

VLAWMO TECHNICAL COMMISSION MEETING

8:00 AM January 10, 2024

Vadnais Heights City Hall, Council Chambers, 800 County Road E East, Vadnais Heights, MN 55127

Action items: ✎

- I. Call to Order – 8:00am – Chair Tessier
- II. Approval of Agenda ✎
- III. Approval of Minutes (December 13, 2023) ✎
- IV. Administration & Operations
 - A. January Financial Report and Consider Authorization for Payment – Phil ✎ 7
 - B. 2024 Technical Commission Officer Appointments – Phil ✎ 14
 - C. Confirmation of 2024 TEC Meeting Dates – Phil ✎ 14
 - D. 2024 Working Budget Overview – Phil 14
- V. Programs
 - A. MS4 Resources for January 2024 – Nick 15
- VI. Projects – Dawn
 - A. Summary of Rotary Park Wetland Restoration Report for Work Beginning in 2025 16, 17
 - B. Summary of 2023 Carp Solutions Report 16, 29
- VII. Commissioner Reports
- VIII. NOHOA
- IX. Ramsey Soil & Water Conservation Division
- X. St. Paul Regional Water Services
- XI. Public Comment
- XII. Next meetings: TEC: Feb 14, 2024, Board meeting: February 28, 2024
- XIII. Adjourn ✎

**Vadnais Lake Area Water Management Organization
Technical Commission (TEC) Minutes
December 13, 2023
Vadnais Heights City Hall, Council Chambers
800 County Road E East, Vadnais Heights, MN 55127**

Commission Members Present:

Gloria Tessier	Gem Lake (GL)
Nick Ousky	Vadnais Heights (VH)
Jami Philip	White Bear Township (WBT)
Terry Huntrods	White Bear Lake (WBL)
Susan Miller	City of North Oaks (NO)
Andy Nelson	City of Lino Lakes (LL)

Absent: None

Others in attendance: Phil Belfiori, Brian Corcoran, Lauren Sampedro, Dawn Tanner (VLAWMO staff), Ed Shapland (CAC), Jeremy Erickson (SPRWS), Erin Spry (City of Vadnais Heights)

I. Call to Order

Chair Tessier called the meeting to order at 8:00 am.

II. Approval of Agenda

It was moved by Commissioner Huntrods and seconded by Commissioner Miller to approve the December 13, 2023 TEC agenda. Vote: all aye. Motion passed.

III. Approval of Minutes (November 8, 2023)

It was moved by Commissioner Philip and seconded by Chair Tessier to approve the November 8th meeting minutes as presented. Vote: all aye. Motion passed.

IV. Administration & Operations

A. Financial Report for December and Authorization for Payment

Administrator Belfiori outlined the December financial report as included in the packet.

He highlighted expenses for the spent lime project, Tamarack Nature Center potential wetland restorations, the next phase of the Pleasant Lake carp removal effort, the East Vadnais resiliency study, and payment for the North Oaks entrance raingarden through

the Landscape Level 2 grant program. Staff recommends approval of the December payments.

It was moved by Commissioner Huntrods and seconded by Commissioner Miller to approve the December Financial Report for payment. Vote: All aye. Motion passed.

B. December TEC Report to the Board

Administrator Belfiori summarized the December TEC Report to the Board.

Highlights included sentence to serve ditch maintenance on Lambert Creek, the Wilkinson deep-water wetland, a 2024 raingarden project at Elmwood Park in Vadnais Heights, the beginning of the 2023 audit, the certification of SSU charges, and a scope of work for updating VLAWMO's next 10-year watershed plan, which begins its planning phase in early 2024.

It was moved by Commissioner Ousky and seconded by Commissioner Philip to approve the December TEC Report to the Board of Directors. Vote: All aye. Motion passed.

V. Programs

A. Awards and Outreach

1. Presentation of Watershed Awards

Voss summarized the 2023 Watershed Award winners Carol Nelson and Kristie Elfering. He then highlighted some of their accomplishments on partnership projects. He asked if TEC had any feedback on the award process and reminded the TEC members that they should be thinking about nominees for next year.

2. Update on Education and Outreach 2023 results

Voss presented a summary document on the 2023 education and outreach program results and the 2024 goals and desired outcomes. Commissioner Miller asked what was the best accomplishment for the year. Voss responded that VLAWMO exceeded expectations for the number of residents who first attended a workshop and then followed up with the grant programs. The goal was five people and in 2023 there were eight people. Similarly, the number of residents who participated in the grant programs and then attended workshops increased.

B. Cost Share policy updates

Sampedro provided a cost-share policy update following November's changes to Soil Health, Landscape Level 1, and Landscape Level 2 grant programs. Minor additional changes were made to the Soil Health and Landscape Level 1 programs and the TEC's

recommendation of a new tree guide was included in the December packet. Sampedro proposed approval of the updated documents and tree guide for implementation in 2024.

It was moved by Commissioner Philip and seconded by Commissioner Ousky to approve the recommendation of the 2024 cost share program policy updates and implementation of the tree guidance document as included in the TEC meeting packet to the Board of Directors. Vote: All aye. Motion passed.

VI. Projects

A. Consider contracts/quotes for 2024

Tanner presented the 2024 contracts to support 2024 lake surveys, site maintenance, restorations, biochar filter maintenance, and carp removal.

Tanner provided an example of a lake survey that is part of the quote for 2024 from the Ramsey County Soil and Water Conservation Division, which was an early-year delineation of Curly-leaf Pondweed in impaired Gilfillan Lake. Another example was the continued work with Vadnais Heights City Hall buckthorn removal utilizing the Munch Bunch goat grazing.

Staff requests approval of the attached contracts.

It was moved by Commissioner Huntrods and seconded by Commissioner Philip to recommend Board approval of the batch of contracts provided in the packet with dollar amounts summarized in the table above with: RCSWCD, NST, Sandstrom Land Management, the Munch Bunch, and Carp Solutions. Vote: All aye. Motion passed.

B. Consider recommendation for Tamarack and Wilkinson alum feasibility study and scope of work with Barr Engineering for the bid process, oversight, and inspection

Tanner provided a background and summary for the alum feasibility study. The feasibility study for Tamarack and Wilkinson Lakes alum treatment was authorized in 2023. This included sediment core samples, analysis of monitoring data, subwatershed impacts, and other investigations. The final feasibility report was provided to VLAWMO in November. Wilkinson and Tamarack Lakes are both of poor quality in the watershed and an alum treatment is a tool to help shift the water quality into a clean water state. The combination of both lakes helps provide an economical benefit and supports the mobilization costs of the alum treatment. Tanner provided that the effort is budgeted for 2024 from the VLAWMO budget, and that a landowner and community outreach effort will complement the effort. The anticipated application is for fall, 2024.

Commissioner Miller asked if there have been alum treatments on any other lakes in the watershed. Tanner provided that there hasn't been any lakes that have been treated by alum in our watershed, but summarized other state, national, and local alum treatments that have occurred, including many in the Twin Cities metro.

It was moved by Commissioner Miller and seconded by Commissioner Nelson to recommend to the Board for approval and authorization to finalize the Tamarack and Wilkinson alum feasibility study by Barr Engineering and authorize the engineering scope of services from Barr Engineering for the bid process through oversight and inspection with a 15% contingency. Vote: All aye. Motion passed.

C. Wilkinson deep-water wetland update

Tanner displayed photos of the recent invasive buckthorn and honeysuckle removal and the partnership with North Oaks Company. Native vegetation establishment at the construction is being followed for spring 2024.

D. Spent lime demonstration project update

Tanner stated a total of seven loads of spent lime were applied to Oak Knoll Pond during late summer/fall 2023. Tanner provided that additional updates and results of monitoring will be provided when the project continues in 2024.

E. Comprehensive watershed management plan development update

Tanner said VLAWMO staff met with BWSR on November 16 and received support and feedback on the Comprehensive Watershed Management Plan update process. Feedback will be incorporated into the process plan.

The TEC and Subcommittee's recommendations will be presented to the Board, as described at the November TEC meeting, at the December 13 Board meeting.

F. Pleasant Lake aquatic vegetation materials

Tanner summarized recent news articles including an article that was submitted in December. Staff are also working on educational signage that will be presented to NOHOA for approvals, discussion, and placement.

VII. Commissioner Reports

None.

VIII. NOHOA

None.

IX. Ramsey Soil & Water Conservation Division

None.

X. St. Paul Regional Water Services

None.

XI. Public Comment

None.

XII. Next Meetings:

Next TEC meeting December 13th, Next BOD meeting December 13th.

