LAKE EDUCATION AND PLANNING SERVICES, LLC

RICE LAKE
BARRON COUNTY

2023 MANAGEMENT SUMMARY REPORT
WBIC: 2103900

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RICE LAKE PROTECTION AND REHABILITATION DISTRICT

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INTRODUCTION

This report discusses lake management activities completed by the Rice Lake Protection and Rehabilitation District (RLPRD) and Lake Education and Planning Services (LEAPS) throughout 2022. The following actions were completed by LEAPS to assist the RLPRD in aquatic plant management and lake stewardship education.

- WDNR 2022-23 AIS Population Control (ACEI) grant
- RLPRD Board and Annual Meetings
- Management of hybrid watermilfoil (HWM)
- Management of curly-leaf pondweed (CLP)
- Native aquatic plant harvesting
- Aquatic plant survey work
- AIS education, monitoring, planning, and prevention
- Watercraft inspection (Clean Boats Clean Waters, CBCW)
- Water quality monitoring
- Recreational Boating Facilities grant
- 2024 Preliminary CLP and HWM management planning
- 2024 AIS Population Control grant application and award

Each bullet will be discussed more in the following sections.

2022-23 WDNR ACEI GRANT

In late February 2022, the RLPRD was awarded a two-year Aquatic Invasive Species (AIS) small-scale, population control grant project to chemically treat HWM in Clearwater Bay and the South Basin using the herbicide ProcellaCOR. The grant (ACEI 28122) officially began on March 15, 2022 and ended December 31, 2023. The main activities in the grant are related to the management of HWM. This includes management planning and implementation, aquatic plant survey work, application of ProcellaCOR in 2022, and herbicide concentration testing.

Professional Services Agreements were prepared for Year 1 of the grant (March 2022 through February 2023) and Year 2 of the grant (March 2023 through December 2023).

A summary report was already completed for the first year of the project, 2022.

2023 RLPRD BOARD MEETINGS AND ANNUAL MEETING

RLPRD board meetings were held in each month between January and November 2023. There was no December 2023 Board Meeting. The RLPRD Annual Meeting was held in October 2023. LEAPS attended every meeting except May. During each meeting LEAPS would give an update on grants, HWM and CLP management planning and implementation, and aquatic plant survey results. During the Annual Meeting, LEAPS prepared a PowerPoint presentation and delivered it to the participants of the meeting.

2023 HYBRID WATERMILFOIL MANAGEMENT

Application of ProcellaCOR was completed in Clearwater Bay and in two locations in the South Basin in the spring of 2022. Due to this application, there was no planned herbicide application to control HWM in 2023. Instead, EWM was removed during several free diving events, contracted scuba divers, and limited mechanical harvesting.

APPLICATION OF HERBICIDES

Preliminary HWM management planning for 2023 included more physical and diver removal of individual plants in both Clearwater Bay and the South Basin. A small chemical treatment of one area of Clearwater Bay totaling 2.8 acres was also proposed (Figure 1). After a discussion with the WDNR, it was determined that this chemical application proposal would not likely be permitted, due to chemical treatments completed in Clearwater Bay in 2022, so it was not completed.

Figure 1: Preliminary 2023 herbicide application proposal in Clearwater Bay (this was not completed)

FREE DIVING

HWM was physically removed from the South Basin on three different dates in 2023 – May 31, June 8, and June 20. Between the three dates, 16.5 hours of removal time was logged and at least sixteen 18-gallon totes of HWM were removed (Figures 2&3). After the third free diving event, the dive team reported that any more removal was likely pointless because there was too much!

Figure 2: HWM removed on May 31 by free diving. Removed HWM was dumped at the aquatic plant harvesting dump site off Lakeshore Dr.

Figure 3: A portion of the HWM removed June 8th and 20th by free diving

PHYSICAL REMOVAL BY SCUBA DIVERS (DIVE GUYS, INC)

A fall HWM survey completed on September 10, 2023, was timed perfectly for identifying HWM. It is usually very difficult to accurately document the location of HWM during the fall survey due to large amounts of native, Northern watermilfoil (NWM) that is present at the same time. However, during the Sept 10 survey, HWM was in its flowering stage with flower heads sticking out of the water several inches wherever HWM were found (Figure 4). Every HWM bed located had flowers, regardless of size. NWM does not produce flower heads, so it was clear that the beds were HWM.

Figure 4: Hybrid watermilfoil bed with flowers in the South Basin on Sept. 10, 2023

Since HWM was found in at least 16 different locations in the South Basin (Figure 5) and because it was so easy to identify, the RLPRD was encouraged by its consultant to hire a scuba diving company to remove as much HWM from the new beds as they could before the end of the month (September 2023).

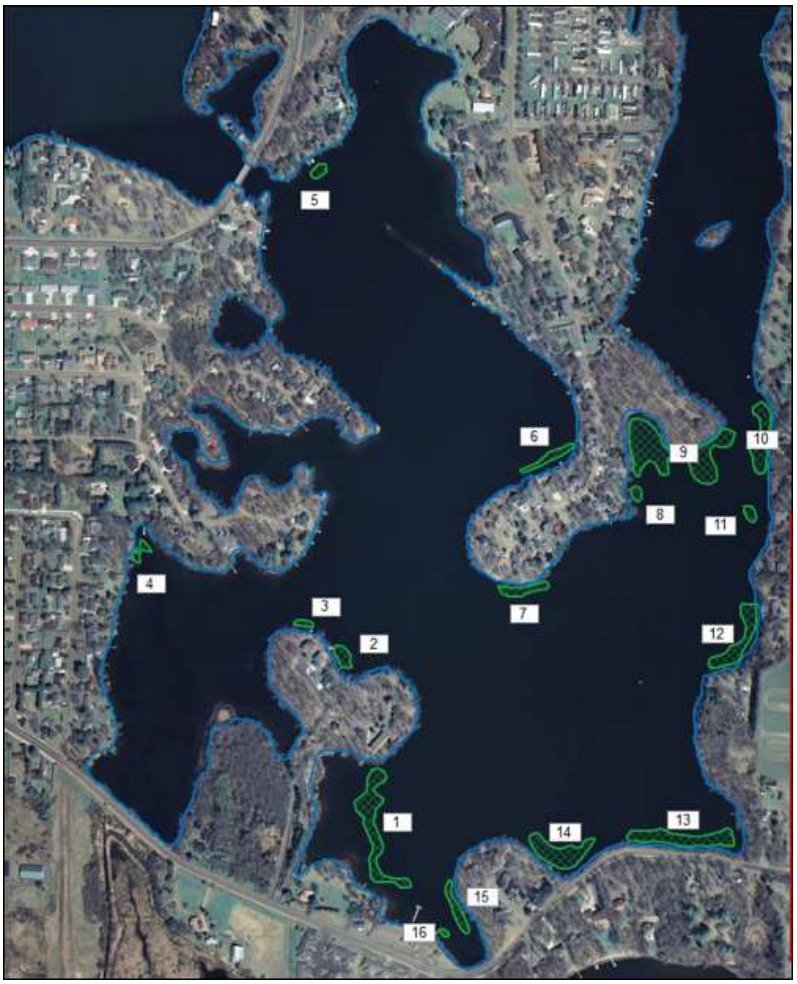

Figure 5: 2023 fall HWM survey locations in the south basin

Immediately following the Sept. 10th survey, two companies offering contracted scuba diver removal services were contacted. On September 13th, Dive Guys, LLC came to the lake and completed several hours of scuba diver removal, concentrating on the smaller beds. In a short but extremely efficient removal, an estimated 1000+ pounds of HWM was taken from the lake. The crew consisted of 2 boats, 2 RLPRD employees, 5 divers/retrievers, 1 consultant with some awesome maps and GPS coordinates, and 2 spectators taking pictures.

MECHANICAL HARVESTING

Despite the application of aquatic herbicides in Clearwater Bay in 2022, HWM in the bay has continued to spread and get more dense in the areas it has invaded. A large area of nearly continuous HWM is located extending north from the big island in the bay. This area was included in a harvesting program late in the 2023 season. An estimated 6-tons of primarily EWM was removed from this area in late September 2023.

PRE- AND POST-CHEMICAL TREATMENT PI, AQUATIC PLANT SURVEY WORK

In support of the chemical treatment of HWM in Clearwater Bay and the South Basin using ProcellaCOR, a pre- and post-treatment point-intercept survey grid was established. The grid included 100 points within proposed treatment areas and throughout Clearwater Bay and parts of the South Basin (Figure 6). On May 15, 2022, LEAPS completed a pre-treatment survey of these points. During that survey, 53 of the 100 points surveyed had aquatic vegetation present (Table 1). The average depth of aquatic plants was 5-ft with plants documented in as much as 9.5-ft of water. During the pre-treatment survey 12 species of aquatic plants were identified including HWM and CLP.

