

2018 - 2027

# Lower Minnesota River Watershed District

Watershed Management Plan

DRAFT

60-Day Review DRAFT

**Watershed Management Plan  
for the  
Lower Minnesota River Watershed District  
2018 - 2027**

**Approved**  
**Month, Day, Year**

**Board of Managers**

Mgr. Yvonne Shirk, Dakota County  
Mgr. David Raby, Hennepin County  
Mgr. Jesse Hartmann, Scott County

**Consultants**

Linda Loomis, Administrator  
Naiad Consulting, LLC

Della Schall Young, PMP, CPESC – Plan Amendment Consultant  
Young Environmental Consulting Group, LLC

General Counsel  
John Kolb, Attorney  
Maury Noonan, attorney  
Rinke Noonan

**Lower Minnesota River Watershed District**

112 East Fifth Street, Suite 102  
Chaska, MN 55318  
Telephone: 952-856-5880  
Fax: 952-856-6067

[www.watersheddistrict.org](http://www.watersheddistrict.org)

Technical Advisory Committee

Bryan Gruidl, City of Bloomington  
Charlie Sawdey, Carver Watershed Management Organization(WMO)  
Dan Boyum, Stantec (City of Carver)  
Dan Edgerton, Stantec (City of Chaska)  
Daryl Jacobson, City of Burnsville  
Dave Modrow, City of Eden Prairie  
Jacob Busiahn, City of Shakopee  
Jennie Skancke, Minnesota Department of Natural Resources(DNR)  
Jesse Carlson, City of Savage  
Joe Mulcahy, Metropolitan Council  
John Smyth, Stantec (City of Chaska)  
Kristen Larosn, Carver WMO  
Leslie Stovring, City of Eden Prairie  
Lindsay Albright, Dakota SCWD  
Mark Nemeth, DNR Fisheries  
Matt Clark, City of Chaska  
Mike Behan, Dakota County  
Mike Wanous, Carver Soil and Water Conservation District (SWCD)  
Paul Nelson, Scott County  
Sarah Inouye-Leas, USFWS – MN Valley National Wildlife Refuge  
Seng Thongvanh, City of Savage  
Stacy Sass, Shakopee Mdewakanton Sioux Community  
Steve Christopher, Board of Water and Soil Resources  
Terry Jeffery, City of Chanhassen  
Troy Kupual, Scott SWCD

## Table of Contents

DRAFT

## Table of Contents

<b>EXECUTIVE SUMMARY</b> .....	<b>I</b>
E1. Plan Organization .....	i
E2. Watershed Issues .....	ii
E3. Watershed Management Framework .....	ii
E3.1. Mission.....	ii
E3.2. Watershed Purpose .....	iii
E3.3. Goals .....	iii
E3.4. Plan Implementation .....	iv
E3.5. Measurable Outcomes .....	v
<b>INTRODUCTION</b> .....	<b>1</b>
I1. History .....	1
I2. Location and Boundaries .....	1
I3. District Characteristics .....	2
I4. District Management .....	2
I5. 2010 – Present Accomplishments .....	4
<b>1 LAND AND WATER RESOURCES INVENTORY</b> .....	<b>1-1</b>
1.1 Introduction.....	1-1
1.2 Climate and Precipitation.....	1-1
1.2.1 Weather Station .....	1-4
1.2.2 Temperature.....	1-4
1.2.3 Precipitation.....	1-4
1.2.4 Climate Variability in Minnesota.....	1-7
1.3 Geology and Topography .....	1-8
1.3.1 Surficial Geology .....	1-8
1.3.2 Bedrock Geology .....	1-9
1.3.3 Topography.....	1-9
1.4 Surface Water Resources.....	1-9
1.4.1 Impaired Waters .....	1-19
1.4.2 Minnesota River .....	1-20
1.4.3 Streams.....	1-21
1.4.4 Lakes .....	1-21
1.4.5 Wetlands.....	1-23
1.4.6 Stormwater System and Floodplain Information.....	1-24
1.5 Hydrologic and Hydraulic Modeling.....	1-27
1.6 Surface Water Quality and Quantity Monitoring .....	1-27
1.6.1 Lakes .....	1-27
1.6.2 Minnesota River .....	1-37
1.6.3 Streams.....	1-44
1.6.4 Fens .....	1-46
1.7 Surface Water Appropriations.....	1-52

1.7.1	Shoreland Ordinances .....	1-53
1.8	Groundwater Resources .....	1-53
1.8.1	General Groundwater Information.....	1-54
1.8.2	Groundwater Quality .....	1-54
1.8.3	Groundwater Availability and Use .....	1-55
1.8.4	Groundwater Sustainability .....	1-57
1.9	Soils .....	1-57
1.9.1	General Description .....	1-58
1.9.2	Soil Erosion and Sedimentation .....	1-58
1.10	Land Use and Public Utility Service.....	1-62
1.11	Water Based Recreational Areas .....	1-67
1.12	Commercial and Recreational Navigation.....	1-71
1.13	Fish and Wildlife Habitat.....	1-76
1.14	Unique Features and Scenic Areas .....	1-76
1.15	Pollutant Sources .....	1-77
1.15.1	Feedlots .....	1-77
1.15.2	Abandoned Wells.....	1-77
1.15.3	Storage Tanks .....	1-77
1.15.4	Industrial Discharges.....	1-77
1.15.5	Wastewater Treatment Plants .....	1-77
1.15.6	Landfills and Solid Waste .....	1-80
1.15.7	Hazardous Waste .....	1-80
1.15.8	Pesticide and Fertilizer .....	1-81
<b>2</b>	<b>ISSUES AND PROBLEMS ASSESSMENTS.....</b>	<b>2-1</b>
2.1	Introduction.....	2-1
2.2	Issues Summary.....	2-1
2.2.1	Issue 1 – Unclear Role of the District .....	2-2
2.2.2	Issue 2 – Outside Influences .....	2-2
2.2.3	Issue 3 – Water Quality.....	2-3
2.2.4	Issue 4 – Flooding and Floodplain Management.....	2-8
2.2.5	Issue 5 – Erosion and Sediment Control .....	2-10
2.2.6	Issue 6 – Groundwater.....	2-13
2.2.7	Issue 7 – Commercial and Recreational Navigation.....	2-13
2.2.8	Issue 8 – Public Education and Outreach.....	2-16
2.2.9	Issue 9 – Potential Problems.....	2-16
2.3	Existing Regulatory Controls .....	2-16
2.3.1	Water Quality.....	2-16
2.3.2	Unique Natural Resources.....	2-20
2.3.3	Wetlands.....	2-21
2.3.4	Floodplain Management .....	2-22
2.3.5	Erosion and Sediment Control.....	2-22

