BROWN'S CREEK
WATERSHED DISTRICT
Preserving the integrity of the watershed for future generations
www.bcwd.org | 455 Hayward Ave N, Oakdale, MN 55128 | 651-330-8220

REGULAR MEETING OF THE BOARD OF MANAGERS
Wednesday, April 9, 2025
Regular meeting at 6:30 PM

NOTE NEW MEETING LOCATION
Meeting will be held at
Washington County Government Center
Lower Level Room LL14
14949 62nd St N, Stillwater, MN 55082

1) Call Regular Meeting to order @ 6:30PM

2) Approve Regular Meeting Agenda and Discussion Agenda **-Board Action**

3) Public Comments

4) Consent Agenda – **Board Action** (*all items listed under the consent agenda are considered to be routine by the Board of Managers and will be enacted by one motion. There will be no separate discussion on these items unless a Manager removes an item from the consent agenda for discussion or there is a request to remove the item from the consent agenda, in which event the board will consider whether to remove the item from the consent agenda and consider it separately*.)
   a) Approve Minutes of the March 12, 2025 Regular Meeting
   b) Accept Permit Fee Statement
   c) Authorize administrator to distribute 2024 annual report and 2025 annual plan
   d) Approve the 2025 scope of work for the trout habitat preservation project
   e) Authorization purchase of monitoring equipment replacement from Tech Sales Co
   f) Approve watershed management plan update language for the flood management and groundwater management sections for inclusion in the draft plan
   g) Authorize printing and mailing newsletter from Stillwater Printing
   h) Authorize payment to Geomorphic Restoration for pay application #5

5) Treasurer's Report
   a) 2024 Audit Presentation
   b) Review Authorized Funds Spreadsheet
   c) Revised 2025 Budget with actual carry forward – **Board Action**
   d) Current Items Payable-**Board Action (Roll Call Vote)**

6) Permits
   a) BCWD Permit #25-05 St. Croix Valley Recreation Center Parking Lot– **Board Action**
   b) Washington County CSAH 15B Phase 2 - project overview and discussion

7) Projects
   a) 2024 lake and stream monitoring summary – presentation
   b) Chloride Assessment Scope – **Board Action**
   c) H&H model update and Flood Vulnerability Assessment – **Board Action**
   d) Minnesota Department of Natural Resources shore structure agreement – **Board Action**
   e) Brown's Creek Cove Reach Stream Assessment **– Board Action**
   f) Lake Vegetation Surveys **– Board Action**

8) Old Business
   a) Meeting Location
   b) Schedule of 2025 Regular and Workshop meetings - **- Board Action**

9) Discussion Agenda - No Action Required
   a) Updates
      (1) Administrator - Minnesota Pollution Control Agency 319 grant phase 2 workplan
      (2) Legal
      (3) Engineer
      (4) Managers
   b) May 2025 Regular Meeting BCWD Board Agenda

10) Adjournment

DRAFT Minutes of the regular meeting of the Brown's Creek Watershed District Board of Managers, Wednesday March 12, 2025

ROLL CALL

Managers Present:	**Others Present:**
Klayton Eckles, President	Karen Kill, BCWD administrator
Celia Wirth, Treasurer	Hannah Peterson, BCWD staff
Debra Sahulka, Secretary	Michael Welch, Smith Partners, BCWD counsel
Chuck LeRoux, Vice President	Camilla Correll, EOR, BCWD engineer
	John Sarafolean, EOR, BCWD engineer
	Stu Grubb, EOR, BCWD engineer
Manager Absent:	Cameron Blake, Washington Conservation District staff
Larry Odebrecht, 2nd Vice President	Brett Stolpestad, Washington Conservation District staff
	Tom Kranz, Holly Kranz permit applicants
	Don Peterson, resident

1) Call regular meeting to order

President Klayton Eckles called the regular meeting to order at 6:36 p.m.

2) Approve agenda

Karen Kill requested to postpone discussion of the revised 2025 budget (item 5b) until the April meeting. She requested the addition of Brown's Creek Conservation Easement Area prescribed burn contractor selection as item 7d.

Manager LeRoux moved, seconded by Manager Wirth, to approve the agenda as amended. Motion carried, 4/0.

3) Public Comments

There were no public comments.

4) Consent agenda

Manager Wirth moved, seconded by Manager Sahulka, to approve the consent agenda:

a) Approve Minutes of the February 12, 2025 Workshop & Regular Meeting
b) Accept Permit Fee Statement
c) Authorize Emmons & Olivier Resources weather station scope of work
d) Authorize staff registration for University of Minnesota stormwater training

Motion carried 4/0.

5) Treasurer's Report

Manager Wirth moved, seconded by Manager Sahulka, to accept the authorized funds spreadsheet and authorize the payment of the bills as presented, totaling $108,049.52.

	Yea	Nay	Abstain	Absent
Manager Eckles	**X**			
Manager Odebrecht				**X**
Manager LeRoux	**X**			
Manager Wirth	**X**			
Manager Sahulka	**X**			

Motion carried on a roll call vote 4/0.

6) Permits

a) BCWD Permit #25-04 Kranz Single-Family Home Addition

John Sarafolean presented the engineer's report on a permit application for an addition on a single-family home property. A variance was requested because the Kranz family had built a raingarden to provide stormwater management under Permit #22-13. The raingarden was oversized on construction and additional untreated stormwater flows to and is managed in it, but the raingarden does not capture stormwater from the proposed addition. The Kranzes are requesting a variance to allow treatment in the raingarden in lieu of management of stormwater from the new addition. The managers discussed the need to reevaluate the permit fee structure and process for single-family permits to increase efficiency and lower costs. Don Peterson, a neighbor of the Kranz family, noted his support of the project.

Manager Wirth moved, seconded by Manager LeRoux, to approve the variance and Permit #25-04 with the conditions and stipulations stated in the engineer's report. Motion carried 4/0.

7) Projects

a) Stewardship grant and best management practice maintenance presentation

Brett Stolpestad presented on the watershed district's stewardship grant program including the projects installed in 2024 and the program's goals for 2025. The managers discussed how to educate homeowners and make sure the projects are maintained as property ownership changes. Mr. Stolpestad also shared that the Washington Conservation District received a Pollinator Pathways grant to provide stormwater facilities in the Croixwood neighborhood in Stillwater. Cameron Blake presented on the Washington Conservation District's maintenance program including work on specific capital-improvement projects in the watershed in 2024. Mr. Blake said program staff do not inspect BCWD permit sites.

b) Groundwater well 2024 data and 2025 scope

Stu Grubb presented watershed well-measurement data. The managers discussed how the wells were selected to be measured, how to locate wells, and what measuring 4-5 additional wells would cost.

Manager Wirth, seconded by Manger Eckles, to authorize the Emmons and Olivier Resources scope of services for monitoring the existing well network and groundwater management for $4,160 from account 942-0004 and $8,500 from account 942-0011 for a total of $12,660, in addition to the carryover of $5,576 for expanding the well network from 2024. Motion carried 4/0.

c) Hydrologic and Hydraulic Model update presentation

Camilla Correll requested the presentation be tabled until the April meeting.

d) Brown's Creek Conservation Easement Area prescribed burn contractor selection

Ms. Kill shared the quotes from three contractors for a prescribed burn at the Brown's Creek Conservation Area, lowest of which from Edge Ecosystems. She noted that the burn would take place this spring, likely in the early morning with optimal wind conditions.

Manager Wirth moved, seconded by Manager Sahulka, to authorize the administrator to contract with Edge Ecosystems not to exceed $1,400 from account 935-0002 upon advice of counsel to conduct the prescribed burn at the Brown's Creek Conservation Easement Area. Motion carried 4/0.

8) Old business

a) Meeting location

Ms. Kill discussed possible meeting locations. While the Stillwater Township board denied Brown's Creek Watershed District's request to use its Town Hall, the managers said that would be their first choice and encouraged the administrator to follow up and offer to pay a fee if needed. They said that Oak Glen Golf Course would be their second choice. The board decided to meet at the Washington County Government Center again in April and until a new location is finalized.

b) Schedule of regular and special 2025 meetings

The managers elected to postpone approving a full schedule of meetings until a new meeting location is finalized. Ms. Kill shared that staff will send a poll for dates for the two remaining watershed-management plan update workshops.

9) Discussion Agenda

a) Updates

(1) Administrator

(a) Belwin education collaboration

Ms. Kill shared that Belwin Conservancy is looking to partner with Stillwater schools on educational programming in their new accessible facility, and a proposal will be coming to BCWD for financial support, similar to a previous partnership with Warner Nature Center, supported by local watershed districts.

(b) MS4Front demonstration

Ms. Kill shared that she, Manager Wirth, Hannah Peterson, and a representative from EOR attended a demonstration of permit-management software by Houston Engineering and that a quote will be pulled together for the board to consider.

(c) Beaver study letters of support

Ms. Kill told the board that she wrote a couple of letters of support for a University of Minnesota professor who is applying for grant funding to conduct research on the impacts of beavers on water resources in Minnesota. Mr. Grubb shared additional upcoming beaver education events including a presentation to EOR and the National Beaver Summit.

(d) MSCMWO Management Plan Update

Ms. Kill shared that she will be reviewing and providing comments on the Middle St Croix Watershed Management Organization's updated watershed management plan.

(e) Brown's Creek restoration next steps

Ms. Kill shared that she is working with the Minnesota Department of Natural Resources Fisheries on a change order for the steps to the creek and that she is working with them on a new accessible access point funded through a Get Out More grant. She also told the board about the upcoming planting at the restoration site on April 26, 2025 at 8 a.m.

(2) Legal

Michael Welch noted that a provision in the district's contract with EOR's contract provides that the administrator may waive apparent conflicts of interest for the engineer to work with others in the watershed under particular circumstances. He also shared that there is no update on the chloride limited-liability legislation at this time.

(3) Engineer

Mr. Grubb shared that EOR has acquired a new drone with infrared thermal sensing technology that could be used to identify where groundwater is feeding Brown's Creek and the wetlands in the district.

(4) Managers

Manager Wirth confirmed with the board that she will be the only delegate attending the Minnesota Watersheds special meeting on March 21, 2025.

10) Adjournment

Manager Wirth moved, seconded by Manager Sahulka, to adjourn the regular meeting at 8:47 p.m. Motion carried 4/0.

Respectfully Submitted by
Hannah Peterson, BCWD staff and Debra Sahulka, Recording Secretary

APPLICANT/PERMIT NO.	PERMIT DATE	Status/Notes	RULES							TYPE				FEES OWED	
			2	3	4	5	6	7	Decompaction	GOV	SF RES	RES DEV	COM	EXEMPT	AMT DUE
Bergmann Development/Sanctuary Permit No. 05-12	10/14/2005		X	X	X			X				X			$0.00
Stillwater Medical Center Parking Permit 13-26		need to verify infiltration with monitoring data	X	X				X					X		$3,039.10
Brown's Creek Cove Permit 15-07		received as-builts and not built as approved - needs correction	X	X	X			X				X			$8,238.52
Heifort Hills Permit 16-03		need as-builts	X	X	X	X		X				X			$1,327.34
Farms of Grant/White Oaks Savannah Permit 17-01			X	X	X			X				X			$19,356.20
The Lakes of Stillwater Permit 17-04	Extended to 12/31/2025	received as-builts and not built as approved - needs correction	X	X	X			X					X		$4,473.18
West Ridge Permit 17-17			X	X	X			X	X			X			$2,189.16
Heifort Hills Estates Permit 18-02			X	X	X			X	X			X			$41,206.46
Boutwell Farms Permit 18-04A			X	X	X			X	X			X			$785.69
Hazel Place/Hertiage Ridge Permit 18-05 (Was 17-09)		as of 10/2023 - still two lots to go	X	X	X			X	X			X			($2,408.42)
Nottingham Village Permit 18-06		approved (overflow too	X	X	X			X				X			$1,328.90
Ridgecrest Permit 18-11		waiting for popeyes to be done - one raingardian install at popeyes, one raingarden replanted, need documentation of compost follow up spring 2024	X	X				X	X				X		$2,296.78
St Croix Valley Recreation Center Expansion Permit 18-14		contact Reabar - last follow up 2021		X				X	X	X				$6,970.28	
Central Commons Permit 19-05	NOT ISSUED - term until 11/11/2025	Financial Assurance and Declaration still outstanding	X	X	X			X	X				X		$60,241.50
Neal Ave Road Reconstruction Permit 20-05	6/1/2020	contact Reabar	X	X						X				$19,088.31	
CSAH 15-36 Interchange Permit 20-08	3/24/2021 3 year approval	waiting for as-builts		X			X	X		X				$22,178.60	
White Pine Ridge Permit 20-12	6/7/2021 surety redution request 1/12/23			X					X			X			$ 1,420.42
Maryland Gateway Addition Permit 21-13	9/29/2021	four lots left to build	x	x				x				x			($611.00)
Schwartz Residence Permit 21-15	5/6/2021 erosion control only	amendment requested for 2.0	x	x							x				($319.38)
Fahey Permit 21-34	11/4/2021			x							x				($743.78)
Norell Ave N Improvements Permit 21-45	*(Fall 2022 BMP still needs to be finalized fall 2023)*	waiting on maintnance agreement	x	x				x		x				$10,458.63	
Gonyea (8 lots)- White Pine Ridge Permit 22-02				x								x			($150.60)

APPLICANT/PERMIT NO.	PERMIT DATE	Status/Notes	RULES							TYPE				FEES OWED	
			2	3	4	5	6	7	Decompaction	GOV	SF RES	RES DEV	COM	EXEMPT	AMT DUE
Wetridge (12 lots) - Sharkey/GreenHalo Permit 22-03 (Transferred 21-30 and 21-31)	3/25/2022			x								x			($442.71)
13290 Boutwell Road N - Sharkey/GreenHalo Permit 22-05	3/25/2022			x								x			($590.51)
7125 Lone Oak Trail (WOS L106)-weichman Permit 22-11	9/25/2022 need to amend declaration			x							x				$8,424.13
Stillwater Oaks Permit 22-18	conditional approval		x	x	x			x				x			$3,305.50
Popeyes OPH Permit 22-20	11/9/2022			x									x		($189.62)
Wash Co. CSAH 57 culverts Permit 22-31	2/2/2023			x						x				$0.00	
Cty Rd 61 Re-alignment Permit 23-01	4/12/2023 not yet closable		x	x						x				$8,147.40	
WOS L114 - Cates (7211 Lone Oak Trail Tweden) Permit 23-02	9/26/2023 submittal			x	x			x			x				$8,627.43
Boutwell Farm Lot 1 (2545 Boutwell Farm Rd) Permit 23-03	5/3/2023 NOPV Board Order Items			x							x				$3,569.86
Westridge B1L4 (986 Creekside) Permit 23-04	5/3/2023			x							x				($656.02)
Rocket Carwash Permit 23-05	conditional approval 4/12/2023		x	x									x		$4,824.00
7239 Lone Oak Trail (WOS L118) Permit 23-07	5/3/2023			x							x				$689.54
72nd St Road and Trail Improvements Permit 23-08	5/26/2023									x				$3,438.36	
7273 Lone Oak Trail- WOS Lot 122 - Freiroy Residence Permit 23-11	Conditions not met but started construction 7/27/2023	Need LOC-submitted but not acceptable		x							x				$1,058.25
The Lakes - Phase III/Sandhill Shores Permit 23-13	6/8/2023			x								x			$582.82
Wiskow Berm Permit 23-14	6/28/2023			x							x				($492.72)
7085 Lone Oak Trail- WOS L102- Mensah Res/Cates Permit 23-15	9/6/2023			x							x				$1,388.79
7285 Lone Oak Trl- WOS L124 Permit 23-18	needed			x							x				$283.00
Liberty Classical Academy Expansion Permit 23-19	Plans submitted 6-12-2024 Fee received 12-21-2023		x	x	x			x					x		$3,188.25
Take 5 Oil Change Permit 24-01	8/23/2024		x	x				x					x		($2,323.18)
Schuster Residence- 122nd St N Permit 24-02	3/12/2024			x							x				$1,111.50
WOS L120- 7255 Lone Oak- Hilgert Permit 24-03	3/18/2024			x							x				$2,089.86
Swager Residence Permit 24-05	3/7/2024			x							x				$ (645.40)
Rutherford Elementary Permit 24-06	8/29/2024		x	x				x		x				$ 8,379.06	
Elliot Crossing Permit 24-07	8/2/2024 submittal		x	x	x			x				x			$ 42,621.47
Altendorfer Residence - 13075 Lynch Rd Permit 24-08	5/8/2024			x							x				$ (770.19)

APPLICANT/PERMIT NO.	PERMIT DATE	Status/Notes	RULES							TYPE				FEES OWED	
			2	3	4	5	6	7	Decompaction	GOV	SF RES	RES DEV	COM	EXEMPT	AMT DUE
Washington County CSAH 5 - Trails and Bridge Permit 24-09	1/28/2025		x	x		x		x		x				$ 19,971.75	
Boutwell Farms lot 1 -Conlin - 2545 Boutwell Farm Rd Permit 24-10	application incomplete 8/29/2024			x							x				$ (787.14)
7300 Lone Oak Trail - WOS Lot 127 Karr Residence (Cates) Permit 24-11	8/29/2024			x							x				$ 685.75
7338 Lone Oak Trail- WOS Lot 130-Carlson Residence Permit 24-12	pre-application - lowest floor alteration request App recived 9/24/2024			x							x				$ (103.56)
8413 Marylane Permit 24-13	10/24/2024			x							x				$ (926.50)
Pratt Homes - 105th and Jamaca - Wick Residence Permit 24-14	9/16/2024			x							x				$ (559.65)
Lornston Permit 24-15	11/7/24			x	x						x				$ (1,060.00)
Goodsell Permit 24-16	12/10/2024			x	x						x				$ (7,232.20)
WOS Lot 129 - Weatherby Permit 24-17	12/3/2024			x							x				$ (7,232.20)
Washington County CSAH 15B/South Frontage Rd Permit 24-18	submittal 11/13/2024		x	x		x	x	x		x				$ 13,389.48	
Curve Crest Blvd Utility Extension Permit 25-01	2/19/2025			x						x				$ 1,702.75	
Anderson Holdings Mass Grading Permit 25-02	submittal 2/6/2025			x									x		$ 1,160.50
Lakeview Hospital Site Permit 25-03	submittal 2/18/2025		x	x		x		x					x		$ 5,504.25
Kranz Home Addition Permit 25-04	submittal 2/20/2025		x									x			$ 282.00
St. Croix Rec Center Parking Lot Extension Permit 25-05	submittal 2/14/2025?			x						x				$ 9,672.25	
CSAH 15 Pavement Preservation Permit 25-06	3/18/2025			x						x				$ 973.50	
WOS Lot 121 - 7238 Lone Oak Trail (Castillo) Permit 25-07	Submittal 3/7/25			x							x				$ 530.00
TOTAL NON-EXEMPT DUE BCWD:			##	457	45	18	30	178	25	71	153	13	119		**$235,830.15**
Total due back to applicants if closed:															**($223,918.58)**

BROWN'S CREEK WATERSHED DISTRICT

Preserving the integrity of the watershed for future generations

2024 Annual Report & 2025 Annual Plan

The Brown's Creek Watershed District (BCWD) is a local unit of government dedicated to protecting, managing, and improving water resources within the watershed's 28 square miles, including parts of Stillwater, Oak Park Heights, Lake Elmo, Grant, Hugo, Stillwater Township, and May Township.

To implement its 2017-2026 watershed management plan, the BCWD utilizes education and cost-share programs, capital improvement projects, and its permitting program to preserve and restore the quality of water resources. In 2024, the BCWD worked with partners to develop the next 10-year watershed management plan, and there will be more opportunity for input in 2025 before its 2026 approval.

In 2024, BCWD partnered with the City of Stillwater, the Minnesota Department of Natural Resources, and private landowners to restore over 2,000 feet of Brown's Creek to improve water quality, habitat, and recreation. The work will be complete in 2025. More information on the project can be found at bcwd.org/browns-creek-restoration-project/.

With the help of the East Metro Water Resources Education Program (EMWREP) and the BCWD Citizen Advisory Committee, 2025 will be another great year for community outreach. We will be sending out our annual newsletter, mailing updated homeowner packets to new residents, and implementing targeted outreach for upcoming projects. The CAC is planning summer outreach events, and our annual Community Event and Bird Festival will take place on September 20th in partnership with Sustainable Stillwater MN. We hope to see you join us for the fun!

Board of Managers

The BCWD Board of Managers is appointed by the Washington County Commissioners. Managers can be contacted through the BCWD Office.

- **Klay Eckles**, President
- **Chuck LeRoux**, Vice President
- **Celia Wirth**, Treasurer
- **Debra Sahulka**, Secretary
- **VACANT**, 2nd Vice President

Regular board meetings are typically held at 6:30pm on the second Wednesday of each month. There will be board workshops in July and August to develop the 2026 Budget and workplan and assess the progress of the 2025 workplan. The full meeting schedule including dates, times, and locations can be found at bcwd.org/calendar/.

District Staff

District Office: 455 Hayward Ave N, Oakdale, MN 55128

District Website: www.bcwd.org

- **Karen Kill**, Administrator: 651.330.8220 or kkill@mnwcd.org
- **Hannah Peterson**, Communications & Project Assistant: hpeterson@mnwcd.org

District Consultants (selected in 2025 biennial solicitation):

- **Legal Services:** Smith Partners PLLP
- **Engineering Services:** Emmons & Olivier Resources, Inc.

How to Get Involved

- **Volunteer at an upcoming event:** See bcwd.org/calendar/ or facebook.com/brownscreekwatersheddistrict for upcoming opportunities.
- **Apply for a stewardship grant:** Learn more at bcwd.org/stewardship-grants/.
- **Join the Citizens Advisory Committee (CAC):** Hybrid meetings are open to the public at the Lakes at Stillwater and over Zoom on the 2nd Monday of even months at 6pm. Learn more at bcwd.org/citizens-advisory-committee/.
- **Contribute to the Watershed Management Plan Update:** Learn more at bcwd.org/watershed-management-plan-update/.

2024 - 2025 Budget

2024 Actual Budget:

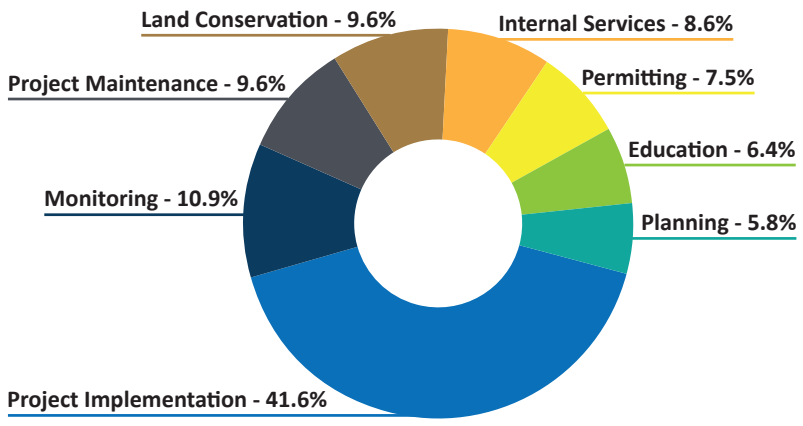
- **Revenue:** $1,329,800
- **Expenses:** $1,761,000

2025 Total Budget: $2,089,000

- **Carry Over:** $840,999 (40%)
- **Grants:** $40,501 (2%)
- **Levy:** $1,207,500 (58%)

Large projects include continued restoration along Brown's Creek.

2025 Budget Categories:

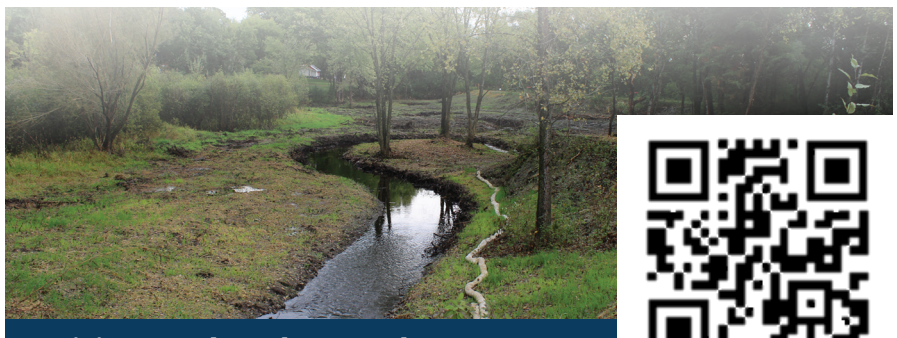


Watershed Facts

BWCD has four distinct landforms including the:

- **Headwaters Region:** predominantly lakes and wetlands
- **Brown's Creek Middle Reach:** predominantly wetlands
- **Long Lake Tributary:** routed to McKusick Lake
- **Brown's Creek Gorge:** where the creek flows into the St. Croix

BCWD contains some of the last remaining rare and unique ecosystems in the Twin Cities Metropolitan Area including Brown's Creek, a cold-water trout stream and other groundwater dependent wetlands that support a variety of plants and animals.



Visit www.bcwd.org to learn more.

Get your head in the watershed...

Explore some of the actions the BCWD takes to manage water resources within the district.

Ecological Health

Unique ecosystems and endangered species were found in the watershed through lake vegetation surveys and a wetland inventory in 2024. The BCWD will continue with vegetative restoration projects and outreach on ecological health in 2025. The volunteer stream monitoring program with local high school students at SAHS continued in 2024 and will again in 2025.

Erosion Prevention & Sediment Control

To reduce sediment loads and erosion and improve water quality, the BCWD restores and protects riparian buffers and inspects projects. In 2024 the district continued to inspect and maintain capital improvement projects including the Brown's Creek Tributary restoration project and removed 30 tons of sediment from four direct outfalls to Brown's Creek.

Land Conservation

In 2024, the CAC continued biological monitoring at the Brown's Creek Conservation Area, in addition to the BCWD capturing wildlife photos with motion cameras. 2024 maintenance included invasive species removal. The BCWD is partnering with the Washington Conservation District on a 2025-2026 HELP grant which includes a prescribed burn and native tree and shrub plantings to improve habitat.

Wetland Management

In 2024, the BCWD completed an updated function and value inventory to ensure wetland classifications are accurate and align with current science and practice and test a new draft functional assessment tool. In 2025, the BCWD will conduct outreach to assess the feasibility of a wetland restoration project.

Floodplain Management

The BCWD continues to manage floodplains with its regulatory program and supporting flood risk reduction projects. In 2024, the BCWD partnered with the City of Stillwater to lower the 62nd Street Trail and bring several adjacent homes into compliance with the BCWD flood-freeboard standard of two feet to increase flood resilience in the area.

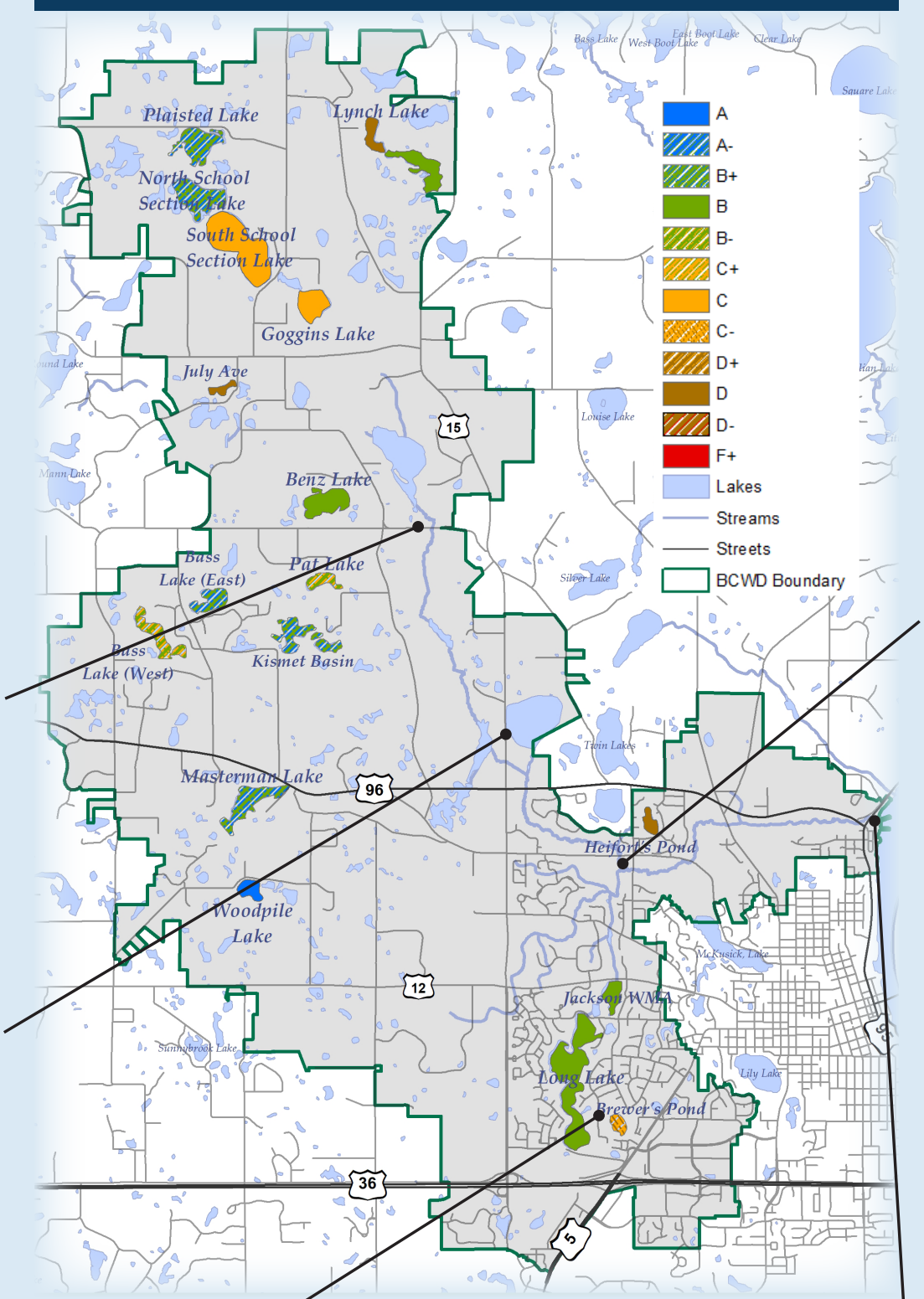
Lake Management

In 2024, the BCWD held community meetings for Long, Wood Pile, and Masterman Lake residents focused on shallow lake ecology, flood risk, and how they can help protect water quality. Water quality is trending upwards for Long Lake, and could soon be the final of Stillwater's lakes delisted for nutrient pollution, highlighting the success of collaborating with local partners to improve lake health.

Regulations

The BCWD administers a permitting program to ensure sustainable development in the watershed. In 2024, the BCWD began working with local partners to assess the regulatory program and anticipates beginning the rule revision process in 2026. The BCWD approved 14 permits in 2024, including four variances (Permits 23-02, 24-01, 24-06, & 24-09). There were no notices of probable violation issued.

BCWD's 2024 Water Quality Report Card



Stormwater Runoff

The BCWD implements capital improvement projects and encourages installing BMPs to treat stormwater runoff before it reaches the creek, lakes, and ponds. In 2025, the Applewood Golf Course Stormwater Reuse project will come online, and the BCWD is also partnering with the City of Stillwater to install a stormwater separator near Brewer's Pond to improve Long Lake's water quality.

Groundwater Management

The district monitors groundwater measurements and trends to improve its understanding of the connection between surface and groundwater throughout the watershed. The BCWD participated in the Washington County groundwater plan update in 2024. The BCWD also continued with annual resident well monitoring efforts in 2024 and will in 2025 as well, hopefully adding 4-5 additional wells.

Recreation

The BCWD seeks to protect and restore the district's resources to provide recreational value to the community. Biking or walking the Brown's Creek State Trail offers beautiful views, especially in the newly restored stretch through Brown's Creek Park in Stillwater. Restoration will create increased access to the creek, including an ADA accessible fishing pier.

Education, Outreach, & Stewardship

In 2024, the BCWD's CAC continued to host their Open Yard events and annual fall community event to engage and educate community members and continued their partnership with the East Metro Water Resources Education Program. These efforts will continue in 2025. The BCWD also offers stewardship grants to enable landowners to identify and implement projects to improve water quality and habitat in the watershed.

Stream Management

In 2024, work to restore 2,000 linear feet of the creek was completed under an MPCA 319 grant that covered 60% of the project with a 40% local match. The restoration project will be done in 2025 after a volunteer tree planting and stream access is completed. Continued outreach will take place in 2025 to plan restoration of an additional stretch of Brown's Creek.

Climate Change Adaptation

The BCWD has been assessing rainfall projection data and educating residents about their flood risks as well as encouraging landowners to install BMPs to increase capacity and resilience in their communities.

Monitoring & Data Collection

The BCWD partners with the Washington Conservation District to collect and evaluate water quantity and quality data on Brown's Creek and the district's major lakes. The creek's 2024 loads to the St. Croix River were:

- **TSS (Sediment):** 109.68 lbs/acre (Goal: 74 lbs/acre)
- **TP (Phosphorus):** 2,563 lbs/yr (Goal: 1,804 lbs/yr)

memo

Project Name |	THPP Infiltration Monitoring	**Date** |	1/09/25
To / Contact info |	BCWD Board of Managers		
Cc / Contact info |	Karen Kill, Administrator		
From / Contact info |	Mike Majeski, Conservation Biologist		
Regarding |	THPP Monitoring for 2025		

The following scope of services outlines the tasks to conduct infiltration monitoring at the Trout Habitat Preservation Project (THPP) during the 2025 monitoring season. Lack of runoff and basin inundation prevented planned infiltration monitoring in 2024.

Background

The THPP was constructed in the winter of 1999 to alleviate high water conditions in the Goggins/School Section lakes system while protecting cold water resources within Brown's Creek. A series of wetlands were enhanced, and infiltration basins were constructed to store and infiltrate water, thereby reducing the amount of water discharged to the headwaters of Brown's Creek. The THPP system also captures and infiltrates water from the surrounding 723-acre subwatershed during years when the Goggins/ School Section lakes system is not outletting. The water levels in Goggins Lake have fluctuated drastically over the last several decades, with record high water levels in 1998 (elevation 972.69 feet) followed by record low water levels in 2010 (elevation 960.35 feet). In the fall of 2024, water levels at Goggins Lake were near elevation 965.6 feet which is approximately 4.4 feet below the lake outlet elevation and 0.9 feet below the Ordinary High Water Level (OHWL).

When Goggin's Lake is below the outlet elevation, the BCWD Board recommends monitoring at THPP should occur once every three years to measure infiltration capacity. It has been four years since infiltration monitoring was conducted at THPP (2021) due to persistent drought conditions and lack of basin inundation. If basin inundation occurs in 2025, it is recommended that infiltration rates be measured at the Basin 1-3 complex to compare data with previous analyses. Results from the analysis will help inform if infiltration trench improvements or repairs are necessary to maintain the function of the infiltration system.

Recommended Scope of Services for 2025

EOR Tasks:

- Install two level loggers to measure infiltration rates at the Basin 1-3 complex, install a temperature logger at the THPP outlet to record temperatures during discharge events, and prepare a memorandum summarizing the data. The anticipated cost for equipment installation, infiltration monitoring, data analysis, equipment removal/storage/ maintenance, and reporting is estimated at $6,914. <u>If snowmelt or rainwater runoff does not inundate the THPP facility in 2025, this task will not be conducted.</u>

<u>Requested Action</u>

1. Approve a budget of $6,914 from account number 903-0001 to conduct infiltration monitoring at THPP if basin inundation occurs in 2025.

WASHINGTON CONSERVATION DISTRICT
455 HAYWARD AVE N
OAKDALE, MN 55128
651-330-8220 [PHONE]
651-330-7747 [FAX]
WWW.MNWCD.ORG

MEMORANDUM

TO: **BCWD Board of Managers**

FROM: Aaron DeRusha, WCD

DATE: **3/19/2025**

RE: **BCWD Water Monitoring Equipment Replacement Request**

Winter testing of the watershed district's stage and velocity sensors identified one sensor for the Diversion monitoring station to be evaluated by the manufacturer for drifting stage. The manufacturer confirmed the sensor is faulty and was deemed unrepairable. The stage and velocity sensor is integral to the function and performance of the monitoring station and pollutant load calculation method. I am requesting the BCWD board approve the replacement cost, including extended warranty, of one stage and velocity sensor for $2,323.00 plus applicable shipping. Attached is a quote detailing these costs. The equipment will be purchased and installed by WCD, to be reimbursed by BCWD. BCWD will retain ownership of the equipment.

Requested board action: Approve equipment replacement expenditures as described above, and payment not to exceed $2,450 to Washington Conservation District for reimbursement.

Q U O T A T I O N

Quotation For:

Washington Conservation District
455 Hayward Ave N
Oakdale MN 55128
Ph: (651) 330-8220 **Fx:** (651) 330-7747

Quotation#: 2250338
Revision#:
Date: 03/19/25

Attn: Aaron DeRusha **E-Mail:** ADeRusha@mnwcd.org
Ref: Isco 750 AV Sensors w/ Additional Warranty

Please Address Order To:

TECH SALES CO.
311 W. 44TH STREET
MINNEAPOLIS MN 55409

FOB: Factory
Shipment: 3-4 Weeks ARO
Salesman: Travis DeGroot
Validity: 30 Days
Terms: NET 30 DAYS

Item	Qty	Part#/Description	Unit Price	Total Price
1	5	603254021 Low Profile Area Velocity Sensor with 10' range and 25' cable.	2,090.70	10,453.50
2	5	Warranty Additional 1 year Warranty	232.30	1,161.50
			Quote Total:	**11,615.00**

Prices shown do not include freight or sales tax. MasterCard/Visa payments are accepted but may be subject to a 4% surcharge. Please review this quotation and let us know if you have any questions.

By: _____
Travis DeGroot

BCWD: $2,323
MSCWMO: $2,323
SWWD: $6,969

memo

Project Name |	Watershed Management Plan Update	**Date** |	04/04/2025
To / Contact info |	BCWD Board of Managers		
Cc / Contact info |	Karen Kill, District Administrator		
From / Contact info |	Camilla Correll, PE, Alex Furneaux		
Regarding |	Floodplain Management and Groundwater Management		

Background

As we finalize the review and updates to the issues, policies, and goals in the watershed management plan, we ask that the Board of Managers provide feedback on the remaining two issue categories: Floodplain Management and Groundwater Management.

Much of the content for Floodplain Management was developed by the Board of Managers and District Staff in 2022 when the BCWD experienced flooding in Kimbro Basin. The current version of the Plan includes issues, policies, and goals for the "**Protection of Flood Storage Areas"** and "**Management of Flood Prone Areas"** (i.e., landlocked basins), relying on the administration of the BCWD regulatory standards to achieve the goals. Since the flooding in Kimbro Basin took place and the recognition that Minnesota is getting warmer and wetter, the Board of Managers took a closer look at the Floodplain Management section of the watershed management plan and explored their role in floodplain management. After a series of workshops, the BCWD Board of Managers expanded the sub-issues, policies, and goals to include "**Flood Prevention", "**Protection of Flood Storage Areas", and "**Flood Mitigation** and Management of Flood Prone Areas". The version attached to this memorandum also reflects feedback/suggestions made by the Technical Advisory Committee.

Much of the content for Groundwater Management reflects what the watershed district has learned about the groundwater system over the last 10 years, as well as feedback/suggestions made by the Technical Advisory Committee. The revised content includes the addition of "**Groundwater Flooding**" in response to the flooding experienced in Kimbro Basin, a flood event driven by high groundwater levels.

Board Review

District staff is requesting that the Board of Managers review the attached sections of the updated Watershed Management Plan so that we can address any questions or concerns at the April 9, 2025 Board Meeting. After this content has been reviewed by the Board, EOR will begin finalizing the issues, policies, and goals so that we can identify the implementation activities that the BCWD should include in the Plan. The draft Implementation Plan will be reviewed by the Citizens Advisory Committee (CAC) on April 14, 2025 and the Technical Advisory Committee (TAC) on April 22, 2025. Once we have gotten this feedback, we will make revisions to the Implementation Plan so that we can share it with the Board at the upcoming workshop.

Board Action

None.

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3.6. Floodplain and Flood Management

3.6.1. General Issue Statement

Historically, localized flooding within the watershed has damaged and threatened to damage private properties and public infrastructure. Hydrologic and hydraulic (H&H) model updates using updated rainfall data (i.e., NOAA Atlas 14) ~~rainfall data~~ indicate that there are now properties with inadequate freeboard, putting them at increased risk of flood damage. The BCWD recognizes that the risk of flooding now and into the future will increase as a result of climate trends and events. Flooding can subject properties to damage (including damage that may not be covered by insurance) and pose health risks when flooding intersects with private well overtopping.

These threats pose unique challenges in the watershed, which contains numerous landlocked basins. The ~~BCWD risks losing~~loss of flood storage areas through land and basin alterations. The loss of flood storage areas can increase the frequency, elevation, and duration of flooding and can result in increased impacts to infrastructure, property, ~~and~~ as well as the natural environment.

3.6.2. Relevance to the District

Flooding is a natural occurrence that is vital to the health of many ecosystems. Natural water bodies and constructed stormwater management facilities within the watershed function as flood storage areas. As Minnesota's climate continues to change, there will continue to be an increase in the frequency of flooding. During the next century, spring rainfall and annual precipitation are likely to increase, and severe rainstorms are likely to intensify. These wetter conditions will result in elevated groundwater levels, which limits stormwater infiltration, thereby increasing the rate and volume of runoff traveling downstream. In addition, ~~Alterations~~ alterations to the floodplain or outlets of water bodies or stormwater management facilities can change flooding characteristics and impact properties and natural resources. According to the landlocked basin analysis the BCWD performed in 2016 (using the updated NOAA Atlas 14 Precipitation-Frequency Atlas of the United States), the 33 basins within the watershed that are landlocked for the 100-year, 10-day event may be at an elevated risk for flooding if changes in adjacent land uses cause increased volumes of runoff to enter the basins. Additionally, existing or proposed structures in and around flood storage areas require protection from damage caused by flooding.

3.6.3. Sub-Issue Areas

Flood Prevention

Maintaining the hydrologic balance of the watershed is critical to addressing impacts of flooding. As precipitation patterns change, the watershed management approach must adapt to promote resiliency.

Protection of Flood Storage Areas

The natural process of flooding can threaten public safety, damage private property, and ~~become damaging to~~ structures if the areas that naturally store floodwaters are filled. Filling of flood storage areas (with earthen fill) increases the frequency of flooding and increases the water surface elevation of a flood.

Flood Mitigation and Management of Flood-Prone Areas

Areas prone to flooding as identified in the H/H model such as lands adjacent to lakes, streams, and wetlands or within landlocked basins should be managed to avoid impacts to infrastructure and

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structures. Development within these flood prone areas can remove critical stabilizing features, such as vegetation and shoreline structure. Instability along the shoreline of streams and lakes leads to negative ecological impacts, such as erosion and loss in biodiversity. Structures ~~can~~ should be placed where the risk of flooding is low in order to avoid damage.

Commented [AA91]: Can? Should? Must?
Michael noted that "must" was suggested but not fully accepted by the group

3.6.4. Policies, Goals, and Implementation

The policies, goals, and implementation items related to these sub-issue areas are summarized in the following tables. The sub-issue area is identified in a heading, followed by a related policy. The goals addressing that policy are lettered and stated, followed by the implementation items for that goal. This format is intended to clearly display how each policy and goal will be addressed.

Table 2~~53223~~. Floodplain Management Policies, Goals, and Implementation Activities

SUB-ISSUE:	~~Protection of Flood Storage Areas~~Flood Prevention		
POLICY:	**BCWD will collect, analyze and publish watershed flooding and rainfall data, including water elevations and other hydrological information to serve as a technical resource for District communities.~~The BCWD is committed to the protection of flood storage areas to reduce the impacts of flooding and promote recharge.~~**		
GOALS		**IMPLEMENTATION ITEM**	
A	Operate with the most current data on flooding and climate change impacts to water resources and infrastructure ~~Understand the impacts of climate change trends on local water resources and infrastructure.~~	1 ~~1~~	Conduct routine updates to ~~Re-run~~ the District's hydrologic & hydraulic model including ~~to~~ conducting flood risk assessments for current and future storm forecasts ~~on flood risk assessments~~, stormwater design~~s~~ performance, and to inform analysis of the BCWD rules. ~~include updated climate data (e.g., NOAA Atlas 14) as well as climate change projections. Update to NOAA Atlas 15 when it is available.~~*~~Addressed through administration of the BCWD regulatory standards and criteria.~~*
		2	Conduct flood hazard assessments and make the information available to local partners to support local decision-making. This includes involvement in local community comprehensive planning processes.
		~~3~~	Share stormwater models, associated reports, and feasibility studies with partners and permit applicants and provide technical assistance as requested.
		~~3~~ 4	Develop a community flood reporting campaign to ground-truth the H&H model and raise awareness about flooding.
POLICY:	**The BCWD will collaborate with property owners, watershed communities and state and federal agencies to reduce risk of flood damage.**		
GOALS		**IMPLEMENTATION ITEM**	
A	Ensure risk and responsibility are assigned to the entity best and most appropriately positioned to manage them.	1	Hold meetings with member communities and neighborhood groups to share data related to flooding with an emphasis on projected conditions
		2	Explore roles with member communities to lay foundation for a collaborative approach to stormwater and flood management (e.g., District will help solve flooding that crosses municipal boundaries).

Commented [CC92]: @Ryan Fleming What do you think about the goal? Should we modify what the Board approved in 2022 by including the alternative text?

Commented [RF93R92]: @Camilla Correll Can we combine the to say, "operate with the most current data on flooding and climate change impacts to water resources and infrastructure"? Otherwise, I think "current data on flooding" is broad enough to include also understanding impacts associated with anticipated climate change.

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Table 253223. Floodplain Management Policies, Goals, and Implementation Activities

		3	Engage emergency management professionals in floodplain mapping review and determine watershed role in flood preparedness through County emergency management plans.
POLICY:	**BCWD will plan and implement projects with public and private partners to increase flood resilience in the watershed through, for example, regional stormwater management.**		
GOALS		**IMPLEMENTATION ITEM**	
A	Increase the use of climate resilient strategies in the watershed	1	Encourage utilization of regional stormwater-management provisions in BCWD rules.
		2	Explore possible regional stormwater-management projects with municipal partners.
		3	Implement reuse within the Marketplace drainage area.
		4	Study the use of active management through approaches such as smart outlets (e.g. on Long Lake) and implement this technology if cost-beneficial.
POLICY:	**The BCWD will explore possible capital projects that provide flood storage and hazard mitigation.**		
GOALS		**IMPLEMENTATION ITEM**	
A	Contribute to the Lower St Croix 1W1P's runoff retention goal by increasing flood storage across the watershed by 0.4 inches. ~~Add flood storage in the watershed~~	1	Restore flood-storage capacity and construct, if feasible, additional flood-storage capacity in critical locations as identified in the Flood Hazard Assessment.
		2	Evaluate and implement revisions to future BCWD project designs to prioritize increasing watershed storage, reducing peak flows, improving vegetation health and density, increasing drought and flood protection and increasing other resilience-related functions.
SUB-ISSUE:	**Protection of Flood Storage Areas**		
POLICY:	**The BCWD is committed to the protection of flood storage areas to reduce the impacts of flooding and promote recharge.**		
GOALS		**IMPLEMENTATION ITEM**	
A	Ensure no net loss of flood storage capability within the watershed.	1	*Addressed through administration of the BCWD regulatory standards and criteria.*
		2	Conduct a flood sensitivity analysis for a 200-year impact on the freeboard
SUB-ISSUE:	**Flood Mitigation and Management of Flood Prone Areas**		
POLICY:	**The BCWD will continue to protect structures and natural communities from flooding exceeding natural water level fluctuations.**		
GOALS		**IMPLEMENTATION ITEM**	

Commented [AA94]: @Camilla Correll 1W1P identifies 0.16 inches or 7,900 acre-feet across the entire watershed in the next 10 years.

BCWD anticipates between 2018-2050 0.3-0.4 inches of increased runoff

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Table 25~~32~~~~23~~. Floodplain Management Policies, Goals, and Implementation Activities

A	Assess the potential for flooding properties when evaluating land management activities.	**1**	*Addressed through administration of the BCWD regulatory standards and criteria.*
		2	Expand mapping of flood intersections with infrastructure beyond the work completed to assess lakes.
		~~2~~ 3	Continue to monitor lake levels and shallow aquifer groundwater levels to evaluate conditions that may cause impacts to existing structures.
POLICY:	**The BCWD will collaborate with property owners, watershed communities and state and federal agencies to prepare for flooding.**		
GOALS		**IMPLEMENTATION ITEM**	
A	Balance prevention and mitigation efforts.	1	Consider changes to the rule language to allow mitigation without exacerbating onsite flood risk.
		2	Explore expansion of BCWD's cost-share program to include water quantity as well as water quality projects
B	Acquire at-risk properties with opportunities for public co-benefits associated with this Plan's goals.	1	Modify the land conservation program to include criteria that would allow the BCWD to determine whether or not to acquire properties or easements to allevitate existing or future flooding
C	Provide support to property owners' efforts to manage their flood risk.	1	Provide technical assistance to homeowners experiencing or at risk of flooding.
		2	Develop outreach and guidance materials related to flood-risk management and conduct community meetings to disseminate flood-risk assessment data and guidance.
		3	Develop a homeowner's packet for at-risk properties.
		4	Develop a request for proposals template homeowners seeking engineering design and construction services.
POLICY:	**The BCWD desires to minimize the risks of flooding associated with land alterations adjacent to landlocked basins.**		
GOALS		**IMPLEMENTATION ITEM**	
A	Minimize the risk of flooding to structures within landlocked basins.	**1**	*Addressed through administration of the BCWD regulatory standards and criteria.*
B	Minimize the risk of flooding on downstream properties when outlets are provided for landlocked basins.	~~2~~ 1	*Addressed through administration of the BCWD regulatory standards and criteria.*
		2	Plan and implement projects with public and private partners to support their efforts to prepare for flooding.
POLICY:	**The BCWD will maintain and enhance existing BCWD capital improvements that provide storage and hazard mitigation.**		

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Table 25~~32~~23. Floodplain Management Policies, Goals, and Implementation Activities

A	Maintain and enhance BCWD projects to provide additional flood- mitigation capacity.	1	Maintain the flood-risk mitigation functionality of Kismet basin and Trout-Habitat Preservation Project, and consider enhancing such capacity.
		2	Evaluate and implement changes to existing BCWD projects that provide opportunities for adaptive management, upscaling retrofits, and use of innovative technology to improve performance under a changing climate

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Table 263324. Floodplain Management Implementation Activities (from Table 23) addressed by Baseline Monitoring Program

Implementation activities where costs are identified under the Baseline Monitoring Program: - Continue to monitor lake levels and shallow aquifer groundwater levels to evaluate conditions that may cause impacts to existing structures - Costs identified in under the Baseline Monitoring Program. - Maintain BCWD weather station to collect local climate data for modeling efforts.

Kismet Basin Lake aerial

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3.7. Groundwater Management

3.7.1. General Issue Statement

Land-altering activities and climate change have the potential to impact groundwater resources as well as groundwater dependent natural resources. Without proper land-use and water resource management, the following impacts may occur: reduced groundwater recharge, reduced groundwater quality, alterations to drinking water supply, potential for groundwater flooding, and alterations to the functions and values of groundwater dependent natural resources.

Climate change is impacting groundwater . Research suggests climate change will impact groundwater recharge through reduced infiltration during high-intensity precipitation events. Emerging research suggests warmer surface waters infiltrating into groundwater have the potential to raise groundwater temperatures, impacting groundwater dependent natural resources.

3.7.2. Relevance to the District

The BCWD contains groundwater dependent natural resources which have the potential to be impacted by increasing development pressure in the watershed. While some of these resources are well known to the public, for example Brown's Creek, there are other unique resources that had not been identified until the North Washington Groundwater Study and the Natural Resource Inventory for the Brown's Creek watershed were performed.

The impairment of Brown's Creek, declining groundwater levels, and reduced baseflow in the creek highlight the need to protect, conserve and utilize the region's groundwater in ways that protect public health, support economic growth and development, maintain habitat and ecosystem health, and provide for recreational opportunities.

Historic high flooding in Kimbro Basin in summer 2020 exposed that there remain significant gaps in our understanding of how groundwater impacts the watershed. Developing a greater understanding of the watershed's groundwater resources plays a key role in monitoring change and providing more informe decision-making on how to manage groundwater and its dependent resources.

The Washington County Groundwater Plan (~~2014~~2025-~~2024~~2035) lists several actions that should be addressed by Watershed Management Organizations (WMOs) including BCWD outlined in Table 27.~~:~~

Table 27. Washington County Groundwater Plan Goal Alignment

Goal	Relevant Areas to the BCWD
Goal #1 Groundwater Quality	• PFAS Education and Awareness • Cost share funding for agricultural water quality BMPs • Utilize approved nutrient and bacterial total maximum daily loads (TMDLs) to identify areas for focused septic system maintenance and management. • Follow the MPCA Stormwater Manual and any guidance from MDH for safe placement of infiltration practices • Implement stormwater BMPs that are protective of groundwater, including safe and feasible water reuse.

Commented [AA95]: Support partner efforts to understand impacts to groundwater quality from stormwater infiltration

Groundwater monitoring in response to pumping/wells in north

Revising rules regarding infiltration

Commented [AA96]: Ask Jimmy - updating.

Fen protection plan.

Commented [AA97]: Consider whether this need to remain in the final version of the plan, or only the working plan.

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Goal #2 Groundwater Quantity	• Partner with the WCD and watersheds to support efforts for soil health. • Support stormwater retention, infiltration, and opportunities to replenish aquifer storage • Support and encourage safe and feasible water reuse. • Encourage regular and consistent updates to Atlas 14.
Goal #3 Groundwater Education	• Education on climate change impacts, adaptation, and mitigation in addition to groundwater and surface water interaction • Educate residents on BMPs that minimize GW contamination caused by use and storage of fertilizers, pesticides, and salt.
Goal #4 Groundwater Governance	• Participation in Lower St. Croix One Watershed One Plan partnership

3.7.3. Sub-Issue Areas

Management of Groundwater Quality

Groundwater supplies all of the drinking water within BCWD and Washington County. Pollution prevention is the key to maintaining this vital resource. The cleanup of aquifers is expensive, takes a long time, and is often not even possible with current technology. Ensuring that volume control and infiltration practices installed within the watershed will not lead to contamination of groundwater aquifers is important to the protection of drinking water sources.

Management of Groundwater Recharge and Supply

Drinking water supplies and groundwater dependent natural resources need a sustainable supply of groundwater in order to remain viable. Impervious surfaces can reduce the amount of water that infiltrates and recharges aquifers. Excessive groundwater withdrawals from wells can alter groundwater flow and limit the availability of groundwater for other purposes. Groundwater sustainability can generally be defined as groundwater withdrawals and natural discharges being equal to groundwater recharge, with no negative impacts to surface water bodies. Groundwater recharge occurs on a large scale throughout the watershed. In fact, some groundwater within the watershed boundaries may be recharged by areas outside the watershed.

The BCWD intends to proactively manage groundwater resources in the watershed rather than reactively responding to a crisis. Groundwater elevations and flow are controlled by long-term trends in climate, recharge, and groundwater withdrawal. By the time low groundwater elevations or discharges become a problem, it may be too late to implement a timely solution. The BCWD will not only monitor trends in groundwater elevations and water use, but also try to recognize and predict when and where issues could arise in the future and implement policies to avoid adverse effects on natural resources and water supplies.

Groundwater Flooding

Flooding of Groundwater Dependent Natural Resources (GDNRs) represents an emerging concern highlighted by historic flooding in Kimbro Basin in 2020. Managing groundwater flooding is a new area for the BCWD to consider as climate change continues to alter the water supply. Developing models that can more accurately anticipate groundwater flooding and monitoring groundwater levels will play

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an important role in informing the District's role in protecting properties from flooding and communicating the impacts of this type of flooding to watershed partners.

Management of Groundwater Dependent Natural Resources

The Brown's Creek Watershed District has been proactively managing its unique groundwater dependent natural resources since its inception in 1997. While Brown's Creek was the focal point initially, the BCWD has come to recognize the value in protecting the other high quality and highly sensitive groundwater dependent natural resources in the watershed, including:

- Wetlands
- Fens (rare wetlands with high pH)
- Springs and spring creeks
- Most lakes

Brown's Creek Watershed District should continue to protect these resources by recognizing when and where they are threatened. The BCWD will review options for strengthening its rules to ensure the sustainability of groundwater flow. Enforcement of the rules must be ongoing. Public education is critical to the widespread acceptance and compliance with the rules.

3.7.4. Policies, Goals, and Implementation

The policies, goals, and implementation items related to these sub-issue areas are summarized in the following tables. The sub-issue area is identified in a heading, followed by a related policy. The goals addressing that policy are lettered and stated, followed by the implementation items for that goal. This format is intended to clearly display how each policy and goal will be addressed.

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Table 283525. Groundwater Management Policies, Goals, and Implementation Activities

SUB-ISSUE:	**Management of Groundwater Quality**		
POLICY:	**The BCWD supports the protection of groundwater quality.**		
GOALS		**IMPLEMENTATION ITEM**	
A	Establish controls to reduce the potential for transport of pollutants into the groundwater.	**1**	Support well-sealing programs by Washington County and others by helping to identify unsealed wells and promote the program to residents in the BCWD.
		2	Rely on regulatory subsurface sewage treatment system (SSTS) programs of Washington County and MPCA to address potential contamination from septic systems. Support and promote Washington County financial assistance program for non-compliant SSTS, and work with the county as opportunities arise to implement other SSTS strategies from the Washington County Groundwater Plan, such as targeted inventories, and education efforts.
		3	Work with ~~Washington County~~EMWREP to develop an outreach plan to educate lawn care companies, golf courses, kennel operations, and county and LGU public works departments on how to use BMPs to minimize the effects on groundwater caused by the use and storage of fertilizers, pesticides, and road salt, while properly maintaining their properties.
		4	Work with ~~Washington County~~EMWREP to develop and implement an education program directed at homeowners outlining proper use and disposal of pharmaceuticals, lawn and garden chemicals, hazardous household waste, salt usage and storage, and management of pet waste (e.g. Unused Medications Disposal, Household Hazardous Waste Events).
		5	Support county and state government efforts to define, monitor, and educate the public about contaminants of emerging concern~~.~~ Impacting groundwater (e.g. PFAS).
		6	*Addressed through administration of the BCWD regulatory standards and criteria.*
B	Cooperate with the wellhead protection and source water assessment efforts of municipalities and others.	**1**	Share relevant data on groundwater resources and resource protection areas with municipalities for use in wellhead protection plans and source water assessments.
		2	Review wellhead protection plans and source water assessments for consistency with BCWD-identified areas of contamination concern and recharge protection.
		3	Update rules to minimize infiltration in ERAs and transportation corridors with highly vulnerable DWSMAs.
		4	Promote operational and programmatic best management practice resources intended to protect groundwater quality (e.g. secondary containment, safe salt storage, sealing unused wells, fertilizer and pesticide application management, dust suppressant treatment management, water softener maintenance, etc…)
SUB-ISSUE:	**Management of Groundwater Recharge and Supply**		
POLICY:	**The BCWD is committed to sustaining the quantity of groundwater within the watershed to support its groundwater resources in response to land use and climate change.**		
GOALS		**IMPLEMENTATION ITEM**	

Commented [CC98]: LSCR1W1P:
1A. Increase agricultural best management practices that improve soil health and reduce groundwater pollution.
1B. Reduce contamination from subsurface sewage treatment systems, household hazardous waste, pesticide use, leaky underground tanks, closed landfills, abandoned wells, etc.

Commented [AA99]: BWSR
- work with partners to plan for potential challenges related to quantity and quality
DNR
Increase communication re: risks of overuse and degradation, promote GW conservation; > coordination in communication activities between orgs w/ water mgmt responsibilities
Water harvest to reduce GW reliance
Maintain/enhance recharge
Homeowner septic system education
Chloride management.

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A	Work with state and other local partners to maintain or restore pre-settlement recharge conditions within the District and plan for emerging challenges related to groundwater quantity and quality.	1	Utilize USGS GW model to determine how best to implement impervious surface retrofit projects to benefit groundwater dependent natural resources.
		2	Continue to participate in the North and East Metro Groundwater Management Area Plan Project Advisory Team by attending meetings.
		3	Establish rules and policies for "no net loss" of recharge due to construction of impervious surfaces.
		4	Utilize the cost-share program to assist businesses, residents, and local governments to reduce their groundwater use and encourage reuse where feasible through ~~with~~ groundwater conservation and reuse BMPs.
			Support communication about the risks and consequences of groundwater overuse and degradation.
		5	*Addressed through administration of the BCWD regulatory standards and criteria.*
B	Reduce irrigation from the groundwater system through groundwater appropriations standards. ~~Address the utilization of groundwater through groundwater appropriation standards~~.	1	Review water appropriations permits applications and submit comments to the Department of Natural Resources.
		~~2~~	~~Work with Washington County and the MDNR to develop a regional water conservation plan.~~
		~~3~~	~~Consider amending Rules to include groundwater appropriations standards for wells being constructed in the vicinity of a GDNR by 2018.~~
C	Quantify, to the extent possible, the potential effects of groundwater appropriations on Brown's Creek and other groundwater-dependent natural resources.	1	Present investigation findings to the City of Stillwater, to the MNDNR, and to the Oak Glen Golf Course and consider whether a different pumping schedule could alleviate stress on the aquifers below Brown's Creek.
		2	Provide the USGS with new information so that the Groundwater Model can be updated every two years.
D	Gather information to support the District's understanding of groundwater quantities, groundwater quality, and groundwater flow.	1	Collect groundwater elevation data from residential wells, monitoring wells and high capacity wells at least annually. Install data recorders to collect more frequent measurements where possible. Share information with Washington County and MNDNR.
		2	Collect groundwater data in Brown's Creek to identify stretches that are gaining and losing groundwater every five years starting in 2018.
		3	Conduct groundwater chemistry monitoring and analysis near groundwater dependent natural resources (i.e. lakes) to provide data supporting groundwater flow analysis.
		4	Complete a dye trace (or other tracer such as stable isotopes) study to quantify groundwater flow into Brown's Creek by 2017.
		5	Conduct 10 soil borings or install 10 monitoring wells (piezometers) near the creek to better define the glacial geology in areas between the high capacity wells and Brown's Creek.
		6	Inventory seepage points along the creek and other GDNR every other year and compare to previous inventories.

Commented [AA101]: Karen noted not available at management scale, consider alternatives, discuss with Camilla

Commented [AA102]: Karen noted not a priority in review of 2017-2026 activities.

Commented [CC100]: From LSCR1W1P:
2A. Reduce or maintain groundwater consumption despite continued growth
2B. Increase infiltration and recharge in rural and urban areas

Commented [CC103]: From LSCR1W1P:
3A. Gather data needed to understand groundwater resources

Commented [AA104R103]: 3-7 and 10 not prioritized by the Board in 2017-2026; consider what should remain/remove through Board feedback and Implementation Plan.

Click here to enter text.

		7	In support of groundwater modeling efforts, conduct one pumping test per year on existing residential and golf course wells to obtain better local data on hydraulic conductivity of aquifers.
		8	Work with the MNDNR Observation Well program and others to install deep observation wells near Brown's Creek to monitor bedrock aquifers.
		9	Identify opportunities to partner on groundwater monitoring efforts with municipalities, other watershed districts, Washington County, and state agencies, such as PFAS monitoring.
		10	Develop a water budget for the district that includes surface water and groundwater interaction, an assessment of the geologic conditions, land use and groundwater contamination and climate change trends and impacts
SUB-ISSUE:	**Groundwater Flooding**		
POLICY:	**The BCWD is committed to understanding the conditions that can lead to groundwater flooding and communicate this to Washington County, LGUs, and property owners.**		
GOALS		**IMPLEMENTATION ITEM**	
A	Identify areas susceptible to groundwater flooding	1	Update the District's H/H model to Atlas 14
SUB-ISSUE:	**Management of Groundwater Dependent Natural Resources**		
POLICY:	**The BCWD is committed to sustaining and improving the function and value of groundwater dependent natural resources.**		
GOALS		**IMPLEMENTATION ITEM**	
A	Maintain or improve the function and value of groundwater dependent natural resources within the District.	~~1~~	~~Evaluate definition of groundwater dependent natural resources and associated contributing drainage area to assess the need to revise BCWD Rule language.~~
		21	Develop GIS database of relevant current and historical groundwater dependent natural resources monitoring data and provide the database to the public via the District website.
		~~3~~2	Develop and implement an expanded education program for citizens and public officials on the interaction between groundwater and surface water, the value of and need to protect groundwater recharge areas and wetlands, an implementation of BMPs and LID and redevelopment strategies to protect groundwater resources.
		43	Get permission from the owner of Indian Hills Golf Course and conduct baseline monitoring of the fen.
POLICY:	**The BCWD is committed to ensuring that activities within the watershed provide for groundwater recharge, provide thermal protection to Brown's Creek, & reduce volume related impacts to the watershed's water bodies.**		
GOALS		**IMPLEMENTATION ITEM**	

Commented [AA105]: Not determined necessary during the 2018/2019 revision.

Commented [AA106]: Not prioritized by EMWREP program in previous iteration of the Plan, however as the issue continues to evolve it may be worthwhile to get in front of communities to do outreach on the issue.

Click here to enter text.

A	Protect and maintain the quantity and quality of groundwater recharge	1	*Addressed through administration of the BCWD Regulatory standards and criteria.*
B	Identify and implement methods to provide thermal protection to Brown's Creek to achieve the thermal loading reduction identified in the Brown's Creek TMDL Implementation Plan	1	**SEE IMPLEMENTATION ACTIVITIES IDENTIFIED UNDER BROWN'S CREEK MANAGEMENT (TABLE 61)**
C	Reduce volume-related impacts to the watershed's water bodies (e.g. stormwater impacts such as wetland bounce and duration)	1	Promote stormwater reuse by working with local businesses, local units of government and Washington County to incorporate BMPs into new development or redevelopment projects.
		2	*Addressed through administration of the BCWD Regulatory standards and criteria.*

Click here to enter text.

Table 293626. Projected Expenditures (in 1,000's) for Groundwater Management Practices

Implementation Activities	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	10-Yr. Total
Work with Washington County to develop an outreach plan to educate land care companies, golf courses, kennel operations, and county and LGU public works departments on how to use BMPs to minimize the effects on groundwater caused by the use and storage of fertilizers, pesticides, and road salt, while properly maintaining their properties.	--	--	--	--	3	--	--	--	--	--	3
Work with Washington County to develop and implement an education program directed at homeowners outlining proper use and disposal of lawn and garden chemicals, salt usage and storage, and management of pet waste.	--	--	--	--	3	--	--	--	--	--	3
Utilize USGS GW model to determine how best to implement impervious surface retrofit projects to benefit groundwater dependent natural resources.	--	2	--	--	--	--	--	--	--	--	2
Continue to participate in the North and East Metro Groundwater Management Area Plan Project Advisory Team by attending meetings.	1	1	--	--	--	--	--	--	--	--	2
Establish rules and policies for "no net loss" of recharge due to construction of impervious surfaces.	5	5	--	--	--	--	--	--	--	--	10
Review water appropriations permit applications and submit comments to the Department of Natural Resources.	1	1	1	1	1	1	1	1	1	1	10
Work with Washington County and/or to MDNR to develop a regional water conservation plan.	--	--	--	--	5	--	--	--	--	--	5

Click here to enter text.

Implementation Activities	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	10-Yr. Total
Consider amending Rules to include groundwater appropriations standards for wells being constructed in the vicinity of a GDNR by 2018.	5	--	--	--	--	--	--	--	--	--	5
Present investigation findings to the City of Stillwater and to Oak Glen Golf Course and consider whether a revised pumping schedule could alleviate stress on the aquifers below Brown's Creek by meeting with them individually.	7	--	--	--	--	--	--	--	--	--	7
Provide the USGS with new information so that Groundwater Model can be updated every two years.	--	10	--	10	--	10	--	10	--	10	50
Collect groundwater elevation data from residential wells, monitoring wells and high capacity wells at least annually. Install data recorders to collect more frequent measurements where possible. Share information with Washington County and MNDNR.	5	5	5	5	5	5	5	5	5	5	50
Collect groundwater data in Brown's Creek to identify stretches that are gaining and losing groundwater every five years starting in 2018.	--	5	--	--	--	--	5	--	--	--	10
Conduct groundwater chemistry monitoring and analysis near groundwater dependent natural resources (i.e. lakes) to provide data supporting groundwater flow analysis.	--	--	12	--	--	--	--	--	--	--	12
Complete a dye trace (or other tracer such as stable isotopes) study to quantify groundwater flow into Brown's Creek by 2020.	--	--	--	20	--	--	--	--	--	--	20
Conduct 10 soil borings or install 10 monitoring wells (piezometers) near the creek to better define the glacial geology in areas between the	--	--	7	7	7	--	--	--	--	--	21

Click here to enter text.

Implementation Activities	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	10-Yr. Total
high capacity wells and Brown's Creek.											
Inventory seepage points along the creek and other GDNR every other year and compare to previous inventories.	--	1.5	--	1.5	--	1.5	--	1.5	--	1.5	7.5
In support of groundwater modeling efforts, conduct one pumping test per year on existing residential and golf course wells to obtain better local data on hydraulic conductivity of aquifers.	--	--	8	8	8	8	8	--	--	--	40
Work with the MNDNR Observation Well program and others to install deep observation wells near Brown's Creek to monitor bedrock aquifers.	1	1	1	1	1	--	--	--	--	--	5
Evaluate definition of groundwater dependent natural resources and associated contributing drainage area to assess the need to revise BCWD Rule language.	3	'--	'--	'--	'--	'--	'--	'--	'--	'--	3
Develop GIS database of relevant current and historical groundwater dependent natural resources monitoring data and provide the database to the public via the District website.	--	--	--	--	--	3	--	--	--	--	3
Develop and implement an expanded education program for citizens and public officials on the interaction between groundwater and surface water, the value of and need to protect groundwater recharge areas and wetlands, an implementation of BMPs and LID and redevelopment strategies to protect groundwater resources.	--	--	--	--	1	1	1	--	--	--	3
Total for Groundwater Management	**28**	**31.5**	**34**	**53.5**	**34**	**29.5**	**20**	**17.5**	**6**	**17.5**	**271.5**

Click here to enter text.

Table 3037727. Groundwater Management Implementation Activities from Table 25 addressed by Administrative and/or Project Development Program

Support well sealing programs by Washington County and others by helping to identify unsealed wells and promote the program to residents in the BCWD.
Rely on regulatory subsurface sewage treatment system (SSTS) programs of Washington County and MPCA to address potential contamination from septic systems. Support and promote Washington County financial assistance program for non-compliant SSTS, and work with the county as opportunities arise to implement other SSTS strategies from the Washington County Groundwater Plan, such as targeted inventories, and education efforts.
Share relevant data on groundwater resources and resource protection areas with municipalities for use in wellhead protection plans and source water assessments.
Review wellhead protection plans and source water assessments for consistency with BCWD-identified areas of contamination concern and recharge protection.
Identify opportunities to partner on groundwater monitoring efforts with municipalities, other watershed districts, Washington County, and state agencies.

Table 3138728 Groundwater Management Implementation Activities from Table 25 addressed by East Metro Water Resource Education Program

Support county and state government efforts to define, monitor, and educate the public about contaminants of emerging concern.

Table 3239729. Groundwater Management Implementation Activities from Table 25 where implementation costs covered under another Issue Category

Implementation Activity	Issue Category where implementation cost is identified (Table #)
Utilize the cost-share program to assist with groundwater conservation BMPs.	Stormwater Management (Table 5)

BROWN'S CREEK
WATERSHED DISTRICT
Preserving the integrity of the watershed for future generations
www.bcwd.org | 455 Hayward Ave N, Oakdale, MN 55128 | 651-330-8220

MEMORANDUM

TO: Brown's Creek Watershed District Board
FROM: Hannah Peterson and Karen Kill
RE: 2025 Newsletter
DATE: April 4, 2025

Background:

The approved 2017-2026 BCWD Watershed Management Plan placed a high priority on watershed education and outreach. The plan states that BCWD will send an annual newsletter to all citizens of the District with an annual budget of $5,000.

Issue:

We would like to print and mail 3,850 to 4,350 copies of the newsletter:

- **3,850:** Homesteaded addresses in the district
- **4,350:** All addresses in the district

We received quotes for both 4,000 and 4,500 copies from two printing companies:

Company	Quantity	Printing	Mailing/Postage	Total
Stillwater Printing	4,000	$2,236.92	$960.00	$3,196.92
	4,500	$2,516.54	$1,080.00	$3,596.54
Minuteman Press	4,000	$2,872.45	$3,572.00	$6,444.45
	4,500	$3,196.74	$4,018.50	$7,215.24

Schedule:

The goal would be for the newsletters to be mailed the first week of May 2025.

Recommended Action:

Approve moving forward with printing and mailing up to 4,500 Spring 2025 newsletters with Stillwater Printing not to exceed $3,596.54 total from 910-0000.

BROWN'S CREEK WATERSHED DISTRICT

Preserving the integrity of the watershed for future generations

WATERSHED NEWS - SPRING 2025

What is the Watershed District?

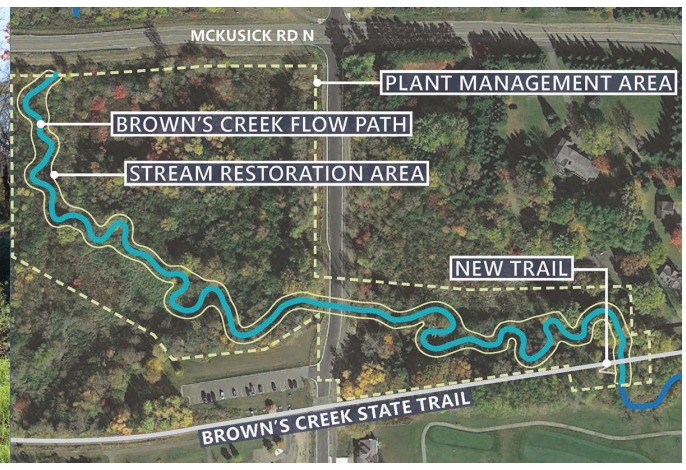
Watershed districts are local units of government based on hydrologic boundaries (where the water flows) to conserve natural resources. The Brown's Creek Watershed District (BCWD) contains a few rare and unique ecosystems including Brown's Creek, a cold-water trout stream, and lakes, ponds, and wetlands that support a variety of plants and animals. The BCWD includes parts of Stillwater, Oak Park Heights, Lake Elmo, Grant, Hugo, Stillwater Township, and May Township.

Brown's Creek Restoration Update

The BCWD worked with the MN Department of Natural Resources, the City of Stillwater, and adjacent property owners in 2024 - 2025 to restore 2,000 feet of Brown's Creek. Restoration activities included tree and shrub removal (buckthorn and boxelder), recreating the natural bends and curves in the stream, managing invasive species, and planting native vegetation. **This restoration helps species in the watershed:**

- Rock riffles increase fish spawning opportunities and provide refuge for macroinvertebrates.
- Deeper pools protect aquatic species from the summer heat and provide overwintering habitat for fish and amphibians.
- Invasive species management and native plantings improve upland pollinator habitats.
- Woody vegetation provides refuge for small mammals, reptiles, and birds.

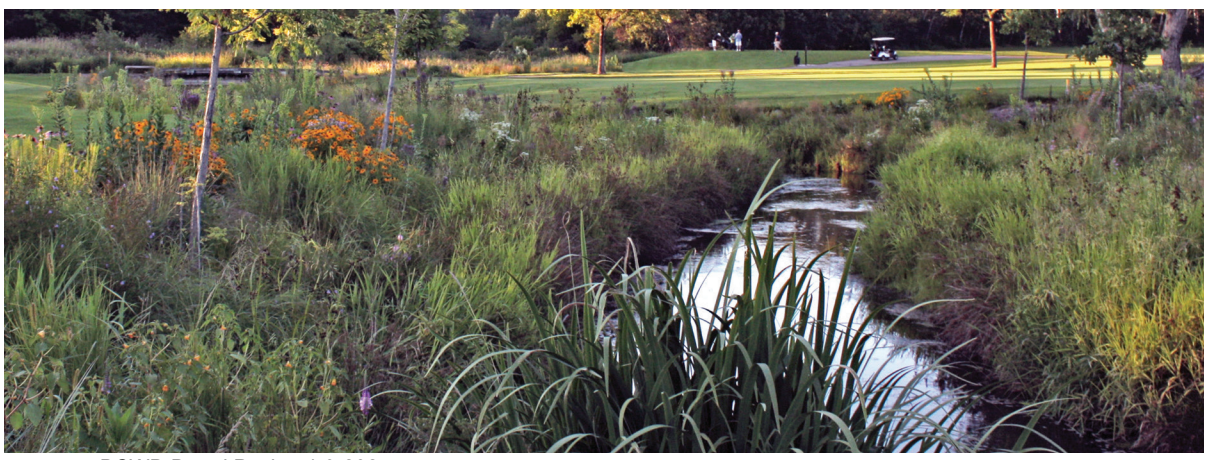
For more information, visit bcwd.org/browns-creek-restoration-project.



Regulatory Program and Buffer Zones

Minnesota statute requires watershed districts to have rules and regulations to conserve natural resources in the state and watershed. The Brown's Creek Watershed District's regulatory program includes rules and a permitting process with requirements for stormwater management, erosion and sediment control, buffers, shoreline alterations, water crossings, and flood control.

Buffers zones are areas of native plants surrounding a water body that support ecosystem health by protecting water resources and creating habitat. They are required for development projects under Rule 4.0 (Lake, Stream, and Wetland Buffer Requirements) for Brown's Creek and its tributaries, lakes, wetlands larger than an acre, and groundwater dependent natural resources. Buffers can range from 25 to 150 feet wide depending on the criteria it meets, and they must be marked at the buffer's upland edge. Activities that will degrade water quality and habitat are prohibited in the buffer zone. The full details of Rule 4.0 can be found in the rules document found at bcwd.org/permitting.



Vision Statement

The Brown's Creek Watershed District consists of communities interlaced with natural corridors. These natural corridors improve the function and value of the district's water resources and support a diverse population of plants, wildlife, and fish. The district brings people and the environment together to accommodate development that preserves the connection between surface water and groundwater and enhances the quality of these resources.

District Office

Address: 455 Hayward Ave N.
Oakdale, MN 55128

Phone: 651-330-8220

Website: bcwd.org

Board of Managers

- **Klay Eckles**, President
- **Celia Wirth**, Treasurer
- **Chuck LeRoux**, Vice President
- **Debra Sahulka**, Secretary
- **VACANT**, 2nd Vice President

Monthly board meetings are typically at 6:30pm on the 2nd Wednesday. See bcwd.org/calendar for the full schedule.

District Staff

- **Karen Kill**, Administrator: kkill@mnwcd.org
- **Hannah Peterson**, Communications & Project Assistant: hpeterson@mnwcd.org

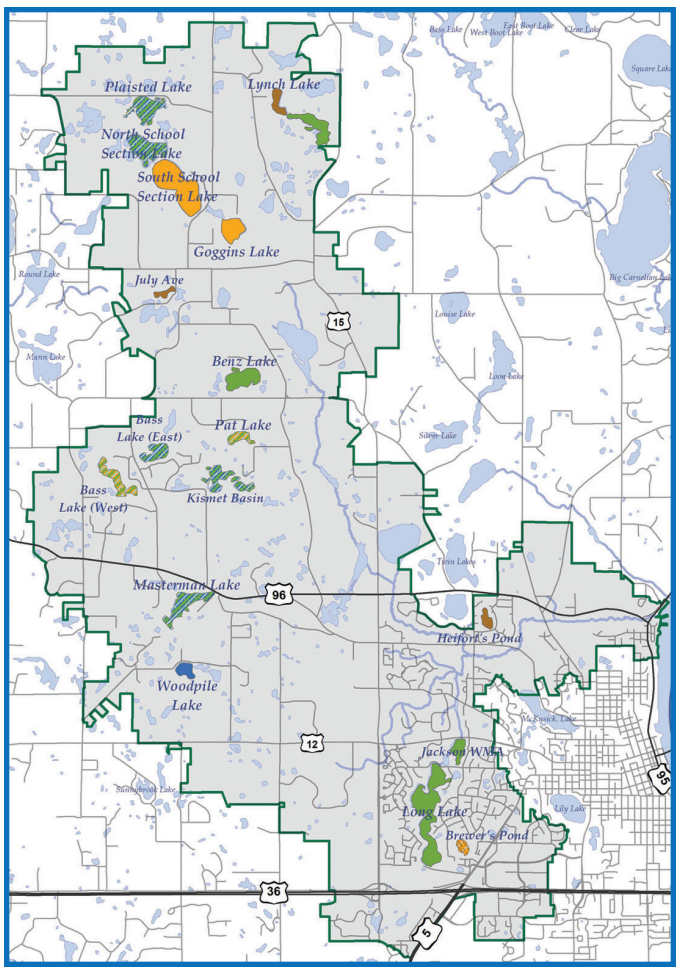
Get Involved!

