LOWER MINNESOTA RIVER
WATERSHED DISTRICT

Executive Summary for Action

Lower Minnesota River Watershed District Board of Managers Meeting
Wednesday, May 18, 2022

Agenda Item
Item 6. E. – Watershed Management Plan

Prepared By
Linda Loomis, Administrator

Summary
The LMRWD Comprehensive Watershed Management Plan was adopted in 2018. Many of the activities included in the Capital Improvement Program (CIP) have been completed or are underway. Therefore, staff has planned a new 5-year CIP. A draft CIP is attached for the Board's review along with a Technical Memorandum prepared by Young Environmental.

Once the Board has approved the draft CIP, it will be shared with all LMRWD partners for comment, according to statutory requirements.

Attachments
Watershed Management Plan Draft Implementation Program Table

Recommended Action
Provide comments and direction to staff

Young Environmental Consulting Group, LLC

Technical Memorandum

To: Linda Loomis, Administrator

From: Della Schall Young, CPESC, PMP

Date: May 12, 2022

Re: Lower Minnesota River Watershed District – Watershed Management Plan Draft Implementation Program Table

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In 2018, the watershed management plan (Plan) was amended to incorporate the strategic resource evaluations and standards for high value resource areas (fens, trout streams, and trout lakes) and natural steep slopes mainly along the Minnesota River bluff. Additionally, the Implementation Program section of the Plan, which includes programs, projects, and studies, was updated to emphasize activities associated with the first five years (2018–2022). The update incorporated the acknowledgment that in 2022 the Implementation Program section would have to be updated using the 2018–2022 data for the remaining five years. It is time to amend the Plan to update the Lower Minnesota River Watershed District (LMRWD) Implementation Program for 2023–2027.

The attached draft Implementation Program Table incorporates the findings and recommendations of the following projects:

- Trout Streams Geomorphic Assessments
- Gully Inventory and Conditions Assessment
- Floodplain Lakes Paleolimnology Study
- Trout Lakes Sustainable Lake Management Plans
- Steep Slopes Vegetation Management Plan
- Assumption Creek Hydrology Restoration Project
- Dredge Site Restoration Project
- Trout Stream Gaps Analysis and Long-term Management Plan1
- East Chaska Creek Bank Stabilization Project
- Minnesota River Floodplain Model Feasibility Study1
- Minnesota River Study Area 3—Bluff Stabilization Study
- Spring Creek Project

The draft Implementation Program Table is intended to form the foundation of the Plan amendment. To move forward with the amendment, the staff asks managers to authorize moving forward with the attached draft, recognizing it will be modified with input from the technical advisory committee members, granting agencies, and other LMRWD partners.

Lower Minnesota River Watershed District—DRAFT Implementation Program (2023–2027)