2.3.6	Groundwater.....	2-22
2.3.7	Commercial and Recreational Navigation.....	2-23
2.4	Management Gaps .....	2-24
2.4.1	Issue 1 – Unclear Role of District.....	2-24
2.4.2	Issue 2 – Outside Influences .....	2-24
2.4.3	Issue 3 – Water Quality.....	2-24
2.4.4	Issue 4 – Flooding and Floodplain Management.....	2-25
2.4.5	Issue 5 – Erosion and Sediment Control .....	2-25
2.4.6	Issue 6 – Groundwater.....	2-26
2.4.7	Issue 7 – Commercial and Recreational Navigation.....	2-26
2.4.8	Issue 8 – Public Education and Outreach.....	2-27
<b>3</b>	<b>GOALS, POLICIES, AND MANAGEMENT STRATEGIES.....</b>	<b>3-1</b>
3.1	Mission and Purpose .....	3-1
3.1.1	Mission.....	3-1
3.1.2	Purpose.....	3-1
3.1.3	Goal Summary.....	3-2
3.2	Goal 1: Organizational Management To Manage the District’s Different Roles .....	3-6
	Policy 1.1: To Serve as a Facilitator .....	3-6
	Policy 1.2: To Serve as an Educator .....	3-6
	Policy 1.3: To Serve as a Manager.....	3-7
3.3	Goal 2: Surface Water Management To Protect, Improve, and Restore Surface Water Quality 3-9	
	Policy 2.1: To Use of High Value Resources Area Overlay District to Manage Water Resources .....	3-9
	Policy 2.2: To Prevent Further Water Quality Degradation.....	3-9
	Policy 2.3: Enable Informed Decisions.....	3-11
3.4	Goal 3: Groundwater Management To Protect and Promote Groundwater Quality and Quantity.....	3-12
	Policy 3.1: To Support and Assist in Intercommunity Management of Groundwater .....	3-12
	Policy 3.2: To Promote Groundwater Recharge.....	3-12
	Policy 3.3: To Protect and Improve Groundwater-Sensitive Water Resources.....	3-13
	Goal 4: Unique Natural Resources Management To protect and manage unique natural resources.....	3-13
	Policy 4.1: .....To Maintain or Improve the Quality and Quantity of Fish and Wildlife Habitat 3-13	
	Policy 4.2: Advocate for Protection, Education, and Monitoring of Unique Natural Resources .....	3-13
	Policy 4.3: .....Coordinate with LGUs to Identify and Develop Critical Trails and Green Space Corridors for Improvement and Protection.....	3-14
	Policy 4.4: Protect, Preserve, and Enhance the Connectivity of Wildlife Habitat .....	3-14
3.5	Goal 5: Wetland Management To protect and Preserve Wetlands .....	3-15

Policy 5.1: ..To Preserve Wetlands for Water Retention, Recharge, Soil Conservation, Wildlife Habitat, Aesthetics, and Natural Water Quality Enhancements .....	3-15
3.6    Goal 6: Floodplain and Flood Management to Manage Floodplains and Mitigation Flooding.....	3-16
Policy 6.1: ..... To Maintain Natural Water Storage Areas and the Minnesota River Floodway.....	3-16
3.7    Goal 7: Erosion and Sediment Control. To Manage Erosion and Control Sediment Discharge.....	3-16
Policy 7.1: Endorse the NPDES General Permits .....	3-16
Policy 7.2: Adopt Vegetation Management Standard .....	3-17
Policy 7.3: Manage Streambank and Mainstem Erosion .....	3-17
Policy 7.4: To Maintain the Shoreland’s Integrity .....	3-17
Policy 7.5: To Maintain the Integrity of Minnesota River Bluff Areas.....	3-18
3.8    Goal 8: Commercial and Recreational Navigation To maintain and Improve Navigation and Recreational use of the Lower Minnesota River.....	3-18
Policy 8.1: Promote Co-Existence of Commercial and Recreational Navigation on the Lower Minnesota River.....	3-18
Policy 8.2: Manage Dredge Material .....	3-18
Policy 8.3: Provide Funding for Dredge Material Management.....	3-19
3.9    Goal 9: Public Education and Outreach Program To increase public participation and awareness of unique natural resources and the Minnesota River .....	3-20
Policy 9.1: Encourage Public Participation.....	3-20
3.10   Goal 10: Encouraging other LGUs to include information about the District in their water resource-related documents. ....	3-21
Policy 10.1: .....Provide Education and Marketing to Foster Sustainable Behavior and Environmental Stewardship.....	3-21
<b>4      IMPLEMENTATION PROGRAM .....</b>	<b>4-1</b>
4.1    Administrative and managerial.....	4-1
4.2    Coordination with local, state, and federal governments and non-government organizations.....	4-5
4.3    Studies and Programs.....	4-5
4.3.1 Sustainable Lake Management Plans .....	4-6
4.3.2 Geomorphic Assessments .....	4-6
4.3.3 Paleo-limnology Study.....	4-6
4.3.4 Fen Stewardship Program.....	4-6
4.3.5 Water Resources Restoration Fund.....	4-6
4.4    Capital Improvement Projects .....	4-7
4.5    Funding Mechanisms .....	4-10
4.5.1 Funding Statutes Available to Watershed District.....	4-10
4.5.2 Emergency Projects .....	4-12
4.5.3 Proposed Funding Mechanisms .....	4-12
4.5.4 Petitioned Projects.....	4-13
<b>5      IMPACT OF IMPLEMENTATION.....</b>	<b>5-1</b>



5.1	Local Water Plan Development and Implementation.....	5-1
5.1.1	District LWP Review.....	5-1
5.1.2	Metropolitan Council Review.....	5-1
5.1.3	Administration and Enforcement of LWPs.....	5-1
5.2	Existing Control.....	5-2
<b>6</b>	<b>ADMINISTRATION .....</b>	<b>6-1</b>
6.1	Amendments to the Plan .....	6-1
6.1.1	Major Amendments .....	6-1
6.1.2	Minor Amendments.....	6-2
6.1.3	Amendment Format and Distribution.....	6-2
6.2	Annual Reporting.....	6-3
6.2.1	Financial Report .....	6-3
6.2.2	Activity Report .....	6-3
6.2.3	Audit Report.....	6-3

