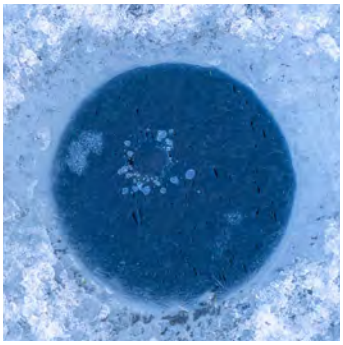
RILEY PURGATORY BLUFF CREEK
WATERSHED DISTRICT

protect. manage. restore.

Annual Report 2022











Message from the Administrator

Another busy year at Riley Purgatory Bluff Creek Watershed (RPBCWD or the District) and, in many ways, a normal year following the contortions needed to deal with the pandemic years. We have returned to bringing water resource science back into the classrooms and at tabling events. We have held Technical Advisory Committee meetings in person. Most importantly, staff have been able to work collaboratively on various projects and programs.

The Watershed Stewardship Grant provided more than a quarter million dollars to residents, associations, and cities to implement projects that protect and enhance water quality. The district was part of the Hennepin County Chloride Initiative, which developed a toolbox to assist property managers, homeowner associations, communities of faith and other organizations with large campuses in their efforts to reduce winter salt use. We also collaborated with several agencies as part of the Lower MN River Chloride Reduction Grant program to provide cost-share dollars to companies and government agencies to purchase equipment or implement practices to reduce winter salt use.

Of course, we have also put projects into the ground. The completed Silver Lake Water Quality Improvement Project stabilized an eroded channel and added iron-enhanced sand filtration to treat runoff from Pleasantview Road before entering Silver Lake. The Rice Marsh Lake Water Quality Improvement Project was also completed. This project included installation of two manufactured treatment devices known as Kraken, which use filter cartridges to treat runoff, and restored portions of the park into a pollinator garden and native prairie. The other major capital project completed in 2022 was a creek restoration and flood mitigation project along Middle Riley Creek performed collaboratively with the Bearpath Creek Golf and Country Club and Bearpath Homeowners Association.

The data collection program continues to monitor lake levels, stream levels, and bio-chemical parameters. Sediment sampling is being used to evaluate the efficacy of prior alum treatments on various lakes and to define a schedule and dosing rate for future applications. The aerator will once again be used on Rice Marsh Lake to minimize winterkill of the panfish population to help control carp populations in the Riley chain of lakes.

The district looks forward to 2023, the partnerships we can foster, and the work we can all do collectively to protect, preserve, and restore our water resources for today and future generations.

Sincerely,

Terry Jeffery
District Administrator
tjeffery@rpbcwd.org
952-607-6512, Extension 1

Table of Contents

Land Acknowledgment

We acknowledge that we are on ancestral and contemporary Očhéthi Šakówiŋ land that was stolen from the Waȟpékhute Dakota tribe in the 1851 Treaty of Mendota. We recognize these tribal nations as the original stewards of the land, water, and natural resources within the District, and we honor the importance of protecting the culturally significant resources of this land.

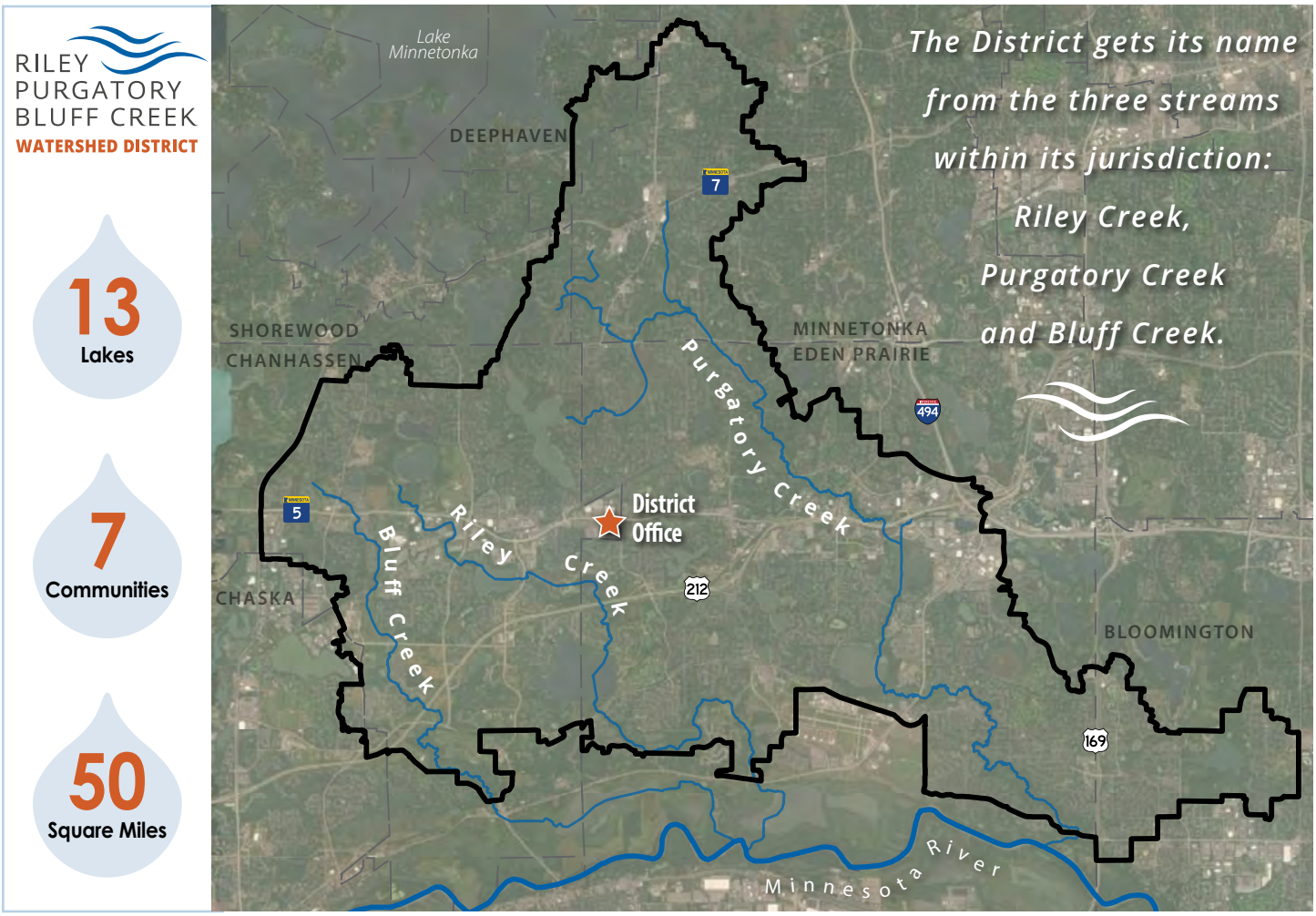
Overview

The Riley Purgatory Bluff Creek Watershed District (RPBCWD or the District) is a local government unit established on July 31, 1969, to protect, manage, and restore water resources. It encompasses some 50 square miles of land that drains into any of the three creeks in its name. The District includes parts of seven cities (Bloomington, Chanhassen, Chaska, Deephaven, Eden Prairie, Minnetonka, and Shorewood) and two counties (Carver and Hennepin).

The District is led by five managers (four appointed by the Hennepin County Commissioners and one by Carver) each serving three-year terms directing District activities. The District partners with these local communities and residents to identify issues affecting the water resources and to prioritize projects and regulations to address these issues. In addition, the District works to educate and engage community members regarding the protection of the District's water resources.

Report Purpose

The purpose of the annual report is to fulfill the requirements set forth in Minnesota Statute Chapter 103D.351, which requires watershed districts to file an annual report with the Board of Soil and Water Resources and the Department of Natural Resources. Minnesota Regulation MR 8410.0150 requires the report to contain certain information..



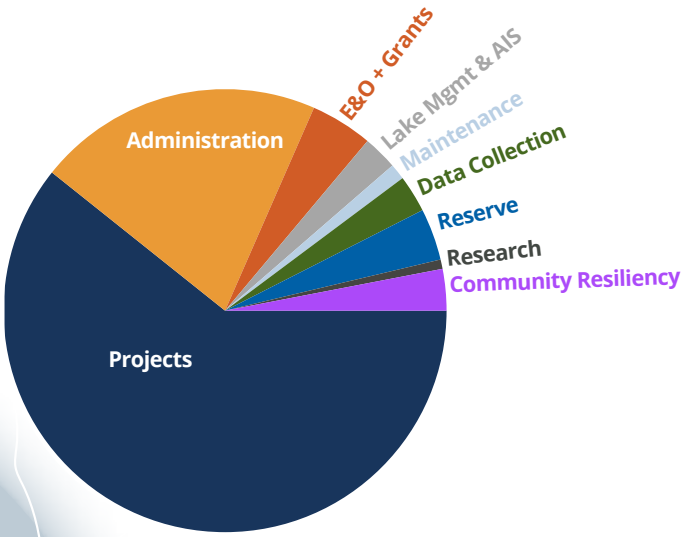
District tax dollars at work

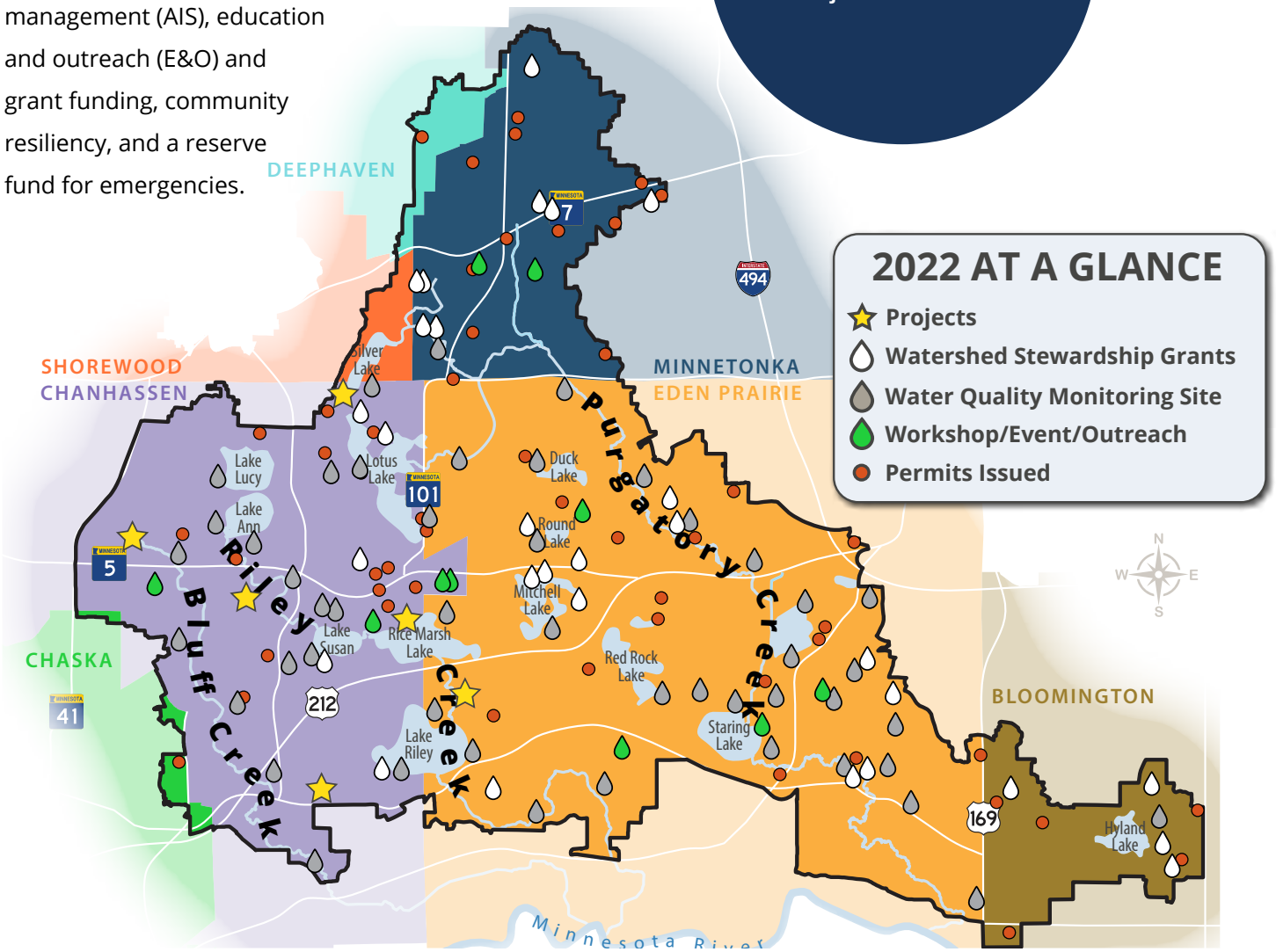
Projects and programs of the Riley Purgatory Bluff Creek Watershed District are funded through property tax levies. We thank our community for their part in financing our mission of protecting, managing, and restoring our water resources!

The 2022 levy was $3.6 million, and the complete 2022 budget, including funds from previous levies, was $7.2 million. The funds were used for projects, as well as administration, maintenance, research, lake and creek monitoring, aquatic invasive species management (AIS), education and outreach (E&O) and grant funding, community resiliency, and a reserve fund for emergencies.

Download the 2022 Annual Communication

Every year, the District distributes an annual communication. It contains general information, annual highlights, and ways the community can engage in the District's work.





48 Monitoring Sites

29 Grants Awarded

66 Permits Issued

6 Active Projects

42 Partner Organizations

Governance

The District is governed by a five-person board of managers. Two independent committees, the Citizens Advisory Committee (CAC) and Technical Advisory Committee (TAC), provide advice and comment to the Board as required by Minnesota Statute 103D.331. Daily operations are carried out by a team of employees and consultants led by the District's administrator.

Beginning 2023

Regular Meetings
First Wednesday of the month at 7 p.m.*

Workshops
Third Thursday of the month at 7 p.m.*

* Schedule changes posted on website, rpbcwd.org/calendar

Due to COVID, meetings held virtually until further notice.

Board of Managers

Four managers are appointed by the Hennepin County Commissioners and one by the Carver County Commissioners. They serve three-year terms. In 2022, Manager Duevel was appointed.

Vice President
Larry Koch
Term ends 7/31/2024
471 Bighorn Drive
Chanhassen, MN 55317
lkoch@rpbcwd.org
Appt. by Carver County

Treasurer
Jill Crafton
Term ends 7/31/2024
10351 Decatur Avenue S
Bloomington, MN 55438
jcrafton@rpbcwd.org
Appt. by Hennepin County

Member
Tom Duevel
Term ends 7/31/2025
6111 Creek View Ridge
Minnetonka, MN 55345
tduevel@rpbcwd.org
Appt. by Hennepin County

Secretary
Dorothy Pedersen
Term ends 7/31/2023
6155 Ridge Road
Shorewood, MN 55331
dpedersen@rpbcwd.org
Appt. by Hennepin County

President
David Ziegler
Term ends 7/31/2025
16729 Baywood Terr.
Eden Prairie, MN 55346
dziegler@rpbcwd.org
Appt. by Hennepin County

Staff

Terry Jeffery
Administrator
tjeffery@rpbcwd.org

Amy Bakkum
Office Administrator
abakkum@rpbcwd.org

Zach Dickhausen
Natural Resources Coordinator
zdickhausen@rpbcwd.org

Liz Forbes
Communications Manager
lforbes@rpbcwd.org

Eleanor Mahon
Education & Outreach Coordinator
emahon@rpbcwd.org

Josh Maxwell
Water Resources Coordinator
jmaxwell@rpbcwd.org

Mat Nicklay
Natural Resources Technician
mnicklay@rpbcwd.org

Contact RPBCWD
18681 Lake Drive East
Chanhassen, MN 55317
info@rpbcwd.org
952-607-6512

Front (L-R): Liz Forbes, Amy Bakkum, Eleanor Mahon, Josh Maxwell
Back (L-R): Mat Nicklay, Terry Jeffery, Zach Dickhausen

Consultants

District Engineer

Barr Engineering Co.
Attn: Scott Sobiech, CFM, PE
4300 Market Pointe Drive, Suite 200, Edina, MN 55435
(952) 832-2755, ssobiech@barr.com

Accounting

Redpath and Company, Ltd.
Attn: Nancy Martinson
4810 White Bear Parkway, White Bear Lake, MN 55110
(651) 426-5844

Legal

Smith Partners PLLP
Attn: Louis Smith
250 S Marquette Ave, Ste 250, Minneapolis, MN 55401
(612) 344-1400

Auditing

Abdo
Attn: Justin Nilson
5201 Eden Avenue Ste 250, Edina, MN 55436
(952) 715-3011, justin.nilson@abdosolutions.com

Citizen Advisory Committee

Meetings: Third Monday of the month, 6 p.m.*
* Schedule changes posted at rpbcwd.org/CAC

The Citizen Advisory Committee (CAC) are community volunteers that advise the Board of citizen interests. The CAC is required to meet at least once a year.

2022 Members

Andrew Aller *(Chair)*
Jim Boettcher *(Vice Chair)*
Rodey Batiza (*Recorder*)
Michelle Frost
Heidi Groven
Terry Jorgensen
Sharon McCotter
Marilynn Torkelson
Jeff Weiss
Jessica Willey

CAC members Oct 2022 (pictured left to right): Michelle, Andrew, Terry, Rodey, Sharon, Marilynn. Not pictured: Heidi, Jim, Jeff, Jessica.

Technical Advisory Committee

The Technical Advisory Committee (TAC) includes representatives of cities, counties, and government agencies. They provide technical advice on projects and programs to the District. The board of managers annually appoints members to the TAC. Staff from agencies or local government units are welcome to join us at our meetings.

Steve Christopher
Board of Water & Soil Resources

Jeff Weiss
Citizen Advisor

Paul Moline
Carver County

Mike Wanous
Carver County Soil & Water Conservation District

Bryan Gruidl
City of Bloomington

Joe Seidl
City of Chanhassen

Matt Clark
City of Chaska

Robert Bean Jr.
City of Deephaven

Dave Modrow
City of Eden Prairie

Sara Schweigert
City of Minnetonka

Robert Bean Jr.
City of Shorewood

Karen Galles
Hennepin County

Linda Loomis
Lower Minnesota River Watershed District

Joe Mulcahy
Metropolitan Council

Wes Pearce-Saunders/
Tayler Huinker
Minnesota Department of Natural Resources

Minnesota Pollution Control Agency

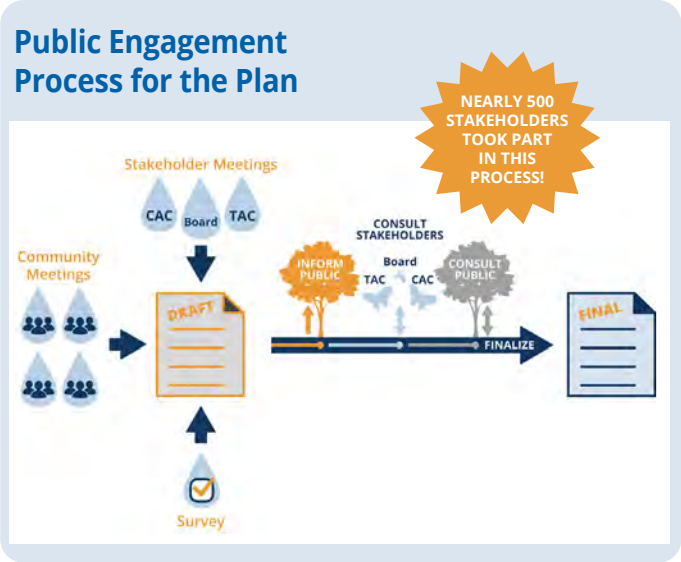
US Army Corps of Engineers

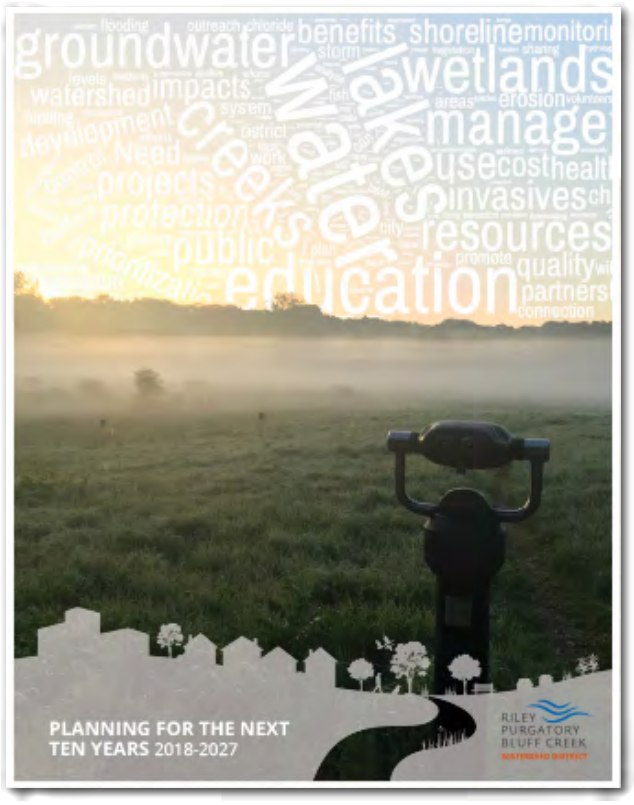
10-Year Management Plan

In 2018, the District's 10-year Watershed Management Plan was adopted. The plan guides all the District's actions, from monitoring to water quality projects, over a 10-year period. The plan can be found at rpbcwd.org/10yearplan. If you cannot access the plan online, contact District staff to obtain a copy.

Each year, a District Workplan is developed to guide implementation of the 10-Year Watershed Management Plan. The workplan can be viewed in the next section of this report.

Components of the 10-Year Plan





Capital Improvement Program Update

To update the District's 10-year Watershed Management Plan, the District worked in 2018 to evaluate and prioritize its capital improvement projects. Of the 175 projects identified, the District, with input from partners, identified 34 projects to be implemented during the next 10 years beginning in 2018. One new project, Lake Riley Alum Treatment, was identified and added later. The table below provides a summary of the status of the District's Capital Improvement Program as of the end of 2022.

Status of Capital Improvement Projects

Capital Improvement Project Name	Anticipated Substantial Completion	Status at end of 2022
BLUFF CREEK		
Bluff Creek Tributary	2020	Substantially complete; ongoing vegetation establishment
Bluff Creek Reach 5	2024	Feasibility study complete. Headwater wetland restoration added and completed. 30% design of Galpin Blvd crossing.
Chanhassen High School	Completed 2019	Collaborating with ISD 112
Wetland Restoration at Pioneer Trail	2022	Substantial completion in July of 2022. On-going vegetation establishment and maintenance.
RILEY CREEK		
Like Riley Alum Treatment (second)	Completed 2020	Post-treatment monitoring
Lake Susan Water Quality Improvement Phase 2	Completed 2019	Completed
Rice Marsh Lake In-lake Phosphorus Load Control	Completed 2018	Monitoring
Rice Marsh Lake Water Quality Improvement Phase I	2022	Substantial completion in August of 2022. On-going vegetation establishment and maintenance. Monitoring of BMPs.
Riley Creek Restoration (Reach E and D3)	2020	Substantially complete; ongoing vegetation establishment
Lake Riley and Rice Marsh Lake Subwatershed Assessment	Completed 2021	Assessment completed
Upper Riley Creek Stabilization	Construction 2023/2024	Ecological enhancement plan complete; design in 2022
Middle Riley Creek Restoration	2022	Substantial completion in August of 2022; ongoing vegetation establishment and maintenance as well as E&O.
St. Hubert Water Quality Project	2021	Substantially completion Sept of 2021; ongoing vegetation establishment; development of education curriculum.

CONTINUED ON NEXT PAGE

Capital Improvement Project Name	Anticipated Substantial Completion	Status at end of 2022
PURGATORY CREEK		
Lotus Lake Kerber Pond Ravine	2020	Feasibility complete
Purgatory Creek Recreation Area - Berm/ Retention Area feasibility and design	2022	Design 90% complete; collaborating with City of Eden Prairie; construction 2023/2024.
Lotus Lake In-lake phosphorus Load Control	First dose completed 2018	Monitoring; second dose scheduled in 2023.
Silver Lake Water Quality Improvement Project	2022	Substantially complete in November 2021; ongoing vegetation establishment
Scenic Heights	2020	Completed
Hyland Lake In-lake phosphorus Load Control	First dose completed 2019	Completed; turned over lead to Three Rivers Parks; still partnering.
Mitchell Lake Subwatershed Assessment	Completed 2021	Assessment completed
Duck Lake Watershed Load	2021	Substantially complete; ongoing vegetation establishment
Lotus Lake Watershed Load - LL_1, LL_3, LL_7, & LL_8	2025	Feasibility study begun in fall of 2022 with anticipated completion in summer of 2023.

Local Plan Adoption & Implementation

The District has received and approved Local Surface Water Management Plans for all cities within the District as required under the District's regulatory program. The District will continue to administer its regulatory program in all municipalities.

Financial Status

The District's fund balance and financial status are included in the District's Annual Audit. The Annual Audit is included as Appendix D to this report. The District's audited financial report was prepared by Abdo, a certified public accounting firm. As required by Minnesota Rules §8410.0150, subp. 2, the Audited Financial Report includes classification and reporting of revenues and expenditures, a balance sheet, an analysis of changes in final balances, and all additional statements necessary for full financial disclosures.

2022 Audit

Upon its completion in late spring of 2023, the 2022 Audited Financial Report may be found on our website at rpbcwd.org/annualreport.

Biennial Solicitation of Interest Proposals

Under Minnesota Statute §103B.227, subd 5, the District must issue a biennial solicitation for legal, technical, and other professional services. Having solicited services in 2021, the District will solicit professional services again in early 2023. Solicitations for services will be printed in local newspapers, posted on the District website, and circulated online.

2022 Budget

The District adopted its 2022 Annual Budget in September 2021 and was shared with county assessors in December 2021. The 2022 Annual Budget and actual receipts and expenses for 2022 are set forth in the following table.

REVENUES		
Item	**Revised 2022 Budget**	**Actual received to date (Dec 2022)**
Plan Implementation Levy	$3,640,581.00	$3,619,016.70
Permit Fees	$25,000.00	$106,956.05
Grant Income	$71,933.00	$12,875.00
Investment Income	$30,000.00	$56,731.99
Miscellaneous Income	-	$1,248.78
Fund Balance	$3,767,514.00	$3,796,828.52
Cash Reserves	$3,355,058.00	-
Deferred Revenue	$272,000.00	-

EXPENDITURES				
ADMINISTRATION				
Item	**2022 Budget**	**Fund Transfers (None)**	**2022 Revenue Sources**	**Actual spent to date (Dec 2022)**
Audit	-	-	$15,000.00	$14,818.75
Accounting (and Audit)	-	-	$45,000.00	$35,027.68
Advisory Committees	-	-	$5,000.00	$1,215.90
Insurance and Bonds	-	-	$21,000.00	$26,009.33
Engineering Services	-	-	$132,000.00	$137,183.70
Legal Services	-	-	$108,000.00	$122,458.01
Manager Per Diem/Expense	-	-	$30,000.00	$41,190.18
Dues and Publications	-	-	$16,000.00	$9,159.66
Office Cost	-	-	$191,000.00	$150,304.28
Permit Review and Inspection	-	-	$160,000.00	$197,073.35
Permit and Grant Database	-	-	$30,000.00	$7,047.00
Professional Services	-	-	$17,400.00	$55,058.14
Recording Services	-	-	$15,500.00	$15,495.00
Staff Cost	-	-	$789,681.00	$445,344.88
SUBTOTAL	-	-	**$1,575,581.00**	**$ 1,257,385.86**

Continues on next page

PROGRAMS AND PROJECTS				
Item	**2022 Budget**	**Fund Transfers (None)**	**2022 Revenue Sources**	**Actual spent to date (Dec 2022)**
District Wide				
10-Year Management Plan	-	-	$80,000.00	$15,795.66
AIS Inspection and early response	-	-	$68,000.00	$15,569.26
Cost-Share/Stewardship Grant	-	-	$260,000.00	$206,710.88
Data Collection and Monitoring	-	-	$213,000.00	$185,510.16
Community Resiliency	-	-	$130,000.00	$102,240.00
Education and Outreach	-	-	$100,000.00	$98,143.96
Plant Restoration - U of M	-	-	$50,000.00	$6,654.13
Repair and Maintenance Fund	-	-	$100,000.00	$12,726.50
Wetland Management	-	-	$157,000.00	$6,752.11
Groundwater Conservation	$220,000.00	$(49,000.00)	$171,000.00	$40,830.39
Lake Vegetation Implementation	-	-	$76,000.00	$76,737.25
Opportunity Project	-	-	$250,000.00	-
Stormwater Ponds- U of M	-	-	$20,000.00	$15,170.00
Hennepin County Chloride Initiative	-	-	$90,000.00	$93,555.94
Lower Minnesota Chloride Cost-Share	-	-	$195,000.00	$80,684.95
SUBTOTAL	**-**	**-**	**$1,960,000.00**	**$957,081.19**
Bluff Creek				
Bluff Creek Tributary	-	-	$5,000.00	$4,490.80
Wetland Restoration at Pioneer Trail	-	-	$478,933.00	$92,560.03
Bluff Creek B5 by Galpin Blvd	-	-	$120,000.00	$13,426.50
SUBTOTAL	**-**	**-**	**$603,933.00**	**$110,477.33**
Riley Creek				
Lake Riley Alum Treatment	-	-	$20,000.00	$32,152.50
Rice Marsh Lake in-lake phosphorus load	-	-	$26,000.00	$8,520.70
Lake Susan Water Quality Improvement Phase 2	-	-	-	$2,005.10
Rice Marsh Lake Water Quality Improve Phase 1	-	-	$228,000.00	$122,993.81
Riley Creek Restoration (Reach E and D3)	-	-	$78,000.00	$34,587.69
Upper Riley Creek Stabilization	-	-	$1,447,000.00	$176,347.53
Middle Riley Creek	$201,000.00	$140,000.00	$61,000.00	$96,775.29
St. Hubert Water Quality Project	-	-	$46,000.00	$109.30
SUBTOTAL	**-**	**-**	**$1,906,000.00**	**$473,491.92**

Continues on next page

Item	2022 Budget	Fund Transfers (None)	2022 Revenue Sources	Actual spent to date (Dec 2022)
Purgatory Creek				
Purgatory Creek Rec Area-Berm/retention area-feasibility/design	$225,000.00	$(91,000.00)	$134,000.00	-
Lotus Lake in-lake phosphorus load control	-	-	$80,000.00	-
Silver Lake Restoration: Feasibility Phase 1	-	-	$46,000.00	$44,402.83
Scenic Heights	-	-	$4,058.00	-
Hyland Lake in-lake phosphorus load control	-	-	$20,000.00	-
Duck Lake watershed load	-	-	$25,000.00	$5,149.48
Duck Lake Partnership	-	-	$235,000.00	$235,000.00
Lotus Lake Watershed Improvement Project	-	-	$325,000.00	$21,654.25
SUBTOTAL	**-**	**-**	**$869,058.00**	**$306,206.56**
RESERVE	**-**	**-**	**$230,000.00**	**-**
TOTAL EXPENDITURES	-	-	$7,144,572.00	$3,104,642.86

2022 Work Plan

Each year, the watershed district creates a work plan with goals and objectives for its projects and programs. The plan is a guide for the year, and a way to track progress. This summary describes the District's accomplishments toward fulfilling its 2022 work plan.