	Activity	Strategy	Description	Coordination Partner	2023	2024	2025	2026	2027
Administrative / Managerial									
1	General Administrative Services	All strategies	General administrative services, conferences, coordination with LGUs, stakeholders and other project partners, LGU program reviews, 9-Foot Channel, and advisory committees (technical and citizen).	All District LGUs, BWSR	$250,000	$250,000	$250,000	$250,000	$250,000
2	Perform Periodic Assessments and Program Reviews	1.3.1, 2.3.3, 5.1.2	The District will regularly assess and review its programs through use of the following: annual reports to BWSR; annual financial audits; annual water quality monitoring reports; annual reports or meetings with the LGUs to track and document local water plan implementation; periodic reviews of development plans targeting 10 percent of permits issued and the program's equivalence with this Plan, and biannual program reviews that benchmark accomplishments against the strategies and outcome articulated in the Plan.						
			Administrative/Managerial Budget Sub-Total		**$250,000**	**$250,000**	**$250,000**	**$250,000**	**$250,000**
Studies and Programs									
1	Cost-Share Incentive and Water Quality Restoration Program	All strategies	The District values and supports efforts made by residents to help achieve the goals of the District. Through the Cost Share Incentive and Water Quality Restoration Program, the District hopes to engage citizens in community actions that protect local lakes, rivers, streams, wetlands, and fens. Applicants must meet eligibility criteria and submit an application to and be approved by the Board of Managers. The cost share and incentives will be reviewed annually. Program effectiveness will be measured in two ways: (1) by comparing water quality trends before and after projects are implemented, and (2) by how many projects are funded through the program.	All District LGUs	$20,000	$20,000	$20,000	$20,000	$20,000
2	Education and Outreach Program	1.2.1, 4.2.3, 8.1.1, 9.1.1–4 and 9.2.1–3, 10.1.1–3	As part of the District's public education and outreach program, support is provided for the Citizen Advisory Committee, which includes preparing monthly meeting agendas and minutes, securing educational presentations, increasing management through outreach, and developing handouts. The District's social media accounts are managed, and quarterly content calendars are developed. Interpretive signage has been created for sites in the District with plans for additional signs at project and high resources value sites. Outreach to schools, partners, and nongovernmental organizations focusing on educational support is conducted annually. Editing and updating the District's website is ongoing.	All District LGUs, BWSR, MPCA, Metropolitan Council, SWCDs, and neighboring WDs and WMO	$75,000	$75,000	$75,000	$75,000	$75,000
3	Fen Stewardship Program	1.1.1, 2.3.3	The District, in partnership with the MNDNR and Metropolitan Council, will develop a fen stewardship program for the District's fens. The effort will review historical data, assess current conditions, and develop a road map for restoration, preservation, and protection of the District's fens. Management plans or sustainability reports will be developed for all fens (starting with Seminary Fen and Savage Fen) to effectively manage and protect these groundwater-dependent resources.	MNDNR, Metropolitan Council	$25,000	$25,000	$25,000	$25,000	$25,000
4	Geomorphic Assessments	4.2.1	The geomorphic assessments will consider changes in trout stream alignment, baseflow, geometry, and selected stream reaches. Stream width-to-depth ratios, stream bed slopes, meander patterns, and other bed features shall be modeled according to a stable reference reach. Reference reaches are nearby, hydrologically, and geomorphically stable stream segments. A reference reach could be upstream or downstream or in a nearby watershed. This assessment is generally considered twice during the Plan cycle.	All District LGUs, MNDNR		$100,000	$50,000		
5	Monitoring Program and Detailed Data Assessments	2.3.1–2, 3.3.1	The District will continue to perform water quantity and quality monitoring of resources within the boundaries of the District. The District's Monitoring Plan will be updated to include the geochemistry recommendations from the Fens Sustainability Gaps Analysis report and the monitoring parameter recommendations from the Quarry Lake Sustainable Lake Management Plan report. Over the past few years, the District has collected a large quantity of water-quality data. The Plan includes a preliminary assessment of lake water-quality data. However, the last comprehensive data evaluation was completed in 2000. Periodic data evaluations are necessary to convert data into information that decision makers can use. Data collected for each water resource will be evaluated on a three-year or five-year cycle. As part of Strategy 1.3.1, all water resources within the watershed will	All District LGUs, MPCA, Metropolitan Council, SWCDs, and neighboring WDs and WMO	$75,000	$75,000	$75,000	$100,000	$100,000

