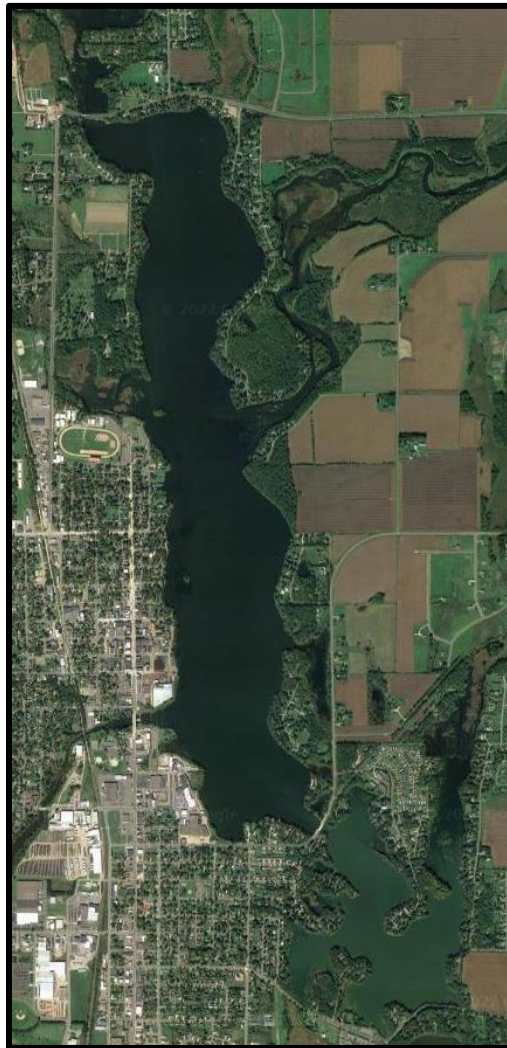


# RICE LAKE BARRON COUNTY

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## 2021 MANAGEMENT SUMMARY REPORT WBIC: 2103900

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## INTRODUCTION

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This report discusses lake management activities completed by the Rice Lake Protection and Rehabilitation District (RLPRD) and Lake Education and Planning Services (LEAPS) throughout 2021. The following actions were completed by LEAPS to assist the RLPRD in aquatic plant management and lake stewardship education.

02/17/2021 – RLPRD board meeting  
04/21/2021 – RLPRD board meeting  
04/22/2021 – LEAPS CLP pretreatment survey  
04/27/2021 – LEAPS Hybrid watermilfoil survey  
04/29/2021 – ERS CLP pretreatment survey  
05/05/2021 – Chemical treatment permit obtained  
05/19/2021 – RLPRD board meeting  
05/22/2021 – LEAPS water quality sampling and training of new lake coordinator  
05/25/2021 – LEAPS CLP bed mapping survey  
06/01/2021 – Harvesting permit obtained  
06/10/2021 – ERS CLP posttreatment survey  
07/31/2021 – LEAPS meeting with new lake coordinator  
07/21/2021 – RLPRD board meeting  
08/12/2021 – LEAPS Rice Lake AIS survey  
08/18/2021 – RLPRD board meeting  
09/09/2021 – Lutra HWM diver removal  
09/15/2021 – RLPRD board meeting  
09/27/2021 – LEAPS and RLPRD AIS grant discussion  
10/21/2021 – LEAPS HWM survey

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## 2021 HYBRID WATERMILFOIL MANAGEMENT

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The RLPRD participated in Hybrid watermilfoil (HWM) management in 2021 as approved by the Wisconsin Department of Natural Resources. The proposed areas for chemical treatment in Clearwater Bay were delineated from 2020 late summer bed mapping surveys and an early spring survey conducted by LEAPS (4/27/2021) in 2021. LEAPS and the RLPRD – after review and suggested modifications from the WDNR – determined that that an area of HWM totaling 7.71 acres should be treated in spring of 2021 (Figure 1). After submitting a preliminary treatment plan and receiving a chemical permit early in 2021, the RLPRD was approved to chemically treat the beds. On 5/26/2021, Dale Dressel of Northern Aquatic Services (NAS) applied 49.27 gallons of Shredder Amine 4 at a rate of 3.0 parts per million (Table 1).