ADMINISTRATION	Description
Accounting, Audit & Budget	• Coordinate with Accountants for the development of financial reports • Coordinate with the Auditor • Continue to work with the Treasurer to maximize on fund investments
Administration	• Administrator activities
Annual Report & Communication	• Compile, finalize and submit an annual report to agencies
BWSR	• Discuss Targeted Watershed Grant distribution
DEI	• Incorporate Diversity, Equity, and Inclusion (DEI) into District programs as appropriate
Human Resources	• General human resources
Internal Policies	• Work with Governance Manual and Personnel Committees to review bylaws and manuals as necessary
Advisory	• Engage with the Technical Advisory Committee on water conservation, chloride management and emerging topics. • Engage with the Citizen Advisory Committee on water conservation, annual budget, and emerging topics
Local SWMP	• Administer local Stormwater Management Program (SWMP)
MAWD	• Minnesota Association of Watershed Districts
DISTRICT WIDE	**Description**
Regulatory Program	• Review regulatory program to maximize efficiency • Engage Technical Advisory Committee and Citizen Advisory Committee on possible rule changes. • Implement a regulatory program
Aquatic Invasive Species (AIS)	• Review AIS monitoring program • Develop and implement Rapid Response Plan as appropriate • Coordinate with local government units (LGUs) and keep stakeholders aware of AIS management activities • Manage and maintain the aeration system on Rice Marsh Lake. • Riley Chain of Lakes Carp Management • Purgatory Chain of Lakes Carp Management • Review AIS inspection program • Keep abreast of technology and research in AIS • Zebra mussel adult and veliger monitoring
Cost Share	• Schedule and coordinate site visits • Review applications and recommend implementation • Evaluate program
Data Collection	• Continue Data Collection at permanent sites • Watershed Outlet Monitoring Program (WOMP) • Identify monitoring sites to assess future project sites • Water Level Sensors
District Hydrology & Hydraulics Model	• Coordinate maintenance of Hydrology and Hydraulics Model • Coordinate model update with LGUs if additional information is collected • Partner and implement with the City of Bloomington on Flood Evaluation and Water Quality Feasibility
Education and Outreach	• Implement Education & Outreach Plan, review at year end • Manage partnership activities with other organizations • Coordinate Public Engagement with District projects

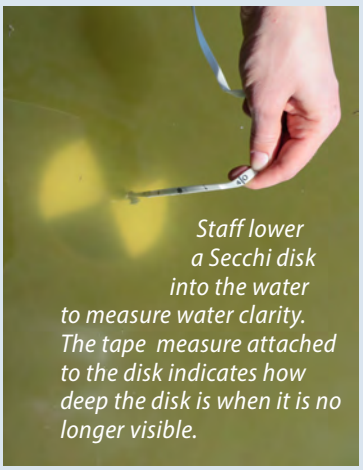
Continues on next page

Groundwater Conservation	• Work with other LGUs to monitor, assess, and identify gaps • Engage with the Technical Advisory Committee to identify potential projects • Develop a water conservation program (look at Woodbury model)
Lake Vegetation Management	• Work with the University of Minnesota or Aquatic Plant Biologist, cities of Chanhassen and Eden Prairie, lake associations, and residents as well as the Minnesota Department of Natural Resources on potential treatments. • Implement herbicide treatment as needed on monitored lakes (Susan, Riley, Lotus, Mitchell, Red Rock, Staring) • Secure DNR permits and contracts with herbicide applicators • Schedule regularly point intercept surveys • Work with Three Rivers Park District for Hyland Lake
Opportunity Projects	• Assess potential projects as they are presented to the District
Total Maximum Daily Load (TMDL)	• Continue working with the Minnesota Pollution Control Agency on the Watershed Restoration and Protection Strategies (WRAPS) • Engage the Technical Advisory Committee
Repair & Maintenance Grant	• Develop and formalize grant program.
University of Minnesota	• Review and monitor progress on University of Minnesota grant • Support Dr. John Gulliver and Dr. Ray Newman research and coordinate with local partners • Keep the managers abreast to progress in the research • Identify next management steps
Watershed Plan	• Review and identify needs for amendments.
Wetland Conservation Act (WCA)	• Administer WCA within the cities of Shorewood and Deephaven • Represent the District on Technical Evaluation Panel throughout the District
Wetland Management	• Assess known existing wetlands, identify previously unknown wetlands, identify wetlands for potential restoration/ rehabilitation and wetlands requiring additional protection
Hennepin County Chloride Initiative (HCCI)	• Phase 2: Develop market research to target homeowner associations and worship centers on how to incorporate reduced salt use in their winter maintenance
Lower Minnesota Chloride Cost-Share Program	• The Lower Minnesota River Watersheds are coming together to offer cost-share grants
BLUFF CREEK WATERSHED	**Description**
Bluff Creek Tributary Restoration	• Implement and finalize restoration • Monitor Project
Wetland Restoration at Pioneer Trail/ Hwy 101	• Remove 3 properties from flood zone, restore a minimum 7 acres and as many as 16 acres of wetlands, connect public with resources, reduction of volume, rate, pollution loads to Bluff Creek
RILEY CREEK WATERSHED	**Description**
Lake Riley Alum Treatment	• Continue monitoring of lake
Lake Susan Improvement Phase 2	• Collect data from functioning iron-enhanced sand filter and reuse system
Lake Susan Spent Lime	• Yearly startup and monitoring
Lower Riley Creek Stabilization	• Finalize plant establishment and remove temporary erosion prevention and sediment control BMPs • Continue Public Engagement for project and develop signage for restoration
Rice Marsh Lake Alum Treatment	• Analyze sediment cores for second alum dosing
Rice Marsh Lake Watershed Load Project 1	• Executed cooperative agreement with Chanhassen • Implement project
Upper Riley Creek	• Develop cooperative agreement with the City of Chanhassen • Order project and begin design.
Middle Riley Creek	• Implement project • Work with Bearpath Golf and Country Club to develop education and outreach program

Continues on next page

St. Hubert Water Quality Project	• Develop curriculum to be used with teachers and students at St. Hubert • Establish native vegetation and monitor soil development, water quality/quantity benefits, and ecological changes.
PURGATORY CREEK WATERSHED	**Description**
Purgatory Creek Recreation Area (PCRA) Berm	• Work with City to determine next steps
Duck Lake Water Quality Project	• Close out project
Lotus Lake Internal Load Control	• Analyze sediment cores for second alum dosing
Scenic Heights	• Close out project
Silver Lake Restoration	• Execute cooperative agreement with Chanhassen • Implement project • Develop and install signage

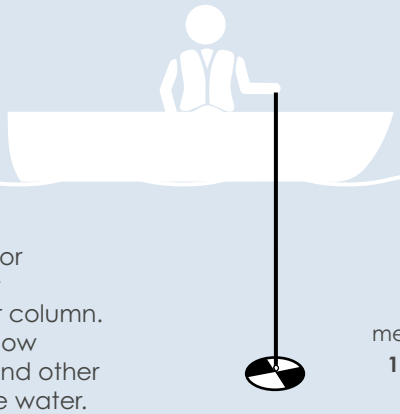
Did You Know?



Staff lower a Secchi disk into the water to measure water clarity. The tape measure attached to the disk indicates how deep the disk is when it is no longer visible.

How Water Clarity is Measured

A Secchi disk is a simple tool for measuring how deep sunlight penetrates into a lake's water column. The measurement indicates how much fine sediment, algae, and other suspended particles are in the water. Reduced water clarity may be harmful to aquatic plants and animals.



Water clarity is measured in meters.
1 meter = 3.3 feet

2023 Budget & Work Plan

The District adopted its 2023 Annual Budget in September 2022 and revised through December 2022. For a description of goals, see section 3 of the 10-Year Plan.

Administration & Overhead

Title	2023 Budget	Description	Goals
Administration and Overhead	$1,792,011	Professional Services	Admin 1, Reg 1
		Staff compensation	Admin 1
		Rent & utilities	Admin 1
		Permit review and inspections	Admin 1, Reg 1
		Develop and foster relationships with partner cities	Admin 1, Plan 1
		Advisory committees and manager per diem	Admin 1, Plan 1

District Wide Initiatives & Projects

Title	Budget	Description	Goals
10-Year Management Plan	$135,000	Review and evaluate regulatory program for improved efficiency	Plan 1
		Review and evaluate project prioritization metrics	Plan 1
		Facilitate meetings of TAC, CAC, and other stakeholders	Plan 1
		Develop Ecological Health Action Plan	Plan 2
AIS Inspection and Early Response	$68,000	Partner with municipalities and counties to provide watercraft inspections at launches	Wqual 1, Wqual 3
		Provide capacity and mechanics for rapid response to newly discovered aquatic invasive plant populations	Wqual 1, Wqual 3
Cost-share/Stewardship Grant	$280,000	Provide financial incentive to private landowners to implement best management practices on their properties	EO 1, Wqual 1, Wqual 3
		Provide financial assistance to municipalities to implement and incorporate best management practices into facilities management and capital projects	EO 1, Wqual 1, Wqual 3
		Provide technical assistance to landowners concerning erosion prevention, sediment control, and surface water management	EO 1, Wqual 1, Wqual 3
Data Collection and Monitoring	$233,300	Collect hydraulic, hydrologic, and water quality data on District lakes and streams	DC 1
		Monitor and assess near-bank scour and escarpment erosion	DC 1
		Maintenance of Watershed Outlet Monitoring Program (WOMP) stations	DC 1
		Monitor flow rates and volumes as well as water quality parameters in areas identified as potential locations for BMPs	DC 1, Wqual 1
		Monitor installed best management practices to assess efficacy and to guide future projects	DC 1, Wqual 1
		Assist lake associations and municipalities in the development of lake management plans	DC 1
Community Resiliency	$260,000	Develop high resolution hydraulic and hydrologic model throughout the District	Plan 2
		Develop flood risk mapping for various climate change impact scenarios	Plan 2
		Partner with municipalities and local road authorities to identify and address community resilience practices and projects	Plan 1, Plan 2

Continues on next page

Education and Outreach	$110,000	Work with local schools and other youth organizations to provide educational programs and curriculum pertaining to surface water management	EO 1
		Develop and disseminate information through written formats, website development, social media platforms, etc	EO 1
		Recruit, engage, and supervise volunteer groups	EO 1
		Engage in partnerships such as the Minnesota Water Steward program and the Hennepin County Chloride Initiative	EO 1
		Partner with municipalities to fulfill their MS4 requirements	Plan 1, EO 1
Plant Restoration - U of M	$54,000	Partner with faculty and students at the University of Minnesota to gather data on aquatic vegetation management and restoration.	Wqual 1, Wqual 3, DC 1
Repair and Maintenance Fund	$100,000	Maintenance of best management practices initiated by the District	Admin 1, Plan 1
Wetland Management*	$140,000	Assess all wetlands within the District utilizing the MN Rapid Assessment Methodology	Wqual 2
		Perform Floristic Quality Assessments on all District wetlands	Wqual 2
		Develop metrics for the assessment of functions and values that can be improved or restored throughout the District for water quality, erosion prevention, sediment control, habitat provision, biodiversity, community resilience.	Wqual 2, Wquan 1, Plan 2
		Develop and maintain GIS database of wetland function and values	Wqual 1, Wqual 2
Groundwater Conservation*	$100,000	Work with cities to develop programs aimed at reduction of potable water supply use.	Ground 1
		Collect data and employ modeling to understand groundwater / surface water interaction	Ground 1, Plan 1
Lake Vegetation Implementation	$148,000	Perform point intercept surveys	Wqual 1, Wqual 3, Data 1
		Perform aquatic invasive species surveys	Wqual 1, Wqual 3, Data 1
		Perform turion counts	Wqual 1, Wqual 3, Data 1
Opportunity Project*	$250,000	Funds dedicated to capital projects brought forward by stakeholders not currently identified in the 10-year plan. **Will require plan amendment when implemented.	Admin 1, Plan 1
Stormwater Ponds - U of M	$4,830	Finalization of the research done by the UofM SAFL on performance of stormwater pond and potential treatment.	Plan 1, DC 1, Wqual 1
SUBTOTAL	**$1,883,130**		

Continues on next page

Bluff Creek Watershed Initiatives and Capital Projects

Title	Budget	Description	Goals
Bluff Creek Tributary*	$5,000	Last year of maintenance for vegetation establishment and punchlist items in restored Bluff Creek tributary.	Wqual 1
Wetland Restoration at Pioneer	$100,000	Removal of three homes from floodplain of large wetland complex	Plan 2, Wquan 1
		Restoration of seven acres of hydrologically altered wetland.	Wquan 1, Wqual 2, Wqual 3
		Flood storage, rate control, and stream protection for Bluff Creek	Wqual 1, Wqual 2, Plan 2
		Work with volunteer organizations and local government to develop and provide for educational opportunities	EO 1
Bluff Creek B5 by Galpin	$110,000	Feasibility and design of creek restoration in upper Bluff Creek near headwaters	Wqual 1
		Evaluation of headwater wetland for restoration, flood storage, and habitat restoration.	Wqual 1, Plan 1, Plan 2,
SUBTOTAL	**$215,000**		

Riley Creek Watershed Initiatives and Capital Projects

Title	Budget	Description	Goals
Lake Riley - Alum Treatment*	$0	Continue monitoring of Lake Riley to determine future actions.	Wqual 1, DC 1
Rice Marsh Lake in-lake phosphorus load	$15,000	Sediment coring.	Wqual 1, DC 1
Rice Marsh Lake Water Quality Improvement - Phase 1	$27,000	Installation of two inline manufactured treatment devices	Wqual 1, DC 1
		Construction of bioinfiltration practice	Wqual 1, DC 1
		Restoration of prairie area as well as soils correction for infiltration and for data collection of efficacy as treatment practice	Wqual 1, DC 1
Riley Creek Restoration (Reach E and D3)	$58,000	Final plant establishment and punchlist item completion for stabilization of lower Riley Creek	Wqual 1, Wqual 3
Upper Riley Creek Stabilization	$1,924,000	Feasibility, design, and construction of upper Riley Creek from TH 5 to Lake Susan.	Wqual 1, Wqual 3
Middle Riley Creek Restoration	$27,000	Final plant establishment and punchlist item completion for stabilization of middle Riley Creek	Wqual 1, Wqual 3
St Hubert Water Quality Project	$50,000	Work with school staff to develop educational curriculum and opportunities for students at St Hubert's and elsewhere	EO 1
		Final plant establishment and punchlist item completion for stabilization of St. Hubert Water Quality Project	Wqual 1, EO 1
SUBTOTAL	**$2,101,000**		

Continues on next page

Purgatory Creek Watershed Initiatives and Capital Projects

Title	Budget	Description	Goals
Purgatory Creek Rec Area- Berm	$214,000	Partnership with Eden Prairie to repair of berm for flood control, water treatment, and recreational access.	Wqual 1, Wqual 3, Plan 2
Lotus Lake in-lake phosphorus load control*	$115,000	Dosing calculations for future alum treatment; will carry over to next year	Wqual 1, Wqual 3
Silver Lake Water Quality BMP	$9,400	Final vegetation establishment and punch list items for project that installed iron enhanced sand filter ditch checks and channel stabilization	Wqual 1
Hyland Lake in-lake phosphorus load control	$0	Assist Three Rivers Park District as needed.	Wqual 1, Wqual 3, DC 1
Duck Lake Watershed Load	$15,000	Vegetation maintenance of biofiltration features constructed in 2021 throughout the Duck Lake Watershed.	Wqual 1, EO 1
Duck Lake Road Partnership	$235,000	Partnership with Eden Prairie to reconnect fragmented Duck Lake, protect lacustrian wetland areas and provide flood storage.	Wqual 1, Plan 1, Plan 2
Lotus Lake Watershed Improvement Project (LL1, LL3, LL7, LL8)	$350,000	Design and feasibility of multiple regional stormwater treatment practices throughout the Lotus Lake watershed in concert with Chanhassen	Wqual 1, DC 1, Plan 1
Kerber Pond Ravine - Lotus Lake	$80,000	Partner with Chanhassen to stabilize tributary to Lotus Lake	Wqual 1, Plan 1
SUBTOTAL	**$1,018,400**		

SUMMARY	
RESERVE	**$325,000**
TOTAL EXPENDITURES	**$7,334,541**

*Denotes multi-year project

REGULATORY PROGRAM UPDATE

Regulation plays an important role in preventing and mitigating water resource issues. The regulatory program sets standards that must be met by entities that develop or otherwise disturb land within the District. The regulatory program is intended to provide for consistent application of resource protection from impacts related to land use change throughout the watershed.

The District's Board of Managers adopted the regulatory program on November 5, 2014, and implementation of the regulatory program went into effect in January 2015. In response to stakeholder comments, the District modified the regulatory program in 2018 and 2019. The regulatory program includes thirteen rules, A-N, (rule I was eliminated in 2018 revisions). The rules and summary of modifications are available on the District's website at rpbcwd.org/permits.

Permitting

The District Regulatory Program requires individuals and entities desiring to take certain actions to obtain a permit from the District before commencing any work covered by District Rules. Since the District reinstituted its regulatory program in 2015, 571 permit applications have been submitted to the District, including 76 for the 2022 calendar year. In 2021 District staff began using MS4Front permit management software and database which allows staff to easily view and track permits, escrows, fees, inspections, and violations.

In 2022, there were 24 permit applications that were approved by the Board of Managers. In addition, another 38 were approved administratively as set forth in District policy. These included 20 permits for work on existing single-family lots of record, 20 issued to municipalities or local road authorities, and 22 to commercial properties.

In 2022, the District was responsible for administration of regulations throughout the District as no municipalities adopted ordinances equally protective of the resources.

Variances

In 2022, two requests for variances from District rules were submitted and approved by the Board of Managers:

- One variance request was for the floodplain management and drainage alterations rule (Rule B) for the Reserve at Autumn Woods project (Permit Number 2021-063). The request pertained to the provision of compensatory storage criteria.
- One variance request was for the wetland and creek buffers rule (Rule D) for the Tonka-Woodcraft Improvements project (Permit Number 2021-079). The request pertained to the buffer widths criteria.

District staff inspect project sites and direct permit holders to take corrective actions as needed to protect water quality. The image above shows a silt fence violation (failure) at a site in 2022.

The image above shows tracking of sediment onto a street from a 2022 construction site, which violates District permit rules.

Permit Violations

During 2022 there were three locations where work was conducted without a permit from RPBCWD. The district continues to work with the property owners to rectify these conditions and as such the Board of Managers has not pursued formal violation notices or enforcement action as indicated in Rule N.

Wetland Conservation Act

In September 2018, the District assumed Minnesota Wetland Conservation Act (WCA) authority from the cities of Deephaven and Shorewood for property within the District. As WCA authority, the District has the authority to issue WCA wetland boundary and type, exemption, and no-loss determinations; sequencing and replacement plan approvals; authority to request the assistance of the technical evaluation panel (TEP) as defined by Minnesota Rule 8420.0240; and otherwise administer WCA. Under direction of the Administrator, District staff review WCA applications with members of the TEP, which includes representatives from BWSR, county, local watershed districts/management organizations, and, as needed, the Minnesota DNR, city, and U.S. Army Corp of Engineers.

As a part of WCA authority, BWSR requires the District to fill out an annual tracking form. In 2022, staff received two WCA applications. The first was a boundary and type application from Shorewood. The application was approved with the condition that the applicant adjust boundaries of their delineated wetlands based upon TEP site review.

The second was a boundary and type application in Deephaven. Staff and TEP members voiced concerns about placement of delineated wetland boundaries in the wetland report. Due to late timing of application and drought conditions, reviewers determined a site review could not occur in 2022. District staff and applicant agreed to withdraw and resubmit the application in spring 2023 when conditions would accommodate a delineation review.

District staff also serve as members of TEP for other cities. Responsibilities include reviewing application materials and providing comments. Staff also attend meetings or site visits as deemed necessary by the acting LGU.

Passed into law in 1991, the Minnesota Wetland Conservation Act strives to achieve no net loss in the quantity, quality, and ecological diversity of Minnesota's existing wetlands.

FLOOD RISK ASSESSMENT

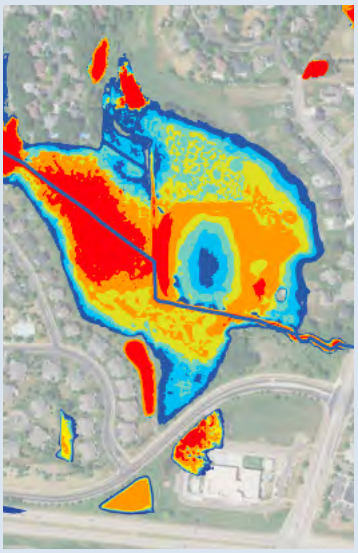
Beginning in 2021, with anticipated completion in 2023, the District partnered with the City of Eden Prairie to incorporate more detailed information in the Riley Creek and Purgatory Creek subwatershed hydrologic and hydraulic models and to develop a framework to prioritize future evaluation of flood-risk reduction projects. The initial framework includes six criteria identified by the Technical Advisory Committee for prioritizing flood-prone areas but may be modified to address flood-prone areas identified within Eden Prairie:

- Number of impacted structures
- Frequency of flooding
- Social vulnerability index
- Project efficiency
- Multiple benefits
- Critical Infrastructure

The evaluation is partially funded with a grant from the Minnesota Pollution Control Agency (MPCA). The evaluation will include thousands of areas throughout Eden Prairie. Areas with higher scores indicate locations that are a higher priority to mitigate flood-risk. Work in 2021 included revisions to the stormwater models to incorporate additional detail. In 2022, updated model results were validated, and models are being used to identify flood-prone areas within Eden Prairie.

The prioritization framework can be used as a tool to determine where to begin with further evaluation of flood-risk mitigation projects. This provides the RPBCWD and City of Eden Prairie a methodology to compare potential benefits of flood-risk mitigation projects and prioritize how to invest limited resources for mitigating flood risk.

In 2023, the District will continue to identify partnership opportunities with member cities to add detail to the stormwater model to identify flood-risk areas not adjacent to the creeks.



Flood risk maps are located in the Appendix of this report.

High water on Purgatory Creek in 2018.

Wetlands play an important role in reducing flood risk.

CHLORIDE REDUCTION INITIATIVES

The District is the fiscal agent and project lead partnering with area water management organizations for two chloride reduction initiatives: the Hennepin County Chloride Initiative (HCCI) and the Lower Minnesota Chloride Grant. Both programs target chloride pollution and are supported by a Watershed-Based Implementation Funding grant from the Board of Soil and Water Resources (BWSR). The grant from BWSR ran through the end of 2022.

Hennepin County Chloride Initiative

The first phase of the Hennepin County Chloride Initiative (HCCI) gathered input from applicators to understand barriers and needs from the industry. The final report is available on the District website.

The second phase of the initiative was development of site winter maintenance management plan templates. The templates were completed in 2021 and housed on the Minnesota Pollution Control Agency statewide chloride resources webpage under "Site winter maintenance management plan templates."

The final phase occurred in 2021-22. HCCI worked with a marketing firm to develop chloride reduction messaging and branding for an initiative called *Low Salt, No Salt Minnesota*.

LOW SALT. NO SALT. MINNESOTA
CLEARING A PATH TO SAFETY, SAVINGS & SUSTAINABILITY

Low-Salt-No-Salt-MN.org

Low Salt, No Salt Minnesota includes a webpage, hosted by RPBCWD, with a wealth of tools and resources to assist LGUs in their local chloride pollution reduction efforts.

RPBCWD hosted a facilitator workshop in January 2023 to launch the initiative. More than 25 people from watershed districts, municipalities, state agencies, and private consultants attended the first facilitator workshop. More facilitator workshops are planned along with presentations about *Low Salt, No Salt Minnesota* at the Minnesota Water Resources Conference and the Minnesota Association of Watershed Districts Conference.

The *Low Salt, No Salt* toolbox includes a facilitator guide, PowerPoint presentation, videos, pledge form,

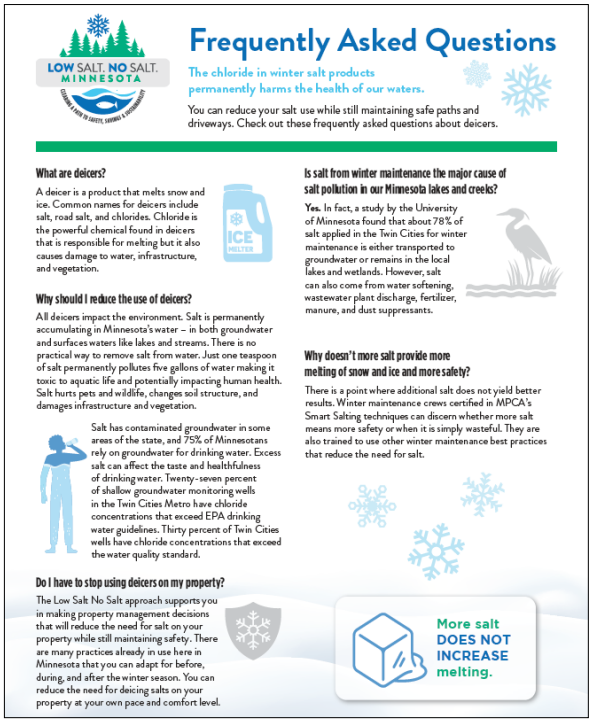
Low Salt, No Salt Minnesota facilitator workshop held at the RPBCWD office on January 31, 2023.

Card handout available from Low-Salt-No-Salt-MN.org.

frequently asked questions list, and more.

Press for *Low Salt, No Salt Minnesota* included an article in the Star Tribune — front page on the printed version! The article was also shared by Star Tribune social media accounts as well as by HCCI partner accounts.

Moving forward, members of HCCI will continue working together on chloride pollution reduction by building the resources section of the *Low Salt, No Salt* webpage and sharing any materials that are developed by others. An online map is in the early stages of development that shows where programming has already occurred.



Lower MN Collaborative Chloride Reduction Grant

The Lower Minnesota Collaborative kicked off the Chloride Reduction Grant in 2020 with funds from a BWSR Watershed-based Funding Grant. The Chloride Reduction Grant offered financial support and resources for businesses and local government units for tools and practices which reduce, directly or indirectly, chloride use by that organization. The program concluded in 2022 with expiration of BWSR grant funds.

The collaborative included RPBCWD, Nine Mile Creek Watershed District, Lower Minnesota River Watershed District, and Richfield-Bloomington Watershed Management Organization. During its duration, the Chloride Reduction Grant supported seven projects. Participants included three municipalities, two school districts, and two businesses. Projects included equipment upgrades and a weather station to better monitor winter road conditions.

Below is a summary of grant funds expended:

Chloride Reduction Grant Budget Summary	
Funds distributed	$107,013

Eden Prairie Independent School District #272 used Chloride Reduction Grant Funds to replace two outdated salt spreaders with more advanced equipment that can be calibrated to conditions and ultimately reduce salt use.

Educator Mini-Grants

The Educator Mini-Grant supports educators in their efforts to connect their students with water resources. One Mini-Grant was approved in 2022 for a teacher at Scenic Heights Elementary School to repair the dock on their school pond to provide students with safer access to the pond.

Scenic Heights Elementary utilized a Mini-Grant to repair dock for student use.

