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VLAWMO
Vadnais Lake Area
Water Management Organization

800 County Road E East, Vadnais Heights, MN 55127
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SPECIAL BOARD OF DIRECTORS MEETING AGENDA

7:00 PM March 25, 2020

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

I. **Call to Order**, Chair, Jim Lindner

II. **Approval of Agenda**

III. **Visitors and Presentations**

IV. **Consent Agenda**
   A. Approval of Minutes February 26, 2019

V. **Business**
   A. Administration
      1. Consideration of Administrator hiring
   B. Goose Lake
      1. Alum treatment grant consideration and decision
   C. Cost Share Program
      1. LL2 2020-03 Peterson Native Restoration, NO
   D. Projects
      1. Partnership with RWMWD Carp effort in West Vadnais Lake

VI. **Discussion**

VII. **Administration Communication** –direction

XI. **Adjourn**

Next regular meeting: April 22, 2020

The Vadnais Lake Area Water Management Organization
800 County Road E East, Vadnais Heights, 55127 651-204-6070
Website: www.vlawmo.org; Email: office@vlawmo.org

MINUTES OF THE BOARD OF DIRECTORS
February 26, 2020

Attendance		Present	Absent
Jim Lindner, Chair	City of Gem Lake	X	
Kara Ries	City of North Oaks (alternate)	X	
Rob Rafferty, Secretary-Treasurer	City of Lino Lakes	X	
Ed Prudhon	White Bear Township	X	
Dan Jones	City of White Bear Lake		X
Patricia Youker	City of Vadnais Heights	X	
Stephanie McNamara	Administrator	X	
Brian Corcoran	Water Resources Mgr.	X	
Dawn Tanner	Program Development Coord.	X	
Nick Voss	Education & Outreach Coord.	X	
Tyler Thompson	GIS Watershed Tech.	X	

Others in attendance: Paul Duxbury (VLAWMO TEC commissioner & rep.); Melissa King, Barb Peichel (BWSR); Kurt Carpenter (WBL resident); Diane Gorder (North Oaks); Alex Legeros (WBCA).

I. Call to Order

The meeting was called to order at 7:01 pm by Chair Lindner.

II. Approval of Agenda

The agenda for the meeting was presented with Lindner proposing to add agenda item V. A. 3.
A motion was made by Lindner and seconded by Prudhon to approve the February meeting agenda as amended. Vote: all aye. Motion passed.

III. Visitors and Presentations

A. February TEC Report to the Board and February 2020 Finance Report,

Duxbury presented the TEC's operations and recommendations to the Board from their January & February meetings, including officer roles for the TEC.

B. First Annual Stewardship Award

Voss presented the first annual Watershed Steward Award, given to an individual or party that has shown excellence and dedication in Watershed stewardship. The 2019 nominee and winner, Diane Gorder of North Oaks, was presented the award and was photographed with the VLAWMO Staff & Board of Directors. Susan Miller was the honorable mention for runner up for the award.

C. Public Visitors

None.

IV. Consent Agenda

A. Approval of Minutes

The minutes from the December 11th, 2019 Board meeting are placed on the consent agenda for approval, as presented.

B. Project update reports

Staff has completed a list updates to report on projects and programs not up for discussion on the Board meeting agenda. These updates were included in the February Board packet and may be discussed if any Directors would so choose.
Discussion: none.

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C. Designation of Legal Notice – Press Publications and VLAWMO Website

McNamara presented items on the consent agenda for approval, continuing to use Press Publications and the VLAWMO website for public notices to jurisdiction, as well as continuing to advertise with the League of Minnesota Cities publication, as appropriate. **Staff is recommending the Board authorize the consent agenda for approval that staff continues to use Press Publications and the VLAWMO website for public notices to our jurisdiction, as well as advertisement with the League of MN Cities publication, as appropriate.**

D. Set meeting dates for 2020

McNamara presented 2020 Board meeting dates, following the established pattern of years prior. The proposed meeting dates are: February 26, April 22, June 24, August 26, October 28, and December 9. **Staff recommends approval of the proposed 2020 Board of Director meeting dates.**

E. Adpot-a-Drain 2019 results

Voss presented the 2019 Adopt-a-Drain results, of which VLAWMO is a paying member organization through Watershed Partners, and offers the service to JPA municipalities to claim towards SWPPP & MS4 reporting. Municipalities must be a paying member of the program through Watershed Partners to join. In 2019 VLAWMO had 21 participants report cleanings and 489.4 lbs of debris removed from adopted storm drains.

F. 2020 Education & Outreach activities

Included in the Board packet, Voss laid out the schedule for E&O events and activities for 2020.

G. Wetlands/Development review – At Home Properties Vadnais Heights

A PUD for an apartment building development has been received and reviewed by VLAWMO staff, and comments have been submitted to the City of Vadnais Heights. No wetland impact is anticipated at this time with current plans, but staff will review and comment again once final development plans and stormwater/hydro reports have been submitted.

Discussion: none.

A motion was made by Rafferty and seconded by Ries to approve the February 26, 2020 meeting consent agenda, including items IV. A - G. Vote: all aye. Motion passed.

V. Business

A. Administration

1. Elections and Appointments

a. Election of Board Officers

2019 Board officers included: Chair, Jim Lindner; Vice Chair, Marty Long; Secretary-Treasurer, Rob Rafferty. Officers preside over meetings and take on other small business duties.

Discussion: Lindner proposed nominating and moving for all 3 Officer positions as the same as in 2019. The rest of the Board Directors agreed to this.

A motion was made by Prudhon to nominate and seconded by Rafferty to elect Jim Lindner as Chair, Marty Long as Vice Chair, and Rob Rafferty as Secretary-Treasurer for 2020 Board Officer positions. Vote: all aye. Motion passed.

b. Committee Assignments

The Finance, Policy & Personnel Committee may meet 1-3 times per year and makes recommendation for Board action for new policies or updates, and assist with human resources issues, as needed. Staff is looking for Board members that may volunteer to serve on the Committee.

c. Appointment of TEC Chair – Gloria Tessier

The VLAWMO Technical Commission has voted to continue to have Gloria Tessier as the VLAWMO TEC Chair.

A motion was made by Rafferty and seconded by Lindner to appoint Gloria Tessier as Chair for the VLAWMO Technical Commission for 2020. Vote: all aye. Motion passed.

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2. Personnel Committee update/special meeting

Upon closure of the Administrator position application period, 5 applications had been received and McNamara is confident they are good candidates. The Search Committee decided Sara Noah (Noah & Associates) and McNamara would do the preliminary round of screening, with semifinalists to be interviewed during one of the first weekends in March.
Discussion: McNamara summarized the progress on a new Administrator and asked if any other Board members would like to be a part of the process, to let her know. Prudhon asked if there is point system to vet the candidates. McNamara confirmed this is the case and how applicants are ranked.

3. Special meeting of the Board March 25, 2020

Chair Lindner proposed a special meeting of the Board on March 25, 2020 at 7:00 pm at the Vadnais Heights City Hall in anticipation of making an offer to a candidate for the Administrator position. Lindner and McNamara offered that any other Directors of the Board that would like to be a part of the process, to please notify them. Lindner also explained it is planned to schedule final interviews on one of the first Saturdays in March to determine a final candidate. McNamara mentioned if enough Directors are present, the meeting will have to be noticed as a meeting of the Board.
A motion was made by Rafferty and seconded by Youker to schedule a special meeting of the VLAWMO Board for March 25, 2020 at 7:00pm at the Vadnais Heights City Hall. Vote: all aye. Motion passed.

B. Education and Outreach

1. 2019 Annual Report approval

A draft of the 2019 VLAWMO Annual Report has been prepared and staff is seeking Board approval of the Draft for staff to finalize and submit to BWSR before the April submittal deadline, as well as approval of printing and dispersal costs and efforts.
Discussion: Lindner clarified that this would be for printing, submittal and distribution. Voss affirmed this.
A motion was made by Ries and seconded by Youker to approve the Draft 2019 VLAWMO Annual Report for finalization and authorizes staff to submit the final copy for the April submittal deadline. Vote: all aye. Motion passed.

2. White Bear Center for the Arts – Community Blue Grant

Voss presented a Community Blue grant application submitted by the White Bear Center for the Arts that hosts 10 tea ceremonies where participants will receive custom mugs created by an artist, and incorporates volunteer maintenance and incorporation of other VLAWMO E&O programs. The project will begin with a kickoff event and end with a culmination event to be documented in a summary video at the end of the project. This project would have residual advertising and education & outreach effects. Staff is recommending approval of the Community Blue grant application "CB-2020-02 WBCA/Upstream" in the amount of $7,566.80.
Discussion: Lindner commented how this application was groundbreaking and asked how it came about. Prudhon asked if any more groups were involved with or planned for this project. Rafferty asked for more description as to what the project includes. Voss listed the project budget items as well as goals and activity items.
A motion was made by Ries and seconded by Youker to approve the Community Blue grant CB-2020-02 WBCA/Upstream for funding in the amount of $7,566.80. Vote: all aye. Motion passed.

C. Cost Share Program

1. LL2 2020-01 TNC Teal Pond Restoration

A Landscape Level 2 grant application was received from RC Soil & Water Conservation Division that would remove invasive species and restore the native vegetation of Teal Pond

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at the Tamarack Nature Center. TEC and Staff are recommending approval of the application in the amount of $5,890.00.

Discussion: Prudhon asked about the pond levels and if fluctuation would affect the restoration. Tanner affirmed that native revegetation will take place further up the Pond slope and vegetation will not be affected.

A motion was made by Prudhon and seconded by Youker to approve the Landscape Level 2 grant LL2 2020-01 for funding in the amount of $5,890.00. Vote: all aye. Motion passed.

2. LL2 2020-02 Cty Rd F Raingardens Retrofit

Ramsey County and the City of White Bear Lake have submitted a LL2 grant application in the amount of $15,000 for retrofitting and rehabilitation of 6 raingardens on County Road F, and a total project cost of $72,269. The basins were early raingardens installed in 2003, and currently don't feature proper routing and stormwater collection, minimizing their effectiveness. This is one of the projects that were identified in the Goose Subwatershed analysis for effective stormwater volume and nutrient reduction into Polar Chev Channel and East Goose Lake. TEC and Staff are recommending approval of the application in the amount of $15,000.

Discussion: Rafferty and Youker asked for clarification on maintenance and longevity of the revegetation and basins. Thompson clarified the County & the City have a maintenance agreement that both the City & County utilize to ensure long-term maintenance.

A motion was made by Prudhon and seconded by Youker to approve the Landscape Level 2 grant LL2 2020-02 for funding in the amount of $15,000.00. Vote: 4 aye, Youker abstained. Motion passed.

3. LL2 2020-03 Peterson Native Restoration

An application was received for a large .26 acre native restoration at a private residence in North Oaks for the amount of $9,024, though it was found only $5,949 was applicable for asked funding, as the total applicable project cost is $7,932. The project is on a steep backyard hillside that drains to Sora Pond, and eventually flows to Black Lake. The site was cleared of buckthorn and woody vegetation and now needs to be stabilized and restored. This project would normally be qualify as a LL1 grant, though due to a recent large-scale erosion failure last year with a similar site in North Oaks, staff realizes this as an issue where a similar situation can be avoided. Staff and TEC are recommending funding of the LL2 grant application with a 50% match of applied funding, in the amount of $4,000.

Discussion: Prudhon asked if the applicants had approached staff prior to vegetation removal, or were they just looking for a fix to an issue they created. Thompson answered the application came in after vegetation removal, a line item that was also included on their estimate from Prairie Restoration, though they chose to use a different contractor to perform the work for cheaper than PRI, then to still apply for grant funding for native revegetation and stabilization. Rafferty suggested himself and other interested members of the Board visit the site and table the decision for approval for the March 25 special meeting of the Board.

A motion was made by Rafferty and seconded by Youker to table approval the Landscape Level 2 grant LL2 2020-03 for funding and to visit the site to be familiarized with the Project. Vote: all aye. Motion passed.

D. Projects

1. Birch Lake – 4th & Otter: Bid Selection & Authorize Signing of Contract

After the second round of bidding for construction for the iron-enhanced sand filter for Birch Lake, 10 bids were received with 4 bids lower than the lowest bid from the 1st round of bidding. Cost reductions were made by changes to the project schedule, contract modifications and replacement of the decorative brick façade with colorized concrete to be chosen by the land owners. The updated Engineer's Estimate of cost was $109,953.80, and

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the lowest responsible bid was Blackstone Construction LLC at $111,292.25. Barr Engineering submitted a Technical Memo recommending selection of Blackstone Construction LLC to enter into agreement for construction, along with notice of bid award, entering into a construction services agreement, and sign notice to proceed with construction. Staff and TEC are recommending entering into contract and selecting Blackstone LLC for construction, based on their bid of $111,292.25. Construction shall commence within 5 calendar days after date stated in notice to proceed, and shall be complete and ready for final payment not later than June 30, 2020.

Discussion: Rafferty expressed concern with the total cost of the project and asked for clarification of what the project was and what it was accomplishing. Thompson responded with a description of what the project accomplishes, treating stormwater before entering Birch Lake, and protecting the water quality of one of VLAWMO's healthiest lakes.