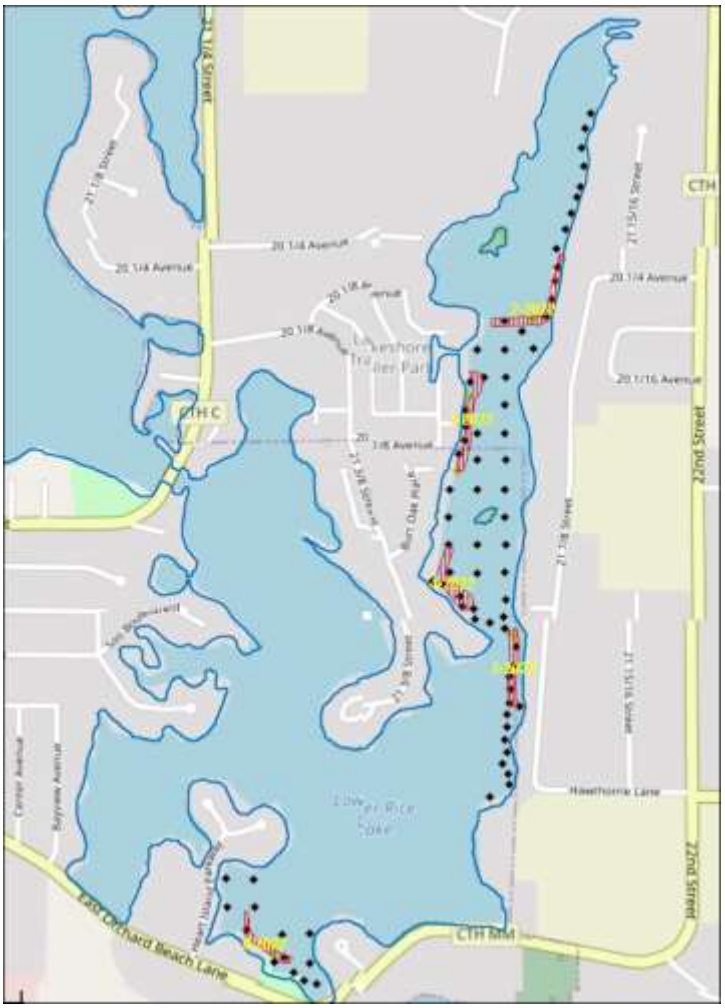

Figure 6: 2022 pre- and post-chemical treatment PI aquatic plant survey points (100 total)

The 100 points were again surveyed in early September 2022 by LEAPS. During the post-treatment survey, 17 different aquatic plant species including HWM but not CLP were found. Unfortunately, the amount of HWM increased significantly between the pre- and post-treatment survey. Fall 2022 HWM bed mapping suggested that the amount of HWM was down in the 2022 areas treated with ProcellaCOR, but up substantially in areas that were not chemically treated. Table 1 compares the statistics from the pre and post survey. Figure 7 shows the changes in aquatic plants between the two surveys. All the data from the post-treatment survey is higher than that from the pre-treatment survey, suggesting the treatment had little impact on either HWM or native aquatic plants. CLP is down between the two surveys, but this is likely due to it being too late in the season to find CLP.

Table 1: 2022 Pre- and Post-treatment PI survey results – Rice Lake

SUMMARY STATS: Rice Lake 2022 Pre and Post Treatment PI Survey	Pre	Post
Total number of sites visited	100	100
Total number of sites with vegetation	53	72
Total number of sites shallower than maximum depth of plants	70	80
Frequency of occurrence at sites shallower than maximum depth of plants	75.71	90.00
Simpson Diversity Index	0.79	0.87
Maximum depth of plants (ft)**	9.50	13.00
Number of sites sampled using rake on Rope (R)	0	0
Number of sites sampled using rake on Pole (P)	0	0
Average number of all species per site (shallower than max depth)	1.74	2.54
Average number of all species per site (veg. sites only)	2.30	2.82
Average number of native species per site (shallower than max depth)	1.59	2.49
Average number of native species per site (veg. sites only)	2.13	2.80
Species Richness	12	15
Species Richness (including visuals)	12	17

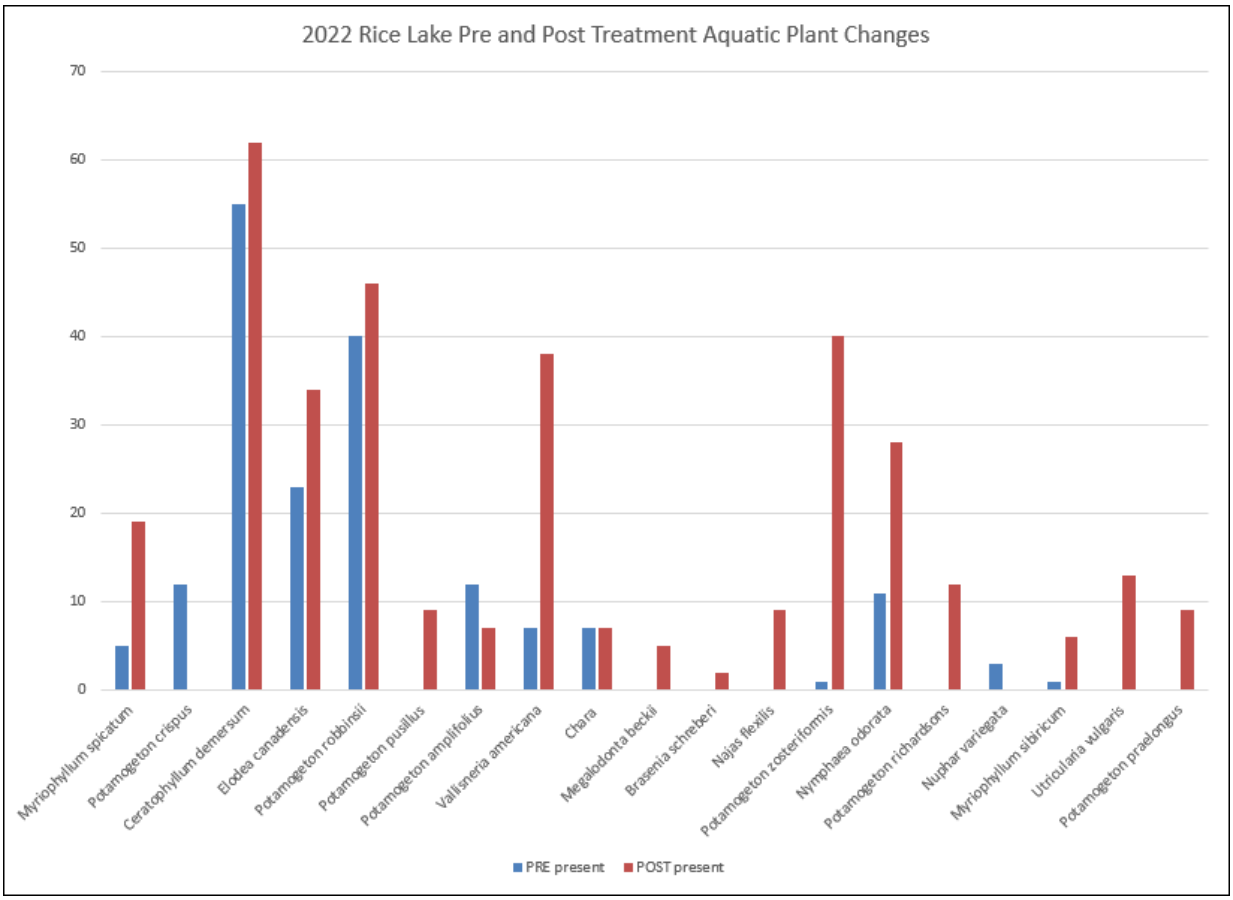

Figure 7: 2022 Pre- and post-treatment aquatic plant changes in Rice Lake, Barron County

2023 CURLY-LEAF PONDWEED (CLP) MANAGEMENT

The RLPRD completed CLP management in 2023 using only mechanical harvesting. A mechanical harvesting permit was submitted to the WDNR and approved April 13, 2023. The permit included removal of up to 178 acres of curly-leaf pondweed, coontail, white water lily, water celery, northern water milfoil in Rice Lake in Barron County. Curly-leaf pondweed harvesting is generally done lake-wide wherever abundant CLP is located. Once the CLP season has ended, generally around the 4th of July, the RLPRD switches to harvesting of predesignated navigation and access lanes.

During the 2023 season, an estimated 175 tons of CLP was removed from Rice Lake.

2023 NATIVE AQUATIC PLANT HARVESTING

In addition to harvesting CLP from the lake, an additional 66 acres of navigation lanes and channels are kept open through harvesting during the summer. Table 2 and Figure 8 reflect what is usually harvested once the CLP season ends.

Table 2: 2022 Rice Lake CLP and Navigation Lane Harvesting

2022 Rice Lake, Barron County Summer Navigation Lanes Harvesting Program March 30, 2022			
Color	***Width (ft)***	***Miles***	***Acres***
Yellow	20	2.3	5.58
Green	40	0.36	1.75
Red	60	3.49	25.38
Orange	80	2.51	24.35
Blue	160	0.45	8.73
		9.11	65.79

