LAKE EDUCATION AND PLANNING SERVICES, LLC

RED CEDAR LAKES

2024 MANAGEMENT SUMMARY REPORT

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RED CEDAR LAKES ASSOCIATION

Table of Contents

Figures

Tables

INTRODUCTION

This report discusses lake management activities completed by the Red Cedar Lakes Association (RCLA) and Lake Education and Planning Services (LEAPS) throughout 2024 in Hemlock, Red Cedar, Bass, and Balsam Lakes. The following actions were completed by LEAPS and additional contractors to assist the RCLA in aquatic plant management and lake stewardship education.

2024 LEAPS PROFESSIONAL SERVICES AGREEMENT AND SCHEDULE OF TASKS

A Professional Services Agreement (PSA) and Schedule of Tasks was agreed between the RCLA and LEAPS in March 2024. The following tasks were included in that agreement.

1. 2024 CLP Management Planning and Implementation Support ($3,113.50)
    a. Treatment planning, WDNR permit preparation, and a pre-treatment CLP survey
2. 2024 Aquatic Plant Survey Support ($440.00)
    a. GIS support for wild rice mapping
3. 2024 CLP bed mapping ($2,761.27)
4. 2024 Purple Loosestrife Beetle Rearing Support ($735.04)

The sum of the agreement was $6,941.27.

2024 CURLY-LEAF PONDWEED (CLP) MANAGEMENT PLANNING AND IMPLEMENTATION

The year 2024 was the sixth year included in an AIS Control of and Established Infestation (ACEI) grant awarded to the RCLA back in April 2019 to cover CLP management planning and implementation, originally through June 2022. Intended to support large-scale chemical treatment of CLP across all three lakes – Balsam, Red Cedar, and Hemlock for three years, the grant was supposed to run out of funding going into 2022. However, the amount of CLP that needed management in each of the three years 2019, 2020, and 2021 did not reach the expected amounts, so management of CLP was expanded to include 2022, 2023, and 2024.

Over the course of the last six years (2019 to 2024) the amount of CLP chemically treated in the system has not reached original expectations. Table 1 reflects what has been chemically treated in all three lakes since 2019.

Table 1: Herbicide Application in the Red Cedar lakes since 2019

Year	Balsam Lake (acres)	Red Cedar Lake (acres)	Hemlock Lake (acres)
2019	3.94	13.31	10.68
2020	2.73	2.69	3.85
2021	2.55	0	0
2022	0.82	2.42	0
2023	0	0	0
2024	0	18.05	15.44

HERBICIDE APPLICATION IN 2024

No herbicide was applied to any of the lakes in 2023. In 2024 a preliminary herbicide application plan included one CLP bed (5.0ac) on Balsam; six CLP beds (34.01ac); and two CLP beds on Hemlock (16.56ac). After a pre-treatment survey of the proposed treatment areas on May 13 completed by LEAPS, the proposed treatment areas were modified. It was determined that no herbicide application would be necessary on Balsam Lake, DASH would be

incorporated instead. Only four treatment areas on Red Cedar Lake were kept totaling 18.05ac. The two areas on Hemlock Lake were slightly modified from 16.56ac to 15.44ac (Figure 1, Table 2).

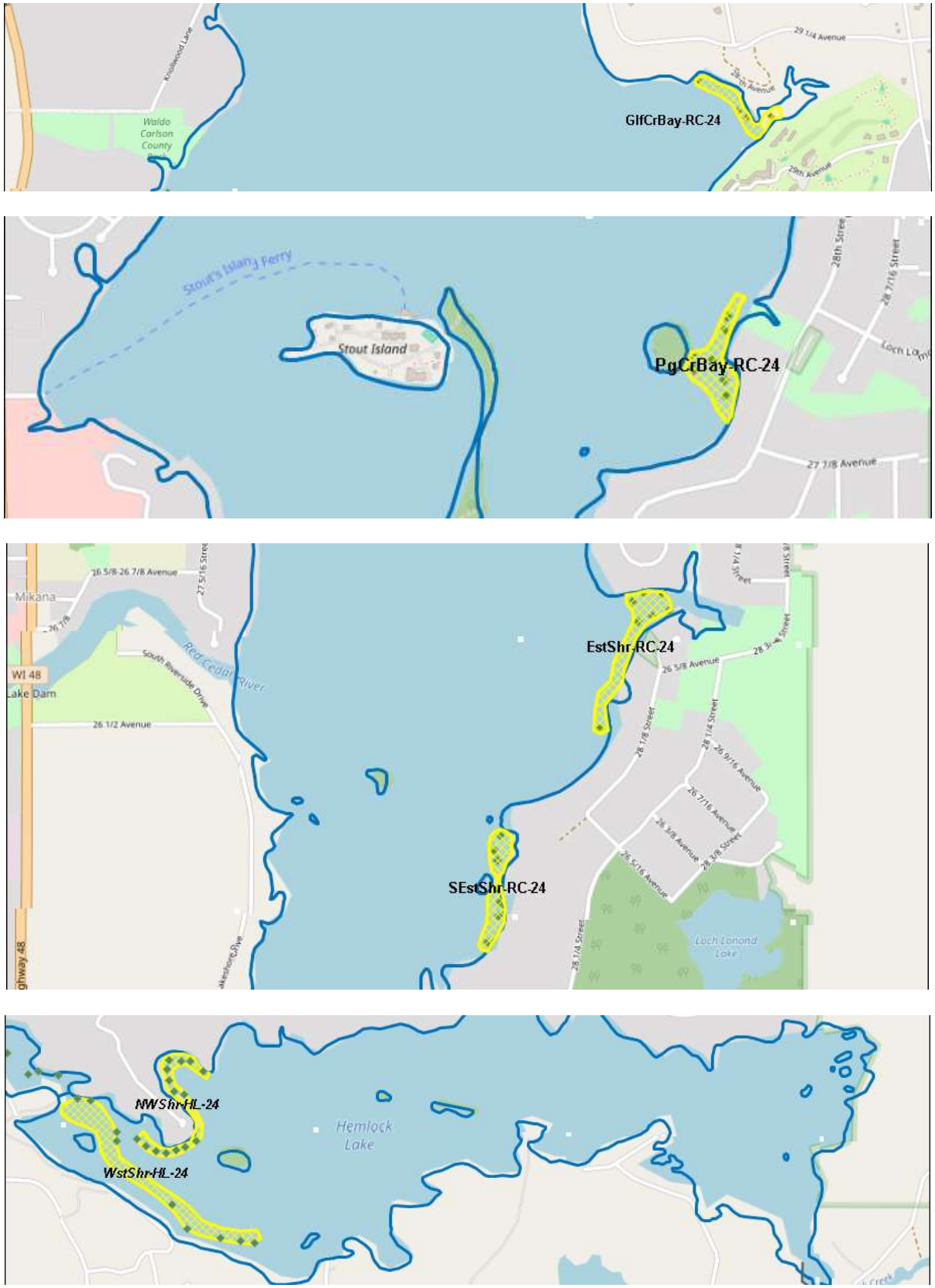


Figure 1: 2024 Modified herbicide application areas in Red Cedar and Hemlock Lakes (LEAPS, 2024)

Table 2: Modified chemical treatment details from Red Cedar and Hemlock Lakes

2024 Red Cedar Lake Preliminary CLP Chemical Treatment 5/13/2024						
Treatment Characteristics				Endothall (Aquathol K)		
Treatment Site	Acreage	Mean Depth (feet)	Volume (acre-feet)	Treatment a.i. ppm	gallons†	Application rate (gal/ac-ft)
GlfCrBay-RC-24	3.50	6.00	21.00	1.50	21.00	6.00
PgCrBay-RC-24	4.59	6.00	27.54	1.50	27.54	6.00
EstShr-RC-24	5.76	5.75	33.12	1.50	33.12	5.75
SEstShr-RC-24	4.20	4.00	16.80	1.50	16.80	4.00
Chem Beds	**18.05**		**98.46**		**98.46**	

2024 Hemlock Lake Preliminary CLP Chemical Treament 5/13/2024						
Treatment Characteristics				Endothall (Aquathol K)		
Treatment Site	Acreage	Mean Depth (feet)	Volume (acre-feet)	Treatment a.i. ppm	gallons†	Application rate (gal/ac-ft)
WstShr-HL-24	10.88	5.25	57.12	1.50	57.12	
NWShr-HL-24	4.56	5.50	25.08	1.50	25.08	
Chem	15.44		82.20		82.20	

Herbicide application was completed by Northern Aquatic Services on May 20, 2024. The water temperature was about 64°F and the air temperature was about 66°F. The wind was out of the south at 0-3mph. Aquathol K, an endothall-based herbicide, was applied at 1.5ppm per acre-foot of water. The total application had a price tag of about $25,000.00, or about $750.00/ac.

2024 DIVER ASSISTED SUCTION HARVEST (DASH)

In 2024, the Red Cedar Lakes Association again contracted with red Aquatic Plant Management, Inc (APM) to complete DASH in Balsam Lake and Red Cedar Lake. Despite the cost in 2023 ($4,202.38) to remove what amounted to about an acre of CLP, the project was considered successful enough to bring them back in 2024 to work on both Balsam and Red Cedar again. On Balsam Lake, the presence of wild rice makes the use of aquatic herbicides less desirable. Multiple areas of CLP on Red Cedar Lake were fairly concentrated but too small to apply herbicide (>5.0 acres is desirable for application of herbicides).

A WDNR Mechanical Harvesting Permit was submitted to the WDNR by the RCLA in early April and was approved by the WDNR on April 26. The permit included 2.5ac on Balsam and 2.5ac on Red Cedar. After CLP bed mapping on June 11, 5 small beds of CLP in Balsam Lake in an area totaling about 1.6ac and 3 small beds in Red Cedar Lake totaling 1.5ac were listed as priority removal sites for DASH (Figure 2). APM was contracted for 2 days of DASH removal completed on June 17 & 18. Weather conditions were rainy on June 17, but better on the second day.

APM (Figure 4) concentrated its efforts along the west shore of Balsam Lake (Figure 3) removing 160.5cuft (or about 50 onion bags, Figure 4) of CLP with just shy of 14hrs of underwater dive time (Table 3). They were unable to get to any other location on Balsam Lake or in Red Cedar Lake in the two days they were on the lake. In total, they removed CLP from about 1.6ac along the west shore of Balsam Lake with a total fee of $5,777.00 – about $3,600/ac, nearly 5x as much per acre when compared to herbicide application. There is no criticism of APM as they worked hard for the entire time they were on the lake.

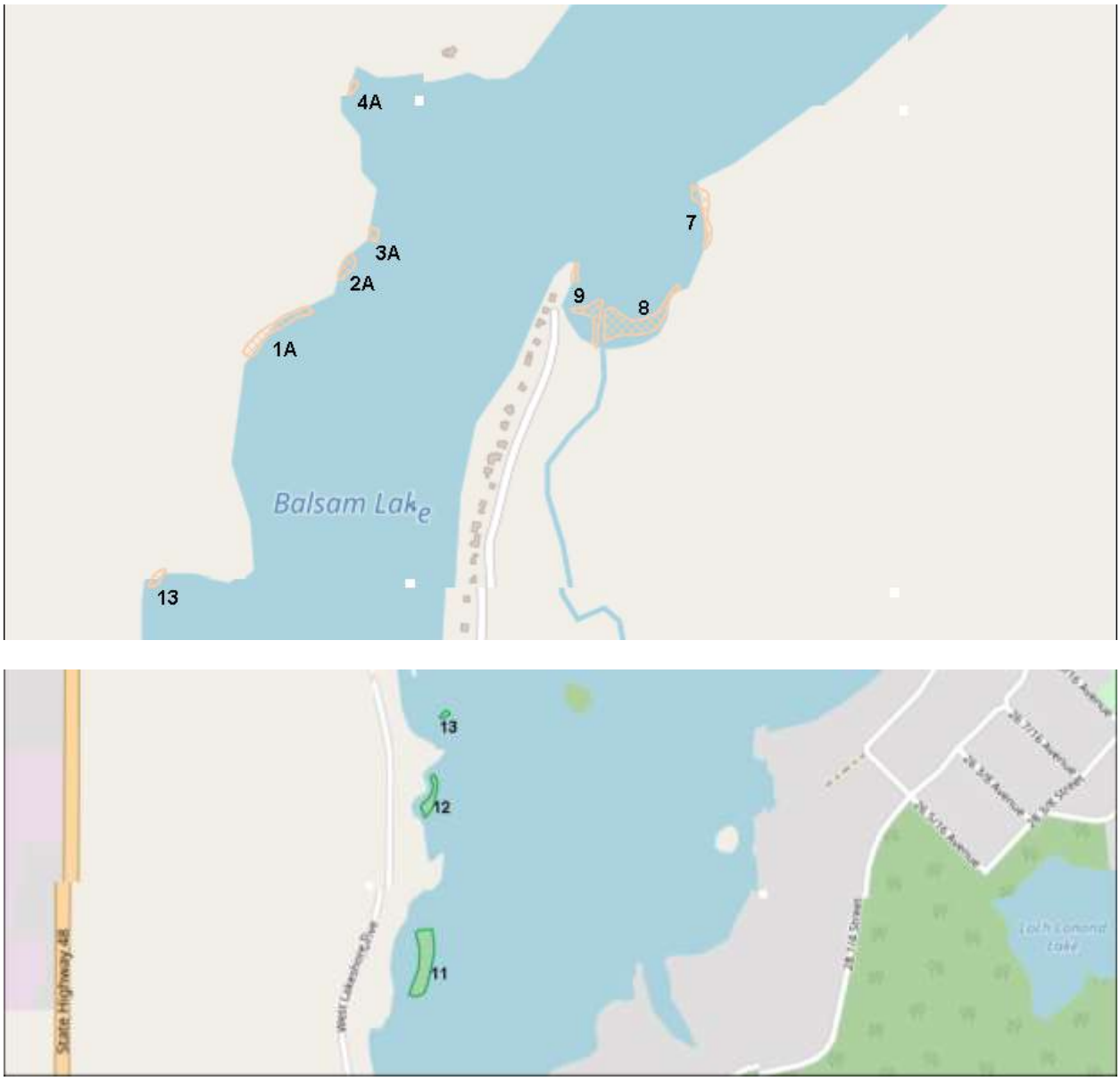


Figure 2: 2024 CLP DASH removal beds – Balsam (1a,2a,3a,4a & 13); Red Cedar (11,12,13)

Table 3: 2024 CLP DASH removal numbers (APM, 2024)

Date	Weather Conditions	Water Temp (F)	Underwater Dive Time (hrs)	AIS Removed (cubic ft)
6/17/2024	Rain	69	7.8	104.0
6/18/2024	Cloudy	69	6.0	56.5
Grand Total			**13.8**	**160.5**

Dive Location	Avg. Water Depth	# of Dives	Underwater Dive Time	AIS Removed (cubic feet)
WstShrN-BL-24	5.1	11	13.8	160.5
Grand Total	**5.1**	**11**	**13.8**	**160.5**

Figure 3: 2024 CLP DASH removal sites in Balsam Lake (APM, 2024)

Figure 4: APM DASH boat (left); and an employee holding an onion bag of CLP (approximately 3.0cuft) (RCLA, 2024)

2024 AQUATIC PLANT SURVEY RESULTS

2024 BALSAM LAKE CLP BED MAPPING RESULTS

CLP bed mapping in Balsam Lake, completed on June 11, 2024, by LEAPS. It was expected that there would be more CLP in 2024 than there had been in the last several years due to the weather conditions over the 2023-24 winter season. Little snowfall and very limited ice cover led to early ice out and excellent growing conditions for CLP. During the June survey 13 beds of CLP totaling 4.81ac were identified (Figure 5). In 2023, there was only one area considered a bed totaling 0.31ac.

