



2022 DISTRICT TOUR

August 27, 2022



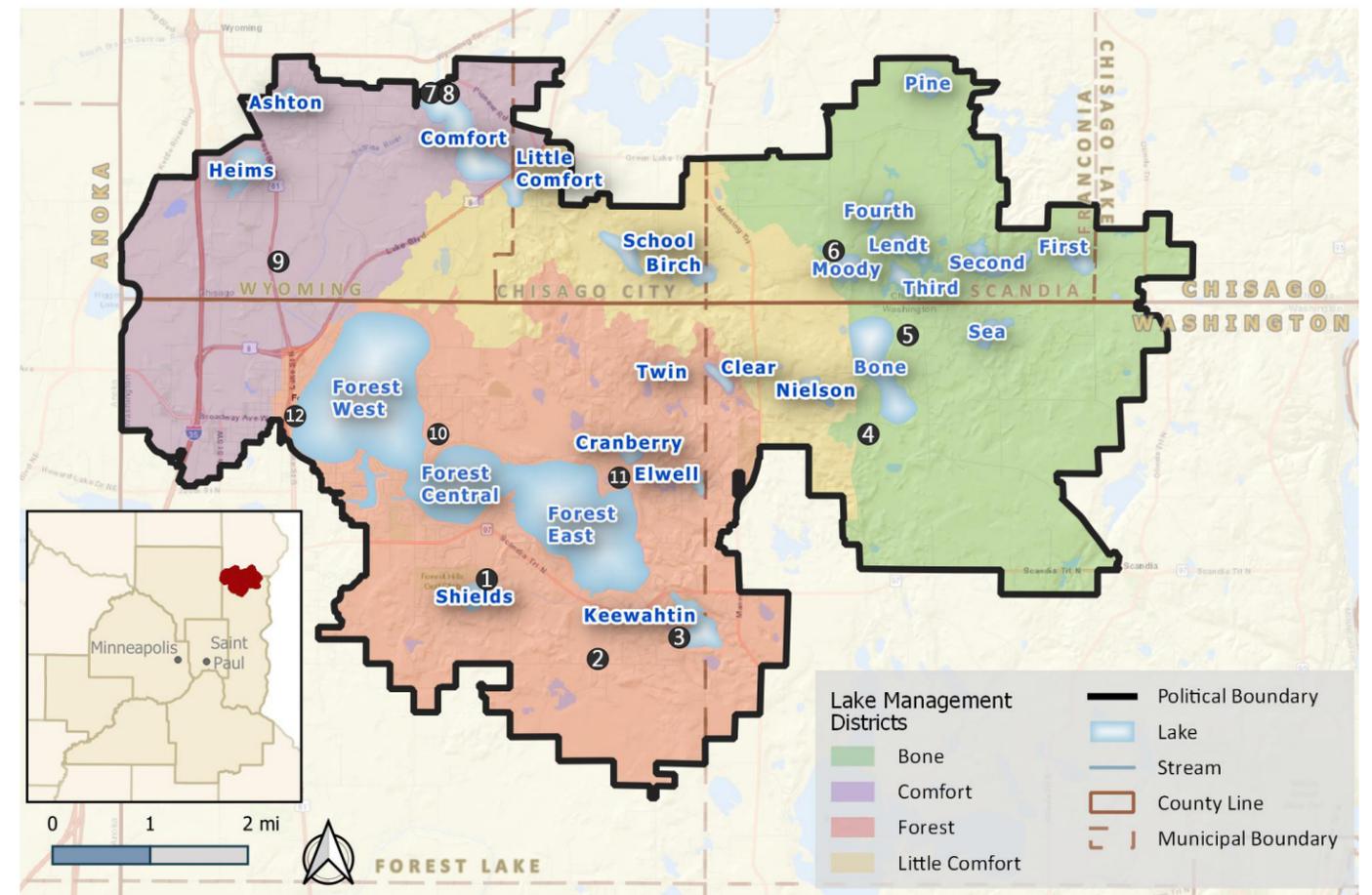
We would like to formally welcome you to the Comfort Lake-Forest Lake Watershed District's 2022 District Tour. Our District encompasses 49 square miles, over 20 named lakes, approximately 300 drainage ditches, the Sunrise River system, and over 1000 wetlands.

The CLFLWD was formed to protect and improve these important resources, and that is what we have been doing for the past twenty-three years. Today we will take some time to visit a few of our current project sites and see live demonstrations of the latest monitoring and field equipment.

Regardless of where you live, each of our actions affect our waterbodies. Thank you for taking the time to come, to learn, and to celebrate with us today.

Sincerely,

CLFLWD
Board of Managers



Tour Map

2022 District Tour Itinerary

1. Shields Lake
2. Washington Judicial Ditch-6 Iron Enhanced Sand Filter
3. Lake Keewahtin
4. Bone Lake Southeast Wetland
5. Bone Lake Northeast Wetland
6. Moody Lake Capstone Projects
7. Citizen Assisted Tributary Monitoring Program Demo
8. Watercraft Inspection Program Demo
9. Sunrise River Highway-61 Wetland Enhancement
10. Land Donation
11. Land Acquisition
12. Enhanced Street Sweeping

Understanding Watersheds and Watershed Districts

What is a Watershed?

A watershed is an area of land where all water falling or flowing will drain to a common point. Watersheds aren't divided by political boundaries but by topography and flow of water. In the Comfort Lake-Forest Lake Watershed, water flows through a system of public drainage systems, rivers, and lakes to the Sunrise River and finally the St. Croix River.



What is a Watershed District?

Water resources are managed by watershed districts and organizations in Minnesota. Watershed districts work to solve and prevent water-related problems. Watershed District's are special purpose units of local government authorized by the Legislature in 1955 when it passed the Watershed Act, MSA103D. The Comfort Lake-Forest Lake Watershed District (CLFLWD) manages water across 49 square miles in Washington and Chisago Counties and is responsible for water quality issues.

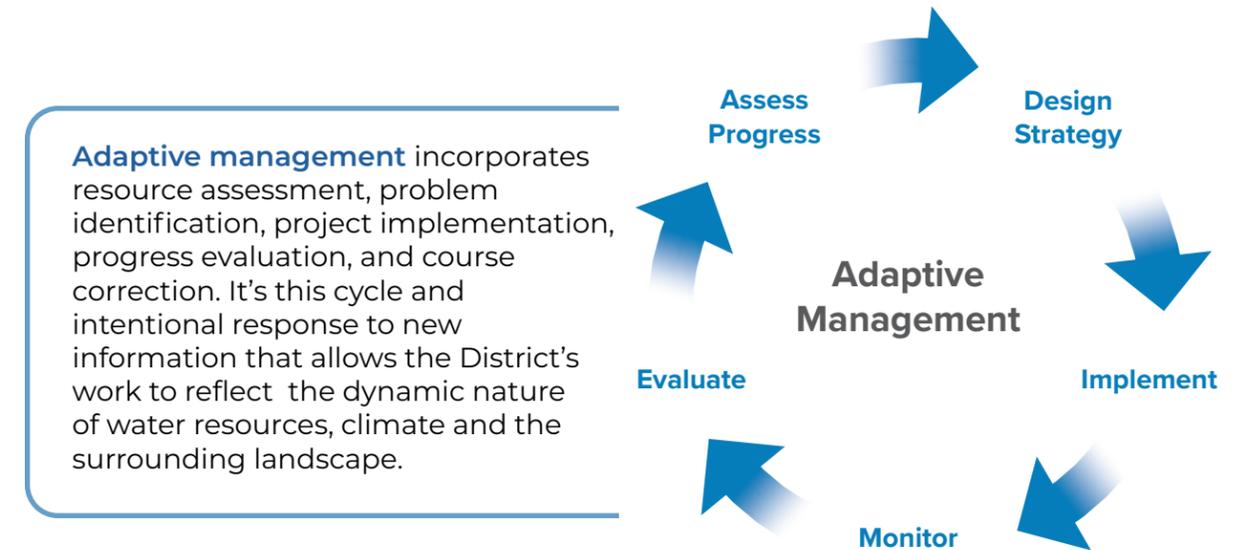
Watershed districts exist because water management issues frequently cannot be addressed solely within a single municipality or county. Solving these issues requires prioritization based on geographic and hydrologic needs and not political boundaries. The interconnected nature of waterways means that dollars spent in one city or county result in benefits for all other cities and counties in the watershed.

