14	Phosphorus, as P
	Secchi Disk Depth	17	
	2003	# of Samples	# of Samples
	Parameter		Parameter
	Chlorophyll <i>a</i> (corrected)	13	Phosphorus, as P
	Secchi Disk Depth	18	
	2004	# of Samples	# of Samples
	Parameter		Parameter
	Chlorophyll <i>a</i> (corrected)	14	Phosphorus, as P
	Secchi Disk Depth	24	
	2005	# of Samples	# of Samples
	Parameter		Parameter
	Chlorophyll <i>a</i> (corrected)	13	Phosphorus, as P
	Secchi Disk Depth	28	
	2006	# of Samples	# of Samples
	Parameter		Parameter
	Chlorophyll <i>a</i> (corrected)	13	Phosphorus, as P
	Secchi Disk Depth	24	

Name		Brickyard Clayhole			
	2007 <u>Parameter</u> Chlorophyll <i>a</i> (corrected) Secchi Disk Depth	<u># of Samples</u> 13 21	<u>Parameter</u> Phosphorus, as P	<u># of Samples</u> 13	
	2008 <u>Parameter</u> Chlorophyll <i>a</i> (corrected) Secchi Disk Depth	<u># of Samples</u> 14 22	<u>Parameter</u> Phosphorus, as P	<u># of Samples</u> 14	
	2009 <u>Parameter</u> Chlorophyll <i>a</i> (corrected) Secchi Disk Depth	<u># of Samples</u> 14 26	<u>Parameter</u> Phosphorus, as P	<u># of Samples</u> 11	
	2010 <u>Parameter</u> Chlorophyll <i>a</i> (corrected) Secchi Disk Depth	<u># of Samples</u> 14 22	<u>Parameter</u> Phosphorus, as P	<u># of Samples</u> 14	
Data Steward	MPCA				
Strategic Resource Evaluation:					
Required Metrics	<u>Parameter</u> Chlorophyll-a (µg/L) Total Phosphorus (µg/L) Secchi Depth (m)	<u>Minnesota Eutrophication Standard</u> <14 <40 >1.4			
Data Required for Assessment	No additional Chlorophyll-a, Total Phosphorus, or Secchi Depth data is required for assessment of this resource.				
Resource Category:					
Category 2 – Proceed with feasibility study to determine potential projects, controls and/or management practices that could be used to improve or protect the resource.					

Name	Chaska Lake		
Water Body Type	Lake		
County	Carver		
City	Chaska, Carver		
% of Watershed Within Lower Minnesota River Watershed District (LMRWD)	100%		
Watershed Land Use	63% Park, Recreational, or Preserve - 30% Water - 7% Other		
Use Classification	2B, 3C		
PWI #	10-4P		
Size	46 acres		
Depth:	Average	1.5 ft	
	Maximum	3.5 ft	
Lake Type	Floodplain/groundwater		
Water Supply	Springs		
Jurisdictional Entities	<p>United States Army Corps of Engineers (USACE):</p> <ul style="list-style-type: none"> - Administers Clean Water Act (CWA), Section 404 <p>Minnesota Pollution Control Agency (MPCA):</p> <ul style="list-style-type: none"> - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 - MN Rule 7050 (non-degradation rule) <p>Wetland Conservation Act (WCA):</p> <ul style="list-style-type: none"> - Minnesota Department of Natural Resources (DNR), enforces WCA - Board of Water and Soil Resources (BWSR), oversees administration of WCA - County/City, administer WCA 		
Recreational Access	N/A		
Fisheries Information	N/A		
Impaired Water	Insufficient data to assess		
Summary of Available Chemical Data:			
Monitoring Station ID	N/A		
Latitude	N/A		
Longitude	N/A		
Date(s) Collected	1975-2008		
Collected By	Satellite imagery		
Parameters	Year	Lake Clarity (m)	Year
	~1975	0.61	2003
	~1985	0.57	2004
	~1990	0.57	2005
	~1995	0.63	~2005
	~2000	0.52	2008
Data Steward	University of Minnesota (Minnesota LakeBrowser, Twin Cities LakeBrowser)		
Strategic Resource Evaluation:			
Required Metrics	Parameter	Minnesota Eutrophication Standard	
	Chlorophyll-a (µg/L)	<20	
	Total Phosphorus (µg/L)	<60	
	Secchi Depth (m)	>1.0	
Data Required for Assessment	Eight (8) samples each for Chlorophyll-a, Total Phosphorus, and Secchi Depth data collected over 2+ years during the June-September period (typically one sampling event per month)		
Resource Category:			
Category 1 – Additional Chlorophyll-a, Total Phosphorus, and Secchi Depth data is needed to confirm if projects could be completed to improve, protect, or preserve the resource.			

Name	Colman (Nine Mile) Lake		
Water Body Type	Lake		
County	Hennepin		
City	Bloomington		
% of Watershed Within Lower Minnesota River Watershed District (LMRWD)	100%		
Watershed Land Use	59% Park, Recreational, or Preserve - 21% Single Family Detached - 15% Water - 5% Other		
Use Classification	2B, 3C		
PWI #	27-13P		
Size	114 acres		
Depth:	Average	<1.0 ft	
	Maximum	3.5 ft	
Lake Type	Floodplain/groundwater		
Water Supply	Nine Mile Creek, seepage and springs		
Jurisdictional Entities	United States Army Corps of Engineers (USACE): <ul style="list-style-type: none"> - Administers Clean Water Act (CWA), Section 404 Minnesota Pollution Control Agency (MPCA): <ul style="list-style-type: none"> - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 - MN Rule 7050 (non-degradation rule) Wetland Conservation Act (WCA): <ul style="list-style-type: none"> - Minnesota Department of Natural Resources (DNR), enforces WCA - Board of Water and Soil Resources (BWSR), oversees administration of WCA - County/City, administer WCA 		
Recreational Access	N/A		
Fisheries Information	N/A		
Impaired Water	Insufficient data to assess		
Summary of Available Chemical Data:			
Monitoring Station ID	N/A		
Latitude	N/A		
Longitude	N/A		
Date(s) Collected	1975-2008		
Collected By	Satellite imagery		
Parameters	Year	Lake Clarity (m)	Year
	~1975	No Data	2003
	~1985	0.81	2004
	~1990	No Data	2005
	~1995	0.86	~2005
	~2000	No Data	2008
Data Steward	University of Minnesota (Minnesota LakeBrowser, Twin Cities LakeBrowser)		
Strategic Resource Evaluation:			
Required Metrics	Parameter	Minnesota Eutrophication Standard	
	Chlorophyll-a (µg/L)	<20	
	Total Phosphorus (µg/L)	<60	
	Secchi Depth (m)	>1.0	
Data Required for Assessment	Eight (8) samples each for Chlorophyll-a, Total Phosphorus, and Secchi Depth data collected over 2+ years during the June-September period (typically one sampling event per month)		
Resource Category:	Category 1 – Additional Chlorophyll-a, Total Phosphorus, and Secchi Depth data is needed to confirm if projects could be completed to improve, protect, or preserve the resource.		

Name	Courthouse Lake		
Water Body Type	Lake		
County	Carver		
City	Chaska		
% of Watershed Within Lower Minnesota River Watershed District (LMRWD)	100%		
Watershed Land Use	29% Water - 25% Park, Recreational, or Preserve - 24% Institutional - 16% Single Family Detached - 6% Other		
Use Classification	1B, 2A, 3B		
PWI #	10-5P		
Size	12 acres		
Depth:	Average	25 ft	
	Maximum	57 ft	
Lake Type	Trout/quarry		
Water Supply	Underground springs		
Jurisdictional Entities	United States Army Corps of Engineers (USACE): <ul style="list-style-type: none"> - Administers Clean Water Act (CWA), Section 404 Minnesota Pollution Control Agency (MPCA): <ul style="list-style-type: none"> - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 - MN Rule 7050 (non-degradation rule) Wetland Conservation Act (WCA): <ul style="list-style-type: none"> - Minnesota Department of Natural Resources (DNR), enforces WCA - Board of Water and Soil Resources (BWSR), oversees administration of WCA - County/City, administer WCA 		
Recreational Access	Fishing pier		
Fisheries Information	Brook, Brown, Lake, and Rainbow Trout observed. Brook, Brown, and Rainbow Trout stocked in 2010. (Source: DNR)		
Impaired Water	No		
Summary of Available Chemical Data:			
Monitoring Station ID	10-0005-00-201		
Latitude	44.789635		
Longitude	-93.5896		
Date(s) Collected	Mar 1997 through Nov 2011		
Collected By	Citizen Lake Monitoring Program, MCES Citizen-Assisted Lake Monitoring Program, Twin Cities Metropolitan Area Chloride Project		
Parameters	2002	# of	# of
	Parameter	Samples	Parameter
	Chlorophyll <i>a</i> (corrected)	14	Phosphorus, as P
	Secchi Disk Depth	27	14
	2003	# of	# of
	Parameter	Samples	Parameter
	Chlorophyll <i>a</i> (corrected)	14	Phosphorus, as P
	Secchi Disk Depth	20	13
	2004	# of	# of
	Parameter	Samples	Parameter
	Chlorophyll <i>a</i> (corrected)	14	Phosphorus, as P
	Secchi Disk Depth	22	17
	2005	# of	# of
	Parameter	Samples	Parameter
	Chlorophyll <i>a</i> (corrected)	13	Phosphorus, as P
	Secchi Disk Depth	28	21

Name		Courthouse Lake		
	2006 <u>Parameter</u> Chlorophyll <i>a</i> (corrected) Secchi Disk Depth	<u># of Samples</u> 13 26	<u>Parameter</u> Phosphorus, as P	<u># of Samples</u> 13
	2007 <u>Parameter</u> Chlorophyll <i>a</i> (corrected) Secchi Disk Depth	<u># of Samples</u> 13 19	<u>Parameter</u> Phosphorus, as P	<u># of Samples</u> 13
	2008 <u>Parameter</u> Chlorophyll <i>a</i> (corrected) Secchi Disk Depth	<u># of Samples</u> 14 25	<u>Parameter</u> Phosphorus, as P	<u># of Samples</u> 14
	2009 <u>Parameter</u> Chlorophyll <i>a</i> (corrected) Secchi Disk Depth	<u># of Samples</u> 14 26	<u>Parameter</u> Phosphorus, as P	<u># of Samples</u> 13
	2010 <u>Parameter</u> Chlorophyll <i>a</i> (corrected) Secchi Disk Depth	<u># of Samples</u> 14 24	<u>Parameter</u> Phosphorus, as P	<u># of Samples</u> 14
	2011 <u>Parameter</u> Chlorophyll <i>a</i> (corrected) Secchi Disk Depth	<u># of Samples</u> 0 1	<u>Parameter</u> Phosphorus, as P	<u># of Samples</u> 0
Data Steward	MPCA			
Strategic Resource Evaluation:				
Required Metrics	<u>Parameter</u> Chlorophyll-a (µg/L) Total Phosphorus (µg/L) Secchi Depth (m)	<u>Minnesota Eutrophication Standard</u> <20 <60 >1.0		
Data Required for Assessment	No additional Chlorophyll-a, Total Phosphorus, or Secchi Depth data is required for assessment of this resource.			
Resource Category:				
Category 2 – Proceed with feasibility study to determine potential projects, controls and/or management practices that could be used to improve or protect the resource.				

Name	Lake Cy Ess	
Water Body Type	Lake	
County	Carver	
City	(not located)	
% of Watershed Within Lower Minnesota River Watershed District (LMRWD)	(unknown)	
Watershed Land Use	(unknown)	
Use Classification	(unknown)	
PWI #	10-225W	
Size	11 acres	
Depth:	Average	N/A
	Maximum	N/A
Lake Type	N/A	
Water Supply	N/A	
Jurisdictional Entities	United States Army Corps of Engineers (USACE): <ul style="list-style-type: none"> - Administers Clean Water Act (CWA) Section 404 Minnesota Pollution Control Agency (MPCA): <ul style="list-style-type: none"> - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 - MN Rule 7050 (non-degradation rule) Wetland Conservation Act (WCA): <ul style="list-style-type: none"> - Minnesota Department of Natural Resources (DNR), enforces WCA - Board of Water and Soil Resources (BWSR), oversees administration of WCA - County/City, administer WCA 	
Recreational Access	N/A	
Fisheries Information	N/A	
Impaired Water	Insufficient data to assess	
Summary of Available Chemical Data:		
No data available.		
Strategic Resource Evaluation:		
Required Metrics	Parameter	Minnesota Eutrophication Standard
	Chlorophyll-a (µg/L)	<20
	Total Phosphorus (µg/L)	<60
	Secchi Depth (m)	>1.0
Data Required for Assessment	Eight (8) samples each for Chlorophyll-a, Total Phosphorus, and Secchi Depth data collected over 2+ years during the June-September period (typically one sampling event per month)	
Resource Category:		
Category 1 – Additional Chlorophyll-a, Total Phosphorus, and Secchi Depth data is needed to confirm if projects could be completed to improve, protect, or preserve the resource.		

Name	Dean Lake		
Water Body Type	Lake		
County	Scott		
City	Shakopee		
% of Watershed Within Lower Minnesota River Watershed District (LMRWD)	66%		
Watershed Land Use	60% Undeveloped - 13% Single Family Detached - 12% Water - 15% Other		
Use Classification	2B, 3C		
PWI #	70-74P		
Size	216 acres		
Depth:	Average	3 ft	
	Maximum	5 ft	
Lake Type	Groundwater		
Water Supply	Seepage, natural springs and intermittent surface drainage		
Jurisdictional Entities	United States Army Corps of Engineers (USACE): <ul style="list-style-type: none"> - Administers Clean Water Act (CWA) Section 404 Minnesota Pollution Control Agency (MPCA): <ul style="list-style-type: none"> - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 - MN Rule 7050 (non-degradation rule) Wetland Conservation Act (WCA): <ul style="list-style-type: none"> - Minnesota Department of Natural Resources (DNR), enforces WCA - Board of Water and Soil Resources (BWSR), oversees administration of WCA - County/City, administer WCA 		
Recreational Access	N/A		
Fisheries Information	N/A		
Impaired Water	Yes		
Affected Use	Aquatic recreation		
Pollutant or Stressor	Nutrients/Eutrophication		
Total Maximum Daily Load (TMDL) Study:			
Start Date	2013		
Completion Date	2018		
TMDL Implementation Plan Status	N/A		
Summary of Available Chemical Data:			
Monitoring Station ID	70-0074-00-451		
Latitude	44.773795		
Longitude	-93.440978		
Date(s) Collected	Apr 2002 through Oct 2010		
Collected By	MCES Citizen-Assisted Lake Monitoring Program		
Parameters	2002	# of Samples	# of Samples
	Parameter		Parameter
	Chlorophyll <i>a</i> (corrected)	6	Phosphorus, as P
	Secchi Disk Depth	7	7
	2003	# of Samples	# of Samples
	Parameter		Parameter
	Chlorophyll <i>a</i> (corrected)	7	Phosphorus, as P
	Secchi Disk Depth	7	7
	2004	# of Samples	# of Samples
	Parameter		Parameter
	Chlorophyll <i>a</i> (corrected)	6	Phosphorus, as P
			6

Name	Dean Lake			
	Secchi Disk Depth	6		
	2005 <u>Parameter</u> Chlorophyll <i>a</i> (corrected) Secchi Disk Depth	<u># of Samples</u> 7 7	<u>Parameter</u> Phosphorus, as P	<u># of Samples</u> 7
	2006 <u>Parameter</u> Chlorophyll <i>a</i> (corrected) Secchi Disk Depth	<u># of Samples</u> 8 8	<u>Parameter</u> Phosphorus, as P	<u># of Samples</u> 8
	2007 <u>Parameter</u> Chlorophyll <i>a</i> (corrected) Secchi Disk Depth	<u># of Samples</u> 8 9	<u>Parameter</u> Phosphorus, as P	<u># of Samples</u> 9
	2008 <u>Parameter</u> Chlorophyll <i>a</i> (corrected) Secchi Disk Depth	<u># of Samples</u> 7 10	<u>Parameter</u> Phosphorus, as P	<u># of Samples</u> 10
	2009 <u>Parameter</u> Chlorophyll <i>a</i> (corrected) Secchi Disk Depth	<u># of Samples</u> 12 0	<u>Parameter</u> Phosphorus, as P	<u># of Samples</u> 12
	2010 <u>Parameter</u> Chlorophyll <i>a</i> (corrected) Secchi Disk Depth	<u># of Samples</u> 8 8	<u>Parameter</u> Phosphorus, as P	<u># of Samples</u> 8
Data Steward	MPCA			
Strategic Resource Evaluation:				
Required Metrics	<u>Parameter</u> Chlorophyll-a (µg/L) Total Phosphorus (µg/L) Secchi Depth (m)		<u>Minnesota Eutrophication Standard</u> <20 <60 >1.0	
Data Required for Assessment	No additional Chlorophyll-a, Total Phosphorus, or Secchi Depth data is required for assessment of this resource.			
Resource Category:				
Category 2 – Proceed with feasibility study to determine potential projects, controls and/or management practices that could be used to improve or protect the resource.				

Name	Firemen's Clayhole		
Water Body Type	Lake		
County	Carver		
City	Chaska		
% of Watershed Within Lower Minnesota River Watershed District (LMRWD)	1%		
Watershed Land Use	89% Park, Recreational, or Preserve - 11% Other		
Use Classification	2B, 3C		
PWI #	10-226		
Size	9 acres		
Depth:	Average		
	Maximum	23 ft	
Lake Type	N/A		
Water Supply	N/A		
Jurisdictional Entities	United States Army Corps of Engineers (USACE): <ul style="list-style-type: none"> - Administers Clean Water Act (CWA), Section 404 Minnesota Pollution Control Agency (MPCA): <ul style="list-style-type: none"> - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 - MN Rule 7050 (non-degradation rule) Wetland Conservation Act (WCA): <ul style="list-style-type: none"> - Minnesota Department of Natural Resources (DNR), enforces WCA - Board of Water and Soil Resources (BWSR), oversees administration of WCA - County/City, administer WCA 		
Recreational Access	Earthen boat landing, swimming beach, fishing pier		
Fisheries Information	Stocked annually with Bluegill Sunfish and Largemouth Bass (Source: DNR).		
Impaired Water	No		
Summary of Available Chemical Data:			
Monitoring Station ID	10-0226-00-201		
Latitude	44.790749		
Longitude	-93.603708		
Date(s) Collected	May 2001 through Oct 2011		
Collected By	Citizen Lake Monitoring Program; MCES Citizen-Assisted Lake Monitoring Program		
Parameters	2002	# of Samples	# of Samples
	Parameter		Parameter
	Chlorophyll <i>a</i> (corrected)	14	Phosphorus, as P
	Secchi Disk Depth	16	14
	2003	# of Samples	# of Samples
	Parameter		Parameter
	Chlorophyll <i>a</i> (corrected)	14	Phosphorus, as P
	Secchi Disk Depth	19	14
	2004	# of Samples	# of Samples
	Parameter		Parameter
	Chlorophyll <i>a</i> (corrected)	14	Phosphorus, as P
	Secchi Disk Depth	25	16
	2005	# of Samples	# of Samples
	Parameter		Parameter
	Chlorophyll <i>a</i> (corrected)	14	Phosphorus, as P
	Secchi Disk Depth	28	14
	2006	# of Samples	# of Samples
	Parameter		Parameter
	Chlorophyll <i>a</i> (corrected)	13	Phosphorus, as P
			13

Name		Firemen's Clayhole		
	Secchi Disk Depth	24		
	2007	# of		# of
	Parameter	Samples	Parameter	Samples
	Chlorophyll <i>a</i> (corrected)	13	Phosphorus, as P	13
	Secchi Disk Depth	18		
	2008	# of		# of
	Parameter	Samples	Parameter	Samples
	Chlorophyll <i>a</i> (corrected)	14	Phosphorus, as P	14
	Secchi Disk Depth	21		
	2009	# of		# of
	Parameter	Samples	Parameter	Samples
	Chlorophyll <i>a</i> (corrected)	14	Phosphorus, as P	13
	Secchi Disk Depth	26		
	2010	# of		# of
	Parameter	Samples	Parameter	Samples
	Chlorophyll <i>a</i> (corrected)	14	Phosphorus, as P	14
	Secchi Disk Depth	23		
	2011	# of		# of
	Parameter	Samples	Parameter	Samples
	Chlorophyll <i>a</i> (corrected)	0	Phosphorus, as P	0
	Secchi Disk Depth	14		
Data Steward	MPCA			
Strategic Resource Evaluation:				
Required Metrics	Parameter	Minnesota Eutrophication Standard		
	Chlorophyll-a (µg/L)	<20		
	Total Phosphorus (µg/L)	<60		
	Secchi Depth (m)	>1.0		
Data Required for Assessment	No additional Chlorophyll-a, Total Phosphorus, or Secchi Depth data is required for assessment of this resource.			
Resource Category:				
Category 2 – Proceed with feasibility study to determine potential projects, controls and/or management practices that could be used to improve or protect the resource.				

Name	Fisher Lake		
Water Body Type	Lake		
County	Scott		
City	Shakopee		
% of Watershed Within Lower Minnesota River Watershed District (LMRWD)	100%		
Watershed Land Use	40% Park, Recreational, or Preserve - 34% Water - 13% Industrial and Utility - 13% Other		
Use Classification	2B, 3C		
PWI #	70-87P		
Size	284 acres		
Depth:	Average	1 ft	
	Maximum	3 ft	
Lake Type	Floodplain/groundwater/marsh		
Water Supply	Blue Lake, natural springs, seepage and minor surface drainage		
Jurisdictional Entities	United States Army Corps of Engineers (USACE): <ul style="list-style-type: none"> - Administers Clean Water Act (CWA) Section 404 Minnesota Pollution Control Agency (MPCA): <ul style="list-style-type: none"> - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 - MN Rule 7050 (non-degradation rule) Wetland Conservation Act (WCA): <ul style="list-style-type: none"> - Minnesota Department of Natural Resources (DNR), enforces WCA - Board of Water and Soil Resources (BWSR), oversees administration of WCA - County/City, administer WCA 		
Recreational Access	N/A		
Fisheries Information	N/A		
Impaired Water	Insufficient data to assess		
Summary of Available Chemical Data:			
Monitoring Station ID	N/A		
Latitude	N/A		
Longitude	N/A		
Date(s) Collected	1975-2008		
Collected By	Satellite imagery		
Parameters	Year	Lake Clarity (m)	Year
	~1975	No Data	2003
	~1985	0.38	2004
	~1990	No Data	2005
	~1995	No Data	~2005
	~2000	No Data	2008
Data Steward	University of Minnesota (Minnesota LakeBrowser, Twin Cities LakeBrowser)		
Strategic Resource Evaluation:			
Required Metrics	Parameter	Minnesota Eutrophication Standard	
	Chlorophyll-a (µg/L)	<20	
	Total Phosphorus (µg/L)	<60	
	Secchi Depth (m)	>1.0	
Data Required for Assessment	Eight (8) samples each for Chlorophyll-a, Total Phosphorus, and Secchi Depth data collected over 2+ years during the June-September period (typically one sampling event per month)		
Resource Category:			
Category 1 – Additional Chlorophyll-a, Total Phosphorus, and Secchi Depth data is needed to confirm if projects could be completed to improve, protect, or preserve the resource.			

Name	Gifford Lake			
Water Body Type	Lake			
County	Scott			
City	Louisville Township			
% of Watershed Within Lower Minnesota River Watershed District (LMRWD)	95%			
Watershed Land Use	18% Water - 16% Agricultural - 16% Undeveloped - 15% Park, Recreational, or Preserve - 13% Industrial and Utility - 11% Extractive - 11% Other			
Use Classification	2B, 3C			
PWI #	70-118P			
Size	116 acres			
Depth:	Average	N/A		
	Maximum	N/A		
Lake Type	Floodplain/groundwater/marsh and old quarry or channel bed			
Water Supply	Springs, intermittent surface drainage			
Jurisdictional Entities	United States Army Corps of Engineers (USACE): <ul style="list-style-type: none"> - Administers Clean Water Act (CWA) Section 404 Minnesota Pollution Control Agency (MPCA): <ul style="list-style-type: none"> - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 - MN Rule 7050 (non-degradation rule) Wetland Conservation Act (WCA): <ul style="list-style-type: none"> - Minnesota Department of Natural Resources (DNR), enforces WCA - Board of Water and Soil Resources (BWSR), oversees administration of WCA - County/City, administer WCA 			
Recreational Access	N/A			
Fisheries Information	N/A			
Impaired Water	Insufficient data to assess			
Summary of Available Chemical Data:				
Monitoring Station ID	N/A			
Latitude	N/A			
Longitude	N/A			
Date(s) Collected	1975-2008			
Collected By	Satellite imagery			
Parameters	Year	Lake Clarity (m)	Year	Lake Clarity (m)
	~1975	0.56	2003	0.25
	~1985	0.64	2004	0.5
	~1990	0.93	2005	0.5
	~1995	1.24	~2005	0.73
	~2000	0.62	2008	0.78
Data Steward	University of Minnesota (Minnesota LakeBrowser, Twin Cities LakeBrowser)			
Strategic Resource Evaluation:				
Required Metrics	Parameter		Minnesota Eutrophication Standard	
	Chlorophyll-a (µg/L)		<20	
	Total Phosphorus (µg/L)		<60	
	Secchi Depth (m)		>1.0	
Data Required for Assessment	Eight (8) samples each for Chlorophyll-a, Total Phosphorus, and Secchi Depth data collected over 2+ years during the June-September period (typically one sampling event per month)			
Resource Category:				
Category 1 – Additional Chlorophyll-a, Total Phosphorus, and Secchi Depth data is needed to confirm if projects could be completed to improve, protect, or preserve the resource.				