	Activity	Strategy	Description	Coordination Partner	2023	2024	2025	2026	2027
			be evaluated. An outcome of Strategy 1.3.1 will be groupings of water resources into high, medium, and low categories for detailed data assessments and timetables formulated for each category.						
6	Implementation of the Sustainable Lake Management Plans	3.2.1–2, 3.3.1	Sustainable lake management plans (SLMPs) were developed for trout lakes in the District in 2019. The District will implement the recommended management strategies from the SLMPs, including the following: routine vegetation surveys every five years to monitor changes in Eurasian Watermilfoil and to determine whether control is needed, and temperature profiling to determine suitability for trout habitat and the bathymetric survey of Quarry Lake.	All District LGUs		$50,000	$50,000		$50,000
7	Vegetation Management Plans	7.2.1	This strategy consists of the District undertaking an effort in partnership with the DNR, USFWS, BWSR, NRCS, and NGOs (e.g., Great River Greening) to develop a vegetation management standard and plan for unique natural resources within the District. This plan would be functional for all who live, work, and invest in the District.	MNDNR, USFWS, BWSR, NRCS, NGOs				$65,000	
8	Water Resources Restoration Fund	1.1.1, 3.2.1–2, 3.3.1	This program will fund projects sponsored by LGUs that reduce urban nonpoint source pollution, improve and protect groundwater quality, and promote surveys and studies of wetlands' (fens') health and management. Program effectiveness will be measured in two ways: (1) by comparing water quality trends before and after projects are implemented, and (2) by how many projects are funded through the program.	All District LGUs	$125,000	$100,000	$100,000	$160,000	$150,000
9	Ike's Creek Habitat and Vegetation Study	4.2.1–2	Ike's Creek is preservable trout water; however, further investigation is needed to understand the substantial instream vegetation within the creek and the quality of the habitat within the system. The District will complete further investigation to determine whether the vegetation is beneficial or harmful to trout populations within the stream. Stream habitat quality will be assessed at each site using the modified FSHA forms, and IBIs for fish and invertebrates will be conducted the first year.	MNDNR, City of Bloomington	$25,000	$5,000	$5,000	$5,000	$5,000
10	Trout Stream Cross Section Surveys	4.2.1	Ongoing analysis of each stream is required to document changes in stream cross sections to provide insight into how the geomorphology of the streams is changing over time. The District will prioritize specific subreaches to survey more intensively, and stream cross sections will be resurveyed once every three years.	All District LGUs, MNDNR	$10,000	$10,000		$10,000	
11	Fen Private Land Acquisition Study	4.3.1	To preserve and protect fens in the District in perpetuity, the District will map and assess the values of adjacent private properties to each fen and work with corresponding municipalities to consider opportunities to purchase private fen land for conservation. If land acquisition is not feasible, the District will consider opportunities to develop agreements with private property owners to ensure management of each fen is consistent and comprehensive.	City of Savage, City of Chaska, City of Eagan, City of Burnsville, City of Mendota Heights, MNDNR		$50,000	$25,000		
12	Fen Qualitative Vegetation Surveys	4.1.1, 4.2.1	Quality vegetation is critical to fen viability. Qualitative vegetation surveys will be conducted to document the presence or absence of fen indicator species every two to three years, and a qualitative relevé will be conducted every five to seven years to verify whether fens are thriving or degrading. Bryophytes (mosses and liverworts) will be added as indicator species to be reviewed during the surveys. Survey results will provide an indication of the variability of the fen community structure and extent of invasive species populations.	MNDNR	$20,000	$20,000	$20,000	$20,000	$20,000
13	Fen Geochemistry Study	3.3.1	Understanding the geochemistry of the fens is important to determine whether changes are the result of water chemistry. At least one representative well in the aquifer beneath each viable fen will be sampled for dissolved major ions and nutrients annually. In addition, the District will include a stable-isotropic ratio of oxygen and hydrogen analysis in the groundwater to determine sources of recharge water. Sampling of stable-isotropic ratios from upland surface waters in the perceived recharge areas will also be conducted to further describe the flow of recharge waters to groundwater discharging into the fens.	MNDNR, Metropolitan Council	$2,000	$2,000	$2,000	$2,000	$2,000