XIII. Adjourn

It was moved by Commissioner Huntrods and seconded by Commissioner Philip to adjourn the meeting at 8:34 am. Vote: all aye. Motion passed.

Minutes compiled by Nick Voss.

DRAFT

VLAWMO Finance Summary: January 2024

Jan-24		Actual 1/1/24	Actual to Date	2023 Budget	Carry over from 2022 to 2023	Remaining in Budget	2023 Available	Act vs. Budget
BUDGET #	INCOME							
5.11	Storm Water Utility	\$502,366	\$1,095,007	\$1,090,887	\$0	(\$4,120)	\$1,090,887	100%
5.12	Service Fees	\$0	\$0	\$200	\$0	\$200	\$200	0%
5.13	Interest + mitigation acct	\$5,421	\$51,239	\$1,000	\$0	(\$50,239)	\$1,000	5124%
5.14	Misc. income - WCA admin & other	\$34,930	\$85,311	\$3,000	\$0	(\$82,311)	\$3,000	2844%
5.15	Other Income Grants/ <u>loan</u>	\$104,276	\$202,313	\$385,284	\$0	\$182,971	\$385,284	53%
5.16	Transfer from reserves	\$0	\$0	\$294,364	\$231,999	\$526,363	\$526,363	0%
	TOTAL	\$646,993	\$1,433,870	\$1,774,735	\$231,999	\$572,864	\$2,006,734	81%
EXPENSES								
3.1	Operations & Administration							
3.110	Office - rent, copies, post tel supplies	\$2,228	\$25,677	\$28,181	\$0	\$2,504	\$28,181	91%
3.120	Information Systems	\$1,439	\$16,426	\$33,300	\$0	\$16,874	\$33,300	49%
3.130	Insurance	\$0	\$10,058	\$7,571	\$0	(\$2,487)	\$7,571	133%
3.141	Consulting - Audit	\$0	\$10,788	\$9,000	\$0	(\$1,788)	\$9,000	120%
3.142	Consulting - Bookkeeping	\$0	\$689	\$1,500	\$0	\$811	\$1,500	46%
3.143	Consulting - Legal	\$311	\$1,075	\$6,000	\$0	\$4,925	\$6,000	18%
3.144	Consulting - Eng. & Tech.	\$2,018	\$5,185	\$30,000	\$15,000	\$39,815	\$45,000	12%
3.150	Storm Sewer Utility	\$0	\$11,544	\$15,000	\$0	\$3,456	\$15,000	77%
3.160	Training (staff/board)	\$0	\$18,260	\$13,250	\$0	(\$5,010)	\$13,250	138%
3.170	Misc. & mileage	\$162	\$3,751	\$6,300	\$0	\$2,549	\$6,300	60%
3.191	Administration - staff	\$31,403	\$406,352	\$422,353	\$0	\$16,001	\$422,353	96%
3.192	Employer Liability	\$9,163	\$118,029	\$122,428	\$0	\$4,399	\$122,428	96%
3.2	Monitoring and Studies							
3.210	Lake and Creek lab analysis	\$0	\$12,989	\$18,000	\$0	\$5,011	\$18,000	72%
3.220	Equipment	\$0	\$965	\$3,000	\$1,000	\$3,035	\$4,000	24%
3.230	Wetland assessment & management	\$0	\$0	\$0	\$10,000	\$10,000	\$10,000	0%
3.240	Watershed planning /special study	\$2,003	\$3,650	\$10,000	\$5,000	\$11,350	\$15,000	24%
3.3	Education and Outreach							
3.310	Public Education	\$2,000	\$4,359	\$6,000	\$0	\$1,641	\$6,000	73%
3.320	Marketing	\$70	\$15,284	\$15,000	\$9,500	\$9,216	\$24,500	62%
3.330	Community Blue Ed Grant	\$0	\$7,526	\$8,000	\$0	\$474	\$8,000	94%
Total Core functions: Ops, Monitoring, Education		\$50,797	\$672,607	\$754,883	\$40,500	\$122,776	\$795,383	85%

Capital Improvement Projects and Programs								
3.4	Subwatershed Activity							
3.410	Gem Lake	\$0	\$0	\$15,000	\$10,000	\$25,000	\$25,000	
3.420	Lambert Creek	\$0	\$27,287	\$55,000	\$0	\$27,713	\$55,000	50%
3.421	Lambert Lake Loan	\$0	\$38,568	\$38,568	\$0	\$0	\$38,568	100%
3.425	Goose Lake	\$1,261	\$34,387	\$92,500	\$0	\$58,113	\$92,500	37%
3.430	Birch Lake	\$0	\$16,510	\$20,000	\$0	\$3,490	\$20,000	83%
3.440	Gilf Black Tam Wilk Amelia	\$2,566	\$333,546	\$157,500	\$43,000	(\$133,046)	\$200,500	166%
3.450	Pleasant Charley Deep	\$0	\$42,040	\$48,000	\$30,000	\$35,960	\$78,000	54%
3.460	Sucker Vadnais	\$15,521	\$29,414	\$35,000	\$28,000	\$33,586	\$63,000	47%
3.48	Programs							
3.480	Soil Health Grant	\$0	\$3,157	\$8,000	\$0	\$4,843	\$8,000	39%
3.481	Landscape 1	\$0	\$15,000	\$30,000	\$6,263	\$21,263	\$36,263	41%
3.482	Landscape 2/BWSR WBF	\$0	\$32,129	\$35,000	\$36,636	\$39,507	\$71,636	45%
3.483	Project Research & feasibility	\$0	\$0	\$5,000	\$0	\$5,000	\$5,000	0%
3.485	Facilities Maintenanc/ Pub. Ditch Main.	\$0	\$29,464	\$90,000	\$37,600	\$98,136	\$127,600	23%
3.5	Regulatory							
3.510	Engineer Plan review	\$0	\$0	\$5,000	\$0	\$5,000	\$5,000	0%
	<i>Total CIP & Program</i>	\$19,348	\$601,502	\$634,568	\$191,499	\$224,565	\$826,067	73%
	Total of Core Operations & CIP	\$70,145	\$1,274,109	\$1,389,451	\$231,999	\$347,341	\$1,621,450	79%

Fund Balance	12/1/2023	1/1/2024
4M Account	\$683,013	\$921,058
4M Plus Savings	\$239,094	\$240,180
Total	\$922,107	\$1,161,238

Restricted funds	1/1/2024
Mitigation Savings	\$21,020
Term Series	\$300,000

Vadnais Lake Area Water Management Organization
Check Detail

10:46 AM

01/03/2024

December 14, 2023 through January 10, 2024

Type	Num	Date	Name	Item	Account	Paid Amount	Original Amount
Check	5697	01/10/2024	Nicholas Voss		Checking - 1987		-37.34
				3.170 · Misc. & mileage		-37.34	37.34
TOTAL						-37.34	37.34
Check	5698	01/10/2024	Dawn Tanner		Checking - 1987		-48.75
				3.170 · Misc. & mileage		-48.75	48.75
TOTAL						-48.75	48.75
Check	5699	01/10/2024	Brian Corcoran		Checking - 1987		-45.85
				3.170 · Misc. & mileage		-45.85	45.85
TOTAL						-45.85	45.85
Check	5700	01/10/2024	Phil Belfiori		Checking - 1987		-30.13
				3.170 · Misc. & mileage		-30.13	30.13
TOTAL						-30.13	30.13
Check	5701	01/10/2024	SEH		Checking - 1987		-2,018.02
				3.144 · Eng. & Tech.		-2,018.02	2,018.02
TOTAL						-2,018.02	2,018.02
Check	5702	01/10/2024	Metro WaterShed Partners		Checking - 1987		-2,000.00
				3.310 · Public Education		-2,000.00	2,000.00
TOTAL						-2,000.00	2,000.00
Check	5703	01/10/2024	Hisdahl's Trophies		Checking - 1987		-70.00
				3.320 · Marketing		-70.00	70.00
TOTAL						-70.00	70.00
Check	5704	01/10/2024	SRF Consulting Group		Checking - 1987		-15,521.07
				3.460 · Sucker Vadnais		-15,521.07	15,521.07
TOTAL						-15,521.07	15,521.07
Check	5705	01/10/2024	Houston Engineering, Inc		Checking - 1987		-2,002.50
				3.240 · Watershed Plan Amendment		-2,002.50	2,002.50
TOTAL						-2,002.50	2,002.50