In addition, a CLP survey was completed on Mud Lake after there were several reports of dense beds being present. The June 11 survey documented four beds of CLP totaling 2.28ac (Figure 4). DASH removal did not include Mud Lake in 2024, but there has already been discussion about adding it to DASH removal in 2025.

The 2024 CLP bed mapping survey was completed prior to the completion of two days of DASH removal, so whether or not DASH had a visible impact in the harvested area is unknown, however, it is speculated that it did.

Figure 5: June 11, 2024 Balsam and Mud Lakes CLP – LEAPS

2024 RED CEDAR LAKE CLP BED MAPPING RESULTS

A CLP bed mapping survey on Red Cedar Lake on June 12, 2024, documented 27 beds of CLP totaling 6.48ac (Figure 6). The survey was completed several weeks after the chemical treatment of 18 acres, and in the areas where herbicide was applied there appeared to be a substantial reduction in Most of the beds identified in the June 12 survey were small, only two exceeded a full acre in size. Density in the beds was across the board with some being very dense (a 3 on a 1-3 scale). Most beds were either 1 or 2 in density. During the 2023 survey only two true beds of CLP totaling 0.5ac were identified.

As in 2023, DASH could have removed most of the CLP that was found however it would likely take a week or more of work, so until the RCLA purchases their own DASH boat, it will remain only a small-scale management action with a high cost.

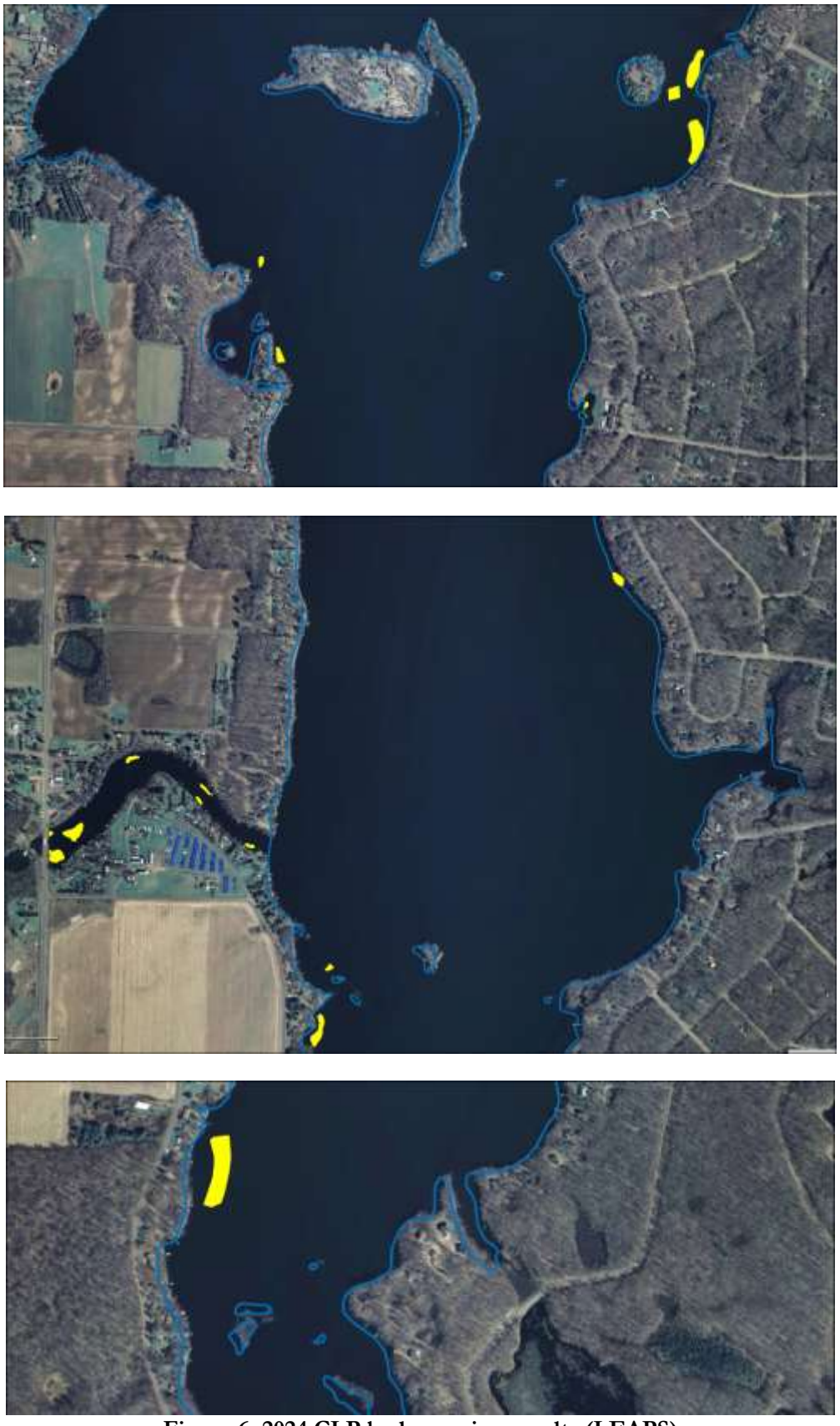


Figure 6: 2024 CLP bed mapping results (LEAPS)

2024 HEMLOCK LAKE CLP BED MAPPING RESULTS

Despite the nearly 16ac chemical treatment in Hemlock Lake in May of 2024, a CLP bed mapping survey completed on June 11 identified 9 beds totaling 24.39ac (Figure 7). Only two beds were identified 2023 totaling 0.012ac. Fortunately, most of the areas with CLP in 2024 had density ratings of 1 or 2 on a 1-3 scale with 3 being the most dense.

Figure 7: 2024 CLP mapping results from Hemlock Lake – LEAPS

Table 4 reflects the total acreage of CLP in the lakes from the last three years.

Table 4: 2022-24 CLP acreage (LEAPS)

Lake Name	2022	2023	2024
Balsam/Mud	5.7	0.8 (whole system – all lakes combined)	7.09
Red Cedar	4.59		6.48
Hemlock	0.32		24.39
TOTAL	**10.61**		**37.96**

2024 MURPHY FLOWAGE CLP BED MAPPING RESULTS

CLP was not mapped in Murphy Flowage in 2024.

2024 WILD RICE MAPPING

Wild rice is present near the boat landing on Balsam Lake and down the channel to Mud Lake. It has been mapped by RCLA volunteers for several years. Figure 8 shows wild rice mapping results from 2019, a year when there was a lot of wild rice present, 2023 when there wasn't much, and in 2024 when wild rice appears to be rebounding. Photos from the 2024 survey are included in Figure 9. Despite the increase, little if any of the wild rice is suitable for human harvest.

Figure 8: 2019 wild rice (yellow – 1.5ac); 2023 (blue – 0.34ac); 2024 (red – 1.08ac)

Figure 9: 2024 Wild rice photos (Val Bausch)

YELLOW IRIS SURVEY

Yellow iris (Figure 10) is a non-native shoreland flower that has become more prevalent on area lakeshores. Like purple loosestrife, it can be invasive and take over large areas of shoreline. It was identified at 10pts in Red Cedar Lake in 2023, and at 18pts in 2024 (Figure 10). All the surveys completed have been impromptu surveys completed when surveying for other species like CLP. A more formal survey should be completed and a management strategy defined so it does not become a greater problem.

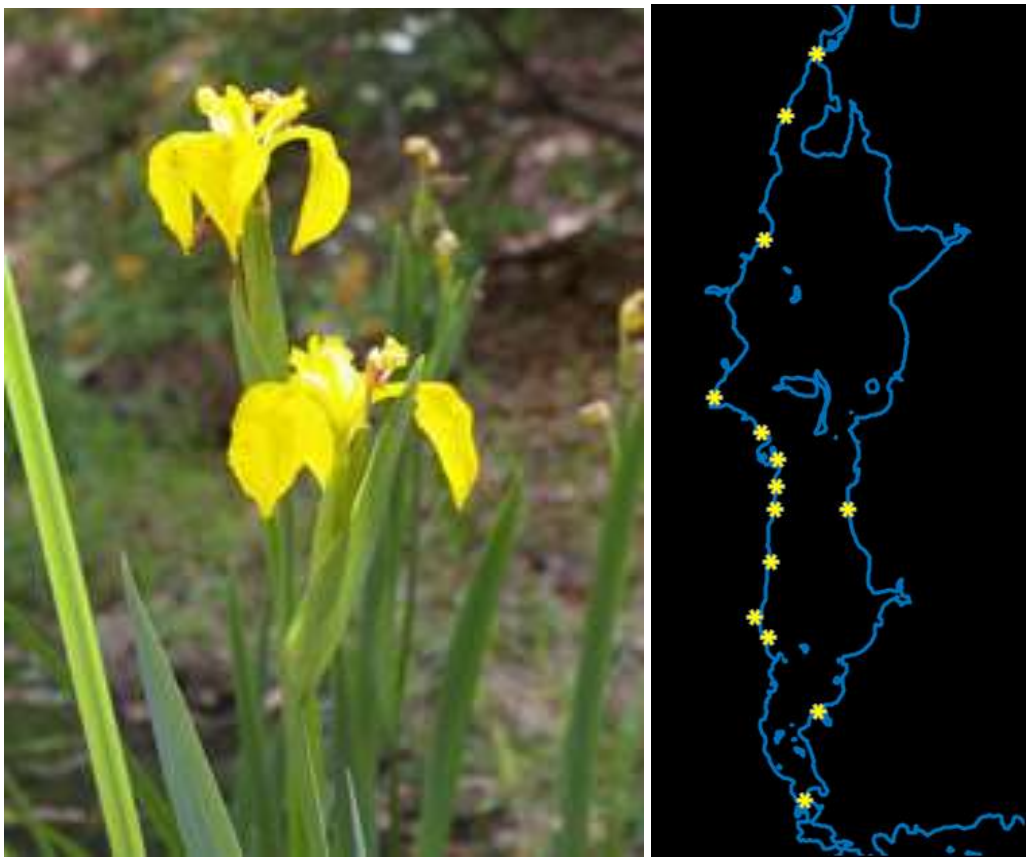


Figure 10: Yellow iris and its locations on the shores of Red Cedar Lake (RCLA)

The amount of CLP in the lakes each year varies greatly based on the previous winter. In 2024, very little snow, very limited ice formation, and early ice out led to a resurgence in CLP. In 2023, after a more "normal" winter, there was barely enough CLP to consider application of herbicide as a management action. The amount of CLP in 2022 and 2023 could have been effectively managed without the use of herbicides. This was done on Balsam Lake where DASH was used for the first time in 2023. It was again used in 2024 on Balsam Lake and had been planned to be used on Red Cedar as well. Unfortunately, the amount of CLP that was in the 2024 target area on Balsam Lake took up all the two days of DASH that was contracted.

DASH

Future CLP management using DASH will require more days – probably a week or more to effectively control the smaller areas where herbicide application is generally not permitted. Doing so however, will come with increased cost. The average cost per day for DASH is about $3,500.00 and results over the last two years have shown that only a half to one acre of CLP can be removed in any given day. There are several reasons for that. The density of CLP is one huge factor. Fairly large, concentrated areas with lots of CLP take longer to remove (like Balsam Lake in 2024). But so do smaller areas spread throughout the system as the DASH boat and team must travel to each location by water, or by pulling the boat and launching it again at a different landing, all of which reduces time in the water and the efficiency of the DASH removal process.

There are a couple of ways these issues could be addressed. One, contracted DASH could involve more than one DASH boat and DASH diving team so more could be accomplished when they are on the lake. The other would be for the RCLA to invest in their own DASH boat and staff so that there is more time available to complete DASH. Until RCLA invests in their own equipment, contracted DASH will be the best option but will continue to be a very expensive management action based on the acreage of CLP removed.

That said, there are areas of the lakes where DASH may likely be the only acceptable management action. Such is the case in Balsam Lake and Mud Lake due to the presence of wild rice. DASH has yet to be used in Red Cedar (even though it may present the best DASH removal sites) due to the sheer size of the lake, the amount of CLP being removed in Balsam, and the limited time that DASH has been contracted.

HERBICIDE APPLICATION

Where aquatic herbicides can be used to control CLP is limited by WDNR policy incorporated into the existing Aquatic Plant Management Plan. In general, only individual areas of CLP that reach or exceed five acres can be targeted with herbicides. In addition, the density of CLP within those larger areas is considered. If the density is not such that it interferes with navigation/lake use or prevents native aquatic plant growth, even though it may exceed five acres, herbicide application will likely not be undertaken.

During the 2024 CLP survey, Hemlock Lake had the largest areas of CLP, however, most of those areas were not dense, with ratings of only 1 and sometimes 2 on a 1-3 rating with 3 being the most dense. If the 2024/25 winter season is more "normal" the amount of CLP in the spring of 2025 may be substantially less than it was during the 2024 survey. If another winter is had, like the 2023/24 winter, it is likely that CLP will be as bad or worse in the spring of 2025 than it was in the spring of 2024.