The CLFLWD is divided into four major lake management districts for planning and project purposes. The four lake management districts include Bone Lake, Forest Lake, Little Comfort Lake, and Comfort Lake. Each major lake district is divided into smaller subwatersheds for monitoring and project work. A map of the lake management districts and their designated color-coding is provided on the previous page.

Managing a Watershed

Adaptive Management

The District's water resource management approach is based on a core framework of adaptive management, diagnostic monitoring, and cost-benefit analysis. The District utilizes an adaptive management policy to respond to changing conditions while remaining mindful of long-term goals.



Project Selection

The District considers **cost-benefit** when deciding which project to implement; not all projects are good investments. The District uses its diagnostic monitoring data to target projects in locations where there will be the greatest pollutant reductions and water quality improvements. This provides the greatest impact from the District's limited funding and is a basic application of the **Pareto Principle** or the 80/20 rule. The 80/20 rule states that for many outcomes, roughly 80% of consequences come from 20% of the causes. In terms of water resource management, this means that 80% of the pollutant loads are coming from approximately 20% of the sources AND 80% of the reductions may be achieved from 20% of the projects.

Projects are implemented from upstream to downstream within the District. Moody and Shields Lakes are the headwaters; water flows downstream through Bone and Forest Lakes and ends up in Little Comfort and Comfort Lakes. As upstream lakes improve, downstream lakes improve as well.

Ongoing Support

In addition to implementing water quality improvement projects, the District maintains several ongoing programs that play a crucial role in protecting lakes and streams. While the projects are often the 'star of the play' and receive most of the attention, the programs are the much needed support structure around them. This Tour will include demonstrations from several of our programs including Monitoring (CAT monitoring, pg.18), Education (Adopt-A-Drain, pg.27) and Aquatic Invasive Species Management (Watercraft Inspections, pg. 20).

Shields Lake

Progress Toward Water Quality Goals

Lake Overview

Shields Lake is a shallow lake of 30 acres located south of Forest Lake's middle basin. Over 85% of Shields Lake is considered to be in the littoral zone where rooted plants can grow. It's used mainly for fishing and has a public fishing pier. Over 500 acres of land drain to Shields Lake. Shields Lake drains directly to Forest Lake through a stream connecting the two lakes.



Water Quality Trends

Shields Lake was added to the State's Impaired Waters list in 2006 due to high nutrient levels. For many years the water quality of Shields Lake was rated at or below a "C-" making it one of the least healthy lakes within the Comfort Lake-Forest Lake Watershed District.

Due to its poor water quality, its location at the top of the District's southern flow network, and its direct connection to Forest Lake, Shields Lake has been the focus of a number of lake improvement efforts. These improvements include a winter aeration system, fish barrier installation, stormwater harvest and irrigation reuse system, alum treatment, and city park shoreline restoration.

The latest water monitoring data shows significant improvements to the water quality of Shields Lake. In fact, Shields Lake now meets all of the State's criteria for de-listing from the impaired waters list.

5226 Shields Lake	
Long-term District Goal:	Phosphorus Reduction (lb/yr)
Load Reduction to Achieve Long-term Goal of 60 µg/L: (based on 2006-2015 benchmark of 241 µg/L)	1,023
Load reduction progress through 2021	1,007
2021 Remaining Load Reduction	16
TOTAL In-Progress + Planned Projects	
TOTAL In-Progress Projects:	16
TOTAL Planned Projects:	0
TOTAL In-Progress + Planned Projects	16
Completed Projects	
Completed Projects	1,007.0
Stormwater Harvest & Irrigation Reuse	94.0
Electric Fish Barrier (internal load)	✓
Aerator (internal load)	✓
Shields Lake Alum Treatment (internal load)	✓
Total Internal Load Projects	913
In-Progress Projects	
In-Progress Projects	16.0
Curlyleaf pondweed management	✓
Permitted: Chestnut Creek (16-008)	16.0
Planned Projects	
Planned Projects	0.0
Project operations & maintenance	N/A

Shields Lake Phosphorus	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Shallow Lake State Standard ≤ 60 µg/L										
10-Year Average: 179 µg/L										
Summer Average	195	162	299	349	194	191	180	128	54	38

5226 Shields Lake Summary

(Shields) 2021 Water Quality Grade: B

Excellent	Good	Average	Marginal	Poor
A	B	C	D	F
All or most samples meet the desired threshold	Many samples meet or are near the desired threshold	Some samples meet or are near desired threshold	Many samples do not meet the desired threshold	Most samples do not meet the desired threshold

(Shields) Lake Goals & Status Summary

Table 26. Shields Lake Water Quality Goals & Status Summary

	Long-Term Goal	Current Status	Remaining
5-Year Average Phosphorus Concentration	≤60 µg/L	118.2 µg/L	16 lb/yr phosphorus load
5-Year Average Secchi Depth	≥4.26 ft	3.8 ft	
10-Year Average Bottom Water Chloride	≤230 mg/L	TBD	TBD
% of Parcels with ≥75% Natural Shoreline	≥75% of parcels	TBD	TBD

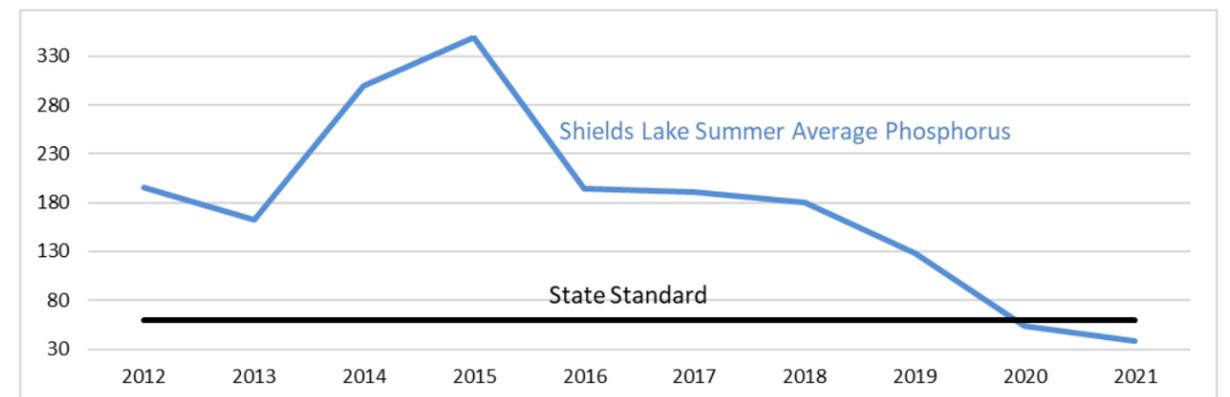
(Shields) Project Implementation Progress



Reduction Goal: 1,023lbs
Progress Toward Sustainable Goal: 98%

Figure 26. Shields Lake Phosphorus Reduction Goals and Project Progress Graph

Lake	Total Phosphorus Trend	Chlorophyll-a Trend	Secchi Disk Trend
Shields Lake	Significantly Improving Trend Since 2012	Improving Trend Since 2001	Improving Trend Since 2012



Tables and figures from the 2021 Progress Report: <http://cflwd.org/AnnualReportsandAudits.php>