	Check 5706 01/10/2024 Metro - Inet	Checking - 1987	-1,439.00
		IT Support	-1,439.00 1,439.00
TOTAL			<u>-1,439.00 1,439.00</u>
	Check 5707 01/10/2024 Barr Engineering Co	Checking - 1987	-3,827.16
		3.440 · Gilfillan Black Tamarack Wilkin	-1,705.00 1,705.00
		3.440 · Gilfillan Black Tamarack Wilkin	-861.00 861.00
		Oak Knoll	-1,261.16 1,261.16
TOTAL			<u>-3,827.16 3,827.16</u>
	Check 5708 01/10/2024 Kennedy & Graven, Chartered	Checking - 1987	-310.50
		3.143 · Legal	-310.50 310.50
TOTAL			<u>-310.50 310.50</u>
	Check 5709 01/10/2024 City of Vadnais Heights	Checking - 1987	-2,228.15
		Rent	-1,765.00 1,765.00
		Phone/Internet/Machine Overhead	-315.00 315.00
		Postage	-19.65 19.65
		Copies	-128.50 128.50
TOTAL			<u>-2,228.15 2,228.15</u>
	Check 5710 01/10/2024 City of White Bear Lake	Checking - 1987	-40,566.45
		payroll	-31,403.24 31,403.24
		Administration FICA	-2,282.95 2,282.95
		Administration PERA	-2,355.24 2,355.24
		Insurance Benefit	-4,480.10 4,480.10
		Admin payroll processing	-44.92 44.92
TOTAL			<u>-40,566.45 40,566.45</u>

Vadnais Lake Area Water Management Orga
Profit & Loss
 December 14, 2023 through January 10, 2024

10:50 AM
 01/03/2024
 Cash Basis

Dec 14, '23 - Jan 10, 24

Ordinary Income/Expense	
Income	
Misc.	34,930.00
5.1 · Income	
5.11 · Storm Water Utility	502,366.03
5.13 · Interest	5,420.62
Total 5.1 · Income	<u>507,786.65</u>
6.6.6 · Grants	104,276.42
Total Income	<u>646,993.07</u>
Gross Profit	646,993.07
Expense	
3.1 · Administrative/Operations	
3.110 · Office	
Copies	128.50
Phone/Internet/Machine Overhead	315.00
Postage	19.65
Rent	1,765.00
Total 3.110 · Office	<u>2,228.15</u>
3.120 · Information Systems	
IT Support	1,439.00
Total 3.120 · Information Systems	<u>1,439.00</u>
3.143 · Legal	310.50
3.144 · Eng. & Tech.	2,018.02
3.170 · Misc. & mileage	162.07
3.191 · Employee Payroll	
payroll	31,403.24
Total 3.191 · Employee Payroll	<u>31,403.24</u>
3.192 · Employer Liabilities	
Admin payroll processing	44.92
Administration FICA	2,282.95
Administration PERA	2,355.24
Insurance Benefit	4,480.10
Total 3.192 · Employer Liabilities	<u>9,163.21</u>
Total 3.1 · Administrative/Operations	<u>46,724.19</u>
3.2 · Monitoring and Studies	
3.240 · Watershed Plan Amendment	2,002.50
Total 3.2 · Monitoring and Studies	<u>2,002.50</u>
3.3 · Education and Outreach	
3.310 · Public Education	2,000.00
3.320 · Marketing	70.00
Total 3.3 · Education and Outreach	<u>2,070.00</u>
3.4 · Capital Imp. Projects/Programs	

3.425 · Goose Lake	
Oak Knoll	1,261.16
Total 3.425 · Goose Lake	1,261.16
3.440 · Gilfillan Black Tamarack Wilkin	2,566.00
3.460 · Sucker Vadnais	15,521.07
Total 3.4 · Capital Imp. Projects/Programs	19,348.23
Total Expense	70,144.92
Net Ordinary Income	576,848.15
Net Income	576,848.15

Vadnais Lake Area Water Management Organization
Custom Transaction Detail Report
 November 1, 2023 through January 1, 2024

10:43 AM

01/03/2024

Accrual Basis

Type	Date	Num	Name	Memo	Account	Clr	Split	Amount	Balance
Nov 1, '23 - Jan 1, 24									
Credit Card Charge	11/01/2023		Google*SVCAPPS_VLAWM		US Bank CC	√ WEB		42.00	42.00
Credit Card Charge	11/08/2023		adobe *photography plan		US Bank CC	√ Software		9.99	51.99
Credit Card Charge	11/15/2023		Eventbrite	phil 2023 MAWD	US Bank CC	√ 3.160 · Training (staff/board)		350.48	402.47
Transfer	11/20/2023			Funds Transfer	US Bank CC	√ Checking - 1987		-676.04	-273.57
Credit Card Charge	11/27/2023		Adobe "Creative Cloud		US Bank CC	√ Software		32.50	-241.07
Credit Card Charge	11/30/2023		Arrowwood Resort & Conference Center	phil MAWD	US Bank CC	√ 3.160 · Training (staff/board)		387.30	146.23
Credit Card Charge	11/30/2023		Arrowwood Resort & Conference Center	dawn MAWD	US Bank CC	√ 3.160 · Training (staff/board)		258.20	404.43
Credit Card Charge	12/04/2023		Google*SVCAPPS_VLAWM		US Bank CC	√ WEB		42.00	446.43
Credit Card Charge	12/06/2023		field environmental instruments Inc	pH meter renewal	US Bank CC	Oak Knoll		250.00	696.43
Credit Card Charge	12/06/2023		mn Department of Agriculture	renewal pest 2024 license	US Bank CC	3.170 · Misc. & mileage		10.22	706.65
Credit Card Charge	12/07/2023		field environmental instruments Inc	pH meter renewal	US Bank CC	Oak Knoll		250.00	956.65
								956.65	956.65
Nov 1, '23 - Jan 1, 24									

TEC Staff Memo – January 10, 2024

IV. Administration & Operations

A. January Financial Report and Consider Authorization for Payment

Please find the January financial report and authorization to pay bills in the ePacket for consideration and approval.

B. 2024 Technical Commission Officer Appointments

With January comes the need to elect or confirm a slate of officers for the Technical Commission. Per usual, the Board will officially appoint the TEC Chair but they look to the TEC to recommend who they want as Chair for the year. Currently, officers from 2023 are:

- Gloria Tessier, Chair
- Susan Miller, Vice Chair
- Andy Nelson, Financial Officer
- Terry Huntrods, Liaison to the Board

Recommended action item: Please confirm officer slate for 2024.

C. Confirmation of 2024 TEC Meeting Dates

Requesting confirmation from the TEC of the 2024 meeting schedule and location so this information can be shared with the Board of Directors and be included in the VLAWMO calendar.

D. 2024 Working Budget Overview

At their December 13, 2023 meeting the VLAWMO Board approved the fund balance carry over “working budget” for 2024. As approved, the final “working” budgeted expenditures for 2024 will be \$2,163,873.

To pay these expenditures the projected income within the approved working budget for 2024 is made up of: 1) \$1,179,431 from the SSU and some small fees and 2) up to \$984,442 in 2023 fund balance carry over. It is also estimated that \$365,000 of grants/ other outside funding revenue sources (mostly MPCA 319 grant income /partnership for proposed Wilkinson Lk. and BWSR grant income for watershed based cost share) will be utilized to implement some of the important projects and programs in the 2024 budget. These outside funding revenue grant amounts are anticipated to be revised based on project board action and project timing constraints and or other variables.

Summary of some of the key 2024 approved Budget project highlights include:

- Polar Lakes Park Reuse Study
- Wilkinson & Tamarack Alum
- Wilkinson Lake BMPs /studies

- Development of the 2027-2036 VLAWMO Watershed Management Plan
- Level 2 cost-share partnership projects and other cost share activities/programs
- Pleasant Lake (carp management) program
- Public drainage inspection and maintenance program
- Project communication and education/ outreach
- Water quality monitoring
- Lambert Pond project loan debt service

V. Programs

A. MS4 Resources for January 2024

At the January 10th TEC meeting, Voss will outline a new illicit discharge (IDDE) training resource for municipal MS4 partners to utilize in 2024. Voss will engage with partners for customization and adaptation to each community's needs, as needed.

The IDDE training pertains to Minimum Control Measure #3 in the MS4 permit. The requirements for permit holders to meet include having the following procedures and plans in place in the City/Township:

- Regulatory mechanisms:
 - Prohibit general illicit discharge, report
 - Pet waste
 - Salt storage
- IDDE incorporated into all municipal operation inspection and maintenance
- Detecting and tracking
- Recognition training for field staff (police, fire, public works, parks, etc.)
- Identify priority areas
- Procedures for investigating, locating, and eliminating
- Enforcement response procedures
- Documentation

The IDDE training also utilizes these requirements and the MS4 permit itself as a guide to understanding the goals of what the permit is striving to accomplish for water resources.