Action Grants

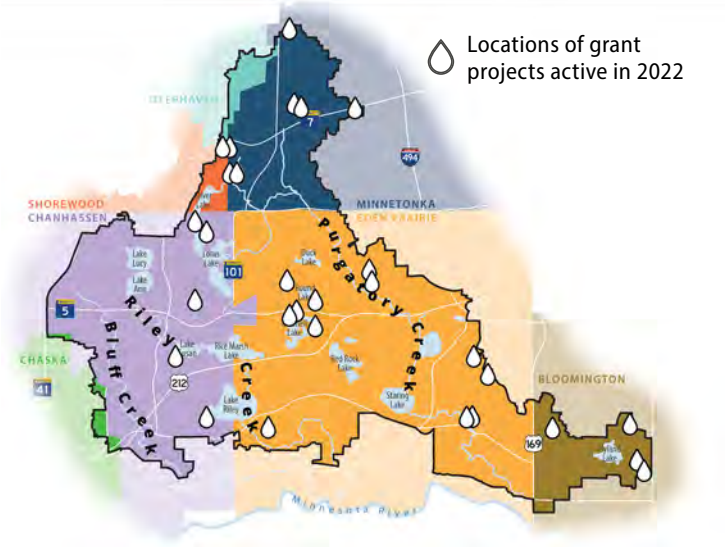
Action grants are small, simple grants for projects to protect clean water. They are designed to help members of the community install fun, easy projects as a way to grow awareness throughout within communities in our watershed. 2 projects were approved in 2022 and are underway. One project will replace buckthorn on the bluffs of Purgatory Creek with native plants, and the other will transform a traditional lawn into a bee lawn.

Stewardship Grants

The Watershed Stewardship Grant Program provides cost-share and technical assistance for projects that protect and conserve water resources. Ideal projects increase public awareness of the vulnerability of local water resources and solutions to improve them.

Potential grant applicants are required to begin an application with a site visit. In 2022, 39 site visits performed. The initial or "kick off" site visits are typically performed by Seth Ristow with the Carver Soil and Water Conservation District (SWCD). This ongoing partnership provides opportunity for district residents to discuss their project ideas with someone experienced in implementing a variety of best management

Active Watershed Stewardship Grantees in 2022



Who were the grantees?

Homeowners	22
Non-profits	7
Municipality	1

Where were they from?

Eden Prairie	12
Chanhassen	6
Minnetonka	6
Bloomington	4
Shorewood	1

What kind of project did they do?

Habitat restorations	18
Native plantings	4
Shoreline resto/buffer	4
Rain gardens	3

practices including habitat restoration, erosion control, and rain gardens. Of the 39 initial site visits in 2022, about half resulted in submission of a grant application and executed cost-share agreements.

Twenty-one grant projects were completed in 2022 with total cost-share reimbursement of $97,755.740. Before reimbursement, grantees must schedule and pass a project inspection (Carver County SWCD). The grantee must also submit a project report consisting of a summary description, photographs, and receipts before reimbursement is considered by grant coordinator. Grantees are required to maintain projects and submit reports for several years after installation.

At the end of 2022, nine projects remained active with completion anticipated in 2023. The pending reimbursement for these project totals about $60,000.

A general overview of activities in 2022 is provided in the table below.

2022 Stewardship Grant Activities	Quantity
Site visits performed	39
Grant applications submitted	18
Executed grant agreements	17
Projects completed (executed 2021 or 2022)	21

Some cost-share projects installed in 2022.

Native planting at The Preserve Association.

Kolb-Severson native vegetation shoreline buffer.

Ursel shoreline before project installation.

Ursel shoreline after native vegetation buffer installation.

EDUCATION & OUTREACH

There are many ways to have an impact on clean water, and we can't do it alone. The District's Education & Outreach program aims to support the goals outlined in the 10-Year Plan by fostering an engaged community and offering opportunities for involvement.

The District's commitment to community engagement continued in 2022 despite the challenges presented by COVID-19. This section explores the ways the Education & Outreach program continued to provide opportunities for stewardship and build a network of engaged residents

Events

Tree Giveaway

The gravel beds outside our office spent the summer growing saplings and shrubs so that their roots could grow dense and hardy. While in a gravel bed, a sapling will grow at its normal rate above ground, but below ground will form a fibrous root system that will give it an advantage when it's eventually planted in the ground. Planting trees provides a full range of ecosystem services and is an excellent way to minimize stormwater runoff. In total, RPBCWD gave away 100 saplings to 42 community members to plant on their properties. Trees given away included a diverse mix oak, crabapple, wild plum, dogwood, chokecherry, and elderberry.

Tabling Events

In 2022, RPBCWD staff and volunteers hosted tables at these events:

- Eden Prairie Everything Spring Expo (95 people)
- Eden Prairie Eco Expo (65 people)
- Minnetonka High School Volunteer Fair (estimated 40 students stopped by)
- Minnesota Association of Watershed Districts (MAWD) Annual Conference

Staff Eleanor Mahon and GreenCorps member Alaina Portoghese at the 2022 MAWD conference next to the RPBCWD display that won "Best Education Booth."

Feb Fest

The 29th Annual Chanhassen February Festival was February 5th. The District has participated in this event since 2018, leading free snowshoeing tours around Lake Ann. In 2022, 35 visitors to the festival snowshoed with us including 12 youth visitors. Twenty-two people (mostly youth) completed our Lake Ann Bingo scavenger hunt.

RPBCWD staff and volunteers hosted snowshoe tours at Feb Fest 2022.

Project Tour

A project tour for the Board of Managers and members of the Citizen Advisory Committee (CAC) was held on October 11, 2022. Scott Sobiech, District Engineer, led the tour with presentations by staff including Josh Maxwell and Zach Dickhausen. Bearpath Golf Course representatives also met with the tour group at Stop 1 to discuss their role in the Middle Riley Creek Restoration Project. The tour included a tour guide and six stops as follows:

Stop 1	Middle Riley Creek (R3) Restoration Project
Stop 2	Pioneer Trail Wetland Restoration Project
Stop 3	Rice Marsh Lake Stormwater Management Project (The Kraken)
Stop 4	St. Hubert Water Quality Project
Stop 5	Upper Riley Creek (R4) Restoration Plan
Stop 6	Upper Bluff Creek (B5) Ecological Enhancement Plan

The first stop during the 2022 Project Tour was at the Middle Riley Creek Restoration Project at Bearpath Golf Course.

Josh Maxwell, Water Resources Coordinator, explains operation of the automated sampling unit for the Kraken filtration units for the Rice Marsh Lake Stormwater Management Project (Stop 3).

District Engineer Scott Sobiech answers questions about the St. Hubert Water Quality Project (Stop 6 of the tour).

Volunteer Program

Adopt-a-Dock

Adopt-a-Dock is a citizen science initiative where lakeshore residents monitor for aquatic invasive species. In 2022, 22 participants used passive plate samplers to monitor for zebra mussels on Duck, Lucy, Lotus, Mitchell, Red Rock, Riley, and Silver lakes.

Adopt-a-Drain

In 2022, 50 new participants adopted 74 storm drains within the Riley Purgatory Bluff Creek Watershed District, preventing 1,268 pounds of debris from entering our waterways. Led by Hamline University, Adopt-a-Drain allows individuals, businesses and organizations to adopt a storm drain in their neighborhood and pledge to keep it clear of leaves and debris throughout the year. Participants track their impact by logging the amount of debris cleared into an online portal. Homeowners who have adopted drains can opt to receive small yard signs to place near their drains, educating their neighbors about their positive impact on clean water. Across all of Minnesota, the Adopt-a-Drain program kept 124,936 pounds of debris out of waterways in 2022.

Minnesota Water Stewards

A partnership with the Freshwater Society, Minnesota Water Stewards trains and supports community leaders to reduce water pollution and educate their community to conserve and protect our waterways. In 2022, RPBCWD sponsored one steward through the program, while 18 past stewards continued their service hours within the District.

Youth Outreach

Staff brought water resources into the classrooms of 805 students throughout the year. The District continued its partnership with the Eden Prairie Outdoor Center, where students tested the lake's dissolved oxygen and chloride levels and learned how their personal actions impact the health of our lakes.

Event	Grade	Students
Staring Lake Outdoor Center - winter session	4th grade	175
Staring Lake Outdoor Center - spring session	4th grade	168
Eden Lake Elementary	1st grade	104
Minnetonka Explorers	Kindergarten	105
Metro Children's Water Fest	4th grade	147
St. Hubert's School	2nd grade	70
Bluff Creek Elementary STEM Fest	4th & 5th grade	36
	Total students	805

St. Hubert 2nd graders learn about macroinvertebrates, Sept 2022.

Bluff Creek Elementary Students learn about watersheds, Nov 2022.

Continuing Education

In 2022, RPBCWD hosted five workshops and webinars in partnership with various community partners.

Turf Maintenance Training

The summer turf grass maintenance training with the Minnesota Pollution Control Agency focuses on best management practices for lawn/turf care maintenance. In 2022, 37 attendees learn how turf management affects local lakes and rivers, gain techniques to optimize fertilizer and pesticide applications, and access resources to help implement new techniques into their lawn care maintenance.

Webinars

RPBCWD hosted two additional webinars for 116 attendees in partnership with Nine Mile Creek Watershed District in 2022. A Shallow Lakes Webinar in the spring focused on the functions and values of shallow lakes, the importance of their plants, and the rules that regulate them. In the fall, a Rain Garden and Shoreline Buffer Workshop taught attendees how a rain garden or buffer planting can capture stormwater runoff on their property, reducing water pollution and absorbing more water into the soil.

Education Events	Attendees
Shallow Lakes Webinar *April 12, 2022*	106
Turf Grass Maintenance Training *Summer 2022*	37
Smart Salting for Property Managers *October 2, 2022*	9
Smart Salting: Parking Lots & Sidewalks *November 15, 2022*	120
Raingarden & Shoreline Buffer Workshop *November 29, 2022*	10
Total attendees	282

Smart Salting Trainings

RPBCWD hosted two Smart Salting trainings led by the Minnesota Pollution Control Agency in 2022. A total of 129 city staff, property managers, business staff, and winter maintenance professionals came together to learn how to reduce salt use while still maintaining a high level of safety and service. Participants learned of the hidden costs of salt use and the permanent environmental impacts of chloride pollution, were taught sustainable and efficient maintenance strategies. They were given resources to help fund smart salting practices, manage liability issues, and empower their staff and visitors to understand and participate in their smart salting measures.

Communications Program

The District's communication efforts encompass the various ways to convey our message of protecting and restoring our water resources to our community.

Annual Communication

In compliance with Minnesota Statute §103B.227, subdivision 4, the District created and distributed an Annual Communication. The 2022 Annual Communication includes general district information, updates on projects, and ways community members can help improve our water resources. Approximately 2,000 copies of the Annual Communication were sent to local leaders, distributed to city halls, libraries, and community centers across the District, and handed out at community events. Download the document at rpbcwd.org/annualreport.

Newsletters

Electronic newsletters are sent quarterly to mailing list subscribers who opt-in for district updates. Subscribers can also opt to receive emails for volunteer opportunities and board meeting notices. A summary of newsletter distribution is provided below.

2022 Newsletter Summary

Issue	Recipients	Opens	Link Clicks
Spring	520	229	23
Fall	642	252	32
Winter	761	281	12

Lake & Creek Fact Sheets

Fact sheets for each lake were updated with previous year's water quality data. The fact sheets were made available on the website, in the office's front vestibule, and upon request.

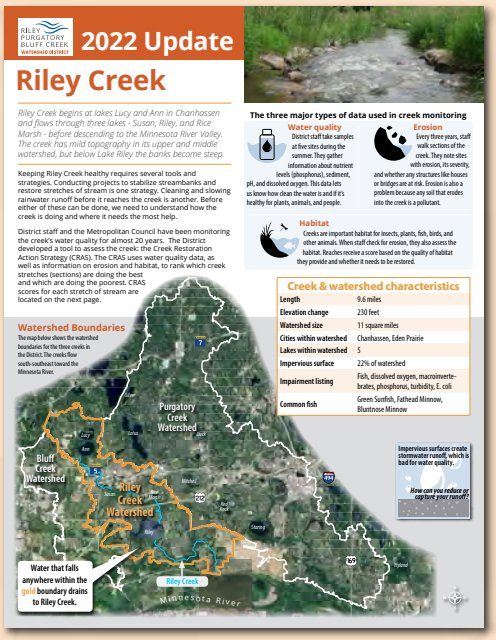
Fact sheets may be previewed in the Waterbodies section of this document. A fact sheet for waterbodies can be downloaded at rpbcwd.org/explore/waterbodies.

Lake fact sheets are available for:

- Ann
- Duck
- Hyland
- Lotus
- Lucy
- Mitchell
- Red Rock
- Rice Marsh
- Riley
- Round
- Silver
- Staring
- Susan

Creek fact sheets are available for:

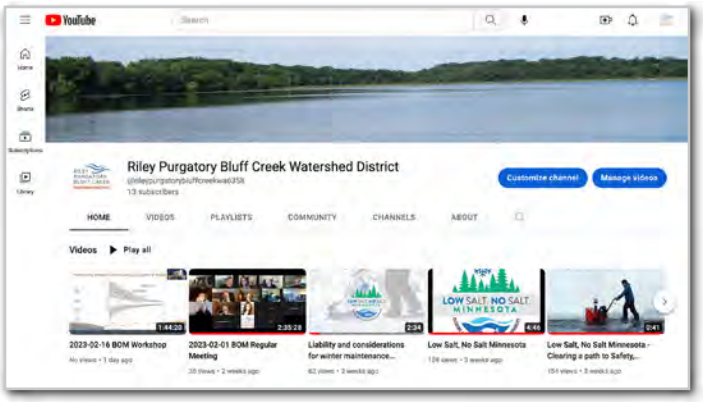
- Riley Creek
- Purgatory Creek
- Bluff Creek



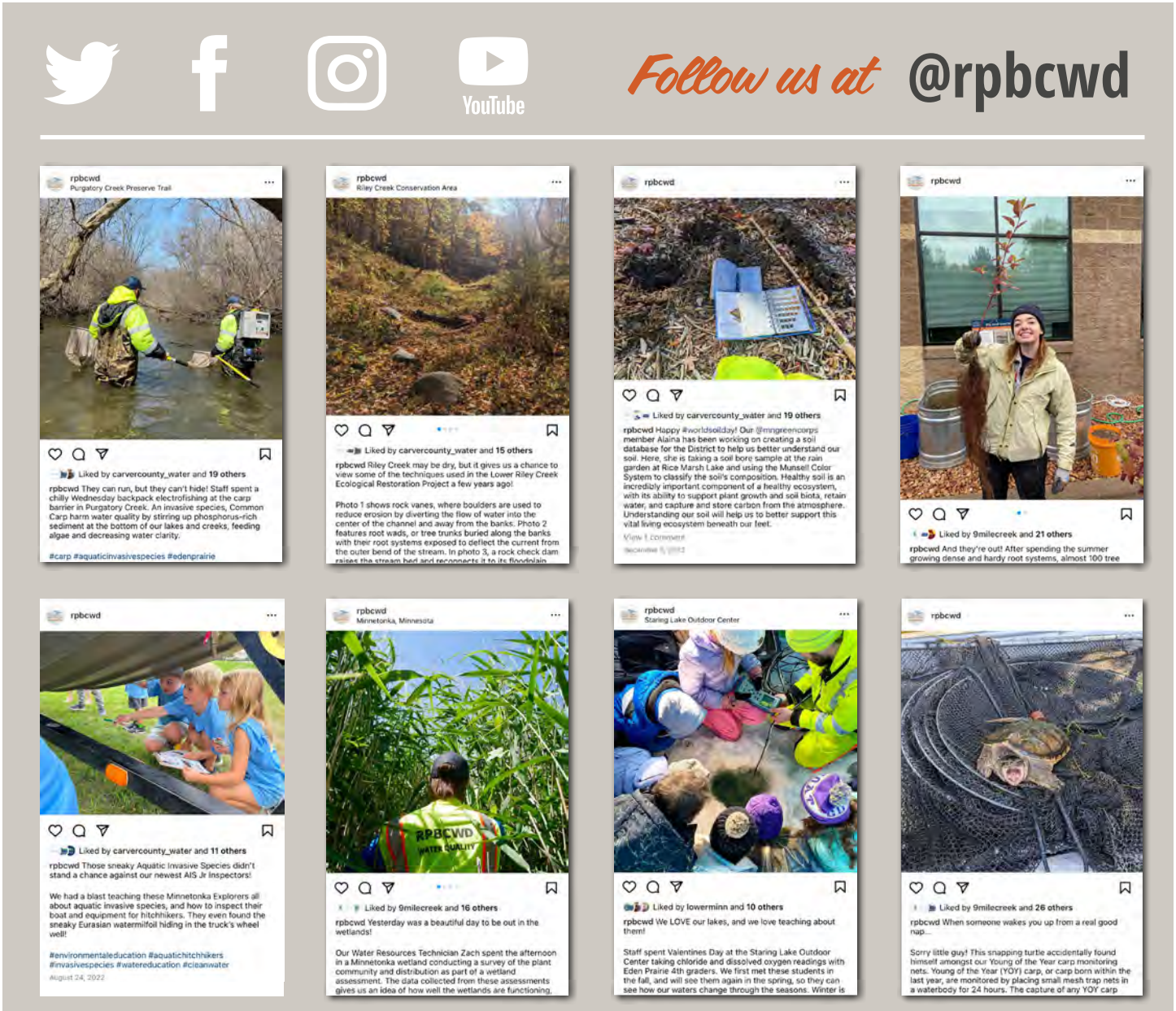
Social Media

The District currently posts content on three social media platforms including Facebook, Instagram, and Twitter under the username @rpbcwd. Through interactions and on handouts, the District encourages residents to follow District social media accounts.

Platform	Posts in 2022	Total followers
Twitter	13 tweets	246
Instagram	42 posts	444
Facebook	71 posts	409



In 2022, staff began expanding the video library on the RPBCWD YouTube channel. Moving forward, Board of Manager meetings will be posted on the channel in addition to other videos of interest.



Water Quality Monitoring

The water quality monitoring program supports the District's 10-year Water Management Plan to remove waterbodies from the Impaired Waters list maintained by the Minnesota Pollution Control Agency (MPCA). Data collected during the field season (April-September) helps determine sources of water quality impairments and provides information needed to design and install improvement projects.

Staff downloads lake level sensor data.

For a deeper dive into the details, download the *2022 Water Resources Report* on rpbcwd.org/annualreport.

Download the
2022 Water Resources Report
rpbcwd.org/annualreport

What's that abbreviation?

Abbreviation	What is stands for	What it indicates
Chl-a	Chlorophyll-*a*	Level of algae growth
CL	Chloride	Level of salt pollution
DO	Dissolved oxygen	Oxygen level of water
TP	Total phosphorus	Level of all phosphorus
TDP	Total dissolved phosphorus	Level of all available phosphorus
OP	Ortho phosphorus	Level of biologically available phosphorus
TSS	Total suspended solids	Level of silt/sediment suspended in water

How was water quality data collected in the District in 2022?

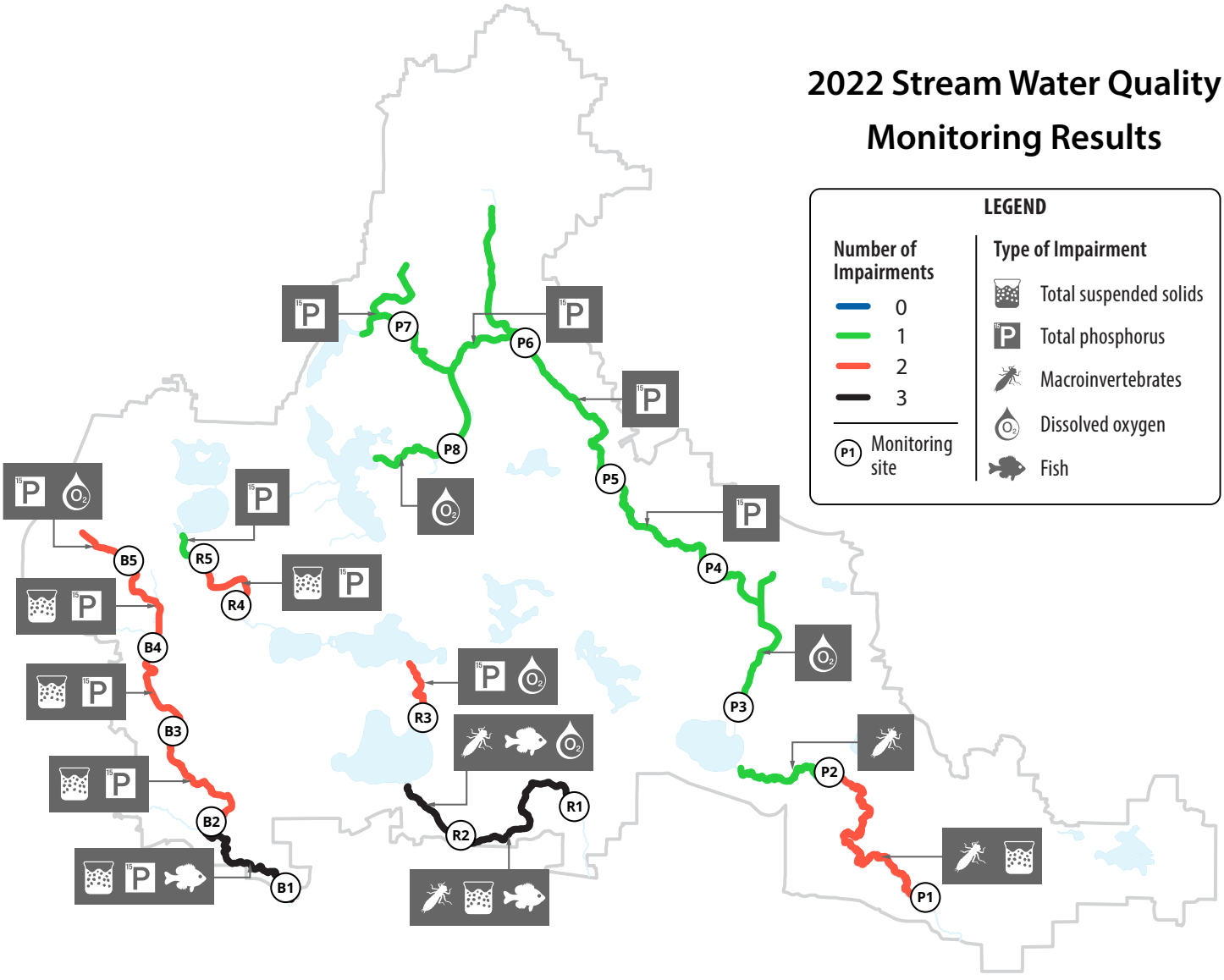
Method	Description	Data collected	Number of sites/units	Purpose
Regular bi-weekly sampling	On a bi-weekly basis at set locations, staff record data on-site and collect samples for lab testing. In streams, staff use a meter to measure a flow rate. In lakes, staff use a Secchi disk to measure clarity. *Waterbody types: Streams, lakes, high-value wetlands*	TP, OP, CL, Chl-a, TSS Water flow rate (streams)	Streams: 18 sites Lakes: 13 sites Wetlands: 2 sites	Consistent sampling locations allow comparison from year-to-year and of trends over time.
Automated sampling units	In-stream unit collects continuous data. Unit also collects water samples during storm events. *Waterbody types: Streams*	Continuous: Water level, temperature, flow rate Storm events: TP, OP, Chl-a, TDP, TSS	Streams: 4 units	Units moved as needed to collect data before implementation of improvement projects.
Enviro DIY units	In-stream unit collects data every 15 minutes. Data uploaded and available to anyone at monitormywatershed.org *Waterbody types: Streams, lakes, stormwater ponds, BMPs*	Water level, temperature, conductivity, turbidity	Streams: 5 units Lakes: 8 units	Units moved as needed to collect baseline data and data for hydraulic/hydrology modeling.
Lake level sensors	In-lake unit collects continuous data. *Waterbody types: Lakes, high-value wetlands*	Water level	Lakes: 7 sensors	Collect lake level data.
WOMP stations	In-stream unit collects continuous data. Unit also collects water samples during storm events. *Waterbody types: Streams*	Nitrogen, chloride, TSS, TP, OP, Chl-a, E coli	3 stations	Permanent stations owned by Metropolitan Council to monitor water quality trends.

Stream Status

In 2022, staff collected and analyzed water samples every two weeks, April through September, to determine average water quality of streams.

The District monitors streams for six impairment categories defined by the MPCA. When a measured value does not meet the standard, the stream is designated as impaired for the category. In 2022, the number of impairments for Riley and Purgatory remained the same as seen in 2021, but rose for Bluff Creek. The 2022 drought significantly impacted all three streams. Of the 18 regular sampling sites, 11 went dry or became stagnant at some point during the year. The increase seen in Bluff Creek was likely caused by the extremely low water levels and corresponding flows which concentrated nutrients and reduced dissolved oxygen in the stream. The table on the right shows a comparison between 2022 and the previous year. The map below shows the number of impairments by stream monitoring segment.

	Impairments per year		
Stream name	**2020**	**2021**	**2022**
Bluff Creek	10	9	11
Riley Creek	6	11	11
Purgatory Creek	11	9	9
TOTAL	**27**	**29**	**31**



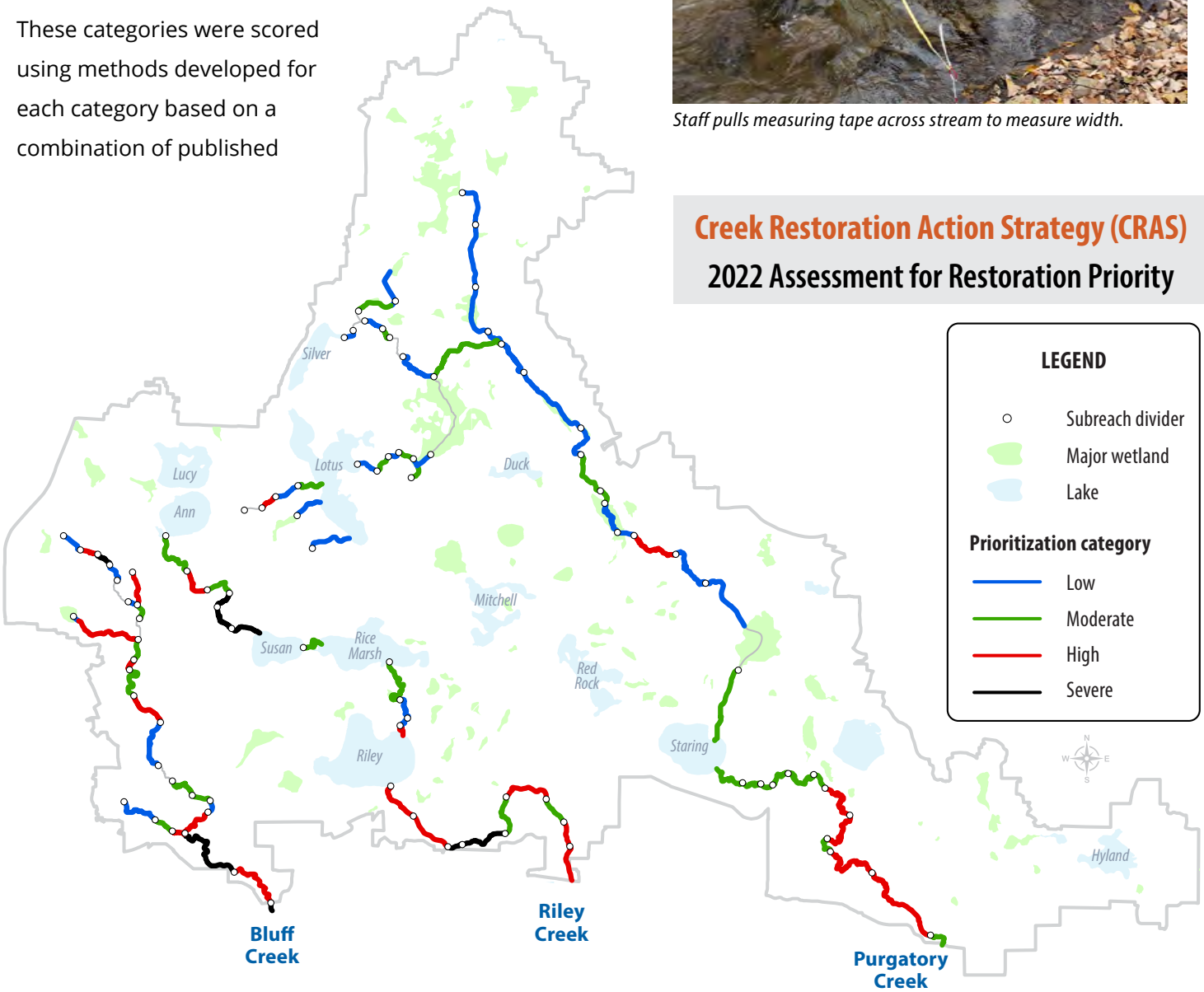
Creek Restoration Action Strategy (CRAS)

The RPBCWD developed the Creek Restoration Action Strategy (CRAS) to prioritize creek reaches, sub-reaches, or sites, in need of stabilization and/or restoration. The District identified eight categories of importance for project prioritization:

- Infrastructure risk
- Erosion and channel stability
- Public education
- Ecological benefits
- Water quality
- Project cost
- Partnerships
- Watershed benefits

These categories were scored using methods developed for each category based on a combination of published studies and reports, erosion inventories, field visits, and scoring sheets from specific methodologies. Final tallies of scores for each category, using a two-tiered ranking system, were used to prioritize sites for restoration/remediation.

Staff pulls measuring tape across stream to measure width.



2022 Lake Summaries

During the 2022 monitoring season, 13 lakes and two wetlands were monitored in the District. Regular water quality lake sampling was conducted on each lake approximately every two weeks throughout the growing season (June-September).