Name	Grass Lake		
Water Body Type	Lake		
County	Hennepin		
City	Eden Prairie		
% of Watershed Within Lower Minnesota River Watershed District (LMRWD)	56%		
Watershed Land Use	43% Park, Recreational, or Preserve - 17% Water - 14% Undeveloped - 12% Airport - 10% Industrial and Utility - 4% Other		
Use Classification	2B, 3C		
PWI #	27-80P		
Size	467 acres		
Depth:	Average	1.5 ft	
	Maximum	3.5 ft	
Lake Type	Floodplain/groundwater/marsh		
Water Supply	Riley Creek, seepage and springs		
Jurisdictional Entities	United States Army Corps of Engineers (USACE): <ul style="list-style-type: none"> - Administers Clean Water Act (CWA), Section 404 Minnesota Pollution Control Agency (MPCA): <ul style="list-style-type: none"> - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 - MN Rule 7050 (non-degradation rule) Wetland Conservation Act (WCA): <ul style="list-style-type: none"> - Minnesota Department of Natural Resources (DNR), enforces WCA - Board of Water and Soil Resources (BWSR), oversees administration of WCA - County/City, administer WCA 		
Recreational Access	N/A		
Fisheries Information	N/A		
Impaired Water	Insufficient data to assess		
Summary of Available Chemical Data:			
Monitoring Station ID	N/A		
Latitude	N/A		
Longitude	N/A		
Date(s) Collected	1975-2008		
Collected By	Satellite imagery		
Parameters	Year	Lake Clarity (m)	Year
	~1975	No Data	2003
	~1985	0.72	2004
	~1990	0.81	2005
	~1995	0.7	~2005
	~2000	No Data	2008
			0.5
			0.5
			0.5
			0.58
			No Data
Data Steward	University of Minnesota (Minnesota LakeBrowser, Twin Cities LakeBrowser)		
Strategic Resource Evaluation:			
Required Metrics	Parameter	Minnesota Eutrophication Standard	
	Chlorophyll-a (µg/L)	<20	
	Total Phosphorus (µg/L)	<60	
	Secchi Depth (m)	>1.0	
Data Required for Assessment	Eight (8) samples each for Chlorophyll-a, Total Phosphorus, and Secchi Depth data collected over 2+ years during the June-September period (typically one sampling event per month)		
Resource Category:			
Category 1 – Additional Chlorophyll-a, Total Phosphorus, and Secchi Depth data is needed to confirm if projects could be completed to improve, protect, or preserve the resource.			

Name	Gun Club Lake		
Water Body Type	Lake		
County	Dakota		
City	Mendota Heights, Eagan		
% of Watershed Within Lower Minnesota River Watershed District (LMRWD)	69%		
Watershed Land Use	49% Water - 47% Park, Recreational, or Preserve - 4% Other		
Use Classification	2B, 3C		
PWI #	19-78P		
Size	1,216 acres		
Depth:	Average	1 ft	
	Maximum	2.5 ft	
Lake Type	Floodplain/groundwater/marsh		
Water Supply	Springs, seepage		
Jurisdictional Entities	United States Army Corps of Engineers (USACE): - Administers Clean Water Act (CWA), Section 404 Minnesota Pollution Control Agency (MPCA): - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 - MN Rule 7050 (non-degradation rule) Wetland Conservation Act (WCA): - Minnesota Department of Natural Resources (DNR), enforces WCA - Board of Water and Soil Resources (BWSR), oversees administration of WCA - County/City, administer WCA		
Recreational Access	N/A		
Fisheries Information	Bluegill Sunfish, Crappie, Largemouth Bass observed. (Source: DNR)		
Impaired Water	Insufficient data to assess		
Summary of Available Chemical Data:			
Monitoring Station ID	19-0078-00-20		
Latitude	44.870239		
Longitude	-93.1826		
Date(s) Collected	May 2004 through June 2004		
Collected By	Citizen Lake Monitoring Program		
Parameters	2004	# of Samples	# of Samples
	Parameter		Parameter
	Chlorophyll <i>a</i> (corrected)	0	Phosphorus, as P
	Secchi disk depth	2	0
Data Steward	MPCA		
Monitoring Station ID	N/A		
Latitude	N/A		
Longitude	N/A		
Date(s) Collected	1975-2008		
Collected By	Satellite imagery		
Parameters	Year	Lake Clarity (m)	Lake Clarity (m)
	~1975	0.82	2003 0.5
	~1985	0.82	2004 0.5
	~1990	0.71	2005 1
	~1995	0.74	~2005 No Data
	~2000	No Data	2008 0.88
Data Steward	University of Minnesota (Minnesota LakeBrowser, Twin Cities LakeBrowser)		
Strategic Resource Evaluation:			
Required Metrics	Parameter	Minnesota Eutrophication Standard	
	Chlorophyll-a (µg/L)	<20	

Name	Gun Club Lake	
	Total Phosphorus (µg/L)	<60
	Secchi Depth (m)	>1.0
Data Required for Assessment	Eight (8) samples each for Chlorophyll-a, Total Phosphorus, and Secchi Depth data collected over 2+ years during the June-September period (typically one sampling event per month)	
Resource Category:	Category 1 – Additional Chlorophyll-a, Total Phosphorus, and Secchi Depth data is needed to confirm if projects could be completed to improve, protect, or preserve the resource.	

Name	Long Meadow Lake		
Water Body Type	Lake		
County	Hennepin		
City	Bloomington		
% of Watershed Within Lower Minnesota River Watershed District (LMRWD)	46%		
Watershed Land Use	29% Water - 22% Park, Recreational, or Preserve - 16% Airport - 14% Single Family Detached - 19% Other		
Use Classification	2B, 3C		
PWI #	27-2P		
Size	1,188 acres		
Depth:	Average	1 ft	
	Maximum	3.5 ft	
Lake Type	Floodplain/groundwater/marsh		
Water Supply	Natural springs, some surface drainage from north and south		
Jurisdictional Entities	United States Army Corps of Engineers (USACE): <ul style="list-style-type: none"> - Administers Clean Water Act (CWA), Section 404 Minnesota Pollution Control Agency (MPCA): <ul style="list-style-type: none"> - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 - MN Rule 7050 (non-degradation rule) Wetland Conservation Act (WCA): <ul style="list-style-type: none"> - Minnesota Department of Natural Resources (DNR), enforces WCA - Board of Water and Soil Resources (BWSR), oversees administration of WCA - County/City, administer WCA 		
Recreational Access	N/A		
Fisheries Information	N/A		
Impaired Water	Insufficient data to assess		
Summary of Available Chemical Data:			
Monitoring Station ID	N/A		
Latitude	N/A		
Longitude	N/A		
Date(s) Collected	1975-2008		
Collected By	Satellite imagery		
Parameters	Year	Lake Clarity (m)	Year
	~1975	No Data	2003
	~1985	1.06	2004
	~1990	0.57	2005
	~1995	0.73	~2005
	~2000	0.47	2008
Lake Clarity (m)			
			0.5
			0.5
			1
			0.88
			0.87
Data Steward	University of Minnesota (Minnesota LakeBrowser, Twin Cities LakeBrowser)		
Strategic Resource Evaluation:			
Required Metrics	Parameter	Minnesota Eutrophication Standard	
	Chlorophyll-a (µg/L)	<20	
	Total Phosphorus (µg/L)	<60	
	Secchi Depth (m)	>1.0	
Data Required for Assessment	Eight (8) samples each for Chlorophyll-a, Total Phosphorus, and Secchi Depth data collected over 2+ years during the June-September period (typically one sampling event per month)		
Resource Category:			
Category 1 – Additional Chlorophyll-a, Total Phosphorus, and Secchi Depth data is needed to confirm if projects could be completed to improve, protect, or preserve the resource.			

Name	Nyssens Lake			
Water Body Type	Lake			
County	Scott			
City	Jackson Township			
% of Watershed Within Lower Minnesota River Watershed District (LMRWD)	100%			
Watershed Land Use	33% Park, Recreational, or Preserve - 25% Agricultural - 19% Undeveloped - 23% Other			
Use Classification	2B, 3C			
PWI #	70-116P			
Size	185 acres			
Depth:	Average	1 ft		
	Maximum	4 ft		
Lake Type	Floodplain/groundwater/marsh and southern lake is old quarry or gravel pit			
Water Supply	Spring, seepage and small amount of local drainage			
Jurisdictional Entities	United States Army Corps of Engineers (USACE): <ul style="list-style-type: none"> - Administers Clean Water Act (CWA) Section 404 Minnesota Pollution Control Agency (MPCA): <ul style="list-style-type: none"> - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 - MN Rule 7050 (non-degradation rule) Wetland Conservation Act (WCA): <ul style="list-style-type: none"> - Minnesota Department of Natural Resources (DNR), enforces WCA - Board of Water and Soil Resources (BWSR), oversees administration of WCA - County/City, administer WCA 			
Recreational Access	N/A			
Fisheries Information	N/A			
Impaired Water	Insufficient data to assess			
Summary of Available Chemical Data:				
Monitoring Station ID	N/A			
Latitude	N/A			
Longitude	N/A			
Date(s) Collected	1975-2008			
Collected By	Satellite imagery			
Parameters	Year	Lake Clarity (m)	Year	Lake Clarity (m)
	~1975	No Data	2003	0.5
	~1985	No Data	2004	1
	~1990	No Data	2005	0.5
	~1995	0.63	~2005	No Data
	~2000	No Data	2008	No Data
Data Steward	University of Minnesota (Minnesota LakeBrowser, Twin Cities LakeBrowser)			
Strategic Resource Evaluation:				
Required Metrics	Parameter		Minnesota Eutrophication Standard	
	Chlorophyll-a (µg/L)		<20	
	Total Phosphorus (µg/L)		<60	
	Secchi Depth (m)		>1.0	
Data Required for Assessment	Eight (8) samples each for Chlorophyll-a, Total Phosphorus, and Secchi Depth data collected over 2+ years during the June-September period (typically one sampling event per month)			
Resource Category:				
Category 1 – Additional Chlorophyll-a, Total Phosphorus, and Secchi Depth data is needed to confirm if projects could be completed to improve, protect, or preserve the resource.				
Name	Overlook Lake			

Name	Nyssens Lake	
Water Body Type	Lake	
County	Hennepin	
City	Bloomington	
% of Watershed Within Lower Minnesota River Watershed District (LMRWD)	100%	
Watershed Land Use	76% Single Family Detached - 12% Single Family Attached - 12% Other	
Use Classification	2B, 3C	
PWI #	27-1071P	
Size	6 acres	
Depth:	Average	N/A
	Maximum	N/A
Lake Type	N/A	
Water Supply	N/A	
Jurisdictional Entities	United States Army Corps of Engineers (USACE): <ul style="list-style-type: none"> - Administers Clean Water Act (CWA) Section 404 Minnesota Pollution Control Agency (MPCA): <ul style="list-style-type: none"> - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 - MN Rule 7050 (non-degradation rule) Wetland Conservation Act (WCA): <ul style="list-style-type: none"> - Minnesota Department of Natural Resources (DNR), enforces WCA - Board of Water and Soil Resources (BWSR), oversees administration of WCA - County/City, administer WCA 	
Recreational Access	N/A	
Fisheries Information	N/A	
Impaired Water	Insufficient data to assess	
Summary of Available Chemical Data:		
No data available.		
Strategic Resource Evaluation:		
Required Metrics	Parameter	Minnesota Eutrophication Standard
	Chlorophyll-a (µg/L)	<20
	Total Phosphorus (µg/L)	<60
	Secchi Depth (m)	>1.0
Data Required for Assessment	Eight (8) samples each for Chlorophyll-a, Total Phosphorus, and Secchi Depth data collected over 2+ years during the June-September period (typically one sampling event per month)	
Resource Category:		
Category 1 – Additional Chlorophyll-a, Total Phosphorus, and Secchi Depth data is needed to confirm if projects could be completed to improve, protect, or preserve the resource.		

Name	Rice Lake (Hennepin County)		
Water Body Type	Lake		
County	Hennepin, Carver		
City	Eden Prairie, Chanhassen		
% of Watershed Within Lower Minnesota River Watershed District (LMRWD)	33%		
Watershed Land Use	31% Park, Recreational, or Preserve - 23% Undeveloped - 19% Water - 11% Agricultural - 16% Other		
Use Classification	2B, 3C		
PWI #	27-132P		
Size	517 acres		
Depth:	Average	1 ft	
	Maximum	3 ft	
Lake Type	Floodplain/groundwater/marsh		
Water Supply	Bluff Creek, springs and intermittent surface drainage		
Jurisdictional Entities	United States Army Corps of Engineers (USACE): <ul style="list-style-type: none"> - Administers Clean Water Act (CWA) Section 404 Minnesota Pollution Control Agency (MPCA): <ul style="list-style-type: none"> - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 - MN Rule 7050 (non-degradation rule) Wetland Conservation Act (WCA): <ul style="list-style-type: none"> - Minnesota Department of Natural Resources (DNR), enforces WCA - Board of Water and Soil Resources (BWSR), oversees administration of WCA - County/City, administer WCA 		
Recreational Access	Earthen boat landing, shore fishing		
Fisheries Information	N/A		
Impaired Water	Insufficient data to assess		
Summary of Available Chemical Data:			
Monitoring Station ID	N/A		
Latitude	N/A		
Longitude	N/A		
Date(s) Collected	1975-2008		
Collected By	Satellite imagery		
Parameters	Year	Lake Clarity (m)	Year
	~1975	0.62	2003
	~1985	0.56	2004
	~1990	No Data	2005
	~1995	1.02	~2005
	~2000	No Data	2008
			No Data
Data Steward	University of Minnesota (Minnesota LakeBrowser, Twin Cities LakeBrowser)		
Strategic Resource Evaluation:			
Required Metrics	Parameter	Minnesota Eutrophication Standard	
	Chlorophyll-a (µg/L)	<20	
	Total Phosphorus (µg/L)	<60	
	Secchi Depth (m)	>1.0	
Data Required for Assessment	Eight (8) samples each for Chlorophyll-a, Total Phosphorus, and Secchi Depth data collected over 2+ years during the June-September period (typically one sampling event per month)		
Resource Category:			
Category 1 – Additional Chlorophyll-a, Total Phosphorus, and Secchi Depth data is needed to confirm if projects could be completed to improve, protect, or preserve the resource.			

Name	Rice Lake (Scott County)		
Water Body Type	Lake		
County	Scott		
City	Savage		
% of Watershed Within Lower Minnesota River Watershed District (LMRWD)	94%		
Watershed Land Use	31% Undeveloped - 23% Park, Recreational, or Preserve - 13% Single Family Detached - 10% Industrial and Utility - 23% Other		
Use Classification	2B, 3C		
PWI #	70-25P		
Size	259 acres		
Depth:	Average	1 ft	
	Maximum	3 ft	
Lake Type	Floodplain/groundwater/marsh		
Water Supply	Natural springs, seepage and some local drainage		
Jurisdictional Entities	United States Army Corps of Engineers (USACE): - Administers Clean Water Act (CWA) Section 404 Minnesota Pollution Control Agency (MPCA): - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 - MN Rule 7050 (non-degradation rule) Wetland Conservation Act (WCA): - Minnesota Department of Natural Resources (DNR), enforces WCA - Board of Water and Soil Resources (BWSR), oversees administration of WCA - County/City, administer WCA		
Recreational Access	N/A		
Fisheries Information	N/A		
Impaired Water	Insufficient data to assess		
Summary of Available Chemical Data:			
Monitoring Station ID	N/A		
Latitude	N/A		
Longitude	N/A		
Date(s) Collected	1975-2008		
Collected By	Satellite imagery		
Parameters	Year	Lake Clarity (m)	Year
	~1975	No Data	2003
	~1985	1.39	2004
	~1990	0.87	2005
	~1995	0.93	~2005
	~2000	No Data	2008
Data Steward	University of Minnesota (Minnesota LakeBrowser, Twin Cities LakeBrowser)		
Strategic Resource Evaluation:			
Required Metrics	Parameter	Minnesota Eutrophication Standard	
	Chlorophyll-a (µg/L)	<20	
	Total Phosphorus (µg/L)	<60	
	Secchi Depth (m)	>1.0	
Data Required for Assessment	Eight (8) samples each for Chlorophyll-a, Total Phosphorus, and Secchi Depth data collected over 2+ years during the June-September period (typically one sampling event per month)		
Resource Category:			
Category 1 – Additional Chlorophyll-a, Total Phosphorus, and Secchi Depth data is needed to confirm if projects could be completed to improve, protect, or preserve the resource.			

Name	Snelling Lake			
Water Body Type	Lake			
County	Hennepin			
City	Minnesota Department of Natural Resources (DNR) land			
% of Watershed Within Lower Minnesota River Watershed District (LMRWD)	97%			
Watershed Land Use	53% Airport - 18% Institutional - 12% Park, Recreational, or Preserve - 17% Other			
Use Classification	2B, 3C			
PWI #	27-1P			
Size	119 acres			
Depth:	Average	6 ft		
	Maximum	12 ft		
Lake Type	Floodplain/groundwater			
Water Supply	Mainly natural springs, little surface drainage			
Jurisdictional Entities	United States Army Corps of Engineers (USACE): - Administers Clean Water Act (CWA), Section 404 Minnesota Pollution Control Agency (MPCA): - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 - MN Rule 7050 (non-degradation rule) Wetland Conservation Act (WCA): - DNR, enforces WCA - Board of Water and Soil Resources (BWSR), oversees administration of WCA - County/City, administer WCA			
Recreational Access	Fishing pier, carry in boats			
Fisheries Information	Bluegill Sunfish, Carp, Northern Pike observed. (Source: DNR)			
Impaired Water	Yes			
Affected Use	Aquatic consumption			
Pollutant or Stressor	Mercury in fish tissue			
Total Maximum Daily Load (TMDL) Study:				
Start Date	-			
Completion Date	2008			
TMDL Implementation Plan Status	Completed			
Summary of Available Chemical Data:				
Monitoring Station ID	N/A			
Latitude	N/A			
Longitude	N/A			
Date(s) Collected	1975-2008			
Collected By	Satellite imagery			
Parameters	Year	Lake Clarity (m)	Year	Lake Clarity (m)
	~1975	1.74	2003	2
	~1985	2.66	2004	No Data
	~1990	2.64	2005	2
	~1995	1.61	~2005	1.78
	~2000	3.03	2008	2.65
Data Steward	University of Minnesota (Minnesota LakeBrowser, Twin Cities LakeBrowser)			
Strategic Resource Evaluation:				
Required Metrics	Parameter	Minnesota Eutrophication Standard		
	Chlorophyll-a (µg/L)	<20		

Name	Snelling Lake	
	Total Phosphorus ($\mu\text{g/L}$)	<60
	Secchi Depth (m)	>1.0
Data Required for Assessment	Eight (8) samples each for Chlorophyll-a, Total Phosphorus, and Secchi Depth data collected over 2+ years during the June-September period (typically one sampling event per month)	
Resource Category:		
Category 1 – Additional Chlorophyll-a, Total Phosphorus, and Secchi Depth data is needed to confirm if projects could be completed to improve, protect, or preserve the resource.		

Appendix B – STREAMS

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Name	Bluff Creek	
Water Body Type	Stream	
County	Carver, Hennepin	
City	Chanhassen, Eden Prairie	
% of Watershed Within Lower Minnesota River Watershed District (LMRWD)	37%	
Watershed Land Use	35% Park, Recreational, or Preserve - 24% Undeveloped - 16% Water - 10% Agricultural - 15% Other	
Use Classification	2B, 3C	
Jurisdictional Entities	United States Army Corps of Engineers (USACE): - Administers Clean Water Act (CWA) Section 404 Minnesota Pollution Control Agency (MPCA): - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 Wetland Conservation Act (WCA): - Minnesota Department of Natural Resources (DNR), enforces WCA - Board of Water and Soil Resources (BWSR), oversees administration of WCA - County/City, administer WCA	
Recreational Access	N/A	
Fisheries Information	Bluntnose Minnow, Brook Stickleback, Fathead Minnow, Iowa Darter. (Source: DNR)	
Flow Information	N/A	
Gauging Station	N/A	
Impaired Water	Yes	
Affected Use	Aquatic Life	Aquatic Life
Pollutant or Stressor	Fish and Biological Assessments	Turbidity
Total Maximum Daily Load (TMDL) Study:		
Start Date	2008	2008
Completion Date	2011	2011
TMDL Implementation Plan Status	In progress	In progress
Summary of Available Chemical Data:		
Multiple monitoring stations exist along the stream. Samples have been collected and analyzed which support the status of impaired water for fish and biological assessments, and turbidity.		
Data Steward	MPCA	
Strategic Resource Evaluation:		
Required Metric Standard	Turbidity (for aquatic life)	E. coli (for aquatic recreation)
	25 nephelometric turbidity units (NTU) (Twenty independent measurements collected randomly between April and October. The water is considered impaired if at least three measurements and 10% of the measurements exceed the standard. Measurements may be collected over multiple years.)	Chronic standard: 126 organisms per 100mL of water (Minimum of five measurements per month for at least three of the months between April and October, aggregated over a period of up to 10 years.) Acute standard: 1,260 organisms per 100mL of water
Data Required for Assessment	No additional turbidity data is required to evaluate the resource.	Additional E. coli data is required for assessment. No E. coli samples have been collected.
Resource Category:		
Category 1 – Additional E. coli data is needed to confirm if projects could be completed to improve, protect, or preserve the resource.		

Name	Carver Creek	
Water Body Type	Stream	
County	Carver	
City	Chaska	
% of Watershed Within Lower Minnesota River Watershed District (LMRWD)	<1%	
Watershed Land Use	42% Park, Recreational, or Preserve - 33% Single Family Detached - 22% Undeveloped - 3% Other	
Use Classification	2B, 3C	
Jurisdictional Entities	United States Army Corps of Engineers (USACE): <ul style="list-style-type: none"> - Administers Clean Water Act (CWA) Section 404 Minnesota Pollution Control Agency (MPCA): <ul style="list-style-type: none"> - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 Wetland Conservation Act (WCA): <ul style="list-style-type: none"> - Minnesota Department of Natural Resources (DNR), enforces WCA - Board of Water and Soil Resources (BWSR), oversees administration of WCA - County/City, administer WCA 	
Recreational Access	N/A	
Fisheries Information	Bigmouth Shiner, Blacknose Dace, Central Stoneroller, Creek Chub, Fantail Darter, Fathead Minnow, Johnny Darter, White Sucker observed. (Source: DNR)	
Flow Information	Mean Flow (1980): 13.4 cfs	
Gauging Station	USGS 05330645	
Impaired Water	Yes	
Affected Use	Aquatic Recreation	Aquatic Life
Pollutant or Stressor	Fecal Coliform	Turbidity
Total Maximum Daily Load (TMDL) Study:		
Start Date	-	2006
Completion Date	2008	2010
TMDL Implementation Plan Status	Completed	In progress
Summary of Available Chemical Data:		
Multiple monitoring stations exist along the stream. Samples have been collected and analyzed which support the status of impaired water for fecal coliform and turbidity.		
Data Steward	MPCA	
Strategic Resource Evaluation:		
Required Metric Standard	Turbidity (for aquatic life) 25 nephelometric turbidity units (NTU) (Twenty independent measurements collected randomly between April and October. The water is considered impaired if at least three measurements and 10% of the measurements exceed the standard. Measurements may be collected over multiple years.)	E. coli (for aquatic recreation) Chronic standard: 126 organisms per 100mL of water (Minimum of five measurements per month for at least three of the months between April and October, aggregated over a period of up to 10 years.) Acute standard: 1,260 organisms per 100mL of water
Data Required for Assessment	No additional turbidity data is required to evaluate the resource.	No additional E. coli data is required to evaluate the resource.
Resource Category:		
Category 2 – Proceed with feasibility study to determine potential projects, controls and/or management practices that could be used to improve or protect the resource.		
Name	Chaska Creek	

Name	Carver Creek	
Water Body Type	Stream	
County	Carver	
City	Chaska	
% of Watershed Within Lower Minnesota River Watershed District (LMRWD)	2%	
Watershed Land Use	41% Park, Recreational, or Preserve - 41 % Single Family Detached - 18% Other	
Use Classification	2B, 3C	
Jurisdictional Entities	United States Army Corps of Engineers (USACE): <ul style="list-style-type: none"> - Administers Clean Water Act (CWA) Section 404 Minnesota Pollution Control Agency (MPCA): <ul style="list-style-type: none"> - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 Wetland Conservation Act (WCA): <ul style="list-style-type: none"> - Minnesota Department of Natural Resources (DNR), enforces WCA - Board of Water and Soil Resources (BWSR), oversees administration of WCA - County/City, administer WCA 	
Recreational Access	N/A	
Fisheries Information	Blacknose Dace, Brook Stickleback, Central Mudminnow, Creek Chub, Johnny Darter observed. (Source: DNR)	
Flow Information	N/A	
Gauging Station	N/A	
Impaired Water	Yes	
Affected Use	Aquatic recreation	
Pollutant or Stressor	Fecal coliform	
Total Maximum Daily Load (TMDL) Study:		
Start Date	2013	
Completion Date	2016	
TMDL Implementation Plan Status	N/A	
Summary of Available Chemical Data:		
Multiple monitoring stations exist along the stream. Samples have been collected and analyzed which support the status of impaired water for fecal coliform. Enough samples have also been collected to support the status of impaired water for turbidity; however an impairment determination has not been made.		
Data Steward	MPCA	
Strategic Resource Evaluation:		
Required Metric Standard	Turbidity (for aquatic life)	E. coli (for aquatic recreation)
	25 nephelometric turbidity units (NTU) (Twenty independent measurements collected randomly between April and October. The water is considered impaired if at least three measurements and 10% of the measurements exceed the standard. Measurements may be collected over multiple years.)	Chronic standard: 126 organisms per 100mL of water (Minimum of five measurements per month for at least three of the months between April and October, aggregated over a period of up to 10 years.) Acute standard: 1,260 organisms per 100mL of water
Data Required for Assessment	No additional turbidity data is required to evaluate the resource.	No additional E. coli data is required to evaluate the resource.
Resource Category:		
Category 2 – Proceed with feasibility study to determine potential projects, controls and/or management practices that could be used to improve or protect the resource.		