New smart salting education tools are also available for municipalities' digital or print communication channels, continuing and expanding upon the smart salting education efforts of 2023. The resources are being distributed in January through VLAWMO's MS4 email distribution list, which consists of City, Township, County, and school district representation.

VI. Projects

A. Summary of Rotary Park Wetland Restoration Report for Work Beginning in 2025

Natural Shore Technologies provided their final draft Rotary Park, wetland prioritization for restoration, report at the end of 2023, as scheduled. As part of the process, they also developed a table with recommended actions and estimated budget for restoration actions. It is anticipated that these actions will begin in partnership with the City of White Bear Lake and VLAWMO in 2025. Excerpts from the report and the estimated schedule and budget are attached in the packet. These documents have also been provided to the City of White Bear Lake for review. The full restoration report draft is located here: https://www.vlawmo.org/index.php/download_file/4780/

B. Summary of 2023 Carp Solutions Report

Carp Solutions provided the end-of-year report for 2023 carp removal in the Pleasant Lake system. The report is attached in the packet and states the progress made since the project was initiated in 2019. Although there is a range in the current biomass estimates, depending upon which technology is used and because of small sample sizes, the population is now anticipated to be below the targeted management threshold. Preparation is in place for removal activities during spring 2024.

Rotary Nature Preserve Wetland - Plant Community Assessment and Management Recommendations

City of White Bear Lake, Ramsey County, Minnesota



Prepared for:
Vadnais Lake Area WMO
800 County Road E East
St. Paul, MN 55127

Prepared by:
Natural Shore Technologies, Inc.
1480 County Road 90
Independence, MN 55359



TABLE OF CONTENTS

I. INTRODUCTION	3
II. NATURAL HISTORY/BACKGROUND	4
Early Inhabitants	4
Historical Public Land Survey	4
Ecological Land Classification	4
Ramsey County Soil Survey	5
National Wetland Inventory	5
Review of Aerial Photography	5
Elevation Base Map	7
Hydrology	7
III. METHODS	7
Plant Surveys	7
Restoration Prioritization and Management	7
IV. RESULTS	8
Wetland Plant Communities	9
The Distribution of High Quality Wetland Areas	11
Upland Communities	11
V. MANAGEMENT NOTES AND RECOMMENDATIONS	13
Strategic Invasive Species Control	13
Prescribed Fire	14
Active versus Passive Ecological Restoration	15
Wetland Plant Species to Consider for Restoration	15
Restoration and Management Prioritization	16
VI. REFERENCES	19
VII. APPENDIX A: Supporting Figures	20
VIII. APPENDIX B: Soil Survey Descriptions	31
IX. APPENDIX C: Ecological Land Classification Descriptions	35
X. APPENDIX D: Wetland Class Descriptions	38
XI. APPENDIX E: Plant Species Noted	40
XII. APPENDIX F: MN DNR Native Plant Community Classifications	44

I. INTRODUCTION

The Vadnais Lake Area Water Management Organization (VLAWMO) retained the services of Natural Shore Technologies to classify plant community types and to provide management recommendations for the wetland system located in the Rotary Nature Preserve, White Bear Lake. This Preserve is a 36 acre city park located north of Birch Lake, between Birch Lake Boulevard North and White Bear Parkway ([Appendix A, Figure 1](#)). Collectively through a strong partnership, the City of White Bear Lake, VLAWMO, and Rotary Club volunteers have done an excellent job in restoring and maintaining the Preserve's natural resources and infrastructure.

This Preserve has a rich history and is a local destination for walkers, hikers, birders, and other outdoor enthusiasts. Popular trails and a boardwalk over the wetland provide easy access to plant and wildlife viewing. A link to naturalist observations can be found here: [iNaturalist](#). A log pavilion is also available for neighborhood gatherings. In 2022, White Bear Lake began an effort to remove invasive woody plant species and restore wetland buffers on the eastern portion of the system adjacent to the walking path ([White Bear Lake Plan](#)). This wetland study will build on and complement these restoration efforts, providing guidance on how to effectively preserve and enhance the native plant communities that are present in this unique ecological system.

Fieldwork to conduct wetland plant community assessments took place on three separate occasions between May and October, 2023. The main goal of this effort was to characterize and map existing plant community types throughout the wetland complex. A global positioning system (GPS) was used to delineate distinct vegetation types, and then later, these data sets were compiled to generate maps that clearly describe and georeference the vegetation found in the Rotary Nature Preserve wetland. In addition to defining various native plant communities, emphasis was placed on assessing the distribution of three invasive wetland plant species: reed canary grass (*Phalaris arundinacea*), purple loosestrife (*Lythrum salicaria*), and narrowleaf and hybrid cattail (*Typha angustifolia* and *Typha X glauca*).

This study lays out management recommendations for practitioners to use in preserving and improving the plant community types within Rotary Nature Preserve wetland. Specific areas within the wetland are prioritized for management. Key restoration approaches are presented for individual plant community types. Revegetation methods are discussed. Management recommendations are given for the most problematic invasive weed species. Together, this information can be used to improve the ecological quality of the Rotary Nature Preserve wetland ecosystem. These efforts will create exceptional wildlife habitat, but they will also substantially contribute to the enjoyment experienced by the residents that visit this unique park.



A southern mesic prairie (UPs23) was identified in the west-central area of the park. This plant community is unique in comparison to the communities found elsewhere in the park and is also bordered by walking trails, making it high profile. The prairie represents only 1.4 acres of the 36 acre parkland. From the available historical records, it is unclear if this area was seeded with prairie species or if it can be considered a prairie remnant. However, it is evident from historical photos that this section of land was intensively hayed prior to park acquisition.

UPs23 - Southern Mesic Prairie (1.3 ac): Grass-dominated but forb-rich herbaceous communities on somewhat poorly drained to well-drained loam soils.



V. MANAGEMENT NOTES AND RECOMMENDATIONS

Efficient and sustainable wetland management hinges on a multifaceted approach and often involves strong agency and citizen partnerships. Preserving and encouraging the expansion of remnant stands of native vegetation is imperative for maintaining the biodiversity and ecological

health of the Rotary Nature Preserve wetland. Below, we summarize strategic invasive weed control that includes implementing a host of efficient and economical management approaches and a sitewide prioritization scheme. With this wetland, it is reasonable to implement both active and passive ecological restoration. Moreover, we recommend establishing a monitoring and adaptive management framework that would allow for real-time adjustments based on plant community response and evolving site conditions. Additionally, there is the opportunity to conduct restoration activities close to pathways and boardwalks that allows for easy access and observation. This facilitates educational opportunities and also promotes community engagement and support for the wetland restoration and conservation efforts.

Strategic Invasive Species Control

Reed Canary Grass

In the Rotary Park wetland, controlling reed canary grass involves a combination of mechanical and chemical control. Mechanical control primarily focuses on mowing or cutting during the early stages of growth, in spring, before seed production. This helps weaken the plant and reduces seed production. Chemical control involves the use of a glyphosate type herbicide (labeled for aquatic use) either being sprayed or applied by wicking leaves. Targeting this invasive grass species during the latter part of the growing season (August or later in Minnesota) is optimal. This is when herbicides are most efficiently translocated into the root systems (Reinhardt and Galatowitsch 2004). Integrating these strategies in a coordinated and adaptive management plan is essential for effective long-term control of reed canary grass. Regular monitoring and adjustments to the control plan based on response indicators are crucial for successful management. Additionally, quickly establishing a native plant cover through planting and reseeding can work to inhibit reed canary grass growth.

Purple Loosestrife

The management of purple loosestrife often employs a combination of chemical and biological control strategies to mitigate its impact on natural ecosystems. Chemical control involves the application of herbicides when the plant is actively growing, typically in mid to late summer (July 1 - September 1) when it is in full bloom. Treating during this time will reduce the cover of purple loosestrife and minimize seed production. This approach is especially productive when targeting small patches of loosestrife (< 100 plants) or outlier (individual) plants within a stand of native vegetation. For additional information on chemical control, please visit the MN DNR website:

[DNR - herbicide control](#)

To enhance the long-term control of purple loosestrife and minimize environmental impact, biological control insects are being used to manage this invasive species. This approach involves the introduction of specialized herbivores, such as *Galerucella* beetles, which selectively feed on purple loosestrife. These biocontrol agents can help to suppress the plant's growth over time, providing a sustainable, ecological solution to managing this noxious weed over a large scale. Since the 1990s, the MN DNR has been actively releasing loosestrife leaf eating beetles throughout the state (see [DNR Biological Control](#)). In systems where populations are low, beetle stocking may be used as an effective management tool.