A motion was made by Prudhon and seconded by Lindner to authorize approval of selection of Blackstone Contractors, LLC for bid award for construction of the Birch Lake IESF White Bear Lake, MN project, signing of the Construction Services Agreement, and authorization of Project Manager, Tyler Thompson to sign the Notice to Proceed. Vote: 4 aye, Rafferty nay. Motion passed.

2. Pleasant Lake Sedimentation Study and internal loading preliminary investigation

As part of the Pleasant Lake SLMP that was completed in 2019, an implementation priority is assessing the potential for internal and external sedimentation and nutrient loading in the lake. Preliminary modeling of the lake was begun by U of M capstone students, with help of Barr Engineering, though completion of H&H modeling still needs to be completed. Recent complaints from North Oaks residents regarding lower water levels and decreased water quality are prompting the proposal of further study of Lake metrics. Tasks 1 – 3, sandbar cores, internal loading cores, and bathymetry of the east and west bays of Pleasant are recommended for funding in 2020 in the amount of $21,000.

Discussion: Rafferty suggested VLAWMO only funding $19,000 and asking North Oaks to contribute the remaining $2,000. Prudhon asked if the SPRWS would be able to help with funding. Tanner responded the SPRWS doesn't have this in their budget for 2020, but may add it for 2021. Ries commented that she will bring this to the next North Oaks City Council meeting for funding assistance. Rafferty noted he does not wish reducing the scope of the project and would like all items included in the $21,000 cost.

A motion was made by Rafferty and seconded by Youker for $19,000 of funding from VLAWMO, and to seek further funding from the City of North Oaks. Vote: all aye. Motion passed.

3. Goose Lake Alum treatment grant

After the BWSR Board approved VLAWMO's grant proposal for the alum treatment on East Goose Lake, 2 concerns were identified by BWSR staff. The results of the Fall 2019 fish survey of East & West Goose showed that the bullhead population had increased dramatically, and the game fish population had declined, pointing to a fish kill. The high rough fish population is worrisome for disturbance of the alum treatment. The lack of boating restrictions for East Goose Lake is the other, more complicated issue that BWSR staff is concerned that the annual removals and longevity of the alum treatment will not be able to meet BWSR's reinforced grant assurances for project effectiveness for 10-15 years. If this were the case, VLAWMO would be financially responsible for reaching project measures mentioned in the grant application, and would be incorporated into a grant workplan. Staff has asked Barr Engineering for more modeling simulating boat traffic and the effectiveness and longevity of an alum treatment. Staff requests the Board consider all of this information and wait for further information from the project engineer to make a decision regarding acceptance or withdraw its request for grant funds at the special meeting of the Board in March.

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Discussion: King overviewed grant assurances, and explained how the project much achieve the what is stated in the grant application. Rafferty question boating is the only reason BWSR is asking VLAWMO to reconsider grant acceptance. King explained that with key elements changing, bullhead population and boating restrictions, the project may not be able to achieve continued results stated in the application, and that a reevaluation would be wise before accepting grant funding, where VLAWMO may be held financially liable for completing the project as it was outlined in the application. McNamara expressed that our project engineer has been asked to remodel the alum treatment to account for current conditions, and proposed in-lake management in the form of bullhead removal before a treatment should be completed.

A motion was made by Lindner and seconded by Prudhon to table any action or decision on the East Goose Alum Grant for the March 25 Board meeting. Vote: all aye. Motion passed.

4. WBF Goose Subwatershed BMP options

Staff outlined the 4 different top options for BMPs that were identified by Barr Engineering and were selected by staff: underground IESF chamber on Cty Rd F off of Highland Ave.; adding 20 new curb-cut raingardens to Cty Rd F; large IESF at WBL Methodist Church; IESF construction on the Lakeaires Elementary School property. Staff is asking the Board to consider these options and wait for cost estimates to be delivered and for a recommendation to be made at the March Technical Commission meeting for selection to proceed with a BMP option at the special meeting of the Board in March.

Discussion: Lindner asked for clarification that these would be similar options to the Birch Lake iron-enhanced sand filter. McNamara confirmed this.

VIII. Discussion

IX. Administration Communication

1. Metro INET JPA Direction

VLAWMO's IT provider, Metro I-Net, is currently a side unit of the City of Roseville and work has begun on moving towards a Joint Powers Agreement that creates a permanent structure and members will have a voting say in policy action, and a Board of Directors. If all current members agree to join a JPA, a 5% annual budget increase is expected for each member of Metro I-Net to cover overhead costs. If fewer members sign on for the JPA, costs could rise dramatically. The call for a JPA has been talked about for years to gain stability and insulate from possible disbandment from the City of Roseville, if their Council decided so. Metro I-Net is looking for verbal commitment for entering into a possible JPA with Metro I-Net. Approval of a JPA would come later in 2020 after there is an understanding of total participation.

X. Adjourn

A motion was made by Lindner and seconded by Youker to adjourn at 9:13 pm. Vote: all aye. Motion passed.

Minutes compiled and submitted by Tyler Thompson.

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March-20		Actual 3/1/20	Actual to Date	2020 Budget	2019 carry over/Grants	Remaining in Budget	2020 Available	Act vs. Budget
BUDGET #	**INCOME**							
5.11	Storm Water Uti	$0	$16,449	$890,800	$0	$874,351	$890,800	2%
5.12	Service Fees	$0	$0	$200	$0	$200	$200	0%
5.13	Interest + mitiga	$842	$2,845	$5,000	$0	$2,155	$5,000	57%
5.14	Misc. income - V	$1,495	$3,050	$3,000	$0	($50)	$3,000	102%
5.15	Other Income G	$22,545	$22,557	$0	$0	($22,557)	$0	
5.16	Transfer from re	$100,000	$100,000	$0	$0	($100,000)	$0	
	TOTAL	$124,882	$144,901	$899,000	$0	$754,099	$899,000	16%
	EXPENSES							
3.1	**Operations & Administration**							
3.110	Office - rent, cop	$2,078	$6,093	$25,200	$0	$19,107	$25,200	24%
3.120	Information Sys	$0	$2,639	$20,000	$2,000	$19,361	$22,000	12%
3.130	Insurance	$0	$0	$5,800	$0	$5,800	$5,800	0%
3.141	Consulting - Aud	$0	$0	$6,700	$0	$6,700	$6,700	0%
3.142	Consulting - Boo	$0	$0	$1,500	$0	$1,500	$1,500	0%
3.143	Consulting - Leg	$100	$299	$4,000	$2,500	$6,201	$6,500	5%
3.144	Consulting - Eng	$1,503	$1,503	$30,000	$0	$28,497	$30,000	5%
3.150	Storm Sewer Ut	$1,250	$2,353	$14,000	$0	$11,647	$14,000	17%
3.160	Training (staff/b	$0	$0	$4,500	$1,500	$6,000	$6,000	0%
3.170	Misc. & mileage	$366	$1,734	$5,500	$800	$4,566	$6,300	28%
3.191	Administration -	$26,058	$79,051	$347,200	$50,000	$318,149	$397,200	20%
3.192	Employer Liabili	$6,659	$20,731	$89,600	$12,000	$80,869	$101,600	20%
3.2	**Monitoring and Studies**							
3.210	Lake and Creek	$0	$322	$22,000	$10,000	$31,678	$32,000	1%
3.220	Equipment	$64	$416	$4,000	$0	$3,584	$4,000	10%
3.230	Wetland assess	$0	$0	$10,000	$0	$10,000	$10,000	0%
3.3	**Education and Outreach**							
3.310	Public Educatio	$57	$2,061	$8,500	$1,000	$7,439	$9,500	22%
3.320	Marketing	$41	$550	$7,500	$0	$6,950	$7,500	7%
3.330	Community Blue	$5,407	$5,952	$10,000	$2,000	$6,048	$12,000	50%
Total Core functions: Ops, Monit		*$43,582*	*$123,704*	*$616,000*	*$81,800*	*$574,096*	*$697,800*	*18%*
Capital Improvement Projects and Programs								
3.4	**Subwatershed Activity**							
3.410	Gem Lake	$0	$0	$0	$0	$0	$0	
3.420	Lambert Creek	$5,702	$15,032	$120,000	$63,275	$168,243	$183,275	8%
3.425	Goose Lake	$5,167	$11,770	$60,000	$150,316	$198,546	$210,316	6%
3.430	Birch Lake	$2,881	$14,241	$10,000	$39,067	$34,826	$49,067	29%
3.440	Gilf Black Tam V	$0	$0	$30,000	$50,000	$80,000	$80,000	0%
3.450	Pleasant Charle	$0	$0	$10,000	$9,000	$19,000	$19,000	0%
3.460	Sucker Vadnais	$0	$3,164	$12,000	$10,000	$18,836	$22,000	14%
3.48	**Programs**							
3.481	Landscape 1	$0	$0	$24,000	$11,500	$35,500	$35,500	0%
3.482	Landscape 2	$12,750	$13,015	$20,000	$11,361	$18,346	$31,361	42%
3.483	Project Researc	$0	$9,725	$0	$0	($9,725)	$0	#DIV/0!
3.470	Facilities Mainte	$0	$0	$5,000	$29,176	$34,176	$34,176	0%
3.5	**Regulatory**							
3.510	Engineer Plan re	$0	$0	$2,000	$0	$2,000	$2,000	0%
	Total CIP & Prog	*$26,499*	*$66,947*	$293,000	$373,695	*$599,748*	*$666,695*	*10%*
	Total of Core Op	**$70,082**	$190,651	$909,000	$455,495	**$1,173,844**	$1,364,495	**14%**

Fund Balance		2/1/2020	3/1/2020
4M Account		$381,051	$219,264
4M Plus Savings		$411,939	$512,475
Total		$792,990	$731,739

Restricted funds	3/1/2020
Mitigation Savings	$27,021
Term Series (3/28/19)	$0

Vadnais Lake Area Water Management Orga

9:00 AM

Profit & Loss

03/05/2020

February 15 through March 13, 2020

Cash Basis

	Feb 15 - Mar 13, 20
Ordinary Income/Expense	
Income	
Mitigation Interest	1.38
5.1 · Income	
5.13 · Interest	840.97
5.15 · Other Income Grants	13,645.46
Total 5.1 · Income	14,486.43
6.6.6 · Grants	8,900.00
Total Income	23,387.81
Gross Profit	23,387.81
Expense	
3.1 · Administrative/Operations	
3.110 · Office	
Copies	49.79
Phone/Internet/Machine Overhead	275.00
Postage	16.00
Rent	1,540.00
Supplies	147.59
3.110 · Office - Other	50.00
Total 3.110 · Office	2,078.38
3.120 · Information Systems	
Hardware	0.00
Total 3.120 · Information Systems	0.00
3.143 · Legal	99.50
3.144 · Eng. & Tech.	1,502.87
3.150 · Storm Sewer Utility	1,250.00
3.160 · Training (staff/board)	0.00
3.170 · Misc. & mileage	366.05
3.191 · Employee Payroll	
payroll	26,057.60
Total 3.191 · Employee Payroll	26,057.60
3.192 · Employer Liabilities	
Admin payroll processing	44.92
Administration FICA	1,926.71
Administration PERA	1,954.32
Insurance Benefit	2,733.08
Total 3.192 · Employer Liabilities	6,659.03
Total 3.1 · Administrative/Operations	38,013.43
3.2 · Monitoring and Studies	
3.220 · Equipment	63.92
Total 3.2 · Monitoring and Studies	63.92
3.3 · Education and Outreach	
3.310 · Public Education	57.13

3.320 · Marketing	40.96
3.330 · Community Blue Education Grant	5,407.00
Total 3.3 · Education and Outreach	5,505.09
3.4 · Capital Imp. Projects/Programs	
3.420 · Lambert Creek Restoration	5,701.89
3.425 · Goose Lake	
WB Funding - Goose subshed	1,567.00
3.425 · Goose Lake - Other	3,600.00
Total 3.425 · Goose Lake	5,167.00
3.430 · Birch Lake	
4th & Otter project	2,880.50
Total 3.430 · Birch Lake	2,880.50
Total 3.4 · Capital Imp. Projects/Programs	13,749.39
3.48 · Programs	
3.482 · Landscape 2	12,750.00
Total 3.48 · Programs	12,750.00
Total Expense	70,081.83
Net Ordinary Income	-46,694.02
Net Income	**-46,694.02**