## List of Tables

Table I-1: Lower Minnesota River Watershed District Board of Managers (1960 - Present) .....	I-4
Table I-2: Lower Minnesota River Watershed District - 2010 – 2016 Activities and Accomplishments .	I-5
Table 1-1: Precipitation Summary - Minneapolis/St. Paul Airport Station Averages 1981-2010 Extremes: 1891-2010 .....	1-6
Table 1-2: 2016 Impaired Waters in the Lower Minnesota River Watershed District .....	1-19
Table 1-3: Lower Minnesota River Watershed District Lake Data.....	1-22
Table 1-4: Brickyard Clayhole Annual Average Water Quality Parameters.....	1-28
Table 1-5: Fireman’s Lake Annual Average Water Quality Parameters.....	1-30
Table 1-6: Courthouse Lake Annual Average Water Quality Parameters .....	1-32
Table 1-7: Dean Lake Annual Average Water Quality Parameters.....	1-34
Table 1-8: Metropolitan Council Environmental Service Lake Grade.....	1-36
Table 1-9: Quarry Island, Fort Snelling, and Nichols Fens 2007-2010 Regression Analysis.....	1-50
Table 1-10: 2007 DNR Permitted Surface Water Appropriations .....	1-53
Table 1-11: County Groundwater Management Status.....	1-54
Table 1-12: 2007 Groundwater Appropriation.....	1-56
Table 2-1: Lower Minnesota River Watershed District Flooding Problem Areas .....	2-9
Table 3-1: Summary of District Issues, Goals, and Strategies.....	3-2
Table 3-2: Lower Minnesota River Watershed District Short-term and Long-term Metrics .....	3-8
Table 0-1: Lower Minnesota River Watershed District - Implementation Program Budget for 2018 -2027 .....	4-3
Table 4-2: Coordination Strategies with District Partners .....	4-5
Table 4-3: Lower Minnesota River Watershed District – Capital Improvement Projects.....	4-8

## List of Figures

Figure 1-1: Overview Map - West .....	1-2
Figure 1-2: Overview Map - East .....	1-3
Figure 1-3: Normal Precipitation.....	1-5
Figure 1-4: Surficial Geology Map - West.....	1-11
Figure 1-5: Surficial Geology Map - East .....	1-12
Figure 1-6: Bedrock Geology Map - West .....	1-13
Figure 1-7: Bedrock Geology Map - East .....	1-14
Figure 1-8: Topographic Map – West.....	1-15
Figure 1-9: Topographic Map – East.....	1-16
Figure 1-10: Water Resources Map – West.....	1-17
Figure 1-11: Water Resources Map – East.....	1-18
Figure 1-12: Wetlands Map – West.....	1-26
Figure 1-13: Wetlands Map –East .....	1-27

Figure 1-14: Water Quality and Quantity Monitoring Map -West.....	1-42
Figure 1-15: Water Quality and Quantity Monitoring Map – East.....	1-43
Figure 1-16: Soils Map – West .....	1-60
Figure 1-17: Soils Map – East .....	1-61
Figure 1-18: Existing Land Use Map – West.....	1-63
Figure 1-19: Existing Land Use Map – East.....	1-64
Figure 1-20: 2030 Regional Planned Land Use Map –West.....	1-65
Figure 1-21: 2030 Regional Planned Land Use Map – East.....	1-66
Figure 1-22: Unique Resources –West.....	1-68
Figure 1-23: Unique Resources – East.....	1-69
Figure 1-24: Commercial Navigation – West.....	1-73
Figure 1-25: Commercial Navigation – East.....	1-74
Figure 1-26: Potential Pollutant Sources – West.....	1-77
Figure 1-27: Potential Pollutant Sources – East.....	1-78
Figure 2-1: Minnesota River Basin Map .....	2-3
Figure 2-2: Comparison of Loads from the Minnesota River Basin. ....	2-5
Figure 2-3: Load Comparison from the Lower Minnesota River Basin and External Contributors .....	2-5
Figure 2-4: Lane’s Scale of Stream Equilibrium .....	2-12

## List of Appendices

- Appendix A: Lower Minnesota River Watershed District Legal Description
- Appendix B: MCES Stream Monitoring and Assessment Stream Water Quality Analyses
- Appendix C: Eagle Creek Monitoring Reports
- Appendix D: Willow Creek Monitoring Reports
- Appendix E: East Chaska Creek Monitoring Reports
- Appendix F: West Chaska Creek Monitoring Reports
- Appendix G: Assumption Creek Monitoring Reports
- Appendix H: Spring Creek Monitoring Report
- Appendix I: Unnamed Creek #7 Monitoring Reports
- Appendix J: Lower Minnesota River Watershed District: Gully Inventory
- Appendix K: Lower Minnesota River Watershed District Draft Standards
- Appendix L: Cost Share Incentive and Water Quality Restoration Program Criteria

## List of Acronyms and Abbreviations

Term	Definition
AC	Acre
BMP	Best Management Practice
BOD	Biochemical oxygen demand
BWSR	Board of Water and Soil Resource
CAC	Citizen Advisory Council
CAMP	Citizen Assisted Monitoring Program
CCP	Minnesota River Valley National Wildlife Refuge Comprehensive Conservation Plan
CFS	Cubic feet per second
CHL-A	Chlorophyll-a
CIP	Capital Improvement Projects
CLP	Closed Landfill Program
CMMP	Channel Maintenance Management Plan
COE	U.S. Army Corps of Engineers
CSMP	Citizen Stream Monitoring Program
CSTS	Community Sewage Treatment System
CSWCD	Carver Soil and Water Conservation District
CWA	Clean Water Act
CWCS	Comprehensive Wildlife Conservation Strategies
DMMP	Dredge Material Maintenance Plan
DNR	Minnesota Department of Natural Resources
DO	Dissolved Oxygen
DOH	Minnesota Department of Health
DOT	Minnesota Department of Transportation
EPA	Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Maps
FIS	Flood Insurance Study
FQA	Floristic Quality Assessment
FT	Feet
ISTS	Individual Sewage Treatment System
ITPHS	Imminent Threat to Public Health and Safety
LGU	Local Government Unit
LID	Low Impact Development
LMRWD	Lower Minnesota River Watershed District (District)
LUST	Leaking Underground Storage Tanks