MECHANICAL HARVESTING

Another option for CLP management would be mechanical harvesting. If used at the right time during the CLP growing season, mechanical harvesting can remove CLP biomass, open navigation areas, and remove dense cover that may prevent native aquatic plant growth. It can also prevent the buildup of new turions in the sediment. The same companies that offer DASH removal also offer contracted mechanical harvesting. Harvesting may be a way to increase the amount of CLP removed without chemicals, removing more than DASH can do. Other things must be considered though. Having to travel long distances on the water between mechanical harvesting areas and boat

landings or other off-load sites slows down the process. A dump site that can handle large quantities of CLP and a means to get the CLP from the off-load site to the dump site would also have to be determined. The cost for mechanical harvesting is generally a little less per day than DASH removal. Harvesting can remove more CLP so the cost per acre of CLP should also be less than using DASH. Drawbacks include escaped fragments during harvesting that wash up on the shoreline and finding an available contractor during the "best" time to harvest CLP. If a contracted mechanical harvester was used on a lake with CLP and EWM before coming to the Red Cedar Lakes and not cleaned appropriately, there is a risk that EWM or another AIS could be introduced.

2025 MANAGEMENT RECOMMENDATIONS

Only two areas of CLP in Hemlock Lake are large enough to consider application of herbicide (Figure 11). However, the density in both areas is low.

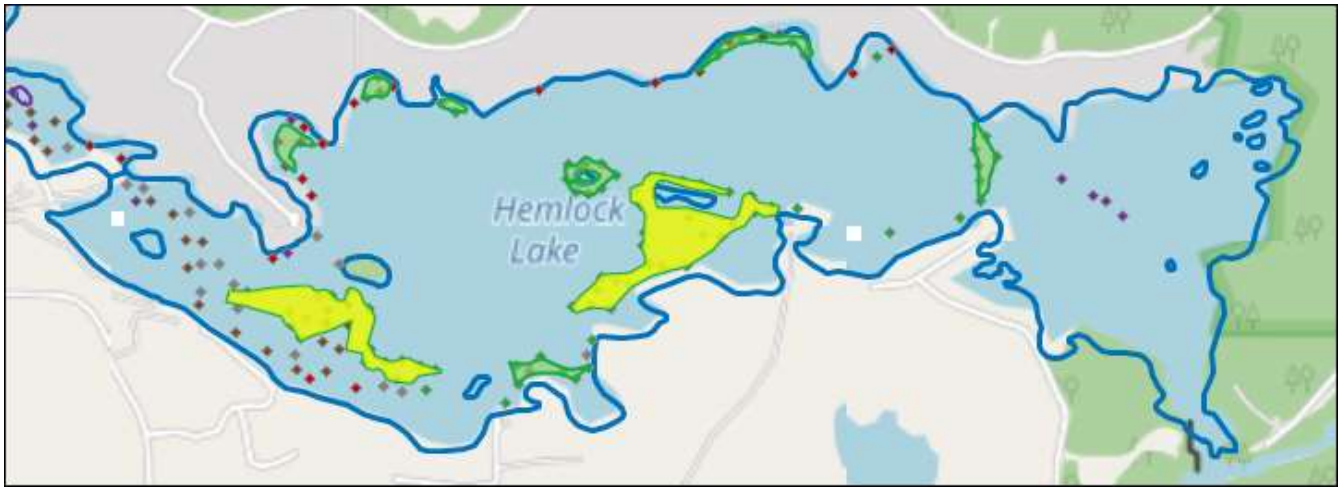


Figure 11: Two areas of CLP in Hemlock Lake that reach or exceed 5ac (left = 7.76ac; right = 9.71ac)

There are no areas of CLP on Red Cedar Lake that reach or exceed 5ac. The two largest areas are <1.5ac each (Figure 12).

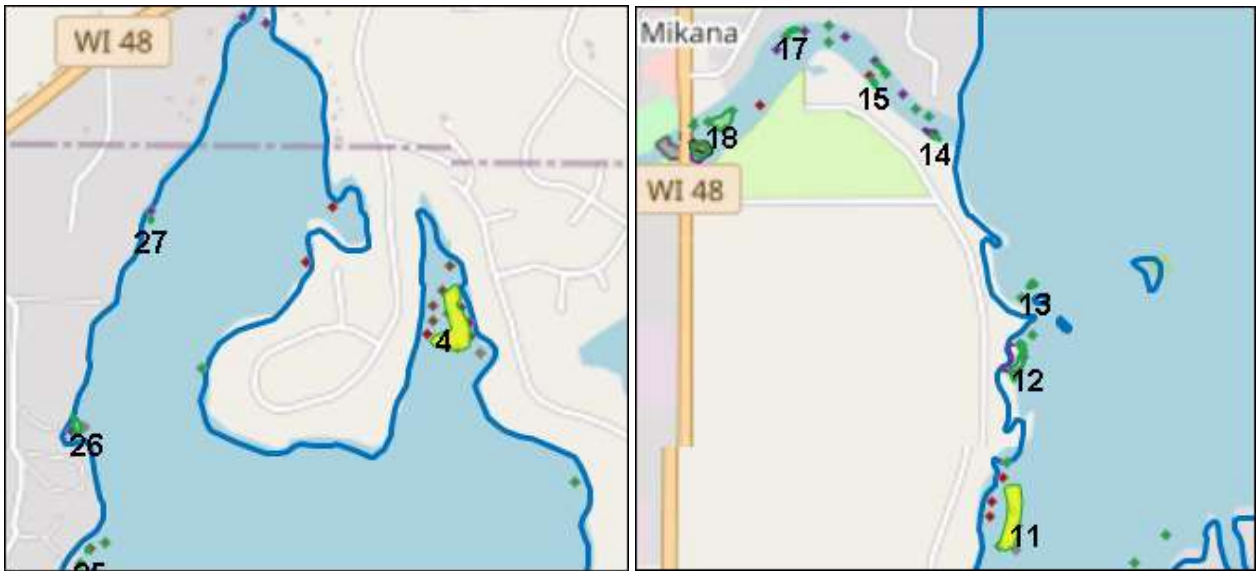


Figure 12: Two largest areas of CLP in Red Cedar Lake (Bed4-left = 1.47ac; Bed11-right = 1.13ac)

There are no areas of CLP that reach or exceed 5ac on Balsam and Mud Lakes. The two largest CLP beds in Balsam and Mud Lakes are both less than 2ac (Figure 13).

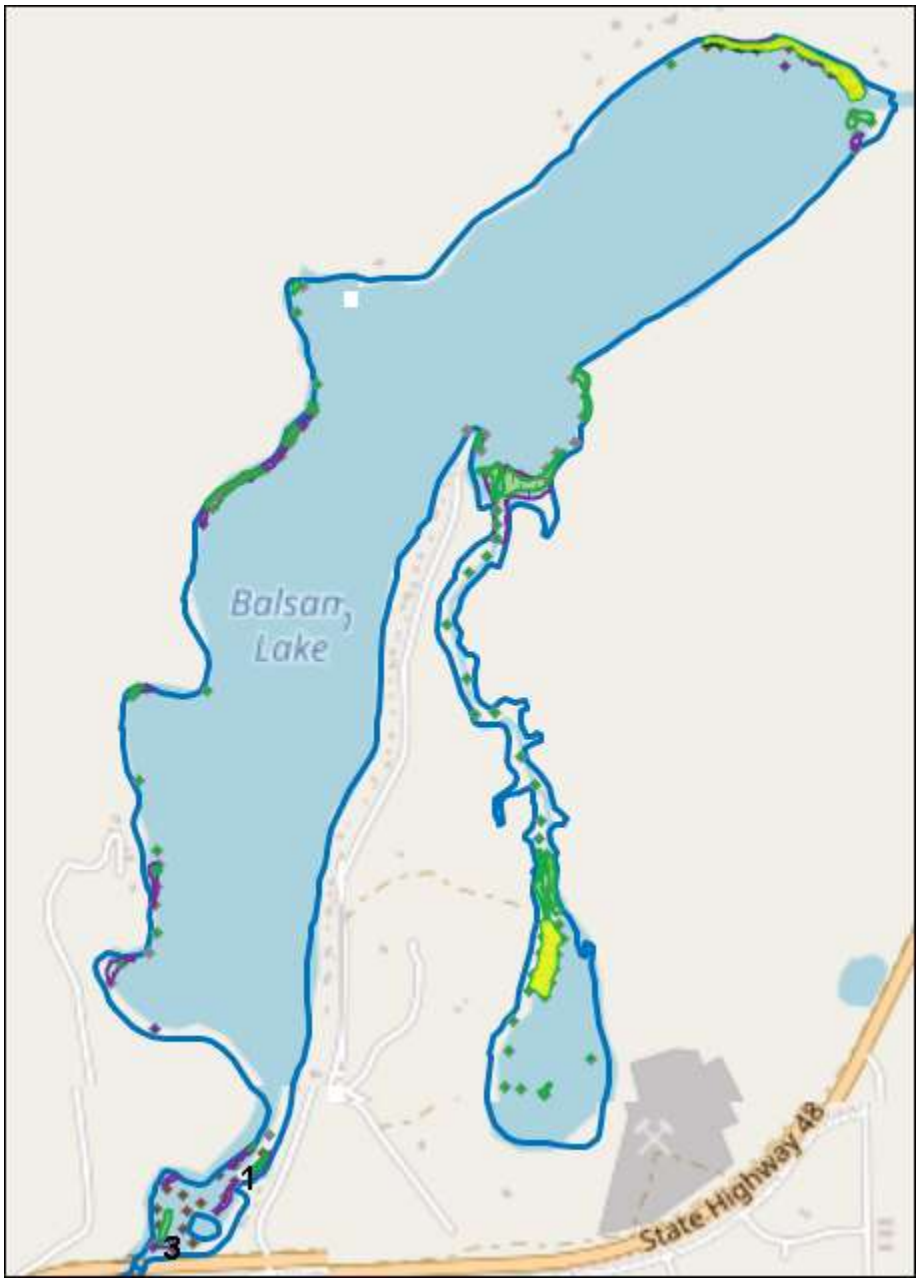


Figure 13: Two largest areas of CLP in Balsam and Mud Lakes (north end of Balsam = 1.72ac; Mud = 1.43ac)

If the 2024/25 winter season is like the last winter, then it is reasonable to assume that an herbicide application proposal and permit application could be drawn up including the largest areas of CLP with nearby beds combined. This is most likely to be done on Red Cedar and Hemlock. It may be possible to chemically treat the north end of Balsam. Regardless of any preliminary treatment proposal, pre-treatment survey work should be completed in the spring of 2025 to confirm the proposed treatment areas.

If there is grant support, the RCLA should continue to implement DASH. It is recommended that they contract with a provider for at least five days in 2025 so more CLP can be removed in more places. When working with the contractors that offer DASH, the subject of mechanical harvesting should also be discussed. Perhaps in 2025, both DASH and mechanical harvesting could be implemented with mechanical harvesting being considered a test run to determine whether it should be considered in the future.

2024 PURPLE LOOSESTRIFE BIO-CONTROL

The RCLA worked in cooperation with LEAPS and the Birchwood Middle School to raise and release Galerucella beetles used for control of purple loosestrife in 2024. LEAPS gathered the rootstock and materials, and then worked with teachers and students at the Middle School to pot the rootstock and place nets on the pots. The beetle rearing station was tended to by the Middle School until it was time to inoculate their netted plants with beetles.

LEAPS collected the beetles from areas close to Birchwood, and then worked with students and teachers to inoculate the plants (Figure 14). From that point on, the RCLA and the Middle School cooperated to determine a release date for the beetles and with the help of summer school students, released the beetles on the bogs in the channel between the main body of Red Cedar Lake and Hemlock Lake in June 2024 (Figure 15).

Figure 14: Two Birchwood Middle School students "all in" on PL beetle sucking

Figure 15: Birchwood students taking PL beetles out to the bogs in June 25, 2024 (Lori Anderson, 2024)

2024 AIS MONITORING AND EDUCATION

Volunteers have performed aquatic invasive species (AIS) monitoring on a regular basis in the lakes, and the RCLA has several committees dedicated to AIS monitoring, prevention, education, and removal. To stay ahead of the current infestations, as well as any other future AIS concerns, monitoring and education will continue in the future to prevent new introductions and limit their spread should they occur. LEAPS promotes and provides AIS education through events geared towards education and by attending RCLA meetings.

The Nature Committee monitors the lakes for AIS including purple loosestrife and yellow iris. Boat landings are monitored for EWM and zebra mussels.

The RCLA Annual Meeting held July 13, 2024. Agenda items included the following:

Presentations were made by each Committee during the meeting.

The RCLA prepares and distributes two newsletters each year, one in the spring and one in the fall. The newsletters contain updates from every Committee currently in play with the RCLA:

- Aquatic Invasive Species Committee
- Nature Committee
- Shoreline & Island Restoration Committee
- Fish Habitat Committee
- Water Quality Committee
- Communication Committee
- Coupon Book Committee
- Lake Information & Safety Committee
- Membership Committee

Digital copies of the newsletter, meeting minutes, management plans, plant survey results, water quality results, and a host of other information is available on the RCLA webpage at https://www.redcedarlakes.com/.

2024 CLEAN BOATS, CLEAN WATERS

LEAPS assisted the RCLA in organizing Clean Boats, Clean Waters (CBCW) in 2024. The group was approved for a CBCW grant to support these efforts totaling 400hrs of inspection time. Several paid employees (hired by LEAPS) and paid employees of the RCLA spent time at several landings in 2024 - Hemlock, Waldo Carlson, 48&V, and Loch Lomond boat landings. Table 5 reflects all the watercraft inspection time put in by LEAPS inspectors in 2024.

Table 5: LEAPS watercraft inspection breakdown for 2024

Landing	Hours Worked	# of Shifts	Weekday Shifts	Weekend Shifts	Morning Shifts	Afternoon Shifts	Evening Shifts
Hemlock	100	26	13	13	10	8	8
Waldo	98	25	11	14	7	9	9
48&V	107	28	20	8	10	12	6
Loch Lomond	100	26	11	15	7	14	5
TOTAL	**405**	**105**	**55**	**50**	**34**	**43**	**28**

HEMLOCK LAKE

LEAPS paid inspectors put in 100 hours on Hemlock Lake during the 2024 season. A total of 100 boats were inspected. A total of 183 people were contacted by watercraft inspectors.