Name	Credit River
Water Body Type	Stream
County	Scott
City	Savage
% of Watershed Within Lower Minnesota River	1%

Name	Credit River	
Watershed District (LMRWD)		
Watershed Land Use	55% Undeveloped - 16% Single Family Detached - 29% Other	
Use Classification	2B, 3C	
Jurisdictional Entities	United States Army Corps of Engineers (USACE): <ul style="list-style-type: none"> - Administers Clean Water Act (CWA) Section 404 Minnesota Pollution Control Agency (MPCA): <ul style="list-style-type: none"> - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 Wetland Conservation Act (WCA): <ul style="list-style-type: none"> - Minnesota Department of Natural Resources (DNR): enforces WCA - Board of Water and Soil Resources (BWSR): oversees administration of WCA - County/City: administer WCA 	
Recreational Access	N/A	
Fisheries Information	N/A	
Flow Information	Mean Flow (1980): 7.7 cfs	
Gauging Station	USGS 05330870	
Impaired Water	Yes	
Affected Use	Aquatic Life	
Pollutant or Stressor	Turbidity	
Total Maximum Daily Load (TMDL) Study:		
Start Date	2008	
Completion Date	2010	
TMDL Implementation Plan Status	In Progress	
Summary of Available Chemical Data:		
Multiple monitoring stations exist along the stream. Samples have been collected and analyzed which support the status of impaired water for turbidity.		
Data Steward	MPCA	
Strategic Resource Evaluation:		
Required Metric Standard	Turbidity (for aquatic life)	E. coli (for aquatic recreation)
	25 nephelometric turbidity units (NTU) (Twenty independent measurements collected randomly between April and October. The water is considered impaired if at least three measurements and 10% of the measurements exceed the standard. Measurements may be collected over multiple years.)	Chronic standard: 126 organisms per 100mL of water (Minimum of five measurements per month for at least three of the months between April and October, aggregated over a period of up to 10 years.) Acute standard: 1,260 organisms per 100mL of water
Data Required for Assessment	No additional turbidity data is required to evaluate the resource.	Additional E. coli data is required for assessment. No E. coli data has been posted to MPCA website.
Resource Category:		
Category 1 – Additional E. coli data is needed to confirm if projects could be completed to improve, protect, or preserve the resource.		

Name	East Chaska Creek		
Water Body Type	Stream		
County	Carver		
City	Chaska		
% of Watershed Within Lower Minnesota River Watershed District (LMRWD)	7%		
Watershed Land Use	33% Undeveloped - 20% Single Family Detached - 20% Park, Recreational, or Preserve - 12% Retail and Other Commercial - 15% Other		
Use Classification	2B, 3C		
Jurisdictional Entities	United States Army Corps of Engineers (USACE): <ul style="list-style-type: none"> - Administers Clean Water Act (CWA) Section 404 Minnesota Pollution Control Agency (MPCA): <ul style="list-style-type: none"> - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 Wetland Conservation Act (WCA): <ul style="list-style-type: none"> - Minnesota Department of Natural Resources (DNR), enforces WCA - Board of Water and Soil Resources (BWSR), oversees administration of WCA - County/City, administer WCA 		
Recreational Access	N/A		
Fisheries Information	Black Bullhead, Blacknose Dace, Bluntnose Minnow, Brook Stickleback, Central Mudminnow, Creek Chub, Fathead Minnow, Largemouth Bass, Pumpkinseed, White Sucker observed. (Source: DNR)		
Flow Information	N/A		
Gauging Station	N/A		
Impaired Water	Yes		
Affected Use	Aquatic Life	Aquatic Recreation	Aquatic Life
Pollutant or Stressor	Turbidity	Fecal Coliform	Fish and Biological Assessments
Total Maximum Daily Load (TMDL) Study:			
Start Date	2013	2013	2013
Completion Date	2018	2018	2018
TMDL Implementation Plan Status	N/A	N/A	N/A
Summary of Available Chemical Data:			
Samples have been collected and analyzed which support the status of impaired water.			
Data Steward	MPCA		
Strategic Resource Evaluation:			
Required Metric	Turbidity (for aquatic life)	E. coli (for aquatic recreation)	
Standard	25 nephelometric turbidity units (NTU) (Twenty independent measurements collected randomly between April and October. The water is considered impaired if at least three measurements and 10% of the measurements exceed the standard. Measurements may be collected over multiple years.)	Chronic standard: 126 organisms per 100mL of water (Minimum of five measurements per month for at least three of the months between April and October, aggregated over a period of up to 10 years.) Acute standard: 1,260 organisms per 100mL of water	
Data Required for Assessment	No additional turbidity data is required to evaluate the resource.	No additional E. coli data is required to evaluate the resource.	
Resource Category:			
Category 2 – Proceed with feasibility study to determine potential projects, controls and/or management practices that could be used to improve or protect the resource.			

Name	Minnesota River
Water Body Type	Stream
County	Hennepin, Dakota, Scott, Carver
City	Mendota Heights, Eagan, Bloomington, Burnsville, Savage, Eden Prairie, Shakopee, Chanhassen, Jackson Township, Chaska, Carver
% of Watershed Within Lower Minnesota River Watershed District (LMRWD)	<1%

Name	Minnesota River		
Watershed Land Use	27% Park, Recreational, or Preserve - 16% Undeveloped - 12% Single Family Detached - 11% Water - 34% Other		
Use Classification	Western portion: 2B, 3C; Eastern portion: 2C, 3C		
Jurisdictional Entities	United States Army Corps of Engineers (USACE): <ul style="list-style-type: none"> - Administers Rivers and Harbors Act Section 10 - Administers Clean Water Act (CWA) Section 404 Minnesota Pollution Control Agency (MPCA): <ul style="list-style-type: none"> - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 Wetland Conservation Act (WCA): <ul style="list-style-type: none"> - Minnesota Department of Natural Resources (DNR), enforces WCA - Board of Water and Soil Resources (BWSR), oversees administration of WCA - County/City, administer WCA 		
Recreational Access	Concrete boat landings; carry in boats; fishing pier; shore fishing		
Fisheries Information	Bigmouth Buffalo, Black Crappie, Bluegill, Bullhead Minnow, Common Carp, Emerald Shiner, Fathead Minnow, Flathead Catfish, Freshwater Drum, Gizzard Shad, Green Sunfish, Largemouth Bass, Logperch, Mooneye, Quillback, Slenderhead Darter, Smallmouth Buffalo, Spotfin Shiner, Walleye, White Bass, Yellow Perch observed. (Source: DNR)		
Flow Information	Median Flow (2003-2011): 2,430 cfs Mean Flow (2003-2011): 3,720 cfs		
Gauging Station	USGS 05330920		
Impaired Water	Yes		
Affected Use	Aquatic Recreation	Aquatic Consumption	Aquatic Consumption
Pollutant or Stressor	Fecal Coliform	Mercury water column	Mercury in fish tissue
Total Maximum Daily Load (TMDL) Study:			
Start Date	2018	-	-
Completion Date	2024	2008	2008
TMDL Implementation Plan Status	N/A	Completed	Completed
Affected Use	Aquatic Life	Aquatic Life	Aquatic Consumption
Pollutant or Stressor	Dissolved oxygen	Turbidity	PCB in fish tissue
TMDL Study:			
Start Date	-	2008	1998
Completion Date	2006	2011	2011
TMDL Implementation Plan Status	Completed	In progress	In progress
Summary of Available Chemical Data:			
Multiple monitoring stations exist along the stream. Samples have been collected and analyzed which support the status of impaired water.			
Data Steward	MPCA		
Strategic Resource Evaluation:			
Required Metric Standard	Turbidity (for aquatic life)	E. coli (for aquatic recreation)	
	25 nephelometric turbidity units (NTU) (Twenty independent measurements collected randomly between April and October. The water is considered impaired if at least three measurements and 10% of the measurements exceed the standard. Measurements may be collected over multiple years.)	Chronic standard: 126 organisms per 100mL of water (Minimum of five measurements per month for at least three of the months between April and October, aggregated over a period of up to 10 years.) Acute standard: 1,260 organisms per 100mL of water	
Data Required for Assessment	No additional turbidity data is required to evaluate the resource.	No additional E. coli data is required to evaluate the resource.	

Name	Minnesota River
Resource Category: Category 2 – Proceed with feasibility study to determine potential projects, controls and/or management practices that could be used to improve or protect the resource.	

Name	Nine Mile Creek
Water Body Type	Stream
County	Hennepin
City	Bloomington
% of Watershed Within Lower Minnesota River Watershed District (LMRWD)	2%
Watershed Land Use	47% Single Family Detached - 14% Park, Recreational, or Preserve - 11% Golf Course - 28% Other
Use Classification	2B, 3C
Jurisdictional Entities	United States Army Corps of Engineers (USACE): - Administers Clean Water Act (CWA) Section 404 Minnesota Pollution Control Agency (MPCA):

Name	Nine Mile Creek	
	<ul style="list-style-type: none"> - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 Wetland Conservation Act (WCA): <ul style="list-style-type: none"> - Minnesota Department of Natural Resources (DNR), enforces WCA - Board of Water and Soil Resources (BWSR), oversees administration of WCA - County/City, administer WCA 	
Recreational Access	N/A	
Fisheries Information	Black Bullhead, Black Crappie, Blacknose Dace, Bluegill, Central Mudminnow, Common Shiner, Creek Chub, Emerald Shiner, Fathead Minnow, Green Sunfish, Hybrid Sunfish, Johnny Darter, Largemouth Bass, Northern Pike, Orangespotted Sunfish, Pumpkinseed, Shorthead Redhorse, Silver Redhorse, Spotfin Shiner, Tadpole Madtom, Walleye, White Sucker, Yellow Bullhead, Yellow Perch observed. (Source: DNR)	
Flow Information	Mean Flow (1964-1972): 18.3 cfs	
Gauging Station	United States Geological Survey (USGS) 05330900	
Impaired Water	Yes	
Affected Use	Fish and Biological Assessments	
Pollutant or Stressor	Fish and Biological Assessments	
Total Maximum Daily Load (TMDL) Study:		
Start Date	2005	
Completion Date	2010	
TMDL Implementation Plan Status	Completed	
Summary of Available Chemical Data:		
Multiple monitoring stations exist along the stream. Samples have been collected and analyzed which support the status of impaired water.		
Data Steward	USGS, MPCA	
Strategic Resource Evaluation:		
Required Metric Standard	Turbidity (for aquatic life)	E. coli (for aquatic recreation)
	25 nephelometric turbidity units (NTU) (Twenty independent measurements collected randomly between April and October. The water is considered impaired if at least 3 measurements and 10% of the measurements exceed the standard. Measurements may be collected over multiple years.)	Chronic standard: 126 organisms per 100mL of water (Minimum of five measurements per month for at least three of the months between April and October, aggregated over a period of up to 10 years.) Acute standard: 1,260 organisms per 100mL of water
Data Required for Assessment	Additional turbidity data is required for assessment. No turbidity data has been posted to MPCA website	Additional E. coli data is required for assessment. No E. coli data has been posted to MPCA website.
Resource Category:		
Category 1 – Additional turbidity and E. coli data is needed to confirm if projects could be completed to improve, protect, or preserve the resource.		

Name	Purgatory Creek
Water Body Type	Stream
County	Hennepin
City	Eden Prairie
% of Watershed Within Lower Minnesota River Watershed District (LMRWD)	2%
Watershed Land Use	58% Airport - 20% Undeveloped - 13% Single Family Detached - 9% Other
Use Classification	2B, 3C
Jurisdictional Entities	<p>United States Army Corps of Engineers (USACE):</p> <ul style="list-style-type: none"> - Administers Clean Water Act (CWA) Section 404 <p>Minnesota Pollution Control Agency (MPCA):</p> <ul style="list-style-type: none"> - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 <p>Wetland Conservation Act (WCA):</p> <ul style="list-style-type: none"> - Minnesota Department of Natural Resources (DNR), enforces WCA - Board of Water and Soil Resources (BWSR), oversees administration of WCA - County/City, administer WCA
Recreational Access	N/A

Name	Purgatory Creek	
Fisheries Information	Black Bullhead, Black Crappie, Bluegill, Central Mudminnow, Common Carp, Creek Chub, Freshwater Drum, Green Sunfish, Johnny Darter, Largemouth Bass, Northern Pike, Pumpkinseed, Walleye, White Sucker, Yellow Bullhead, Yellow Perch observed. (Source: DNR)	
Flow Information	Mean Flow (1976-1980): 9.6 cfs	
Gauging Station	United States Geological Survey (USGS) 05330800	
Impaired Water	No	
Summary of Available Chemical Data: Samples have been collected and analyzed which support the status of no impairment.		
Data Steward	USGS, MPCA	
Strategic Resource Evaluation:		
Required Metric Standard	Turbidity (for aquatic life) 25 nephelometric turbidity units (NTU) (Twenty independent measurements collected randomly between April and October. The water is considered impaired if at least three measurements and 10% of the measurements exceed the standard. Measurements may be collected over multiple years.)	E. coli (for aquatic recreation) Chronic standard: 126 organisms per 100mL of water (Minimum of five measurements per month for at least three of the months between April and October, aggregated over a period of up to 10 years.) Acute standard: 1,260 organisms per 100mL of water
Data Required for Assessment	Additional turbidity data is required for assessment. No turbidity data has been posted to MPCA website.	Additional E. coli data is required for assessment. No E. coli data has been posted to MPCA website.
Resource Category: Category 1 – Additional turbidity and E. coli data is needed to confirm if projects could be completed to improve, protect, or preserve the resource.		

Name	Riley Creek	
Water Body Type	Stream	
County	Hennepin	
City	Eden Prairie	
% of Watershed Within Lower Minnesota River Watershed District (LMRWD)	56%	
Watershed Land Use	44% Park, Recreational, or Preserve - 17% Water - 13% Undeveloped - 12% Airport - 10% Industrial and Utility - 4% Other	
Use Classification	2B, 3C	
Jurisdictional Entities	United States Army Corps of Engineers (USACE): <ul style="list-style-type: none"> - Administers Clean Water Act (CWA) Section 404 Minnesota Pollution Control Agency (MPCA): <ul style="list-style-type: none"> - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 Wetland Conservation Act (WCA): <ul style="list-style-type: none"> - Minnesota Department of Natural Resources (DNR), enforces WCA - Board of Water and Soil Resources (BWSR), oversees administration of WCA - County/City, administer WCA 	
Recreational Access	N/A	
Fisheries Information	N/A	

Name	Riley Creek	
Flow Information	N/A	
Gauging Station	N/A	
Impaired Water	Yes	
Affected Use	Aquatic Life	
Pollutant or Stressor	Turbidity	
Total Maximum Daily Load (TMDL) Study:		
Start Date	2011	
Completion Date	2014	
TMDL Implementation Plan Status	N/A	
Summary of Available Chemical Data:		
Multiple monitoring stations exist along the stream. Samples have been collected and analyzed which support the status of impaired water for turbidity.		
Data Steward	MPCA	
Strategic Resource Evaluation:		
Required Metric Standard	Turbidity (for aquatic life)	E. coli (for aquatic recreation)
	25 nephelometric turbidity units (NTU) (Twenty independent measurements collected randomly between April and October. The water is considered impaired if at least three measurements and 10% of the measurements exceed the standard. Measurements may be collected over multiple years.)	Chronic standard: 126 organisms per 100mL of water (Minimum of five measurements per month for at least three of the months between April and October, aggregated over a period of up to 10 years.) Acute standard: 1,260 organisms per 100mL of water
Data Required for Assessment	No additional turbidity data is required to evaluate the resource.	Additional E. coli data is required for assessment. No E. coli data has been posted to MPCA website.
Resource Category:		
Category 1 – Additional E. coli data is needed to confirm if projects could be completed to improve, protect, or preserve the resource.		

Name	Spring Creek	
Water Body Type	Stream	
County	Carver	
City	Carver	
% of Watershed Within Lower Minnesota River Watershed District (LMRWD)	56%	
Watershed Land Use	48% Undeveloped - 24% Agricultural - 18% Single Family Detached - 10% Other	
Use Classification	2B, 3C	
Jurisdictional Entities	United States Army Corps of Engineers (USACE): <ul style="list-style-type: none"> - Administers Clean Water Act (CWA) Section 404 Minnesota Pollution Control Agency (MPCA): <ul style="list-style-type: none"> - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 Wetland Conservation Act (WCA): <ul style="list-style-type: none"> - Minnesota Department of Natural Resources (DNR), enforces WCA - Board of Water and Soil Resources (BWSR), oversees administration of WCA - County/City, administer WCA 	
Recreational Access	N/A	
Fisheries Information	N/A	
Flow Information	N/A	
Gauging Station	N/A	
Impaired Water	Yes	
Affected Use	Aquatic Life	
Pollutant or Stressor	Turbidity	
Total Maximum Daily Load (TMDL) Study:		
 Start Date	2006	
 Completion Date	2010	
TMDL Implementation Plan Status	In progress	
Summary of Available Chemical Data:		
Multiple monitoring stations exist along the stream. Samples have been collected and analyzed which support the status of impaired water for turbidity. Enough data has also been collected to support the status of impaired water for E. coli.		
Data Steward	MPCA	
Strategic Resource Evaluation:		
Required Metric Standard	Turbidity (for aquatic life)	E. coli (for aquatic recreation)
	25 nephelometric turbidity units (NTU) (Twenty independent measurements collected randomly between April and October. The water is considered impaired if at least three measurements and 10% of the measurements exceed the standard. Measurements may be collected over multiple years.)	Chronic standard: 126 organisms per 100mL of water (Minimum of five measurements per month for at least three of the months between April and October, aggregated over a period of up to 10 years.) Acute standard: 1,260 organisms per 100mL of water
Data Required for Assessment	No additional turbidity data is required to evaluate the resource.	No additional E. coli data is required to evaluate the resource.
Resource Category:		
Category 2 – Proceed with feasibility study to determine potential projects, controls and/or management practices that could be used to improve or protect the resource.		

Name	Assumption Creek			
Water Body Type	Trout Stream			
County	Carver			
City	Chaska, Chanhassen			
% of Watershed Within Lower Minnesota River Watershed District (LMRWD)	59%			
Watershed Land Use	43% Undeveloped - 30% Park, Recreational, or Preserve - 16% Agricultural - 11% Other			
Use Classification	1B, 2A, 3B			
Jurisdictional Entities	United States Army Corps of Engineers (USACE): - Administers Clean Water Act (CWA) Section 404 Minnesota Pollution Control Agency (MPCA): - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 Wetland Conservation Act (WCA): - Minnesota Department of Natural Resources (DNR), enforces WCA - Board of Water and Soil Resources (BWSR), oversees administration of WCA - County/City, administer WCA DNR: - Trout stream management			
Recreational Access	N/A			
Fisheries Information	American Brook Lamprey, Central Mudminnow, Creek Chub, Fathead Minnow, Green Sunfish, Iowa Darter, Johnny Darter, Northern Pike, Pumpkinseed, White Sucker, Yellow Perch observed. (Source: DNR)			
Impaired Water	Insufficient data to assess			
Summary of Available Chemical Data:				
Monitoring Station ID	99MN007			
Latitude	44.80882874			
Longitude	-93.55155134			
Date(s) Collected	Jul 2, 1999			
Parameters	<u>Parameter</u>	<u># of Samples</u>	<u>Parameter</u>	<u># of Samples</u>
	Water Temperature	1	Conductivity	1
	Field Turbidity	1	Dissolved Oxygen	1
	pH	1		
Data Steward	Minnesota DNR			
Strategic Resource Evaluation:				
Required Metric Standard	Turbidity (for aquatic life) 10 nephelometric turbidity units (NTU) (Twenty independent measurements collected randomly between April and October. The water is considered impaired if at least 3 measurements and 10% of the measurements exceed the standard. Measurements may be collected over multiple years.)	E. coli (for aquatic recreation) Chronic standard: 126 organisms per 100mL of water (Minimum of five measurements per month for at least three of the months between April and October, aggregated over a period of up to 10 years.) Acute standard: 1,260 organisms per 100mL of water		
Data Required for Assessment	Additional turbidity data is required for assessment. Insufficient turbidity data has been posted to MPCA website.	Additional E. coli data is required for assessment. No E. coli data has been posted to MPCA website.		
Required Metric	Temperature (for aquatic life)	Dissolved Oxygen (for aquatic life)		

Name		Assumption Creek	
Standard	No material increase allowed from stream modifications or new heat sources.	7 mg/L (Twenty independent measurements collected before 9:00 am between April and November, preferably over multiple years.)	
Data Required for Assessment	No additional temperature data is required to evaluate the resource.	Additional dissolved oxygen data is required for assessment. Insufficient dissolved oxygen data has been posted to MPCA website.	
Resource Category: Category 1 – Additional turbidity, E. coli, and dissolved oxygen data is needed to confirm if projects could be completed to improve, protect, or preserve the resource.			

Name	Eagle Creek			
Water Body Type	Trout Stream			
County	Scott			
City	Savage, Shakopee			
% of Watershed Within Lower Minnesota River Watershed District (LMRWD)	98%			
Watershed Land Use	31% Undeveloped - 23% Park, Recreational, or Preserve - 15% Single Family Detached - 10% Industrial and Utility - 21% Other			
Use Classification	1B, 2A, 3B			
Jurisdictional Entities	United States Army Corps of Engineers (USACE): - Administers Clean Water Act (CWA) Section 404 Minnesota Pollution Control Agency (MPCA): - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 Wetland Conservation Act (WCA): - Minnesota Department of Natural Resources (DNR), enforces WCA - Board of Water and Soil Resources (BWSR), oversees administration of WCA - County/City, administer WCA DNR: - Trout stream management			
Recreational Access	N/A			
Fisheries Information	Brook Stickleback, Brown Trout, Central Mudminnow, White Sucker, Yellow Perch observed. (Source: DNR)			
Impaired Water	Insufficient data to assess			
Summary of Available Chemical Data:				
Monitoring Station ID	99MN008			
Latitude	44.77516282			
Longitude	-93.38655037			
Date(s) Collected	July 2, 1999			
Parameters	<u>Parameter</u>	<u># of Samples</u>	<u>Parameter</u>	<u># of Samples</u>
	Water Temperature	1	Conductivity	1
	Field Turbidity	1	Dissolved Oxygen	1
	pH	1		
Data Steward	Minnesota DNR			
Strategic Resource Evaluation:				
Required Metric Standard	Turbidity (for aquatic life) 10 nephelometric turbidity units (NTU) (Twenty independent measurements collected randomly between April and October. The water is considered impaired if at least three measurements and 10% of the measurements exceed the standard. Measurements may be collected over multiple years.)	E. coli (for aquatic recreation) Chronic standard: 126 organisms per 100mL of water (Minimum of five measurements per month for at least three of the months between April and October, aggregated over a period of up to 10 years.) Acute standard: 1,260 organisms per 100mL of water		
Data Required for Assessment	Additional turbidity data is required for assessment. Insufficient turbidity data has been posted to MPCA website.	Additional E. coli data is required for assessment. No E. coli data has been posted to MPCA website.		
Required Metric	Temperature (for aquatic life)	Dissolved Oxygen (for aquatic life)		

Name	Eagle Creek	
Standard	No material increase allowed from stream modifications or new heat sources.	7 mg/L (Twenty independent measurements collected before 9:00 am between April and November, preferably over multiple years.)
Data Required for Assessment	No additional temperature data is required to evaluate the resource.	Additional dissolved oxygen data is required for assessment. Insufficient dissolved oxygen data has been posted to MPCA website.
Resource Category: Category 1 – Additional turbidity, E. coli, and dissolved oxygen data is needed to confirm if projects could be completed to improve, protect, or preserve the resource.		

Name	Kennaley's Creek			
Water Body Type	Trout Stream			
County	Dakota			
City	Eagan			
% of Watershed Within Lower Minnesota River Watershed District (LMRWD)	100%			
Watershed Land Use	39% Undeveloped - 36% Park, Recreational, or Preserve - 25% Other			
Use Classification	1B, 2A, 3B			
Jurisdictional Entities	United States Army Corps of Engineers (USACE): - Administers Clean Water Act (CWA) Section 404 Minnesota Pollution Control Agency (MPCA): - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 Wetland Conservation Act (WCA): - Minnesota Department of Natural Resources (DNR): enforces WCA - Board of Water and Soil Resources (BWSR): oversees administration of WCA - County/City, administer WCA DNR: - Trout stream management			
Recreational Access	Public access			
Fisheries Information	Brook Stickleback, Central Mudminnow, Iowa Darter, Northern Pike observed. (Source: DNR)			
Impaired Water	Insufficient data to assess			
Summary of Available Chemical Data:				
Monitoring Station ID	99MN001			
Latitude	44.82505957			
Longitude	-93.21730505			
Date(s) Collected	June 18, 1999			
Parameters	<u>Parameter</u>	<u># of Samples</u>	<u>Parameter</u>	<u># of Samples</u>
	Water Temperature	1	Conductivity	1
	Field Turbidity	1	Dissolved Oxygen	1
	pH	1		
Data Steward	Minnesota DNR			
Strategic Resource Evaluation:				
Required Metric Standard	Turbidity (for aquatic life) 10 nephelometric turbidity units (NTU) (Twenty independent measurements collected randomly between April and October. The water is considered impaired if at least three measurements and 10% of the measurements exceed the standard. Measurements may be collected over multiple years.)	E. coli (for aquatic recreation) Chronic standard: 126 organisms per 100mL of water (Minimum of five measurements per month for at least three of the months between April and October, aggregated over a period of up to 10 years.) Acute standard: 1,260 organisms per 100mL of water		
Data Required for Assessment	Additional turbidity data is required for assessment. Insufficient turbidity data has been posted to MPCA website.	Additional E. coli data is required for assessment. No E. coli data has been posted to MPCA website.		
Required Metric	Temperature (for aquatic life)	Dissolved Oxygen (for aquatic life)		

Name		Kennaley's Creek
Standard	No material increase allowed from stream modifications or new heat sources.	7 mg/L (Twenty independent measurements collected before 9:00 am between April and November, preferably over multiple years.)
Data Required for Assessment	No additional temperature data is required to evaluate the resource.	Additional dissolved oxygen data is required for assessment. Insufficient dissolved oxygen data has been posted to MPCA website.
Resource Category: Category 1 – Additional turbidity, E. coli, and dissolved oxygen data is needed to confirm if projects could be completed to improve, protect, or preserve the resource.		