	Activity	Strategy	Description	Coordination Partner	2023	2024	2025	2026	2027
14	Brickyard Clayhole Lake Groundwater Budget Study	3.3.1	Brickyard Clayhole Lake has been considered for management as a trout lake. Much of the surface runoff that might add warm water to the lake has been diverted elsewhere, and groundwater may help sustain a cold-water fishery in the lake. Initial observations suggest that groundwater has the potential to interact with the lake. The District will determine the relationship between groundwater and Brickyard Clayhole Lake, the daily outflow and develop a water budget for the lake. This will allow the District to quantify the influence of groundwater more accurately on the lake and the effect of diverting runoff away from the lake.	City of Chaska, MNDNR		$25,000			
15	Quarry Lake Shoreline Assessment	7.4.1	Quarry Lake is landlocked, and the water levels vary for extended periods, which has created shoreline erosion issues. The severity of the shoreline erosion will be verified by conducting a field visit and shoreline assessment.	City of Shakopee, MNDNR	$15,000				
16	Gun Club Fen Site Reconnaissance Study	4.2.1	This study consists of a site visit to collect necessary survey data and to complete a site reconnaissance that will inform restoration techniques and design. The extent and type of information that needs to be gathered will depend on the restoration option that is pursued. For example, bankfull indicators are required for stream restoration, but not for storage options.	City of Mendota Heights, MNDNR	$10,000				
17	Seminary Fen Animal Population Study	4.1.1	Fens are known to sustain unique and rare plant species, but they also may support other plants that are poorly understood or not studied. The District will complete a plan and monitoring techniques to better understand these populations.	City of Chaska, MNDNR		$10,000	$5,000	$5,000	$5,000
18	Gully Inventory Drone Survey	7.3.1	The 2020 and 2021 Gully Inventory and Condition Assessments identified areas that were inaccessible to personnel because of safety concerns, so it is unknown whether gullies were present. As part of future gully inventory and condition assessments, drone surveys will be needed to document these inaccessible areas and conditions to determine whether restoration activities may be necessary.	All District LGUs	$100,000				
Studies and Programs Budget Sub-total					**$502,000**	**$567,000**	**$452,000**	**$487,000**	**$452,000**
Capital Improvements									
1	Minnesota River Study Area 3—Bluff Stabilization Project	4.2.1–2, 7.5.1	Located on the north bank of the Minnesota River, this area has been prone to erosion for some time. The District, in partnership with the City of Eden Prairie, has evaluated options to stabilize the slope, protect public and private infrastructure, and prevent future degradation of the Minnesota River water quality resulting from the Area 3 bank erosion. The District will set aside 5 percent of construction costs to support the project.	Army Corps of Engineers, City of Eden Prairie		$100,000	$100,000		
2	Seminary Fen Restoration Site B	4.1.1, 4.2.2	A partially drained 17-acre wetland from Falls Curve Road to Old Highway 12, which is predominantly growing reed canary grass, will be restored. The restoration involves disabling the drainage system and restoring vegetation.	City of Chaska, MNDNR		$50,000	$25,000		
3	Seminary Fen Restoration Site C-2 Study	4.1.1, 4.2.2	Seminary Fen Ravine Site C-2 is actively discharging sediment into the Seminary Fen Wetland Complex. This project will conduct a ravine study to estimate sediment contributions to the Seminary Fen from the C-2 site and provide methods and cost estimates for correcting the erosion problems.	City of Chaska, MNDNR		$20,000	$40,000		
4	Seminary Fen Restoration Site C-2 and C-3 Design and Construction	4.1.1, 4.2.2	The final design and construction will be done for the Ravine Sites C-2 and C-3, which are discharging sediment into the Seminary Fen Wetland Complex.	City of Chaska, MNDNR			$55,000	$50,000	$65,000
5	Eagle Creek Bank Restoration at Town and Country RV Park Feasibility Study	4.2.1, 7.4.1	Signs of hillslope failure have been observed near the campground on the Main Branch of Eagle Creek, which is an added environmental stressor on the stream. The District will assess the eroding banks at the campground and determine the urgency for stabilization of Eagle Creek.	MNDNR, City of Savage		$30,000			
6	Eagle Creek Bank Restoration at Town and Country RV Park Project	7.4.1	The District will develop a design and stabilize the hillslope failure near the campground on the Main Branch of Eagle Creek to reduce sedimentation to the creek.	MNDNR, City of Savage			$150,000		