The watercraft inspection time put in by LEAPS inspectors is reflected in Table 5. In addition, inspectors documented 17 different lakes visited by boaters prior to coming to the Red Cedar Lakes. Of those lakes, four have Eurasian water milfoil, two have zebra mussels, and one has spiny waterflea. These data reflect the importance of continuing watercraft inspection on the Red Cedar Lakes (and Big Chetac and Birch) in the future.

RED CEDAR LAKE

WALDO CARLSON

LEAPS paid inspectors and RCLA monitors put in 160 hours on the Waldo Carlson landing on Red Cedar Lake during the 2024 season. Of that time, 98 hours were put in by LEAPS employees. The remaining time was put in by inspectors paid directly by the RCLA. A total of 184 boats (116 by LEAPS inspectors) were inspected. A total of 386 people (224 by LEAPS inspectors) were contacted by watercraft inspectors.

48&V

LEAPS paid inspectors put in 107 hours on the 48&V landing on Red Cedar Lake during the 2024 season. A total of 62 boats were inspected. A total of 112 people were contacted by watercraft inspectors.

LOCH LOMOND

LEAPS paid inspectors and RCLA monitors put in 156.25 hours on the Loch Lomond Beach Club landing on Red Cedar Lake in 2024. LEAPS inspectors put in 100 hours of that time. A total of 109 boats (68 by LEAPS inspectors) were inspected. A total of 315 people (154 by LEAPS inspectors) were contracted.

BALSAM LAKE, WASHBURN COUNTY

No watercraft inspection time was put in on the Balsam Lake boat landing in 2024.

DECONTAMINATION STATIONS

There are Decontamination Stations in place at both the Hemlock, Waldo, Loch Lomond, and Balsam Lake landings. There is no decontamination station at the 48&V landing. RCLA volunteers check the decontamination stations making sure the materials are still in place and fluids are filled.

BALSAM LAKE

From the WEx webpage, Balsam Lake - Deep Hole Near Birchwood WI in Washburn County was sampled on 4 different days during the 2024 season. As of 9/24, no water quality data has been entered past the middle of July. Parameters sampled included: water clarity (Secchi disk), temperature, dissolved oxygen, total phosphorus, chlorophyll-a. The Trophic State Index values for the three parameters – Secchi disk readings of water clarity, total (TP) phosphorus, and chlorophyll-a (Chl-a) without August samples taken into consideration places Balsam Lake mostly in the meso-trophic category for lakes (Figure 16). Balsam Lake is considered a deep, two-story fishery lake, although it does not currently support a cold-water fishery. When compared to other two-story fishery lakes, these values identify Balsam Lakes as way worse than average for all parameters (Figure 17). There are no significant trends, good or bad, for any of the three main parameters.

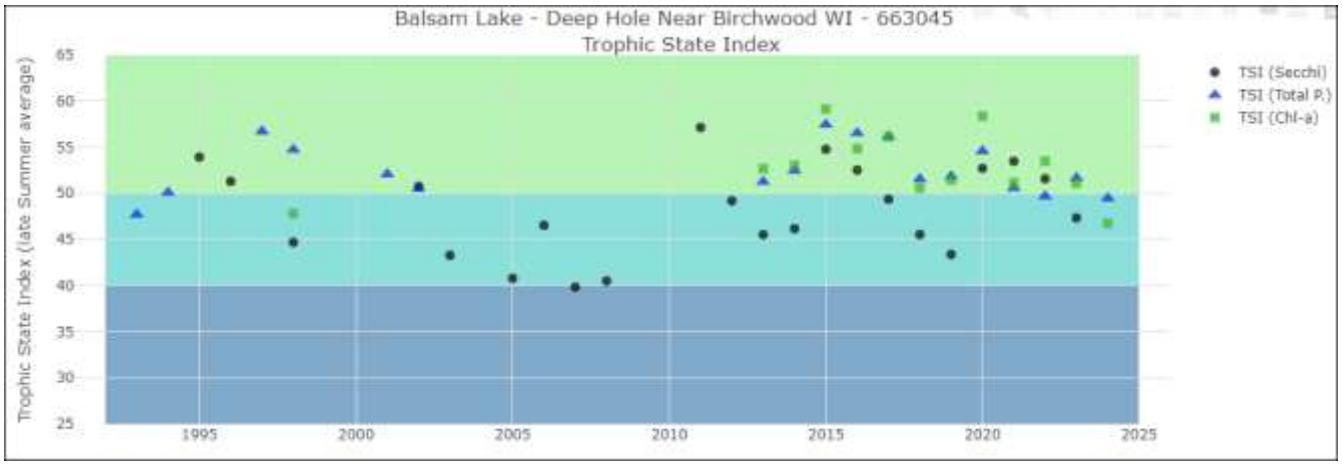


Figure 16: Historic TSI values for Secchi, total phosphorus, and chlorophyll-a in Balsam Lake, Washburn County at the Deep Hole Near Birchwood (WEx, 2024)

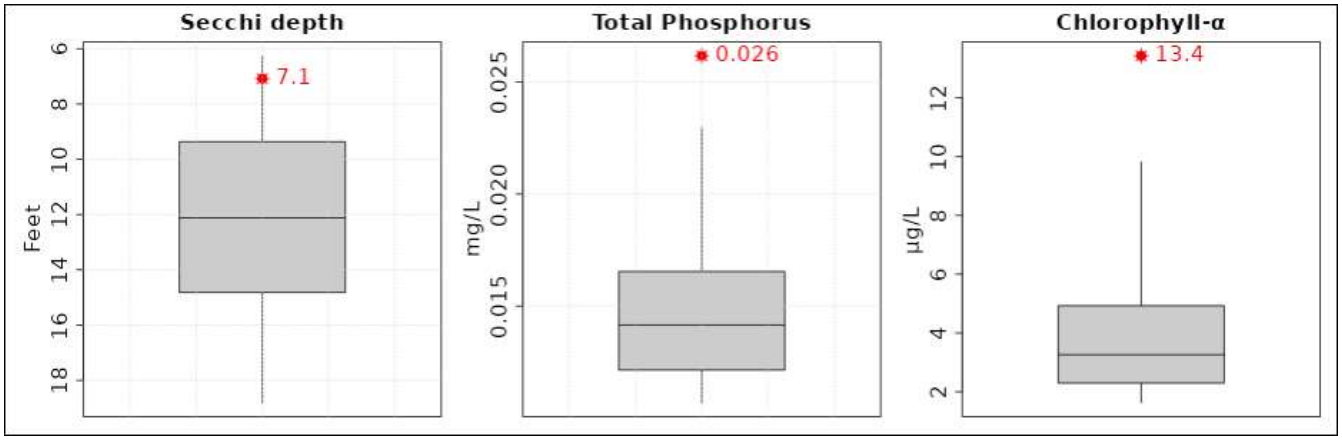


Figure 17: Trophic status compared to similar lakes using data from the last 10 years (WEx, 2024)

RED CEDAR LAKE

Red Cedar Lake - Deep Hole North was sampled on 9 different days during the 2024 season. Parameters sampled included: water clarity (Secchi disk), temperature, dissolved oxygen, total phosphorus, chlorophyll. The 2024 Trophic State Index values for the three parameters – Secchi disk readings of water clarity, total phosphorus, and chlorophyll-place Red Cedar Lake in the eutrophic category (Figure 18). This is worse than the last several years, but in line with some previous data. Eutrophic lakes are nutrient-rich, with either a lot of aquatic plants or a lot of algae. Red Cedar Lake is considered a deep, two-story fishery lake, although its' ability to support a cold-water fishery is marginal at

best. When compared to other two-story fishery lakes, these values identify Red Cedar Lake as worse than average for all parameters (Figure 19). In the late summer, there is a significant trend toward improving total phosphorus over time, but no trends for water clarity or Chl-a.

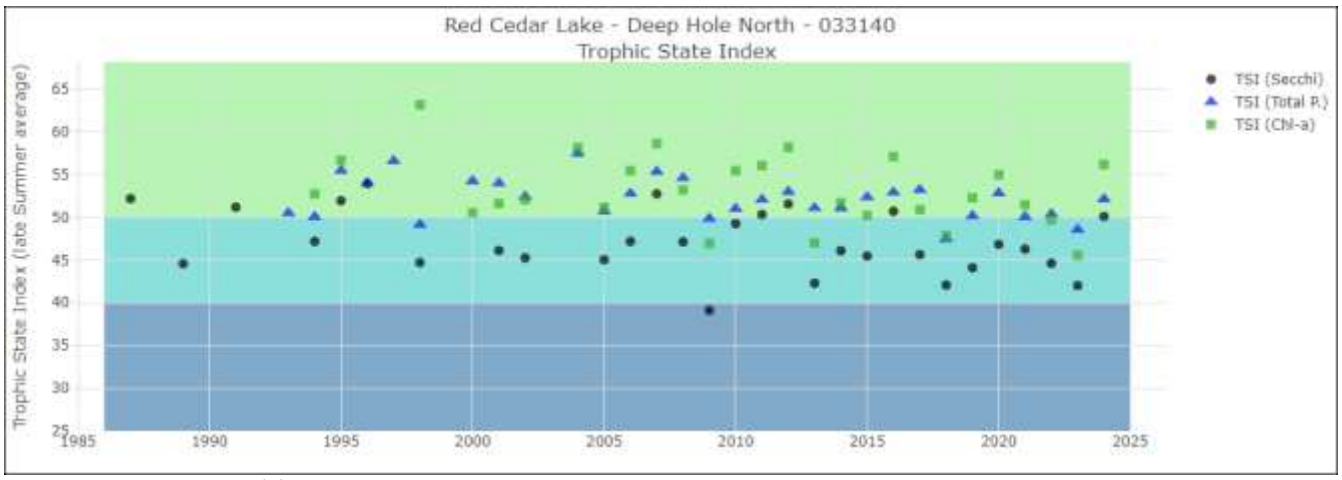


Figure 18: Historic TSI values for Secchi, total phosphorus, and chlorophyll-a in Red Cedar Lake, Barron County at the Deep Hole North (WEx, 2024)

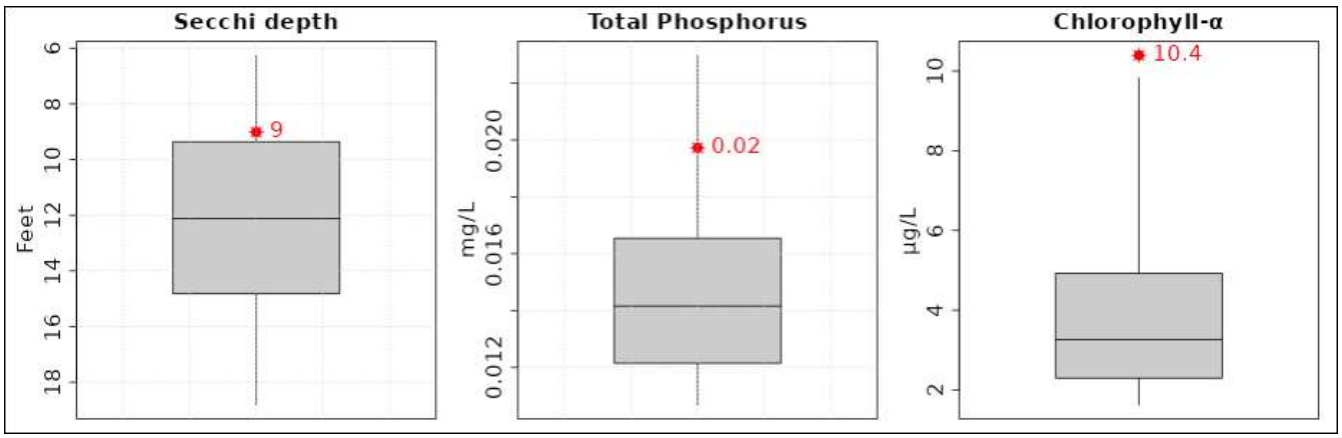


Figure 19: Trophic status compared to similar lakes using data from the last 10 years (WEx, 2024)

HEMLOCK LAKE

No water quality data has been submitted for Hemlock Lake since 2022. The RCLA should strive to find a new CLMN volunteer to once again collect at least water clarity data using a Secchi disk. Hemlock Lake was a part of the CLMN expanded water quality monitoring program up to 2022, but a lack of data collection has likely removed it from the program. Expanding monitoring includes Secchi disk readings and water samples analyzed for total phosphorus and chlorophyll-a (algae).

TEMPERATURE AND DISSOLVED OXYGEN

Temperature and dissolved oxygen (DO) profiles were collected from both Balsam Lake (one profile) and Red Cedar Lake (9 profiles) in 2024. The last time temperature and DO were collected from Hemlock Lake was in 2020. Balsam and Red Cedar are considered deep water, stratified lakes. When a lake stratifies, it means that in the summer, the water column separates into three distinct layers, the epilimnion (warm surface water), the hypolimnion (colder bottom water), and the thermocline (a transition zone between the surface and bottom waters). Water at the surface of the lake is warmer and oxygen rich. Water at the bottom of the lake is colder and generally loses oxygen through the early part of the season until there is no oxygen left in the bottom waters. When there is no oxygen, it means there can be no fish and it means that additional nutrients may be dumped back into the water column when previously bound phosphorus breaks away from the iron in the sediment.

In the past, both Red Cedar and Balsam Lake were considered cold-water lakes capable of supporting a cold water fishery of cisco and whitefish. Not anymore. The water in the bottom of both lakes becomes devoid of oxygen too soon in the season, and where there is enough oxygen present, the water is too warm to support the cold-water species.

Figure 20 shows the only profile collected in Balsam Lake. Since it is in the month of May, the profile indicates that stratification has not yet occurred. Later in the season, the thermocline gets established at about 20-ft. DO concentration plummets after 20-ft. Water temperature drops substantially as well. Of note is that there seems to be a band of oxygen producing algae that hovers right near the thermocline as indicated by the DO concentration at about 18-ft being so high compared to the rest. This is likely not an anomaly as it happens quite frequently in Balsam Lake.