LEAPS returned to Rice Lake and examined Clearwater Bay in addition to the rest of the lake to search for HWM several times over the year (Figure 2). On 8/12/2021, LEAPS surveyed the lake for HWM and additional AIS as part of a training exercise with the new Rice Lake Coordinator. HWM was found once again in Clearwater Bay (Figure 2). The HWM was noted to be canopied and dense along the eastern edge of the entrance to the bay. The survey also found a stand of Japanese knotweed that was reported and documented. LEAPS personnel and the lake coordinator also removed several areas of purple loosestrife along the southern edge of the lake near Orchard Beach Lane.

Following the August HWM survey, the RLPRD was concerned with the amount of HWM found in Clearwater Bay and its location within areas of high boat traffic and the path of the CLP harvester and the resulting fragmentation and spread of the hybrid milfoil. After the WDNR declined to approve a fall herbicide treatment of the area, LEAPS recommended diver removal of the smaller beds in favor of waiting for spring to apply herbicide. Lutra LLC was contracted to dive on the milfoil. LEAPS and RLPRD volunteers assisted Lutra's Noah Berg on 9/9/2021 by marking HWM plants and catching HWM fragments. Lutra removed HWM areas in the channel to Clearwater Bay as originally planned; however, the discovery of a new, deep water bed directly south of the channel area warranted removal as well (Figure 3). In addition, LEAPS discovered several new HWM plants at the south end of the lake (Figure 3). Lutra confirmed their identification; in total, Lutra spent 5 hours diving and removing HWM.

LEAPS returned to the lake to examine Clearwater Bay and the southern basin on 10/21/2021. The survey found more canopied HWM plants in the southern basin of Rice Lake where Lutra had removed plants (Figure 4). The HWM also extended further into Clearwater Bay, but it was noted that the spring treatment area had greatly reduced HWM (Figure 4).