Name	Unnamed Stream #1 (Harnack Creek)			
Water Body Type	Trout Stream			
County	Dakota			
City	Eagan			
% of Watershed Within Lower Minnesota River Watershed District (LMRWD)	100%			
Watershed Land Use	87% Park, Recreational, or Preserve - 13% Other			
Use Classification	1B, 2A, 3B			
Jurisdictional Entities	United States Army Corps of Engineers (USACE): - Administers Clean Water Act (CWA) Section 404 Minnesota Pollution Control Agency (MPCA): - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 Wetland Conservation Act (WCA): - Minnesota Department of Natural Resources (DNR): enforces WCA - Board of Water and Soil Resources (BWSR): oversees administration of WCA - County/City: administer WCA DNR: - Trout stream management			
Recreational Access	N/A			
Fisheries Information	Brook Stickleback, Fathead Minnow observed. (Source: DNR)			
Impaired Water	Insufficient data to assess			
Summary of Available Chemical Data:				
Monitoring Station ID	99MN005			
Latitude	44.82038648			
Longitude	-93.22247336			
Date(s) Collected	June 26, 1999			
Parameters	<u>Parameter</u>	<u># of Samples</u>	<u>Parameter</u>	<u># of Samples</u>
	Water Temperature	1	Conductivity	1
	Field Turbidity	1	Dissolved Oxygen	1
	pH	1		
Data Steward	Minnesota DNR			
Strategic Resource Evaluation:				
Required Metric Standard	Turbidity (for aquatic life)	E. coli (for aquatic recreation)		
	10 nephelometric turbidity units (NTU) (Twenty independent measurements collected randomly between April and October. The water is considered impaired if at least 3 measurements and 10% of the measurements exceed the standard. Measurements may be collected over multiple years.)	Chronic standard: 126 organisms per 100mL of water (Minimum of five measurements per month for at least three of the months between April and October, aggregated over a period of up to 10 years.) Acute standard: 1,260 organisms per 100mL of water		
Data Required for Assessment	Additional turbidity data is required for assessment. Insufficient turbidity data has been posted to MPCA website.	Additional E. coli data is required for assessment. No E. coli data has been posted to MPCA website.		
Required Metric Standard	Temperature (for aquatic life)	Dissolved Oxygen (for aquatic life)		
	No material increase allowed from stream modifications or new heat sources.	7 mg/L (Twenty independent measurements collected before 9:00 am between April and November, preferably over multiple years.)		

Name	Unnamed Stream #1 (Harnack Creek)	
Data Required for Assessment	No additional temperature data is required to evaluate the resource.	Additional dissolved oxygen data is required for assessment. Insufficient dissolved oxygen data has been posted to MPCA website.
Resource Category: Category 1 – Additional turbidity, E. coli, and dissolved oxygen data is needed to confirm if projects could be completed to improve, protect, or preserve the resource.		

Name	Unnamed Stream #4 (One Mile Creek)			
Water Body Type	Trout Stream			
County	Dakota			
City	Burnsville			
% of Watershed Within Lower Minnesota River Watershed District (LMRWD)	79%			
Watershed Land Use	51% Single Family Detached - 49% Park, Recreational, or Preserve			
Use Classification	1B, 2A, 3B			
Jurisdictional Entities	United States Army Corps of Engineers (USACE): - Administers Clean Water Act (CWA) Section 404 Minnesota Pollution Control Agency (MPCA): - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 Wetland Conservation Act (WCA): - Minnesota Department of Natural Resources (DNR), enforces WCA - Board of Water and Soil Resources (BWSR), oversees administration of WCA - County/City, administer WCA DNR: - Trout stream management			
Recreational Access	N/A			
Fisheries Information	Black Bullhead, Blacknose Dace, Bluegill, Brook Stickleback, Central Mudminnow, Creek Chub, Fathead Minnow, Golden Shiner, Green Sunfish, Hybrid Sunfish, Johnny Darter, Pumpkinseed observed. (Source: DNR)			
Impaired Water	Insufficient data to assess			
Summary of Available Chemical Data:				
Monitoring Station ID	99MN002			
Latitude	44.81311099			
Longitude	-93.23674897			
Date(s) Collected	June 21, 1999			
Parameters	<u>Parameter</u>	<u># of Samples</u>	<u>Parameter</u>	<u># of Samples</u>
	Water Temperature	1	Conductivity	1
	Field Turbidity	1		
Data Steward	Minnesota Department of Natural Resources			
Strategic Resource Evaluation:				
Required Metric Standard	Turbidity (for aquatic life)		E. coli (for aquatic recreation)	
	10 nephelometric turbidity units (NTU) (Twenty independent measurements collected randomly between April and October. The water is considered impaired if at least three measurements and 10% of the measurements exceed the standard. Measurements may be collected over multiple years.)		Chronic standard: 126 organisms per 100mL of water (Minimum of five measurements per month for at least three of the months between April and October, aggregated over a period of up to 10 years.) Acute standard: 1,260 organisms per 100mL of water	
Data Required for Assessment	Additional turbidity data is required for assessment. Insufficient turbidity data has been posted to MPCA website.		Additional E. coli data is required for assessment. No E. coli data has been posted to MPCA website.	
Required Metric	Temperature (for aquatic life)		Dissolved Oxygen (for aquatic life)	

Name		Unnamed Stream #4 (One Mile Creek)
Standard	No material increase allowed from stream modifications or new heat sources.	7 mg/L (Twenty independent measurements collected before 9:00 am between April and November, preferably over multiple years.)
Data Required for Assessment	No additional temperature data is required to evaluate the resource.	Additional dissolved oxygen data is required for assessment. No dissolved oxygen data has been posted to MPCA website.
Resource Category: Category 1 – Additional turbidity, E. coli, and dissolved oxygen data is needed to confirm if projects could be completed to improve, protect, or preserve the resource.		

Name	Unnamed Stream #7	
Water Body Type	Trout Stream	
County	Dakota	
City	Burnsville	
% of Watershed Within Lower Minnesota River Watershed District (LMRWD)	54%	
Watershed Land Use	82% Park, Recreational, or Preserve - 18% Other	
Use Classification	1B, 2A, 3B	
Jurisdictional Entities	United States Army Corps of Engineers (USACE): <ul style="list-style-type: none"> - Administers Clean Water Act (CWA) Section 404 Minnesota Pollution Control Agency (MPCA): <ul style="list-style-type: none"> - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 Wetland Conservation Act (WCA): <ul style="list-style-type: none"> - Minnesota Department of Natural Resources (DNR), enforces WCA - Board of Water and Soil Resources (BWSR), oversees administration of WCA - County/City, administer WCA DNR: <ul style="list-style-type: none"> - Trout stream management 	
Recreational Access	N/A	
Fisheries Information	N/A	
Impaired Water	Insufficient data to assess	
Summary of Available Chemical Data: No data available		
Strategic Resource Evaluation:		
Required Metric Standard	Turbidity (for aquatic life)	E. coli (for aquatic recreation)
	10 nephelometric turbidity units (NTU) (Twenty independent measurements collected randomly between April and October. The water is considered impaired if at least three measurements and 10% of the measurements exceed the standard. Measurements may be collected over multiple years.)	Chronic standard: 126 organisms per 100mL of water (Minimum of five measurements per month for at least three of the months between April and October, aggregated over a period of up to 10 years.) Acute standard: 1,260 organisms per 100mL of water
Data Required for Assessment	Additional turbidity data is required for assessment. No turbidity data has been posted to MPCA website.	Additional E. coli data is required for assessment. No E. coli data has been posted to MPCA website.
Required Metric Standard	Temperature (for aquatic life)	Dissolved Oxygen (for aquatic life)
	No material increase allowed from stream modifications or new heat sources.	7 mg/L (Twenty independent measurements collected before 9:00 am between April and November, preferably over multiple years.)
Data Required for Assessment	No additional temperature data is required to evaluate the resource.	Additional dissolved oxygen data is required for assessment. No dissolved oxygen data has been posted to MPCA website.
Resource Category: Category 1 – Turbidity, E. coli, and dissolved oxygen data is needed to confirm if projects could be completed to improve, protect, or preserve the resource.		

Appendix C - WETLANDS

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Name	Blue Marsh
Water Body Type	Wetland
County	Scott
City	Shakopee
% of Watershed Within the Lower Minnesota River Watershed District (LMRWD)	100%
Watershed Land Use	55% Park, Recreational, or Preserve - 30% Water - 10% Industrial and Utility - 5% Other
Use Classification	2D
Wetland Classification	3, 5, 7
PWI #	70-88P
Jurisdictional Entities	<p>United States Army Corps of Engineers (USACE):</p> <ul style="list-style-type: none"> - Administers Clean Water Act (CWA) Section 404 <p>United States Environmental Protection Agency (EPA):</p> <ul style="list-style-type: none"> - Can veto USACE decision under CWA <p>Minnesota Pollution Control Agency (MPCA):</p> <ul style="list-style-type: none"> - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 - MN Rule 7050 (nondegradation rule) <p>Minnesota Department of Natural Resources (DNR):</p> <ul style="list-style-type: none"> - Enforces Wetland Conservation Act (WCA) <p>Board of Water and Soil Resources (BWSR):</p> <ul style="list-style-type: none"> - Oversees administration of WCA
Recreational Access	N/A
Fisheries Information	N/A
Summary of Previous Assessments:	
<p>Surface Water Management Plans</p> <p>The surface water management plan for the City of Shakopee was completed in January 2007. Recommendations in the plan include the following:</p> <p>Pg. 7, Section 3: The Blue Lake Watershed receives stormwater run-off from the eastern two thirds of Shakopee and portions of Prior Lake. This watershed generally carries water from the south to the north through Deans Lake, emptying into Blue Lake, which discharges to the Minnesota River. The Prior Lake -Spring Lake outlet channel is the primary conveyance route to Blue Lake for this watershed. The outlet channel directs water from Prior Lake to the north through Pike Lake and then to Shakopee via Deans Lake and the Deans Lake bypass channel. The outlet channel eventually discharges water to Blue Lake and the Minnesota River. The Prior Lake- Spring Lake Outlet is managed through a Joint Powers Agreement by the Cities of Prior Lake, Shakopee, the Mdewakanton Sioux Community, and the Prior Lake-Spring Lake Watershed District.</p> <p>The City will require the following criteria for discharge rates:</p> <ol style="list-style-type: none"> a. In newly developing watersheds, measures shall be taken to limit runoff rates generated by any subwatershed to the rates specified in the Stormwater Management Plan for the City, or if the plan does not specify a rate, the discharge rate should be limited to 1/3 cfs per acre for 100-year critical duration events. b. For newly developing or redeveloping areas within the Blue Lake Drainage System upstream of Deans Lake, it is the policy of the City of Shakopee that the maximum peak discharge rate will be limited to a maximum of 0.1 cfs per acre in a 100-year storm. c. An attempt will be made to limit the peak discharge rate from all newly developing property in the Blue Lake District upstream of Deans Lake, to approximately 1/20 of a cfs for rainfall events having intensities relating to a Ten (10) year return frequency event. d. The peak discharge rate requirements shall be waived to the extent necessary to allow an outlet orifice to be limited to no less than the equivalent area of eight-inch opening, and/or allow the outlet to be sized to allow the detention area to draw down to within one foot of the normal run-out elevation within 72 hours following the onset of a 100-year rainfall event. <p>Minnesota Land Cover Classification System (MLCCS): Scott County (Scott County mapped by Stubbs and United States Fish and Wildlife Service (USFWS)).</p> <p>Summary: Mixed wetland communities within or at the fringes of Blue Lake in Scott County are mapped as: altered/non-native dominated shrubland, altered/non-native grassland, floodplain forest, floodplain forest silver maple subtype, littoral</p>	

Name	Blue Marsh
<p>open water, palustrine open water, slender glasswort saline meadow, and slow moving open water. Floodplain forest fringe given high rating as natural community (AB rating). No invasive species data are provided.</p>	
<p>Minnesota County Biological Survey (MCBS) Area of Biodiversity Significance: HIGH DNR MCBS rates the Blue marsh community as a single unit, including the Rice Marsh (Scott County), Blue Marsh and Fisher Marsh with a High Biodiversity Significance Rating: "High" sites contain very good quality occurrences of the rarest species, high-quality examples of rare native plant communities, and/or important functional landscapes. Relevé data is not available for Blue Marsh area.</p>	
<p>Natural Heritage Information System (NHIS) Sensitive Species Data. The site is identified as an important nesting colony. Species using the site in 1991 included the Great Blue Heron, Night Heron, Great Egret, Black Crowned Night, Heron and Double-Crested Cormorant. Forster's Tern noted at the identified site.</p>	
<p>Strategic Resource Evaluation:</p>	
Required Metrics	TBD
Standard	TBD
Data Required for Assessment	TBD
Resource Category	<p>Category 1 – Additional data is needed to confirm if projects could be completed to improve, protect, or preserve the resource. Category 2 – Proceed with the feasibility study to determine potential projects, controls and/or management practices that could be used to improve or protect the resource.</p>

Name	Chaska Marsh
Water Body Type	Wetland
County	Carver
City	Chaska, Carver
% of Watershed within the Lower Minnesota River Watershed District (LMRWD)	100%
Watershed Land Use	77% Park, Recreational, or Preserve - 18% Water - 5% Other
Use Classification	2D
Wetland Classification	1, 3, 5, 6, 7
PWI #	10-4P
Jurisdictional Entities	United States Army Corps of Engineers (USACE): - Administers Clean Water Act (CWA) Section 404 United States Environmental Protection Agency (EPA): - Can veto USACE decision under CWA Minnesota Pollution Control Agency (MPCA): - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 - MN Rule 7050 (nondegradation rule) Minnesota Department of Natural Resources (DNR): - Enforces Wetland Conservation Act (WCA) Board of Water and Soil Resources (BWSR): - Oversees administration of WCA (Minnesota Rule 8420)
Recreational Access	N/A
Fisheries Information	N/A

Summary of Previous Assessments:

**From City of Chaska Local Surface Water Management Plan, December 2007:
Pg. 21.**

Chaska Lake (PWI #4P).

Chaska Lake is a DNR protected water. The lake is southwest of the downtown area and is in the floodplain area of the Minnesota River. Little data is available. The lake appears to have a large wetland fringe and is likely a relatively shallow lake. Its area is approximately 68 acres. The area of its watershed is 525 acres, giving a watershed to lake ratio of 7.7 to 1. The lake drains via a natural overland outlet northeast to Chaska Creek just upstream of the confluence with the Minnesota River.

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Chaska Lake District

The Chaska Lake District is approximately 555 acres in the southern portion of the City. Varied land characteristics dominate the two portions of the district that are divided by Old Trunk Highway 212, generally consisting of bluffs and ravines to the north of the highway and floodplain to the south. The usable area in the district (not bluffs, ravines, or floodplain) is undeveloped and currently used for agriculture. The area drains north and discharges to Chaska Creek, just downstream of the USACE diversion channel outlet, and ultimately drains to the Minnesota River.

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Table 5-6. Loading Assessment Results for Select Waterbodies

Waterbody	Stressor		Receiving Load		
			1988	2005	2020
Chaska Lake	TP	Lbs/yr	103	101	73
	TSS		62,700	60,400	36,800
	V	Ac-ft/yr	120	119	181

Minnesota Land Cover Classification System (MLCCS): Mapped in 1994 by Stubbs and the United States Fish and Wildlife Service (USFWS).

Name	Chaska Marsh
<p>Entire Marsh and surrounding areas mapped as native forest and marshland. However, no Natural Area Quality Qualifiers (NAQQ) are provided, nor did the surveyors indicate presence and extents of non-native invasive species.</p> <p>MLCCS Update could provide valuable quality data.</p> <p>Minnesota County Biological Survey (MCBS) Area of Biodiversity Significance: BELOW “Below” sites lack occurrences of rare species and natural features or do not meet MCBS standards for outstanding, high, or moderate rank. These sites may include areas of conservation value at the local level, such as habitat for native plants and animals, corridors for animal movement, buffers surrounding higher-quality natural areas, areas with high potential for restoration of native habitat, or open space.</p> <p>Natural Heritage Information System (NHIS) Sensitive Species Data. No plant or animal species listed by the state are identified within the Marsh Complex area.</p>	
Strategic Resource Evaluation:	
Required Metrics	TBD
Standard	TBD
Data Required for Assessment	TBD
Resource Category	<p>Category 1 – Additional data is needed to confirm if projects could be completed to improve, protect, or preserve the resource.</p> <p>Category 2 – Proceed with feasibility study to determine potential projects, controls and/or management practices that could be used to improve or protect the resource.</p>

Name	Colman (Nine Mile) Marsh
Water Body Type	Wetland
County	Hennepin
City	Bloomington
% of Watershed Within the Lower Minnesota River Watershed District (LMRWD)	96%
Watershed Land Use	67% Park, Recreational, or Preserve - 16% Single Family Detached - 15% Water - 2% Other
Use Classification	2D
Wetland Classification	3, 4, 5, 6, 7
PWI #	27-13P
Jurisdictional Entities	<p>United States Army Corps of Engineers (USACE):</p> <ul style="list-style-type: none"> - Administers Clean Water Act (CWA) Section 404 <p>United States Environmental Protection Agency (EPA):</p> <ul style="list-style-type: none"> - Can veto USACE decision under CWA <p>Minnesota Pollution Control Agency (MPCA):</p> <ul style="list-style-type: none"> - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 - MN Rule 7050 (nondegradation rule) <p>Minnesota Department of Natural Resources (DNR):</p> <ul style="list-style-type: none"> - Enforces Wetland Conservation Act (WCA) <p>Board of Water and Soil Resources (BWSR):</p> <ul style="list-style-type: none"> - Oversees administration of WCA
Recreational Access	N/A
Fisheries Information	N/A
Summary of Previous Assessments:	
<p>Surface Water Management Plans No mention is made of Colman Marsh in City of Bloomington Surface Water Management Plan, 2007.</p> <p>Minnesota Land Cover Classification System (MLCCS): Mapped in 2007 by Tony Randazzo and Fred Harris Summary: The mixed wetland communities within or at the fringes of Colman Marsh in Hennepin County are mapped as: altered non-native deciduous forest, altered non-native grassland with deciduous trees, black ash swamp seepage subtype, cobble/gravel shore, fast moving linear open water habitat, floodplain forest, floodplain forest silver maple subtype mixed emergent marsh, palustrine open water, altered/non-native grassland, water lily open marsh and wet meadow.</p> <p>Black ash swamp and floodplain forest types are listed as C or D ranking (moderate or poor condition natural communities) due to the heavy presence of invasive buckthorn.</p> <p>Floodplain forest silver maple subtype are characterized by young trees comprised of silver maples, green ash, and black willows. Groundcover is comprised primarily of lake sedge, Virginia wild rye, and reed canary grass. Seeps are present.</p> <p>Mixed emergent marsh and wet meadow areas are listed as B or C ranking (good or moderate condition natural communities). The lower rankings come from the moderate invasion by hybrid cattail and reed canary grass.</p> <p>There is an Emergent Marsh among flooded trees. Beaver activity is common in the area, and may have caused a flood out of the floodplain forest. It is in the backwater basin of Nine Mile Creek</p> <p>There is a Wet meadow with high species diversity, but many early successional invasives. The flooded forest is evidenced by many fallen trunks buried under herbaceous material. Wet meadow species dominate. Sandbar willow in patches are scattered throughout.</p> <p>Invasive species identified by surveyors within the marsh and surrounding areas in MLCCS data include: substantial (6-25%)</p>	

Name	Colman (Nine Mile) Marsh
<p>amounts of reed canary grass (<i>Phalaris arundinacea</i>), mostly at the wetland margin, and common buckthorn (<i>Rhamnus cathartica</i>) in forested communities.</p>	
<p>Minnesota County Biological Survey (MCBS) Area of Biodiversity Significance: HIGH</p>	
<p>MCBS includes Colman Marsh as part of the Nine Mile Creek Lake and outlet channel giving the entire area a “High Biodiversity Significance” rating.</p>	
<p>High Biodiversity Significance: "High" sites contain very good quality occurrences of the rarest species, high-quality examples of rare native plant communities, and/or important functional landscapes.</p>	
<p>Natural Heritage Information System (NHIS) Sensitive Species Data.</p>	
<p>There are no known occurrences of T&E species within the Colman Marsh area, however, the DNR describes the marsh in the NHIS data as: “Wet meadow/shallow marsh on shallowly sloping peat with groundwater seepage at foot of steep slope on north side of Minnesota River Valley. Mosaic of patches dominated by <i>Care lacustris</i>, <i>Calamagrostis canadensis</i>, <i>Sparganium eurycarpum</i>, <i>Typha sp.</i>, <i>Acorus</i>, <i>Phragmites</i>, <i>Leersia oryzopsis</i>, <i>Scirpus acutus</i> (CF), <i>Carex stricta</i> and <i>Scirpus fluviatalis</i>. Scattered clumps of shrubs: <i>Amorpha fruticosa</i>, <i>Salix bebbiana</i> and <i>Cornus stolonifera</i>. Good native species diversity. <i>Phalaris</i> is present on disturbed edges, grades into deep marsh dominated by <i>Scirpus fluviatalis</i>.”</p>	
<p>Strategic Resource Evaluation:</p>	
Required Metrics	TBD
Standard	TBD
Data Required for Assessment	TBD
Resource Category	<p>Category 1 – Additional data is needed to confirm if projects could be completed to improve, protect, or preserve the resource.</p> <p>Category 2 – Proceed with feasibility study to determine potential projects, controls and/or management practices that could be used to improve or protect the resource.</p>

Name	Fisher Marsh
Water Body Type	Wetland
County	Scott
City	Shakopee
% of Watershed Within the Lower Minnesota River Watershed District (LMRWD)	100%
Watershed Land Use	41% Park, Recreational, or Preserve - 33% Water - 13% Industrial and Utility - 13% Other
Use Classification	2D
Wetland Classification	1, 3, 4, 5, 6, 7
PWI #	70-87P
Jurisdictional Entities	<p>United States Army Corps of Engineers (USACE):</p> <ul style="list-style-type: none"> - Administers Clean Water Act (CWA) Section 404 <p>United States Environmental Protection Agency (EPA):</p> <ul style="list-style-type: none"> - Can veto USACE decision under CWA <p>Minnesota Pollution Control Agency (MPCA):</p> <ul style="list-style-type: none"> - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 - MN Rule 7050 (nondegradation rule) <p>Minnesota Department of Natural Resources (DNR):</p> <ul style="list-style-type: none"> - Enforces Wetland Conservation Act (WCA) <p>Board of Water and Soil Resources (BWSR):</p> <ul style="list-style-type: none"> - Oversees administration of WCA
Recreational Access	N/A
Fisheries Information	N/A
Summary of Previous Assessments:	
<p>Surface Water Management Plans It is considered a natural area disconnected from the stormwater systems of the city, and very minimally addressed in the Shakopee Surface Water Management Plan.</p> <p>Minnesota Land Cover Classification System (MLCCS): Scott County (Scott County mapped by Stubbs and United States Fish and Wildlife Service [USFWS]). Summary: It's made up of mixed wetland communities within or at the fringes of Fisher Lake in Scott County, mapped as: altered/non-native dominated shrubland, altered/non-native grassland, grassland with sparse deciduous trees, mixed hardwood swamp, native dominated temporarily flooded shrubland, floodplain forest, wet meadow, willow swamp, and slow moving open water.</p> <p>Minnesota County Biological Survey (MCBS) Area of Biodiversity Significance: HIGH DNR MCBS rates the Blue marsh community as a single unit, including the Rice Marsh (Scott County), Blue Marsh and Fisher Marsh with a High Biodiversity Significance Rating: "High" sites contain very good quality occurrences of the rarest species, high-quality examples of rare native plant communities, and/or important functional landscapes. Relevé data is not available for the Fisher Marsh area.</p> <p>Natural Heritage Information System (NHIS) Sensitive Species Data. The site is identified as an important nesting colony. Forster's Tern is at the identified site. A bald eagle nest is located along the north edge between the marsh and the Minnesota River.</p>	
Strategic Resource Evaluation:	
Required Metrics	TBD
Standard	TBD
Data Required for Assessment	TBD

Name	Fisher Marsh
Resource Category	Category 1 – Additional data is needed to confirm if projects could be completed to improve, protect, or preserve the resource. Category 2 – Proceed with the feasibility study to determine potential projects, controls and/or management practices that could be used to improve or protect the resource.