Washington Judicial Ditch-6 Iron Enhanced Sand Filter

WJD-6 - Forest Lake

2

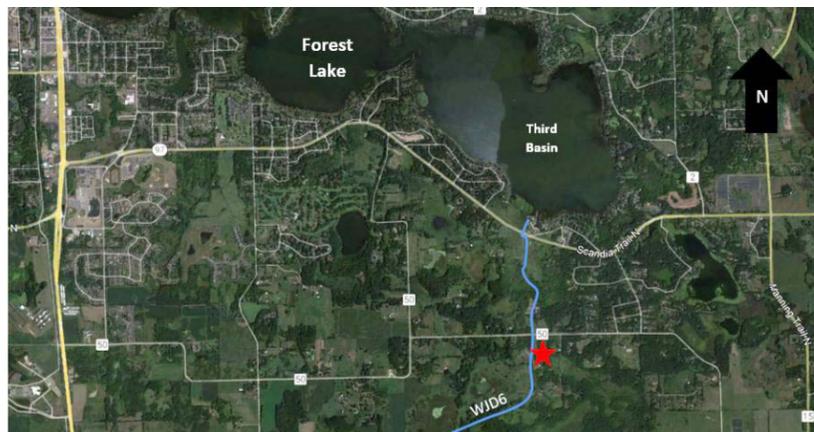
Project Description

Nutrient-rich water from the Washington Judicial Ditch-6 (WJD-6) drainage system will be directed through a series of two iron enhanced sand filters (IESF) along County Road 50. An IESF is a water filtration basin containing a sand and iron filing filter mixture. When water is pumped from the judicial ditch, into these basins, the iron filings bind and remove the excess phosphorus nutrients from the water. In addition to the phosphorus removal, the IESF basins will allow soil particles to settle out of the water before the water is returned back to the judicial ditch.

Project Outcomes

The project is estimated to keep around 85+ pounds of phosphorus from entering Forest Lake each year, resulting in cleaner and clearer water. A 2022 drainage study has indicated that the project's water diversion will have no impact on the lands drained by the WJD-6 ditch system, nor will the project impact any adjacent properties.

Project Location



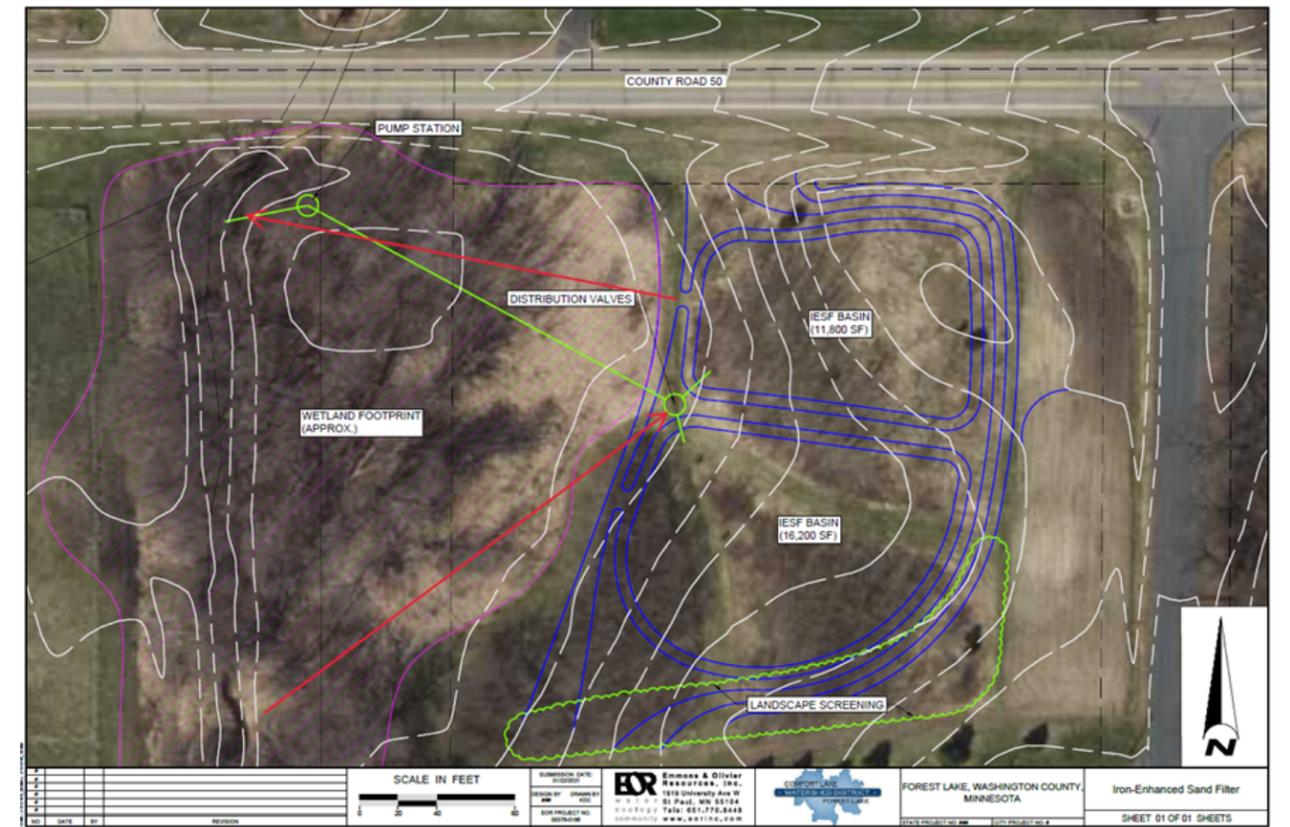
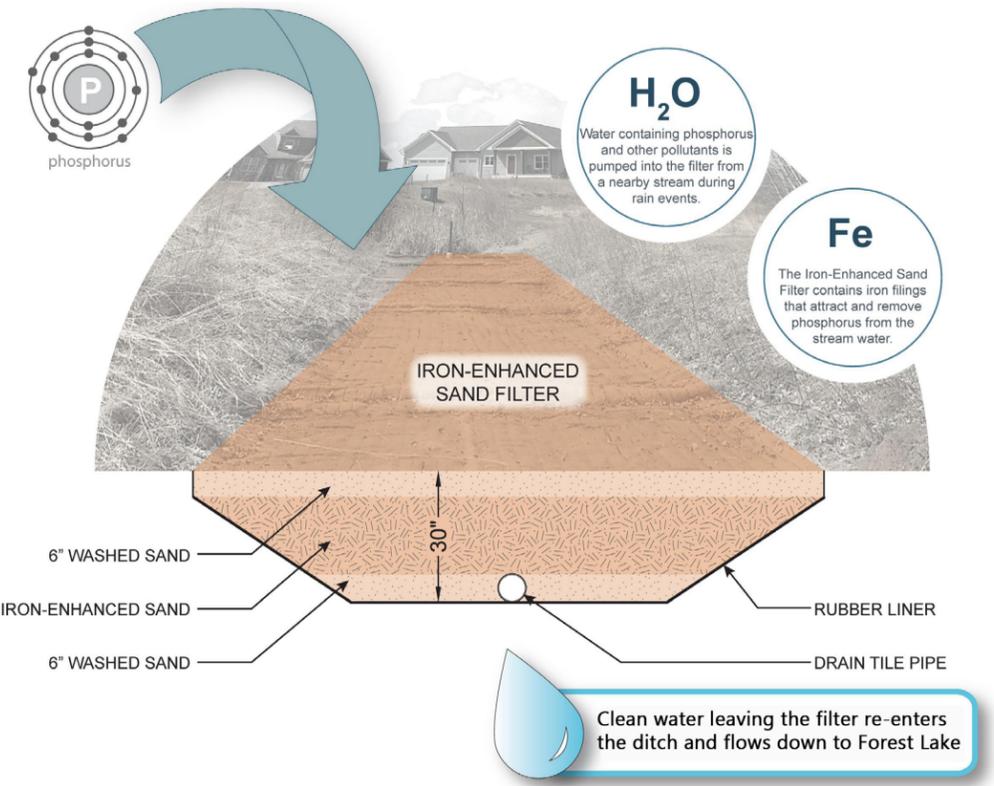
\$689
per lb of phosphorus
per year, includes
O&M cost

Timeline

Fall/Winter 2022/2023
Construction of IESF basins

Financials

Clean Water Fund Grant	\$747,400
MPCA Section 319 Grant	\$192,010
District Grant Match	\$280,590
Total Project Budget	\$1,220,000



Early rendering of the Washington Judicial Ditch-6 Iron Enhanced Sand Filter Project

Lake Keewahtin

Protecting a High Quality Waterbody

Lake Overview

Lake Keewahtin (formerly known as Sylvan or Halfbreed Lake) is a deep lake largely fed by groundwater. It is landlocked, meaning it does not drain to any other waterbodies on the surface, and it does not have a public access. Lake Keewahtin has exceptional water quality. It is meeting the District 10-year water quality goals and has a statistically significant improving trend in Secchi depth (+26%) since 1974. This lake formerly had a derogatory name, but local residents petitioned the City of Forest Lake in 2017, ultimately changing the name to Lake Keewahtin which pays homage to the area's Native American heritage and translates to "north wind."