	Activity	Strategy	Description	Coordination Partner	2023	2024	2025	2026	2027
7	Gully Feasibility Studies	1.1.1, 7.3.1	The 2020 and 2021 Gully Inventory and Condition Assessments identified high priority regions (HPRs) that should be further studied to determine whether there are opportunities to stabilize or restore the gullies to prevent further erosion and sedimentation downstream. These regions were identified based on their current advanced state of degradation and proximity to the LMRWD high value resource areas. Annually the LMRWD will coordinate with partner municipalities to determine which HPRs have local support and develop a feasibility study to identify project extents, potential restoration needs, and probable costs for grant applications and future construction.	All District LGUs	$30,000	$30,000	$30,000	$30,000	$30,000
8	Minnesota River Floodplain Modeling	4.2.1	The Lower Minnesota River Floodplain Model Feasibility Study determined that the hydrologic and hydraulic modeling commonly used to regulate development in the floodplain and evaluate Rule C permits are out of date. The hydrologic statistical analysis, based on the USGS streamgage at Jordan, has not been updated in 20 years, missing four of the top ten recorded floods on the Minnesota River, and must be reevaluated to determine the flood flows within the LMRWD reach. Following the hydrologic update, the hydraulic model of the Lower Minnesota River should be comprehensively updated to incorporate recent developments in the floodplain, the revised flow data, and better data to evaluate the flood risk within the Lower Minnesota River floodplain. The initial capital investment of updating the hydrologic analysis and hydraulic model will be followed by annual updates to maintain the hydraulic model and incorporate the most recent data from municipalities and LMRWD permits.	Army Corps of Engineers	$75,000	$20,000	$20,000	$20,000	$20,000
9	Fen Recharge Area Feasibility Study	3.1.1	Each fen has unique flow characteristics, and recharge areas are unknown. To better protect the fens from long-term adverse influences and changing land use in upland areas, recharge areas will be identified for each fen complex.	MNDNR, Metropolitan Council	$20,000				
10	Brickyard Clayhole Lake Shoreline Feasibility Study	7.4.1	The shoreline condition inventory revealed some shoreline features that may be detrimental to the lake. In particular, turbid inflow and a sediment delta have been observed at the north end of the lake, and it is unknown whether an upland ravine is contributing to this discharge. Further examination is required to identify the sources and potential solutions to protect the lake from degradation.	City of Chaska, MNDNR		$15,000			
11	Spring Creek Site 3 Design Feasibility Study	7.4.1	Site 3 is prioritized as a top at-risk site for erosion; however, a stabilization design has not been developed. The District will work with the landowner and Carver SWCD to conduct a feasibility study to determine the best approach to stabilize the area.	Carver SWCD	$15,000	$15,000			
12	Spring Creek Site 2 Stabilization Project	7.4.1	Site 2 is one of the most at-risk sites for erosion, and the site will be stabilized using the SWCD's design (increased riprap size and standard gradation recommended).	Carver SWCD		$75,000	$75,000		
13	Spring Creek Vegetation Management Project	7.4.1	The creek will be prone to further erosion without the added protection of adequate vegetation. Vegetation management (e.g., removal of invasives, native plantings, etc.), particularly in the floodplain and channel banks, will be explored with the property owners.	Carver SWCD			$40,000		
14	Spring Creek Site 1 Stabilization Feasibility Study	7.4.1	The structures at Site 1 do not appear to be under immediate threat from Spring Creek. The District will reevaluate the need for stabilization pending the results of the monitoring and vegetation management efforts.	Carver SWCD				$120,000	
15	Seminary Fen Drain Tile Demolition Project	4.2.3, 9.1.3	Remnant drain tiles may be affecting the hydrology of the Seminary Fen. Removing the tiles could seriously damage the fen. It has been proposed instead that people walk the suspected tile lines and physically break the tiles with a heavy handheld device like a mallet or ice chisel so they no longer convey water. The District will engage volunteers or interns to perform the drain tile demolition.	City of Chaska, MNDNR	$5,000	$5,000	$5,000		
16	Dredge Site Culvert Replacement	8.3.1	A culvert near the site entrance needs to be removed and replaced. The District will work with the Army Corps of Engineers to perform the culvert replacement.	Army Corps of Engineers				$51,500	
17	Vernon Avenue Upgrade at the Dredge Site	8.3.1	Approximately two-thirds of a mile of Vernon Avenue (from Hwy 13 to the site entrance) requires upgrading to allow for increased truck traffic. The District will coordinate with the Army Corps of Engineers to upgrade Vernon Avenue.	Army Corps of Engineers				$62,500	
18	Eagle Creek Brown Trout Habitat Improvements Project	4.4.1	Background research indicates that the East Branch historically has been able to support a more reliable brown trout population while also having some of the worst habitat conditions in the watershed. The District will complete habitat improvements in the East Branch to support brown trout populations.	MNDNR, USFWS			$10,000	$20,000	$40,000