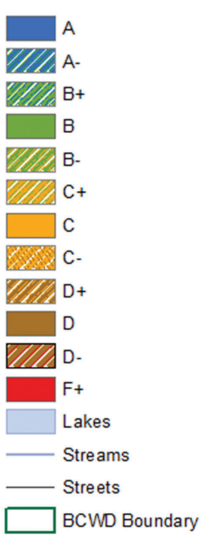
Visit our website or contact us for involvement opportunities.

- **Volunteer:** bcwd.org/calendar
- **Apply for a stewardship grant:** bcwd.org/stewardship-grants.
- **Join the Citizen's Advisory Committee (CAC):** bcwd.org/citizens-advisory-committee.
- **Contribute to the Watershed Management Plan Update:** bcwd.org/watershed-management-plan-update.
- **Request a free site visit:** mnwcd.org/site-visit-signup-form.
- **Adopt a storm drain:** mn.adopt-a-drain.org.
- **Search for and follow Brown's Creek Watershed District on social media:** Facebook, Instagram, and YouTube.

View Online

Scan the QR code or visit bcwd.org/newsletters to view this newsletter and past issues online.





Water Quality Report Card

We partner with the Washington Conservation District to collect and evaluate water quantity and quality data on Brown's Creek and the district's major lakes. Continued monitoring provides a clearer picture of how to best restore and protect our resources for the future. The creek's 2024 loads to the St. Croix River were:

- **TSS (Sediment):** 109.68 lbs/acre (Goal: 74 lbs/acre)
- **TP (Phosphorus):** 2,563 lbs/yr (Goal: 1,804 lbs/yr)

The lake grades for 2024 are in the map to the right, and the full monitoring report can be found at bcwd.org/lakes-and-streams-monitoring.

Upcoming Events

Join us at one of BCWD's upcoming family-friendly events!

Long Lake West Trail Birding
May 3rd – 8am at Long Lake Trail (parking at end of 62nd)

Brown's Creek Tributary Restoration Tour
May 17th – 9:30am, Brown's Creek Park

Tour of Butterfly Cove Gardens
June 26th – 6:30pm, See calendar for location

Low Mow Lawns and Pollinators
July 24th – 6:30pm, See calendar for location

Brown's Creek Restoration Tour
Aug 21st – 6:30pm, Brown's Creek Park

Community Event
Sept 20th – 10am-1pm, Brown's Creek Park

Trout Release?
October 5th – 10am, Brown's Creek Park

Check out **bcwd.org/calendar** for updates and new events added throughout the year, and contact Hannah Peterson at **hpeterson@mnwcd.org** with any questions.

BROWN'S CREEK WATERSHED DISTRICT
455 Hayward Ave N. Oakdale, MN 55128

Name
Or Current Resident
Address 1
Address 2

Stewardship Grants

Our Stewardship Grant Program provides residents with grants up to $500 for projects that benefit water quality and wildlife habitat within the watershed. Examples include native pollinator gardens, raingardens, low-input or wildlife friendly turf alternatives, rain barrels, and targeted water education or outreach. **If you have a plan to implement conservation practices on your property, apply for one of our stewardship grants this year!**

Restoring Habitat at the Brown's Creek Conservation Area

The Brown's Creek Conservation Area is a parcel of land in Grant with 1,300 feet of Brown's Creek and 2.4 acres of wetland that is owned and maintained by the BCWD with the goal to provide habitat for native species. The Citizen's Advisory Committee conducts surveys each spring and summer to identify plant and bird species. There are also trail cameras on-site to take photos of wildlife, like the one below.

The BCWD worked with Great River Greening in 2019 to 2023 on a grant project to restore prairie, wetland, and woodland habitat. This year, we are excited to continue habitat restoration with a Habitat Enhancement Landscape Program (HELP) grant from the Minnesota Board of Water and Soil Resources (BWSR). HELP aims to restore and enhance native habitats across Minnesota to improve plant and animal diversity. The BCWD is partnering with the Washington Conservation District to enhance woodland and prairie habitats with a prescribed burn of 0.17 acres of prairie in spring 2025 and a volunteer planting of about 150 native trees and shrubs in 2026.

More information on the conservation area and updates on restoration can be found at bcwd.org/browns-creek-conservation-area.

memo

Project Name |	Brown's Creek Stream Restoration Project	**Date** |	04/02/25
To / Contact info |	Karen Kill (BCWD Board of Managers (BCWD)		
Cc / Contact info |	Camilla Correll (EOR)		
From / Contact info |	Dan Mossing (EOR) Mike Majeski (EOR)		
Regarding |	Contractor Payment Application #5		

The purpose of this memorandum is to recommend payment of Pay Request #5 from Geomorphic Restoration, Inc. for the Brown's Creek Stream Restoration Project.

PROJECT UPDATE

This payment application is for all work completed through March 2025. The work for this payment application included removal of all remaining invasive vegetation and seeding native vegetation. Remaining items to complete before project closeout Year 1/2 extended vegetation management .

PAY APPLICATION REVIEW

The quantity billed under this pay request has been verified via field inspections, measurements, and/or material invoices submitted by the contractor. Work has been satisfactorily completed.

SUMMARY OF PAYMENT(S)

Original Contract Price (Including Add Alternate)	$355,261.50
Current Contract Price with Change Order #1	$358,638.50
Work completed to date	$307,074.83
Retainage (5%)	$15,353.74
Amount Eligible to Date	$291,721.09
Previous Payment for Pay Application #1	$43,878.13
Previous Payment for Pay Application #2	$73,534.99
Previous Payment for Pay Application #3	$142,849.66
Previous Payment for Pay Application #4	$20,210.31
Payment Request #5:	***$11,248.00***

RECOMMENDATION

Recommend payment of $11,248.00 to Geomorphic Restoration, Inc. for work completed under this pay request.

Encl:

- Contractor's Application for Payment No. 5 (Dated 04/02/2025)

Approved by:

_____

Dan Mossing, PE

Contractor's Application for Payment No. 5

	Application Period: Mar-25	Application Date: 4/2/2025
To (Owner): Brown's Creek Watershed District	From (Contractor): Geomorphic Restoration, Inc.	Via (Engineer): Emmon's and Olivier Resources, Inc.
Project: Brown's Creek Stream Restoration Project	Contract: Brown's Creek Stream Restoration Project	
Owner's Contract No.: -	Contractor's Project No.: -	Engineer's Project No.: 00041-0418

Application For Payment

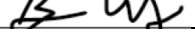
Change Order Summary

Approved Change Orders		
Number	Additions	Deductions
1	$3,377.00	
TOTALS	$3,377.00	
NET CHANGE BY CHANGE ORDERS	$3,377.00	

1. ORIGINAL CONTRACT PRICE	**$**	**$355,261.50**
2. Net change by Change Orders	**$**	**$3,377.00**
3. Current Contract Price (Line 1 ± 2)	**$**	**$358,638.50**
4. TOTAL COMPLETED AND STORED TO DATE (Column F on Progress Estimate)	**$**	**$307,074.83**
5. RETAINAGE:		
a. 5.0% X $307,074.83 **Work Completed**	**$**	**$15,353.74**
b. X Stored Material	**$**	
c. Total Retainage (Line 5a + Line 5b)	**$**	**$15,353.74**
6. AMOUNT ELIGIBLE TO DATE (Line 4 - Line 5c)	**$**	**$291,721.09**
7. LESS PREVIOUS PAYMENTS (Line 6 from prior Application)	**$**	**$280,473.09**
8. AMOUNT DUE THIS APPLICATION	**$**	**$11,248.00**
9. BALANCE TO FINISH, PLUS RETAINAGE (Column G on Progress Estimate + Line 5 above)	**$**	**$63,540.42**

Contractor's Certification

The undersigned Contractor certifies that to the best of its knowledge: (1) all previous progress payments received from Owner on account of Work done under the Contract have been applied on account to discharge Contractor's legitimate obligations incurred in connection with Work covered by prior Applications for Payment; (2) title of all Work, materials and equipment incorporated in said Work or otherwise listed in or covered by this Application for Payment will pass to Owner at time of payment free and clear of all Liens, security interests and encumbrances (except such as are covered by a Bond acceptable to Owner indemnifying Owner against any such Liens, security interest or encumbrances); and (3) all Work covered by this Application for Payment is in accordance with the Contract Documents and is not defective.

By:  Date: 4/2/2025

Payment of: $ $11,248.00
(Line 8 or other - attach explanation of the other amount)

is recommended by:  4/2/2025
(Engineer) (Date)

Payment of: $
(Line 8 or other - attach explanation of the other amount)

is approved by:
(Owner) (Date)

Approved by:
Funding Agency (if applicable) (Date)

Brown's Creek Watershed District
2025 Budget Approved 12-11-2024
4-9-2025

		Estimated 2024 Carry Forward	2025 Grants	2025 Levy	2025 Total Budget	Allocated	Available
100-2910	Designated Funds - Management Plan Projects	*$ 841,580*			$ 841,580		$ 841,580
					$ -		$ -
Revenue					$ -		$ -
100-3700	Interest Income				$ -		$ -
100-3601	Metropolitan Council Outlet Monitoring Grant		$ 5,000		$ 5,000		$ 5,000
100-3630	Washington County Cost-share Applewood Reuse				$ -		$ -
100-3631	MPCA Small Watershed Grant 2023-2025				$ -		$ -
100-3632	MPCA Small Watershed Grant 2025-2029		$ 34,800		$ 34,800		$ 34,800
100-3100	Tax Levy			$ 1,207,531	$ 1,207,531		$ 1,207,531
TOTAL, ESTIMATED Sources of Funding		**$ 841,580**	**$ 39,800**	**$ 1,207,531**	**$ 2,088,911**	**$ -**	**$ 2,088,911**

ACCT. #	General Expenses	Estimated 2024 Carry Forward	2025 Grants	2025 Levy	2025 Total Budget	Allocated	Available
200-4000	Manager Per Diem and Expense			$ 10,000	$ 10,000		$ 10,000
200-4250	Dues & Subscriptions (MN Watersheds 7200 and LMCIT 2800)			$ 10,000	$ 10,000	$ 10,000	$ -
200-4270	Bonding & Insurance			$ 6,500	$ 6,500	$ 6,500	$ -
200-4280	Postage & Delivery			$ 1,000	$ 1,000		$ 1,000
200-4290	Printing & Notices			$ 1,000	$ 1,000		$ 1,000
200-4330	Accounting			$ 5,000	$ 5,000	$ 5,040	$ (40)
200-4331	Audit			$ 12,000	$ 12,000	$ 11,300	$ 700
200-4949	Misc., Other Expense			$ 2,000	$ 2,000		$ 2,000
200-4320	Wash. Conservation District--Admin			$ 65,000	$ 65,000	$ 65,000	$ -
200-4265	Admin Conference Registrations			$ 3,000	$ 3,000	$ 250	$ 2,750
200-4410	Legal Fees - General			$ 27,100	$ 27,100	$ 26,700	$ 400
200-4500	Staff Engineer			$ 31,289	$ 31,289	$ 31,289	$ (0)
	Diversity, Equity and Inclusion Training			$ 5,000	$ 5,000		$ 5,000
	Contingency Reserve			$ 40,750	$ 40,750		$ 40,750
TOTAL GENERAL FUND EXPENSES:		**$ -**	**$ -**	**$ 219,639**	**$ 219,639**	**$ 156,079**	**$ 63,560**

ACCT. #	MANAGEMENT PLAN EXPENSES	Estimated 2024 Carry Forward	2025 Grants	2025 Levy	2025 Total Budget	Allocated	Available
300-4320	Wash. Conservation District--Administrator			$ 250,000	$ 250,000	$ 250,000	$ -
300-4410	Legal Fees - Mgmt Plan			$ 60,000	$ 60,000		$ 60,000
300-4501	Staff Engineer			$ 99,522	$ 99,522	$ 95,623	$ 3,899
300-4702	Permitting, Legal Review			$ 15,750	$ 15,750		$ 15,750
300-4703	Permitting, Engineering Review			$ 75,000	$ 75,000		$ 75,000
300-4704	Permitting, Inspection Database			$ 10,500	$ 10,500		$ 10,500
300-4710-1	Baseline Monitoring		$ 5,000	$ 145,000	$ 150,000	$ 177,465	$ (27,465)
300-4640	Equip. Maint. and Upgrades	*$ 15,000*		$ 10,000	$ 25,000	$ 8,775	$ 16,225
300-4810	Shared Educator Position			$ 31,000	$ 31,000	$ 24,500	$ 6,500
300-4950	Management Plan Implementation -future projects				$ -		$ -
903-0001	Trout Habitat Preservation Project: Monitoring,	*$ 6,500*			$ 6,500		$ 6,500
909-0000	Rules Review/Evaluation	*$ 20,000*		$ 10,000	$ 30,000		$ 30,000
909-0001	Groundwater Dep Nat Resource Inventory update				$ -		$ -
909-0002	Permitting Program Internal Procedure updates	*$ 25,000*			$ 25,000		$ 25,000
910-0000	Education & Outreach			$ 103,500	$ 103,500	$ 7,350	$ 96,150
911-0000	Volunteer Stream Monitoring			$ 4,500	$ 4,500	$ 4,909	$ (409)
914-0000	Homeowner BMP Program			$ 50,000	$ 50,000	$ 25,534	$ 24,466
922-0000	Plan Reviews - LGU/LWMP				$ -		$ -
923-0000	H & H Model Maintenance	*$ 42,500*			$ 42,500		$ 42,500
923-0003	Long Lake - Flood Risk - Weir Modification Assessment			$ 30,000	$ 30,000		$ 30,000
927-0000	Management Plan Update	*$ 10,000*		$ 15,000	$ 25,000		$ 25,000
929-0000	Long Lake Plan Implementation			$ 103,700	$ 103,700		$ 103,700
929-0012	Long Lake - Marketplace Reuse Feasibility	*$ 225,120*		$ (225,120)	$ -		$ -
929-0013	Long Lake - Chloride Impairement Assessment			$ 15,000	$ 15,000		$ 15,000
929-0014	Long Lake - Brewer's Pond BMP/LGU cost-share			$ 25,000	$ 25,000	$ 25,000	$ -
935-0000	Land Conservation Program	*$ 150,000*		$ 50,000	$ 200,000		$ 200,000
935-0002	110th Street Property Implementation	*$ 50,000*	$ 5,900		$ 55,900	$ 5,900	$ 50,000
935-0003	Develop Land Conservation Priorities	*$ 20,000*			$ 20,000		$ 20,000
940-0000	BMP Program – LGU/Community Demonstration Projects				$ -		$ -
942-0004	Measuring Trends in GW Elevations & Flow			$ 4,700	$ 4,700	$ 9,736	$ (5,036)
942-0007	Groundwater - Browns Creek piezometers	*$ 8,960*		$ (8,960)	$ -		$ -
942-0011	Groundwater - Coordination with users	*$ 8,500*			$ 8,500	$ 8,500	$ -
947-0017	Brown's Creek Implementation - Ecoli	*$ 10,000*		$ 5,800	$ 15,800		$ 15,800
947-0018	Brown's Creek - Biological Survey (Macroinvert)			$ 4,100	$ 4,100		$ 4,100
947-0022	Brown's Creek - Buffer and Stream Restoration	*$ 40,800*			$ 40,800		$ 40,800
947-0023	Brown's Creek - Golf Course Reuse - Oak Glen				$ -		$ -
947-0026	Brown's Creek - Brown's Creek Cove Reach	*$ 23,200*	$ 34,800		$ 58,000		$ 58,000
947-0027	Brown's Creek - McKusick Road rock crib feasibility	*$ 26,000*			$ 26,000		$ 26,000
948-0000	CIP Maintenance	*$ 115,000*		$ 85,000	$ 200,000		$ 200,000
953-0000	Fen Management Plan Implementation				$ -		$ -
957-0000	Weather Station			$ 3,900	$ 3,900	$ 3,976	$ (76)
959-0004	Resource Assessment - AIS			$ 15,000	$ 15,000		$ 15,000
960-0000	St Croix Phosphorus Reduction	*$ 10,000*			$ 10,000		$ 10,000
961-0000	Mendel Wetland Restoration Feasiblity	*$ 35,000*			$ 35,000		$ 35,000
TOTAL MANAGEMENT PLAN PROJECT EXPENSES:		**$ 841,580**	**$ 45,700**	**$ 987,892**	**$ 1,875,172**	**$ 647,268**	**$ 1,227,904**
TOTAL, OPERATING EXP. & MGMT. PLAN PROJECTS:		***$ 841,580***	***$ 45,700***	***$ 1,207,531***	***$ 2,094,811***	***$ 803,347***	***$ 1,291,464***

Brown's Creek Watershed District
2025 Budget - Proposed Revision
4-9-2025

		Estimated 2024 Carry Forward	Actual 2024 Carry Forward	Revised Carry Forward for Approval	2025 Grants	2025 Levy	2025 Total Budget	Allocated	Available
100-2910	Designated Funds - Management Plan Projects	*$ 841,580*	*$ 821,101.62*	*$ 977,324.51*			$ 977,325		$ 977,325
							$ -		$ -
Revenue							$ -		$ -
100-3700	Interest Income		*$ 50,104*				$ -		$ -
100-3601	Metropolitan Council Outlet Monitoring Grant				$ 5,000		$ 5,000		$ 5,000
100-3630	Washington County Cost-share Applewood Reuse		*$ 66,800*	*$ 66,800*			$ 66,800		$ 66,800
100-3631	MPCA Small Watershed Grant 2023-2025		*$ 320,706*	*$ 320,706*			$ 320,706		$ 320,706
100-3400	Permits		*$ 106,119*				$ -		$ -
100-3632	MPCA Small Watershed Grant 2025-2029				$ 34,800		$ 34,800		$ 34,800
100-3633	WCD HELP Grant 2025-2026				$ 5,900		$ 5,900		$ 5,900
100-3100	Tax Levy					$ 1,207,531	$ 1,207,531		$ 1,207,531
TOTAL, ESTIMATED Sources of Funding		**$ 841,580**	**$ 1,364,831**	**$ 1,364,831**	**$ 45,700**	**$ 1,207,531**	**$ 2,618,061**	**$ -**	**$ 2,618,061**

ACCT. #	General Expenses	Estimated 2024 Carry Forward	Actual 2024 Carry Forward	Revised Carry Forward for Approval	2025 Grants	2025 Levy	2025 Total Budget	Allocated	Available
200-4000	Manager Per Diem and Expense		*$ 1,238*			$ 10,000	$ 10,000		$ 10,000
200-4250	Dues & Subscriptions (MN Watersheds 7200 and LMCIT 2800)		*$ 1,502*			$ 10,000	$ 10,000	$ 10,000	$ -
200-4270	Bonding & Insurance		*$ 793*			$ 6,500	$ 6,500	$ 6,500	$ -
200-4280	Postage & Delivery		*$ 1,000*			$ 1,000	$ 1,000		$ 1,000
200-4290	Printing & Notices		*$ (69)*			$ 1,000	$ 1,000		$ 1,000
200-4330	Accounting					$ 5,000	$ 5,000	$ 5,040	$ (40)
200-4331	Audit					$ 12,000	$ 12,000	$ 11,300	$ 700
200-4949	Misc., Other Expense		*$ (3,080)*			$ 2,000	$ 2,000		$ 2,000
200-4320	Wash. Conservation District--Admin		*$ 1*			$ 65,000	$ 65,000	$ 65,000	$ -
200-4265	Admin Conference Registrations		*$ (435)*			$ 3,000	$ 3,000	$ 250	$ 2,750
200-4410	Legal Fees - General		*$ (276)*			$ 27,100	$ 27,100	$ 26,700	$ 400
200-4500	Staff Engineer		*$ 131*			$ 31,289	$ 31,289	$ 31,289	$ (0)
	Diversity, Equity and Inclusion Training		*$ 5,000*			$ 5,000	$ 5,000		$ 5,000
	Contingency Reserve		*$ 50,000*	*$ -*		$ 40,750	$ 40,750		$ 40,750
TOTAL GENERAL FUND EXPENSES:		**$ -**	**$ 55,805**		**$ -**	**$ 219,639**	**$ 219,639**	**$ 156,079**	**$ 63,560**

ACCT. #	MANAGEMENT PLAN EXPENSES	Estimated 2024 Carry Forward	Actual 2024 Carry Forward	Revised Carry Forward for Approval	2025 Grants	2025 Levy	2025 Total Budget	Allocated	Available
300-4320	Wash. Conservation District--Administrator		*$ (15,001)*			$ 250,000	$ 250,000	$ 250,000	$ -
300-4410	Legal Fees - Mgmt Plan		*$ 20,356*			$ 60,000	$ 60,000		$ 60,000
300-4501	Staff Engineer		*$ 5,532*			$ 99,522	$ 99,522	$ 95,623	$ 3,899
300-4702	Permitting, Legal Review		*$ (17,411)*			$ 15,750	$ 15,750		$ 15,750
300-4703	Permitting, Engineering Review		*$ (236,102)*	*$ -*		$ 75,000	$ 75,000		$ 75,000
300-4704	Permitting, Inspection Database		*$ 1,000*			$ 10,500	$ 10,500		$ 10,500
300-4710-1	Baseline Monitoring		*$ (10,426)*		$ 5,000	$ 145,000	$ 150,000	$ 177,465	$ (27,465)
300-4640	Equip. Maint. and Upgrades	*$ 15,000*	*$ 16,488*	*$ 15,000*		$ 10,000	$ 25,000	$ 8,775	$ 16,225
300-4810	Shared Educator Position		*$ 19*			$ 31,000	$ 31,000	$ 24,500	$ 6,500
300-4950	Management Plan Implementation -future projects						$ -		$ -
903-0001	Trout Habitat Preservation Project: Monitoring,	*$ 6,500*	*$ 5,425*	*$ 6,914*			$ 6,914		$ 6,914
909-0000	Rules Review/Evaluation	*$ 20,000*	*$ 24,465*	*$ 24,465*		$ 10,000	$ 34,465	$ 11,231	$ 23,234
909-0001	Groundwater Dep Nat Resource Inventory update						$ -		$ -
909-0002	Permitting Program Internal Procedure updates	*$ 25,000*	*$ 25,000*	*$ 25,000*			$ 25,000		$ 25,000
910-0000	Education & Outreach		*$ 5,292*			$ 103,500	$ 103,500	$ 7,350	$ 96,150
911-0000	Volunteer Stream Monitoring		*$ 791*			$ 4,500	$ 4,500	$ 4,909	$ (409)
914-0000	Homeowner BMP Program		*$ 28,597*	*$ 10,000*		$ 50,000	$ 60,000	$ 35,534	$ 24,466
922-0000	Plan Reviews - LGU/LWMP						$ -		$ -
923-0000	H & H Model Maintenance	*$ 42,500*	*$ 104,793*	*$ 65,334*			$ 65,334	$ 22,834	$ 42,500
923-0003	Long Lake - Flood Risk - Weir Modification Assessment					$ 30,000	$ 30,000		$ 30,000
927-0000	Management Plan Update	*$ 10,000*	*$ 142,131*	*$ 110,575*		$ 15,000	$ 125,575	$ 100,575	$ 25,000
929-0000	Long Lake Plan Implementation					$ 103,700	$ 103,700		$ 103,700
929-0012	Long Lake - Marketplace Reuse Feasibility	*$ 225,120*	*$ 190,232*	*$ 225,120*		$ (225,120)	$ -		$ -
929-0013	Long Lake - Chloride Impairement Assessment					$ 15,000	$ 15,000		$ 15,000
929-0014	Long Lake - Brewer's Pond BMP/LGU cost-share					$ 25,000	$ 25,000	$ 25,000	$ -
935-0000	Land Conservation Program	*$ 150,000*	*$ 150,000*	*$ 150,000*		$ 50,000	$ 200,000		$ 200,000
935-0002	110th Street Property Implementation	*$ 50,000*	*$ 73,457*	*$ 50,000*	$ 5,900		$ 55,900	$ 5,900	$ 50,000
935-0003	Develop Land Conservation Priorities	*$ 20,000*	*$ 20,000*	*$ 20,000*			$ 20,000		$ 20,000
940-0000	BMP Program – LGU/Community Demonstration Projects						$ -		$ -
942-0004	Measuring Trends in GW Elevations & Flow		*$ 1,138*	*$ 5,036*		$ 4,700	$ 9,736	$ 9,736	$ -
942-0007	Groundwater - Browns Creek piezometers	*$ 8,960*	*$ 8,960*	*$ 8,960*		$ (8,960)	$ -		$ -
942-0011	Groundwater - Coordination with users	*$ 8,500*	*$ 24,000*	*$ 8,500*			$ 8,500	$ 8,500	$ -
947-0017	Brown's Creek Implementation - Ecoli	*$ 10,000*	*$ 10,000*	*$ 10,000*		$ 5,800	$ 15,800		$ 15,800
947-0018	Brown's Creek - Biological Survey (Macroinvert)		*$ (515)*			$ 4,100	$ 4,100		$ 4,100
947-0022	Brown's Creek - Buffer and Stream Restoration	*$ 40,800*	*$ 102,994*	*$ 98,600*			$ 98,600	$ 98,400	$ 200
947-0023	Brown's Creek - Golf Course Reuse - Oak Glen						$ -		$ -
947-0026	Brown's Creek - Brown's Creek Cove Reach	*$ 23,200*	*$ 20,000*	*$ 23,200*	$ 34,800		$ 58,000		$ 58,000
947-0027	Brown's Creek - McKusick Road rock crib feasibility	*$ 26,000*		*$ 26,000*			$ 26,000		$ 26,000
948-0000	CIP Maintenance	*$ 115,000*	*$ 29,115*	*$ 44,275*		$ 85,000	$ 129,275		$ 129,275
953-0000	Fen Management Plan Implementation						$ -		$ -
957-0000	Weather Station		*$ 873*	*$ 2,846*		$ 3,900	$ 6,746	$ 5,361	$ 1,385
959-0004	Resource Assessment - AIS		*$ (99)*			$ 15,000	$ 15,000		$ 15,000
960-0000	St Croix Phosphorus Reduction	*$ 10,000*	*$ 10,000*	*$ 10,000*			$ 10,000		$ 10,000
961-0000	Mendel Wetland Restoration Feasiblity	*$ 35,000*	*$ 30,696*	*$ 35,000*			$ 35,000		$ 35,000
962-0000	District-Wide Pond Management Planning/Implementation		*$ (9,003)*				$ -		$ -
963-0000	District-Wide Vegetation Surveys						$ -		$ -
964-0000	District-Wide Chloride Source Assessment		*$ 2,500*	*$ 2,500*			$ 2,500		$ 2,500
960-0001	DNR Gully Stabilization						$ -		
TOTAL MANAGEMENT PLAN PROJECT EXPENSES:		**$ 841,580**	**$ 765,297**	**$ 977,325**	**$ 45,700**	**$ 987,892**	**$ 2,010,916**	**$ 891,693**	**$ 1,119,223**
TOTAL, OPERATING EXP. & MGMT. PLAN PROJECTS:		***$ 841,580***	***$ 977,325***	***$ 977,325***	***$ 45,700***	***$ 1,207,531***	***$ 2,230,555***	***$ 1,047,772***	***$ 1,182,783***

BROWN'S CREEK WATERSHED DISTRICT
4/9/2025
CURRENT ITEMS PAYABLE-PAGE 1 of 2

	YES	NO	ABSTAIN	ABSENT
ECKLES	_____	_____	_____	_____
ODEBRECHT	_____	_____	_____	_____
LEROUX	_____	_____	_____	_____
WIRTH	_____	_____	_____	_____
SAHULKA	_____	_____	_____	_____

VENDOR		**ACCOUNT #**	ITEMS	TOTAL	**CK NO**
Emmons & Olivier Resources, Inc.	March 2025 Invoices				
	Inv. 41-0000-232 Retainer	300-4500	$ 7,932.00		
	Inv. 41-0000-232 Retainer	200-4500	$ 2,644.00		
	Inv. 41-0001-235 General Permitting	300-4703	$ 12,686.56		
	Inv. 41-0307-96 Permits 2017				
	Permit #17-01 Grant Holdings Subd	300-4703	$ 83.56		
	Permit #17-17 West Ridge	300-4703	$ 34.48		
	Inv. 41-0350-44 Permits 2019				
	Permit #19-05 Central Commons	300-4703	$ 1,486.00		
	Inv. 41-0365-51 Permits 2020				
	Permit #20-12 White Pine Ridge	300-4703	$ 473.08		
	Inv. 41-0402-37 Permits 2022				
	Permit #22-18 Stillwater Oaks	300-4703	$ 1,380.00		
	Inv. 41-0420-26 Permits 2023				
	Permit #23-14 Wiskow Berm	300-4703	$ 83.56		
	Permit #23-15 WOS Lot 102	300-4703	$ 83.56		
	Permit #23-19 Liberty Classical Academy Expansion	300-4703	$ 648.00		
	Inv. 41-0438-15 Permits 2024				
	Permit #24-01 Take 5 Oil Change	300-4703	$ 113.98		
	Permit #24-02 Schuster Residence	300-4703	$ 197.54		
	Permit #24-03 WOS Lot 120 Hilgert Residence	300-4703	$ 83.56		
	Permit #24-07 Elliot Crossing	300-4703	$ 797.50		
	Permit #24-08 Altendorfer Residence	300-4703	$ 83.56		
	Permit #24-11 WOS Lot 127 Karr Residence	300-4703	$ 83.56		
	Permit #24-12 WOS Lot 130 Carlson Residence	300-4703	$ 83.56		
	Permit #24-14 Wick Residence	300-4703	$ 171.04		
	Permit #24-16 Goodsell Residence	300-4703	$ 171.04		
	Permit #24-17 WOS Lot 129 Weatherby Residence	300-4703	$ 83.56		
	Permit #24-18 CSAH 15 Frontage	300-4703	$ 166.98		
	Inv. 41-0461-3 Permits 2025				
	Permit #25-02 Anderson Holdings	300-4703	$ 40.50		
	Permit #25-03 Lakeview Hospital	300-4703	$ 7,263.25		
	Permit #25-04 Kranz Residence	300-4703	$ 2,106.00		
	Permit #25-05 St. Croix Rec Center	300-4703	$ 7,694.50		
	Permit #25-06 CSAH 15 Pavement Preservation	300-4703	$ 162.00		
	Permit #25-07 WOS Lot 121 Castille Residence	300-4703	$ 1,530.00		
	Inv. 41-0205-87 CIP Operation and Maintenance	948-4500	$ 526.90		

EOR Continued	Inv. 41-0418-28 Brown's Ck Pk Restoration	947-0022	$ 2,668.10	
	Inv. 41-0433-14 2024 H&H Model Update	923-0000	$ 9,982.25	
	Inv. 41-0437-13 2024 OGGC Reuse Maintenance & Monitoring	948-0000	$ 81.00	
	Inv. 41-0443-7 Rare Aquatic Plant Outreach	910-0000	$ 121.50	
	Inv. 41-0447-12 BCWD 2024 WMP Update	927-0000	$ 7,216.00	
	Inv. 41-0453-10 BCWD IESF O&M 2024	948-4500	$ 420.50	
	Inv. 41-0457-3 Diversion Water Quality Assessment	927-0000	$ 5,007.00	
	Inv. 41-0464-1 2025 Weather Station	957-0000	$ 729.50	
	Inv. 41-0465-1 2025 Groundwater Monitoring & Mgmnt	942-0004	$ 3,242.75	$ 78,362.43
Xcel Energy	Inv. 920253935 - Iron Enhanced Sand Filter pump operation	948-4500	$ 33.81	$ 33.81
Washington Conservation District	Inv. 6902 February 2025 Water Monitoring			
	Baseline Water Monitoring - Labor	300-4710	$ 12,641.66	
	Baseline Water Monitoring - Equipment	300-4640	$ 16.67	
	Baseline Water Monitoring - New Equipment Expense	300-4640	$ 9,042.88	
	Inv. 6908 February 2025 BMP Program	914-0000	$ 828.50	$ 22,529.71
Smith Partners	March 2025 Invoices			
	Inv. 45645 Retainer - Meetings, Preparation	200-4410	$ 2,260.88	
	Inv. 45646 General Legal Services	300-4410	$ 293.00	
	Inv. 45647 Planning	300-4410	$ 791.55	
	Inv. 45648 Contracts	300-4410	$ 117.38	
	Inv. 45649 Permits	300-4702	$ 3,022.85	
	Inv. 45650 Sureties	300-4410	$ 1,875.16	
	Inv. 45651 Capital Project Development	300-4410	$ 761.80	
	Inv. 45652 Brown's Creek Restoration	300-4410	$ 0.63	
	Inv. 45653 Land Conservation	300-4410	$ 1,348.25	$ 10,471.50
Dave S. McCord, LTD	Inv. 4483 February 2025 Accounting Services	200-4330	$ 420.00	$ 420.00
Abdo LLP	Inv. 504465 2024 Audit	200-4331	$ 8,300.00	$ 8,300.00
A House Unbuilt	Inv. 104 The Water Where We Live Exhibition	910-000	$ 1,125.79	$ 1,125.79
Guy Wagner	Inv. 1085 The Water Where We Live Video	910-000	$ 1,500.00	$ 1,500.00
GM Contracting, Inc.	Applewood Reuse Project Pay Request #5	929-0010	$ 5,849.76	$ 5,849.76
Geomorphic Restoration, Inc.	Brown's Creek Stream Restoration Project Pay Request #5	947-0022	$ 11,248.00	$ 11,248.00
St. Croix Event Center	Meeting Space for Regulatory Partner Meeting 2	909-0000	$ 375.00	$ 375.00
Stillwater Township	Security Deposit for Town Hall Application for Board Meeting Space	200-4949	$ 120.00	$ 120.00
City of Stillwater	BC Park Buckthorn Removal Cost-Share Reimbursement	947-0022	$ 16,150.00	$ 16,150.00

Manager Sahulka	Quarter I 2025 Per Diem	200-4000	$	400.00	$	400.00
Manager Wirth	Quarter I 2025 Per Diem	200-4000	$	700.00	$	700.00
Manager Odebrecht	Quarter I 2025 Per Diem	200-4000	$	100.00	$	100.00
Manager LeRoux	Quarter I 2025 Per Diem	200-4000	$	200.00	$	200.00
Manager Eckles	Quarter I 2025 Per Diem	200-4000	$	400.00	$	400.00
Total Amount Disbursed					**$**	**158,286.00**

BROWN'S CREEK WATERSHED DISTRICT
4/9/2025
MONTHLY ITEMS DEPOSITED - Page 1 of 1

VENDOR	INVOICE/DESCRIPTION	ACCOUNT #	CK NO	DEPOSIT DATE	TOTAL
4M Fund	Dividend (Interest)	100-3700	Direct Deposit	3/31/2025	$ 3,642.39
Curt Swanson Homes, LLC	#25-07 Permit Fee Deposit	300-4703	47099	3/17/2025	$ 1,000.00
Central Commons LLC	#19-05 Financial Assurance	300-4703	1535	3/21/2025	$ 62,800.00
Minnesota Management & Budget, State of Minnesota	MPCA 319 Grant Payment	100-3631	9455619	3/10/2025	$ 261,898.60
TOTAL AMOUNT DEPOSITED:					**$ 329,340.99**

BROWN'S CREEK WATERSHED DISTRICT
4/9/2025
CURRENT ITEMS PAYABLE-PAGE 1 of 2

	YES	NO	ABSTAIN	ABSENT
ECKLES	_____	_____	_____	_____
ODEBRECHT	_____	_____	_____	_____
LEROUX	_____	_____	_____	_____
WIRTH	_____	_____	_____	_____
SAHULKA	_____	_____	_____	_____

VENDOR		**ACCOUNT #**	ITEMS	TOTAL	**CK NO**
Emmons & Olivier Resources, Inc.	March 2025 Invoices				
	Inv. 41-0000-232 Retainer	300-4500	$ 7,932.00		
	Inv. 41-0000-232 Retainer	200-4500	$ 2,644.00		
	Inv. 41-0001-235 General Permitting	300-4703	$ 12,686.56		
	Inv. 41-0307-96 Permits 2017				
	Permit #17-01 Grant Holdings Subd	300-4703	$ 83.56		
	Permit #17-17 West Ridge	300-4703	$ 34.48		
	Inv. 41-0350-44 Permits 2019				
	Permit #19-05 Central Commons	300-4703	$ 1,486.00		
	Inv. 41-0365-51 Permits 2020				
	Permit #20-12 White Pine Ridge	300-4703	$ 473.08		
	Inv. 41-0402-37 Permits 2022				
	Permit #22-18 Stillwater Oaks	300-4703	$ 1,380.00		
	Inv. 41-0420-26 Permits 2023				
	Permit #23-14 Wiskow Berm	300-4703	$ 83.56		
	Permit #23-15 WOS Lot 102	300-4703	$ 83.56		
	Permit #23-19 Liberty Classical Academy Expansion	300-4703	$ 648.00		
	Inv. 41-0438-15 Permits 2024				
	Permit #24-01 Take 5 Oil Change	300-4703	$ 113.98		
	Permit #24-02 Schuster Residence	300-4703	$ 197.54		
	Permit #24-03 WOS Lot 120 Hilgert Residence	300-4703	$ 83.56		
	Permit #24-07 Elliot Crossing	300-4703	$ 797.50		
	Permit #24-08 Altendorfer Residence	300-4703	$ 83.56		
	Permit #24-11 WOS Lot 127 Karr Residence	300-4703	$ 83.56		
	Permit #24-12 WOS Lot 130 Carlson Residence	300-4703	$ 83.56		
	Permit #24-14 Wick Residence	300-4703	$ 171.04		
	Permit #24-16 Goodsell Residence	300-4703	$ 171.04		
	Permit #24-17 WOS Lot 129 Weatherby Residence	300-4703	$ 83.56		
	Permit #24-18 CSAH 15 Frontage	300-4703	$ 166.98		
	Inv. 41-0461-3 Permits 2025				
	Permit #25-02 Anderson Holdings	300-4703	$ 40.50		
	Permit #25-03 Lakeview Hospital	300-4703	$ 7,263.25		
	Permit #25-04 Kranz Residence	300-4703	$ 2,106.00		
	Permit #25-05 St. Croix Rec Center	300-4703	$ 7,694.50		
	Permit #25-06 CSAH 15 Pavement Preservation	300-4703	$ 162.00		
	Permit #25-07 WOS Lot 121 Castille Residence	300-4703	$ 1,530.00		
	Inv. 41-0205-87 CIP Operation and Maintenance	948-4500	$ 526.90		

EOR Continued	Inv. 41-0418-28 Brown's Ck Pk Restoration	947-0022	$ 2,668.10	
	Inv. 41-0433-14 2024 H&H Model Update	923-0000	$ 9,982.25	
	Inv. 41-0437-13 2024 OGGC Reuse Maintenance & Monitoring	948-0000	$ 81.00	
	Inv. 41-0443-7 Rare Aquatic Plant Outreach	910-0000	$ 121.50	
	Inv. 41-0447-12 BCWD 2024 WMP Update	927-0000	$ 7,216.00	
	Inv. 41-0453-10 BCWD IESF O&M 2024	948-4500	$ 420.50	
	Inv. 41-0457-3 Diversion Water Quality Assessment	927-0000	$ 5,007.00	
	Inv. 41-0464-1 2025 Weather Station	957-0000	$ 729.50	
	Inv. 41-0465-1 2025 Groundwater Monitoring & Mgmnt	942-0004	$ 3,242.75	$ 78,362.43
Xcel Energy	Inv. 920253935 - Iron Enhanced Sand Filter pump operation	948-4500	$ 33.81	$ 33.81
Washington Conservation District	Inv. 6902 February 2025 Water Monitoring			
	Baseline Water Monitoring - Labor	300-4710	$ 12,641.66	
	Baseline Water Monitoring - Equipment	300-4640	$ 16.67	
	Baseline Water Monitoring - New Equipment Expense	300-4640	$ 9,042.88	
	Inv. 6908 February 2025 BMP Program	914-0000	$ 828.50	$ 22,529.71
Smith Partners	March 2025 Invoices			
	Inv. 45645 Retainer - Meetings, Preparation	200-4410	$ 2,260.88	
	Inv. 45646 General Legal Services	300-4410	$ 293.00	
	Inv. 45647 Planning	300-4410	$ 791.55	
	Inv. 45648 Contracts	300-4410	$ 117.38	
	Inv. 45649 Permits	300-4702	$ 3,022.85	
	Inv. 45650 Sureties	300-4410	$ 1,875.16	
	Inv. 45651 Capital Project Development	300-4410	$ 761.80	
	Inv. 45652 Brown's Creek Restoration	300-4410	$ 0.63	
	Inv. 45653 Land Conservation	300-4410	$ 1,348.25	$ 10,471.50
Dave S. McCord, LTD	Inv. 4483 February 2025 Accounting Services	200-4330	$ 420.00	$ 420.00
Abdo LLP	Inv. 504465 2024 Audit	200-4331	$ 8,300.00	$ 8,300.00
A House Unbuilt	Inv. 104 The Water Where We Live Exhibition	910-000	$ 1,125.79	$ 1,125.79
Guy Wagner	Inv. 1085 The Water Where We Live Video	910-000	$ 1,500.00	$ 1,500.00
GM Contracting, Inc.	Applewood Reuse Project Pay Request #5	929-0010	$ 5,849.76	$ 5,849.76
Geomorphic Restoration, Inc.	Brown's Creek Stream Restoration Project Pay Request #5	947-0022	$ 11,248.00	$ 11,248.00
St. Croix Event Center	Meeting Space for Regulatory Partner Meeting 2	909-0000	$ 375.00	$ 375.00
Stillwater Township	Security Deposit for Town Hall Application for Board Meeting Space	200-4949	$ 120.00	$ 120.00
City of Stillwater	BC Park Buckthorn Removal Cost-Share Reimbursement	947-0022	$ 16,150.00	$ 16,150.00

Edge Ecosystems LLC	Brown's Creek Conservation Area Prescribed Burn	935-0022	$ 1,400.00	$ 1,400.00
Manager Sahulka	Quarter I 2025 Per Diem	200-4000	$ 400.00	$ 400.00
Manager Wirth	Quarter I 2025 Per Diem	200-4000	$ 700.00	$ 700.00
Manager Odebrecht	Quarter I 2025 Per Diem	200-4000	$ 100.00	$ 100.00
Manager LeRoux	Quarter I 2025 Per Diem	200-4000	$ 200.00	$ 200.00
Manager Eckles	Quarter I 2025 Per Diem	200-4000	$ 400.00	$ 400.00
Total Amount Disbursed				**$ 159,686.00**

BROWN'S CREEK WATERSHED DISTRICT
4/9/2025
MONTHLY ITEMS DEPOSITED - Page 1 of 1

VENDOR	INVOICE/DESCRIPTION	ACCOUNT #	CK NO	DEPOSIT DATE	TOTAL
4M Fund	Dividend (Interest)	100-3700	Direct Deposit	3/31/2025	$ 3,642.39
Curt Swanson Homes, LLC	#25-07 Permit Fee Deposit	300-4703	47099	3/17/2025	$ 1,000.00
Central Commons LLC	#19-05 Financial Assurance	300-4703	1535	3/21/2025	$ 62,800.00
Minnesota Management & Budget, State of Minnesota	MPCA 319 Grant Payment	100-3631	9455619	3/10/2025	$ 261,898.60
TOTAL AMOUNT DEPOSITED:					**$ 329,340.99**

Brown's Creek Watershed District
Treasurer's Report
4/9/25

Total Bank Balance			
4M Fund		$	1,065,205.09
USBank			-
Less Accounts Payable			(158,286.00)
Plus Unrecorded Deposits since	03/31/2025		
Total Balance		$	906,919.09

memo

Project Name |	BCWD Permit 25-05 St. Croix Recreation Center	**Date** |	4/4/2025
To / Contact info |	BCWD Board of Managers		
Cc / Contact info |	Reabar Abdullah, PE; Dillon McClung / City of Stillwater		
Cc / Contact info |	Karen Kill, Administrator / BCWD		
From / Contact info |	Ryan Fleming, PE; Julia Lau, EIT / EOR		
Regarding |	Permit Application No. 25-05 Engineer's Report		

The following review of the above-captioned project located within the legal jurisdiction of the Brown's Creek Watershed District (BCWD) was conducted to determine compliance with the BCWD rules for purposes of the engineer's recommendation to the Board of Managers for its determination of the permit application.

Applicant: City of Stillwater
Permit Submittal Date: *3/21/2025*
Completeness Determination: *3/21/2025*
Board Action Required By: *5/19/2025*
Review based on BCWD Rules effective April 1, 2020
Recommendation: Approve with Conditions

GENERAL COMMENTS

Existing Conditions: The project site includes two adjacent St. Croix Valley Recreation Center parcels with a total area of 16.4 acres, with approximately 0.07 acres of disturbance occurring on the neighboring Marker Buoy LLC & SKN Associates LLC parcel to the east. Disturbance is limited to 3.13 acres of the parcels that currently includes a skate park, surrounding turf grass and gravel drive path located north of Curve Crest Boulevard and east of Market Drive. Of the 3.13-acre area, 2.40 acres flow west toward an existing stormwater pond on the west side of the existing parking lot. The remaining 0.73 acres of the site flow offsite south toward the storm sewer system on Curve Crest Boulevard. The skate park includes 0.37 acres of impervious surface.

Proposed Conditions: The project will replace the existing skate park with a parking lot, sidewalk, a biofiltration basin, and driveways connecting west to the adjacent parking lot and south to Curve Crest Boulevard (Figure 1). Storm sewer will be added in the proposed parking lot to convey runoff to the biofiltration basin, then to the existing stormwater pond on the west side of the existing parking lot. The project will disturb approximately 3.13 acres. The entire 0.37 acres of existing impervious will be removed and the total proposed impervious area will be 1.85 acres of the 3.13-acre disturbance.

Recommendation: The BCWD engineer recommends that the Board approve the application with the conditions outlined in the report.

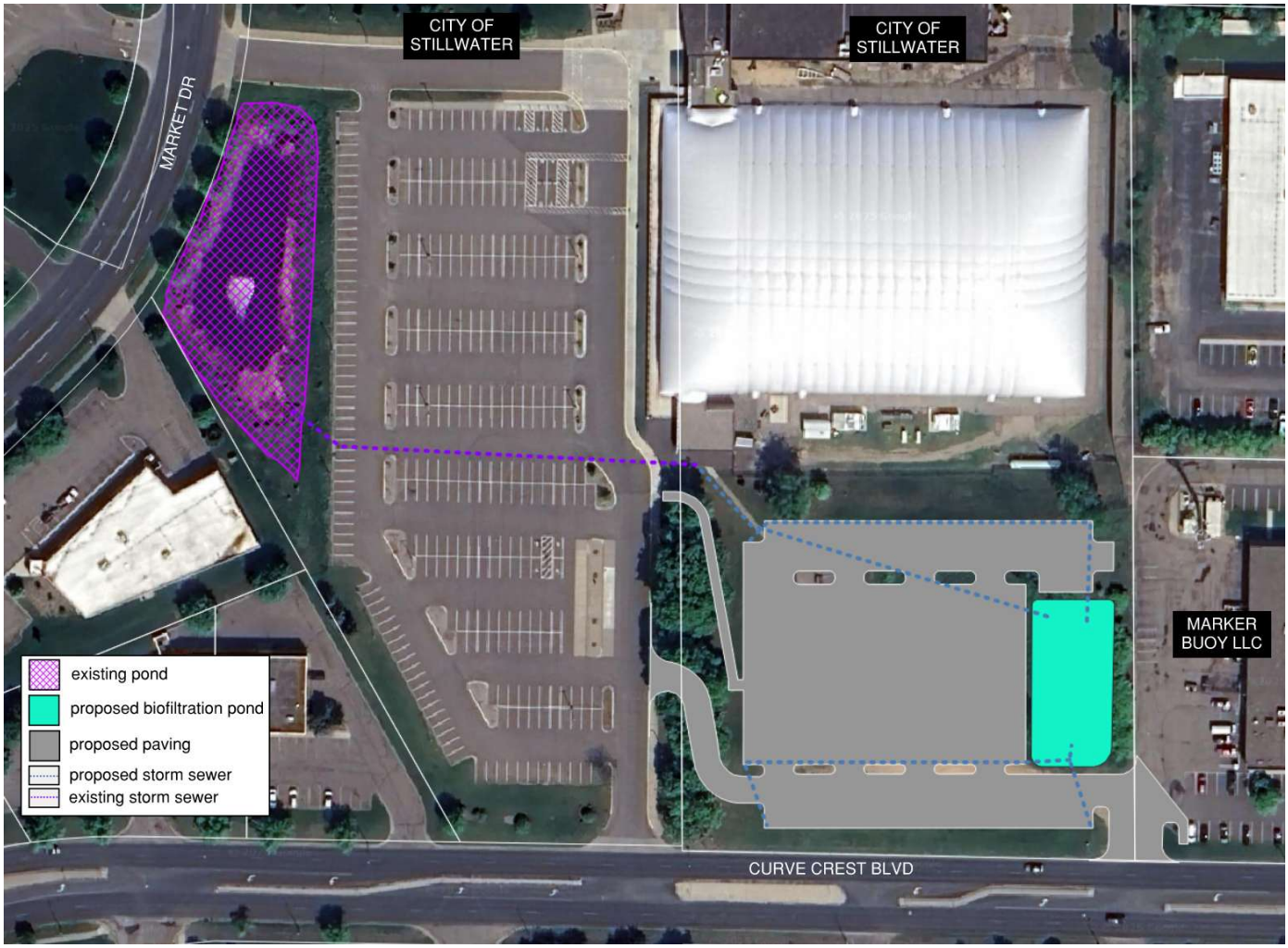


Figure 1: St. Croix Valley Recreation Center Site Plan

Rule 2.0—STORMWATER MANAGEMENT

Under 2.2(b) of the Rule, the proposed project triggers the application of Rule 2.0 Stormwater Management because it creates one or more acres of new and/or reconstructed impervious surface. The site is located within the Diversion Structure Subwatershed, so the stormwater criteria in subsection 2.4.1(b) apply.

The existing site has a total of 7.78 acres of impervious surface. The proposed site will have a total of 9.26 acres of impervious area. Of the original impervious area, 0.37 acres (4.76%) will be disturbed under this project. Under 2.2(b)(ii) since the proposed activity will disturb less than 50 percent of existing impervious surface on the site, the criteria will apply only to reconstructed and net additional impervious surface and disturbed areas on the project site.

The stormwater management plan for the project includes:

- *Constructing storm sewer catch basins with SAFL baffle pretreatment devices, and storm sewer piping to convey runoff from new pavement to the proposed biofiltration basin.*
- *Constructing a biofiltration basin with outlet piping connecting to the existing storm sewer beneath the existing parking lot, which discharges to the existing stormwater pond.*

The proposed project is within the emergency response area for Stillwater's well number 10. The BCWD finds that stormwater infiltration is not a viable solution due to this site constraint. Stormwater management will be achieved by installing 2 SAFL baffles to trap sediment in the catch basins before flow enters the proposed biofiltration basin. Filtration media and drain tiles will be installed within the biofiltration basin to filter the water before discharging to the existing stormwater pond. The total drainage area of the proposed basin is 1.97 acres, which includes the proposed parking lot and a small hill section north of the basin.

Runoff leaves the site at the following discharge points:

- *"Market Drive" – The existing drainage area consists of 14.32 acres, including the ice rink, existing parking lot, existing stormwater pond, and skate park. The proposed drainage area will increase to 15.83 acres by eliminating the skate park and routing the entire proposed parking lot and biofiltration basin to the existing pond to discharge to sewer on Market Drive.*

- *"Curve Crest Boulevard" – The existing drainage area consists of the 0.73-acre southeast gravel and turf portion of the skate park, and the entrance apron to the Marker Bouy LLC & SKN Associates LLC parcel. The proposed drainage area to Curve Crest Boulevard will decrease to 0.29 acres due to capturing more area in the proposed biofiltration basin.*

Rate Control

According to BCWD Rule 2.4.1(b)(i), an applicant must submit a stormwater-management plan providing no increase in the existing peak stormwater flow rates from the site for a 24-hour precipitation event with a return frequency of two, 10 or 100 years for all points where discharges leave the site.

☒ Rule Requirement Met

The stormwater management plan developed for the site was evaluated using a HydroCAD model of existing and post-development site conditions. A comparison of the modeled peak flow rates to each discharge point is included in Table 1 and 2.

Table 1 - Peak Discharge Rate to Market Drive

Event	*Existing Discharge Rate (cfs)*	*Proposed Discharge Rate (cfs)*
2-year (2.80")	15.19	15.04
10-year (4.17")	22.60	22.19
100-year (7.23")	33.20	33.04

Table 2 - Peak Discharge Rate to Curve Crest Boulevard

Event	*Existing Runoff Rate (cfs)*	*Proposed Runoff Rate (cfs)*
2-year (2.80")	0.89	0.50
10-year (4.17")	2.14	1.05
100-year (7.23")	5.39	2.39

Volume Control

According to BCWD Rule 2.4.1(b)(ii), an applicant must submit a stormwater-management plan providing retention onsite of 1.1 inches of stormwater volume from the regulated impervious surface.

☒ Rule Requirement Met

Flexible treatment options within the diversion structure subwatershed apply when an applicant demonstrates that retention of 1.1 inches of stormwater volume onsite is not reasonably feasible. Because this site is located in the Emergency Response Area for Stillwater's drinking water well number 10, the permit applicant asserts that retention of stormwater volume onsite via infiltration is not reasonably feasible and the BCWD engineer concurs. Flexible Treatment Option A requires a 0.55-inch volume retention onsite, which is not feasible without the use of infiltration. Flexible Treatment Option B can be applied, which requires retention onsite of stormwater volume to the extent practicable and removal of 60 percent of the annual total phosphorus loading (BCWD Rule 2.4.3(b)).

A MIDS Model was used to calculate the annual total phosphorus loading for the new impervious area (1.67 acres) compared to the annual total phosphorus loading trapped within the proposed biofiltration basin to demonstrate compliance with the water quality requirement. As the following results illustrate, the rule requirement for Flexible Treatment Option B, 60% total phosphorus removal is exceeded with the biofiltration basin providing 68% removal of the total phosphorous load. The MIDS model results show that 11% of the annual stormwater runoff volume will be retained due to the perched outlet design of the biofiltration basin to retain volume in the void space below for treatment via evapotranspiration.

- *Annual total phosphorus load from new/reconstructed impervious area = 3.14 lbs/year*
- *Annual total phosphorus loading trapped in biofiltration basin = 2.14 lbs/year (Removal of 68% TP)*
- *Volume retained to extent practicable = 0.06 inches*

• *Annual volume retention onsite = 0.43 acre-ft (11% runoff volume)*

Lake/Wetland Bounce

According to BCWD Rule 2.4.1(b)(iii), an applicant must submit a stormwater-management plan providing no increase in the bounce in water level or duration of inundation for a 24-hour precipitation event with a return frequency of two, 10 or 100 years in the subwatershed in which the site is located, for any downstream lake or wetland beyond the limit specified in Appendix 2.1.

☐ Rule provision imposes no compliance requirements on the project. *There are no applicable downstream waterbodies as specified in Appendix 2.1.*

Infiltration Pretreatment

According to BCWD Rule 2.5.2, surface flows to infiltration facilities must be pretreated for long-term removal of at least 50 percent of sediment loads.

☐ Rule provision imposes no compliance requirements on the project. *There is no stormwater infiltration proposed for this site.*

The BCWD Rule does not require pretreatment for bioretention or filtration practices. However, like infiltration practices, bioretention and filtration practices can be prone to failure from inadequate pretreatment. For the proposed biofiltration basin, pretreatment of the proposed parking lot runoff is provided by 2 SAFL baffles prior to stormwater discharge into the basin.

Rule 2.0 Conditions:

2-1. Provide BCWD a biofiltration basin planting plan for review and approval.

2-2. Provide BCWD with the final Civil Plan Set prior to start of construction. (BCWD 2.7.9)

2-3. Provide documentation as to the status of a National Pollutant Discharge Elimination System stormwater permit for the project from the Minnesota Pollution Control Agency and provide the Storm Water Pollution Prevention Plan (SWPPP) as it becomes available (BCWD Rule 2.7.15).

2-4. The stormwater management facilities to be constructed for the project must be added to the inventory of those maintained under the March 8th, 2010, programmatic maintenance agreement between the City of Stillwater and BCWD (BCWD Rule 2.6).

Rule 3.0—EROSION CONTROL

According to BCWD Rule 3.2, all persons undertaking any grading, filling, or other land-altering activities which involve movement of more than fifty (50) cubic yards of earth or removal of vegetative cover on five thousand (5,000) square feet or more of land must submit an erosion control plan to the District, and secure a permit from the District approving the erosion control plan. The proposed project triggers the application of Rule 3.0 Erosion Control because 2.76 acres of vegetative cover are proposed to be disturbed.

☒ Rule Requirements Met with Conditions

The erosion and sediment control plan includes:

- *Catch basin inlet protection*
- *Silt fence*
- *Erosion control logs*
- *Rock construction entrance*

To meet the criteria of BCWD Rule 3.2, the erosion and sediment control plan must include:

- *Add perimeter controls along the eastern edge of the limit of disturbance.*

The following conditions must be addressed in the erosion and sediment control plan to comply with the District's requirements:

Rule 3.0 Conditions:

3-1. Address all erosion control comments above (BCWD 3.2.2).

3-2. Provide the contact information for the erosion and sediment control responsible party during construction once a contractor is selected. Provide the District with contact information for the Erosion Control Supervisor and the construction schedule when available (BCWD 3.3.2).

Rule 4.0—LAKE, STREAM, AND WETLAND BUFFER REQUIREMENTS

According to BCWD Rule 4.2.1, Rule 4.0 applies to land that is (a) adjacent to Brown's Creek; a tributary of Brown's Creek designated as a public water pursuant to Minnesota Statutes section 103G.005, subdivision 15; a lake, as defined in these rules; a wetland one acre or larger; or a groundwater-dependent natural resource; and (b) that has been either (i) subdivided or (ii) subject to a new primary use for which a necessary rezoning, conditional use permit, special-use permit or variance has been approved on or after April 9, 2007, (for wetlands and groundwater-dependent natural resources other than public waters) or January 1, 2000 (for other waters).

☐ Rule Not Applicable to Permit. *There are no adjacent lakes, streams, or wetlands.*

Rule 5.0—SHORELINE AND STREAMBANK ALTERATIONS

According to BCWD Rule 5.2, no person may disturb the natural shoreline or streambank partially or wholly below the ordinary high water mark of a waterbody, without first securing a permit from the District.

☐ Rule Not Applicable to Permit. *There are no proposed shoreline or streambank alterations.*

Rule 6.0—WATERCOURSE AND BASIN CROSSINGS

According to Rule 6.2, no person may use the beds of any waterbody within the District for the placement of roads, highways and utilities without first securing a permit from the District.

☐ Rule Not Applicable to Permit. *There are no proposed watercourse or basin crossings.*

Rule 7.0—FLOODPLAIN AND DRAINAGE ALTERATIONS

According to Rule 7.2, no person may alter or fill land below the 100-year flood elevation of any waterbody, wetland, or stormwater management basin, or place fill in a landlocked basin, without first obtaining a permit from the District. No person may alter stormwater flows at a property

boundary by changing land contours, diverting or obstructing surface or channel flow, or creating a basin outlet, without first obtaining a permit from the District.

☒ Rule Requirements Met

Under BCWD Rule 7.3.5, the District will issue a permit to alter surface flows under paragraph 7.2 only on a finding that the alteration will not have an unreasonable impact on an upstream or downstream landowner and will not adversely affect flood risk, basin or channel stability, groundwater hydrology, stream baseflow, water quality or aquatic or riparian habitat.

A HydroCAD model was prepared to evaluate downstream flooding impacts. This model demonstrates that there will be little to no impact to downstream properties or resources as a result of the proposed redevelopment, nor will there be significant impact to downstream properties during construction.

The existing stormwater pond has a 100-year flood elevation from which the flood footprint extends to the centerline of Market Drive but does not impact any downstream structures or properties. The biofiltration basin design includes flood storage such that implementation of this project will result in the flood elevation in the existing pond to decrease by 0.05 feet, which will not pose unreasonable impact on upstream or downstream landowners.

Rule 8.0—FEES

As the City of Stillwater is a government entity, the applicant is exempt from fees.

Rule 9.0—FINANCIAL ASSURANCES

As the City of Stillwater is a government entity, the applicant is exempt from financial assurances.

Rule 10.0—VARIANCES

According to BCWD Rule 10.0, the Board of Managers may hear requests for variances from the literal provisions of these Rules in instances where their strict enforcement would cause undue hardship because of the circumstances unique to the property under consideration. The Board of Managers may grant variances where it is demonstrated that such action will be keeping with the spirit and intent of these rules. Variance approval may be conditioned on an applicant's preventing or mitigating adverse impacts from the activity.

☒ Rule Not Applicable to Permit. *There are no requested variances.*

RECOMMENDED CONDITIONS OF THE PERMIT:

The following is a summary of the remaining tasks necessary to bring the project into compliance with the BCWD Rules in all respects other than where variances are requested as discussed above:

1. Address all stormwater management requirements (Conditions 2-1 to 2-3).
2. Address all erosion control requirements (Conditions 3-1 to 3-2).
3. Provide authorization from the property owner Marker Buoy LLC & SKN Associates LLC for the disturbance proposed to occur on its parcel.

STIPULATIONS OF APPROVAL:

1. Note that the permit, if issued, will require that the applicant notify the District in writing at least three business days prior to commencing land disturbance. (BCWD Rule 3.3.1)

2. To ensure that construction is carried out according to the approved plan, provide verification that construction standards have been met for the biofiltration basin. This includes but is not limited to confirmation that biofiltration soil meets the specifications in the plan, and that the vegetation establishment procedures have been followed per the landscaping/restoration plan. This can be achieved by scheduling a BCWD inspection during construction of the basins, or well-documented photographic evidence by the onsite engineer along with collected survey elevations of the basins.
3. Provide the District with As-built record drawings showing that the completed grading and stormwater facilities conform to the grading plan.
4. Provide contact information for the party responsible for long-term maintenance of proposed stormwater facilities.

BROWN'S CREEK WATERSHED DISTRICT
2024 WATER MONITORING SUMMARY

Prepared for:

Brown's Creek Watershed District
Preserving the integrity of the watershed for future generations

Prepared by:

Washington Conservation District

ACKNOWLEDGMENTS

Several agencies and individuals were directly involved in many aspects of this project including data collection and analysis, as well as technical and administrative assistance.

Brown's Creek Watershed District (BCWD) Board of Managers
Klayton Eckles, President
Celia Wirth, Vice President
Gerald Johnson, Treasurer
Charles LeRoux, 2nd Vice President
Debra Sahulka, Secretary

Brown's Creek Watershed District
Karen Kill, BCWD Administrator

Watershed Engineer
Emmons and Olivier Resources, Inc.

Watershed Legal Council
Smith Partners, P.L.L.P.

Metropolitan Council
Cassie Champion
Brian Johnson
Dan Henley
Mallory Vanous

Minnesota Department of Natural Resources (MN DNR)
Sandy Fecht
Mark Nemeth

Stillwater Area High School
Pete Stenross
Katie Crowley
SAHS Students

Minnesota Trout Unlimited- Trout in the Classroom
Evan Griggs
Amber Taylor

Washington Conservation District
The BCWD and WCD would also like to thank those volunteers and landowners who assist with data collection and allow property access.

ABBREVIATIONS, ACRONYMS, AND SYMBOLS

Bi-weekly	Every two weeks
CaCO3	Calcium Carbonate
CAMP	Citizen-Assisted Lake Monitoring Program
cfs	cubic feet per second
Chl-α	Chlorophyll-α
BCWD	Brown's Creek Watershed District
DO	Dissolved Oxygen
EIMS	Environmental Information Management System
E. coli	*Escherichia coli*
FAV	Final Acute Value
IESF	Iron Enhanced Sand Filter
MCES	Metropolitan Council Environmental Services
mg/L	milligrams per liter
MN DNR	Minnesota Department of Natural Resources
MPCA	Minnesota Pollution Control Agency
MPN	most probable number
NTU	nephelometric turbidity units
OHWL	Ordinary High Water Level
Ortho-P	Ortho-phosphorus
THPP	Trout Habitat Preservation Project
TKN	Total Kjeldahl Nitrogen
TMDL	Total Maximum Daily Load
TP	Total Phosphorus
TSI	Trophic State Index
TSMP	Trout Stream Mitigation Project/Diversion Structure
TSS	Total Suspended Solids
µg/L	micrograms per liter
µm	micrometers
µmhos/cm	micromhos per centimeter
VSS	Volatile Suspended Solids
WCD	Washington Conservation District

2024 Brown's Creek Watershed District Baseline Water Quality Monitoring

MONITORING SUMMARY

This report focuses on the summary of lake and stream water quality data collected by the Washington Conservation District (WCD) in 2024. References will also be made to the Brown's Creek and Long Lake 2020 Trend Analysis completed by Brown's Creek Watershed District's engineer, Emmons & Olivier Resources, Inc. (EOR). Additional information on the natural and cultural resources, improvement projects, and challenges related to water resources within the Brown's Creek Watershed District (BCWD) can be found in the BCWD 2017-2026 Watershed Management Plan, the 2010 Brown's Creek Biota TMDL, and past monitoring summaries.

The drought conditions observed in 2021-2023 continued into the beginning of 2024 with some of the lowest snow totals ever recorded in the state. Spring conditions were somewhat cooler than average, with overnight freezing temperatures persisting into mid-April. However, a warm, largely snow-free winter caused most lakes to lose the little ice cover that formed by the first week of March; a full month earlier than median ice-out dates. Contrary to most years, due to the lack of snow cover and drought at the end of 2023, water levels in streams and lakes in the District were at their lowest immediately after ice-out with no recharge from snowmelt. Spring conditions were very wet, with May and June combining to be 5.52 inches of precipitation above the thirty year average. This was contrasted by extremely dry late summer and fall conditions, where September and October were some of the driest ever recorded, with just 2.69 inches of precipitation combined. Overall, annual precipitation was 5.75 inches greater than the thirty year average of 33.9 inches. Warm air temperatures also impacted water conditions, although only one day over 90 ºF was recorded by the National Weather Service in Stillwater. Ice-in was somewhat delayed due to fluctuating warm and cold temperatures and rain extending into December. The wet and warm conditions in 2024 are generally reflected in poorer water quality conditions than previous years.

Lake Monitoring

BCWD monitored eighteen basins for nutrients, chlorophyll-α, Secchi disk transparency, temperature and dissolved oxygen profiles, elevation, and user perception rankings. Bass Lake East, Bass Lake West, Benz Lake, Goggins Lake, Jackson WMA (Sinnits) Pond, Kismet Basin, Long Lake, Lynch Lake South, Masterman Lake, Plaisted Lake, South School Section Lake, and Woodpile Lake were monitored every other week, while Brewer's Pond, Heifort's Pond, July Avenue Wetland, Lynch Lake North, North School Section Lake, and Pat Lake were monitored every four weeks by WCD staff. Volunteers also monitored Brewer's Pond and Heifort's Pond

every four weeks on an offset schedule with WCD, such that samples were collected every other week.

Five lakes experienced a slight decline in water quality as measured by lake grade over the previous year. Six lakes experienced an improvement in lake grade; Benz Lake, Heifort's Pond, Kismet Basin, Lynch Lake South, Masterman Lake, and Woodpile Lake. Bass Lake West, Goggins Lake, July Ave Wetland, Long Lake, and South School Section Lake declined in grade from the year prior, and all other lakes maintained their lake grade.

Of the eighteen lakes monitored, July Ave Wetland and Lynch Lake North summer averages exceeded (were poorer than) state impairment thresholds for total phosphorus, chlorophyll-α, and Secchi disk transparency. South School Section Lake exceeded the impairment threshold for total phosphorus and chlorophyll-α. Brewer's Pond and Heifort's Pond exceeded the impairment threshold for chlorophyll-α and Secchi disk transparency. Lynch Lake South exceeded the impairment threshold for Secchi disk transparency.

Peak elevation for the year on most lakes occurred in August. In 2024 four basins had elevations above their Ordinary High Water (OHW) level, for part or all of the monitoring season.

Stream and Stormwater Monitoring

Brown's Creek

Consistent with past years, Brown's Creek was monitored at four locations; Highway 15, McKusick Road, Stonebridge, and the Outlet. Automated storm composite and manual grab samples during storm and base flow conditions were collected at all sites and analyzed for nutrients, sediment, metals, and *Escherichia coli* (*E.coli*). Continuous (15 minute) stage, discharge, temperature, dissolved oxygen (DO), turbidity, and specific conductivity were collected at all four stations, and continuous pH was also collected at McKusick Road, Stonebridge and the Outlet.

<u>Nutrients & Discharge</u>

The total discharge to the St. Croix River in 2024 was 261,552,581 cubic feet of water, as recorded at the Outlet. The total phosphorus (TP) and total suspended solids (TSS) loads to the St. Croix River at the Outlet were 2,563 pounds of phosphorus (0.554 lbs/ac) and 507,151 pounds of sediment (109.68 lbs/ac), as calculated by Metropolitan Council Environmental Services (MCES). These were near the long term average load since load calculations began in 2000. The sampling strategy at the Outlet was changed by MCES in 2017 to a manual grab collected on the same weekday every other week, and composite samples collected in major storm events. This change in sampling method has resulted in an apparent shift to lower annual loads, as the strategy is not biased towards runoff events as it was in the past, and the method

used to calculate annual loads was altered to comply with MCES standard operating procedures. The creek exceeded the state standard of 0.100 mg/L of TP for six of 26 applicable sample, but was below the standard for most of the year. The creek met the TMDL goal of 23 mg/L of TSS during base flow, but exceeded the state standard of 10 mg/L from April 1 to September 30 in May through August for a total of five of 12 applicable samples. TSS loading was greater than the TMDL goal of 74 pounds per acre, primarily due to the wet spring conditions. Additionally, in-water construction work as part of the streambank and floodplain restoration project along Neal Avenue contributed to the higher TP and TSS loads. Loading and conditions at individual sites are discussed in greater detail later in this summary.

Metals

No metals exceedances were recorded at the Outlet. A small number of chronic level exceedances of lead and cadmium were recorded at the upstream monitoring stations. The number and severity of metals standards exceedances in 2024 was again low compared to past years.

Bacteria

Samples taken during base flow at each station were above state standards for *E.coli*. Based on long term monitoring, bacteria concentrations at all stations are above the standard June through September, and at McKusick Road in the month of May. Sufficient data has not been collected at Highway 15, McKusick Road, or Stonebridge to compare to the standard in April.

Temperature & Dissolved Oxygen

Temperature and dissolved oxygen regimes were most suitable for trout survival at McKusick Road, Stonebridge and the Outlet. Although the threat level threshold of 18.3 ºC was exceeded at McKusick Road, Stonebridge, and the Outlet 40, 49, and 15 days, respectively, as measured by daily average temperature, the critical level threshold at which trout could not survive of 23.9 ºC was never exceeded at any site. The number of threat level exceedances at all sites near the average over the last ten years when a full season of data was available. Dissolved oxygen concentrations were better than the state standard of 7 mg/L as a daily minimum for the entire season at the Outlet, and were poorer than the standard only one day at Stonebridge. McKusick Road was poorer than the standard 29 days, partially due to the in-water restoration work around Neal Avenue. Highway 15 is not suitable for trout during summer months due to low dissolved oxygen and warm temperatures. In past years McKusick Road has not typically had favorable conditions for both temperature and dissolved oxygen, but it is hoped increased shading and bank stabilization resulting from the restoration work will improve conditions in this reach. The upper reaches of the creek around Highway 15 have been found to contain invasive curly-leaf pondweed, which will hinder trout suitability by slowing the water, allowing for warmer temperatures and sediment deposition over spawning gravel.

Turbidity

Continuous turbidity and specific conductivity were monitored at each of the four stations on the creek. Average daily turbidity exceeding the TMDL goal of 10 NTU ranged from 12.9% to 34.5% of the days monitored across the four monitoring stations. In 2024 Stonebridge was the most turbid site, with 34.5% of the days monitored exceeding the 10 NTU goal. Turbidity conditions were heavily influenced by the in-water restoration work during the summer months, which caused daily spikes in turbidity when construction activities were occurring. These spikes were of the same magnitude as major storm events, and are reflected in load data. Specific conductivity data are not discussed, but are available upon request.

Biology

The MN DNR has a management plan to stock 1,000 yearling rainbow trout in the creek each spring. Due to difficulties of raising brown trout at state hatcheries to target size, the agency shifted to stocking rainbow trout in 2019. Stillwater Area High School and the Minnesota Trout Unlimited – Trout in the Classroom program also raised and released several hundred fingerling rainbow trout into the creek. The rainbow trout thrive in similar conditions as brown trout, but grow faster and will provide better recreational opportunities to anglers.

Diversion Drainage

The diversion drainage was again monitored at the Trout Stream Mitigation Project (TSMP) Diversion Structure for nutrients, sediment, and metals, as well as continuous stage, velocity, discharge, and temperature. A secondary level logger installed at the diversion weir shows no water overtopped the weir in 2024. A very small volume of water directly discharges via a small hole in the base of the structure designed to allow groundwater base flow into Brown's Creek. Total discharge to McKusick Lake was 72,832,083 cubic feet of water; the second highest volume recorded since monitoring began in 2006. The TP load was 573 pounds (0.149 lbs/ac) and the TSS load was 230,855 pounds (59.88 lbs/ac). The TP and TSS loads were well below the ten year and all-time averages. The site met the state standard for 2B waters for TP and TSS, but has historically shown an extremely high storm loading rate. Erosional head cuts in the drainage tributaries have been identified as the source of the excessive loading rates through drone flights and surveys conducted by the District's engineer. Rock vanes and stabilization projects have been implemented by the District to reduce erosion and restore floodplain connectivity. Annual TSS and TP reductions as a result of these projects are estimated to be 70 pounds of sediment and 76 pounds of phosphorus per year. In 2024 beavers also constructed a series of dams upstream of the site first noted in July, further trapping sediment by reducing flow rate and improving floodplain connectivity. The high total discharge and below average nutrient loads provide evidence the restoration projects and natural processes resulting from beaver activity may be improving water quality conditions in the drainage. Concentrations of metals were again low in 2024. One chronic standard exceedance of copper and three chronic standard exceedances of lead were sampled, which are among the lowest ever recorded. Continuous temperature

monitoring was added to the site in 2024 to provide further data on how restoration and beaver activities are affecting habitat and water quality conditions in the drainage.

Long Lake Drainages

The Tributary to Long Lake at Marketplace Pond was monitored for nutrients, sediment, metals, and continuous stage and discharge, while the Tributary to Long Lake at 62nd Street was monitored for stage only. The total discharge to Long Lake at Marketplace Pond was 24,319,915 cubic feet, while the discharge at 62nd Street was estimated based on prior data at 3,294,857 cubic feet during the monitoring period. These were the greater than the long term average discharges for these sites. The tributary at Marketplace Pond contributed 157 pounds of phosphorus (0.383 lbs/ac) and 18,320 pounds of sediment (44.68 lbs/ac). Although not classified as a 2B water, the state standard for TP was exceeded during base flow conditions in May, and the TSS standard is being met at the Marketplace Pond for all samples at base flow. Storm events at the tributary at Marketplace Pond exceeded the maximum standard for copper four times, the chronic standard for copper once, the chronic standard for lead three times, and the maximum and chronic standards for zinc once each.

McKusick Wetland Outlet

McKusick Wetland Outlet was added to the monitoring network in 2017. The outlet was monitored at its discharge point to Brown's Creek 100 feet upstream of the McKusick Road site for continuous stage, discharge, and temperature, as well as nutrients, sediment, and metals. Discharge to Brown's Creek during the period of monitoring (April 24 to October 29) was calculated at 9,588,210 cubic feet. The TP load for this period contributed 165.5 pounds of phosphorus, while the TSS load contributed 4,788 pounds of sediment. Although not a 2B water, when compared to state standards for TP and TSS the site meets the standard for TSS, but was above the TP standard for every sample collected.

The Oak Glen Golf Course Irrigation Reuse project was completed in 2021, and directs flow from the wetland away from Brown's Creek to a pond to be used as irrigation water. This helps reduce thermal and nutrient loads to Brown's Creek and increases the suitability of the creek to support cold water species. The outlet appears to have had flow during the entire monitoring period. Continuous temperature data collected at the site show water discharged to the creek exceeded the TMDL threat level threshold 58.9% of the monitored period, and the critical level threshold 7.7% of the period.

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I. INTRODUCTION

Knowledge of the changes to water quality and quantity of our water resources through monitoring guides when, where, and how management activities should be implemented to protect or restore those resources. The Brown's Creek Watershed District (BCWD) utilizes monitoring and the data collected to make such decisions as outlined in its watershed management plan. In 2024 BCWD monitored 22 basins (lakes), four stations on Brown's Creek, a tributary to Brown's Creek, two stations in the Long Lake subwatershed, and one station in the diversion drainage at the Diversion Structure. A summary of monitoring locations and monitored parameters can be found in Table 1 and Figure 1.

The Washington Conservation District (WCD) also conducted special project and maintenance monitoring at several locations including the Iron Enhanced Sand Filter (IESF) on Morgan Avenue, Brown's Creek Rock Crib, Countryside Auto sediment chamber, McKusick Road sediment chambers, the Oak Glen Golf Course Irrigation Reuse project, and bathymetry data on Stillwater stormwater ponds. Comparable levels of data collection versus baseline sites occurred at each project, such as collection of continuous stage, discharge, and temperature, and measurement of sediment depths in complex monitoring situations. As this summary focuses on baseline monitoring data, special project monitoring will not specifically be discussed, although the locations of several projects are described. Individual monitoring summaries for each project will be prepared and made available in separate reports.