Management of Purple Loosestrife

Purple loosestrife is a wetland plant from Europe and Asia. It was introduced into the east coast of North America in the 1800s. First spreading along roads, canals, and drainage ditches, then later distributed as an ornamental, this exotic plant is in 40 states and all Canadian border provinces.

Purple loosestrife invades marshes and lakeshores, replacing cattails and other wetland plants. The plant can form dense, impenetrable stands which are unsuitable as cover, food, or nesting sites for a wide range of native wetland animals including ducks, geese, rails, bitterns, muskrats, frogs, toads, and turtles. Many rare and endangered wetland plants and animals are also at risk.

Treatment of purple loosestrife on Lake Keewahtin has been, and will continue to be, a multi-year effort. In 2016 and 2017 Loosestrife beetles (*Galerucella* sp.) and weevils (*Nanophyes mamoratus*) were collected from White Bear Lake and released into known patches of purple loosestrife around Lake Keewahtin. Unfortunately, the population of beetles and weevils did not establish throughout the lake and the District turned to other treatment methods. In September 2020 the District surveyed purple loosestrife growth on the lake. That survey was used to obtain a treatment permit from the DNR and determine treatment areas for 2021. Treatment with the herbicide Triclopyr was conducted in September 2021. A follow-up survey was conducted this July to determine which areas needed further management. Another round of herbicide treatment is anticipated to occur by end of August 2022.



5227 Lake Keewahtin Summary

(Keewahtin) 2021 Water Quality Grade: A

Excellent	Good	Average	Marginal	Poor
A All or most samples meet the desired threshold	B Many samples meet or are near the desired threshold	C Some samples meet or are near desired threshold	D Many samples do not meet the desired threshold	F Most samples do not meet the desired threshold

(Keewahtin) Lake Goals & Status Summary

Table 28. Lake Keewahtin Water Quality Goals & Status Summary

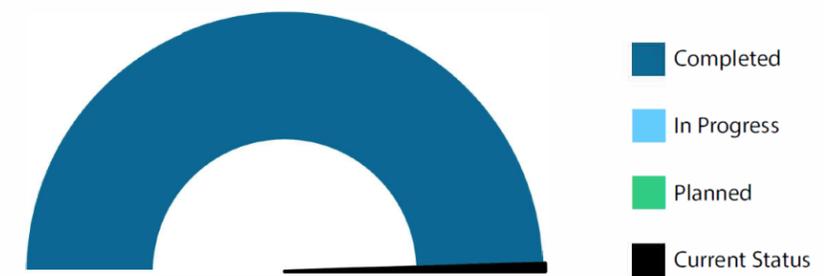
	Long-Term Goal	Current Status*	Remaining
5-Year Average Phosphorus Concentration	≤20 µg/L	14 µg/L	0 lb/yr phosphorus load*
5-Year Average Secchi Depth	≥10 ft	14.3 ft	
10-Year Average Bottom Water Chloride	≤230 mg/L	TBD	TBD
% of Parcels with ≥75% Natural Shoreline Source: 2016 Shoreland Inventory	≥75% of parcels ≥57 parcels	67% of parcels 50 parcels	8% of parcels 7 parcels

*Currently meets goal, no further reductions needed until the next round of diagnostic monitoring.

Table 29. Lake Keewahtin Phosphorus Reduction Goals

5227 Lake Keewahtin	Phosphorus Reduction (lb/yr)
Load Reduction to Achieve Long-term Goal of 20 µg/L: (based on 2004 benchmark of 20 µg/L)	0
Load reduction progress through 2021	0
2021 Remaining Load Reduction	0

(Keewahtin) Project Implementation Progress



Reduction Goal: 0lbs
Progress Toward Sustainable Goal: 100%

Figure 27. Lake Keewahtin Phosphorus Reduction Goals and Project Progress Graph

Tables and figures from the 2021 Progress Report: <http://cflwd.org/AnnualReportsandAudits.php>