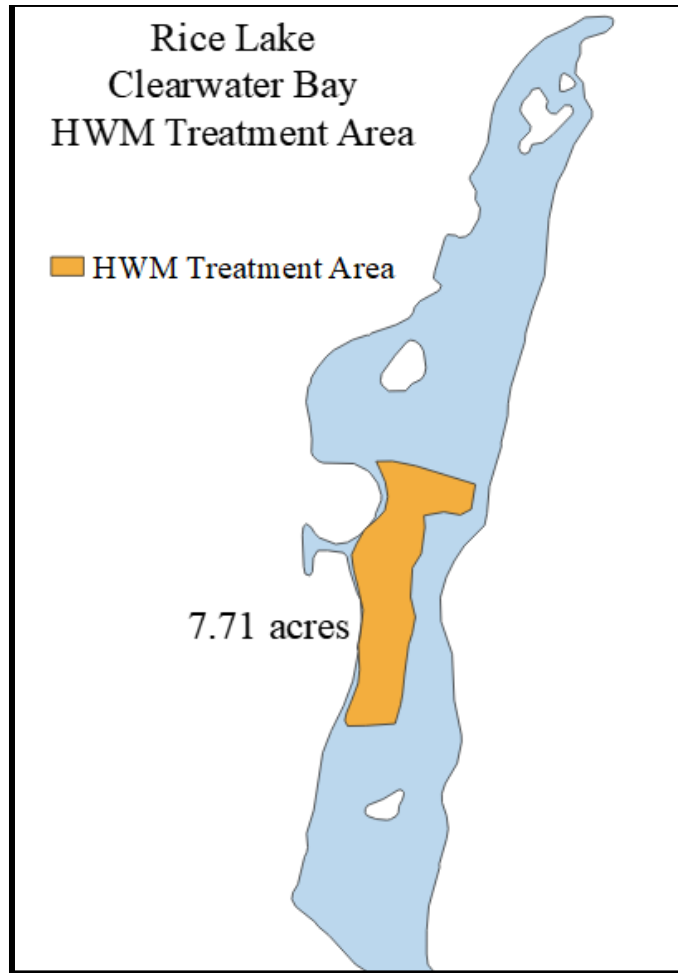


Figure 1. 2021 Rice Lake Clearwater Bay HWM Treatment Areas

Table 1. 2021 Rice Lake Clearwater Bay HWM Treatment Details

Rice Lake, Barron County 2021 Final HWM Chemical Treatment Plan 4/29/2021						
Treatment Site	Acreage	Mean Depth (feet)	Volume (acre-feet)	Treatment a.i. ppm	Treatment application (gal)	Application rate (gal/ac-ft)
CLWB-W-21	7.71	3	23.13	3.0	49.27	2.13
	<b>7.71</b>		<b>23.13</b>		<b>49.27</b>	