For the Rotary Nature Preserve wetland, assessing the possibility of integrating both chemical and biological control measures in a comprehensive management plan may lead to an effective and environmentally friendly approach to combating the spread of purple loosestrife. Regular monitoring and adaptive management are essential components of this integrated strategy to ensure ongoing success in controlling this invasive wetland species.

Narrowleaf and Hybrid Cattail

As with reed canary grass, a combination of chemical and mechanical control measures are suggested for the management of Narrowleaf Cattail (*Typha angustifolia*) and Hybrid Cattail (*Typha x glauca*) in the Rotary Park wetland. Fortunately, the invasive cattail infestations in this system consist of patches with sparse to moderate plant cover. Hence, it seems plausible to use a mechanical “cut and flood” technique to kill or severely set back cattail in this system. Cattail with cut stems that have been under the water for an extended period of time tend to have a high rate of mortality. We recommend using this management tool to treat outlier plants and patches less than 1,000 SF in size.

Herbicides, when applied carefully, can be used to target these cattail species while minimizing harm to native vegetation. The use of aquatic-approved herbicides, such as glyphosate-based formulations, can effectively suppress cattail growth, particularly in areas where mechanical control may be impractical. It is recommended that a combination of spraying, leaf wicking, and cutting-stem treatment be used for cattail control in the Rotary Nature Preserve wetland. When using glyphosate, we recommend treating cattail later in the growing season (August - October). For additional information on the chemical control of invasive cattails, check out the Board of Soil and Water Resources invasive species control information here: [BWSR - cattail control](#).

Prescribed Fire

Fire is a natural disturbance and plays a crucial role in shaping sedge meadow wetlands by influencing vegetation composition, nutrient cycling, and habitat structure. Fire may facilitate the dominance of fire-adapted plant species and help maintain the open character of sedge meadows, preventing encroachment by woody vegetation. Although fire is an important wetland management tool, we recommend delaying the use of fire in the Rotary Park wetland until there is an established and large-scale effort to control invasive species. Fire should not be thought of as an all-encompassing tool that will significantly reduce the abundance and cover of invasive species. Conversely, in some situations, fire could actually stimulate weed abundance by opening up bare soil areas. This is especially a concern in restored wetlands where reed canary grass has been dominant and actively controlled, e.g., Spring Peeper Meadow at the U of MN Landscape Arboretum (Julia Bohnen, pers. comm.).

Active versus Passive Ecological Restoration

Active restoration involves direct interventions, such as planting and seeding or implementing engineering solutions to accelerate ecosystem recovery. In contrast, passive restoration relies on natural processes to drive recovery, emphasizing the removal of stressors and the promotion of natural regeneration. For instance, in the Rotary Nature Preserve wetland, it may be reasonable to determine if a viable native seed bank exists in certain locations. Once invasive species are controlled, then native plants may have the opportunity to expand without actively seeding or planting. This approach aligns with the principles of allowing ecosystems to rebound at their own pace without extensive human interference. The choice between these strategies depends on factors such as the level of degradation, available resources, and desired outcomes. While active restoration can yield rapid results, it is more costly. But, it does have the important benefit of establishing vegetation that will quickly occupy space and inhibit weed growth. Passive restoration, although less intrusive, may necessitate more time for recovery but can be more resilient in the long run. A judicious combination of these approaches, informed by site-specific conditions, emerges as a promising strategy for achieving successful and sustainable ecological restoration.

Wetland Plant Species to Consider for Restoration

In certain highly degraded areas (see below) that will be intensively managed for invasive plant species, it is reasonable to employ a host of revegetation techniques that will introduce a diversity of aggressive native wetland species. Below is a species list to be used as a starting point in developing revegetation plans for both sedge meadow and emergent marsh habitats in the Rotary Nature Preserve wetland (Table 2). These species have exhibited long-term resilience in restored wetland systems in the presence of invasive reed canary grass, cattail, and purple loosestrife (Bartodziej and Galatowitsch, in press; Dan Shaw, pers. comm.).

Graminoids	Scientific name	Common name
	<i>Bolboschoenus fluviatilis</i>	River bulrush
	<i>Calamagrostis canadensis</i>	Canada bluejoint
	<i>Carex atherodes</i>	Slough sedge
	<i>Carex lacustris</i>	Lake sedge
	<i>Carex vulpinoidea</i>	Fox sedge
	<i>Carex stricta</i>	Tussock sedge
	<i>Eleocharis spp.</i>	Spikerush

	<i>Schoenoplectus tabernaemontani</i>	Softstem bulrush
	<i>Scirpus cyperinus</i>	Woolgrass
	<i>Spartina pectinata</i>	Prairie cordgrass
Forbs		
	<i>Acorus americanus</i>	Sweet flag
	<i>Asclepias incarnata</i>	Swamp milkweed
	<i>Eutrochium maculatum</i>	Joe-pye weed
	<i>Iris versicolor</i>	Blue flag iris
	<i>Mimulus ringens</i>	Monkey flower
	<i>Sagittaria latifolia</i>	Arrowhead
	<i>Scutellaria galericulata</i>	Marsh skullcap
	<i>Silphium perfoliatum</i>	Cup plant
	<i>Sparganium americanum</i>	Bur-reed
	<i>Verbena hastata</i>	Blue vervain
Pteridophyta		
	<i>Onoclea sensibilis</i>	Sensitive fern
	<i>Thelypteris palustris</i>	Northern marsh fern

Table 2. Wetland species to consider for restoration.

Restoration and Management Prioritization

For the Rotary Nature Preserve wetland, we recommend implementing a restoration prioritization scheme that takes into account: 1) the preservation and expansion of remnant patches of native vegetation, 2) the distribution and abundance of invasive weed species cover, 3) the ease and potential effectiveness of management, and 4) the logistics related to public engagement opportunities. Below, we outline a broad approach that optimizes the use of limited resources, maximizes the overall impact of restoration activities, and fosters the sustained functionality of this wetland system. This is a starting point for developing a long-term management plan. Additionally, we believe that the viability of a management plan, in part, is determined by integrating education and public outreach into the prioritization scheme. This

ensures that restoration efforts actively engage and educate local communities, creating a more informed and committed constituency for ongoing conservation efforts.

1) Control Outlier Weeds within High Quality Wetland Areas

- a) Goal: minimize the expansion of invasive weed species within stands
- b) Target WMn82b and MRn93 stands
- c) Spot mow (weed whip) early in the growing season to reduce seed production
- d) Cut small patches of invasive cattail below the water
- e) Wick individual plants with herbicide in late summer-early fall when treatment is most effective

2) Treat the Perimeter of High Quality Wet Meadow Areas

- a) Goal: Expand the coverage of native wet meadow areas
- b) Target RCG/PL and RCG/PL/CT areas around WMn82b stands
- c) Treat adjoining outer bands of invasive weeds with glyphosate type herbicide
- d) This approach has proven to be successful in wetland areas on the MN Arboretum Campus (Julia Bohnen, pers. comm.)
- e) Closely monitor treated areas to determine if native species recolonize these bands without seeding or planting (passive restoration)
- f) If native plant establishment does not take place, develop and implement a revegetation plan for the treated areas (active restoration)

3) Restore and Manage Emergent Marsh and Wet Meadow by the Boardwalk

- a) Goal: Reduce invasive weed cover and increase native plant diversity
- b) Target both MRn93 and WMn82b1 areas
- c) Spot treat cattail and RCG with a glyphosate type herbicide
- d) Intensively plant area with aggressive wetland and emergent plant species listed above
- e) Explore the opportunity for public involvement - interpretive signage and perhaps volunteer planting just off the boardwalk

4) Investigate Purple Loosestrife Beetle Rearing

- a) Goal: Reduce purple loosestrife cover sitewide
- b) Determine if leaf-eating beetle populations are low
- c) If so, research the possibility of beetle rearing and release with volunteers
- d) This is another excellent opportunity for public involvement

5) Treat RCG Areas Adjacent to Buffer Restoration Areas

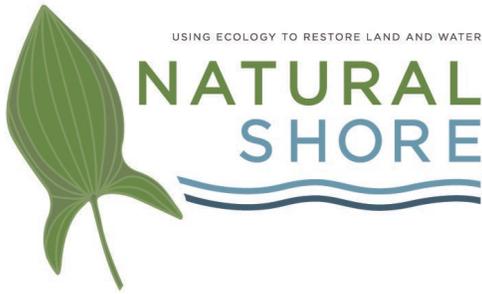
- a) Goal: Restore highly visible RCG wetland areas on the east side of the wetland, by the walking paths and adjoining newly installed upland buffer areas
- b) Broadcast spray highly degraded RCG areas on the east side of the wetland
- c) Closely monitor response - multiple treatments will likely be required

- d) Actively restore these areas with a combination of seeding and planting - introduce aggressive native wetland species
- e) Due to the proximity to the pathway, this would be an excellent planting opportunity for volunteers
- f) Research the possibility of interpretive signage

6) Set up a Series of Test Plots in the RCG/PL and RCG/PL/CT Meadows

- a) Goal: To determine if there is a viable native seed bank in the highly degraded wet meadow areas
- b) Treat test plots in northwest portion of the wetland, targeting RCG/PL areas - late summer/fall application
- c) Closely monitor to assess plant response over time
- d) Because this area is relatively large (10 ac), it would be extremely beneficial to determine if a passive restoration approach could be successful in improving this wet meadow area

**Rotary Park Wetland Restoration Report-
Schedule & Estimated Budget for Restoration Actions**
(Subject to change)



Date: December 14, 2023

To: Dawn Tanner, Natural Resources Specialist, VLAWMO

Memo Description: Budget Addendum to the report titled, “Rotary Nature Preserve Wetland – Plant Community Assessment and Management Recommendations.” Please refer to page 18 of the report for a detailed summary of restoration tasks.