Bone Lake Southeast Wetland Acquisition & Restoration

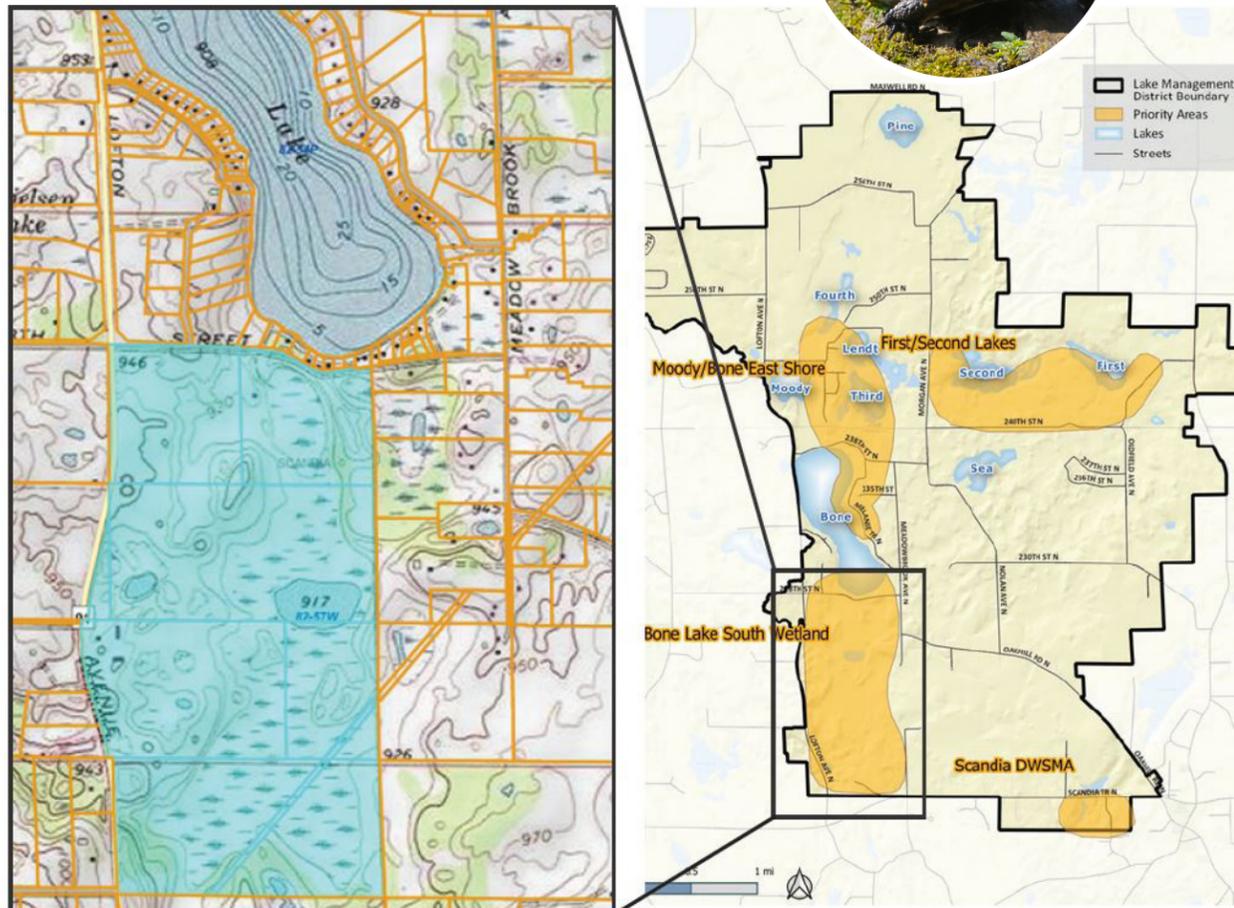
Bone Lake

Project Description

The CLFLWD is proposing to acquire in fee a 305-acre property located south of Bone Lake. The property includes 119 acres of established wetland and 186 acres of upland that could be restored to native prairie or oak savanna. This proposed project will enhance habitat for the Blanding's turtle and other native species, keep water on the landscape, improve water quality in Bone Lake, and protect groundwater.

The District is in the process of applying for a \$4.5 million Lessard-Sams Outdoor Heritage Fund grant for the purchase and restoration of the property. District staff will present the proposal to the Outdoor Heritage Council in September, and initial grant allocations will be announced in October. If awarded, the grant would be available by July 2023. The current owner of the property has signed a letter of support indicating that they are willing to sell the land to the District. This project also received letters of support from the Bone Lake Association and City of Scandia.

4



Project Location

The CLFLWD identified this site as a priority area due to several factors:

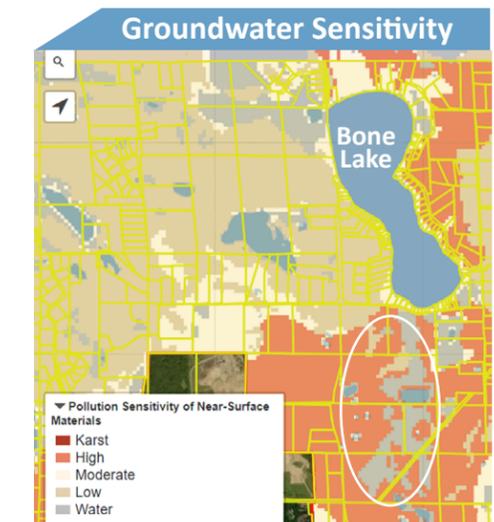
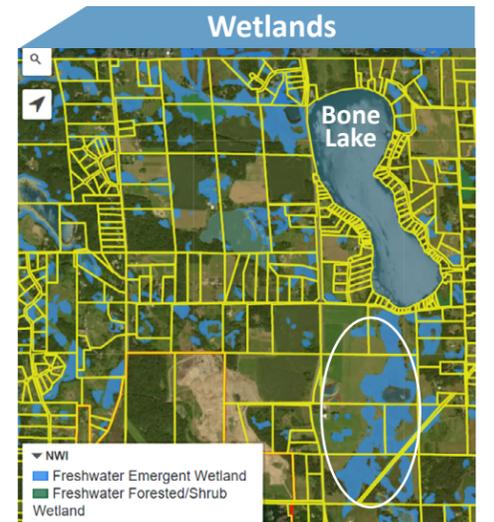
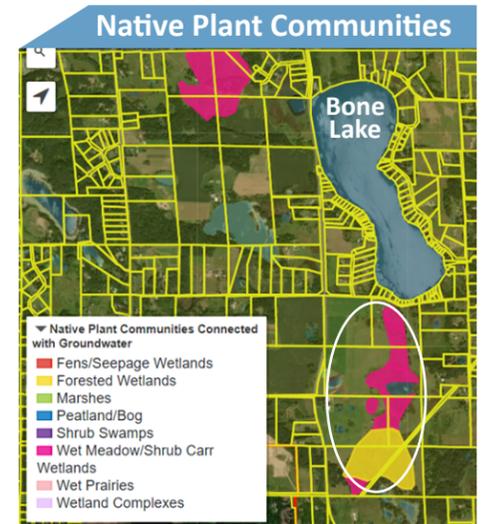
- It contains native plant communities connected with groundwater, including wet meadow/shrub carr and forested wetland.
- It is close in proximity to Bone Lake, which is impaired for aquatic recreation due to eutrophication.
- It is an area of high pollution sensitivity of near-surface materials.
- It is predominantly covered by wetland and restorable plant habitat.

This site is called out in the District's [10-year Watershed Management Plan](#) as a high priority area for protection in order to achieve water resource benefits and District goals including:

- Provide habitat benefits
- Keep water on the landscape
- Improve water quality
- Protect groundwater

Project Outcomes

- 305 acres of land protected and enhanced
 - 119 acres of wetland
 - 186 acres of upland native prairie or oak savanna
- Protect biologically diverse wetland and native prairie/oak savanna plant communities
- Promote healthy populations of threatened and endangered species such as Blanding's turtle and Rusty-patched bumblebee



Bone Lake Northeast Wetland Restoration

Bone Lake

Project Description

This project consists of restoring a wetland on the northeast corner of Bone Lake. This wetland was heavily impacted by manure runoff from an adjacent dairy farm which operated in the mid-1900s. This project removed the manure laden soils, which contained high concentrations of nutrients such as phosphorus, from the wetland. The soils were then transported to a nearby agricultural field where they were incorporated into the field to improve soil health.

Project Outcomes

Wetlands typically act as a natural filter for excess nutrients such as phosphorus that can degrade water quality. However, this wetland was so heavily impacted by the historic manure deposits that it was not able to properly filter the water flowing through it. Removal of the manure laden soils will allow the wetland to resume its natural function and keep an estimated 15-20 pounds of phosphorus out of Bone Lake each year.

Project Location



\$637
per lb of phosphorus
per year, includes
O&M cost

Timeline

- Winter 2021/2022
Wetland excavation and soil relocation
- Spring 2022
Soil integration and field stabilization
- Summer/Fall 2022
Wetland buffer establishment

Financials

Clean Water Fund Grant	\$171,200
District Grant Match	\$42,800
Total Project Budget	\$214,000



1964 Aerial of barn and cows adjacent to wetland



Excavation of wetland soils



Wetland soils deposited at farm field



Leveling of farm field

Moody Lake Capstone Projects

Moody Lake

Project Description

Moody Lake is a major lake within the headwaters of the CLFLWD northern flow network, and as such, its water quality sets the stage for downstream waters, particularly Bone Lake, Comfort Lake, the Sunrise River, and ultimately the St. Croix River. A multi-year diagnostic and implementation feasibility study was conducted in the Moody Lake watershed to prioritize nutrient sources, target cost-effective BMPs, and estimate the measurable phosphorus reductions that will be achieved through implementation of these projects.

Project Outcomes

Potential projects include: several wetland enhancements, raingarden and/or shoreline restoration, implementation of wetland treatment cells, and agricultural best management practices. Cumulative phosphorus reduction from these projects will achieve the remaining 10% load reduction needed to meet the long-term water quality goals for Moody Lake.