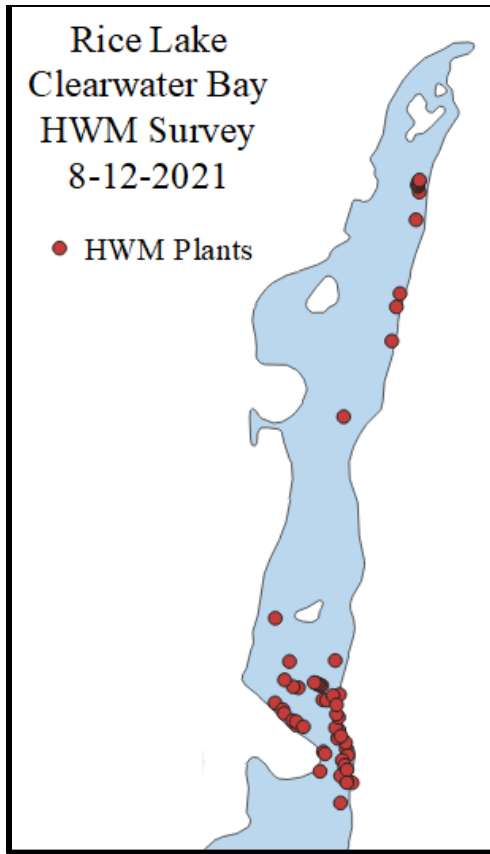


Figure 2. 8-12-2021 LEAPS HWM Survey

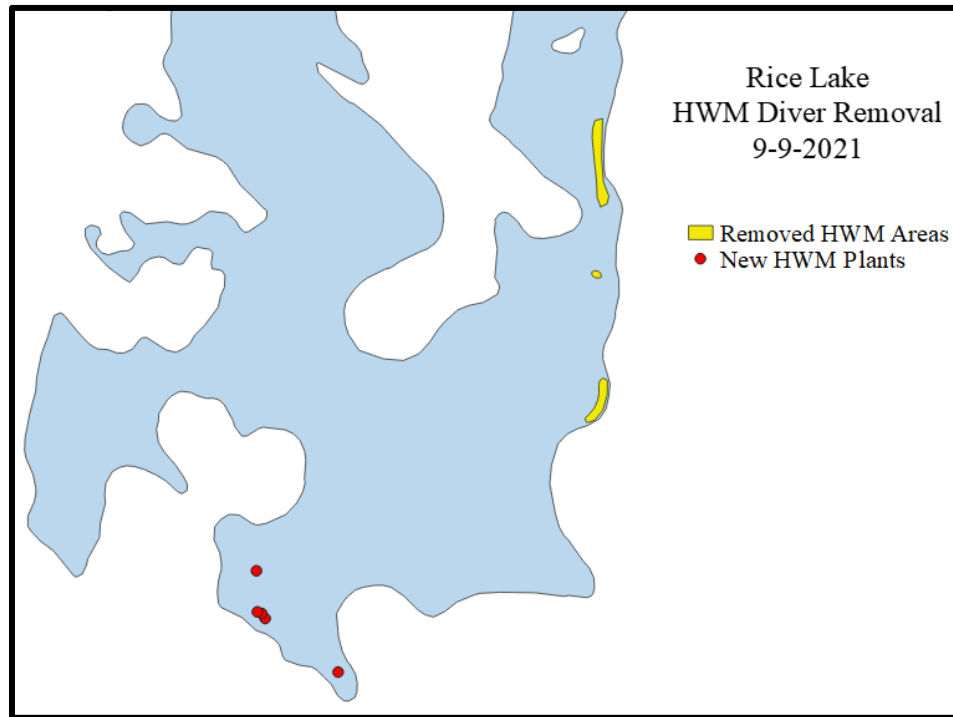


Figure 3. Rice Lake 9-9-2021 HWM Diver Removal and HWM Plants

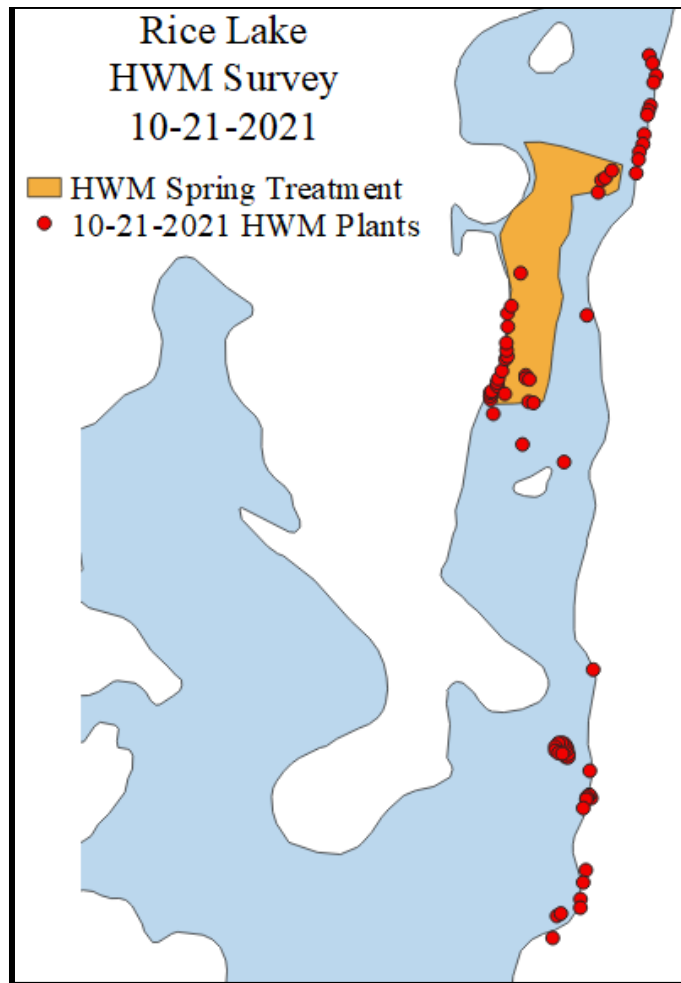


Figure 4. 10-21-2021 Clearwater Bay and South Basin HWM Survey

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## 2021 CURLY LEAF PONDWEED MANAGEMENT

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The RLPRD participated in Curly leaf pondweed (CLP) management in 2021 as approved by the Wisconsin Department of Natural Resources. The group managed the invasive pondweed by through a chemical treatment and mechanical harvesting. Directly adjacent to Lakeshore Drive and in the bay immediately south of the river outlet by the Lumber Hall of Fame Park and Boat Landing, has historically very high densities of (CLP). These two areas were proposed for chemical treatment in May, in part to allow public use of the lake where it has been limited by CLP in previous years (Figure 5). The proposed areas were delineated by LEAPS based off CLP densities in previous years and a survey conducted by LEAPS on 4/22/21 that confirmed CLP's high density (Figure 5). Endangered Resource Services, LLC (ERS) was contracted to perform pre and posttreatment surveys of the area. Their 4/29/2021 point intercept survey confirmed the LEAPS survey (Figure 6). Thus, an area totaling 21.07 acres was treated on 5/12/2021 by Dale Dressel of Northern Aquatic Services (NAS) after receiving the necessary permits and approvals. NAS applied 87.03 gallons of Aquathol K at an average rate of 1.75 parts per million (Table 2).