LWP	Local Water Plan
LWPA	Local Watershed Plan Authority
M	Meter
M.S.	Minnesota Statute
Managers	District Board of Managers
MBS	Minnesota Biological Survey
MCCC	Minnesota Civilian Conservation Corps
MCES	Metropolitan Council Environmental Services
MDA	Minnesota Department of Agriculture
MG/L	Milligram per liter
MLCCS	Minnesota Land Cover Classification System
MN	Minnesota
MnRAM	Minnesota Routine Assessment Methodology
MOU	Memorandum of Understanding
MPCA	Minnesota Pollution Control Agency
MRBJPB	Minnesota River Basin Joint Powers Board
MRCC	Midwestern Regional Climate Center
MS4	Municipal Separate Storm Sewer System
MSP	Minneapolis-St. Paul
MUSA	Metropolitan Urban Services Area
NFIP	National Flood Insurance Program
NGO	Non-Government Organization
NHIS	Natural Heritage Information System
NO3	Nitrate
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NURP	National Urban Runoff Program
NWI	National wetland inventory
OHWL	Ordinary High Water Level
PLP	Permanent List of Priorities
QAPP	Quality Assurance Project Plan
QA/QC	Quality Control Quality Assurance
R.M.	River mile
RCRA	Resource Conservation and Recovery Act
SDS	State Disposal System
SDS	State Disposal System
SFHA	Special Flood Hazard Areas

SLMP	Sustainable Lake Management Plan
SNA	Scientific and Natural Area
SRE	Strategic Resources Evaluation
SSC	Suspended Sediment Concentration
SSL	Suspended Sediment Loads
SSTS	Subsurface Sewage Treatment System
SWCD	Soil and Water Conservation District
SWPPP	Storm Water Pollution Prevention Plan
TAC	Technical Advisory Committee
TDP	Total Dissolved Phosphorus
TKN	Total Kjeldahl Nitrogen
TMDL	Total Maximum Daily Load
TP	Total Phosphorus
TSD	Treatment, Storage and Disposal
TSL	Total Suspended Load
TSS	Total Suspended Solids
UAA	Use Attainability Analyses
USAF	United States Air Force
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	U.S. Geological Survey
VIC	Voluntary Investigation Cleanup
WCA	Wetland Conservation Act
WD	Watershed District
WMO	Water Management Organization
WOMP	Watershed Outlet Monitoring Program
WWTP	Waste Water Treatment Plant
µG/L	Microgram per liter
MRB	Minnesota River Board

## EXECUTIVE SUMMARY

The Lower Minnesota River Watershed District (District) Watershed Management Plan (Plan) describes how the District will address water resources management over the next 10 years as required by M.S. 103B and 103D and Minnesota Rules (MN Rules) 8410. The purpose of this Plan is to protect, preserve, and manage the surface water resources (Minnesota River, lakes, streams, and wetlands) and groundwater within the District.

In 1960, the District was organized by petition from Hennepin, Ramsey, Dakota, Scott, and Carver counties in response to the Minnesota Watershed Act of 1955. The District's first Watershed Management Plan was prepared, approved, and adopted in 1961.

The Metropolitan Surface Water Management Program (M.S. 103B) and Watershed Act requires the District to review and update its Plan every ten years. This Plan will be effective 2018–2027. In addition to complying with the aforementioned laws, this Plan meets the requirements of MN Rules 8410, 8420, and 7050. The Plan includes management standards and procedures for addressing surface water, wetland, and groundwater issues, as well as navigation issues along the Minnesota River.

### E1. PLAN ORGANIZATION

This Plan documents the Lower Minnesota River Watershed and its management, and therefore, much of the information is technical. Background information regarding scientific terms and processes is provided where practical. An acronym list is also provided. Readers are encouraged to consult area professionals or professional references for more information.

The Plan contains the following sections as required by MN Rule 8410:

**Executive Summary:** Provides an overview of the plan.

**Introduction:** Summarizes State statutes, plan requirements, the organization and its history, and 2010 - present District accomplishments.

**Section 1.0: Land and Water Resource Inventory:** Presents current and historic background and inventory information regarding the watershed's physical, hydrological, biological, and human environment.

**Section 2.0: Issues Identification/Assessment of Problems:** Provides an overview of the issues identified during the planning process, assesses the adequacy of existing controls, and identifies potential management gaps.

**Section 3.0: Goals, Policies, and Management Strategies:** Presents the management framework (goals, policies, and strategies) adopted by the District Board of Managers (Managers) to address the priority issues and management gaps.

**Section 4.0: Implementation Program:** Describes the Plan’s implementation elements and impact on local governments and residents. This section provides an implementation program table and preliminary annual budgets.

**Section 5.0: Impact on Local Units of Government:** Expresses the potential financial impact that the Plan changes will have on local government units (LGU).

**Section 6.0: Amendment and Reporting:** Describes the procedures for amending the Plan and addressing the annual reporting requirement.

## **E2. WATERSHED ISSUES**

Watershed issues are problems or concerns identified by the Managers, by the Technical Advisory Committee (TAC), and the Citizen Advisory Committee (CAC). These issues need attention and, in some cases, resolution. The TAC and CAC held workshops and partnership work sessions to develop a list of watershed issues. Information generated at those sessions was presented to the Board and is addressed here. The following issues were identified and discussed in detail in Section 2.0 - Issues and Problems Assessments.

1. Unclear role of the District
2. Outside influences
3. Water quality
4. Flooding and floodplain management
5. Erosion and sediment control
6. Groundwater
7. Commercial and recreational navigation
8. Public education and outreach
9. Potential problems

## **E3. WATERSHED MANAGEMENT FRAMEWORK**

Section 3.0 presents the Plan’s management framework regarding goals, policies, strategies, and standards. This framework is based on the issues identified by the TAC, CAC, and Manager, given their priority and the adequacy of existing controls. The District’s mission and purpose, presented below, were also taken into consideration when developing the framework.