	Activity	Strategy	Description	Coordination Partner	2023	2024	2025	2026	2027
19	Eagle Creek Beaver and Vegetation Management	4.1.1, 4.4.1	Beaver activity and dam construction can limit access to spawning sites and create fish barriers to more suitable habitats. Continued beaver management practices and management of invasive species, especially on the restored reaches, will be critical to the long-term success of the fishery.	MNDNR, USFWS					$20,000
20	Kelly Farm Tributaries Stabilization Project	4.4.3, 7.3.1	Sediment inflows from gully formation along the Kelly Farm tributaries and the steep banks of the lower reaches are of concern for the viability of the brook trout population. The District will complete restoration of the gullies along the Kelly Farm tributaries to reduce sediment inflows to Ike's Creek.	City of Bloomington, MNDNR			$10,000	$20,000	$40,000
Capital Improvements Budget Sub-total					**$145,000**	**$360,000**	**$560,000**	**$374,000**	**$215,000**
Total					**$897,000**	**$1,177,000**	**$1,262,000**	**$1,111,000**	**$917,000**
Potential Projects—Unfunded									
1	Minnesota River Assessment of Ecological and Economic Impacts of Sedimentation	2.3.1, 4.2.1	This project will examine sedimentation in the Lower Minnesota River Watershed District, including monitoring, modeling, and analyzing sediment sources, sinks, and pathways in the watershed; summarizing how sources, sinks, and pathways may have changed; and estimating the economic and ecological effects of sedimentation. The project team will look at how sedimentation (1) changes the stage-discharge relationships that may cause flooding, (2) generates costs for maintaining a commercial navigation channel on the Minnesota River, and (3) affects the watershed with its ecological conditions. Through these analyses, a new baseline can be established, and an understanding attained of how changes in land use will alter the watershed baseline and create a new condition. In addition, the District will pursue upstream flow management that is consistent with recommendations of the NCED group using the Management Option Simulation Tool in the Le Sueur watershed and similar approaches in other watersheds to mitigate this issue.	Army Corps of Engineers		$37,500	$30,000	$45,000	$50,000
2	Minnesota River Assessment of Water Storage Benefits and Opportunities	4.2.1	Using the Agricultural Conservation Planning Framework (ACPF) and the Prioritize, Target, and Measure Application, we will determine whether a flow reduction would benefit from the placement of storage measures in key locations throughout the basin. This analysis will help us understand whether the threshold for meaningful change can be realized to recommend specific levels of storage in the basin. The analysis is needed to accomplish the desired actions: (1) hydrocorrect DEMs for the lower watershed where storage impacts are desired, (2) run the ACPF on priority subbasins to determine where storage opportunities exist, (3) develop a detailed hydrologic model if one does not exist, (4) run existing and storage scenarios to determine whether the amount of the discharges could be lowered for hypothetical rainfall events ranging from 10-year to 100-year events, and (5) summarize the saturation of storage and the maximum change anticipated in the specific agro-ecoregion.	Army Corps of Engineers		$30,000	$25,000	$45,000	$50,000
3	Lower Minnesota River Sediment Analysis	4.2.1	Previous analysis of how sedimentation has changed in the floodplain of the Lower Minnesota River has involved using pollen assemblages to date horizons. However, further analysis is required to confirm that the interpreted horizons are correct. The District will use dating of the stored core material to date the sediment to provide a more accurate understanding of sedimentation in the floodplain.	Freshwater Society, U of M		$12,500			
Potential Projects—Unfunded Budget Total					**$ -**	**$80,000**	**$55,000**	**$90,000**	**$100,000**