Vadnais Lake Area Water Management Organization

8:48 AM

Check Detail

03/05/2020

February 15 through March 13, 2020

Type	Num	Date	Name	Item	Account	Paid Amount	Original Amount
Check	**eft**	**02/22/2020**	**Reliance Standard**		**Checking - 1987**		**-177.68**
					Insurance Benefit	-177.68	177.68
TOTAL						-177.68	177.68
Check	**EFT**	**02/20/2020**	**further**		**Checking - 1987**		**-8.00**
					Insurance Benefit	-8.00	8.00
TOTAL						-8.00	8.00
Check	**1010**	**03/13/2020**	**kjolhaug Environmental Services**		**Mitigation & Monitoring - 8355**		**-2,085.00**
			kjolhaug Environmental Services		Wetland Mitigation Payable	-2,085.00	2,085.00
TOTAL						-2,085.00	2,085.00
Check	**4886**	**03/13/2020**	**Nicholas Voss**		**Checking - 1987**		**-155.92**
					3.170 · Misc. & mileage	-129.96	129.96
					3.320 · Marketing	-25.96	25.96
TOTAL						-155.92	155.92
Check	**4887**	**03/13/2020**	**Tyler J Thompson**		**Checking - 1987**		**-108.35**
					3.170 · Misc. & mileage	-108.35	108.35
TOTAL						-108.35	108.35
Check	**4888**	**03/13/2020**	**Stephanie Oliver McNamara**		**Checking - 1987**		**-72.15**
					3.170 · Misc. & mileage	-72.15	72.15
TOTAL						-72.15	72.15
Check	**4889**	**03/13/2020**	**City of Vadnais Heights**		**Checking - 1987**		**-1,880.79**
					Rent	-1,540.00	1,540.00

				Phone/Internet/Machine Overhead	-200.00	200.00
				Phone/Internet/Machine Overhead	-75.00	75.00
				Postage	-16.00	16.00
				Copies	-49.79	49.79
TOTAL					-1,880.79	1,880.79
Check	**4890**	**03/13/2020**	**Barr Engineering Co**	**Checking - 1987**		**-1,567.00**
				WB Funding - Goose subshed	-1,567.00	1,567.00
TOTAL					-1,567.00	1,567.00
Check	**4891**	**03/13/2020**	**Dawn Tanner**	**Checking - 1987**		**-87.11**
				3.170 · Misc. & mileage	-87.11	87.11
TOTAL					-87.11	87.11
Check	**4892**	**03/13/2020**	**Barr Engineering Co**	**Checking - 1987**		**-2,880.50**
				4th & Otter project	-2,880.50	2,880.50
TOTAL					-2,880.50	2,880.50
Check	**4893**	**03/13/2020**	**Kennedy & Graven, Chartered**	**Checking - 1987**		**-99.50**
				3.143 · Legal	-99.50	99.50
TOTAL					-99.50	99.50
Check	**4894**	**03/13/2020**	**Innovative Office Solutions**	**Checking - 1987**		**-147.59**
				Supplies	-147.59	147.59
TOTAL					-147.59	147.59
Check	**4895**	**03/13/2020**	**SEH**	**Checking - 1987**		**-7,204.76**
				3.144 · Eng. & Tech.	-1,218.52	1,218.52
				3.420 · Lambert Creek Restoration	-5,701.89	5,701.89
				3.144 · Eng. & Tech.	-284.35	284.35
TOTAL					-7,204.76	7,204.76

Check	**4896**	**03/13/2020**	**City of White Bear Lake**	**Checking - 1987**	**-32,530.95**
			payroll	-26,057.60	26,057.60
			Administration FICA	-1,926.71	1,926.71
			Administration PERA	-1,954.32	1,954.32
			Insurance Benefit	-2,547.40	2,547.40
			Admin payroll processing	-44.92	44.92
TOTAL				-32,530.95	32,530.95
Check	**4897**	**03/13/2020**	**Hisdahl's Trophies**	**Checking - 1987**	**-15.00**
			3.320 · Marketing	-15.00	15.00
TOTAL				-15.00	15.00
Check	**4898**	**03/13/2020**	**FastSigns**	**Checking - 1987**	**-50.00**
			3.110 · Office	-50.00	50.00
TOTAL				-50.00	50.00
Check	**4899**	**03/13/2020**	**Blue Water Science**	**Checking - 1987**	**-3,600.00**
			3.425 · Goose Lake	-3,600.00	3,600.00
TOTAL				-3,600.00	3,600.00
Check	**4900**	**03/13/2020**	**Ehlers & Associates, Inc.**	**Checking - 1987**	**-1,250.00**
			3.150 · Storm Sewer Utility	-1,250.00	1,250.00
TOTAL				-1,250.00	1,250.00
Check	**4901**	**03/13/2020**	**Ramsey County PW**	**Checking - 1987**	**-12,750.00**
			3.482 · Landscape 2	-12,750.00	12,750.00
TOTAL				-12,750.00	12,750.00
Check	**4902**	**03/13/2020**	**White Bear Center for the Arts**	**Checking - 1987**	**-5,407.00**
			3.330 · Community Blue Education Grant	-5,407.00	5,407.00
TOTAL				-5,407.00	5,407.00

Vadnais Lake Area Water Management Organization

8:46 AM

Custom Transaction Detail Report

03/05/2020

February 1 through March 1, 2020

Accrual Basis

	Type	Date	Num	Name	Memo	Account	Clr	Split	Amount	Balance
Feb 1 - Mar 1, 20										
	Credit Card Charge	02/02/2020		Prairie Moon Nursery	seed for 4th & otter	US Bank CC	√	4th & Otter project	3,500.00	3,500.00
	Credit Card Charge	02/03/2020		Google*SVCAPPS_VLAWM		US Bank CC	√	WEB	20.83	3,520.83
	Credit Card Charge	02/06/2020		Panera Bread	Lady A's mtg food	US Bank CC		3.170 · Misc. & mileage	93.80	3,614.63
	Credit Card Charge	02/24/2020		Amazon.com	batteries remote cams	US Bank CC		3.220 · Equipment	63.92	3,678.55
	Credit Card Charge	02/28/2020		Mad Jacks	HR interviews	US Bank CC		3.170 · Misc. & mileage	30.77	3,709.32
Feb 1 - Mar 1, 20									**3,709.32**	**3,709.32**

VLAWMO
Vadnais Lake Area
Water Management Organization

800 County Road E E, Vadnais Heights, MN 55127
www.vlawmo.org; Office@vlawmo.org

To: Board of Directors

From: Stephanie McNamara, Administrator

Date: March 19, 2020

Re: V. A. 1. Hiring of the Administrator

The Search committee met with the three finalists last Saturday, March 14th. Sara Noah, our Human Resources consultant and I did a preliminary interview two weeks before. The first choice candidate has been offered a package of salary and benefits that is the same as received by your current administrator.

The novel corona virus has managed to affect even this process. At this point, I am anticipated a counter offer Friday from the candidate which will go to the committee. They will provide an updated recommendation prior to the meeting.

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To: Board of Directors

From: Stephanie McNamara, Administrator

Date: March 18, 2020

Re: V. B. 1. Alum Treatment Grant for Goose Lake

Budget considerations (Goose Subwatershed #3.425)

2020 Budget:	$ 60,000
Total funds available (includes other BMPs)	$210,316
BWSR Grant (pending)	$190,000
Local match for alum grant (WBL: $35,000)	$ 47,500
Expenditures as of 2/1/2020:	($ 6,603)

Past Board actions:

2010	Goose Lake (E & W) put on the MPCA Impaired Waters List
2014	TMDL/Impaired Waters study & plan implementation
2017	Sediment coring and preliminary study of Goose Lake received
2018	Feasibility study on Goose Lake including dosing determination received
6/2018	Authorize staff to prepare a grant application for alum treatment in Goose Lake
8/2018	Request partner agencies for contributions to the East Goose Alum treatment grant fund match
10/2018	Execute grant agreement between VLAWMO and State of MN for 2019-21 Watershed Based Funding grant funds
2/2019	Lake bathymetry and vegetation study funded
6/2019	Authorization to pursue grant funding for alum treatment on East Goose Lake, as well as authorizing supply the City of WBL with further information on boating restrictions and their effectiveness on shallow lakes treated with alum.
8/2019	Authorization to hire Blue Water Science to conduct a fish survey of East Goose – fall 2019
8/2019	Authorize staff to submit the formal recommendation for a boating restriction on East Good Lake to the city of White Bear Lake for their consideration.
10/2019	Authorize distribution of a list of clarifying points regarding E. Goose Lake regarding a presentation to the WBL City Council
12/2019	Rescind the recommendation from October 23rd Board meeting to the City of White Bear Lake regarding boating restrictions.
2/2020	Level 2 VLAWMO grant to help fund Co. Road F raingarden reconstruction with Ramsey County and the City of White Bear Lake as approved ($15,000).

Background and discussion

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The VLAWMO Board approved the 2017 VLAWMO Watershed Plan, which included the East Goose Lake Alum Treatment Project (project). The purpose of the project is to reduce the internal loading in East Goose. Modeling has indicated internal load accounts for 88% of the total phosphorus loading in the lake. Subwatershed projects are planned to address the 11% of loading coming from the drainage area.

East Goose Lake is surrounded by road easements, commercial properties, and 26 townhomes and single-family residences. Shoreland residents use the lake primarily for boating and swimming. Because of the lake depth (maximum depth of 6 – 7 feet), poor water quality, and the lack of vegetation, the lake does not sustain game fish. Restoring water quality in the lake will help prevent toxic algal blooms, provide for safer and more diverse recreational opportunities such as fishing and bird watching, and improve lake aesthetics.

EPA/MPCA rules (MS4 permit) require the City of White Bear Lake (WBL) to reduce phosphorus load in Goose Lake by 91%. WBL has been a partner in both the alum treatment efforts and the subwatershed projects.

State grant funding for the Project was pursued last summer and was approved by the BWSR Board in January 2020. A variety of assurances or supports for the value and effectiveness of the project were offered in the grant application. This included timing and amount of dosing per the feasibility study, BMP's in the subwatershed, and proposed temporary restrictions on boating. The Board offered technical support and recommendation to the City of White Bear who has ordinance authority. As you know, the boating restrictions met with considerable resistance from the waterskiing community. The DNR must approve any boating restrictions the City might enact. They look for community support before they would approve a new ordinance. The draft ordinance was withdrawn after VLAWMO retracted the recommendation for temporary boating restrictions.

Rough fish removal is required to protect an alum treatment. Rough fish removal was done previously but has not been maintained because of winterkills. A new removal effort must be conducted with either 1) predator fish stocking with aeration or 2) rough fish removal with follow-up surveys prior to the alum treatment to demonstrate effectiveness of removal. Removal, stocking, and aeration would be at VLAWMO's cost, and the choice for which path to follow would be a Board decision.

The Project budget includes $190,000 grant from BWSR, a 25% local match of $47,500. WBL has pledged $35,000 toward that match.

BWSR has expressed concern that the metric of the grant cannot be met within the time period of the grant for a variety of reasons expressed in the attached letter. The top three include the lack of boat restrictions as an assurance of success, an increased bullhead population and a lack of community support.

Elements of the Project

1. VLAWMO would continue **water quality monitoring** on Goose Lake.

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2. **2020 Access to the lake**: staff has had conversations with WBL staff about using city land to access the lake on a reliable basis. This would be a restricted access and is needed regardless of which option the board chooses. Minor modifications may be necessary. Est. cost: $2,000 +/-
3. **Fish management** to address burgeoning bullhead population. Harvesting. Est. cost: $10,000 - $12,000. Stocking with predator/game fish Est. cost: TBD. Possible winter aeration, Est. cost: TBD.
4. **Alum treatment** of the lake to take place in 2 steps. Timing: TBD. Est. cost: $190,000
5. **Plan for managing post- treatment vegetation**. Would VLAWMO address invasive species such as curly leaf pondweed? Cost: potentially annual herbicide treatments. Consider the cost-share program for lake association for managing native species under a DNR approved vegetation management plan.
6. Continuing **community engagement** particularly in address fish and vegetation management and any other ongoing concerns. Care being taken to engage a more complete cross section of the local community including more residents, businesses, and local agencies.

The Challenge: Develop an approach to in-lake treatment for East Goose Lake that preserves BWSR grant funding, allows boating and has the support of the local community.

Options

1. Negotiate with BWSR to release grant funding with an assurance agreement that provides for performance based payments (e.g. if testing after the first year shows acceptable results, the remainder of the funds will be released).
2. Seek a 60-90 extent extension from BWSR to do a peer review of the Barr Engineering feasibility study, discuss options and re-engage lakeshore residents to begin the development of a lake vegetation management plan (LMVP) and fisheries plan.
3. Do not accept the grant. Prepare more completely in the coming months and reapply with updated information, including a range of predicted removals of 100-800 pounds of TP per year instead of 800 pounds per year and no proposed boating restriction. A new application would be submitted in the next grant cycle of Clean Water Funding if VLAWMO can demonstrate substantial support for an alum treatment on East Goose Lake. There is no guarantee of receiving funding.

   Preparation includes:

   - Rough fish removal and follow-up surveys or rough fish removal with stocking and aeration
   - Addition of restricted access boat landing
   - A series of facilitated stakeholder meetings
4. Do not accept the grant. Conduct facilitated stakeholder discussions as described in option 2. Conduct fish removal as described in option 2 and work with the City of White Bear Lake to construct boat landing. If VLAWMO cannot demonstrate support for an alum treatment, we would not reapply for funds in the next round of Clean Water Funding.

