

LAKE EDUCATION AND PLANNING SERVICES, LLC

UPPER AND LOWER VERMILLION LAKES BARRON COUNTY

2022 MANAGEMENT SUMMARY REPORT
WBIC: 2098800 & 2098200

Prepared by: Dave Blumer, Lake Educator



VERMILLION LAKES ASSOCIATION

Table of Contents

INTRODUCTION.....	3
2021-22 GRANT MODIFICATIONS	3
2022 EWM MANAGEMENT	3
2022 EWM AND CURLY-LEAF PONDWEED (CLP) SURVEYS	7
2022 AIS EDUCATION EVENTS, CBCW, AND NEWSLETTERS	10
2023-27 AQUATIC PLANT MANAGEMENT PLAN FOR LOWER VERMILLION LAKE	12
2022 CITIZEN LAKE MONITORING WATER QUALITY	12
2023 CLP AND EWM MANAGEMENT PLANNING.....	14
2023-24 WDNR SURFACE WATER AIS SMALL-SCALE POPULATION CONTROL GRANT APPLICATION	16

Figures

Figure 1: 2022 Preliminary EWM chemical treatment proposal – map.....	4
Figure 2: Areas of concentrated DASH removal – APM LLC.....	5
Figure 3: June 2022 CLP bed mapping results on Upper Vermillion Lake - LEAPS	7
Figure 4: 2022 Lower Vermillion Lake CLP bed mapping results – ERS	8
Figure 5: June 29, 2022 EWM bed mapping results – LEAPS and VLA.....	9
Figure 6: 2022 and historic watercraft inspection results through CBCW on Lower Vermillion Lake	11
Figure 7: TSI values (Secchi, chlorophyll, and total phosphorus) for Lower Vermillion Lake).....	13
Figure 8: TSI values (Secchi, chlorophyll, and total phosphorus) for Upper Vermillion Lake	14
Figure 9: 2023 Preliminary EWM management proposal for Lower Vermillion Lake – Herbicide (ProcellaCOR) and DASH – map.....	15

Tables

Table 1: 2022 Preliminary EWM chemical treatment proposal - details.....	4
Table 2: DASH removal details – APM LLC.....	5
Table 3: 2023 Preliminary EWM management proposal for Lower Vermillion Lake – Herbicide (ProcellaCOR) and DASH – details.....	15

INTRODUCTION

This report discusses lake management activities completed by the Vermillion Lakes Association (VLA) and Lake Education and Planning Services (LEAPS) throughout 2022. The following actions were completed by LEAPS to assist the VLA in aquatic plant management and lake stewardship education.

- 2021-22 AIS population control grant
- 2022 Eurasian watermilfoil (EWM) management planning and implementation
- Aquatic plant survey
- Aquatic invasive species (AIS) education and prevention
- Water quality
- Aquatic Plant Management (APM) Plan
- 2023 Preliminary EWM management
- 2023-24 AIS population control grant application

Each of these bullets will be discussed in the following sections of this Summary Report.

2021-22 GRANT MODIFICATIONS

On April 22, 2022, the VLA requested a 15% increase in the existing budget of the 2021-22 AIS Population Control Grant (ACEI 125221). The increase in funds was requested due to a change in EWM management to include four days of diver-aided suction harvest (DASH) in July 2022. The change in management actions was made when a chemical application permit for management in 2022 was denied by the WDNR. The cost amendment was finally approved on July 25, 2022.

The 2021- 22 grant officially ends December 31, 2022. In early 2023, the VLA will work on a final reimbursement from the WDNR for the project.

2022 EWM MANAGEMENT

Based on the results of scuba diver removal and fall EWM bed mapping in 2021, a preliminary chemical application treatment proposal was created for Lower Vermillion Lake to be implemented in the spring of 2022. The treatment proposal included eight areas of EWM totaling 5.5 acres. Six beds on the east side of the lake totaling 2.06 acres were to be chemically treated with ProcellaCOR at 3-5 pdus/ac-ft. The remaining two beds on the west side of the lake totaling 3.44 acres were to be chemically treated using liquid 2,4D based herbicide at 4.0ppm/ac-ft (Table 1, Figure 1).

A chemical application permit was prepared by LEAPS and the VLA and submitted to the WDNR on March 31, 2022. It was denied by the WDNR on April 18, 2022. Reasons given for denial included:

- Wisconsin Administrative Code Chapter NR 107.05(3)(c): The department determines that the proposed treatment will not provide nuisance relief, or will place unreasonable restrictions on existing water uses.
- Due to the criteria listed in the approved APM plan for Lower Vermillion Lake; Goal , Objective 1; stating the objective to keep EWM to less than one acre as determined by fall bed mapping. With the 2021 fall bed map, the total acreage determined for EWM beds was 0.7 acres. Based on the information provided a 2022 chemical treatment is not warranted.