### **E3.1. MISSION**

The District’s mission is to manage and protect the Minnesota River, lakes, streams, wetlands, and groundwater, and to assist and facilitate in providing river navigation by:

- Promoting open communication, partnering with citizens, community organizations, and local, state, and federal agencies.
- Improving and protecting the quality of the Minnesota River and all water bodies in the watershed.



- Minimizing the negative effects of floods and droughts on the Minnesota River and all water bodies in the watershed.
- Collecting and distributing information regarding surface water and groundwater in the watershed; establishing priorities; and developing local plans to improve water resources in the watershed.
- Monitoring and understanding the effects of municipal groundwater appropriations and drought on groundwater levels.
- Working with LGUs to enforce the Wetland Conservation Act.
- Assisting and facilitating the efforts of state and federal agencies to maintain the navigation channel.
- Educating stakeholders about the impact they have on the water resources in the watershed and motivating them to change behaviors that have a negative impact.

### **E3.2. WATERSHED PURPOSE**

The Metropolitan Surface Water Management Act states that the District’s purposes and other water management programs (quoted from M.S.103B.201) are as follows:

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

Unlike other water management programs in the state subject to M.S.103B, the District has an additional purpose, as noted in the District’s mission, which is to assist and facilitate the efforts of state and federal agencies to maintain the Minnesota River 9-Foot navigation channel.

### **E3.3. GOALS**

The following goals were established by the District. These goals are not presented in any order and do not reflect rank within the District.

- Goal 1: Organizational Management – To manage the different roles of the District
- Goal 2: Surface Water Management – To protect, preserve, and restore surface water quality
- Goal 3: Groundwater Management – To protect and promote groundwater quantity and quality
- Goal 4: Unique Resources Management – To protect and manage unique resources
- Goal 5: Wetland Management – To protect and preserve wetlands
- Goal 6: Floodplain and Flood Management - To manage floodplains and mitigate flooding

- Goal 7: Erosion and Sediment Control – To manage erosion and control sediment discharge
- Goal 8: Commercial and Recreational Navigation – To maintain and improve the Lower Minnesota River’s navigation and recreational use
- Goal 9: Public Education and Outreach – To increase public participation and awareness of the Minnesota River and its unique natural resources

### E3.4. PLAN IMPLEMENTATION

The three major elements of the implementation program described in Section 4 are highlighted below:

**Administrative/Managerial Efforts:** This includes staffing, day-to-day operations, and funding for audits, reporting, training, and contingency.

**Studies and Programs:** The Plan includes the following studies and programs.

- Cost Share Incentive and Water Quality Restoration Program
- Periodic Assessments and Program Reviews
- Detailed Data Assessments
- Monitoring Program
- Vegetation Management Standard/Plan
- Dredge Material Beneficial Use Plan
- 9-Foot Channel Strategic Funding Plan
- Education and Outreach Program
- Sustainable Lake Management Plans
- Geomorphic Assessments
- Paleo-limnology Study
- Fen Stewardship Program
- Water Resources Restoration Fund

**Capital Improvements Projects:** The Plan includes the projects listed below in Table E-1. Additional projects can be added during the annual meeting before the budgeting process starts.

**Table E-1: Lower Minnesota River Watershed District – Capital Improvement Projects\***

<u>Project Name</u>	<u>Project Partner</u>	<u>Estimated Cost</u>	<u>Estimated Timeline</u>
<u>Boundary Assessment Project</u>	<u>Carver County WMO and Riley – Purgatory Bluff Creek WD</u>	<u>\$10,000</u>	<u>2018</u>
<u>Eagle Creek (East Branch) Project</u>	<u>DNR, MN Trout Unlimited and City of Savage.</u>	<u>\$12,000</u>	<u>2018</u>
<u>Dredge Site Restoration Project</u>	<u>BWSR</u>	<u>\$480,000</u>	<u>2018 - 2019</u>

<u>Minnesota River Sediment Reduction Strategy</u>	<u>MPCA and BWSR</u>	<u>\$50,000</u>	<u>2018 - 2019</u>
<u>Riley Creek Project (Downstream of Flying Cloud Dr.)</u>	<u>Hennepin County</u>	<u>\$50,000</u>	<u>2018 - 2019</u>
<u>Riley Creek Sediment Reduction Project</u>	<u>Riley-Purgatory Bluff Creek WD</u>	<u>\$75,000</u>	<u>2018 - 2019</u>
<u>East Creek Treatment Wetland Project</u>	<u>City of Chaska and MPCA</u>	<u>\$170,000</u>	<u>2018 - 2020</u>
<u>Carver Creek Restoration Project</u>	<u>City of Carver, Carver WMO, Carver County SWCD and USFWS</u>	<u>\$93,500</u>	<u>2019</u>
<u>East Creek Bank Stabilization Project</u>	<u>City of Chaska, MPCA and BWSR</u>	<u>\$50,000</u>	<u>2019</u>
<u>Spring Creek Project</u>	<u>City of Carver</u>	<u>\$45,000</u>	<u>2019</u>
<u>Minnesota River Corridor Management Project</u>	<u>All District LGUs</u>	<u>\$100,000</u>	<u>2020 - 2021</u>
<u>Minnesota River Study Area 3 (Bluff Stabilization Project)</u>	<u>City of Eden Prairie</u>	<u>\$350,000</u>	<u>2022 - 2023</u>

### **E3.4.1. LOCAL WATER PLANS**

The required content of local water plans, as stipulated by MN 8410, is addressed in Section 5.1.1-4. In general, local water plans shall include:

- Surface Water, Groundwater, Wetlands, Floodplain and Flood Management, Unique Natural Resources, and Erosion and Sediment Control Goals and Policies
- Watershed Management Standards
- Water Conservation Act (WCA) Responsibilities

### **E3.5. MEASURABLE OUTCOMES**

The Plan’s success will be measured by successful implementation of policies and strategies to meet the nine identified goals mentioned above. Other success determinations include generated annual review trends and assessment of the program’s short and long-term metrics. The short and long-term metrics are provided below in Table E-2.