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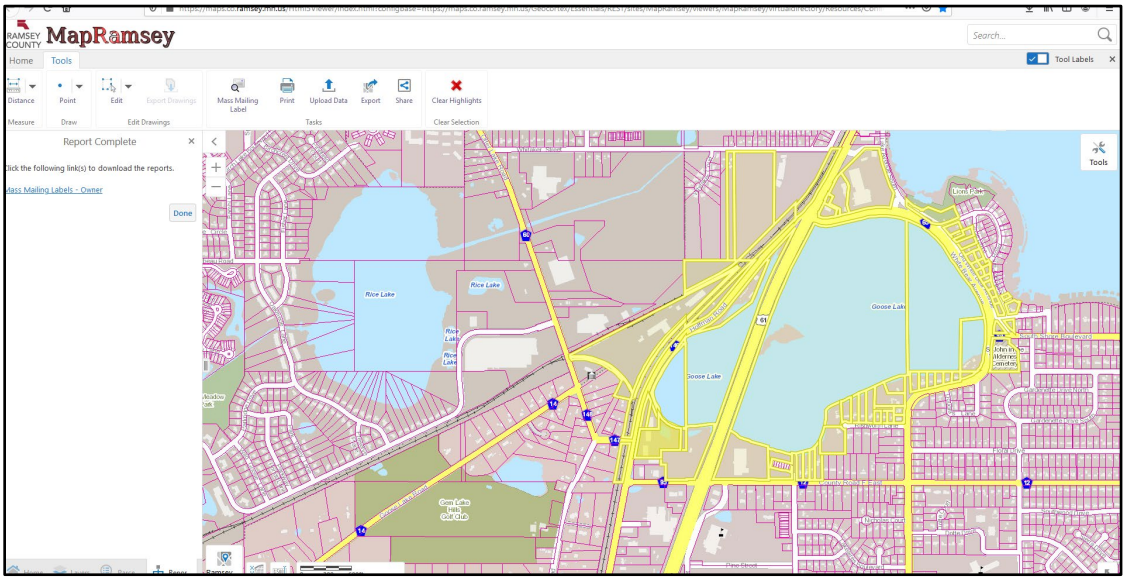
Further discussion on an option for stakeholder meetings that could take place regardless of which option is chosen.

Over the coming months VLAWMO would conduct a series of facilitated meetings with stakeholders, especially those living on the lake. Meetings would begin when it is again possible with a goal of 2-3 meetings taking place over the summer prior to the new grant deadline. It is uncertain when in-person stakeholder meetings will be feasible to initiate due to the current pandemic. The Ramsey County Property Map shows ~58 property owners that are immediately adjacent (or nearly so). These people would be contacted directly and requested to participate in facilitated discussions and sign a document that states their preference regarding an alum treatment on the lake. A model for this is the MN DNR invasive species treatment permit that requires all lakeshore owners to sign their permission for invasive species control. VLAWMO would not require that everyone agree to an alum treatment, but would document the preferences of ~58 property owners and make that available to BWSR and others as a statement regarding stakeholder opinion regarding an alum treatment on East Goose Lake. These stakeholder meetings would be conducted in a neutral location with a professional facilitator at VLAWMO's expense. The total number of meetings and cost would be decided by the Board.

A map is included for reference as to how ~58 landowners were identified. This map and total number of landowners included could be modified by direction from the Board. For example, right now residents with property on East and West Goose Lake would be included in the discussion. It could be limited to only East Goose Lake, if that was preferred.



Recommendation: The Board may consider an update at the Board meeting following a Friday afternoon conference call with BWSR staff. This could further inform the viability of option 1. Clarification of how success is to be measured is needed.

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engineering and environmental consultants

BARR

Technical Memorandum

To: Stephanie McNamara, Vadnais Lake Area Water Management Organization (VLAWMO)
From: Greg Wilson, Barr Engineering Co. (Barr)
Subject: Reevaluation of Goose Lake Alum Treatment Effectiveness
Date: March 10, 2020
Project: 23621353.00

Minnesota Board of Water and Soil Resources (BWSR) awarded $190,000 in grant funds to VLAWMO this past January for the East Goose Lake alum treatment which ranked as the highest scoring submittal in the FY2020 Projects and Practices category. Two potential issues with the alum treatment have been raised since the project award—the resurgence of the bullhead population in the lake and potential impact on alum floc given the high likelihood that boating restrictions will not be in-effect following the alum treatment. The purpose of this memorandum is to reevaluate the timing and potential effectiveness of alum treatment for East Goose Lake given the aforementioned concerns. As a part of this evaluation, information from past shallow lake alum treatments were compiled/consulted, the applicability of alternative stable states was considered, watershed BMP cost-benefit material was updated and project assurances were reconsidered to make recommendations about whether alum treatment still makes sense for East Goose Lake at this time.

Examples of Successful Alum Treatments for Shallow Lakes

The long-term efficacy of alum treatment for deeper lakes is well documented, but some studies have raised concerns about the longevity of alum treatment for shallow lakes. As a result, the available monitoring data was compiled and reviewed for four shallow lakes in the region that have had alum treatments between eight and 23 years ago, which Barr staff either designed and/or had firsthand experience with the lake and watershed management. In general, alum treatment represented the final management measure that converted each one of these lakes from turbid, eutrophic systems to a clear-water state.

The following table summarizes the in-lake total phosphorus (TP) changes that resulted from alum treatment in each of the four shallow lakes that were evaluated. In all four cases, the alum treatment has remained effective at controlling internal phosphorus load and there are indications or anecdotal evidence for the three oldest that the treatment longevity has been supported by positive feedback from changes to the lake ecology.

Lake	10-yr Ave Pre-Alum Treatment TP (mg/L)	1-yr Post-Alum Treatment TP (mg/L)	% Δ	1-yr to 3-yr Post-Alum Treatment TP (mg/L)	% Δ	1-yr to 5-yr Post-Alum Treatment TP (mg/L)	% Δ	1-yr to 10-yr Post-Alum Treatment TP (mg/L)	% Δ
Isles	0.061	0.022	*-64%*	0.029	*-52%*	0.034	*-44%*	0.040	*-33%*
Half Moon, WI	0.064	0.035	*-45%*	0.035	*-46%*	0.036	*-44%*		
SW Anderson	0.100							0.021	*-79%*
Kohlman	0.088	0.050	*-43%*	0.043	*-51%*	0.046	*-48%*	0.046	*-48%*

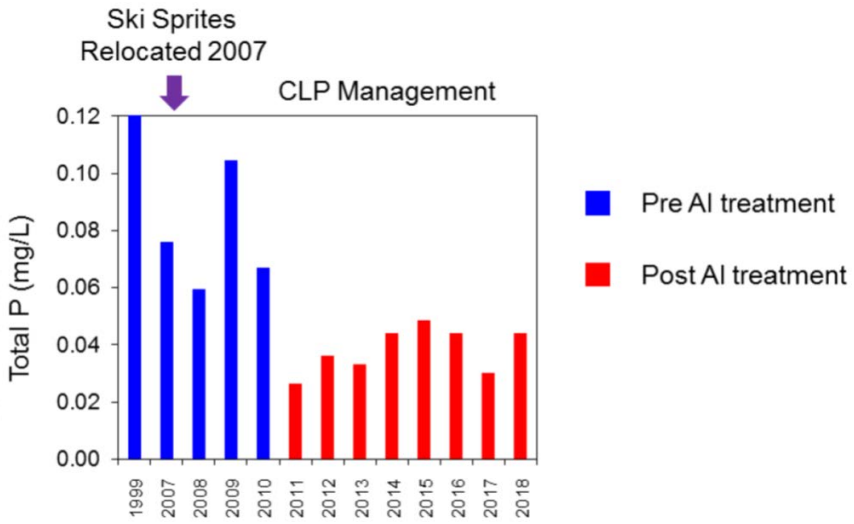
Notes
% Δ - Percent reduction in total phosphorus compared to 10-yr pretreatent average.

Lake of the Isles, Minneapolis

Lake of the Isles received an alum treatment in 1996. As shown in the above table, the TP concentration immediately dropped by two-thirds from the 10-year average TP concentration observed over the ten years prior to the treatment. Between the last five to fifteen years, the TP concentration has remained between 30 and 40 percent lower than the pretreatment TP average, and is significantly lower than the shallow lake standard of 0.060 mg/L. The Lake of the Isles watershed has not undergone significant change either before or after the alum treatment.

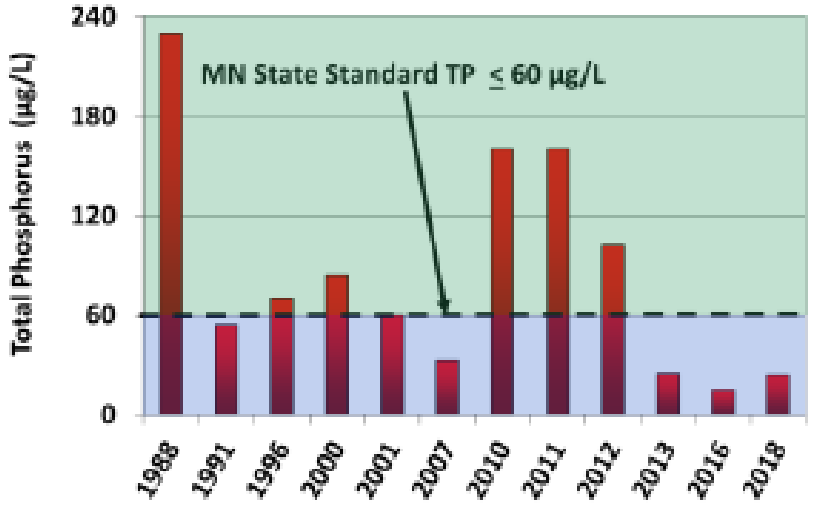
Half Moon Lake, Eau Claire, Wisconsin

Half Moon Lake received an alum treatment in 2011, as well as another, smaller maintenance treatment for one arm of the lake in 2017. As shown in the above table, the TP concentration has remained approximately 45 percent lower than the 10-year average TP concentration observed over the ten years prior to the treatment, and is significantly lower than Minnesota's shallow lake standard. While the Half Moon Lake watershed has not undergone significant change since the alum treatment, it should be noted that water-skiing was moved off the lake in 2007, boating restrictions were put in-place and private lakeshore residences have been systematically purchased and converted to public ownership. The following figure shows TP changes over time, which also reflects annual curlyleaf pondweed treatments.



Southwest Anderson Lake, Eden Prairie

Southwest Anderson Lake received an alum treatment in the fall of 2012. As shown in the above table, the TP concentration has remained approximately 80 percent lower than the 10-year average TP concentration observed over the ten years prior to the treatment, and is significantly lower than the shallow lake standard. The lake watershed has not undergone significant change since the alum treatment. The following figure shows TP changes over time, which also reflects a lake drawdown and aquatic plant treatment to control curlyleaf pondweed.



Kohlman Lake, Maplewood

Kohlman Lake received an alum treatment in 2010. As shown in the above table, the TP concentration has remained between 45 and 50 percent lower than the 10-year average TP concentration observed over the ten years prior to the treatment, and remains lower than Minnesota's shallow lake standard. While the Kohlman Lake watershed had not undergone significant change since the alum treatment, it should be noted that significant efforts were taken to remove carp from the lake and watershed, while water-skiing and boating have continued as lake uses. Aquatic plant growth increased significantly following the alum treatment, but plant harvesting has been used to balance recreational and ecological use and Ramsey-Washington Metro Watershed District has maintained monitoring records and quantified the TP removed through plant harvesting.

Alum Treatment and Watershed BMP Cost Effectiveness

Over the last year and a half Barr has assisted VLAWMO in an effort to further clarify watershed loading into both Goose Lake basins and identify the most cost-effective BMPs that could utilize watershed based grant funding. Hydrologic and hydraulic modeling was developed, along with updates to the P8 water

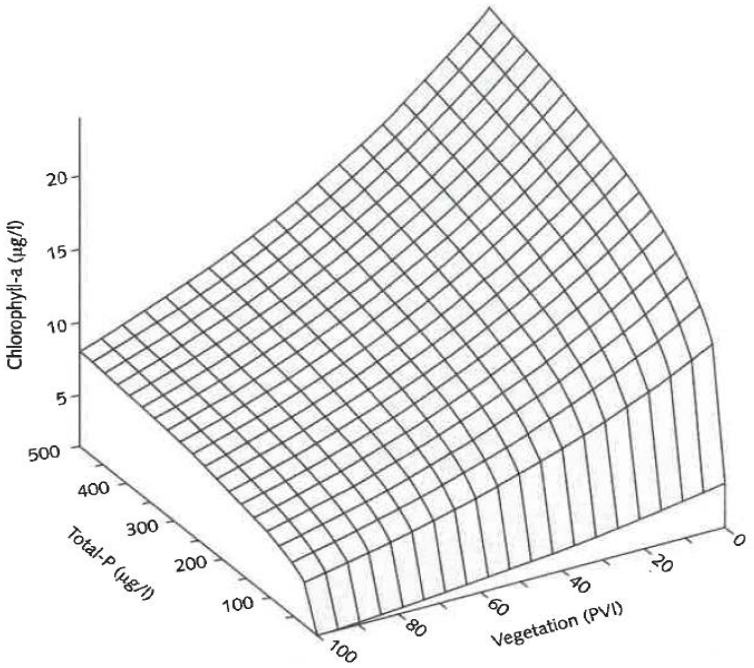
quality modeling, to identify and complete concept designs for three sets of BMPs that could feasibly be implemented in the East Goose Lake watershed. The results of this analysis showed that the combined costs of implementing all three BMP options would approach $2.3 million and could drop the average annual watershed TP load by approximately 70 pounds. The cost-benefit associated with implementation of any of the watershed BMP options ranges from $1,000 to $3,000 per pound of TP reduced per year.