Instead, the WDNR “recommended” that the VLA manage EWM using “Manual removal and/or DASH of Eurasian Watermilfoil with the remaining AIS Control grant funds from ACEI25221 – Lower Vermillion Lake

Improvement Project by AIS Management, is an alternative for these locations.” As result, the VLA took steps to contract with a DASH provider for 4 days of DASH removal in July, and made the request for additional grant funds in the previous section.

Table 1: 2022 Preliminary EWM chemical treatment proposal - details

2022 Lower Vermillion Lake, Barron County Preliminary Spring HWM Diquat Chemical Treatment Proposal 3/30/2022						
New Name	Acres	Mean Depth (feet)	Acre-feet	Treatment PDU/acft	PDU Application	
Bed 4-2022	0.18	4.00	0.72	3.00	2.16	
Bed 5-2022	0.20	6.00	1.20	4.00	4.80	
Bed 6-2022	0.45	4.00	1.80	3.00	5.40	
Bed 7-2022	0.59	7.00	4.13	5.00	20.65	
Bed 8-2022	0.43	7.00	3.01	5.00	15.05	
Bed 9-2022	0.21	5.00	1.05	4.00	4.20	
	2.06				52.26	
ProcellaCOR	PDU = 3.2 oz		fl. Ounces	gallons		
2022	# of PDU = 52.26		167.232	1.3		
	Cost/PDU = \$75.00					
	Total Cost = \$3,919.50					
2022 2,4-D Treatment Characteristics				Eurasian Watermilfoil Control 2,4-D Amine 4 (liquid 2,4-D)		
Location/Name	Acreage EWM	Mean Depth (feet)	Volume (acre-feet)	Treatment a.i. ppm	Gallons	gal/acre-ft
Bed 1-2022	1.23	5.0	6.15	4.0	17.5	2.84
Bed 2-2022	2.21	5.0	11.05	4.0	31.4	2.84
Total	3.44		17.20		48.8	
	Cost (\$/gal)	Gallons	Total			
	2,4-D Amine 4	50	48.8			\$2,440.00
TOTAL TREATMENT COST	\$6,359.50					
Total Acres Treated	5.5					



Figure 1: 2022 Preliminary EWM chemical treatment proposal – map

The VLA contracted with Aquatic Plant Management, LLC out of Minocqua, WI to complete DASH Services in Lower Vermillion Lake for 4 days. The cost for this management action was \$2,600.00 per 8 hour day plus additional fees for permit application, travel, and misc. expenses.

APM, LLC submitted a Mechanical Harvesting Permit for DASH to the WDNR on May 15, 2022. The permit was approved by the WDNR on May 27, 2022.

DASH services were completed between 7/11 and 7/14/2022. The APM DASH team focused their efforts at 4 main sites prioritized by the VLA (Figure 2). In total APM was able to remove 460.5 cubic feet of EWM from Lower Vermillion Lake. The dive team spent ~60% of their time and removed ~60% of the AIS biomass from the south shoreline of the west portion of the lake. DASH was an effective method of removal due to the dense nature of the EWM infestation at all of the dive sites.



Figure 2: Areas of concentrated DASH removal – APM LLC

Table 2: DASH removal details – APM LLC

Date	Weather Conditions	Water Temp (F)	Underwater Dive Time (hrs)	AIS Removed (cubic ft)
7/11/2021	Periods of rain	75	3.3	75.0
7/12/2022	Partly Cloudy	75	6.8	101.5
7/13/2022	Cloudy	75	6.8	96.5
7/14/2022	Sunny	75	6.7	187.5
Grand Total			23.5	460.5

Dive Location	Avg. Water Depth	# of Dives	Underwater Dive Time	AIS Removed (cubic feet)
SE Shoreline	6.4	4	3.4	76.5
W Bay N Shore	6.8	4	1.9	34.5
W Bay S Shore	6.8	17	13.8	260.5
W of Channel	8.0	5	4.4	89.0
Grand Total	6.9	30	23.5	460.5

In an addendum to their first DASH Summary Report, APM LLC added these notes about each of the areas where they implemented DASH.

Northeast Area

The colony located in this part of the lake represented the densest EWM growth on the east side of the lake. Native aquatic plant growth did not impede DASH efforts at this site, and allowed for a clear view of the lakebed in the immediate vicinity of the colony. Divers did note some EWM fragments attempting to root in the area around the colony, but were able to remove them during the diving activities. DASH seems to be appropriate for this area.

Southeast Bay

The EWM growth in the SE area of the lake was characterized by 2 small plant colonies along with several clumps of 10-25 EWM plants. Some EWM fragments were present on the lakebed, but were not present in high numbers. Due to the organic/sand substrate at the dive sites, coupled with the comparatively low native plant density, DASH is a suitable management technique for this part of the lake.