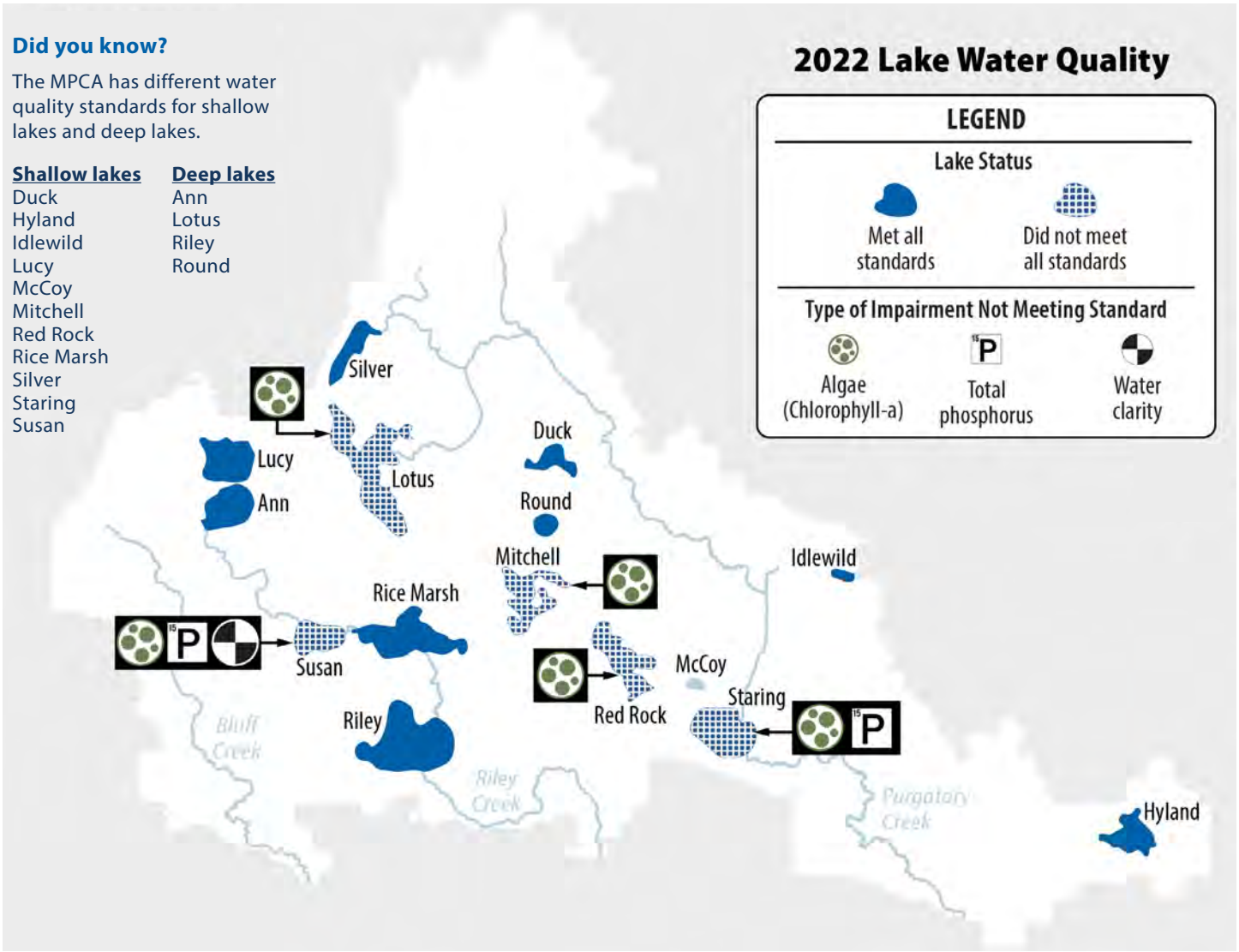
In 2022, Lake Ann, Lake Lucy, Lake Riley, Rice Marsh Lake, Silver Lake, Round Lake, Duck Lake, Hyland Lake, and Lake Idlewild met all three MPCA standards. Riley Chain of Lakes water quality remained relatively unchanged from 2021. Following the past aluminum sulfate ("alum") treatments, both Lake Riley and Rice Marsh Lake continued to meet all MPCA standards. Lake Susan had the most degraded water quality in 2022 and did not meet any of the standards. Of the Purgatory Chain of Lakes, Mitchell Lake improved from 2021 by meeting the TP while still not meeting the Chl-a. Following the spring 2022 alum treatment, Hyland Lake improved by meeting all standards. Staring Lake decreased in water clarity and saw significant increases in TP and Chl-a, likely because of a combination of low water levels and a reduction in non-native vegetation following the whole lake fluridone herbicide treatment. This led to increased sediment suspension, which should improve as native plants expand in the lake. All lakes met the proposed nitrate/nitrite water quality standard and only Idlewild (wetland) did not meet the chloride standard.

Looking for more details?
Download the
2022 Water Resources Report
online at rpbcwd.org/annualreport.

Did you know?

The MPCA has different water quality standards for shallow lakes and deep lakes.

Shallow lakes	Deep lakes
Duck	Ann
Hyland	Lotus
Idlewild	Riley
Lucy	Round
McCoy	
Mitchell	
Red Rock	
Rice Marsh	
Silver	
Staring	
Susan	



In addition to regular sampling, the District monitored water levels on lakes, assessed carp populations on seven waterbodies, and sampled zooplankton and phytoplankton populations in five lakes.

Staff removed 1,581 pounds of Common Carp (*Cyprinus carpio*) from the District in 2022. The majority of these fish (1,353 pounds) were removed from the Purgatory Chain of Lakes. In 2022, a total of four young-of-year (YOY) carp were captured via trap net surveys and all were captured in the Lower Purgatory Creek Recreation Area (LPCRA). The lack of young carp captured in other sampled lakes indicates that 2022 was a poor reproductive year for Common Carp. Carp biomass estimates were only high for Lake Susan Park Pond, which we will continue to monitor.

The District also monitored public access points and analyzed water samples for the presence of Zebra Mussel (*Dreissena polymorpha*) in 14 lakes. In 2022, zebra mussel veligers and adults were found only in Lake Riley (first recorded in 2018). In Lotus Lake, water samples processed in 2022 did not test positive for the presence of environmental DNA (eDNA) from zebra mussels, which is the first time since being listed in 2019. A boat lift onshore was found to be harboring fully desiccated zebra mussels, but it is unknown if they were introduced to the lake.

In 2022, aquatic vegetation surveys were conducted by the City of Eden Prairie in Hyland Lake (TRPD), Mitchell, Red Rock, and Rice Marsh, and by RPBCWD in Lake Susan, Lake Lucy, Lotus Lake, Staring Lake, and Lake Riley. In spring 2022, Curlyleaf Pondweed (*Potamogeton crispus*) was treated on Mitchell Lake (12.85 acres/Diquat), Lake Riley (16.7 acres/Diquat), Lake Susan (8.25 acres/Diquat), and Red Rock (13 acres/Aquathol). Eurasian watermilfoil (*Myriophyllum spicatum*) was treated on Riley (8.1 acres/Procellacor), and both Eurasian Watermilfoil and Curlyleaf Pondweed were targeted with a single treatment on Lotus Lake (20.8 acres/Diquat) and Staring Lake (whole lake/Fluridone).

2022 AIS Monitoring and Treatments

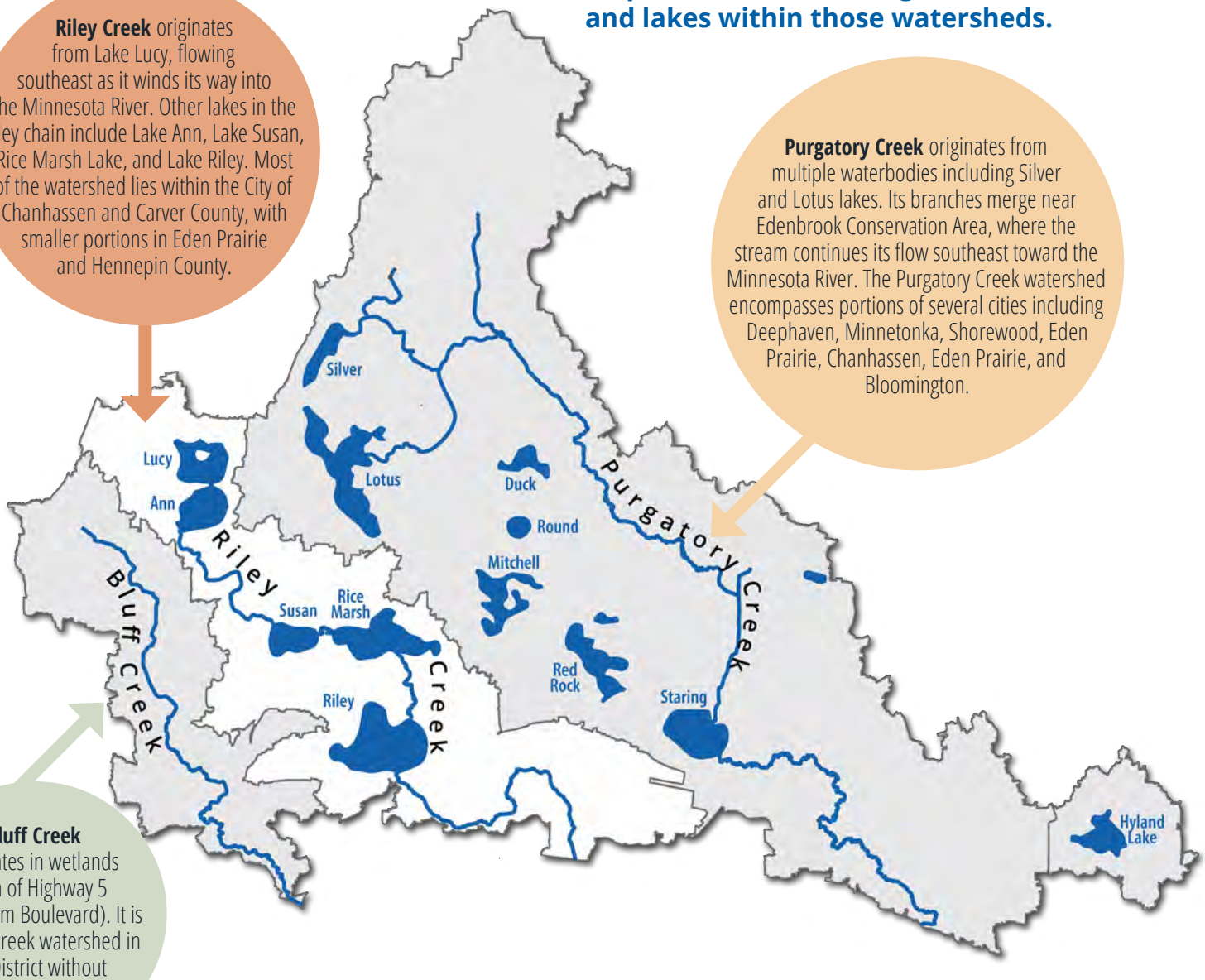
Lake name	Adult zebra mussel monitoring	Zooplankton & phytoplankton monitoring	Point-intercept vegetation survey	Invasive aquatic plant treatment
Ann	✓			
Duck	✓			
Hyland	✓		✓	✓
Idlewild				
Lotus	✓	✓	✓	✓
Lucy	✓		✓	
McCoy				
Mitchell	✓		✓	✓
Red Rock	✓		✓	✓
Rice Marsh		✓	✓	
Riley	✓	✓	✓	✓
Round	✓		✓	
Silver	✓			
Staring	✓	✓	✓	✓
Susan	✓	✓	✓	✓

In 2022, about 24,000 goldfish were removed from stormwater ponds Most of these came from Kerber Pond west of Lotus Lake.

Riley Creek originates from Lake Lucy, flowing southeast as it winds its way into the Minnesota River. Other lakes in the Riley chain include Lake Ann, Lake Susan, Rice Marsh Lake, and Lake Riley. Most of the watershed lies within the City of Chanhassen and Carver County, with smaller portions in Eden Prairie and Hennepin County.

Purgatory Creek originates from multiple waterbodies including Silver and Lotus lakes. Its branches merge near Edenbrook Conservation Area, where the stream continues its flow southeast toward the Minnesota River. The Purgatory Creek watershed encompasses portions of several cities including Deephaven, Minnetonka, Shorewood, Eden Prairie, Chanhassen, Eden Prairie, and Bloomington.

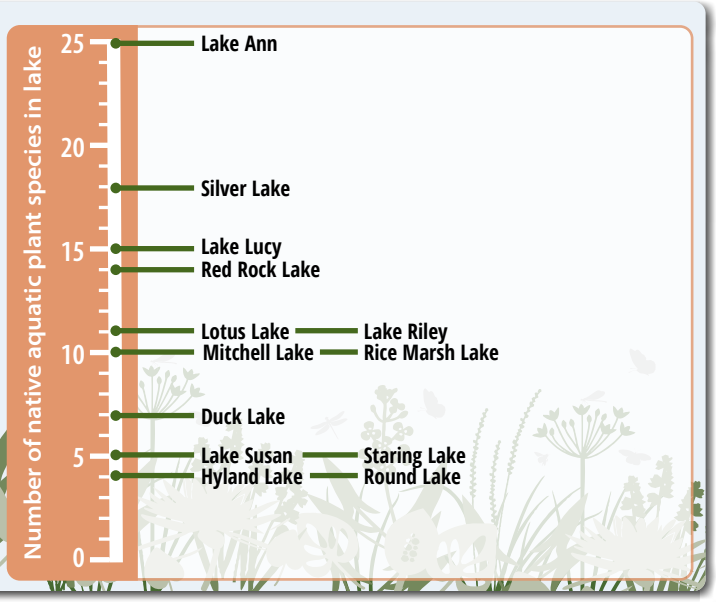
Map of RPBCWD showing creek watersheds and lakes within those watersheds.



Bluff Creek originates in wetlands north of Highway 5 (Arboretum Boulevard). It is the only creek watershed in the District without any lakes.

Native Aquatic Plant Diversity

To be healthy, a lake needs native aquatic plants! Plants remove pollutants from water, dissipate wave action, and provide wildlife habitat. How does the native aquatic plant diversity of lakes in the District compare to each other?



Lake Ann Fact Sheet

Download lake fact sheets: rpbcwd.org/explore/waterbodies

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

2022 Update

Lake Ann

Located in Chanhassen, Lake Ann is at the headwaters of Riley Creek. Over the past 40 years, Lake Ann has consistently met the Minnesota Pollution Control Agency clean water standards.

During June through September of each year, District staff visit the lake every two weeks to collect water samples and take readings. Samples are sent to a laboratory to be tested for nutrients and other compounds. Staff also measure water clarity by lowering a Secchi disk into the water and measuring how deep it goes before it is no longer visible. The data indicates the lake's health based on standards set by the Minnesota Pollution Control Agency (MPCA).

Lake Ann is classified as a "Deep Lake" by the MPCA. To be considered healthy, the lake must have very low average phosphorus and chlorophyll-a levels and an average water clarity of 1.4 meters (4.6 feet) or greater. See summary below. Additional details are located on the next page.

Total Phosphorus: The lake consistently meets the standard. In 2022, the average total phosphorus level was 0.020 mg/L, which was slightly lower than in the last three years.

Chlorophyll-a: The lake consistently meets the standard. In 2022, the average chlorophyll-a reading was 7.3 µg/L, a slight improvement from 2021.

Water clarity: The lake consistently meets the standard for water clarity. The average reading in 2022 was 3.3 meters, which was a slight decrease from 2021.

Fish: As part of the District's Common Carp Management Plan, staff deployed trap nets to assess carp reproduction. No young-of-the-year carp were captured, signaling no to very little reproduction in 2022. A total of 252 bluegills were captured in a 2022 fish survey. Five of the bluegills were in the 8 to 11-inch size class, which indicates a healthy reproducing population.

Lake & watershed characteristics

Lake size	119 acres
Average lake depth	16.8 feet
Maximum lake depth	40 feet
MPCA lake classification	Deep lake
Watershed size	257 acres
Impervious surface	2% of watershed
Impairment listing	Mercury
Common fish	Bluegill, Northern Pike, Largemouth Bass, Yellow Perch, Pumpkinseed Sunfish
Invasive species	Curly-leaf Pondweed, Eurasian Watermil-foil, Common Carp, Brittle Naiad

Watershed Boundary

Top 3 *things you can do at HOME to protect the LAKE*

Protect storm drains.
Prevent grass clippings, lawn fertilizer and debris from entering storm drains so they don't end up in the lake.

Pick up dog waste.
Did you know that pet waste pollutes water? It's full of nutrients and bacteria. Bag it and toss it in a trash can.

Reduce stormwater runoff.
Reduce the flow of stormwater off your property by installing a rain garden, native planting, or rain barrel.

Lake Ann Water Quality by the Numbers

For the past 40 years, **Lake Ann** has consistently met the clean water standards set by the MPCA. The graphs below show water quality trends over time with the red line showing the MPCA standard for **deep lakes**.

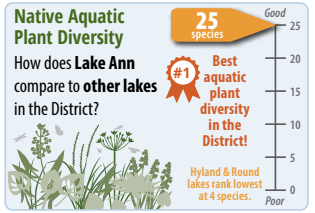
Averages

★ = Standard met

Water Quality Parameter	Historical Average	2022 Average	MPCA Standard: Deep Lakes
Total Phosphorus (mg/L)	0.025 ★	0.020 ★	< 0.040
Chlorophyll-a (µg/L)	8.1 ★	7.3 ★	< 14.0
Water Clarity (meter)	2.6 ★	3.3 ★	≥ 1.4

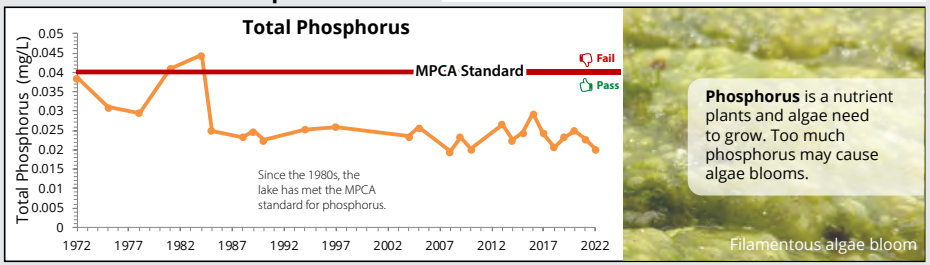
Native Aquatic Plant Diversity

How does **Lake Ann** compare to **other lakes** in the District?

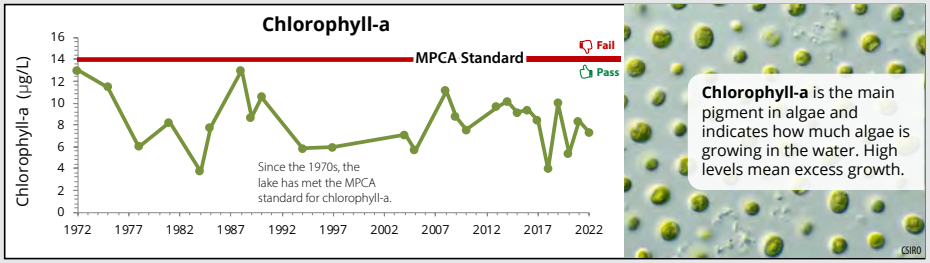


Trends Over Time: 1972-present

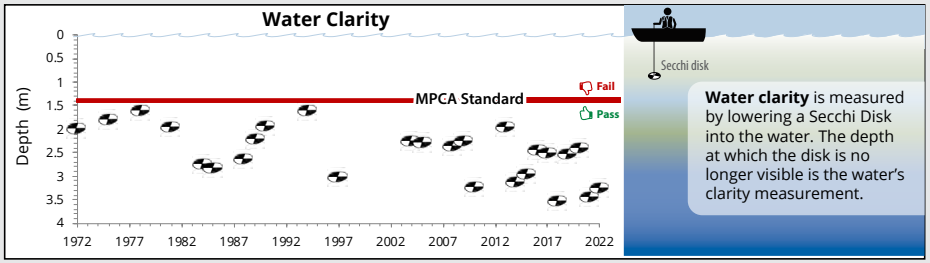
Read the *Water Resources Report* at rpbcwd.org/annualreport



Phosphorus is a nutrient plants and algae need to grow. Too much phosphorus may cause algae blooms.



Chlorophyll-a is the main pigment in algae and indicates how much algae is growing in the water. High levels mean excess growth.



Water clarity is measured by lowering a Secchi Disk into the water. The depth at which the disk is no longer visible is the water's clarity measurement.

Grants for Shoreline Restoration
The watershed district offers up to **75% cost share** assistance for restoring your shoreline! Learn more: rpbcwd.org/grants

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

Contact us

18681 Lake Drive East
Chanhassen, MN 55317

info@rpbcwd.org

952-607-6512

www.rpbcwd.org

@rpbcwd

Duck Lake Fact Sheet

Download lake fact sheets: rpbcwd.org/explore/waterbodies

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

2022 Update

Duck Lake

Located in Eden Prairie, Duck Lake is one of the District's shallow lakes. Since 2011, it has seen improvement in water quality and has met the Minnesota Pollution Control Agency's clean water standards for several years.

During June through September of each year, District staff visit the lake every two weeks to collect water samples and take readings. Samples are sent to a laboratory to be tested for nutrients and other compounds. Staff also measure water clarity by lowering a Secchi disk into the water and measuring how deep it goes before it is no longer visible. The data indicates the lake's health based on standards set by the Minnesota Pollution Control Agency (MPCA).

Duck Lake is classified as a "Shallow Lake" by the MPCA. To be considered healthy, the lake must have very low average phosphorus and chlorophyll-a levels and average water clarity of 1.0 meter (3.3 feet) or greater. See summary below. Additional details are located on the next page.

Total Phosphorus: No significant trend. In 2022, the lake met the MPCA standard with an average total phosphorus level of 0.031 mg/L.

Chlorophyll-a: No significant trend. In 2022, the average reading for chlorophyll-a was 5.2 µg/L.

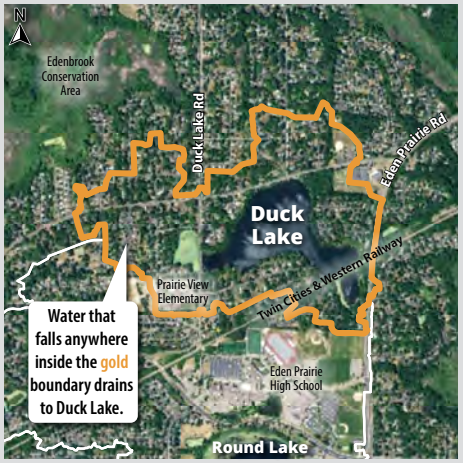
Water clarity: No significant trend. The lake consistently meets the standard for water clarity. The average reading in 2022 was 2.0 meters.

Fish: Over the past few years, Duck Lake has had consecutive winter fish kills due to depleted oxygen levels. This has reduced native fish survival and is considered a natural process for a shallow lake.

Lake & watershed characteristics

Lake size	41 acres
Average lake depth	3.4 feet
Maximum lake depth	8 feet
MPCA lake classification	Shallow lake
Watershed size	233 acres
Impervious surface	20% of watershed
Impairment listing	Not listed
Common fish	Bluegill, Black Crappie, Largemouth Bass, Green Sunfish
Invasive species	Curly-leaf Pondweed, Purple Loosestrife, Eurasian Watermilfoil, Goldfish

Watershed Boundary



Top 3 *things you can do at HOME to protect the LAKE*

Protect storm drains.
Prevent grass clippings, lawn fertilizer and debris from entering storm drains so they don't end up in the lake.

Pick up dog waste.
Did you know that pet waste pollutes water? It's full of nutrients and bacteria. Bag it and toss it in a trash can.

Reduce stormwater runoff.
Reduce the flow of stormwater off your property by installing a rain garden, native planting, or rain barrel.

Duck Lake Water Quality by the Numbers

The graphs below show water quality trends over time with the red line showing the MPCA standard for **shallow lakes**. Over the last decade, **Duck Lake** has typically met the clean water standards set by the MPCA.

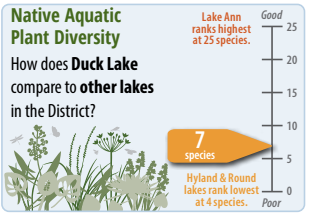
Averages

★ = Standard met

Water Quality Parameter	Historical Average	2022 Average	MPCA Standard: Shallow Lakes
Total Phosphorus (mg/L)	0.056 ★	0.031 ★	< 0.060
Chlorophyll-a (µg/L)	14.8 ★	5.2 ★	< 20
Water Clarity (meter)	1.8 ★	2.0 ★	> 1.0

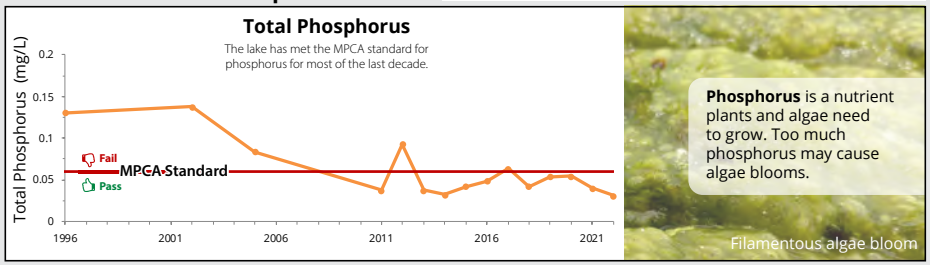
Native Aquatic Plant Diversity

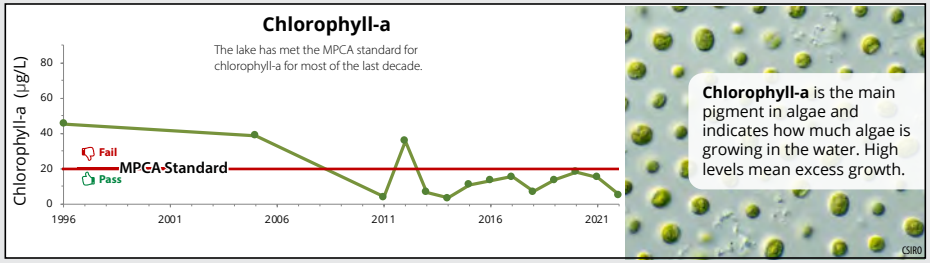
How does **Duck Lake** compare to **other lakes** in the District?

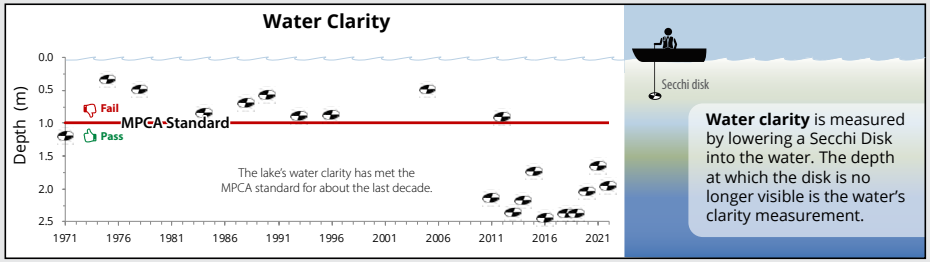


Trends Over Time: 1972-present

Read the *Water Resources Report* at rpbcwd.org/annualreport







Grants for Shoreline Restoration
The watershed district offers up to **75% cost share** assistance for restoring your shoreline! Learn more: rpbcwd.org/grants

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

Contact us

18681 Lake Drive East
Chanhassen, MN 55317

www.rpbcwd.org

info@rpbcwd.org

952-607-6512

@rpbcwd

Hyland Lake Fact Sheet

Download lake fact sheets: rpbcwd.org/explore/waterbodies

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

2022 Update

Hyland Lake

Located in Bloomington, Hyland Lake is surrounded by Hyland Lake Park Reserve, a Three Rivers Park District facility. Visitors can paddle the lake in the summer, hike nearby trails, and ski in the winter.

During June through September of each year, Three Rivers Park District staff visit the lake every two weeks to collect water samples and take readings. Samples are sent to a laboratory to be tested for nutrients and other compounds. Staff also measure water clarity by lowering a Secchi disk into the water and measuring how deep it goes before it is no longer visible. The data indicates the lake's health based on standards set by the Minnesota Pollution Control Agency (MPCA).

Hyland Lake is classified as a "Shallow Lake" by the MPCA. To be considered healthy, the lake must have very low average phosphorus and chlorophyll-a levels and average water clarity of 1.0 meter (3.3 feet) or greater. See summary below. Additional details are located on the next page.

Total Phosphorus: A second dose of aluminum sulfate (alum) was applied in 2022 by Three Rivers Park District. Alum reduces algae growth by trapping phosphorus, an algae food source, in lake sediments. In 2022, the lake met the MPCA standard with an average total phosphorus level of 0.034 mg/L. The lake has consistently met the standard since the first alum dose in 2019.

Chlorophyll-a: In 2022, the average reading for chlorophyll-a was 7.6 µg/L. Levels have dropped since the alum treatment.

Water clarity: Since the first alum treatment, the lake has met the standard for water clarity for the last four years. The average reading in 2022 was 1.7 meters.

Plants: Surveys in 2020-2022 for invasive Curly-leaf Pondweed (CLP) indicate a robust population, likely due to improved water clarity after the 2019 alum treatment. In 2022, Fluridone herbicide was used to treat CLP following ice-out and dramatically reduced CLP presence.
A late summer plant survey revealed low numbers of native plants, which may have been influenced by the lake's lowest water level since 1979.