**Table E-2: Lower Minnesota River Watershed District Short-term and Long-term Metrics**

<b>Goal</b>	<b>Short-term Metric</b>	<b>Long-term Metric</b>
Goal 1: Organizational Management	<ul style="list-style-type: none"> <li>● Completion of scheduled activities</li> <li>● Annual LGU Audits</li> <li>● Amount of dollars leveraged for</li> </ul>	<ul style="list-style-type: none"> <li>● Formation of a Minnesota River Basin Commission</li> <li>● Legislative funding support</li> </ul>

	projects from other agencies and property owners	
Goal 2: Surface Water Management	<ul style="list-style-type: none"> <li>• Number and types of projects completed as part of the Cost Share Incentive Program and Water Quality Restoration Programs</li> <li>• Number of targeted studies and projects completed</li> </ul>	<ul style="list-style-type: none"> <li>• Positive trends in water quality parameters identified for monitoring efforts</li> </ul>
Goal 3: Groundwater Management	<ul style="list-style-type: none"> <li>• Number of targeted studies and projects completed</li> </ul>	<ul style="list-style-type: none"> <li>• Positive trends in water quality parameters identified for monitoring efforts</li> </ul>
Goal 4: Unique Natural Resources Management	<ul style="list-style-type: none"> <li>• Number of targeted studies and projects completed</li> <li>• Development and completion of the Fen Stewardship</li> <li>• Development of groundwater model for fen management</li> </ul>	<ul style="list-style-type: none"> <li>• Number and acreage of unique natural resources protected, restored, or enhanced</li> <li>• Acquisition of high-valued easements</li> <li>• Sustained protection of the fens and trout waters</li> </ul>
Goal 5: Wetland Management	<ul style="list-style-type: none"> <li>• Completion of scheduled activities</li> </ul>	<ul style="list-style-type: none"> <li>• Number and acreage of wetlands protected, restored, or enhanced</li> </ul>
Goal 6: Floodplain and Flood Management	<ul style="list-style-type: none"> <li>• Completion of scheduled activities</li> </ul>	<ul style="list-style-type: none"> <li>• Number of structures damaged and value of flood damages</li> <li>• Preservation of floodplain resources</li> </ul>
Goal 7: Erosion and Sediment Control	<ul style="list-style-type: none"> <li>• Completion of scheduled activities</li> <li>• Reduction in streambank, ravine bank, and slope failures</li> </ul>	<ul style="list-style-type: none"> <li>• Positive trends in water quality</li> <li>• Protection and preservation of Minnesota River Bluff</li> </ul>
Goal 8: Commercial and Recreational Navigation	<ul style="list-style-type: none"> <li>• Completion of scheduled activities</li> <li>• Number of targeted studies and projects completed</li> </ul>	<ul style="list-style-type: none"> <li>• Secure regular congressional and state legislative funding for the 9-Foot channel</li> </ul>
Goal 9: Public Education and Outreach	<ul style="list-style-type: none"> <li>• Number and types of sponsored events</li> <li>• Number of participants at events</li> <li>• Number of articles, press releases, and pamphlets developed</li> <li>• Number of articles, press releases, and pamphlets printed</li> <li>• Number of volunteers</li> </ul>	<ul style="list-style-type: none"> <li>• Same as short-term metrics</li> </ul>

## **INTRODUCTION**

This section provides introductory information about the Lower Minnesota River Watershed District (District), including the history, location, boundaries, unique characteristics, and management.

### **I1. HISTORY**

In 1955, the Minnesota State Legislature enacted the initial Minnesota Watershed Act, previously called Minnesota Statute (M.S.) Chapter 112. Pursuant to this statutory authority, five counties (Hennepin, Ramsey, Dakota, Scott, and Carver) petitioned for the establishment of a watershed district. On March 23, 1960, the Minnesota Water Resources Board, now the Board of Water and Soil Resources (BWSR), established the Lower Minnesota River Watershed District.

In 1957, the District was part of the first petition in Minnesota. However, the petition was challenged and defeated in the courts. Meanwhile, on the national stage, the U.S. Congress ordered the U.S. Army Corps of Engineers (COE) to deepen the Minnesota River channel from four to nine feet from the confluence with the Mississippi River to river mile (R.M.) 14.7 in Savage, Minnesota. The congressional order required the COE to partner with a local regulatory entity to serve as the local sponsor. The District's original practitioner re-petitioned for the watershed district formation and added the local sponsor role to the petition. The petition was submitted to the COE for the 9-Foot channel. The re-petition was successful, and the District was established in 1960, making it the second watershed district in Minnesota.

Minnesota state statutes and rules affecting watershed districts (WDs) and water management organizations (WMOs) have broadened the role of WDs in water management, especially in the Twin Cities metropolitan area. The statutes affecting WDs and WMOs in the metropolitan area were recodified to M.S.103D and M.S.103B, respectively. One requirement of the statutes is that WDs and WMOs complete watershed management plans and update them every ten years. The District adopted its first Plan in 1961.

### **I2. LOCATION AND BOUNDARIES**

The District is in the southwest part of the Twin Cities metropolitan area along the Minnesota River. The District boundaries 80 square miles of Carver, Hennepin, Dakota, Scott, and Ramsey counties, which includes the Minnesota River valley from Fort Snelling, at the confluence of the Minnesota and Mississippi rivers, upstream to Carver, Minnesota. The District includes the bluffs on both sides of the Minnesota River within this reach of the river. Within the District's boundaries are community portions of Mendota Heights, Mendota, Lilydale, Eagan, Bloomington, Burnsville,

Savage, Shakopee, Eden Prairie, Chanhassen, Chaska, Jackson Township, Louisville Township, and Carver. The legal description is in Appendix A.

### **13. DISTRICT CHARACTERISTICS**

The goals, policies, strategies, implementation plan, and capital improvements program set forth in this Plan reflect the District's specific characteristics. The features of the District include:

- The District boundary generally follows the Minnesota River watershed up to the bluff line.
- Both quantity and quality of surface water resources are very closely tied to groundwater.
- Unique and rare water resources in the District include floodplain wetlands, calcareous fens, and trout waters.
- The District plays a critical role in commercial navigation, as stated in the original order creating the District.
- The District contains the upper reaches of the navigation pools created by Lock and Dam No. 2 on the Mississippi River at Hastings.

### **14. DISTRICT MANAGEMENT**

The District's affairs are administered by five Managers appointed by County Commissioners. Presently, two Managers are appointed by Hennepin County and one Manager is appointed by Carver, Dakota, and Scott counties. (Ramsey County is no longer represented on the Board since only a small uninhabited area of the county is within the District's boundaries.) Appointments are in three-year terms, and each Manager is eligible for reappointment. Table I-1 lists every Manager who has served, their term of office, and county of residence.