Table 1. Monitoring Site Location, Description, and Parameter(s) Monitored

Site Description	Map Site ID#	Site Name	General Site Location	Monitored Parameters
Stream Monitoring	**1**	Brown's Creek at Hwy 15	Hwy 15	Continuous Water Quality and Discharge; Water Quality Composite/Grab Samples
Stream Monitoring	**2**	Brown's Creek at McKusick Road	McKusick Road	Continuous Water Quality and Discharge; Water Quality Composite/Grab Samples
Stream Monitoring	**3**	Brown's Creek at Stonebridge Trail	Stonebridge Trail	Continuous Water Quality and Discharge; Water Quality Composite/Grab Samples
Stream Monitoring	**4**	Brown's Creek Outlet	Hwy 95 & 96	Continuous Water Quality and Discharge; Water Quality Composite/Grab Samples
Stream Monitoring	**5**	Brown's Creek Diversion	Neal Ave.	Discharge, Temperature, and Water Quality Composite/Grab Samples
Stream Monitoring	**6**	Tributary to Long Lake at 62nd St.	62nd St.	Stage
Stream Monitoring	**7**	Tributary to Long Lake at Marketplace Pond	Market Dr.	Discharge and Water Quality Composite/Grab Samples
BMP Effectiveness	**8**	Iron Enhanced Sand Filter (IESF)-1 Outlet	Morgan Ave. N.	Discharge and Water Quality Composite/Grab Samples
Stream Monitoring	**9**	McKusick Wetland Outlet	McKusick Road	Discharge, Temperature, and Water Quality Grab Samples
BMP Effectiveness	**10**	Brown's Creek Park Rock Crib (5 In-Crib Temperature Loggers and Outlet Discharge)	Neal Ave.	Discharge, Temperature, Sediment Depth and Maintenance Requirements
BMP Maintenance	**11**	McKusick Road and Countryside Auto Sediment Chambers	McKusick Road	Sediment Depth and Maintenance Requirements
BMP Effectiveness	**12**	Oak Glen Pond Water Reuse	McKusick Road	Stage
			DNR ID	
Lake Monitoring	**13**	Kismet Basin	82-033400	Water Quality Samples, Elevation
Lake Monitoring	**14**	Long Lake (North Basin)	82-002100	Water Quality Samples, Elevation
Lake Monitoring	**15**	Goggins Lake	82-007700	Water Quality Samples, Elevation
Lake Monitoring	**16**	South School Section Lake	82-015100	Water Quality Samples, Elevation
Lake Monitoring	**17**	Benz Lake	82-012000	Water Quality Samples, Elevation
Lake Monitoring	**18**	Masterman Lake	82-012600	Water Quality Samples, Elevation
Lake Monitoring	**19**	Woodpile Lake	82-013200	Water Quality Samples, Elevation
Lake Monitoring	**20**	Lynch Lake (North Basin)	82-004200	Water Quality Samples, Elevation
Lake Monitoring	**21**	Lynch Lake (South Basin)	82-004202	Water Quality Samples, Elevation
Lake Monitoring	**22**	Bass Lake (West)	82-012300	Water Quality Samples, Elevation
Lake Monitoring	**23**	Bass Lake (East)	82-012400	Water Quality Samples, Elevation
Lake Monitoring	**24**	July Avenue Pond	82-031800	Water Quality Samples, Elevation
Lake Monitoring	**25**	Pat Lake	82-012500	Water Quality Samples, Elevation
Lake Monitoring	**26**	Plaisted Lake	82-014800	Water Quality Samples, Elevation
Lake Monitoring	**27**	Jackson Wildlife Management Area Pond (Sinnits Pond)	82-030500	Water Quality Samples, Elevation
Lake Monitoring	**28**	Brewer's Pond	82-002200	Water Quality Samples, Elevation
Lake Monitoring	**29**	Heifort's Pond	82-048500	Water Quality Samples, Elevation
Lake Monitoring	**30**	North School Section	82-014900	Water Quality Samples, Elevation
Lake Monitoring	**31**	Highway 12 & Kimbro Pond	82-034900	Elevation
Lake Monitoring	**32**	Brown's Creek at Gateway Trail	82-030300	Elevation
Lake Monitoring	**33**	55th St. Pond	82-031600	Elevation
Lake Monitoring	**34**	Vanzwol Pond	82-012800	Elevation
Lake Monitoring	**35**	Marketplace Pond	N/A	Bathymetry
Lake Monitoring	**36**	62nd St. Pond	N/A	Bathymetry
Lake Monitoring	**37**	Wildwood Pines Pond	N/A	Bathymetry
Lake Monitoring	**38**	Washington Ave Pond	N/A	Bathymetry
Lake Monitoring	**39**	Clinic Pond 2	N/A	Bathymetry
Lake Monitoring	**40**	Tower Dr. Pond	N/A	Bathymetry

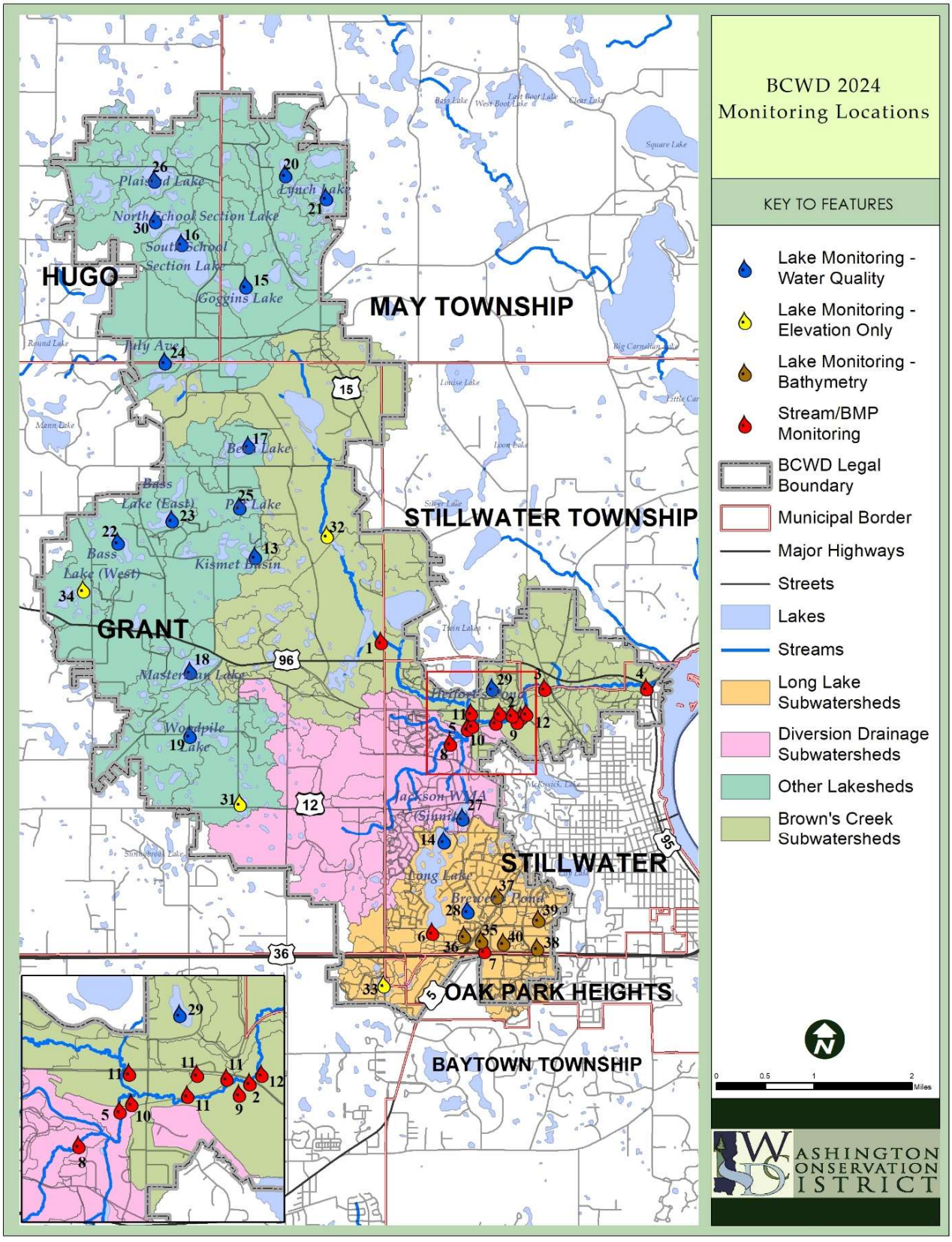

Figure 1. Brown's Creek Watershed District 2024 Sampling Locations

II. PURPOSE AND GOALS

BCWD uses a monitoring network to assess the quality of its water resources and maintains partnerships with the Minnesota Department of Natural Resources (MN DNR), Metropolitan Council, Washington Conservation District (WCD), Stillwater Area High School, and volunteers to collect and manage data. The general purpose of the baseline water monitoring program is to collect long term data to identify issues within the watershed and track changes towards meeting water quality goals described in the 2017-2026 Watershed Management Plan and the Brown's Creek TMDL Implementation Plan. The goals specific to this monitoring summary include the collection of useful data about the water resources of the District, production of an annual assessment of monitoring data, and the use of that data to determine the performance of District programs and regulations. Additional policies, goals, and implementation strategies related to monitoring data are more fully described in the watershed management plan.

III. LAKE MONITORING

III.A. Locations and Parameters

In 2024 water quality data were collected by the WCD on eighteen basins (lakes) (Table 1 and Figure 1). Each lake was sampled for total phosphorus (TP), total Kjeldahl nitrogen (TKN), chlorophyll-α, and Secchi disk transparency. A complete listing of nutrient and Secchi data by lake is available in Appendix A. One-meter increment temperature and dissolved oxygen profiles as well as a user perception ranking (physical and recreational suitability) were also recorded. These data are available via request or on the Metropolitan Council's Environmental Information Management System (EIMS) Water Quality Database website (https://eims.metc.state.mn.us).

III.B. Methods

Each basin was sampled April through October using a two-meter (6.56 feet) integrated surface water column sampler from a watercraft, except for Brewer's Pond and Heifort's Pond, which were sampled from the surface only using a bucket to match citizen volunteer protocols. Bass Lake East, Bass Lake West, Benz Lake, Goggins Lake, Jackson WMA (Sinnits) Pond, Kismet Basin, Long Lake, Lynch Lake South, Masterman Lake, Plaisted Lake, South School Section Lake, and Woodpile Lake were monitored bi-weekly, while Brewer's Pond, Heifort's Pond, July Avenue Wetland, Lynch Lake North, North School Section Lake, and Pat Lake were monitored every four weeks. Volunteers monitored Brewer's Pond and Heifort's Pond on an offset schedule with WCD so that samples were collected every other week. Chlorophyll-α samples were obtained by filtering water from the integrated sample through a 1.5 µm fiberglass filter using a hand pump. Samples collected for TP, TKN, and chlorophyll-α were analyzed by the Metropolitan Council Environmental Services Lab. The sampling methods above were developed by and consistent with Metropolitan Council's Citizen Assisted Monitoring Program (CAMP). Measurements obtained during the sampling season were averaged to allow comparison of individual lake dynamics from year to year. Trend analysis for long term Secchi

disk transparency, TP, and chlorophyll-α (corrected for pheophytin) trends were completed using a Kendall's Tau statistical test, presented in Appendix A, and only data collected by professional agencies were used to assess for trends. All other data were quality assured, quality controlled, and reviewed by WCD staff. Detailed standard operating procedures used by WCD for water sampling, monitoring, and data management are available on the WCD website (https://www.mnwcd.org/water-monitoring).

III.C. Results and Discussion

III.C.1. Lake Grades

The lake water quality grading system was developed following the 1989 sampling season by Metropolitan Council. This grading system ranks water quality characteristics by comparing summer averages to those of other lakes specific to the metro area. The grading curve represents percentile ranges for the May through September averages of total phosphorus concentration, uncorrected trichromatic chlorophyll-α concentration, and Secchi disk transparency for 119 lakes sampled from 1980 to 1988, and the ranges were re-confirmed in 2000 using more recent data. Percentile ranges for each parameter can be found in Table 2. A benefit of the lake grade system is that it was developed specifically for lakes in the metro area, and serves as a convenient way to compare water quality between lakes. Current grades for each lake can be found in Figure 2, and the latest ten years of grades for each lake can be found in Appendix A. In addition, comparison of June through September water quality averages (total phosphorus concentration, pheophytin-corrected chlorophyll-α, and Secchi disk transparency) will be made to state eutrophication standards for each lake as the Minnesota Pollution Control Agency (MPCA) uses this timeframe to assess impairment status. Beginning in 2019 volunteer data collected through the CAMP program on Brewer's Pond and Heifort's Pond were incorporated into lake grade and summer averages. June through September averages and impairment thresholds can be found in Table 3.

Table 2. Lake Grade Ranges

Grade	Percentile	TP (µg/L)	Chl-α (µg/L)	Secchi (m)
A	<10	<23	<10	>3.0
B	10 - 30	23-32	10-20	2.2-3.0
C	30-70	32-68	20-48	1.2-2.2
D	70-90	68-152	48-77	0.7-1.2
F	>90	>152	>77	<0.7

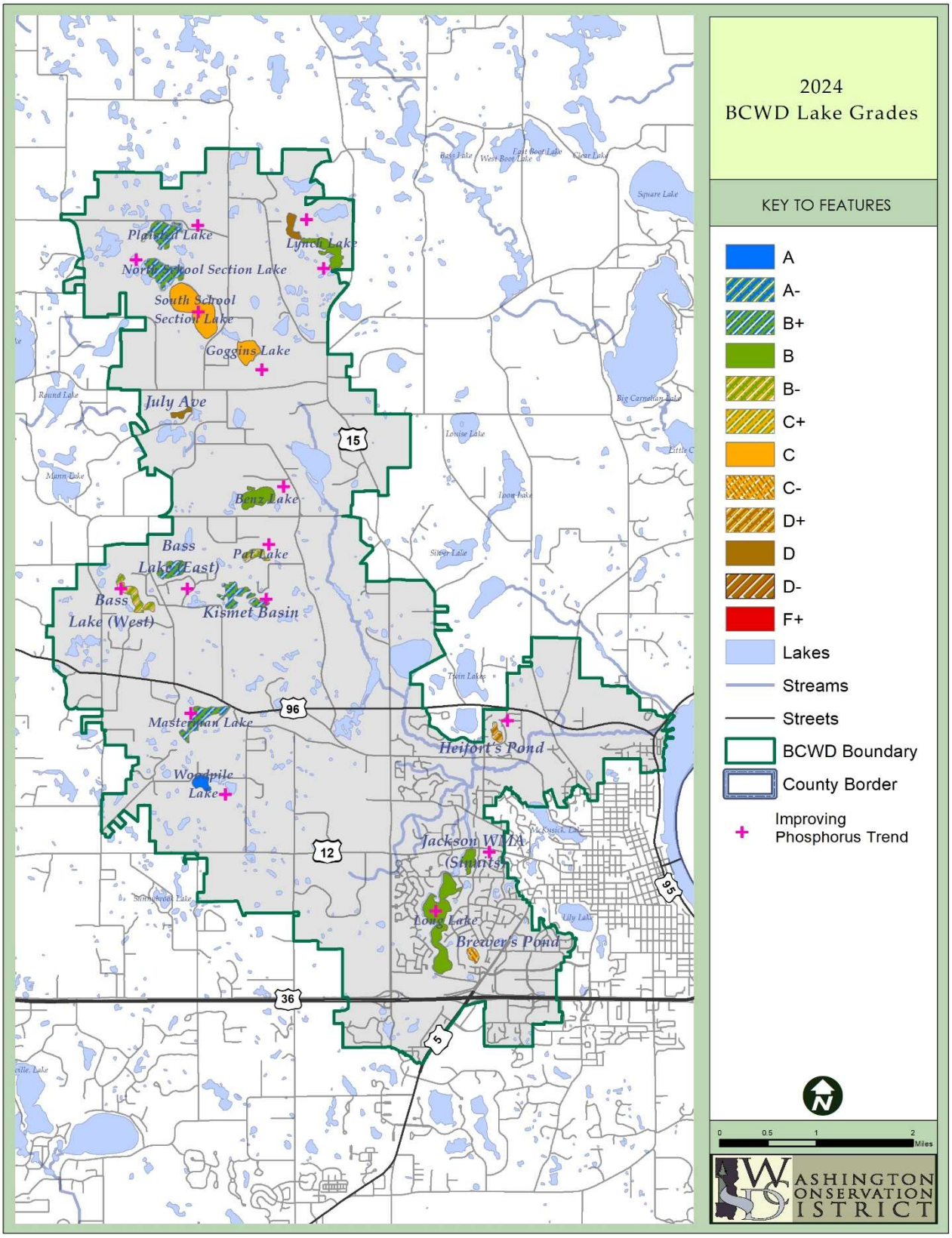

Figure 2. Brown's Creek Watershed District 2024 Lake Grades

Table 3. Impairment Thresholds and June Through September Average 2024 Parameters

Lake	Total Phosphorus (mg/L)	Pheophytin Corrected Chlorophyll-α (µg/L)	Secchi (meters)	Total Kjeldahl Nitrogen (mg/L)
Impairment Threshold- Shallow	*0.060*	*20.0*	*1.00*	*N/A*
Impairment Threshold- Deep	*0.040*	*14.0*	*1.40*	*N/A*
Eco-Region Value	*0.023-0.050*	*5.0-22.0*	*1.5-3.2*	*0.60-1.20*
Bass East	0.032	5.3	2.19	0.97
Bass West	0.031	1.9	1.87	0.91
Benz	0.024	5.1	1.39	0.77
Brewer's	0.042	35.3	0.80	1.69
Goggins	0.049	19.6	1.43	1.12
Heifort's	0.052	43.0	0.64	1.77
Jackson WMA	0.025	2.2	1.44	0.56
July Ave	0.096	73.0	0.50	2.21
Kismet	0.022	7.8	1.32	0.74
Long	0.032	4.9	2.45	0.93
Lynch North	0.120	46.8	0.55	1.81
Lynch South	0.029	7.2	0.85	0.85
Masterman	0.022	3.7	1.32	0.76
North School Section	0.024	7.7	2.44	0.66
Pat	0.047	8.6	1.83	0.70
Plaisted	0.023	3.6	2.19	0.66
South School Section*	0.041	36.7	1.45	1.24
Woodpile*	0.019	4.6	3.27	0.84

Exceeds impairment threshold

*Indicates deep lake. All others are classified as shallow.

Lake grades held stable for most lakes in the District when compared to 2024. Six lakes experienced an improvement in lake grade; Benz Lake, Heifort's Pond, Kismet Basin, Lynch Lake South, Masterman Lake, and Woodpile Lake. Bass Lake East, Brewer's Pond, Jackson WMA (Sinnits) Pond, Lynch Lake North, North School Section Lake, Pat Lake, and Plaisted Lake maintained their grade from the year prior, and all other lakes declined in lake grade. 2024 had warm temperatures and the drought conditions of the previous years ended. 2024 did have an increased period of open water from early spring ice out, which can encourage algal growth, as seen in 2021.

The most notable shift in lake grade occurred on Long Lake with continued improvements in water quality from an F+ grade in 2016, to a B grade in 2024. This appears to be the result of lower chlorophyll-α concentrations and higher water clarity, which may be the product of a robust community of aquatic vegetation. South School Section Lake also continues to respond positively to treatments to remove curly-leaf pondweed. The lake was treated in 2017 and May of 2021, and has improved from a D+ grade in 2018 to a B grade in 2021-2022, but has since been declining receiving a B- in 2023, and a C in 2024, which is the historic average. The decline to a D+ grade in 2018 after the initial treatment was likely the result of a release in nutrients stored in the curly-leaf pondweed, before the remaining vegetative community recovered. Curly-leaf pondweed was also found in a small area of Goggins Lake near the connection between Goggins Lake and South School Section Lake. Goggins Lake was also

treated for curly-leaf pondweed in 2021. In 2024 Goggins received a C, a slight improvement from the historic average of a C-.

III.C.2. Total Phosphorus

Phosphorus is a major nutrient involved in eutrophication and is generally associated with the growth of aquatic plants and algal blooms. Common sources of phosphorus include runoff from agricultural fields, livestock areas, urban areas, lakeshore lawns and improperly operating septic systems. In most lakes in this region, phosphorus is the least available nutrient; therefore, its abundance or scarcity controls the extent of algal growth. Algal growth in turn affects the clarity of the water and light penetration, and can control the extent of aquatic vegetation by shading out plants. The phosphorus flow path through the watershed can be found in Appendix C.

The state impairment threshold for total phosphorus (TP) is 0.060 mg/L in shallow lakes (generally greater than 50 acres and less than 15 feet deep, or more than 80% littoral area) and 0.040 mg/L in deeper lakes. In 2024 July Avenue Wetland, Lynch Lake North, and South School Section Lake summer average TP concentrations exceeded impairment standards (Table 3).

Trend analyses were completed on lakes where eight or more years, with at least six years occurring in the last ten years, of TP measurements had been collected to determine if lakes are improving, declining, or stable in terms of average summer TP. A two-tailed Kendall's Tau statistical test was completed using a p-value of <0.05 to determine statistical significance of the trend. Bass Lake East, Bass Lake West, Benz Lake, Goggins Lake, Heifort's Pond, Jackson WMA (Sinnits) Pond, Kismet Basin, Long Lake, Lynch Lake North, Lynch Lake South, Masterman Lake, North School Section Lake, Pat Lake, Plaisted Lake, South School Section Lake, and Woodpile Lake have improving trends for TP, meaning the average summer TP concentration is decreasing (Figure 2 and Appendix A). No statistically significant trend exists on July Avenue Wetland or Brewer's Pond. South School Section Lake shifted from no trend in recent years to an improving TP trend starting in 2022. The Brown's Creek and Long Lake 2020 Trend Analysis completed by the District's engineer, Emmons & Oliver Resources, Inc. (EOR) also show an improving short term trend from 2011-2020, and a statistically significant improving trend over the long term, from 1995-2020, on Long Lake.

III.C.3. Chlorophyll-α

Chlorophyll-α is a photosynthetic compound found in algae and aquatic plants, and is a direct indicator of algal productivity. Lakes with high chlorophyll-α concentrations are often eutrophic or hypereutrophic. These lakes tend to have excessive algal growth, shading out rooted plants. Lakes with low chlorophyll-α concentrations can be mesotrophic or even oligotrophic, and tend to have more rooted plants to take up phosphorus, rather than phosphorus being used by algae within the water column which produces more chlorophyll-α.

The impairment threshold for chlorophyll-α is 20 µg/L in shallow lakes and 14 µg/L in deeper lakes. Brewer's Pond, Heifort's Pond, July Avenue Wetland, Lynch Lake North, and South School Section Lake summer average concentrations exceeded the impairment threshold (Table 3).

Trend analyses were completed on lakes where eight or more years, with at least six years occurring in the last ten years, of chlorophyll-α measurements had been collected to determine if lakes are improving, declining, or stable in terms of algal productivity. A two-tailed Kendall's Tau statistical test was completed using a p-value of <0.05 to determine statistical significance of the trend. Bass Lake East, Benz Lake, Goggins Lake, Heifort's Pond, Jackson WMA (Sinnits) Pond, Kismet Basin, Long Lake, Lynch Lake North, Lynch Lake South, Masterman Lake, North School Section Lake, Pat Lake, Plaisted Lake, and Woodpile Lake show statistically significant long term trends for improving chlorophyll-α concentrations, meaning less algae is being produced (Appendix A). No statistically significant trends were present on Bass Lake West, Brewer's Pond, July Avenue Wetland, or South School Section Lake. No lakes showed an increasing trend for chlorophyll-α concentration. EOR's trend analysis also shows a short term improving trend and a statistically significant long term improving trend on Long Lake.

III.C.4. Transparency

The measurement of depth of light penetration using a Secchi disk provides a simple measure of water transparency, or clarity. It can also serve as a proxy for turbidity in the water, as well as an indication of the trophic state of the lake. A reduction in water transparency is usually the result of turbidity composed of suspended sediments, organic matter and/or phytoplankton (algae). Several lakes in the district, such as Benz Lake and Masterman Lake, are clearer than they are deep, meaning an accurate measure of transparency cannot be achieved because the disk rests on the lake bottom or is obscured by vegetation instead of reaching a depth where it is no longer visible. This can give the false appearance of low water clarity when considering average transparency, when in reality the true Secchi depth is much higher. Lakes which experience this phenomenon are noted in the summary points sections of Appendix A.

The impairment threshold for Secchi disk transparency is 1.00 meter in shallow lakes and 1.40 meters in deep lakes. Brewer's Pond, Heifort's Pond, July Avenue Wetland, Lynch Lake North, and Lynch Lake South summer average transparencies were poorer than the state standard (Table 3).

Trend analyses were completed on lakes where eight or more years, with at least six years occurring in the last ten years, of Secchi disk measurements had been collected to determine if lakes are improving, declining, or stable in terms of average summer clarity. A two-tailed Kendall's Tau statistical test was completed using a p-value of <0.05 to determine statistical significance of the trend. Goggins Lake, Long Lake, Lynch Lake North, Lynch Lake South,

North School Section Lake, and Woodpile Lake show statistically significant long term trends for improving water clarity (Appendix A). No significant trends have been observed on Brewer's Pond, Heifort's Pond, Pat Lake or South School Section Lake. Bass Lake East, Bass Lake West, Benz Lake, Jackson WMA (Sinnits) Pond, Kismet Basin, Masterman Lake, and Plaisted Lake are too shallow to determine an accurate trend, since the lakes are often clearer than they are deep. July Avenue Wetland is the only lake exhibiting a declining trend for clarity. EOR's trend analysis shows an improving short term trend and a statistically significant long term improving trend on Long Lake.

III.C.5. Total Kjeldahl Nitrogen

Total Kjeldahl nitrogen (TKN) measures the sum of ammonia and organic nitrogen present in the water column. An abundance of this nutrient can lead to excess plant growth and increase the rate of eutrophication, especially if it is the limiting nutrient in a lake. Sources of TKN are similar to those of TP. Although eutrophication standards do not exist at this time for TKN, June through September averages can be compared to the North Central Hardwood Forest ecoregion to assess if lakes may have excessive amounts of nitrogen. The ecoregion range for TKN is 0.60-1.20 mg/L. Brewer's Pond, Heifort's Pond, July Avenue Wetland, Lynch Lake North, and South School Section Lake were poorer than the ecoregion range, while Bass Lake East, Bass Lake West, Benz Lake, Goggins Lake, Kismet Basin, Long Lake, Lynch Lake South, Masterman Lake, North School Section Lake, Pat Lake, Plaisted Lake, and Woodpile Lake were within the ecoregion range (Table 3). Jackson WMA (Sinnits) Pond was better than the ecoregion range.

III.C.6. Temperature and Dissolved Oxygen

In addition to surface water measurements, temperature and dissolved oxygen data were recorded during each sampling event. Temperature and dissolved oxygen were recorded at one-meter increments from the surface to the lake bottom. The data collected from these profiles are housed by WCD and are available upon request, or are available via the MPCA website (https://webapp.pca.state.mn.us/wqd/surface-water).

These data show the extent of summer stratification and are useful in identifying the thermocline (the layer of water in which the temperature rapidly declines), if one exists. As a lake stratifies, the water column becomes more stable and mixing is less likely to occur. If mixing occurs during the growing season, benthic nutrients become available and can result in increased algal production. As a rule of thumb, shallow lakes are constantly mixed by wind, wave action, and precipitation, while lakes deeper than 20 feet often stratify. Shallow lakes can loosely stratify if they are protected from wind, during calm weather periods, or if enough algae and aquatic plants exist near the surface to block out solar radiation near the bottom.

In 2024 Bass Lake East, Bass Lake West, Brewer's Pond, Goggins Lake, Long Lake, Lynch Lake South, Pat Lake, and Woodpile Lake stratified to some degree during the monitoring

season. These lakes may have benefited from reduced internal loading due to the lack of mixing of nutrient-rich waters near the lake bottom. Details on the depth of the thermocline for each lake that stratified can be found in Appendix A. The other ten lakes in the district did not significantly stratify in 2024, meaning nutrients from internal loading were available for algal growth during the entire growing season.

III.C.7. Elevations

Lake elevations rose throughout early and mid-monitoring season due to precipitation events which contrasted the previous years' drought conditions. Peak elevation for the year on every lake occurred in August, rising after several storm events. In 2020, twelve basins maintained elevations above their regulated Ordinary High Water (OHW) level. In contrast, only four basins were above their OHW during 2024; Heifort's Pond, North School Section Lake, Plaisted Lake, and South School Section Lake. Elevation charts for each lake monitored can be found in Appendix A or using the MN DNR's Lake Finder (http://www.dnr.state.mn.us/lakefind/index.html).

IV. STREAM AND STORMWATER MONITORING

IV.A. Locations and Parameters

In 2024, BCWD monitored four stations on Brown's Creek, two stations in the Long Lake subwatershed, one station at the Diversion Structure in the diversion drainage, and one tributary to Brown's Creek (Table 1 and Figure 1). The stations on Brown's Creek were located at Manning Avenue (Highway 15), McKusick Road, Stonebridge Trail (Stonebridge), and the intersection of Minnesota State Highways 95 & 96 (the Outlet). The two tributaries to Long Lake were monitored at 62nd Street and the Marketplace Pond. The tributary to Brown's Creek (McKusick Wetland Outlet) was monitored approximately 100 feet upstream of the McKusick Road station.

The four stations on Brown's Creek were monitored for continuous (15 minute) stage and discharge, total phosphorus (TP), dissolved phosphorus, total Kjeldahl nitrogen (TKN), total suspended solids (TSS), volatile suspended solids (VSS), copper, nickel, lead, zinc, cadmium, chromium, chloride, calcium, magnesium, nitrate, nitrite, ammonia, hardness, and *Escherichia coli* (*E.coli*). These sites were also monitored for continuous temperature, dissolved oxygen, specific conductivity, and turbidity, and continuous pH at Stonebridge and the Outlet. The Outlet was additionally sampled for sulfate, alkalinity, and ortho-phosphorus. The Tributary to Long Lake at Marketplace Pond was monitored for continuous stage and discharge, TP, dissolved phosphorus, TKN, TSS, VSS, copper, nickel, lead, zinc, cadmium, chromium, chloride, calcium, magnesium, nitrate, nitrite, ammonia, and hardness. The Tributary to Long Lake at 62nd Street was monitored for continuous stage only. The station at the Diversion Structure was monitored for continuous stage, discharge, and temperature, and TP, dissolved phosphorus, TKN, TSS,

VSS, copper, nickel, lead, zinc, cadmium, chromium, chloride, calcium, magnesium, nitrate, nitrite, ammonia, and hardness. An additional level logger was placed at the base of the diversion structure weir to determine if water overtopped it and was discharged directly to Brown's Creek. A tributary to Brown's Creek, McKusick Wetland Outlet, was monitored for continuous stage, discharge, and temperature, and TP, dissolved phosphorus, TKN, TSS, VSS, copper, nickel, lead, zinc, cadmium, chromium, chloride, calcium, magnesium, nitrate, nitrite, ammonia, and hardness. Continuous precipitation was monitored at Highway 15 and the tributary to Long Lake at Marketplace Pond.

IV.B. Methods

The Highway 15, McKusick Road, Stonebridge, Outlet, Marketplace Pond, and Diversion Structure monitoring stations utilized automated water quality samplers consisting of a stage/velocity sensor, data logger, bottle carousel containing 24 sample bottles, strainer, intake tubing, solar panel, deep cycle marine battery, and steel enclosure. Discharge was calculated using a rating curve based on permanent staff gauges at Highway 15, McKusick Road, Stonebridge, and the Outlet, while discharge at Marketplace Pond and the Diversion Structure was calculated using an area-velocity relationship. Continuous precipitation data were collected at Highway 15 and Marketplace Pond using tipping bucket rain gauges to assist in loading calculations, but are not discussed in this summary. The samplers were programmed to collect automated flow weighted storm composite samples triggered by a rise in stage. Manual grab samples were taken during storm conditions if it was determined the automated sampler had malfunctioned or had not yet been installed. Monthly manual grab samples during base flow conditions were attempted at these sites, although the Tributary to Long Lake at Marketplace Pond is often dry or stagnant during non-event periods. *E.coli* samples were collected at the time as the base grab samples when possible. Continuous temperature, dissolved oxygen, specific conductivity, and turbidity at the four stations on Brown's Creek were collected using long term deployed sondes, and secondary temperature loggers were deployed to fill data gaps created by malfunctions of the primary sonde. Sondes were also used to collect continuous pH at McKusick Road, Stonebridge and the Outlet. Stand-alone temperature loggers were used to collect temperature data at the Diversion Structure and McKusick Wetland Outlet.

It must be noted the sampling strategy at the Outlet, at the direction of Metropolitan Council Environmental Services's (MCES) Watershed Outlet Monitoring Program (WOMP), was changed to a manual grab sample on the same day every other week regardless of flow conditions, and the composite sampler was to be programmed to capture only major events. MCES installed a new data logger and refrigerated sampler in 2019, and four storm composite samples were collected in 2024. Some analytes such as metals, sulfate, ortho phosphorus, alkalinity, and hardness were changed to be analyzed quarterly. The goal of this strategy is to create a more robust dataset that is better suited for long term statistical trend analysis and impairment assessment. However, the change in sampling methods causes an apparent shift to

lower nutrient loading totals due to differences in load calculation methods, as well as the timing of samples with respect to precipitation events. A limitation of grab sampling is the sample occurs at a discrete point in time and often misses the peak load which is most likely to occur on the rising limb or at the peak flow of a storm. This can lead to artificially low loading estimates, whereas composite sampling captures multiple samples throughout the storm and can provide more accurate data for loading calculations but is less appropriate for trend analysis due to bias and variation in each storm event.

The Tributary to Long Lake at 62nd Street station was monitored using a stage sensor only, and discharge during the monitoring period was estimated based on stage and discharge data collected in previous years. The McKusick Wetland Outlet station was monitored using a stage/velocity sensor, and discharge was calculated using an area-velocity relationship. Similar to other stations, monthly manual grab samples were collected during base flow conditions, and grab samples were attempted during storm events.

All samples collected were analyzed by the MCES Lab and reviewed by WCD staff. All continuous data were quality assured, quality controlled, and analyzed by WCD staff, with the exception of the Outlet stage, discharge, and loading, which were reviewed and analyzed by MCES. More detailed standard operating procedures used by WCD and MCES for water sampling, monitoring, and data management are available upon request.

IV.C. Results and Discussion

IV.C.1. Brown's Creek

Brown's Creek is classified as a 2A water by the State of Minnesota, meaning it is designated for aquatic life and recreation, and should support a cold water fishery, aquatic life, and their habitats. The creek is listed as impaired by the MPCA due to a lack of cold water fish assemblages and low scores for indices of biological integrity (IBI) as described in the 2010 Brown's Creek Biota TMDL, and two reaches are impaired for *E.coli*. The stressors identified which contribute to these conditions are high total suspended solids (TSS), high temperature, low dissolved oxygen, high copper concentrations, and high nitrate-nitrite concentrations. The lower reaches of the creek where groundwater inputs help to cool the stream do support a trout fishery with some natural reproduction, and is annually stocked by the MN DNR. The following sections will make comparisons between the parameters monitored and state standards for 2A waters as described in the Minnesota Administrative Rules Part 7050.0222, as well as recommendations and goals set forth in the TMDL study. A summary of the standards and goals can be found in Table 4**.**

Table 4. State Standards for 2A and 2B Waters and Brown's Creek Biota TMDL Goals

Parameter	Class 2A Waters	Class 2B Waters	TMDL Goal
Total Phosphorus (TP)	0.100 mg/L	0.100 mg/L	N/A
Total Suspended Solids (TSS)	10 mg/L (Apr 1 to Sept 30)	30 mg/L (Apr 1 to Sept 30)	23 mg/L (10 NTU equivalent)
Chloride (Chronic)	>230 mg/L	>230 mg/L	N/A
Dissolved Oxygen (Daily Minimum)	7 mg/L	5 mg/L	7 mg/L
pH	<6.5 or >8.5	<6.5 or >8.5	N/A
Temperature	N/A	N/A	18.3 ºC (Threat), 23.9 ºC (Critical)

1a. Discharge

Total discharge was nearly the same as the year prior at each station on Brown's Creek. The total amount of water discharged to the St. Croix River as measured at the Outlet was 261,552,581 cubic feet, and was slightly lower than average over the last ten years. Calculated discharge for each site can be seen in Table 9. The Brown's Creek and Long Lake 2020 Trend Analysis completed by EOR shows there is a statistically significant increasing trend in overall streamflow at all stations except the Outlet, after construction of the Diversion Structure. Base flow also shows a statistically significant increasing trend at all sites except the Outlet. Increased base flow is considered beneficial for cooling the stream and maintaining dissolved oxygen concentrations.

According to the National Weather Service (NWS) station in Stillwater the total precipitation for 2024 was 39.67 inches; 5.75 inches above the thirty year average. Precipitation was well above average in May, June, and August, with a combined departure of +8.27 inches during these months. This was followed by an extremely dry late summer and fall, with a combined departure in September and October of -3.44 inches. The most significant precipitation event occurred August 5, where storm total of 2.60 inches of precipitation was recorded.

1b. Phosphorus & Sediment

The total phosphorus (TP) and total suspended solids (TSS) loads increased at all sites when compared to 2023 (Table 9, Figure 3, and
Figure 4). The TP load discharged to the St. Croix River at the Outlet was 2,563 pounds, which equates to 0.554 pounds per acre of watershed land. For reference, the load at the Outlet was at the median value since calculations began in 2000. The state standard for TP is 0.100 mg/L; manual grab samples exceeded the standard for sites from May into September due to the wet conditions. Nutrient water chemistry results for each site and sample can be found in Table 5-Table 8. TP flow weighted mean concentrations show a significant decreasing trend over the most recent ten year period at Stonebridge and the Outlet according to EOR's trend analysis. There are no significant long term trends, although the overall pattern for TP concentrations appears to be improving in the lower

reaches of the creek. Short term trends show statistically significant improving conditions at Stonebridge and the Outlet.

The TSS load exported to the St. Croix River was 507,151 pounds, or 109.68 pounds per acre of watershed land. For reference, the TMDL goal for the creek is 74 pounds per acre. This is a departure from conditions observed during the droughts from 2021-2023, when the creek did meet the TMDL goal. It is important to note that in-stream construction activities as part of the streambank and floodplain restoration project on Neal Avenue contributed to high TSS concentrations, and the impact to the creek is temporary and the long term benefits of the project are expected to outweigh these impacts. While the state standard for TSS is 10 mg/L from April 1 to September 30, the target concentration identified in the TMDL is 23 mg/L. The target concentration specific to Brown's Creek of 23 mg/L correlates to the former state standard for turbidity of 10 NTU, but has since been replaced by the river eutrophication standards which use TSS concentration to assess impairment status. The state TSS standard was exceeded at the Outlet for May through August. The TMDL goal of 23 mg/L was met at all sites under base flow conditions, and the annual flow weighted mean concentration (annual load divided by annual discharge) at the Outlet was 31.1 mg/L. Site and sample specific results can be found in Table 5-Table 8. No statistically significant long term trends in TSS exist at any station according to EOR's trend analysis. However, the most recent ten year period does show significant trends for decreasing flow weighted mean concentrations for TSS at McKusick Road, Stonebridge, and the Outlet.

A summary of site specific total loads and loading per acre of watershed area can be found in Table 9 and detailed loading tables describing hourly intervals for the year can be found in Appendix B. Discrete measurements of dissolved oxygen, temperature, pH, specific conductivity, and transparency can also be found in Appendix B. TP concentrations and loads moving on flow paths through the watershed can be seen in Appendix C.

Table 5. Brown's Creek at Highway 15 2024 Chemistry Results

Sample Type	Start	End	TSS (mg/L)	VSS (mg/L)	TKN (mg/L)	TP (mg/L)	Dissolved P (mg/L)	*E. coli* (mpn/100 mL)	Copper (mg/L)	Nickel (mg/L)	Lead (mg/L)	Zinc (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Chloride (mg/L)	Nitrite N (mg/L)	Nitrate N (mg/L)	Ammonia Nitrogen (mg/L)	Hardness (mg/L _CaCO3)
Storm Composite	4/16/2024 22:53	4/17/2024 13:11	39	23	1.37	0.236	0.071								12.1	<0.06	0.24	<0.06	
Storm Composite	4/29/2024 4:55	4/30/2024 2:06	12	7	0.76	0.068	<0.050		<0.00100	<0.00050	<0.00050	<0.00500	<0.00010	<0.00250	14.8	<0.06	<0.20	<0.06	137
Storm Composite	5/21/2024 19:32	5/22/2024 19:17	83	49	2.87	0.279	0.062		0.00180	0.00140	0.00150	0.00910	<0.00010	<0.00250	10.0	<0.06	<0.20	<0.06	130
Storm Composite	6/4/2024 20:15	6/5/2024 13:06	113	68	3.34	0.339	0.085		0.00290	0.00160	0.00170	0.01140	<0.00010	0.00280	7.9	<0.06	<0.20	<0.06	131
Storm Composite	6/18/2024 21:43	6/20/2024 6:02	78	46	2.30	0.279	0.078								7.9	<0.06	<0.20	<0.06	
Storm Composite	6/28/2024 11:43	6/28/2024 20:09	66	40	1.01	0.310	0.088		0.00140	0.00140	0.00110	0.00640	0.00010	<0.00250	10.7			<0.06	165
Storm Composite	7/22/2024 18:01	7/23/2024 9:03	137	80	2.87	0.449	0.085		0.00200	0.00140	0.00210	0.01150	<0.00010	0.00270	11.0	<0.06	0.34	<0.06	157
Storm Grab	8/6/2024 13:14	8/6/2024 13:14	29	18	1.40	0.196	0.086		<0.00100	0.00090	0.00053	<0.00500	<0.00010	<0.00250	9.3	<0.06	<0.20	<0.06	129
Base Grab	5/20/2024 14:10	5/20/2024 14:10	10	7	0.74	0.109	0.047	427							14.7	<0.06	0.24	<0.06	
Base Grab	6/26/2024 14:01	6/26/2024 14:01	8	6	1.77	0.218	0.148	138							15.9	<0.06	<0.20	<0.06	
Base Grab	7/25/2024 13:20	7/25/2024 13:20	5	3	0.62	0.120	0.074	278							11.6	<0.06	0.25	<0.06	
Base Grab	8/29/2024 8:25	8/29/2024 8:25						365											
Base Grab	9/3/2024 9:37	9/3/2024 9:37	4	3	0.58	0.080	0.074								15.2	<0.06	0.25	<0.06	
Base Grab	9/24/2024 9:07	9/24/2024 9:07	5	3	0.44	0.067	0.029	172							15.1	<0.06	0.36	<0.06	
Base Grab	10/21/2024 14:14	10/21/2024 14:14	5	3	0.42	0.057	0.027	84							15.2	<0.06	0.30	<0.06	

Exceeds Water Quality Standard
No Exceedance Determinable
Exceeds Chronic Standard
Exceeds Max Standard
Exceeds Final Acute Standard

Table 6. Brown's Creek at McKusick Road 2024 Chemistry Results

Sample Type	Start	End	TSS (mg/L)	VSS (mg/L)	TKN (mg/L)	TP (mg/L)	Dissolved P (mg/L)	*E. coli* (mpn/100 mL)	Copper (mg/L)	Nickel (mg/L)	Lead (mg/L)	Zinc (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Chloride (mg/L)	Nitrite N (mg/L)	Nitrate N (mg/L)	Ammonia Nitrogen (mg/L)	Hardness (mg/L _CaCO3)
Storm Composite	4/29/2024 4:09	4/29/2024 19:20	26	11	0.93	0.107	<0.050		0.00110	0.00086	<0.00050	<0.00500	<0.00010	<0.00250	21.2	<0.06	<0.20	<0.06	150
Storm Composite	5/21/2024 17:25	5/22/2024 17:06	188	56	2.64	0.427	0.085		0.00310	0.00270	0.00220	0.01190	0.00012	0.00390	15.3	<0.06	<0.20	<0.06	126
Storm Composite	6/4/2024 19:25	6/4/2024 23:25	456	141	4.43	0.726	0.091		0.00690	0.00500	0.00540	0.03510	0.00015	0.00700	15.5	<0.06	0.22	<0.06	138
Storm Composite	6/18/2024 21:52	6/19/2024 22:37	69	27	1.83	0.299	0.120								18.2	<0.06	<0.20	<0.06	
Storm Composite	7/22/2024 18:20	7/23/2024 1:17	387	141	5.50	0.762	0.076		0.00900	0.00710	0.00620	0.03090	0.00020	0.01070	19.0	<0.06	0.40	<0.06	167
Storm Composite	8/5/2024 12:10	8/6/2024 0:23	1,670	183	5.51	0.742	0.094		0.00880	0.00750	0.00580	0.03060	0.00023	0.01130	17.9	<0.06	0.26	<0.06	156
Base Grab	5/20/2024 14:39	5/20/2024 14:39	8	4	0.58	0.087	0.042	345							24.2	<0.06	0.31	<0.06	
Base Grab	6/26/2024 14:33	6/26/2024 14:33	15	8	1.13	0.222	0.154	291							22.5	<0.06	0.25	<0.06	
Base Grab	7/25/2024 13:33	7/25/2024 13:33	9	5	0.68	0.124	0.080	613							19.5	<0.06	0.32	<0.06	
Base Grab	8/29/2024 8:45	8/29/2024 8:45						1,046											
Base Grab	9/3/2024 10:11	9/3/2024 10:11	7	3	0.60	0.135	0.070								25.3	<0.06	0.27	<0.06	
Base Grab	9/24/2024 9:28	9/24/2024 9:28	5	<3	0.41	0.088	0.051	308							23.7	<0.06	0.41	<0.06	
Base Grab	10/21/2024 14:45	10/21/2024 14:45	<3	<3	0.23	0.063	0.045	83							23.9	<0.06	0.38	<0.06	

Exceeds Water Quality Standard
No Exceedance Determinable
Exceeds Chronic Standard
Exceeds Max Standard
Exceeds Final Acute Standard

Table 7. Brown's Creek at Stonebridge 2024 Chemistry Results

Sample Type	Start	End	TSS (mg/L)	VSS (mg/L)	TKN (mg/L)	TP (mg/L)	Dissolved P (mg/L)	*E. coli* (mpn/100 mL)	Copper (mg/L)	Nickel (mg/L)	Lead (mg/L)	Zinc (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Chloride (mg/L)	Nitrite N (mg/L)	Nitrate N (mg/L)	Ammonia Nitrogen (mg/L)	Hardness (mg/L _CaCO3)
Storm Composite	4/16/2024 18:26	4/17/2024 13:01	125	43	2.27	0.428	0.056								21.0	<0.06	0.31	<0.06	
Storm Composite	4/29/2024 7:18	4/30/2024 5:08	108	34	1.79	0.307	<0.050		0.00290	0.00180	0.00130	0.01270	0.00015	<0.00250	21.8	<0.06	0.28	<0.06	154
Storm Composite	5/21/2024 17:56	5/22/2024 5:29	315	98	3.44	0.582	0.075		0.00560	0.00390	0.00350	0.02420	0.00019	0.00610	14.9	<0.06	<0.20	<0.06	132
Storm Composite	6/4/2024 19:36	6/4/2024 22:04	299	111	5.07	0.732	0.078		0.00690	0.00450	0.00470	0.02630	0.00013	0.00640	11.8	<0.06	0.20	<0.06	124
Storm Composite	6/18/2024 22:04	6/19/2024 4:11	125	45	2.24	0.347	0.100								16.6	<0.06	<0.20	<0.06	
Storm Grab	6/26/2024 14:20	6/26/2024 14:20	107	25	4.31	0.302	0.156	276							22.5	<0.06	0.25	<0.06	
Storm Composite	7/22/2024 19:26	7/22/2024 21:21	424	144	5.96	0.785	0.088		0.00970	0.00730	0.00610	0.03160	0.00170	0.01080	13.4	<0.06	0.45	<0.06	133
Storm Composite	8/5/2024 18:20	8/5/2024 21:38	663	233	8.05	0.854	0.096		0.01190	0.00880	0.00720	0.03650	0.00024	0.01490	15.0	<0.06	0.25	<0.06	140
Base Grab	5/20/2024 15:03	5/20/2024 15:03	7	3	0.59	0.079	0.045	210							25.5	<0.06	0.32	<0.06	
Base Grab	7/25/2024 13:00	7/25/2024 13:00	9	5	0.73	0.128	0.074	461							19.5	<0.06	0.34	<0.06	
Base Grab	8/29/2024 8:55	8/29/2024 8:55						980											
Base Grab	9/3/2024 9:22	9/3/2024 9:22	9	4	0.66	0.128	0.068								26.2	<0.06	0.26	<0.06	
Base Grab	9/24/2024 9:37	9/24/2024 9:37	3	<3	0.39	0.090	0.056	194							23.6	<0.06	0.40	<0.06	
Base Grab	10/21/2024 13:36	10/21/2024 13:36	3	<3	0.22	0.067	0.046	154							27.3	<0.06	0.36	<0.06	

Exceeds Water Quality Standard
No Exceedance Determinable
Exceeds Chronic Standard
Exceeds Max Standard
Exceeds Final Acute Standard

Table 8. Brown's Creek Outlet 2024 Primary Chemistry Results

Sample Type	Start	End	TSS (mg/L)	VSS (mg/L)	TKN (mg/L)	TP (mg/L)	Dissolved P (mg/L)	Sulfate (mg/L)	Ortho P (mg/L as P)	Alkalinity (mg/L_CaCO3)	*E. coli* (mpn/100 mL)
Scheduled Grab	1/4/2024 10:33	1/4/2024 10:33	3	<3	0.24	0.055	<0.050		0.021		84
Scheduled Grab	1/17/2024 11:01	1/17/2024 11:01	6	<3	0.22	<0.050	<0.050		0.018		56
Scheduled Grab	1/31/2024 11:10	1/31/2024 11:10	4	<3	0.23	<0.050	<0.050		0.022		22
Scheduled Grab	2/14/2024 10:46	2/14/2024 10:46	3	<3	0.20	<0.050	<0.050		0.019		26
Scheduled Grab	2/27/2024 9:57	2/27/2024 9:57	3	<3	0.18	<0.050	<0.050		0.017		24
Scheduled Grab	3/13/2024 9:40	3/13/2024 9:40	4	<3	0.24	<0.050	<0.050	8.29	0.016	191	18
Scheduled Grab	3/27/2024 9:51	3/27/2024 9:51	7	<3	0.64	0.062	0.052		0.036		43
Scheduled Grab	4/10/2024 9:37	4/10/2024 9:37	10	3	0.71	0.086	0.053		0.031		19
Scheduled Grab	4/25/2024 9:05	4/25/2024 9:05	<3	<3	0.40	<0.050	<0.050		0.020		13
Scheduled Grab	5/8/2024 8:40	5/8/2024 8:40	6	3	0.68	0.062	0.033		0.019		68
Storm Composite	5/21/2024 17:49	5/22/2024 3:15	228	73	3.58	0.489	0.066				
Scheduled Grab	5/22/2024 12:47	5/22/2024 12:47	93	34	1.63	0.290	0.098		0.072		1,553
Storm Composite	6/4/2024 20:26	6/5/2024 5:01	195	73	3.87	0.620	0.106				
Scheduled Grab	6/5/2024 9:24	6/5/2024 9:24	75	33	2.08	0.319	0.128	1.71	0.100	98	1,986
Storm Composite	6/18/2024 22:40	6/18/2024 23:27	316	107	4.84	0.731	0.097				
Scheduled Grab	6/20/2024 8:29	6/20/2024 8:29	39	16	0.88	0.230	0.127		0.102		231
Scheduled Grab	7/18/2024 8:40	7/18/2024 8:40	14	6	0.47	0.121	0.068		0.057		225
Scheduled Grab	7/31/2024 8:30	7/31/2024 8:30	9	5	0.49	0.112	0.066		0.055		435
Storm Composite	8/5/2024 12:58	8/5/2024 23:14	287	109	5.80	0.585	0.083		0.065		
Scheduled Grab	8/12/2024 8:35	8/12/2024 8:35	<3	<3	0.55	0.092	0.065		0.054		81
Scheduled Grab	8/28/2024 8:51	8/28/2024 8:51	41	14	1.20	0.195	0.089		0.050		1,414
Scheduled Grab	9/10/2024 9:01	9/10/2024 9:01	5	<3	0.32	0.081	0.046	6.74	0.039	208	261
Scheduled Grab	9/25/2024 8:27	9/25/2024 8:27	5	3	0.35	0.076	0.045		0.039		84
Scheduled Grab	10/8/2024 14:51	10/8/2024 14:51	<3	<3	0.26	0.060	0.039		0.033		61
Scheduled Grab	10/22/2024 9:02	10/22/2024 9:02	<3	<3	0.24	0.062	0.042		0.034		41
Scheduled Grab	11/6/2024 13:54	11/6/2024 13:54	4	<3	0.42	0.066	0.037		0.031		56
Scheduled Grab	11/21/2024 10:00	11/21/2024 10:00	9	4	0.59	0.074	0.038		0.031		133
Scheduled Grab	12/4/2024 10:30	12/4/2024 10:30	6	5	0.33	0.057	0.025	8.98	0.027	190	47
Scheduled Grab	12/18/2024 10:00	12/18/2024 10:00	6	<3	0.30	0.052	0.032		0.020		28
Scheduled Grab	12/31/2024 10:00	12/31/2024 10:00	5	<3	0.50	0.070	0.039		0.032		272

Exceeds Water Quality Standard

Table 9. Brown's Creek Historic Loading- Latest Ten Years

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Brown's Creek at Highway 15										
Discharge (cf)	97,159,132	152,081,358	135,660,983	129,764,024	201,962,562	148,727,410	117,049,943	98,760,517	94,107,164	100,591,203
Total pounds of Phosphorus exported	1,450	1,736	831	1,182	1,406	1,072	690	567	659	838
TP (lbs/ac/yr)	0.410	0.492	0.235	0.335	0.398	0.303	0.195	0.161	0.187	0.237
Total pounds of TSS exported	211,364	239,237	105,900	132,765	136,203	128,722	46,409	59,093	52,665	91,374
TSS (lbs/ac/yr)	59.84	67.73	29.98	37.59	38.56	36.44	13.14	16.73	14.94	25.87
Brown's Creek at McKusick Road										
Discharge (cf)	152,913,065	229,482,654	192,485,489	179,429,476	340,391,004	234,134,803	196,267,817	163,409,449	163,853,967	158,481,122
Total pounds of Phosphorus exported	2,248	3,059	1,766	1,602	4,062	2,204	1,386	1,282	1,432	1,803
TP (lbs/ac/yr)	0.562	0.765	0.442	0.401	1.016	0.551	0.347	0.321	0.358	0.451
Total pounds of TSS exported	728,640	1,646,798	638,650	404,296	978,014	471,464	234,226	172,292	189,377	508,266
TSS (lbs/ac/yr)	182.21	411.80	159.70	101.10	244.56	117.90	58.57	43.08	47.36	127.10
Brown's Creek at Stonebridge										
Discharge (cf)	Not Calculated	224,138,246	232,701,338	225,604,711	368,848,809	235,850,584	192,272,282	168,072,167	164,126,900	173,826,291
Total pounds of Phosphorus exported	Not Calculated	2,778	2,229	1,946	3,948	2,186	1,556	1,363	1,372	1,781
TP (lbs/ac/yr)	Not Calculated	0.663	0.532	0.465	0.942	0.522	0.371	0.325	0.327	0.425
Total pounds of TSS exported	Not Calculated	1,187,547	718,290	515,386	825,635	437,876	256,270	241,966	173,619	488,806
TSS (lbs/ac/yr)	Not Calculated	283.49	171.47	123.03	197.10	104.53	61.18	57.76	41.45	116.69
Brown's Creek Outlet										
Discharge (cf)	241,784,443	284,583,206	278,020,037	267,105,859	447,411,048	386,269,467	249,448,143	220,440,000	219,500,000	261,552,581
Total pounds of Phosphorus exported	3,156	3,514	2,275*	2,315*	4,833*	4,289*	1,566*	1,219*	1,494*	2,563*
TP (lbs/ac/yr)	0.683	0.760	0.492	0.501	1.045	0.928	0.339	0.264	0.323	0.554
Total pounds of TSS exported	1,119,632	1,114,674	498,032*	400,729*	1,286,424*	1,137,017*	317,962*	172,589*	251,417*	507,151*
TSS (lbs/ac/yr)	242.13	241.06	107.71	86.66	278.21	245.89	68.76	37.32	54.37	109.68
	*Sampling regime and load estimation method changed									

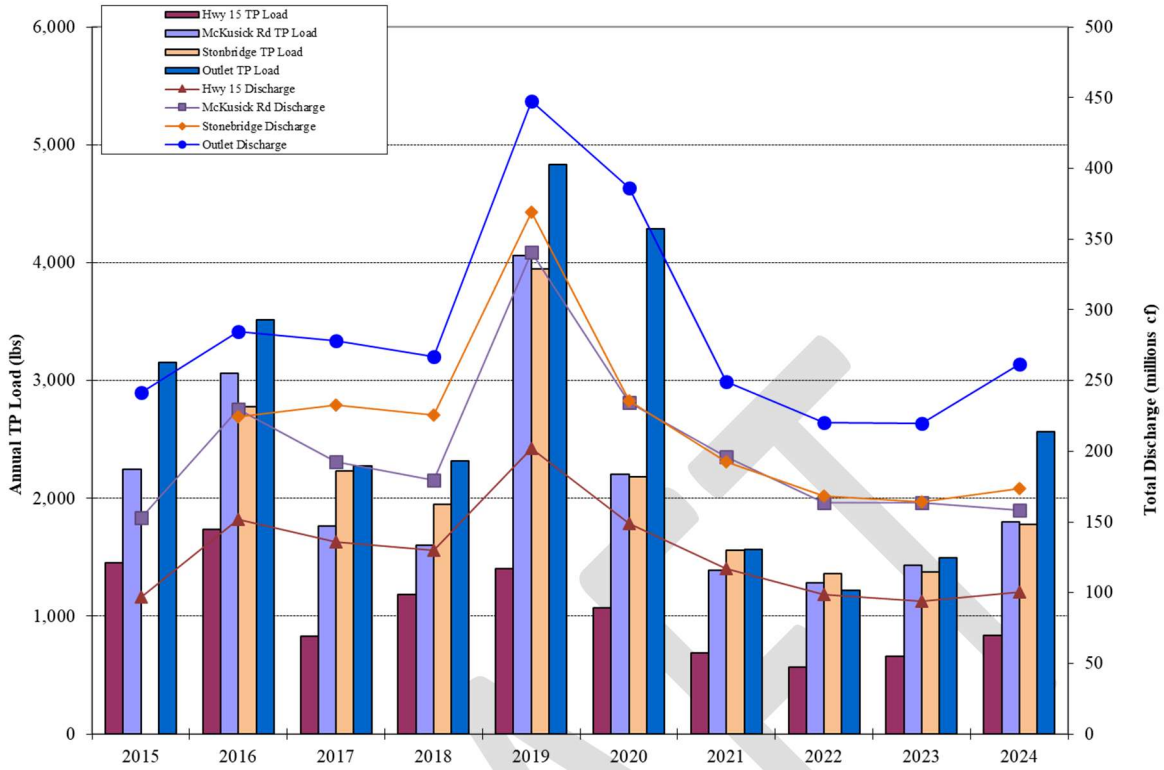

Figure 3. Brown's Creek Phosphorus Loading- Latest Ten Years

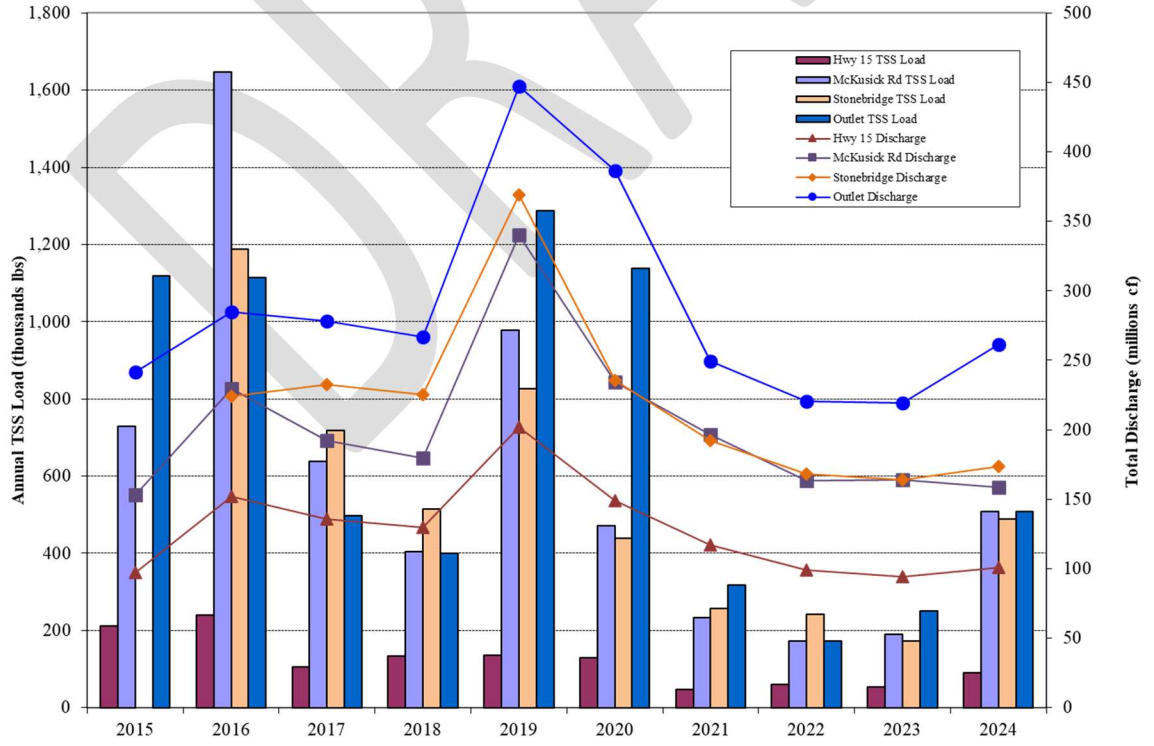

Figure 4. Brown's Creek Sediment Loading- Latest Ten Years

1c. Metals

One of the stressors identified in the TMDL study is high concentrations of copper, which are harmful to aquatic life. Additionally, other metals such as lead and zinc can be toxic to aquatic organisms. Standards for such metals are variable based on the hardness of the water which affects the level of toxicity a given concentration has. Under soft water conditions (low hardness) metals are more readily taken up by aquatic organisms, increasing the toxicity of the concentrations of metals in the water. Calculation of metals standards are described in the Minnesota Administrative Rules Part 7050.0222 and are divided into three categories of toxicity; chronic, maximum, and final acute value (FAV). The chronic standard protects organisms from long term exposure to a pollutant with minimal effects, the maximum standard from short term exposure with no or little mortality, and the FAV is the concentration at which mortality can be expected.

Heavy metals exceedances for each site and sample can be found in Table 5-Table 7, and Table 10. A small number of chronic level exceedances of lead and cadmium were detected at McKusick Road and Stonebridge, and no exceedances were detected at Highway 15 and the Outlet. The number and severity of metals exceedances in 2024 was again low compared to past years.

Chloride concentrations have not exceeded the state standard for chronic exposure of 230 mg/L, but the trend analysis completed by EOR shows there are statistically significant increasing loads for chloride at all monitoring stations. For reference, the highest chloride concentration recorded on the creek occurred at the Outlet on January 17 at 31.4 mg/L. Unlike many other pollutants, chloride has no natural attenuation once it is in water, and there are no known cost-effective ways to treat water contaminated with chloride. The District should continue to investigate ways to promote reductions in salt use and smart salt management, especially for water softener and road de-icing applications.

Table 10. Brown's Creek Outlet 2024 Secondary Chemistry Results

Sample Type	Start	End	Copper (mg/L)	Nickel (mg/L)	Lead (mg/L)	Zinc (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Chloride (mg/L)	Nitrite N (mg/L)	Nitrate N (mg/L)	Ammonia Nitrogen (mg/L)	Hardness (mg/L_CaCO3)
Scheduled Grab	1/4/2024 10:33	1/4/2024 10:33							30.6	<0.06	1.42	<0.06	
Scheduled Grab	1/17/2024 11:01	1/17/2024 11:01							31.4	<0.06	1.27	<0.06	
Scheduled Grab	1/31/2024 11:10	1/31/2024 11:10							29.5	<0.06	1.16	<0.06	
Scheduled Grab	2/14/2024 10:46	2/14/2024 10:46							28.3	<0.06	1.10	<0.06	
Scheduled Grab	2/27/2024 9:57	2/27/2024 9:57							28.8	<0.06	1.09	<0.06	
Scheduled Grab	3/13/2024 9:40	3/13/2024 9:40	<0.00100	<0.00050	<0.00050	<0.00500	<0.00010	<0.00300	29.6	<0.06	0.91	<0.06	246
Scheduled Grab	3/27/2024 9:51	3/27/2024 9:51							29.4	<0.06	0.82	0.08	
Scheduled Grab	4/10/2024 9:37	4/10/2024 9:37							24.9	<0.06	0.52	<0.06	
Scheduled Grab	4/25/2024 9:05	4/25/2024 9:05							27.7	<0.06	0.66	<0.06	
Scheduled Grab	5/8/2024 8:40	5/8/2024 8:40							25.7	<0.06	0.25	<0.06	
Storm Composite	5/21/2024 17:49	5/22/2024 3:15	0.00580	0.00400	0.00330	0.03350	0.00017	0.00600		<0.06	<0.20	0.45	139
Scheduled Grab	5/22/2024 12:47	5/22/2024 12:47							16.2	<0.06	<0.20	<0.06	
Storm Composite	6/4/2024 20:26	6/5/2024 5:01	0.00640	0.00400	0.00360	0.03480	0.00042	0.00600		<0.06	0.26	0.73	141
Scheduled Grab	6/5/2024 9:24	6/5/2024 9:24	0.00230	0.00170	0.00140	0.00850	<0.00010	<0.00300	15.0	<0.06	<0.20	<0.06	126
Storm Composite	6/18/2024 22:40	6/18/2024 23:27	0.00880	0.00570	0.00530	0.06710	0.00018	0.00900		<0.06	0.25	1.18	159
Scheduled Grab	6/20/2024 8:29	6/20/2024 8:29							25.2	<0.06	<0.20	<0.06	
Scheduled Grab	7/18/2024 8:40	7/18/2024 8:40							27.2	<0.06	0.73	<0.06	
Scheduled Grab	7/31/2024 8:30	7/31/2024 8:30							28.2	<0.06	0.72	<0.06	
Storm Composite	8/5/2024 12:58	8/5/2024 23:14	0.00830	0.00600	0.00480	0.03810	0.00015	0.01000	19.0	<0.06	0.37	0.21	172
Scheduled Grab	8/12/2024 8:35	8/12/2024 8:35							25.9	<0.06	0.65	<0.06	
Scheduled Grab	8/28/2024 8:51	8/28/2024 8:51							20.8	<0.06	0.31	<0.06	
Scheduled Grab	9/10/2024 9:01	9/10/2024 9:01	<0.00100	<0.00050	<0.00050	<0.00500	<0.00010	<0.00300	28.9	<0.06	0.76	<0.06	257
Scheduled Grab	9/25/2024 8:27	9/25/2024 8:27							28.0	<0.06	0.76	<0.06	
Scheduled Grab	10/8/2024 14:51	10/8/2024 14:51							29.6	<0.06	0.79	<0.06	
Scheduled Grab	10/22/2024 9:02	10/22/2024 9:02							29.0	<0.06	0.64	<0.06	
Scheduled Grab	11/6/2024 13:54	11/6/2024 13:54							29.9	<0.06	0.46	<0.06	
Scheduled Grab	11/21/2024 10:00	11/21/2024 10:00							27.6	<0.06	0.47	<0.06	
Scheduled Grab	12/4/2024 10:30	12/4/2024 10:30	<0.00100	<0.00050	<0.00050	<0.00500	<0.00010	<0.00300	31.4	<0.06	1.10	<0.06	248
Scheduled Grab	12/18/2024 10:00	12/18/2024 10:00							30.1	<0.06	1.17	<0.06	
Scheduled Grab	12/31/2024 10:00	12/31/2024 10:00							30.3	<0.06	0.90	0.10	

No Exceedance Determinable
Exceeds Chronic Standard
Exceeds Max Standard
Exceeds Final Acute Standard

1d. Bacteria (*E.coli*)

The sites on Brown's Creek are not meeting the state standard for *E.coli* for nearly all months regulated by the standard, and two reaches of the creek have been listed as impaired for bacteria. A summary table by month and site can be found in Table 11. The standard is defined as follows, and is based on the latest ten years of data as per MPCA protocol:

"*Not to exceed 126 organisms per 100 milliliters as a geometric mean of not less than five samples representative of conditions within any calendar month, nor shall more than ten percent of all samples taken during any calendar month individually exceed 1,260 organisms per 100 milliliters. The standard applies only between April 1 and October 31.*"

Table 11. Monthly Geometric Means of *E.coli*- Latest Ten Years

Site	April	May	June	July	August	September	October
Highway 15	Insufficient Data	102	279	223	379	236	91
McKusick Road	Insufficient Data	137	402	695	430	232	84
Stonebridge	Insufficient Data	120	286	498	380	192	96
Brown's Creek Outlet	19	108	389	340	183	224	80
Diversion	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Trib at 62nd St	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data

Exceeds geometric mean of 126 #/100mL from not less than 5 samples in a calendar month

10% of samples taken in the last 10 years exceed 1,260 #/100mL (Doesn't necessarily exceed geometric mean standard)

Previous studies have excluded human borne *E.coli* as a significant source of bacteria, indicating failing septic systems and illegal straight pipes are not contributing to the high levels of bacteria. Likely sources of bacteria include large congregations of geese around the McKusick Road area, beavers and muskrat in the upper reaches of the creek, and nearby livestock operations. Further studies will focus on species of wildlife and livestock to determine sources of bacteria. The trend analysis completed by EOR has shown statistically significant long term trends for decreasing *E.coli* concentrations at McKusick Road and Stonebridge, and an increasing trend at the Outlet over the most recent ten year period.

1e. Temperature & Dissolved Oxygen

The 2010 Brown's Creek Biota TMDL indicates a threat level temperature of 18.3 ºC and a critical level temperature of 23.9 ºC for trout survivability. The threat level impact as defined as physiological stress, reduced growth, and egg mortality. The critical level impact is defined as the point at which direct mortality can be expected. For the purposes of this summary, daily average temperatures are used to determine if impact levels have been reached.

Consistent with previous years, multi-parameter sondes were deployed at all four stations on the creek. Due to battery and logger malfunctions in years prior, secondary temperature

loggers were deployed to minimize gaps in the temperature data created by the primary loggers. However, these gaps will still exist in the dissolved oxygen period of record, as no secondary dissolved oxygen sensors were available.

The number of daily average threat level temperature exceedances in the creek in 2024, when excluding years with significant data gaps, slightly better than average when compared to the last ten years (Table 12). The number of threat level exceedances recorded at the Outlet were slightly better than the median value when compared to the period of record extending back to 2006. No daily average temperature at any site exceeded the critical level temperature. According to the NWS station in Stillwater air temperatures were in excess of 90 ºF only one day of the season.

A Riparian Shading Study was completed in 2018 and describes the relationship of thermal loading via solar radiation and shade producing objects along the stream corridor. The study identified the least shaded (less than 60% shaded) reaches of the creek as immediately downstream of Highway 15, immediately west of Millbrook Park, a reach between Millbrook Park and McKusick Road, and the reach flowing through Oak Glen Golf Course north of McKusick Road. This study and the increase in the number of threat level temperature exceedances moving downstream from McKusick Road to Stonebridge indicate the buffer strip installations within the golf course have not reached full maturity. They are expected to provide up to 80% shade coverage when the final growth is achieved. The full Riparian Shading Study report is available on the District's website. Warmer creek temperatures in 2024 are also likely influenced by the removal of buckthorn and other undesirable vegetation along the reach around Neal Avenue, where vegetation was stripped for the streambank and floodplain restoration project. Temporary impacts will likely show higher temperatures in the McKusick and Stonebridge reaches until the revegetation with native grasses, shrubs, and trees reaches maturity several years from now.

In 2022 and 2023 some of the coolest temperatures ever recorded in the creek were observed in spite of warm, dry summers. This was especially encouraging given the conditions, and may indicate other thermal load reduction practices including riparian shade restorations, the Brown's Creek Park Rock Crib, and surface water diversions such as the Diversion Drainage and the Oak Glen Golf Course Irrigation Reuse projects are positively impacting the creek.

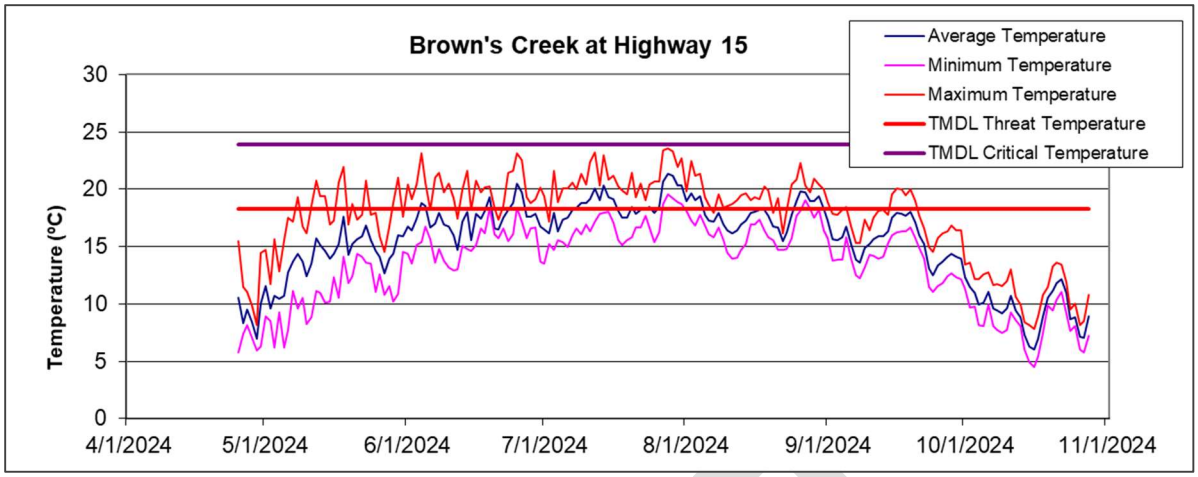

Figure 5. Brown's Creek at Highway 15 2024 Daily Temperature Summary

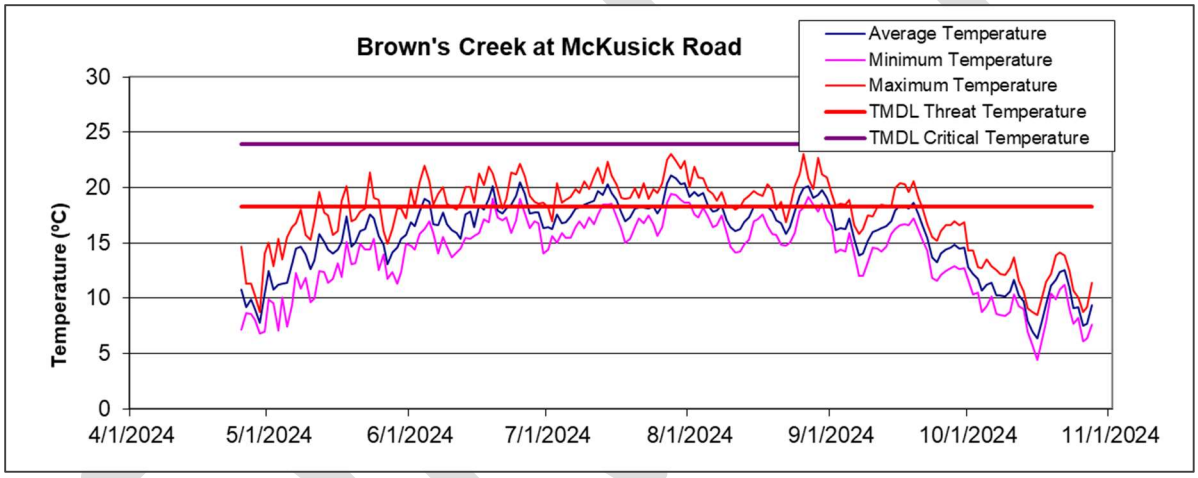

Figure 6. Brown's Creek at McKusick Road 2024 Daily Temperature Summary

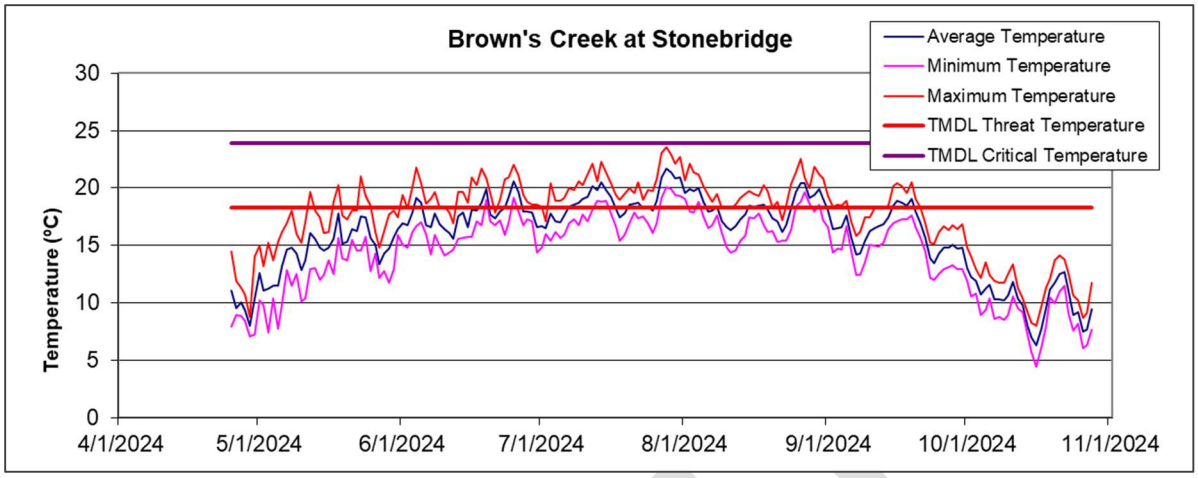

Figure 7. Brown's Creek at Stonebridge 2024 Daily Temperature Summary

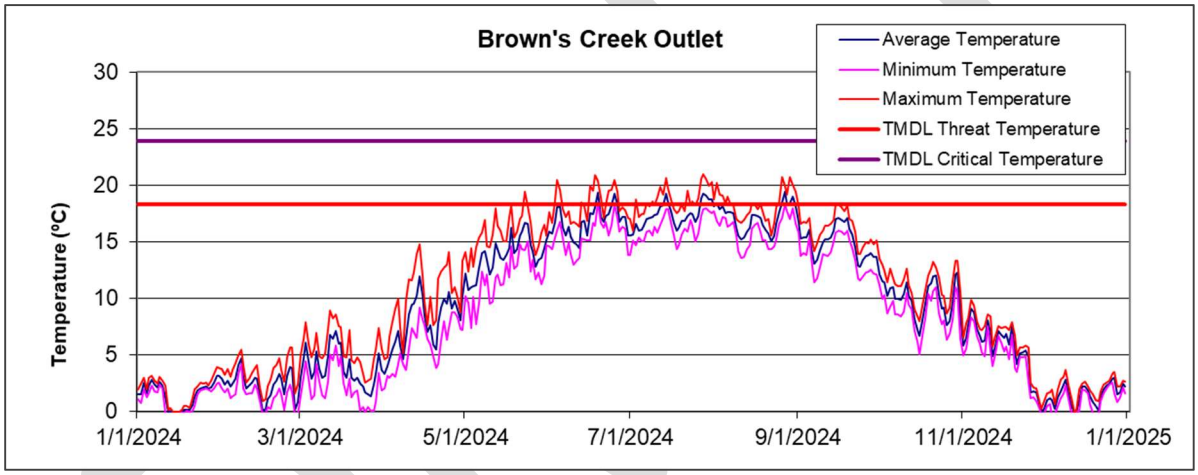

Figure 8. Brown's Creek Outlet 2024 Daily Temperature Summary

Table 12. Annual Occurrences of Brown's Creek Daily Average Temperature Greater than Threat and Critical Level Thresholds

	Exceedances at Highway 15		Exceedances at McKusick		Exceedances at Stonebridge		Exceedances at Outlet	
Year	18.3ºC	23.9ºC	18.3ºC	23.9ºC	18.3ºC	23.9ºC	18.3ºC	23.9ºC
2015	28*	0*	65	0	26*	0*	22	0
2016	14*	0*	17*	0*	71	0	35	0
2017	54	0	43	0	48	0	8	0
2018	61	0	54	0	66	0	19	0
2019	31	0	36	0	42	0	20	0
2020	38	0	42	0	48	0	23	0
2021	47	0	39	0	54	0	11	0
2022	28	0	31	0	37	0	6	0
2023	34	0	35	0	49	0	4	0
2024	33	0	40	0	49	0	15	0

* Based on severely limited period of record

The state standard for dissolved oxygen in 2A waters is 7 mg/L as a daily minimum. Logger malfunctions somewhat limited the period of record at Highway 15 and McKusick Road. Oxygen concentrations at Highway 15 were below the state standard 82.9% of the days monitored, and are unsuitable for trout survival (Table 13, Figure 9). The data collected show daily swings high above 7 mg/L at Highway 15 due to intense macrophyte growth, but drops well below the threshold at night.

Dissolved oxygen levels at McKusick Road tended to be poorer than previous years, with 29 days being worse than the state standard. Again, this is likely influenced by the in-stream restoration work around Neal Avenue.

Stonebridge continues to exhibit better conditions for trout survival, with only one day monitored below the dissolved oxygen standard. However, temperatures at Stonebridge were above the threat level temperature threshold nine days more than McKusick Road, indicating a slightly higher level of temperature stress as the creek flows through the golf course (Table 12 and Figure 7). Increased shading in the Oak Glen Golf Course buffer area and restoration project around Neal Avenue are expected to cool the water between the McKusick Road and Stonebridge sites, as well as increase oxygen levels.