Following the treatment, ERS performed another survey of the treatment area on 6/10/2021 to determine the effectiveness of the chemical herbicide in reducing CLP and its effects on the native plants. During the posttreatment survey, ERS found CLP at 14 points (13.3% coverage) with one additional visual sighting. None of these rated a 3, four rated a 2 (3.8% with a significant infestation), and the remaining ten were a 1 for a mean rake fullness of 1.29. All CLP plants seen posttreatment were chemically burned, but several, especially in the bay by the

Lumber Hall of Fame Park, survived to set turions. Despite this, the survey demonstrated a highly significant decline ( $p < 0.001$ ) in total CLP density and distribution, as well as rake fullness 3, 2, and 1 (Figure 7).

Following the treatment, the native plant community was relieved of most of its competition with the invasive CLP and was allowed to flourish. The Simpson Diversity Index increased from 0.80 to 0.83, and the Floristic Quality Index improved from 19.3 to 21.4 (Table 3). The average number of native species increased per site and the species richness increased from 11 to 14 while the total rake fullness decreased from an average of 1.94 to 1.38 (Table 3).

On 5/25/2021, LEAPS performed a whole lake survey of the CLP in Rice Lake. LEAPS mapped a total of 134.51 acres of CLP (Figure 8). The mapped beds were canopied and had an average rake fullness of 2. There was a notable lack of CLP in the area that had been treated in May. The mapped CLP information will be used to inform CLP management in 2022.

In addition to chemical treatment, the RLPRD obtained a permit to mechanically harvest CLP and clear navigation channels to ensure recreational access to the lake. It was determined that another 98 acres of CLP should also be harvested to increase lake access and reduce total loading of phosphorus (Figure 9). RLPRD volunteers and personnel worked throughout the spring and summer to harvest CLP and maintain lake access. A report of the total amount of CLP harvested in 2021 is forth coming.