Preliminary Restoration Schedule with Associated Budget:

Task #	Plant Comm.	Restoration Elements	Cost Est.	Timeline
1	WMn82b and MRn93	Spot herbicide, weed whip, and cut cattail below water level – outlier patches	\$25,000 - \$30,000	2025
2	Perimeter around WMn82b stands	Target RCG/PL and RCG/PL/CT stands around WMn82b		
3,5	RCG, MRn93 and WMn82b1	Spring/summer mowings and fall herbicide treatments - RCG		
1	WMn82b and MRn93	Spot herbicide, weed whip, and cut cattail below water level – outlier patches	\$25,000 - \$30,000	2026
2	Perimeter around WMn82b stands	Target RCG/PL and RCG/PL/CT stands around WMn82b		

3	MRn93 and WMn82b1	Site prep. - seed and plant – erosion control		
5	RCG (NE section closest to parking area	Site prep. - seed and plant – erosion control	\$30,000	2027
6	RCG/PL and RCG/PL/CT	Treat test plots in the northwest portions of the wetland		
5	RCG (Eastern side parallel to walking path	Site prep. - seed and plant – erosion control	\$30,000	2028
6	RCG/PL and RCG/PL/CT	Area scope and restoration approach based on test area results	\$30,000	2029

NOTES:

Maintenance costs are not included above. Once, restoration is initiated, annual maintenance activities would range from \$4,000-\$8,000, depending coverage and the invasive weed response to initial control efforts.

Purple loosestrife beetle rearing can be performed by volunteers, thus it is not included in the budget summary above.

Restoration efforts past 2029 will be shaped by restoration results and pilot test results that take place in the RCG/PL and RCG/PL/CT meadows (northwest section of the wetland).



2023 Pleasant Lake System Carp Management Report

December 27, 2023

Prepared for: Vadnais Lake Area Water Management

Attn.: Dawn Tanner

Prepared by:

Carp Solutions, LLC

CarpSolutionsMN.com

Summary

This report covers Carp Solutions' work to manage the common carp population in Pleasant Lake in North Oaks, MN, as well as its connected water bodies in 2023. Backpack electrofishing and some new technology was employed to remove 384 carp migrating up from Pleasant Lake at the barrier in between Deep and Wilkinson Lakes. Of these carp, ten had PIT tags implanted by Carp Solutions during boat electrofishing surveys, nine from 2019 and one from 2022. In October, five carp were captured in Pleasant Lake and implanted with radio tags for future tracking in the system. Using the mark-recapture method and the catch per unit effort from the boat electrofishing, it is possible to estimate the carp population and biomass density. Using the mark-recapture method with a very small sample size, the estimated carp population in Pleasant Lake is 1,539 (90% CI: 276-2,802) with an estimated biomass density of 46.7 kilograms/hectare (90% CI: 8.4-85.1 kg/ha). From the catch per unit effort of the boat electrofishing, the carp population is estimated to be 1,959 (90% CI: 1,574-2,345) with a biomass density of 56.0 kg/ha (90% CI: 47.3-64.6 kg/ha). Although these estimates are fairly imprecise due to smaller sample sizes, the carp population does seem to be below the biomass density management threshold of 100 kg/ha. In order to further reduce the carp population with maximal efficiency, some technological improvements were tested during and after the spring removals. We recommend continuing spring removals with these technologies and periodic boat electrofishing surveys of the carp population in Pleasant Lake.

Methods and Results

Background

In 2019, Carp Solutions conducted boat electrofishing surveys on Pleasant Lake to estimate the carp biomass density and implant PIT tags into the captured carp in order to track their suspected migration through Deep Lake towards Wilkinson Lake. A total of 78 carp were

captured, implanted with PIT tags, and released. The data from these surveys indicated that there was a carp biomass density of 273 kg/ha, well above the management threshold of 100 kg/ha. In the springs of 2020 and 2021, a PIT antenna was installed in the connecting channel between Deep and Wilkinson Lakes to track the spring migration of carp. In 2020, 71% of the carp tagged in Pleasant Lake in 2019 were detected at this antenna. The following year, 53% of the tagged carp were detected. This indicated that a majority of the carp in Pleasant Lake migrated up towards Wilkinson Lake. Based on this data, a removal of this migration of carp from Pleasant Lake through Deep Lake into Wilkinson Lake was recommended. In the spring of 2022, a barrier was constructed at the PIT antenna site from the previous two years (Figure 1) and 670 carp were removed from this channel, along with an additional 250-300 that died of hypoxia in the section below the permanent barrier at the outlet of Wilkinson Lake. The exact number of these carp is unknown, with the estimate being based off of the 246 dead carp that were counted. It is possible that this number is much higher. A follow up summer boat electrofishing survey was conducted, finding a substantially reduced biomass density of 48.9 kg/ha. Based on this success, it was decided to conduct removals in the Deep Lake channel again in the spring of 2023.

Preparation for removal

Work on the Deep Lake removal site began on April 14th for the 2023 spring removal season. On this date the barrier was closed in anticipation of the annual spring migration of common carp. A Passive Integrated Transponder (PIT) tag antenna system was also installed on the same day in order to help indicate when a removal should be conducted at the site. On April 19th the barrier was further reinforced to fix damage from the previous winter. A power supply issue was also addressed with the PIT system, as well as installation of a remote access camera in order to further assist with the timing of removal efforts. In an attempt to increase the efficiency of removals, a box net at the base of the barrier was tested. This box net was installed on April 21st, although the net was left on shore to avoid unnecessary bycatch. The net was stretched briefly on May 9th. However, it was pulled to the side later that day after aggregations of fish tangled in the net and made it unusable. Due to the failure of the box net a second barrier wall was installed on May 12th in order to contain fish during removal events.

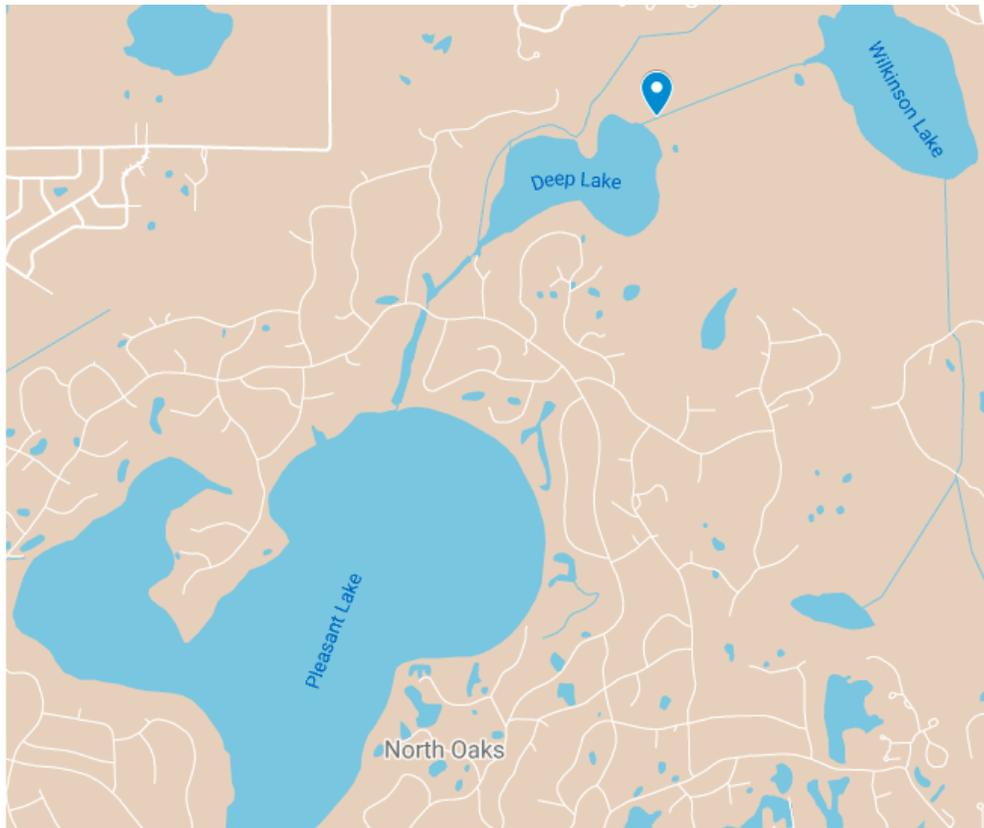


Figure 1: The location of the barrier wall in respect to the Wilkinson Lake/Deep Lake channel.