Project Location



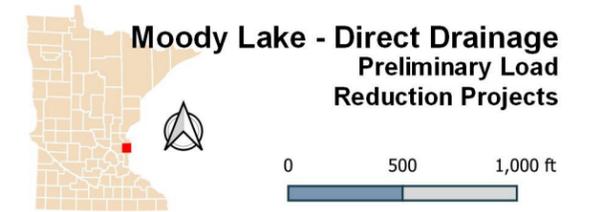
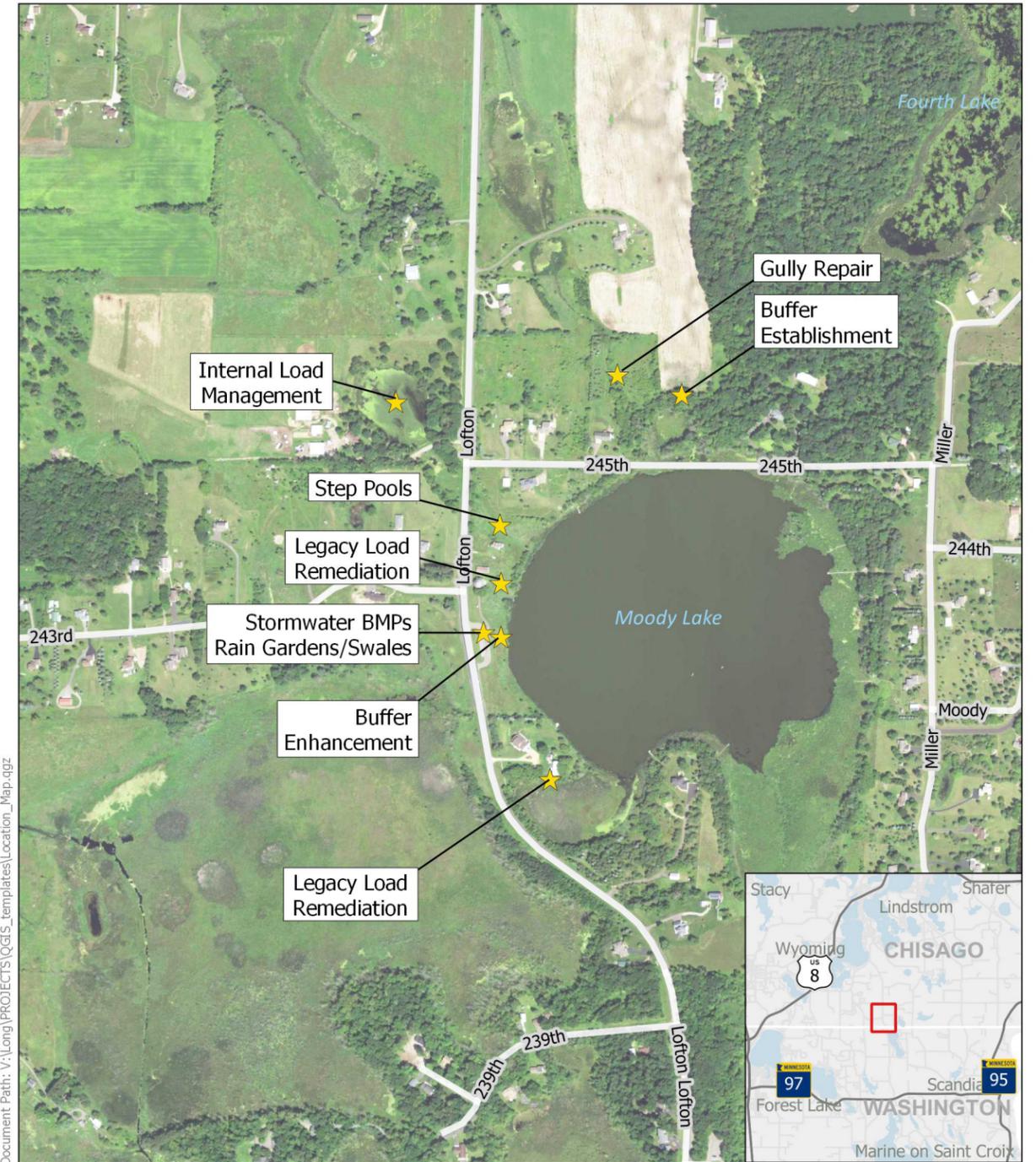
\$288
per lb of phosphorus
per year, includes
O&M cost

Timeline

Projects will be completed prior to grant expiration in December 2024

Financials

Clean Water Fund Grant	\$239,000
District Grant Match	\$59,875
Total Project Budget	\$299,375



Citizen Assisted Tributary Monitoring Program

Forest Lake

Program Description

Water monitoring is crucial to effectively improving water resources, and it comprises a key element of the Prioritized, Targeted and Measurable (PTM) implementation strategy. Sequential diagnostic water monitoring is specifically used to identify existing and legacy pollutant load sources to water resources. The Citizen Assisted Tributary Monitoring Program (CAT) is an effort by the Comfort Lake-Forest Lake Watershed District to expand its diagnostic monitoring capabilities in a cost-effective manner while also engaging local residents. The program works with trained volunteers to take water samples at drainage points surrounding selected lakes, then deliver those samples to the District for analysis using inexpensive, yet accurate, digital colorimeters. The CAT program is a low-cost (about \$12 per sample) screening tool that both compliments and focuses more expensive full scale diagnostic efforts. The outcome of these monitoring efforts is a refined understanding of the distribution of watershed pollutant sources that impact lake and river water quality.

This program acts as a piece of the bigger picture, allowing for the District to diagnose nutrient loading sources, and prioritize and target where future water quality improvement projects should be located. The CAT program is a low-cost solution to a high-cost, but necessary, diagnostic monitoring effort that allows the district to focus on the water quality projects with the greatest cost-benefit to the taxpayer.

7



This program received the 2021 Program of the Year Award from the Minnesota Association of Watershed Districts



Affordable Equipment

The CAT program uses the HACH DR500 Pocket Colorimeter and HACH reagents. One water sample can be analyzed with this equipment in under 5 minutes for a cost of less than three dollars (excluding staff time/costs).

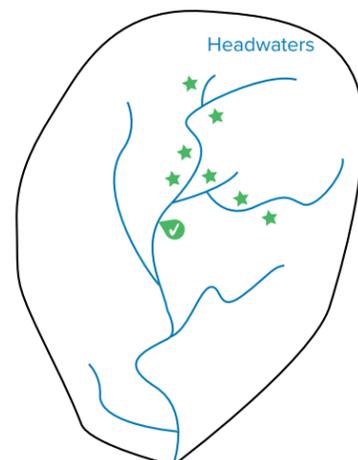
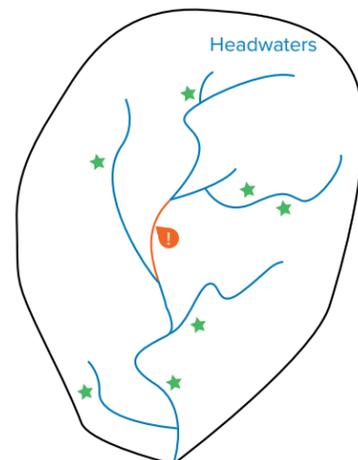
Project Implementation

Traditional Approach

May solve localized issues but will likely not be enough to solve in-stream or downstream water quality problems.

Targeted Approach

Focuses project locations in areas where diagnostic monitoring data indicates improvements will resolve in-stream water quality problems.



- Area of known water quality degradation
- Stream — Watershed boundary
- ★ Location of water quality project or best management practice (BMP)

Targeted Locations

The CAT program is currently being used to evaluate the many small inputs or micro-drainages into Forest Lake. The CLFLWD hopes to expand this program throughout the District in coming years.



Watercraft Inspection Program

District Wide

Program Description

The District's Aquatic Invasive Species (AIS) Prevention & Management Program is multifaceted and constantly evolving. Watercraft inspections are a key component of the AIS Program and are an effective strategy against invasive species introduction and establishment. Watercraft Inspectors offer education to boaters and supervision of actions to limit the spread of invasive species such as zebra mussels, Eurasian watermilfoil, curlyleaf pondweed, and many others. Watercraft inspection surveys also provide valuable information about boat traffic and boater compliance with aquatic invasive species laws.