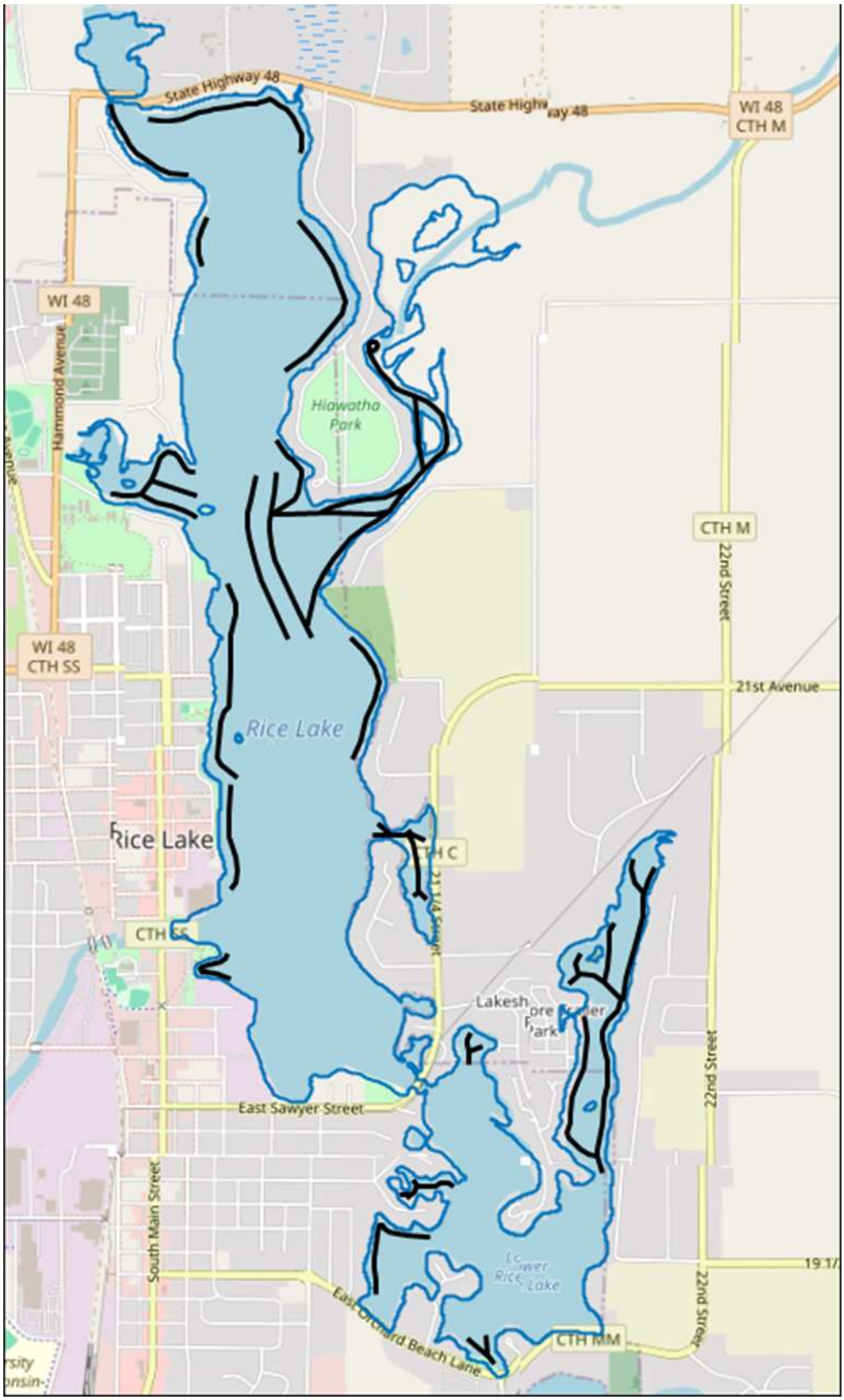

Figure 8: 2023 Rice Lake navigation lanes

During the 2023 season, an estimated 700 tons of mixed aquatic vegetation was removed from the navigation and access lanes in Rice Lake.

MOON LAKE

In addition to opening navigation lanes and access corridors on Rice Lake, one of the LD harvesters was brought over to Moon Lake to help them clear navigation and access lanes and open water lake use areas. In total, an estimated 414 tons of mixed native aquatic vegetation was removed from Moon Lake in 2023 following a permit application prepared by the Moon Lake Association. This is the third year that aquatic plant harvesting has been completed on Moon Lake. In 2021, 390 tons of aquatic vegetation was removed. In 2022, 250 tons was removed. Most of this vegetation was watershield (*Brasenia schreberi*).

2023 AQUATIC PLANT SURVEY WORK

Several aquatic plant surveys were completed in Rice Lake in 2023.

CLP

Mapping of CLP was again completed by RLPRD volunteers in 2023. Their data was then turned into maps by their consultant. In 2023, 15 beds of CLP were mapped totaling 73.35 acres (Figure 9). Some of these beds were lighter in density than others. Results showed that in the Big Bay area on the east side of the lake that was chemically treated in 2022, CLP was down substantially compared to those areas that were not chemically treated. CLP along the west shore (Lakeshore Dr) also remained low. It had been chemically treated three years ago (2021).

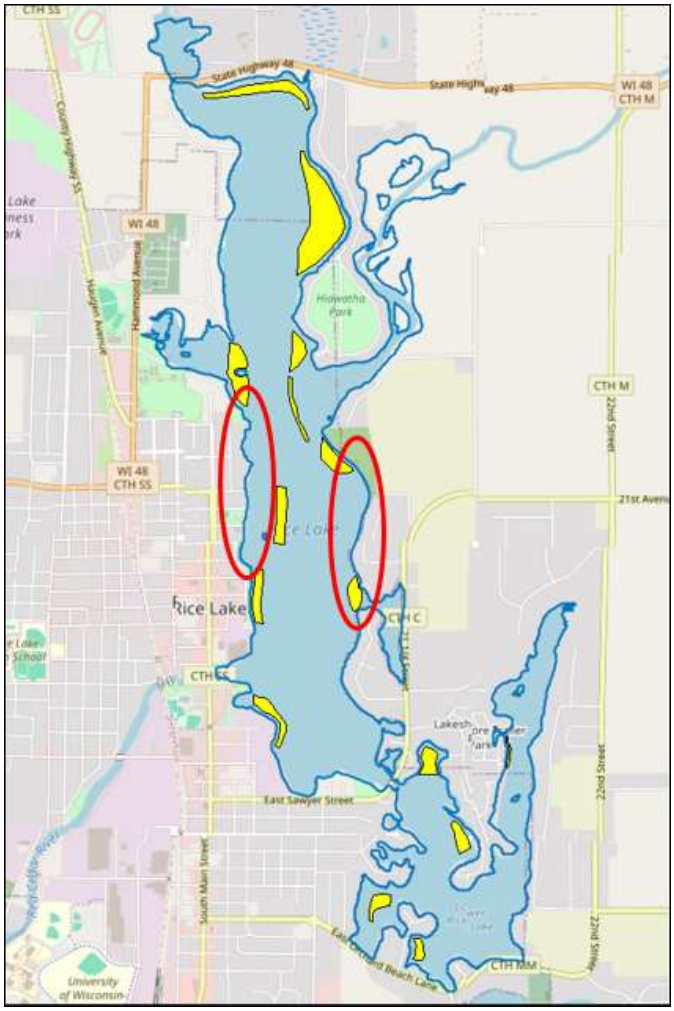

Figure 9: 2023 CLP bed mapping (red circles represent areas previously treated with herbicides)

Table 3 reflects CLP mapping results from 2018 to 2023. In 2020 and 2021, CLP was at its worst level since 2010. It is expected that with the winter 2023-24 conditions that were had, that CLP will again be very high in the lake. In 2024, CLP bed mapping will be completed by an outside aquatic plant surveyor, as will an early season point-intercept survey. The results should be interesting.

Table 3: CLP bed mapping results from 2018 to 2023

Year of Survey	# of Beds	Mean Bed Size (acres)	Total Acres
2023	15	4.89	73.35
2022	11	5.59	61.49
2021	18	7.47	134.46
2020	23	5.98	137.54
2019	27	1.28	34.56
2018	23	1.4	32.66

HWM

The first HWM survey was 100 points prior to the proposed chemical treatment in Clearwater Bay and the South Basin. This survey has already been discussed in a previous section.

A 2023 fall HWM survey and bed mapping was completed by LEAPS on September 10, 2023. The timing of the survey ended up being perfect for finding new infestations of HWM. HWM flowers in the late summer, with small 1–3-inch flower heads sticking up out of the water. NWM does not flower, so there are no spikes sticking out of the water in a bed of NWM. Nearly every bed of HWM found had flowers sticking out of the water making it much easier to identify the two different plant species during the mapping. The bad news was that because HWM was so easy to identify, a lot of it was found. During the survey, 16 beds were found totaling 6.24 acres (Figure 10). Fortunately, no HWM was found outside of the south basin and clearwater bay, but it is likely just a matter of time. During the September 10th survey, a small bed of HWM was found just inside the South Basin from the narrows bridge (Bed 5).

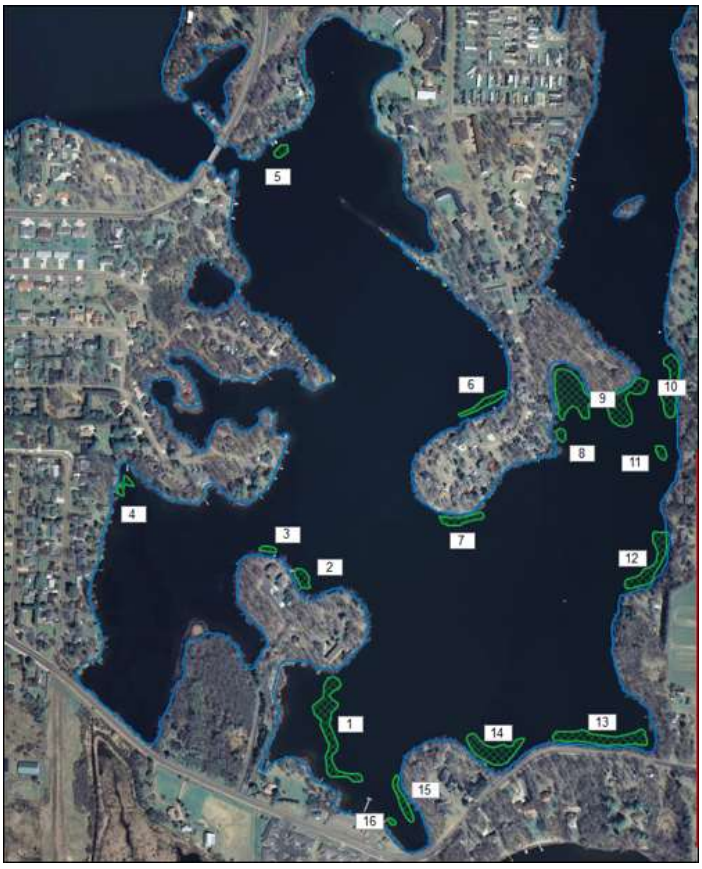

Figure 10: 2023 HWM bed mapping results

In addition to what was found in the South Basin, Clearwater Bay continues to be overrun with HWM. During the September survey, 3 beds totaling 2.64 acres and literally hundreds of individual points were mapped (Figure 11). It is difficult to determine the bed management actions to be taken in Clearwater Bay as application of herbicides to the entire basin will likely take out many desirable native species along with the HWM. Physical removal is no longer effective at providing any level of control. Mechanical harvesting may be the best option available to the RLPRD is Clearwater Bay. Although it would do little to reduce the amount of HWM, it would at least keep the bay usable and navigable.