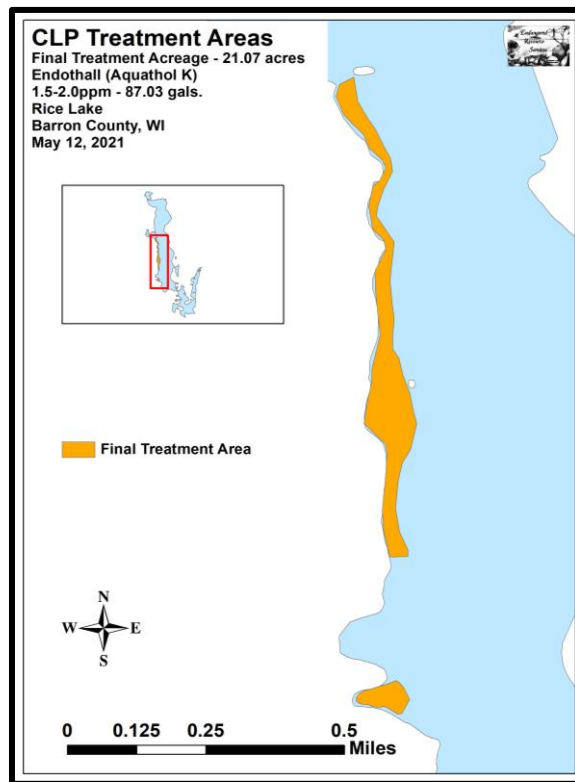


Figure 5. 2021 Rice Lake CLP Chemical Treatment Area



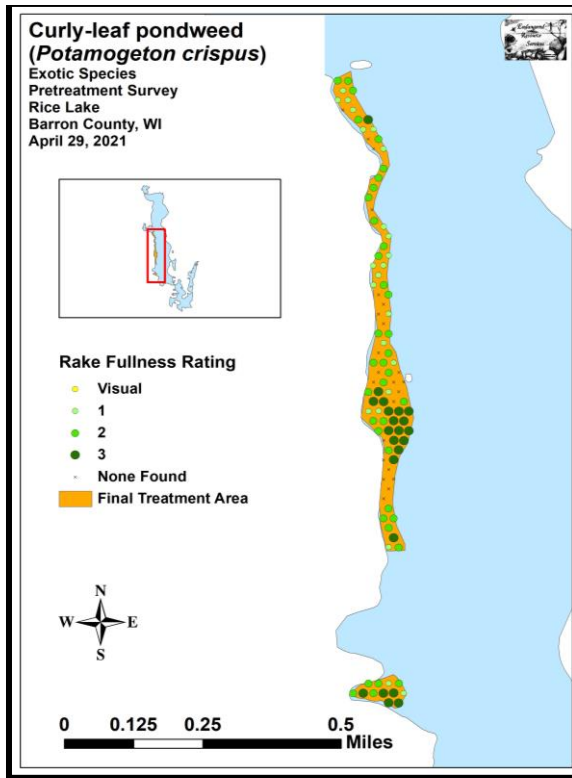


Figure 6. ERS Pretreatment CLP Survey

Table 2. 2021 Rice Lake CLP Chemical Treatment Summary

<b>Bed Number</b>	<b>Final Treatment Area (acres)</b>	<b>Chemical, Rate, and Total Pounds</b>
1	18.78	Aquathol K – 1.5ppm – 75.12gals.
2	2.29	Aquathol K – 2.0ppm – 11.91gals.
<b>Total</b>	<b>21.07</b>	<b>Aquathol K – 1.5-2.0ppm – 87.03gals.</b>

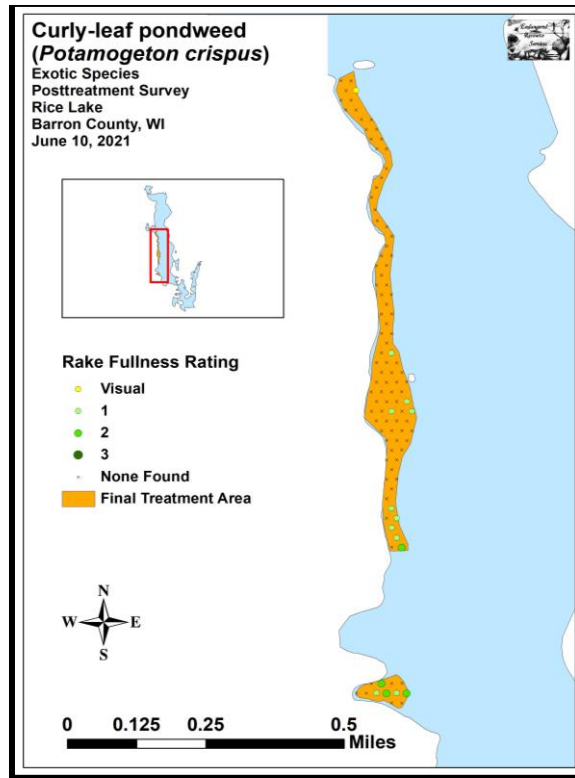


Figure 7. ERS Pretreatment CLP Survey

Table 3. ERS 2021 CLP Pre and Posttreatment Survey Statistics Summary

Summary Statistics:	Pre	Post
Total number of points sampled	105	105
Total number of sites with vegetation	100	89
Total number of sites shallower than the maximum depth of plants	105	101
Freq. of occur. at sites shallower than max. depth of plants (in percent)	95.2	88.1
Simpson Diversity Index	0.80	0.83
Mean Coefficient of Conservatism	6.1	5.9
Floristic Quality Index	19.3	21.4
Maximum depth of plants (ft)	9.5	7.0
Mean depth of plants (ft)	4.9	4.3
Median depth of plants (ft)	4.5	4.5
Average number of all species per site (shallower than max depth)	2.16	1.79
Average number of all species per site (veg. sites only)	2.27	2.03
Average number of native species per site (shallower than max depth)	1.38	1.65
Average number of native species per site (sites with native veg. only)	1.81	1.90
Species Richness	11	14
Mean Rake Fullness (veg. sites only)	1.94	1.38