Removals

Starting on May 9th, a large number of fish were observed trying to migrate upstream and were stopped at the barrier on the remote camera. There were also multiple carp detected by the PIT system at the time, initiating a removal on May 10th. During the removal, a large number of fish previously observed on the camera were found to be native bigmouth buffalo along with a very small number of common carp also present. The removal effort resulted in the capture of five carp, none of which were PIT tagged. The trap was reset for a subsequent removal and, with assistance from VLAWMO and the North Oaks Company, the site was prepared for the usage of Carp Solution’s telehandler to increase the efficiency of removals.

After the first removal, there was an immediate peak of PIT tagged carp being detected at the PIT antenna. This peak only lasted two days, but was followed by a steady buildup of daily detections starting on May 15th. In addition to the PIT antenna, a large number of fish were seen on the remote camera. A removal was carried out on May 19th and a total of 379 carp were captured, including ten marked with PIT tags. The telehandler greatly increased the efficiency of the removal compared to similar scale removals at this site in 2022. To further increase efficiency, a remotely operated gate was installed at the downstream barrier wall so that carp could be trapped on short notice without the need for staff to be onsite. Unfortunately, no aggregations of carp were observed on camera after the construction of this wall. Additionally, only one PIT tagged carp was detected at the PIT antenna following the removal on May 19th. Thus, no more removals were conducted at the site for the remainder of the season.

In total, 384 carp were removed in the spring of 2023. A subset of 65 of these captured carp were measured for length, which can be seen in Figure 2. The average length was 31.8 inches with an estimated average weight of 18.3 lbs. Among the captured carp, ten PIT tags were detected, all of which were captured on the second removal day. The ten recaptured carp out of 384 captured carp equates to a recapture rate of 2.6% or one out of 38 migrating carp being tagged. Of the ten recaptured carp, nine were originally tagged in 2019, and the remaining one was tagged in 2022. By comparing the length when the carp were tagged and when they were recaptured, the carp growth rate can be estimated. On average, these carp grew 0.22 inches per year (spread of 0.05-0.79 inches per year) since their initial mark and capture.

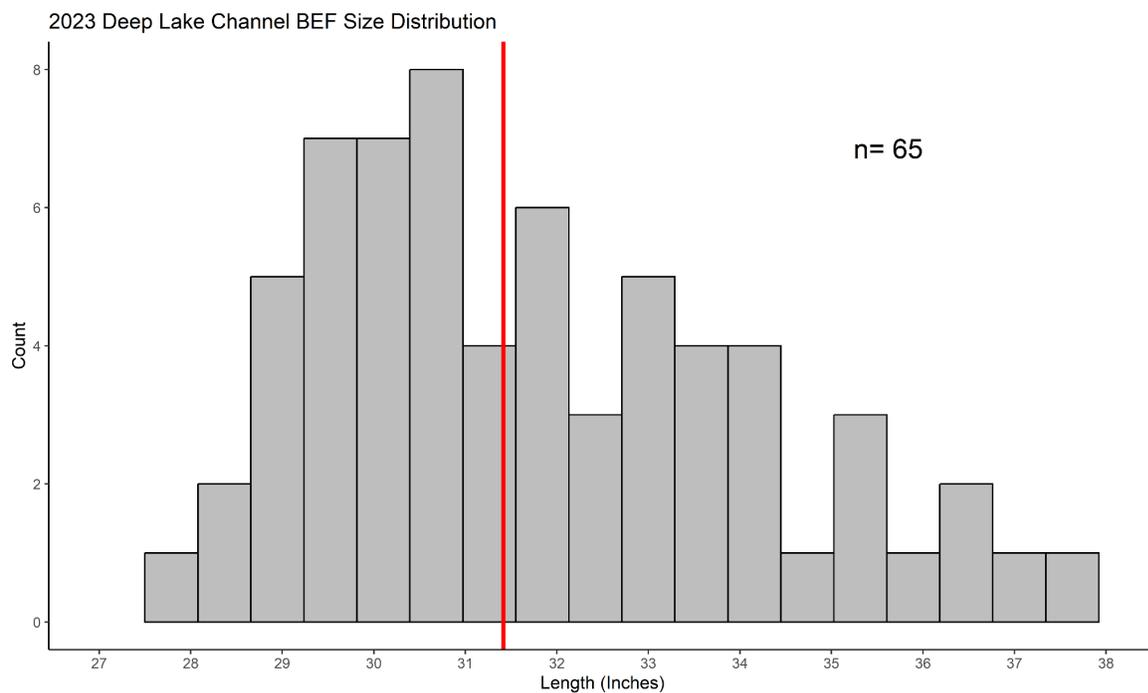


Figure 2: A histogram of the size distribution of carp (n=65). The red line indicates median length.

PIT antenna

The PIT antenna below the barrier was operated between April 14th-June 20th. During this period, 26 PIT tagged carp were detected, mostly in three distinct periods (Figure 3). Of these 26, 23 were originally tagged in 2019, and three were originally tagged in 2022. The three carp tagged in 2022 represent 42.8% of the seven carp tagged in that year. Of the 26 tagged carp detected at the antenna, ten (38.5%) were captured and removed. Based on the percentage of tagged carp among the captured carp (2.6%) and the number of carp detected (26), approximately 1,000 carp participated in the attempted spring migration towards Wilkinson Lake, of which 384 were removed and an estimated 616 carp survived to return to Pleasant Lake.