Since 1960, the Managers have met regularly each month. The Managers currently meet on the third Wednesday evening of each month, unless modified. All meetings are open to the public, and a notice is provided in advance.

Financial records are provided monthly to the Managers. Annually, the Managers authorize and obtain financial audits of the District's books and records. In addition, the Managers review and propose a budget, initially prepared by the District administrator, for the following year. After a public hearing, the budget is approved for implementation.

**Table I-1: Lower Minnesota River Watershed District Board of Managers (1960 - Present)**

<b>Manager</b>	<b>Term of Office</b>	<b>County Represented</b>
Kenneth W. Westerberg	1960 – 1966	Scott
Charles H. Bingham	1960 – 1968	Ramsey
Alfred W. Hubbard	1960 – 1972	Hennepin
Casimir A. Lubansky	1960 – 1981	Carver
Jens A. Caspersen	1960 – 1984	Dakota
Merrill M. Madsen, Jr.	1966 – 1978, 1984 – 1994	Scott, Dakota
William J. Jaeger, Jr.	1968 – 1977, 1983 – 1994	Ramsey, Hennepin, Hennepin
Paul G. Fallquist	1972 – 1983	Hennepin
Russell A. Sorenson	1977 – 1992	Hennepin
J. William Kennedy	1978 – 1981	Scott
Russell K. Heltne	1981 – 1987	Scott
Cyril B. Ess	1981 – 1996	Carver
Jim A. Kephart	1988 – 1999	Scott
Edward A. Schlampp	1992 – 2012	Hennepin
Wallace E. Neal	1994 – 2002	Hennepin
Eugene A. DePalma	1995 – 1999	Dakota
Terry L. Schwalbe	1996 – 2002	Carver
Glenda Spiotta	1999 – 2002	Scott
Ronald Kraemer	2001 – 2008	Dakota
Stephen B. Dalsin	2002 – 2003	Hennepin
Lawrence Samstad	2002 – 2011	Scott
Leo Forner	2003 – 2006	Carver
Leonard Kremer	2003 – 2016	Hennepin
Kent Francis	2006 – 2015	Carver
Don McCready	2009 – 2010	Dakota
Carla Shutrop	2011 – 2013	Scott
Yvonne Shirk	2011 – Present	Dakota
<u>Mike Murphy</u>	<u>2015 – 2016</u>	<u>Scott</u>
<u>David Raby</u>	<u>2015 - Present</u>	<u>Hennepin</u>
<u>Jesse Hartman</u>	<u>2016 – Present</u>	<u>Scott</u>

The District expects to have a Citizen’s Advisory Committee (CAC) which would serve as an advisory committee to the managers. Once established, the CAC would meet quarterly, at a minimum, to:

- Act as liaison between the District and residents.
- Increase public awareness by educating District residents about actions to protect and improve water resources and habitat within the District.
- Advise the managers and staff on issues important to residents.

The District will consult with some or all its Technical Advisory Committee (TAC), whose current members are listed in the Foreword of this Plan, on an as-needed basis but no less than twice a year to get assistance with the following activities:

- Perform the District’s biennial program review.
- Implement Goals 4 and 9 of this Plan, which increase the participation and awareness of unique natural resources and the Minnesota River.
- Implement Goal 9 of this Plan, which increase public participation and awareness of unique natural resources and the Minnesota River.

## I5. 2010 – PRESENT ACCOMPLISHMENTS

The District has been invaluable in managing and protecting the Minnesota River, lakes, streams, wetlands, groundwater, and unique resources that respond to the needs of their constituents and partners. Table I-2 presents activities and accomplishments of the District between 2010 - 2016

**Table I-2: Lower Minnesota River Watershed District - 2010 – 2016 Activities and Accomplishments.**

<b><u>WATERSHED MANAGEMENT PLAN ACTIVITIES</u></b>	
<u>Amended the Plan to incorporate the 2012 Governance Study, the 2013 Dredge Material Site Management Plan, and the Strategic Resources Evaluation (SRE).</u>	
<u>Participated in the BWSR-led Performance Review and Assistance Program Level II evaluation</u>	
<u>Adopted a Data Practices Policy and Procedures, as required by Minnesota Statutes Sections 10.03, subdivision 2 and 13.05, subdivision 5 and 8.</u>	
<u>Continued to work on the formation of a Minnesota River Basin Commission at the Minnesota State legislature.</u>	
<u>Commented on the Minnesota Sediment Reduction Strategy for the Minnesota River Basin, South Metro Mississippi River Total Suspended Solids Total Maximum Daily Load (TMDL) Study, Chippewa River &amp; Hawk Creek River TMDL/ Watershed Restoration and Protection (WRAP) Strategy, Yellow Medicine One Watershed One Plan, and Minnesota Department of Transportation Statewide Ports and Waterways Plan</u>	
<b><u>MONITORING PROGRAM</u></b>	
<b><u>Carver County Soil and Water Conservation District (SWCD)</u></b>	<u>Carver County SWCD monitors East &amp; West Chaska creeks for nutrient occurrence and concentration for the District.</u>



<u>Dakota County SWCD</u>	<u>Dakota County SWCD monitors water levels in observation wells in Savage Fen and Seminary Fen for the District.</u>
<u>Scott County SWCD</u>	<u>Scott County SWCD conducts thermal monitoring and performs continuous stream monitoring for water quality on Eagle Creek.</u>
<u>Metropolitan Council Environmental Services (MCES)</u>	<u>Through the Citizen Assisted Monitoring Program (CAMP), MCES monitors water quality of Courthouse, Firemen's and Brickyard lakes.</u>
<u>United States Geological Survey (USGS)</u>	<u>USGS monitors the stream gage on the Minnesota River at Ft. Snelling and samples bedload, loads, and sediment transport in the Minnesota River through a partnership with the District and the U.S. Army Corps of Engineers.</u>
<b>EDUCATION AND OUTREACH</b>	
<u>Metro Blooms Rainwater Garden Workshops</u>	<u>Contributed \$11,800 to Metro Blooms to conduct A &amp; B workshops in the cities of Bloomington (2), Savage, Chanhassen, and Eden Prairie. The District also promoted the workshops on its website and provided in-kind promotional materials to the workshop locations.</u>
<u>Metro Water Festival</u>	<u>2013 – 2016, the District has participated in and sponsored ten (10) classrooms to attend the festival 2013 -2016.</u>
<u>Metro Watershed Partners</u>	<u>Contributed \$500 to the Metro Watershed Partners for Clean Water Minnesota advertising program.</u>
<u>Blue Thumb Planting for Clean Water</u>	<u>Maintained Blue Thumb membership, promoted it on the District's website, and volunteered in organized activities such as rain garden workshops.</u>
<u>Carver County Environmental Children's Water Festival</u>	<u>Contributed \$500 towards bus transportation from Carver County to the State Fair Grounds.</u>
<u>Barge Tour</u>	<u>Hosted a barge tour on the Minnesota River in September. Tour speakers included representatives from the Minnesota Soybean Growers, U.S. Fish &amp; Wildlife Service, CHS, Upper River Services among others. The Minnesota River Basin legislators were invited to learn about the importance of the navigation channel to the</u>