Table 13. Daily Minimum Dissolved Oxygen Exceedances

Site	Days Monitored	Dissolved Oxygen Daily Minimum Below 7 mg/L	Percent of Days Exceeded	Record Completeness
Highway 15	123	102	82.9%	72.8%
McKusick Road	142	29	20.4%	84.0%
Stonebridge	168	1	0.6%	99.4%
Outlet	169	0	0.0%	100.0%

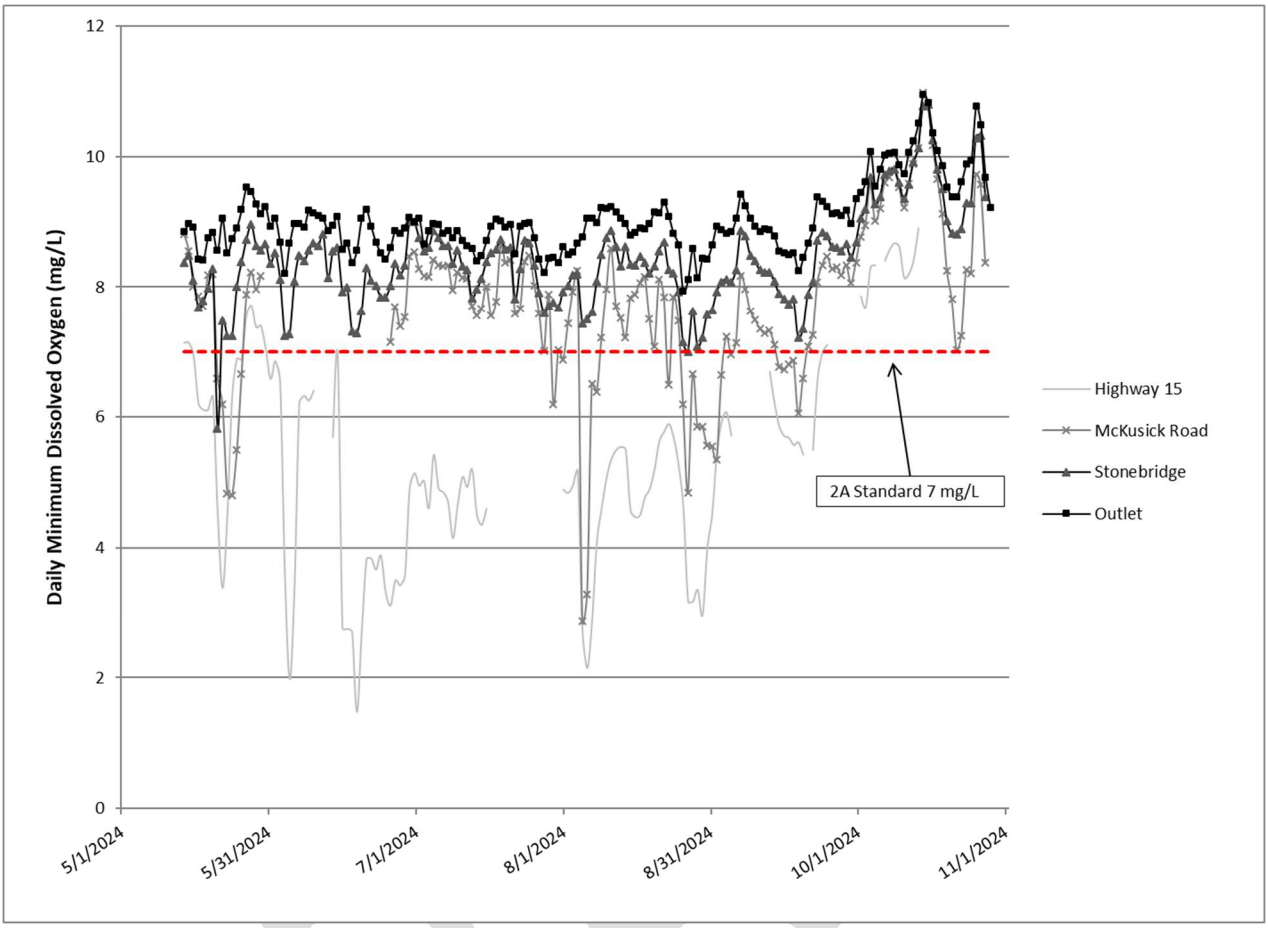

Figure 9. Daily Minimum Dissolved Oxygen in Brown's Creek

The Outlet continues to be the best location on Brown's Creek for trout survival. The average daily temperature exceeded the threat level threshold only fifteen days during the season (Table 12). This is due to cold groundwater inputs in the gorge upstream of the Outlet and a robust tree canopy to shade the stream. Daily minimum oxygen concentrations were suitable for trout for the entire season (Figure 9 and Appendix B).

The trend analysis completed by EOR shows there is a statistically significant long term cooling trend at the Outlet, and a long term cooling pattern at Stonebridge that is not statistically significant. The study also shows a long term statistically significant warming trend at McKusick Road. Dissolved oxygen concentrations show no statistically significant trends at any site, except the Outlet since construction of the Diversion Structure.

1f. Turbidity & Specific Conductivity

Turbidity and specific conductivity can be helpful for determining the amount of particles and dissolved materials in a stream. Turbidity measures the amount of light scattered by particles such as suspended sediment, phytoplankton, and bacteria while specific conductivity measures electrical conductance of the water and is influenced by the amount

of dissolved ions in the water. Excess turbidity can be detrimental to trout, since they are primarily sight feeders. It also typically indicates a high sediment load which can clog gills and cover spawning areas.

Continuous turbidity and specific conductivity were monitored at all four stations on Brown's Creek. Turbidity sensors on the multi-parameter sondes have the tendency to be covered by bedload sediment during storm events and can be fouled by algae growth on the sensor itself, and as such gaps in the record exist at some sites. To account for fouling continuous turbidity data were converted to a daily average where at least three quarters of a day was successfully logged for comparison to a 10 NTU threshold which correlates to the TMDL goal of 23 mg/L of TSS. Specific conductivity data are not discussed in this report as they do not directly apply to state standards or TMDL goals, but are available upon request. Turbidity data is also used to evaluate sediment and nutrient loading in the creek. A summary of days successfully monitored for turbidity at each site can be found in Table 14 and average daily turbidity can be viewed in Figure 10.

Table 14. Brown's Creek Turbidity Standard Exceedances

Site	Days Monitored	Days Over 10 NTU	Percent of Days Exceeded	Record Completeness
Highway 15	140	18	12.9%	82.8%
McKusick Road	142	42	29.6%	84.0%
Stonebridge	168	58	34.5%	99.4%
Outlet	169	38	22.5%	100.0%

It is worth noting the creek tends to meet the 10 NTU goal during nearly all periods of base flow, indicating the majority of sediment and other sources of turbidity are being contributed during storm events (Figure 10). Turbidity was also significantly influenced by the in-stream restoration work around Neal Avenue. During construction activities, daily spikes in turbidity of the same magnitude as heavy precipitation events were evident at McKusick Road and Stonebridge. These periods were also accounted for in the loading tables found in Appendix B. The highest daily average turbidity at Highway 15, McKusick Road, Stonebridge, and the Outlet were recorded during storms on June 5 (37 NTU), August 6 (132 NTU), August 27 (72 NTU), and August 27 (67 NTU), respectively.

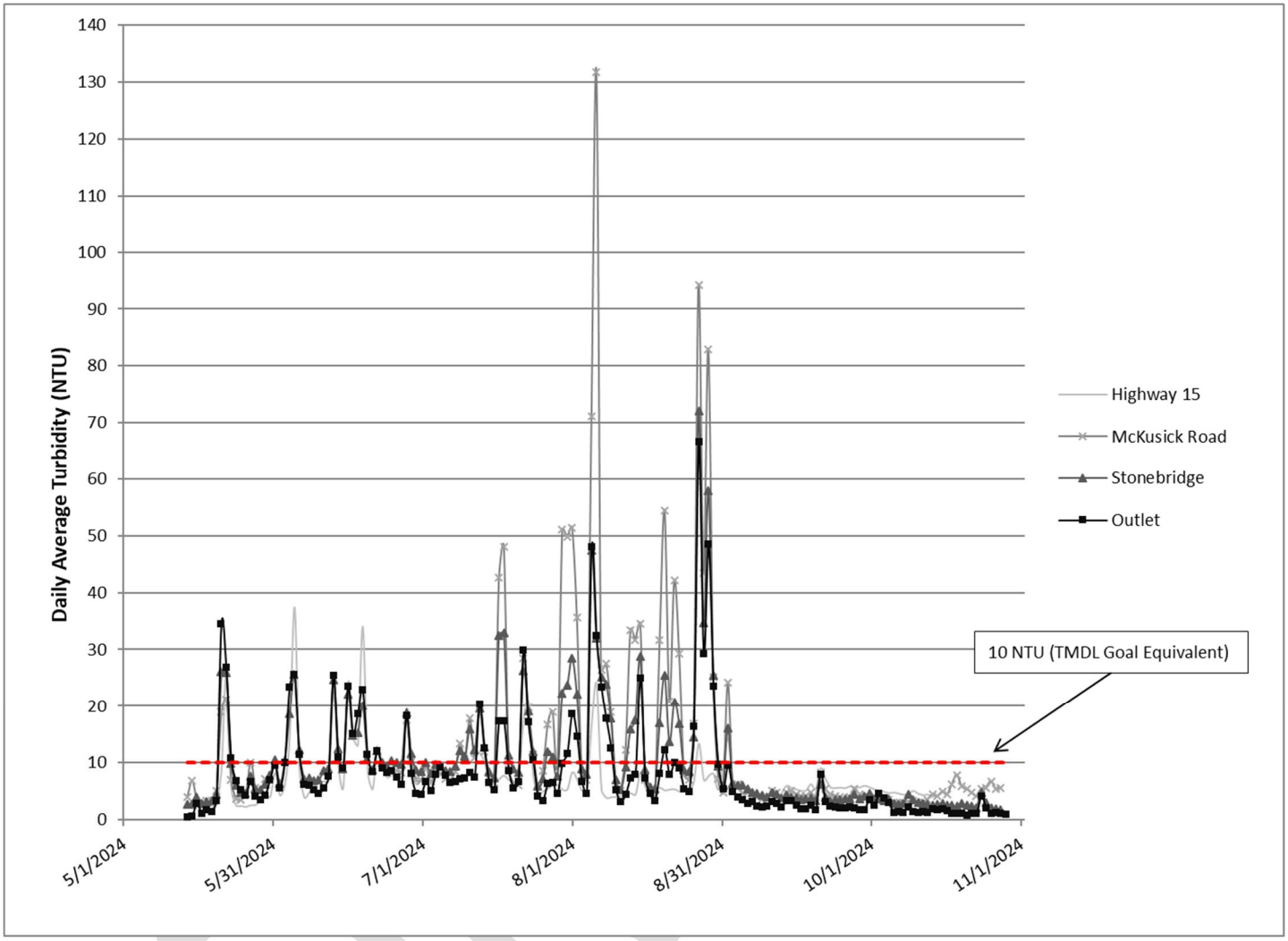

Figure 10. Brown's Creek Daily Average Turbidity

1g. Fisheries & Aquatic Invasive Species

Brown's Creek currently supports a brown and rainbow trout fishery dependent upon stocking in the lower reaches of the creek. Brown trout have been shown to have a limited amount of natural reproduction, and rainbow trout rely on stocking efforts. In 2020 the MN DNR switched from stocking brown trout to rainbow trout because they are easier to produce, grow larger and faster, and are stocked at a size that provides better recreational opportunity to anglers. Additionally, neither species is native to Minnesota, but they are considered naturalized and non-deleterious, and provide ecosystem and recreational benefits where native brook trout cannot survive. MN DNR has a management plan to stock 1,000 yearling rainbows at the Outlet annually. Stillwater Area High School (SAHS) and the Minnesota Trout Unlimited – Trout in the Classroom program also reared and stocked several hundred fingerling rainbow trout into the stream.

Fish and macroinvertebrate sampling conducted by the District's engineer and SAHS have identified many varieties of organisms present in the creek that need high quality, well oxygenated water to survive, such as rainbow darters. Results of fish and macroinvertebrate samplings can be found on the District's website or are available upon request.

Field staff continue to observe heavy growth of invasive curly-leaf pondweed in the upper reaches of the creek at Highway 15 and above McKusick Road. Dense mats of vegetation can alter flow rates, nutrient transport in the stream, hinder efforts to make stream improvements by slowing the water, and create conditions for warmer temperatures and increased sediment deposition on potential spawning areas. The BCWD should continue to work with partners to limit or prevent or manage the spread of curly-leaf pondweed downstream.

IV.C.2. Diversion Drainage

The Trout Stream Mitigation Project (TSMP), also known as the Diversion Structure, has been functioning since 2003 to divert warm water flows away from Brown's Creek through McKusick Lake to the St. Croix River (Table 1 and Figure 1). Diverting the water away from the creek protects it from additional thermal and sediment loads, improving conditions for trout and other cold water organisms. However, the water diverted away from the creek impacts its receiving waters: McKusick Lake and the wetland complex at the inlet to the lake. Therefore, monitoring is important to determine the load of pollutants discharged to the lake.

2a. Discharge

Discharge doubled from the year prior to 72,832,083 cubic feet exported to McKusick Lake, due to a wet spring and summer (Table 16). This volume of water is the second highest recorded since monitoring began in 2006. No water overtopped the Diversion Structure in 2024. The structure was designed to divert events up to the 1.5-year storm event under fully developed conditions. Since 2014 there have been five known events during which water has overtopped the structure and discharged directly to Brown's Creek, ranging from a few hours to a half-day. Although noteworthy, the volume of direct discharges has been minimal and have only occurred during major storm events, and likely have little impact on thermal and nutrient loads in the creek when the creek is already high with runoff. More importantly, the structure diverts the significantly warmer base flow and all moderate and minor runoff events in the drainage away from the creek, reducing thermal loads to Brown's Creek.

2b. Phosphorus & Sediment

The TP load to McKusick Lake was 573 pounds, or 0.149 pounds of phosphorus per acre of watershed land (Table 16). The TP load was the near the median value when considering the latest ten years and all-time data since 2006, but is well below the all-time

average value of 908 pounds. Water flowing through the site met the 2B phosphorus standard at base flow for all of the samples collected, while storm event concentrations were much higher (Table 15). However, the trend analysis study shows statistically significant increasing concentrations of TP over both the short and long term in the drainage.

The TSS load was 230,855 pounds of sediment, equating to 59.88 pounds per acre of watershed land (Table 16). The state standard for 2B waters is 30 mg/L of TSS from April 1 to September 30. Water flowing through the site during this period met the standard during base flow conditions, and storm concentrations were much lower than prior wet years when concentrations sometimes exceeded 2,000 mg/L (Table 15). Despite the wet conditions, the TSS load was the third lowest in the last ten years and well below the long term average load of 554,361 pounds. No significant trends exist for TSS in the drainage.

The District has worked since 2018 to repair erosional head cuts and increase floodplain connectivity through the installation of rock vanes on the drainage tributaries. The practices are estimated to reduce the TP load by 76 pounds per year, and the sediment load by 70 tons per year. Additionally, beavers were again active in the drainage in 2024, creating dams between the IESF harvest pond and the monitoring site. The dams, when present, enhance floodplain connectivity and settling of nutrients while improving habitat, and a resulting reduction in TP and TSS loads is likely reflected in annual loads. Due to these considerations the District has opted to leave the dams in place when found. The relatively low TP and TSS loads paired with the second highest total discharge ever recorded may indicate the restoration efforts by the District and natural processes from beaver activity are having positive impacts on water quality in the drainage. The IESF upstream of the monitoring site also continues to operate to reduce TP loads in the drainage. Monitoring data from the IESF is analyzed by EOR and summarized in an annual maintenance memo for the filter.

Table 15. Brown's Creek Diversion 2024 Chemistry Results

Sample Type	Start	End	TSS (mg/L)	VSS (mg/L)	TKN (mg/L)	TP (mg/L)	Dissolved P (mg/L)	Copper (mg/L)	Nickel (mg/L)	Lead (mg/L)	Zinc (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Chloride (mg/L)	Nitrite N (mg/L)	Nitrate N (mg/L)	Ammonia Nitrogen (mg/L)	Hardness (mg/L _CaCO3)
Storm Composite	4/16/2024 16:47	4/17/2024 0:42	90	27	2.23	0.373	0.058	0.00370	0.00290	0.00170	0.01600	0.00020	<0.00250	60.3	<0.06	0.73	<0.06	134
Storm Composite	5/21/2024 18:11	5/22/2024 6:11	186	53	2.18	0.432	0.081	0.00460	0.00420	0.00260	0.01370	0.00019	0.00400	40.9	<0.06	0.23	<0.06	99
Storm Composite	6/3/2024 5:43	6/3/2024 12:23	96	28	1.44	0.193	0.032	0.00260	0.00230	0.00140	0.00820	0.00020	<0.00250	70.6	<0.06	<0.20	<0.06	121
Storm Composite	6/4/2024 19:53	6/4/2024 23:34	1,080	336	4.68	0.905	0.064	0.01120	0.01110	0.00910	0.04380	0.00030	0.00970	51.8	<0.06	0.20	<0.06	121
Storm Composite	6/16/2024 2:29	6/16/2024 5:52	148	42	1.92	0.344	0.054	0.00400	0.00380	0.00240	0.01240	0.00018	0.00320	42.0			<0.06	111
Storm Composite	6/28/2024 6:34	6/28/2024 8:33	758	184	1.86	0.675	0.060	0.00870	0.00860	0.00710	0.03100	0.00030	0.00840	39.9			<0.06	158
Storm Composite	7/22/2024 18:31	7/22/2024 21:26	396	104	4.02	0.697	0.072	0.00800	0.00790	0.00570	0.03260	0.00024	0.00720	34.2	<0.06	0.40	<0.06	144
Storm Composite	8/5/2024 12:11	8/5/2024 23:28	234	57	2.91	0.483	0.072	0.00560	0.00640	0.00350	0.02070	0.00020	0.00510	26.3	<0.06	0.36	<0.06	123
Base Grab	5/20/2024 14:27	5/20/2024 14:27	6	3	0.60	0.080	0.044	<0.00100	0.00077	<0.00050	<0.00500	<0.00010	<0.00250	76.1	<0.06	0.23	<0.06	158
Base Grab	6/27/2024 13:56	6/27/2024 13:56	5	<3	0.58	0.073	0.040	<0.00100	0.00056	<0.00050	<0.00500	<0.00010	<0.00250	73.4	<0.06	<0.20	<0.06	90
Base Grab	7/25/2024 13:47	7/25/2024 13:47	3	<3	0.46	0.051	0.039	0.00130	0.00052	<0.00050	<0.00500	<0.00010	<0.00250	56.8	<0.06	<0.20	<0.06	79
Base Grab	9/3/2024 9:51	9/3/2024 9:51	3	<3	0.48	0.054	0.039	<0.00100	0.00054	<0.00050	<0.00500	<0.00010	<0.00250	38.9	<0.06	<0.20	<0.06	73
Base Grab	9/24/2024 9:18	9/24/2024 9:18	3	<3	0.46	0.073	0.044							42.2	<0.06	0.28	<0.06	136
Base Grab	10/21/2024 14:30	10/21/2024 14:30	3	<3	0.37	0.065	0.023	<0.00100	0.00070	<0.00050	<0.00500	<0.00010	<0.00250	46.6	<0.06	0.32	<0.06	295

Exceeds Water Quality Standard
No Exceedance Determinable
Exceeds Chronic Standard
Exceeds Max Standard
Exceeds Final Acute Standard

Table 16. Brown's Creek Diversion Historic Loading- Latest Ten Years

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Brown's Creek Diversion Structure										
Discharge (cf)	46,276,327	70,780,581	39,625,672	45,453,990	112,468,888	68,165,935	46,792,341	41,610,620	35,622,586	72,832,083
Total pounds of Phosphorus exported	1,837	1,574	784	964	3,598	760	446	389	367	573
TP (lbs/ac/yr)	0.447	0.408	0.203	0.250	0.933	0.197	0.116	0.101	0.095	0.149
Total pounds of TSS exported	1,008,346	1,533,496	596,382	505,314	2,707,186	246,238	401,069	75,429	74,875	230,855
TSS (lbs/ac/yr)	261.57	397.79	154.70	131.08	702.25	63.87	104.01	19.57	19.42	59.88

2c. Metals

Heavy metals exceedances at the Diversion site can be seen in Table 15. The export of water high in metals to McKusick Lake and its wetland complex are particularly concerning due to the potential to destroy aquatic life in a short period of time, as opposed to nutrient or sediment loading which typically degrades habitat and populations of aquatic life over time. The chronic standard for copper was exceeded once, and three chronic standard exceedances for lead were recorded. The number and severity of exceedances of metals standards in the drainage were again among the lowest observed since metals analysis began in 2007. Improvements made to reduce erosion and the natural settling of sediments that may have metals bound to them in beaver impoundments are the most likely drivers of this. In most cases, severe exceedances of metals are associated with extreme TSS concentrations in this drainage. Sources of metals in the drainage may include improperly disposed wastes, such as deep cycle batteries. The combination and concentration of metals observed over time appear to point to this as a possible source. The District has allocated funds to conduct sediment coring and soil analysis to identify nutrient and metals hotspots in the drainage.

2d. Temperature

A stand-alone temperature logger was added to the monitoring site in 2024 to provide additional characterization of habitat and water quality conditions in the drainage. The drainage tends to be much warmer than Brown's Creek, and further collection of these data may provide insights on how restoration practices and beaver activity affect conditions in the drainage. Recorded daily average temperatures can be found in (Figure 11). Although the drainage is effectively disconnected from Brown's Creek as a receiving water, daily average temperatures at McKusick Road are included for reference.

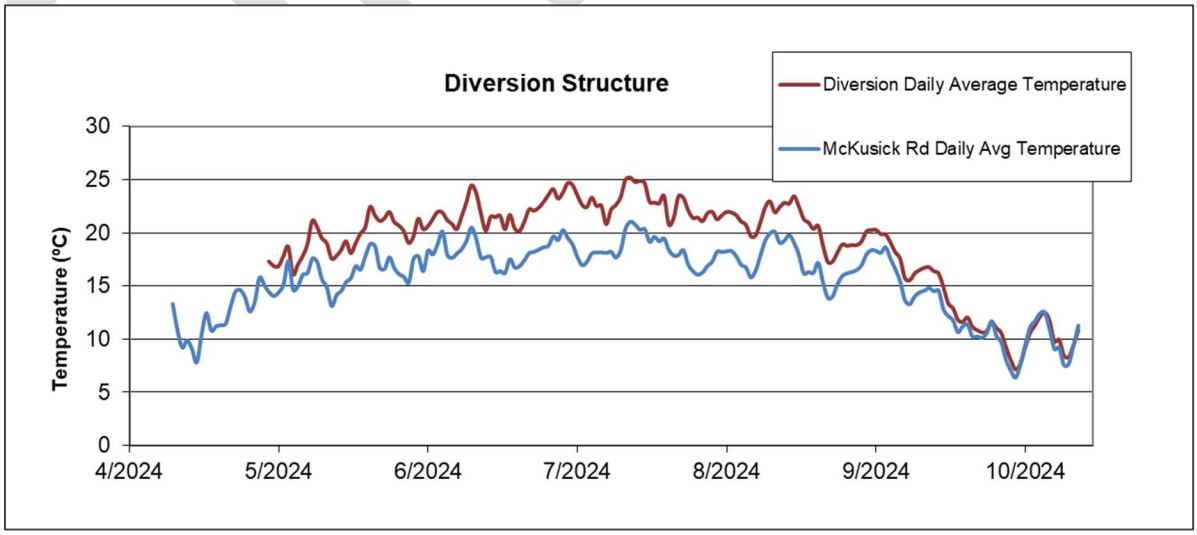

Figure 11. Diversion Drainage 2024 Daily Average Temperature

IV.C.3. Long Lake Drainage

The tributaries to Long Lake at 62nd St. and Marketplace Pond drain a high percentage of impervious surface and developed areas upstream of Long Lake (Table 1 and Figure 1). For the purposes of this report, the Tributary to Long Lake at Marketplace Pond will be compared to 2B water quality standards. The Tributary at Marketplace Pond is not classified as a 2B water, although its receiving water, Long Lake, is. The Tributary at 62nd Street will not be compared to state standards as water chemistry sampling at the site ceased following the 2016 monitoring season; only stage has been recorded since. The water discharged to Long Lake directly affects the quality of the lake, which has had significant issues caused by excess nutrients. Water from Long Lake makes its way downstream to Jackson WMA (Sinnits) Pond, the diversion drainage, McKusick Lake and its wetland complex, and eventually to the St. Croix River. Monitoring subwatershed contributions to Long Lake can help determine locations for targeted management, as well as track improvements made upstream.

3a. Discharge

Annual discharge to Long Lake from the tributary at Marketplace Pond was 24,319,915 cubic feet. Only stage data was collected at the tributary at 62nd Street, and discharge was estimated during the period of logged data based on stage and discharge data from 2014. Data from 2014 was used because it covered the widest range of observed stages and was representative of the average of other years of data collection. Discharge outside of logged data was not estimated, although the total volume outside of the period of record is likely negligible as the site freezes in the winter. Discharge to Long Lake from the tributary at 62nd Street was estimated at 3,294,857 cubic feet (Table 18). Flow in both systems is almost entirely event based, and flow often ceases during dry or winter conditions.

3b. Phosphorus & Sediment

The TP load at Marketplace Pond was 0.383 pounds per acre for a total of 157 pounds of phosphorus, and the TSS load was 44.68 pounds per acre for a total of 18,320 pounds of sediment (Table 18). It appears the tributary at Marketplace Pond is meeting the standard of 30 mg/L of TSS at base flow, but was above the 0.100 mg/L TP standard for two of five base flow samples (Table 17). Although storm composite samples are generally not compared to state standards, the concentrations of TSS were often below the standard, and the TP concentrations were well above the standard. It should be noted the tributary at Marketplace Pond flows through several small settling ponds before discharging to Long Lake, and some additional settling of sediment and uptake of nutrients likely occurs. Sampling of the tributary at 62nd Street ceased after the 2016 monitoring season.

3c. Metals

Heavy metal exceedances for the tributary at Marketplace Pond can be found in Table 17. There were one chronic and four max standard exceedances of copper, three chronic

standard exceedances of lead, and one max and one chronic standard exceedance of zinc recorded. The amount of heavy metals in the subwatershed is influenced by development and impervious surfaces, such as parking lots and Highway 36 where materials from vehicle leaks and brake dust tend to collect. The hardness of water in the subwatershed also tends to be very low, increasing the toxicity of metals. Metals contributed from this subwatershed have the potential to degrade aquatic life near the point of discharge to Long Lake before the water is fully integrated into the lake.

Table 17. Tributary to Long Lake at Marketplace Pond 2024 Chemistry Results

Sample Type	Start	End	TSS (mg/L)	VSS (mg/L)	TKN (mg/L)	TP (mg/L)	Dissolved P (mg/L)	Copper (mg/L)	Nickel (mg/L)	Lead (mg/L)	Zinc (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Chloride (mg/L)	Nitrite N (mg/L)	Nitrate N (mg/L)	Ammonia Nitrogen (mg/L)	Hardness (mg/L _CaCO3)
Storm Composite	4/28/2024 21:06	4/29/2024 2:34	14	6	0.87	0.103	<0.050	0.00460	0.00094	<0.00050	0.01590	0.00011	<0.00250	160.0	<0.06	<0.20	0.07	31.9
Storm Composite	5/21/2024 17:31	5/21/2024 20:37	17	5	0.68	0.089	0.029	0.00480	0.00088	0.00053	0.01360	<0.00010	<0.00250	18.8	0.20	0.20	0.17	18.2
Storm Composite	5/31/2024 19:35	6/1/2024 4:12	13	5	0.62	0.094	0.045	0.00360	0.00080	<0.00050	0.00960	<0.00010	<0.00250	47.8			0.07	26.6
Storm Composite	6/4/2024 19:14	6/5/2024 0:18	7	3	0.67	0.076	0.040	0.00460	0.00079	<0.00050	0.01070	<0.00010	<0.00250	21.1	<0.06	0.22	0.13	21.7
Storm Composite	6/12/2024 23:59	6/13/2024 0:43	63	19	1.37	0.203	0.034	0.00630	0.00200	0.00160	0.03760	<0.00010	<0.00250	14.4	<0.06	0.36	0.43	24.4
Storm Composite	6/28/2024 5:22	6/28/2024 7:00	17	7	0.51	0.116	0.055	0.00340	0.00091	<0.00050	0.01900	<0.00010	<0.00250	9.0			0.09	21.1
Storm Composite	7/13/2024 23:41	7/14/2024 1:18	20	7	0.85	0.121	0.036	0.00450	0.00110	0.00056	0.01870	<0.00010	<0.00250	9.7	<0.06	0.22	0.17	27.4
Storm Composite	7/22/2024 17:53	7/22/2024 19:02	43	14	1.08	0.154	0.033	0.00510	0.00160	0.00120	0.03710	<0.00010	<0.00250	6.8	<0.06	0.32	0.20	25.9
Storm Composite	8/5/2024 10:43	8/5/2024 14:22	10	5	0.94	0.119	0.030	0.00330	0.00083	<0.00050	0.01170	<0.00010	<0.00250	9.5	<0.06	<0.20	0.19	27.4
Base Grab	5/16/2024 8:46	5/16/2024 8:46	7	4	0.78	0.109	0.040	0.00360	0.00095	<0.00050	0.00690	<0.00010	<0.00250	82.6	<0.06	0.29	<0.06	36.9
Base Grab	6/27/2024 13:25	6/27/2024 13:25	<3	<3	0.69	0.090	0.066	0.00310	0.00093	<0.00050	<0.00500	<0.00010	<0.00250	27.1	<0.06	0.25	0.11	30.4
Base Grab	7/25/2024 14:07	7/25/2024 14:07	5	3	0.56	0.078	0.041	0.00240	0.00062	<0.00050	<0.00500	<0.00010	<0.00250	15.8	<0.06	<0.20	<0.06	33.7
Base Grab	9/3/2024 10:39	9/3/2024 10:39	7	5	0.68	0.083	0.074	0.00370	0.00069	<0.00050	0.00560	<0.00010	<0.00250	12.6	<0.06	<0.20	<0.06	27.9
Base Grab	9/16/2024 11:23	9/16/2024 11:23	<3	<3	0.66	0.117	0.075	0.00350	0.00072	<0.00050	<0.00500	<0.00010	<0.00250	28.3	<0.06	0.33	<0.06	39.4

Exceeds Water Quality Standard
No Exceedance Determinable
Exceeds Chronic Standard
Exceeds Max Standard
Exceeds Final Acute Standard

Table 18. Long Lake Drainage Historic Loading- Latest Ten Years

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Tributary to Long Lake at Marketplace Pond										
Discharge (cf)	22,983,609	23,534,188	15,250,645	16,492,464	28,970,261	14,353,605	13,899,568	7,753,526	12,052,262	24,319,915
Total pounds of Phosphorus exported	137	137	77	70	150	83	121	79	121	157
TP (lbs/ac/yr)	0.335	0.333	0.187	0.170	0.367	0.202	0.296	0.192	0.294	0.383
Total pounds of TSS exported	15,797	18,278	15,162	16,473	15,882	10,645	9,593	7,112	12,870	18,320
TSS (lbs/ac/yr)	38.53	44.58	36.98	40.18	38.74	25.96	23.40	17.35	31.39	44.68
Tributary to Long Lake at 62nd Street										
Discharge (cf)	1,413,178	2,824,017	1,811,811*	957,234*	3,403,761*	2,842,101*	584,566*	274,469*	628,588*	3,294,857*
Total pounds of Phosphorus exported	32	49	NA	NA	NA	NA	NA	NA	NA	NA
TP (lbs/ac/yr)	0.056	0.086	NA	NA	NA	NA	NA	NA	NA	NA
Total pounds of TSS exported	6,115	20,956	NA	NA	NA	NA	NA	NA	NA	NA
TSS (lbs/ac/yr)	10.63	36.45	NA	NA	NA	NA	NA	NA	NA	NA
	*Flow not estimated outside of logged data									

IV.C.4. McKusick Wetland Outlet

The tributary to Brown's Creek at McKusick Wetland Outlet discharges water through a pipe approximately 100 feet upstream of the McKusick Road monitoring station from a wetland complex at the headwaters of McKusick Lake. Based on aerial photo evidence it may also provide a "short circuit" for warm, nutrient rich water diverted by the Diversion Structure to be introduced into Brown's Creek after flowing through the wetland complex at the headwaters of McKusick Lake. In 2021 the Oak Glen Golf Course Irrigation Reuse Project was completed, which redirects water from the outlet to a holding pond. This reduces warm, nutrient rich and oxygen poor inputs of water to Brown's Creek. Although not classified as a 2B water, for the purposes of this summary, the data collected will be compared to 2B TP and TSS standards.

4a. Discharge

Discharge at McKusick Wetland Outlet was calculated using an area velocity relationship during the period of recorded data. Periods of flow outside of recorded data were not estimated due to the site freezing during winter months. The recorded discharge to Brown's Creek was 9,588,210 cubic feet (Table 20). High water levels in Brown's Creek occasionally created backwater conditions at the site, making discharge calculations difficult during some periods. The outlet appeared to be flowing at least a small amount the entire monitoring period except for late September into early October. A significant portion of the stage and discharge data was lost between August 7 and September 3 due to a logger malfunction.

4b. Phosphorus & Sediment

The TP load during recorded data was estimated at 165.5 pounds of phosphorus, while the estimated TSS load was 4,788 pounds of sediment (Table 20). The concentrations of TSS and TP were not precipitation or stage dependent, indicating the wetland complex "pulses" nutrients following storm events. As such, TP and TSS loads were calculated by averaging samples with similar concentrations based on seasonality, and applying the average concentration to the recorded discharge for the time period, which is consistent with past years. One TSS sample on June 3 was excluded as an outlier. It is important to note the characteristics of the site and sampling strategy do not allow for load calculations as precise as other monitored strategies, i.e. composite sampling.

Samples collected show the site nearly always meets the 2B standard of 30 mg/L of TSS, but exceeded the standard of 0.100 mg/L of TP for every sample collected (Table 19). The water discharging from the wetland is generally low in suspended sediment and other materials, but quite high in phosphorus, a large fraction of which is often dissolved phosphorus. This is typical of wetlands, which break down organic materials while filtering particulate matter, but can have negative effects on receiving waters by contributing nutrients that are readily available to organisms like algae.

Table 19. McKusick Wetland Outlet 2024 Chemistry Results

Sample Type	Start	End	TSS (mg/L)	VSS (mg/L)	TKN (mg/L)	TP (mg/L)	Dissolved P (mg/L)	Copper (mg/L)	Nickel (mg/L)	Lead (mg/L)	Zinc (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Chloride (mg/L)	Nitrite N (mg/L)	Nitrate N (mg/L)	Ammonia Nitrogen (mg/L)	Hardness (mg/L _CaCO3)
Storm Grab	5/22/2024 12:26	5/22/2024 12:26	7	<6	1.14	0.264	0.166	<0.00100	0.00087	<0.00050	<0.00500	<0.00010	<0.00250	20.5	<0.06	<0.20	<0.06	102
Storm Grab	6/3/2024 15:31	6/3/2024 15:31	150	54	1.01	0.280	0.115	<0.00100	0.00059	<0.00050	<0.00500	<0.00010	<0.00250	40.6	<0.06	<0.20	<0.06	145
Base Grab	6/26/2024 14:46	6/26/2024 14:46	7	<7	0.9	0.395	0.273	<0.00100	0.00054	<0.00050	<0.00500	<0.00010	<0.00250	48.0	<0.06	<0.20	<0.06	155
Base Grab	7/23/2024 10:08	7/23/2024 10:08	6	<5	0.83	0.222	0.088	<0.00100	<0.00050	<0.00050	<0.00500	<0.00010	<0.00250	28.5	<0.06	<0.20	<0.06	131
Base Grab	7/31/2024 8:10	7/31/2024 8:10	14	<12	1.80	0.249	0.042	<0.00100	0.00110	<0.00050	0.00810	<0.00010	<0.00250	7.8	<0.06	<0.20	0.10	198
Storm Grab	8/6/2024 15:16	8/6/2024 15:16	<5	<5	1.06	0.241	0.142	0.00150	0.00150	<0.00050	<0.00500	<0.00010	<0.00250	26.2	<0.06	<0.20	<0.06	97
Base Grab	9/3/2024 10:19	9/3/2024 10:19	8	4	0.80	0.306	0.122	<0.00100	0.00053	<0.00050	<0.00500	<0.00010	<0.00250	40.8	<0.06	<0.20	<0.06	144

Exceeds Water Quality Standard
No Exceedance Determinable
Exceeds Chronic Standard
Exceeds Max Standard
Exceeds Final Acute Standard

Table 20. McKusick Wetland Outlet 2023 Discharge and Loading Estimates

Site	Period	Total Flow (cf)	Total Flow (ac-ft)	Average TP Concentration (mg/L)	TP Range (mg/L)	Average TSS Concentration (mg/L)	TSS Range (mg/L)	TP Load (lbs.)	TSS Load (lbs.)
McKusick Wetland Outlet	4/24-8/7	9147260	210.10	0.275	0.222-0.395	8	5-14	157.0	4,568
McKusick Wetland Outlet	9/3-10/29	440,950	10.13	0.306	0.306	8	8	8.4	220
Total		**9,588,210**	**220.23**					**165.5**	**4,788**

Table 21. McKusick Wetland Outlet Historic Loading Data

	2017	2018	2019	2020	2021	2022	2023	2024
McKusick Wetland Outlet								
Discharge (cf)	18,610,746	8,319,145	43,988,560	18,179,910	5,072,806	5,153,850	5,834,490	9,588,210
Total pounds of Phosphorus exported	298.2	138.5	453.1	284.6	68.3	69.1	115.1	165.5
Total pounds of TSS exported	9,055	5,072	13,275	10,927	2,327	2,868	3,870	4,788
Values reported are totals during the monitoring period only.								

4c. Temperature

Historic thermal data recorded at McKusick Wetland Outlet show temperatures roughly 2.5 ^{o}C higher, on average, than those recorded at McKusick Road during similar time periods. The wetland is warmed by solar radiation and frequently reaches high temperatures. Although the wetland outlet is not intended to be suitable for trout, when compared to TMDL thresholds of 18.3 ^{o}C (threat level) and 23.9 ^{o}C (critical level), water temperatures exceeded the thresholds 58.9% and 7.7%, respectively, of the monitoring period when flow was present. It is important to compare temperatures to these thresholds because they directly influence temperatures in Brown's Creek when discharged upstream of the McKusick Road site. Trout have been observed and stocked in the reach of Brown's Creek the wetland outlet discharges to, but only during spring and fall when water temperatures are cooler. Continuous temperature data can be seen in Figure 11, where temperature data has been removed during periods of zero water discharge, alongside the daily average temperature at McKusick Road.

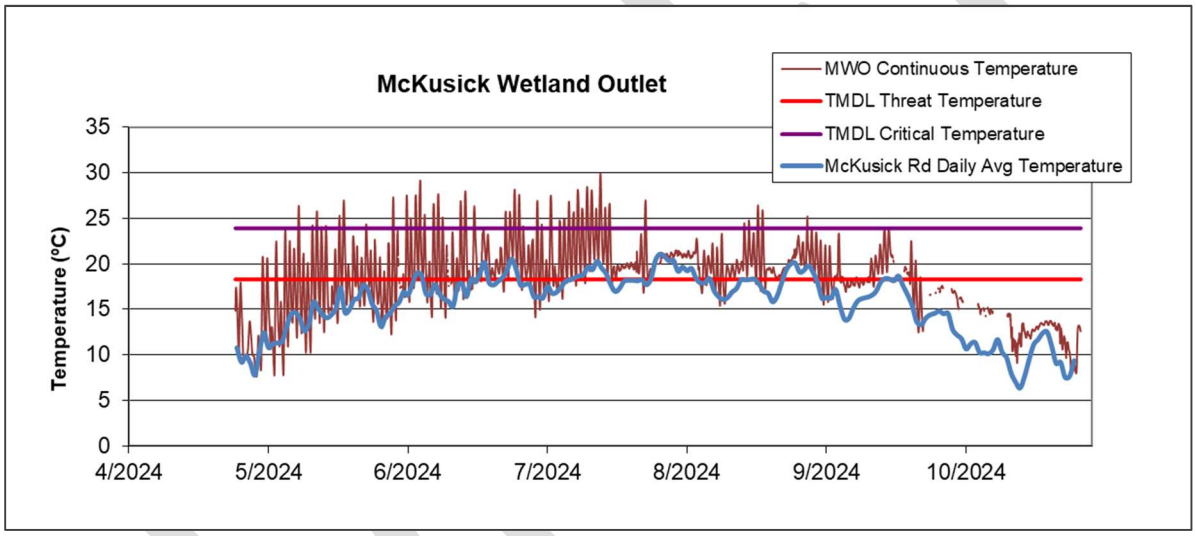

Figure 12. McKusick Wetland Outlet 2024 Continuous Temperature

V. RECOMMENDATIONS

- Continue chloride monitoring on lakes likely to be impacted by salt use.
- Perform macrophyte surveys on lakes that are lacking data.
- Continue collecting water quality and continuous discharge data at existing monitoring stations to track changes in the watershed and provide baseline data for modeling and other uses.
- Continue identifying salt use reduction strategies to limit chloride loading.
- Continue identifying cooperative opportunities with landowners to implement stream shading projects.
- Continue monitoring repairs to erosion issues in the diversion drainage to prevent degradation of McKusick Lake.
- Consider modifying sampling on Brown's Creek to match Metropolitan Council's WOMP program using unbiased sampling regimes as opposed to storm/event based sampling to allow for more rigorous statistical trend analysis.

APPENDIX A - WATER QUALITY DATA – BY LAKE

Brown's Creek Watershed Lakes: Bass East, Bass West, Benz, Brewer's Pond, Goggins, Heifort's Pond, Jackson WMA (Sinnits Pond), July Avenue, Kismet, Long (North Basin), Lynch North, Lynch South, Masterman, North School Section, Pat, Plaisted, South School Section, and Woodpile

Lake grades are assessed using the Metropolitan Council's lake grade system. Grades are determined based on May through September averages of total phosphorus concentration, uncorrected trichromatic chlorophyll-α concentration, and Secchi disk transparency.

The Minnesota Pollution Control Agency (MPCA) uses the June through September average to assess impairment status of a lake based on total phosphorus concentration, pheophytin-corrected chlorophyll-α concentration, and Secchi disk transparency. The MPCA sets lake eutrophication standards for aquatic life and recreation. The standard for TP is 0.040 mg/L for deep lakes and 0.060 mg/L for shallow lakes. In general, shallow lakes are defined as less than 15 feet deep, with greater than 80% littoral area, and less than 10 acres.

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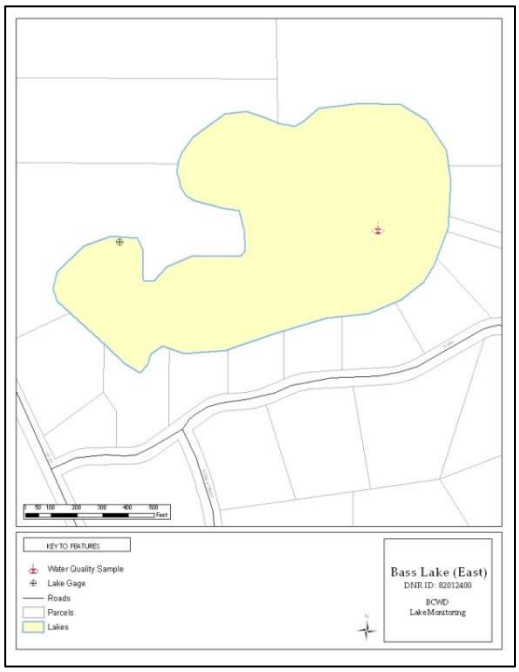
Bass Lake (East)

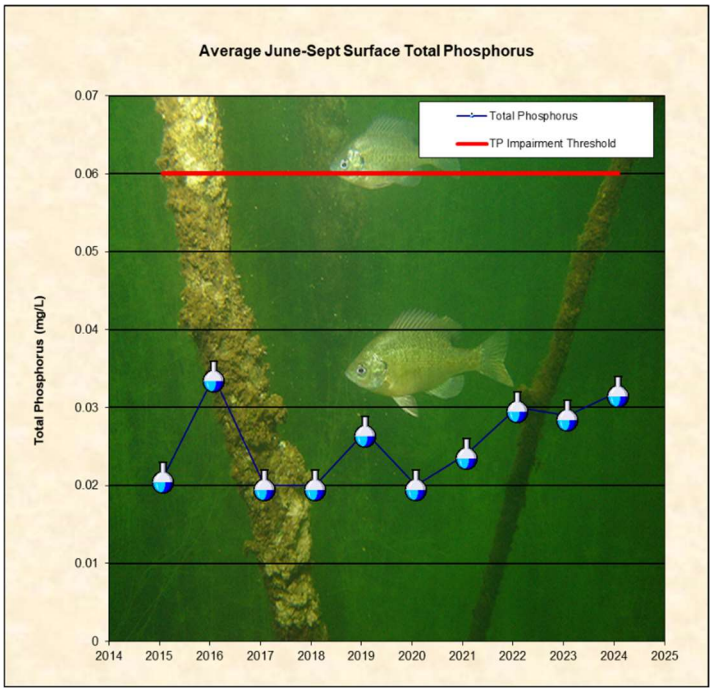
2024 Lake Grade: B+

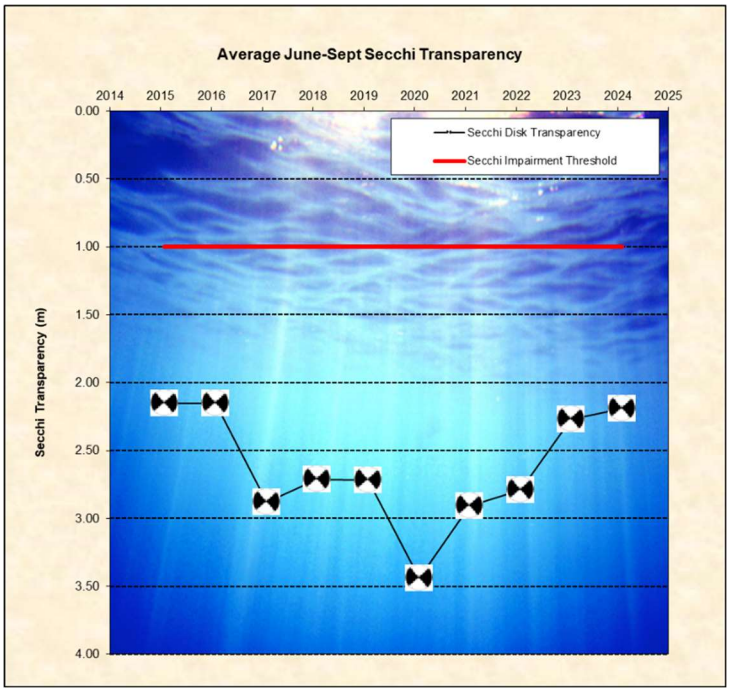
- DNR ID #: 820124
- Municipality: City of Grant
- Location: Section 10, T30N-R21W
- Lake Size: 29 Acres
- Maximum Depth (2024): 18 ft.
- Ordinary High Water Mark: 960.20 ft.
- 100-Year High Water Level: 960.40 ft.
- 99% Littoral
  Note: Littoral area is the portion of the lake <15 ft. and dominated by aquatic vegetation.



Summary Points

- Based on chlorophyll-α data, the lake is classified as mesotrophic according to the Carlson Trophic State Index.
- Using the Kendall's Tau correlation test ($p<0.05$) there is a statistically significant **improving** trend for average total phosphorus and average chlorophyll-α, and the trend for the average Secchi transparency is skewed due to vegetation limiting the transparency.
- The major land use is rural/agricultural.
- The lake stratified in 2024 with a thermocline around 2 meters.
- This lake is categorized as shallow according to the Minnesota Pollution Control Agency's standards.
- Lab methodology was changed for 2023 total phosphorus sample analysis, as such no results were reported <0.022 mg/L (April-mid September).





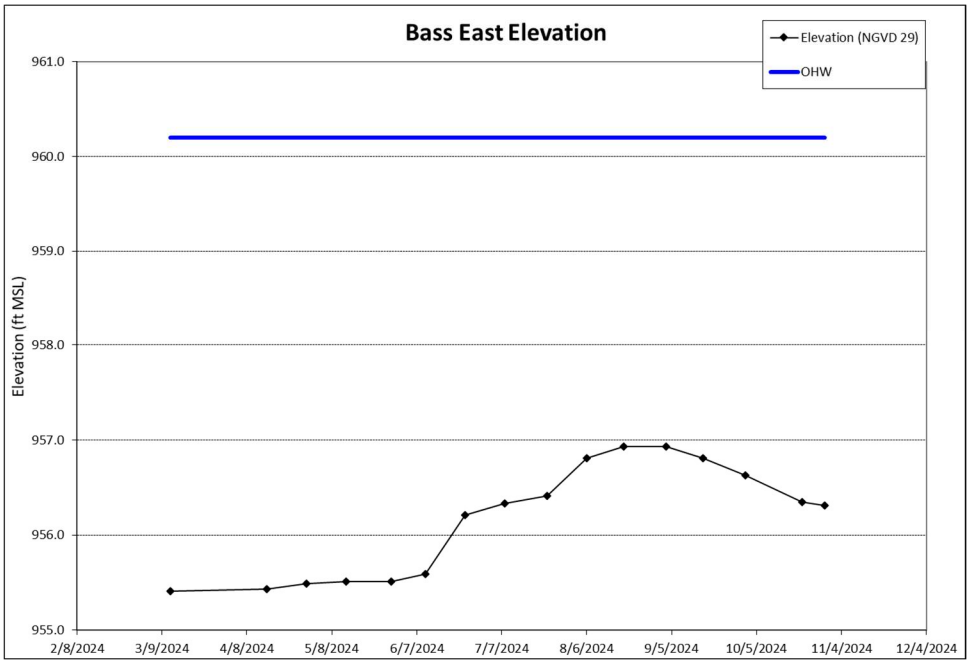
Date/Time	Total Phosphorus (mg/L)	Uncorrected Trichromatic Chlorophyll-*a* (ug/L)	Pheophytin-Corrected Chlorophyll-*a* (ug/L)	Total Kjeldahl Nitrogen (mg/L)	Secchi Disk Depth (m)	Surface Temperature (Celsius)	Surface Dissolved Oxygen (mg/L)
4/15/2024 12:25	0.015	2.0	2.1	0.51	3.66	15.6	15.14
4/29/2024 10:35	0.017	2.6	2.1	0.49	3.81	11.2	9.22
5/13/2024 10:56	0.021	3.0	2.9	0.54	2.59	20.2	9.30
5/29/2024 10:42	0.030	2.0	1.6	0.70	2.13	19.8	6.81
6/10/2024 10:07	0.058	4.5	3.5	0.73	2.13	22.2	7.10
6/24/2024 11:44	0.040	5.3	4.5	2.64	1.68	24.5	9.22
7/8/2024 9:53	0.040	16.0	15.0	0.66	2.29	25.0	11.44
7/23/2024 9:46	0.023	2.7	2.1	0.75	2.13	25.7	9.82
8/6/2024 10:25	0.023	4.3	3.2	0.63	2.29	24.0	5.69
8/19/2024 10:16	0.024	4.5	4.3	0.67	2.29	24.9	11.04
9/3/2024 10:10	0.030	8.4	6.7	0.84	2.29	23.0	12.23
9/16/2024 9:43	0.020	3.9	3.2	0.81	2.44	24.1	12.81
10/1/2024 13:02	0.035	8.3	6.9	0.62	2.44	20.2	8.41
10/21/2024 10:54	0.024	20.0	21.0	0.68	2.13	13.9	14.24
2024 Average	0.029	6.3	5.7	0.81	2.45	21.0	10.18
2024 Summer Average	0.032	6.2	5.3	0.97	2.19	24.2	9.92

Water quality thresholds are 0.04 mg/L TP, 14 µg/L CL-a, 1.4 m Secchi depth*

Shallow lake water quality thresholds are 0.06 mg/L TP, 20 µg/L CL-a, 1.0 m Secchi depth*

	High	High Date	Low	Low Date	Average
2024 Elevation (ft)	956.93	8/19/2024	955.41	3/12/2024	956.11

*Data requirements and determinations of use assessment according to the MPCA's Guidance Manual for Assessing the Quality of Minnesota Surface Waters: "Samples must be collected over a minimum of 2 years and data used for assessments must be collected from June to September. Typically, a minimum of 8 individual data points for TP, corrected chlorophyll-a (chl-a corrected for pheophytin), and Secchi are required. Data used for phosphorus and chlorophyll-a calculations are limited to those collected from the upper most 3 meters of the water column (surface). If more than one sample is collected in a lake per day, these values are averaged to yield a daily average value. Following this step, all June to September data for the 10-year assessment window are averaged to determine summer-mean values for TP, corrected chl-a, and Secchi depth. These values are then compared to the standards and the assessment is made."

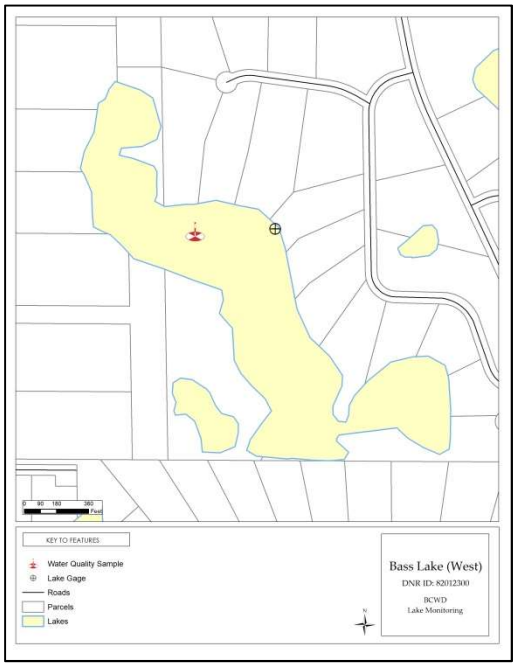


Lake Water Quality Summary										
	Lake Grades (May-Sept)									
	2024	2023	2022	2021	2020	2019	2018	2017	2016	2015
Total Phosphorus (mg/l)	B	B	B	A	A	B	A	A	C	A
Chlorophyll-*a* (ug/l)	A	A	A	A	A	A	A	A	A	A
Secchi depth (ft)	B	B	B	B	A	B	B	B	B	C
Overall	**B+**	**B+**	**B+**	**A-**	**A**	**B+**	**A-**	**A-**	**B**	**B+**

Bass Lake (West)

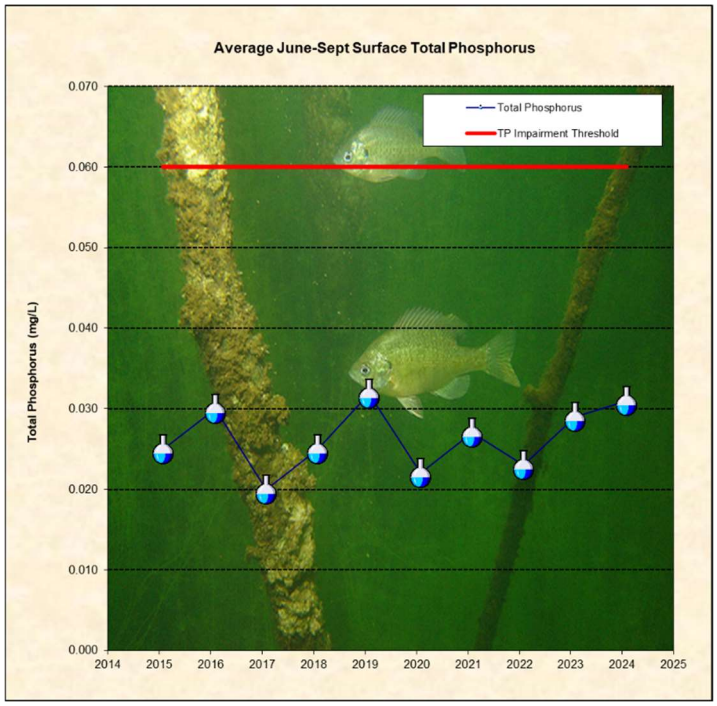
2024 Lake Grade: B-

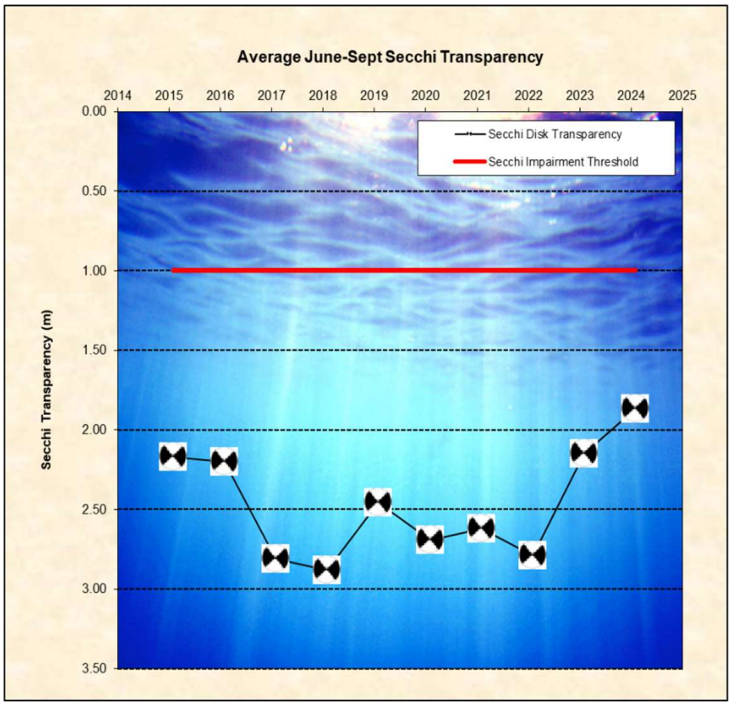
- DNR ID #: 820123
- Municipality: City of Grant
- Location: Section 10, T30N-R21W
- Lake Size: 72 Acres
- Maximum Depth (2024): 15 ft.
- Ordinary High Water Mark: 952.60 ft.
- 100-Year High Water Level: 955.90 ft.
- 100% Littoral
  Note: Littoral area is the portion of the lake <15 ft and dominated by aquatic vegetation.



Summary Points

- Based on chlorophyll-α data, the lake is classified as eutrophic according to the Carlson Trophic State Index.
- Using the Kendall's Tau correlation test ($p<0.05$) there is a statistically significant **improving** trend for average total phosphorus, no trend for average chlorophyll-α, and the trend for the average Secchi transparency is skewed due to vegetation limiting the transparency.
- The major land use is rural/agricultural.
- The lake stratified in 2024 with a thermocline between 2 and 3 meters.
- This lake is categorized as shallow according to the Minnesota Pollution Control Agency's standards.
- Lab methodology was changed for 2023 total phosphorus sample analysis, as such no results were reported <0.022 mg/L (April-mid September).





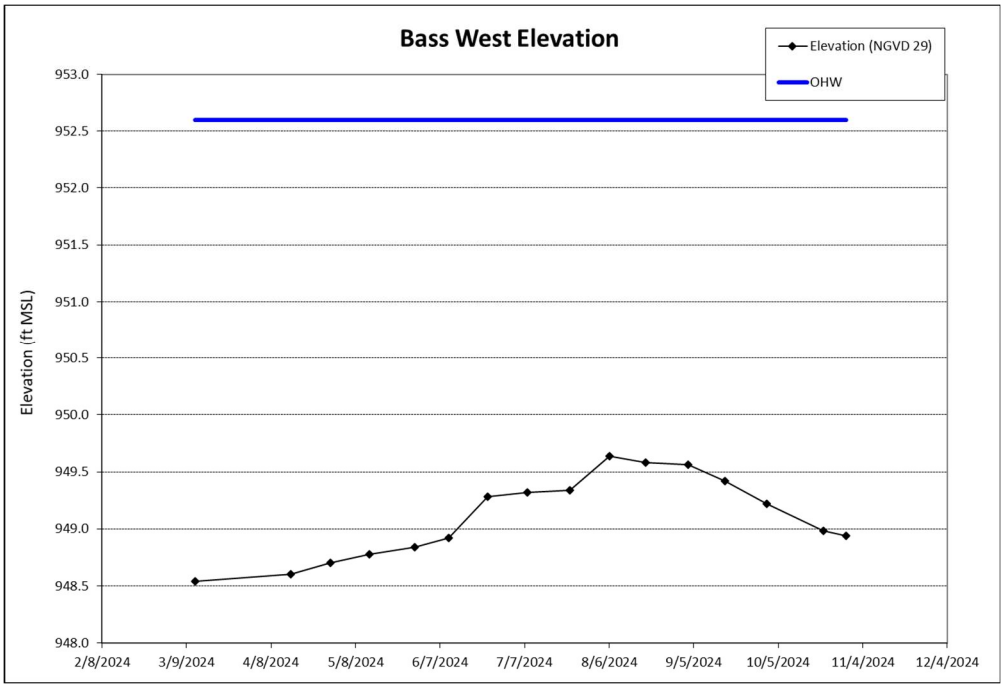
Date/Time	Total Phosphorus (mg/L)	Uncorrected Trichromatic Chlorophyll-*a* (ug/L)	Pheophytin-Corrected Chlorophyll-*a* (ug/L)	Total Kjeldahl Nitrogen (mg/L)	Secchi Disk Depth (m)	Surface Temperature (Celsius)	Surface Dissolved Oxygen (mg/L)
4/15/2024 12:00	0.018	2.0	1.9	0.66	3.51	14.2	14.73
4/29/2024 11:02	0.018	3.7	2.7	0.51	3.11	11.3	9.44
5/13/2024 10:26	0.020	2.4	2.1	0.59	2.74	19.2	9.78
5/29/2024 10:08	0.022	2.3	2.1	0.58	3.35	19.5	7.50
6/10/2024 10:34	0.023	3.7	3.5	0.62	2.90	22.2	8.34
6/24/2024 11:16	0.027	5.3	4.8	1.59	2.44	23.4	8.70
7/8/2024 10:17	0.022	5.8	5.3	0.67	2.29	24.3	11.76
7/23/2024 10:12	0.026	8.3	8.8	0.74	2.13	25.4	9.53
8/6/2024 10:50	0.046	15.0	14.0	0.86	1.37	24.6	7.32
8/19/2024 9:53	0.043	20.0	18.0	1.09	1.07	24.2	12.17
9/3/2024 10:40	0.040	30.0	28.0	1.09	0.91	22.6	14.33
9/16/2024 10:06	0.024	6.9	5.6	0.88	1.83	24.1	11.92
10/1/2024 13:30	0.037	11.0	9.3	0.96	1.83	19.9	8.74
10/21/2024 11:22	0.019	3.2	2.7	0.79	3.51	13.6	12.63
2024 Average	0.028	8.5	7.8	0.83	2.36	20.6	10.49
2024 Summer Average	0.031	11.9	11.0	0.91	1.87	23.9	10.51

Water quality thresholds are 0.04 mg/L TP, 14 µg/L CL-a, 1.4 m Secchi depth*

Shallow lake water quality thresholds are 0.06 mg/L TP, 20 µg/L CL-a, 1.0 m Secchi depth*

	High	High Date	Low	Low Date	Average
2024 Elevation (ft)	949.64	8/6/2024	948.54	3/12/2024	949.12

*Data requirements and determinations of use assessment according to the MPCA's Guidance Manual for Assessing the Quality of Minnesota Surface Waters: "Samples must be collected over a minimum of 2 years and data used for assessments must be collected from June to September. Typically, a minimum of 8 individual data points for TP, corrected chlorophyll-a (chl-a corrected for pheophytin), and Secchi are required. Data used for phosphorus and chlorophyll-a calculations are limited to those collected from the upper most 3 meters of the water column (surface). If more than one sample is collected in a lake per day, these values are averaged to yield a daily average value. Following this step, all June to September data for the 10-year assessment window are averaged to determine summer-mean values for TP, corrected chl-a, and Secchi depth. These values are then compared to the standards and the assessment is made."

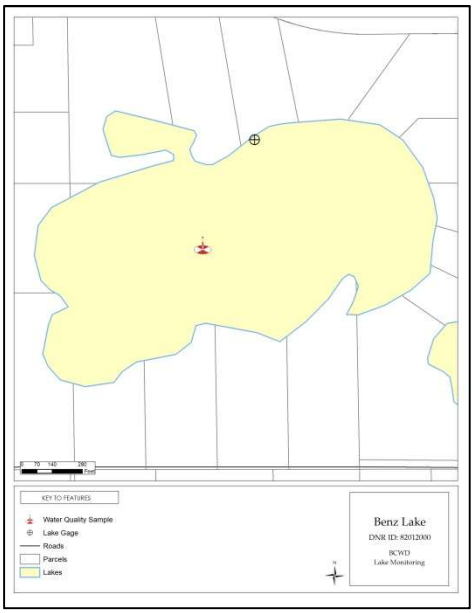


Lake Water Quality Summary										
	Lake Grades (May-Sept)									
	2024	2023	2022	2021	2020	2019	2018	2017	2016	2015
Total Phosphorus (mg/l)	B	B	A	B	A	B	B	A	B	B
Chlorophyll-*a* (ug/l)	B	A	A	A	A	A	A	A	A	A
Secchi depth (ft)	C	B	B	B	A	B	B	B	B	C
Overall	**B-**	**B+**	**A-**	**B+**	**A**	**B+**	**B+**	**A-**	**B+**	**B**

Benz Lake

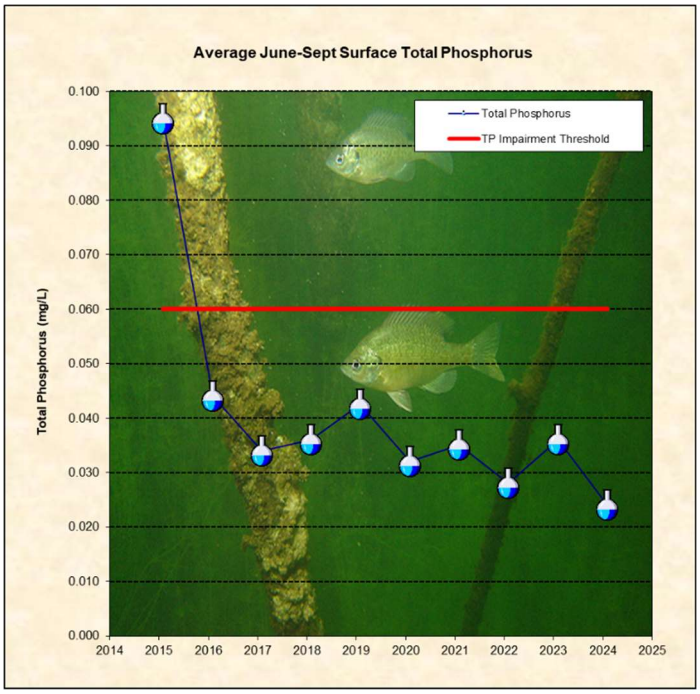
2024 Lake Grade: B

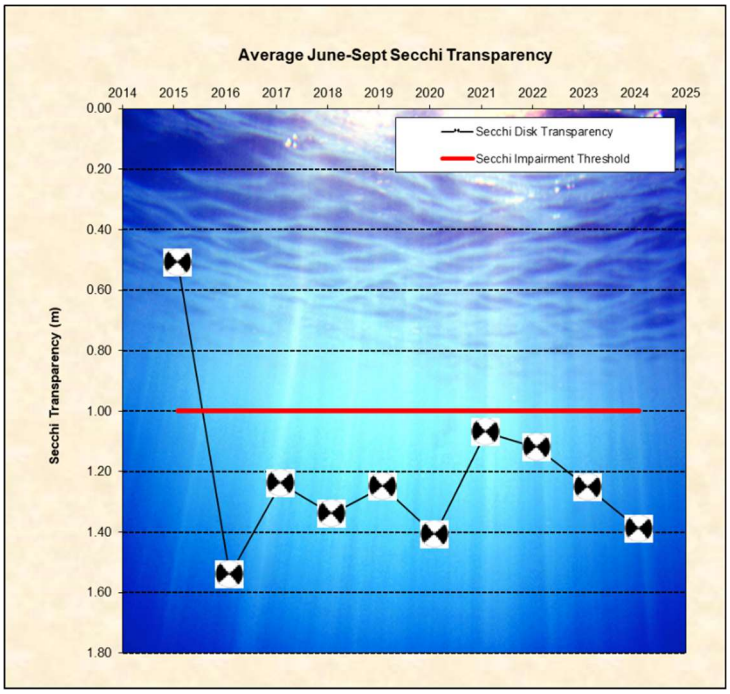
- DNR ID #: 820120
- Municipality: City of Grant
- Location: SE$^{1/4}$ Section 2, T30N-R21W
- Lake Size: 40 Acres
- Maximum Depth (2024): 7 ft.
- Ordinary High Water Mark: 958.90 ft.
- 100-Year High Water Level: 956.20 ft.
- 100% Littoral
  Note: Littoral area is the portion of the lake <15 ft. and dominated by aquatic vegetation.



Summary Points

- Based on chlorophyll-α data, the lake is classified as eutrophic according to the Carlson Trophic State Index.
- Using the Kendall's Tau correlation test ($p<0.05$) there is a statistically significant **improving** trend for average total phosphorus and average chlorophyll-α, and the trend for the average Secchi transparency is skewed due to vegetation limiting the transparency.
- The major land use is rural/agricultural.
- The lake did not stratify in 2024.
- This lake is categorized as shallow according to the Minnesota Pollution Control Agency's standards.
- Benz Lake is listed as impaired for nutrients on the Minnesota Pollution Control Agency's Impaired Waters List.





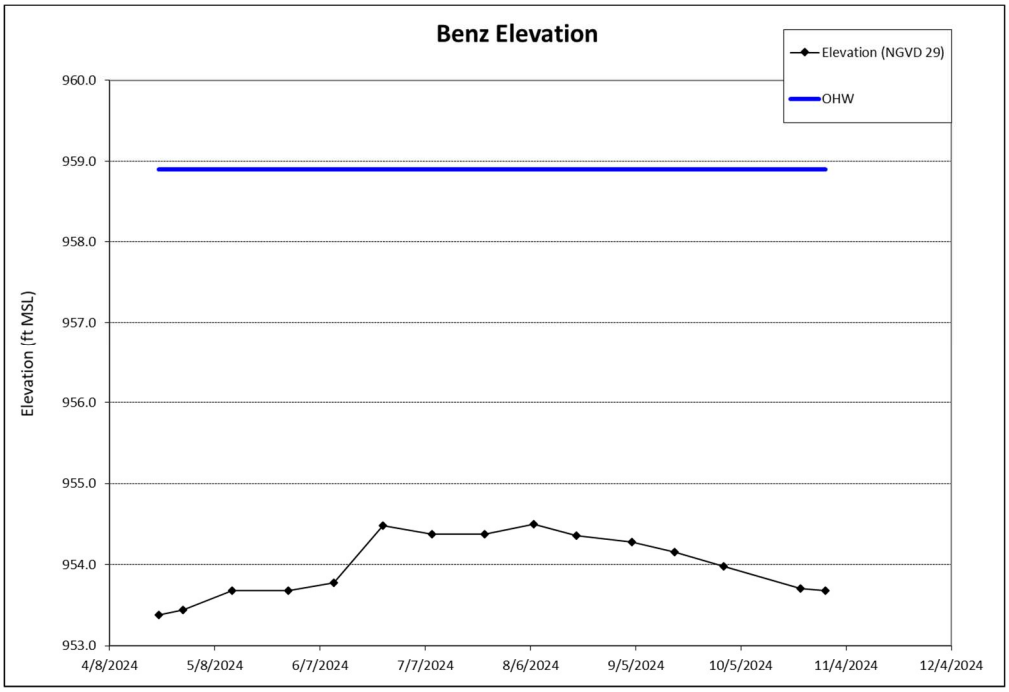
Date/Time	Total Phosphorus (mg/L)	Uncorrected Trichromatic Chlorophyll-*a* (ug/L)	Pheophytin-Corrected Chlorophyll-*a* (ug/L)	Total Kjeldahl Nitrogen (mg/L)	Secchi Disk Depth (m)	Surface Temperature (Celsius)	Surface Dissolved Oxygen (mg/L)
4/17/2024 13:50	0.026	3.0	2.4	0.42	1.52	11.7	12.67
4/29/2024 11:30	0.024	2.5	1.9	0.43	1.52	10.7	9.13
5/13/2024 11:28	0.029	1.4	1.1	0.54	1.52	20.4	10.76
5/29/2024 11:11	0.043	10.0	9.1	0.60	1.52	20.8	9.22
6/11/2024 14:24	0.028	3.5	3.2	0.55	1.37	23.0	10.25
6/25/2024 9:35	0.028	11.0	10.0	1.51	1.37	25.0	10.98
7/9/2024 10:25	0.026	8.4	8.0	0.76	1.22	25.3	15.42
7/24/2024 9:43	0.027	7.0	6.4	0.69	1.52	24.3	9.62
8/7/2024 12:40	0.025	3.6	2.9	0.91	1.22	24.7	10.86
8/19/2024 11:15	0.023	3.0	2.4	0.71	1.37	25.1	14.33
9/4/2024 12:58	0.026	9.7	8.3	0.68	1.52	23.0	14.85
9/16/2024 11:00	0.019	2.3	1.9	0.62	1.52	24.4	16.99
9/30/2024 11:25	0.010	3.6	3.2	0.48	1.37	21.5	14.41
10/22/2024 9:09	0.017	5.1	5.1	0.54	1.22	14.0	16.23
2024 Average	0.025	5.3	4.7	0.67	1.41	21.0	12.55
2024 Summer Average	0.024	5.8	5.1	0.77	1.39	24.0	13.08

Water quality thresholds are 0.04 mg/L TP, 14 µg/L CL-a, 1.4 m Secchi depth*

Shallow lake water quality thresholds are 0.06 mg/L TP, 20 µg/L CL-a, 1.0 m Secchi depth*

	High	High Date	Low	Low Date	Average
2024 Elevation (ft)	954.50	8/7/2024	953.38	4/22/2024	954.04

*Data requirements and determinations of use assessment according to the MPCA's Guidance Manual for Assessing the Quality of Minnesota Surface Waters: "Samples must be collected over a minimum of 2 years and data used for assessments must be collected from June to September. Typically, a minimum of 8 individual data points for TP, corrected chlorophyll-a (chl-a corrected for pheophytin), and Secchi are required. Data used for phosphorus and chlorophyll-a calculations are limited to those collected from the upper most 3 meters of the water column (surface). If more than one sample is collected in a lake per day, these values are averaged to yield a daily average value. Following this step, all June to September data for the 10-year assessment window are averaged to determine summer-mean values for TP, corrected chl-a, and Secchi depth. These values are then compared to the standards and the assessment is made."

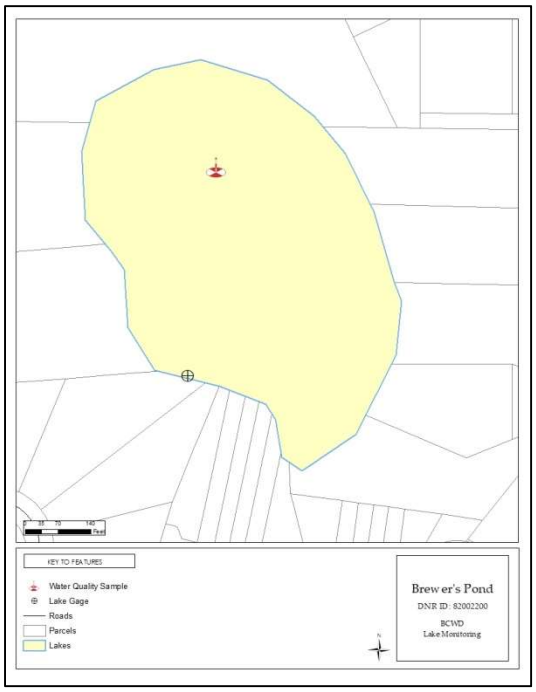


Lake Water Quality Summary										
	Lake Grades (May-Sept)									
	2024	2023	2022	2021	2020	2019	2018	2017	2016	2015
Total Phosphorus (mg/l)	B	C	B	C	B	C	C	C	C	D
Chlorophyll-*a* (ug/l)	A	A	A	A	A	C	A	A	A	D
Secchi depth (ft)	C	C	D	D	C	C	C	D	C	F
Overall	**B**	**B-**	**B-**	**C+**	**B**	**C**	**B-**	**C+**	**B-**	**D-**

Brewer's Pond

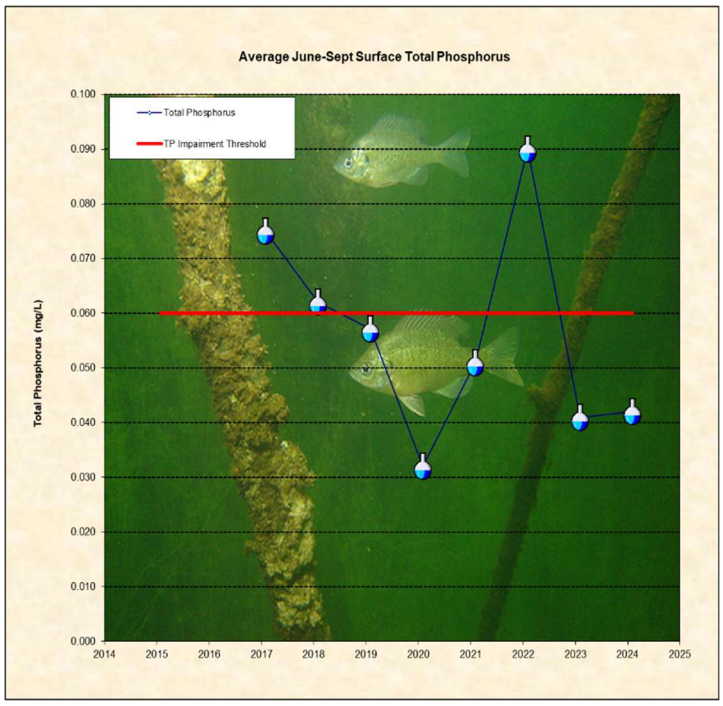
2024 Lake Grade: C-

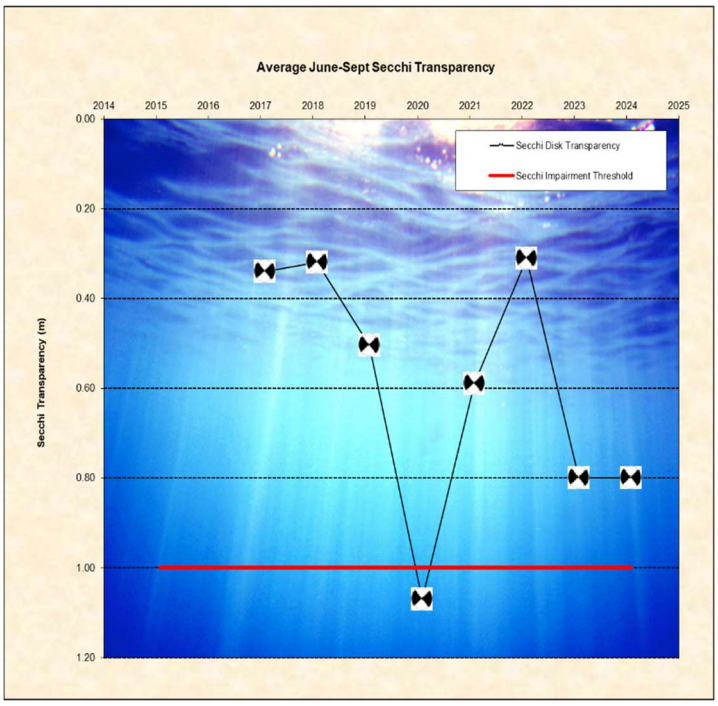
- DNR ID #: 820022
- Municipality: City of Stillwater
- Location: SE$^{1/4}$ Section 31, T30N-R20W
- Lake Size: 9 Acres
- Maximum Depth (2024): 15 ft.
- Ordinary High Water Mark: 891.90 ft.
- 100-Year High Water Level: 893.85 ft.
- 100% Littoral
  Note: Littoral area is the portion of the lake <15 ft. and dominated by aquatic vegetation.



Summary Points

- Based on chlorophyll-α data, the lake is classified as eutrophic according to the Carlson Trophic State Index.
- Using the Kendall's Tau correlation test ($p<0.05$) there is currently no trend for the average total phosphorus, average chlorophyll-α, and average Secchi transparency.
- The major land use is urban/residential.
- The lake stratified in 2024 with a thermocline around 3 meters.
- This lake is categorized as shallow according to the Minnesota Pollution Control Agency's standards.