South Shore of West Bay

As the dive team worked their way east to west along the shoreline, there was a notable increase in both EWM and native aquatic plant densities. On the east end of the dive area, EWM growth was fairly scattered, with a relatively low number of fragments on the lakebed. As the team worked toward the west end, the number of fragments present increased proportionally with the EWM density. Many of the EWM fragments were obscured by a thick layer of algae on the lakebed, which likely resulted in some remaining EWM, post-management. The substrate in the dive area was conducive to DASH, however the dense native aquatic plant growth on the west end was less than ideal.

Southwest Shore of West Bay

This area of the lake presented serious challenges to the dive team. This area contained the largest/densest EWM growth in the entire lake. The EWM growth was embedded within extremely dense native aquatic plant colonies, which greatly reduced the efficiency and effectiveness of the DASH efforts. There was a very high number of fragments present on the lakebed, scattered in and around the native plant growth. The native plant density prevented the dive team from being able to remove a significant amount of these fragments. Due to the obscured fragments, it is reasonable to assume that regrowth and possible expansion of these colonies in 2023 is likely. Overall, when considering the goal of year-to-year reductions in EWM density/distribution, DASH does not seem to be the most suitable management technique for this area of the lake.

North Shore of West Bay

While this area did not contain the same EWM density as the Southwest shore of the west bay, it presented many of the same challenges. The EWM growth was composed of clumps of plants with scattered EWM between them. The high density of native aquatic plants prevented the dive team from removing a large number of the fragments on the lakebed, and likely obscured many more. The suitability of DASH for this area will be best determined by both the 2022 post-season AIS survey and 2023 pre-season survey.

Overall, DASH appeared to be fairly effective in the east basin of Lower Vermillion Lake. However, as the divers worked their way west along the north and the south shores of the lake, they readily admitted that DASH is less than ideal under the conditions they found. And in at least the west basin of the lake, an abundance of new EWM growth, post-DASH, discovered in a year-end survey, may actually be a result of DASH and the disturbances it caused.

The total fee paid to APM LLC by the VLA for DASH services in 2022 was \$11,994.70. The estimated cost to have completed the 5.5 acre proposed chemical treatment in 2022 was \$10,279.00. The DASH removal project covered nearly 3 acres of EWM on Lower Vermillion Lake. The 4-day effort included 175 volunteer hours by lake residents to manage the project along with picking up EWM floating fragments to minimize EWM from spreading.

2022 EWM AND CURLY-LEAF PONDWEED (CLP) SURVEYS

Multiple surveys of AIS were completed in 2022. On June 8, 2022 LEAPS completed a CLP survey of Upper Vermillion Lake. Within the roughly 93 acre lake, the meandering bedmapping survey identified 49 acres of moderate to dense growth CLP, 53% of the total lake surface area (Figure 3).



Figure 3: June 2022 CLP bed mapping results on Upper Vermillion Lake - LEAPS

Because the late ice-off and rapid warm up in the spring of 2022 did not appear to favor CLP, the spring bed mapping survey of Lower Vermillion Lake was delayed until June 28, 2022. At that time, 12 CLP beds were mapped that totaled 2.02 acres (approximately 0.9% of the lake's surface area) (Figure 4). This was an 8.83-acre decline (- 81.38%) from 2021 when 8 beds that covered 10.85 acres (5.0% of the lake's surface area) was delineated. The 2022 results seemed to be more in line with previous CLP surveys conducted on the lake in 2016 (nine CLP beds on 3.66 acres - 1.7% coverage) and 2009 (a single CLP bed on 1.10 acres - 0.6% coverage). Although at face value the increase in 2021 CLP bed coverage might appear troubling, during the 2009 point-intercept survey more overall CLP was found than in either of the 2016 or 2021 surveys. At that time, it was noted that CLP was common and present throughout the lake in 2009, but it was seldom invasive or bed forming. In 2016, CLP was more restricted, but tended to occur at greater densities when it was present. The 2021 survey found CLP beds were common, but they were generally patchy and seemed unlikely to cause more than minor navigation impairment. In 2022, CLP was again patchy and seldom bed forming. During each of the four surveys, the surveyor noted these beds tended to hold schools of both adult and juvenile panfish potentially making them important early-season vertical habitat.

It should also be noted, that across northern WI, the late winter, spring and early summer weather conditions like ice thickness, snow cover, ice out, and spring temperatures in 2022 were much less conducive to abundant CLP

growth than they were in 2021. The 2021 season saw less thick ice, little snow cover, cooler temperature reflected in many lakes with greater than normal growth of CLP. The differences between 2021 and 2022 CLP in Lower Vermillion Lake really demonstrates how late winter, spring, and early summer weather characteristics can really impact CLP growth from one year to the next.