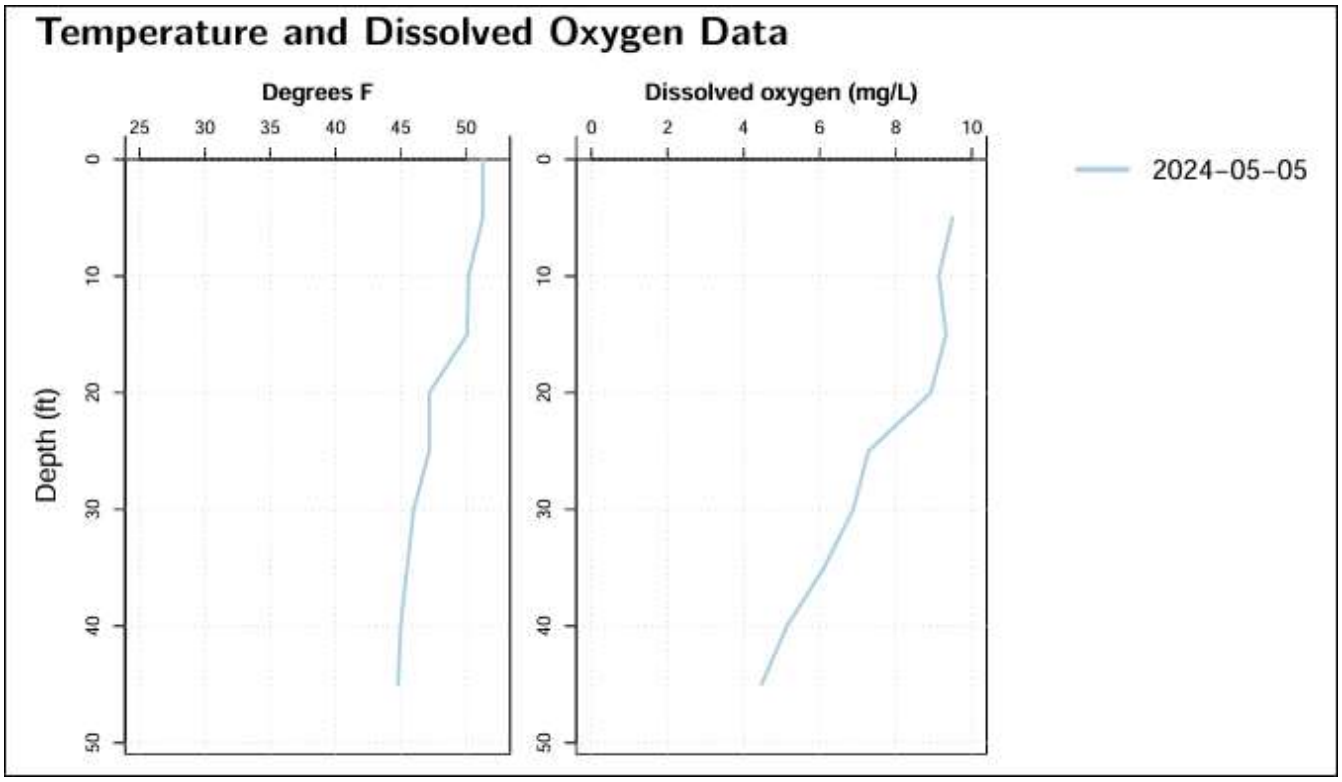


Figure 20: Single Temperature and DO profile from May 2024 – Balsam Lake (WEx, 2024)

Figure 21 shows all the profiles taken in 2024 from Red Cedar Lake. Like Balsam, a thermocline gets established around 20-ft. DO concentration plummets after 20-ft. Water temperature drops substantially as well. Red Cedar Lake does not show the band of algae near the thermocline like Balsam Lake does.

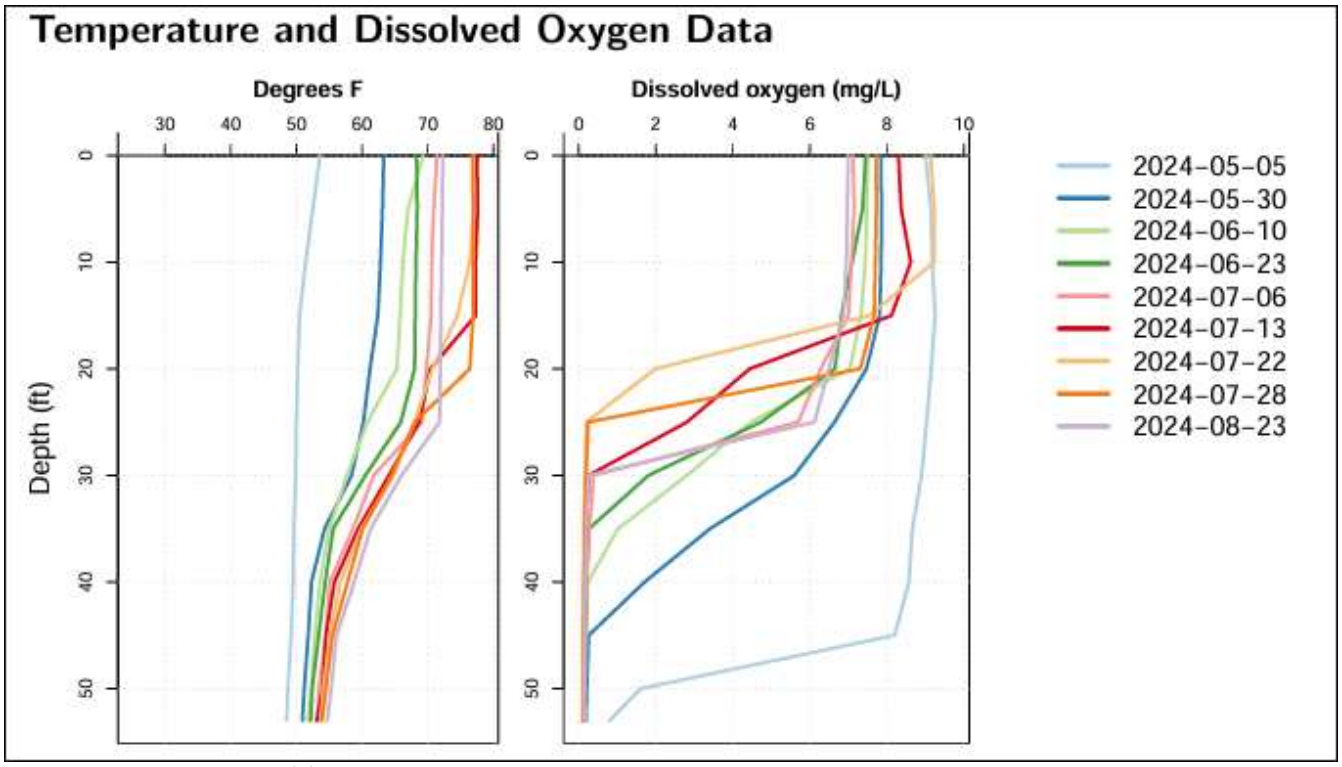


Figure 21: Temperature and DO profiles from 2024 – Red Cedar Lake (WEx, 2024)

CURRENT GRANT STATUS

The only currently active grant still in play for the Red Cedar Lakes is the ACEI grant awarded back in 2019. The RCLA has received grants annually to support the Clean Boats Clean Waters watercraft inspection program. The 2024 project is complete, and a new grant has been applied for in 2025.

The RCLA also has one or more Healthy Lakes grants to support island restoration and shoreland habitat improvement projects.

2024 RCLA Management Summary Report was completed by Dave Blumer, LEAPS on September 25, 2024.

Balsam Lake CLP Removal Report 2024

PO Box 1134 Minocqua, WI 54548

Balsam Lake CLP Removal Summary 2024

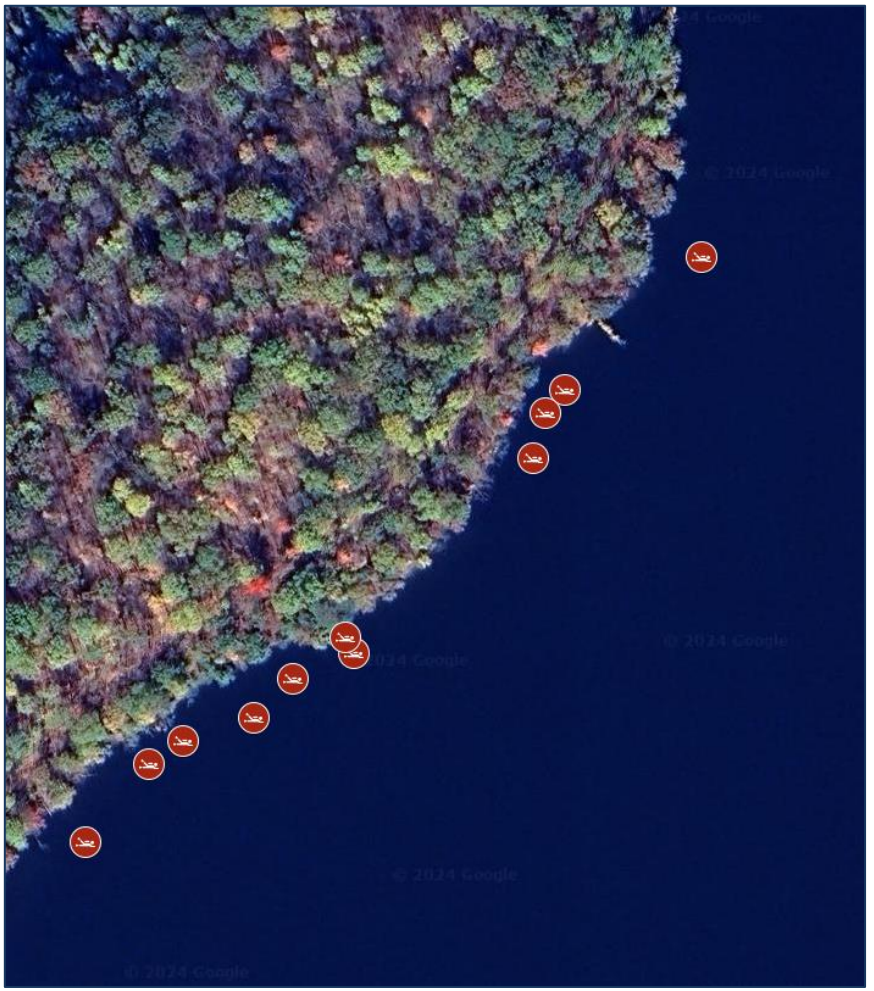
Dive Background: In June, Aquatic Plant Management LLC (APM) conducted two (2) days of Diver Assisted Suction Harvesting for Curly Leaf Pondweed (CLP) on Balsam Lake in Barron/Washburn County, WI. The team focused their efforts at 1 site as prioritized by the Red Cedar Lake Association. In total APM was able to remove **160.5 cubic feet of CLP** from Balsam Lake.

Date	Weather Conditions	Water Temp (F)	Underwater Dive Time (hrs)	AIS Removed (cubic ft)
6/17/2024	Rain	69	7.8	104.0
6/18/2024	Cloudy	69	6.0	56.5
Grand Total			**13.8**	**160.5**

Dive Location	Avg. Water Depth	# of Dives	Underwater Dive Time	AIS Removed (cubic feet)
WstShrN-BL-24	5.1	11	13.8	160.5
Grand Total	**5.1**	**11**	**13.8**	**160.5**

Dive Highlights and Recommendations: The dive team spent all of their time at the highest priority location along the northwestern shoreline in the center of the lake. Due to the density and acreage of CLP in the colony, the team was not able to go to other sites on the chain that had been identified as having CLP. Overall, Balsam Lake should continue to take an Integrated Pest Management (IPM) approach and evaluate different strategies to manage the CLP population on the lake. Continued monitoring and management efforts are important to prevent the spread of CLP throughout Balsam Lake.

Map of Balsam Lake Dive Sites



Detailed Diving Activities

Date	Dive Location	Latitude	Longitude	Underwater Dive Time (hrs)	AIS Removed (cubic ft)	AIS Density	Avg Water Depth (ft)	Native Species	Native By-Catch	Substrate Type
6/17/2024	WstShrN-BL-24	45.65643	-91.58512	2.67	50.0	Small Plant Colony	4.0	Grasses	1.0	Organic
6/17/2024	WstShrN-BL-24	45.65650	-91.58481	2.17	21.5	Small Plant Colony	4.0	Grasses	1.5	Organic
6/17/2024	WstShrN-BL-24	45.65662	-91.58464	1.17	19.0	Small Plant Colony	4.0	Northern Milfoil	2.0	Organic
6/17/2024	WstShrN-BL-24	45.65670	-91.58437	1.83	13.5	Small Plant Colony	4.0	Grasses	2.0	Organic
6/18/2024	WstShrN-BL-24	45.65792	-91.58284	1.08	10.0	Small Plant Colony	5.5	Grasses	1.5	Organic/Sand
6/18/2024	WstShrN-BL-24	45.65751	-91.58344	0.83	7.0	Small Plant Colony	6.0	Pondweeds	1.5	Organic/Sand
6/18/2024	WstShrN-BL-24	45.65730	-91.58358	0.83	7.0	Small Plant Colony	6.0	Northern Milfoil	1.5	Organic/Sand
6/18/2024	WstShrN-BL-24	45.65744	-91.58353	1.00	7.0	Highly Scattered	6.0	Grasses	1.0	Organic/Sand
6/18/2024	WstShrN-BL-24	45.65675	-91.58441	0.75	11.0	Small Plant Colony	6.0	Grasses	1.0	Organic/Sand
6/18/2024	WstShrN-BL-24	45.65612	-91.58555	0.50	11.0	Small Plant Colony	5.5	Pondweeds	1.0	Organic
6/18/2024	WstShrN-BL-24	45.65636	-91.58527	1.00	3.5	Small Plant Colony	5.5	Grasses	1.0	Organic/Sand
Total	**11**			**13.83**	**160.5**					

2020 to 2024 CLP Mapping – Red Cedar Lakes (Balsam, Red Cedar, Hemlock, & Mud (2024 only))