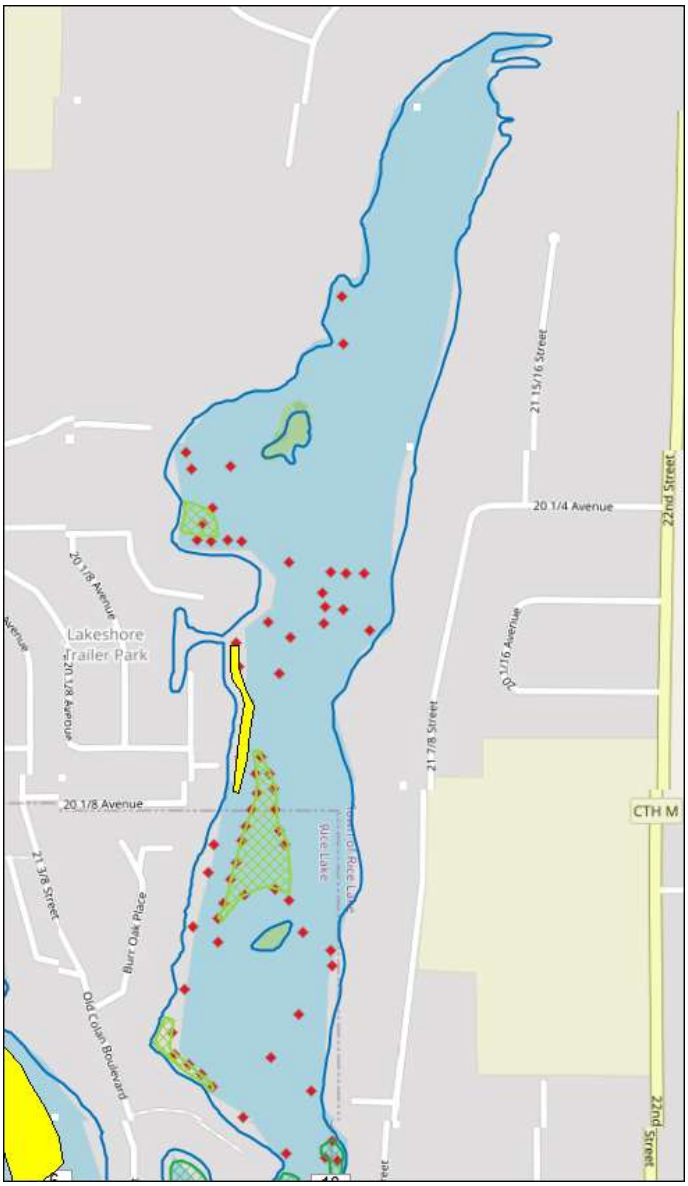

Figure 11: September 10, 2023 HWM meandering survey results in Clearwater Bay

2023 AIS MONITORING AND PURPLE LOOSESTRIFE REMOVAL

One of the responsibilities of the LD Coordinator in 2023 was to complete a series of AIS monitoring trips around the lake during the season looking for AIS that are either not known to be in Rice Lake already, or those that are present but at very low levels. In addition, several volunteers completed searches for yellow iris and purple loosestrife and completed physical removal of purple loosestrife.

Due to the amount of yellow iris that was found in 2023, mapping of yellow iris was built into a new grant that was awarded in March of 2024. Mapping will lead to a management plan to remove/contain/control yellow iris in Rice Lake. It is expected that this plan will be developed and implemented in 2026.

The LD Coordinator and volunteers logged nine trips around the lake in 2023 looking for AIS. The dates for monitoring began April 27 and continued through August 19. During the meandering surveys curly-leaf pondweed, yellow iris, hybrid watermilfoil, purple loosestrife, Chinese mystery snails, and zebra mussels were looked for. Of these invasive species, only zebra mussels have never been identified in Rice Lake.

2023 WATERCRAFT INSPECTION – CLEAN BOATS CLEAN WATERS

The following are the details from the 2023 watercraft inspection program at the main public boat landings on Rice Lake.

- Three Landings – 418.0 hours
    - Orchard Beach – 195 hrs.
    - Stein – 195 hrs.
    - Arnolds – 28 hrs.
- Boats Inspected - 500
    - Orchard Beach – 286 hrs.
    - Stein – 192 hrs.
    - Arnolds – 22 hrs.
- People Contacted = 894
    - Orchard Beach – 496 hrs.
    - Stein – 363 hrs.
    - Arnolds – 35 hrs.

Boaters came from a dozen or more different lakes. Of those lakes, 4 have EWM and 2 have zebra mussels.

The RLPRD has already submitted and been approved for a CBCW grant to cover watercraft inspection in 2024.

2023 WATER QUALITY

Two sites in Rice Lake, the South Basin (Station ID: 033181) and Central Basin (Station ID: 033163) are regularly monitored for several water quality parameters. The South Basin was monitored on five different dates in 2023 (Figure 12). Parameters included water clarity, total phosphorus (TP), chlorophyll-a (Chla), temperature (Temp), and dissolved oxygen (DO).

SOUTH BASIN

The South Basin is deeper than the Central Basin and maintains its water clarity later into the season. However, once the South Basin stratifies in late summer, water clarity becomes worse than in the Central Basin, as the Central Basin is continually flushed by the Red Cedar River from the east and Bear Creek from the north. The South Basin flows into the Central Basin but does not have a significant source of inflow other than ground water.

SOUTH BASIN – WATER CLARITY

Figure 13 reflects all the Secchi disk readings taken in the South Basin since readings began. Readings start out in the 6-10ft range through early summer, and then drop to 3-5ft in August and September. When looking at all the data, the only significant trend is that Secchi disk readings in the early summer spring (May - July) are trending to worse readings.

Date	Secchi depth (ft)	Secchi hit bottom	TSI_Secchi	Total phosphorus (mg/L)	TSI_TotalP	Chlorophyll-a (ug/L)	TSI_Chla	Water color	User perception
2023-04-27		no		0.021	52				
2023-05-14	5.50	no	53					BROWN	1
2023-06-26	7.00	no	49	0.025	53	10.1	52	BROWN	2
2023-07-31	8.00	no	47	0.025	53	9.8	52	GREEN	3
2023-08-24	3.50	no	59	0.032	55	54.0	65	GREEN	4

User perception rating	Meaning
1	Beautiful, could not be nicer
2	Very minor aesthetic problems
3	Enjoyment somewhat impaired (algae)
4	Would not swim but boating OK (algae)
5	Enjoyment substantially impaired (algae)

Figure 12: Historic Secchi disk readings of water clarity at the South Basin in Rice Lake (WEx, 2024)

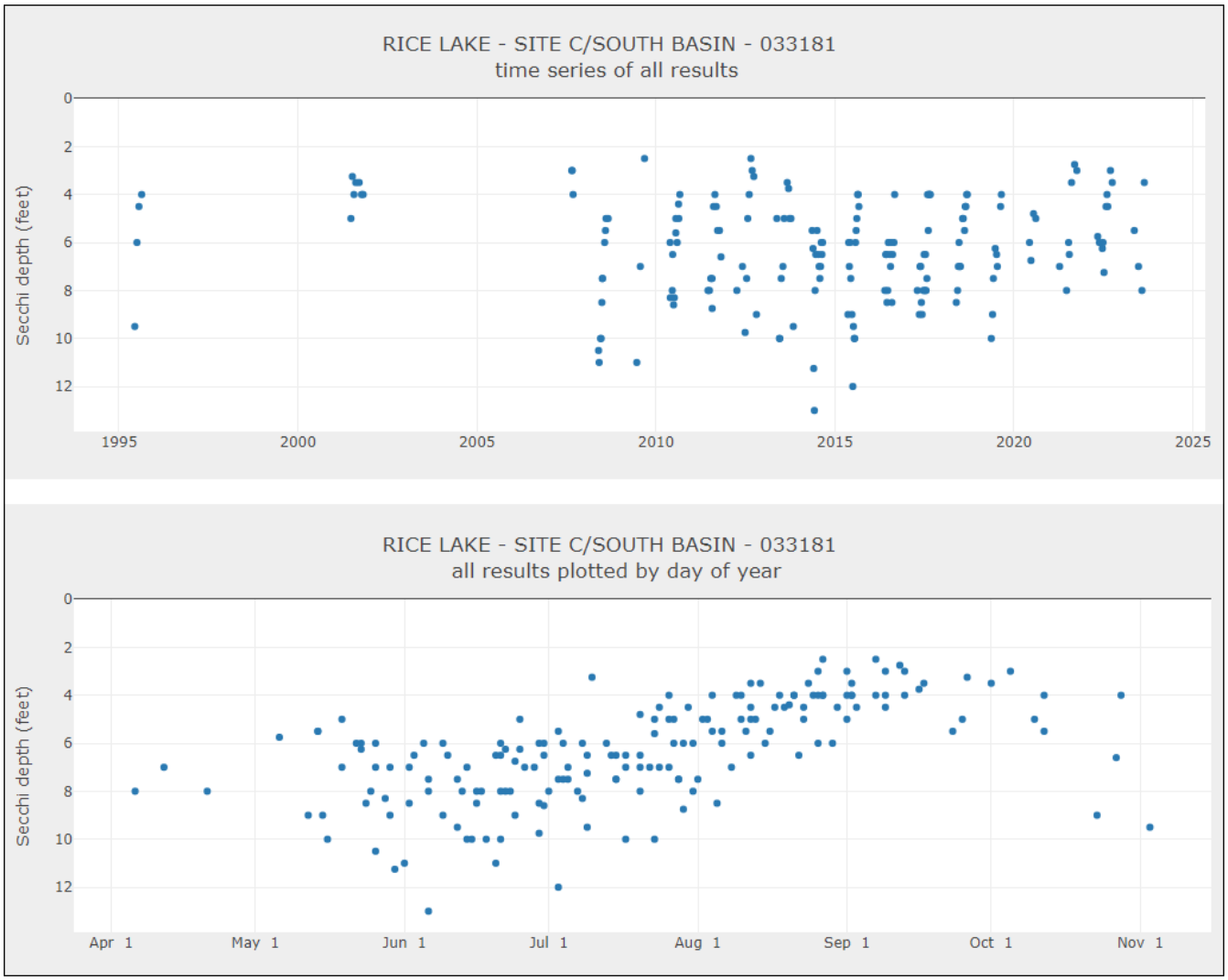

Figure 13: All Secchi disk readings of water clarity taken from the South Basin in Rice Lake (top); all Secchi disk readings through the open water season (bottom) (WEx, 2024).