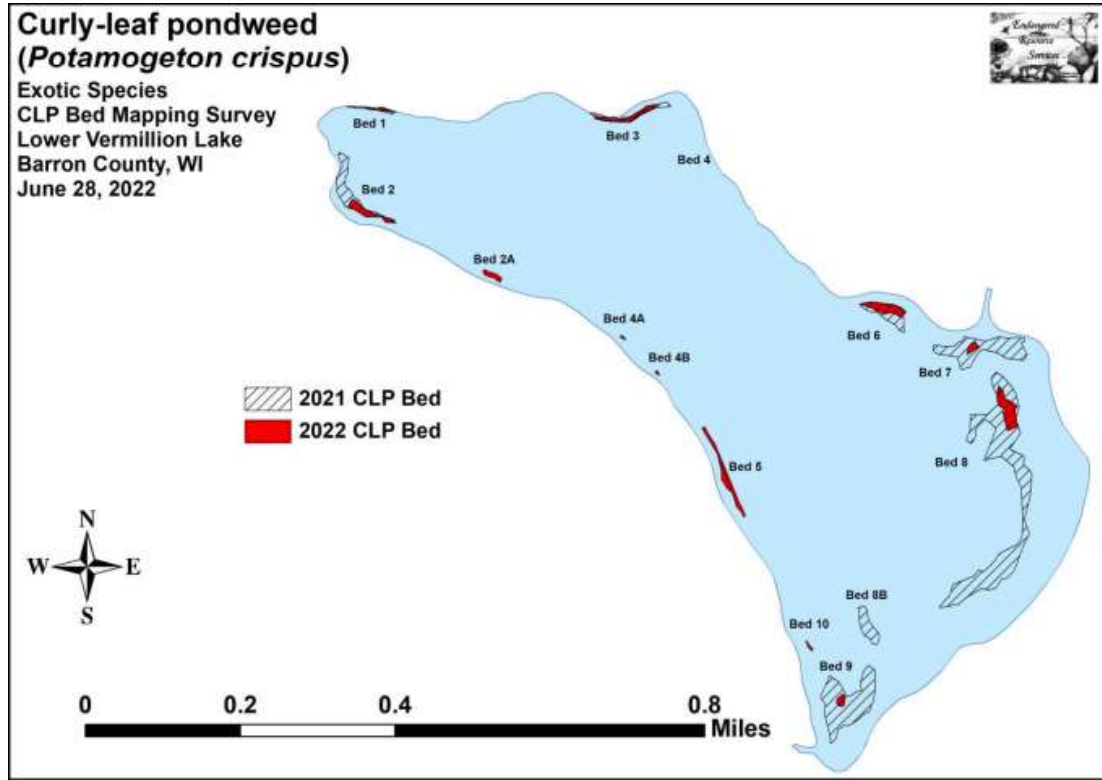


Figure 4: 2022 Lower Vermillion Lake CLP bed mapping results – ERS

No management of CLP is expected in Lower Vermillion Lake in 2023, however, there has been some consideration for managing CLP in Upper Vermillion Lake. The VLA has contracted with a local company offering mechanical harvesting to remove CLP in Upper Vermillion Lake in the past, but the sheer amount of CLP in the lake makes whole lake harvesting difficult. Contracted harvesting services a couple of years ago, only concentrated on opening up an access channel to open water from the public boat landing and for the few property owners on the lake. This may be considered again. The use of aquatic herbicides has been discussed, but because of a very limited presence of wild rice on the north end of the lake, herbicides have never been used.

EWM in Lower Vermillion Lake was mapped by LEAPS and VLA volunteers on June 29, 2022, just prior to the expected four days of DASH removal. During that survey, 20 areas of EWM were mapped covering 2.4 acres of the lakes surface area (Figure 5).



Figure 5: June 29, 2022 EWM bed mapping results – LEAPS and VLA

ERS was originally scheduled to complete a fall EWM bed mapping survey, but this was cancelled after the four days of DASH. However, on September 4, 2022, well-trained VLA volunteers completed an impromptu survey of the lake and the areas covered by DASH to look for EWM. The following were comments from that survey.

I went out on the lake this afternoon and validated how we thought the EWM would react to DASH. The east side of the lake actually looked good. There were a few EWM towers at the northeast location but it looked OK overall. The other east locations looked OK as well.

That said, the west side both north and south, has significant growth/ regrowth of EWM. I would guess that we could spend another 2 days doing DASH right now if we had the funds to do so.

Dave, we were right to say we could do DASH on the east side of the lake but we are also right to say we need herbicide on the west side to control EWM there. Just returning to my dock I had a pile of EWM on my prop that really frustrated me. The same holds true for my neighbors on my side of the lake and on the other side of the lake by the first house plus their 3 neighbors going east as well.