Date/Time	Total Phosphorus (mg/L)	Uncorrected Trichromatic Chlorophyll-*a* (ug/L)	Pheophytin-Corrected Chlorophyll-*a* (ug/L)	Total Kjeldahl Nitrogen (mg/L)	Secchi Disk Depth (m)	Surface Temperature (Celsius)	Surface Dissolved Oxygen (mg/L)
4/15/2024 14:18	0.043	8.2	6.9	1.97	1.07	15.4	13.94
4/25/2024 7:00	0.046	6.0	5.3	1.75	1.40	12.5	NA
5/13/2024 14:10	0.046	4.3	3.5	1.76	1.83	20.8	9.06
5/27/2024 7:00	0.042	16.0	14.0	1.59	1.30	19.7	NA
6/11/2024 12:22	0.038	12.0	11.0	1.42	1.22	22.1	9.17
6/24/2024 9:00	0.039	17.0	15.0	1.42	1.60	24.0	NA
7/8/2024 11:15	0.042	40.0	42.0	1.60	0.61	26.0	12.52
7/23/2024 7:15	0.044	47.0	47.0	1.76	0.80	25.2	NA
8/6/2024 11:50	0.044	50.0	50.0	1.67	0.61	24.9	11.18
8/23/2024 18:20	0.037	31.0	28.0	1.78	0.80	24.2	NA
9/3/2024 12:55	0.043	46.0	46.0	1.80	0.46	23.1	14.12
9/25/2024 8:30	0.040	45.0	46.0	1.92	0.50	20.3	NA
9/30/2024 13:13	0.049	34.0	33.0	1.88	0.61	21.5	12.93
10/18/2024 7:40	0.054	26.0	26.0	2.10	0.90	11.7	NA
2024 Average	0.043	27.3	26.7	1.74	0.98	20.8	11.85
2024 Summer Average	0.042	35.8	35.3	1.69	0.80	23.5	11.98

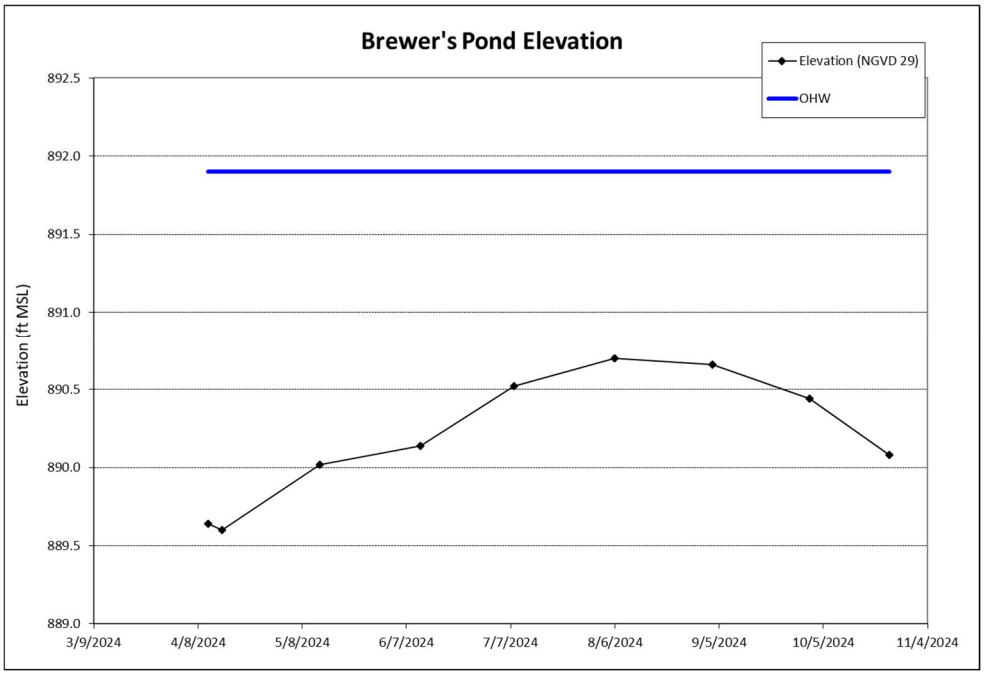
Water quality thresholds are 0.04 mg/L TP, 14 µg/L CL-a, 1.4 m Secchi depth*

Shallow lake water quality thresholds are 0.06 mg/L TP, 20 µg/L CL-a, 1.0 m Secchi depth*

Samples collected by a volunteer

	High	High Date	Low	Low Date	Average
2024 Elevation (ft)	890.70	8/6/2024	889.60	4/15/2024	890.22

*Data requirements and determinations of use assessment according to the MPCA's Guidance Manual for Assessing the Quality of Minnesota Surface Waters: "Samples must be collected over a minimum of 2 years and data used for assessments must be collected from June to September. Typically, a minimum of 8 individual data points for TP, corrected chlorophyll-a (chl-a corrected for pheophytin), and Secchi are required. Data used for phosphorus and chlorophyll-a calculations are limited to those collected from the upper most 3 meters of the water column (surface). If more than one sample is collected in a lake per day, these values are averaged to yield a daily average value. Following this step, all June to September data for the 10-year assessment window are averaged to determine summer-mean values for TP, corrected chl-a, and Secchi depth. These values are then compared to the standards and the assessment is made."

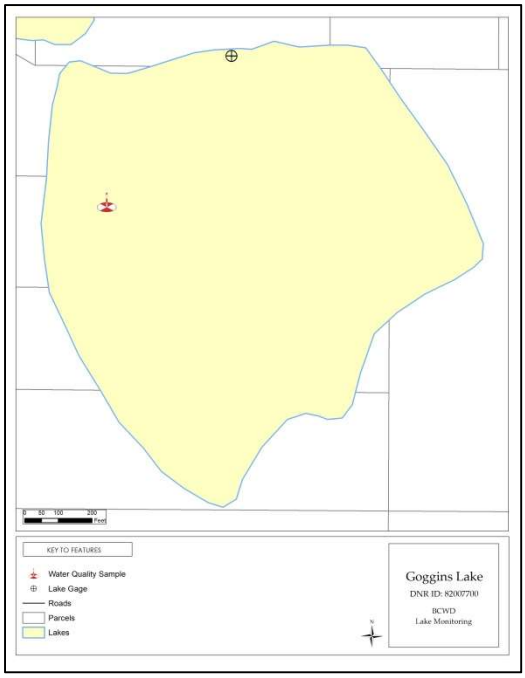


Lake Water Quality Summary										
	Lake Grades (May-Sept)									
	2024	2023	2022	2021	2020	2019	2018	2017	2016	2015
Total Phosphorus (mg/l)	C	C	D	C	C	C	C	D	NA	NA
Chlorophyll-*a* (ug/l)	C	C	F	C	C	C	D	D	NA	NA
Secchi depth (ft)	D	D	F	F	D	F	F	F	NA	NA
Overall	**C-**	**C-**	**F+**	**D+**	**C-**	**D+**	**D**	**D-**	**NA**	**NA**

Goggins Lake

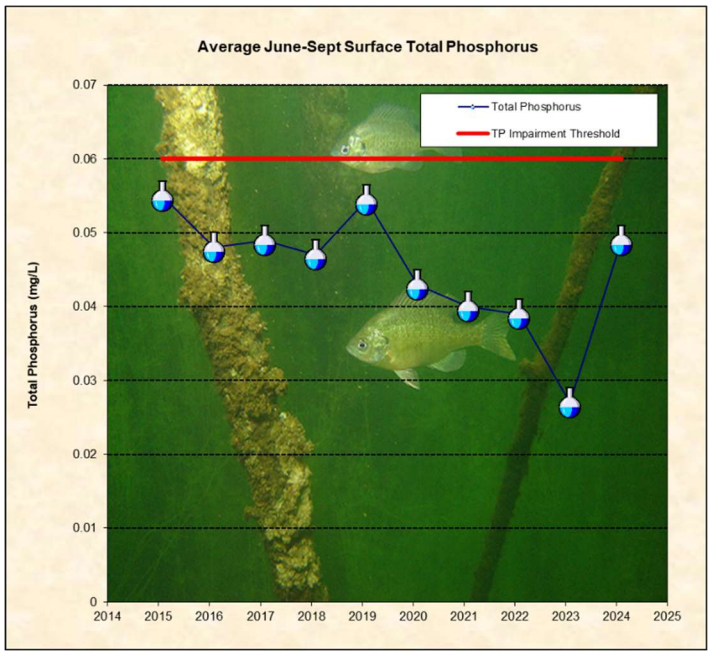
2024 Lake Grade: C

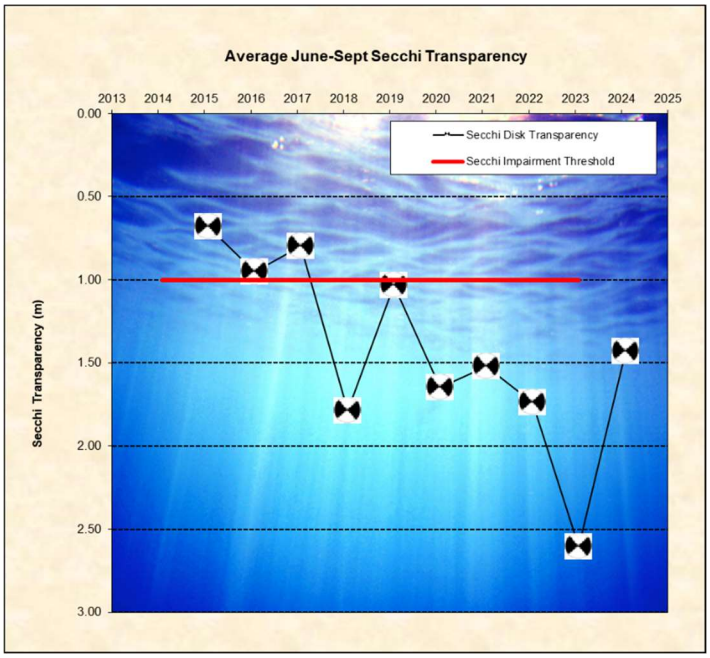
- DNR ID #: 820077
- Municipality: May Township
- Location: NW$^{1/4}$ Section 31, T31N-R20W
- Lake Size: 85 Acres
- Maximum Depth (2024): 15 ft.
- Ordinary High Water Mark: 966.50 ft.
- 100-Year High Water Level: 972.20 ft.
- 99% Littoral
  Note: Littoral area is the portion of the lake <15 ft. and dominated by aquatic vegetation.



Summary Points

- Based on chlorophyll-α data, the lake is classified as eutrophic according to the Carlson Trophic State Index.
- Using the Kendall's Tau correlation test ($p<0.05$) there is a statistically significant **improving** trend for the average total phosphorus, average chlorophyll-α, and average Secchi transparency.
- The major land use is rural/agricultural.
- The lake stratified in 2024 with a thermocline around 3 meters.
- This lake is categorized as shallow according to the Minnesota Pollution Control Agency's standards.
- Goggins Lake is listed as impaired for nutrients on the Minnesota Pollution Control Agency's Impaired Waters List.
- Lab methodology was changed for 2023 total phosphorus sample analysis, as such no results were reported <0.022 mg/L (April-mid September).





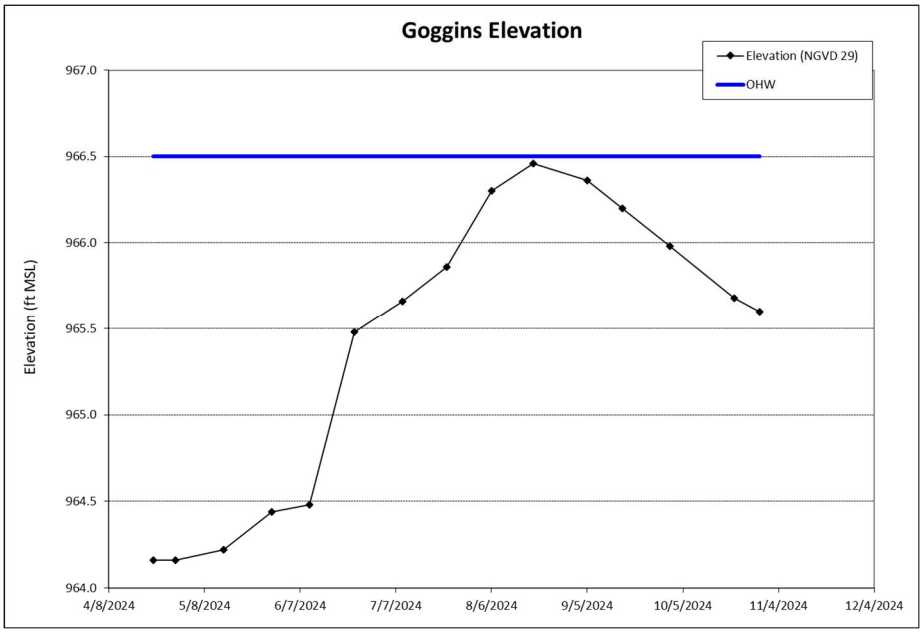
Date/Time	Total Phosphorus (mg/L)	Uncorrected Trichromatic Chlorophyll-*a* (ug/L)	Pheophytin-Corrected Chlorophyll-*a* (ug/L)	Total Kjeldahl Nitrogen (mg/L)	Secchi Disk Depth (m)	Surface Temperature (Celsius)	Surface Dissolved Oxygen (mg/L)
4/17/2024 10:13	0.029	3.2	2.7	0.77	2.74	11.4	13.46
4/29/2024 14:00	0.038	8.0	6.7	0.95	2.13	10.7	9.74
5/14/2024 11:40	0.033	5.5	5.1	0.85	1.83	18.8	10.88
5/29/2024 14:55	0.040	5.0	4.0	0.89	2.44	21.7	9.33
6/10/2024 14:20	0.040	26.0	25.0	1.09	1.52	23.5	9.09
6/24/2024 14:03	0.067	48.0	49.0	1.30	0.76	24.6	13.62
7/9/2024 14:30	0.052	21.0	19.0	1.31	1.52	28.3	16.15
7/23/2024 13:25	0.047	14.0	13.0	1.04	1.52	25.2	9.73
8/6/2024 15:07	0.046	19.0	18.0	1.08	1.37	25.5	8.51
8/19/2024 13:40	0.047	12.0	11.0	1.15	1.98	26.4	12.91
9/5/2024 9:50	0.051	15.0	11.0	1.15	1.37	22.2	10.25
9/16/2024 13:45	0.039	12.0	11.0	1.05	1.37	24.8	16.06
10/1/2024 9:36	0.065	39.0	35.0	1.16	1.22	19.7	7.78
10/21/2024 14:17	0.047	26.0	25.0	1.13	1.37	14.4	14.07
2024 Average	0.046	18.12	16.82	1.07	1.65	21.2	11.54
2024 Summer Average	0.049	20.88	19.63	1.12	1.43	25.1	12.04

Water quality thresholds are 0.04 mg/L TP, 14 µg/L CL-a, 1.4 m Secchi depth*

Shallow lake water quality thresholds are 0.06 mg/L TP, 20 µg/L CL-a, 1.0 m Secchi depth*

	High	High Date	Low	Low Date	Average
2024 Elevation (ft)	966.46	8/19/2024	964.16	4/29/2024	965.32

*Data requirements and determinations of use assessment according to the MPCA's Guidance Manual for Assessing the Quality of Minnesota Surface Waters: "Samples must be collected over a minimum of 2 years and data used for assessments must be collected from June to September. Typically, a minimum of 8 individual data points for TP, corrected chlorophyll-a (chl-a corrected for pheophytin), and Secchi are required. Data used for phosphorus and chlorophyll-a calculations are limited to those collected from the upper most 3 meters of the water column (surface). If more than one sample is collected in a lake per day, these values are averaged to yield a daily average value. Following this step, all June to September data for the 10-year assessment window are averaged to determine summer-mean values for TP, corrected chl-a, and Secchi depth. These values are then compared to the standards and the assessment is made."

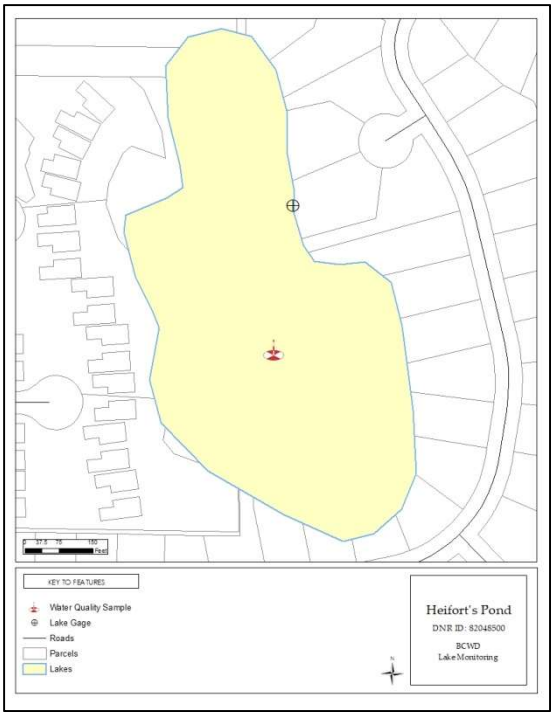


Lake Water Quality Summary										
	Lake Grades (May-Sept)									
	2024	2023	2022	2021	2020	2019	2018	2017	2016	2015
Total Phosphorus (mg/l)	C	C	C	C	C	C	C	C	C	C
Chlorophyll-*a* (ug/l)	C	A	B	B	B	C	B	C	C	C
Secchi depth (ft)	C	B	C	C	C	C	C	D	D	F
Overall	**C**	**B**	**C+**	**C+**	**C+**	**C**	**C+**	**C-**	**C-**	**D+**

Heifort's Pond

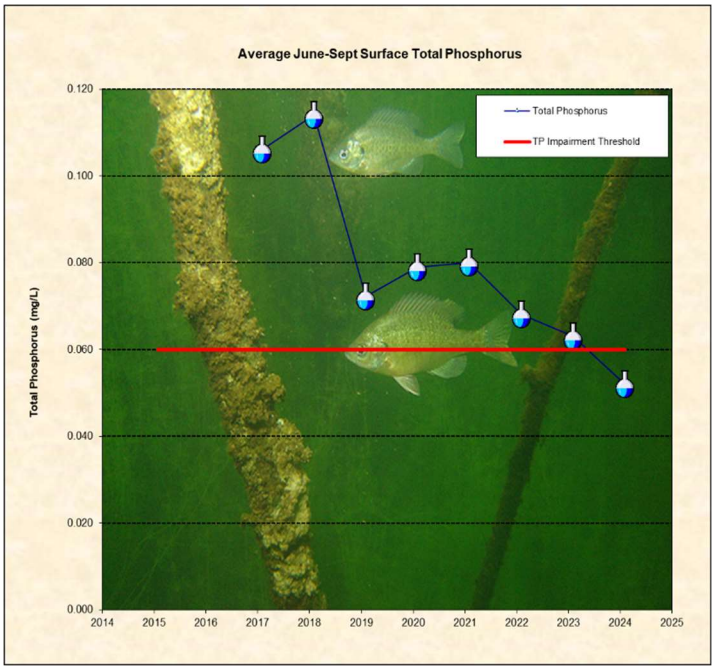
2024 Lake Grade: D+

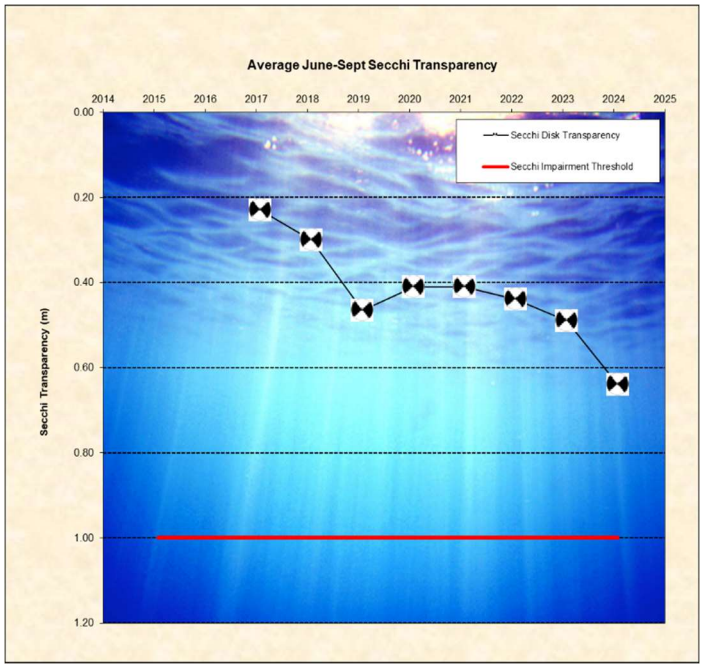
- DNR ID #: 820485
- Municipality: City of Stillwater
- Location: NW$^{1/4}$ Section 20, T30N-R20W
- Lake Size: 6 Acres
- Maximum Depth (2024): 8 ft.
- Ordinary High Water Mark: 883.9 ft.
- 100-Year High Water Level: 885.42 ft.
- 100% Littoral
  Note: Littoral area is the portion of the lake <15 ft. and dominated by aquatic vegetation.



Summary Points

- Based on chlorophyll-α data, the lake is classified as eutrophic according to the Carlson Trophic State Index.
- Using the Kendall's Tau correlation test ($p<0.05$) there is a statistically significant **improving** trend for the average total phosphorus and average chlorophyll-α, and no trend for the average Secchi transparency.
- The major land use is urban/residential.
- The lake did not stratify in 2024.
- This lake is categorized as shallow according to the Minnesota Pollution Control Agency's standards.



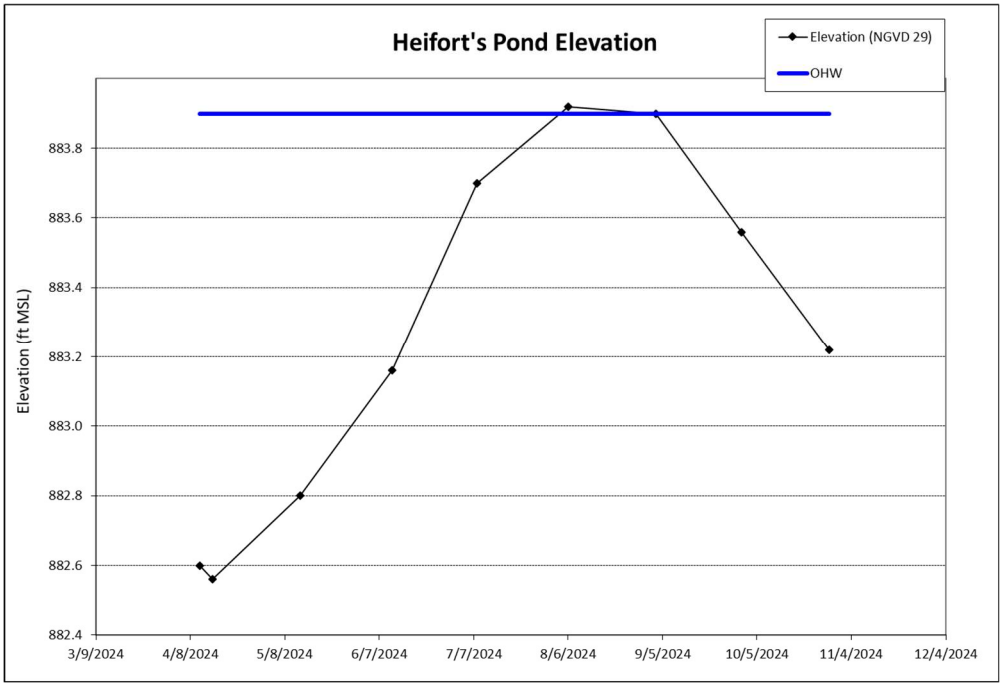


Date/Time	Total Phosphorus (mg/L)	Uncorrected Trichromatic Chlorophyll-*a* (ug/L)	Pheophytin-Corrected Chlorophyll-*a* (ug/L)	Total Kjeldahl Nitrogen (mg/L)	Secchi Disk Depth (m)	Surface Temperature (Celsius)	Surface Dissolved Oxygen (mg/L)
4/15/24 13:40	0.068	46.0	46.0	2.44	0.30	16.1	16.41
5/1/24 15:51	0.063	40.0	36.0	1.80	0.60	16.0	NA
5/13/24 13:40	0.057	25.0	24.0	1.94	0.46	21.1	10.03
5/29/24 12:27	0.058	34.0	32.0	1.85	0.70	21.2	NA
6/11/24 12:58	0.041	25.0	24.0	1.60	0.61	22.4	9.80
6/26/24 11:15	0.039	20.0	18.0	1.31	1.00	26.1	NA
7/8/24 10:45	0.029	13.0	13.0	1.35	0.91	25.1	11.98
7/23/24 12:43	0.053	34.0	33.0	1.53	1.00	25.9	NA
8/6/24 11:20	0.058	64.0	59.0	1.86	0.30	23.8	8.40
8/20/24 11:40	0.054	46.0	47.0	1.71	0.70	24.7	NA
9/3/24 12:25	0.070	89.0	85.0	2.18	0.30	23.0	14.38
9/22/24 11:30	0.068	61.0	60.0	2.29	0.50	21.0	NA
9/30/24 12:45	0.059	50.0	48.0	2.08	0.46	20.9	15.44
10/16/24 12:17	0.062	40.0	36.0	1.94	0.60	11.9	NA
2024 Average	0.056	41.9	40.1	1.85	0.60	21.4	12.35
2024 Summer Average	0.052	44.7	43.0	1.77	0.64	23.7	12.00

Water quality thresholds are 0.04 mg/L TP, 14 µg/L CL-a, 1.4 m Secchi depth*
Shallow lake water quality thresholds are 0.06 mg/L TP, 20 µg/L CL-a, 1.0 m Secchi depth*
Samples collected by a volunteer

	High	High Date	Low	Low Date	Average
2024 Elevation (ft)	883.92	8/6/2024	882.56	4/15/2024	883.28

*Data requirements and determinations of use assessment according to the MPCA's Guidance Manual for Assessing the Quality of Minnesota Surface Waters: "Samples must be collected over a minimum of 2 years and data used for assessments must be collected from June to September. Typically, a minimum of 8 individual data points for TP, corrected chlorophyll-a (chl-a corrected for pheophytin), and Secchi are required. Data used for phosphorus and chlorophyll-a calculations are limited to those collected from the upper most 3 meters of the water column (surface). If more than one sample is collected in a lake per day, these values are averaged to yield a daily average value. Following this step, all June to September data for the 10-year assessment window are averaged to determine summer-mean values for TP, corrected chl-a, and Secchi depth. These values are then compared to the standards and the assessment is made."

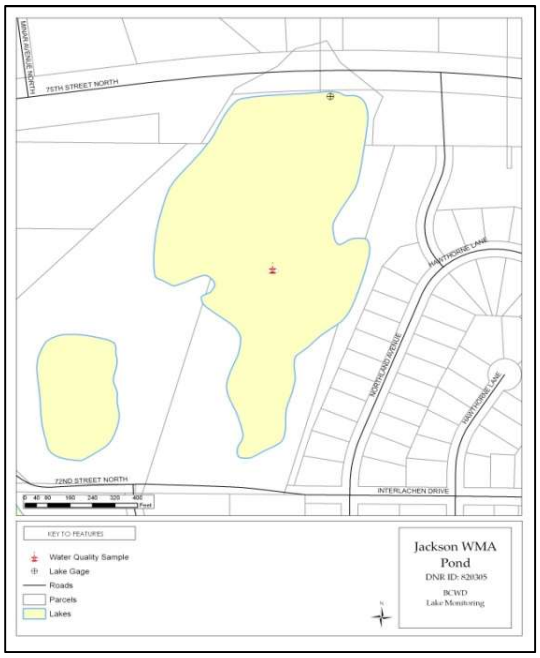


Lake Water Quality Summary										
	Lake Grades (May-Sept)									
	2024	2023	2022	2021	2020	2019	2018	2017	2016	2015
Total Phosphorus (mg/l)	C	C	D	D	D	D	D	D	NA	NA
Chlorophyll-*a* (ug/l)	C	D	D	F	D	D	F	F	NA	NA
Secchi depth (ft)	F	F	F	F	F	F	F	F	NA	NA
Overall	**D+**	**D**	**D-**	**F+**	**D-**	**D-**	**F+**	**F+**	**NA**	**NA**

Jackson WMA (Sinnits) Pond

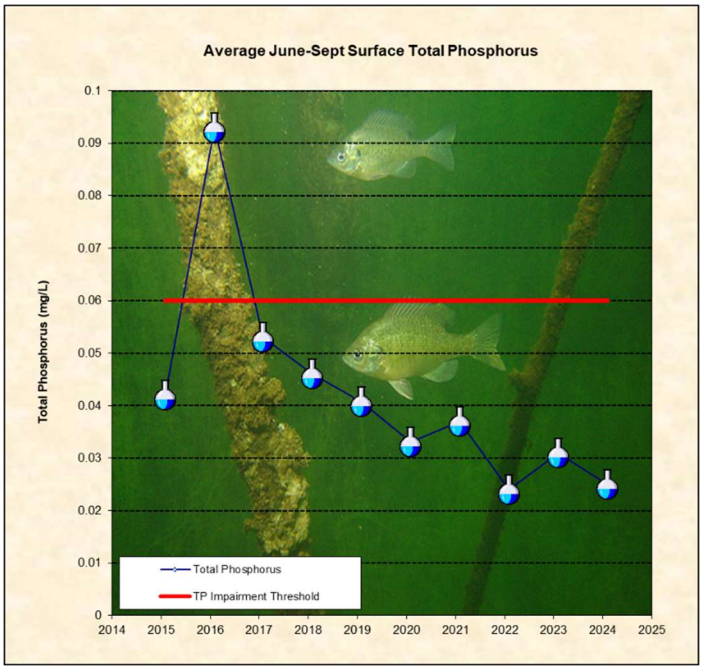
2024 Lake Grade: B

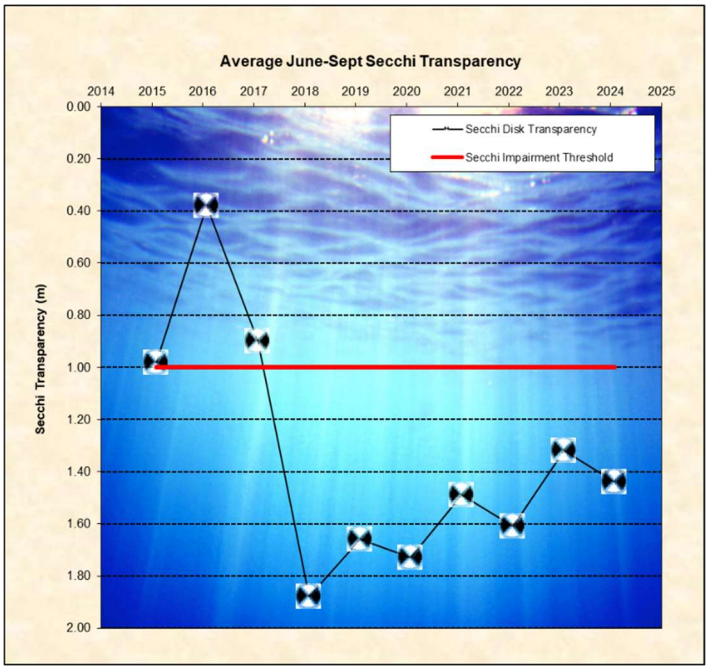
- DNR ID #: 820305
- Municipality: City of Stillwater
- Location: SE$^{1/4}$ Section 30, T30N-R20W
- Lake Size: 14.3 Acres
- Maximum Depth (2024): 7 ft.
- Ordinary High Water Mark: NA
- 100-Year High Water Level: NA
- 100% Littoral
  Note: Littoral area is the portion of the lake <15 ft. and dominated by aquatic vegetation.



Summary Points

- Based on chlorophyll-α data, the lake is classified as eutrophic according to the Carlson Trophic State Index.
- Using the Kendall's Tau correlation test ($p<0.05$) there is a statistically significant **improving** trend for average total phosphorus and for average chlorophyll-α, and the trend for the average Secchi transparency is skewed due to vegetation limiting the transparency.
- The major land use is urban/residential.
- The lake did not stratify in 2024.
- This lake is categorized as shallow according to the Minnesota Pollution Control Agency's standards.
- Lab methodology was changed for 2023 total phosphorus sample analysis, as such no results were reported <0.022 mg/L (April-mid September).





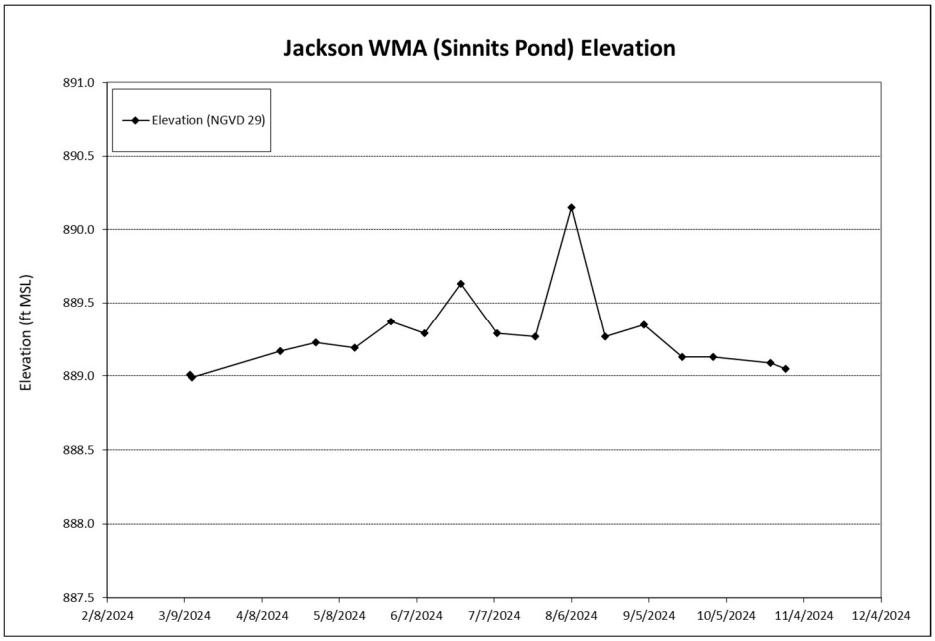
Date/Time	Total Phosphorus (mg/L)	Uncorrected Trichromatic Chlorophyll-*a* (ug/L)	Pheophytin-Corrected Chlorophyll-*a* (ug/L)	Total Kjeldahl Nitrogen (mg/L)	Secchi Disk Depth (m)	Surface Temperature (Celsius)	Surface Dissolved Oxygen (mg/L)
4/15/2024 15:25	0.024	2.4	2.1	0.58	2.13	15.6	13.96
4/29/2024 15:10	0.023	4.3	2.9	0.53	1.83	11.8	9.54
5/14/2024 13:16	0.030	2.8	2.4	0.60	2.13	20.8	9.34
5/28/2024 11:38	0.032	5.9	5.1	0.65	1.83	19.3	6.93
6/10/2024 15:27	0.031	3.3	2.9	0.68	1.98	24.0	8.33
6/24/2024 13:28	0.033	3.3	2.9	0.67	1.68	24.8	7.22
7/8/2024 12:51	0.027	2.5	2.4	0.54	1.52	25.4	17.24
7/23/2024 15:12	0.021	2.4	2.7	0.53	1.07	25.9	15.42
8/6/2024 13:40	0.032	4.1	3.2	0.52	2.29	25.2	8.08
8/19/2024 14:45	0.024	1.2	1.0	0.61	0.76	27.3	15.80
9/3/2024 13:50	0.020	1.3	1.6	0.50	1.07	22.9	15.61
9/18/2024 14:03	0.019	2.0	1.9	0.54	0.91	24.7	16.73
9/30/2024 14:05	0.017	2.3	1.6	0.49	1.68	21.5	12.54
10/22/2024 11:34	0.018	3.1	2.7	0.53	1.68	14.5	13.29
2024 Average	0.025	2.9	2.5	0.57	1.61	21.7	12.15
2024 Summer Average	0.025	2.5	2.2	0.56	1.44	24.6	13.00

Water quality thresholds are 0.04 mg/L TP, 14 µg/L CL-a, 1.4 m Secchi depth*

Shallow lake water quality thresholds are 0.06 mg/L TP, 20 µg/L CL-a, 1.0 m Secchi depth*

	High	High Date	Low	Low Date	Average
2024 Elevation (ft)	890.15	8/6/2024	888.99	3/12/2024	889.30

*Data requirements and determinations of use assessment according to the MPCA's Guidance Manual for Assessing the Quality of Minnesota Surface Waters: "Samples must be collected over a minimum of 2 years and data used for assessments must be collected from June to September. Typically, a minimum of 8 individual data points for TP, corrected chlorophyll-a (chl-a corrected for pheophytin), and Secchi are required. Data used for phosphorus and chlorophyll-a calculations are limited to those collected from the upper most 3 meters of the water column (surface). If more than one sample is collected in a lake per day, these values are averaged to yield a daily average value. Following this step, all June to September data for the 10-year assessment window are averaged to determine summer-mean values for TP, corrected chl-a, and Secchi depth. These values are then compared to the standards and the assessment is made."

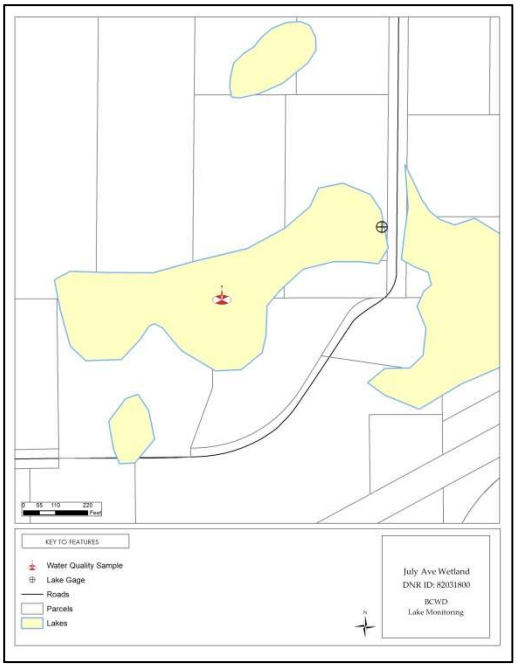


Lake Water Quality Summary										
	Lake Grades (May-Sept)									
	2024	2023	2022	2021	2020	2019	2018	2017	2016	2015
Total Phosphorus (mg/l)	B	B	B	C	C	C	C	C	D	C
Chlorophyll-*a* (ug/l)	A	A	A	A	A	C	A	B	F	B
Secchi depth (ft)	C	C	C	C	C	C	C	D	F	D
Overall	**B**	**B**	**B**	**B-**	**B-**	**C**	**B-**	**C**	**F+**	**C**

July Ave Wetland

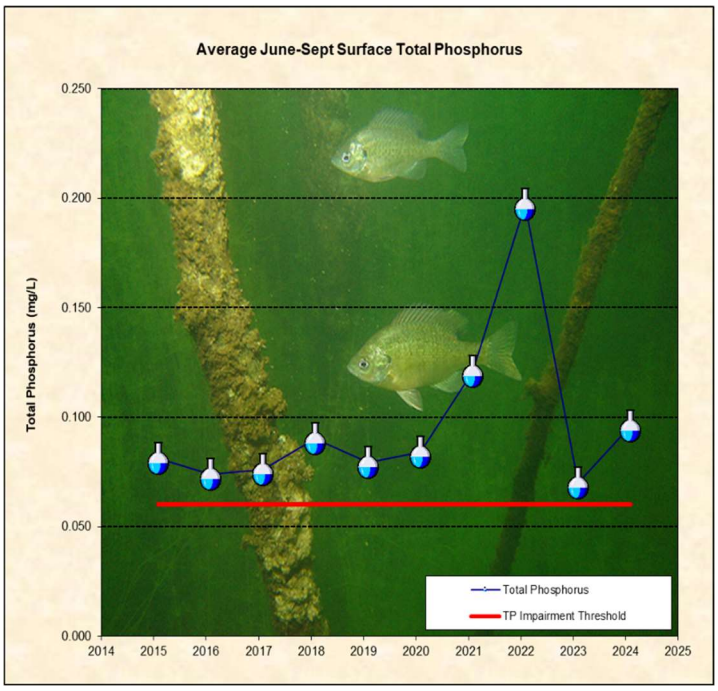
2024 Lake Grade: D

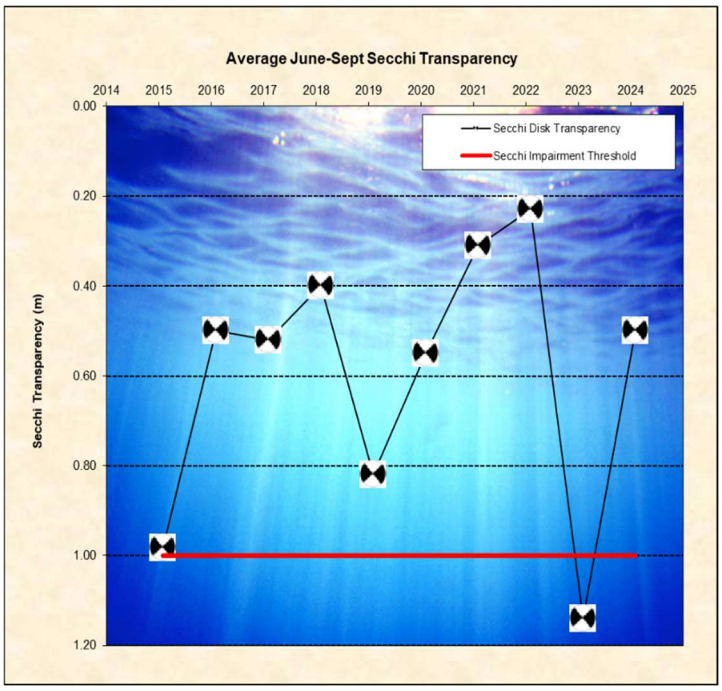
- DNR ID #: 820318
- Municipality: City of Grant
- Location: Section 3, T30N-R21W
- Lake Size: 12 Acres
- Maximum Depth (2024): 9 ft.
- Ordinary High Water Mark: NA
- 100-Year High Water Level: 979.20 ft.
- 100% Littoral
  Note: Littoral area is the portion of the lake <15 ft. and dominated by aquatic vegetation.



Summary Points

- Based on chlorophyll-α data, the lake is classified as eutrophic according to the Carlson Trophic State Index.
- Using the Kendall's Tau correlation test ($p<0.05$) there is a statistically significant **declining** trend for the average Secchi transparency, and no trend for average total phosphorus and average chlorophyll-α.
- The major land use is rural/agricultural.
- The lake did not stratify in 2024.
- This lake is categorized as shallow according to the Minnesota Pollution Control Agency's standards.





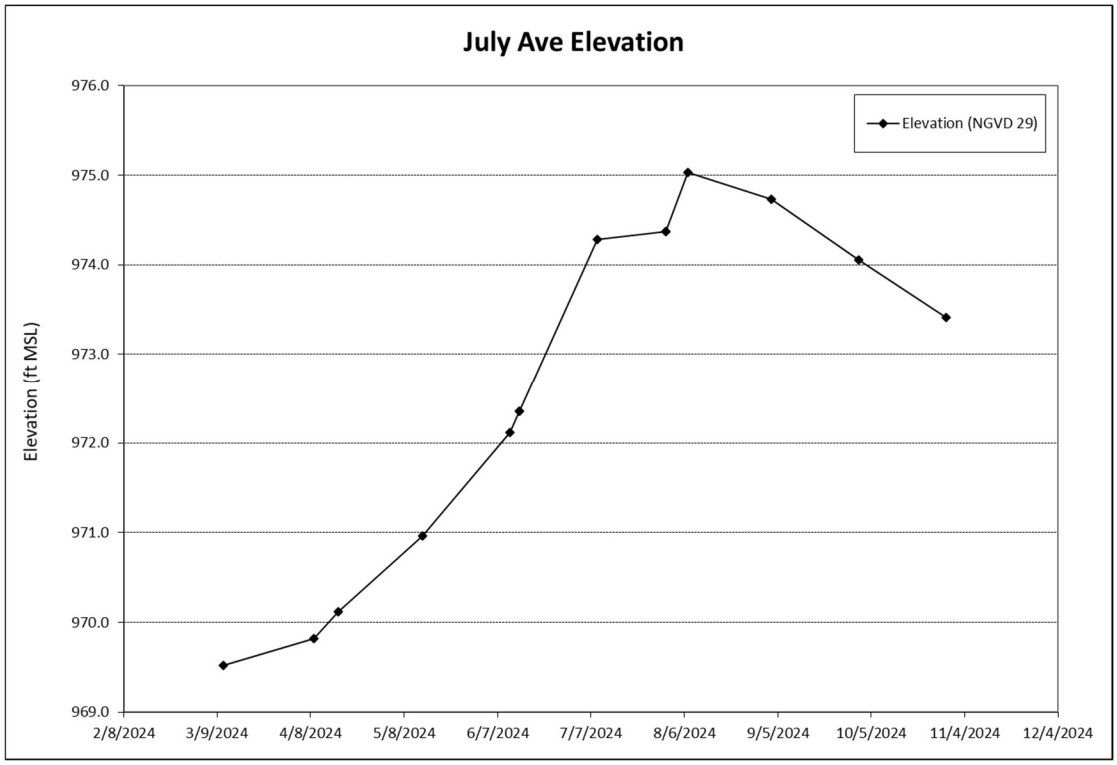
Date/Time	Total Phosphorus (mg/L)	Uncorrected Trichromatic Chlorophyll-*a* (ug/L)	Pheophytin-Corrected Chlorophyll-*a* (ug/L)	Total Kjeldahl Nitrogen (mg/L)	Secchi Disk Depth (m)	Surface Temperature (Celsius)	Surface Dissolved Oxygen (mg/L)
4/17/2024 10:38	0.047	4.6	3.2	0.95	1.22	11.2	12.87
5/14/2024 8:33	0.064	13.0	12.0	1.13	1.07	19.7	8.53
6/11/2024 10:54	0.114	94.0	90.0	2.29	0.46	21.8	13.00
7/9/2024 10:52	0.105	130.0	130.0	3.10	0.30	26.3	21.23
8/7/2024 13:06	0.083	37.0	35.0	1.73	0.61	25.0	11.60
9/3/2024 11:11	0.080	48.0	37.0	1.70	0.61	22.3	9.78
10/1/2024 11:38	0.100	120.0	110.0	1.76	0.46	18.9	7.61
2024 Average	0.085	63.8	59.6	1.81	0.68	20.7	12.09
2024 Summer Average	0.096	77.3	73.0	2.21	0.50	23.9	13.90

Water quality thresholds are 0.04 mg/L TP, 14 µg/L CL-a, 1.4 m Secchi depth*

Shallow lake water quality thresholds are 0.06 mg/L TP, 20 µg/L CL-a, 1.0 m Secchi depth*

	High	High Date	Low	Low Date	Average
2024 Elevation (ft)	975.03	8/7/2024	969.52	3/11/2024	972.50

*Data requirements and determinations of use assessment according to the MPCA's Guidance Manual for Assessing the Quality of Minnesota Surface Waters: "Samples must be collected over a minimum of 2 years and data used for assessments must be collected from June to September. Typically, a minimum of 8 individual data points for TP, corrected chlorophyll-a (chl-a corrected for pheophytin), and Secchi are required. Data used for phosphorus and chlorophyll-a calculations are limited to those collected from the upper most 3 meters of the water column (surface). If more than one sample is collected in a lake per day, these values are averaged to yield a daily average value. Following this step, all June to September data for the 10-year assessment window are averaged to determine summer-mean values for TP, corrected chl-a, and Secchi depth. These values are then compared to the standards and the assessment is made."

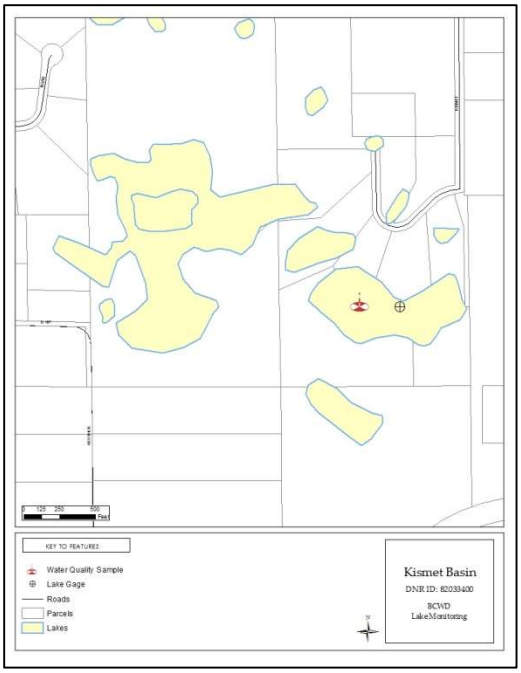


Lake Water Quality Summary										
	Lake Grades (May-Sept)									
	2024	2023	2022	2021	2020	2019	2018	2017	2016	2015
Total Phosphorus (mg/l)	D	C	F	D	D	D	D	C	D	D
Chlorophyll-*a* (ug/l)	D	C	F	F	D	D	D	D	D	D
Secchi depth (ft)	D	C	F	F	F	D	F	F	F	F
Overall	**D**	**C**	**F**	**F+**	**D-**	**D**	**D-**	**D**	**D-**	**D-**

Kismet Basin

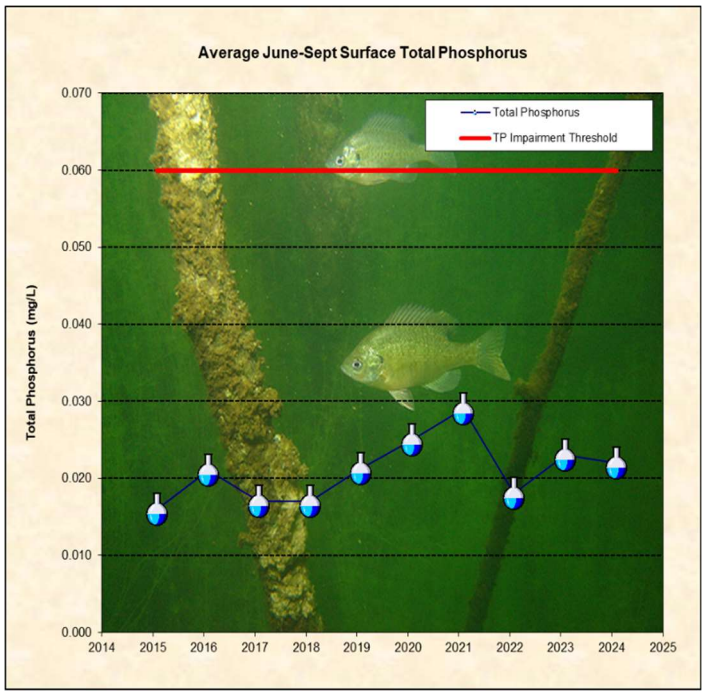
2024 Lake Grade: B+

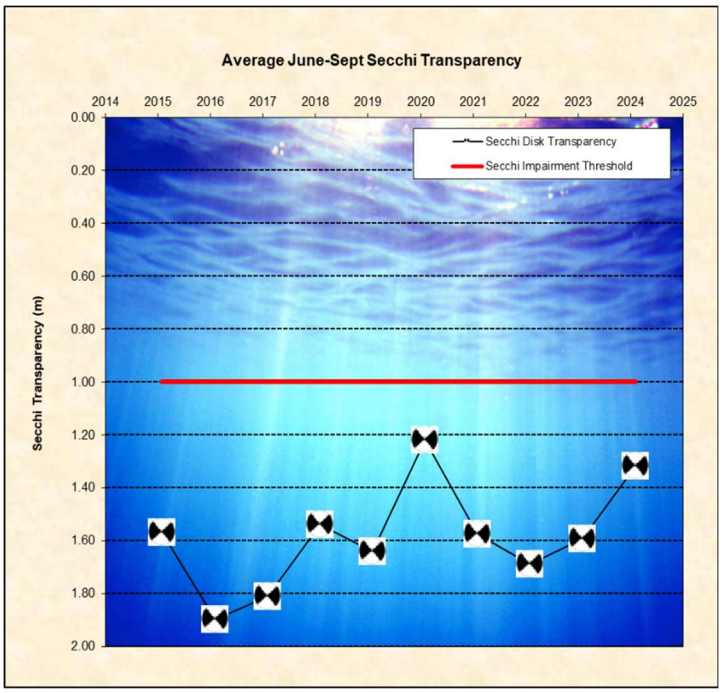
- DNR ID #: 820334
- Municipality: City of Grant
- Location: $S^{1/2}$ Section 11, T30N-R21W
- Lake Size: 70 Acres
- Maximum Depth (2024): 11 ft.
- Ordinary High Water Mark: 943.50 ft.
- 100-Year High Water Level: 944.90 ft.
- 100% Littoral
  Note: Littoral area is the portion of the lake <15 ft. and dominated by aquatic vegetation.



Summary Points

- Based on chlorophyll-α data, the lake is classified as eutrophic according to the Carlson Trophic State Index.
- Using the Kendall's Tau correlation test ($p<0.05$) there is a statistically significant **improving** trend for the average total phosphorus and the average chlorophyll-α, and the trend for the average Secchi transparency is skewed due to vegetation limiting the transparency.
- The major land use is rural/agricultural.
- The lake did not stratify in 2024.
- This lake is categorized as shallow according to the Minnesota Pollution Control Agency's standards.
- Lab methodology was changed for 2023 total phosphorus sample analysis, as such no results were reported <0.022 mg/L (April-mid September).





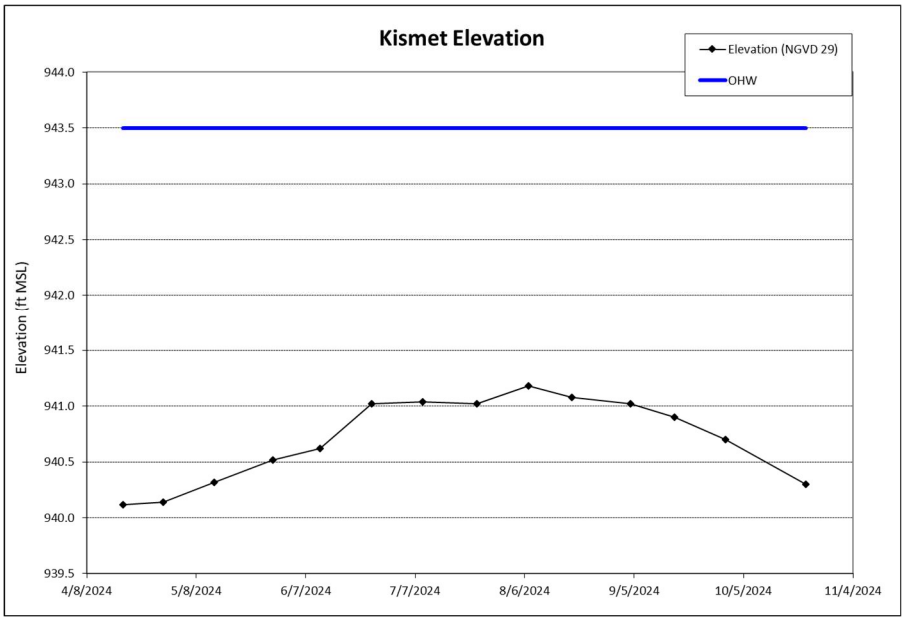
Date/Time	Total Phosphorus (mg/L)	Uncorrected Trichromatic Chlorophyll-*a* (ug/L)	Pheophytin-Corrected Chlorophyll-*a* (ug/L)	Total Kjeldahl Nitrogen (mg/L)	Secchi Disk Depth (m)	Surface Temperature (Celsius)	Surface Dissolved Oxygen (mg/L)
4/17/2024 13:00	0.023	7.2	5.3	0.53	1.98	12.1	10.86
4/29/2024 11:55	0.017	3.9	3.5	0.46	1.83	11.4	7.98
5/13/2024 12:24	0.024	6.1	5.1	0.58	1.58	20.6	9.05
5/29/2024 11:45	0.021	4.9	4.0	0.60	1.07	19.9	8.19
6/11/2024 14:00	0.031	12.0	11.0	0.76	1.22	22.5	10.13
6/25/2024 9:09	0.025	11.0	10.0	1.77	0.76	24.4	10.39
7/9/2024 10:03	0.020	3.7	2.9	0.62	1.07	24.8	10.90
7/24/2024 10:09	0.028	19.0	17.0	0.49	1.07	23.6	5.21
8/7/2024 10:10	0.022	7.8	7.2	0.64	1.22	22.6	4.75
8/19/2024 10:50	0.022	7.2	6.7	0.67	1.37	23.6	9.40
9/4/2024 11:00	0.019	6.6	5.3	0.56	1.52	21.4	5.80
9/16/2024 10:38	0.017	3.5	2.1	0.59	1.83	23.2	9.57
9/30/2024 11:01	0.018	9.1	7.7	0.53	1.83	20.2	6.73
10/22/2024 9:36	0.022	9.8	8.5	0.64	1.83	13.7	10.59
2024 Average	0.022	8.0	6.9	0.67	1.44	20.3	8.54
2024 Summer Average	0.022	8.9	7.8	0.74	1.32	22.9	8.10

Water quality thresholds are 0.04 mg/L TP, 14 µg/L CL-a, 1.4 m Secchi depth*

Shallow lake water quality thresholds are 0.06 mg/L TP, 20 µg/L CL-a, 1.0 m Secchi depth*

	High	High Date	Low	Low Date	Average
2024 Elevation (ft)	941.18	8/7/2024	940.12	4/18/2024	940.74

*Data requirements and determinations of use assessment according to the MPCA's Guidance Manual for Assessing the Quality of Minnesota Surface Waters: "Samples must be collected over a minimum of 2 years and data used for assessments must be collected from June to September. Typically, a minimum of 8 individual data points for TP, corrected chlorophyll-a (chl-a corrected for pheophytin), and Secchi are required. Data used for phosphorus and chlorophyll-a calculations are limited to those collected from the upper most 3 meters of the water column (surface). If more than one sample is collected in a lake per day, these values are averaged to yield a daily average value. Following this step, all June to September data for the 10-year assessment window are averaged to determine summer-mean values for TP, corrected chl-a, and Secchi depth. These values are then compared to the standards and the assessment is made."

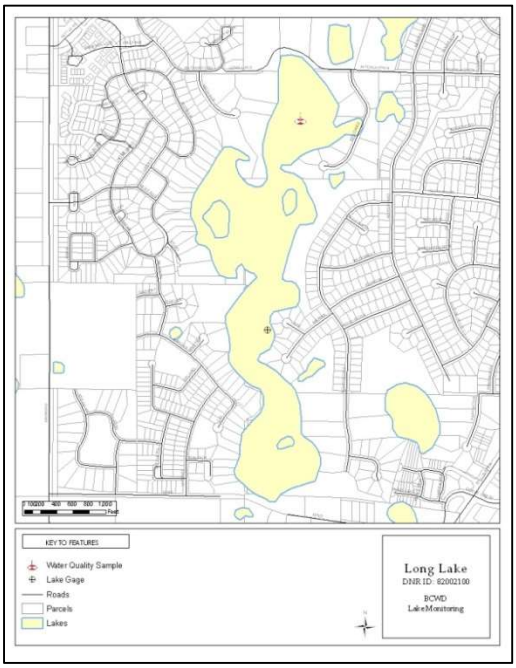


Lake Water Quality Summary										
	Lake Grades (May-Sept)									
	2024	2023	2022	2021	2020	2019	2018	2017	2016	2015
Total Phosphorus (mg/l)	A	B	A	B	B	A	A	A	B	A
Chlorophyll-*a* (ug/l)	A	A	A	C	A	A	A	A	A	B
Secchi depth (ft)	C	C	C	C	C	C	C	C	C	C
Overall	**B+**	**B**	**B+**	**C+**	**B**	**B+**	**B+**	**B+**	**B**	**B**

Long Lake

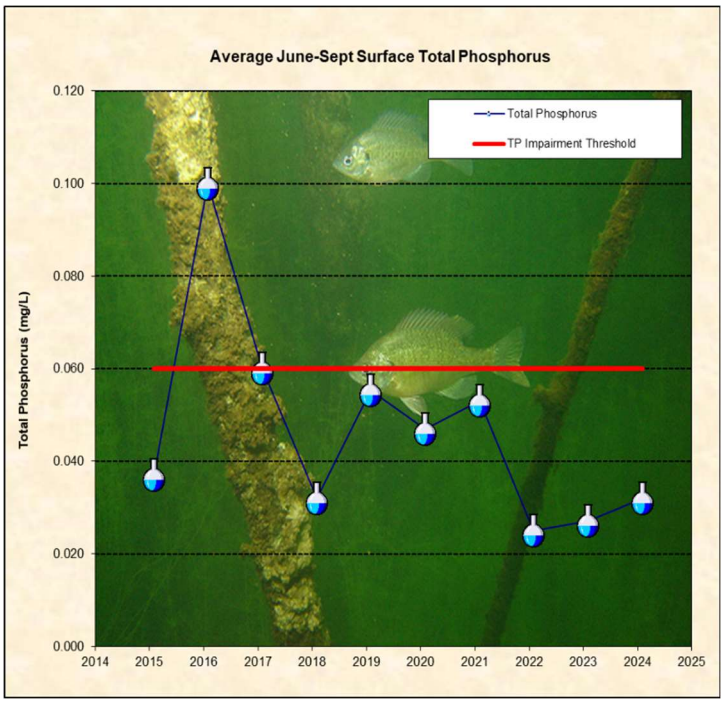
2024 Lake Grade: B

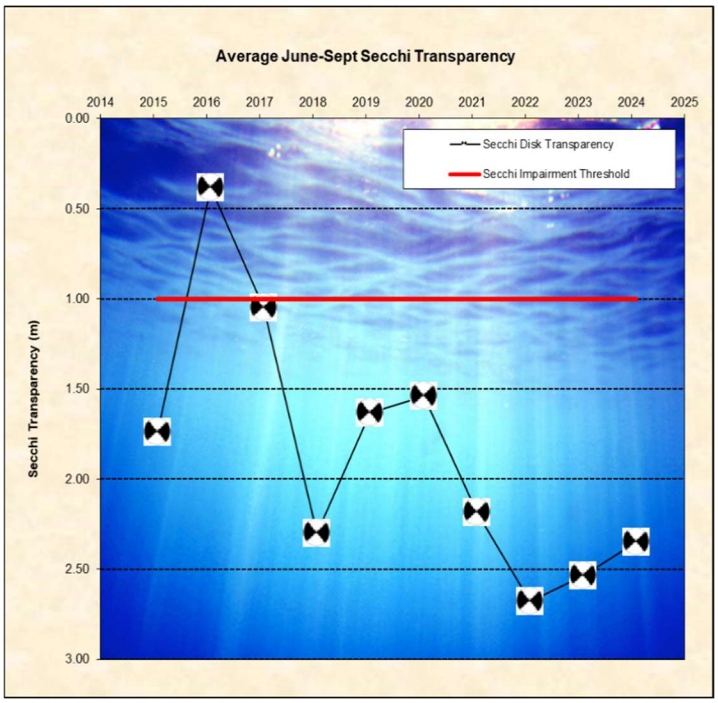
- DNR ID #: 820021
- Municipality: City of Stillwater
- Location: Section 30, T30N-R20W
- Lake Size: 110 Acres
- Maximum Basin Depth (2024): 21 ft.
- Ordinary High Water Mark: 891.50 ft.
- 100-Year High Water Level: 893.20 ft.
- 95% Littoral
  Note: Littoral area is the portion of the lake <15 ft. and dominated by aquatic vegetation.



Summary Points

- Based on chlorophyll-α data, the lake is classified as mesotrophic according to the Carlson Trophic State Index.
- Using the Kendall's Tau correlation test ($p<0.05$) there is a statistically significant **improving** trend for the average Secchi transparency, average chlorophyll-α, and average total phosphorus.
- The major land use is urban/residential.
- The lake stratified in 2024 with a thermocline around 2 meters.
- This lake is categorized as shallow according to the Minnesota Pollution Control Agency's standards.
- Long Lake is listed as impaired for nutrients on the Minnesota Pollution Control Agency's Impaired Waters List.





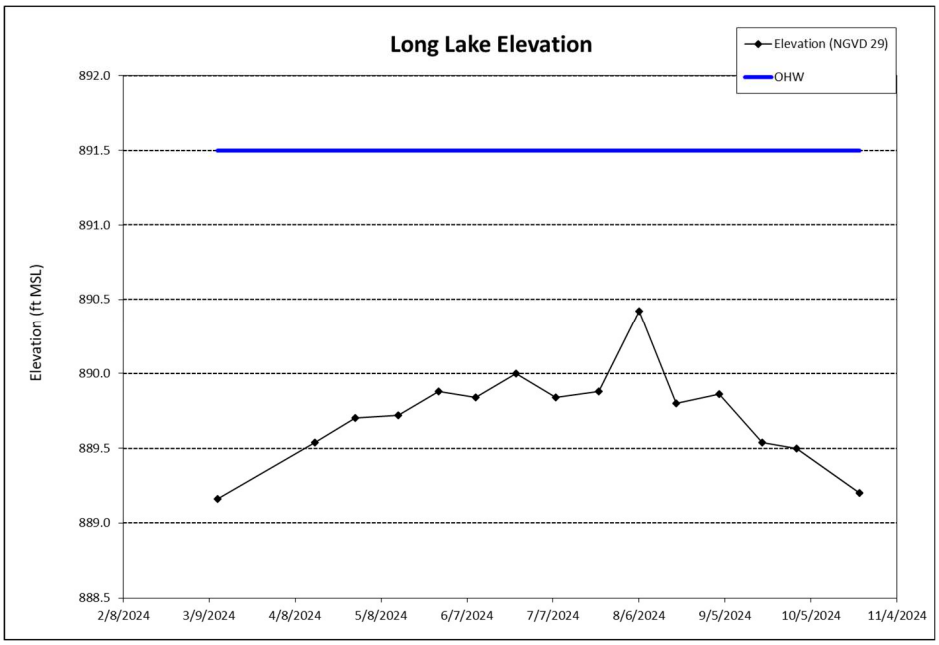
Date/Time	Total Phosphorus (mg/L)	Uncorrected Trichromatic Chlorophyll-*a* (ug/L)	Pheophytin-Corrected Chlorophyll-*a* (ug/L)	Total Kjeldahl Nitrogen (mg/L)	Secchi Disk Depth (m)	Surface Temperature (Celsius)	Surface Dissolved Oxygen (mg/L)
4/15/2024 14:55	0.020	2.6	1.3	0.64	4.88	14.8	15.03
4/29/2024 14:47	0.020	3.4	2.4	0.49	3.81	11.8	9.48
5/14/2024 12:54	0.027	2.3	2.1	0.59	2.90	20.2	9.55
5/28/2024 10:40	0.044	9.1	8.0	0.67	1.52	19.3	6.52
6/10/2024 15:03	0.040	3.8	3.5	0.68	2.29	24.5	7.48
6/24/2024 13:05	0.045	8.6	6.9	3.69	1.52	24.6	8.97
7/8/2024 12:28	0.034	4.1	3.7	0.76	2.59	25.6	12.41
7/23/2024 14:15	0.026	4.9	4.8	0.44	2.13	26.1	11.31
8/6/2024 13:14	0.030	5.3	5.6	0.60	2.44	25.3	8.42
8/19/2024 14:24	0.032	6.8	6.1	0.64	2.44	26.3	13.51
9/3/2024 13:25	0.034	8.6	7.7	0.54	2.44	22.8	13.18
9/18/2024 13:40	0.021	2.6	2.4	0.50	2.59	24.2	14.97
9/30/2024 13:40	0.025	4.2	3.5	0.50	2.74	21.5	11.36
10/22/2024 11:05	0.027	10.0	9.6	0.59	2.59	14.2	13.11
2024 Average	0.030	5.5	4.8	0.81	2.63	21.5	11.09
2024 Summer Average	0.032	5.4	4.9	0.93	2.35	24.5	11.29

Water quality thresholds are 0.04 mg/L TP, 14 µg/L CL-a, 1.4 m Secchi depth*

Shallow lake water quality thresholds are 0.06 mg/L TP, 20 µg/L CL-a, 1.0 m Secchi depth*

	High	High Date	Low	Low Date	Average
2024 Elevation (ft)	890.42	8/6/2024	889.16	3/12/2024	889.76

*Data requirements and determinations of use assessment according to the MPCA's Guidance Manual for Assessing the Quality of Minnesota Surface Waters: "Samples must be collected over a minimum of 2 years and data used for assessments must be collected from June to September. Typically, a minimum of 8 individual data points for TP, corrected chlorophyll-a (chl-a corrected for pheophytin), and Secchi are required. Data used for phosphorus and chlorophyll-a calculations are limited to those collected from the upper most 3 meters of the water column (surface). If more than one sample is collected in a lake per day, these values are averaged to yield a daily average value. Following this step, all June to September data for the 10-year assessment window are averaged to determine summer-mean values for TP, corrected chl-a, and Secchi depth. These values are then compared to the standards and the assessment is made."

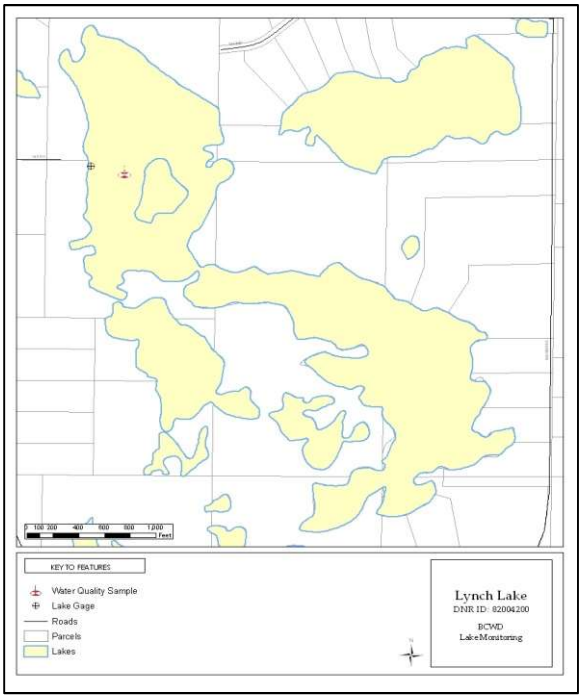


Lake Water Quality Summary										
	Lake Grades (May-Sept)									
	2024	2023	2022	2021	2020	2019	2018	2017	2016	2015
Total Phosphorus (mg/l)	C	B	B	C	C	C	C	C	D	C
Chlorophyll-*a* (ug/l)	A	A	A	A	B	C	A	B	F	B
Secchi depth (ft)	B	B	B	B	C	C	B	D	F	C
Overall	**B**	**B+**	**B+**	**B**	**C+**	**C**	**B**	**C**	**F+**	**C+**

Lynch Lake – North Basin

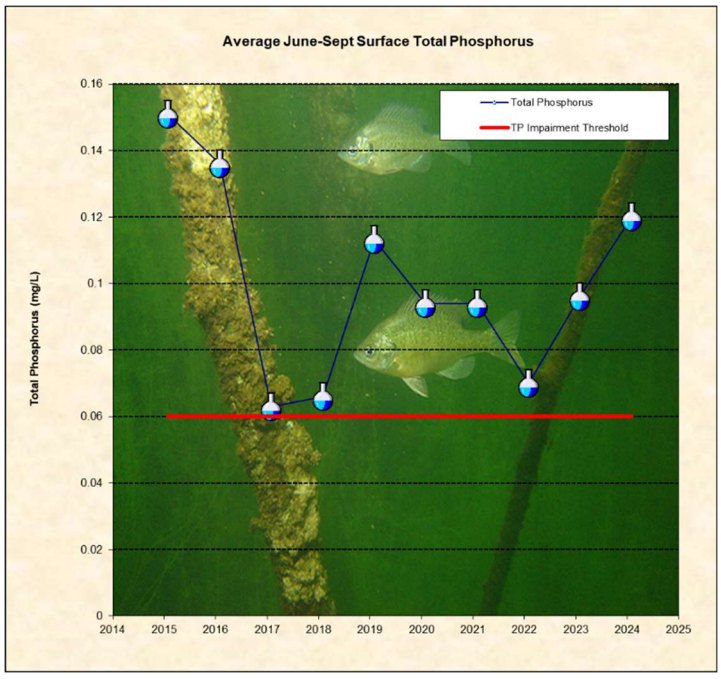
2024 Lake Grade: D

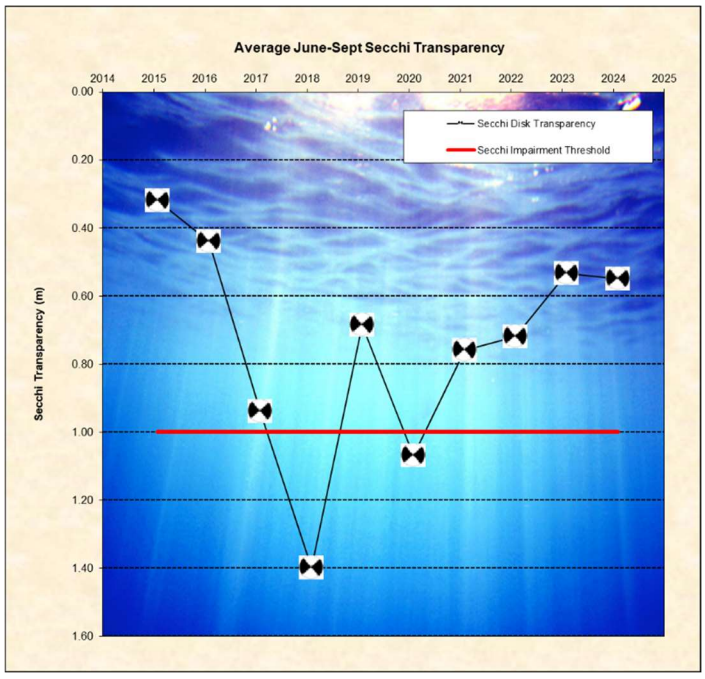
- DNR ID #: 820042
- Municipality: May Township
- Location: Section 30, T31N-R20W
- Lake Size: 87 Acres
- Maximum Depth (2024): 6 ft.
- Ordinary High Water Mark: 1005.30 ft.
- 100-Year High Water Level: 1008.10 ft.
- 100% Littoral
  Note: Littoral area is the portion of the lake <15 ft. and dominated by aquatic vegetation.



Summary Points

- Based on chlorophyll-α data, the lake is classified as eutrophic according to the Carlson Trophic State Index.
- Using the Kendall's Tau correlation test ($p<0.05$) there is a statistically significant **improving** trend for the average Secchi transparency, average chlorophyll-α, and average total phosphorus.
- The major land use is rural/agricultural.
- The lake did not stratify in 2024.
- This lake is categorized as shallow according to the Minnesota Pollution Control Agency's standards.
- Lynch Lake is listed as impaired for nutrients on the Minnesota Pollution Control Agency's Impaired Waters List.





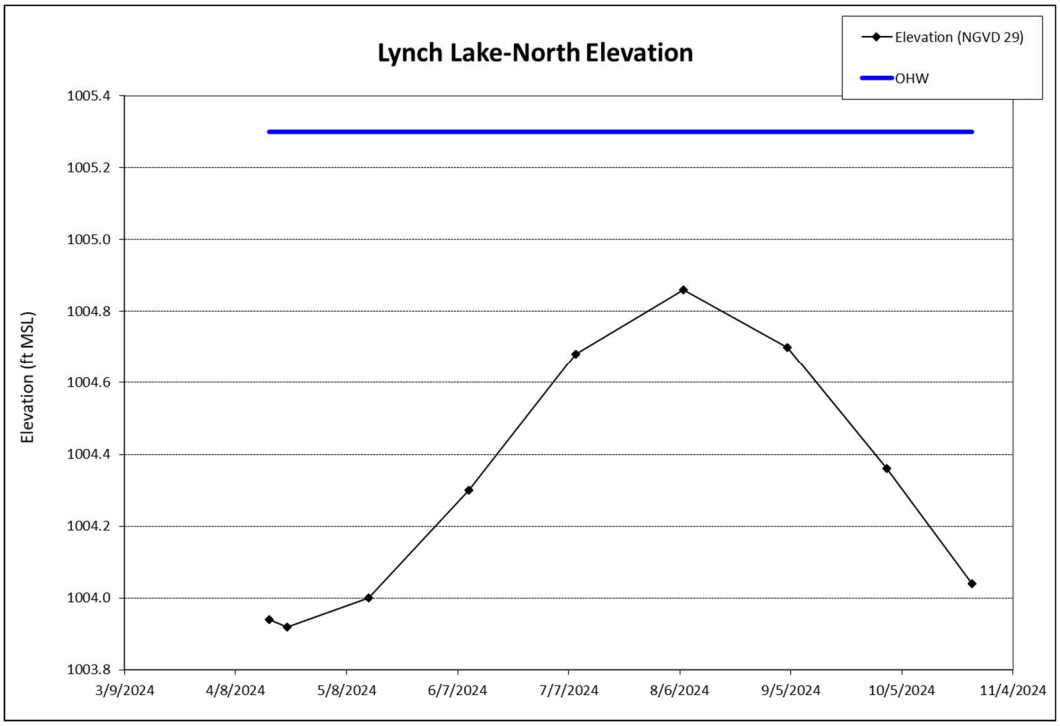
Date/Time	Total Phosphorus (mg/L)	Uncorrected Trichromatic Chlorophyll-*a* (ug/L)	Pheophytin-Corrected Chlorophyll-*a* (ug/L)	Total Kjeldahl Nitrogen (mg/L)	Secchi Disk Depth (m)	Surface Temperature (Celsius)	Surface Dissolved Oxygen (mg/L)
4/17/2024 11:02	0.126	43.0	34.0	1.46	0.61	11.1	12.43
5/14/2024 9:00	0.126	54.0	48.0	1.70	0.30	18.7	8.92
6/10/2024 11:08	0.214	110.0	100.0	3.14	0.06	22.5	11.03
7/9/2024 11:12	0.083	16.0	14.0	1.27	0.76	24.8	14.09
8/7/2024 11:11	0.092	38.0	36.0	1.47	0.76	22.8	9.73
9/4/2024 9:48	0.089	42.0	37.0	1.36	0.61	20.4	11.05
10/1/2024 10:40	0.074	29.0	24.0	1.25	0.76	18.3	8.06
2024 Average	0.115	47.4	41.9	1.66	0.55	19.8	10.76
2024 Summer Average	0.120	51.5	46.8	1.81	0.55	22.6	11.48

Water quality thresholds are 0.04 mg/L TP, 14 µg/L CL-a, 1.4 m Secchi depth*

Shallow lake water quality thresholds are 0.06 mg/L TP, 20 µg/L CL-a, 1.0 m Secchi depth*

	High	High Date	Low	Low Date	Average
2024 Elevation (ft)	1004.86	8/7/2024	1003.92	4/22/2024	1004.34

*Data requirements and determinations of use assessment according to the MPCA's Guidance Manual for Assessing the Quality of Minnesota Surface Waters: "Samples must be collected over a minimum of 2 years and data used for assessments must be collected from June to September. Typically, a minimum of 8 individual data points for TP, corrected chlorophyll-a (chl-a corrected for pheophytin), and Secchi are required. Data used for phosphorus and chlorophyll-a calculations are limited to those collected from the upper most 3 meters of the water column (surface). If more than one sample is collected in a lake per day, these values are averaged to yield a daily average value. Following this step, all June to September data for the 10-year assessment window are averaged to determine summer-mean values for TP, corrected chl-a, and Secchi depth. These values are then compared to the standards and the assessment is made."