In addition, the lake water quality modeling cited in the In-Lake Treatment Feasibility Study was revisited to put the updated watershed TP loading and BMP load reduction estimates into perspective with the expected benefit and cost of an in-lake alum treatment ($190,000). Depending on which year was used from the in-lake water quality modeling, it was confirmed that the internal TP load in East Goose Lake would range from 550 to 1,000 pounds per year. Assuming that an in-lake alum treatment would reduce the internal TP load by 80 percent, the cost benefit associated with implementation of the alum treatment of East Goose Lake translates to a range of $240 to $430 per pound of TP reduced per year.

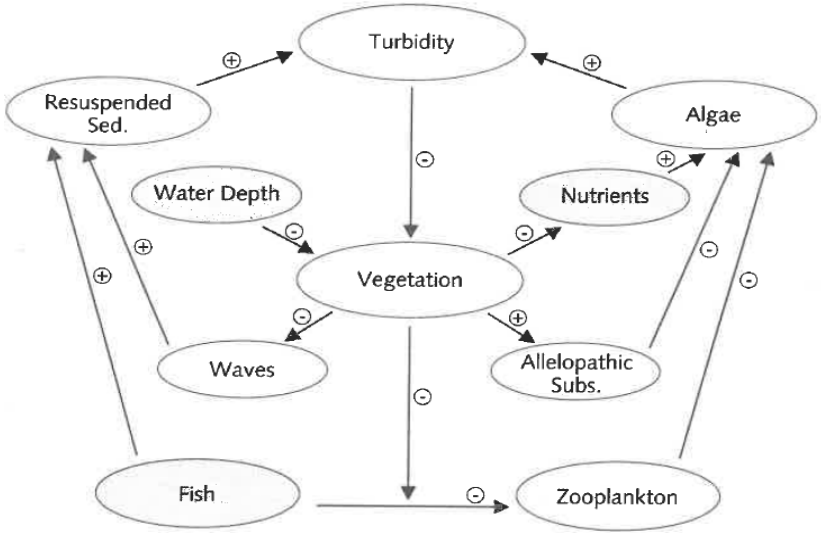
A comparison of the annualized cost-benefit analysis between watershed BMPs and alum treatment indicates that it is between 2.3 to 12.5 times more cost-effective to complete an alum treatment on East Goose Lake, compared to implementation of any of the other watershed BMP options. It is further noted that all of the internal TP load represents bioavailable phosphorus that is immediately available for uptake by algae, whereas no more than half of the TP load reduced by watershed BMPs would come from bioavailable TP loss. In addition, TP load reductions estimated for the watershed BMPs apply to the whole year, while the TP load reductions associated with in-lake alum treatment apply to the same summer months used in determining compliance with the State water quality standards.

Alternative Stable States of Shallow Lakes

Scheffer and van Nes (2007) revisited the original stable states theory for shallow lakes, which was inspired by observations that lakes tended to shift rather abruptly between clear and turbid states, and that once lakes turned turbid, they resisted restoration efforts. This theory applied to East Goose Lake in its turbid state would imply that fish (along with sediment phosphorus release) promote algae growth by recycling nutrients and/or stir up sediments (along with wind mixing and boating) and control development of zooplankton that would otherwise help clear the water of algae. The turbidity, in turn, makes it difficult to establish submerged plants. In contrast, once submerged plants become established they can greatly reduce turbidity by reducing wave resuspension and supporting other mechanisms (zooplankton, etc.) that control excessive algae without requiring additional reductions in phosphorus concentrations. As Sheffer (1998) shows in the following figure, an increasing extent of aquatic vegetation coverage can greatly reduce chlorophyll-a (or algae growth) for the same TP concentration. The positive and negative effects of plant growth are most pronounced on either end of the spectrum.



Scheffer and van Nes (2007) concluded that while the original theory remains quite valid to explain major patterns of change, less conspicuous shifts between alternative states also seem to occur in reality, whereby the change of biological communities along a gradient of eutrophication can be seen as a continuum in which gradual species replacements are interrupted at critical points by moderate or more dramatic shifts in communities. The most optimistic expectations are that implementation of watershed BMPs will provide a gradual shift in lake water quality for East Goose Lake, which realistically, may be imperceptible for lake use given the extremely high TP concentrations that currently exist. It will take an alum treatment on East Goose Lake before aquatic plants can become established, which in turn, can establish a positive feedback loop as shown in the following figure (Sheffer, 1998).



Project Assurances for In-Lake Alum Treatment

Two potential issues with the alum treatment have been raised since the project award—the resurgence of the bullhead population in the lake and potential impact on alum floc given the high likelihood that boating restrictions will not be in-effect following the alum treatment.

Bottom-feeding fish tend to stir up a deeper layer of sediment than other biological life in lake systems. For example, adult carp might be expected to stir up 10 to 20 cm of sediment, or two to three times the sediment thickness that is typically used to estimate the alum dose required for alum treatment. Given the current condition is East Goose Lake, it is possible that doubling the alum dose could mitigate the impact of the bullhead population. The less costly and better alternative for long-term water quality benefit involves bullhead removal and ongoing monitoring to control the rough fish population of the lake.

Barr recently became aware of a paper that helps address the potential impact that boating could have on alum floc following an alum treatment. Egemose et al. (2009) conducted a laboratory resuspension experiment using a calibrated erosion chamber with intact sediment cores from a shallow lake that had previously been treated with aluminum. They found that newly applied aluminum reduced sediment stability (initially), but ageing led to the same stability as untreated sediment within two months with an intact biofilm or within four months with a disturbed biofilm. Egemose et al. (2009) also concluded that aluminum application to shallow lakes prone to resuspension, and with high production, must be done in periods with less resuspension risk to allow for two to four months for floc stabilization. As a result, it is expected that a late-summer/early-fall alum treatment of East Goose Lake would provide adequate ageing and/or biofilm development to mitigate the increased potential for sediment resuspension before the following summer.

Recommendations

After accounting for the bioavailable fraction of TP load reduced during the summer months, an in-lake alum treatment is between ten and fifty times more cost-effective at perceptively improving lake water quality in East Goose Lake. As a result, it is recommended that VLAWMO submit the aforementioned project assurances and cost-benefit information to BWSR and proceed with work plan approval for Phase I of the alum treatment. Lake water quality response should then be monitored following the Phase I alum application for two summers to ensure that the desired effect is attained before proceeding with the second phase of alum application (which may require a request for BWSR to extend the project schedule by one year).

References

Egemose, S., G. Wauer and A. Kleeberg. 2009. Resuspension behaviour of aluminum treated lake sediments: effects of ageing and pH. Hydrobiologia 636: 203-217.

Scheffer, M. 1998. Ecology of Shallow Lakes. Chapman & Hall. London.

Scheffer, M. and E.H. van Nes. 2007. Shallow lake theory revisited: various alternative regimes driven by climate, nutrients, depth and lake size. Hydrobiologia 584: 455-466.

VLAWMO
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Water Management Organization

800 County Road E E, Vadnais Heights, MN 55127
www.vlawmo.org; Office@vlawmo.org

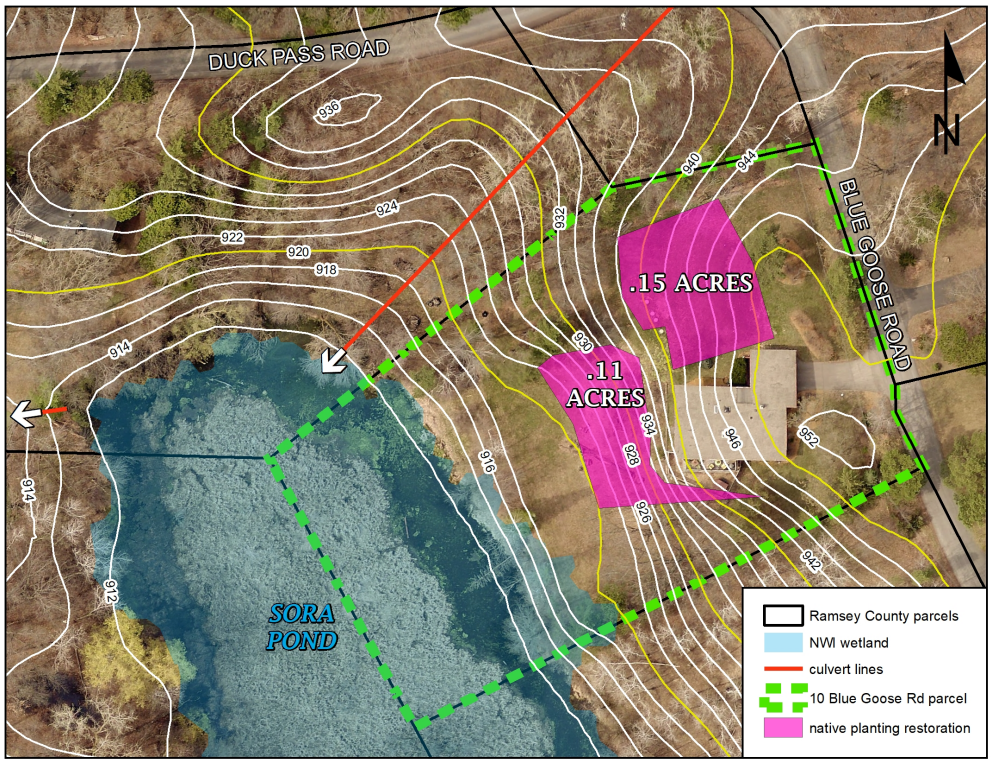
To: Board of Directors

From: Tyler Thompson

Date: March 19, 2020

Re: V. C. 1. Cost Share Program – LL2 2020-03 Peterson Landscape Level 2 Grant, NO

An application was received for LL2 cost share funding in the amount of $9,024 for a .26 acre native restoration at a private residence in North Oaks. After clarifying with the applicant, only $7,932 of the Project was eligible for applying for VLAWMO cost share funds. The February Board memo was unclear that the homeowners had seen a neighbor's native restoration and had heard about VLAWMO's cost share program through them, and had planned to do the same. The homeowner then had a proposal submitted from Prairie Restorations, Inc. for restoring their backyard hillside that was covered with buckthorn, to native vegetation. However, in this proposal, the cost to remove buckthorn was considerably high, so the applicants hired a cheaper contractor to perform the work last fall, and planned to have PRI carry out the rest of their proposal. Their application includes preparation of the planting site by herbicide of current invasive plants, then reseeding and planting with native plugs to restore the project area, totaling .26 acres.



At the February meeting, the Board voted to table the approval of grant funding for members of the Board to view the site to verify the project. After this, staff is bringing this project back to the Special March 25th Board meeting, and is recommending approval.

Staff has recommended a 50% match of the requested $7,932 LL2 funding for the project, resulting in total recommended amount of $4,000 for funding of LL2 2020-03. TEC concurs and is recommending Board approval.

Recommendation: TEC & staff recommend approval and funding of the LL2-2020-03 grant application in the amount of $4,000.00

Vadnais Lake Area Water Management Organization
800 East County Rd E
Vadnais Heights, MN 55127
www.vlawmo.org
(651) 204-6070

LANDSCAPE LEVEL 2 GRANT APPLICATION FORM

Please submit form and required materials to: TYLER THOMPSON
tyler.thompson@vlawmo.org
(651) 204-6071

Please fill in the application as best as possible and use additional pages if necessary. Refer to the Grant Guidance document for further information or contact Tyler Thompson with any questions.

APPLICANT INFORMATION

ORGANIZATION NAME: Dawn and Don Peterson

CONTACT PERSON: Dawn or Don Peterson

ADDRESS: 10 Blue Goose Rd. CITY: North Oaks ZIP: 55127

PHONE: 651-431-1441 - Dawn
651-315-1278 Don EMAIL: peterson.dawn@comcast.net

PROJECT SUMMARY

ESTIMATED **TOTAL** COST OF YOUR PROJECT: $ 12,032 AMOUNT OF GRANT REQUESTED: $ $9,024

AMOUNT & SOURCE OF MATCHING FUNDS? (25% MATCH REQUIRED): $3008 – homeowner

WHEN DO YOU PLAN TO COMPLETE YOUR PROJECT? We have already had the hill mowed by a brush mower. Would like to have Prairie restorations begin in the spring.

TYPE OF PROJECT THAT WILL BE COMPLETED:

- Raingarden/ Infiltration Basin ☐
- Shoreline Restoration ☐
- Native Plant Restoration ☒
- Other ☐

If other, please describe proposed project: See enclosed plan from Prairie Restorations.

PROJECT BACKGROUND

DESCRIBE YOUR PROPERTY (INCLUDING WATER RESOURCES WHICH MAY BORDER THE PROPERTY), AND WHAT ISSUE YOU HOPE TO ADDRESS WITH THIS PROJECT.

Our home sits on a large hill that drains into a wetland pond. This hill was full of buckthorn and other noxious weeds. This fall we paid to have it brush mowed except for our septic hill which currently has long yard grass. It is so steep my husband just quit mowing it.