The VLA volunteers completing this survey live on opposite sides of the lake and between the two of them have regularly monitored and mapped the entire lake for EWM (yellow “stars” on Figure 5).

2022 AIS EDUCATION EVENTS, CBCW, AND NEWSLETTERS

In 2022, the VLA prepared and distributed two newsletters (spring and fall), a week-long series of emails to report on the progress of DASH removal in the middle of July, and held its annual Breakfast Meeting of the constituency on May 28th. During the Breakfast meeting AIS materials were handed out to participants and an update related to AIS management was completed.

Several volunteers, led by two people who were well-trained in the identification of EWM and other AIS, completed multiple surveys looking for EWM. At least 175 hours of volunteer time was put in to support the four days of DASH removal on Lower Vermillion Lake.

Volunteers also collected water quality information and completed some physical removal of EWM.

The VLA applied for and received a CBCW grant in 2022. Paid and volunteer watercraft inspectors put in 238 hours at the public landing off 9th Street; checked 155 boats, and spoke to 274 people (Figure 6).

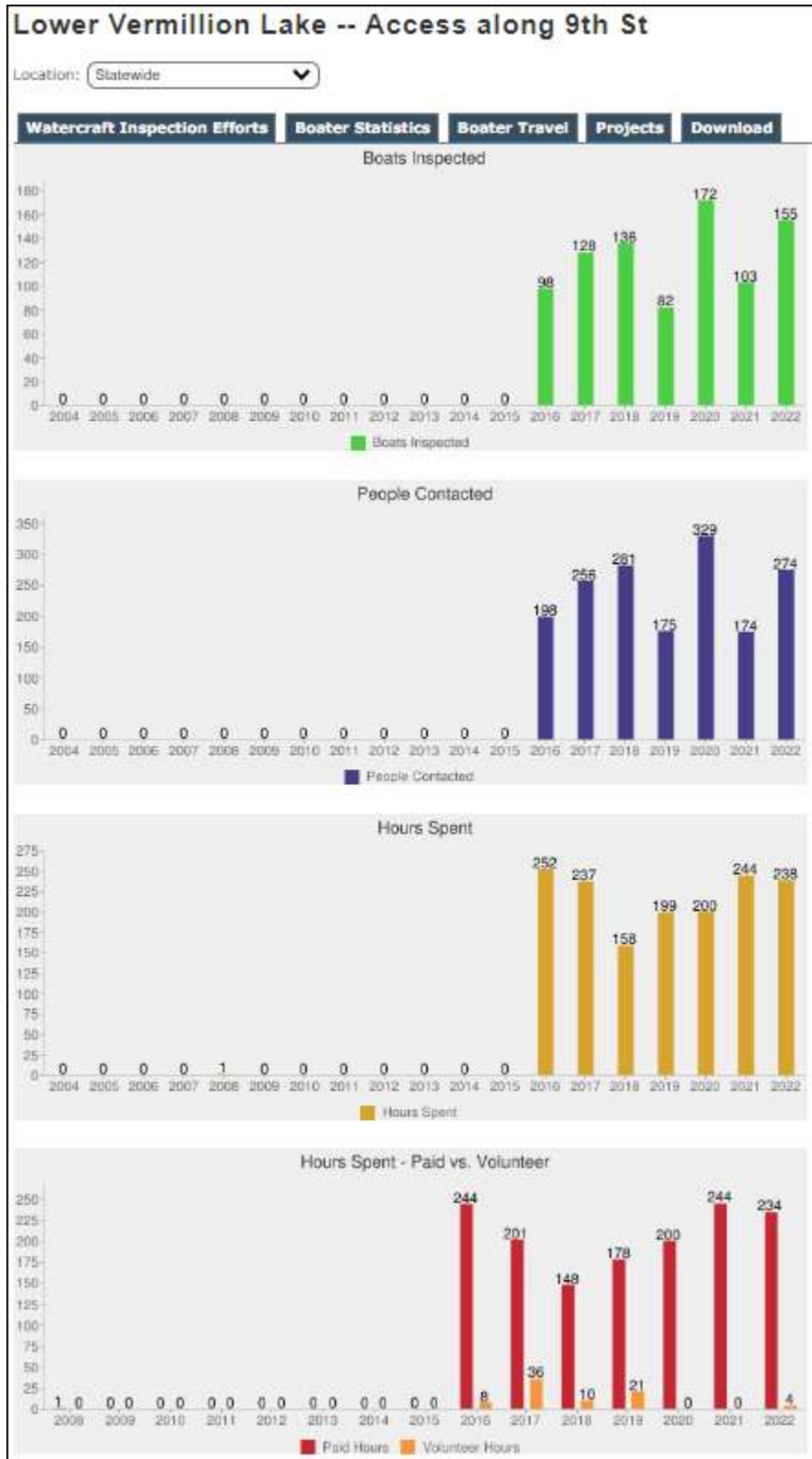


Figure 6: 2022 and historic watercraft inspection results through CBCW on Lower Vermillion Lake