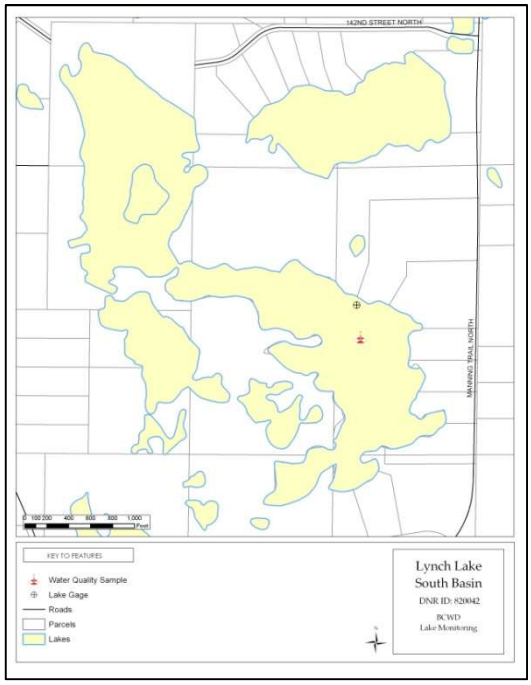


Lake Water Quality Summary										
	Lake Grades (May-Sept)									
	2024	2023	2022	2021	2020	2019	2018	2017	2016	2015
Total Phosphorus (mg/l)	D	D	D	D	D	D	C	C	D	D
Chlorophyll-*a* (ug/l)	C	D	C	C	C	D	B	C	D	F
Secchi depth (ft)	F	D	D	D	D	D	C	D	F	F
Overall	**D**	**D**	**D+**	D+	D+	D	C+	C-	D-	F+

Lynch Lake – South Basin

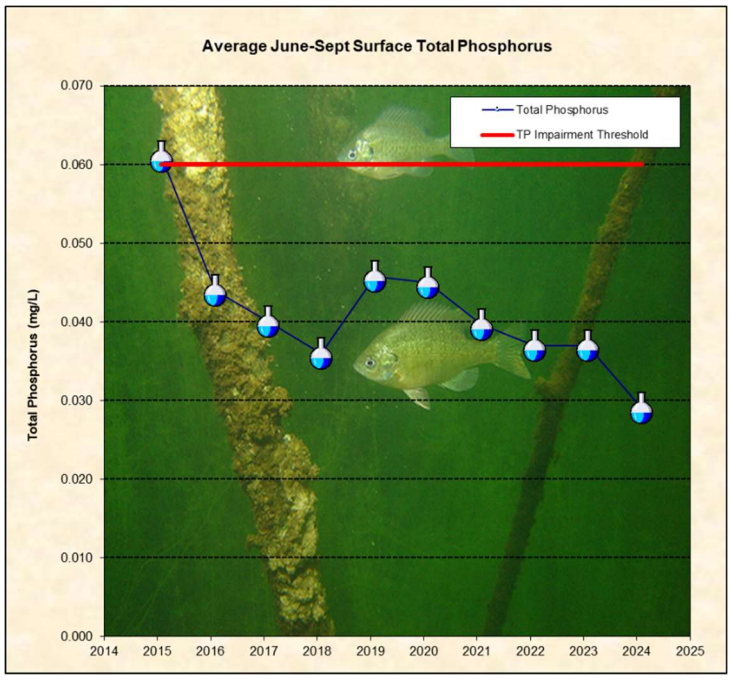
2024 Lake Grade: B

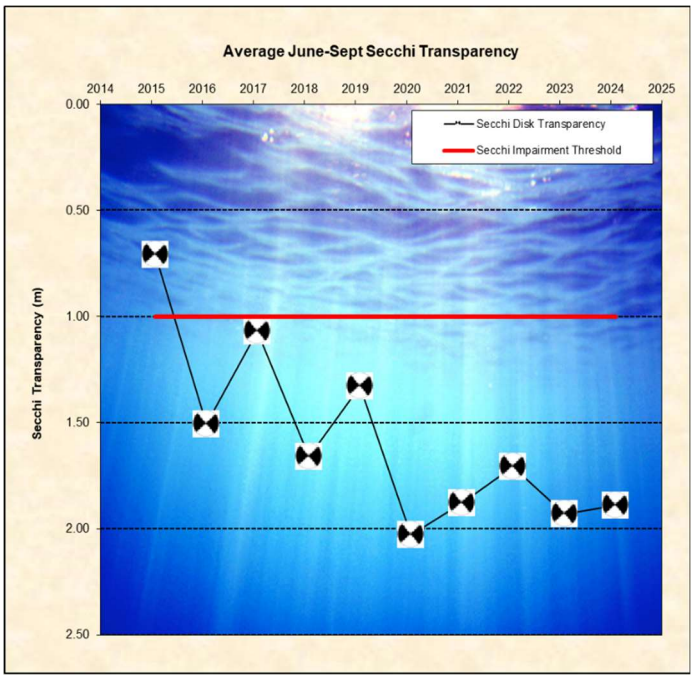
- DNR ID #: 820042
- Municipality: May Township
- Location: Section 30, T31N-R20W
- Lake Size: 87 Acres
- Maximum Depth (2024): 16 ft.
- Ordinary High Water Mark: 1005.30 ft.
- 100-Year High Water Level: 1008.10 ft.
- 99% Littoral
  Note: Littoral area is the portion of the lake <15 ft. and dominated by aquatic vegetation.



Summary Points

- Based on chlorophyll-α data, the lake is classified as eutrophic according to the Carlson Trophic State Index.
- Using the Kendall's Tau correlation test ($p<0.05$) there is a statistically significant **improving** trend for the average Secchi transparency, average chlorophyll-α, and average total phosphorus.
- The major land use is rural/agricultural.
- The lake stratified in 2024 with the thermocline around 3 meters.
- This lake is categorized as shallow according to the Minnesota Pollution Control Agency's standards.
- Lynch Lake is listed as impaired for nutrients on the Minnesota Pollution Control Agency's Impaired Waters List.





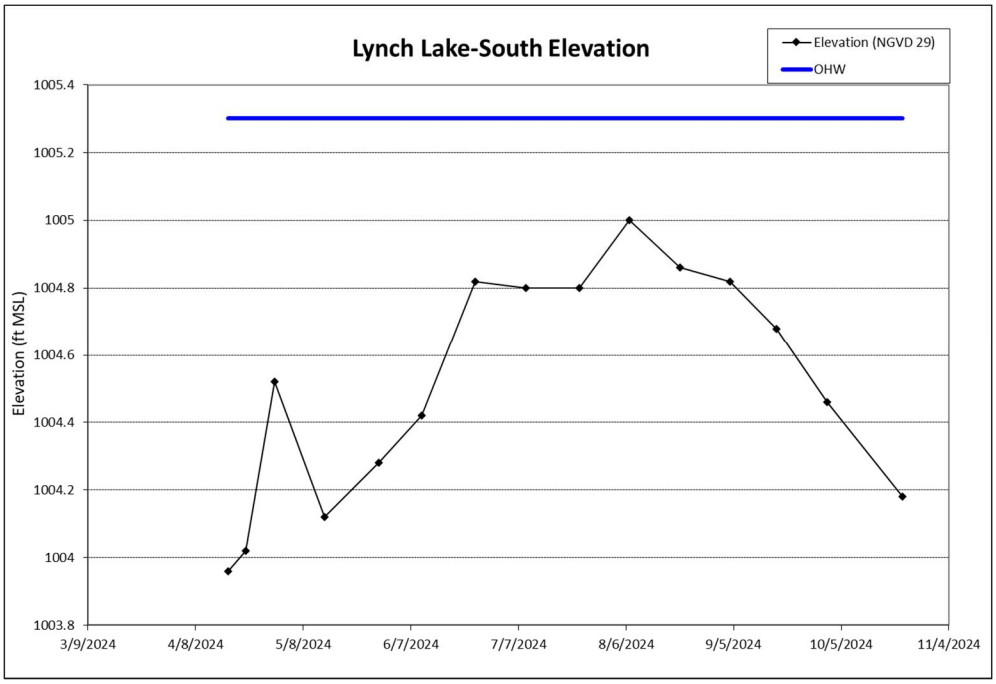
Date/Time	Total Phosphorus (mg/L)	Uncorrected Trichromatic Chlorophyll-*a* (ug/L)	Pheophytin-Corrected Chlorophyll-*a* (ug/L)	Total Kjeldahl Nitrogen (mg/L)	Secchi Disk Depth (m)	Surface Temperature (Celsius)	Surface Dissolved Oxygen (mg/L)
4/17/2024 11:30	0.029	8.9	7.2	0.74	2.59	11.6	14.16
4/30/2024 9:14	0.036	7.8	6.4	0.76	2.44	11.2	9.71
5/14/2024 9:30	0.036	4.8	4.3	0.82	2.44	18.9	8.77
5/29/2024 13:10	0.036	8.3	6.9	0.80	1.98	20.6	8.91
6/10/2024 11:38	0.040	10.0	9.1	0.83	1.98	22.9	8.44
6/25/2024 10:52	0.036	10.0	9.6	1.30	1.68	24.5	10.71
7/9/2024 11:36	0.026	6.0	5.1	0.72	2.13	26.0	12.51
7/24/2024 10:45	0.025	9.4	8.8	0.68	1.98	25.3	10.72
8/7/2024 10:45	0.024	12.0	10.0	0.83	1.98	24.5	9.82
8/21/2024 10:40	0.030	9.1	7.5	0.85	1.83	23.9	10.50
9/4/2024 10:20	0.028	3.7	3.2	0.82	1.52	22.3	13.53
9/17/2024 8:54	0.024	6.2	4.5	0.73	1.98	23.4	13.04
10/1/2024 11:09	0.031	14.0	12.0	0.71	1.52	19.9	8.36
10/22/2024 10:18	0.026	9.0	8.0	0.81	2.13	14.0	11.70
2024 Average	0.031	8.5	7.3	0.81	2.01	20.6	10.78
2024 Summer Average	0.029	8.3	7.2	0.85	1.89	24.1	11.16

Water quality thresholds are 0.04 mg/L TP, 14 µg/L CL-a, 1.4 m Secchi depth*

Shallow lake water quality thresholds are 0.06 mg/L TP, 20 µg/L CL-a, 1.0 m Secchi depth*

	High	High Date	Low	Low Date	Average
2024 Elevation (ft)	1005.00	8/7/2024	1003.96	4/17/2024	1004.51

*Data requirements and determinations of use assessment according to the MPCA's Guidance Manual for Assessing the Quality of Minnesota Surface Waters: "Samples must be collected over a minimum of 2 years and data used for assessments must be collected from June to September. Typically, a minimum of 8 individual data points for TP, corrected chlorophyll-a (chl-a corrected for pheophytin), and Secchi are required. Data used for phosphorus and chlorophyll-a calculations are limited to those collected from the upper most 3 meters of the water column (surface). If more than one sample is collected in a lake per day, these values are averaged to yield a daily average value. Following this step, all June to September data for the 10-year assessment window are averaged to determine summer-mean values for TP, corrected chl-a, and Secchi depth. These values are then compared to the standards and the assessment is made."

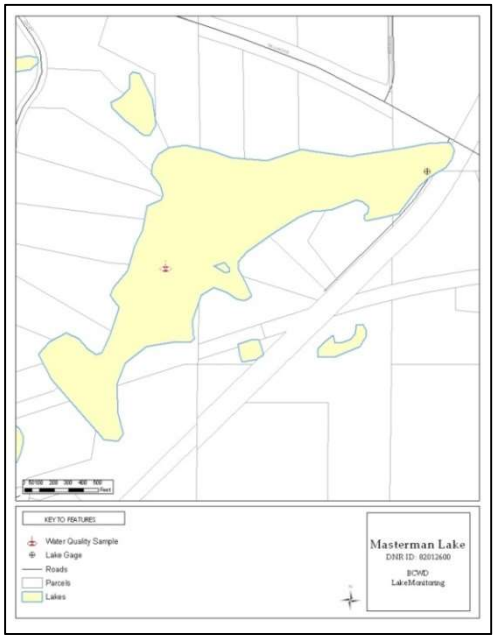


Lake Water Quality Summary										
	Lake Grades (May-Sept)									
	2024	2023	2022	2021	2020	2019	2018	2017	2016	2015
Total Phosphorus (mg/l)	B	C	C	C	C	C	C	C	C	C
Chlorophyll-*a* (ug/l)	A	B	B	B	A	C	B	B	C	C
Secchi depth (ft)	C	C	C	C	C	C	C	D	C	D
Overall	**B**	**C+**	**C+**	**C+**	**B-**	**C**	**C+**	**C**	**C**	**C-**

Masterman Lake

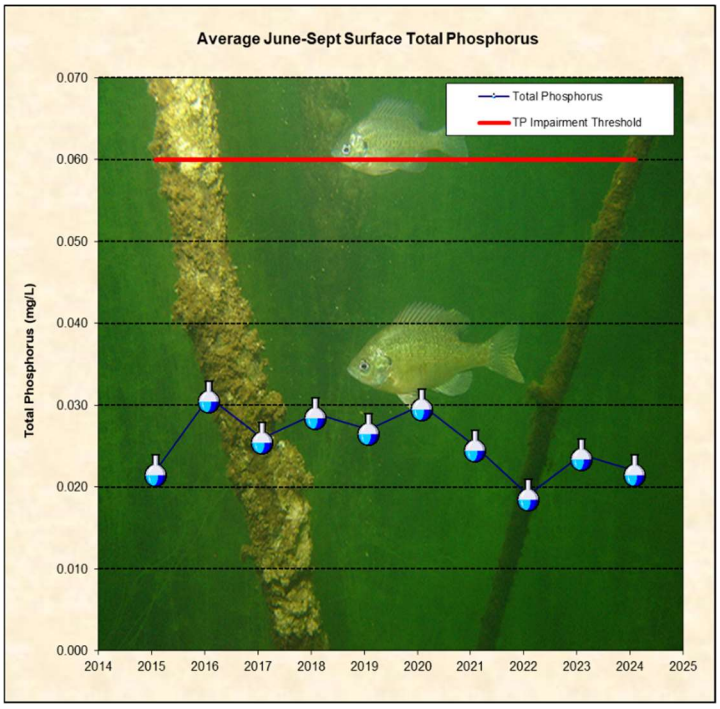
2024 Lake Grade: B+

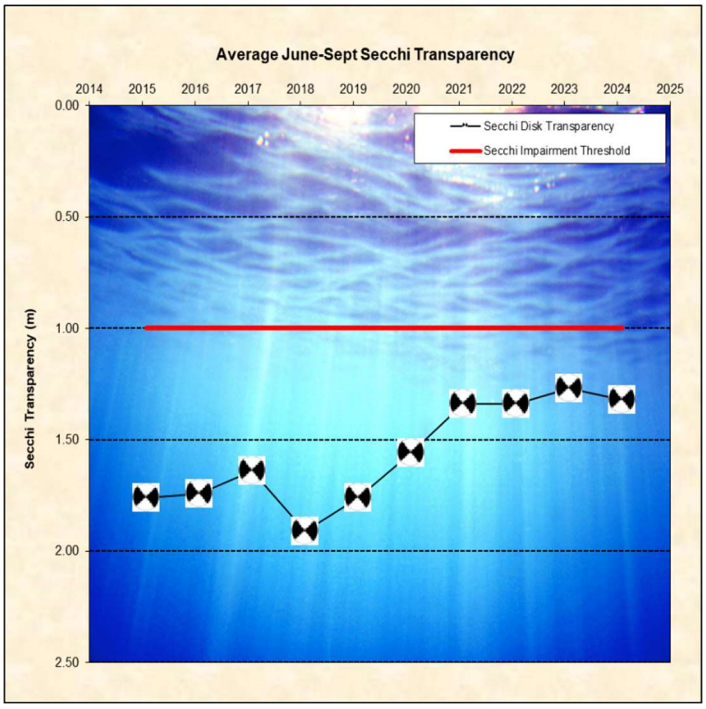
- DNR ID #: 820126
- Municipality: City of Grant
- Location: Section 23, T30N-R21W
- Lake Size: 40 Acres
- Maximum Depth (2024): 7 ft.
- Ordinary High Water Mark: 955.70 ft.
- 100-Year High Water Level: 955.90 ft.
- 100% Littoral
  Note: Littoral area is the portion of the lake <15 ft. and dominated by aquatic vegetation.



Summary Points

- Based on chlorophyll-α data, the lake is classified as mesotrophic according to the Carlson Trophic State Index.
- Using the Kendall's Tau correlation test ($p<0.05$) there is a statistically significant **improving** trend for the average total phosphorus and average chlorophyll-α, and the trend for the average Secchi transparency is skewed due to vegetation limiting the transparency.
- The major land use is rural/agricultural.
- The lake did not stratify in 2024.
- This lake is categorized as shallow according to the Minnesota Pollution Control Agency's standards.
- Lab methodology was changed for 2023 total phosphorus sample analysis, as such no results were reported <0.022 mg/L (April-mid September).





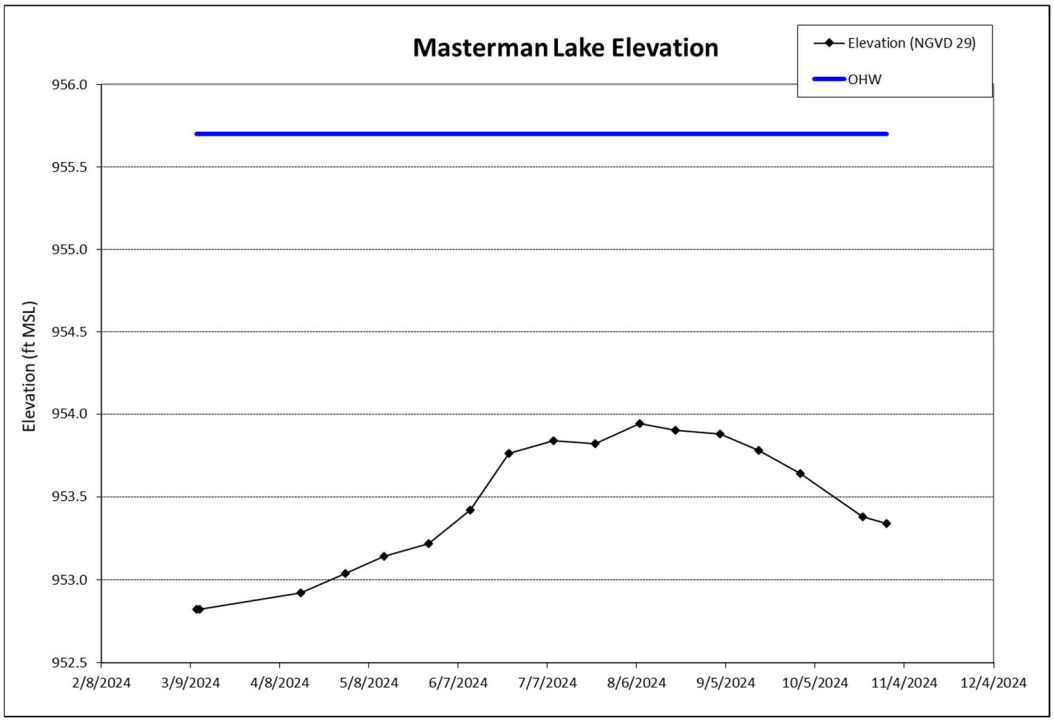
Date/Time	Total Phosphorus (mg/L)	Uncorrected Trichromatic Chlorophyll-*a* (ug/L)	Pheophytin-Corrected Chlorophyll-*a* (ug/L)	Total Kjeldahl Nitrogen (mg/L)	Secchi Disk Depth (m)	Surface Temperature (Celsius)	Surface Dissolved Oxygen (mg/L)
4/15/2024 10:54	0.028	9.8	7.5	0.64	1.83	15.3	14.98
4/30/2024 8:40	0.031	11.0	9.1	0.67	1.52	11.1	9.73
5/13/2024 9:55	0.026	4.6	4.0	0.63	1.52	20.0	9.23
5/28/2024 10:02	0.021	3.9	3.2	0.58	1.52	18.7	7.39
6/11/2024 9:35	0.020	2.9	2.4	0.52	1.22	21.8	9.42
6/24/2024 10:48	0.019	4.8	4.5	2.15	1.22	23.2	8.48
7/9/2024 9:10	0.018	4.1	3.7	0.63	1.52	24.3	10.35
7/23/2024 10:37	0.018	5.2	4.3	0.61	1.37	25.0	7.57
8/7/2024 8:45	0.019	4.7	4.5	0.56	1.37	22.5	5.77
8/19/2024 9:30	0.051	5.8	4.8	0.76	1.37	23.5	9.46
9/3/2024 9:40	0.020	4.8	3.5	0.59	1.22	21.8	7.78
9/16/2024 11:28	0.015	3.4	2.4	0.53	1.37	24.0	11.89
9/30/2024 10:02	0.018	4.2	3.5	0.49	1.22	20.1	7.89
10/21/2024 11:55	0.018	8.1	8.0	0.59	1.52	13.9	12.77
2024 Average	0.023	5.5	4.7	0.71	1.41	20.4	9.48
2024 Summer Average	0.022	4.4	3.7	0.76	1.32	22.9	8.73

Water quality thresholds are 0.04 mg/L TP, 14 µg/L CL-a, 1.4 m Secchi depth*

Shallow lake water quality thresholds are 0.06 mg/L TP, 20 µg/L CL-a, 1.0 m Secchi depth*

	High	High Date	Low	Low Date	Average
2024 Elevation (ft)	953.94	8/7/2024	952.82	3/12/2024	953.46

*Data requirements and determinations of use assessment according to the MPCA's Guidance Manual for Assessing the Quality of Minnesota Surface Waters: "Samples must be collected over a minimum of 2 years and data used for assessments must be collected from June to September. Typically, a minimum of 8 individual data points for TP, corrected chlorophyll-a (chl-a corrected for pheophytin), and Secchi are required. Data used for phosphorus and chlorophyll-a calculations are limited to those collected from the upper most 3 meters of the water column (surface). If more than one sample is collected in a lake per day, these values are averaged to yield a daily average value. Following this step, all June to September data for the 10-year assessment window are averaged to determine summer-mean values for TP, corrected chl-a, and Secchi depth. These values are then compared to the standards and the assessment is made."

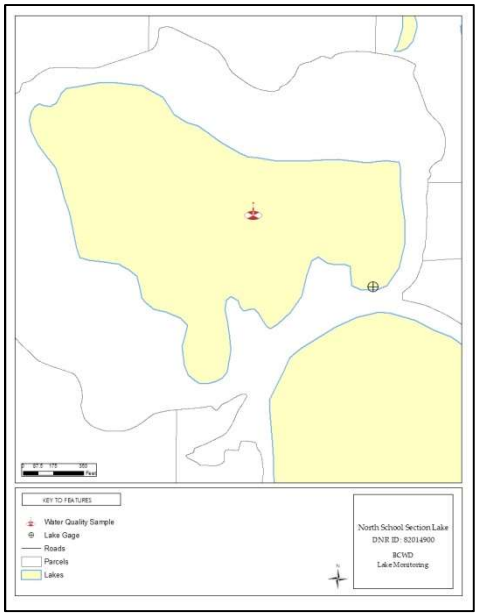


Lake Water Quality Summary										
	Lake Grades (May-Sept)									
	2024	2023	2022	2021	2020	2019	2018	2017	2016	2015
Total Phosphorus (mg/l)	A	B	A	A	B	B	B	B	B	A
Chlorophyll-*a* (ug/l)	A	A	A	A	B	A	A	B	B	A
Secchi depth (ft)	C	C	C	C	C	C	C	C	C	C
Overall	**B+**	**B**	**B+**	**B+**	**B-**	**B**	**B**	**B-**	**B-**	**B+**

North School Section Lake

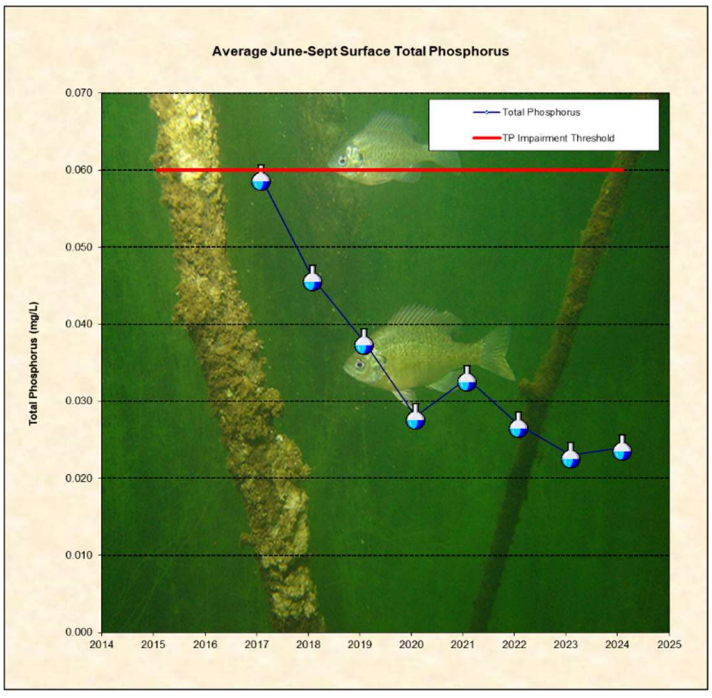
2024 Lake Grade: B+

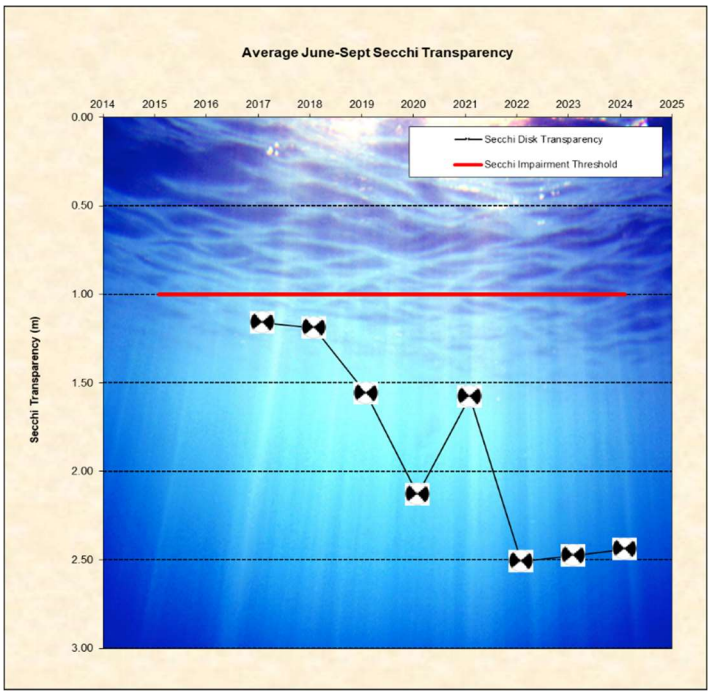
- DNR ID #: 820149
- Municipality: City of Hugo
- Location: SW ¼ Section 25, T31N-R21W
- Lake Size: 40 Acres
- Maximum Depth (2024): 12 ft.
- Ordinary High Water Mark: 963.2 ft.
- 100-Year High Water Level: 970.42 ft.
- 100% Littoral
  Note: Littoral area is the portion of the lake <15 ft. and dominated by aquatic vegetation.



Summary Points

- Based on chlorophyll-α data, the lake is classified as mesotrophic according to the Carlson Trophic State Index.
- Using the Kendall's Tau correlation test ($p<0.05$) there is a statistically significant **improving** trend for the average Secchi transparency, average chlorophyll-α, and average total phosphorus.
- The major land use is rural/agricultural.
- The North and South School Section basins were connected in 2024.
- The lake did not stratify in 2024.
- This lake is categorized as shallow according to the Minnesota Pollution Control Agency's standards.
- Lab methodology was changed for 2023 total phosphorus sample analysis, as such no results were reported <0.022 mg/L (April-mid September).





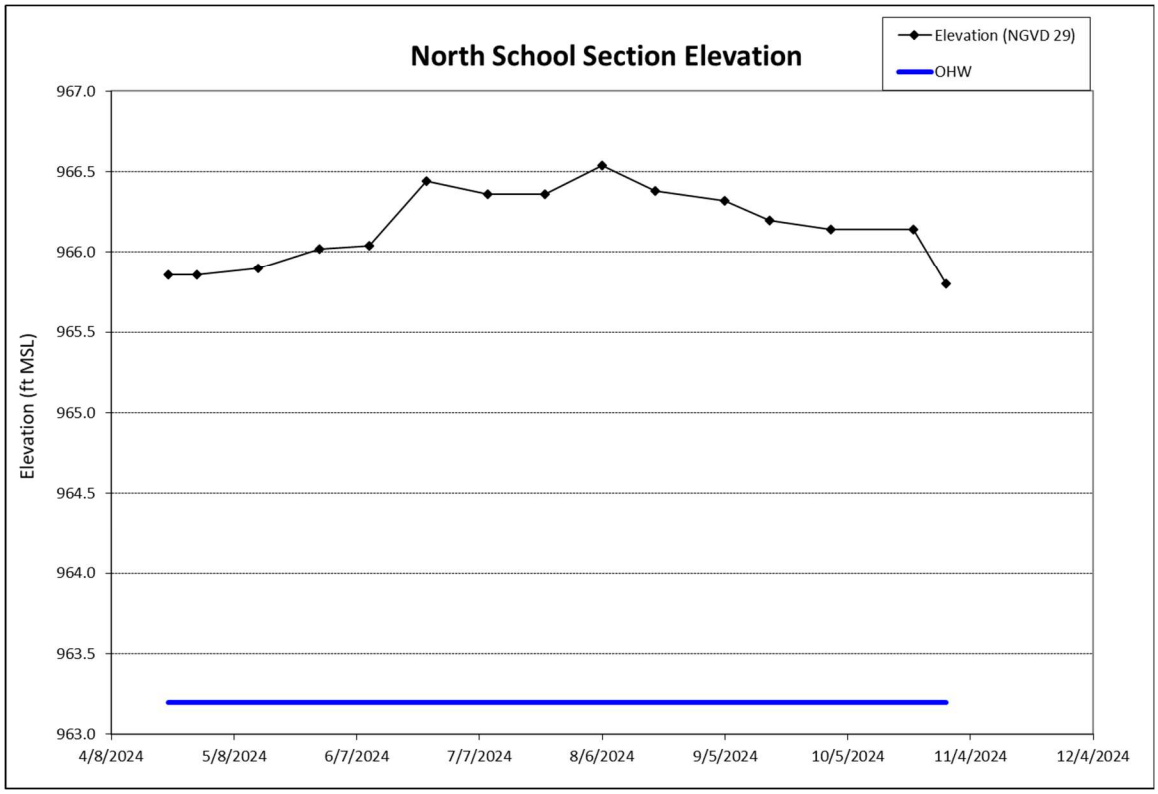
Date/Time	Total Phosphorus (mg/L)	Uncorrected Trichromatic Chlorophyll-*a* (ug/L)	Pheophytin-Corrected Chlorophyll-*a* (ug/L)	Total Kjeldahl Nitrogen (mg/L)	Secchi Disk Depth (m)	Surface Temperature (Celsius)	Surface Dissolved Oxygen (mg/L)
4/17/2024 9:30	0.020	5.0	4.0	0.59	2.13	11.6	13.02
5/14/2024 11:05	0.020	1.1	1.3	0.61	3.35	18.7	11.04
6/10/2024 13:40	0.026	7.7	7.5	0.64	2.74	23.1	9.02
7/9/2024 13:55	0.017	11.0	11.0	0.58	2.29	27.4	14.59
8/6/2024 14:30	0.027	8.7	8.3	0.79	2.44	24.7	6.97
9/5/2024 9:15	0.025	5.4	4.0	0.63	2.29	21.2	9.64
10/1/2024 8:52	0.030	4.6	4.0	0.65	2.44	19.1	8.71
2024 Average	0.024	6.2	5.7	0.64	2.53	20.8	10.43
2024 Summer Average	0.024	8.2	7.7	0.66	2.44	24.1	10.06

Water quality thresholds are 0.04 mg/L TP, 14 µg/L CL-a, 1.4 m Secchi depth*

Shallow lake water quality thresholds are 0.06 mg/L TP, 20 µg/L CL-a, 1.0 m Secchi depth*

	High	High Date	Low	Low Date	Average
2024 Elevation (ft)	966.54	8/6/2024	965.86	4/22/2024	966.19

*Data requirements and determinations of use assessment according to the MPCA's Guidance Manual for Assessing the Quality of Minnesota Surface Waters: "Samples must be collected over a minimum of 2 years and data used for assessments must be collected from June to September. Typically, a minimum of 8 individual data points for TP, corrected chlorophyll-a (chl-a corrected for pheophytin), and Secchi are required. Data used for phosphorus and chlorophyll-a calculations are limited to those collected from the upper most 3 meters of the water column (surface). If more than one sample is collected in a lake per day, these values are averaged to yield a daily average value. Following this step, all June to September data for the 10-year assessment window are averaged to determine summer-mean values for TP, corrected chl-a, and Secchi depth. These values are then compared to the standards and the assessment is made."

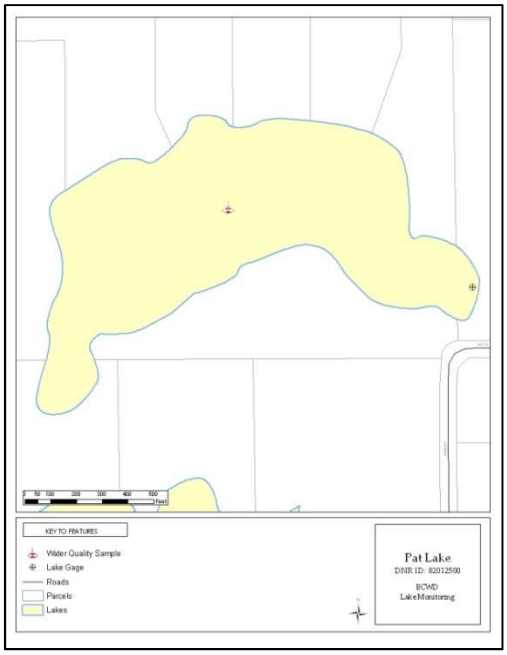


Lake Water Quality Summary										
	Lake Grades (May-Sept)									
	2024	2023	2022	2021	2020	2019	2018	2017	2016	2015
Total Phosphorus (mg/l)	B	A	B	B	C	C	C	C	NA	NA
Chlorophyll-*a* (ug/l)	A	A	A	B	A	C	C	C	NA	NA
Secchi depth (ft)	B	B	B	C	B	C	C	C	NA	NA
Overall	**B+**	**B+**	**B+**	**B-**	**B**	**C**	**C**	**C**	**NA**	**NA**

Pat Lake

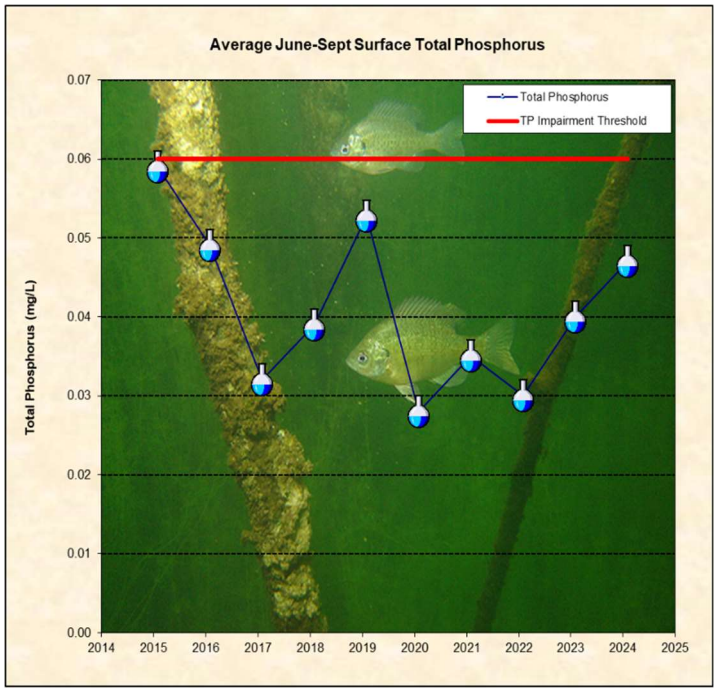
2024 Lake Grade: B-

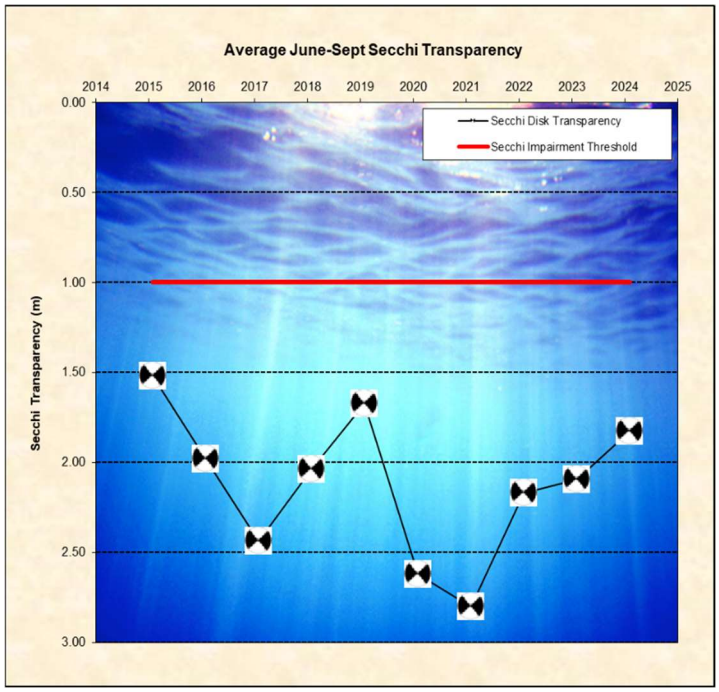
- DNR ID #: 820125
- Municipality: City of Grant
- Location: Section 11, T30N-R21W
- Lake Size: 20 Acres
- Maximum Depth (2024): 16 ft.
- Ordinary High Water Mark: 941.80 ft.
- 100-Year High Water Level: 949.10 ft.
- 99% Littoral
  Note: Littoral area is the portion of the lake <15 ft. and dominated by aquatic vegetation.



Summary Points

- Based on chlorophyll-α data, the lake is classified as eutrophic according to the Carlson Trophic State Index.
- Using the Kendall's Tau correlation test ($p<0.05$) there is a statistically significant **improving** trend for the average total phosphorus and average chlorophyll-α, and no trend for average Secchi transparency at this time.
- The major land use is rural/agricultural.
- The lake stratified in 2024 with a thermocline around 2 meters.
- This lake is categorized as shallow according to the Minnesota Pollution Control Agency's standards.
- Lab methodology was changed for 2023 total phosphorus sample analysis, as such no results were reported <0.022 mg/L (April-mid September).





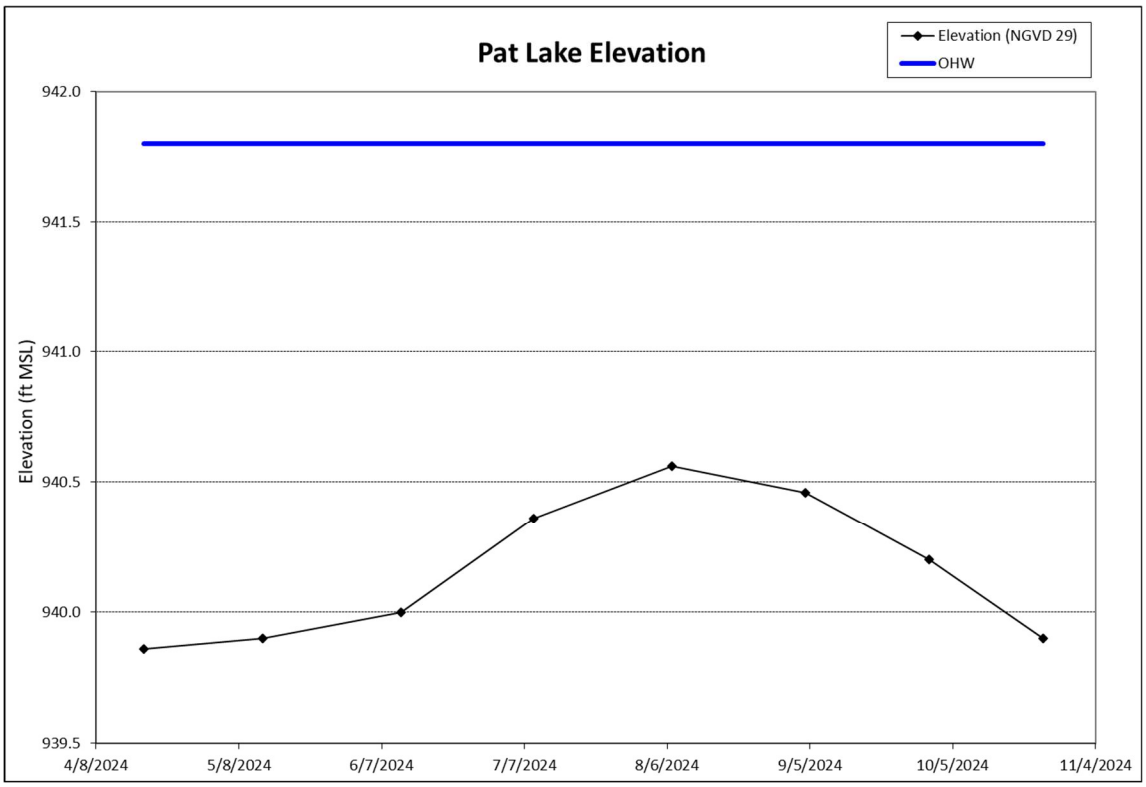
Date/Time	Total Phosphorus (mg/L)	Uncorrected Trichromatic Chlorophyll-*a* (ug/L)	Pheophytin-Corrected Chlorophyll-*a* (ug/L)	Total Kjeldahl Nitrogen (mg/L)	Secchi Disk Depth (m)	Surface Temperature (Celsius)	Surface Dissolved Oxygen (mg/L)
4/17/2024 13:24	0.025	4.9	3.7	0.48	2.90	12.2	11.92
5/13/2024 11:57	0.025	2.7	2.4	0.56	3.05	20.4	9.17
6/11/2024 13:34	0.038	3.6	2.9	0.61	2.13	23.0	8.82
7/9/2024 9:40	0.064	11.0	11.0	0.78	2.13	25.5	12.03
8/7/2024 9:42	0.062	13.0	12.0	0.85	1.52	24.1	7.56
9/4/2024 11:27	0.030	7.8	6.1	0.63	1.37	22.7	9.77
9/30/2024 10:35	0.039	13.0	11.0	0.65	1.98	21.1	11.23
2024 Average	0.040	8.0	7.0	0.65	2.15	21.3	10.07
2024 Summer Average	0.047	9.7	8.6	0.70	1.83	23.3	9.88

Water quality thresholds are 0.04 mg/L TP, 14 µg/L CL-a, 1.4 m Secchi depth*

Shallow lake water quality thresholds are 0.06 mg/L TP, 20 µg/L CL-a, 1.0 m Secchi depth*

	High	High Date	Low	Low Date	Average
2024 Elevation (ft)	940.56	8/7/2024	939.86	4/18/2024	940.19

*Data requirements and determinations of use assessment according to the MPCA's Guidance Manual for Assessing the Quality of Minnesota Surface Waters: "Samples must be collected over a minimum of 2 years and data used for assessments must be collected from June to September. Typically, a minimum of 8 individual data points for TP, corrected chlorophyll-a (chl-a corrected for pheophytin), and Secchi are required. Data used for phosphorus and chlorophyll-a calculations are limited to those collected from the upper most 3 meters of the water column (surface). If more than one sample is collected in a lake per day, these values are averaged to yield a daily average value. Following this step, all June to September data for the 10-year assessment window are averaged to determine summer-mean values for TP, corrected chl-a, and Secchi depth. These values are then compared to the standards and the assessment is made."

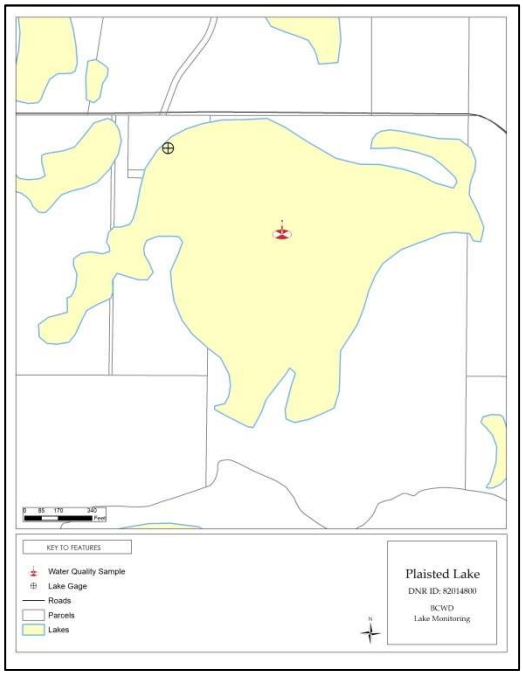


Lake Water Quality Summary										
	Lake Grades (May-Sept)									
	2024	2023	2022	2021	2020	2019	2018	2017	2016	2015
Total Phosphorus (mg/l)	C	C	B	C	B	C	C	B	C	C
Chlorophyll-*a* (ug/l)	A	A	A	A	A	B	B	A	B	C
Secchi depth (ft)	C	C	B	B	B	C	C	B	C	C
Overall	**B-**	**B-**	**B+**	**B**	**B+**	**C+**	**C+**	**B+**	**C+**	**C**

Plaisted Lake

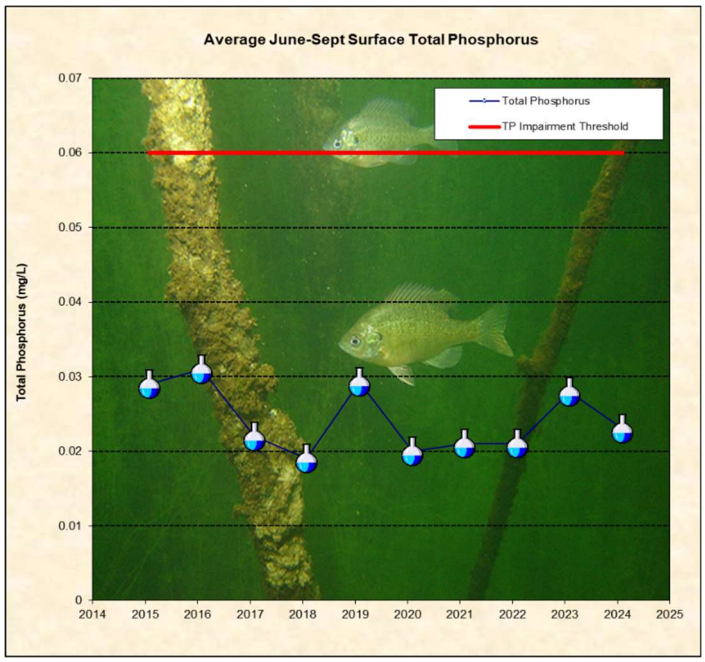
2024 Lake Grade: B+

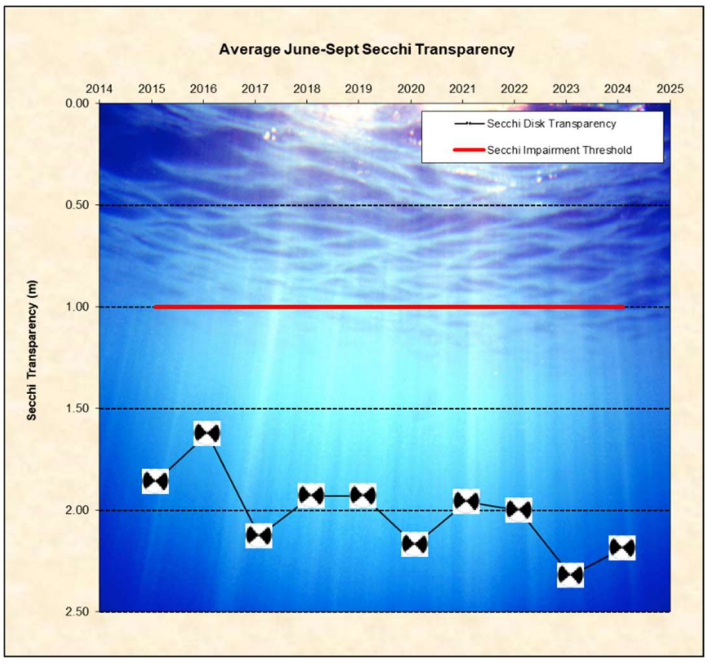
- DNR ID #: 820148
- Municipality: City of Hugo
- Location: Section 25, T31N-R21W
- Lake Size: 70 Acres
- Maximum Depth (2024): 11 ft.
- Ordinary High Water Mark: 966.00 ft.
- 100-Year High Water Level: NA
- 100% Littoral
  Note: Littoral area is the portion of the lake <15 ft. and dominated by aquatic vegetation.



Summary Points

- Based on chlorophyll-α data, the lake is classified as mesotrophic according to the Carlson Trophic State Index.
- Using the Kendall's Tau correlation test ($p<0.05$) there is a statistically significant **improving** trend for the average total phosphorus and average chlorophyll-α, and the trend for the average Secchi transparency is skewed due to vegetation limiting the transparency.
- The major land use is rural/agricultural.
- The lake did not stratify in 2024.
- This lake is categorized as shallow according to the Minnesota Pollution Control Agency's standards.
- Plaisted Lake is listed as impaired for nutrients on the Minnesota Pollution Control Agency's Impaired Waters List.
- Lab methodology was changed for 2023 total phosphorus sample analysis, as such no results were reported <0.022 mg/L (April-mid September).





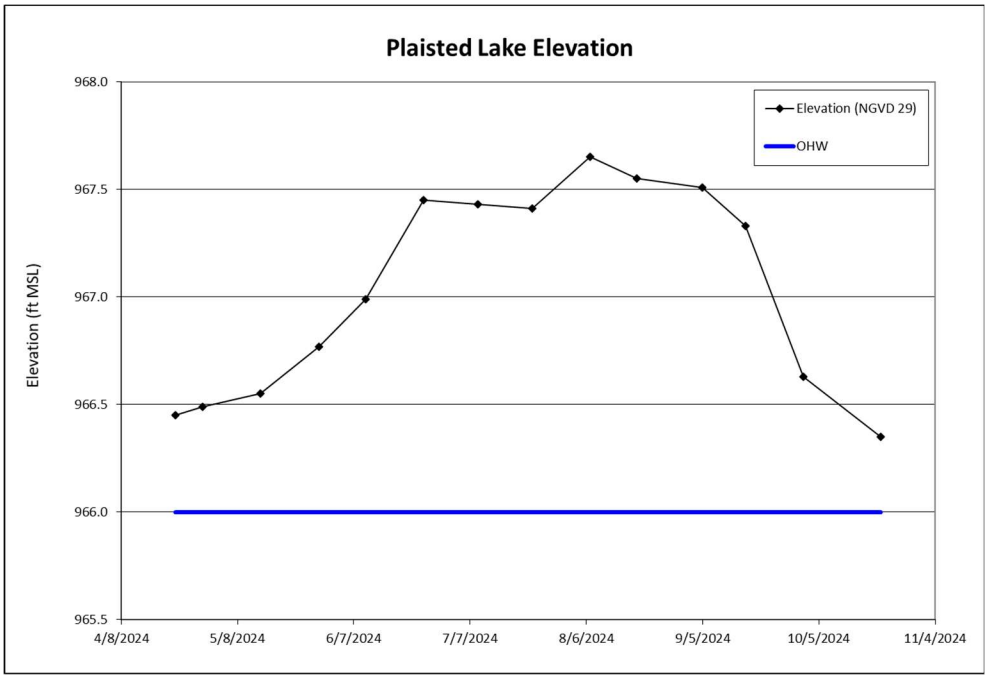
Date/Time	Total Phosphorus (mg/L)	Uncorrected Trichromatic Chlorophyll-*a* (ug/L)	Pheophytin-Corrected Chlorophyll-*a* (ug/L)	Total Kjeldahl Nitrogen (mg/L)	Secchi Disk Depth (m)	Surface Temperature (Celsius)	Surface Dissolved Oxygen (mg/L)
4/17/2024 8:48	0.020	4.3	3.5	0.48	2.59	11.9	12.93
4/29/2024 13:06	0.026	4.8	3.7	0.50	2.59	11.1	9.40
5/14/2024 10:15	0.020	1.9	1.9	0.48	2.44	19.2	9.70
5/29/2024 13:50	0.023	1.9	1.6	0.47	2.29	20.6	7.71
6/10/2024 12:55	0.029	2.9	2.4	0.58	2.29	23.2	8.51
6/25/2024 10:20	0.024	3.7	2.9	1.58	2.44	24.5	8.84
7/9/2024 12:59	0.026	6.6	6.1	0.56	2.13	26.2	14.50
7/23/2024 11:45	0.026	7.5	7.2	0.52	2.13	25.7	11.77
8/7/2024 13:34	0.020	4.9	4.0	0.54	1.68	25.1	9.08
8/19/2024 12:43	0.027	2.8	3.2	0.58	2.44	25.4	12.14
9/5/2024 8:30	0.018	2.1	1.6	0.46	2.13	22.3	10.79
9/16/2024 12:50	0.016	2.0	1.3	0.46	2.29	24.3	13.66
10/1/2024 10:09	0.026	2.8	2.4	0.50	2.44	20.0	8.85
10/21/2024 13:22	0.022	7.9	7.2	0.54	2.59	14.2	13.23
2024 Average	0.023	4.0	3.5	0.59	2.32	21.0	10.79
2024 Summer Average	0.023	4.1	3.6	0.66	2.19	24.6	11.16

Water quality thresholds are 0.04 mg/L TP, 14 µg/L CL-a, 1.4 m Secchi depth*

Shallow lake water quality thresholds are 0.06 mg/L TP, 20 µg/L CL-a, 1.0 m Secchi depth*

	High	High Date	Low	Low Date	Average
2024 Elevation (ft)	967.65	8/7/2024	966.45	4/22/2024	967.13

*Data requirements and determinations of use assessment according to the MPCA's Guidance Manual for Assessing the Quality of Minnesota Surface Waters: "Samples must be collected over a minimum of 2 years and data used for assessments must be collected from June to September. Typically, a minimum of 8 individual data points for TP, corrected chlorophyll-a (chl-a corrected for pheophytin), and Secchi are required. Data used for phosphorus and chlorophyll-a calculations are limited to those collected from the upper most 3 meters of the water column (surface). If more than one sample is collected in a lake per day, these values are averaged to yield a daily average value. Following this step, all June to September data for the 10-year assessment window are averaged to determine summer-mean values for TP, corrected chl-a, and Secchi depth. These values are then compared to the standards and the assessment is made."

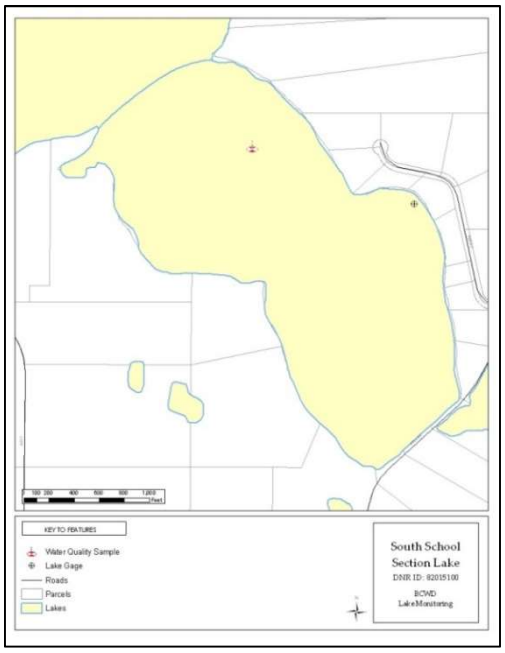


Lake Water Quality Summary										
	Lake Grades (May-Sept)									
	2024	2023	2022	2021	2020	2019	2018	2017	2016	2015
Total Phosphorus (mg/l)	B	B	A	A	A	B	A	A	B	B
Chlorophyll-*a* (ug/l)	A	A	A	A	A	A	A	A	B	A
Secchi depth (ft)	B	B	C	B	B	C	C	C	C	C
Overall	**B+**	**B+**	**B+**	**A-**	**A-**	**B**	**B+**	**B+**	**B-**	**B**

South School Section Lake

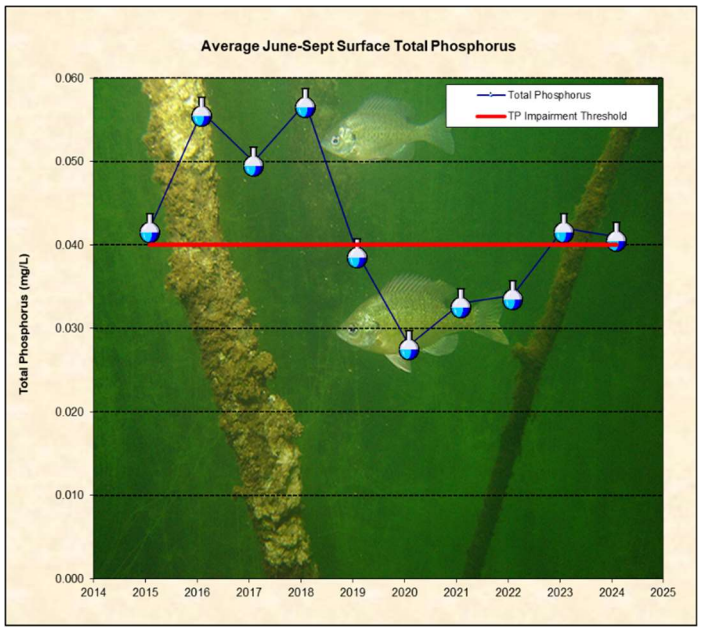
2024 Lake Grade: C

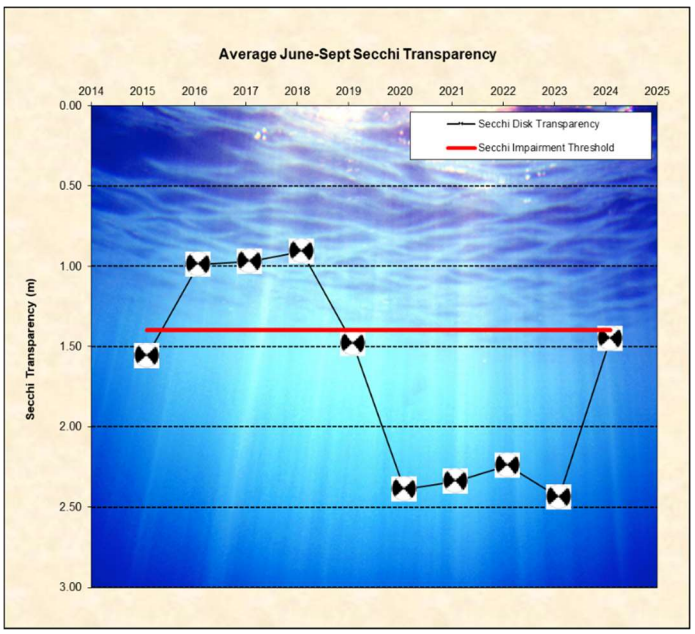
- DNR ID #: 820151
- Municipality: City of Hugo
- Location: S ½ Section 25, T31N-R21W
- Lake Size: 115 Acres
- Maximum Depth (2024): 21 ft.
- Ordinary High Water Mark: 965.30 ft.
- 100-Year High Water Level: 972.20 ft.
- 41% Littoral
  Note: Littoral area is the portion of the lake <15 ft. and dominated by aquatic vegetation.



Summary Points

- Based on chlorophyll-α data, the lake is classified as eutrophic according to the Carlson Trophic State Index.
- Using the Kendall's Tau correlation test ($p<0.05$) there is a statistically significant **improving** trend for the average total phosphorus, and no trend for average Secchi transparency and average chlorophyll-α at this time.
- The major land use is rural/agricultural.
- The lake did not stratify in 2024.
- The North and South School Section basins were connected in 2024.
- This lake is categorized as a deep lake according to the Minnesota Pollution Control Agency's standards.
- South School Section Lake is listed as impaired for nutrients on the Minnesota Pollution Control Agency's Impaired Waters List.
- Lab methodology was changed for 2023 total phosphorus sample analysis, as such no results were reported <0.022 mg/L (April-mid September).





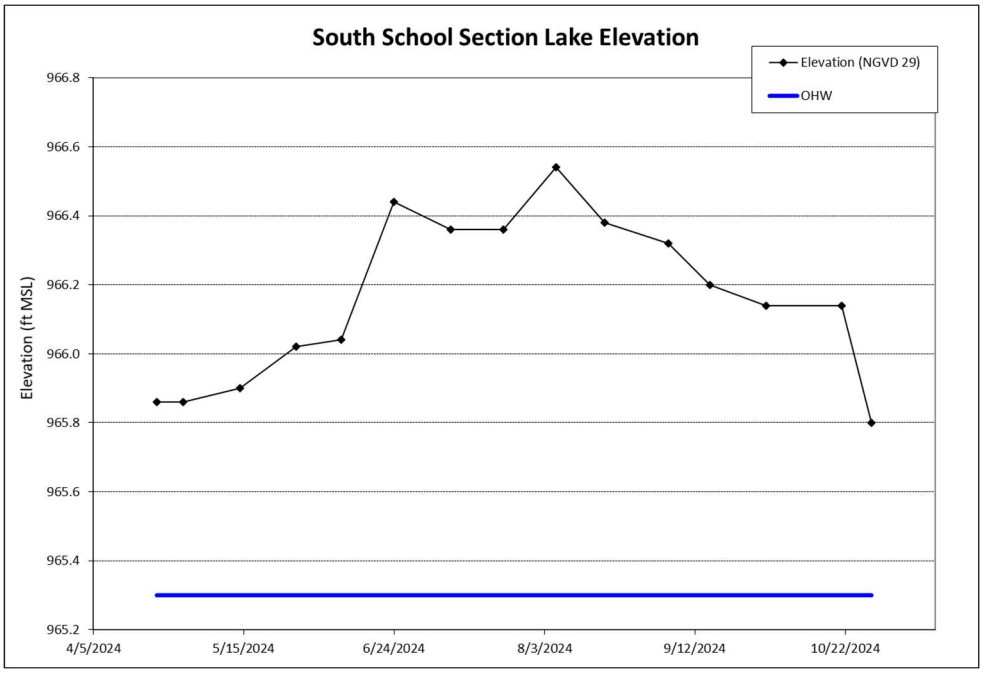
Date/Time	Total Phosphorus (mg/L)	Uncorrected Trichromatic Chlorophyll-*a* (ug/L)	Pheophytin-Corrected Chlorophyll-*a* (ug/L)	Total Kjeldahl Nitrogen (mg/L)	Secchi Disk Depth (m)	Surface Temperature (Celsius)	Surface Dissolved Oxygen (mg/L)
4/17/2024 9:40	0.022	12.0	10.0	0.73	2.44	10.5	15.72
4/29/2024 13:34	0.033	7.4	6.1	0.75	2.29	10.6	10.20
5/14/2024 10:45	0.037	2.0	1.6	0.68	3.96	17.6	9.98
5/29/2024 14:22	0.023	3.6	3.5	0.65	4.42	21.0	9.52
6/10/2024 13:25	0.027	5.7	5.3	0.78	3.05	22.3	8.51
6/24/2024 14:40	0.028	13.0	13.0	1.32	2.13	23.1	11.44
7/9/2024 13:40	0.023	15.0	15.0	0.82	1.83	26.4	16.08
7/23/2024 12:58	0.040	45.0	44.0	1.10	1.22	25.5	13.24
8/6/2024 14:15	0.045	41.0	41.0	1.10	1.22	25.5	9.90
8/19/2024 13:11	0.057	50.0	50.0	1.60	0.76	26.1	16.96
9/5/2024 9:00	0.050	48.0	46.0	1.41	0.76	22.2	9.81
9/16/2024 13:15	0.056	79.0	79.0	1.79	0.61	24.7	17.46
10/1/2024 9:05	0.056	37.0	34.0	1.41	0.91	20.1	6.52
10/21/2024 13:50	0.040	26.0	25.0	1.29	1.37	14.1	12.50
2024 Average	0.038	27.5	26.7	1.10	1.93	20.7	11.99
2024 Summer Average	0.041	37.1	36.7	1.24	1.45	24.5	12.93

Water quality thresholds are 0.04 mg/L TP, 14 µg/L CL-a, 1.4 m Secchi depth*

Shallow lake water quality thresholds are 0.06 mg/L TP, 20 µg/L CL-a, 1.0 m Secchi depth*

	High	High Date	Low	Low Date	Average
2024 Elevation (ft)	966.54	8/6/2024	965.86	4/22/2024	966.19

*Data requirements and determinations of use assessment according to the MPCA's Guidance Manual for Assessing the Quality of Minnesota Surface Waters: "Samples must be collected over a minimum of 2 years and data used for assessments must be collected from June to September. Typically, a minimum of 8 individual data points for TP, corrected chlorophyll-a (chl-a corrected for pheophytin), and Secchi are required. Data used for phosphorus and chlorophyll-a calculations are limited to those collected from the upper most 3 meters of the water column (surface). If more than one sample is collected in a lake per day, these values are averaged to yield a daily average value. Following this step, all June to September data for the 10-year assessment window are averaged to determine summer-mean values for TP, corrected chl-a, and Secchi depth. These values are then compared to the standards and the assessment is made."

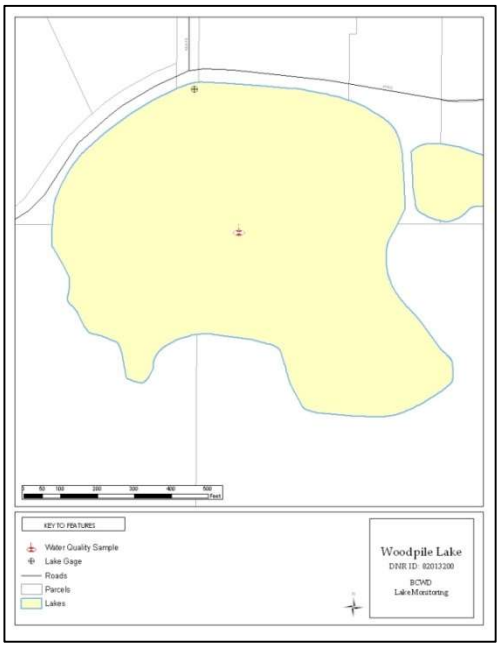


Lake Water Quality Summary										
	Lake Grades (May-Sept)									
	2024	2023	2022	2021	2020	2019	2018	2017	2016	2015
Total Phosphorus (mg/l)	C	C	B	B	B	C	C	C	C	C
Chlorophyll-*a* (ug/l)	C	B	B	B	B	C	D	C	C	C
Secchi depth (ft)	C	B	B	B	B	C	D	D	C	C
Overall	**C**	**B-**	**B**	**B**	**B**	**C**	**D+**	**C-**	**C**	**C**

Woodpile Lake

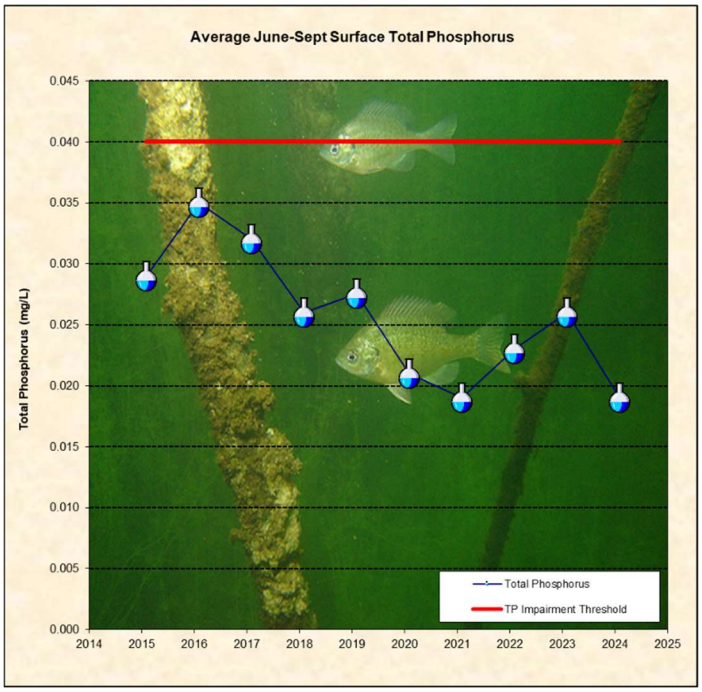
2024 Lake Grade: A

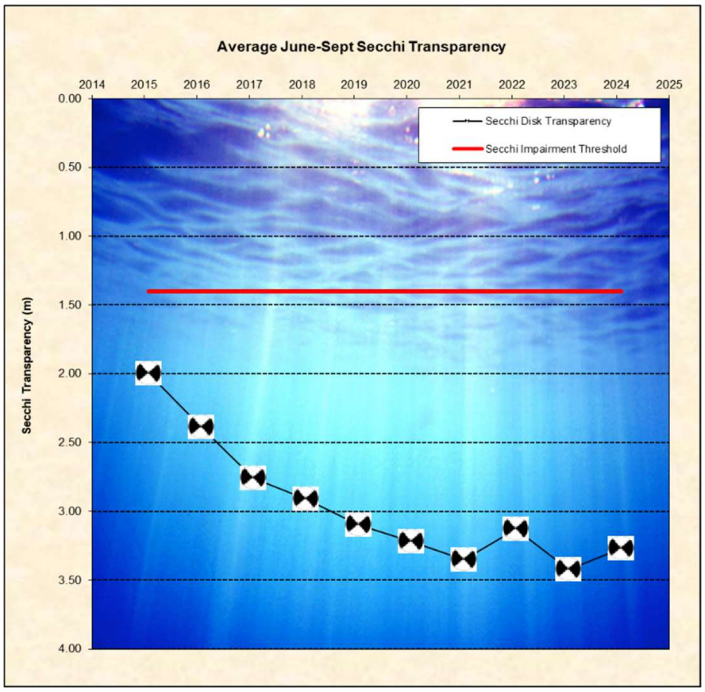
- DNR ID #: 820132
- Municipality: City of Grant
- Location: Section 23, T30N-R21W
- Lake Size: 15 Acres
- Maximum Depth (2024): 27 ft.
- Ordinary High Water Mark: 968.50 ft.
- 100-Year High Water Level: 971.00 ft.
- 8% Littoral
  Note: Littoral area is the portion of the lake <15 ft. and dominated by aquatic vegetation.



Summary Points

- Based on chlorophyll-α data, the lake is classified as mesotrophic according to the Carlson Trophic State Index.
- Using the Kendall's Tau correlation test ($p<0.05$) there is a statistically significant **improving** trend for the average Secchi transparency, average chlorophyll-α, and average total phosphorus.
- The major land use is rural/agricultural.
- The lake stratified in 2024 with a thermocline between 2 and 3 meters.
- This lake is categorized as a deep lake according to the Minnesota Pollution Control Agency's standards.
- Lab methodology was changed for 2023 total phosphorus sample analysis, as such no results were reported <0.022 mg/L (April-mid September).





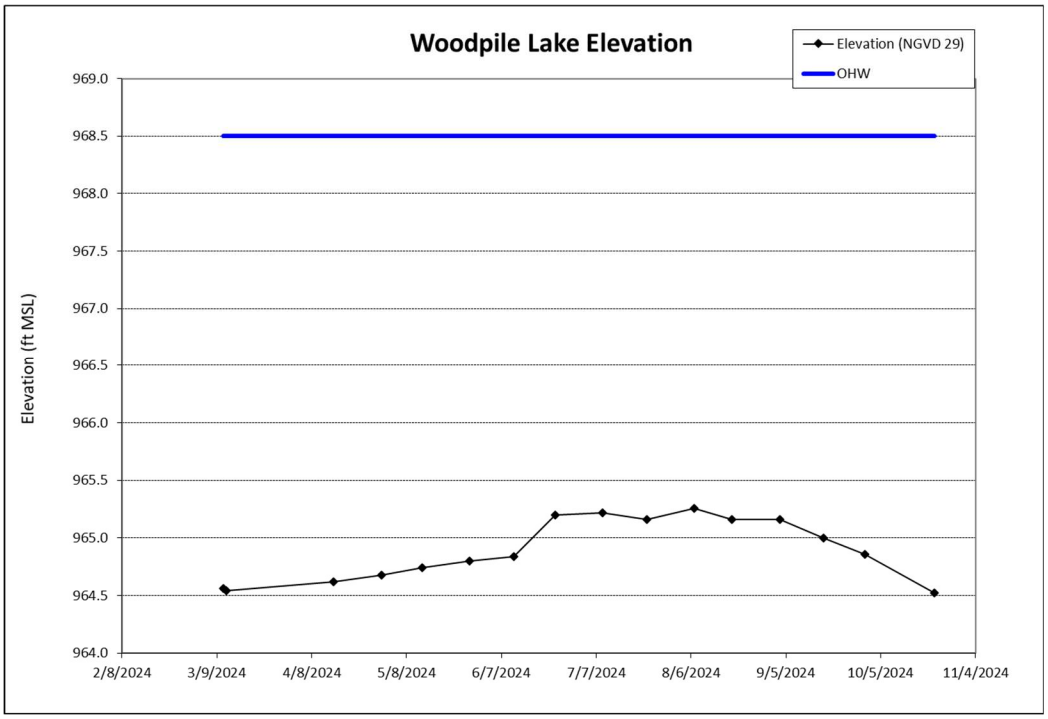
Date/Time	Total Phosphorus (mg/L)	Uncorrected Trichromatic Chlorophyll-*a* (ug/L)	Pheophytin-Corrected Chlorophyll-*a* (ug/L)	Total Kjeldahl Nitrogen (mg/L)	Secchi Disk Depth (m)	Surface Temperature (Celsius)	Surface Dissolved Oxygen (mg/L)
4/15/2024 11:22	0.020	1.7	1.3	0.50	4.88	13.5	15.85
4/30/2024 8:12	0.016	2.3	1.9	0.56	4.72	11.3	10.33
5/13/2024 9:21	0.020	1.6	1.3	0.59	4.88	18.6	10.49
5/28/2024 9:36	0.020	2.0	1.9	0.52	3.66	19.1	8.46
6/11/2024 9:02	0.020	2.6	2.4	0.59	3.96	22.1	9.45
6/24/2024 10:22	0.021	3.8	3.5	2.38	2.74	23.4	9.82
7/9/2024 8:45	0.020	8.3	8.0	0.66	3.05	24.5	12.05
7/23/2024 11:02	0.022	8.5	8.3	0.67	2.74	25.6	13.04
8/7/2024 9:09	0.021	5.8	5.3	0.64	2.74	24.2	8.71
8/19/2024 9:00	0.021	3.5	3.5	0.73	3.66	24.1	12.83
9/3/2024 9:13	0.020	5.2	4.3	0.62	2.90	22.8	11.35
9/17/2024 8:22	0.018	4.4	4.0	0.73	3.81	23.6	15.46
9/30/2024 9:35	0.007	2.8	1.9	0.52	3.81	20.9	11.23
10/22/2024 8:36	0.016	2.9	2.7	0.62	3.66	14.3	12.50
2024 Average	0.019	4.0	3.6	0.74	3.66	20.6	11.54
2024 Summer Average	0.019	5.0	4.6	0.84	3.27	23.5	11.55

Water quality thresholds are 0.04 mg/L TP, 14 µg/L CL-a, 1.4 m Secchi depth*

Shallow lake water quality thresholds are 0.06 mg/L TP, 20 µg/L CL-a, 1.0 m Secchi depth*

	High	High Date	Low	Low Date	Average
2024 Elevation (ft)	965.26	8/7/2024	964.54	3/12/2024	964.92

*Data requirements and determinations of use assessment according to the MPCA's Guidance Manual for Assessing the Quality of Minnesota Surface Waters: "Samples must be collected over a minimum of 2 years and data used for assessments must be collected from June to September. Typically, a minimum of 8 individual data points for TP, corrected chlorophyll-a (chl-a corrected for pheophytin), and Secchi are required. Data used for phosphorus and chlorophyll-a calculations are limited to those collected from the upper most 3 meters of the water column (surface). If more than one sample is collected in a lake per day, these values are averaged to yield a daily average value. Following this step, all June to September data for the 10-year assessment window are averaged to determine summer-mean values for TP, corrected chl-a, and Secchi depth. These values are then compared to the standards and the assessment is made."