Name	Grass Marsh
Water Body Type	Wetland
County	Hennepin
City	Eden Prairie
% of Watershed Within the Lower Minnesota River Watershed District (LMRWD)	56%
Watershed Land Use	43% Park, Recreational, or Preserve - 17% Water - 13% Undeveloped - 12% Airport - 10% Industrial and Utility - 5% Other
Use Classification	2D
Wetland Classification	1, 3, 4, 5, 6, 7
PWI #	27-80P
Jurisdictional Entities	<p>United States Army Corps of Engineers (USACE):</p> <ul style="list-style-type: none"> - Administers Clean Water Act (CWA) Section 404 <p>United States Environmental Protection Agency (EPA):</p> <ul style="list-style-type: none"> - Can veto USACE decision under CWA <p>Minnesota Pollution Control Agency (MPCA):</p> <ul style="list-style-type: none"> - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 - MN Rule 7050 (nondegradation rule) <p>Minnesota Department of Natural Resources (DNR):</p> <ul style="list-style-type: none"> - Enforces Wetland Conservation Act (WCA) <p>Board of Water and Soil Resources (BWSR):</p> <ul style="list-style-type: none"> - Oversees administration of WCA
Recreational Access	N/A
Fisheries Information	N/A
Summary of Previous Assessments:	
<p>Surface Water Management Plans Grass Lake is not mentioned in the City of Eden Prairie Surface Water Management Plan (2007).</p> <p>Minnesota Land Cover Classification System (MLCCS): Mapped in 2005 by Paul Bockenstedt, Bonestroo. Mapped in 2007 by Tony Randazzo and Fred Harris Summary: There are mixed wetland communities within or at the fringes of Grass Marsh in Eden Prairie, Hennepin County, mapped as: altered non-native saturated soils deciduous forest, floodplain forest, littoral open water, mixed emergent marsh, native dominated shrubland, seepage meadow, wet meadow, and willow swamp.</p> <p>Nearly all mapped areas within the grass marsh basin were given natural areas designators, including highest quality natural communities (seepage meadows, willow swamp and floodplain forest), good, moderate and poor condition natural communities.</p> <p>Reed canary grass noted as heavy (26-50%) in some floodplain forest areas.</p> <p>Minnesota County Biological Survey (MCBS) Area of Biodiversity Significance: HIGH MCBS includes this marsh in the Flying Cloud Prairie area, giving the entire area a “High Biodiversity Significance” rating. High Biodiversity Significance: "High" sites contain very good quality occurrences of the rarest species, high-quality examples of rare native plant communities, and/or important functional landscapes.</p> <p>Natural Heritage Information System (NHIS) Sensitive Species Data. NHIS data for grass marsh indicates the area provides habitat for bald eagles in scattered floodplain forest surrounding the marsh. Common moorhen, a state special concern bird was observed in the marsh in 1991. No threatened or endangered plant species are known to occur within the marsh area.</p>	

Name	Grass Marsh
Strategic Resource Evaluation:	
Required Metrics	TBD
Standard	TBD
Data Required for Assessment	TBD
Resource Category	<p>Category 1 – Additional data is needed to confirm if projects could be completed to improve, protect, or preserve the resource.</p> <p>Category 2 – Proceed with feasibility study to determine potential projects, controls and/or management practices that could be used to improve or protect the resource.</p>

Name	Gun Club Marsh
Water Body Type	Wetland
County	Dakota
City	Mendota Heights, Eagan
% of Watershed Within the Lower Minnesota River Watershed District (LMRWD)	71%
Watershed Land Use	53% Park, Recreational, or Preserve - 44% Water - 3% Other
Use Classification	2D
Wetland Classification	3, 4, 5, 6, 7
PWI #	19-78P
Jurisdictional Entities	<p>United States Army Corps of Engineers (USACE):</p> <ul style="list-style-type: none"> - Administers Clean Water Act (CWA) Section 404 <p>United States Environmental Protection Agency (EPA):</p> <ul style="list-style-type: none"> - Can veto USACE decision under CWA <p>Minnesota Pollution Control Agency (MPCA):</p> <ul style="list-style-type: none"> - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 - MN Rule 7050 (nondegradation rule) <p>Minnesota Department of Natural Resources (DNR):</p> <ul style="list-style-type: none"> - Enforces Wetland Conservation Act (WCA) <p>Board of Water and Soil Resources (BWSR):</p> <ul style="list-style-type: none"> - Oversees administration of WCA
Recreational Access	N/A
Fisheries Information	N/A
Summary of Previous Assessments:	
<p>From Lower Minnesota River – MPCA http://www.pca.state.mn.us/index.php/water/water-types-and-programs/watersheds/lower-minnesota-river.html#restoration-and-protection Web page states that Watershed Monitoring Study (WMS) is complete. Not available online.</p>	
<p>Surface Water Management Plans Gun Club Stormwater Pond is addressed in the Stormwater Management Plan, but Marsh is not discussed. Gun Club Fens are briefly discussed in the City Wetland Plan, reference other plans. Gun Club Marsh is not discussed.</p>	
<p>Minnesota Land Cover Classification System (MLCCS): Mapped by D. Holmen, Dakota SWCD (date not known). Mapped units within the wetland basin include: altered/non-native deciduous forest, altered/non-native dominated saturated shrubland, aspen forest, calcareous seepage fen prairie subtype, cattail marsh, floodplain forest, grassland with sparse deciduous trees-altered/non-native vegetation, limnetic open water, Lowland Hardwood Forest, medium-tall grass with altered/non-native dominated grassland, mixed emergent marsh, mixed hardwood swamp, palustrine open water, wet meadow shrub subtype, willow swamp.</p>	
<p>Moderate Condition Natural Communities: The surveyor mapped a limited number of areas as moderate condition natural community with obvious past disturbance, but still clearly recognizable as a native community, that were not dominated by weedy species in any layer. These areas, including willow swamp, mixed emergent marsh, lowland hardwood forest, aspen forest, and floodplain forest are located around the fringes of the northern portion of Gun Club Marsh, north of Interstate 494.</p> <p>Very limited data on invasive species.</p>	
<p>Minnesota County Biological Survey (MCBS) Area of Biodiversity Significance: HIGH MCBS staff ranks both north and south Gun Club Lake Marsh as “High Biodiversity Significance”.</p>	
<p>High Biodiversity Significance: "High" sites contain very good quality occurrences of the rarest species, high-quality</p>	

Name	Gun Club Marsh
examples of rare native plant communities, and/or important functional landscapes.	
Natural Heritage Information System (NHIS) Sensitive Species Data: Listed botanical species identified within the Marsh Complex are considered calciphiles (plants adapted to Calcareous Fen locations). State listed calciphiles identified associated with the fens in this marsh include: Small White Lady Slipper (<i>Cypripedium candidum</i>), Cowbane (<i>Oxypolis rigidor</i>), Sterile Sedge (<i>Carex sterilis</i>) and Valerian (<i>Valeriana edulis</i> var. <i>ciliate</i>).	
Strategic Resource Evaluation:	
Required Metrics	TBD
Standard	TBD
Data Required for Assessment	TBD
Resource Category	Category 1 – Additional data is needed to confirm if projects could be completed to improve, protect, or preserve the resource. Category 2 – Proceed with feasibility study to determine potential projects, controls and/or management practices that could be used to improve or protect the resource.

Name	Long Meadow Marsh
Water Body Type	Wetland
County	Hennepin
City	Bloomington
% of Watershed Within the Lower Minnesota River Watershed District (LMRWD)	47%
Watershed Land Use	28% Water - 25% Park, Recreational, or Preserve - 15% Airport - 13% Single Family Detached - 19% Other
Use Classification	2D
Wetland Classification	1, 3, 4, 5, 6, 7
PWI #	27-2P
Jurisdictional Entities	<p>United States Army Corps of Engineers (USACE):</p> <ul style="list-style-type: none"> - Administers Clean Water Act (CWA) Section 404 <p>United States Environmental Protection Agency (EPA):</p> <ul style="list-style-type: none"> - Can veto USACE decision under CWA <p>Minnesota Pollution Control Agency (MPCA):</p> <ul style="list-style-type: none"> - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 - MN Rule 7050 (nondegradation rule) <p>Minnesota Department of Natural Resources (DNR):</p> <ul style="list-style-type: none"> - Enforces Wetland Conservation Act (WCA) <p>Board of Water and Soil Resources (BWSR):</p> <ul style="list-style-type: none"> - Oversees administration of WCA
Recreational Access	N/A
Fisheries Information	N/A
Summary of Previous Assessments:	
<p>Surface Water Management Plans Minimally addressed in the City of Bloomington Surface Water Management Plan (2007).</p> <p>Minnesota Land Cover Classification System (MLCCS): Mapped in 2005 by Tony Randazzo/Great River Greening Summary: A very diverse wetland complex within or at the fringes of Long Meadow Marsh in Hennepin County, mapped as: altered non-native deciduous forest, altered non-native deciduous woodland, altered non-native grassland with deciduous trees, black ash swamp-seepage subtype, fast moving linear open water habitat, floodplain forest, floodplain forest silver maple subtype, long grasses on hydric soils, mixed emergent marsh, palustrine open water, altered/non-native grassland, water lily open marsh, wet meadow and willow swamp.</p> <p>The marsh areas are generally considered of moderate to good quality. The presence of purple loosestrife (<i>Lythrum salicaria</i>), hybrid cattails (<i>Typha x glauca</i>) and reed canary (<i>Phalaris arundinacea</i>) at the margins were noted, but were generally not dominant.</p> <p>Minnesota County Biological Survey (MCBS) Area of Biodiversity Significance: MODERATE Relevé Notes: Wet meadow on the bottom lands in the Minnesota River Valley. The surface is slightly springy. On the coarse surface, the fibric peat is greater than 1m deep. The water table is at the surface in a mosaic of patches. Other patches are dominated by <i>Carex lacustris</i> or sparganium species. The community is undisturbed except...(data ends)</p> <p>Natural Heritage Information System (NHIS) Sensitive Species Data. The state threatened <i>polyodon spathula</i> was observed in Long Meadow Lake from 1950-1959, and last observed in 2004. Numerous bald eagle nests are located in floodplain forests around Long Meadow Marsh. Descriptions of black ash seepage swamps are provided by DNR staff member Fred Harris from 1995: "Series of 5-6 small seepage areas along base of steep slopes on N side of Minnesota River Valley. Variable canopy dominated by <i>Fraxinus nigra</i> (10-40 CM DBH), <i>Fraxinus</i></p>	

Name	Long Meadow Marsh
<p><i>pennsylvanica</i> and <i>Fraxinus nigra</i>. Shrubs include <i>Ribes americana</i>, <i>Rhamnus frangula</i>, <i>Rhamnus cathartica</i>, <i>Sambucus</i>. Herbs dominated by <i>Symplocarpus</i>, <i>Impatiens</i>, <i>Equisetum pratensis</i> and <i>Glyceria striata</i> with good diversity of herbs associated with seepage. <i>Phalaris</i> in small areas of silt deposition. On very soft muck with much groundwater seepage.”</p>	
Strategic Resource Evaluation:	
Required Metrics	TBD
Standard	TBD
Data Required for Assessment	TBD
Resource Category	<p>Category 1 – Additional data is needed to confirm if projects could be completed to improve, protect, or preserve the resource.</p> <p>Category 2 – Proceed with feasibility study to determine potential projects, controls and/or management practices that could be used to improve or protect the resource.</p>

Name	Rice Marsh (Hennepin County)
Water Body Type	Wetland
County	Hennepin, Carver
City	Eden Prairie, Chanhassen
% of Watershed Within the Lower Minnesota River Watershed District (LMRWD)	35%
Watershed Land Use	37% Park, Recreational, or Preserve - 21% Undeveloped - 17% Water - 10% Agricultural - 15% Other
Use Classification	2D
Wetland Classification	1, 3, 4, 5, 6, 7
PWI #	27-132P
Jurisdictional Entities	<p>United States Army Corps of Engineers (USACE):</p> <ul style="list-style-type: none"> - Administers Clean Water Act (CWA) Section 404 <p>United States Environmental Protection Agency (EPA):</p> <ul style="list-style-type: none"> - Can veto USACE decision under CWA <p>Minnesota Pollution Control Agency (MPCA):</p> <ul style="list-style-type: none"> - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 - MN Rule 7050 (nondegradation rule) <p>Minnesota Department of Natural Resources (DNR):</p> <ul style="list-style-type: none"> - Enforces Wetland Conservation Act (WCA) <p>Board of Water and Soil Resources (BWSR):</p> <ul style="list-style-type: none"> - Oversees administration of WCA
Recreational Access	N/A
Fisheries Information	N/A
Summary of Previous Assessments:	
<p>Eden Prairie Local Water Management Plan (revision, 2008) Pg. 31. Lower Minnesota River Watershed District places Rice Lake and Grass Lake in its Floodplain category. It is the District's goal to manage these floodplain water resources to maintain and potentially enhance the existing natural plant and animal communities, and to preserve those human uses (such as fishing, hiking, biking, etc.) that currently take place. The City intends to cooperate with the District, the Cities of Chanhassen and Chaska, the United States Fish and Wildlife Service (USFWS), and the DNR to investigate water quality concerns and identify options for improvement as requested.</p>	
<p>Chanhassen Second Generation Surface Water Management Plan (August, 2006)(direct excerpt):</p> <p>Rice Lake (Minnesota DNR I.D. No. 27-132P)</p> <p>Rice Lake is located in the southeast corner of the City of Chanhassen, on the border of Chanhassen and Eden Prairie. The LMRWD Plan describes Rice Lake as a floodplain lake. Bluff Creek flows into Rice Lake, and it is located within the Raguet Wildlife Management Area. Very little water quality information is available on this lake. According to the LMRWD Plan, floodwaters from the Minnesota River contribute a large portion of the overall nutrients and sediments to this lake, and once the flooding subsides the high sediment and nutrient loads are trapped in the lakes. The LMRWD Plan states that improvement to the Minnesota River water quality will help reduce this heavy sediment and nutrient loading to the floodplain lakes like Rice Lake.</p>	
<p>Minnesota Land Cover Classification System (MLCCS): Hennepin County (Eden Prairie Mapped by Bonestroo, Paul Bockenstedt in 2005). Summary: Mixed wetland communities within or at the fringes of Rice Marsh Lake in Hennepin County mapped as: altered/non-native dominated seasonally flooded shrubland, altered/non-native grassland with sparse deciduous trees, fallow hydric soils, floodplain forest, row cropland on hydric soils, littoral open water, mixed emergent marsh, seepage meadow, wet</p>	

Name	Rice Marsh (Hennepin County)
<p>meadow, and willow swamp. Nearly half of the mapped areas surrounding the marsh are mapped as being of “good natural quality community” or “moderate condition natural community.” Marsh Fringes mapped with abundant Reed Canary Grass (<i>Phalaris arundinacea</i>).</p>	
<p>Carver County (Eden Prairie mapped by Stubbs and the USFWS. Summary: Mixed Emergent Marsh, Floodplain forest intermittently exposed aquatic bed, and wet meadow were mapped. No natural community quality information or invasive species information was provided.</p>	
<p>Minnesota County Biological Survey (MCBS) Area of Biodiversity Significance: MODERATE/HIGH DNR MCBS rates the Carver County marsh community with a Moderate Biodiversity Significance Rating: "Moderate" sites contain occurrences of rare species, moderately disturbed native plant communities, and/or landscapes that have strong potential for recovery of native plant communities and characteristic ecological processes. DNR MCBS rates the Hennepin County marsh community with a High Biodiversity Significance Rating: "High" sites contain very good quality occurrences of the rarest species, high-quality examples of rare native plant communities, and/or important functional landscapes</p>	
<p>Natural Heritage Information System (NHIS) Sensitive Species Data. No NHIS species are known from the Rice Marsh Complex.</p>	
<p>Strategic Resource Evaluation:</p>	
Required Metrics	TBD
Standard	TBD
Data Required for Assessment	TBD
Resource Category	<p>Category 1 – Additional data is needed to confirm if projects could be completed to improve, protect, or preserve the resource. Category 2 – Proceed with feasibility study to determine potential projects, controls and/or management practices that could be used to improve or protect the resource.</p>

Name	Rice Marsh (Scott County)
Water Body Type	Wetland
County	Scott
City	Chanhassen
% of Watershed Within the Lower Minnesota River Watershed District (LMRWD)	95%
Watershed Land Use	29% Undeveloped - 28% Park, Recreational, or Preserve - 12% Single Family Detached - 10% Industrial and Utility - 21% Other
Use Classification	2D
Wetland Classification	3, 4, 5, 6, 7
PWI #	70-25P
Jurisdictional Entities	<p>United States Army Corps of Engineers (USACE):</p> <ul style="list-style-type: none"> - Administers Clean Water Act (CWA) Section 404 <p>United States Environmental Protection Agency (EPA):</p> <ul style="list-style-type: none"> - Can veto USACE decision under CWA <p>Minnesota Pollution Control Agency (MPCA):</p> <ul style="list-style-type: none"> - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 - MN Rule 7050 (nondegradation rule) <p>Minnesota Department of Natural Resources (DNR):</p> <ul style="list-style-type: none"> - Enforces Wetland Conservation Act (WCA) <p>Board of Water and Soil Resources (BWSR):</p> <ul style="list-style-type: none"> - Oversees administration of WCA
Recreational Access	N/A
Fisheries Information	N/A
Summary of Previous Assessments:	
Chanhassen Second Generation Surface Water Management Plan (August, 2006)(direct excerpt):	
Rice Marsh Lake (MNDNR I.D. No. 10-1P)	
<p>Rice Marsh Lake is located in the east-central portion of the City of Chanhassen, and a portion (126 acres) of the watershed occurs within the City of Eden Prairie. Rice Marsh Lake is a flow-through basin with an inlet that receives outflow from Lake Susan and an outlet that discharges into Lake Riley. Rice Marsh Lake has a surface area of 79 acres and a maximum depth of 11 feet. The Ordinary High Water (OHW) level is 877.0 MSL. There is no public access on Rice Marsh Lake. Rice Marsh Lake is surrounded by extensive beds of emergent vegetation, some of which have been excavated for water quality improvements. Rice Marsh Lake has had a wastewater treatment plant on its northern shore.</p>	
<p>The 1994 Plan recognized that Rice Marsh Lake was not a well studied lake. Despite this status, water quality and clarity data was available annually from 1972 through 1991. Rice Marsh Lake is classified as hypereutrophic due to excessive nutrients (high phosphorus), excess algae, and poor water clarity, with average Secchi disc readings of 1.5 feet. Based on the data available, the trophic conditions are likely attributed to several factors, including the lake's small size, shallow depths, watershed-to-lake ratio (large watershed compared to the size of the lake), specific land uses and, to some extent, the wastewater treatment plant discharge. The Metropolitan Council score for water quality on Rice Marsh Lake ranges from "poor" to "very poor".</p>	
<p>Following the recommendations of the 1994 Plan, a Water Quality Monitoring study and Aquatic Plant Survey were both completed for Rice Marsh Lake in 2003. The results demonstrate a trend of improving water quality. Water clarity (Secchi disc) readings averaged 7.0 feet and were consistent throughout the summer. Phosphorus has dropped below the 40 ppb threshold and chlorophyll a was noticeably lower. The new Met Council grading system gave an overall water quality grade of B, which is an improvement over the "poor" to "very poor" grade. Grade B would equate to "good" in the old system.</p>	
The Aquatic Plant Survey identified five species of emergent plants and two submerged species. No Eurasian watermilfoil	

Name	Rice Marsh (Scott County)
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(*Myriophyllum spicatum*) was identified, but curlyleaf pondweed (*Potamogeton crispus*) was extensive with peak coverage of 64% in the early summer. Coontail was the most abundant submerged species with nearly 97% coverage at the end of summer. White water lily (*Nymphaea tuberosa*) was the most abundant emergent species, covering 50% of the lake surface. Floating filamentous algae mats became well established throughout the lake towards the end of summer. With a maximum depth of plant growth at 10 feet, most of Rice Marsh Lake is littoral and vegetated.

Future management needs and watershed improvements for Rice Marsh Lake include:

- Focusing on continued implementation of the recommendations in the 1994 Plan.
- Developing and implementing a lake management plan or strategy for controlling curlyleaf pondweed. A Lake Management Plan is a recommended tool that may be a means to identify the sources of the improved water quality on Rice Marsh Lake, and is a tool for setting long and short term management goals and priorities. For example, given the shallow depths and flow-through hydrology of Rice Marsh, management priorities could focus on managing Rice Marsh Lake for wildlife, or for multiple uses that include wildlife management with storm water or flood storage improvements.

The 1994 Plan identified a list of proposed storm water ponds within the Rice Marsh Lake subwatershed. The table in Appendix I of the 2006 Plan lists all recommended storm water ponds from Table III-D1 in the 1994 Plan, and identifies whether a recommended pond from the 1994 Plan has been constructed. The table also includes all new storm water ponds that were inventoried as part of the most recent wetland inventory. Table 28 is a summary of the proposed storm water ponds in the Rice Marsh Lake subwatershed.

Table 28. Rice Marsh Lake Proposed Ponds Prioritization

1994 Plan Priority Ranking	2006 Water Management Class	Pond Label
First	Improve-3	RM-P5.7
Third	Improve-3	RM-P4.9
Fifth	Improve-3	RM-P3.1

The Riley-Purgatory-Bluff Creek Watershed District (RPBCWD) completed a Use Attainability Analysis (UAA) for Rice Marsh Lake and Lake Susan in 1999. The UAA set specific goals and recommendations for water quality and quantity in the Rice Marsh Lake watershed. The following recommended BMPs were included in the UAA:

- Upgrade five ponds in the Rice Marsh Lake watershed.
- Add four ponds in the Rice Marsh Lake watershed.
- Treat Rice Marsh Lake with in-lake alum treatment.

Most of the recommended locations for additional storm water ponds in the Rice Marsh Lake watershed are addressed in Appendix I of the Plan. According to the 2005 wetland and storm water pond inventory, improvements have been made at several locations within the Rice Marsh Lake watershed. The City will continue to work with the RPBCWD as opportunities arise to construct the additional storm water treatment ponds in the Rice Marsh Lake watershed.

Minnesota Land Cover Classification System (MLCCS): Scott County (Scott County mapped by Stubbs and United States Fish and Wildlife Service (USFWS)).

Summary: Mixed wetland communities within or at the fringes of Rice Lake in Scott County are mapped as: altered/non-native grassland, floodplain forest, floodplain forest silver maple subtype, littoral open water, grassland with sparse deciduous trees, wet meadow, fast moving open water and dry oak savanna at the southern edge. Floodplain forest fringe was given high rating as natural community (AB rating). No invasive species data were provided.

Minnesota County Biological Survey (MCBS) Area of Biodiversity Significance: HIGH

DNR MCBS rates the Rice Marsh community as a single unit, including the Rice Marsh (Scott County), Blue Marsh and Fisher Marsh with a High Biodiversity Significance Rating: "High" sites contain very good quality occurrences of the rarest species, high-quality examples of rare native plant communities, and/or important functional landscapes. Relevé data are not available for Rice Marsh area.

Name	Rice Marsh (Scott County)
<p>Three Relevé points collected by Jason Husveth for DNR within FWS Valley Refuge:</p> <ol style="list-style-type: none"> 1. Saturated emergent marsh between wet meadow and <i>Schoenoplectus fluviatilis</i>-dominated emergent marsh. Areas inundated 3-4 cm in August. Likely entirely inundated in the spring. Higher diversity than the river bullrush stands. 2. Marsh dominated by <i>S. fluviatilis</i> on seasonally inundated silt loam with high organic material. Drawn down in August; soils saturated to surface. The river bullrush stands less diverse than other openings. 3. Saturated wet meadow zone between oak savanna upland & semi-permanently flooded River bullrush-dominated emergent marsh. The community has features of wet meadow & emergent marsh. <p>Natural Heritage Information System (NHIS) Sensitive Species Data. The DNR's Fred Harris describes wetland communities as dominated by natives in three community types. Wild Rice within open water areas, River Bullrush in a band around all three lakes (assume Blue, Fisher and Rice Lakes) and emergent wetlands composed of mixed cattail (<i>Typha</i> sp.), lake sedge (<i>Carex lacustris</i>), bur-reed (<i>Sparganium</i> sp.), reed canary grass (<i>Phalaris arundinacea</i>), and Canada bluejoint (<i>Calamagrostis Canadensis</i>), among others. 1997: 19 Special Concern Bullsnaek eggshells were collected showing no sign of predation. 1981: Forster's Tern observed in Rice Marsh.</p>	
Strategic Resource Evaluation:	
Required Metrics	TBD
Standard	TBD
Data Required for Assessment	TBD
Resource Category	Category 1 – Additional data is needed to confirm if projects could be completed to improve, protect, or preserve the resource. Category 2 – Proceed with feasibility study to determine potential projects, controls and/or management practices that could be used to improve or protect the resource.

Appendix D - FENS

Black Dog Lake Fen	2
Black Dog Lake North Fen	4
Gun Club Lake North Fen (Quarry Island Fen)	5
Gun Club Lake South Fen (Fort Snelling Fen)	7
Nicols Meadow Fen	9
Savage Fen	13
Seminary Fen	15

Name	Black Dog Lake Fen		
Water Body Type	Fen		
County	Dakota		
City	Burnsville		
Location	Township	Range	Section
	027N	24W	NW34, NWNE34, NNW34, SESE27, NENE34
% of Watershed Within the Lower Minnesota River Watershed District (LMRWD)	73%		
Watershed Land Use	43% Park, Recreational, or Preserve - 15% Undeveloped - 10% Major Highway - 32% Other		
Use Classification	2D		
Wetland Classification	3, 5		
DNR Fen ID	252, 14373, 31929		
Jurisdictional Entities	United States Army Corps of Engineers (USACE): - Administers Clean Water Act (CWA) Section 404 United States Environmental Protection Agency (EPA): - Can veto USACE decision under CWA Minnesota Pollution Control Agency (MPCA): - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 - MN Rule 7050 (nondegradation rule) Minnesota Department of Natural Resources (DNR): - Fen identification and protection Board of Water and Soil Resources (BWSR): - Administers MN Rule 8420		
Recreational Access	N/A		
Fisheries Information	N/A		
Summary of Previous Assessments:			
<u>Groundwater Levels</u> None. No known monitoring wells are installed.			
<u>Other Assessments</u> This fen was identified by the DNR in 1994, but appears to not have been reassessed until 2011.			
Minnesota County Biological Survey (MCBS) Area of Biodiversity Significance: MODERATE			
In summer 2011, as a part of a review for the permitting of a new road to the Xcel Black Dog Power Plant, DNR staff (Doug Norris, Jeanette Leete, Melissa Doperalski and Craig Wills) assessed the site and came to the following conclusion:			
The Black Dog calcareous fen was originally mapped by the Minnesota County Biological Survey in 1994. The fen community in the vicinity of the proposed access road appears to have been mapped as an extension of the calcareous fen community surveyed to the southwest; it's unclear the extent to which this particular location was surveyed. However, populations of the following notable species were recorded in the Natural Heritage Information System (NHIS) in the area of the proposed access road:			
Valerian <i>Valeriana edulis</i> state-threatened calcareous fen indicator Small white lady's slipper <i>Cypripedium candidum</i> state special concern calcareous fen indicator Common water dropwort <i>Oxypolis rigidior</i> calcareous fen indicator Tuberous Indian-plantain <i>Arnoglossum plantagineum</i> state-threatened			

Name	Black Dog Lake Fen	
<p>Overall, the calcareous fen community in the area of the proposed access road is in a very degraded condition, characterized by the dominance of invasive plant species and indications of a possible lack of adequate hydrology. However, this is based on one brief field review. If an access road alternative on the north side of the railroad tracks moves forward, we would require that additional vegetation surveys be conducted and may also require installation of monitoring wells/piezometers to more clearly characterize existing hydrologic conditions. We would use this information to determine whether or not the area in question should continue to be officially listed as calcareous fen, subject to DNR regulation under Minnesota Statutes 103G.223. Even if this area was determined to no longer qualify as a regulated calcareous fen, the DNR would still recommend a road alternative south of the railroad tracks, to avoid significant wetland impacts.</p>		
Strategic Resource Evaluation:		
Required Metric	Groundwater Levels / Vertical Gradient	Calcareous Fen Indicator Vegetation
Standard	Maintain current potentiometric elevation of shallow (water table) and deep aquifers.	Maintain current rare and important indicator vegetation.
Data Required for Assessment	Groundwater levels from nested monitoring wells.	No additional data is required for this metric to evaluate the resource.
Resource Category	Category 1 – Additional data is needed to confirm if projects could be completed to improve, protect, or preserve the resource.	