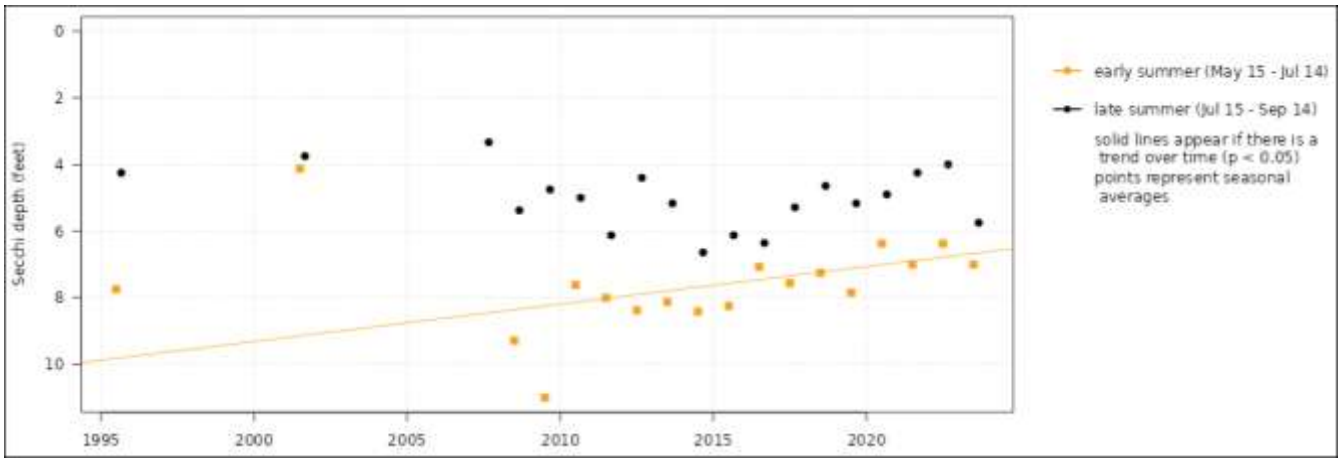

Figure 14: Significant trends over time in water clarity in the South Basin of Rice Lake (WEx, 2024)

SOUTH BASIN – CHEMISTRY

Chemistry data includes TP and Chla. TP is a measurement of the amount of phosphorus in the lake. Phosphorus is the main nutrient supporting aquatic plant growth. It also supports the growth of algae that turns the water green. Chla is a measurement of the amount of green pigment (chlorophyll-a) that is in a water sample. The green pigment reflects the algae in the water. Impoundments like Rice Lake that have more than 30µg/l (0.03mg/L) of total phosphorus may experience noticeable algae blooms.

Figure 15 shows all TP data collected from the South Basin since about 2008. Like with Secchi disk readings of water clarity, the only significant trend in TP is that the early summer concentrations are increasing (Figure 16). Increasing phosphorus is not ideal and can lead to worsening water quality.

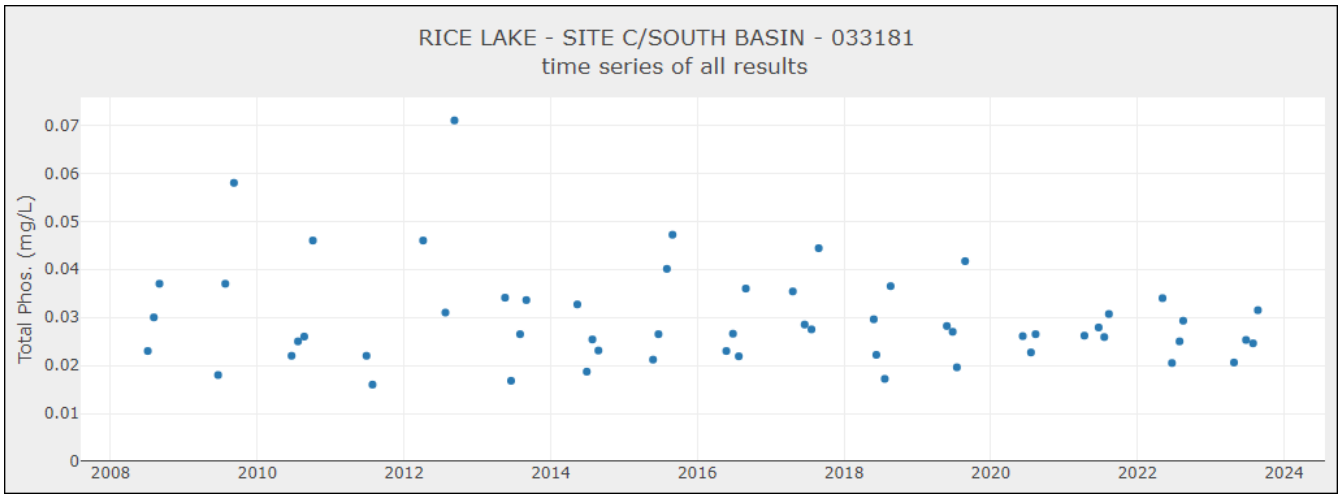

Figure 15: All TP data collected from the South Basin of Rice Lake (WEx, 2024)

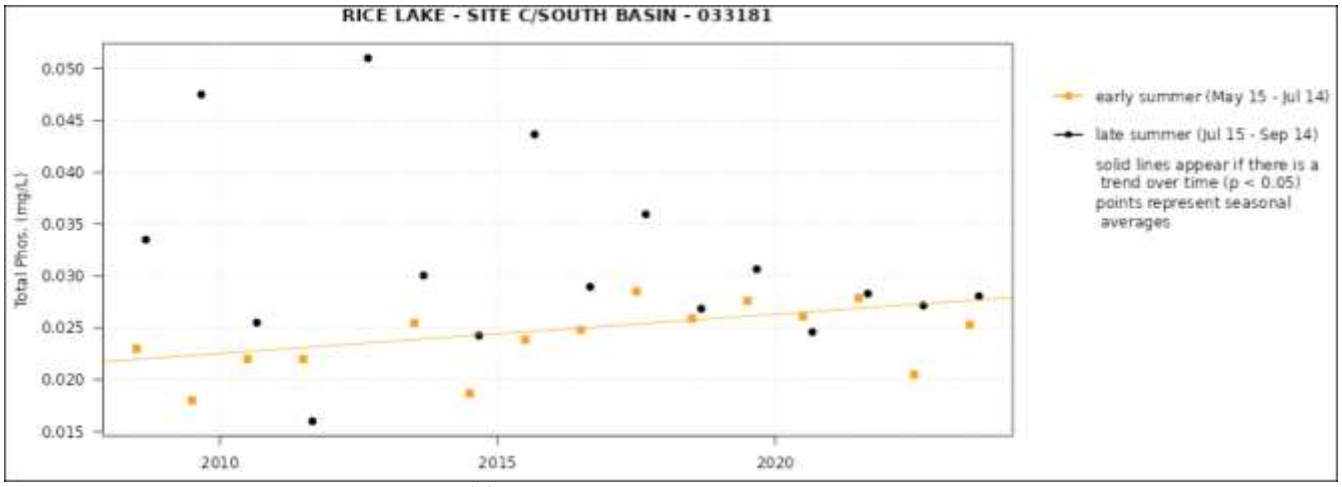

Figure 16: Significant trends in TP concentrations in the South Basin of Rice Lake (WEx, 2024)

Chla concentrations in the South Basin increase rapidly in late July (Figure 17), again primarily due to nutrient release from the bottom sediments of the lake. And like Secchi disk readings of water clarity and TP, the only significant trend is an increasing one in the early summer (Figure 18). Increasing levels of Chla indicate more algae in the lake to turn the water green.

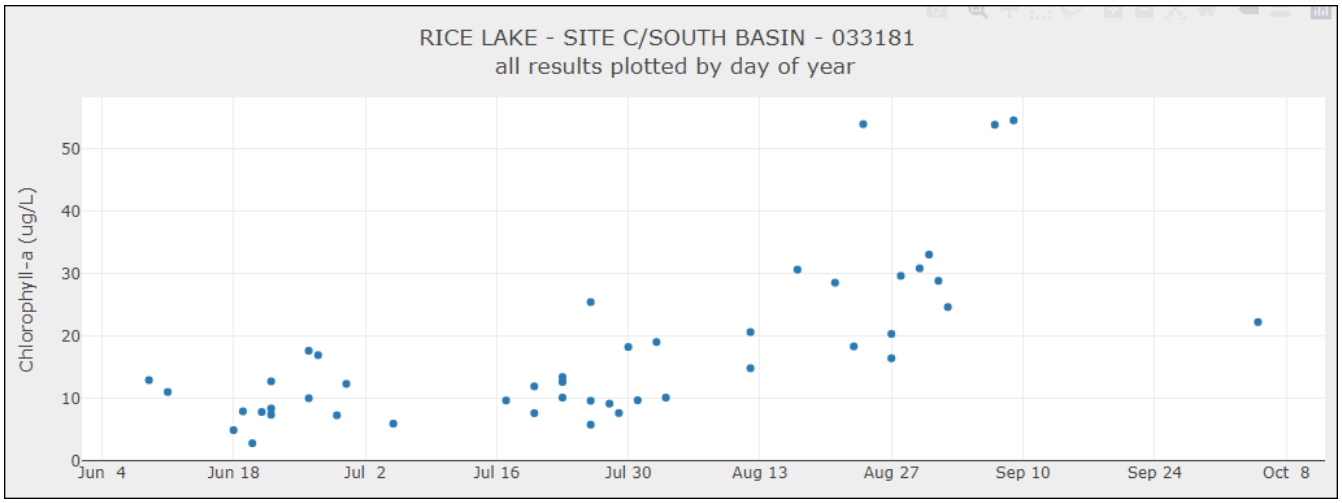

Figure 17: Seasonal Chla concentrations in the South Basin of Rice Lake (WEx, 2024)

Figure 18: Significant trends in Chla from the South Basin of Rice Lake (WEx, 2024)

All three parameters – Secchi disk readings of water clarity, TP, and Chla can be combined in one formula and put in a Trophic State Index (TSI) scale from 0-100. The TSI equations use late summer (July 15 - September 15) averages of Secchi depth, total phosphorus, and chlorophyll-α. Values greater than 50 are considered Eutrophic and may lead to excess nutrients, lower water clarity, and greater risk of harmful algal blooms and hypoxia (low oxygen). Values between 40 and 50 are considered Mesotrophic with moderate levels of nutrients and moderate water clarity. Values less than 40 are considered Oligotrophic with low levels of nutrients, high water clarity, and lower risk of hypoxia. Figure 19 represents all TSI data for the South Basin in Rice Lake. Nearly all the data collected puts the South Basin of Rice Lake in the eutrophic category for lakes.