Key – Points

Brown Points – 2020 CLP

Grey Points – 2021 CLP

Purple Points – 2022 CLP

Dark Red Points – 2023 CLP

Green Points – 2024 CLP

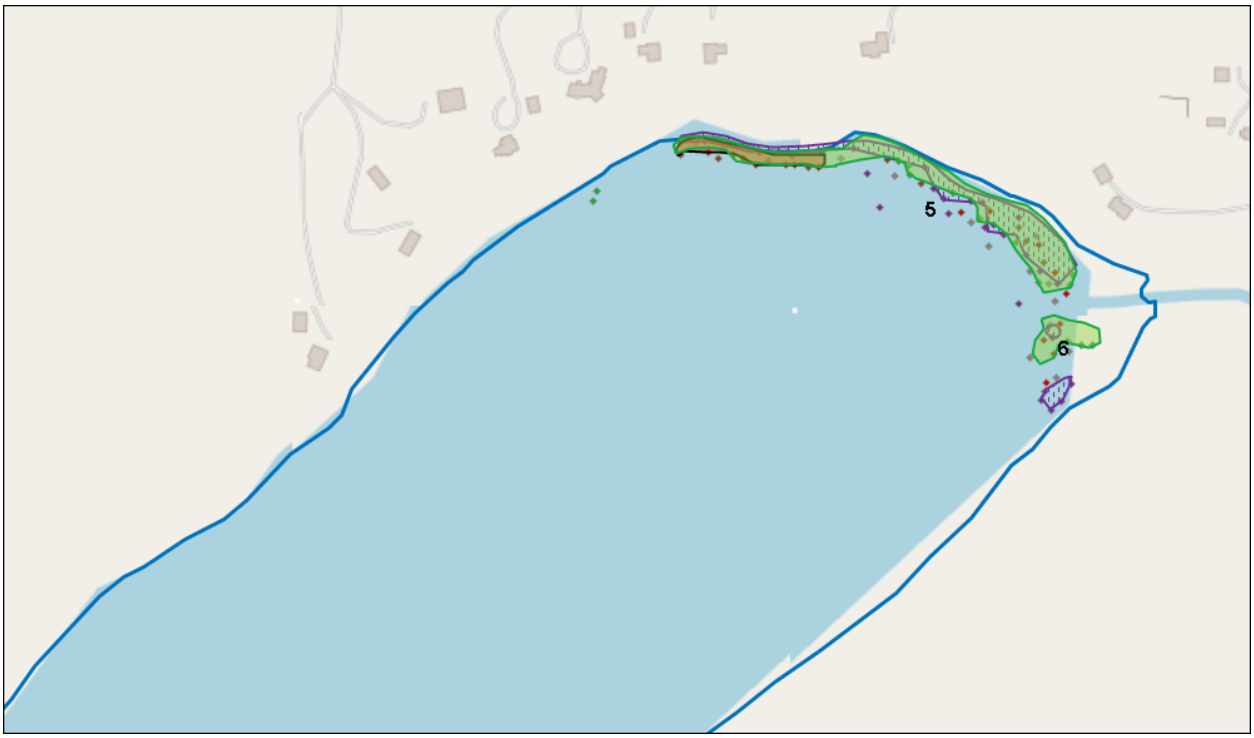
Key – Beds

Purple hash, purple outline – 2022 CLP beds

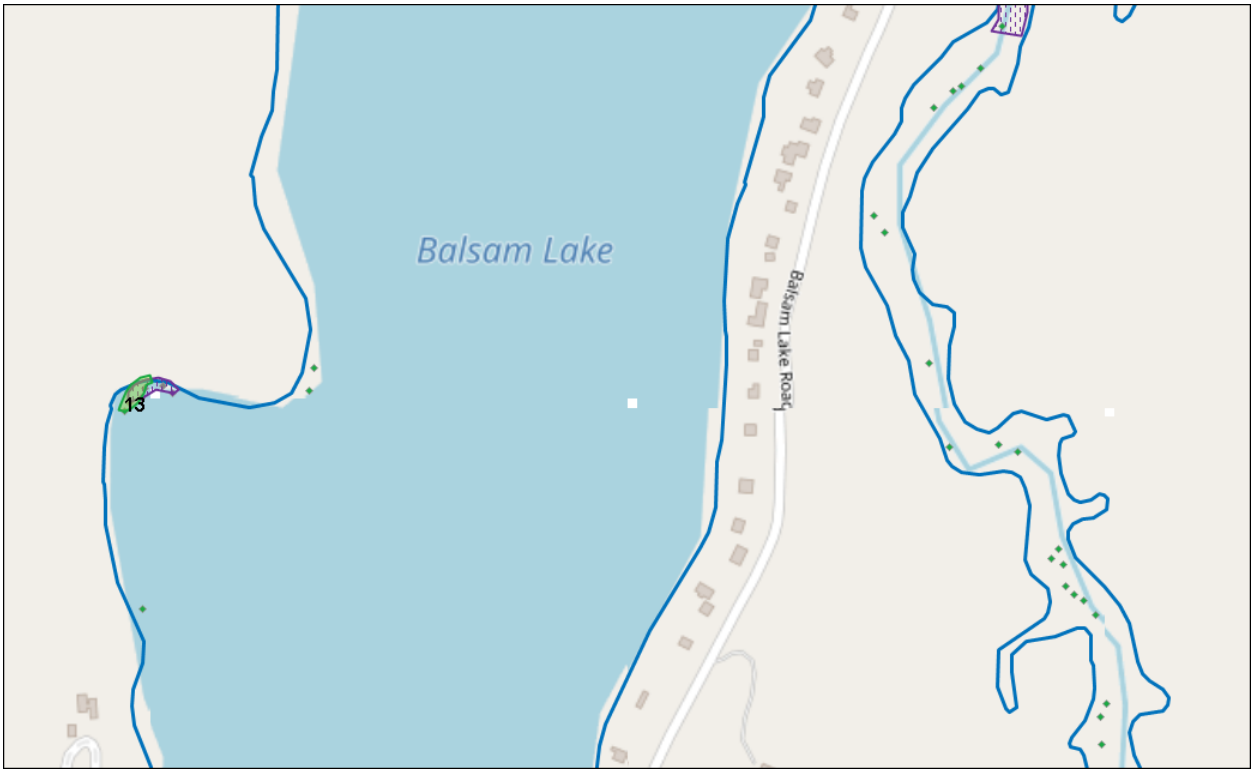
Light red, black outline – 2023 CLP beds

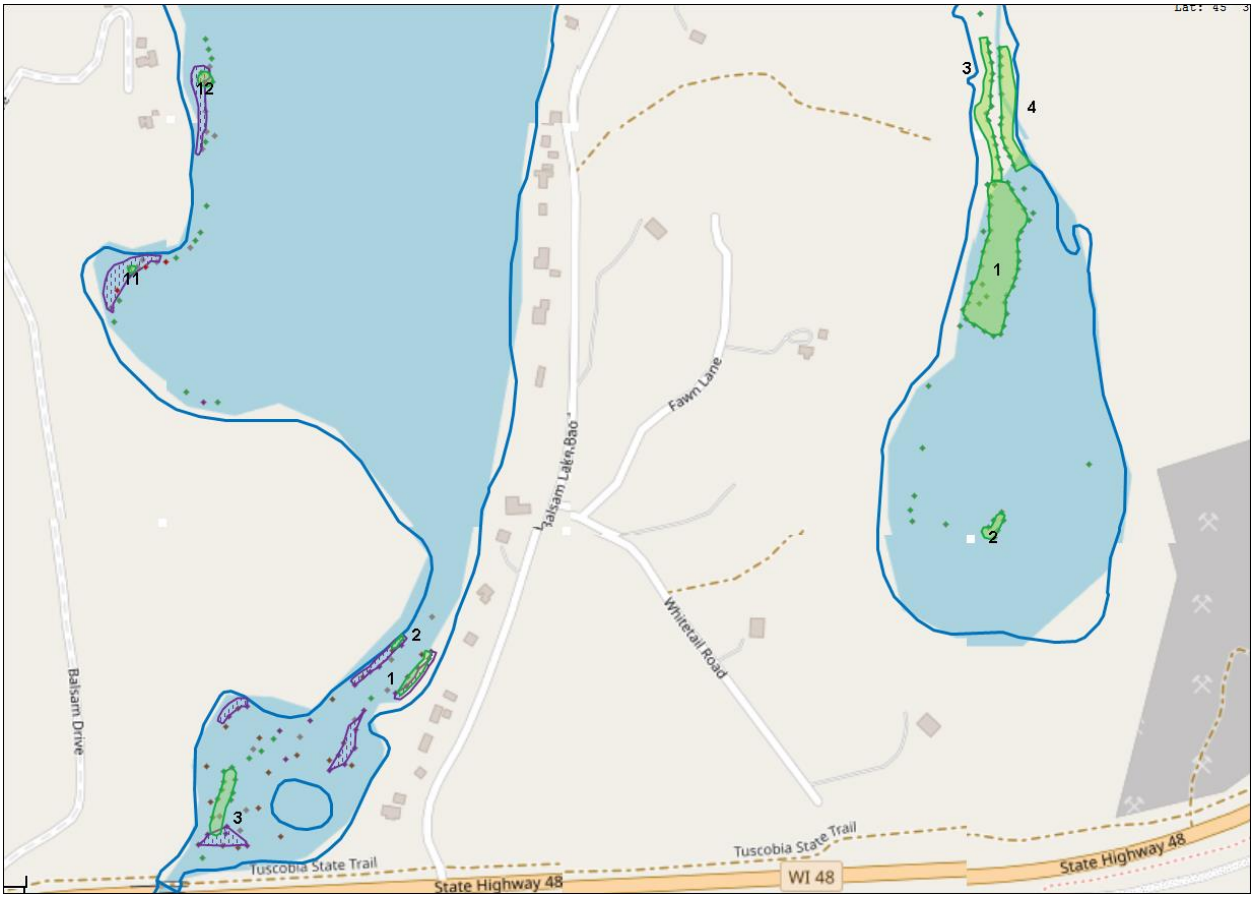
Light green, dark green outline – 2024 CLP beds

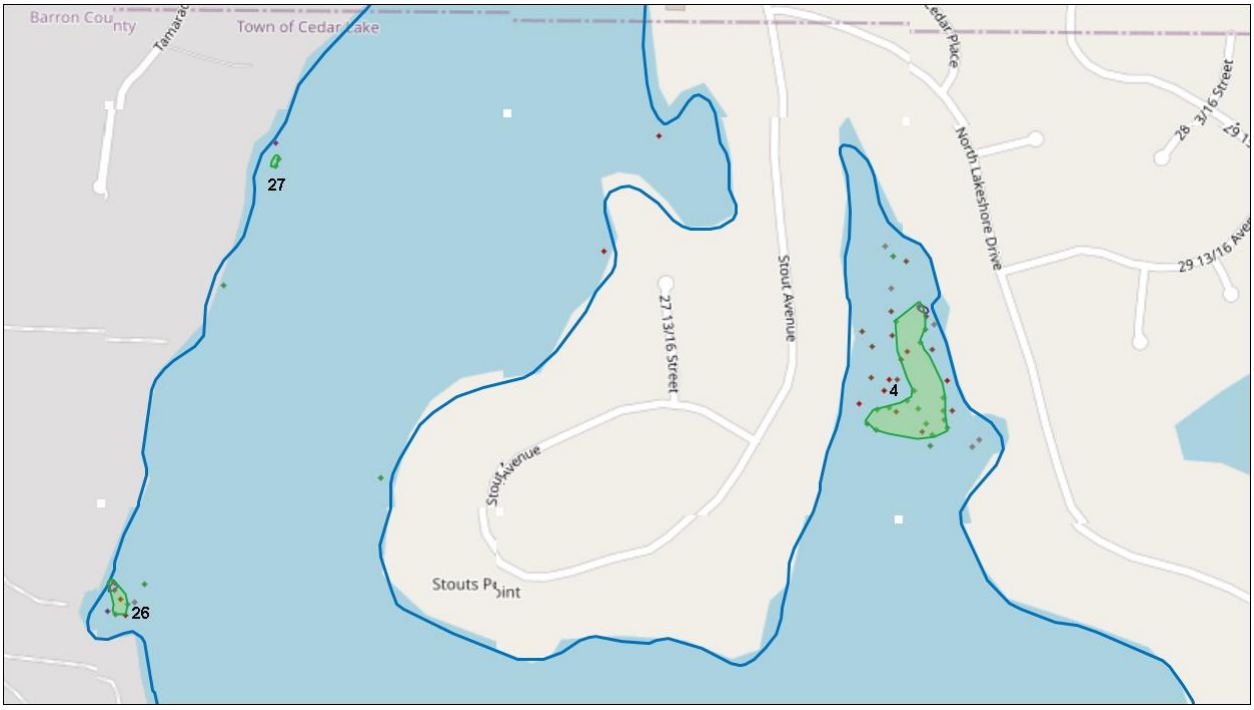
2024 (beds are numbered)	**2023**	**2022**
Balsam/Mud = 7.09 ac	Entire System = 0.8 acre	Balsam = 5.7 ac
Red Cedar = 6.48 ac		Red Cedar = 4.59 ac
Hemlock = 24.39 ac		Hemlock = 0.32 ac
Total = 37.96ac		Total = 10.61 ac