Lake & watershed characteristics

Lake size	84 acres
Average lake depth	7.5 feet
Maximum lake depth	12 feet
MPCA lake classification	Shallow lake
Watershed size	922 acres
Impervious surface	17% of watershed
Impairment listing	Nutrients
Common fish	Bluegill, Black Crappie, Walleye, Black Bullhead, Largemouth Bass
Invasive species	Curly-leaf Pondweed

Watershed Boundary

Top 3 *things you can do at HOME to protect the LAKE*

Protect storm drains.
Prevent grass clippings, lawn fertilizer and debris from entering storm drains so they don't end up in the lake.

Pick up dog waste.
Did you know that pet waste pollutes water? It's full of nutrients and bacteria. Bag it and toss it in a trash can.

Reduce stormwater runoff.
Reduce the flow of stormwater off your property by installing a rain garden, native planting, or rain barrel.

Hyland Lake Water Quality by the Numbers

The graphs below show water quality trends over time with the red line showing the MPCA standard for **shallow lakes**. Three Rivers Park District provides most of the water quality and plant survey data for Hyland Lake.

ThreeRivers PARK DISTRICT

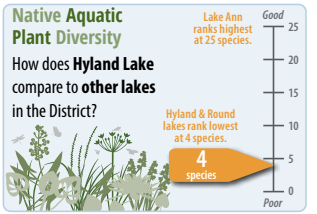
Averages

★ = Standard met

Water Quality Parameter	Historical Average	2022 Average	MPCA Standard: Shallow Lakes
Total Phosphorus (mg/L)	0.090	0.034 ★	< 0.060
Chlorophyll-a (µg/L)	54.1	7.6 ★	< 20
Water Clarity (meter)	1.2 ★	1.7 ★	> 1.0

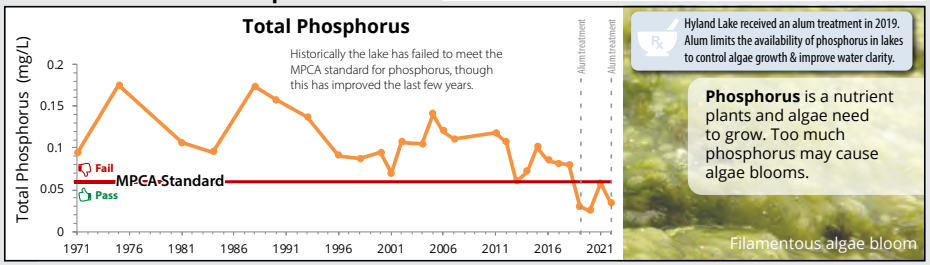
Native Aquatic Plant Diversity

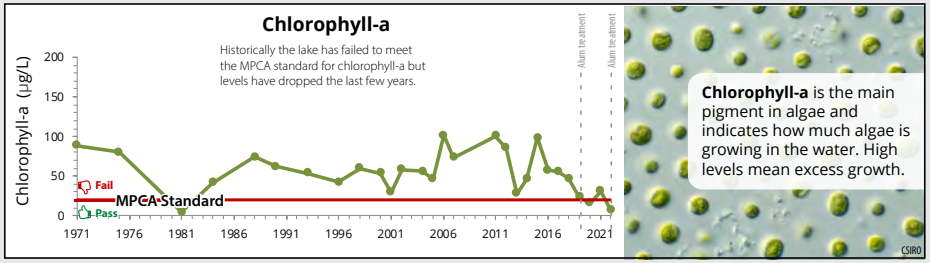
How does **Hyland Lake** compare to **other lakes** in the District?

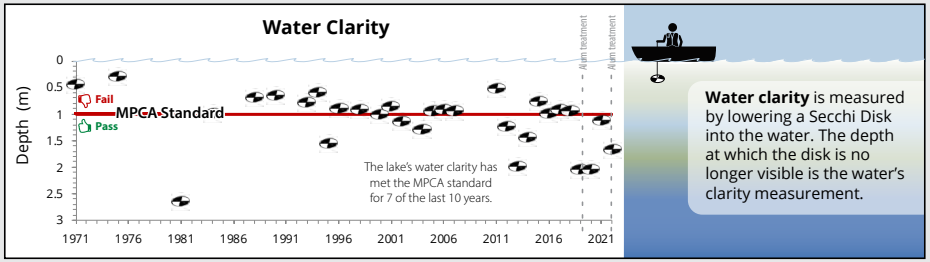


Trends Over Time: 1972-present

Read the *Water Resources Report* at rpbcwd.org/annualreport







Grants for Shoreline Restoration
The watershed district offers up to **75% cost share** assistance for restoring your shoreline! Learn more:
rpbcwd.org/grants

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

Contact us

18681 Lake Drive East
Chanhassen, MN 55317
www.rpbcwd.org
info@rpbcwd.org
952-607-6512
@rpbcwd

Lotus Lake Fact Sheet

Download lake fact sheets: rpbcwd.org/explore/waterbodies

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

2022 Update

Lotus Lake

Located in eastern Chanhassen, Lotus Lake is one of three headwaters of Purgatory Creek. Water flows out of Lotus into the south fork of Purgatory Creek, which eventually meets up with the two other forks of the creek.

During June through September of each year, District staff visit the lake every two weeks to collect water samples and take readings. Samples are sent to a laboratory to be tested for nutrients and other compounds. Staff also measure water clarity by lowering a Secchi disk into the water and measuring how deep it goes before it is no longer visible. The data indicates the lake's health based on standards set by the Minnesota Pollution Control Agency (MPCA).

Lotus Lake is classified as a "Deep Lake" by the MPCA. To be considered healthy, the lake must have very low average phosphorus and chlorophyll-a levels and average water clarity of 1.4 meters (4.6 feet) or greater. See summary below. Additional details are located on the next page.

Total Phosphorus: Since the alum treatment in 2018, the lake has consistently met the standard. In 2022, the average level was 0.033 mg/L.

Chlorophyll-a: The lake has never met the standard. In 2022, the average chlorophyll-a reading was 25.4 µg/L.

Water clarity: Since 2013, the lake has consistently met the standard for water clarity except for one year. The average reading in 2022 was 1.5 meters.

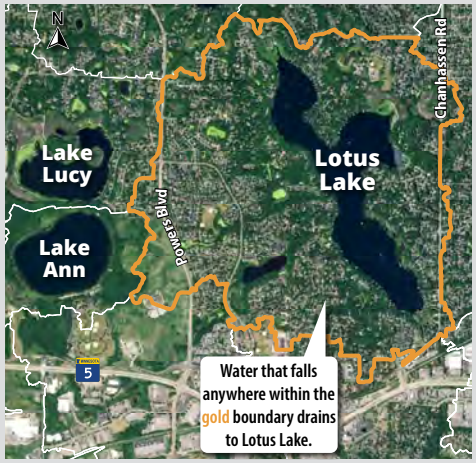
Fish: As part of the District's Common Carp management plan, Lotus Lake had trap nets deployed to assess carp reproduction. No young-of-year carp were captured signaling no to very little recruitment occurred in 2022.

Plants: Eurasian Watermilfoil and Curly-leaf Pondweed were targeted with Diquat herbicide in spring 2022. A late summer plant survey indicated that near-shoreline vegetation has declined since the 2017 and 2019 surveys. Coontail was the most common native plant species, while Eurasian watermilfoil has been steadily increasing since 2017.

Lake & watershed characteristics

Lake size	248 acres
Average lake depth	16 feet
Maximum lake depth	31 feet
MPCA lake classification	Deep lake
Watershed size	1,408 acres
Impervious surface	16% of watershed
Impairment listing	Mercury, nutrients, fish
Common fish	Bluegill, Yellow Bullhead, Walleye, Black Crappie
Invasive species	Eurasian Watermilfoil, Common Carp, Curly-leaf Pondweed, Brittle Naiad

Watershed Boundary



Top 3 *things you can do at HOME to protect the LAKE*

Protect storm drains.
Prevent grass clippings, lawn fertilizer and debris from entering storm drains so they don't end up in the lake.

Pick up dog waste.
Did you know that pet waste pollutes water? It's full of nutrients and bacteria. Bag it and toss it in a trash can.

Reduce stormwater runoff.
Reduce the flow of stormwater off your property by installing a rain garden, native planting, or rain barrel.

Lotus Lake Water Quality by the Numbers

For the last few years, **Lotus Lake** has consistently met the clean water standards set by the MPCA. The graphs below show water quality trends over time with the red line showing the MPCA standard for **deep lakes**.

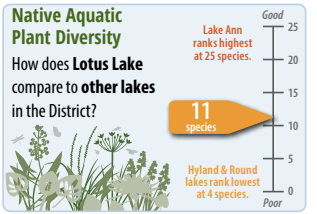
Averages

★ = Standard met

Water Quality Parameter	Historical Average	2022 Average	MPCA Standard: Deep Lakes
Total Phosphorus (mg/L)	0.050	0.033 ★	< 0.040
Chlorophyll-a (µg/L)	34.3	25.4	< 14.0
Water Clarity (meter)	1.4 ★	1.5 ★	≥ 1.4

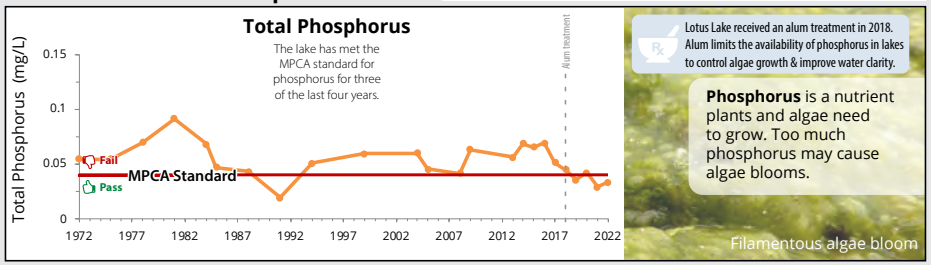
Native Aquatic Plant Diversity

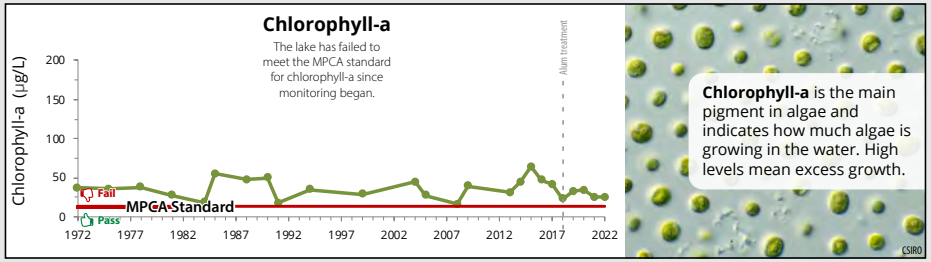
How does **Lotus Lake** compare to **other lakes** in the District?

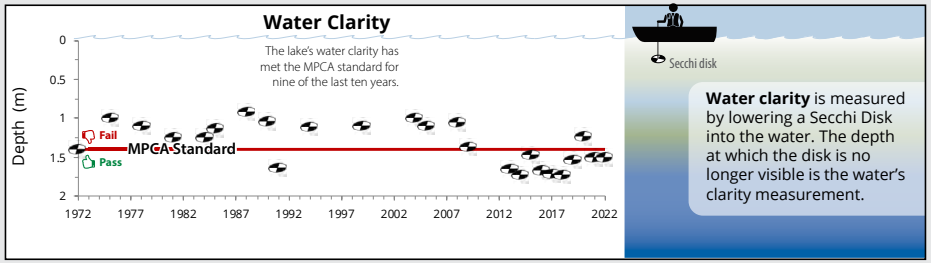


Trends Over Time: 1972-present

Read the *Water Resources Report* at rpbcwd.org/annualreport







Grants for Shoreline Restoration
The watershed district offers up to **75% cost share** assistance for restoring your shoreline! Learn more: rpbcwd.org/grants

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

Contact us

18681 Lake Drive East
Chanhassen, MN 55317

info@rpbcwd.org

952-607-6512

www.rpbcwd.org

@rpbcwd

Lake Lucy Fact Sheet

Download lake fact sheets: rpbcwd.org/explore/waterbodies

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

2022 Update

Lake Lucy

Lake Lucy is the headwaters to Riley Creek. Water flows out of Lucy to Lake Ann and then to Riley Creek. On its way south to the Minnesota River, Riley Creek passes through Susan, Rice Marsh, and Riley lakes.

During June through September of each year, District staff visit the lake every two weeks to collect water samples and take readings. Samples are sent to a laboratory to be tested for nutrients and other compounds. Staff also measure water clarity by lowering a Secchi disk into the water and measuring how deep it goes before it is no longer visible. The data indicates the lake's health based on standards set by the Minnesota Pollution Control Agency (MPCA).

Lake Lucy is classified as a "Shallow Lake" by the MPCA. To be considered healthy, the lake must have very low average phosphorus and chlorophyll-a levels and average water clarity of 1.0 meter (3.3 feet) or greater. See summary below. Additional details are located on the next page.

Total Phosphorus: No significant trend in average concentrations since monitoring began. In 2022, the lake met the MPCA standard with average level of 0.042 mg/L.

Chlorophyll-a: No significant trend but last few years have seen declining levels, which is likely linked to a winterkill in 2019/2020. In 2022, the average reading for chlorophyll-a was 13.3 µg/L, well within the MPCA standard of 20 µg/L.

Water clarity: No significant trend in average clarity readings since monitoring began. The lake consistently meets the standard. The average reading in 2022 was 2.3 meters, well within the MPCA standard of 1.0 meters.

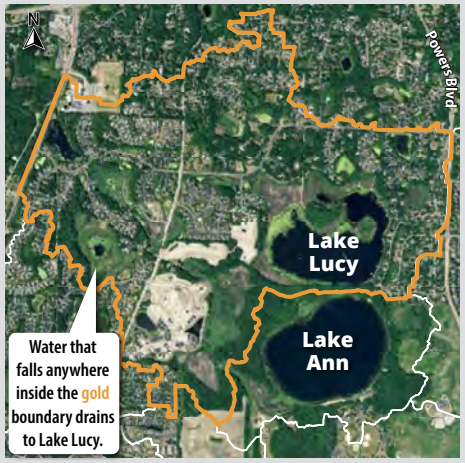
Fish: Electrofishing was used to monitor adult Common Carp an invasive species that harms water quality by stirring up lake bottom sediments and removing aquatic vegetation. In 2022, no adults were captured.

Plants: A 2022 plant survey indicated that Coontail and White Waterlily were the dominant native plants. The number of native species has declined, possibly due to low water levels.

Lake & watershed characteristics

Lake size	88 acres
Average lake depth	6.5 feet
Maximum lake depth	20 feet
MPCA lake classification	Shallow lake
Watershed size	988 acres
Impervious surface	14% of watershed
Impairment listing	Mercury
Common fish	Bluegill, Northern Pike, Yellow Bullhead, Black Crappie, Pumpkinseed Sunfish
Invasive species	Curly-leaf Pondweed, Eurasian Watermilfoil, Common Carp

Watershed Boundary



Top 3 *things you can do at HOME to protect the LAKE*

Protect storm drains.
Prevent grass clippings, lawn fertilizer and debris from entering storm drains so they don't end up in the lake.

Pick up dog waste.
Did you know that pet waste pollutes water? It's full of nutrients and bacteria. Bag it and toss it in a trash can.

Reduce stormwater runoff.
Reduce the flow of stormwater off your property by installing a rain garden, native planting, or rain barrel.

Lake Lucy Water Quality by the Numbers

Over the last few years, **Lake Lucy** has met the clean water standards set by the MPCA. The graphs below show water quality trends over time with the red line showing the MPCA standard for **shallow lakes**.

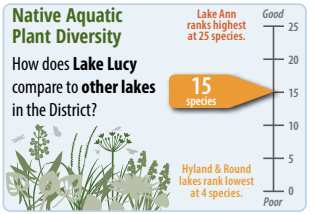
Averages

★ = Standard met

Water Quality Parameter	Historical Average	2022 Average	MPCA Standard: Shallow Lakes
Total Phosphorus (mg/L)	0.059 ★	0.042 ★	< 0.060
Chlorophyll-a (µg/L)	28.0	13.3 ★	< 20
Water Clarity (meter)	1.4 ★	2.3 ★	> 1.0

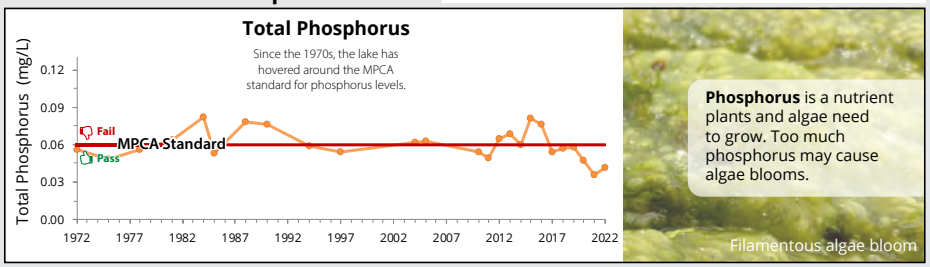
Native Aquatic Plant Diversity

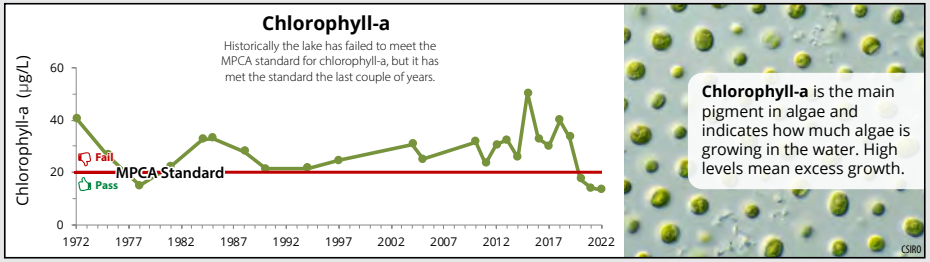
How does **Lake Lucy** compare to **other lakes** in the District?

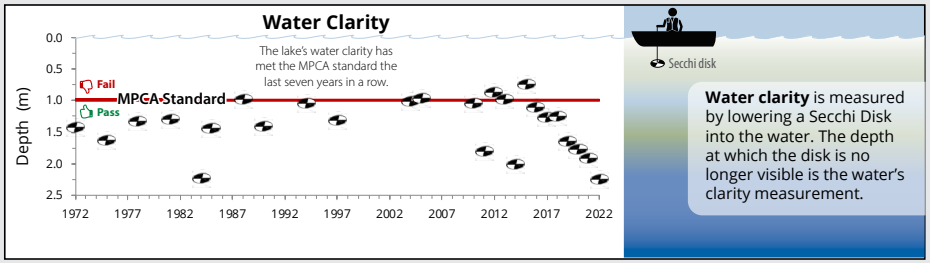


Trends Over Time: 1972-present

Read the *Water Resources Report* at rpbcwd.org/annualreport







Grants for Shoreline Restoration
The watershed district offers up to **75% cost share** assistance for restoring your shoreline! Learn more:
rpbcwd.org/grants

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

Contact us

18681 Lake Drive East
Chanhassen, MN 55317
www.rpbcwd.org
info@rpbcwd.org
952-607-6512
@rpbcwd

Mitchell Lake Fact Sheet

Download lake fact sheets: rpbcwd.org/explore/waterbodies

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

2022 Update

Mitchell Lake

Located in Eden Prairie, Mitchell Lake is a part of the Purgatory Creek chain of lakes. During high water events it outflows through an overflow pipe to Red Rock Lake.

During June through September of each year, City of Eden Prairie staff visit the lake every two weeks to collect water samples and take readings. Samples are sent to a laboratory to be tested for nutrients and other compounds. Staff also measure water clarity by lowering a Secchi disk into the water and measuring how deep it goes before it is no longer visible. The data indicates the lake's health based on standards set by the Minnesota Pollution Control Agency (MPCA).

Mitchell Lake is classified as a "Shallow Lake" by the MPCA. To be considered healthy, the lake must have very low average phosphorus and chlorophyll-a levels and average water clarity of 1.0 meter (3.3 feet) or greater. See summary below. Additional details are located on the next page.

Total Phosphorus: Concentrations have decreased since 1972. In 2022, the lake met the MPCA standard with an average total phosphorus level of 0.057 mg/L.

Chlorophyll-a: No significant trend. In 2022, the average reading for chlorophyll-a was 22.3 µg/L, an improvement from 2021 (33.8 µg/L).

Water clarity: No significant trend. The lake consistently meets the standard for water clarity. The average reading in 2022 was 1.8 meters.

Plants: In early spring 2022, an herbicide treatment was performed on 12.85 acres of the lake to suppress Curly-leaf Pondweed. Coontail was the dominant plant in Mitchell Lake and was found growing at 54% of sites surveyed. The number of species observed at each site ranged from one to six species with the most occurring in the northeast arm of the lake.

Lake & watershed characteristics

Lake size	124 acres
Average lake depth	5.3 feet
Maximum lake depth	19 feet
MPCA lake classification	Shallow lake
Watershed size	937 acres
Impervious surface	30% of watershed
Impairment listing	Mercury
Common fish	Bluegill, Black Bullhead, Black Crappie, Northern Pike, Pumpkinseed
Invasive species	Curly-leaf Pondweed, Eurasian Watermil-foil, Purple Loosestrife

Watershed Boundary

Top 3 *things you can do at HOME to protect the LAKE*

Protect storm drains.
Prevent grass clippings, lawn fertilizer and debris from entering storm drains so they don't end up in the lake.

Pick up dog waste.
Did you know that pet waste pollutes water? It's full of nutrients and bacteria. Bag it and toss it in a trash can.

Reduce stormwater runoff.
Reduce the flow of stormwater off your property by installing a rain garden, native planting, or rain barrel.

Mitchell Lake Water Quality by the Numbers

The graphs below show water quality trends over time with the red line showing the MPCA standard for **shallow lakes**.

For the last few years, the City of Eden Prairie has collected water quality data for Mitchell Lake.

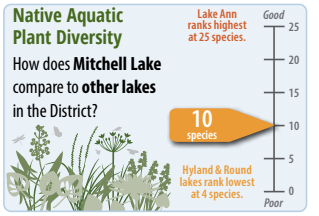
Averages

★ = Standard met

Water Quality Parameter	Historical Average	2022 Average	MPCA Standard: Shallow Lakes
Total Phosphorus (mg/L)	0.073	0.057 ★	< 0.060
Chlorophyll-a (µg/L)	33.6	22.3	< 20
Water Clarity (meter)	1.2 ★	1.8 ★	> 1.0

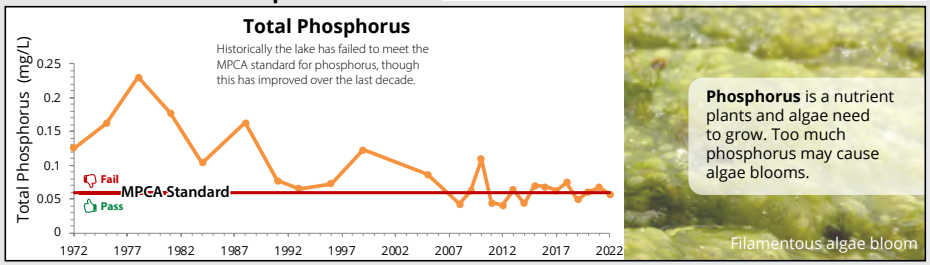
Native Aquatic Plant Diversity

How does **Mitchell Lake** compare to **other lakes** in the District?

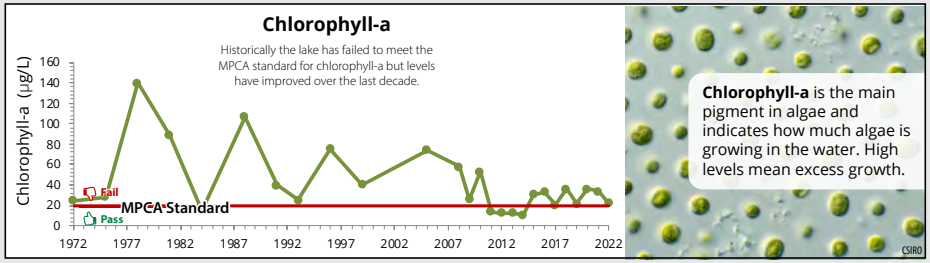


Trends Over Time: 1972-present

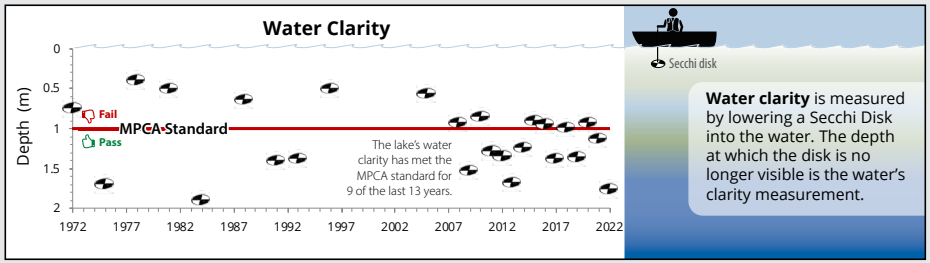
Read the *Water Resources Report* at rpbcwd.org/annualreport



Phosphorus is a nutrient plants and algae need to grow. Too much phosphorus may cause algae blooms.



Chlorophyll-a is the main pigment in algae and indicates how much algae is growing in the water. High levels mean excess growth.



Water clarity is measured by lowering a Secchi Disk into the water. The depth at which the disk is no longer visible is the water's clarity measurement.

Grants for Shoreline Restoration
The watershed district offers up to **75% cost share** assistance for restoring your shoreline! Learn more: rpbcwd.org/grants

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

Contact us

18681 Lake Drive East
Chanhassen, MN 55317

info@rpbcwd.org

952-607-6512

www.rpbcwd.org

@rpbcwd

Red Rock Lake Fact Sheet

Download lake fact sheets: rpbcwd.org/explore/waterbodies

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

2022 Update

Red Rock Lake

Located in Eden Prairie, Red Rock Lake is a part of the Purgatory Creek chain of lakes. During high water events it outflows through an overflow pipe to Staring Lake.

During June through September of each year, City of Eden Prairie staff visit the lake every two weeks to collect water samples and take readings. Samples are sent to a laboratory to be tested for nutrients and other compounds. Staff also measure water clarity by lowering a Secchi disk into the water and measuring how deep it goes before it is no longer visible. The data indicates the lake's health based on standards set by the Minnesota Pollution Control Agency (MPCA).

Red Rock Lake is classified as a "Shallow Lake" by the MPCA. To be considered healthy, the lake must have very low average phosphorus and chlorophyll-a levels and average water clarity of 1.0 meter (3.3 feet) or greater. See summary below. Additional details are located on the next page.

Total Phosphorus: No significant trend. In 2022, the lake met the MPCA standard with an average total phosphorus level of 0.057 mg/L.

Chlorophyll-a: Over the last decade, the yearly average chlorophyll-a measurements have improved. In 2022, the average reading for chlorophyll-a was 26.9 µg/L.

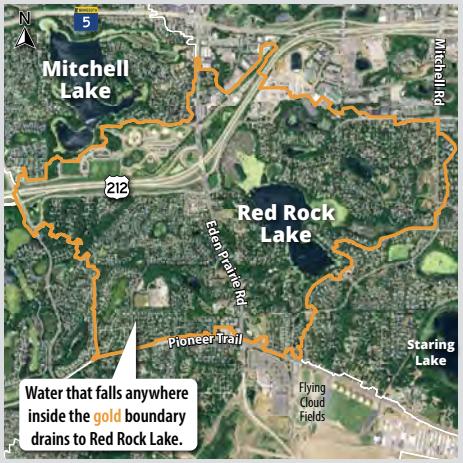
Water clarity: No significant trend. The lake consistently meets the standard for water clarity. The average reading in 2022 was 1.5 meters.

Plants: A point-intercept plant survey was conducted by the City of Eden Prairie in 2022 to track aquatic plant populations.

Lake & watershed characteristics

Size	121 acres
Average depth	4.7 feet
Max depth	19 feet
MPCA lake classification	Shallow lake
Watershed size	1,286 acres
Impervious surface	25% of watershed
Impairment listing	Mercury
Common fish	Bluegill, Northern Pike, Pumpkinseed, Yellow Perch
Invasive species	Curly-leaf Pondweed

Watershed Boundary



Top 3 *things you can do at HOME to protect the LAKE*

Protect storm drains.
Prevent grass clippings, lawn fertilizer and debris from entering storm drains so they don't end up in the lake.

Pick up dog waste.
Did you know that pet waste pollutes water? It's full of nutrients and bacteria. Bag it and toss it in a trash can.

Reduce stormwater runoff.
Reduce the flow of stormwater off your property by installing a rain garden, native planting, or rain barrel.

Red Rock Lake Water Quality by the Numbers

The graphs below show water quality trends over time with the red line showing the MPCA standard for **shallow lakes**.

For the last few years, the City of Eden Prairie has collected water quality data for Red Rock Lake.