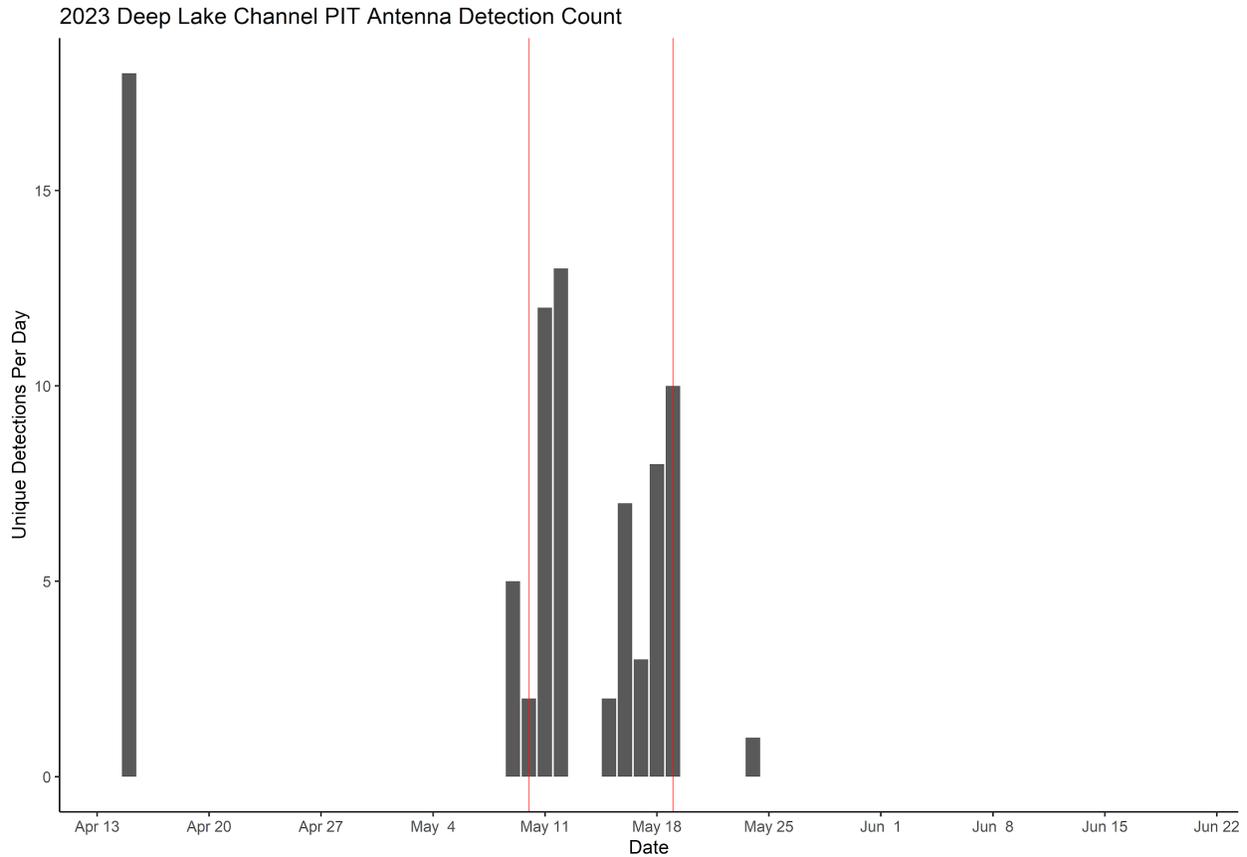


Figure 3: Number of tagged carp detected per day below the barrier when the PIT antenna was installed. The red lines indicate removal days.

Radio tagging

In order to continue monitoring the seasonal movement of carp in the Pleasant Lake system, boat electrofishing was used to capture carp that were implanted with radio tags on October 24th-25th. As a result of these efforts, five adult carp were collected, implanted with radio tags and released. The average size of carp sampled was 32.8 inches long (Table 1). It took two days to collect the five carp (12 transects total). The catch rate was quite low, with an average catch per unit effort (CPUE) 1.05 carp/hr. The low water temperature of 12.5°C and 12°C during the surveys may have contributed to this low catch rate. The carp were concentrated along the shore of the northeast and east side of the lake. Radio tagging surgeries were performed by Dr. Przemek Bajer. The list of radio frequencies and lengths of the tagged carp are shown below in Table 2.

Table 1: Data from the boat electrofishing to capture carp for radio tag implantation in late October 2023.

Date	Transects	Carp caught	Time shocking (min)	CPUE	Average Length (inches)	Population Estimate	Biomass Density Estimate (kg/ha)
10/24/2023	6	3	144	1.25	32.5	2,193	61.4
10/25/2023	6	2	142	0.85	33.1	1,725	50.9
Average	6.0	2.5	143.0	1.05	32.8	1,959	56.0
Total	12	5	286				
SE				0.20	0.31	234	5.3
Lower 90%				0.7	32.2	1,574	47.3
Upper 90%				1.4	33.3	2,345	64.6

Table 2: Data for the 5 carp implanted with radio tags in late October 2023.

Date	Inches	Radio frequency
10/24/2023	33.0	149.332
10/24/2023	29.5	148.771
10/24/2023	35.0	148.621
10/25/2023	35.7	149.212
10/25/2023	30.6	148.891

Discussion

Spring removal of carp from the Pleasant Lake system resumed successfully in 2023 when a total of 384 individuals, weighing approximately 7,030 lbs, were removed. From the PIT antenna data, these 384 individuals were estimated to represent 38.5% of the spring spawning run. As in 2022, the carp were very large, with an average weight of 18.3 lbs. As before, it appears that the carp aggregate at the barrier in between Deep and Wilkinson Lakes for relatively limited periods of time. This aggregation has proven easy to capture, with a total of 1,054 carp weighing an estimated 19,602 lbs being actively removed in 2022-2023. In 2022, an additional 250-300 carp were estimated to have died of hypoxia in the pond below the permanent physical barrier at the outlet of Wilkinson Lake, adding an additional biomass of between 4,700-5,500 lbs removed from the population in the Pleasant Lake system. So, this location has been a productive location to remove spring migrations of carp.

Because of small sample sizes, updated population estimates are somewhat imprecise, but show a significant decline since 2019. The current carp population can be estimated with two methods, using the mark-recapture method, and from the two boat electrofishing surveys in the fall. Using the mark-recapture estimate on the carp marked in the summer of 2022 and

recaptured in the spring of 2023, the estimated carp population in Pleasant Lake is 1,539 (90% CI: 276-2,802). The estimated biomass density is 46.7 kg/ha (90% CI: 8.4-85.1 kg/ha). The confidence interval on these estimates is so large because of the small number of carp tagged (seven) and recaptured (one). Another method for estimating the carp population uses the data from the boat electrofishing surveys following the methods from Bajer and Sorenson 2012. From this, the carp population is estimated to be 1,959 (90% CI: 1,574-2,345) with a biomass density of 56.0 kg/ha (90% CI: 47.3-64.6 kg/ha). The confidence intervals on these estimates are similarly high due to the small number of carp (five) captured during them. Interestingly, the carp were larger than usual in this survey, with an average length of 32.8 inches compared to 31.8 inches in May 2023, 29.3 inches in the summer of 2022, and 31.7 inches in May of 2022. This larger length contributes to a relatively higher biomass density compared to population size when compared to other estimates. Although the difference is not statistically significant, these estimates are lower than that from 2022. In 2022, the carp population was estimated at 2,339 (90% CI: 1,579-3,100) with a biomass density of 48.9 kg/ha (90% CI: 44.7-53.1). This change between 2022 and 2023 is due to the average CPUE dropping from 1.38 carp/hr in 2022 to 1.05 carp/hr in 2023. All of these estimates are far lower than those from 2019, when the carp population was estimated at 8,834 (90% CI: 3,577-14,091) with a biomass density of 230 kg/ha (90% CI: 93-367 kg/ha). The average CPUE in 2022 (1.38 carp/hr) and 2023 (1.05 carp/hr) has fallen significantly since 2019, when it was 9.58 carp/hr. Thus, it appears that removing carp migrating from Pleasant Lake towards Wilkinson Lake has been a very effective method of reducing the carp population in Pleasant Lake.

Removal efficiency has increased with the introduction of new technology as well as the refinement of old technology. The PIT systems and remote cameras continue to be an invaluable asset for monitoring the formation, timing, and size of carp aggregations at barriers. For the removals themselves, we implemented some newly developed equipment to trap the carp within the barriers by adapting our remote trigger system. After the removals, we installed and tested a gate with a door at the downstream barrier. This door was able to be remotely closed, eliminating the need for someone to travel to the site and manually close the gate, potentially dispersing the carp in the process. Although we have continued to use backpack electrofishing units and dip nets to capture the carp, we improved the efficiency of handling the carp after capture through the use of a small telehandler. Carp are counted, scanned for PIT tags, a random subset is measured for length, and they are placed into brailer bags in tubs on the streambank with minimal manual movement. Once placed in the bags, the carp can be maneuvered completely in bulk into the euthanasia tubs and then the dump trailer by the telehandler. From there, they can be transported to and dumped at the burial site with the push of a button. This increase of mechanization ensures that carp can be removed with less labor needed per carp. Overall, the technological improvements increase our ability to capture and remove the aggregations of the large numbers of abnormally large carp in this system.

Management Recommendations

Based on our data from the 2023 season, we recommend the continuation of carp removals in the Pleasant Lake system. With the new barrier constructed at the outlet of Deep Lake, we are hoping to block and remove a larger percentage of the migrating carp population in the system. We hypothesize that the carp will be more motivated to aggregate at this barrier

for longer periods of time since they cannot aggregate in Deep Lake as with the old barrier. At this new barrier, we plan to continue improving removal efficiency with technological advancements. As soon as the ice melts around the new barrier, we will install all of the pipes and reinforce the shore sides of the barrier with sandbags. At this same time, we plan to install a PIT antenna and remote camera inside of this barrier to monitor carp aggregations remotely. We will use the gate that can be closed remotely so that carp aggregations can be trapped quickly before they dissipate. To improve the removal efficiency, we will again use the large boats and telehandler to handle the carp in bulk, decreasing the amount of labor needed per carp. With this technology employed at the new site, we hope to increase the percentage of migrating carp removed and speed up the decrease of the carp population in Pleasant Lake.

As carp removals continue in the Pleasant Lake system, it is important to continue to survey the carp population in the lake. We recommend a set of boat electrofishing surveys every two-three years to monitor the progress of the removals by periodically estimating the carp population, ensure that there is no carp recruitment occurring, and implanting more PIT and possibly radio tags for tracking seasonal movements of the carp in the system. As in 2019 and 2022, we recommend three separate days of boat electrofishing surveys during July-September to accomplish this.

Citations

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