Name	Black Dog Lake North Fen		
Water Body Type	Fen		
County	Dakota		
City	Burnsville		
Location	Township	Range	Section
	027N	24W	SENE24
% of Watershed Within the Lower Minnesota River Watershed District (LMRWD)	100%		
Watershed Land Use	94% Park, Recreational, or Preserve - 6% Other		
Use Classification	2D		
Wetland Classification	3, 5		
DNR Fen ID	16550		
Jurisdictional Entities	United States Army Corps of Engineers (USACE): <ul style="list-style-type: none"> - Administers Clean Water Act (CWA) Section 404 United States Environmental Protection Agency (EPA): <ul style="list-style-type: none"> - Can veto USACE decision under CWA Minnesota Pollution Control Agency (MPCA): <ul style="list-style-type: none"> - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 - MN Rule 7050 (nondegradation rule) Minnesota Department of Natural Resources (DNR): <ul style="list-style-type: none"> - Fen identification and protection Board of Water and Soil Resources (BWSR): <ul style="list-style-type: none"> - Administers MN Rule 8420 		
Recreational Access	N/A		
Fisheries Information	N/A		
Summary of Previous Assessments:			
<u>Groundwater Levels</u> None. No known monitoring wells are installed.			
<u>Other Assessments</u>			
Natural Heritage Information System (NHIS) Record for Calcareous Fen (Black Dog North)			
The site was assessed by the DNR with NHIS data providing the only detail encountered: A small 0.5-acre area surrounded by continuous cover of phragmites and Salix. On the upper floodplain of the Minnesota River, 100 meters east of the railroad tracks and over halfway to the base of the upper terrace, along the trail maintained by the United States Fish and Wildlife Service (USFWS) for bird banding. Fen species include: <i>Carex sterilis</i> , <i>Oxypolis rigidior</i> , <i>Valeriana edulis</i> , and <i>Eriophorum angustifolium</i> . A thorough search for additional species is recommended. An immediate threat is a, development atop the terrace has a storm sewer easement through the fen.			
No additional information is available from this site.			
Minnesota County Biological Survey (MCBS) Area of Biodiversity Significance: MODERATE			
No Relevé data is available for the fen site.			
Strategic Resource Evaluation:			
Required Metric Standard	Groundwater Levels / Vertical Gradient	Calcareous Fen Indicator Vegetation	
	Maintain current potentiometric elevation of shallow (water table) and deep aquifers.	Maintain current rare and important indicator vegetation.	
Data Required for Assessment	Groundwater levels from nested monitoring wells.	Fen vegetation assessment.	
Resource Category	Category 1 – Additional data is needed to confirm if projects could be completed to improve, protect, or preserve the resource.		

Name	Gun Club Lake North Fen (Quarry Island Fen)		
Water Body Type	Fen		
County	Dakota		
City	Mendota Heights		
Location	Township	Range	Section
	028N	23W	WSE33
% of Watershed Within the Lower Minnesota River Watershed District (LMRWD)	48%		
Watershed Land Use	96% Park, Recreational, or Preserve - 4% Other		
Use Classification	2D		
Wetland Classification	3, 5, 6, 7		
DNR Fen ID	20941		
Jurisdictional Entities	United States Army Corps of Engineers (USACE): - Administers Clean Water Act (CWA) Section 404 United States Environmental Protection Agency (EPA): - Can veto USACE decision under CWA Minnesota Pollution Control Agency (MPCA): - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 - MN Rule 7050 (nondegradation rule) Minnesota Department of Natural Resources (DNR): - Fen identification and protection Board of Water and Soil Resources (BWSR): - Administers MN Rule 8420		
Recreational Access	N/A		
Fisheries Information	N/A		
Summary of Previous Assessments:			
<u>Groundwater Levels</u>			
Groundwater levels were measured in two monitoring wells from 2007-2010. The elevation of the deep potentiometric surface dropped approximately one foot during the monitoring period, whereas the shallow potentiometric surface dropped less than 0.5 foot.			
<u>Other Assessments</u>			
2008 Lower Minnesota River Watershed District Fen Well Monitoring Report, prepared by Dakota County Soil and Water Conservation District (SWCD), January, 2009.			
Groundwater monitoring was performed at this site in 2007 and 2008. The Quarry Island Fen had mixed upward and downward trends in hydrologic data. Findings were inconclusive.			
Minnesota County Biological Survey (MCBS) Area of Biodiversity Significance: HIGH			
MCBS Data Point Description (1994). H. Dunevitz.			
Saturated deep peat on a gentle west-facing slope with areas of calcareous groundwater discharge. At the base of steep forested west-facing bluff (west of railroad tracks), just north of the Interstate 494 bridge, east of Gun Club Lake. Dominant graminoids include <i>Carex stricta</i> , <i>C. lacustris</i> , and <i>Calamagrostis canadensis</i> . Rare and/or calciphilic species are <i>Cyripedium candidum</i> , <i>C. parviflorum</i> , and <i>Carex interior</i> , <i>Carex prairea</i> . There are some large patches of phragmites and saturated deep peat on a gentle west-facing slope, with areas of calcareous groundwater discharge at the base of the steep forested west-facing bluff (west of railroad tracks). Grades to disturbed former fen dominated by <i>Phalaris</i> and to emergent marsh. Just north of the I-494 bridge, east of Gun Club Lake.			
MCBS Relevé Data from 1994 visits			
<ul style="list-style-type: none"> On a saturated peat just downslope from calcareous seepage fen to the east and near Gun Club Lake to the west, in the Minnesota River valley. Phragmites has been increasing in recent years. 			

Name	Gun Club Lake North Fen (Quarry Island Fen)	
	<ul style="list-style-type: none"> On saturated muck. Part of a large variable emergent marsh downslope from calcareous seepage fen to the east and near Gun Club Lake to the west. Phragmites has been increasing in recent years. Soil saturated muck, three cm of standing water between hummocks. Grades into emergent marsh at the toe of the slope. Plot just west of large Phragmites clone and large willow clumps. 	
Data Steward	LMRWD (water levels)	
Strategic Resource Evaluation:		
Required Metric Standard	Groundwater Levels / Vertical Gradient	Calcareous Fen Indicator Vegetation
	Maintain current potentiometric elevation of shallow (water table) and deep aquifers.	Maintain current rare and important indicator vegetation.
Data Required for Assessment	No additional data is required for this metric to evaluate the resource.	No additional data is required for this metric to evaluate the resource.
Resource Category	Category 2 – Proceed with feasibility study to determine potential projects, controls and/or management practices that could be used to improve or protect the resource.	

Name	Gun Club Lake South Fen (Fort Snelling Fen)		
Water Body Type	Fen		
County	Dakota		
City	Eagan		
Location	Township	Range	Section
	027N	23W	W04
% of Watershed Within the Lower Minnesota River Watershed District (LMRWD)	46%		
Watershed Land Use	97% Park, Recreational, or Preserve - 3% Other		
Use Classification	2D		
Wetland Classification	3, 5, 6, 7		
DNR Fen ID	244		
Jurisdictional Entities	United States Army Corps of Engineers (USACE): - Administers Clean Water Act (CWA) Section 404 United States Environmental Protection Agency (EPA): - Can veto USACE decision under CWA Minnesota Pollution Control Agency (MPCA): - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 - MN Rule 7050 (nondegradation rule) Minnesota Department of Natural Resources (DNR): - Fen identification and protection Board of Water and Soil Resources (BWSR): - Administers MN Rule 8420		
Recreational Access	N/A		
Fisheries Information	N/A		
Summary of Previous Assessments:			
<u>Groundwater Levels</u>			
Groundwater levels were measured in 13 monitoring wells from 2007-2010. The elevation of the shallow and deep potentiometric surface remained relatively consistent throughout the monitoring period, with only weak trends observed.			
<u>Other Assessments</u>			
2008 Lower Minnesota River Watershed District Fen Well Monitoring Report, prepared by Dakota County Soil and Water Conservation District (SWCD), January 2009.			
Groundwater monitoring was performed at this site in 2007 and 2008. The Fort Snelling Fen appeared to have a weak decreasing water elevation trend, though the authors indicated that a localized decrease in rainfall during the monitoring may have had some effect.			
Minnesota County Biological Survey (MCBS) Area of Biodiversity Significance: HIGH			
MCBS Data Point Description (1994). H. Dunevitz, B. Delaney, E. Fuge, M. Lee			
There is a large expanse of fen on deep saturated peat with several areas of calcareous groundwater discharge.			
1978: Fen first observed.			
1994: a large expanse of fen on deep saturated peat with several areas of calcareous groundwater discharge. Scattered areas of lower-statured sedge-dom vegetation with <i>Carex sterilis</i> , <i>C. prairea</i> , <i>Lobelia kalmii</i> , <i>Triglochin maritima</i> , <i>Cypripedium candidum</i> ; surrounded by areas with 50% shrub cover (<i>Cornus stolonifera</i> , <i>Salix</i> species), diverse herb layer, but heavy thatch and some large <i>Phalaris</i> , phragmites patches.			
MCBS Relevé Data from 1994 visits			
<ul style="list-style-type: none"> There is a good population of <i>Cypripedium candidum</i>, according to an orchid study by the DNR in 1990 at this site. There is also ankle deep water between hummocks formed by <i>Carex stricta</i>. A hydrologic station is at the site, which also features deep organic peat soil. 			

Name	Gun Club Lake South Fen (Fort Snelling Fen)	
Data Steward	LMRWD (water levels)	
Strategic Resource Evaluation:		
Required Metric Standard	Groundwater Levels / Vertical Gradient	Calcareous Fen Indicator Vegetation
	Maintain current potentiometric elevation of shallow (water table) and deep aquifers.	Maintain current rare and important indicator vegetation.
Data Required for Assessment	No additional data is required for this metric to evaluate the resource.	No additional data is required for this metric to evaluate the resource.
Resource Category	Category 2 – Proceed with feasibility study to determine potential projects, controls and/or management practices that could be used to improve or protect the resource.	

Name	Nicols Meadow Fen		
Water Body Type	Fen		
County	Dakota		
City	Eagan		
Location	Township	Range	Section
	027N	23W	NESW18, NWSESW18, SWSESW18
% of Watershed Within the Lower Minnesota River Watershed District (LMRWD)	100%		
Watershed Land Use	43% Undeveloped - 24% Park, Recreational, or Preserve - 10% Single Family Detached - 23% Other		
Use Classification	2D		
Wetland Classification	3, 5		
DNR Fen ID	243, 20942, 20943		
Jurisdictional Entities	United States Army Corps of Engineers (USACE): - Administers Clean Water Act (CWA) Section 404 United States Environmental Protection Agency (EPA): - Can veto USACE decision under CWA Minnesota Pollution Control Agency (MPCA): - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 - MN Rule 7050 (nondegradation rule) Minnesota Department of Natural Resources (DNR): - Fen identification and protection Board of Water and Soil Resources (BWSR): - Administers MN Rule 8420		
Recreational Access	N/A		
Fisheries Information	N/A		
Summary of Previous Assessments:			
<u>Groundwater Levels</u> Nearby construction activities from 1989-1997 had negative impact on the fen, and further research is needed to determine whether the fen is recovering. Groundwater levels were measured in 14 monitoring wells from 2007-2010. The elevation of the shallow and deep potentiometric surface remained relatively consistent throughout the monitoring period, with only weak trends observed. One monitoring well showed an approximately two-foot rise in the potentiometric surface.			
<u>Other Assessments</u> 2008 Lower Minnesota River Watershed District Fen Well Monitoring Report, prepared by Dakota County Soil and Water Conservation District (SWCD), January 2009. Groundwater monitoring was performed at this site in 2007 and 2008. The Nicols Meadow Fen had mixed upward and downward trends in hydrologic data. Findings were inconclusive.			
Full Assessment Completed for Gun Club Lake Watershed Management Organization (GCLWMO) by WSB and Associates, June 30, 2008. Available on-line at: http://www.dakotaswcd.org/watersheds/gunclubwmo/Nicols%20Fen%202008.pdf			
Recommendations of the report include the following: 9.0 Conclusions and Recommendations Current and historical groundwater and stream flow data for the Nicols Meadow Fen area were analyzed during this study. Based on this analysis and the 2002 study the following recommendations are made: 9.1 Recommendations 9.1.1 Groundwater Hydrology Activities associated with the restoration or further understanding of groundwater hydrology should be of the highest priority in			

Name**Nicols Meadow Fen**

looking at opportunities to positively affect this region. Based on observations made through this study, the following recommendations are made:

1. Encourage the continued monitoring of the wells and streams located within Nicols Meadow Fen and Kennaley's Creek areas to track trends in groundwater behavior in future years.
2. Stakeholders and landowners located within the hypothetical recharge area include the Minnesota DNR, City of Eagan, GCLWMO, MCES, Dakota SWCD, LMWRD, and others should consider possible actions to encourage and protect the existing infiltration areas within the probable recharge zone.
3. No groundwater sampling for chemistry was completed as part of this test, but we encourage future evaluations to include chemical composition monitoring to provide a historical record on the groundwater discharges and compare them to other calcareous fens within the state to assist in determining the effects of the various impacts on the Nicols Meadow Fen area.

9.1.2 Adjacent Development

Observations indicate that there are clearly some impacts located immediately adjacent to Nicols Meadow Fen which may have the possibility to be mitigated or should require additional study to determine their influence on the Nicols Meadow Fen and trout stream areas. These recommendations include the following:

1. Conduct an analysis to determine the effects and boundaries of dewatering activity at the Seneca Wastewater Treatment Plant on the Kennaley's Creek and Nicols Meadow Fen area.
2. If studies of the Seneca Wastewater Treatment Plant dewatering operations identify affects that reach Kennaley's Creek and the Nicols Meadow Fen area, options should be explored for reducing the footprint of the Seneca Wastewater Treatment Plant dewatering operations on these resources.

9.1.3 Vegetation

Several threatened and species of concern vegetation are present within the Nicols Meadow Fen area. A number vegetation surveys have been completed over the years and should continue to track the health of the fen and the native species community. Therefore, we recommend the following:

1. Conduct population surveys of vegetation within Nicols Meadow Fen area to determine the ratio of native to invasive species and to screen for indicator species, such as white lady slipper and valerian. These vegetation surveys should be conducted at regular intervals to track the health of the Nicols Meadow Fen complex.
2. Vegetation surveys and sampling will continue to assist to determine if native plants can re-establish themselves in locations of the fen, or if invasive problematic plants are becoming the dominant species.
3. The Minnesota DNR has proposed a woody biomass project for the Nicols Meadow Fen area. It is recommended that this woody biomass project make efforts to remove as many invasive plant species from the area in conjunction with that project.

9.1.4 Agency Cooperation

Due to the large number of stakeholders, both landowners, regulatory agencies, and others located in and around the fen, we support the following recommendations for continued cooperation:

1. Continue multi-agency collaboration between the Minnesota DNR, City of Eagan, GCLWMO, MCES, Dakota SWCD, Mn/DOT, LMRWD, United States Fish and Wildlife Service (USFWS), and others for the purposes of maintaining consistent data gathering techniques, exploring restoration avenues, and to maintain consistency of message for areas in and around the Nicols Meadow Fen, Kennaley's Creek and Harnack Creek areas.
2. Multi-agency collaboration should continue for the purposes of discussing potential ideas on preservation of the fen and to determine the Best Management Practices for future restoration and management activities. We recommend that the free flow of ideas continue between the stakeholders to gather future data, discussing potential ideas on preservation of the fen, and for determining the Best Management Practices for the future restoration of management activities in and around Nicols Meadow Fen, Kennaley's and Harnack Creeks.

9.1.5 Public Contact/Education

Due to the location of the Nicols Meadow Fen, Kennaley's and Harnack Creeks adjacent to Ft. Snelling State Park, and the National Wildlife Refuge, along with the populations of the City of Bloomington and the City of Eagan, this resource is located in a prime location for public exposure for educational opportunities to share the importance and the rarity of calcareous fens and trout streams.

9.1.6 Kennaley's and Harnack Creeks

Based on the analysis of Kennaley's and Harnack Creeks temperature and flow monitoring data, the following recommendations are made:

1. Unfortunately, at this time, it is not feasible to invest in the restoration of habitat for the purposes of stocking trout in Kennaley's or Harnack Creeks. There is not adequate stream flow to support trout populations.
2. Flow monitoring and temperature monitoring of Kennaley's and Harnack Creeks should be continued at some

Name**Nicols Meadow Fen**

consistent level in the event that future restoration efforts or improvement, or changes within the watershed, contribute to more steady flows in the stream channels to the point where restoration options may be considered.

3. Based on discussions with the Minnesota DNR, and to establish historical understanding of these streams, additional research on the history of the Kennaley's and Harnack Creeks could be undertaken to determine whether these streams ever had sustainable viable trout populations or if the streams existed as take and put populations in the past.

9.2 Recommendations from 2002 Report

In the 2002 report, a number of recommendations were made in regard to the Nicols Meadow Fen and Kennaley's Creek, Harnack Creek areas. We have restated several of these recommendations in this location in an effort to maintain consistency and a one-stop shop for information in regard to work that has been completed recently in the Nicols Meadow Fen and Kennaley's and Harnack Creek areas. The recommendations from the 2002 report were as follows:

9.2.1 Fen

- Locate drain tiles within the area, then remove or disable them. A determination should be made whether rare species could be affected from this activity, and the least disruptive method should be used in areas of high quality or at which rare species occur.
- Delineation of fen is not easily distinguished, buffered with native communities (sedge meadow, wet prairie). If an attempt to restore the fen is not possible, the restoration of the next best wetland community may be possible.
- Controlled burns are needed to manage problematic plants (RCG, phragmites – increase thatch; buckthorn & woody problematics)

9.2.2 Harnack Creek

- The steep slope on the north segment just west of Nicols Road is creating a steep down cut channel. To increase the available habitat for trout and improve the streams viability, stream channel improvements may be necessary.
- Removal and maintenance of beaver dams and population may be necessary. Prior to implementation, a determination should be made to see if this activity will cause more harm than good to the creek.

9.2.3 Kennealy Creek

- Determine the existing condition of the spoil pile and whether removal of it would result in the best long-term solution for Nicols Meadow Fen.
- Remove trout pond dams

9.2.4 Groundwater Hydrology

- Should monitoring show reasonable levels of stable ground water, complete stream habitat improvements.
 - Lengthening and adding meander to Harnack Creek
 - Remove problematic species
 - Remove alterations at west branch of Kennaley's Creek
 - Relocate/recycle spoil pile material within the fen
- Identify and develop policies to protect the sources of infiltration that contribute to the Nicols Meadow Fen Complex.
- Perform a study of Seneca dewatering alternatives with the goal of reducing the zone of influence from dewatering activities on the fen, trout streams, and sources of water. Construct improvements at Seneca from the study findings if alternatives are feasible.

9.2.5 Vegetation

- Determine current extent of problematic species and identify the most dense areas and species on a map.
- Complete a management plan for problematic plants. Determine the best single method or a combination of methods to control specific species in particular areas of Nicols Meadow Fen. Methods considered should include herbicide application, prescribed burning, and mechanical removal. This effort should consider impacts to rare species and should not be done in a manner that might negatively affect these species.

9.2.6 Public Contact/Education

- Develop overall management plan for the fen complex that includes public use and education within the resource, and perhaps a designation of the fen as an active laboratory.
- Determine the potential for restoration of native plant communities so Nicols Meadow Fen may serve as a model restoration site.
- Develop a trail system that connects the fen to Ft. Snelling State Park trails, Minnesota Valley National Wildlife Refuge trails, the City of Eagan, and Dakota County trails. Ensure an appropriate level of accessibility that is not likely to increase degradation of the most sensitive portions of the fen, yet allows for public access for educational and recreational activities.
- Develop educational kiosks to raise public awareness about the unique and important functions that the fen complex can provide

Name	Nicols Meadow Fen										
<ul style="list-style-type: none"> - Plants - Source of water for fen - Water chemistry - Amphibians - Birds - Macroinvertebrates - Butterflies 											
<p>9.2.7 Future Adjacent Development</p> <ul style="list-style-type: none"> • The City of Eagan could establish development guidelines for the Cedar Grove Area. • Seneca waste water treatment plant expansions. 											
<p>Natural Heritage Information System (NHIS) Record for Calcareous Fen (Savage Fen). Site was assessed by the DNR with NHIS Relevé data from 2000 (updated 2011) providing the following description: A high quality mesic prairie between degraded calcerous seepage fen and de graded wet meadow. Soil core shows uniform dark clay loam down 20 cm. The shrub cover is higher than the rest of the prairie. Probably burned.</p> <p>Detailed species lists are available in Relevé form from one site at Black Dog Prairie. The site contains a range of fen indicators, including listed, state listed, and tracked species: <i>Cypripedium calceolus</i>, <i>Valeriana edulis</i>, <i>Carex sterilis</i>, <i>Rhynchospora capillacea</i>, <i>Scleria verticillata</i> and <i>Oxypolis rigidor</i>. The site contains three distinct areas mapped as calcareous fen (Southern) and native Mesic Prairie (Southern). In addition, a state threatened butterfly, The Regal Fritillary, was observed on this site in 1968.</p> <p>Minnesota County Biological Survey (MCBS) Area of Biodiversity Significance MCBS mapped the following communities within the Nichols Fen Complex: Calcareous Fen (Southeastern)</p>											
Data Steward	LMRWD (water levels)										
Strategic Resource Evaluation:											
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">Required Metric Standard</td> <td style="text-align: center;">Groundwater Levels / Vertical Gradient</td> <td style="text-align: center;">Calcareous Fen Indicator Vegetation</td> </tr> <tr> <td></td> <td>Maintain current potentiometric elevation of shallow (water table) and deep aquifers.</td> <td>Maintain current rare and important indicator vegetation.</td> </tr> <tr> <td style="text-align: center;">Data Required for Assessment</td> <td>No additional data is required for this metric to evaluate the resource.</td> <td>No additional data is required for this metric to evaluate the resource.</td> </tr> </table>	Required Metric Standard	Groundwater Levels / Vertical Gradient	Calcareous Fen Indicator Vegetation		Maintain current potentiometric elevation of shallow (water table) and deep aquifers.	Maintain current rare and important indicator vegetation.	Data Required for Assessment	No additional data is required for this metric to evaluate the resource.	No additional data is required for this metric to evaluate the resource.		
Required Metric Standard	Groundwater Levels / Vertical Gradient	Calcareous Fen Indicator Vegetation									
	Maintain current potentiometric elevation of shallow (water table) and deep aquifers.	Maintain current rare and important indicator vegetation.									
Data Required for Assessment	No additional data is required for this metric to evaluate the resource.	No additional data is required for this metric to evaluate the resource.									
Resource Category	Category 2 – Proceed with feasibility study to determine potential projects, controls and/or management practices that could be used to improve or protect the resource.										

Name	Savage Fen		
Water Body Type	Fen		
County	Scott		
City	Savage		
Location	Township	Range	Section
	115N	21W	SNE17, SENW17, SWNW16
% of Watershed Within the Lower Minnesota River Watershed District (LMRWD)	94%		
Watershed Land Use	43% Undeveloped - 32% Park, Recreational, or Preserve - 17% Agricultural - 8% Other		
Use Classification	2D		
Wetland Classification	2, 3, 5, 6, 7		
DNR Fen ID	241		
Jurisdictional Entities	United States Army Corps of Engineers (USACE): - Administers Clean Water Act (CWA) Section 404 United States Environmental Protection Agency (EPA): - Can veto USACE decision under CWA Minnesota Pollution Control Agency (MPCA): - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 - MN Rule 7050 (nondegradation rule) Minnesota Department of Natural Resources (DNR): - Fen identification and protection Board of Water and Soil Resources (BWSR): - Administers MN Rule 8420		
Recreational Access	N/A		
Fisheries Information	N/A		

Summary of Previous Assessments:

From the Lower Minnesota River Watershed District *Groundwater Monitoring Strategy* report, 2005. Pgs. 22-23

3.2.6 Savage Fen

Description: Savage Fen lies within the City of Savage and is located south and east of Highway 13. See Figure B-3 in Appendix B for location of this fen. The size of the fen is approximately 87 acres, split into numerous segments below the bluff line.

Existing Studies/Monitoring: Numerous studies of Savage Fen have taken place over the years, with most of those having been lead by Minnesota DNR staff. The fen has been actively monitored since the early 1990s and there are numerous groundwater monitoring wells in the area to study water table elevations within the peat layer, within the aquifer below the fen, and in the recharge area to the south of the fen.

Health of the Resource: Savage Fen is considered to be in overall very good to excellent condition. Native fen plant species abound in the fen, although recent surveys have indicated that invasive plant species are starting to encroach somewhat at the perimeter of the fen. The lack of any recent fires is likely the reason for this encroachment of invasive species. Studies in the early 1990s concluded that the fen was being impacted by the pumping of nearby municipal wells that were completed in the Prairie du Chien and Jordan aquifers. As a result, the City abandoned its wells closest to the fen and drilled deeper wells to obtain water from the Franconia-Ironton-Galesville (FIG) and Mt. Simon aquifers. The FIG and Mt. Simon aquifer are thought to not be connected hydraulically to the aquifers that feed the Savage Fen. The City still maintains three wells in the shallower aquifers, but those wells area located behind the bluff line and usage is typically limited only to peak demand periods.

Since the City of Savage reduced its pumping from the shallower aquifers, it is thought that Savage Fen showed an improvement, with the nearby monitoring wells indicating a return of water table levels to what is thought to be more “natural” conditions.