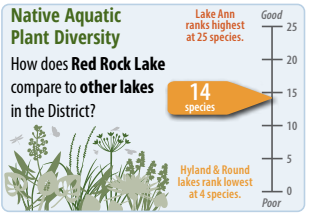
Averages

★ = Standard met

Water Quality Parameter	Historical Average	2022 Average	MPCA Standard: Shallow Lakes
Total Phosphorus (mg/L)	0.064	0.057 ★	< 0.060
Chlorophyll-a (µg/L)	29.7	26.9	< 20
Water Clarity (meter)	1.4 ★	1.5 ★	> 1.0

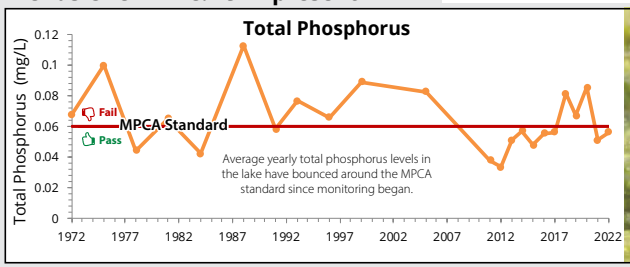
Native Aquatic Plant Diversity

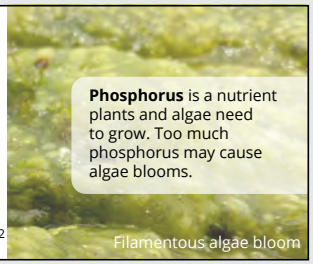
How does **Red Rock Lake** compare to **other lakes** in the District?

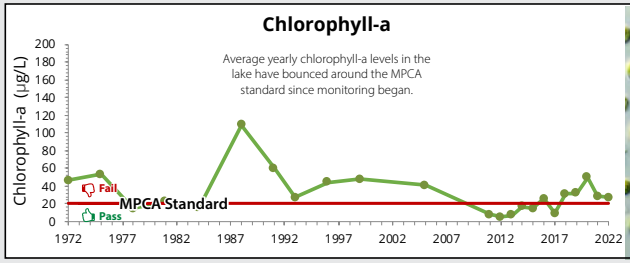


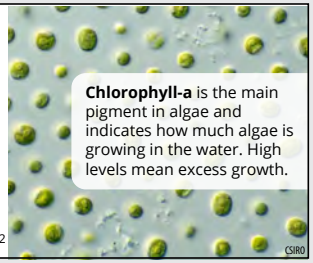
Trends Over Time: 1972-present

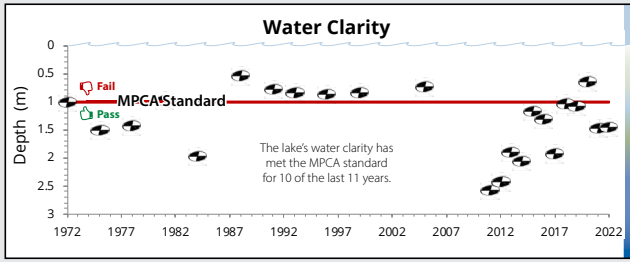
Read the *Water Resources Report* at rpbcwd.org/annualreport

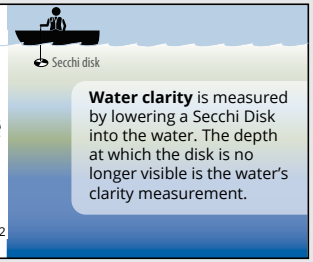












Grants for Shoreline Restoration
The watershed district offers up to **75% cost share** assistance for restoring your shoreline! Learn more: rpbcwd.org/grants

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

Contact us

18681 Lake Drive East
Chanhassen, MN 55317

info@rpbcwd.org

952-607-6512

www.rpbcwd.org

@rpbcwd

Rice Marsh Lake Fact Sheet

Download lake fact sheets: rpbcwd.org/explore/waterbodies

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

2022 Update

Rice Marsh Lake

Located in both Eden Prairie and Chanhassen, Rice Marsh Lake is aerated in the winter. This management practice helps keep bluegill sunfish alive so that they can feed on invasive carp eggs in the spring.

During June through September of each year, District staff visit the lake every two weeks to collect water samples and take readings. Samples are sent to a laboratory to be tested for nutrients and other compounds. Staff also measure water clarity by lowering a Secchi disk into the water and measuring how deep it goes before it is no longer visible. The data indicates the lake's health based on standards set by the Minnesota Pollution Control Agency (MPCA).

Rice Marsh Lake is classified as a "Shallow Lake" by the MPCA. To be considered healthy, the lake must have very low average phosphorus and chlorophyll-a levels and average water clarity of 1.0 meter (3.3 feet) or greater. See summary below. Additional details are located on the next page.

Total Phosphorus: Levels have decreased since monitoring began in 1972. In 2022, the lake met the MPCA standard with an average total phosphorus level of 0.037 mg/L.

Chlorophyll-a: Levels have decreased since monitoring began in 1972. In 2022, the average reading for chlorophyll-a was 12.8 µg/L.

Water clarity: Since 1972, average Secchi disk depths have increased, and the lake consistently meets the standard for water clarity. The average reading in 2022 was 2.4 meters.

Plants: A plant survey was conducted in 2022 to assess aquatic vegetation in the lake. Coontail was the most common plant found at 94% of sites, and Flatstem Pondweed was the second most common plant, found at 62% of sites. Overall, plant growth in Rice Marsh covered 100% of the lake area. Watermeal and duckweed covered approximately 50% of the lake.

Lake & watershed characteristics

Lake size	83 acres
Average lake depth	5 feet
Maximum lake depth	11 feet
MPCA lake classification	Shallow lake
Watershed size	966 acres
Impervious surface	32% of watershed
Impairment listing	Nutrients
Common fish	Bluegill, Northern Pike, Black Crappie, Yellow Bullhead, Pumpkinseed Sunfish
Invasive species	Curly-leaf Pondweed, Purple Loosestrife, Common Carp

Watershed Boundary

Top 3 *things you can do at HOME to protect the LAKE*

Protect storm drains.
Prevent grass clippings, lawn fertilizer and debris from entering storm drains so they don't end up in the lake.

Pick up dog waste.
Did you know that pet waste pollutes water? It's full of nutrients and bacteria. Bag it and toss it in a trash can.

Reduce stormwater runoff.
Reduce the flow of stormwater off your property by installing a rain garden, native planting, or rain barrel.

Rice Marsh Lake Water Quality by the Numbers

Over the last few years, **Rice Marsh Lake** has met the clean water standards set by the MPCA. The graphs below show water quality trends over time with the red line showing the MPCA standard for **shallow lakes**.

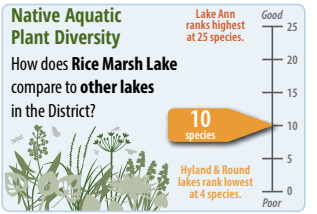
Averages

★ = Standard met

Water Quality Parameter	Historical Average	2022 Average	MPCA Standard: Shallow Lakes
Total Phosphorus (mg/L)	0.113	0.037 ★	< 0.060
Chlorophyll-a (µg/L)	31.7	12.8 ★	< 20
Water Clarity (meter)	1.7 ★	2.4 ★	> 1.0

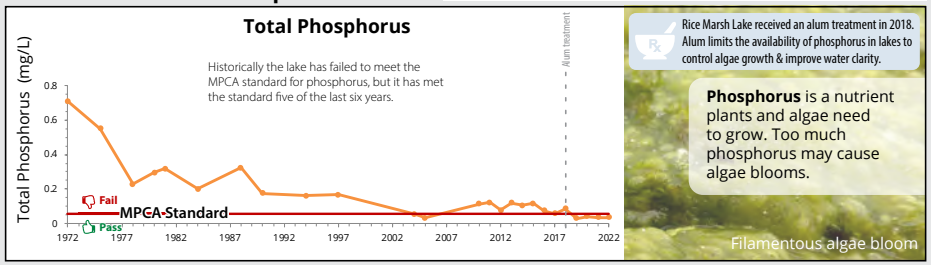
Native Aquatic Plant Diversity

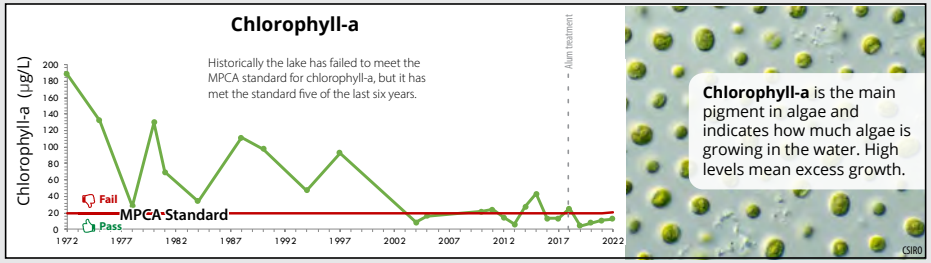
How does **Rice Marsh Lake** compare to **other lakes** in the District?

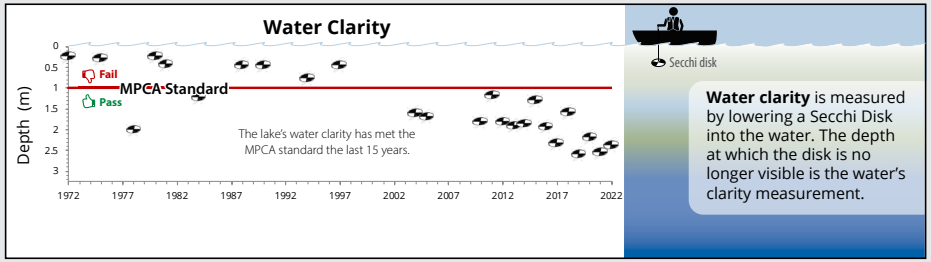


Trends Over Time: 1972-present

Read the *Water Resources Report* at rpbcwd.org/annualreport







Grants for Shoreline Restoration
The watershed district offers up to **75% cost share** assistance for restoring your shoreline! Learn more: rpbcwd.org/grants

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

Contact us

18681 Lake Drive East
Chanhassen, MN 55317

info@rpbcwd.org

952-607-6512

www.rpbcwd.org

@rpbcwd

Lake Riley Fact Sheet

Download lake fact sheets: rpbcwd.org/explore/waterbodies

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

2022 Update

Lake Riley

At 297 acres and average depth of 23 ft, Lake Riley is the largest lake in the Watershed District. It is located on the boundary of Chanhassen and Eden Prairie and is a popular summer recreation spot.

During June through September of each year, District staff visit the lake every two weeks to collect water samples and take readings. Samples are sent to a laboratory to be tested for nutrients and other compounds. Staff also measure water clarity by lowering a Secchi disk into the water and measuring how deep it goes before it is no longer visible. The data indicates the lake's health based on standards set by the Minnesota Pollution Control Agency (MPCA).

Lake Riley is classified as a "Deep Lake" by the MPCA. To be considered healthy, the lake must have very low average phosphorus and chlorophyll-a levels and average water clarity of 1.4 meters (4.6 feet) or greater. See summary below. Additional details are located on the next page.

Total Phosphorus: The lake consistently meets the standard. In 2022, the average total phosphorus level was 0.015 mg/L.

Chlorophyll-a: The lake consistently meets the standard. In 2022, the average chlorophyll-a reading was 4.5 µg/L.

Water clarity: The lake consistently meets the standard for water clarity. Average reading in 2022 was 4.0 meters.

Plants: The lake was treated for Curly-leaf Pondweed (CLP) (16.7 acres) and Eurasian watermilfoil (8.1 acres). A CLP turion (reproductive structure) survey in 2022 showed a slight increase but densities remained low, indicating successful herbicide treatments.

In a June 2022 plant survey, 13 species (11 native) were observed. In August, 12 species (10 native) were observed. Due to management in and around the lake, native plants have steadily increased in frequency of occurrence and have been able to expand into deeper depths because of improved water quality.

Lake & watershed characteristics

Lake size	297 acres
Average lake depth	23 feet
Maximum lake depth	49 feet
MPCA lake classification	Deep lake
Watershed size	1,776 acres
Impervious surface	18% of watershed
Impairment listing	Mercury, nutrients, fish
Common fish	Bluegill, Northern Pike, Yellow Perch, Yellow Bullhead, Black Crappie
Invasive species	Curly-leaf Pondweed, Eurasian Watermilfoil, Zebra Mussels

Watershed Boundary

Top 3 *things you can do at HOME to protect the LAKE*

Protect storm drains.
Prevent grass clippings, lawn fertilizer and debris from entering storm drains so they don't end up in the lake.

Pick up dog waste.
Did you know that pet waste pollutes water? It's full of nutrients and bacteria. Bag it and toss it in a trash can.

Reduce stormwater runoff.
Reduce the flow of stormwater off your property by installing a rain garden, native planting, or rain barrel.

Lake Riley Water Quality by the Numbers

For the last few years, **Lake Riley** has consistently met the clean water standards set by the MPCA. The graphs below show water quality trends over time with the red line showing the MPCA standard for **deep lakes**.

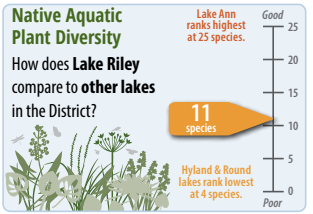
Averages

★ = Standard met

Water Quality Parameter	Historical Average	2022 Average	MPCA Standard: Deep Lakes
Total Phosphorus (mg/L)	0.037 ★	0.015 ★	< 0.040
Chlorophyll-a (µg/L)	21.7	4.5 ★	< 14.0
Water Clarity (meter)	2.1 ★	4.0 ★	≥ 1.4

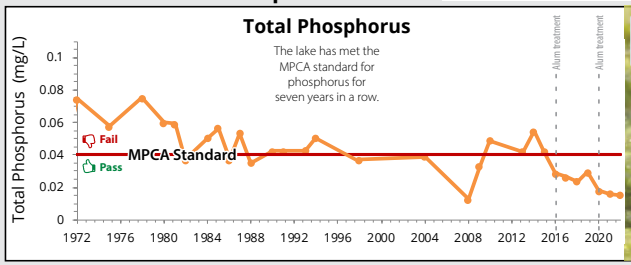
Native Aquatic Plant Diversity

How does **Lake Riley** compare to **other lakes** in the District?



Trends Over Time: 1972-present

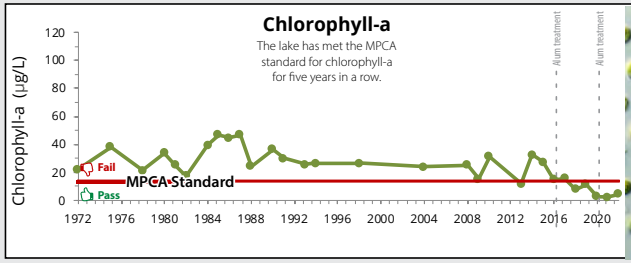
Read the *Water Resources Report* at rpbcwd.org/annualreport

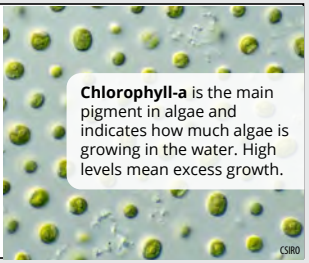


Riley Lake received an alum treatment in 2016 and 2020. Alum limits the availability of phosphorus in lakes to control algae growth & improve water clarity.

Phosphorus is a nutrient plants and algae need to grow. Too much phosphorus may cause algae blooms.

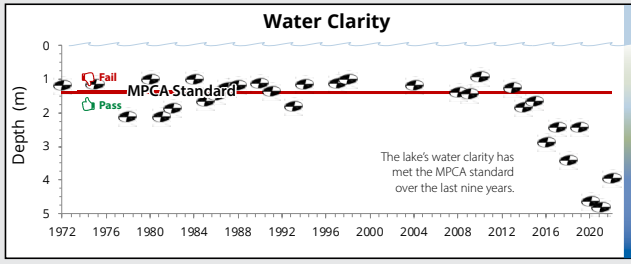
Filamentous algae bloom

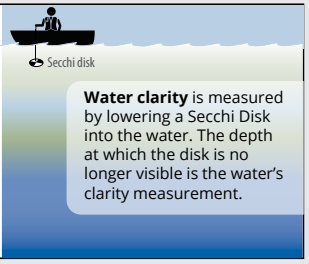




Chlorophyll-a is the main pigment in algae and indicates how much algae is growing in the water. High levels mean excess growth.

CSIRO





Water clarity is measured by lowering a Secchi Disk into the water. The depth at which the disk is no longer visible is the water's clarity measurement.

Grants for Shoreline Restoration
The watershed district offers up to **75% cost share** assistance for restoring your shoreline! Learn more: rpbcwd.org/grants

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

Contact us

18681 Lake Drive East
Chanhassen, MN 55317

info@rpbcwd.org

952-607-6512

www.rpbcwd.org

@rpbcwd

Round Lake Fact Sheet

Download lake fact sheets: rpbcwd.org/explore/waterbodies

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

2022 Update

Round Lake

Located in Eden Prairie, Round Lake is a part of the Purgatory Creek Chain of Lakes. With a park and trail system around the lake, it is a popular recreation spot.

During June through September of each year, City of Eden Prairie staff visit the lake every two weeks to collect water samples and take readings. Samples are sent to a laboratory to be tested for nutrients and other compounds. Staff also measure water clarity by lowering a Secchi disk into the water and measuring how deep it goes before it is no longer visible. The data indicates the lake's health based on standards set by the Minnesota Pollution Control Agency (MPCA).

Round Lake is classified as a "Deep Lake" by the MPCA. To be considered healthy, the lake must have very low average phosphorus and chlorophyll-a levels and average water clarity of 1.4 meters (4.6 feet) or greater. See summary below. Additional details are located on the next page.

Total Phosphorus: Since the alum treatment in 2012 the average TP concentrations have been consistently below the MPCA deep lake standard. In 2022, Round Lake had an average TP concentration of 0.028 mg/L.

Chlorophyll-a: The average chlorophyll-a concentrations have consistently been below the MPCA deep lake standard. In 2022, the average chlorophyll-a concentration was 9.3 µg/L.

Water clarity: Since the alum treatment in 2012, the average Secchi disk depth has stabilized around 2.3 meters. In 2022, the average Secchi disk depth was 2.7 meters.

Plants: In a July 2022 plant survey, Eurasian Watermilfoil growth was found at 47% of sites ranging from light to heavy growth. Plants were observed growing out to a depth of 10 feet in summer. Submerged plants, dominated by native Coontail, covered more than 22 acres of the lake bottom. White Water Lily was relatively widespread at a moderate density along much of the shoreline.

Lake & watershed characteristics

Lake size	30 acres
Average lake depth	11 feet
Maximum lake depth	37 feet
MPCA lake classification	Deep lake
Watershed size	440 acres
Impervious surface	32% of watershed
Impairment listing	Mercury
Common fish	Bluegill, Yellow Bullhead, Black Bullhead, Black Crappie
Invasive species	Curly-leaf Pondweed , Eurasian Watermilfoil, Brittle Naiad

Watershed Boundary

Top 3 *things you can do at HOME to protect the LAKE*

Protect storm drains.

Prevent grass clippings, lawn fertilizer and debris from entering storm drains so they don't end up in the lake.

Pick up dog waste.

Did you know that pet waste pollutes water? It's full of nutrients and bacteria. Bag it and toss it in a trash can.

Reduce stormwater runoff.

Reduce the flow of stormwater off your property by installing a rain garden, native planting, or rain barrel.

Round Lake Water Quality by the Numbers

The graphs below show water quality trends over time with the red line showing the MPCA standard for **deep lakes**.

For the last few years, the City of Eden Prairie has collected water quality data for Round Lake.

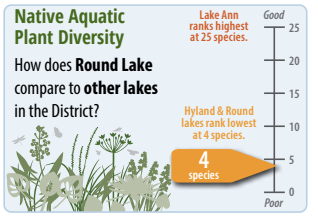
Averages

★ = Standard met

Water Quality Parameter	Historical Average	2022 Average	MPCA Standard: Deep Lakes
Total Phosphorus (mg/L)	0.042	0.028 ★	< 0.040
Chlorophyll-a (µg/L)	13.3 ★	9.3 ★	< 14.0
Water Clarity (meter)	2.3 ★	2.7 ★	≥ 1.4

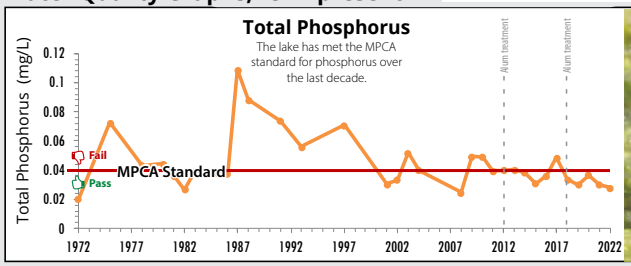
Native Aquatic Plant Diversity

How does **Round Lake** compare to **other lakes** in the District?



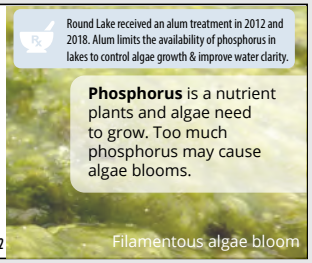
Water Quality Graphs, 1972-present

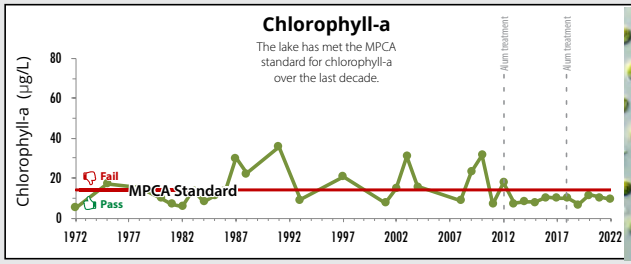
Read the *Water Resources Report* at rpbcwd.org/annualreport



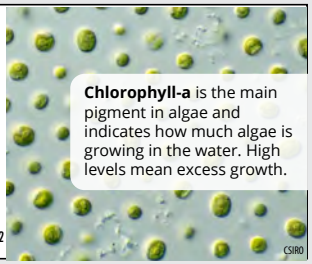
Round Lake received an alum treatment in 2012 and 2018. Alum limits the availability of phosphorus in lakes to control algae growth & improve water clarity.

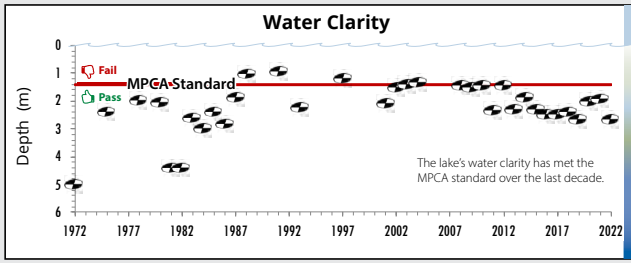
Phosphorus is a nutrient plants and algae need to grow. Too much phosphorus may cause algae blooms.

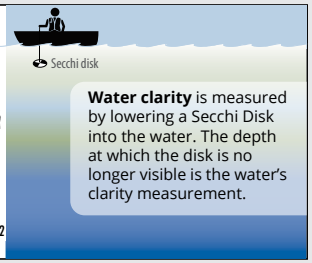




Chlorophyll-a is the main pigment in algae and indicates how much algae is growing in the water. High levels mean excess growth.







Water clarity is measured by lowering a Secchi Disk into the water. The depth at which the disk is no longer visible is the water's clarity measurement.

Grants for Shoreline Restoration

The watershed district offers up to **75% cost share** assistance for restoring your shoreline! Learn more: rpbcwd.org/grants

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

Contact us

18681 Lake Drive East
Chanhassen, MN 55317

info@rpbcwd.org

952-607-6512

www.rpbcwd.org

@rpbcwd

Silver Lake Fact Sheet

Download lake fact sheets: rpbcwd.org/explore/waterbodies

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

2022 Update

Silver Lake

Located in Shorewood, Silver Lake sits at the edge of the watershed district. It is the only lake in the District with a native wild rice population, a rarity in metro area lakes!

During June through September of each year, District staff visit the lake every two weeks to collect water samples and take readings. Samples are sent to a laboratory to be tested for nutrients and other compounds. Staff also measure water clarity by lowering a Secchi disk into the water and measuring how deep it goes before it is no longer visible. The data indicates the lake's health based on standards set by the Minnesota Pollution Control Agency (MPCA).

Silver Lake is classified as a "Shallow Lake" by the MPCA. To be considered healthy, the lake must have very low average phosphorus and chlorophyll-a levels and average water clarity of 1.0 meter (3.3 feet) or greater. See summary below. Additional details are located on the next page.

Total Phosphorus: No significant trend. In 2022, the lake met the MPCA standard with an average total phosphorus level of 0.053 mg/L.

Chlorophyll-a: No significant trend. In 2022, the average reading for chlorophyll-a was 13.0 µg/L.

Water clarity: Since 2017, the lake has consistently met the standard for water clarity. This is correlated with the reduced water levels that occurred after the outlet became cleared. The average reading in 2022 was 1.5 meters.

Lake & watershed characteristics

Lake size	71 acres
Average lake depth	5 feet
Maximum lake depth	14 feet
MPCA lake classification	Shallow lake
Watershed size	391 acres
Impervious surface	14% of watershed
Impairment listing	Nutrients
Common fish	Black Bullhead, Fathead Minnow, Central Mudminnow
Invasive species	Curly-leaf Pondweed, Purple Loosestrife

Watershed Boundary

Top 3 *things you can do at HOME to protect the LAKE*

Protect storm drains.
Prevent grass clippings, lawn fertilizer and debris from entering storm drains so they don't end up in the lake.

Pick up dog waste.
Did you know that pet waste pollutes water? It's full of nutrients and bacteria. Bag it and toss it in a trash can.

Reduce stormwater runoff.
Reduce the flow of stormwater off your property by installing a rain garden, native planting, or rain barrel.

Silver Lake Water Quality by the Numbers

The graphs below show water quality trends over time with the red line showing the MPCA standard for **shallow lakes**. Over the last decade, **Silver Lake** has met the clean water standards set by the MPCA about half the time.

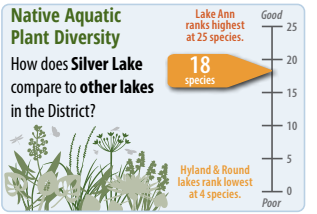
Averages

★ = Standard met

Water Quality Parameter	Historical Average	2022 Average	MPCA Standard: Shallow Lakes
Total Phosphorus (mg/L)	0.091	0.053 ★	< 0.060
Chlorophyll-a (µg/L)	43.7	13.0 ★	< 20
Water Clarity (meter)	1.2 ★	1.5 ★	> 1.0

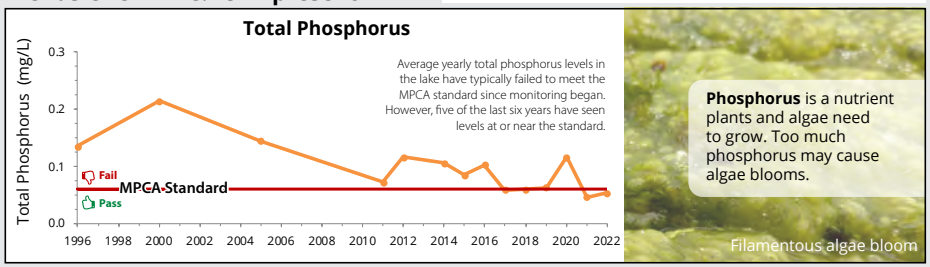
Native Aquatic Plant Diversity

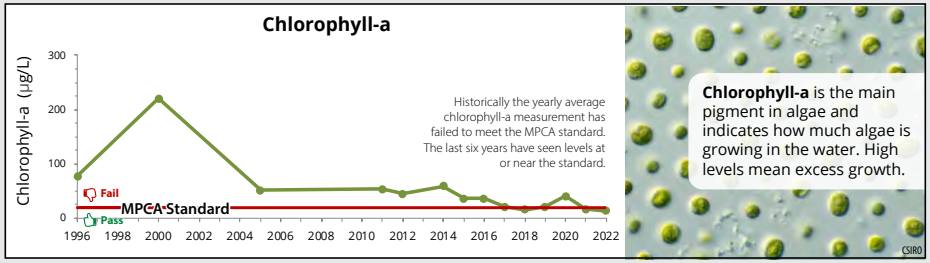
How does **Silver Lake** compare to **other lakes** in the District?

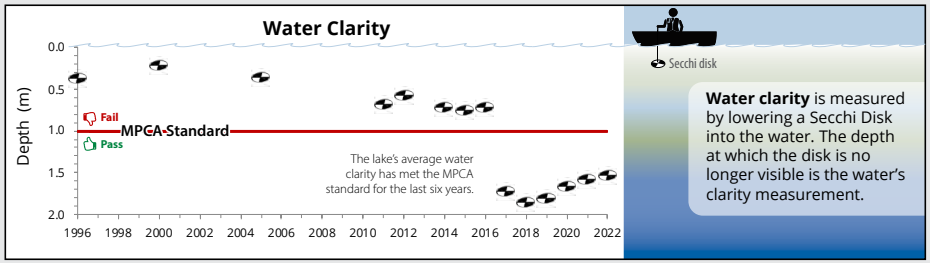


Trends Over Time: 1972-present

Read the *Water Resources Report* at rpbcwd.org/annualreport







Grants for Shoreline Restoration
The watershed district offers up to **75% cost share** assistance for restoring your shoreline! Learn more: rpbcwd.org/grants

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

Contact us
18681 Lake Drive East
Chanhassen, MN 55317
www.rpbcwd.org
info@rpbcwd.org
952-607-6512
@rpbcwd

Staring Lake Fact Sheet

Download lake fact sheets: rpbcwd.org/explore/waterbodies

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

2022 Update

Staring Lake

Staring Lake is located in Eden Prairie, west of Flying Cloud Drive and north of Pioneer Trail. Staring has a public boat ramp and a fishing pier. The Eden Prairie Outdoor Center is also located on its shores, off of Staring Lake Parkway.