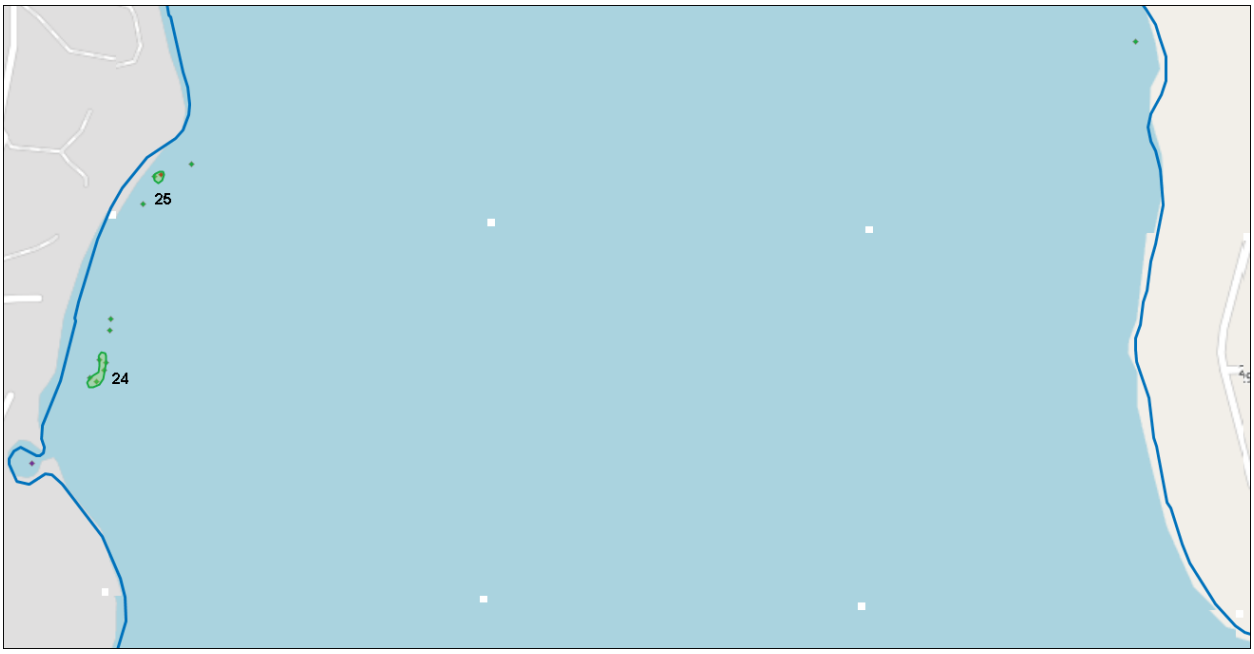


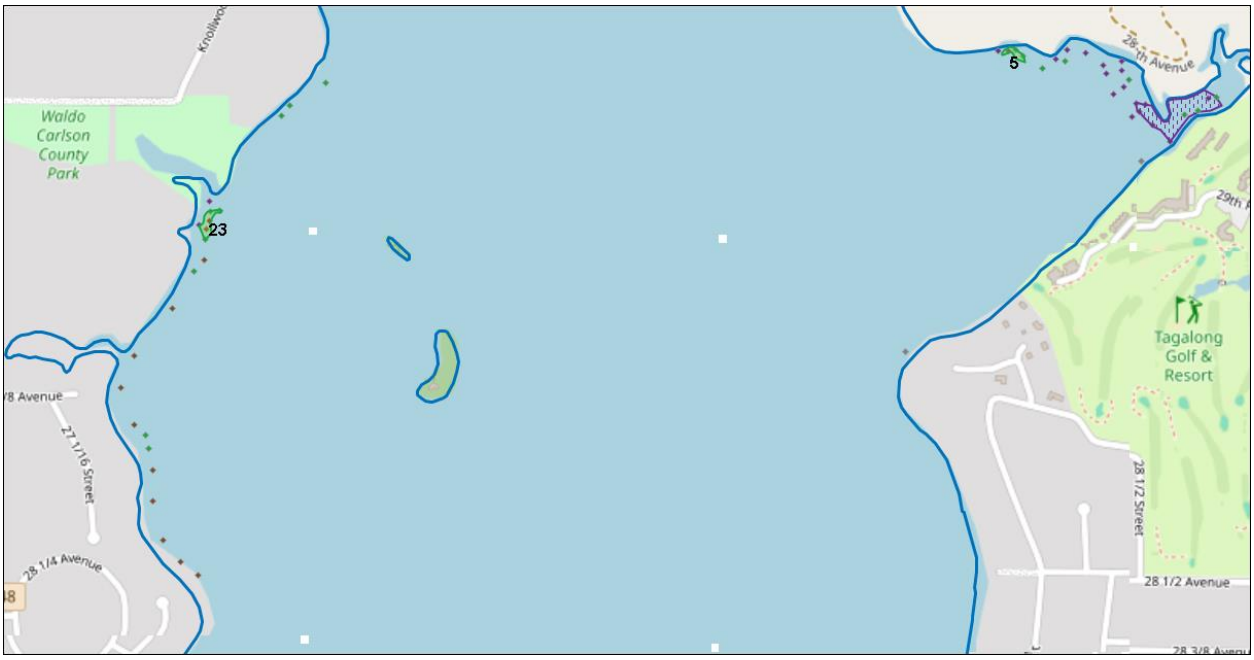

4A
3A
2A
1A
7
10
9
8


Balsam Lake
Balsam Lake Road
13

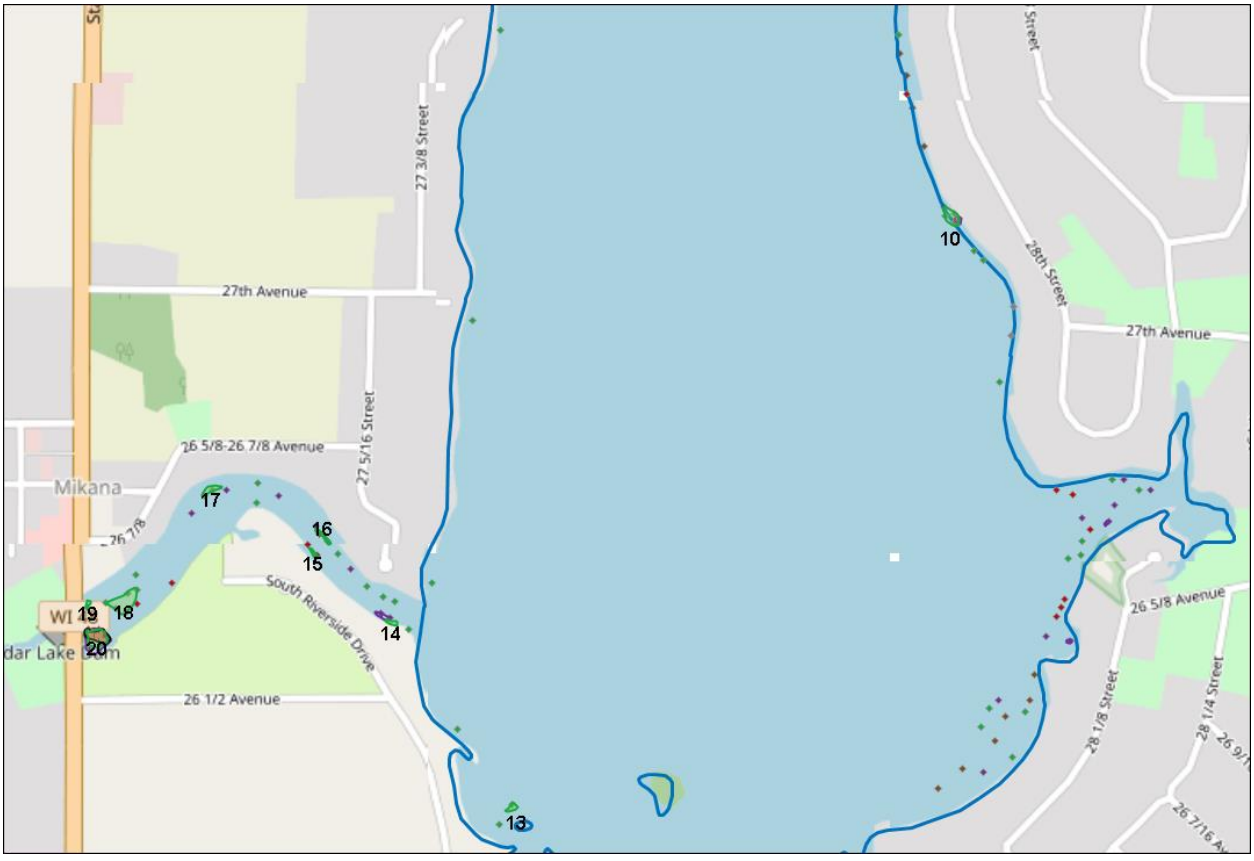

12
11
2
1
3
3
4
1
2
Balsam Drive
Balsam Lake Rd
Fawn Lane
Whitetail Road
Tuscobia State Trail
State Highway 48
WI 48
Tuscobia State Trail
State Highway 48

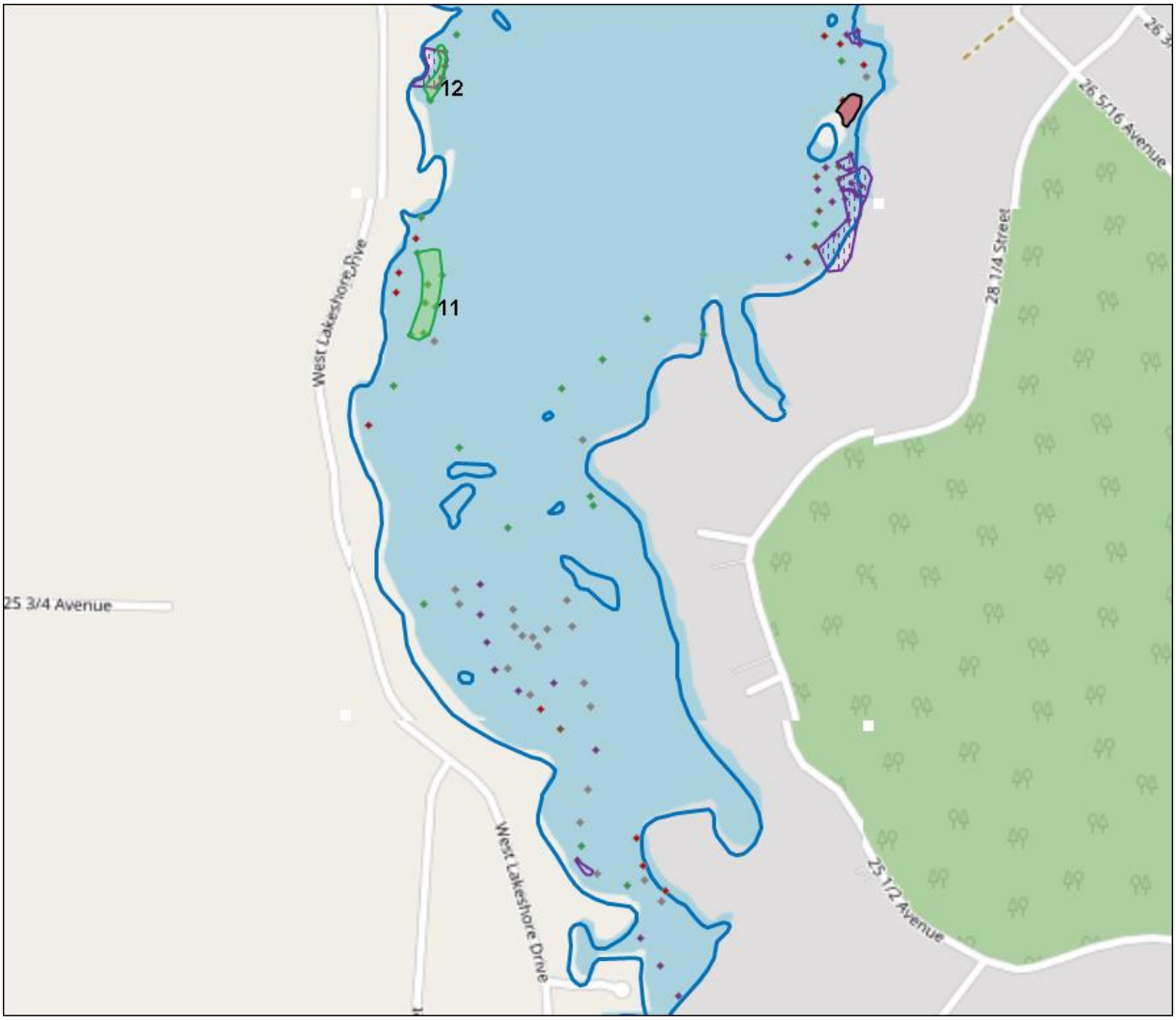

Barron County
Town of Cedar Lake
Tamarack
27
Cedar Place
North Lakeshore Drive
28 3/16 Street
29 13/16 Ave
27 13/16 Street
Stout Avenue
Stout Avenue
4
Stouts Point
26

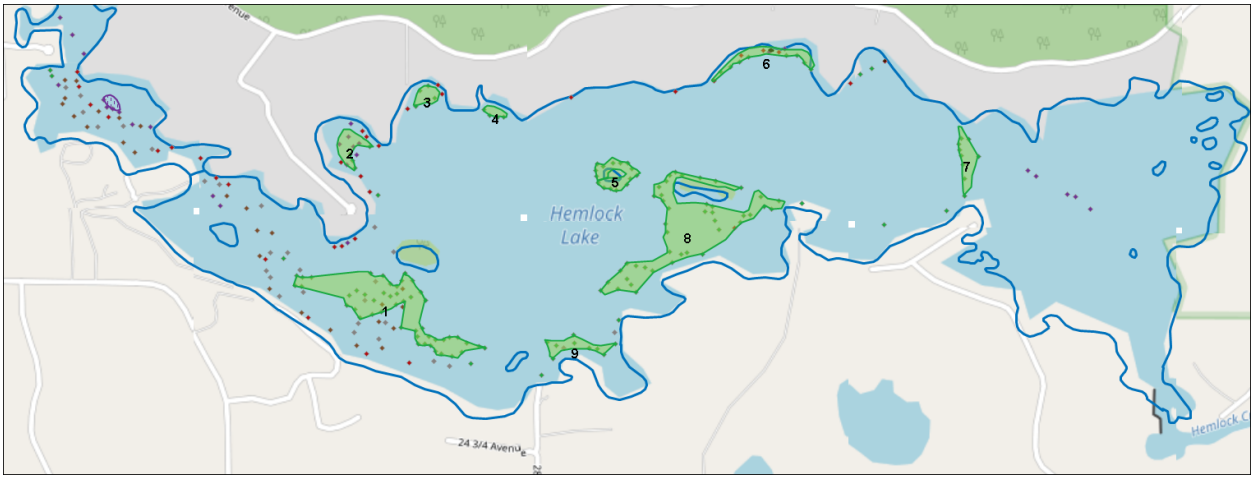

25
24


Waldo Carlson County Park
23
5
Tagalong Golf & Resort
28 1/2 Street
28 1/2 Avenue
28 1/4 Avenue
27 1/16 Street