	<u>Minnesota agricultural economy and the problem upstream sediment poses to navigation.</u>
<b><u>Magnolia Blossoms Tour</u></b>	<u>In 2015, the District hosted a tour on the Magnolia Blossom with Riley Purgatory-Bluff Creek Watershed District, Carver County WMO, Nine Mile Creek WD and Nonpoint Education for Municipal Officials (NEMO). Local elected officials were invited and shown a presentation on the problems of urban sediment on the river and what local elected officials could do to manage stormwater runoff and sediment transport and deposition.</u>
<b><u>Paddle Forward</u></b>	<u>Sponsored one participant in 2015 Paddle Forward expedition on the Minnesota River by Wild River Academy.</u>
	<u>Hosted a Paddle Forward expedition at the Vernon Ave. dredge site with USGS to explain dredging operations.</u>
<u>The District, with the assistance of its CAC, developed its education plan (2011).</u>	
<u>The District sponsored a raingarden workshop in the City of Shakopee, presented by Scott SWCD.</u>	
<u>Participated in the Minnesota River Congress and became part of the organizing committee; made a presentation at the Fourth River Congress.</u>	
<u>Published educational/informational articles for homeowners on ways to maintain and improve water quality in yard-scapes.</u>	
<u>Funded five projects under Cost Share Incentive and Water Quality Restoration Program (2014).</u>	
<b><u>9-FOOT CHANNEL AND DREDGE SITE MANAGEMENT</u></b>	
<u>Unsuccessfully lobbied for \$40,000 from the Port Authority Assistance Program and \$4 million for the 9-Foot channel.</u>	
<u>Received a \$40,000 grant to develop an access road at River Mile 14.7 Dredge Site (2010).</u>	
<u>Investigated two possible sites for the development of an additional dredge material management site below I-35W, as requested by the U.S. Army Corps of Engineers, and prepared a cost estimate for development of a site on Metropolitan Airport Commission property. After unsuccessful attempts to get funding from the State legislature for a second dredge site, the U.S. Army Corps of Engineers was asked to re-evaluate the need for an additional dredge material management site.</u>	
<u>Requested and received an amendment to the Conditional Use Permit (CUP) from the city of Savage. The CUP allows for unlimited truck traffic into and out of the Vernon Avenue facility.</u>	

<u>Secured a commitment from a local contractor to purchase the existing stockpile of dredge material over the course of the next three years and find reuses for it.</u>	
<u>Licensed local industry to place material dredged from private barge slips temporarily at the Vernon Avenue dredge material management site.</u>	
<u>Retained services of LS Marine to manage the dredge materials at 12020 Vernon Avenue in Savage.</u>	
<b><u>CAPITAL IMPROVEMENT PROJECTS</u></b>	
<b><u>Minnesota River Bank and Bluff Stabilization, Eden Prairie</u></b>	<u>The District participated in an analysis of the Minnesota River bank erosion problem located southwest of the intersection of Riverview Road and Mooer Lane in Eden Prairie.</u>
<b><u>Brickyard-Clayhole Shoreline Restoration Project</u></b>	<u>The District partnered with Carver County WMO and the City of Chaska to conduct a shoreline restoration on Brickyard-Clayhole Lake in Chaska. Contributed cost was \$1,333.96 (2011).</u>
<b><u>Carver County Geologic Atlas</u></b>	<u>The District contributed \$2,064.40 towards the completion of the Carver County Geologic Atlas (2011).</u>
<b><u>Seminary Fen Ravine Stabilization Project</u></b>	<u>The District partnered with the city of Chaska to secure a \$220,000 Clean Water Fund Grant to restore a ravine tributary to Seminary Fen in Chaska.</u>
<b><u>Dean Lake Paleolimnology Study</u></b>	<u>Collaborated with Scott WMO and St. Croix Research Station to better understand the trophic and sedimentation history of the lake.</u>
<b><u>Log Meadow Lake Outfall Project</u></b>	<u>The District participated in a project with the City of Bloomington to rehabilitate or reconstruct an existing storm sewer outfall to Long Meadow Lake from the Bloomington Central Station area. The project incorporated water quality best management practices needed to provide additional water quality treatment.</u>
<b><u>Dred Scott Reuse Feasibility Study</u></b>	<u>The District investigated possibility of capturing and reusing stormwater to irrigate Dred Scott playfields in Bloomington, MN.</u>
<b><u>Dakota County Fens Project</u></b>	<u>The District review monitoring data collected on the Dakota County fens (2011 – 2015). The review considered the state of the fens and providing insight on addition monitoring needs.</u>

<u><i>East Chaska Creek Feasibility Study</i></u>	<u>The District completed a feasibility study which investigated stabilization and restoration options for East Chaska Creek.</u>
<u><i>Riley Creek Stream Restoration Feasibility Study</i></u>	<u>The District participated in the feasibility study, with Riley Purgatory-Bluff Creek WD on Riley Creek. The study investigated the construction of an energy dissipation structure below County State Aid Highway 61 and redirection flows from outside creek's meanders.</u>
<u><i>Bluff Creek Project</i></u>	<u>The District participated in a project with Riley Purgatory Bluff Creek WD, the City of Chanhassen, and the Hennepin Rail Authority. The focus of the project was to restore and stabilize an outside bend in the creek, repair undercutting of the tunnel under the Minnesota Bluffs Regional Trail, and to create fish passages into and through the tunnel.</u>