Lake Water Quality Summary										
	Lake Grades (May-Sept)									
	2024	2023	2022	2021	2020	2019	2018	2017	2016	2015
Total Phosphorus (mg/l)	A	B	A	A	A	B	B	B	C	B
Chlorophyll-*a* (ug/l)	A	A	A	A	A	A	A	A	A	B
Secchi depth (ft)	A	A	A	A	A	A	B	B	B	C
Overall	**A**	**A-**	**A**	**A**	**A**	**A-**	**B+**	**B+**	**B**	**B-**

APPENDIX B –STREAM DATA

Total Phosphorus and Total Suspended Solids Loading Tables

Field Water Quality Data Tables

Table 1. Brown's Creek at Highway 15 2024 Total Suspended Solids (TSS) and Total Phosphorus (TP) Loading

	Sample Collection Time				Loading Interval					
Sample Type	Start	End	TSS (mg/L)	TP (mg/L)	Start	End	Interval Volume (cf)	Interval Volume (ac-ft)	Interval TSS (lb)	Interval TP (lb)
*Base**			*6*	*0.109*	*1/1/2024 0:00*	*3/29/2024 12:00*	*15,292,800*	*351.26*	*5,728*	*104.06*
*Snowmelt**			*42*	*0.201*	*3/29/2024 12:00*	*3/31/2024 18:00*	*777,600*	*17.86*	*2,039*	*9.76*
*Base**			*6*	*0.109*	*3/31/2024 18:00*	*4/7/2024 11:00*	*1,333,080*	*30.62*	*499*	*9.07*
*Storm**			*70*	*0.270*	*4/7/2024 11:00*	*4/8/2024 7:00*	*432,000*	*9.92*	*1,888*	*7.28*
*Base**			*6*	*0.109*	*4/8/2024 7:00*	*4/11/2024 10:00*	*675,000*	*15.50*	*253*	*4.59*
Base			*6*	*0.109*	*4/11/2024 10:00*	*4/16/2024 13:00*	*961,179*	*22.08*	*360*	*6.54*
Storm			*70*	*0.270*	*4/16/2024 13:00*	*4/16/2024 22:00*	*118,672*	*2.73*	*519*	*2.00*
Storm Composite	4/16/2024 22:53	4/17/2024 13:11	39	0.236	4/16/2024 22:00	4/17/2024 14:00	425,026	9.76	1,035	6.26
Base			*6*	*0.109*	*4/17/2024 14:00*	*4/28/2024 18:00*	*2,245,260*	*51.57*	*841*	*15.28*
Storm Composite	4/29/2024 4:55	4/30/2024 2:06	12	0.068	4/28/2024 18:00	4/30/2024 3:00	490,768	11.27	368	2.08
Base			*6*	*0.109*	*4/30/2024 3:00*	*5/2/2024 8:00*	*684,332*	*15.72*	*256*	*4.66*
Storm			*70*	*0.270*	*5/2/2024 8:00*	*5/3/2024 1:00*	*329,443*	*7.57*	*1,440*	*5.55*
Base			*6*	*0.109*	*5/3/2024 1:00*	*5/19/2024 14:00*	*3,469,020*	*79.68*	*1,299*	*23.60*
Base Grab	5/20/2024 14:10	5/20/2024 14:10	10	0.109	5/19/2024 14:00	5/21/2024 17:00	417,267	9.58	260	2.84
Storm Composite	5/21/2024 19:32	5/22/2024 19:17	83	0.279	5/21/2024 17:00	5/22/2024 20:00	1,003,020	23.04	5,197	17.47
Base			*6*	*0.109*	*5/22/2024 20:00*	*6/4/2024 19:00*	*3,020,630*	*69.38*	*1,131*	*20.55*
Storm Composite	6/4/2024 20:15	6/5/2024 13:06	113	0.339	6/4/2024 19:00	6/5/2024 18:00	945,509	21.72	6,670	20.01
Base			*6*	*0.109*	*6/5/2024 18:00*	*6/12/2024 23:00*	*1,725,780*	*39.64*	*646*	*11.74*
Storm			*70*	*0.270*	*6/12/2024 23:00*	*6/14/2024 2:00*	*595,476*	*13.68*	*2,602*	*10.04*
Base			*6*	*0.109*	*6/14/2024 2:00*	*6/16/2024 1:00*	*534,305*	*12.27*	*200*	*3.64*
Storm			*70*	*0.270*	*6/16/2024 1:00*	*6/17/2024 1:00*	*874,736*	*20.09*	*3,822*	*14.74*
Base			*6*	*0.109*	*6/17/2024 1:00*	*6/18/2024 21:00*	*1,513,600*	*34.77*	*567*	*10.30*
Storm Composite	6/18/2024 21:43	6/20/2024 6:02	78	0.279	6/18/2024 21:00	6/20/2024 6:00	1,860,760	42.74	9,060	32.41
Base Grab	6/26/2024 14:01	6/26/2024 14:01	8	0.218	6/20/2024 6:00	6/28/2024 6:00	3,938,240	90.46	1,967	53.60
Storm Composite	6/28/2024 11:43	6/28/2024 20:09	66	0.310	6/28/2024 6:00	6/29/2024 4:00	672,606	15.45	2,771	13.02
Base			*6*	*0.109*	*6/29/2024 4:00*	*7/13/2024 8:00*	*5,331,620*	*122.46*	*1,997*	*36.28*
Storm			*70*	*0.270*	*7/13/2024 8:00*	*7/13/2024 11:00*	*53,880*	*1.24*	*235*	*0.91*
Base			*6*	*0.109*	*7/13/2024 11:00*	*7/22/2024 18:00*	*3,220,060*	*73.96*	*1,206*	*21.91*
Storm Composite	7/22/2024 18:01	7/23/2024 9:03	137	0.449	7/22/2024 18:00	7/23/2024 9:00	472,873	10.86	4,044	13.25
Storm			*70*	*0.270*	*7/23/2024 9:00*	*7/24/2024 2:00*	*659,807*	*15.16*	*2,883*	*11.12*
Base Grab	7/25/2024 13:20	7/25/2024 13:20	5	0.120	7/24/2024 2:00	7/26/2024 14:00	1,068,710	24.55	334	8.01
Base			*6*	*0.109*	*7/26/2024 14:00*	*8/5/2024 17:00*	*3,203,220*	*73.57*	*1,200*	*21.80*
Storm			*70*	*0.270*	*8/5/2024 17:00*	*8/6/2024 8:00*	*867,355*	*19.92*	*3,790*	*14.62*
Storm Grab	8/6/2024 13:14	8/6/2024 13:14	29	0.196	8/6/2024 8:00	8/6/2024 19:00	688,023	15.80	1,246	8.42
Base			*6*	*0.109*	*8/6/2024 19:00*	*8/15/2024 4:00*	*3,118,990*	*71.64*	*1,168*	*21.22*
Storm			*70*	*0.270*	*8/15/2024 4:00*	*8/15/2024 9:00*	*67,578*	*1.55*	*295*	*1.14*
Base			*6*	*0.109*	*8/15/2024 9:00*	*8/27/2024 6:00*	*3,088,510*	*70.94*	*1,157*	*21.02*
Storm			*70*	*0.270*	*8/27/2024 6:00*	*8/27/2024 19:00*	*232,170*	*5.33*	*1,015*	*3.91*
Base			*6*	*0.109*	*8/27/2024 19:00*	*8/29/2024 17:00*	*770,667*	*17.70*	*289*	*5.24*
Storm			*70*	*0.270*	*8/29/2024 17:00*	*8/30/2024 4:00*	*242,790*	*5.58*	*1,061*	*4.09*
Base Grab	9/3/2024 9:37	9/3/2024 9:37	4	0.080	8/30/2024 4:00	9/4/2024 10:00	1,685,950	38.72	421	8.42
Base			*6*	*0.109*	*9/4/2024 10:00*	*9/23/2024 9:00*	*3,810,810*	*87.53*	*1,427*	*25.93*
Base Grab	9/24/2024 9:07	9/24/2024 9:07	5	0.067	9/23/2024 9:00	9/25/2024 9:00	451,286	10.37	141	1.89
Base			*6*	*0.109*	*9/25/2024 9:00*	*10/20/2024 14:00*	*5,785,020*	*132.88*	*2,167*	*39.36*
Base Grab	10/21/2024 14:14	10/21/2024 14:14	5	0.057	10/20/2024 14:00	10/22/2024 14:00	638,535	14.67	199	2.27
Base			*6*	*0.109*	*10/22/2024 14:00*	*10/29/2024 15:00*	*2,533,000*	*58.18*	*949*	*17.24*
*Base**			*6*	*0.109*	*10/29/2024 15:00*	*10/31/2024 6:00*	*575,640*	*13.22*	*216*	*3.92*
*Storm**			*70*	*0.270*	*10/31/2024 6:00*	*10/31/2024 20:00*	*315,000*	*7.24*	*1,376*	*5.31*
*Base**			*6*	*0.109*	*10/31/2024 20:00*	*11/18/2024 16:00*	*5,392,800*	*123.87*	*2,020*	*36.70*
*Storm**			*70*	*0.270*	*11/18/2024 16:00*	*11/19/2024 16:00*	*907,200*	*20.84*	*3,964*	*15.29*
*Base**			*6*	*0.109*	*11/19/2024 16:00*	*12/27/2024 18:00*	*9,871,200*	*226.73*	*3,697*	*67.17*
*Storm**			*70*	*0.270*	*12/27/2024 18:00*	*12/28/2024 8:00*	*252,000*	*5.79*	*1,101*	*4.25*
*Base**			*6*	*0.109*	*12/28/2024 8:00*	*1/1/2025 0:00*	*950,400*	*21.83*	*356*	*6.47*
Storm Average			70	0.270						
Base Average			6	0.109						
All Average			42	0.201						
Total							**100,591,203**	**2,310**	**91,374**	**838**
Brown's Creek Major Subwatershed Total Acres							3,532			
Total TSS/TP(lb/ac/yr)									25.87	0.237
Total TSS/TP (kg/ha/yr)									29.00	0.266

Italics indicate estimated concentrations based on average base and storm flow concentrations.

*Interval volumes were estimated using similar flow conditions.

Table 2. Brown's Creek at McKusick Road 2024 Total Suspended Solids (TSS) and Total Phosphorus (TP) Loading

	Sample Collection Time				Loading Interval					
Sample Type	Start	End	TSS (mg/L)	TP (mg/L)	Start	End	Interval Volume (cf)	Interval Volume (ac-ft)	Interval TSS (lb)	Interval TP (lb)
*Base**			*8*	*0.120*	*1/1/2024 0:00*	*3/25/2024 12:00*	*23,727,600*	*545.00*	*11,850*	*177.75*
*Snowmelt**			*107*	*0.315*	*3/25/2024 12:00*	*3/31/2024 15:00*	*3,439,800*	*79.01*	*22,976*	*67.64*
*Base**			*8*	*0.120*	*3/31/2024 15:00*	*4/7/2024 11:00*	*2,066,400*	*47.46*	*1,032*	*15.48*
*Storm**			*225*	*0.511*	*4/7/2024 11:00*	*4/8/2024 14:00*	*1,749,600*	*40.19*	*24,575*	*55.81*
*Base**			*8*	*0.120*	*4/8/2024 14:00*	*4/16/2024 11:00*	*3,742,200*	*85.95*	*1,869*	*28.03*
*Storm**			*225*	*0.511*	*4/16/2024 11:00*	*4/17/2024 10:00*	*1,573,200*	*36.13*	*22,097*	*50.18*
*Base**			*8*	*0.120*	*4/17/2024 10:00*	*4/24/2024 15:15*	*3,430,350*	*78.79*	*1,713*	*25.70*
Base			*8*	*0.120*	*4/24/2024 15:15*	*4/28/2024 15:15*	*1,776,660*	*40.81*	*887*	*13.31*
Storm Composite	4/29/2024 4:09	4/29/2024 19:20	26	0.107	4/28/2024 15:15	4/29/2024 20:15	1,248,460	28.68	2,026	8.34
Base			*8*	*0.120*	*4/29/2024 20:15*	*4/30/2024 8:30*	*597,078*	*13.71*	*298*	*4.47*
*Base**			*8*	*0.120*	*4/30/2024 8:30*	*5/2/2024 7:00*	*1,975,320*	*45.37*	*986*	*14.80*
*Storm**			*225*	*0.511*	*5/2/2024 7:00*	*5/3/2024 0:00*	*1,224,000*	*28.11*	*17,192*	*39.05*
*Base**			*8*	*0.120*	*5/3/2024 0:00*	*5/6/2024 15:15*	*1,884,600*	*43.29*	*941*	*14.12*
Base			*8*	*0.120*	*5/6/2024 15:15*	*5/19/2024 14:15*	*5,031,240*	*115.56*	*2,513*	*37.69*
Base Grab	5/20/2024 14:39	5/20/2024 14:39	8	0.087	5/19/2024 14:15	5/21/2024 17:15	849,253	19.51	424	4.61
Storm Composite	5/21/2024 17:25	5/22/2024 17:06	188	0.427	5/21/2024 17:15	5/22/2024 17:15	2,407,100	55.29	28,250	64.16
Base			*8*	*0.120*	*5/22/2024 17:15*	*5/27/2024 17:15*	*4,357,550*	*100.09*	*2,176*	*32.64*
Turbidity Spike			225	0.511	5/27/2024 17:15	5/27/2024 21:15	64,936	1.49	912	2.07
Base			*8*	*0.120*	*5/27/2024 21:15*	*5/31/2024 17:15*	*1,341,220*	*30.81*	*670*	*10.05*
Storm			*225*	*0.511*	*5/31/2024 17:15*	*6/1/2024 5:15*	*298,635*	*6.86*	*4,195*	*9.53*
Base			*8*	*0.120*	*6/1/2024 5:15*	*6/3/2024 3:15*	*1,131,310*	*25.98*	*565*	*8.47*
Storm			*225*	*0.511*	*6/3/2024 3:15*	*6/3/2024 9:15*	*182,174*	*4.18*	*2,559*	*5.81*
Base			*8*	*0.120*	*6/3/2024 9:15*	*6/4/2024 18:15*	*871,354*	*20.01*	*435*	*6.53*
Storm Composite	6/4/2024 19:25	6/4/2024 23:25	456	0.726	6/4/2024 18:15	6/5/2024 3:15	780,663	17.93	22,223	35.38
Storm			*225*	*0.511*	*6/5/2024 3:15*	*6/5/2024 12:15*	*818,067*	*18.79*	*11,490*	*26.10*
Base			*8*	*0.120*	*6/5/2024 12:15*	*6/12/2024 23:15*	*4,265,190*	*97.97*	*2,130*	*31.95*
Storm			*225*	*0.511*	*6/12/2024 23:15*	*6/13/2024 5:15*	*208,628*	*4.79*	*2,930*	*6.66*
Base			*8*	*0.120*	*6/13/2024 5:15*	*6/15/2024 23:15*	*1,733,980*	*39.83*	*866*	*12.99*
Storm			*225*	*0.511*	*6/15/2024 23:15*	*6/16/2024 7:15*	*422,908*	*9.71*	*5,940*	*13.49*
Base			*8*	*0.120*	*6/16/2024 7:15*	*6/17/2024 5:15*	*1,203,260*	*27.64*	*601*	*9.01*
Storm			*225*	*0.511*	*6/17/2024 5:15*	*6/17/2024 13:15*	*478,595*	*10.99*	*6,722*	*15.27*
Base			*8*	*0.120*	*6/17/2024 13:15*	*6/18/2024 21:15*	*1,598,080*	*36.71*	*798*	*11.97*
Storm Composite	6/18/2024 21:52	6/19/2024 22:37	69	0.299	6/18/2024 21:15	6/19/2024 23:15	2,457,140	56.44	10,584	45.86
Base Grab	6/26/2024 14:33	6/26/2024 14:33	15	0.222	6/19/2024 23:15	6/28/2024 5:15	7,119,280	163.52	6,666	98.66
Storm			*225*	*0.511*	*6/28/2024 5:15*	*6/28/2024 12:15*	*310,965*	*7.14*	*4,368*	*9.92*
Base			*8*	*0.120*	*6/28/2024 12:15*	*7/11/2024 13:15*	*5,656,000*	*129.91*	*2,825*	*42.37*
In Water Work			*225*	*0.511*	*7/11/2024 13:15*	*7/11/2024 19:15*	*63,687*	*1.46*	*895*	*2.03*
Base			*8*	*0.120*	*7/11/2024 19:15*	*7/13/2024 8:15*	*375,179*	*8.62*	*187*	*2.81*
Storm			*225*	*0.511*	*7/13/2024 8:15*	*7/13/2024 13:15*	*132,384*	*3.04*	*1,859*	*4.22*
Base			*8*	*0.120*	*7/13/2024 13:15*	*7/14/2024 1:15*	*267,443*	*6.14*	*134*	*2.00*
Storm			*225*	*0.511*	*7/14/2024 1:15*	*7/14/2024 4:15*	*88,735*	*2.04*	*1,246*	*2.83*
Base			*8*	*0.120*	*7/14/2024 4:15*	*7/17/2024 12:15*	*1,355,290*	*31.13*	*677*	*10.15*
In Water Work			*225*	*0.511*	*7/17/2024 12:15*	*7/17/2024 19:15*	*81,211*	*1.87*	*1,141*	*2.59*
Base			*8*	*0.120*	*7/17/2024 19:15*	*7/18/2024 10:15*	*158,200*	*3.63*	*79*	*1.19*
In Water Work			*225*	*0.511*	*7/18/2024 10:15*	*7/18/2024 19:15*	*94,930*	*2.18*	*1,333*	*3.03*
Base			*8*	*0.120*	*7/18/2024 19:15*	*7/22/2024 17:15*	*873,383*	*20.06*	*436*	*6.54*
Storm Composite	7/22/2024 18:20	7/23/2024 1:17	387	0.762	7/22/2024 17:15	7/23/2024 2:15	331,402	7.61	8,006	15.76
Base Grab	7/25/2024 13:33	7/25/2024 13:33	9	0.124	7/23/2024 2:15	7/26/2024 14:15	1,917,040	44.03	1,077	14.84
Base			*8*	*0.120*	*7/26/2024 14:15*	*7/27/2024 11:15*	*208,810*	*4.80*	*104*	*1.56*
In Water Work			*225*	*0.511*	*7/27/2024 11:15*	*7/27/2024 15:15*	*40,051*	*0.92*	*563*	*1.28*
Base			*8*	*0.120*	*7/27/2024 15:15*	*7/28/2024 11:15*	*189,922*	*4.36*	*95*	*1.42*
In Water Work			*225*	*0.511*	*7/28/2024 11:15*	*7/28/2024 16:15*	*46,438*	*1.07*	*652*	*1.48*
Base			*8*	*0.120*	*7/28/2024 16:15*	*7/30/2024 11:15*	*467,867*	*10.75*	*234*	*3.50*
In Water Work			*225*	*0.511*	*7/30/2024 11:15*	*7/30/2024 19:15*	*94,756*	*2.18*	*1,331*	*3.02*
Base			*8*	*0.120*	*7/30/2024 19:15*	*7/31/2024 11:15*	*174,348*	*4.00*	*87*	*1.31*
In Water Work			*225*	*0.511*	*7/31/2024 11:15*	*7/31/2024 17:15*	*64,956*	*1.49*	*912*	*2.07*
Base			*8*	*0.120*	*7/31/2024 17:15*	*8/1/2024 12:15*	*261,361*	*6.00*	*131*	*1.96*
In Water Work			*225*	*0.511*	*8/1/2024 12:15*	*8/1/2024 21:15*	*167,163*	*3.84*	*2,348*	*5.33*
Base			*8*	*0.120*	*8/1/2024 21:15*	*8/2/2024 10:15*	*251,277*	*5.77*	*125*	*1.88*

In Water Work			*225*	*0.511*	*8/2/2024 10:15*	*8/2/2024 15:15*	*88,564*	*2.03*	*1,244*	*2.83*
Base			*8*	*0.120*	*8/2/2024 15:15*	*8/5/2024 9:15*	*780,012*	*17.92*	*390*	*5.84*
Storm Composite[X]	8/5/2024 12:10	8/6/2024 0:23	1,670	0.742	8/5/2024 9:15	8/6/2024 1:15	1,242,300	28.53	129,512	57.54
Storm			*225*	*0.511*	*8/6/2024 1:15*	*8/6/2024 11:15*	*1,279,740*	*29.39*	*17,975*	*40.82*
Base			*8*	*0.120*	*8/6/2024 11:15*	*8/7/2024 10:15*	*2,460,540*	*56.52*	*1,229*	*18.43*
In Water Work			*225*	*0.511*	*8/7/2024 10:15*	*8/7/2024 15:15*	*321,315*	*7.38*	*4,513*	*10.25*
Base			*8*	*0.120*	*8/7/2024 15:15*	*8/8/2024 13:15*	*922,922*	*21.20*	*461*	*6.91*
In Water Work			*225*	*0.511*	*8/8/2024 13:15*	*8/8/2024 18:15*	*162,299*	*3.73*	*2,280*	*5.18*
Base			*8*	*0.120*	*8/8/2024 18:15*	*8/9/2024 10:15*	*447,370*	*10.28*	*223*	*3.35*
In Water Work			*225*	*0.511*	*8/9/2024 10:15*	*8/9/2024 14:15*	*100,247*	*2.30*	*1,408*	*3.20*
Base			*8*	*0.120*	*8/9/2024 14:15*	*8/12/2024 13:15*	*1,087,940*	*24.99*	*543*	*8.15*
In Water Work			*225*	*0.511*	*8/12/2024 13:15*	*8/12/2024 16:15*	*35,329*	*0.81*	*496*	*1.13*
Base			*8*	*0.120*	*8/12/2024 16:15*	*8/13/2024 12:15*	*225,964*	*5.19*	*113*	*1.69*
In Water Work			*225*	*0.511*	*8/13/2024 12:15*	*8/13/2024 20:15*	*89,411*	*2.05*	*1,256*	*2.85*
Base			*8*	*0.120*	*8/13/2024 20:15*	*8/14/2024 13:15*	*180,726*	*4.15*	*90*	*1.35*
In Water Work			*225*	*0.511*	*8/14/2024 13:15*	*8/14/2024 20:15*	*74,197*	*1.70*	*1,042*	*2.37*
Base			*8*	*0.120*	*8/14/2024 20:15*	*8/15/2024 4:15*	*81,418*	*1.87*	*41*	*0.61*
Storm			*225*	*0.511*	*8/15/2024 4:15*	*8/15/2024 15:15*	*293,556*	*6.74*	*4,123*	*9.36*
Base			*8*	*0.120*	*8/15/2024 15:15*	*8/19/2024 11:15*	*1,653,890*	*37.99*	*826*	*12.39*
In Water Work			*225*	*0.511*	*8/19/2024 11:15*	*8/19/2024 19:15*	*102,175*	*2.35*	*1,435*	*3.26*
Base			*8*	*0.120*	*8/19/2024 19:15*	*8/20/2024 9:15*	*171,504*	*3.94*	*86*	*1.28*
In Water Work			*225*	*0.511*	*8/20/2024 9:15*	*8/20/2024 19:15*	*115,925*	*2.66*	*1,628*	*3.70*
Base			*8*	*0.120*	*8/20/2024 19:15*	*8/21/2024 11:15*	*180,658*	*4.15*	*90*	*1.35*
In Water Work			*225*	*0.511*	*8/21/2024 11:15*	*8/21/2024 14:15*	*33,780*	*0.78*	*474*	*1.08*
Base			*8*	*0.120*	*8/21/2024 14:15*	*8/22/2024 11:15*	*225,143*	*5.17*	*112*	*1.69*
In Water Work			*225*	*0.511*	*8/22/2024 11:15*	*8/22/2024 18:15*	*76,736*	*1.76*	*1,078*	*2.45*
Base			*8*	*0.120*	*8/22/2024 18:15*	*8/23/2024 10:15*	*183,154*	*4.21*	*91*	*1.37*
In Water Work			*225*	*0.511*	*8/23/2024 10:15*	*8/23/2024 18:15*	*91,128*	*2.09*	*1,280*	*2.91*
Base			*8*	*0.120*	*8/23/2024 18:15*	*8/26/2024 19:15*	*792,747*	*18.21*	*396*	*5.94*
Storm			*225*	*0.511*	*8/26/2024 19:15*	*8/26/2024 23:15*	*97,857*	*2.25*	*1,374*	*3.12*
Base			*8*	*0.120*	*8/26/2024 23:15*	*8/27/2024 5:15*	*116,955*	*2.69*	*58*	*0.88*
Storm			*225*	*0.511*	*8/27/2024 5:15*	*8/27/2024 21:15*	*813,497*	*18.69*	*11,426*	*25.95*
Base			*8*	*0.120*	*8/27/2024 21:15*	*8/28/2024 8:15*	*466,386*	*10.71*	*233*	*3.49*
In Water Work			*225*	*0.511*	*8/28/2024 8:15*	*8/28/2024 19:15*	*394,482*	*9.06*	*5,541*	*12.58*
Base			*8*	*0.120*	*8/28/2024 19:15*	*8/29/2024 8:15*	*356,527*	*8.19*	*178*	*2.67*
Storm			*225*	*0.511*	*8/29/2024 8:15*	*8/30/2024 0:15*	*621,134*	*14.27*	*8,724*	*19.81*
Base			*8*	*0.120*	*8/30/2024 0:15*	*8/30/2024 9:15*	*499,923*	*11.48*	*250*	*3.74*
In Water Work			*225*	*0.511*	*8/30/2024 9:15*	*8/30/2024 17:15*	*423,888*	*9.74*	*5,954*	*13.52*
Base			*8*	*0.120*	*8/30/2024 17:15*	*9/2/2024 11:15*	*1,892,860*	*43.48*	*945*	*14.18*
In Water Work			*225*	*0.511*	*9/2/2024 11:15*	*9/2/2024 17:15*	*93,200*	*2.14*	*1,309*	*2.97*
Base Grab	9/3/2024 10:11	9/3/2024 10:11	7	0.135	9/2/2024 17:15	9/4/2024 10:15	574,933	13.21	251	4.85
Base			*8*	*0.120*	*9/4/2024 10:15*	*9/21/2024 9:15*	*6,690,070*	*153.66*	*3,341*	*50.12*
Storm			*225*	*0.511*	*9/21/2024 9:15*	*9/21/2024 15:15*	*148,131*	*3.40*	*2,081*	*4.73*
Base Grab	9/24/2024 9:28	9/24/2024 9:28	5	0.088	9/21/2024 15:15	9/25/2024 10:15	1,890,510	43.42	590	10.39
Base			*8*	*0.120*	*9/25/2024 10:15*	*10/20/2024 14:15*	*7,252,100*	*166.57*	*3,622*	*54.33*
Base Grab	10/21/2024 14:45	10/21/2024 14:45	3	0.063	10/20/2024 14:15	10/29/2024 10:30	2,303,950	52.92	431	9.06
*Base**			*8*	*0.120*	*10/29/2024 10:30*	*10/31/2024 7:00*	*480,600*	*11.04*	*240*	*3.60*
*Storm**			*225*	*0.511*	*10/31/2024 7:00*	*10/31/2024 16:00*	*324,000*	*7.44*	*4,551*	*10.34*
*Base**			*8*	*0.120*	*10/31/2024 16:00*	*11/18/2024 16:00*	*4,665,600*	*107.16*	*2,330*	*34.95*
*Storm**			*225*	*0.511*	*11/18/2024 16:00*	*11/19/2024 8:00*	*864,000*	*19.85*	*12,136*	*27.56*
*Base**			*8*	*0.120*	*11/19/2024 8:00*	*12/27/2024 18:00*	*11,617,200*	*266.83*	*5,802*	*87.03*
*Storm**			*225*	*0.511*	*12/27/2024 18:00*	*12/28/2024 8:00*	*604,800*	*13.89*	*8,495*	*19.29*
*Base**			*8*	*0.120*	*12/28/2024 8:00*	*1/1/2025 0:00*	*2,059,200*	*47.30*	*1,028*	*15.43*
Storm Average			225	0.511						
Base Average			8	0.120						
All Average			107	0.315						
Total							**158,481,122**	**3,640**	**508,266**	**1,803**
Brown's Creek Major Subwatershed Total Acres							3,999			
Total TSS/TP (lb/ac/yr)									127.10	0.451
Total TSS/TP (kg/ha/yr)									142.46	0.505

Italics indicate estimated concentrations based on average base and storm flow concentrations.

*Interval volumes were estimated using similar flow conditions.

[X]TSS result excluded from averages.

Table 3. Brown's Creek at Stonebridge Trail 2024 Total Suspended Solids (TSS) and Total Phosphorus (TP) Loading

	Sample Collection Time				Loading Interval					
Sample Type	Start	End	TSS (mg/L)	TP (mg/L)	Start	End	Interval Volume (cf)	Interval Volume (ac-ft)	Interval TSS (lb)	Interval TP (lb)
*Base**			*6*	*0.098*	*1/1/2024 0:00*	*3/25/2024 12:00*	*25,552,800*	*586.92*	*9,571*	*156.33*
*Snowmelt**			*169*	*0.371*	*3/25/2024 12:00*	*3/31/2024 15:00*	*3,969,000*	*91.16*	*41,873*	*91.92*
*Base**			*6*	*0.098*	*3/31/2024 15:00*	*4/7/2024 11:00*	*2,361,600*	*54.24*	*885*	*14.45*
*Storm**			*271*	*0.542*	*4/7/2024 11:00*	*4/8/2024 14:00*	*1,749,600*	*40.19*	*29,599*	*59.20*
*Base**			*6*	*0.098*	*4/8/2024 14:00*	*4/15/2024 15:15*	*3,503,475*	*80.47*	*1,312*	*21.43*
Base			*6*	*0.098*	*4/15/2024 15:15*	*4/16/2024 11:15*	*327,083*	*7.51*	*123*	*2.00*
Storm Composite	4/16/2024 18:26	4/17/2024 13:01	125	0.428	4/16/2024 11:15	4/17/2024 13:15	1,936,160	44.47	15,108	51.73
Base			*6*	*0.098*	*4/17/2024 13:15*	*4/28/2024 15:15*	*5,288,630*	*121.47*	*1,981*	*32.35*
Storm Composite	4/29/2024 7:18	4/30/2024 5:08	108	0.307	4/28/2024 15:15	4/30/2024 9:15	1,790,090	41.12	12,069	34.31
Base			*6*	*0.098*	*4/30/2024 9:15*	*5/2/2024 7:15*	*1,977,000*	*45.41*	*740*	*12.09*
Storm			*271*	*0.542*	*5/2/2024 7:15*	*5/3/2024 0:15*	*1,289,810*	*29.63*	*21,820*	*43.64*
Base			*6*	*0.098*	*5/3/2024 0:15*	*5/19/2024 15:15*	*9,370,910*	*215.24*	*3,510*	*57.33*
Base Grab	5/20/2024 15:03	5/20/2024 15:03	7	0.079	5/19/2024 15:15	5/21/2024 17:15	813,557	18.69	356	4.01
Storm Composite	5/21/2024 17:56	5/22/2024 5:29	315	0.582	5/21/2024 17:15	5/22/2024 14:15	2,230,330	51.23	43,858	81.03
Base			*6*	*0.098*	*5/22/2024 14:15*	*5/27/2024 18:15*	*4,649,070*	*106.78*	*1,741*	*28.44*
Storm			*271*	*0.542*	*5/27/2024 18:15*	*5/27/2024 21:15*	*84,261*	*1.94*	*1,425*	*2.85*
Base			*6*	*0.098*	*5/27/2024 21:15*	*6/4/2024 19:15*	*3,427,790*	*78.73*	*1,284*	*20.97*
Storm Composite	6/4/2024 19:36	6/4/2024 22:04	299	0.732	6/4/2024 19:15	6/5/2024 4:15	905,778	20.80	16,907	41.39
Base			*6*	*0.098*	*6/5/2024 4:15*	*6/12/2024 23:15*	*4,937,520*	*113.41*	*1,849*	*30.21*
Storm			*271*	*0.542*	*6/12/2024 23:15*	*6/13/2024 6:15*	*264,725*	*6.08*	*4,478*	*8.96*
Base			*6*	*0.098*	*6/13/2024 6:15*	*6/15/2024 23:15*	*1,741,040*	*39.99*	*652*	*10.65*
Storm			*271*	*0.542*	*6/15/2024 23:15*	*6/16/2024 7:15*	*483,729*	*11.11*	*8,183*	*16.37*
Base			*6*	*0.098*	*6/16/2024 7:15*	*6/18/2024 21:15*	*3,573,740*	*82.08*	*1,339*	*21.86*
Storm Composite	6/18/2024 22:04	6/19/2024 4:11	125	0.347	6/18/2024 21:15	6/19/2024 4:15	734,842	16.88	5,734	15.92
Base			*6*	*0.098*	*6/19/2024 4:15*	*6/26/2024 13:15*	*9,030,170*	*207.41*	*3,382*	*55.24*
Storm Grab	6/26/2024 14:20	6/26/2024 14:20	107	0.302	6/26/2024 13:15	6/26/2024 15:15	48,342	1.11	323	0.91
Base			*6*	*0.098*	*6/26/2024 15:15*	*6/28/2024 5:15*	*796,153*	*18.29*	*298*	*4.87*
Storm			*271*	*0.542*	*6/28/2024 5:15*	*6/28/2024 11:15*	*341,377*	*7.84*	*5,775*	*11.55*
Base			*6*	*0.098*	*6/28/2024 11:15*	*7/11/2024 16:15*	*6,418,350*	*147.42*	*2,404*	*39.27*
In Water Work			*271*	*0.542*	*7/11/2024 16:15*	*7/11/2024 22:15*	*52,071*	*1.20*	*881*	*1.76*
Base			*6*	*0.098*	*7/11/2024 22:15*	*7/13/2024 8:15*	*267,877*	*6.15*	*100*	*1.64*
Storm			*271*	*0.542*	*7/13/2024 8:15*	*7/13/2024 14:15*	*158,333*	*3.64*	*2,679*	*5.36*
Base			*6*	*0.098*	*7/13/2024 14:15*	*7/17/2024 14:15*	*1,666,850*	*38.29*	*624*	*10.20*
In Water Work			*271*	*0.542*	*7/17/2024 14:15*	*7/17/2024 21:15*	*66,996*	*1.54*	*1,133*	*2.27*
Base			*6*	*0.098*	*7/17/2024 21:15*	*7/18/2024 12:15*	*122,779*	*2.82*	*46*	*0.75*
In Water Work			*271*	*0.542*	*7/18/2024 12:15*	*7/19/2024 0:15*	*94,987*	*2.18*	*1,607*	*3.21*
Base			*6*	*0.098*	*7/19/2024 0:15*	*7/22/2024 17:15*	*571,006*	*13.12*	*214*	*3.49*
Storm Composite	7/22/2024 19:26	7/22/2024 21:21	424	0.785	7/22/2024 17:15	7/23/2024 0:15	320,873	7.37	8,493	15.72
Base Grab	7/25/2024 13:00	7/25/2024 13:00	9	0.128	7/23/2024 0:15	7/27/2024 14:15	2,413,470	55.43	1,356	19.28
In Water Work			*271*	*0.542*	*7/27/2024 14:15*	*7/27/2024 17:15*	*25,337*	*0.58*	*429*	*0.86*
Base			*6*	*0.098*	*7/27/2024 17:15*	*7/28/2024 14:15*	*155,064*	*3.56*	*58*	*0.95*
In Water Work			*271*	*0.542*	*7/28/2024 14:15*	*7/28/2024 18:15*	*27,366*	*0.63*	*463*	*0.93*
Base			*6*	*0.098*	*7/28/2024 18:15*	*7/30/2024 13:15*	*411,736*	*9.46*	*154*	*2.52*
In Water Work			*271*	*0.542*	*7/30/2024 13:15*	*7/30/2024 20:15*	*67,062*	*1.54*	*1,135*	*2.27*
Base			*6*	*0.098*	*7/30/2024 20:15*	*7/31/2024 13:15*	*146,061*	*3.35*	*55*	*0.89*
In Water Work			*271*	*0.542*	*7/31/2024 13:15*	*7/31/2024 19:15*	*48,226*	*1.11*	*816*	*1.63*
Base			*6*	*0.098*	*7/31/2024 19:15*	*8/1/2024 14:15*	*241,974*	*5.56*	*91*	*1.48*
In Water Work			*271*	*0.542*	*8/1/2024 14:15*	*8/1/2024 22:15*	*136,633*	*3.14*	*2,311*	*4.62*
Base			*6*	*0.098*	*8/1/2024 22:15*	*8/2/2024 12:15*	*249,319*	*5.73*	*93*	*1.53*
In Water Work			*271*	*0.542*	*8/2/2024 12:15*	*8/2/2024 18:15*	*93,225*	*2.14*	*1,577*	*3.15*
Base			*6*	*0.098*	*8/2/2024 18:15*	*8/5/2024 9:15*	*676,611*	*15.54*	*253*	*4.14*
Storm			*271*	*0.542*	*8/5/2024 9:15*	*8/5/2024 17:15*	*298,456*	*6.86*	*5,049*	*10.10*
Storm Composite	8/5/2024 18:20	8/5/2024 21:38	663	0.854	8/5/2024 17:15	8/5/2024 23:15	765,349	17.58	31,677	40.80
Storm			*271*	*0.542*	*8/5/2024 23:15*	*8/6/2024 20:15*	*2,798,640*	*64.28*	*47,346*	*94.69*
Base			*6*	*0.098*	*8/6/2024 20:15*	*8/7/2024 11:15*	*1,720,040*	*39.51*	*644*	*10.52*
In Water Work			*271*	*0.542*	*8/7/2024 11:15*	*8/7/2024 17:15*	*513,119*	*11.79*	*8,681*	*17.36*
Base			*6*	*0.098*	*8/7/2024 17:15*	*8/8/2024 14:15*	*1,182,980*	*27.17*	*443*	*7.24*
In Water Work			*271*	*0.542*	*8/8/2024 14:15*	*8/8/2024 20:15*	*246,793*	*5.67*	*4,175*	*8.35*
Base			*6*	*0.098*	*8/8/2024 20:15*	*8/9/2024 13:15*	*604,103*	*13.88*	*226*	*3.70*
In Water Work			*271*	*0.542*	*8/9/2024 13:15*	*8/9/2024 15:15*	*65,488*	*1.50*	*1,108*	*2.22*
Base			*6*	*0.098*	*8/9/2024 15:15*	*8/12/2024 16:15*	*1,562,980*	*35.90*	*585*	*9.56*
In Water Work			*271*	*0.542*	*8/12/2024 16:15*	*8/12/2024 19:15*	*45,289*	*1.04*	*766*	*1.53*
Base			*6*	*0.098*	*8/12/2024 19:15*	*8/13/2024 14:15*	*269,585*	*6.19*	*101*	*1.65*
In Water Work			*271*	*0.542*	*8/13/2024 14:15*	*8/13/2024 22:15*	*104,186*	*2.39*	*1,763*	*3.53*
Base			*6*	*0.098*	*8/13/2024 22:15*	*8/14/2024 15:15*	*208,420*	*4.79*	*78*	*1.28*
In Water Work			*271*	*0.542*	*8/14/2024 15:15*	*8/14/2024 23:15*	*90,430*	*2.08*	*1,530*	*3.06*
Base			*6*	*0.098*	*8/14/2024 23:15*	*8/15/2024 4:15*	*53,896*	*1.24*	*20*	*0.33*

Storm			*271*	*0.542*	*8/15/2024 4:15*	*8/15/2024 10:15*	*208,665*	*4.79*	*3,530*	*7.06*
Base			*6*	*0.098*	*8/15/2024 10:15*	*8/19/2024 13:15*	*2,538,870*	*58.31*	*951*	*15.53*
In Water Work			*271*	*0.542*	*8/19/2024 13:15*	*8/19/2024 22:15*	*157,440*	*3.62*	*2,663*	*5.33*
Base			*6*	*0.098*	*8/19/2024 22:15*	*8/20/2024 13:15*	*244,139*	*5.61*	*91*	*1.49*
In Water Work			*271*	*0.542*	*8/20/2024 13:15*	*8/20/2024 21:15*	*121,972*	*2.80*	*2,063*	*4.13*
Base			*6*	*0.098*	*8/20/2024 21:15*	*8/22/2024 13:15*	*555,999*	*12.77*	*208*	*3.40*
In Water Work			*271*	*0.542*	*8/22/2024 13:15*	*8/22/2024 21:15*	*108,071*	*2.48*	*1,828*	*3.66*
Base			*6*	*0.098*	*8/22/2024 21:15*	*8/23/2024 12:15*	*211,275*	*4.85*	*79*	*1.29*
In Water Work			*271*	*0.542*	*8/23/2024 12:15*	*8/23/2024 21:15*	*120,626*	*2.77*	*2,041*	*4.08*
Base			*6*	*0.098*	*8/23/2024 21:15*	*8/26/2024 20:15*	*868,495*	*19.95*	*325*	*5.31*
Storm			*271*	*0.542*	*8/26/2024 20:15*	*8/27/2024 22:15*	*1,375,990*	*31.60*	*23,278*	*46.56*
Base			*6*	*0.098*	*8/27/2024 22:15*	*8/28/2024 9:15*	*594,580*	*13.66*	*223*	*3.64*
In Water Work			*271*	*0.542*	*8/28/2024 9:15*	*8/28/2024 21:15*	*544,203*	*12.50*	*9,207*	*18.41*
Base			*6*	*0.098*	*8/28/2024 21:15*	*8/29/2024 10:15*	*435,504*	*10.00*	*163*	*2.66*
Storm			*271*	*0.542*	*8/29/2024 10:15*	*8/30/2024 0:15*	*746,001*	*17.13*	*12,620*	*25.24*
Base			*6*	*0.098*	*8/30/2024 0:15*	*8/30/2024 10:15*	*711,979*	*16.35*	*267*	*4.36*
In Water Work			*271*	*0.542*	*8/30/2024 10:15*	*8/30/2024 18:15*	*531,404*	*12.21*	*8,990*	*17.98*
Base			*6*	*0.098*	*8/30/2024 18:15*	*9/2/2024 13:15*	*2,422,990*	*55.65*	*908*	*14.82*
In Water Work			*271*	*0.542*	*9/2/2024 13:15*	*9/2/2024 19:15*	*122,801*	*2.82*	*2,077*	*4.15*
Base Grab	9/3/2024 9:22	9/3/2024 9:22	9	0.128	9/2/2024 19:15	9/4/2024 9:15	674,029	15.48	379	5.39
Base			*6*	*0.098*	*9/4/2024 9:15*	*9/21/2024 9:15*	*4,995,650*	*114.74*	*1,871*	*30.56*
Storm			*271*	*0.542*	*9/21/2024 9:15*	*9/21/2024 15:15*	*150,386*	*3.45*	*2,544*	*5.09*
Base Grab	9/24/2024 9:37	9/24/2024 9:37	3	0.090	9/21/2024 15:15	9/25/2024 10:15	1,821,850	41.85	341	10.24
Base			*6*	*0.098*	*9/25/2024 10:15*	*10/20/2024 13:15*	*8,204,230*	*188.44*	*3,073*	*50.19*
Base Grab	10/21/2024 13:36	10/21/2024 13:36	3	0.067	10/20/2024 13:15	10/25/2024 15:00	2,708,900	62.22	507	11.33
*Base**			*6*	*0.098*	*10/25/2024 15:00*	*10/31/2024 7:00*	*1,713,600*	*39.36*	*642*	*10.48*
*Storm**			*271*	*0.542*	*10/31/2024 7:00*	*10/31/2024 16:00*	*332,100*	*7.63*	*5,618*	*11.24*
*Base**			*6*	*0.098*	*10/31/2024 16:00*	*11/18/2024 16:00*	*5,443,200*	*125.02*	*2,039*	*33.30*
*Storm**			*271*	*0.542*	*11/18/2024 16:00*	*11/19/2024 8:00*	*950,400*	*21.83*	*16,078*	*32.16*
*Base**			*6*	*0.098*	*11/19/2024 8:00*	*12/27/2024 18:00*	*13,276,800*	*304.95*	*4,973*	*81.22*
*Storm**			*271*	*0.542*	*12/27/2024 18:00*	*12/28/2024 8:00*	*655,200*	*15.05*	*11,084*	*22.17*
*Base**			*6*	*0.098*	*12/28/2024 8:00*	*1/1/2025 0:00*	*2,138,400*	*49.12*	*801*	*13.08*
Storm Average			271	0.542						
Base Average			6	0.098						
All Average			169	0.371						
Total							**173,826,291**	**3,993**	**488,806**	**1,781**
Brown's Creek Major Subwatershed Total Acres							4,189			
Total TSS/TP(lb/ac/yr)									116.69	0.425
Total TSS/TP (kg/ha/yr)									130.79	0.477

Italics indicate estimated concentrations based on average base and storm flow concentrations.

*Interval volumes were estimated using similar flow conditions.

Table 4. Tributary to Long Lake at Marketplace Pond 2024 Total Suspended Solids (TSS) and Total Phosphorus (TP) Loading

	Sample Collection Time				Loading Interval					
Sample Type	Start	End	TSS (mg/L)	TP (mg/L)	Start	End	Interval Volume (cf)	Interval Volume (ac-ft)	Interval TSS (lb)	Interval TP (lb)
*Intermittent Flow**			*5*	*0.095*	*1/1/2024 0:00*	*3/25/2024 12:00*	*7,301*	*0.17*	*2*	*0.04*
*Snowmelt**			*16*	*0.111*	*3/25/2024 12:00*	*3/31/2024 15:00*	*1,058,400*	*24.31*	*1,057*	*7.33*
*Base**			*5*	*0.095*	*3/31/2024 15:00*	*4/7/2024 11:00*	*295,200*	*6.78*	*92*	*1.75*
*Storm**			*23*	*0.119*	*4/7/2024 11:00*	*4/8/2024 1:00*	*756,000*	*17.36*	*1,085*	*5.62*
*Base**			*5*	*0.095*	*4/8/2024 1:00*	*4/16/2024 11:00*	*218,160*	*5.01*	*68*	*1.29*
*Storm**			*23*	*0.119*	*4/16/2024 11:00*	*4/17/2024 1:00*	*756,000*	*17.36*	*1,085*	*5.62*
*Base**			*5*	*0.095*	*4/17/2024 1:00*	*4/25/2024 14:15*	*369,450*	*8.49*	*115*	*2.19*
Base			*5*	*0.095*	*4/25/2024 14:15*	*4/28/2024 13:15*	*12,445*	*0.29*	*4*	*0.07*
Storm Composite	4/28/2024 21:06	4/29/2024 2:34	14	0.103	4/28/2024 13:15	4/29/2024 3:15	146,909	3.37	128	0.94
Base			*5*	*0.095*	*4/29/2024 3:15*	*4/30/2024 19:15*	*283,710*	*6.52*	*89*	*1.68*
Storm			*23*	*0.119*	*4/30/2024 19:15*	*5/1/2024 1:15*	*91,314*	*2.10*	*131*	*0.68*
Base			*5*	*0.095*	*5/1/2024 1:15*	*5/2/2024 7:15*	*221,978*	*5.10*	*69*	*1.32*
Storm			*23*	*0.119*	*5/2/2024 7:15*	*5/2/2024 15:15*	*239,417*	*5.50*	*344*	*1.78*
Base			*5*	*0.095*	*5/2/2024 15:15*	*5/4/2024 7:15*	*349,565*	*8.03*	*109*	*2.07*
Storm			*23*	*0.119*	*5/4/2024 7:15*	*5/4/2024 14:15*	*114,409*	*2.63*	*164*	*0.85*
Base			*5*	*0.095*	*5/4/2024 14:15*	*5/7/2024 4:15*	*310,145*	*7.12*	*97*	*1.84*
Storm			*23*	*0.119*	*5/7/2024 4:15*	*5/7/2024 11:15*	*72,159*	*1.66*	*104*	*0.54*
Base			*5*	*0.095*	*5/7/2024 11:15*	*5/15/2024 8:15*	*279,542*	*6.42*	*87*	*1.66*
Base Grab	5/16/2024 8:46	5/16/2024 8:46	7	0.109	5/15/2024 8:15	5/17/2024 20:15	66,641	1.53	29	0.45
Storm			*23*	*0.119*	*5/17/2024 20:15*	*5/18/2024 2:15*	*31,501*	*0.72*	*45*	*0.23*
Base			*5*	*0.095*	*5/18/2024 2:15*	*5/20/2024 3:15*	*115,522*	*2.65*	*36*	*0.69*
Storm			*23*	*0.119*	*5/20/2024 3:15*	*5/20/2024 9:15*	*66,004*	*1.52*	*95*	*0.49*
Base			*5*	*0.095*	*5/20/2024 9:15*	*5/21/2024 1:15*	*121,578*	*2.79*	*38*	*0.72*
Storm			*23*	*0.119*	*5/21/2024 1:15*	*5/21/2024 16:15*	*238,836*	*5.49*	*343*	*1.77*
Storm Composite	5/21/2024 17:31	5/21/2024 20:37	17	0.089	5/21/2024 16:15	5/22/2024 2:15	682,202	15.67	724	3.79
Base			*5*	*0.095*	*5/22/2024 2:15*	*5/27/2024 17:15*	*1,092,500*	*25.09*	*341*	*6.48*
Storm			*23*	*0.119*	*5/27/2024 17:15*	*5/27/2024 21:15*	*27,714*	*0.64*	*40*	*0.21*
Base			*5*	*0.095*	*5/27/2024 21:15*	*5/31/2024 16:15*	*154,950*	*3.56*	*48*	*0.92*
Storm Composite	5/31/2024 19:35	6/1/2024 4:12	13	0.094	5/31/2024 16:15	6/1/2024 5:15	195,928	4.50	159	1.15
Base			*5*	*0.095*	*6/1/2024 5:15*	*6/3/2024 4:15*	*304,472*	*6.99*	*95*	*1.81*
Storm			*23*	*0.119*	*6/3/2024 4:15*	*6/3/2024 9:15*	*126,783*	*2.91*	*182*	*0.94*
Base			*5*	*0.095*	*6/3/2024 9:15*	*6/4/2024 18:15*	*289,160*	*6.64*	*90*	*1.71*
Storm Composite	6/4/2024 19:14	6/5/2024 0:18	7	0.076	6/4/2024 18:15	6/5/2024 1:15	336,641	7.73	147	1.60
Base			*5*	*0.095*	*6/5/2024 1:15*	*6/12/2024 22:15*	*710,255*	*16.31*	*222*	*4.21*
Storm Composite	6/12/2024 23:59	6/13/2024 0:43	63	0.203	6/12/2024 22:15	6/13/2024 3:15	155,145	3.56	610	1.97
Base			*5*	*0.095*	*6/13/2024 3:15*	*6/15/2024 14:15*	*390,347*	*8.97*	*122*	*2.31*
Storm			*23*	*0.119*	*6/15/2024 14:15*	*6/16/2024 6:15*	*481,013*	*11.05*	*691*	*3.57*
Base			*5*	*0.095*	*6/16/2024 6:15*	*6/17/2024 5:15*	*418,596*	*9.61*	*131*	*2.48*
Storm			*23*	*0.119*	*6/17/2024 5:15*	*6/17/2024 11:15*	*170,042*	*3.91*	*244*	*1.26*
Base			*5*	*0.095*	*6/17/2024 11:15*	*6/18/2024 21:15*	*381,376*	*8.76*	*119*	*2.26*
Storm			*23*	*0.119*	*6/18/2024 21:15*	*6/19/2024 2:15*	*125,269*	*2.88*	*180*	*0.93*
Base			*5*	*0.095*	*6/19/2024 2:15*	*6/21/2024 5:15*	*311,447*	*7.15*	*97*	*1.85*
Storm			*23*	*0.119*	*6/21/2024 5:15*	*6/22/2024 20:15*	*436,696*	*10.03*	*627*	*3.24*
Base Grab	6/27/2024 13:25	6/27/2024 13:25	3	0.090	6/22/2024 20:15	6/28/2024 2:15	321,247	7.38	60	1.80
Storm Composite	6/28/2024 5:22	6/28/2024 7:00	17	0.116	6/28/2024 2:15	6/28/2024 7:15	115,737	2.66	123	0.84
Base			*5*	*0.095*	*6/28/2024 7:15*	*7/2/2024 0:15*	*606,267*	*13.93*	*189*	*3.60*
Storm			*23*	*0.119*	*7/2/2024 0:15*	*7/2/2024 7:15*	*74,951*	*1.72*	*108*	*0.56*
Base			*5*	*0.095*	*7/2/2024 7:15*	*7/4/2024 14:15*	*252,511*	*5.80*	*79*	*1.50*
Storm			*23*	*0.119*	*7/4/2024 14:15*	*7/4/2024 21:15*	*56,017*	*1.29*	*80*	*0.42*
Base			*5*	*0.095*	*7/4/2024 21:15*	*7/8/2024 13:15*	*156,850*	*3.60*	*49*	*0.93*
Storm			*23*	*0.119*	*7/8/2024 13:15*	*7/8/2024 16:15*	*24,778*	*0.57*	*36*	*0.18*
Base			*5*	*0.095*	*7/8/2024 16:15*	*7/13/2024 8:15*	*190,725*	*4.38*	*60*	*1.13*
Storm			*23*	*0.119*	*7/13/2024 8:15*	*7/13/2024 11:15*	*50,157*	*1.15*	*72*	*0.37*
Base			*5*	*0.095*	*7/13/2024 11:15*	*7/13/2024 23:15*	*126,229*	*2.90*	*39*	*0.75*
Storm Composite	7/13/2024 23:41	7/14/2024 1:18	20	0.121	7/13/2024 23:15	7/14/2024 3:15	138,248	3.18	173	1.04
Base			*5*	*0.095*	*7/14/2024 3:15*	*7/22/2024 17:15*	*538,461*	*12.37*	*168*	*3.19*
Storm Composite	7/22/2024 17:53	7/22/2024 19:02	43	0.154	7/22/2024 17:15	7/22/2024 21:15	175,345	4.03	471	1.69
Base Grab	7/25/2024 14:07	7/25/2024 14:07	5	0.078	7/22/2024 21:15	8/1/2024 0:15	522,301	12.00	163	2.54
Storm			*23*	*0.119*	*8/1/2024 0:15*	*8/1/2024 7:15*	*66,672*	*1.53*	*96*	*0.50*
Base			*5*	*0.095*	*8/1/2024 7:15*	*8/5/2024 7:15*	*276,571*	*6.35*	*86*	*1.64*
Storm Composite	8/5/2024 10:43	8/5/2024 14:22	10	0.119	8/5/2024 7:15	8/5/2024 15:15	245,412	5.64	153	1.82
Storm			*23*	*0.119*	*8/5/2024 15:15*	*8/5/2024 23:15*	*567,474*	*13.03*	*815*	*4.22*
Base			*5*	*0.095*	*8/5/2024 23:15*	*8/15/2024 3:15*	*1,051,980*	*24.16*	*328*	*6.24*
Storm			*23*	*0.119*	*8/15/2024 3:15*	*8/15/2024 9:15*	*145,395*	*3.34*	*209*	*1.08*
Base			*5*	*0.095*	*8/15/2024 9:15*	*8/26/2024 19:15*	*503,363*	*11.56*	*157*	*2.99*
Storm			*23*	*0.119*	*8/26/2024 19:15*	*8/26/2024 22:15*	*90,044*	*2.07*	*129*	*0.67*
Base			*5*	*0.095*	*8/26/2024 22:15*	*8/27/2024 5:15*	*132,636*	*3.05*	*41*	*0.79*
Storm			*23*	*0.119*	*8/27/2024 5:15*	*8/27/2024 10:15*	*299,777*	*6.89*	*430*	*2.23*
Base			*5*	*0.095*	*8/27/2024 10:15*	*8/29/2024 17:15*	*620,141*	*14.24*	*194*	*3.68*
Storm			*23*	*0.119*	*8/29/2024 17:15*	*8/29/2024 22:15*	*181,852*	*4.18*	*261*	*1.35*
Base Grab	9/3/2024 10:39	9/3/2024 10:39	7	0.083	8/29/2024 22:15	9/4/2024 11:15	506,623	11.64	221	2.63
Base			*5*	*0.095*	*9/4/2024 11:15*	*9/14/2024 9:15*	*59,656*	*1.37*	*19*	*0.35*
Storm			*23*	*0.119*	*9/14/2024 9:15*	*9/14/2024 12:15*	*10,195*	*0.23*	*15*	*0.08*
Base Grab	9/16/2024 11:23	9/16/2024 11:23	3	0.117	9/14/2024 12:15	9/19/2024 5:15	39,914	0.92	7	0.29
Storm			*23*	*0.119*	*9/19/2024 5:15*	*9/19/2024 21:15*	*31,666*	*0.73*	*45*	*0.24*
Base			*5*	*0.095*	*9/19/2024 21:15*	*9/21/2024 9:15*	*97,568*	*2.24*	*30*	*0.58*
Storm			*23*	*0.119*	*9/21/2024 9:15*	*9/21/2024 14:15*	*124,962*	*2.87*	*179*	*0.93*
Base			*5*	*0.095*	*9/21/2024 14:15*	*10/24/2024 18:15*	*418,283*	*9.61*	*131*	*2.48*
Storm			*23*	*0.119*	*10/24/2024 18:15*	*10/24/2024 22:15*	*46,416*	*1.07*	*67*	*0.34*
Base			*5*	*0.095*	*10/24/2024 22:15*	*10/29/2024 13:45*	*254,219*	*5.84*	*79*	*1.51*
*Base**			*5*	*0.095*	*10/29/2024 13:45*	*10/31/2024 7:00*	*74,250*	*1.71*	*23*	*0.44*
*Storm**			*23*	*0.119*	*10/31/2024 7:00*	*10/31/2024 14:00*	*496,440*	*11.40*	*713*	*3.69*
*Base**			*5*	*0.095*	*10/31/2024 14:00*	*11/18/2024 16:00*	*156,240*	*3.59*	*49*	*0.93*
*Storm**			*23*	*0.119*	*11/18/2024 16:00*	*11/19/2024 5:00*	*842,400*	*19.35*	*1,210*	*6.26*
*Base**			*5*	*0.095*	*11/19/2024 5:00*	*12/27/2024 18:00*	*166,500*	*3.82*	*52*	*0.99*
*Storm**			*23*	*0.119*	*12/27/2024 18:00*	*12/28/2024 4:00*	*252,000*	*5.79*	*362*	*1.87*
*Base**			*5*	*0.095*	*12/28/2024 4:00*	*1/1/2025 0:00*	*198,720*	*4.56*	*62*	*1.18*
Storm Average			23	0.119						
Base Average			5	0.095						
All Average			16	0.111						
Total							**24,319,915**	**559**	**18,320**	**157**
Brown's Creek Major Subwatershed Total Acres							410			
Total TSS/TP(lb/ac/yr)									44.68	0.383
Total TSS/TP (kg/ha/yr)									50.08	0.429

Italics indicate estimated concentrations based on average base and storm flow concentrations.

*Interval volumes were estimated using similar flow conditions.

Table 5. Brown's Creek Diversion Structure Drainage 2024 Total Suspended Solids (TSS) and Total Phosphorus (TP) Loading

	Sample Collection Time				Loading Interval					
Sample Type	Start	End	TSS (mg/L)	TP (mg/L)	Start	End	Interval Volume (cf)	Interval Volume (ac-ft)	Interval TSS (lb)	Interval TP (lb)
*Base**			*4*	*0.066*	*1/1/2024 0:00*	*3/29/2024 12:00*	*3,823,200*	*87.81*	*955*	*15.75*
*Snowmelt**			*215*	*0.321*	*3/29/2024 12:00*	*3/31/2024 18:00*	*583,200*	*13.40*	*7,827*	*11.69*
*Base**			*4*	*0.066*	*3/31/2024 18:00*	*4/7/2024 11:00*	*434,700*	*9.98*	*109*	*1.79*
*Storm**			*374*	*0.513*	*4/7/2024 11:00*	*4/8/2024 1:00*	*252,000*	*5.79*	*5,884*	*8.07*
*Base**			*4*	*0.066*	*4/8/2024 1:00*	*4/11/2024 11:30*	*445,500*	*10.23*	*111*	*1.84*
Base			*4*	*0.066*	*4/11/2024 11:30*	*4/16/2024 11:30*	*557,234*	*12.80*	*139*	*2.30*
Storm Composite	4/16/2024 16:47	4/17/2024 0:42	90	0.373	4/16/2024 11:30	4/17/2024 1:30	236,564	5.43	1,329	5.51
Base			*4*	*0.066*	*4/17/2024 1:30*	*4/28/2024 14:30*	*1,977,190*	*45.41*	*494*	*8.15*
Storm			*374*	*0.513*	*4/28/2024 14:30*	*4/29/2024 3:30*	*120,365*	*2.76*	*2,810*	*3.85*
Base			*4*	*0.066*	*4/29/2024 3:30*	*4/30/2024 19:30*	*354,784*	*8.15*	*89*	*1.46*
Storm			*374*	*0.513*	*4/30/2024 19:30*	*5/1/2024 2:30*	*84,996*	*1.95*	*1,984*	*2.72*
Base			*4*	*0.066*	*5/1/2024 2:30*	*5/2/2024 7:30*	*306,228*	*7.03*	*76*	*1.26*
Storm			*374*	*0.513*	*5/2/2024 7:30*	*5/2/2024 16:30*	*232,037*	*5.33*	*5,417*	*7.43*
Base			*4*	*0.066*	*5/2/2024 16:30*	*5/4/2024 7:30*	*971,731*	*22.32*	*243*	*4.00*
Storm			*374*	*0.513*	*5/4/2024 7:30*	*5/4/2024 16:30*	*252,387*	*5.80*	*5,893*	*8.08*
Base			*4*	*0.066*	*5/4/2024 16:30*	*5/7/2024 6:30*	*1,393,500*	*32.01*	*348*	*5.74*
Storm			*374*	*0.513*	*5/7/2024 6:30*	*5/7/2024 16:30*	*217,845*	*5.00*	*5,086*	*6.98*
Base			*4*	*0.066*	*5/7/2024 16:30*	*5/19/2024 14:30*	*2,104,770*	*48.34*	*526*	*8.67*
Base Grab	5/20/2024 14:27	5/20/2024 14:27	6	0.080	5/19/2024 14:30	5/21/2024 17:30	298,935	6.87	112	1.49
Storm Composite	5/21/2024 18:11	5/22/2024 6:11	186	0.432	5/21/2024 17:30	5/22/2024 7:30	926,589	21.28	10,759	24.99
Base			*4*	*0.066*	*5/22/2024 7:30*	*5/31/2024 17:30*	*5,501,990*	*126.37*	*1,374*	*22.67*
Storm			*374*	*0.513*	*5/31/2024 17:30*	*6/1/2024 9:30*	*162,909*	*3.74*	*3,803*	*5.22*
Base			*4*	*0.066*	*6/1/2024 9:30*	*6/3/2024 4:30*	*434,084*	*9.97*	*108*	*1.79*
Storm Composite	6/3/2024 5:43	6/3/2024 12:23	96	0.193	6/3/2024 4:30	6/3/2024 12:30	163,301	3.75	979	1.97
Base			*4*	*0.066*	*6/3/2024 12:30*	*6/4/2024 18:30*	*518,057*	*11.90*	*129*	*2.13*
Storm Composite	6/4/2024 19:53	6/4/2024 23:34	1,080	0.905	6/4/2024 18:30	6/5/2024 0:30	253,322	5.82	17,079	14.31
Storm			*374*	*0.513*	*6/5/2024 0:30*	*6/5/2024 7:30*	*341,701*	*7.85*	*7,978*	*10.94*
Base			*4*	*0.066*	*6/5/2024 7:30*	*6/12/2024 23:30*	*2,942,960*	*67.60*	*735*	*12.13*
Storm			*374*	*0.513*	*6/12/2024 23:30*	*6/13/2024 5:30*	*109,009*	*2.50*	*2,545*	*3.49*
Base			*4*	*0.066*	*6/13/2024 5:30*	*6/15/2024 14:30*	*759,648*	*17.45*	*190*	*3.13*
Storm			*374*	*0.513*	*6/15/2024 14:30*	*6/16/2024 1:30*	*179,389*	*4.12*	*4,188*	*5.74*
Storm Composite	6/16/2024 2:29	6/16/2024 5:52	148	0.344	6/16/2024 1:30	6/16/2024 6:30	230,727	5.30	2,132	4.95
Base			*4*	*0.066*	*6/16/2024 6:30*	*6/17/2024 5:30*	*930,115*	*21.36*	*232*	*3.83*
Storm			*374*	*0.513*	*6/17/2024 5:30*	*6/17/2024 13:30*	*419,452*	*9.63*	*9,793*	*13.43*
Base			*4*	*0.066*	*6/17/2024 13:30*	*6/18/2024 21:30*	*1,519,090*	*34.89*	*379*	*6.26*
Storm			*374*	*0.513*	*6/18/2024 21:30*	*6/19/2024 7:30*	*650,960*	*14.95*	*15,198*	*20.85*
Base			*4*	*0.066*	*6/19/2024 7:30*	*6/26/2024 13:30*	*5,013,340*	*115.15*	*1,252*	*20.66*
Base Grab	6/27/2024 13:56	6/27/2024 13:56	5	0.073	6/26/2024 13:30	6/28/2024 5:30	392,040	9.00	122	1.79
Storm Composite	6/28/2024 6:34	6/28/2024 8:33	758	0.675	6/28/2024 5:30	6/28/2024 9:30	123,385	2.83	5,838	5.20
Base			*4*	*0.066*	*6/28/2024 9:30*	*7/13/2024 8:30*	*5,140,780*	*118.08*	*1,284*	*21.18*
Storm			*374*	*0.513*	*7/13/2024 8:30*	*7/13/2024 13:30*	*90,192*	*2.07*	*2,106*	*2.89*
Base			*4*	*0.066*	*7/13/2024 13:30*	*7/13/2024 22:30*	*140,293*	*3.22*	*35*	*0.58*
*Storm**			*374*	*0.513*	*7/13/2024 22:30*	*7/14/2024 10:00*	*496,800*	*11.41*	*11,599*	*15.91*
Base			*4*	*0.066*	*7/14/2024 10:00*	*7/22/2024 18:00*	*2,823,750*	*64.86*	*705*	*11.63*
Storm Composite	7/22/2024 18:31	7/22/2024 21:26	396	0.697	7/22/2024 18:00	7/23/2024 0:00	178,879	4.11	4,422	7.78
Base Grab	7/25/2024 13:47	7/25/2024 13:47	3	0.051	7/23/2024 0:00	7/26/2024 14:00	1,186,900	27.26	222	3.78
Base			*4*	*0.066*	*7/26/2024 14:00*	*8/2/2024 13:00*	*1,346,420*	*30.93*	*336*	*5.55*
Beaver Dam Break			*215*	*0.321*	*8/2/2024 13:00*	*8/2/2024 16:00*	*44,053*	*1.01*	*591*	*0.88*
Base			*4*	*0.066*	*8/2/2024 16:00*	*8/5/2024 9:00*	*422,882*	*9.71*	*106*	*1.74*
Storm Composite	8/5/2024 12:11	8/5/2024 23:28	234	0.483	8/5/2024 9:00	8/6/2024 11:00	1,468,680	33.73	21,454	44.28
Base			*4*	*0.066*	*8/6/2024 11:00*	*8/12/2024 8:00*	*5,114,630*	*117.48*	*1,277*	*21.07*
Beaver Dam Break			*215*	*0.321*	*8/12/2024 8:00*	*8/12/2024 12:00*	*79,404*	*1.82*	*1,066*	*1.59*
Base			*4*	*0.066*	*8/12/2024 12:00*	*8/15/2024 4:00*	*587,468*	*13.49*	*147*	*2.42*
Storm			*374*	*0.513*	*8/15/2024 4:00*	*8/15/2024 10:00*	*121,145*	*2.78*	*2,828*	*3.88*
Base			*4*	*0.066*	*8/15/2024 10:00*	*8/26/2024 20:00*	*2,500,620*	*57.44*	*624*	*10.30*
Storm			*374*	*0.513*	*8/26/2024 20:00*	*8/27/2024 17:00*	*589,827*	*13.55*	*13,771*	*18.89*
Base			*4*	*0.066*	*8/27/2024 17:00*	*8/29/2024 17:00*	*1,291,320*	*29.66*	*322*	*5.32*
Storm			*374*	*0.513*	*8/29/2024 17:00*	*8/30/2024 7:00*	*681,385*	*15.65*	*15,909*	*21.82*
Base Grab	9/3/2024 9:51	9/3/2024 9:51	3	0.054	8/30/2024 7:00	9/4/2024 10:00	2,916,310	66.98	546	9.83
Base			*4*	*0.066*	*9/4/2024 10:00*	*9/21/2024 9:00*	*2,290,400*	*52.61*	*572*	*9.44*
Storm			*374*	*0.513*	*9/21/2024 9:00*	*9/21/2024 15:00*	*63,088*	*1.45*	*1,473*	*2.02*
Base Grab	9/24/2024 9:18	9/24/2024 9:18	3	0.073	9/21/2024 15:00	9/25/2024 10:00	561,952	12.91	105	2.56
Base			*4*	*0.066*	*9/25/2024 10:00*	*10/20/2024 14:00*	*1,737,670*	*39.91*	*434*	*7.16*
Base Grab	10/21/2024 14:30	10/21/2024 14:30	3	0.065	10/20/2024 14:00	10/24/2024 19:00	181,740	4.17	34	0.74
Storm			*374*	*0.513*	*10/24/2024 19:00*	*10/24/2024 23:00*	*20,323*	*0.47*	*474*	*0.65*
Base			*4*	*0.066*	*10/24/2024 23:00*	*10/25/2024 15:00*	*48,178*	*1.11*	*12*	*0.20*
*Base**			*4*	*0.066*	*10/25/2024 15:00*	*10/31/2024 6:00*	*291,600*	*6.70*	*73*	*1.20*
*Storm**			*374*	*0.513*	*10/31/2024 6:00*	*10/31/2024 20:00*	*252,000*	*5.79*	*5,884*	*8.07*
*Base**			*4*	*0.066*	*10/31/2024 20:00*	*11/18/2024 16:00*	*1,078,560*	*24.77*	*269*	*4.44*
*Storm**			*374*	*0.513*	*11/18/2024 16:00*	*11/19/2024 16:00*	*518,400*	*11.91*	*12,103*	*16.60*
*Base**			*4*	*0.066*	*11/19/2024 16:00*	*12/27/2024 18:00*	*1,645,200*	*37.79*	*411*	*6.78*
*Storm**			*374*	*0.513*	*12/27/2024 18:00*	*12/28/2024 8:00*	*226,800*	*5.21*	*5,295*	*7.26*
*Base**			*4*	*0.066*	*12/28/2024 8:00*	*1/1/2025 0:00*	*475,200*	*10.91*	*119*	*1.96*
Storm Average			374	0.513						
Base Average			4	0.066						
All Average			215	0.321						
Total							**72,832,083**	**1,673**	**230,855**	**573**
Brown's Creek Major Subwatershed Total Acres							3,855			
Total TSS/TP(lb/ac/yr)									59.88	0.149
Total TSS/TP (kg/ha/yr)									67.12	0.167

Italics indicate estimated concentrations based on average base and storm flow concentrations.

*Interval volumes were estimated using similar flow conditions.

Table 6. Brown's Creek at Highway 15 2023 Field Water Quality Results

Date/Time	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (umhos/cm)	pH
5/20/2024 14:10	16.0	8.90	344	7.45
6/26/2024 14:01	20.6	4.29		7.47
7/25/2024 13:20	18.3	5.82	359	7.61
9/3/2024 9:37	13.8	6.76	388	7.63
9/24/2024 9:07	11.1	7.29		7.62
10/21/2024 14:14	12.9	7.62	415	7.66

Exceeds Water Quality Standard

Table 7. Brown's Creek at McKusick Road 2024 Field Water Quality Results

Date/Time	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (umhos/cm)	pH
5/20/2024 14:39	15.2	9.20	402	8.24
6/26/2024 14:33	19.9	8.04		7.88
7/25/2024 13:33	17.5	8.23	389	
9/3/2024 10:11	14.6	7.60	420	7.70
9/24/2024 9:28	11.5	8.80		7.91
10/21/2024 14:45	13.3	8.36	417	7.97

Exceeds Water Quality Standard

Table 8. Brown's Creek at Stonebridge Trail 2024 Field Water Quality Results

Date/Time	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (umhos/cm)	pH
5/20/2024 15:03	15.7	9.30	406	8.25
6/26/2024 14:20	20.0	8.23		7.99
7/25/2024 13:00	17.9	8.47	388	8.14
9/3/2024 9:22	14.5	8.81	419	7.98
9/24/2024 9:37	11.8	9.37		8.05
10/21/2024 13:36	12.4	9.49	463	8.12

Exceeds Water Quality Standard

Table 9. Brown's Creek Outlet 2024 Field Water Quality Results

Date/Time	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (umhos/cm)	pH
1/4/2024 10:33	1.4	14.35	477	8.45
1/17/2024 11:01	0.0	14.65	470	8.79
1/31/2024 11:10	3.2	13.09	477	8.41
2/14/2024 10:46	2.9	13.17	491	8.32
2/27/2024 9:57	3.7	12.38	485	7.81
3/13/2024 9:40	4.7	11.93	455	8.34
3/27/2024 9:51	0.7	15.09	409	8.20
4/10/2024 9:37	5.9	13.63	352	8.32
4/25/2024 9:05	7.9	12.76	442	8.34
5/8/2024 8:40	11.4	10.77	370	8.05
5/22/2024 12:47	15.4	8.97	267	7.98
6/5/2024 9:24	16.6	8.89	270	7.98
6/20/2024 8:29	16.7	9.40	324	7.97
7/18/2024 8:40	14.2	10.11	462	7.91
8/12/2024 8:35	13.5	10.04	434	
8/28/2024 8:51	17.6	9.06	385	8.30
9/10/2024 9:01	13.8	10.10		8.33
9/25/2024 8:27	11.7	10.38		8.25
10/8/2024 14:51	10.7	10.69		8.37
10/22/2024 9:02	10.8	11.15	503	8.27
11/6/2024 13:54	7.9	11.13	376	8.31
11/21/2024 10:00	3.7	12.75	386	8.21
12/4/2024 10:30	1.9	13.50	493	8.40
12/18/2024 10:00	1.4	13.20	505	
12/31/2024 10:00	2.1	13.06	441	8.65

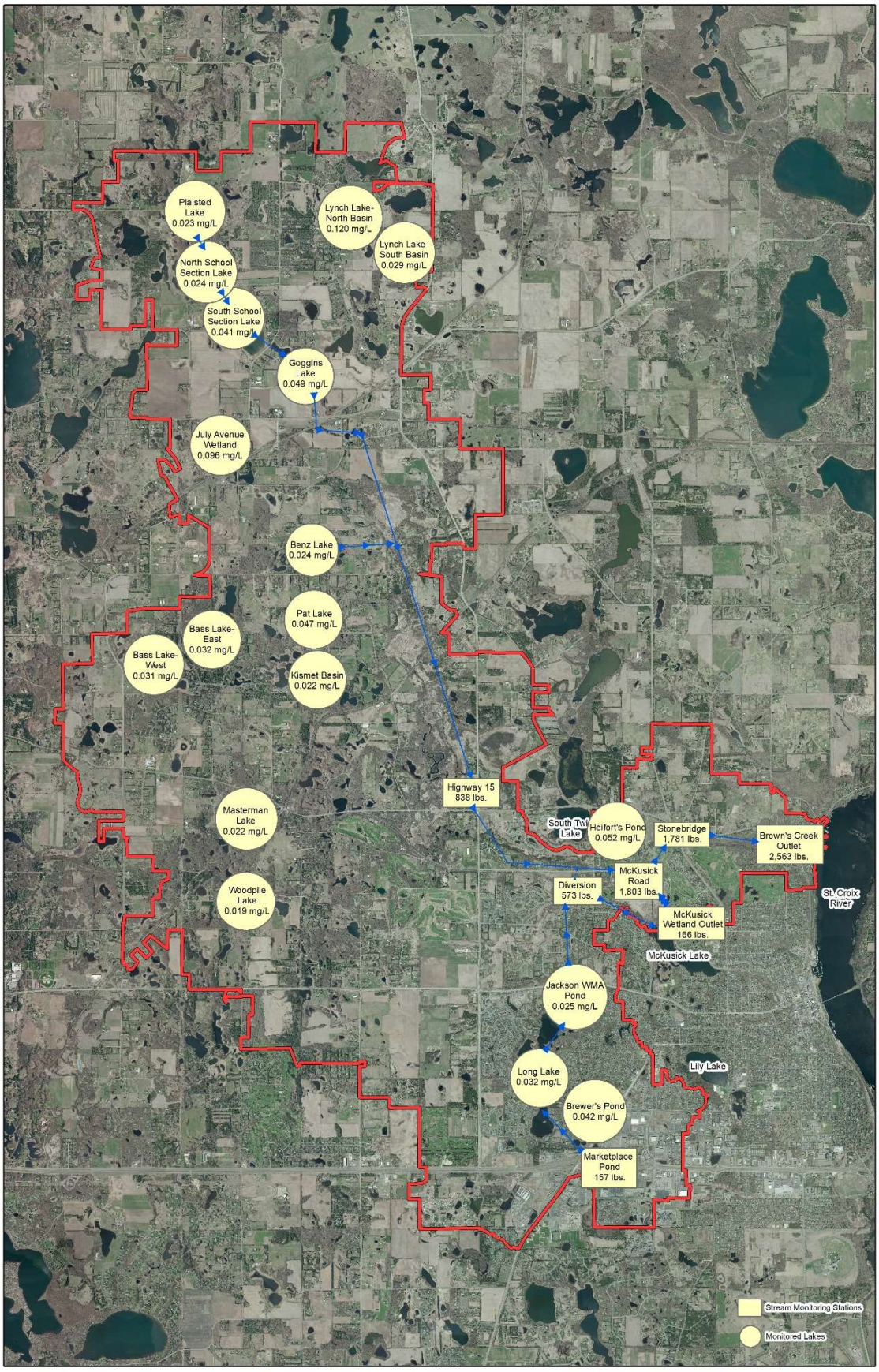
Exceeds Water Quality Standard

Table 10. Brown's Creek Diversion 2024 Field Water Quality Results

Date/Time	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (umhos/cm)	pH
5/20/2024 14:27	18.2	9.57	514	7.86
6/27/2024 13:56	22.0	7.16	336	7.81
7/25/2024 13:47	23.4	6.91	335	6.46
9/3/2024 9:51	19.3	6.68	264	7.46
9/24/2024 9:18	14.2	5.84	511	7.40
10/21/2024 14:30	12.4	6.71	596	7.54

Exceeds Water Quality Standard

APPENDIX C – 2024 BROWN'S CREEK TOTAL PHOSPHORUS FLOW CHART



GLOSSARY

Anoxic- Lacking oxygen.

Best Management Practice (BMP)- Any practice or constructed feature designed to reduce pollution, erosion, or other environmental degradation such as silt fence, rain gardens, storm water pollution prevention plans, buffer strips, etc.

Biota- Living organisms such as plants, animals, and bacteria.

Chronic Standard- The highest water concentration or fish tissue concentration of a toxicant or effluent to which aquatic life, humans, or wildlife can be exposed indefinitely without causing chronic toxicity.

Composite Sample- A collection of individual samples taken over the course of a storm and combined into a single sample to represent conditions throughout the entire storm event.

Discharge- The amount of water moving past a given point in a stream, usually measured in cubic feet per second, but may also be discussed as the total volume of water that flowed through a site in a year, measured in cubic feet.

Eutrophic- Bodies of water with high levels of biological productivity characterized by high amounts of aquatic vegetation with clear water, or minimal vegetation with green water due to algal growth shading out larger plants. These waters are often shallow, have excessive nutrients, and may experience severe algal blooms resulting in anoxic conditions and potential fish kills. Most district lakes fall within this classification.

External Load- Nutrients or pollution contributed from outside a water body such as atmospheric deposition or inlets from streams or pipes.

Final Acute Value (FAV)- An estimate of the concentration of a pollutant corresponding to the cumulative probability of 0.05 in the distribution of all the acute toxicity values for the genera or species from the acceptable acute toxicity tests conducted on a pollutant. This concentration is severe enough to rapidly induce a response, normally observed in 96 hours or less. Acute mortality can be expected above this concentration.

Gaining Stream- A stream which gains water through the stream bed from groundwater.

Hypereutrophic- Bodies of water with extremely high biological productivity and nutrients which often experience severe algal blooms, very low clarity, and limited aquatic life beyond algae and vegetation. Often have the appearance of “pea soup” in mid-summer.

Impaired Waters List/303(d) List- A section of the Clean Water Act which lists water bodies impaired by one or more pollutants for which a TMDL study should be completed.

Internal Load- Nutrients or pollution cycled within a lake from sediments, vegetation, or other sources within a water body.

Littoral- The area of a lake less than 15 feet deep dominated by aquatic vegetation.

Load/Loading- The amount of nutrients or pollutants from a source, usually expressed as pounds or pounds per acre.

Losing Stream- A stream which loses water through the stream bed to the groundwater.

Maximum Standard- The highest concentration of a toxicant in water to which aquatic organisms can be exposed for a brief time with zero or slight mortality. The max standard is half of the final acute value.

Mesotrophic- Bodies of water with an intermediate amount of biological productivity. These waters are typically clear water with healthy aquatic vegetation, some algal growth, and an intermediate amount of nutrients. When stratified, these waters may become anoxic near the bottom.

Non-point Source- A source of pollution from a undefined area such as runoff from a landscape.

Nutrients- Discussed in this report as total phosphorus (TP), total suspended solids (TSS) or sediment, and total Kjeldahl nitrogen (TKN).

Ordinary High Water Level (OHWL)- The boundary of public waters and wetlands determined by a level of water maintained with enough time to leave evidence upon the landscape, such as a change in natural vegetation from terrestrial to aquatic, or the top of the bank of a channel.

Oligotrophic- Bodies of water with low biological productivity characterized by clear water, low algal growth, low nutrient concentrations, minimal aquatic vegetation, and well-oxygenated water.

Point Source- A source of pollution from a single defined outlet such as a pipe.

Shallow Lake- A lake 50 acres or greater in size and less than 15 feet deep, or has greater than 80% littoral area.

Stratification- Separation of water within a lake based on density as a result of differences in water temperature from warm water near the surface and heavy, cold water near the bottom.

Thermocline/metalimnion- The boundary between warm and cold water within a stratified lake characterized by a sudden change in temperature and dissolved oxygen.

Total Maximum Daily Load (TMDL)- Defined by the Clean Water Act as the amount of a pollutant a water body can receive and still meet water quality standards. TMDL studies will often assign a point source load, non-point source load, internal load, and a margin of safety to each pollutant to guide management activities for load reductions from each source.

memo

Project Name |	Long Lake Chloride Source Evaluation Proposal	**Date** |	4-3-2025
To / Contact info |	BCWD Board of Managers		
Cc / Contact info |	Karen Kill, District Administrator		
From / Contact info |	Anne Wilkinson, PhD, Camilla Correll, PE		

Background

In 2021, Long Lake was listed as impaired for chloride. The Brown's Creek and Long Lake 2020 Trend Analysis evaluates the chloride concentrations in the Long Lake tributary at 62nd Street from 2011-2020. Chloride concentrations in the tributary to Long Lake exceeded the chronic standard of 230 mg/L three separate times in the months of March through May. The highest observed chloride concentration was 421 mg/L. The high concentrations in the tributary to Long Lake indicate that there is a source of chloride in the watershed that contributes to the high chloride concentrations in the tributary and downstream in Long Lake. The trend in flow weighted mean concentration (FWMC) in the tributary to Long Lake shows an increasing trend.

Water softener salt and road salt are the two largest sources of chloride in the Twin Cities Metropolitan Area. The recommendation from the Brown's Creek and Long Lake 2020 Trend Analysis Report is that management decisions should be made to stop the accumulation of chloride in the watershed. There are no feasible best management practices to remove chloride in a watershed. Therefore, it is recommended that the BCWD conduct a source assessment to better characterize the sources to Long Lake and provide outreach and education to reduce the export of chloride downstream.

Scope of Services

This proposal serves as a response to the recommendation for a source assessment of chloride in the Long Lake Watershed, as well as a better understanding of the extent of the impairment. The following is a proposed scope and budget for the chloride monitoring in the Long Lake watershed and in Long Lake in 2025. The following sections outline the proposed tasks.

Task 1. Stormwater Infrastructure Monitoring

According to the Brown's Creek and Long Lake 2020 Trend Analysis Report, there were three exceedances of the chronic chloride standard of 230 mg/L in the tributary. Therefore, the tributary to Long Lake is contributing to the elevated chloride concentrations in Long Lake. However, it is not well understood where in the watershed the chloride is coming from. The tributary is not the only possible source for chloride in the watershed, EOR also identified several locations directly draining to the lake that should be investigated. For example, stormwater ponds can accumulate and discharge high concentrations of chloride downstream.

The Washington Conservation District (WCD) will visit six stormwater ponds within the Marketplace complex, Figure 1. At each proposed monitoring location SWCD staff will collect monthly chloride samples from the surface and the bottom of the ponds from April to October.