2023-27 AQUATIC PLANT MANAGEMENT PLAN FOR LOWER VERMILLION LAKE

Through the first half of 2022, LEAPS worked on updating the existing Aquatic Plant Management (APM) Plan for Lower Vermillion Lake. A completed draft of the updated APM Plan was sent to the President of the VLA and posted on the LEAPS Client webpage on June 27, 2022. The APM Plan was then sent to all the constituents on the lake via email with instructions given for at least a 21 day review and comment period. Upon completion of that review period, updates were made to the APM Plan resulting in a final draft sent to the WDNR on July 26, 2022 with a request for review and approval of the management actions in the plan, and approval for eligibility for WDNR Surface Water grants to support planning, implementation, and evaluation of the actions in the APM Plan.

On August 9, 2022, a follow-up email was sent to the WDNR by the President of the VLA asking the status of the WDNR review. On August 12, 2022, the WDNR sent a list of comments to be addressed in the APM Plan. These comments were addressed and the APM Plan modified, and then sent to the WDNR a second time with a request for review and approval on September 8, 2022. On October 12, the VLA received another set of WDNR comments related to the APM Plan. These comments were addressed and the revised APM Plan sent to the WDNR a final time with a request for review and approval on October 15, 2022. Final WDNR approval of the 2023-27 Lower Vermillion Lake APM Plan was received in a letter dated October 19, 2022.

The new APM Plan covers management actions mostly on Lower Vermillion Lake for five years beginning in 2023. There is no current APM Plan for Upper Vermillion Lake at this time. Management actions for aquatic plants are limited in Upper Vermillion Lake, with only mechanical harvesting and physical removal as actions that are likely to be approved by the WDNR in any given year.

Preliminary management planning for Lower Vermillion Lake for EWM in 2023 has already been completed following guidelines in the new APM Plan. The 2023 EWM management proposal will be discussed in the following section. A small-scale population control grant has already been submitted to the WDNR to support these efforts in 2023, however, whether the grant is awarded will not be known until sometime in February 2023.

2022 CITIZEN LAKE MONITORING WATER QUALITY

Lower Vermillion Lake - Deep Hole was sampled 16 different days during the 2022 season. Parameters sampled included:

- water clarity (13)
- temperature (13)
- dissolved oxygen (13)
- total phosphorus (2)
- chlorophyll (3)

The average summer (July-Aug) secchi disk reading for Lower Vermillion Lake - Deep Hole was 7 feet. Typically the summer (July-Aug) water was reported as clear and blue. Chemistry data was collected on Lower Vermillion Lake - Deep Hole. The average summer Chlorophyll was 6.6 µg/l. The summer Total Phosphorus average was 17 µg/l. Lakes that have more than 20 µg/l and impoundments that have more than 30 µg/l of total phosphorus may experience noticeable algae blooms.

The overall Trophic State Index (based on chlorophyll) for Lower Vermillion Lake - Deep Hole was 49. The TSI suggests that Lower Vermillion Lake - Deep Hole was mesotrophic (Figure 7). Mesotrophic lakes are characterized by moderately clear water, but have an increasing chance of low dissolved oxygen in deep water during the summer. This was the case in Lower Vermillion Lake, with low or no DO in the hypolimnion of the lake from the middle of June through September.

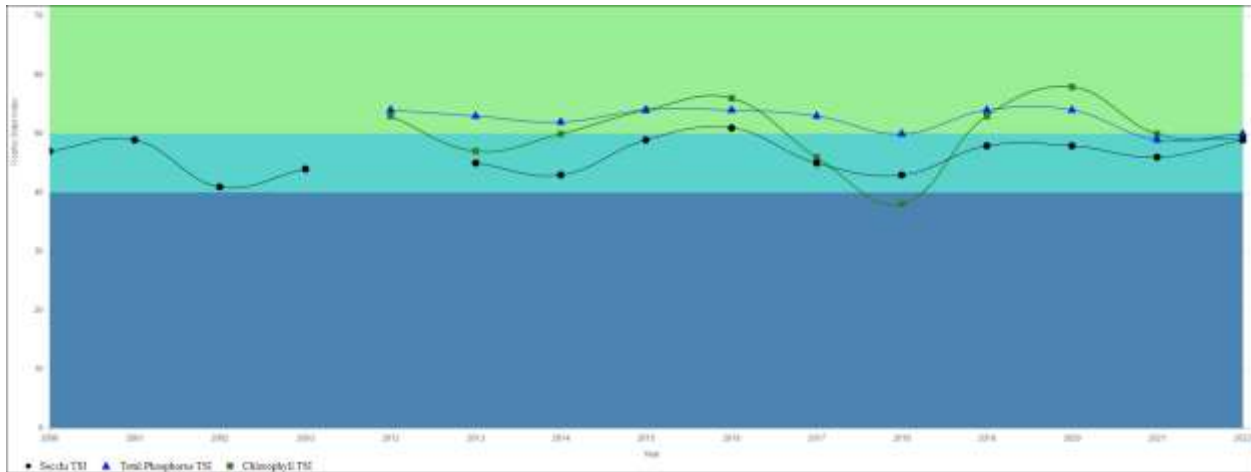


Figure 7: TSI values (Secchi, chlorophyll, and total phosphorus) for Lower Vermillion Lake)