During June through September of each year, District staff visit the lake every two weeks to collect water samples and take readings. Samples are sent to a laboratory to be tested for nutrients and other compounds. Staff also measure water clarity by lowering a Secchi disk into the water and measuring how deep it goes before it is no longer visible. The data indicates the lake's health based on standards set by the Minnesota Pollution Control Agency (MPCA).

Staring Lake is classified as a "Shallow Lake" by the MPCA. To be considered healthy, the lake must have very low average phosphorus and chlorophyll-a levels and average water clarity of 1.0 meter (3.3 feet) or greater. See summary below. Additional details are located on the next page.

Total Phosphorus: Since carp management began in 2011, TP levels have decreased. In 2022, total phosphorus levels peaked (0.106 mg/L) following the Fluridone herbicide treatment combined with low water levels.

Chlorophyll-a: No significant trend. In 2022, the average reading for chlorophyll-a was 70.4 µg/L, which is significantly higher than recent years.

Water clarity: Since carp management began in 2011, clarity has improved. The average reading in 2022 was 1.2 meters, which exceeded the MPCA standard.

Fish: Electrofishing was used to monitor Common Carp, an invasive species that harms water quality by stirring up lake bottom sediments. Carp biomass is decreasing in the lake with little to no reproduction detected the last six seasons.

Plants: In 2022, the herbicide Fluridone was used to successfully treat Eurasian Watermilfoil. Unfortunately, the reduced vegetation combined with low water levels led to reduced water quality. Nutrient levels should decline as native vegetation expands across the lake. A Curly-lead Pondweed turion survey in 2022 yielded no turions indicating the herbicide treatment was effective.

Lake & watershed characteristics

Lake size	166 acres
Average lake depth	7 feet
Maximum lake depth	16 feet
MPCA lake classification	Shallow lake
Watershed size	10,158 acres
Impervious surface	21% of watershed
Impairment listing	Mercury & nutrients
Common fish	Bluegill, Black Crappie, Black Bullhead
Invasive species	Curly-leaf Pondweed, Eurasian Watermilfoil, Brittle Naiad, Common Carp

Watershed Boundary

Did you know?
Staring Lake has the *largest watershed* of all lakes located within the District.

Top 3 *things you can do at HOME to protect the LAKE*

Protect storm drains.
Prevent grass clippings, lawn fertilizer and debris from entering storm drains so they don't end up in the lake.

Pick up dog waste.
Did you know that pet waste pollutes water? It's full of nutrients and bacteria. Bag it and toss it in a trash can.

Reduce stormwater runoff.
Reduce the flow of stormwater off your property by installing a rain garden, native planting, or rain barrel.

Staring Lake Water Quality by the Numbers

The graphs below show water quality trends over time with the red line showing the MPCA standard for **shallow lakes**. Over the last decade, **Staring Lake** has met the clean water standards set by the MPCA about half the time.

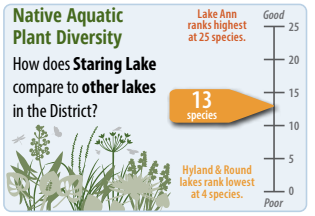
Averages

★ = Standard met

Water Quality Parameter	Historical Average	2022 Average	MPCA Standard: Shallow Lakes
Total Phosphorus (mg/L)	0.085	0.106 ★	< 0.060
Chlorophyll-a (µg/L)	40.7	70.4	< 20
Water Clarity (meter)	1.0	1.2 ★	> 1.0

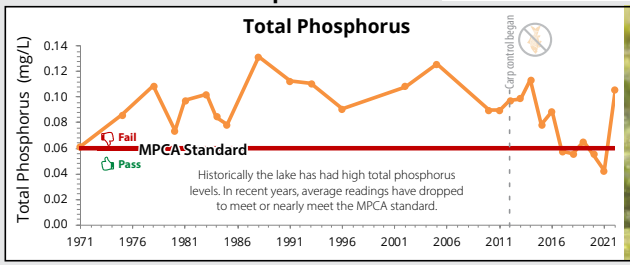
Native Aquatic Plant Diversity

How does **Staring Lake** compare to **other lakes** in the District?

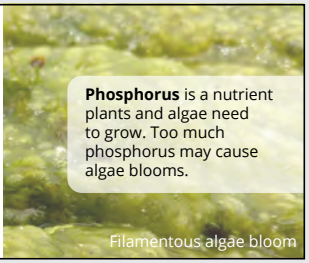


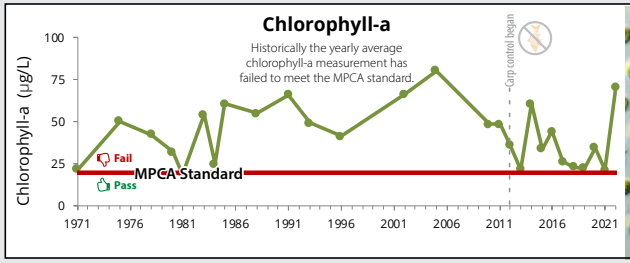
Trends Over Time: 1972-present

Read the *Water Resources Report* at rpbcwd.org/annualreport

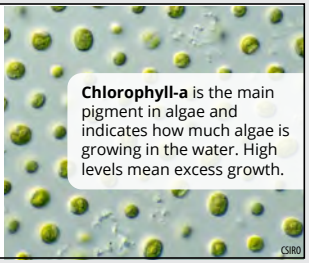


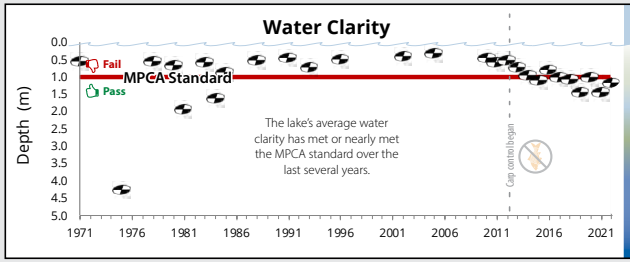
Phosphorus is a nutrient plants and algae need to grow. Too much phosphorus may cause algae blooms.

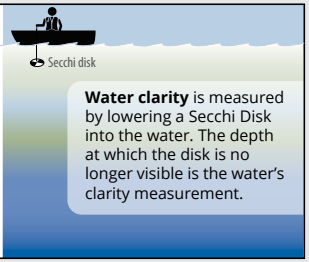




Chlorophyll-a is the main pigment in algae and indicates how much algae is growing in the water. High levels mean excess growth.







Water clarity is measured by lowering a Secchi Disk into the water. The depth at which the disk is no longer visible is the water's clarity measurement.

Grants for Shoreline Restoration
The watershed district offers up to **75% cost share** assistance for restoring your shoreline! Learn more: rpbcwd.org/grants

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

Contact us

18681 Lake Drive East
Chanhassen, MN 55317

info@rpbcwd.org

952-607-6512

www.rpbcwd.org

@rpbcwd

Lake Susan Fact Sheet

Download lake fact sheets: rpbcwd.org/explore/waterbodies

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

2022 Update

Lake Susan

Located in Chanhassen, Lake Susan is a part of the Riley Creek Chain of Lakes. It is the third lake that Riley Creek flows through as it makes its way to the Minnesota River.

During June through September of each year, District staff visit the lake every two weeks to collect water samples and take readings. Samples are sent to a laboratory to be tested for nutrients and other compounds. Staff also measure water clarity by lowering a Secchi disk into the water and measuring how deep it goes before it is no longer visible. The data indicates the lake's health based on standards set by the Minnesota Pollution Control Agency (MPCA).

Lake Susan is classified as a "Shallow Lake" by the MPCA. To be considered healthy, the lake must have very low average phosphorus and chlorophyll-a levels and average water clarity of 1.0 meter (3.3 feet) or greater. See summary below. Additional details are located on the next page.

Total Phosphorus: No significant trend. In 2022, the lake did not meet the MPCA standard with an average total phosphorus level of 0.074 mg/L.

Chlorophyll-a: No significant trend. In 2022, the average reading for chlorophyll-a was 62.2 µg/L.

Water clarity: No significant trend. Over the previous few years, the lake had consistently met the standard for water clarity. The average reading in 2022 was 0.9 meters, which was below the standard.

Plants: In the spring of 2022, herbicide treatments were carried out to reduce Curly-leaf Pondweed on Lake Susan (8.25 acres). Native plant frequency of occurrence and number of species remained low due to poor water quality. The number of projects planned for the lake along with projects already in the ground should improve the lake water quality in the future.

Lake & watershed characteristics

Lake size	88 acres
Average lake depth	10 feet
Maximum lake depth	17 feet
MPCA lake classification	Shallow lake
Watershed size	1,231 acres
Impervious surface	27% of watershed
Impairment listing	Mercury & nutrients
Common fish	Bluegill, Black Crappie, Northern Pike, Black Bullhead, Yellow Bullhead
Invasive species	Curly-leaf Pondweed, Eurasian Watermil-foil, Common Carp, Brittle Naiad

Watershed Boundary

Top 3 *things you can do at HOME to protect the LAKE*

Protect storm drains.
Prevent grass clippings, lawn fertilizer and debris from entering storm drains so they don't end up in the lake.

Pick up dog waste.
Did you know that pet waste pollutes water? It's full of nutrients and bacteria. Bag it and toss it in a trash can.

Reduce stormwater runoff.
Reduce the flow of stormwater off your property by installing a rain garden, native planting, or rain barrel.

Lake Susan Water Quality by the Numbers

The graphs below show water quality trends over time with the red line showing the MPCA standard for **shallow lakes**. In 2022, **Lake Susan** failed to meet three clean water standards set by the MPCA.

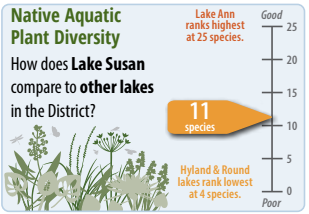
Averages

★ = Standard met

Water Quality Parameter	Historical Average	2022 Average	MPCA Standard: Shallow Lakes
Total Phosphorus (mg/L)	0.081	0.074	< 0.060
Chlorophyll-a (µg/L)	50.2	62.2	< 20
Water Clarity (meter)	1.1 ★	0.9	> 1.0

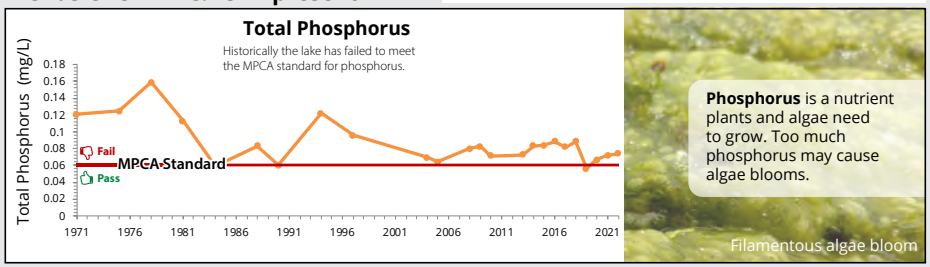
Native Aquatic Plant Diversity

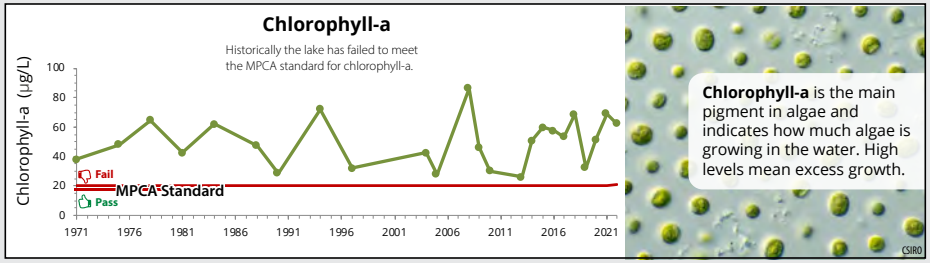
How does **Lake Susan** compare to **other lakes** in the District?

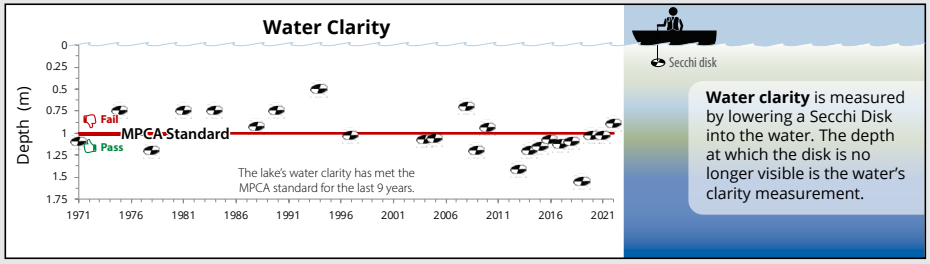


Trends Over Time: 1972-present

Read the *Water Resources Report* at rpbcwd.org/annualreport







Grants for Shoreline Restoration
The watershed district offers up to **75% cost share** assistance for restoring your shoreline! Learn more: rpbcwd.org/grants

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

Contact us

18681 Lake Drive East
Chanhassen, MN 55317

info@rpbcwd.org

952-607-6512

www.rpbcwd.org

@rpbcwd

Overview

In 2022, the District assessed a total of 162 wetlands using the Minnesota Routine Assessment Method (MnRAM), as well as the District's modified Rapid Floristic Quality Assessment (Rapid FQA). Staff Dickhausen focused wetland assessment efforts to those areas in Hennepin County North of County Road 62, the majority of which were in the City of Minnetonka (Figure 1). Wetlands located in the area of Deephaven and Shorewood which lie within District Boundaries were also assessed. Staff Dickhausen also assessed the ponded area near the Chanhassen Public Works building as a part of the District's assessment and delineation of the wetland in preparation for the Upper Riley Creek Stabilization Project.

MnRAM, along with Rapid FQA and other assessment tools, form the basis of wetland restoration prioritization in the District. The use of MnRAM also provides support for the District's regulatory program and implementation of the Minnesota Wetland Conservation Act, where the District is the local government regulating body (Deephaven and Shorewood).

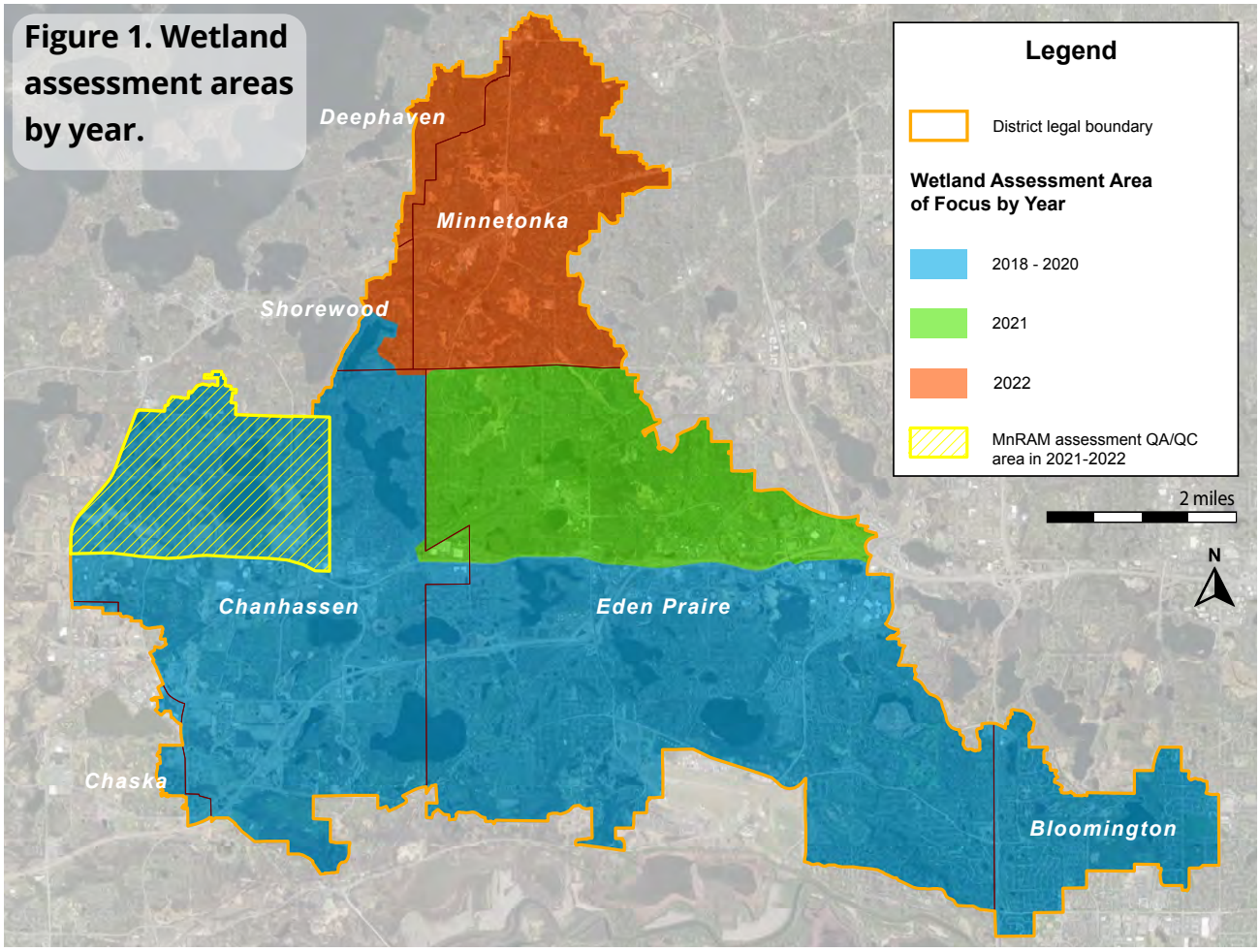


Figure 1. Wetland assessment areas by year.

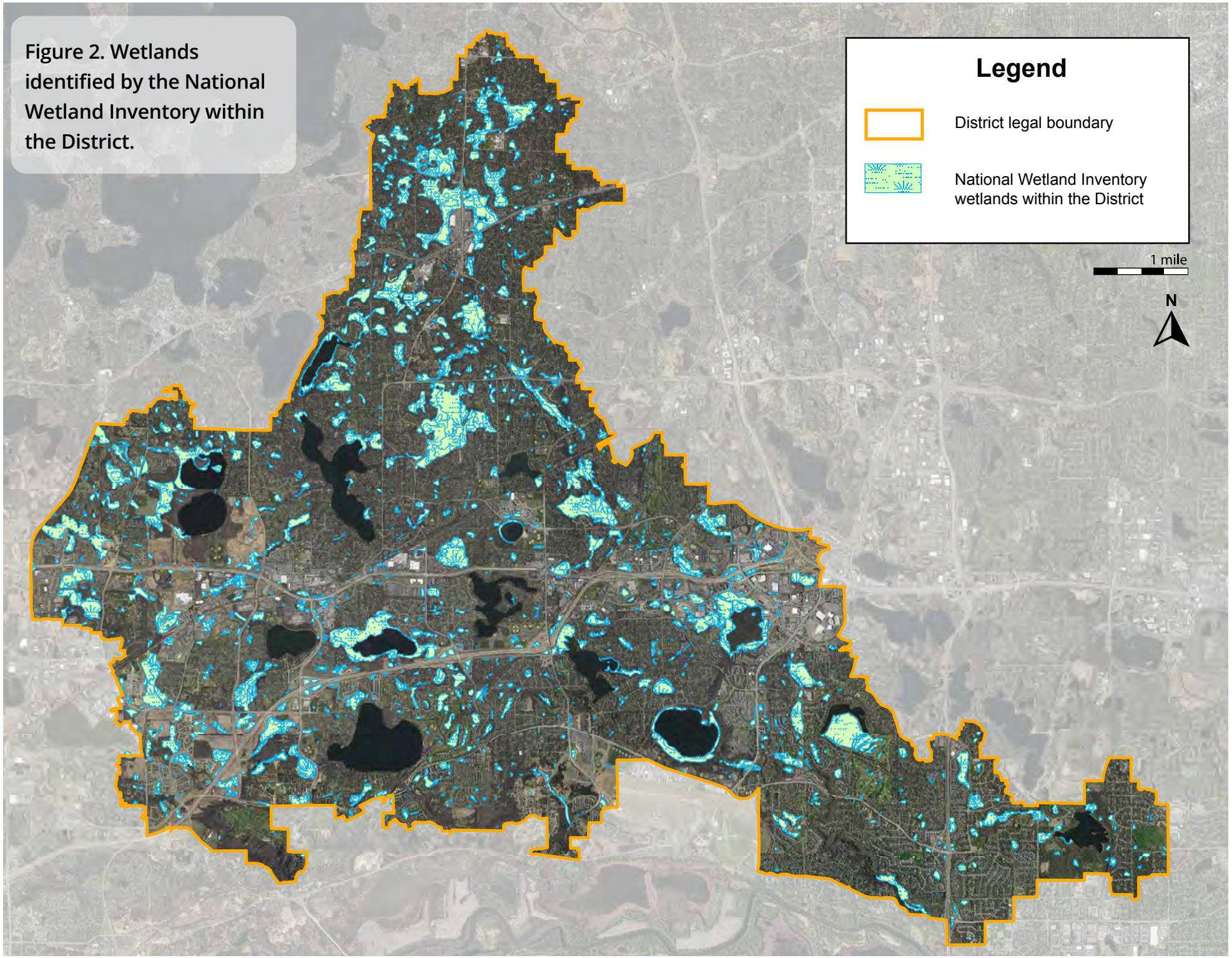


Figure 2. Wetlands identified by the National Wetland Inventory within the District.

Methods

Minnesota Routine Assessment Method (MnRAM)

The Minnesota Routine Assessment Method (MnRAM) for Evaluating Wetland Functions was developed by an interagency working group to assess wetlands following passage of the Minnesota Wetland Conservation Act in 1991. It is a systematic way of documenting wetland functions and characteristics such as size, water depth, soils, topography, vegetation type, buffer widths, wildlife habitat, and human impacts including structures, wetland alterations, and wildlife migration barriers.

During wetland site visits, staff assess the site, fill out the MnRAM worksheet, and document the site with photographs. If staff observe indications of a potential wetland, they perform an initial assessment of approximate boundary or note the site for future investigation.

Through MnRAM wetland assessment, staff are building a detailed catalogue of wetlands within the District. The catalogue supplements standard state and federal wetland inventories by including details such as greater knowledge of wetland extent, more accurate vegetative community designations, record of wetland impacts and degradation, and infrastructure risks. Figure 2 shows the extent of wetlands within the District based on National Wetland Inventory (NWI) data.

Floristic Quality Assessment (FQA) for Minnesota Wetlands

Developed by the Minnesota Pollution Control Agency (MPCA), the Rapid Floristic Quality Assessment (FQA) for wetlands provides an ecological assessment approach based on plant habitat requirements and/or tolerance for disturbance. The approach is based on a C-value assigned to each plant species by Minnesota

Staff Zach Dickhausen performs a wetland assessment in 2022.

Wetland Assessment Methods

MnRAM

Rapid, qualitative assessment used to identify wetland functions. Combines data and observations gathered from a site visit and remote sensing data. This data produces ratings for assessed wetland functions.

This method asks:

What are the characteristics of the wetland as a whole?

FQA

Vegetation-based ecological condition assessment. Sites are assessed for diversity and abundance of plant species. The higher a site scores, the closer it is to a natural condition and the more sensitive it is to disturbance.

This method asks:

What plant species grow in the wetland? How abundant are they?

botanical experts. The higher the C-value, the more sensitive a plant is to site conditions and disturbance. C-values of plants within a given community are used to calculate a floristic quality index (FQI). The greater the FQI, the closer a plant community is to a natural state.

FQA compliments MnRAM by providing a quantitative assessment of the makeup and quality of plant communities within a wetland. When used together, FQA and MnRAM data sets provide a much more comprehensive metric to assess wetlands. RPBCWD first began FQA at the end of the 2020 field season. FQA has been a part of all District wetland assessments since 2021.

Wetland Management Classification

To advance the wetland assessment program, District staff are developing an assessment and management methodology based on ecosystem services to prioritize wetland rehabilitation, protection, and creation. Staff are currently focusing on five ecosystem services: nutrient cycling, community resilience, biodiversity, habitat, and recreation/cultural resources.

Metrics have been developed for each of these services, which, along with data gathered from MnRAM and FQA assessments, determine the assignment of District management classifications to wetlands. These classifications include low, medium, high, or exceptional value wetlands. Management efforts to promote functions and services and to restore, protect, and create wetlands are prioritized on wetlands with higher classification values. Vegetated buffer rules are also set based on these classifications.

To date, staff have conducted assessments on 855 wetlands within the District. Of these, 685 have been assigned classification values (figure 3).

Distribution of wetland classifications in the District.

Classification	Quantity
Exceptional	35
High	89
Medium	418
Low	143
Unclassified	332
TOTAL	1,017

Wetland Assessments

As of the end of 2022, the majority of wetlands within the District have been assessed using MnRAM. Inventory and assessment efforts in 2023 will focus on completing Rapid FQA on wetlands in Chanhassen, the majority of which have not been assessed using this method. Staff will also focus QA/QC assessment efforts on wetlands in the southeastern part of the District, specifically in Bloomington and that portion of Eden Prairie. The District continues to evaluate and develop more quantitative assessment tools to be used in further evaluating higher priority wetlands.

*Broad-leaf Arrowhead (*Sagittaria latifolia*) is a common wetland plant. Its tubers (roots) are a highly valuable food for ducks, swans and geese.*

Wetland Classification Continuum

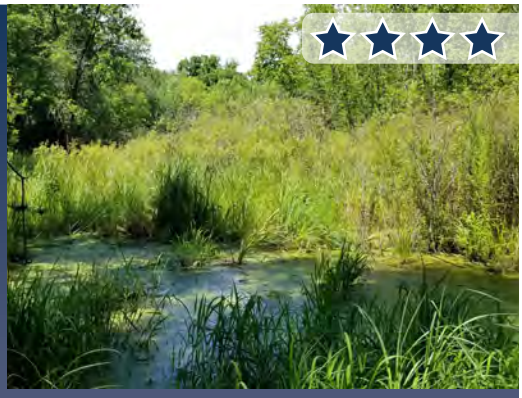
Assigning management classification to wetlands provides input for prioritization of restoration efforts. These classifications are based on FQA data and MnRAM functional categories which include:

- Vegetation diversity/integrity
- Habitat structure
- Amphibian habitat
- Fish habitat
- Shoreline protection
- Cultural/recreational/ educational value
- Stormwater/urban sensitivity
- Wetland water quality
- Characteristic hydrology
- Flood/stormwater attenuation
- Commercial use
- Downstream water quality

See Figure 3 on the next page for an overview of wetlands that have been classified within the District.

Exceptional Value

Wetland has large buffer area or buffers shoreline. High plant diversity. Little or no alteration of soils and plants. Water quality is good. Provides fish and/or amphibian habitat. Significant recreational, educational and/or cultural value.



High Value

Wetland with buffer or provides buffer for shoreline. Provides floodwater attenuation. Better to good water quality. Water deep enough to provide overwintering amphibian habitat. May provide fish habitat. Moderate plant diversity.

Medium Value

Wetland may have been excavated or serve as stormwater pond. Low plant diversity. Minimal educational, aesthetic, or recreational opportunity. Deeper water may provide overwintering wildlife habitat.

Low Value

Associated with agricultural or high-intensity land use. Very low species diversity and dominated by invasive species. Poor water quality, usually due to high inputs of untreated stormwater runoff. Has alteration or excavation. Little or no recreational or cultural value.

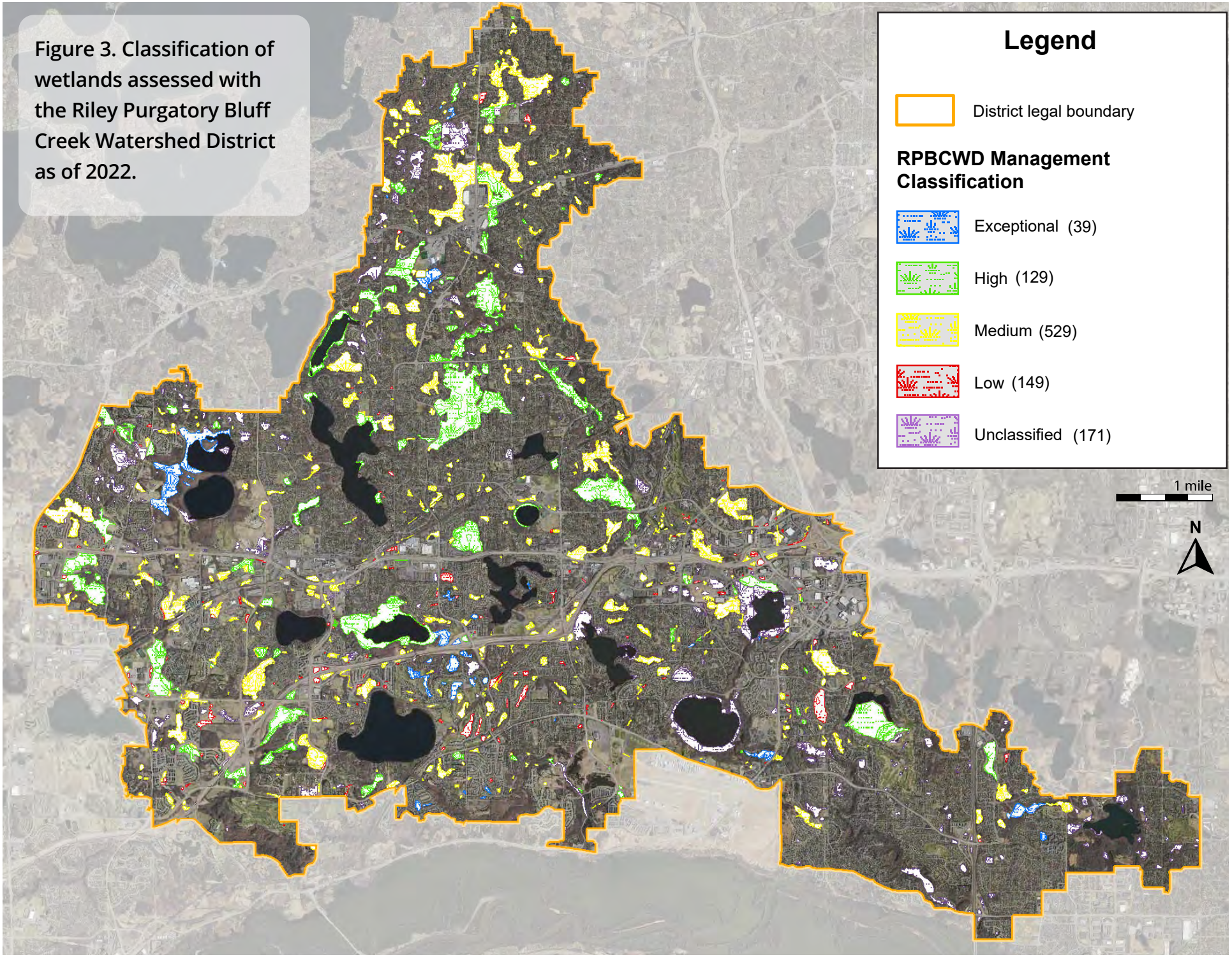


Figure 3. Classification of wetlands assessed with the Riley Purgatory Bluff Creek Watershed District as of 2022.