WHAT RESULTS DO YOU HOPE TO ACHIEVE WITH THIS PROJECT?

We want this large hillside on our property to be restored to native plants. ~~We did it ourselves for a large~~ The amount of buckthorn needed to be eradicated was overwhelming to us. We tried to keep it at bay on another property & it was hard. Decided to get professional help with the property.

HOW WILL THIS PROJECT BE USED TO EDUCATE THE PUBLIC ABOUT GOOD WATER RESOURCE STEWARDSHIP?

We are open to neighbors touring our project & telling them about how it was done & about the project's benefits for the environment.

PLEASE LIST OTHER PARTNERS WHO ARE PROVIDING FUNDING OR OTHER FORMS OF SUPPORT.

Ø None We enjoyed watching the project on Dove Lane matures. We talked to these homeowners about their process and they told us about working with you.

I just read the Dec. North Oaks News & saw the article about your program.

PROJECT SPECIFICATIONS

see Prairie Restoration Proposal.

In order to be considered for a LL2 grant, information regarding the water quality benefit of your project (amount of stormwater and phosphorus captured) must be included. If you are working with a professional designer/contractor and they are able to determine the pollutant capture, include that information with the application. If they are not able to provide the data, please fill in the information below so that VLAWMO staff can perform the calculations.

TOTAL PROPERTY AREA (SQ.FT): _____

PROJECT SIZE (SQ.FT.): _____

IMPERVIOUS AREA DRAINING TO PROJECT (SQ.FT.): _____

PERVIOUS AREA DRAINING TO PROJECT (SQ.FT.): _____

IF YOUR PROJECT IS A RAINGARDEN, PLEASE PROVIDE THE FOLLOWING INFORMATION

SOIL INFILTRATION RATE (INCHES/HR): _____

DEPTH OF RAINGARDEN (INCHES): _____

ADDITIONAL REQUIRED MATERIALS

PROJECT DRAWINGS, SPECIFICATIONS, TIMELINE, ANTICIPATED PLANT LIST AND A DETAILED BUDGET MUST BE SUBMITTED IN ADDITION TO PROVIDING THE ABOVE INFORMATION.

Date: 12/27/2019

Proposal to Create a Native Landscape at the Peterson Residence in North Oaks, MN

Prepared for:
Dawn Peterson
10 Blue Goose Road
North Oaks, MN
651-431-1441
Peterson.dawn@comcast.net

Prepared by:
Jesse Neihart
Project Manager/ Restorationist
612-723-5586
jneihart@prairieresto.com

Project Areas:
Hill behind the house 0.11 acres
0.15 acres

Prairie Restorations, Inc.

Two Oaks Office
PO Box 95
Scandia MN 55073
www.prairieresto.com

A. Company Background: http://www.prairieresto.com/mission.shtml **(Follow the blue links to learn more)**

Prairie Restorations, Inc. (PRI) has been dedicated to the restoration and management of native plant communities for over 40 years. We are fortunate to have worked with thousands of clients on a wide variety of projects in both the public and private sectors throughout the Upper Midwest.

The PRI staff currently consists of 54 full-time professionals and about an equal number of seasonal employees which operate out of six Minnesota locations. Most of the staff has B.S. degrees in natural resource related fields such as biology, forestry, horticulture or wildlife. As a full service restoration company, PRI is able to provide our clients expertise and service in all facets of native landscape restoration. Along with consulting, design, installation and land management services, we also produce our own local ecotype seed and plant materials which are used on all of our projects.

The PRI Team is committed to and passionate about protecting and enhancing our valuable natural resources. It is this dedication that is brought to each and every one of our projects. We are proud to offer the best expertise, services and products available in the industry and appreciate the opportunity to provide you with this proposal.

B. Project Overview:

1. Establishing a native landscape (http://www.prairieresto.com/establish_landscape.shtml) in these areas will provide a long term, ecologically sound landscape that is adapted to the existing conditions of the site. This native landscape will not require irrigation, black dirt or other soil amendments. It will add a distinctive look to the property as well as provide valuable habitat for songbirds, butterflies, bees and other pollinators.

2. The project areas would have nonnative invasive woody species cut, piled, burned, and stump treated. Once removal has been executed, areas should be treated with herbicide, burned to remove dead vegetation, tilled as possible with present stumps, treated with herbicide 2-3 more times, and seeded.

3. An option is given to plant native wildflower and grass plugs within the project area to add diversity and color within the project area.

4. An estimate for 3 years of Establishment Period Vegetation Management is included in this proposal.

5. **Threats**: Nutrient (nitrogen) loading is the primary threat to native plant communities. Excess nutrients favor undesirable vegetation (aka "invasive spp.). Excess nutrients can come from lawn fertilizer, pet excrement, lawn clippings, leaf fall (some trees are heavy nitrogen loading species [e.g. maples, box elders, ash, elm), run-off from agricultural fields, septic systems, excessive compost / mulch and adjacency to high fossil fuel consumption zones (e.g. downwind from coal burning power plants, busy highways, etc.). I recommend to reduce lawn fertilization, create low-frequency mowing buffer between turf and prairie, do not discharge clippings, lawn/pet waste into native plant community, and conduct frequent fire and or biomass harvest (e.g. haying) reduce nitrogen internal loads.

C. Site preparation: http://www.prairieresto.com/installation_preparation.shtml

1. Winter of 2019/2020, remove invasive woody species such as European buckthorn (Rhamnus cathartica) and Eurasian Honeysuckle (Lonicera spp.) and any unwanted species in the project area by flush cutting and stump treating with Triclopyr herbicide (Garlon 4® or equivalent). Cut material will be piled and burned onsite when at least 3 inches of snow present on ground, full coverage.

2. In areas with actively growing vegetation, apply a glyphosate herbicide (Roundup® or equivalent) and a triclopyr herbicide (Vastlan® or equivalent) with appropriate surfactants, as per manufacturer's directions. Allow a minimum of 30 days before disturbing the vegetation with other procedures.

3. Remove the dead vegetation by implementing a prescribed burn using appropriate procedures, equipment and permits. If this is not feasible, mow the dead vegetation and remove excess thatch as needed.

4. As possible with stumps and topography. Disk or till the soil to stimulate weed seed germination. Disking and Tilling is not advisable on a mound system but given the turf and fescue species present, it is the only way to break up the root systems and create a seed bed.

5. Allow the site to green up, followed by an application of a glyphosate herbicide (Roundup® or equivalent) as per manufacturer's directions. Allow a minimum of 10 days before disturbing the vegetation with other procedures.

6. Respray with a glyphosate herbicide (Roundup® or equivalent) when regrowth of vegetation occurs.

7. Harrow or rake the soil to create a smooth seedbed.

D. Seed and Seeding: http://www.prairieresto.com/installation_seeding.shtml

1. The grass seed will be spread by hand broadcasting throughout the project area.

2. A raking will follow to incorporate the seed into the soil.

3. Following the raking, flower seed will be spread by hand broadcasting onto the soil surface.

4. The seed mixes will consist of the following species and amounts:

Grass Seed	**lbs / project area**
TO1 - Two Oaks Short Dry non clay Grass Mix: 43% Little bluestem, 37% Side oats grama, 5% Kalm's brome, 5% June grass, 5% Poverty oats grass, 5% Sand dropseed all by PLS weight.....	11.0
TO4 - Two Oaks Savanna Grass Mix: 21% Little bluestem, 20% Side oats grama, 10% Poverty oats grass, 8% Canada rye, 8% Silky rye, 8% Bottlebrush grass, 8% Big bluestem, 5% Indian grass, 5% Blue grama, 5% Kalm's brome, 2% Hairy wood chess all by PLS weight.....	4.5

http://www.prairieresto.com/CategoryList.php?cID=12

Note: A cover crop will be sown along with the native grasses at a rate of approximately 25 lbs./acre. Cover crop is an

annual grass species that germinates quickly and will reduce the risk of soil erosion on the site. Oats will be used for a spring or summer seeding, and winter wheat will be used for a fall seeding.

Wildflower Seed **oz / project area**

TO1 - Two Oaks Short Dry non clay Forb Mix:
12% Purple prairie clover, 10% Leadplant, 10% Hoary vervain,
8% White prairie clover, 7% Lupine, 8% Black eyed Susan,
6% Butterfly milkweed, 5% Showy penstemon, 4% Bush clover,
4% Rough blazing star, 4% Spiderwort, 3% Gray goldenrod,
3% Upland goldenrod, 2% Whorled milkweed, 2% Partridge pea,
2% Prairie cinquefoil, 1% Prairie onion, 1% Common milkweed,
1% Stiff tickseed, 1% Silky prairie clover, 1% Stiff goldenrod,
1% Showy goldenrod, 1% Smooth aster, 0.5% Yarrow,
0.5% Prairie rose all by PLS weight..... 6.5

TO4 - Two Oaks Savanna Forb Mix:
12% Purple prairie clover, 12% Hoary vervain, 9% Leadplant,
9% White prairie clover, 8% Black eyed Susan, 5% Columbine,
4% Partridge pea, 4% Bush clover,
4% Stiff goldenrod, 4% Spiderwort, 3% Large leaved aster,
3% Ox-eye sunflower, 3% Gray goldenrod,
3% Golden alexander, 2% Canada milkvetch, 2% Canada tick trefoil,
2% Lindley's aster, 2% Smooth aster, 1.5% Common milkweed,
0.5% Yarrow all by PLS weight. 4

http://www.prairieresto.com/CategoryList.php?cID=13

E. Erosion Control: http://www.prairieresto.com/installation_erosion.shtml

1. Cover crop will be sown along with the native grasses.

2. The seeded areas without slope will be mulched with clean straw at a rate of 1.5 tons per acre.

3. Small or inaccessible areas will be hand mulched.

4. Straw erosion blanket (S150 or equivalent) will be applied as per manufacturer's directions to the sloped areas of the project.

F. Plants and Planting:

1. Immediately following the implementation of any erosion control measures, the planting can be further diversified with native wildflower and/or grass plants (plugs). These would be planted individually in appropriate microhabitats throughout, or in designated areas of the project. The plants used would consist primarily of species other than those previously seeded.

2. Plant a total of 500 plugs.

Wildflowers

http://www.prairieresto.com/CategoryList.php?cID=10

Leadplant (*Amorpha canescens*)
Thimbleweed (*Anemone cylindrica*)
Pussytoes (*Antennaria neglecta*)
Columbine (*Aquilegia canadensis*)
Prairie sage (*Artemisia ludoviciana*)
Butterfly weed (*Asclepias tuberosa*)
Whorled milkweed (*Asclepias verticillata*)
Showy penstemon (*Penstemon grandiflorus*)
White prairie clover (*Dalea candida*)
Purple prairie clover (*Dalea purpurea*)
Pale purple coneflower (*Echinacea angustifolia*)
Fireweed (*Epilobium angustifolium*)
Grass-leaved goldenrod (*Euthamia graminifolia*)
Wild strawberry (*Fragaria virginiana*)
Northern bedstraw (*Galium boreale*)
Wild geranium (*Geranium maculatum*)
Stiff sunflower (*Helianthus pauciflorus*)
Rough blazing star (*Liatris aspera*)
Starry false solomon's seal (*Maianthemum stellatum*)
Woodland phlox (*Phlox divaricata*)
Prairie phlox (*Phlox pilosa*)
Solomon's seal (*Polygonatum biflorum*)
Prairie cinquefoil (*Potentilla arguta*)
Yellow coneflower (*Ratibida pinnata*)
Zig zag goldenrod (*Solidago flexicaulis*)
Showy goldenrod (*Solidago speciosa*)
Heath aster (*Symphyotrichum ericoides*)
Calico aster (*Symphyotrichum lateriflorum*)
New England aster (*Symphyotrichum novae-angliae*)
Aromatic aster (*Symphyotrichum oblongifolium*)
Azure aster (*Symphyotrichum oolentangiense*)
Early meadow rue (*Thalictrum dioicum*)
Western spiderwort (*Tradescantia occidentalis*)
Culver's root (*Veronicastrum virginicum*)
Golden alexanders (*Zizia aurea*)

G. Management: http://www.prairieresto.com/management_overview.shtml

1. Management (maintenance) plays a vital role in the eventual success of any native landscape installation, especially during the establishment period. Active management of your native landscape is highly recommended to give the project the best opportunity for long term success.

2. During the germination year, the project area will need to be mowed to control annual weed development. If a "closed" canopy of weed cover develops, it should be mowed to aid in the growth of the prairie seedlings by reducing competition. Mowing may also be necessary if the weeds are about to set seed. Optimum cutting height, depending on the wildflower species present, is typically 4 to 6 inches. It is important that the clippings are finely mulched in order to prevent smothering. PRI can provide the mowing services if desired. Please refer to the cost section of this proposal for a mowing quote.

3. In years following the first growing season, Integrated Plant Management (IPM) services are utilized to control annual, biennial and perennial weed species within the developing native landscape. Typical IPM services include spot herbicide spraying, spot mowing, herbicide wicking or hand weeding. These services are billed on a per trip cost agreed upon prior to the growing season. Rough estimates are provided in the cost section of this proposal for these future management activities.