Upper Vermillion Lake - Center was sampled 3 different days during the 2022 season. Parameters sampled included:

- water clarity
- total phosphorus
- chlorophyll

The average summer (July-Aug) secchi disk reading for Upper Vermillion Lake - Center was 1.25 feet. The average for the Northwest Georegion was 8.8 feet. Chemistry data was collected on Upper Vermillion Lake - Center. The average summer Chlorophyll was 99.7 $\mu\text{g}/\text{l}$ (compared to a Northwest Georegion summer average of 15.8 $\mu\text{g}/\text{l}$). The summer Total Phosphorus average was 210 $\mu\text{g}/\text{l}$. Lakes that have more than 20 $\mu\text{g}/\text{l}$ and impoundments that have more than 30 $\mu\text{g}/\text{l}$ of total phosphorus may experience noticeable algae blooms.

The overall Trophic State Index (based on chlorophyll) for Upper Vermillion Lake - Center was 70 (Figure 8). The TSI suggests that Upper Vermillion Lake - Center is hyper-eutrophic. This TSI usually suggests blue-green algae become dominant and algal scums are possible, extensive plant overgrowth problems possible.

Early season domination of CLP over 50% of the lake's surface area likely contributed to the decline in water quality. CLP completes its life cycle around the 4th of July, dropping out of the water column and senescing (decaying) and releasing large amounts of phosphorus back into the water column. The over-abundance of phosphorus in turn results in a tremendous amount of algae. The algae turn the lake in to pea soup shading out sunlight that is needed to sustain native plants. Only in areas where the water depth is below a couple of feet do native aquatic plants survive. Those that do survive are lily pads, coontail, and duckweed.

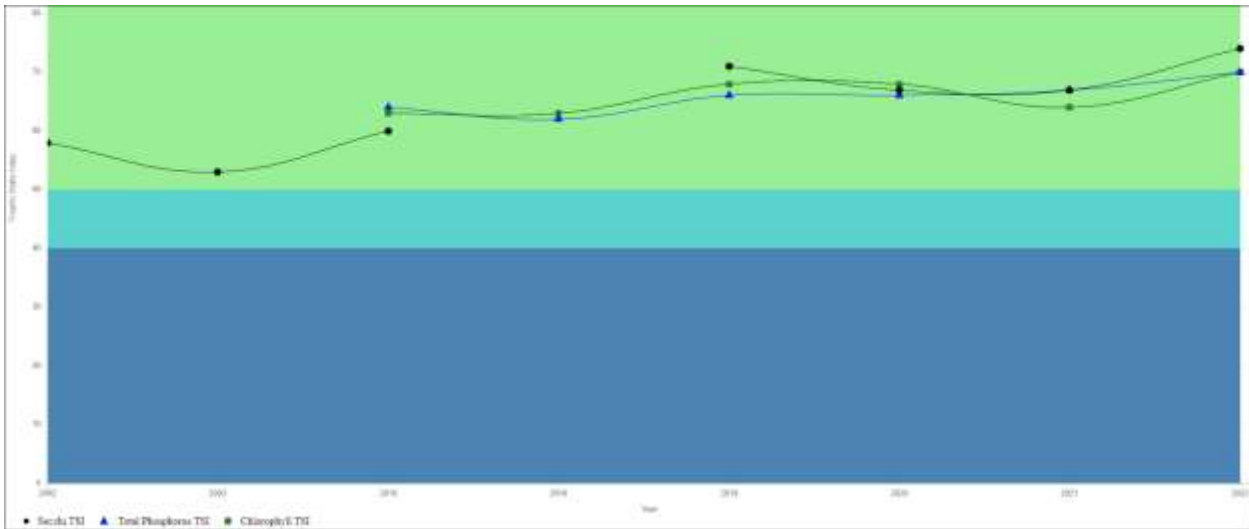


Figure 8: TSI values (Secchi, chlorophyll, and total phosphorus) for Upper Vermillion Lake

2023 CLP AND EWM MANAGEMENT PLANNING

CLP

As in 2021, in 2023 there will likely be no direct management of CLP in either lake. However, CLP bedmapping is expected to be completed in both lakes in 2023, and may lead to a management proposal as early as 2023 for Upper Vermillion Lake using mechanical harvesting or Lower Vermillion Lake in 2024. According to ERS who completed CLP bed mapping in Lower Vermillion Lake in 2022, CLP plays a generally minor role in the lake’s ecosystem. Because of this, active management may not be required – at least in all but the worst places.