When late summer trophic indicator averages (red) from the South Basin from the last 10 years are compared to other reservoir lakes like Rice Lake (Figure 20), we see that Rice Lake is better than average for Secchi and TP, and worse than average for Chla.

Figure 19: Historical TSI values for water clarity, total phosphorus, and chlorophyll-a at the South Basin in Rice Lake (WEx, 2024)

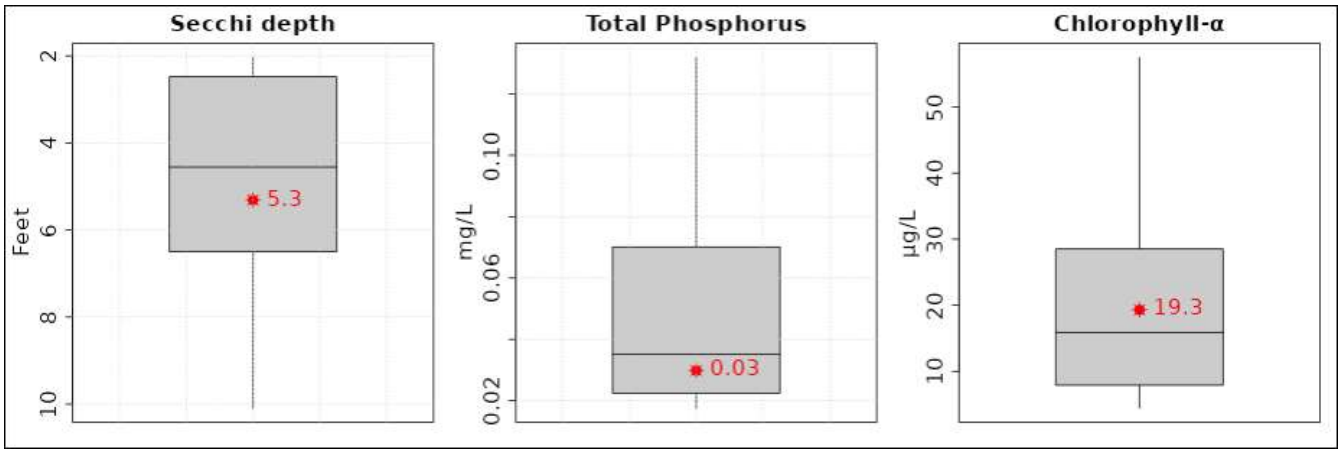

Figure 20: Water quality parameters from the South Basin of Rice Lake compared to other similar lakes (WEx, 2024)

TEMPERATURE AND DISSOLVED OXYGEN

As mentioned, temp and DO profiles were collected from the South Basin in 2023. Because of its depth and relatively small size, the South Basin stratifies in the mid to late summer. Stratification means the lake water splits into several different areas. Warm, nutrient and oxygen rich water rises to the surface (epilimnion). Colder, water with much less or no oxygen drops to the bottom (hypolimnion). Both happen due to density differences in cold and warm water. The two layers are separated by a third layer called the thermocline. When diving into the water, the thermocline is where the water starts to feel colder. According to the profiles taken, the thermocline establishes

somewhere in the 10-15ft depth beginning in late July (Figure 21) and lasts through late September and early October before the layers break down and mix again.

With little or no DO in the bottom waters of the South Basin, a chemical reaction occurs between iron and phosphorus that allows phosphorus formally trapped in the bottom sediments to be released back into the water column. This is what generally leads to the algae blooms and very green water in Rice Lake in the summer.

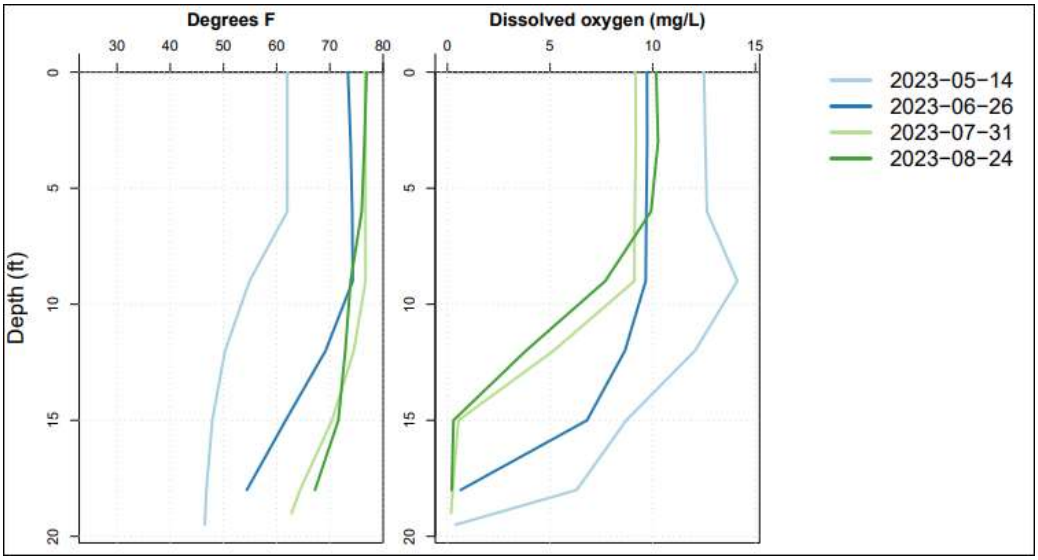

Figure 21: Temperature and DO profiles from the South Basin of Rice Lake (WEx, 2024)

CENTRAL BASIN

The Central Basin is shallower than the South Basin and gets continually flushed by the Red Cedar River from the west and Bear Creek from the north. As a result, water clarity is generally less than in the South Basin, at least until mid to late summer. The central basin was sampled on five dates in 2023 (Figure 22).

CENTRAL BASIN – WATER CLARITY

Figure 23 reflects all the Secchi disk readings taken in the Central Basin since readings began. Readings start out in the 4-7ft range through early summer, and then drop to 3-5ft in August and September. When looking at all the data, there are no significant trends showing water clarity is getting better or getting worse.

Date	Secchi depth (ft)	Secchi hit bottom	TSI_Secchi	Total phosphorus (mg/L)	TSI_TotalP	Chlorophyll-a (ug/L)	TSI_Chla	Water color	User perception
2023-04-27		no		0.044	57				
2023-05-14	4.50	no	55					YELLOW	1
2023-06-26	3.00	no	61	0.033	55	13.2	54	BROWN	3
2023-07-31	3.00	no	61	0.070	61	56.3	65	GREEN	3
2023-08-24	3.00	no	61					GREEN	3
2023-08-28		no		0.048	58	20.8	58		

User perception rating	Meaning
1	Beautiful, could not be nicer
2	Very minor aesthetic problems
3	Enjoyment somewhat impaired (algae)
4	Would not swim but boating OK (algae)
5	Enjoyment substantially impaired (algae)

Figure 22: Historic Secchi disk readings of water clarity at the Central Basin in Rice Lake (WEx, 2024)

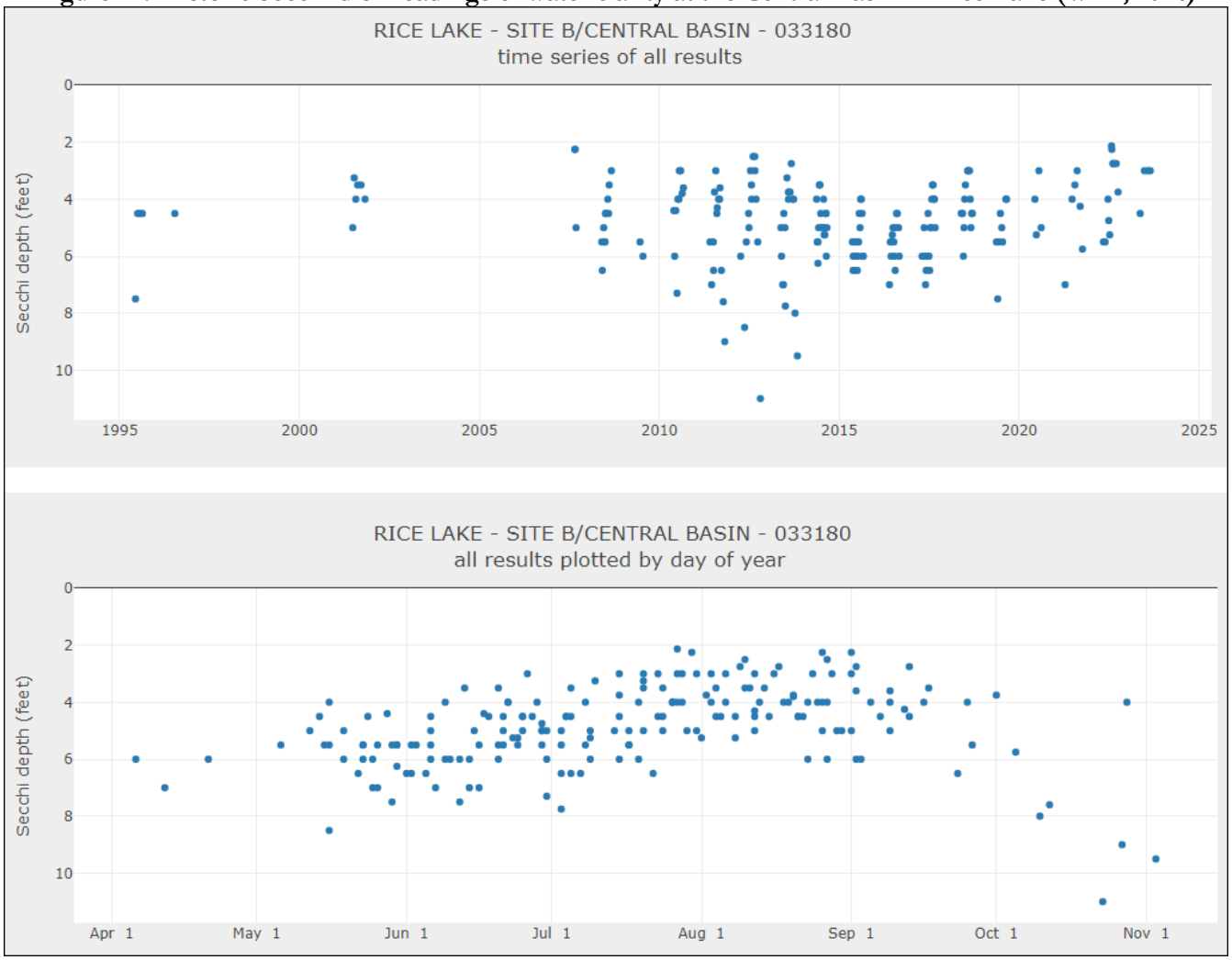

Figure 23: All Secchi disk readings of water clarity taken from the Central Basin in Rice Lake (top); all Secchi disk readings through the open water season (bottom) (WEx, 2024).