Name**Savage Fen**

Current Monitoring Efforts: Savage Fen is currently monitored with two deep wells and seven shallow wells. Minnesota DNR staff, with the assistance of District staff, collects data from these wells at regular intervals.

Future Monitoring Efforts: Since Savage Fen is still being actively monitored, there are no plans to add wells to this site. One of the existing monitoring wells (“SF2”) has been damaged from being shot at and will need to be repaired or abandoned. Minnesota DNR staff feels the current monitoring program does a good job of characterizing the water table in the north-south direction. Minnesota DNR staff would ideally like to see a better characterization of groundwater flow in the east-west direction, but limited funding and resources will likely prevent this from occurring in the foreseeable future.

Priority for Monitoring: LOW. While the excellent condition of Savage Fen necessitates the need for monitoring of its health, the existing monitoring well network and data collection program appears to sufficiently characterize groundwater levels in the area. If the funding or resources to monitor these wells were to disappear, then the priority to re-establish these monitoring efforts should be classified as “HIGH”.

Groundwater Levels

The District has been monitoring groundwater levels in the fen since 1987. Eighteen wells are monitored. In general, some wells which penetrate the buried artesian aquifer have seen a decrease of a few tenths of a foot in the potentiometric surface since monitoring began, whereas other wells, including water table wells, have seen fairly steady or slightly increasing water levels.

Other Assessments

The three essential assessments of Savage Fen were performed in 1998 and form the basis for most decision making regarding Savage Fen. These assessments are:

Almendinger and Leete, *Peat characteristics and groundwater geochemistry of calcareous fens in the Minnesota River Basin, U.S.A.* Biogeochemistry 43: 17-41, 1998.

Almendinger, James E. and Jeanette H. Leete. *Regional and Local Hydrogeology of Calcareous Fens in the Minnesota River Basin, USA.* Wetlands, Vol. 18, No. 2 June 1998. PP. 184-202.

Komor, Stephen C. *Geochemistry and hydrology of a calcareous fen within the Savage Fen wetlands complex, Minnesota, USA.* Geochimica et Cosmochimica Acta, Vol. 58. No. 16, pp. 3353-3367. 1994

Natural Heritage Information System (NHIS) Record for Calcareous Fen (Savage Fen)

The site was assessed by the DNR with NHIS data providing the only detail encountered:

Relevé descriptions in 1987 were limited but describe the location as typical of fen characteristics. Detailed species lists are available in the Relevé form. The site contains a range of fen indicators including state listed and tracked species: *Cyripedium calceolus*, *Valeriana edulis*, *Carex sterilis*, *Rhynchospora capillacea*, *Scleria verticillata* and *Oxypolis rigidor*. In addition to calcareous fen communities, the site contains a mapped native Mesic Prairie.

Minnesota County Biological Survey (MCBS) Area of Biodiversity Significance

MCBS mapped the following communities within the Savage Fen Complex in 1995: Calcareous Fen (Southeastern), Elm-Basswood-Black Ash-(Hackberry) Forest, Mesic Prairie (Southern), Sedge Meadow, Seepage Meadow/Carr, Sugar Maple-Basswood-(Bitternut Hickory) Forest and Willow-Dogwood Shrub Swamp.

Data Steward	LMRWD (water levels)	
Strategic Resource Evaluation:		
Required Metric Standard	Groundwater Levels / Vertical Gradient	Calcareous Fen Indicator Vegetation
	Maintain current potentiometric elevation of shallow (water table) and deep aquifers.	Maintain current rare and important indicator vegetation.
Data Required for Assessment	No additional data is required for this metric to evaluate the resource.	TBD
Resource Category	Category 2 – Proceed with feasibility study to determine potential projects, controls and/or management practices that could be used to improve or protect the resource.	

Name	Seminary Fen		
Water Body Type	Fen		
County	Carver		
City	Chaska, Chanhasen		
Location	Township	Range	Section
	116N	23W	SWNESE34, SW35, NESWSW35
% of Watershed Within the Lower Minnesota River Watershed District (LMRWD)	43%		
Watershed Land Use	56% Undeveloped - 36% Park, Recreational, or Preserve - 8% Other		
Use Classification	2D		
Wetland Classification	2, 6		
DNR Fen ID	20977		
Jurisdictional Entities	United States Army Corps of Engineers (USACE): - Administers Clean Water Act (CWA) Section 404 United States Environmental Protection Agency (EPA): - Can veto USACE decision under CWA Minnesota Pollution Control Agency (MPCA): - National Pollutant Discharge Elimination System (NPDES) - CWA Sections 303(d) and 316 - MN Rule 7050 (nondegradation rule) Minnesota Department of Natural Resources (DNR): - Fen identification and protection Board of Water and Soil Resources (BWSR): - Administers MN Rule 8420		
Recreational Access	N/A		
Fisheries Information	N/A		
Summary of Previous Assessments:			
<u>Groundwater Levels</u>			
<p>Nine monitoring wells are installed within or north (upgradient) of Seminary Fen. One monitoring well penetrates the buried artesian aquifer. The potentiometric surface in this well was measured from 2009-2011, and was relatively flat to slightly rising. The other wells penetrate the water table aquifer at various depths. Water levels in these wells were either measured from 2006-2007, or 2009-2011, and exhibit various trends (downward, flat, and upward).</p>			
<u>Other Assessments</u>			
1995 Natural Heritage Information System (NHIS) Description:			
<p>The soil is deep, well-hydrated peat with much water at the surface. It occurs among areas of shrub swamp and <i>Carex stricta</i> meadows within a large complex of wetlands. There are three separate fen areas. Associated species are <i>Carex sterilis</i>, <i>Carex sartwellii</i>, <i>C. prairea</i>, <i>C. stricta</i>, <i>Muhlenbergia richardsonis</i>, <i>Salix candida</i>, <i>Cornus stolonifera</i>, <i>Cladium</i>, <i>Eleocharis rostellata</i>, <i>Scleria</i>, <i>Rhynchospora</i>, <i>Valeriana</i>, <i>Cypripedium</i>. In Minnesota Valley the outwash is a geomorphic area. DNR Relevés #5035, 5036, 5038.</p>			
Minnesota County Biological Survey (MCBS) Area of Biodiversity Significance: OUTSTANDING			
MCBS Relevé Descriptions in four locations within Seminary Fen:			
<ul style="list-style-type: none"> • On a large, sloping shelf of peat, water table is at ground surface, with four inches of muck at ground surface. Soil is coarse, fibric peat at least 1m deep. • The fen is on deep fibric peat. The site is well-hydrated and bouncy with much surface water between hummocks. There is heavy <i>Scirpus acutus</i> cover in most of the open areas. Most of the surrounding area has fairly dense shrub cover, and is west of the bike trail. • The shrub swamp is on well-hydrated peat with the water table at the ground surface. It lacks surface flow of water, 			

Name	Seminary Fen	
<p>and is in mosaic with calcareous fen openings. The shrub cover varied from 50-100%. There is no evidence of flooding, the ground surface is well-vegetated and has much moss cover.</p> <ul style="list-style-type: none"> The opening is dominated by low sedge species, near the top of a peat mound at the foot of the north side of the Minnesota River Valley. The water table is right at ground surface. The soil is deep, fibric peat. 		
<p>Seminary Fen was assessed in 2006 by Fred Harris of the DNR and Dan Tix of Great River Greening. Their general findings are summarized here:</p>		
<p>“Seminary Fen is a large area of wetlands and upland forests on toe slopes and adjacent steep bluffs on the north side of the Minnesota River Valley. The wetlands contain areas of calcareous seepage fen, an exceedingly rare wetland type that forms in specific conditions of cold mineral-rich groundwater seepage. The calcareous seepage fens in the site are in excellent condition and contain populations of seven rare plant species.”</p>		
<p>“Calcareous Fen (Southeastern) vegetation is concentrated in three areas totaling approximately 90 acres within the larger wetland complex of sedge meadows and marshes. The fens contain several low mounds of accumulated peat. The downslope flanks of these mounds are covered by low-statured <i>graminoids</i>, several of which are exceedingly rare plant species found in southern Minnesota nearly exclusively in calcareous seepage fens. These low <i>graminoid</i> areas are dominated mostly by sterile sedge (<i>Carex sterilis</i>), prairie sedge (<i>Carex prairea</i>), three-square bullrush (<i>Scirpus pungens</i>), beaked spike-rush (<i>Eleocharis rostellata</i>), and mat muhly grass (<i>Muhlenbergia richardsonis</i>). Scattered, small open groundwater pools present in these zones have bare soils encrusted with marl deposits and are ringed with dense concentrations of several small rare plant species: hair-like beak-rush (<i>Rhynchospora capillacea</i>), whorled nut-rush (<i>Scleria verticillata</i>), and marsh arrow grass (<i>Triglochin palustris</i>).”</p>		
<p>“The fen’s survival depends entirely on the maintenance of its groundwater flow, which is a considerable challenge in a rapidly urbanizing landscape.”</p>		
<p>CONCLUSION Seminary Fen is one of the highest quality calcareous fens in southern Minnesota, containing populations of several of the state’s rarest plant species, and is one of the most significant natural areas in the Twin Cities metropolitan area. It should be a high priority for conservation as a natural area.”</p>		
Data Steward	LMRWD (water levels)	
Strategic Resource Evaluation:		
Required Metric Standard	Groundwater Levels / Vertical Gradient	Calcareous Fen Indicator Vegetation
	Maintain current potentiometric elevation of shallow (water table) and deep aquifers.	Maintain current rare and important indicator vegetation.
Data Required for Assessment	No additional data is required for this metric to evaluate the resource.	No additional data is required for this metric to evaluate the resource.
Resource Category	Category 2 – Proceed with feasibility study to determine potential projects, controls and/or management practices that could be used to improve or protect the resource.	

Appendix E – CATEGORY 2 STREAM FEASIBILITY STUDY

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Feasibility Study for Category 2 Streams

Four streams in the Lower Minnesota River Watershed District (District) are on the 2012 303(d) as being impaired for turbidity (Bluff Creek, Riley Creek, Carver Creek, and East Chaska Creek; see **Error! Reference source not found.**,

Figure 2,

Figure 3. East Chaska Creek Priority Sites and Reaches

, below. These streams were selected for a feasibility study to determine potential best management practices (BMPs) to mitigate sources of erosion, thereby reducing turbidity in the streams in areas within the District. This feasibility study also provides costs for the BMPs.

An initial desktop analysis of the streams consisted of examining aerial photos, geographic information system (GIS), and the District gully inventory (Appendix H in the District's Third Generation Plan). Adequate visual detail for BMP recommendation was not possible using only a desktop analysis, so a field reconnaissance trip to these streams took place August 28th, 2012, to examine erosion areas in greater detail. The following sections describe each of the four stream visits, present suggested BMPs to address erosion problem areas, and provide costs associated with implementation.

Bluff Creek

Bluff Creek (

Figure 2) is in Chanhassen near the intersection of County Road 61 (Flying Cloud Drive) and County Road 101 (Great Plains Boulevard). The District section of the creek begins at the southern edge of Bluff Creek Park, emerging from a tunnel underneath a gravel bike trail. A Watershed Outlet Monitoring Program (WOMP) monitoring station, operated by the Metropolitan Council Environmental Services (MCES), is on Bluff Creek at North Highway 101 (Flying Cloud Drive). Streambank erosion was observed below the tunnel exit (Photo 1). Active erosion was observed at the bridge abutments approximately 100 feet downstream at the North Hwy 101 crossing. Active erosion was observed on outer stream bends, where near vertical banks exist. However, the overall channel seemed stable. In sum, excessive active erosion was not observed in Bluff Creek. Suggested actions for Bluff Creek include providing an energy dissipation structure at the tunnel exit, bank stabilization measures along outside creek bends, re-directing runoff coming off of the North Hwy 101 Bridge, and stabilizing the areas around the bridge abutments.

Riley Creek

Riley Creek (

Figure 2) is in Eden Prairie near the intersection of County Road 61 (Flying Cloud Drive and County Road 4 (Spring Road). The District section of the creek begins at Flying Cloud Drive near the Riley Creek WOMP monitoring station. The creek travels 1.3 miles from there to the Minnesota River, passing through Grass Lake. This study examined the reach immediately below the WOMP station.

Streambank erosion was observed at the concrete apron near the WOMP station (Photo 2. Riley Creek WOMP station downstream of Flying Cloud Drive (Eden Prairie)

). Erosion was particularly evident at outside bends where undercut banks and exposed tree roots were observed. The right bank wingwall was also noticed to be broken from the apron structure. In sum, excessive active erosion was not observed in Riley Creek near the WOMP station. Suggested actions for Riley Creek include providing energy dissipation structures below County Road 61 and/or redirecting flows away from outside creek meanders to prevent future erosion during runoff events.

Carver Creek

Carver Creek (Figure 2) is in Carver south of County Road 40 (Main Street W) near downtown Carver. The District section of the creek begins near a trail crossing approximately 1,000 feet above the confluence with the Minnesota River.

The meandering creek had near vertical banks at outer creek bends showing active erosion (bank sloughing). However, the channel banks seem to be held in place by debris jams and not mobilizing downstream (**Error! Reference source not found.**). Approximately 150 feet upstream of the trail crossing there was active gully erosion depositing sediment into the channel (**Error! Reference source not found.**). Further upstream there was similar outer creek bend erosion but debris jams were absent (**Error! Reference source not found.**). In sum, active erosion was observed in Riley Creek at several locations.

Suggested actions for Carver Creek include stabilizing outer bends with toe protection and grading banks to a more stable slope, and stabilizing the gully to prevent future sediment from being transported downstream.

East Chaska Creek

East Chaska Creek (

Figure 3. East Chaska Creek Priority Sites and Reaches

) is in downtown Chaska. The District section of the creek begins below County Road 10 (Engler Boulevard) and continues downstream to the confluence with the Minnesota River. For assessment, the creek was divided into five reaches, A through E, starting from the upstream most point within the District. Recommendations for the different reaches are presented in the text .

Reach A: Engler Boulevard to Crosstown Boulevard

Reach A was heavily vegetated, had some coarse sediment in the channel bed, and was generally stable. There was some localized erosion caused by debris jams in the channel (
*). The culvert outfall at Engler Boulevard was relatively stable, with energy dissipation provided by riprap (**Error! Reference source not found.**). Suggestions for Reach A include removal of channel debris and dead trees.*

Reach B – Crosstown Boulevard to County Road 61

In this stream section, the entire reach was downcut approximately two feet, which was especially evident at the downstream apron at the Crosstown Blvd bridge. There was little to no coarse sediment in channel, consisting mainly of silty sands. The left bank (approximately six feet high, vertical) was problematic, with the majority of the reach having actively eroding banks. The worst area was approximately 720 feet long, beginning at 902 Yellow Brick Road.

Right bank erosional problems were generally confined to outfall locations (one buried outfall and two hanging outfalls). Outfall A (**Error! Reference source not found.**) consisted of a 24-to-30-inch RCP with apron, and was nearly buried. There was a log jam immediately downstream with eroding stream banks. Sediment was accumulating upstream of the outfall, with the right bank sloughing into channel. Outfall B (**Error! Reference source not found.**) is a 12-inch PVC pipe hanging 2.5 feet above the channel bed. Outfall C (**Error! Reference source not found.**) is a 12-inch CMP hanging six inches above the channel bed.

At the pedestrian bridge (

Figure 3. East Chaska Creek Priority Sites and Reaches

, **Error! Reference source not found.**) there was active erosion present, but the upstream reach appeared relatively stable. Near the Crosstown Boulevard Bridge (

Figure 3. East Chaska Creek Priority Sites and Reaches

, **Error! Reference source not found.**) the downstream apron channel was downcut approximately two feet. Riprap was present in the channel along with debris jams. The upstream bridge banks and channel were stable.

Suggestions for Reach B include removing debris and dead trees from the channel and addressing localized problems at outfalls and crossings. Specific suggestions are as follows:

- Outfall A – remove the log jam, stabilize the right bank at the outfall, revegetate the bank, remove the sediment deposit.
- Outfall B – stabilize outfall with rock, step down the outfall, provide toe protection 10 feet upstream and 40 feet downstream.
- Outfall C – stabilize outfall with rock, step down the outfall, toe protection 10 feet upstream and 40 feet downstream.
- Pedestrian Bridge – redirect runoff from the bridge to the channel bed, stabilize abutments five feet upstream and 15 feet downstream.
- Crosstown Boulevard Bridge – grade control/energy dissipation structures to step the channel down and dissipate energy away from the bridge and vulnerable banks; re-direct runoff from bridge.

Reach C – County Road 61 to East Sixth Street

Overall, the channel seemed to be down-cutting through a large sediment deposit. Two outfalls (42-inch concrete apron & trash grate, 42-inch HDPE) were discharging into a wetland-type feature immediately downstream CR-61 (**Error! Reference source not found.**). The banks were vegetated and relatively stable. Suggestions for Reach C include removal of debris and dead trees in the channel where possible, and insertion of grade control structures.

Reach D – East Sixth Street to Beech Street

In general the channel in Reach D was downcut approximately two feet from the 50 feet upstream bridge (**Error! Reference source not found.**) to downstream of Beech Street. The left bank appears to be more of a risk for further erosion. Both larger boulders/riprap deposits in the channel and lack of vegetation on channel banks were identified. Upstream of the E. Sixth Street

Bridge left bank erosion persists (**Error! Reference source not found.**). The right abutment has been grouted and has been downcut. Power lines cross the channel and are threatened by continued erosion of both banks. The outfall is buried by vegetation and sediment on the right bank upstream of the bridge.

Suggestions for Reach D include removal of debris and dead trees in the channel, and addressing localized problems at outfalls and crossings. Specific suggestions include:

- Near Beech Street Bridge – apply grade control throughout the reach, along with toe protection and left bank stabilization.
- Upstream of E.Sixthth Street Bridge – repair the left bank abutment (currently presents a safety hazard).

Reach E – Beech Street to Courthouse Lake Trail

In Reach E the channel was much wider and deeper than the other reaches (**Error! Reference source not found.**). Near vertical banks existed at outside channel bends and localized erosion of banks was occurring because of debris jams in the channel. In all other aspects Reach E is similar to other reaches. Suggestions for Reach E include removal of debris and dead trees in the channel and addressing localized problems at outfalls.

East Chaska Creek Summary

With the exception of Reach A, the creek needs attention to prevent further erosion. The majority of Reach B is actively eroding, especially along the left bank (with respect to the downstream direction) and at blockages in the channel. The reach appears to be actively downcutting and is stabilized by two bridges. A systemic approach to the reach is suggested. That would include looking at channel slope and stability and using grade control structures throughout the reach. An alternate suggestion, which would apply from Reach B to Reach E, would be to focus on localized solutions and include stabilizing the worst of the left bank erosion, pruning canopy, removing debris and log jams, and focusing on outfalls and bridge crossings.

Conclusions

The suggested actions to address erosion in each of the four creeks examined in this study are summarized in the following table.

Table 1. Lower Minnesota River Watershed District: Category 2 Stream Resources - Suggested Actions

Resources	Suggested Action
Bluff Creek	<ol style="list-style-type: none"> 1. Provide an energy dissipation structure at the tunnel exit. 2. Apply bank stabilization measures along outside creek bends. 3. Re-direct runoff coming off of the North Hwy 101 Bridge. 4. Stabilize the areas around the bridge abutments.
Riley Creek	<ol style="list-style-type: none"> 1. Provide an energy dissipation structure below CR 61. 2. Redirect flows away from outside creek meanders to prevent future erosion during runoff events.
Carver Creek	<ol style="list-style-type: none"> 1. Stabilize outer bends with toe protection. 2. Grade banks to a more stable slope.

Resources	Suggested Action
	<ol style="list-style-type: none"> 3. Stabilize the gully to prevent future sediment from being transported downstream.
East Chaska Creek Overall Suggestions	<ol style="list-style-type: none"> 1. Remove debris and dead trees from the channel. 2. Address localized problems at outfalls and crossings.
East Chaska Creek Reach A and Reach B	<p><i>General: remove debris and dead trees from the channel, address localized problems at outfalls and crossings.</i></p> <p><i>Specific suggestions:</i></p> <ol style="list-style-type: none"> 1. <i>Outfall A – remove log jam, stabilize right bank at outfall, revegetate bank, remove sediment deposit.</i> 2. <i>Outfall B – stabilize outfall with rock, step down the outfall, toe protection 10-ft upstream & 40-ft downstream.</i> 3. <i>Outfall C – stabilize outfall with rock, step down the outfall, toe protection 10-ft upstream & 40-ft downstream.</i> 4. <i>Pedestrian Bridge – re-direct runoff from bridge to channel bed, stabilize abutments 5-ft upstream and 15-ft downstream.</i> 5. <i>Crosstown Blvd. Bridge – grade control/energy dissipation structures to step the channel down and dissipate energy away from the bridge and vulnerable banks; re-direct runoff from bridge.</i>
East Chaska Creek Reach C	<ol style="list-style-type: none"> 1. <i>Remove debris and dead trees in the channel where possible.</i> 2. <i>Insert grade control structures.</i>
East Chaska Creek Reach D	<p><i>General: remove debris and dead trees in the channel, and address localized problems at outfalls and crossings. Specific suggestions include:</i></p> <ol style="list-style-type: none"> 1. <i>Near Beech Street Bridge – apply grade control throughout the reach, along with toe protection and left bank stabilization.</i> 2. <i>Upstream of E. Sixth Street Bridge – repair the left bank abutment (currently presents a safety hazard).</i>
East Chaska Creek Reach E	<ol style="list-style-type: none"> 1. <i>Selective clearing, excavation, toe protection, erosion control (jute mesh), topsoil replacement and grading for approximately 2,000 feet</i>