4. Prescribed burning is a highly effective management tool and will be recommended for your project as it matures. Burning stimulates native species to grow more robustly and also help to deter the presence of many non-native and/or woody species.

Prescribed burning, when recommended, will be provided as a separate lump sum cost.

5. In lieu of burning, or during years when the site is not burned, a Spring Dormant Mowing can be used to "clean up" previous year's growth and set the table for the new growing season. This mowing would occur early in the spring, as soon as conditions permit. Spring Dormant Mowing, when recommended, will be provided as a separate lump sum cost.

H. Anticipated Management:

The following table conveys the anticipated management procedures for your project during the first 3 growing seasons. Estimates for these procedures are provided in the cost section of this proposal.

Year	Projected Management Procedures
2020	Complete site mowings to control annual weed canopy (1 or 2 mowings as needed). Project monitoring
2021	Complete site mowing Integrated Plant Management (IPM) – includes spot spraying, spot mowing, wicking, hand weeding, and other techniques to control weeds and invasive species (3 visits are typical) Project monitoring
2022	Integrated Plant Management (IPM) – includes spot spraying, spot mowing, wicking, hand weeding, and other techniques to control weeds and invasive species (3 visits are typical) Project monitoring
2023	Spring burn to encourage native plant growth and to help deter the presence of non-native and woody species. Integrated Plant Management (IPM) – 3 visits are typical Project monitoring

I. Costs:

Project Installation:

Site preparation

Spraying	$325
Burning	$950
Respray	$300
Respray	$300
Disk	$590

Seed and seeding as specified	$2,085
Mulching as specified	$350
S-150 erosion control blanket as specified to sloped areas	$1,757

Total **$6,657**

Additional Options:

Buckthorn and woody plant removal (*cutting, piling, burning and stump treating*) $3,519

Native seedling plugs (*500 installed @ $2.55 each*) $1,275

Vegetation Management:

Future Management Estimates:

Growing season 2020 *(assumes 3 IPM/mow visits)* **$900**
Growing season 2021 *(assumes 3 IPM visits)* **$1,100**
Growing season 2022 *(assumes 3 IPM visits)* **$1,150**
Growing season 2022 *prescribed burn* **$950**

Please note: The ***Future Management Estimates*** are meant to convey typical management costs for projects of similar size and characteristics. Prior to each growing season, you will receive a specified quote from your project manager detailing the recommended management strategies and associated costs for your project.

J. Contract:

If you accept the proposal as written and want to proceed with the project, please sign the contract below.

Owner (print): _____ **Date:**_____

Signed: _____

Contract Value: $_____

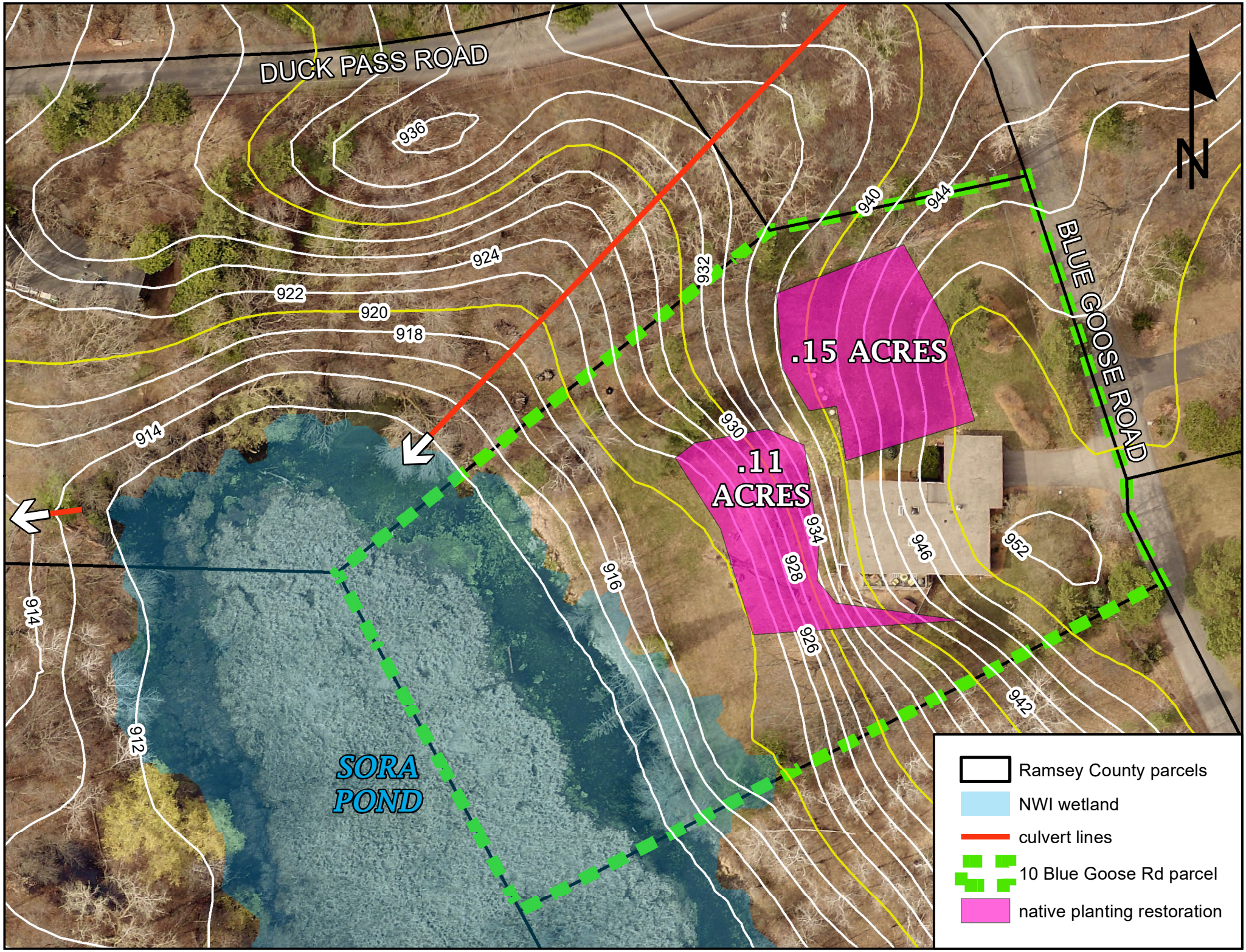
Contractor: *Prairie Restorations, Inc.*

Jesse Neihart—Project Manager/ Restorationist
Prairie Restorations, Inc.
PO Box 95
Scandia MN 55073

A 20% down payment is required at this time. Please return a copy of the signed contract, along with payment for 20% of the total project cost. The remainder of the contract will be billed upon completion.

K. **Notes:** Please note that this proposal is valid for 1 month (from the date on the proposal). If the proposal is accepted after the 1 month period, PRI reserves the right to modify the proposal based on cost fluctuations and material availability.

Restoration outline prepared by Prairie Restorations, Inc. (PRI), Princeton, Minnesota


DUCK PASS ROAD
BLUE GOOSE ROAD
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934
928
926
940
944
946
952
942
.15 ACRES
.11 ACRES
SORA POND
Ramsey County parcels
NWI wetland
culvert lines
10 Blue Goose Rd parcel
native planting restoration

VLAWMO
Vadnais Lake Area
Water Management Organization

800 County Road E E, Vadnais Heights, MN 55127
www.vlawmo.org; Office@vlawmo.org

To: Board of Directors

From: Dawn Tanner

Date: March 19, 2020

Re: **V. D. 1. Partnership with RWMWD Carp effort in West Vadnais Lake**

VLAWMO staff are preparing for the upcoming round of Watershed-based Funding and continuing to reference our Comprehensive Watershed Management Plan for projects that are scheduled to be starting in 2020-2021. Staff are also part of a Metro Carp Management Group. This is a new group that is being formed to coordinate carp management efforts across the metro area, and share successes and failures to make the process more effective and efficient.

As part of our effort to prepare for the West Vadnais TMDL, WBF second round, and SLMP for West Vadnais, we are working to collaborate with Ramsey Washington Metro Watershed District (RWMWD) as part of their ongoing effort to remove Common carp. In RWMWD surveys and report, Common carp management in West Vadnais Lake were identified as a priority. Rough fish management, including carp, are also identified in our Plan. Our ability to contribute to RWMWD's ongoing project means that it is possible for us to conduct relevant efforts without overextending our current budget. We may also be able to leverage WBF funds with this approach when those meetings get underway.

Staff met with RWMWD and Carp Solutions at West Vadnais Lake to take measurements and better understand barrier placement to protect removals already conducted in the Phalen chain (downstream from West Vadnais). West Vadnais has the highest biomass of the waterbodies assessed in the analysis done by RWMWD in 2017-2018.

Lake Owasso also had high biomass reported as a result of this survey. Since the survey was done, Owasso has been the focus of mark-capture-recapture, carp removal, nursery surveys, ageing, radio transmitter implantation/radio telemetry, and commercial seining (See table below).

Table 1. Boat electrofishing surveys for common carp in the Owasso subwatershed. Emily Lake was also surveyed, with only goldfish and black bullhead present. * this is the more accurate biomass and abundance estimate derived using capture-mark-recapture surveys (see Phase 2 for details).

Lake Name	Owasso	Wabasso	Grass	Bennett	W. Vadnais	Owasso Basin
Lake Area (ha)	152	17	56	12	86	3.2
Length (mm)	475	470	419	511	482	456
CPUE (carp/h)	74.0	27.0	11.3	7.8	38.0	9.5
Mass (kg)	1.5	1.4	1.1	1.8	1.6	1.3
Density (carp/ha)	302	115	50	35	160	43
N	16,777*	1,959	2,807	422	13,739	136
Biomass (kg/ha)	218.3*	167.0	52.9	64.2	248.2	56.6

Please review the attached documents included in the packet:

1. Natural Resources Update from RWMWD
2. Common carp management proposal and cost estimate for the full project (RWMWD & VLAWMO)

3. An article by BWSR about carp management in Rice Creek Watershed District (This project is referenced in other materials, and RCWD is a number of years ahead in the effort to remove

   Common carp to levels that allow improved water quality.) https://medium.com/@MnBWSR/the-potential-application-is-huge-3789a37fa190

4. Staff will share a webinar that was presented on Feb. 28 by the Minnesota Aquatic Invasive Species Research Center when it is available online. The link is not available yet at the time of the packet

A short ppt presentation will be included during the Board meeting.

Recommendation: TEC & staff recommend approval and funding to support monitoring and removal on West Vadnais Lake and contribute to a barrier at the outlet of West Vadnais in the amount of $12,500.

Natural Resources Update – March 2020

Bill Bartodziej and Simba Blood

Carp Management - Researching the Feasibility of a Low Voltage Electric Barrier at the West Vadnais Outlet

The problems:

1) A 2017 survey by Carp Solutions, Inc. found carp biomass at approximately 220 lbs/acre in West Vadnais. The carp biomass threshold for water quality impacts is 100 lbs/acre. West Vadnais is a shallow lake and it is likely that the high carp density is negatively affecting water quality. This lake is on the state's impaired waters list. It has had consistently high phosphorus levels and severe algal blooms (Figure 1).

2) In 2019, we captured 57 adult carp at a PVC pipe barrier south of the West Vadnais outlet (Figure 2). This is evidence that carp are moving out of this lake and making their way into the Phalen Chain of Lakes system. This barrier was simple and not failsafe, so there is a good chance that some of carp moved around the barrier. These adult carp can get into small ponds, spawn and migrate into the Phalen Chain, via Gervais Creek and Gervais Mill Pond.

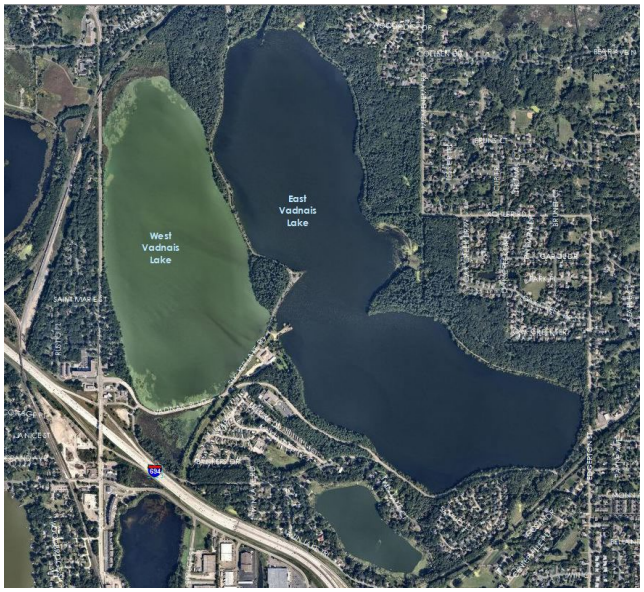


Figure 1: A severe algal bloom was obvious from the air – September 2018.

Figure 2: A simple PVC barrier was used to detect carp migration out of West Vadnais.

Possible solution:

We are researching the possibility of installing a low voltage electric barrier just upstream of the West Vadnais outlet. The barrier unit that we are looking at is being used in Rice Creek by the Watershed, and results have been very promising. Carp Solutions would supervise the installation of the unit.