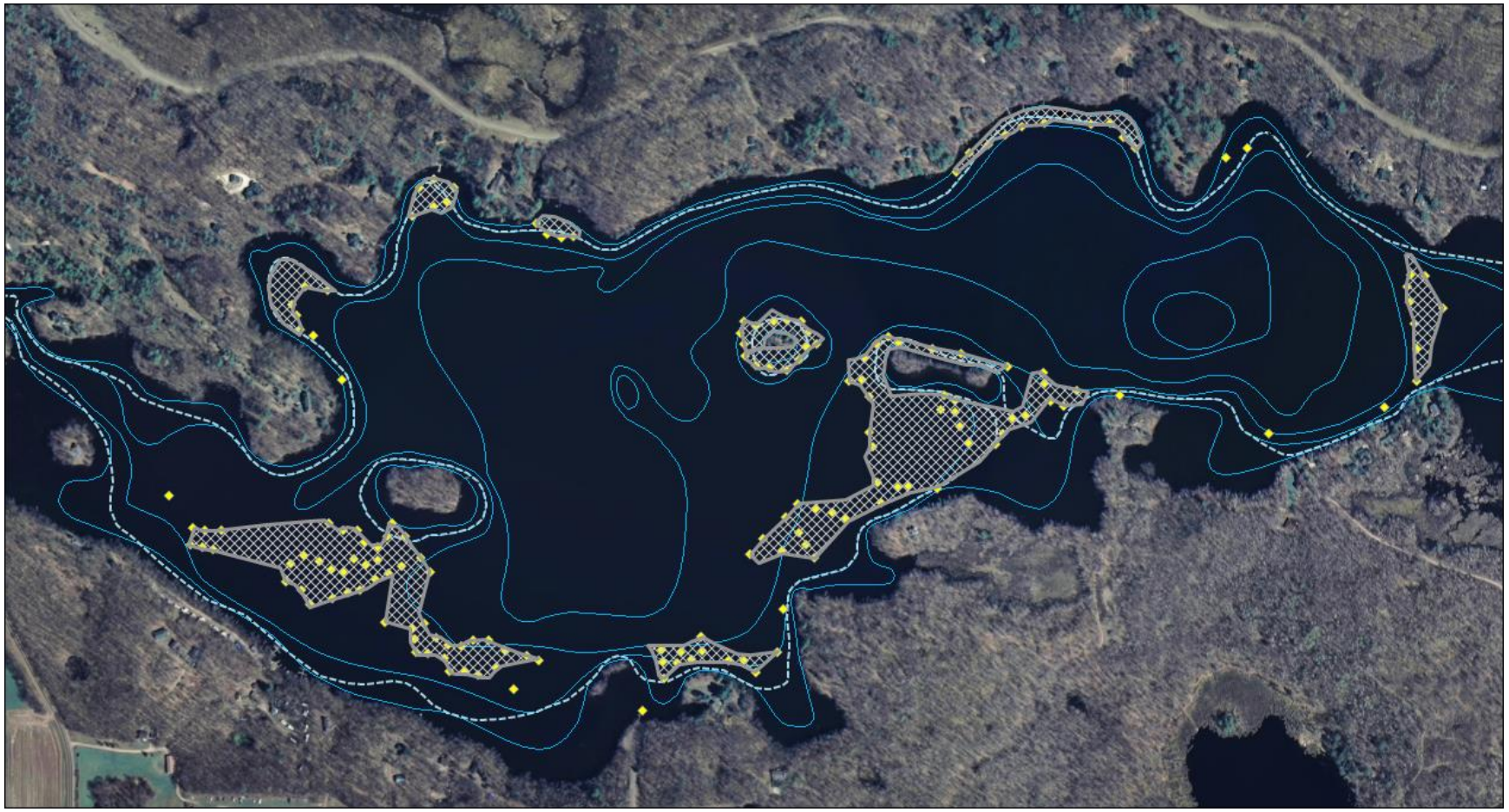

Stout's Island Ferry
Stout's Island
Red Cedar Lake
Edgewood Lane North
Edgewood Road
27 1/2 Avenue
Loch Lomond Beach Club
28th Street
27 7/8 Avenue
28 7/16 Street
27 1/2 Avenue
28 1/2 Street
6
7
8
9
21
22


27 3/8 Street
27th Avenue
26 5/8-26 7/8 Avenue
27 5/16 Street
Mikana
South Riverside Drive
26 1/2 Avenue
28th Street
26 5/8 Avenue
28 1/8 Street
28 1/4 Street
10
13
14
15
16
17
18
19
20


12
11
West Lakeshore Drive
25 3/4 Avenue
West Lakeshore Drive
25 1/2 Avenue
28 1/4 Street
26 5/16 Avenue


1
2
3
4
5
6
7
8
9
Hemlock Lake
24 3/4 Avenue

June 11, 2024 CLP Bed Mapping Balsam, Mud, and Hemlock Lakes



Balsam Lake – 13 beds totaling 4.81 acres. Density of Beds 1-3 rake fullness rating.

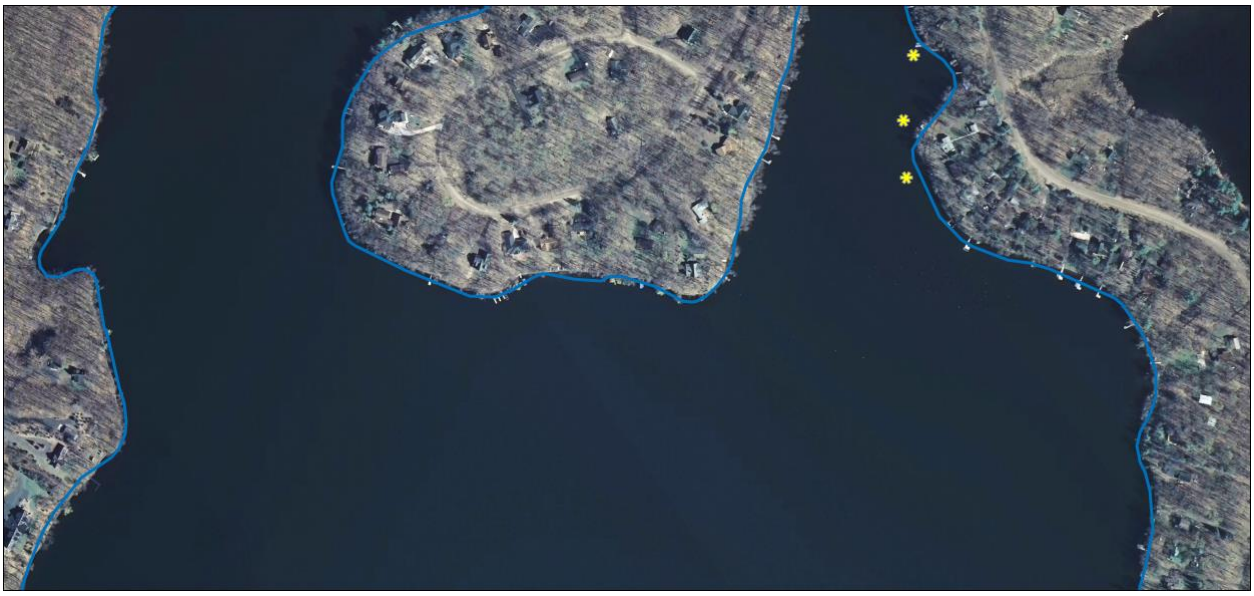
Mud Lake – 4 beds totaling 2.28 acres. Density of Beds 2-3 rake fullness rating.

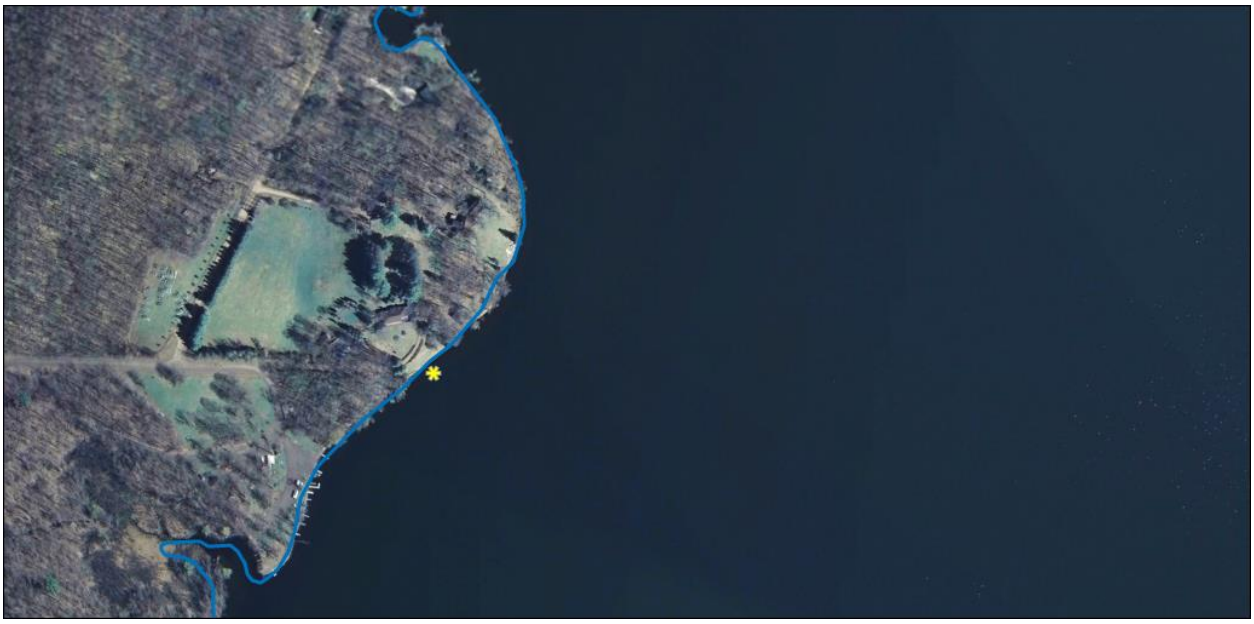
Hemlock Lake – 9 beds totaling 24.39 acres. Density of beds <1 to 2 rake fullness rating. Beds mostly in 6-10 feet of water.

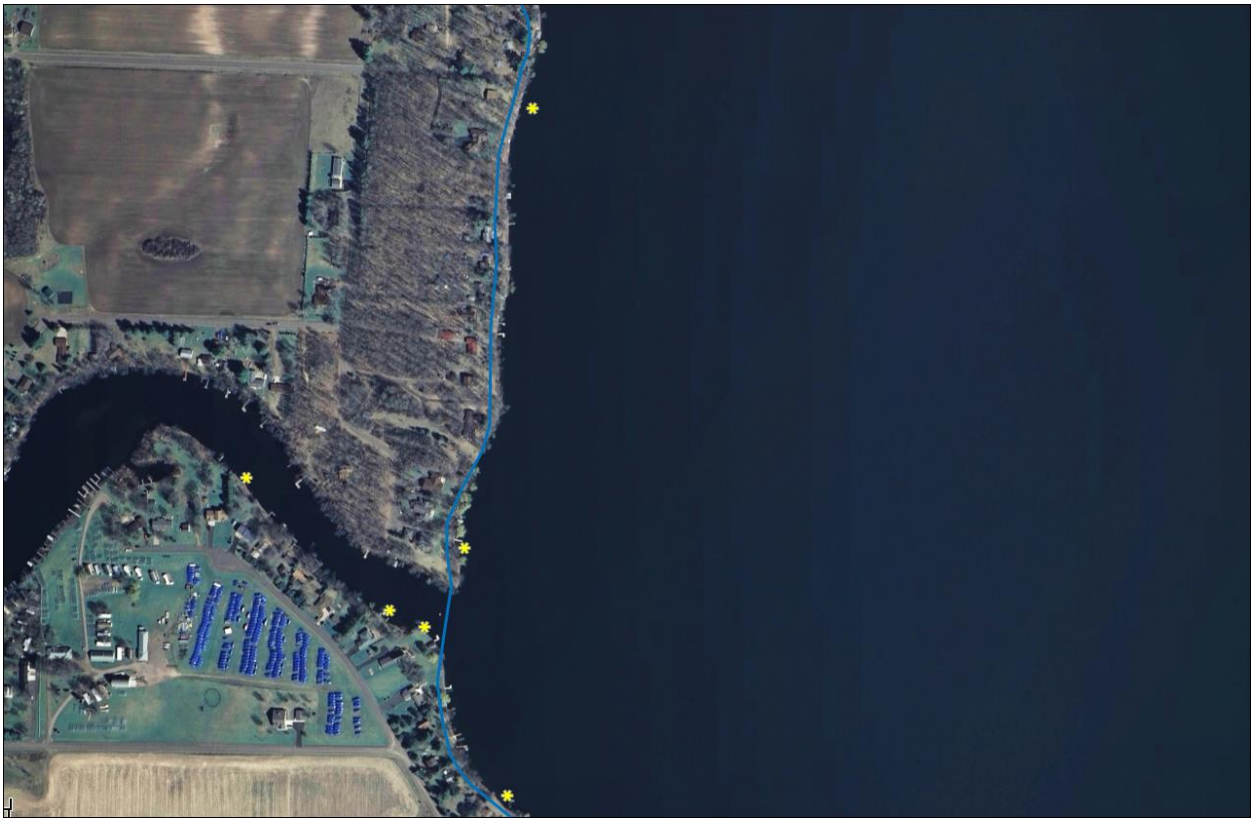
DASH Areas – West shore of Balsam. (Start directly across the lake from the boat landing (See next map)

Yellow polygons on the west shore are the first CLP beds to hit with DASH. Six beds totaling 1.05 acres. Density 2-3.

2023 and 2024 Yellow Iris Sites – Red Cedar Lake, Barron County







6_24_23YellowIrisRedCedar

type	ident	Latitude	Longitude
WAYPOINT	162	45.634231	-91.581195
WAYPOINT	163	45.633605	-91.581311
WAYPOINT	164	45.633052	-91.581256
WAYPOINT	169	45.624811	-91.568669
WAYPOINT	183	45.604186	-91.591354
WAYPOINT	185	45.606676	-91.593787
WAYPOINT	186	45.608085	-91.59548
WAYPOINT	187	45.609315	-91.598433
WAYPOINT	188	45.609577	-91.599455
WAYPOINT	189	45.610339	-91.599278

2024RedCedar_YellowIris

type	ident	Latitude	Longitude
WAYPOINT	033	45.62407577	-91.59371085
WAYPOINT	074	45.63537952	-91.59138939
WAYPOINT	127	45.64108148	-91.58748393
WAYPOINT	128	45.63972889	-91.58600536
WAYPOINT	168	45.6096506	-91.59986249
WAYPOINT	253	45.59968058	-91.58218196
WAYPOINT	254	45.59964982	-91.58209529
WAYPOINT	289	45.58130493	-91.58564569
WAYPOINT	304	45.57316988	-91.58702645
WAYPOINT	349	45.58796226	-91.59231526
WAYPOINT	356	45.58977828	-91.59402559
WAYPOINT	364	45.59105996	-91.59609239
WAYPOINT	420	45.59040642	-91.5929843
WAYPOINT	421	45.59478228	-91.59214117
WAYPOINT	422	45.59963616	-91.59164035
WAYPOINT	423	45.60170053	-91.59158821
WAYPOINT	425	45.60417529	-91.59139543
WAYPOINT	433	45.60654729	-91.59363918
	350	0	0