Task 2. In-lake monitoring

Long Lake has elevated chloride concentrations and is listed as impaired. Thus far, chloride was only sampled at the bottom of the deep hole in the northern-most lobe Long Lake.. BCWD would benefit from better understanding the extent of the chloride contamination within the lake itself to determine the threat of chloride to the aquatic organisms in Long Lake.

WCD will sample three locations at different parts of Long Lake and Sinnet's Pond (formerly the Jackson Wildlife Management Area)once in spring and once in fall, Figure 1. WCD will collect epilimnetic (surface layer) samples at all four locations and an additional hypolimnetic (deep) sample at the deep hole in the northern-most lobe. The other three shallower locations are only 5 feet deep, thus the epilimnetic sample is representative of the entire water column at those sampling locations.

Task 3. Data Analysis and Report

EOR will analyze the data collected by the WCD and develop a summary report that identifies the hotspots within the Marketplace complex ponds as well as within Long lake itself. The report will offer outreach recommendations for reducing sources to Long Lake from area partners.

Fee Summary

Table 1 summarizes the labor, lab fees, and associated costs for the tasks described above.

Table 1. Scope of Services for Long Lake Chloride Source Assessment

Task	Description	EOR Estimated Hours	WCD Labor Cost	Lab fees	Estimated Cost
1	Stormwater Infrastructure		$6,330*	$840*	$7,170*
2	In-lake		$603*	$100*	$703*
4	Data Analysis and Report	24	-	-	$3,932
	Total	**24**	**$6,933**	**$940**	**$11,805**

** The existing agreement with the Washington Conservation District already includes this work.*

Requested Action

1. Approve scope of services and the additional funds not to exceed $3,932 for Emmons and Olivier's Task 4 Data Analysis and Report from account 929-0013.

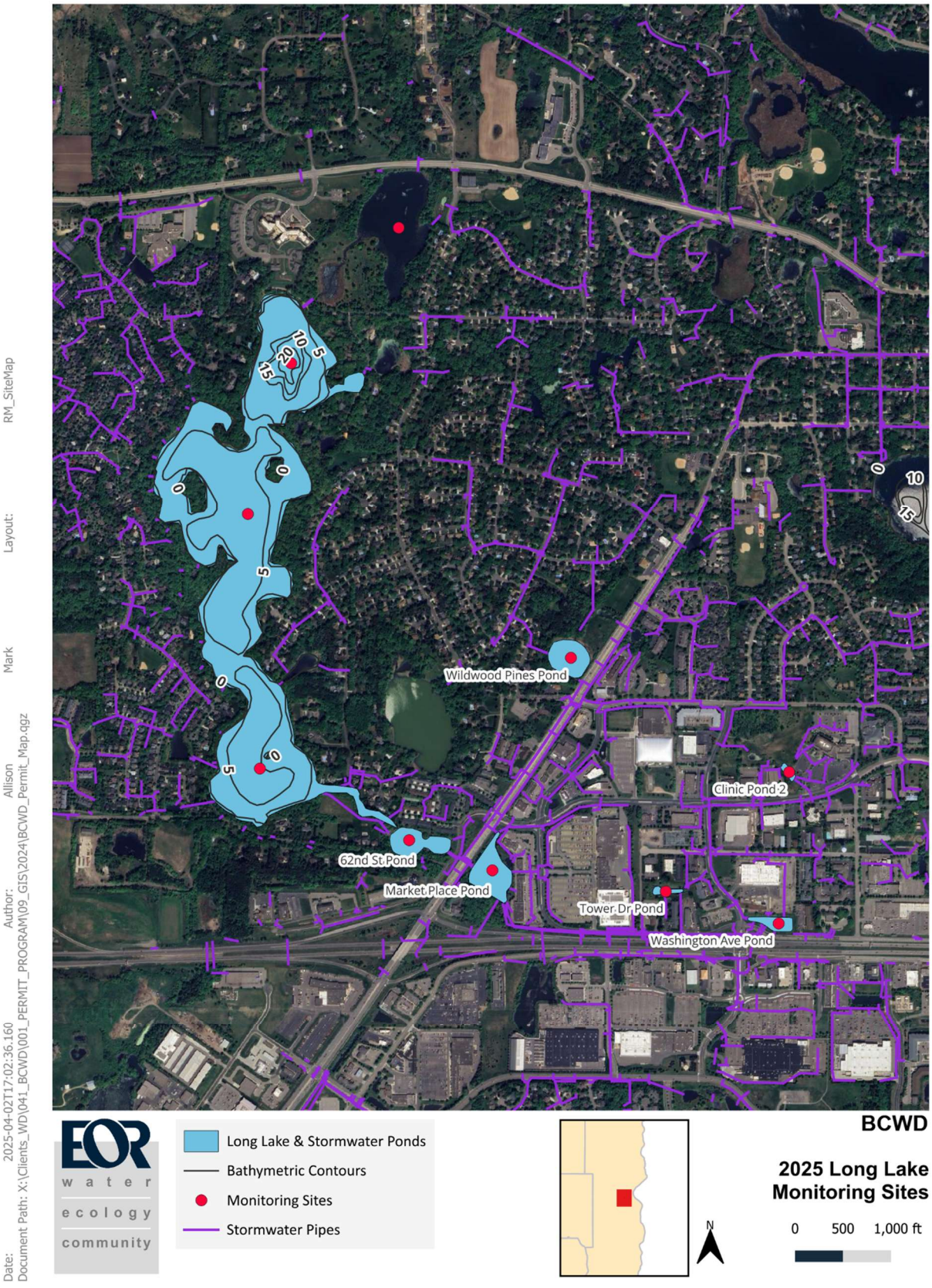


Figure 1: Proposed monitoring sites.

memo

Project Name |	H/H Model Update	**Date** |	4/1/2025
To / Contact info |	BCWD Board of Managers		
Cc / Contact info |	Karen Kill, District Administrator		
From / Contact info |	Camilla Correll, PE		
Regarding |	Flood Vulnerability Assessment		

Background

The BCWD is in the process of completing substantial updates to its hydrologic and hydraulic (H/H) model (H/H). These updates include the use of newer datasets (i.e., updated LiDAR and land use information), updated rainfall data (i.e., NOAA Atlas 14, NEXRAD Radar), and the incorporation of recently permitted development activities. Improvements to the H/H model can help the District and its member communities understand how water moves through the watershed and facilitate data-driven decisions to improve flood control, water quality, infrastructure design, and ecosystem health.

One of the goals for completing this H/H Update was to incorporate the results in the 2026-2037 Watershed Management Plan Update. For example, the updated H/H model can be used to provide the following:

- More accurate high water levels (HWL's) for the District's lakes, ponds, and wetlands.
- More accurate velocities in Brown's Creek and its tributaries.
- Identify areas where capacity or scour are a concern, e.g., at culverts, bridges, and in stream reaches.
- Areas and infrastructure subject to flood risk.

Now that the H/H model update is complete, it will be important to share the results (i.e., the predicted changes) for existing and projected (future) conditions with stakeholders and the District's member communities. This type of engagement is helpful in vetting or ground-truthing the modeling results and in identifying potential areas of concern. If this information can be collected as part of the WMP Update process, the issues, needs, and potential solutions can be included in the 10-year implementation plan.

Scope of Work

The scope of work for the H/H Update did not include using the model outputs to conduct a flood vulnerability assessment. Conducting a flood vulnerability assessment entails using the updated H/H model to engage communities in identifying hazards, evaluating impacts, and prioritizing the studies and/or flood reduction projects that need to be included in the watershed management plan. Given that the District has had limited participation by member communities in the watershed management planning process, this would be an opportunity to engage them in meaningful conversation about the types of impacts we expect to see more of in the next 10-20 years. It should be noted that this flood reduction assessment will use the updated H/H model, which includes existing land use conditions. This assessment will include an estimate of future rainfall conditions, but not include an evaluation of future land use because….

The vulnerability assessment would include the following steps:

1. Critical Event Analysis - Run the model for the 2-, 10-, 25-, 50-, and 100-year, 24-hour rainfall events as well as the frozen ground 7.2" runoff event, which was analyzed for landlocked lakes for the District Ponds Flood Risk Assessment.
2. Use the model outputs to create a series of figures to review potential impacts with stakeholders and member communities for the Mean Event (7.2" 100-year, i.e., current conditions), and the 90th Percentile Event (9.5" 100-year i.e., future/projected conditions):
    a. 100-year HWL

b. Flooded Structures
c. At-Risk Structures within 15' of flood footprint
d. Road Overtopping (Frequency, depth, and duration)
e. Street & structure flooding under 10-year, 24-hour event
f. Velocity change in Brown's Creek/Tributaries

3. Intersect the projected flood footprints with existing GIS map layers to identify social, environmental, and infrastructure impacts as follows:
    a. Social
        i. Flooding of residential structures, private wells, septic systems.
        ii. Flooding of trails/parks.
    b. Environmental
        i. Flooding in areas of high pollution sensitivity of near-surface materials, wellhead protection areas, and emergency response areas.
        ii. Flooding of contamination sites.
        iii. Flooding of impaired waters.
        iv. Flooding of Groundwater Dependent Natural Resources and native plant communities connected with groundwater.
        v. Flooding of areas with high soil erosion risk.
        vi. Flooding of Biological Survey Sites of Biodiversity Significance.
    c. Infrastructural
        i. Flooding of roads, culverts, critical infrastructure such as hospitals, police stations, emergency services, electrical substations, schools, churches, and emergency routes.
4. Community Engagement and Hazard Identification Meetings – Utilizing the flood elevation mapping, conduct meetings with local elected officials and staff to review flood mapping and identify and prioritize hazards.
5. Final Report - Summarizes the steps and deliverables developed for the Flood Vulnerability Assessment. This document will be used to continue engagement with communities and Washington County to identify and prioritize hazards, guide future infrastructure sizing, critical infrastructure replacement, and potential rule revisions by the Brown's Creek Watershed District as well as the Comprehensive Planning process and ordinance revisions for communities.

The following table outlines the timeline, cost, and hours anticipated for this effort.

Task	Timeline	Estimated Hours	Estimated Cost
Critical Event Analysis	April - May	74	$11,771
Create Figures/Maps	April - May	63	$10,541
Intersect with Social, Environmental, and Infrastructural GIS Layers	April - May	16	$2,856
Community Engagement Meeting	June	32	$6,104
Report and Recommendations	June	16	$2,908
TOTAL	**NA**	**201**	**$34,180**

Board Action

1. Approve this scope of work for EOR's involvement in the Flood Vulnerability Assessment in the amount of $34,180 from account number 923-0000.

State of Minnesota

Cooperative Agreement

BROWN'S CREEK PUBLIC SHORE FISHING STRUCTURE
LAND USE, OPERATIONS, AND MAINTENANCE COOPERATIVE AGREEMENT
BETWEEN
THE STATE OF MINNESOTA AND BROWN'S CREEK WATERSHED DISTRICT

This Cooperative Agreement ("Agreement") is between the State of Minnesota, acting through its Commissioner of the Department of Natural Resources ("State") and Brown's Creek Watershed District, ("Watershed District").

Recitals

The Commissioner of Natural Resources has the authority, duty, and responsibility under Minnesota Statutes Section 97A.141 to provide public water access on lakes and rivers, where access is inadequate; and

Under Minnesota Statutes § 471.59, subd. 10, the State is empowered to engage other governmental bodies of the state to provide such assistance as deemed necessary; and

The State and Watershed District have determined that a shore fishing structure on Brown's Creek is of high priority under the state public water access program; and

The shore fishing structure will be located on State-owned land at Sec. 20, T30N, R20W, described as Brown's Creek Aquatic Management Area, and used for fishing, observation, and other compatible uses ("Shore Fishing Structure"), and

The State and the Watershed District desire to cooperate in the installation and maintenance of the Shore Fishing Structure; and

The Watershed District Board has authorized the Watershed District to enter into this Agreement.

Agreement

1. **Term of Agreement**
   1.1 Effective Date: April 30, 2025, or the date the State obtains all required signatures under Minn. Stat. § 16C.05, subd. 2, whichever is later.
   1.2 Expiration Date: December 31, 2045, or until all obligations have been satisfactorily fulfilled, whichever occurs first.

2. **Agreement between the Parties**

   2.1 **State's Duties and Responsibilities. The State shall:**

a. Encumber funds for the Shore Fishing Structure through the standard internal purchasing process including, but not limited to, a separate requisition request.

b. Provide personnel and equipment when feasible to assist with the installation of the Shore Fishing Structure.

c. Approve the designs and plans attached hereto and incorporated herein as Exhibit A by the signature of its authorized representative hereunder.

2.2 **Watershed District's Duties and Responsibilities. The Watershed District shall:**

a. Comply with all local, state and federal laws, regulations, rules and ordinances which may apply to the management, operation, and maintenance of the Shore Fishing Structure.

b. Obtain any permit or license which may be required for the Shore Fishing Structure.

c. Contract for the construction of an accessible route/sidewalk/pathway in substantial conformity with the design and plans in Exhibit A and that meets accessible requirements of less than a 5% gradient, 2% cross slope, connecting the Shore Fishing Structure to an accessible parking space. The Watershed District agrees to comply with the Americans with Disabilities Act (ADA) of 1990 (42 U.S.C. 12101 et seq.) and all applicable regulations and guidelines.

d. Contract for the provision and installation of the Shore Fishing Structure in substantial conformity with the design and plans in Exhibit A, and request assistance from the State as needed.

e. Coordinate with the State or other entities to maintain the Shore Fishing Structure and facilities and keep them in good and sanitary order including necessary routine maintenance and minor repairs to the Shore Fishing Structure.

f. Follow Minnesota Department of Natural Resources' (DNR) Operational Order 113, which requires preventing or limiting the introduction, establishment and spread of invasive species during activities on public waters and DNR-administered lands. Operational Order 113 is incorporated into this Agreement by reference and can be found at https://files.dnr.state.mn.us/assistance/grants/habitat/heritage/oporder_113.pdf Duties listed are in Operational Order 113 under Sections II and III (p. 5-8).

    a. The Watershed District shall prevent invasive species from entering or spreading within a project site by cleaning equipment and clothing prior to arriving at the project site.

    b. If equipment or clothing arrives at the project site with soil, aggregate material, mulch, vegetation (including seeds) or animals, it shall be cleaned with tools or equipment furnished by the Watershed District (such as brush/broom, compressed air, or pressure washer) at the staging area.

    c. The Watershed District shall dispose of material and debris cleaned from equipment and clothing at an appropriate location. If the material cannot be disposed of onsite, then the material must be secured prior to transport (such as a sealed container, covered truck, or wrap with tarp) and legally disposed of offsite.

    d. The Watershed District shall ensure that all equipment and clothing used for work in public waters has been adequately decontaminated for aquatic invasive species. All equipment and clothing including but not limited to waders, vehicles and boats that are exposed to any public water of the state must be thoroughly cleaned and drained of all water before transport to another location.

3. **Funding**

The State shall provide funding for its responsibilities under Article II of this Agreement through the standard internal purchasing process including, but not limited to a separate requisition in which funds will be encumbered. The State shall provide one (1) shore fishing concrete plank and railing to the site. The State shall provide funding to the Watershed District for their responsibilities under Article II of this Agreement, however the total obligation of the State for the construction of the facilities shall not exceed twenty thousand dollars ($20,000). The total obligation of the State for its responsibilities under Article II of this Agreement shall be limited to the amount of funds legislatively appropriated and administratively allocated to this project. No additional funding will be provided, unless agreed upon by all parties and an amendment to this Agreement is completed and executed. The Watershed District will invoice the state for approved construction costs of the Shore Fishing Structure (includes: site prep and installation of the shore fishing concrete plank and railing and installation of accessible route to the shore fishing stations). Reimbursement will be due within thirty (30) days of the acceptance of the invoice by the State's authorized representative. The Watershed District will not receive payment for work found by the State to be unsatisfactory or performed in violation of federal, state or local law.

4. **Authorized Representatives**

The State's Authorized Representative, or their successor, is:

TJ DeBates
Minnesota DNR East Metro Fisheries Supervisor
1200 Warner Road, Saint Paul, MN 55106
Timothy.Debates@state.mn.us | 651.259.5770

The Watershed District's Authorized Representative, or their successor, is:

Karen Kill
Brown's Creek Watershed District Administrator
455 Hayward Ave. N., Oakdale, MN 55128
Karen.kill@mnwc.org | 651.330.8220

Assignment, Amendments, Waiver, and Contract Complete.

4.1 Assignment. The Watershed District may neither assign nor transfer any rights or obligations under this Agreement without the prior consent of the State and a fully executed assignment agreement, executed and approved by the authorized parties or their successors.

4.2 Amendments. Any amendment to this Agreement must be in writing and will not be effective until it has been executed and approved by the authorized parties or their successors.

4.3 Waiver. If the State fails to enforce any provision of this Agreement, that failure does not waive the provision or its right to enforce it.

4.4 Contract Complete. This Agreement contains all negotiations and agreements between the State and the Watershed District. No other understanding regarding this Agreement, whether written or oral, may be used to bind either party.

5. **Liability**

Each party agrees that it will be responsible for its own acts and the results thereof to the extent authorized by law and shall not be responsible for the acts of the other party and the results thereof. The State's liability shall be governed by the provisions of the Minnesota Tort Claims Act, Minnesota Statutes Section 3.736, and other applicable law. The Watershed District's liability shall be governed by Minnesota Statutes Sections 466.01 - 466.15, and other applicable law.

6. **State Audits.**

Under Minn. Stat. § 16C.05, subd. 5, the Watershed District's books, records, documents, and accounting procedures and practices relevant to this Agreement are subject to examination by the State, the State Auditor, or Legislative Auditor, as appropriate, for a minimum of six (6) years from the expiration or termination of this Agreement.

7. **Government Data Practices.**

The Watershed District and State must comply with the Minnesota Government Data Practices Act, Minn. Stat. Ch. 13, (or, if the State contracting party is part of the Judicial Branch, with the Rules of Public Access to Records of the Judicial Branch promulgated by the Minnesota Supreme Court as the same may be amended from time to time) as it applies to all data provided by the State under this Agreement, and as it applies to all data created, collected, received, stored, used, maintained, or disseminated by the Watershed District under this Agreement. The civil remedies of Minn. Stat. § 13.08 apply to the release of the data governed by the Minnesota Government Practices Act, Minn. Stat. Ch. 13, by either the Watershed District or the State.

If the Watershed District receives a request to release the data referred to in this clause, the Watershed District must immediately notify and consult with the State's Authorized Representative as to how the Watershed District should respond to the request. The Watershed District's response to the request shall comply with applicable law.

8. **Publicity and Endorsement.**

8.1 **Publicity**. Any publicity regarding the subject matter of this Agreement must identify the State as the sponsoring agency and must not be released without prior written approval from the State's Authorized Representative. For purposes of this provision, publicity includes notices, informational pamphlets, press releases, information posted on corporate or other websites, research, reports, signs, and similar public notices prepared by or for the Watershed District individually or jointly with others, or any subcontractors, with respect to the program, publications, or services provided resulting from this Agreement.

All publicity shall be provided in an accessible format per Minnesota Statute 16E.03, sub. 9. State of Minnesota guidelines for creating accessible electronic documents can be found at the following URL: https://mn.gov/mnit/programs/accessibility/.

8.2 **Endorsement.** The Watershed District must not claim that the State endorses its products or services.

9. **Venue**

Venue for all legal proceedings out of this Agreement, or its breach, must be in the appropriate state or federal court with competent jurisdiction in Ramsey County, Minnesota.

10. **Termination**

10.1 Termination. The State or the Watershed District may terminate this Agreement at any time, with or without cause, upon thirty (30) days' written notice to the other party.

10.2 Termination for Insufficient Funding. The State may immediately terminate this Agreement if it does not obtain funding from the Minnesota Legislature, or other funding source; or if funding cannot be continued at a level sufficient to allow for the payment of the services covered here. Termination must be by written or fax notice to the Watershed District. The State is not obligated to pay for any services that are provided after notice and effective date of termination. However, the Watershed District will be entitled to payment, determined on a pro rata basis, for services satisfactorily performed to the extent that funds are available. The State will not be assessed any penalty if the Agreement is terminated because of the decision of the Minnesota Legislature, or other funding source, not to appropriate funds. The State must provide the Watershed District notice of the lack of funding within a reasonable time of the State's receiving that notice.

11. **Force Majeure**

Neither party shall be responsible to the other or considered in default of its obligations within this Agreement to the extent that performance of any such obligations is prevented or delayed by acts of God, war, riot, disruption of government, or other catastrophes beyond the reasonable control of the party unless the act or occurrence could have been reasonably foreseen and reasonable action could have been taken to prevent the delay or failure to perform. A party relying on this provision to excuse performance must provide the other party prompt written notice of inability to perform and take all necessary steps to bring about performance as soon as practicable.

12. **E-Verify Certification (in accordance with Minn. Stat. § 16C.075).**

For services valued in excess of fifty thousand dollars ($50,000), the Watershed District certifies that as of the date of services performed on behalf of the State, Watershed District and all its subcontractors will have implemented or be in the process of implementing the federal E-Verify Program for all newly hired employees in the United States who will perform work on behalf of the State. The Watershed District is responsible for collecting all subcontractor certifications and may do so utilizing the E-Verify Subcontractor Certification Form available at http://www.mmd.admin.state.mn.us/doc/EverifySubCertForm.doc. All subcontractor certifications must be kept on file with Contractor and made available to the State upon request.

13. Exhibits. The following Exhibits are attached and incorporated into this Agreement. In the event of a conflict between the terms of this Agreement and its Exhibits, or between Exhibits, the order of precedence is first the Agreement, and then in the following order:

Exhibit A: Shore Fishing Structure Design and Plans
Exhibit B: Shore fishing structure Location Map
Exhibit C: Watershed District Board Meeting Minutes/Resolution

(The remainder of this page intentionally left blank.)

This is a draft for approval only, Do Not Sign. Signing will be done in order, by email through DocuSign.

1. State Encumbrance Verification
Individual certifies that funds have been encumbered as required by Minn. Stat. §§ 16A.15 and 16C.05

Print Name: _____

Signature: _____

Title: _____ Date: _____

SWIFT Contract No. _____

2. Watershed District

Print Name: _____

Signature: _____

Title: _____ Date: _____

3. State Agency
With delegated authority

Print Name: _____

Signature: _____

Title: _____ Date: _____

4. Commissioner of Administration
As delegated to The Office of State Procurement

Print Name: _____

Signature: _____

Title: _____ Date: _____

Admin ID: _____

Exhibit A Shore Fishing Structure Design and Plans

13+00
14+00
15+00
16+00
17+00
1+00
2+00
0+50
1+50
0+00
BROWN'S CREEK THALWEG
(POST CONSTRUCTION ALIGNMENT)
EXISTING
SIDEWALK
WETLAND DELINEATION
(PRE CONSTRUCTION LIMITS)
TIE ADA TRAIL INTO
EXISTING SIDEWALK
PROPOSED
PACKED GRAVEL ADA TRAIL AT
RUNNING 4.80% SLOPE
LENGTH: 251 LF
WIDTH: 5 FT
AREA: 1250 SF
01
02
LIMITS OF
DISTURBANCE
3' LONG X 5' WIDE
FLAT GRAVEL
LANDING PAD
PRESERVE
EXISTING TREE
(TYP)
PROPOSED
5' X 12' CONCRETE PLANK
FISHING PLATFORM WITH RAILINGS
4" COMPACTED CRUSHED AGGREGATE
BASE COURSE - CLASS 5
CONCRETE PLATFORM MAX 1 IN.
ABOVE EXISTING GRADE
(PROVIDED BY OTHERS)
W/D
868
869
870
871
872
873
867
866
865
864
863
862
861

NOTES

SEED ALL DISTURBED AREAS WITH THE SEED MIX BELOW AND EROSION CONTROL BLANKET, CATEGORY 25 (CURLEX II FIBRENET OR APPROVED EQUAL)

50/50 RATIO OF MNDOT SEED MIX 35-641 MESIC PRAIRIE SOUTHEAST AND 36-211 WOODLAND EDGE SOUTH & WEST
AT 20 LBS/AC
ADD COVER CROP - REGREEN
AT 30 LBS/AC
AREA: 0.1 ACRES

SCALE IN FEET
0 10 20 40

N

EOR water ecology community
EMMONS & OLIVIER RESOURCES, INC.
1919 UNIV. AVE. W. #300 ST. PAUL, MN
TEL: 651-770-8448 FAX: 651-770-2552

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

DANIEL E. MOSSING DATE: 01/08/2025 LICENSE #57796

DATE	NO.	DESCRIPTION
01/08/2025	1	FINAL DESIGN SET
	2	
	3	
	4	
	5	
	6	

DESIGNED BY: EOR
DRAWN BY: DEM
CHECKED BY: DEM

EOR JOB #0041-0418

BROWN'S CREEK WATERSHED DISTRICT

CLIENT PROJECT #XXX-XXXX

BROWN'S CREEK RESTORATION PROJECT

WASHINGTON COUNTY, STILLWATER, MN

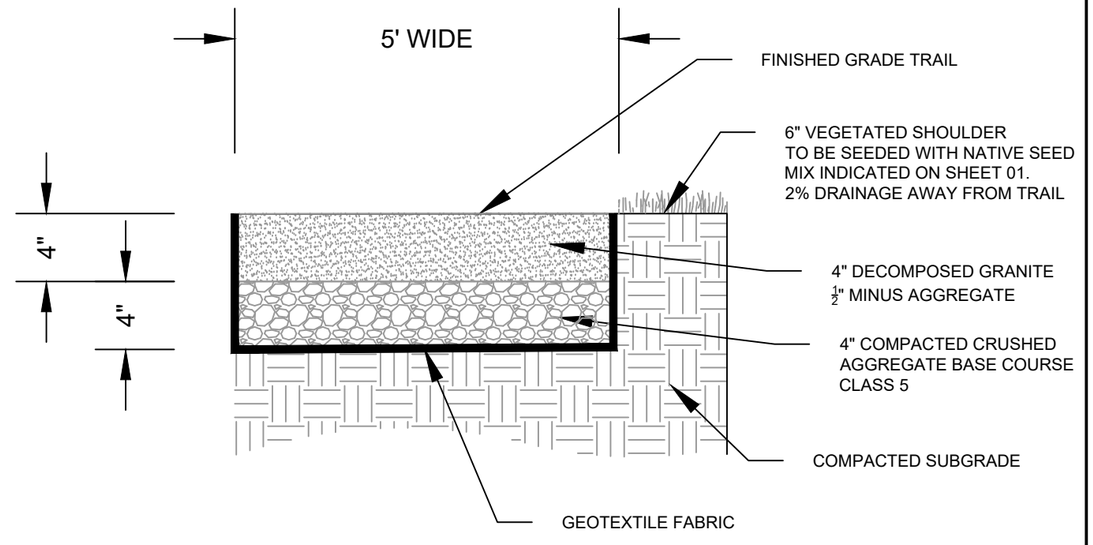
BROWN'S CREEK WATERSHED DISTRICT OAKDALE, MN 55128

NORTH TRAIL
GRAVED ADA TRAIL
PLAN

SHEET 01 OF 02

SCHEDULE OF ESTIMATED QUANTITIES

ITEM #	MNDOT Ref #	BASE BID ITEM	UNIT	QUANTITY
1	2021.501	Mobilization	LS	1
2	2106.507	Common Excavation (Subgrade Excavation Included) - Cut: 130 CY; Fill: 70 CY	CY	130
3	SP	5'x12' - Concrete Slab and Railings - Installation	EA	1
4	2211.501	Aggregate Base, Class 5 Gravel (4" Depth)	CY	16
5	2211.501	1/2" Minus Gravel Surface, Decomposed Granite (4" Depth)	CY	15
6	2511.504	Geotextile Fabric, Type IV	SY	150
7	2575.504	Erosion Control Blanket, Category 25 (Curlex II FibreNet or Approved Equal)	SY	550
8	2575.508	Seed, State Mix 35-641 (Excludes Cover Crop Weight)	LBS	1
9	2575.508	Seed, State Mix 36-211 (Excludes Cover Crop Weight)	LBS	1
10	2575.508	Seed, Regreen	LBS	3



01/02 ADA PACKED GRAVEL TRAIL
NOT TO SCALE

water ecology community
EMMONS & OLIVIER RESOURCES, INC.
1919 UNIV. AVE. W. #300 ST. PAUL, MN
TEL: 651-770-8448

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

DANIEL E. MOSSING DATE: 01/08/2025 LICENSE #57796

DATE	NO.	DESCRIPTION
01/08/2025	1	FINAL DESIGN SET
	2	
	3	
	4	
	5	
	6	

DESIGNED BY: EOR
DRAWN BY: DEM
CHECKED BY: DEM

EOR JOB #0041-0418 CLIENT PROJECT #XXX-XXXX

BROWN'S CREEK WATERSHED DISTRICT

BROWN'S CREEK RESTORATION PROJECT
WASHINGTON COUNTY, STILLWATER, MN

BROWN'S CREEK WATERSHED DISTRICT OAKDALE, MN 55128

NORTH TRAIL GRAVED ADA TRAIL SEQ & DETAILS

SHEET 02 OF 02

Exhibit BA


Browns Creek
Shore Fishing
Metropolitan Council, MetroGIS, Esri, TomTom, Garmin, FAO, NOAA, USGS, EPA, NPS, USFWS
Map by Jim Levitt 12-2024
2024
Coordinate System: NAD 1983 UTM Zone 15N
Saint Paul
St Croix River
N
0 0.05 0.1 Mi
0 0.1 0.2 Km

Exhibit C

BCWD Minutes – April 9, 2025

memo

Project Name |	Brown's Creek Cove Restoration Project	**Date** |	4/3/2025
To / Contact info |	BCWD Board of Managers		
Cc / Contact info |	Karen Kill, District Administrator		
From / Contact info |	Mike Majeski, Dan Mossing, P.E.		
Regarding |	Brown's Creek Cove Survey & Assessment		

Background

During routine stream assessments conducted in Brown's Creek in 2021 and 2022, EOR identified degraded stream conditions and poor riparian vegetation along an approximate 1,950-foot reach between the Millbrook Homeowners Association (HOA) and McKusick Road North (Figure 1). Degraded stream conditions identified included channel incision and subsequent floodplain abandonment, bank erosion, sedimentation aggradation, limited instream habitat for fish and macroinvertebrates, and poor riparian vegetation due to prevalence of woody invasive species.

Following Board approval to conduct landowner outreach to determine interest in a potential stream restoration project on their property, BCWD and EOR staff met with two of the four landowners to discuss the project, and both landowners were amenable to the restoration project and indicated that the two remaining landowners in the project boundary would likely be interested in the project as well.

The purpose of this memo is to provide a scope of services to conduct a geomorphic stream survey and measure bank erosion rates to advance a Minnesota Pollution Control Agency (MPCA) 319 grant application for the proposed restoration project. The grant application is due May 1, 2025, so all stream survey and assessment work will be completed by April 25, 2025.

Scope of Services

Field Data Collection

A geomorphic survey of the project reach will be conducted to determine stream bed and water surface profiles, cross sectional areas, channel dimensions, and floodplain elevations to inform a concept-level design. The field work will also include a bank erosion hazard index (BEHI) survey to measure bank erosion rates that will be used to compute pollutant loading estimates for the MPCA 319 grant application.

Figure 1. Proposed Brown's Creek Cove restoration project (red line) between the Millbrook HOA property and McKusick Road North. Yellow lines are approximate parcel boundaries.

Cost Estimate

Table 2 summarizes the tasks and estimated hours to conduct a field survey and assessment of the Brown's Creek Cove project reach.

Table 1. Cost estimate for the Brown's Creek Cove survey and assessment.

TASK	HOURS	ESTIMATED COST*
1. Public Outreach with BCWD Staff, Provide Materials for Landowner Engagement (TASK COMPLETED)	N/A	
2. Conduct Geomorphic Survey, Quantify Bank Erosion and Pollutant Loading Estimates for MPCA 319 Grant Application	34	$6,528
TOTAL	**34**	**$6,528**

* Estimated cost includes mileage & expenses.

Board Action

1. Approve Task 2 for $6,528 from account 947-0022 to advance geomorphic survey and assessment of the Brown's Creek Cove Restoration project.

memo

Project Name |	2025 Aquatic Vegetation Point-Intercept Surveys	**Date** |	4/1/2025
To / Contact info |	BCWD Board of Managers		
Cc / Contact info |	Karen Kill, BCWD Administrator		
From / Contact info |	Jimmy Marty, Camilla Correll, Pat Conrad (EOR)		
Regarding |	South School Section, Goggins, Long, and Benz Lake Point-Intercept Surveys		

EOR was requested to provide aquatic macrophyte point-intercept survey cost estimates for South School Section, Goggins, Long, and Benz Lakes for consideration by the Board. Background and costs for performing these surveys are described below.

Background

South School Section and Goggins Lakes

The findings of the 2022 curly-leaf pondweed (CLP) delineation and follow up point-intercept survey recommended repeat surveys after 3 years to assess CLP management efficacy. The surveys were also recommended to assess the watermilfoil (EWM) and impacts on the native plant community. Herbicide treatments between 2017 and 2021 reduced CLP abundance at South School Section Lake from a 56% frequency of occurrence to less than 3% in 2022. A colonizing stand of CLP was treated in 2021 at Goggins Lake and was not detected in 2022. For the first time in either lake, the 2022 surveys documented EWM, though no treatment was recommended at the time due to negligible impacts on the native plant community and habitat. Since 2022, a rare aquatic plant (snailseed pondweed) has been documented in Goggins Lake. Therefore, 2025 surveys on both lakes would assess long-term CLP treatment efficacy, EWM impacts on the native plant community, assess snailseed pondweed status, and inform potential future actions. The surveys are proposed for late June 2025 to best capture both peak CLP growth and active EWM and snailseed pondweed growth. If CLP is documented as forming monotypic stands, these areas will be delineated and eligible for 2026 treatments if determined necessary.

Long Lake

EOR understands several Long Lake riparian owners have expressed concern over dense vegetation restricting recreation access in recent years. The last point-intercept survey for Long Lake was completed in 2009. DNR lake survey protocols recommended point-intercept survey monitoring be conducted every 5-10 years to establish trends, and more frequently for lakes that are managed. Based on landowner concerns and the date of the last point-intercept survey, EOR recommends a point-intercept survey be conducted in 2025 to document the existing condition of the aquatic plant community and compare it to the 2009 survey.

Benz Lake

Lake-wide point intercept surveys were last completed at Benz Lake in 2017 and 2022. Following the 2022 survey, EOR recommended point-intercept surveys be repeated every 3-5 years. At the time of the 2017 survey, the lake had recently flipped from an algae dominated, poor clarity condition to a aquatic plant dominated, clear-water state. The lake appeared to be in a similar, aquatic plant dominated, clear-water state during the 2022 survey. Aquatic vegetation growth was expected to

decrease somewhat over time as water quality improves and the plant community establishes a new equilibrium. A lake-wide point intercept survey in 2025 would further establish if stable trends of dense vegetation are continuing or declining and if the clear-water state is being maintained. The survey would be proposed for late June to capture potential CLP issues.

Proposed Tasks & Assumptions

Surveys will be conducted in late June to target peak CLP density while still capturing other aquatic plant diversity. Past point-intercept surveys were targeted in July/August at peak aquatic plant diversity. Future surveys beyond 2025 should alternate timing (or conduct two surveys within a season) to capture both CLP growth and peak aquatic plant diversity.

Task 1: South School Section and Goggins Lake Aquatic Plant Point-Intercept Survey

Based on the depth and clarity of the lakes, abundant aquatic plant growth is likely throughout most of the lakes. To estimate the effort needed to conduct the survey, EOR used the previous point-intercept sampling grids created in 2017 and 2022. Field preparations and sampling all aquatic plants and estimating plant density for each species identified are estimated to take 26 staff hours during a single-day survey. An additional 12 hours will be required to develop maps in GIS and a summary memo describing the distribution, density, and floristic quality of the aquatic plant community.

EOR Fee: 38 hours including report summary, mileage, and equipment fee = $5,951

Assumptions: Work plan assumes two EOR staff will complete the survey. Cost savings of approximately $1,548 could be realized should the District provide one staff person to assist in place of EOR staff.

Task 2: Long Lake Aquatic Plant Point-Intercept Survey

Based on the depth and clarity of the lake, abundant aquatic plant growth is likely throughout most of the lake. To estimate the effort needed to conduct the survey, EOR generated a new point-intercept sampling grid according to DNR methods (~170 sampling points). Field preparations and sampling all aquatic plants and estimating plant density for each species identified are estimated to take 22 staff hours during a single day survey. An additional 10 hours will be required to develop maps in GIS and a summary memo describing the distribution, density, and floristic quality of the aquatic plant community.

EOR Fee: 32 hours including report summary, mileage, and equipment fee = $4,988

Assumptions: Work plan assumes two EOR staff will complete the survey. Cost savings of approximately $1,290 could be realized should the District provide one staff person to assist in place of EOR staff.

Task 3: Benz Lake Aquatic Plant Point-Intercept Survey

Based on the depth and clarity of the lake, abundant aquatic plant growth in July/August is likely throughout most of the lake. To estimate the effort needed to conduct the survey, EOR used the

previous point-intercept sampling grid created in 2022. Field preparations and sampling all aquatic plants, and estimating plant density for each species identified are estimated to take 15 staff hours during a single day survey. An additional 10 hours will be required to develop maps in GIS and a create a summary memo describing the distribution, density, and floristic quality of the aquatic plant community.

EOR Fee: 25 hours including report summary and mileage = $3,960

Assumptions: District will arrange landowner access. The work plan assumes two EOR staff will complete the survey. Cost savings of approximately $902 could be realized should the District provide one staff person to assist in place of EOR staff.

Cost Summary

Task	Cost (EOR only)	Cost (with 1 District staff)
1. South School Lake and Goggins PI Survey	$5,951	$4,403
2. Long Lake PI Survey	$4,988	$3,698
3. Benz Lake PI Survey	$3,960	$3,057
Total	**$14,899**	**$11,158**

Board Action

1. Approve this scope of work for EOR's involvement in the 2025 Aquatic Vegetation Point-Intercept Surveys in the amount of $11,158 with District Staff assistance from account numbers 959-0004.

BROWN'S CREEK
WATERSHED DISTRICT
Preserving the integrity of the watershed for future generations
www.bcwd.org | 455 Hayward Ave N, Oakdale, MN 55128 | 651-330-8220

MEMORANDUM

TO: Brown's Creek Watershed District Board
FROM: Karen Kill and Hannah Peterson
RE: Meeting Location and Dates
DATE: April 4, 2025

Meeting Location

Options	Cost	Pros	Cons
Stillwater Town Hall	$120 deposit and $120/meeting	Within BCWD Boundary, Easy access to meeting, No set end time	Smaller meeting space
Washington County Government Center Room LL14	None	Large Space Projector and large screen available	Outside BCWD Boundary by 1.5 miles No agreement so unsure of 2026 availability, Security locks building at set end time (~9:30)

Regular & Special Meeting Dates

January 8, 2025 - Family Means, 1875 Northwest Ave S, Stillwater
February 12, 2025 – Management Plan Update Workshop 5-6:30pm and Regular Meeting at Family Means, 1875 Northwest Ave S, Stillwater
March 6, 2025 –Art & Water Opening Reception 4-7pm, House Unbuilt 321 South Main St, Suite 204, Stillwater, MN
March 12, 2025 – regular board meeting - Washington County Government Center LL14
April 9, 2025 – regular board meeting - Washington County Government Center LL14

April 26, 2025 – Brown's Creek Park Volunteer Planting Day 8am-complete (likely about 11am)
May 14, 2025 – regular board meeting – location TBD
May 19, 2025 – Watershed Management Plan workshop 6-8-p.m. – location TBD
June 3, 2025 – Watershed Management Plan workshop 6-8p.m. – location TBD
June 25, 2025 – regular board meeting – location TBD **NOTE – Fourth Wednesday of Month**
July 9, 2025 - 2026 Budget Workshop 5-6:30pm and Regular Meeting – location TBD
August 13, 2025 - 2026 Budget Workshop 5-6:30pm and Regular Meeting
September 10, 2025 - regular board meeting – location TBD
September 13, 2025 –2025 Community Event at Brown's Creek Park in Stillwater 10am-1pm
October 8, 2025 - regular board meeting – location TBD
November 12, 2025 - regular board meeting – location TBD
December 10, 2025 - regular board meeting – location TBD

BROWN'S CREEK
WATERSHED DISTRICT
Preserving the integrity of the watershed for future generations
www.bcwd.org | 455 Hayward Ave N, Oakdale, MN 55128 | 651-330-8220

April 3, 2025

Dear Stillwater Township Board of Supervisors,

The Brown's Creek Watershed District requests to make the Stillwater Township Town Hall our monthly board meeting location. It is the ideal location because we are required to have our monthly meetings within the geographic bounds of the Brown's Creek Watershed District.

The board of managers typically meets the 2nd Wednesday of each month at 6:30pm, with occasional workshops prior to our meetings (Currently for July and August). Therefore, we would like to be in the space at 6pm for normal meetings and 4:30pm on workshop days. Our meeting length varies, but we can be out by a certain time if need be.

Our remaining dates for 2025 are:

- **May 14th:** In at 6pm, meeting begins at 6:30pm
- **June 25th (Note this is 4th Wednesday):** In at 6pm, meeting begins at 6:30pm
- **July 9th:** In at 4:30pm, meeting begins at 5pm
- **August 13th:** In at 4:30pm, meeting begins at 5pm
- **September 10th:** In at 6pm, meeting begins at 6:30pm
- **October 8th:** In at 6pm, meeting begins at 6:30pm
- **November 12th:** In at 6pm, meeting begins at 6:30pm
- **December 10th:** In at 6pm, meeting begins at 6:30pm

Thank you for your consideration.
Sincerely,

Karen Kill
Brown's Creek Watershed District Administrator

STILLWATER TOWNSHIP Minnesota

13636 90th Street North, Stillwater, MN 55082
clerk@stillwatertownshipmn.gov – (651)439-4120

Town Hall Passive-Use Application

Submit this Town Hall Passive-Use Application to the Town Clerk at least 10 days prior to the event. Please complete all the items below. Incomplete applications will not be processed.

DATE AND TIME OF RENTAL USE See attached cover letter for list of dates/times

Day of Rental: 2nd Wednesdays Rental Hours: 4:30 or 6pm am/pm to close am/pm

Date of Event: 2nd Wednesdays Event Hours: 5 or 6:30pm am/pm to close am/pm

Note: Please include time needed for setting up and cleaning up.

INDIVIDUAL INFORMATION

Name: Hannah Peterson

Address: 455 Hayward Ave N

City: Oakdale State: MN Zip Code: 55128

Telephone: (H) _____ (W) _____ (C) 763-807-6039

ORGANIZATION/COMPANY INFORMATION

Name of Organization/Company: Brown's Creek Watershed District

Contact Person: Karen Kill or Hannah Peterson

Address: 455 Hayward Ave N

City: Oakdale State: MN Zip Code: 55128

Telephone: (H) _____ (W) 651-330-8220 (C) _____

EVENT INFORMATION

Describe event and activities including any entertainment:
Monthly meeting of the BCWD Board of Managers to discuss business of the watershed district. Will include board members, staff, presenters, and members of the public. Attendance varies by meeting.

Estimate attendance: 10-20

I AGREE TO THE TOWN HALL RULES AND REGULATIONS.

Hannah Peterson
Signature

4/3/2025
Date

TOWN HALL USE ONLY

Application Approved: YES/NO

Signature (Township Personnel)

Date

STILLWATER TOWNSHIP Minnesota

13636 90th Street North, Stillwater, MN 55082
clerk@stillwatertownshipmn.gov – (651)439-4120

Town Hall Passive-Use Rules & Regulations

The Township of Stillwater, Minnesota (the "Township") has adopted the following Town Hall Passive-Use Rules and Regulations concerning the use of the Township's Town Hall to a member of the public or group (the "User") for an "Event." These Rules and Regulations will be incorporated by reference into any contract between the Township and the User.

1. Reserving the Town Hall - To reserve the Town Hall, the User must submit a Town Hall Passive-Use Application (the "Application") to the Township Clerk at least 10 days prior to the Event. Applications will not be accepted more than one year in advance of the Event. Applications will be accepted during the Township's regular business hours.

2. User Fee – The Township WILL charge a nominal security/damage deposit for Passive-Use of the Town Hall.

   A security/damage deposit of **$120.00** (cash/check only; credit cards are not accepted at this time) must accompany the Application. The deposit will be returned if the Application is denied or if the event is cancelled for any reason by the Township or the User. If the Application is approved, the deposit will be returned to the User within fifteen (15) days after of the Event if there is no damage to the Town Hall or its contents. The Township may withhold a portion or all the deposit if the User does not adequately clean the Town Hall following the Event. The amount of the deposit does not limit the liability of the User for any damage or loss caused by the User or the User's guests and invitees.

   If an Applicant/User would like to use the Town Hall on a more regular basis, requests will be considered and discussed at a Town Board meeting where the request will be denied/approved. Yearly renewal/review of applicants for on-going use basis will take place at the beginning of each calendar year.

   A User fee of **$120.00** per use may be incurred at the discretion of the Town Board, especially for Users on a more regular on-going basis.

   The passive-use hours include the time necessary for setting up and cleaning up. If the Town Hall is available, the Township, in its sole discretion, may allow the User to set up the day before the Event.

3. Priority of Use – The Township shall have priority for all governmental activities. The priority for all other uses shall be determined on a first-come, first-serve basis. The

Town Hall is not available for passive use during Township Board meetings, Planning Commission meetings, Park Committee meetings, Communication Committee meetings, Annual meetings, or Budget meetings.

4. Food – Town Board Supervisors request food items NOT be brought in during passive-use of the town hall.

5. Maximum Capacity – The maximum capacity of the Town Hall is forty-three (43) persons in the assembly area of the Town Hall and twenty-nine (29) persons in the entry way of the Town Hall. Under no circumstances shall the number of persons at an Event exceed the maximum capacity. At the discretion of Township Officials, Users not following capacity rules will be asked to vacate the property.

6. Alterations – The User shall not make any alterations to the Town Hall without written consent of the Township. Alterations include any items that shall be hung, glued, taped, or in any other way affixed to the walls, ceiling, floor, windows, or light fixtures of the Town Hall.

7. Building Access – The Town Hall will be available for access at the time reserved. Arrangements can be made with the Town Clerk. The User shall ensure that everyone is out of the building before leaving and is responsible for communicating with Township Staff for the securing of the Town Hall building following the Event.

8. Access by Township – The User shall permit the Township's Officials, Employees or Agents to have access and the enter the Town Hall at any time during the Event.

9. Designated Areas – Only the area designated in the Town Hall Passive-Use Application may be used. Any offices or other restricted areas are off limits.

10. Clean Up – The User is responsible for leaving the Town Hall in as good or better condition than found. All tables and chairs must be returned to their original position. All floors must be tidied up and the User must empty all garbage into the dumpster at the north end of the Town Hall parking lot.

11. Smoking – Smoking in the Town Hall is always prohibited.

12. Law/Ordinances – The User must comply with the laws of the State of Minnesota and Township Ordinances. The Township has the right to terminate use of the Town Hall during any Event if the User violates any State Laws or Township Ordinances.

13. Alcohol/Cannabis Policy – The possession, use or sale of alcoholic beverages/cannabis is prohibited in the Town Hall and on government premises.

14. Restricting Use – The Township Clerk shall have the authority, subject to appeal of the Township Board, to prohibit or limit use of the Town Hall by a particular User based upon knowledge that the User has caused damage to other public facilities or when disruption, damage, theft, or other unfavorable history is recorded from previous use of the Town Hall. The Township Board may prohibit kinds of activities

like exercise classes, art classes, or other kinds of uses that may damage the facility.

15. No Discrimination – The Township does not deny access to the Town Hall on the basis of race, religion, sex, creed, age, sexual orientation, or national origin. Allowing any group to use the Town Hall does not imply endorsement of a group's views by the Township.

16. Accidents/Damage – Any accidents or damage to the Town Hall must be reported to the Township Clerk following the Event. The User shall defend, indemnify and hold harmless the Township and it's officials, employees and agents from any liabilities, judgements, losses, costs or charges (including attorneys' fees) incurred by the Township or any of its officials, employees or agents as a result of any claim, demand, action or suit relating to any bodily injury (including death), loss or property damage caused by, arising our of, related to or associated with the use of the Town Hall by the User or by the User's guests or invitees, except to the extent caused by the sole negligence. Gross negligence or willful misconduct of the Township or its officers, employees, or agents.

17. Personal Property – The Township will not be responsible for any personal property belonging to the User or the User's guests or invitees.

18. Waiver and Assumption of Risk- The User knows, understands, and acknowledges the risks and hazards associated with using the Town Hall and hereby assumes any and all risks and hazards associated therewith. User hereby irrevocably waives any and all claims against the Township or any of its officials, employees or agents for any bodily injury (including death), loss of property damage incurred by the User as a result of using the Town Hall and hereby irrevocably releases and discharges the Township and any of its officials, employees or agents from any and all claims of liability.

19. Insurance Requirements – The Township, in its discretion, may require the User to obtain liability insurance for any use of Township facilities. If liability insurance is required, the following requirements apply:
    a. $1,000,000 minimum.
    b. Insurance shall cover liability for injury, death, and property damage.
    c. The insurance policy must be issued by an insurance company licensed to do business in Minnesota acceptable to the Township.

memo

Project Name |	BCWD Permit Program	**Date** |	04/07/2025
To / Contact info |	BCWD Board of Managers		
Cc / Contact info |	Karen Kill, District Administrator		
From / Contact info |	John Sarafolean, EOR		
Regarding |	March Permit Inspection Update		

Background

BCWD has an on-going permit review process in support of the District Rules. Developments within the District Jurisdictional Boundary are reviewed for compliance with the Rules and conditions of the permit. This memo documents inspections from 03/14/2025 to 04/07/2025.

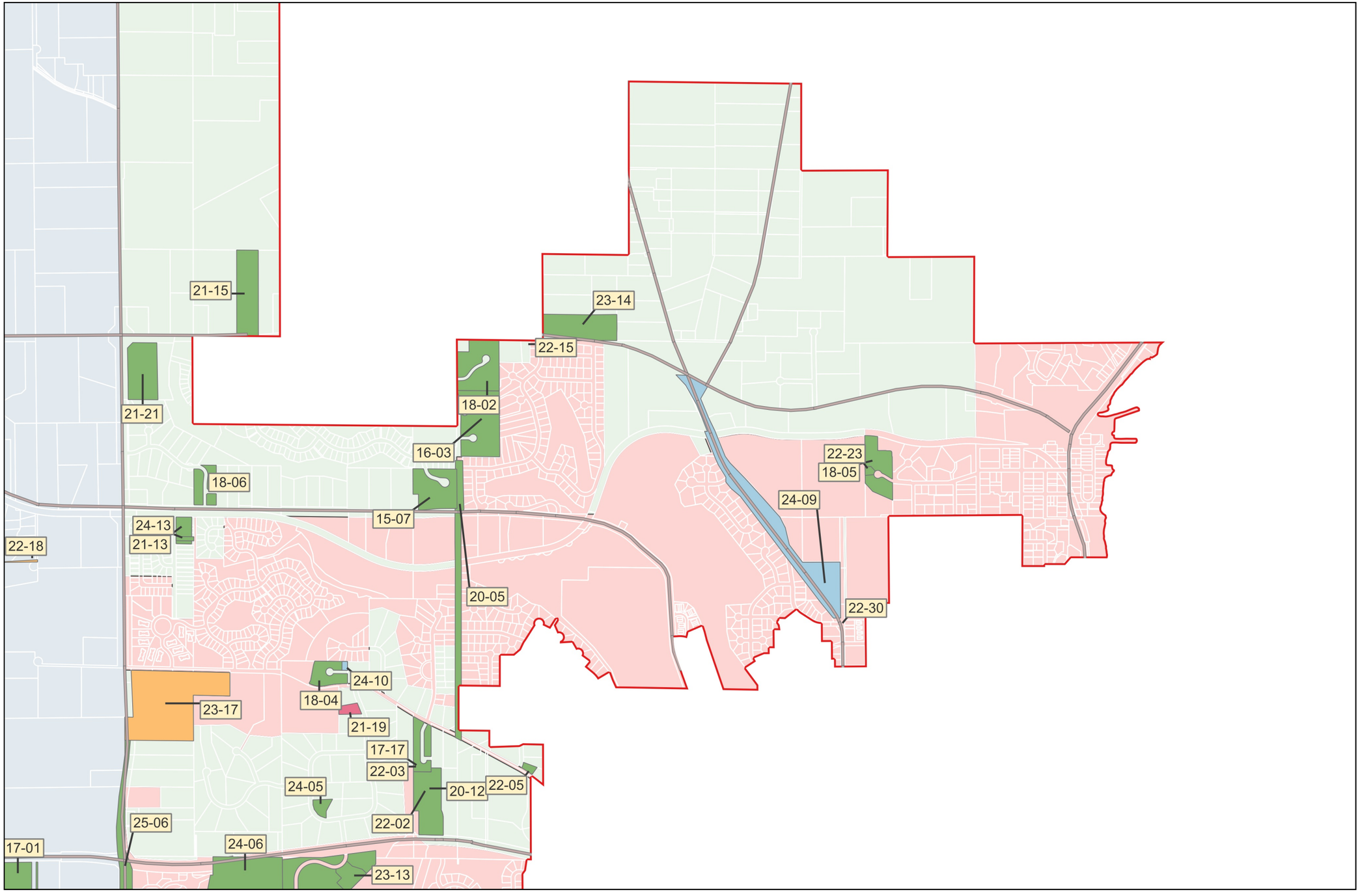
Inspection of Existing Permits

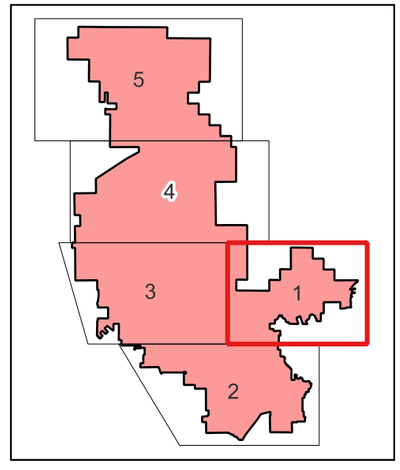
Project Name	Permit ID	Date	Grade
White Oaks Savanna Development	17-01	3/14/2025	B
Wiskow Berm	23-14	3/14/2025	A
WOS Lot 102 Mensah Residence	23-15	3/14/2025	C
Take 5 Oil Change	24-01	3/28/2025	D
Schuster Residence	24-02	3/14/2025	B
		3/28/2025	B
WOS Lot 120 Hilgert Residence	24-03	3/14/2025	B
WOS Lot 127 Karr Residence	24-11	3/14/2025	C
WOS Lot 130 Carlson Residence	24-12	3/14/2025	B
Wick Residence	24-14	3/14/2025	C
		3/28/2025	C
Goodsell Residence	24-16	3/14/2025	B
		3/28/2025	B
WOS Lot 129 Weatherby	24-17	3/14/2025	B
CSAH 15 Frontage Road	24-18	3/28/2025	B

Explanation of Grades:

Permit 24-01 (Take 5 Oil Change, Oak Park Heights) The inspection grade for this site is due to not maintaining or installing erosion and sediment control practices. There have been two inspections performed with no corrective action taking place onsite or correspondence from the project representatives. I have followed up with the City of Oak Park Heights city engineer who is going to attempt to get in contact with the project representatives in order to get the site into compliance.

Permit No.	Applicant/Permit Name	Status
15-07	Brown's Creek Cove	Active
16-03	The Ponds at Heifort Hills	Active
17-01	White Oaks Savanna	Active
17-04	The Lakes of Stillwater	Active
17-17	Westridge	Active
18-02	Heifort Hills Estates	Active
18-04	Boutwell Farm	Active
18-05	Heritage Ridge	Active
18-06	Nottingham Village	Active
20-05	Neal Avenue Reconstruction	Active
20-12	White Pine Ridge	Active
21-13	Marylane Gateway	Active
21-15	Schwartz Residence	Active
21-21	Millbrook West Park	Active
22-02	White Pine Ridge, remaining lots	Active
22-03	Westridge, remaining lots	Active
22-05	13290 Boutwell Rd N	Active
22-18	Stillwater Oaks	Pending
22-23	Ferguson Residence (Heritage Ridge Lot 4)	Active
23-13	Sandhill Shores (Phase III of Lakes at Stillwater)	Active
23-14	Wiskow Berm	Active
23-17	Sundance Stillwater	Pending
24-05	Swager Residence	Active
24-06	Rutherford Elementary	Active
24-09	CSAH 5 Phase 3	Review
24-10	Boutwell Farms Lot 1	Review
24-13	8413 Marylane	Active
25-06	CSAH 15 Pavement Preservation	Active





Active Permit
Conditional Approval
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BCWD Political Boundary

BCWD Permit Sites
April 7th, 2025

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Author: Allison
Layout: Mark
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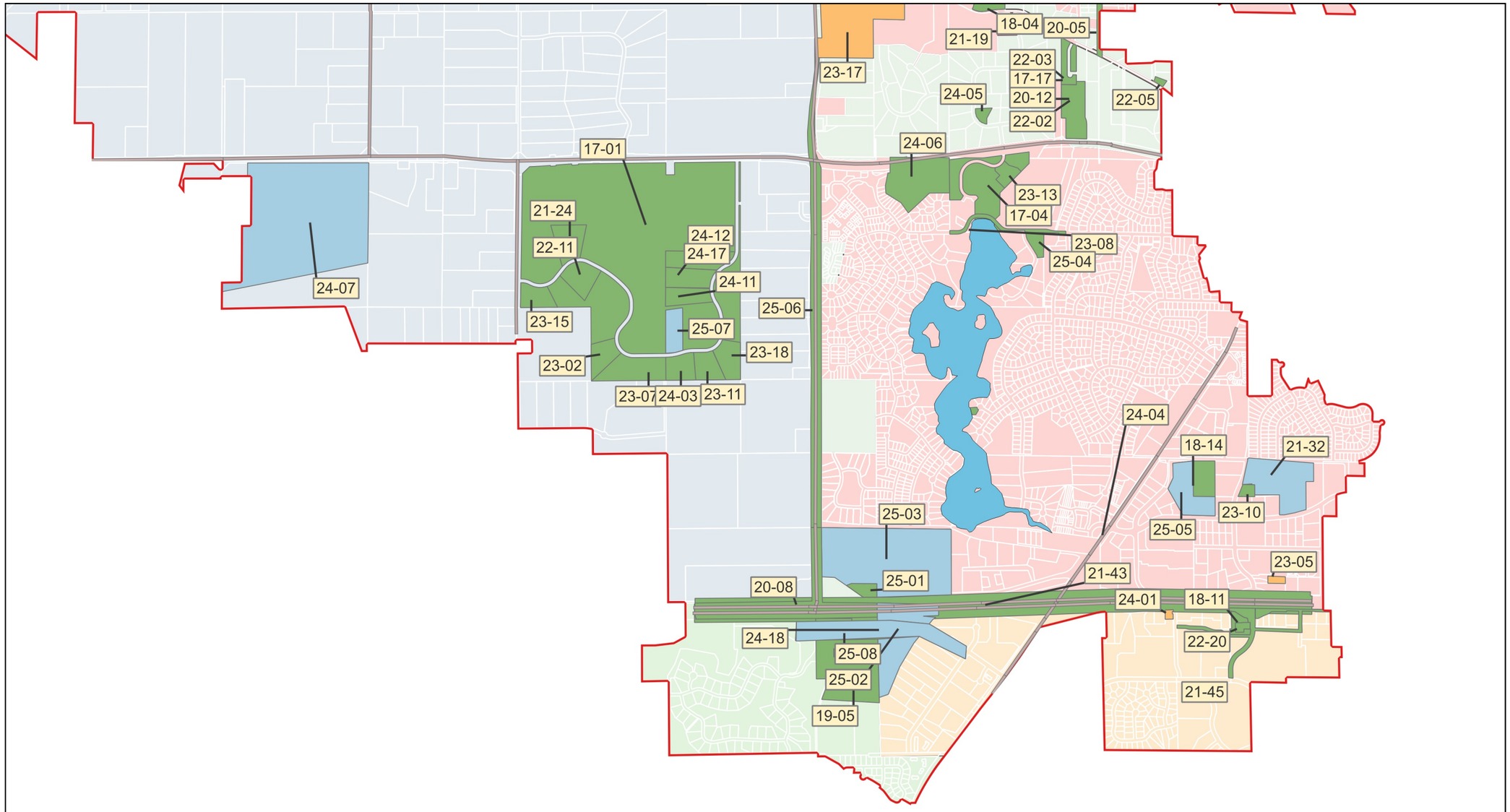
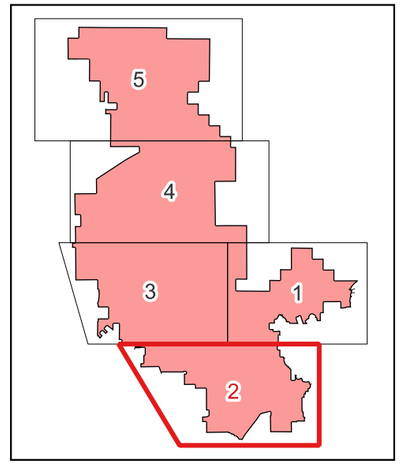


Permit No.	Applicant/Permit Name	Status
17-01	White Oaks Savanna	Active
17-04	The Lakes of Stillwater	Active
17-17	Westridge	Active
18-04	Boutwell Farm	Active
18-11	Ridgecrest	Active
18-14	St. Croix Valley Recreation Center Expansion	Active
19-05	Central Commons	Active
20-05	Neal Avenue Reconstruction	Active
20-08	TH36 CSAH 15 Interchange	Active
20-12	White Pine Ridge	Active
21-24	Nepal Residence - WOS B1L3	Active
21-32	Lakeview EMS	Review
21-43	MnDOT TH-36	Active
21-45	Norell Avenue Improvements	Active
22-02	White Pine Ridge, remaining lots	Active
22-03	Westridge, remaining lots	Active
22-05	13290 Boutwell Rd N	Active
22-11	Wiechmann Residence	Active
22-19	Miller Flood Protection	Active
22-20	Popeyes OPH	Active
23-02	Tweden Residence	Active
23-05	Rocket Carwash	Pending
23-08	72nd St Improvement	Active
23-10	Curio Dance Studio	Active
23-11	Freiroy Residence	Active
23-13	Sandhill Shores (Phase III of Lakes at Stillwater)	Active
23-15	Mensah Residence	Active
23-17	Sundance Stillwater	Pending
23-18	WOS Lot 124 Heck Residence	Active
24-01	Take 5 Oil Change	Pending
24-03	WOS Lot 120 Hilgert Residence	Active
24-05	Swager Residence	Active
24-06	Rutherford Elementary	Active
24-07	Elliot Crossing/ Indian Hills	Review
24-11	WOS Lot 127 Karr Residence	Active
24-12	Carlson Residence	Active
24-17	WOS Lot 129 Weatherby	Active
24-18	CSAH 15 Frontage Road	Active
25-01	Curve Crest Utility	Active
25-02	Anderson Holdings	Review
25-03	Lakeview Hospital	Review
25-04	Kranz Residence Addition	Active
25-05	St. Croix Recreation Center	Review
25-06	CSAH 15 Pavement Preservation	Active
25-07	Castillo Residence	Review
25-08	CSAH 15B Construction	Review



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BCWD Permit Sites
April 7th, 2025

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Author: Allison
Mark
Layout: Permit
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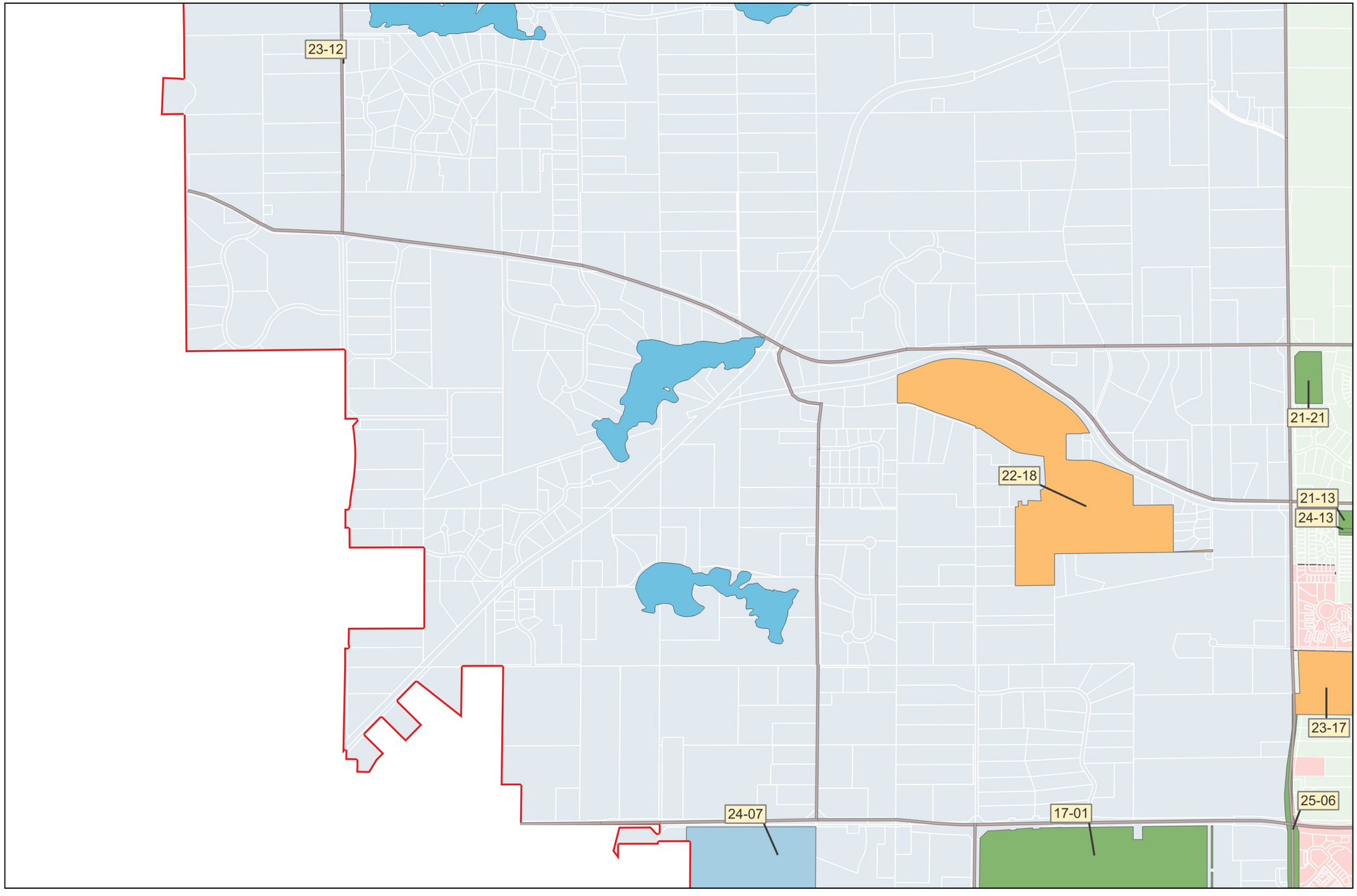
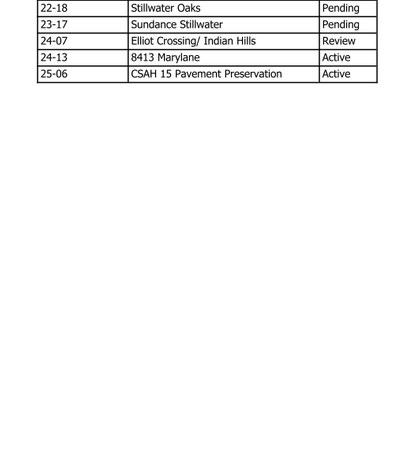
Permit No.	Applicant/Permit Name	Status
17-01	White Oaks Savanna	Active
21-13	Marylane Gateway	Active
21-21	Millbrook West Park	Active
22-18	Stillwater Oaks	Pending
23-17	Sundance Stillwater	Pending
24-07	Elliot Crossing/ Indian Hills	Review
24-13	8413 Marylane	Active
25-06	CSAH 15 Pavement Preservation	Active





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April 7th, 2025

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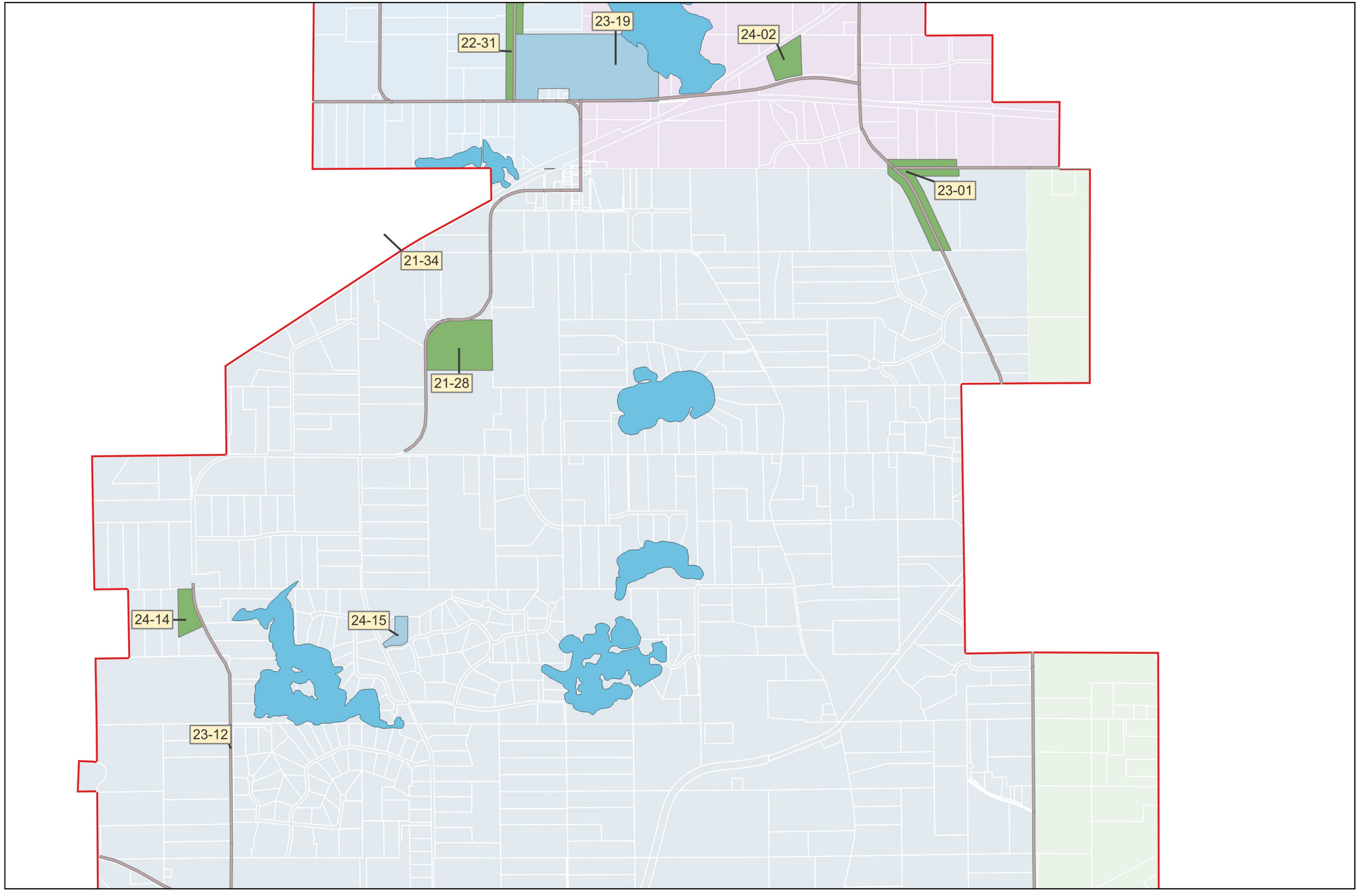
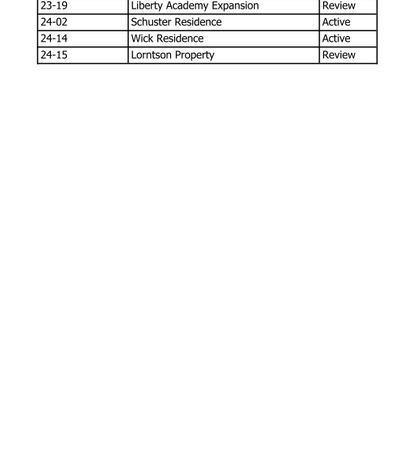
Author: Allison
Layout: Permit_Map
Update Map
Mark

Permit No.	Applicant/Permit Name	Status
21-28	Guerrino Residence	Active
21-34	Fahey Residence	Active
22-31	County Road 57 Culverts	Active
23-01	County Road 61 Improvements	Active
23-19	Liberty Academy Expansion	Review
24-02	Schuster Residence	Active
24-14	Wick Residence	Active
24-15	Lorntson Property	Review





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April 7th, 2025

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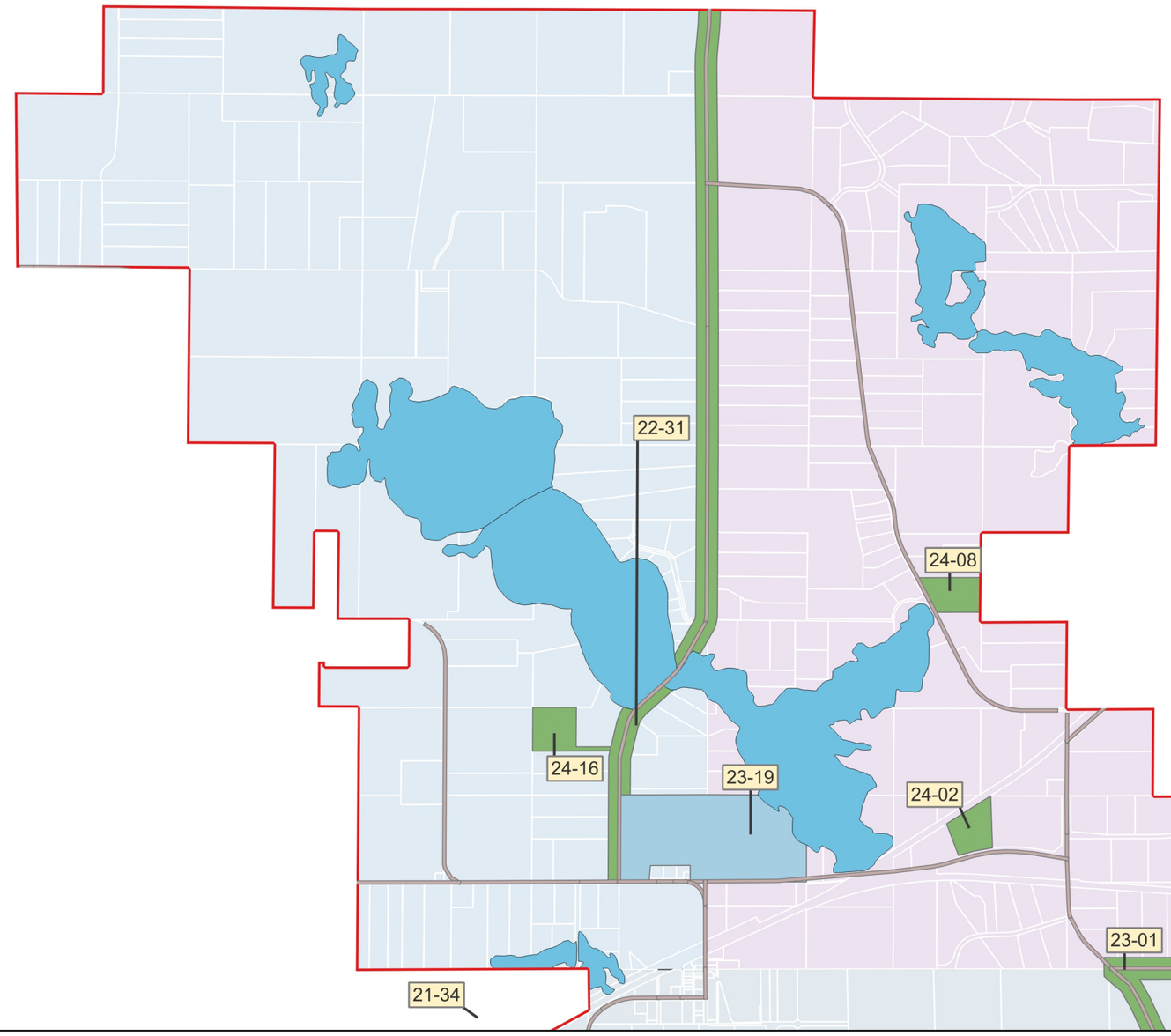
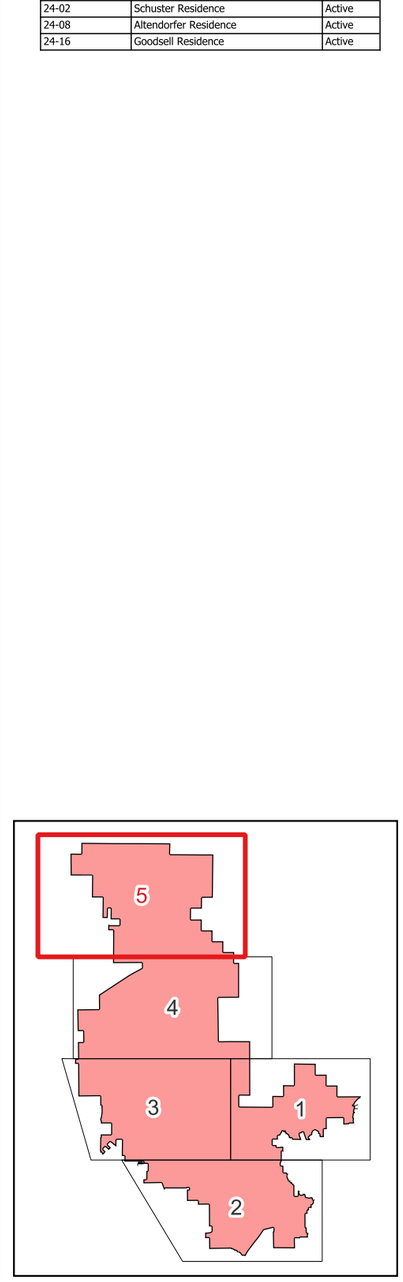
Author: Allison
Layout: Mark
Permit Update Map

Permit No.	Applicant/Permit Name	Status
21-34	Fahey Residence	Active
22-31	County Road 57 Culverts	Active
23-01	County Road 61 Improvements	Active
23-19	Liberty Academy Expansion	Review
24-02	Schuster Residence	Active
24-08	Altendorfer Residence	Active
24-16	Goodsell Residence	Active





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Author: Allison
Layout: Mark
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BROWN'S CREEK
WATERSHED DISTRICT
Preserving the integrity of the watershed for future generations
www.bcwd.org | 455 Hayward Ave N, Oakdale, MN 55128 | 651-330-8220

MEMORANDUM

TO: Brown's Creek Watershed District Board
FROM: Hannah Peterson and Karen Kill
RE: BCWD Outreach Materials Printing
DATE: April 8, 2025

Background:

The BCWD is running low on some outreach materials, and has received a couple requests. We also have upcoming events where we could use more materials on hand.

Issue:

Watershed Activity Books

A parent and PTA Garden & Grounds Committee member at Rutherford Elementary School has requested 615 copies of the activity book to share with all the students for Earth Day. In addition, a community member has requested 30 copies to share with their church. We would also like to print some extra copies to replenish our supply for events.

Company	Quantity	Total
Stillwater Printing	700	$2,130
Minuteman Press	700	$1,363.12
	800	$1,531.31

CAC Recruitment Brochure

We have a few upcoming events that will be good opportunities to recruit more members for our Citizen's Advisory Committee. An updated brochure has been created, and we would like to print 100 copies.

Company	Quantity	Total
Stillwater Printing	100	$115.92
Minuteman Press	100	$109.19

Schedule:

The goal would be to have these printed ASAP to have for Earth Week beginning April 21st

Recommended Action:

Approve printing up to 800 activity books not to exceed $1,531.31 total and 100 CAC recruitment brochures not to exceed $109.19 total with Minuteman Press from account 910-0000.