Capital Improvement Projects

LOTUS LAKE WATER QUALITY IMPROVEMENT PROJECT

Lotus Lake is classified as a deep water lake with a beneficial use category of Class 2: Aquatic life and recreation. The MPCA standard for total phosphorus (TP) less than or equal to 0.04 µg/L. Lotus Lake has only met this standard once between 1972 and 2018. Since Lotus Lake received an alum treatment in 2018, it has consistently met the standard with an average TP concentration in 2021 of 0.029 µg/L. The MPCA standard for chlorophyll-a (Chl-a) is at or below 14µg/L, and Lotus Lake has not met this standard in any year tested although it has been trending downward since the alum treatment. Based upon the 2017 Use Attainability Analysis (UAA), internal loading accounts for 68% of the TP loads to Lotus Lake. A second alum treatment is planned for 2023, addressing the internal loading component. This internal load control is modeled to reduce annual loading approximately 586 pounds per year. In total, Lotus Lake needs a load reduction of 37% or 682 pounds.

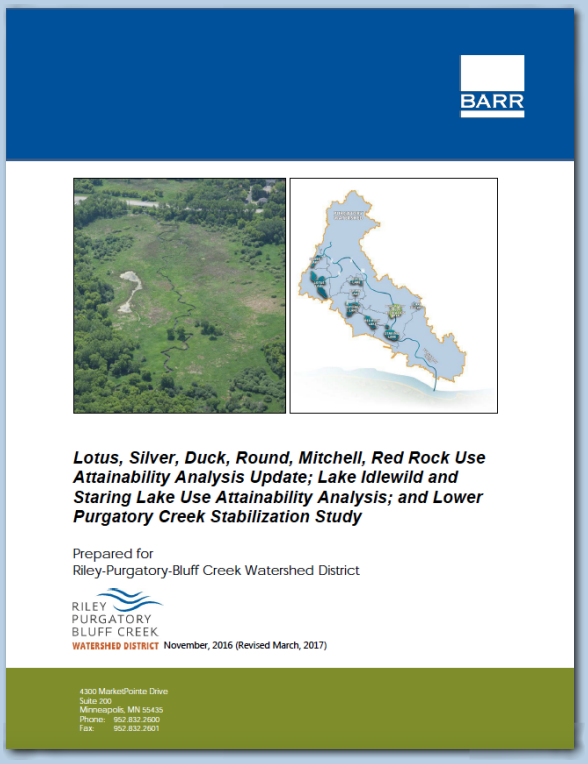
The UAA identified eight potential locations for best management practices to treat the contributing watershed. In chapter 9 of the 2018 10-year plan, these projects were listed individually. It was decided while setting the 2022 budget that an economy of scale could result in a reduction of cost by combining several of the practices into one larger project. To this end, LL_1, LL_3, LL_5, and LL_7 have been combined into one project and the feasibility study was initiated in 2022. Based upon planning level estimates, these practices could potentially reduce external loading to Lotus Lake by 122.9 pounds of TP per year.

At the planning level for the UAA, these projects, in total, ranged in cost from $2,896,000 to $4,059,000. It is important to emphasize that this is at the planning stage and that range will narrow as the design is developed. Funding for the project is anticipated to come from the RPBCWD levy, the City of Chanhassen, and, if awarded, grant funds. The City of Chanhassen has three road reconstruction projects planned for the area in the capital improvement plan. RPBCWD and Chanhassen are working as partners to provide regional treatment for these planned activities.

The project feasibility study should be complete in early summer of 2023. Based upon the findings, the project could be ordered the summer of 2023 with construction in 2024/2025.

What is a UAA?

A Use Attainability Analysis (UAA) is a structured scientific assessment of the factors affecting the attainment of uses specified in Section 101(a)(2) of the Clean Water Act (sometimes called the "fishable/swimmable uses"). Factors considered include the physical, chemical, biological, and economic use removal criteria.



Upper Riley Creek Ecological Enhancement Project

The District has partnered with the City of Chanhassen to stabilize Riley Creek from Highway 5 (MN TH 5) to Lake Susan. The goal of the project, described in the Upper Riley Creek Corridor Ecological Enhancement Plan, was to create an ecologically diverse stream corridor and significantly reduce streambank erosion in Riley Creek and sediment deposition into Lake Susan. Where constraints allow, the stream will be reconnected to the floodplain.

Riley Creek is impaired for both aquatic life (2002) and aquatic recreation (2002 and 2018). The receiving water, Lake Susan, is impaired for aquatic consumption, aquatic life, and aquatic recreation due to mercury, Fish Index of Biotic Integrity (IBI), and nutrients. The sampling performed where Riley Creek passes under Powers Boulevard found that all but two samples in 2018 and all of the 2019 samples exceeded the MPCA standard for total suspended solids (TSS) of ≤30mg/L. Results of the P8 model indicate that 83,000 pounds (about 37,648 kg) of sediment are carried from the watershed to Lake Susan annually. This does not include loading from streambank erosion. To achieve and maintain the long-term water quality goals of Lake Susan, a 67% reduction in erosion source loading is necessary.

This reach, known as R4, was analyzed using the Bank Erosion Hazard Index and the Near Bank Stress Ratings. These tools were used to estimate bank erosion rates and were estimated at about 250 tons of total suspended solids (TSS) each year. By stabilizing Reach 4, engineers estimate the project will reduce TSS by 470,000 pounds per year and total phosphorus (TP) by 250 pounds per year. This represents the bank recession rate of 0.10 to 0.25 feet per year.

In 2022, the district performed a Phase I Environmental Site Assessment (ESA), and Environmental Assessment Worksheet (EAW), preliminary plan design, and hydrologic and hydraulic modeling of the reach. The EAW produced a finding of no recognized environmental conditions. The ESA found nothing of consequence as well. The design has been modified to achieve no rise in flood elevation as required by FEMA. Design will be completed in 2023 with construction to take place in winter of 2023/2024.

Images of eroding banks and incised channel of Riley Creek - Reach 4 (R4) from 2022.

Bluff Creek Headwaters Ecological Restoration Project

The District has partnered with the City of Chanhassen to stabilize Riley Creek from Highway 5 (MN TH5) to Lake Susan. The goal of the project, described in the Bluff Creek Reach 5 Ecological Enhancement Plan was to create an ecologically diverse stream corridor and significantly reduce streambank erosion and sediment deposition into Bluff Creek and the Minnesota River, both of which have Total Suspended Solids (TSS) identified as the stressor. The project will also provide extended detention and ecological restoration within the headwater wetland. Where constraints allow, the stream will be reconnected to the floodplain.

Bluff Creek is impaired for both aquatic life (2002) and aquatic recreation (2002 and 2018). A Total Maximum Daily Load (TMDL) Study was conducted in 2010 and identified in-stream and near-stream erosion as the primary sources of sediment. It further concluded that extended detention, such as will be provided by the wetland restoration, will aid in the reduction of erosive forces in the channel. In 2022, the Bluff Creek Reach 5 Ecological Enhancement Plan was completed. Conversations with the city of Chanhassen made the district aware that Chanhassen was planning on a full reconstruction of Galpin Boulevard. The district is working with Chanhassen to align these projects to the extent practical. One outcome of this communication was that the district advanced study of the creek crossing at Galpin Boulevard and designed a crossing that would not increase rates, velocities, or flood elevations while providing for animal migration.

Modeling completed in 2022 indicates that flow rates and velocities can be reduced to pre-settlement conditions for the 1-year, 2-year, and 10-year return interval storms. This could translate into a reduction of 8,225 pounds of TSS and 31 pounds of total phosphorus (TP) in addition to the reductions resulting from the channel stabilization. The recommended channel stabilization concept (Concept C) is estimated to reduce loading of TSS by 60,200 pounds per year and TP by 38 pounds per year.

Planning level cost estimates range from $606,100 to $848,600. As is always the case, planning level opinions of cost have a wide range because the specific design parameters are unknown. As the design becomes more resolved, the range will narrow.

Design will continue through 2023 with construction to occur in late 2024.

Images of eroding banks and incised channel of Bluff Creek - Reach 5 (B5) from 2022.

RICE MARSH LAKE WATER QUALITY IMPROVEMENT PROJECT

Rice Marsh Lake is classified as a shallow lake. The MPCA standard for TP is ≤ 60 µg/L. The average growing season total phosphorus in 2010 was 115 µg/L with a peak of 130 µg/L. In 2014 the average TP load concentration was 107 µg/L with a peak of 134 µg/L. The 2016 Rice Marsh Lake and Lake Riley Use Attainability Analysis (UAA) found that 44% (712 pounds) of the load was from watershed runoff, 35% was from internal loading, and 19% originated from upstream lakes. To meet water quality goals, TP loading must be reduced by 41% or 681 pounds.

Rice Marsh Lake has a contributing local watershed of 883 acres. The selected subwatershed (RM_12) accounts for approximately 232 of those acres including the highly urbanized town center of Chanhassen, which has minimal treatment. The area accounts for loading of one pound per acre or 232 pounds of TP. The next largest contributing subwatershed (RM_33) accounts for 169 pounds. Most other subwatersheds are in the single digits.

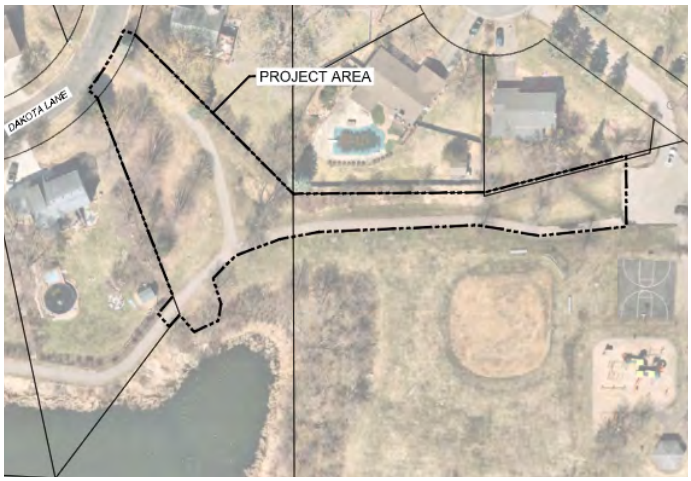
The Feasibility Report for the Rice Marsh Lake Subwatershed RM_12a Water Quality Improvement Project evaluated seven different potential best management practices with one of these, manufactured treatment devices (MTD) looking at 14 different products. After meeting with Chanhassen staff of the Parks and Recreation Department and evaluating other site constraints such as the Metropolitan Council Interceptor Sewer Line, it was decided to go with a manufactured treatment device (MTD). The Kraken® Filter by Bio Clean was the preferred option as it was modeled to have the best removal efficiencies at between 52 and 59 pounds/year as well as having the needed capacity to handle the storm event flows through the system. A sampling unit was placed into the outlet for the

At the feasibility stage, the engineer's opinion of cost for the project ranged from $456,000 to $854,000.

The awarded bid was for $594,830. Funding for the project came from the RPBCWD levy. Chanhassen paid for installation of the curb cut rain garden during their road project and to have an existing storm sewer utility access hole adjusted and refurbished. The city also donated land for the project and partnership with Chanhassen is in the form of their donation of land and their committed to long-term maintenance of the area and the MTDs.

Two filters were installed in series in November 2021. In spring 2022, another raingarden was installed, and 15,000 square feet of park area maintained as lawn had the soils amended and was planted with either pollinator plants or native prairie. There will be three years of ongoing vegetation management.

Kraken® filters were installed in November 2021.



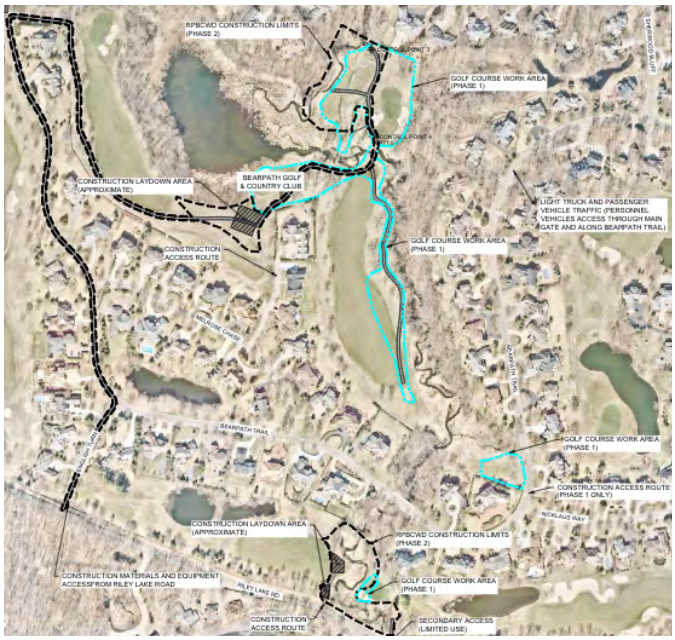
MIDDLE RILEY CREEK STABILIZATION PROJECT

The District partnered with the Bearpath Golf and Country Club and the Bearpath Homeowners Association on this project. The goal of the project, described in the feasibility report, was to create an ecologically diverse stream corridor and significantly reduce streambank erosion and sediment deposition into Riley Creek. In conjunction, the project needed to maintain the aesthetics and playability of the original Jack Nicklaus-designed golf course.

Riley Creek is impaired for both aquatic life (2002) and aquatic recreation (2002 and 2018). The receiving water, Lake Riley, is impaired for aquatic consumption, aquatic life, and aquatic recreation due to mercury, Fish IBI, and nutrients. Downstream, the Minnesota River is impaired for aquatic life and aquatic consumption.

Portions of this reach, known as R3 (extends from Rice Marsh Lake to Lake Riley), were analyzed using the Bank Assessment for Non-Point Source Consequences of Sediment (BANCS) model, which is comprised of two erosion estimation tools. Based upon the Bank Erosion Hazard Index portion of the BANCS, these reaches rated as "high." By stabilizing Sub-Reaches E and D3, engineers estimate the project will reduce total suspended solids (TSS) by 16,640 pounds per year and total phosphorus (TP) by 8.3 pounds per year.

At the feasibility stage, the engineer's opinion of cost for the project ranged from $504,000 to $819,000. The awarded bid was for $439,582. Funding for this project came from the RPBCWD levy and the Bearpath Golf and Country Club. In 2021, the channel was realigned, all stabilization practices such as riffles, root wads, and vegetated reinforced soil slope (VRSS) were installed, and the flood plain area has been temporarily stabilized. The spring of 2022 saw the remainder of the buffer areas planted into native vegetation. Three years of on-going maintenance is left to complete.



Re-meandering and bank stabilization of Riley Creek within Bearpath Golf and Country Club in November 2021.

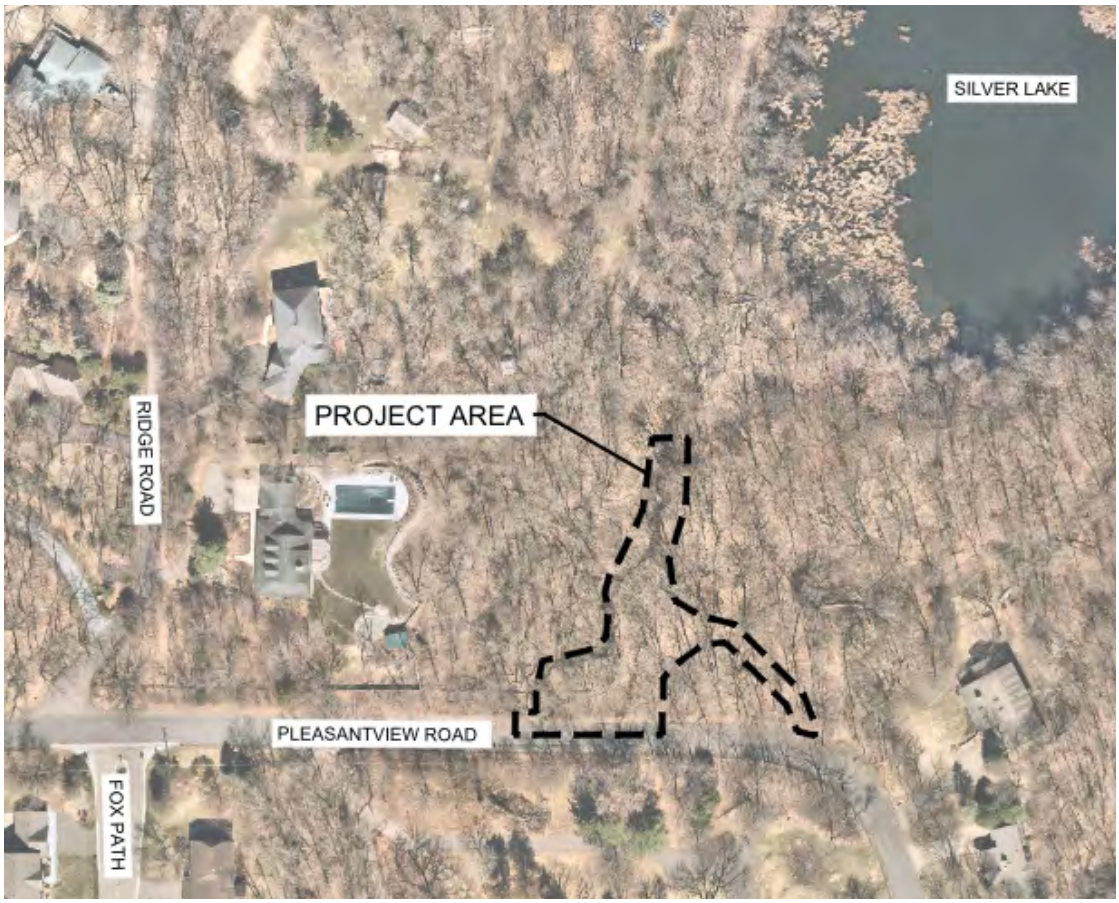
SILVER LAKE WATER QUALITY IMPROVEMENT PROJECT

Silver Lake is classified as a shallow lake, which has an MPCA standard for total phosphorus (TP) less than or equal to 60 µg/L. Silver Lake has only met this standard in 2017. The District set a goal for chlorophyll-a (Chl-a) at or below 20 µg/L, and Silver Lake has not met this standard in any year tested. Based upon the 2017 Use Attainability Analysis, TP loads to Silver Lake need a reduction of 16% or 179 pounds.

The Feasibility Report for the Silver Lake Subwatershed SiL_2 Water Quality Improvement Project identified five potential best management practices to treat the contributing watershed. Installation of a drop manhole structure with sump, channel reshaping, and installation of an iron-enhanced sand ditch check was selected to minimize cost, disturbance to the natural area, and potential utility conflicts. Based on estimates, the project will remove 2.6 to 4.7 pounds of TP per year.

During the feasibility study, the engineer's opinion of project cost ranged from $98,000 to $183,000. The awarded bid was for $127,977. Additional erosion was noted just beyond the construction limits and a change order was authorized to extend the curb and gutter and repair the eroded area for $4,111, bringing total project cost to $132,088. Funding for the project came from the RPBCWD levy with change order paid for by the City of Chanhassen. The City also partnered by donating land for the project and committing to long-term maintenance of the sump manhole and iron-enhanced sand filters.

The project was substantially complete in November 2021 followed by three years of contracted vegetation maintenance.

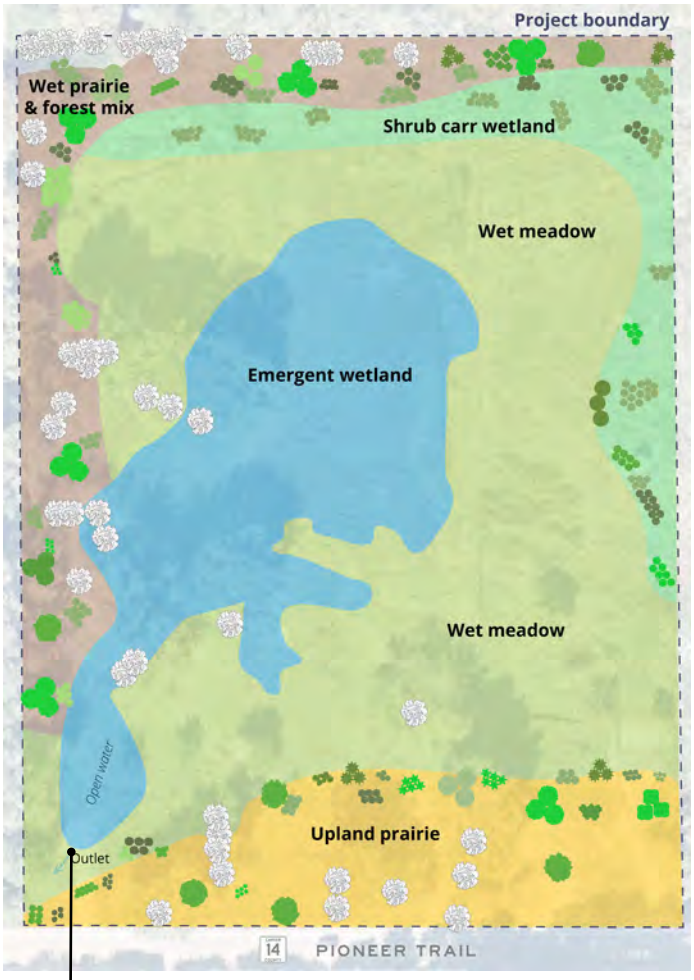


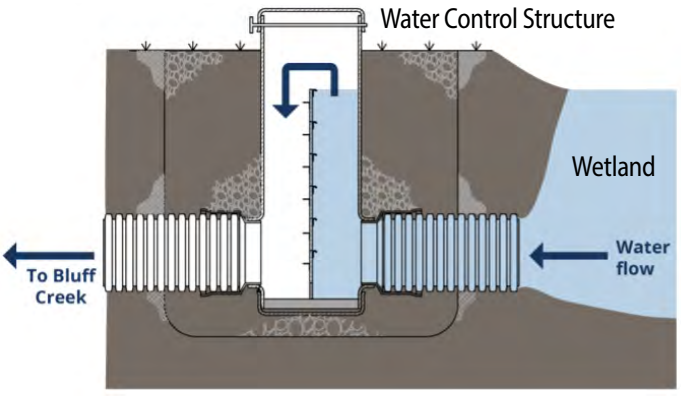
WETLAND RESTORATION ALONG PIONEER TRAIL

Initiated as a flood hazard mitigation project, the project evolved into a wetland restoration project. The City of Chanhassen and RPBCWD purchased three houses that were constructed in an historic wetland and experienced regular flooding. The structures were removed from the property, either by home movers or demolition, and their appurtenances also removed. Upon removal of the homes, RPBCWD commissioned a Feasibility Report – Pioneer Trail Wetland Restoration Project, to determine what ecological, flood protection, and stream protection benefits could be garnered from restoring the wetland on these three properties. The feasibility report looked at two outlet configurations for hydrologic and hydraulic control as well as two conceptual plans for habitat restoration.

At the feasibility stage, the engineer's opinion of cost for the selected options ranged from $400,000 to $650,000. The awarded bid was for $295,098. Funding for the project came from the RPBCWD levy, the City of Chanhassen, a Minnesota Department of Natural Resources Flood Hazard Mitigation Grant, and Watershed Based Funding Grant from the State of Minnesota. In 2021, the outlet structure was installed and earthwork was completed. Invasive species were treated as well. In the spring of 2022, the final treatment of invasive species was completed and in the summer of 2022 the wetlands were sown with native seed mixes and live container shrubs and trees were installed. There will be professional maintenance for a minimum of five years. Volunteers will be asked to perform additional maintenance into the future.

Habitat restoration plan for Pioneer Trail wetland project.





DUCK LAKE ROAD PARTNERSHIP

For many years, Duck Lake Road divided Duck Lake into two separate bodies of water. The separation negatively impacted water quality and wildlife habitat and caused frequent flooding of the roadway. In 2019, the City of Eden Prairie applied for a permit to reconstruct Duck Lake Road. This project evolved into construction of a bridge to replace the section of road dividing the lake.

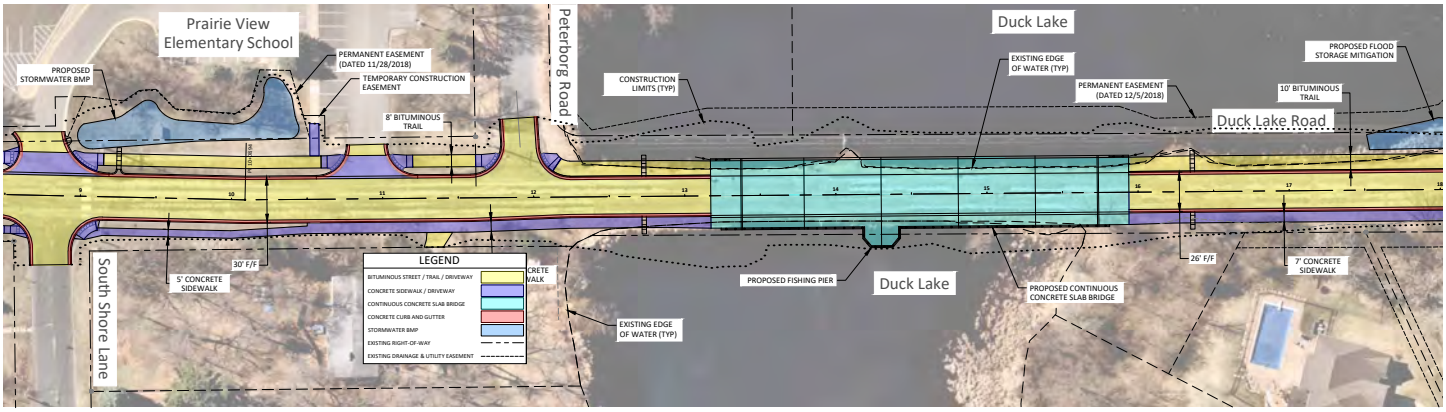
The project replaced approximately 235 feet of two-lane roadway with a bridge and pedestrian improvements. Environmental benefits include restoration of the shoreline and about 7,000 square feet of the lake bed, removal of habitat fragmentation, and improved floodplain impacts by increasing the water storage volume of the lake.

Total project cost is approximately $4.7 million over five years with the District providing up to $1.175 million in support. The project was constructed entirely on city property, and the city will own and maintain Duck Lake Road and its right-of-way when the project is complete.

Project construction began in 2021 with substantial completion in late 2022. The official opening ceremony will be held in June 2023. For more information, check out the City of Eden Prairie Duck Lake Road Improvement Project webpage.

A double row of yellow silt curtains in the water protect the lake from the Duck Lake Road construction zone (fall 2021).

Covering exposed soils during road work reduces the risk of erosion into Duck Lake (fall 2021).



Portion of project plan showing bridge (City of Eden Prairie graphic).

Opportunity Projects

St. Hubert Water Quality and Native Vegetation Restoration Project

This project was a public/private partnership between the District, St. Hubert Catholic School, and Carver Soil and Water Conservation District (SWCD). The project germinated from a school staff member's desire to install a raingarden for her classroom as a project to address runoff from the school's parking lot that had created a deeply incised gully had formed within a tributary to Rice Marsh Lake. The project evolved to address the gully, install a rain garden, install a tree trench, restore 0.6 acres of fallow land to prairie, as well as make some drainage improvements on the site. In addition to the water quality benefits, RPBCWD staff are working with staff at St. Hubert to develop curriculum to turn the prairie into a living classroom. The school and RPBCWD are also working with a class at the University of Minnesota to study soil health and vegetation establishment at the site.

A memorandum of conceptual design was prepared to communicate conceptual design options, approximate costs, as well as benefits and limitations of specific practices. The preliminary opinion of cost ranged from $204,000 to $277,000. The awarded bid was for $290,964. Funding is from the RPBCWD levy, St. Hubert Parish Council, the State of Minnesota Watershed Based Implementation Fund, and Carver SWCD. The project was substantially completed in August of 2021. Three years of maintenance remains on the prairie, rain garden, and tree trench.

Photos taken during the installation of the St. Hubert Opportunity Project.

A view of the tree trench in October 2022.