CENTRAL BASIN – CHEMISTRY

Chemistry data includes TP and Chla. TP is a measurement of the amount of phosphorus in the lake. Phosphorus is the main nutrient supporting aquatic plant growth. It also supports the growth of algae that turns the water green. Chla is a measurement of the amount of green pigment (chlorophyll-a) that is in a water sample. The green pigment represents the algae in the water. Impoundments like Rice Lake that have more than 30µg/l (0.03mg/L) of total phosphorus may experience noticeable algae blooms.

Figure 24 shows all TP data collected from the Central Basin since about 2008. Like with Secchi disk readings of water clarity, there are no significant trends showing TP getting better or worse in the Central Basin.

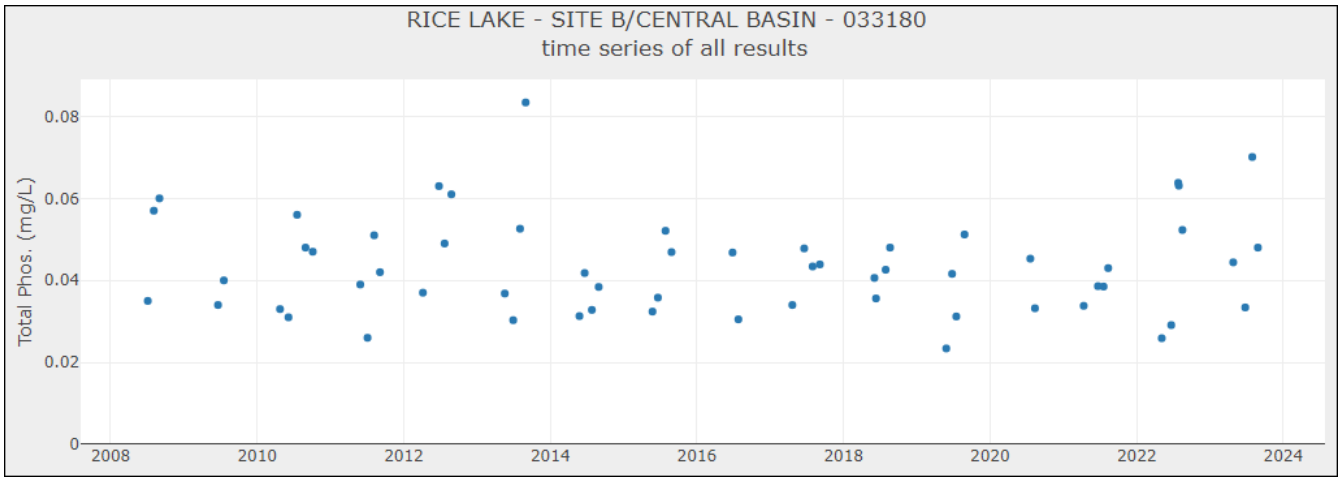

Figure 24: All TP data collected from the Central Basin of Rice Lake (WEx, 2024)

Chla concentrations in the Central Basin remain consistent throughout most of the summer season (Figure 25). This is due in part to the continuous flow of water through the Central Basin flushing out the algae over the dam into the Red Cedar River downstream. Early summer Chla is the only parameter that shows any significant trend to report. Unfortunately, like in the South Basin, Chla in the Central Basin shows a significant trend toward higher or worsening concentrations in the early summer (Figure 26).

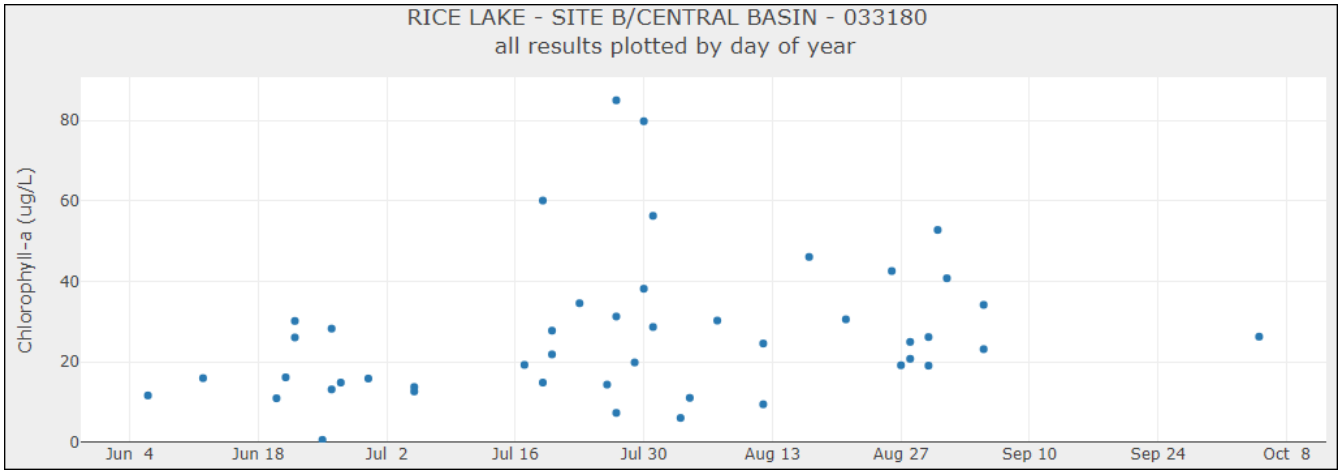

Figure 25: Seasonal Chla concentrations in the Central Basin of Rice Lake (WEx, 2024)

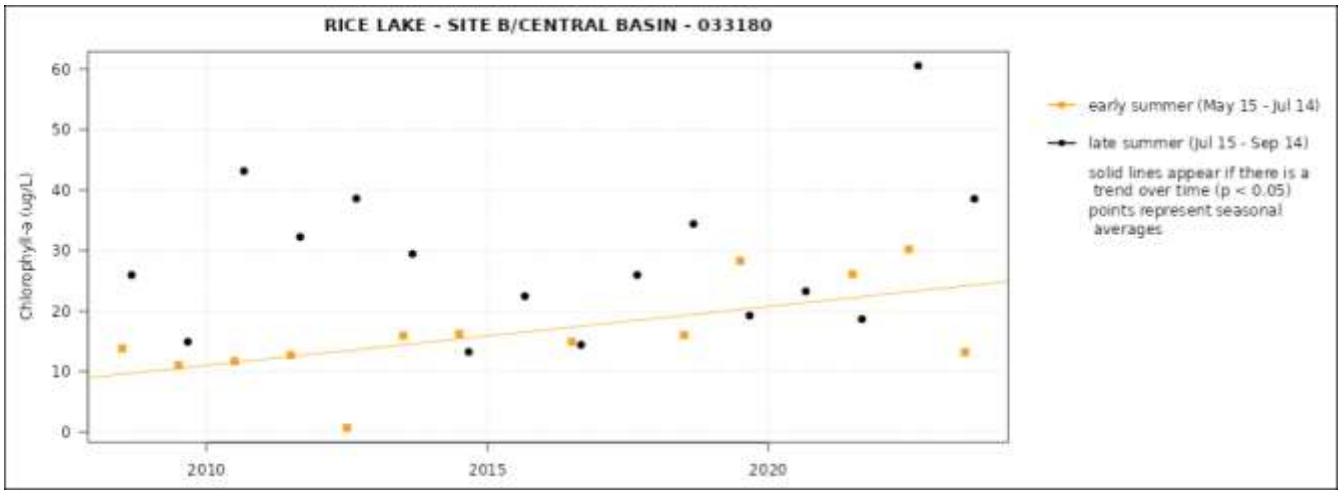

Figure 26: Significant trends in Chla from the Central Basin of Rice Lake (WEx, 2024)

All three parameters – Secchi disk readings of water clarity, TP, and Chla can be combined in one formula and put in a Trophic State Index (TSI) scale from 0-100. The TSI equations use late summer (July 15 - September 15) averages of Secchi depth, total phosphorus, and chlorophyll-α. Values greater than 50 are considered Eutrophic and may lead to excess nutrients, lower water clarity, and greater risk of harmful algal blooms and hypoxia (low oxygen). Values between 40 and 50 are considered Mesotrophic with moderate levels of nutrients and moderate water clarity. Values less than 40 are considered Oligotrophic with low levels of nutrients, high water clarity, and lower risk of hypoxia. Figure 27 represents all TSI data for the Central Basin in Rice Lake. Nearly all the data collected puts the Central Basin of Rice Lake in the eutrophic category for lakes.

When late summer trophic indicator averages (red) from the Central Basin from the last 10 years are compared to other reservoir lakes like Rice Lake (Figure 28), we see that water quality in the Central Basin of Rice Lake is worse than average for Secchi, TP, and Chla.