“Much like algae and duckweeds, CLP tends to grow best in areas with excessive nutrients in the water; especially when there is also bottom disturbance. To help limit CLP’s opportunities to thrive and expand, all lake residents are encouraged to evaluating how their shoreline practices may be impacting the lake. Simple things like establishing or maintaining their own buffer strip of native vegetation along the lakeshore to prevent erosion, building rain gardens, bagging grass clippings, switching to a phosphorus-free fertilizer or preferably eliminating fertilizer near the lake altogether, collecting pet waste, and disposing of the ash from fire pits away from the lakeshore can all significantly reduce the amount of nutrients entering the lake. Avoiding motor starts in water less than 4ft deep can also maintain native vegetation and prevent the stirring up of nutrient-rich sediment. By limiting nutrient inputs, residents not only create less than ideal growing conditions for CLP, but also promote better water clarity and quality by limiting algal growth. Hopefully, a greater understanding of how all property owners can have lake-wide impacts will result in more people taking appropriate conservation actions.”

EWM

Based on the results of DASH and in-lake surveys, a preliminary proposal has been made to manage EWM in Lower Vermillion Lake in 2023 using both aquatic herbicides and DASH. Areas with EWM on the east side of the lake appear to have been effectively controlled by DASH removal. While late season survey work in 2022 already has identified EWM, it is not widespread and should be able to be controlled again in 2023 with DASH.

This is not the case on the west side of the lake where the company completing DASH removal readily admits that it is likely not the best or even a moderately effective management tool. Too many EWM fragments and small growing plants are tucked under native aquatic vegetation growing in the soft mucky bottom. In this area of the lake, primarily the west basin near the boat landing and along the north and south shores, chemical treatment using ProcellaCOR is recommended. A preliminary EWM management proposal has already been made (Table 3 and Figure 9).

A WDNR AIS small-scale, population control grant application has already been submitted to the WDNR requesting grant support of these management actions in 2023. Physical removal by VLA volunteers and property owners, diver and/or DASH removal, various summer surveys, and the fall EWM bedmapping will all be continued in 2023.

Table 3: 2023 Preliminary EWM management proposal for Lower Vermillion Lake – Herbicide (ProcellaCOR) and DASH – details

2023 Lower Vermillion Lake, Barron County Preliminary Spring EWM ProcellaCOR Chemical Treatment Proposal 9/12/2022					
New Name	Acres	Mean Depth (feet)	Acre-feet	Treatment PDU/acft	PDU Application
Bed 1-2023	1.40	6.0	8.40	4.00	33.60
Bed 2-2023	2.90	5.00	14.50	4.00	58.00
	4.30				91.60
ProcellaCOR	PDU = 3.2 oz		fl. Ounces	gallons	
Scenario 1	# of PDU = 91.6		293.12	2.3	
	Cost/PDU = \$75.00				
	Total Cost (NAS) = \$6,870.00				
	Trip Fee (NAS) = \$300.00				
2023 Herbicide Concentration Testing					
Site	1 HAT	3 HAT	6 HAT	24 HAT	48 HAT
West End	1	1	1	1	1
Deep Hole	1	1	1	1	1
1st Bridge Downstream	1	1	1	1	1
	3	3	3	3	3
Blanks	3	TOTAL = 18 samples			
2023 DASH Removal					
Bed 4-2022	0.33	4.00	1.32		
Bed 5-2022	0.29	6.00	1.74		
Bed 6-2022	0.53	4.00	2.12		
Bed 7-2022	0.72	7.00	5.04		
Bed 8-2022	0.51	7.00	3.57		
Bed 9-2022	0.19	5.00	0.95		
	2.57				



Figure 9: 2023 Preliminary EWM management proposal for Lower Vermillion Lake – Herbicide (ProcellaCOR) and DASH – map

**2023-24 WDNR SURFACE WATER AIS SMALL-SCALE POPULATION CONTROL
GRANT APPLICATION**

Working with LEAPS, the VLA prepared and submitted a pre-grant application in September 2022 to support 2023 and 2024 EWM management planning, implementation, water quality, and aquatic plant surveying. The pre-grant was accepted by the WDNR and a grant discussion was held about the project with a WDNR representative on October 12, 2022. Modifications were made and then a final grant application submitted to the WDNR prior to November 15, 2022. Final determination of award is not expected until sometime in February 2023.

If the grant is awarded, management planning and implementation will continue as already determined. If it is not approved, other management actions to control EWM will be explored.