While the main priority for watercraft inspectors is to educate boaters, secondary priorities include:

- Inspecting incoming and outgoing watercraft for presence of invasive hitchhikers and other high risk contaminants
- Decontaminating watercraft if necessary/possible
- Collecting survey data to better understand how AIS spread throughout the state

Program Funding

Funding for the CLFLWD's watercraft inspection program is provided by multiple sources including the Aquatic Invasive Species Prevention Aid Program for both Washington and Chisago counties, local municipalities, and local interest groups such as lake associations and the Lions Club. The MN Department of Natural Resources performs additional inspections on Forest Lake at no cost to the District.

Program Success

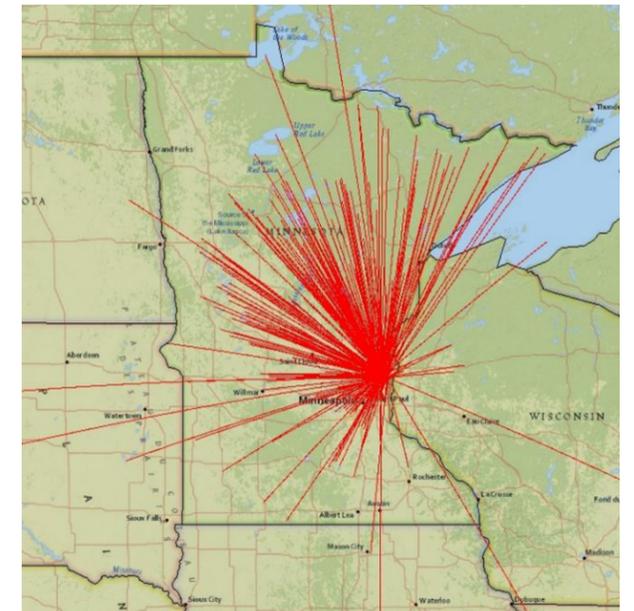
District-wide, watercraft inspectors performed 9,177 inspections and worked 3,551 hours in 2021. Inspectors averaged a rate of 2.58 inspections per hour. The figure below summarizes the total number of inspection hours and inspections completed District-wide over the last eight seasons.

District Wide Inspection Hours and Number of Inspections per Season (Includes DNR)



Widespread boat traffic

Boaters come from far and wide to recreate on our local lakes. The map on the right provides a visual representation of where boat traffic is coming from. Each red line represents at least one boater who traveled from another lake into a CLFLWD Lake. In 2021, 96 inspections were conducted on boats that had previously been in spiny water flea-infested lakes and 48 inspections were done on boats that had previously been in starry stonewort-infested lakes.



Sunrise River Highway-61 Wetland Enhancement

Heims Lake Ditch - Comfort Lake

Project Description

Nutrient-rich water from the Heims Lake drainage ditch will be directed through an enhanced wetland complex. Utilizing the natural filtering ability of the wetland will allow for cleaner water to re-enter the ditch network before it enters Comfort Lake and the Sunrise River.

Project Outcomes

This project is estimated to reduce phosphorus loading to the Sunrise River by 81 lbs/yr (immediately adjacent to the project) and to Comfort Lake by 55 lbs/yr (located further downstream). This nutrient reduction will improve water quality and clarity in the Sunrise River and help Comfort Lake reach and maintain state water quality standards. The project will also provide increased wildlife habitat. The majority of this project will be constructed on the CLFLWD-owned property (aquired through tax forfeiture) and will not impact any of the properties along the Heims Lake drainage ditch or those adjacent to the project area.

Project Location



\$469
per lb of phosphorus
per year, includes
O&M cost

Timeline

Fall/Winter 2022/2023
Project Construction

Financials

Clean Water Fund Grant	\$492,000
MPCA Section 319 Grant:	\$100,000
District Grant Match	\$190,501-491,000*
Total Project Budget	\$1,083,000

* CLFLWD applied for Lower St. Croix WBIF, and the grant decision will be made by mid-September 2022. CLFLWD provides additional local funding to this project through extensive pre-project diagnostic and project targeting work, as well as operations and maintenance to ensure the project meets its minimum 25-year lifespan.



Artistic rendering of the Sunrise River Highway 61 Wetland Enhancement Project.
The project will create a diverse complex of interconnected wetland habitats that will remove excess nutrients from the Heims Lake ditch while providing abundant wildlife habitat.

Land Donation

How we treat the landscape has a significant impact on the health of our lakes and rivers. Adding hard surfaces to the landscape such as roads, homes, and buildings, reduces the amount of water that can soak into the ground and become groundwater. Increased hard surfaces also result in more water running off the surface, picking up pollutants such as phosphorus and sediments, and flowing into lakes and rivers, degrading water quality. Preserving natural landscapes such as forests, prairies, and wetlands, helps preserve the health of lakes and rivers. Lakes are Minnesota's legacy for future generations to enjoy, and you can leave your legacy on the landscape by donating land for conservation purposes. Your land may be eligible for conservation easement payments or purchase at the appraised price. Contact info@clflwd.org for more information.

Hayward Avenue Nature Area

In 2022 the McNamara Family Trust generously donated to the District a 3-acre wetland parcel located along Hayward Avenue North in Forest Lake. This parcel is adjacent to other wetland parcels owned by the City of Forest Lake. The donation allowed considerable tax incentives to the former landowner while ensuring that the property is protected for future generations, leaving a lasting legacy of environmental stewardship.



Land Acquisition

Land acquisition, or land purchase, can be a good and cost-effective option to achieve specific water resource outcomes. Under certain conditions, the District can purchase land for water quality improvement, habitat enhancement, groundwater protection, and increasing landscape resiliency to flooding. The District applies for state grant funds to make land purchases possible. Putting these lands into public ownership can increase public access to natural spaces for recreation.

Conservation easements are an alternative to land purchase and involves working with a landowner to protect a portion of their property into the future. This is a particularly good approach in areas with wetlands and where development is limited or unlikely. Many landowners choosing conservation easements also like the idea that their land is part of their legacy.

North Shore Trail Nature Area

The District purchased a 20-acre parcel located along North Shore Trail by the east basin of Forest Lake. Consisting of both wetland and upland, the property hosts a diverse number of plant and animal species. The property will allow public access for fishing, hiking, picnicking, and birdwatching. It will also have lake access for canoes and kayaks. The property was purchased in 2022 using DNR Conservation Partnership Legacy grant dollars, and the District is currently in the planning phase for enhancement and management of the nature area.



Enhanced Street Sweeping

City of Forest Lake - Forest Lake

Project Description

The City of Forest Lake drains to five significant lakes: Forest, Shields, Keewahtin (formerly Sylvan), Comfort, and Clear Lake; and spans two watershed districts: Comfort Lake-Forest Lake (CLFLWD) and Rice Creek (RCWD). The City of Forest Lake worked with both watershed districts to plan and implement this highly cost-effective project. Using a Clean Water Fund (CWF) grant in 2017, CLFLWD completed the study and implementation plan including targeted sweeping zones and frequencies. The City was then able to purchase a regenerative air vacuum sweeper in 2018 using another CWF grant. All three entities contributed financially to provide match funding to the City's CWF grant for purchase of the sweeper. In 2019, the City used the new sweeper to implement the enhanced sweeping program as recommended by the plan.



This project is the recipient of the 2022 City of Excellence Award from the League of Minnesota Cities. Learn more at lmc.org

Project Outcomes

CLFLWD partnered with the City and University of Minnesota to track the total solids, sediment, and nutrients recovered through sweeping. This found that enhanced street sweeping is one of the most cost-effective strategies for improving lake water quality. The cumulative estimated phosphorus load reduction to all five lakes is 309 pounds per year. In addition to significant water quality improvements to the target lakes, this project will improve city streets and reduce long-term maintenance costs for municipal stormwater facilities. The cost of program implementation is likely equally offset by stormwater maintenance savings, resulting in a net sum zero cost.

Your city or township may be eligible for cost-share funding to perform enhanced street sweeping. The Lower St. Croix Partnership offers technical assistance to create targeted street sweeping plans tailored to individual communities. It also offers cost-share incentive payments for communities to implement the enhanced street sweeping programs, resulting in benefits similar to those described above. Visit www.lsc1w1p.org for more information.