If conditions around the outlet are favorable for the installation (i.e., elevations and access are adequate), we will rent the unit for a year and assess its effectiveness. We will also look at the feasibility of harvesting carp in the outlet channel. If we see a large number of carp aggregate in the outlet channel during the spawning migration, this may be a great location to set up a harvesting station. We could use the barrier setup to direct the carp in a corral and then harvest.

We are partnering with VALAMO on this project and plan to share the expense. Both organizations will benefit greatly from this carp management effort. We have budgeted for this work already (NR program).

Two strips of low voltage electrodes on the bottom substrate compose the barrier on Rice Creek.

Carp were stacked up on the downstream side of the positive strip of electrodes (red line). The watershed used this opportunity to harvest the carp through a corral type system on the side of the creek. We might be able to do the same at the West Vadnais outlet.

Common carp management in 2020 proposal and cost estimate

February 25, 2020

Prepared for:
Prepared for Bill Bartodziej, RWMWD
Dawn Tanner, VLAWMO

Objective 1. Electric carp barrier at outlet of West Vadnais Lake

The aim of this objective is to install a low-voltage electric barrier for carp at the outlet of West Vadnais Lake and test its performance using PIT technology for one year. The barrier will be designed and installed in April 2020. Two rows of electrodes will be placed across the stream and connected to a control unit on shore. RWMWD will arrange site preparation and power supply as needed.

Two PIT antennas will be installed near the barrier, one upstream and one downstream. The antennas will be connected to a reader box placed on shore. A solar panel will be used to provide power to the reader box throughout the year. RWMWD will supply a field box to house the equipment.

At least 100 carp will be tagged in West Vadnais Lake with PIT tags by conducting boat electrofishing surveys (2 days). These fish will be tagged shortly after ice out and will be used to determine what percentage of carp attempt to migrate through the barrier, when the migrations occur and whether the barrier is effective. The PIT system will be checked up to 5 times a month during the peak of migration season (April - June) and then up to two times a month through the rest of the year.

*PIT systems with remote online data access would be $1,500 more per site.

Cost for Objective 1

Barrier design and rent	22000
Barrier install	1280
PIT antenna build and install	1500
PIT system monthly check and rental (300/month rental with monthly check, 9 months)	2700
Implanting carp with PIT tags, 2 days of electrofishing	4000
Cost of PIT tags	600
Overall Obj 1	32080

Objective 2. Documenting movement of carp through Owasso Subwatershed

We will install 4 PIT antenna systems: one between Owasso and Wabasso near the existing barrier, one between Owasso and Victoria Ponds, one between Wabasso and Grass Lake and one between Grass and West Vadnais. The installs will occur in April. At each site we will instal a single antenna (two antennas at Owasso/Wabasso one on each side of the barrier) connected to a data logger, batteries and solar panels. RWMWD and VLAMWO will provide appropriate sites for these systems, ideally in a sunny spot, protected from flooding and vandalism.

The PIT systems will continuously monitor carp migration at each site. Once migrations occur, we will attempt to capture the migrating fish using nets placed by the physical barriers. PIT systems will be in place between April 1 and June 30, 2020 and each will be checked on up to 6 occasions per month to ensure the systems are working, and to download the data. This period could be expended as needed.

*PIT systems with remote online data access would be $1,500 more per site.

Objective 2 (4 PIT systems)	
PIT antenna build and install, 4 sites	6000
PIT system monthly check and rental April - June (300/month per site rent + 10 checks $400 each)	7600
Removal of carp around barriers and disposal, backpack EF (3 people, $80/h each, 5 days)	9600
Overall Objective 2	23200

Objective 3. Installation of physical barriers
Carp Solutions will assist as needed with installations of physical carp barriers in RWMWD. We will also provide one gas post-pounder.

Objective 3	
Installation of physical barriers (5 days, crew of 2, $80/h, post pounder included)	6400

Objective 4. Automated carp net in Phalen chain

We will conduct a demonstration project where a remotely controlled box net and automated programmable feeder will be installed in one location in the Phalen chain during August and September 2020. Carp Solutions will construct and install one 30’ x 60’ net equipped with

remotely controlled trigger mechanisms. We will also install one feeder and program it accordingly. RWMWD will take care of purchasing the bait and re-filling the feeder (~ once every 4 days) and maintaining the net in good order. Carp solutions will assist with carp removal and disposal on 3 occasions.
The net will be named “Curly” in reference to the most dedicated carp removal enthusiast in the chain of lakes - Curly.

Objective 4	
"Curly" net put together and install (2 people, 5 h, $80.h)	800
Net and feeder rental (60 days, $30/day)	1800
setting net, tripping net, carp removal, disposal - 3 times, $1,500 each	4500
Net removal and cleanup	500
Overall Obj 4	7600

Data analysis, report, coordination $2,000

Total Budget: $71,280

The potential application is huge

Minnesota Board of Water and Soil Resources
May 4, 2018 · 6 min read

Minnesota is watching as the Rice Creek Watershed District tests a new way to remove carp. Designed to improve water quality in Long Lake, the techniques used here could be applied throughout the state where carp migrate to spawn.

From left: Post-doctoral researcher Peter Hundt and University of Minnesota technician Kao Vang work with Emil Kukulski, director of Poland-based ProCom System's hydro-ecological department, on April 30 in Rice Creek to reposition a chute through which carp will pass when they migrate upstream from Long Lake to spawn in the Lino Chain of Lakes. The Rice Lake Watershed District is testing a low-voltage electrical guidance system. Paired with a Whooshh System (AKA carp cannon), it is designed to remove about 75 percent of migrating carp. Carp removal is one part of RCWD's $7.3 million plan to improve water quality in Long Lake. Photo Credits: Ann Wessel, BWSR

NEW BRIGHTON — An experimental carp removal system being tested this month on Rice Creek could change the way Minnesota deals with the invasive fish that degrade lakes' water quality and habitat.

If it works, the system could be used where invasive common carp migrate to spawn.

“The potential application is huge, because carp show these spawning migrations in many, many different lake systems,” said lead project researcher Przemek Bajer of the Minnesota Aquatic Invasive Species Research Center. “If you could create a device that removes them from the stream without a lot of physical labor — that would basically revolutionize carp management. You could remove 50 to 80 percent of the population with one or two people with very little effort.”

The system combines technology used in Poland to keep fish out of hydroelectric plants with technology developed in the U.S. to pick fruit.

Carp removal is just one element of Rice Creek Watershed District’s four-part, $7.3 million Long Lake Targeted Watershed Demonstration Project, a comprehensive approach to improve water quality in nutrient-impaired Long Lake. A $3 million Targeted Watershed Demonstration Program grant from the Minnesota Board of Water and Soil Resources was awarded to assist that effort.

Matt Kocian, Rice Creek Watershed District’s lake and stream specialist, and Przemek Bajer of the Minnesota Aquatic Invasive Species Research Center discuss progress of the carp removal system being installed April 30 on Rice Creek in New Brighton. A second system would stop juvenile carp from migrating downstream from the Lino Chain of Lakes.

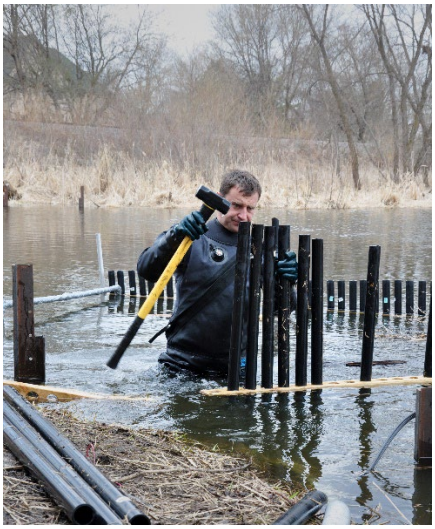
“Algae blooms are frequent; they can be intense,” said Matt Kocian, RCWD lake and stream specialist. “Common carp exacerbate that problem big time. We know in Long Lake and in some of our other lakes we’re not going to meet water-quality standards without addressing carp.”

Carp stir up the lake bottom in search of food, which increases turbidity and frees nutrients that feed algae growth.

To make a noticeable difference in Long Lake, the RCWD estimates the carp population must drop from 800 kilograms per hectare to 100 kg/ha. A single female can produce 1 million eggs a year.

Each spring, approximately 20,000 carp that over-winter in New Brighton’s Long Lake swim up Rice Creek to spawn in the shallow Lino Chain of Lakes.

The experimental system would remove about 75 percent of adult carp leaving Long Lake; a second installation would deter about 75 percent of juvenile carp leaving the Lino Chain of Lakes.



Emil Kukulski, director of Poland-based ProCom System's hydro-ecological department, was on site for a week to test the electrical guidance system. It was developed to keep native fish out of hydroelectric plants' water intake systems. In Michigan, it was adapted to control invasive sea lampreys.

On Day 5 of a seven-day site visit to test the electrical guidance system, Emil Kukulski stood waist-deep in Rice Creek. The hydro-ecological department director of Poland-based Procom System, Kukulski was reconfiguring the chute through which the carp will pass.

The system is designed like this: Lines of positive and negative electrodes produce a low-voltage current that carp will not pass. The electrodes are attached to buoys anchored to a track on the creek bottom. Angled across the creek, the electric guidance system funnels carp to a gate. The only upstream route, it leads to a fish ladder — "steps" built on a floating wood platform. When carp reach the metal chute at the top, they'll drop into the so-called carp cannon.

The Whooshh System, which was developed to pick fruit, and then modified to safely move salmon over dams, will pneumatically propel carp through a plastic tube and into a holding bin on shore.

On April 30 the carp were migrating. The electric barrier was working. But the fish refused to enter the gate.

A similar project worked on invasive sea lampreys in Michigan. The electrical guidance system keeps native fish out of hydroelectric plants' water intakes at 20 sites in Poland, Switzerland and Brazil.

This is the first time it's being tried in Minnesota.

Kukulski — along with post-doctoral student Peter Hundt and University of Minnesota technicians Kao Vang and Cameron Swanson — pounded black PVC pipes into a collar that will hold the repositioned chute in place.

MAISRC adapted the electric barrier and pneumatic removal technologies with funds from RCWD, the BWSR Clean Water Fund grant and the Environment and Natural Resources Trust Fund.

RCWD will lease and test the ProCom equipment for two years (at a cost of $120,000) before deciding whether to purchase for an additional $30,000. RCWD will pay $80,000, part of the cost to lease the Whooshh System for two years; the University of Minnesota will pay the balance.

If the fish don't cooperate soon, Bajer said experiments would resume in the summer when carp migrate in lesser numbers. The average spring migration runs 10 to 14 days.

"There are fish trying to cross the barrier every day. They have been really trying aggressively to cross it," Bajer said two days after the reconfiguration. "However, they do not want to swim through our fish ladder. So we keep adjusting, changing one thing at a time trying to figure out what they don't like about our design."

Przemek Bajer of the Minnesota Aquatic Invasive Species Research Center, the lead project researcher, was on site April 30 to help make adjustments to the carp removal system in Rice Creek.

The crew tried enlarging the entrance, positioning the fish ladder deeper in the water, adding branches to naturalize the approach, increasing water flow with a second pump. Next, Bajer planned to disconnect everything but the entrance.

Once the carp do move, they'll be tracked.

Employees of Bajer's company, Carp Solutions, tagged about 1,000 carp last year. They installed five antennae — near the approach, at the gate, at the start and exit of the fish ladder, and about a mile upstream — to monitor carp movements. Data will help determine the best management strategy.


Five antennae will monitor the movements of about 1,000 carp tagged last year.

"We're learning how sensitive they are to structures that we're putting in the stream," Bajer said. "They seem to be very cautious. The fish ladder is a good example. Even though they could easily cross it, they just don't want to."

Watershed districts throughout the state are paying attention. Two Minnehaha Creek Watershed District employees were on site recently to see the testing.

"If it works, it's a big deal. It could be a game-changer for how we manage carp," Kocian said. "What we're testing here absolutely could be modified and implemented in other locations."

The Minnesota Board of Water and Soil Resources' mission is to improve and protect Minnesota's water and soil resources by working in partnership with local organizations and private landowners. Website: [www.bwsr.state.mn.us.](www.bwsr.state.mn.us)

A remeandered stretch of Rice Creek will be more apparent when the water levels recede. The creek project is one part of Rice Lake Watershed District's plan to improve water quality in Long Lake.

Four-part Long Lake plan: Rice Creek Watershed District's Long Lake Targeted Watershed Demonstration Project addresses phosphorus- and nutrient-loading from the 100,000 acres that flow into Long Lake. The project has 4 elements:

· Hansen Park stormwater retrofits in New Brighton, where a $4 million iron-enhanced filter is slated to go online this summer;

· Mirror Lake stormwater retrofits in Saint Anthony Village;

· Middle Rice Creek restoration, where a remeandering added a half-mile in creek length and will help to reduce erosion and sediment-loading;

· Invasive common carp management.

Who's involved

Rice Creek Watershed District's project partners include the Minnesota Aquatic Invasive Species Research Center, the Environment and Natural Resources Trust Fund, the Clean Water Land & Legacy Amendment, Minnesota Board of Water and Soil Resources, Ramsey and Anoka county parks.