Figure 27: Historical TSI values for water clarity, total phosphorus, and chlorophyll-a at the Central Basin in Rice Lake (WEx, 2024)

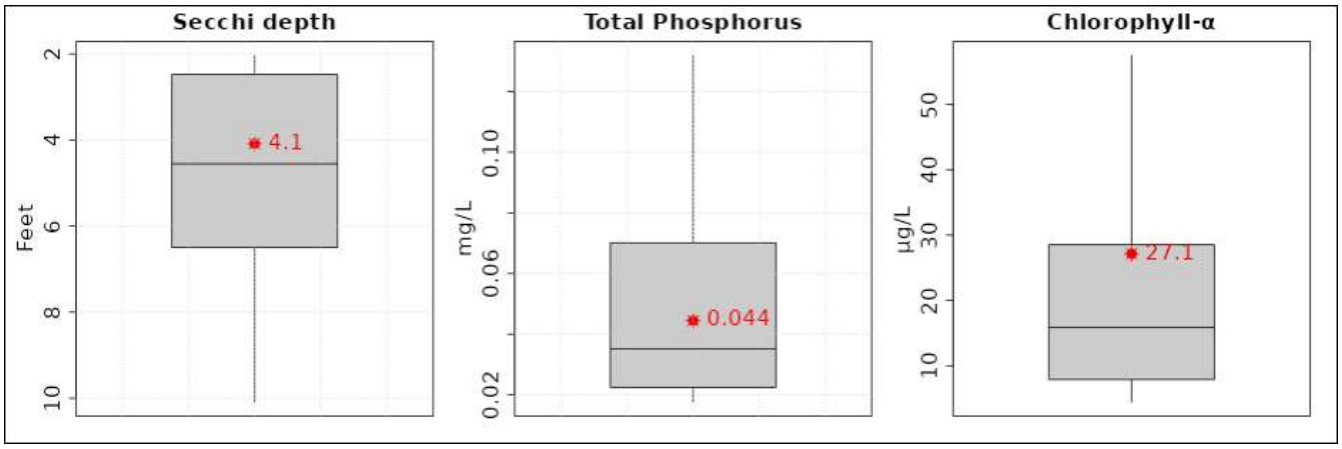

Figure 28: Water quality parameters from the Central Basin of Rice Lake compared to other similar lakes (WEx, 2024)

TEMPERATURE AND DISSOLVED OXYGEN

As mentioned, temp and DO profiles were collected from the Central Basin in 2023. Because of its depth and the fact that the river runs through it, the Central Basin does not stratify (Figure 29). DO levels do decrease starting at about 10ft.

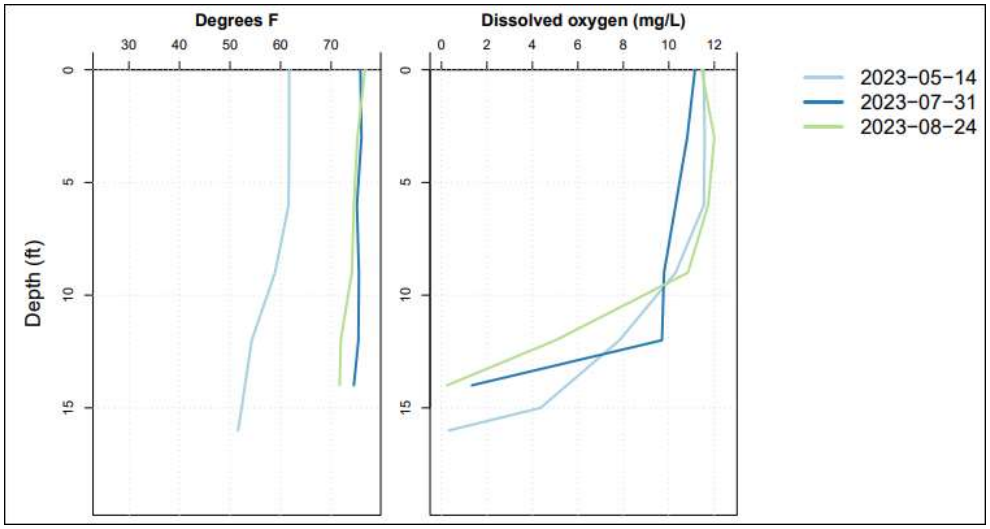

Figure 29: Temperature and DO profiles from the Central Basin of Rice Lake (WEx, 2024)

2023 RECREATIONAL BOATING FACILITIES (RBF) GRANT APPLICATION

A Recreational Boating Facilities grant was awarded to the RLPRD in late 2023 to cover 50% of the cost of a new Aquatic Plant Mechanical Harvester. The new harvester will be ready for use in the 2024 harvesting season.

2024 PRELIMINARY MANAGEMENT PLANNING

Preliminary HWM management planning for 2024 includes herbicide application to control HWM in the South Basin. ProcellaCOR is likely to be used, provided the WDNR allows it use. Because there is wild rice in the Central Basin, the WDNR could deny a permit suggesting the use of ProcellaCOR. If that is the case, then a 2,4D-based herbicide will be used.

The current proposal for the South Basin includes four areas encompassing eight of the sixteen HWM beds identified in the Fall 2023 survey (Figure 30, Table 4). The other beds from that survey were managed with scuba diver removal in late September 2023. Follow-up monitoring will be done in those areas. Herbicide concentration testing is planned for after the 2024 ProcellaCOR application.

Because 2024 is also the year to update whole-lake, point-intercept (PI) aquatic plant survey data, a spring PI and a summer PI survey will be completed by an outside aquatic plant surveyor. The same surveyor will map CLP and HWM in the lake in 2024. The data will be used to update the current Aquatic Plant Management Plan for Rice Lake.

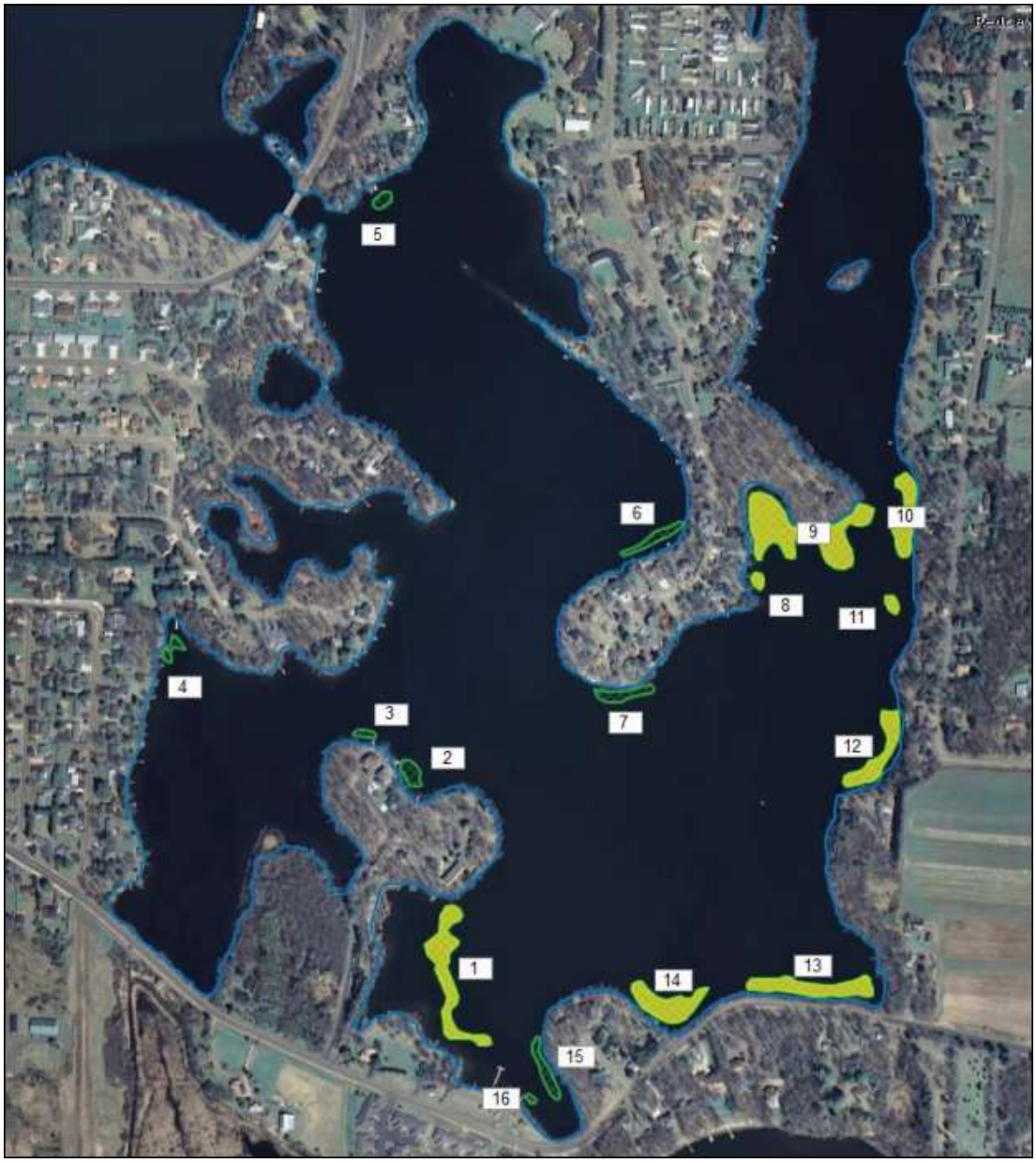

Figure 30: 2024 preliminary HWM herbicide application proposal

Table 4: 2024 preliminary herbicide application using ProcellaCOR

2024 Rice Lake South Basin Spring HWM ProcellaCOR Chemical Treatment Proposal 09/10/2023					
New Name	**Acres**	**Mean Depth (feet)**	**Acre-feet**	**Treatment PDU/acft**	**PDU Application**
Bed 1	0.94	8.00	7.52	5.00	37.60
Beds 8&9	1.74	8.00	13.92	5.00	69.60
Beds 10-12	1.11	8.00	8.88	5.00	44.40
Beds 13&14	1.34	8.00	10.72	5.00	53.60
	5.13				**205.20**
ProcellaCOR	**PDU = 3.2 oz**		**fl. Ounces**	**gallons**	
Scenario 1	# of PDU = 205.20		656.64	5.1	
	Cost/PDU = $75.00				
	$15,390.00				

2024 AIS POPULATION CONTROL GRANT

The RLPRD applied for a two-year AIS Population Control Grant in the fall of 2023. The original project was to cover two years (2024 and 2025) and was focused on control HWM in the South Basin. The grant application was awarded; however, only partial funding was granted. As a result, the two-year project was modified to cover only one year – 2024. Major tasks included in the new grant are control of HWM, whole-lake, point-intercept aquatic plant survey work, and an update of the current Aquatic Plant Management Plan for Rice Lake.