A common problem across the state of Minnesota is the amount of pollutants and excess nutrients (such as phosphorus) entering our lakes and rivers via stormwater conveyance systems. Many of the five area lakes require phosphorus reductions to meet their local water quality goal of seeing past your toes when treading water (7 feet). Enhanced street sweeping helps us get closer to reaching that goal by effectively, and significantly, reducing the amount of phosphorus-laden material such as leaves, grass clippings and sediment entering the lakes via storm drains.

12

\$353
per lb of phosphorus
per year, includes
O&M cost

Timeline

2017
CLFLWD develops Enhanced Street Sweeping Plan

2018
City of Forest Lake Purchases Regenerative Air Sweeper

2019 -
City implements sweeping plan

Financials

Clean Water Fund Grant (plan)	\$36,000
CLFLWD Match (plan)	\$9,000
Clean Water Fund Grant	\$220,000
City of Forest Lake Match	\$35,250
CLFLWD Match	\$19,415
RCWD Match	\$8,085
Total Project Budget	\$327,750

Want to Help?

Residents, community groups, and businesses can help keep our lakes clean by adopting a local storm drain. Spending a few hours a month keeping a storm drain clear of leaves, trash, and other debris helps reduce water pollution.

Learn more adopt-a-drain.org

**ADOPT
A STORM
DRAIN**



Project Cost Effectiveness
Dollars per pound of phosphorus removed

Tour Stop #	Project Name	Total Cost (dollars)	P Removed/ Year (pounds)	Lifespan (years)	Total P Removed Over Lifespan (pounds)	Cost-Effectiveness (dollars/pound)
Bone Lake Management District						
	<i>Project + Post-Project: Wetland Rehab & Effectiveness Monitoring</i>	\$619,714				
	<i>Post-Project: Operations and maintenance</i>	\$58,017				
	Moody Wetland Restorations	\$677,731	445	25	11,125	\$61
	Moody Alum Treatment	\$470,000	324	25	8,100	\$58
	Moody WQ Improvement Projects Total	\$1,147,731	769	25	19,225	\$60
	<i>Project: BMP Implementation (per FY19 CWF grant budget)</i>	\$180,000				
	<i>Post-Project: 25-year O&M and effectiveness monitoring</i>	\$20,000				
	Moody/Bone Lakes SWA Implementation (Ag BMPs)	\$200,000	114	25	2,850	\$70
#6	<i>Project: BMP Implementation (per FY22 CWF grant budget)</i>	\$299,375				
	<i>Post-Project: 25-year O&M and effectiveness monitoring</i>	\$25,000				
	Moody Lake Capstone Projects	\$324,375	45	25	1,125	\$288
#5	<i>Project: BMP Implementation (per FY21 CWF grant budget)</i>	\$214,000				
	<i>Post-Project: 25-year O&M and effectiveness monitoring</i>	\$25,000				
	Bone Lake Northeast Wetland Restoration	\$239,000	15	25	375	\$637
	<i>Project: BMP Implementation (per FY17 CWF grant reporting)</i>	\$215,000				
	<i>Post-Project: 25-year O&M and effectiveness monitoring</i>	\$25,000				
	Bone Lake Partially Drained Wetland Restorations	\$240,000	35	25	875	\$274
	Bone Lake Cropland Rental All figures per contract year	\$3,040	30.4	1	30	\$100
Little Comfort Lake Management District						
	<i>Project Eng/Dev</i>	\$80,400				
	<i>Project: BBSLC Channel Improvements</i>	\$44,750	60			
	<i>Project: East Wetland Impoundment (includes most of proj dev/eng)</i>	\$204,100	75			
	<i>Project: Little Comfort Alum Treatment (factor in re-treatment to get to 25 yrs)</i>	\$210,000	59			
	<i>Post-Project: 25-year O&M and effectiveness monitoring</i>	\$50,000				
	Little Comfort Phosphorus Reduction Projects	\$508,850	194	25	4,850	\$105
	<i>Project: BMP Implementation (per FY22 CWF grant application)</i>	\$50,000				
	<i>Post-Project: 25-year O&M and effectiveness monitoring</i>	TBD				
	July Avenue Feedlot	\$50,000	79	10	790	\$63

Tour Stop #	Project Name	Total Cost (dollars)	P Removed/ Year (pounds)	Lifespan (years)	Total P Removed Over Lifespan (pounds)	Cost- Effectiveness (dollars/pound)
Forest Lake Management District						
#2	<i>Project: BMP Implementation (per FY20 CWF grant application)</i>	\$1,294,452				
	<i>Pre-Project: 25-year O&M and effectiveness monitoring</i>	\$205,000				
	Washington Judicial Ditch-6 Iron Enhanced Sand Filter	\$1,499,452	87	25	2,175	\$689
	Castlewood Cropland Conversion	\$9,898	5	1	5	\$1,980
#1	<i>Project + Post-Project: Shields Lake Stormwater Harvest/Irrigation only (includes O&M)</i>	\$1,143,354	94	25	2,350	\$487
	<i>Project + Post-Project: Shields Lake Alum Treatment only (includes reapplication)</i>	\$300,000	913	25	22,825	\$13
	Shields Lake Harvest/Alum Whole Project Total&Avg Cost Effect.	\$1,443,354	1,007		25,175	\$57
#12	<i>Street sweeping study (CWF grant)</i>	\$45,000				
	<i>Sweeper purchase and outreach (CWF grant)</i>	\$275,000				
	<i>Forest Lake Enhanced Street Sweeping operation (est from city)</i>	\$770,000				
	Forest Lake Enhanced Street Sweeping	\$1,090,000	309	10	3,090	\$353
	<i>Project: BMP Implementation (per grant reporting)</i>	\$184,630				
	<i>Post-Project: 25-year O&M and effectiveness monitoring</i>	\$116,000				
	Hilo Lane Stormwater Retrofit	\$300,630	12	25	300	\$1,002
	<i>Project: BMP Implementation (per grant reporting)</i>	\$202,500				
	<i>Post-Project: 25-year O&M and effectiveness monitoring</i>	\$25,000				
	FL Wetland Treatment Basin (3rd Lake Pond)	\$227,500	56	25	1,400	\$163
	<i>Project: BMP Implementation (per FY22 CWF grant application)</i>	\$482,500				
	<i>Post-Project: 25-year O&M and effectiveness monitoring</i>	\$25,000				
	WJD-6 Wetland Restoration	\$507,500	38	25	950	\$534
	<i>Project: BMP Implementation (per feas study)</i>	\$660,000				
	<i>Post-Project: re-treatment for 25-year life</i>	\$660,000				
	Forest Lake Alum Treatment	\$1,320,000	527	25	13,175	\$100
Comfort Lake Management District						
#9	<i>Project: BMP Implementation (per FY20 CWF grant application)</i>	\$1,090,550				
	<i>Post-Project: 25-year O&M and effectiveness monitoring</i>	\$50,000				
	Sunrise River Highway-61 Wetland Enhancement	\$1,140,550	81	30	2,430	\$469
	<i>Project: BMP Implementation (per FY14 CWF grant reporting)</i>	\$507,555				
	<i>Post-Project: 25-year O&M and effectiveness monitoring</i>	\$50,000				
	Bixby Park Water Quality Improvement Project	\$557,555	99	25	2,475	\$225
Example/Comparison						
	Cost Share Raingarden example (2015)	\$2,880	0.17	10	2	\$1,694

Thank you!

Regardless of where you live, each of our actions affect our waterbodies. Thank you for taking the time to come, to learn, and to celebrate with us today.

Want to learn even more?
Grab a neighbor and join us for the

2022 State of the Watershed Public Meeting

Saturday, September 27th | 6:00-8:00PM

Eko Backen, 22570 Manning Trail N, Scandia, MN 55073

Free appetizers and refreshments during the social hour starting at 5:00pm