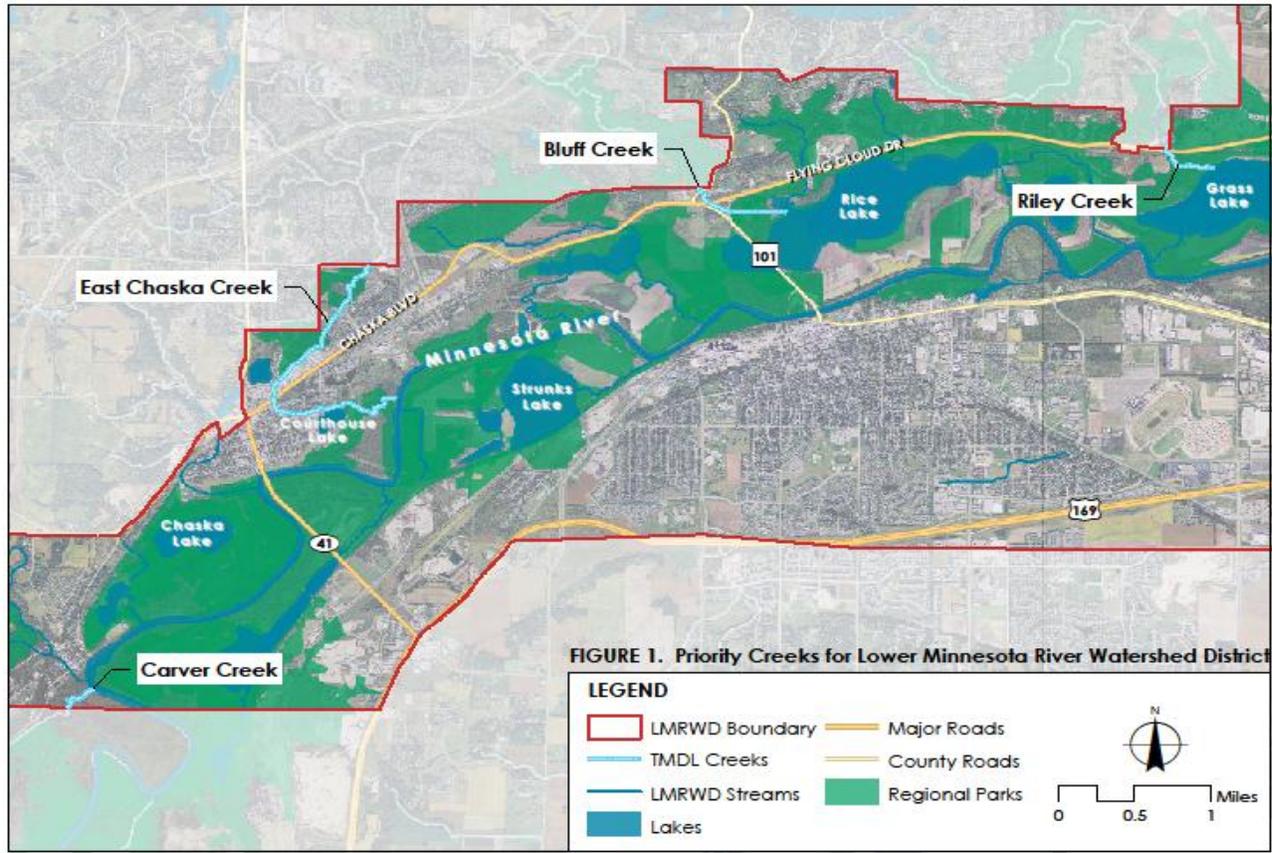


Figure 1. Priority Creeks for Lower Minnesota River Watershed District

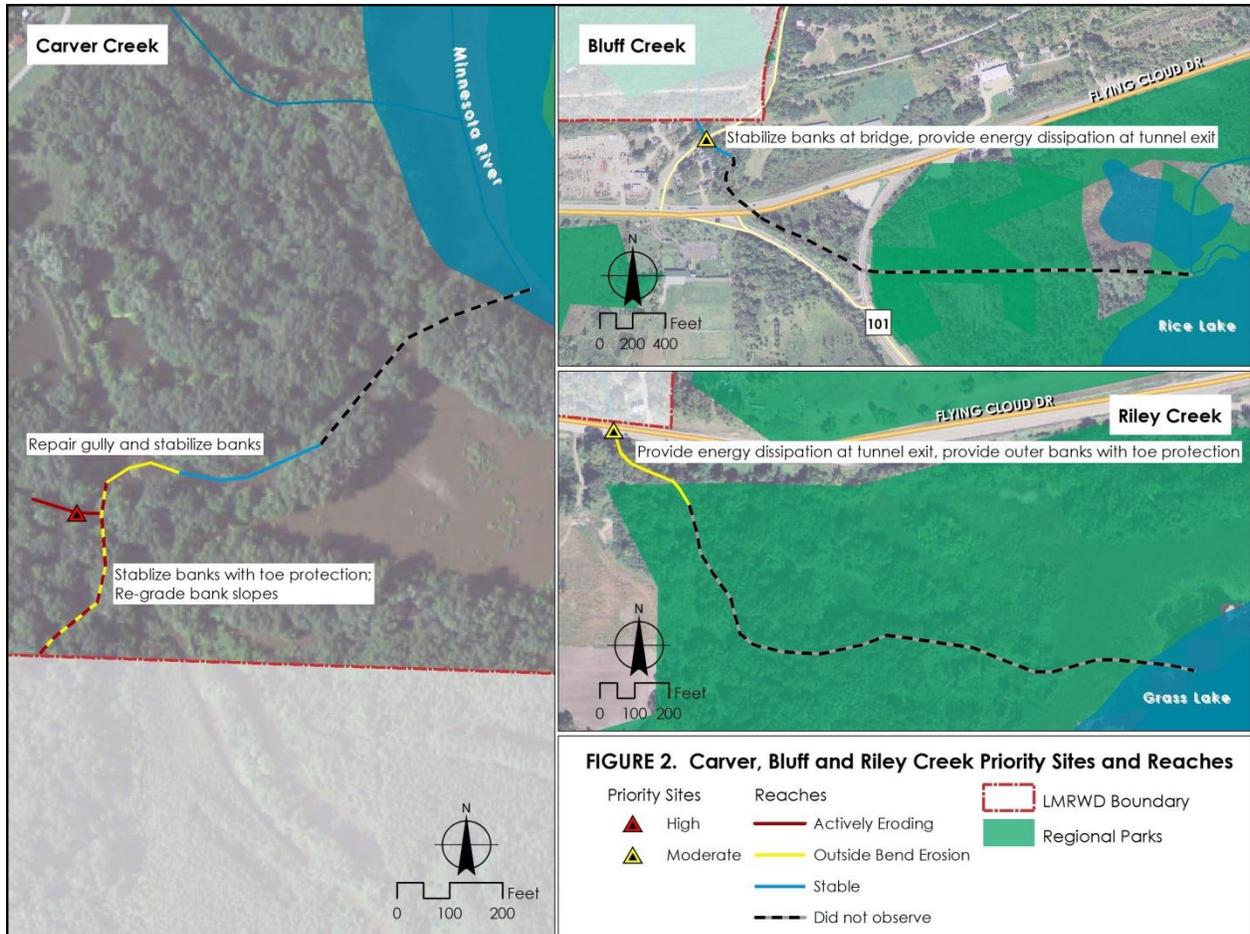


Figure 2. Carver, Bluff, and Riley Creek Priority Sites and Reaches

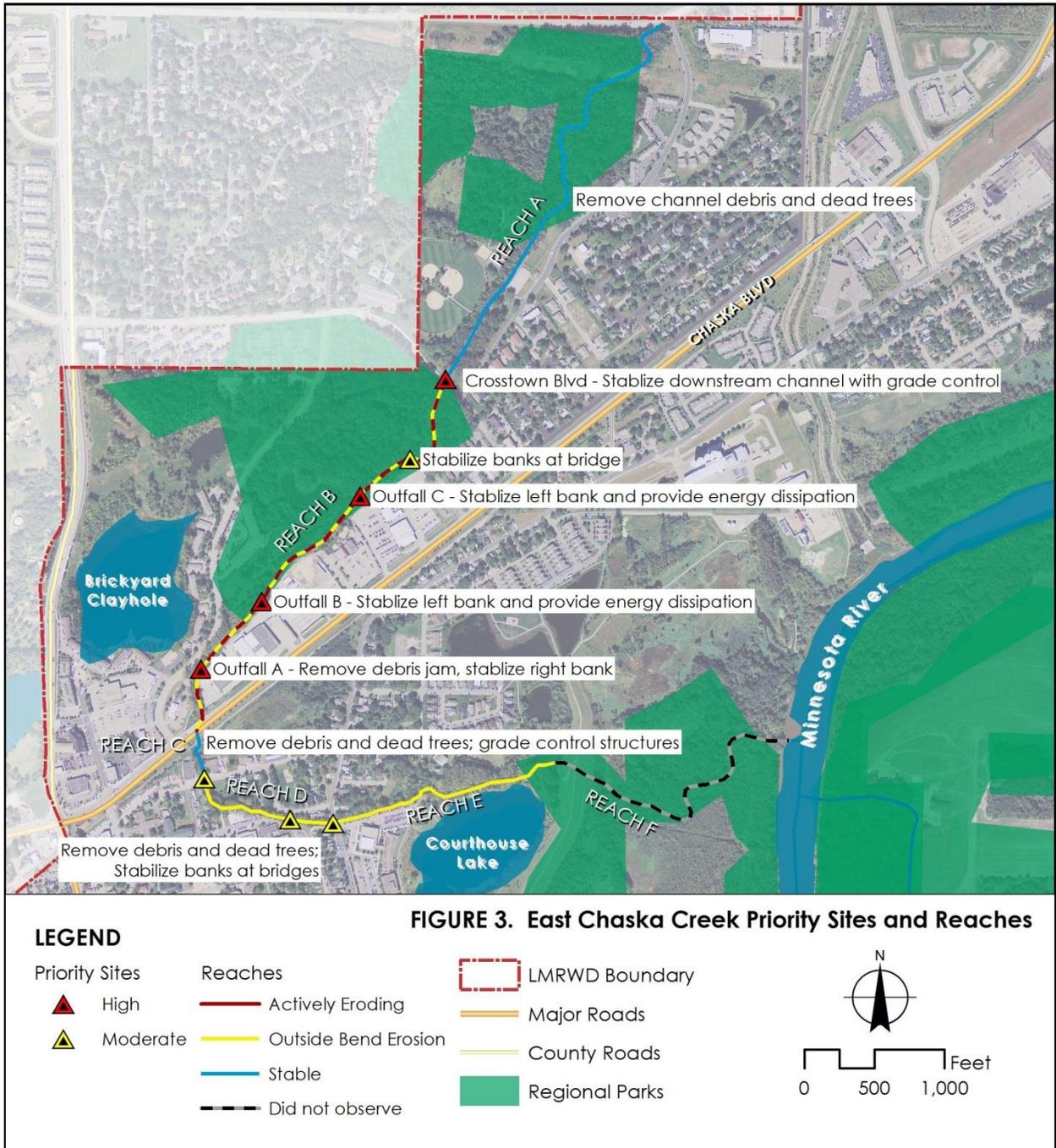


Figure 3. East Chaska Creek Priority Sites and Reaches



Photo 1. Bluff Creek below Flying Cloud Drive (Eden Prairie) and downstream erosion

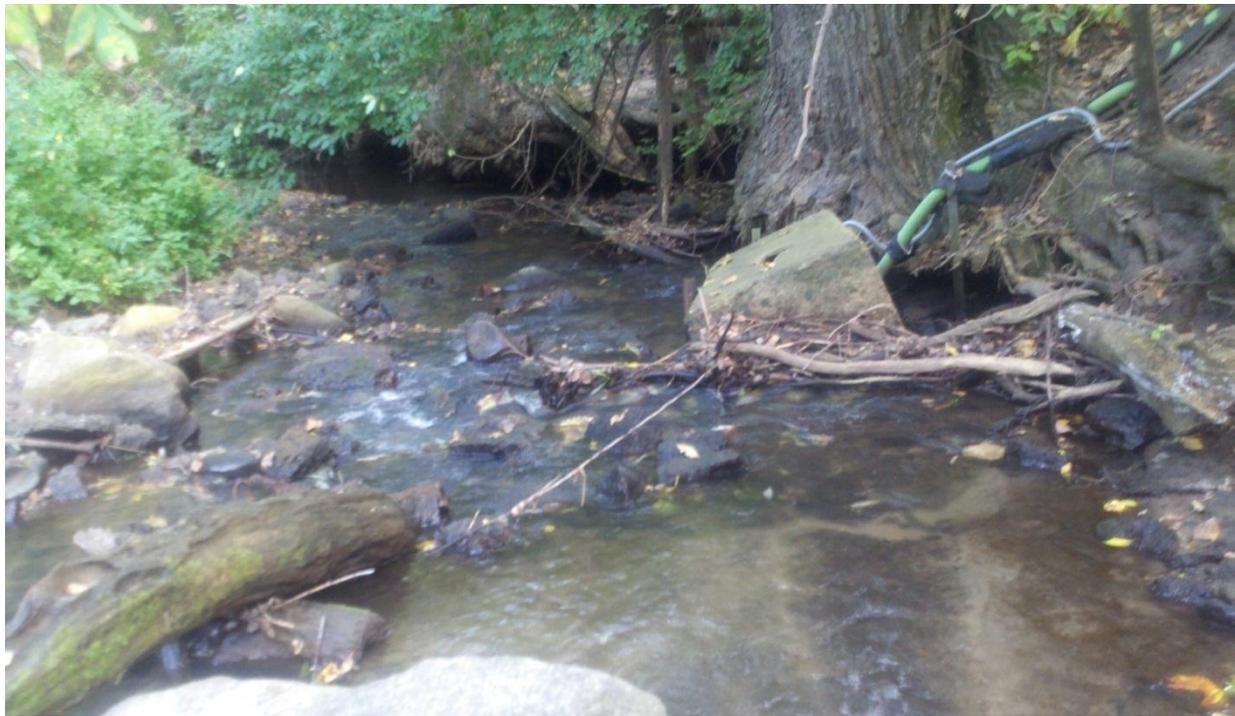


Photo 2. Riley Creek WOMP station downstream of Flying Cloud Drive (Eden Prairie)



Photo 3. Carver Creek downstream of trail crossing



Photo 4. Carver Creek gully approximately 150 feet upstream of trail crossing



Photo 5. Carver Creek approximately 200 feet upstream of trail crossing

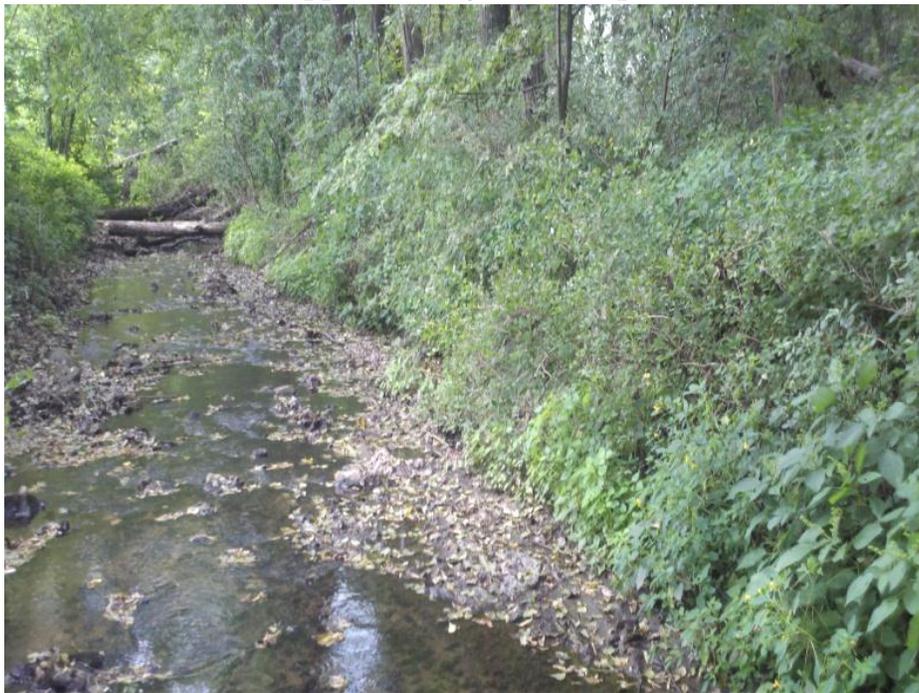


Photo 6. East Chaska Creek log jam northeast of Lions Park



Photo 7. East Chaska Creek riprap effectively dissipating stream velocity (Downstream of Engler Blvd)



Photo 8. East Chaska Creek Outfall A (just downstream of Arby's parking lot)



Photo 9. Outfall B, East Chaska Creek



Photo 10. Outfall C, East Chaska Creek



Photo 11. Pedestrian bridge north of CR 61 and downstream, East Chaska Creek



Photo 12. Downstream of Crosstown Bridge, East Chaska Creek



Photo 13. Downstream of County Road 61, East Chaska Creek

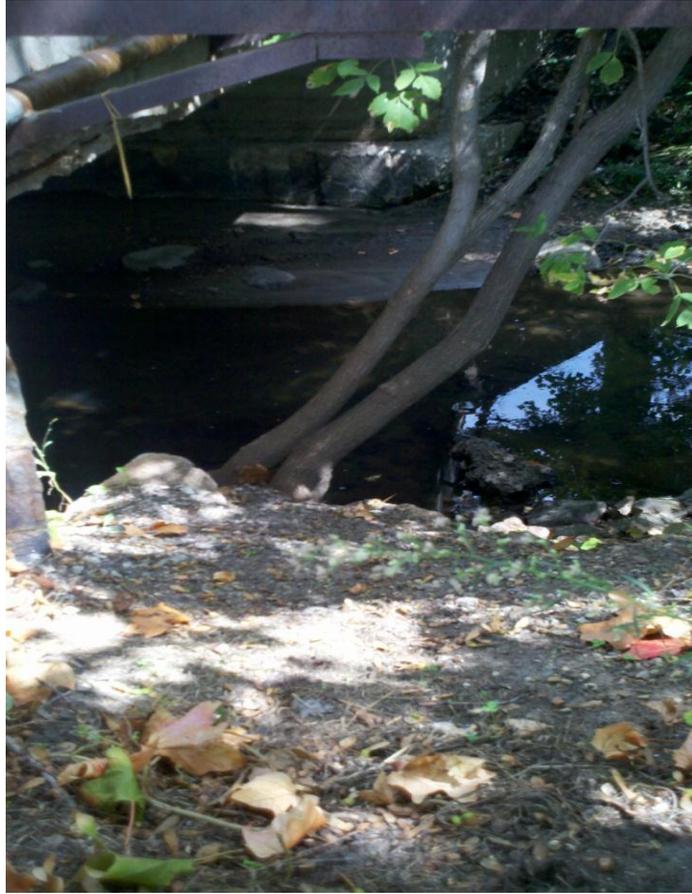


Photo 14. Downstream of bridge near intersection of Oak St and E. Sixth St., East Chaska Creek



Photo 15. Upstream of bridge near intersection of Oak St and E Sixth St., East Chaska Creek



Photo 16. Upstream of Courthouse Lake, East Chaska Creek

Appendix F – IMPLEMENTATION PLAN

On Wednesday, November 28, 2012, the District facilitated a discussion between the managers and members of the technical advisory committee (TAC) to review and prioritize the actions recommended by the SRE for the various lakes, streams, wetlands and fens with the watershed.

Given the breadth of actions considered, the managers and TAC members were taken through a facilitated discussion necessary to guide the prioritization process for implementation based on a relativistic comparison. Each lake, stream, wetland and fen was scored based on how well the recommended management option(s) addresses the District's *Third Generation Watershed Management Plan's* stated issues, strategies and goals. Then, each was scored considering the action's visibility, potential partnership opportunities, grant opportunities and total installation cost. All in attendance scored each individual resource (e.g., Dean Lake) from 1 to 3 for favorability (1 = low, 2 = medium and 3 = high) for how well the resource addresses each of the metrics described above. Resources, regardless of type, were ranked from highest score to lowest. The following table presents the results of the meeting. Using the information from this table, the District plans to modify its Capital Improvement Program (for example, proposed actions with high scores will be implemented first) through the plan amendment process.

Resource	Action	Description/Comments	Third Generation WMP Issue/Goal/Strategy Addressed	Visibility	Estimated Cost	Potential Partner	Priority Score	Comment
Seminary Fen	Restoration project Phase 3; re-survey and protect existing wells; Floristic Quality Assessment (see Black Dog Fen)	This involves grade and bank stabilization of the gully in the bluff feeding Seminary Fen from Phase 1 wetland restoration and rate control. The action includes sedimentation and infiltration steps, stilling basin, and ditch checks.	Issues 3, 5, and 6 Goals 2, 3, 5, and 7 Strategies 2.2.4, 3.2.1, and 7.3.1	Medium	\$295,800	City of Chaska, Carver SWCD, MCES, BWSR and Chanhassen	21	1) Clean Water Grant pending (Awarded 12/2012), 2) Dakota County recommended invasive species plans for all fens
Wetlands and Fens	MLCCS Updates and MnRAM	MLCCS updates: provide a complete, accurate baseline dataset of wetland plant communities found in the marshes. Includes quality control of existing data and addition of new information. Less labor intensive than floristic quality assessment methods but highly valuable from a monitoring and planning perspective. MnRAM: narratively describes the status of each wetland's 9 functions: vegetation, hydrology, flood attenuation, water quality, shoreline protection and wildlife habitat.	Issue: 3 Goals: 2, 4 Strategies: 1.3.1, 4.2.1, 4.3.1, 7.2.1	Low	\$20,000	DNR, BWSR	21	
Dean Lake	Data collection	A sediment core analysis, a rapid sampling of invasive plant and rough fish presence/absence, and primary inlet and outlet water quality and flow rate sampling should be carried out to address questions about internal loading and lake response to management options.	Issue 3 Goal 2 Strategies 2.2.5 and 2.3.1	Medium	\$25,750-\$31,500	PLSLWD and MPCA	21	1) Scott county to provide the District historic areal photos; discuss project with MPCA's Rep Brooke Asleson 2) Potential partners Mdewakanton Sioux and Scott County (technical assistance), 3) After data collection, complete the diagnostic study before assessing options.
Brickyard Clayhole Lake	Gully stabilization	Un-funded gully stabilization projects for the north bluff of Brickyard Clayhole,	Issues 3 and 5 Goals 2 and 7	Medium	\$100,000	City of Chaska and Carver	20	1) work through the development process

Resource	Action	Description/Comments	Third Generation WMP Issue/Goal/Strategy Addressed	Visibility	Estimated Cost	Potential Partner	Priority Score	Comment
		as noted in the 2010 Watershed Management Plan, can be completed and stabilized to help deter sedimentation in the lake.	Strategies 2.2.4/7.3.1			WMO		
	Iron-enhanced sand filters	The use of iron within sand filter benches along detention ponds is an effective means of stripping dissolved phosphorus from stormwater runoff, given spring maintenance is provided.			\$7,500			
Fens	Floristic Quality Assessment	Provides a replicable, descriptive picture in time of the fens. Used as a baseline indicator of fen condition to be compared against in the future (i.e., track degradation or functional lift).	Issue: 3 Goals: 2, 4 Strategies: 1.3.1, 4.2.1, 4.3.1, 7.2.1	Low	\$15,000	DNR, BWSR	19	
East Chaska Creek – Reach A (Engler Blvd to Crosstown Blvd)		Removing debris jams in the channel reaches would help reduce localized erosion.	Issues 3 and 5 Goal 2 and 7 Strategies 2.2.4, 7.3.1, and 7.4.1	High	\$2,000	Chaska, Carver County Environmental Services and CSWCD		
East Chaska Creek – Reach B (Crosstown Blvd to CR 61)		Outfall A: remove log jam, stabilize right bank at outfall, re-vegetate the stream bank, remove sediment deposit.		High	\$48,700		18	
		Outfall B: stabilize outfall with rock, step down the outfall, toe protection 10-ft upstream & 40-ft downstream.						

Resource	Action	Description/Comments	Third Generation WMP Issue/Goal/Strategy Addressed	Visibility	Estimated Cost	Potential Partner	Priority Score	Comment
East Chaska Creek – Reach C (CR 61 to East Sixth St)		Using structures to control steep grades along this reach would help reduce localized erosion.	Issues 3 and 5, Goal 2 and 7, Strategies 2.2.4, 7.3.1, and 7.4.1	High	\$13,800			
East Chaska Creek – Reach D (East Sixth St to Beech St)		Near Beech St Bridge: apply grade control throughout the reach, along with toe protection and left bank stabilization.		High	\$80,500			
		Upstream of East Sixth St Bridge: repair the left bank abutment (currently presents a safety hazard).						
East Chaska Creek – Reach E (Beech St to Courthouse Lake Trail)		Selective clearing, excavation, toe protection, erosion controls (jute mesh) and topsoil placement and grading for approximately 2000 feet		High	\$156,000			
Bluff Creek	Provide an energy dissipation structure at the tunnel exit	Erosion is evident near the tunnel exit and can be reduced with energy dissipation.	Issues 3 and 5 Goal 2 and 7 Strategies 2.2.4 and 7.4.1	Low	\$160,900	MNDOT, Chanhassen and RPBCWD	16	1) Coordinate with MnDOT as part of the Hwy 101 land bridge project.
	Apply bank stabilization measures along outside creek bends	Active erosion was observed on outer stream bends, where vertical banks exist.						
	Re-direct runoff coming off of the North Highway 101 Bridge	Erosion near the bridge is enhanced by runoff from the bridge. The erosion can be reduced if the runoff is redirected.						
	Stabilize the areas around the	Active erosion was observed at the bridge abutments, stabilization in this						

Resource	Action	Description/Comments	Third Generation WMP Issue/Goal/Strategy Addressed	Visibility	Estimated Cost	Potential Partner	Priority Score	Comment
	bridge abutments	area would help reduce erosion in the creek.						
Snelling Lake	Assess the lake for nutrient impairment during the summers of 2013 and 2014.	Assessment should include standard measures of Secchi depth, chlorophyll-a, and total phosphorus. Sampling should be conducted once per month, in the June-September period.	Issue 3 Goal 2 Strategy 2.2.4	High	\$3,000	Fort Snelling State Park	15	1) CAMP/ CMLP monitoring Program and Potential SAG area
Savage Fen	Develop an invasives species control plan; Floristic Quality Assessment (see Black Dog Fen)	Groundwater levels are being monitored. Invasives plan should review existing data and plans and perform an initial site visit to supplement data for development of a plant community management plan.	Issue: 3 Goals: 2, 4 Strategies: 1.3.1, 4.2.1, 4.3.1, 7.2.1	Medium	\$6,500 (if a plan is required)	Savage, DNR-SNA, BWSR	13	
Carver Creek	Stabilize outer bends with toe protection	Outer bends show active erosion (bank sloughing). Stabilizing the bends with toe protection is a suggested approach to reducing erosion.	Issues 3 and 5 Goal 2 and 7 Strategies 2.2.4, 7.3.1, and 7.4.1	Medium	\$93,500	Carver, Carver WMO, CSWCD and the USFWS	11	1) This is about 3 - 5 years out.
	Grade banks to a more stable slope	Vertical creek banks were present at the outer banks, which can be graded to more gentle slopes to address erosion concerns.						
	Stabilize the gully	There is active gully erosion depositing sediment into Carver Creek, approximately 150 feet upstream of a trail crossing. Gully stabilization at this would deter significant sediment transport into the creek.						
Assumption Creek	Monitor all trout streams regularly	Monitoring plan includes dissolved oxygen, temperature, turbidity,	Issue 3 Goals 2 and 3	Low	\$15,000	Eagan, Carver County Env.	7	1) Diagnostic Study should be considered after data collection has been completed. 2) Consider City MS4

Resource	Action	Description/Comments	Third Generation WMP Issue/Goal/Strategy Addressed	Visibility	Estimated Cost	Potential Partner	Priority Score	Comment
Kennaley's Creek Unnamed Stream #1 (Harnack Creek) Unnamed Stream #4 (One Mile Creek) Unnamed Stream #7	for 2 years	conductivity, and pH. Sampling should be conducted bi-weekly from April through October for 2013 and 2014.	Strategy 2.3.1			Serv., Carver SWCD, Chaska, Chanhassen, and MCES for Assumption Creek. Dakota SWCD, Burnsville, MCES and DNR (Fort Snelling State Park) for the remaining.		plans. 3) Consider a Use Attainability Analysis (UAA) for the creeks to determine if they are viable trout habitat
Riley Creek	Provide an energy dissipation structure below CR 61 Redirect flows away from outside creek meanders	Erosion near the intersection of CR 61 and CR 4 can be reduced with energy dissipation below CR 61. Erosion was particularly evident at outside bends where undercut banks and exposed tree roots were observed. Stabilizing the outside creek meanders would help address this concern.	Issues 3 and 5 Goal 2 and 7 Strategies 2.2.4 and 7.4.1	Low	\$168,500	Eden Prairie	7	
Chaska Lake	No action recommended for Category 1 lakes.	Lakes that did not have the necessary data required for assessment were assigned a Category 1 status. Flooding from the Minnesota River has potential to occur in these lakes, which may lead to nutrient deposition. The lakes are not recommended for future monitoring because there is no public access and little public benefit would likely come	-	-	-	-		
Black Dog Lake			-	-	-	-		
Gun Club Lake			-	-	-	-		
Rice Lake (Henn. County)			-	-	-	-		
Coleman (Nine Mile) Lake			-	-	-	-		

Resource	Action	Description/Comments	Third Generation WMP Issue/Goal/Strategy Addressed	Visibility	Estimated Cost	Potential Partner	Priority Score	Comment
Grass Lake		from future projects.	-	-	-	-		
Long Meadow Lake			-	-	-	-		
Overlook Lake			-	-	-	-		
Blue Lake			-	-	-	-		
Fisher Lake			-	-	-	-		
Gifford Lake			-	-	-	-		
Nyssens Lake			-	-	-	-		
Rice Lake (Scott County)			-	-	-	-		
Lake Cy Ess			-	-	-	-		
Courthouse Lake	No action recommended	Very small drainage area in proportion to the lake with water supply primarily groundwater fed. Drainage is dominated by natural cover. Unlisted.	-	-	-	-		
Firemen's Clayhole Lake		Only 1% of the drainage area is within District. Unlisted. Suggest working with Carver WMO to establish management techniques.	-	-	-	-		