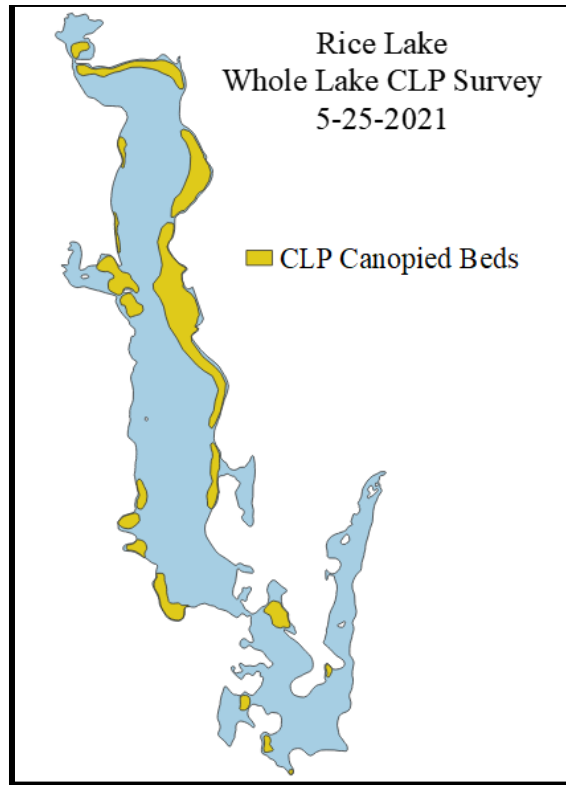


Figure 8. LEAPS 5/25/2021 CLP Survey



Figure 9. 2021 Rice Lake CLP harvesting areas

## NATIVE AQUATIC PLANT HARVESTING IN RICE LAKE AND MOON LAKE

In addition to harvesting CLP from the lake, and additional 66 acres of navigation lanes and channels is allowed (Table 4; Figure 9).

**Table 4. 2021 Rice Lake CLP and Navigation Lane Harvesting**

2021 Rice Lake, Barron County Summer Navigation Lanes Harvesting Program April 15, 2021			
<i>Color</i>	<i>Width (ft)</i>	<i>Miles</i>	<i>Acres</i>
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
2021 Expected CLP Harvesting Plan April 15, 2021			
2008, 2018, & 2019 CLP Bedmapping Comparison			
<i>Color</i>	<i>Year</i>	<i># of Beds</i>	<i>Total Acres</i>
Tan/Black	2008	33	199.3
Orange/orange	2018	23	32.34
Red/red	2019	27	34.63
CLP bedmapping was not completed in 2020 due to Covid-19			



**Figure 9. 2021 Rice Lake Navigation Lanes**

Navigation lanes and open water access corridors are kept open throughout the summer season on Rice Lake. A final report of the vegetation harvested will be forth coming.

In addition to opening up navigation lanes and access corridors on Rice Lake, the 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. A report of how much was harvested in 2021 on Moon Lake is forth coming.

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## 2021 CITIZEN LAKE MONITORING

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Water quality data was collected by LEAPS personnel and the lake coordinator in 2021 from the North Basin (Station ID: 033192), Central Basin (Station ID: 033163), and South Basin (Station ID: 033181) in Rice Lake. Secchi readings were the only water quality measurement taken in the North Basin (Table 5). From April to October, Secchi readings averaged 4.8 feet giving the basin a TSI score of 54.8, which classifies the basin as eutrophic (Table 5). Total phosphorus (TP) samples were collected on four dates in the Central Basin and on three dates in the South Basin; they averaged 38.5 ug/L and 28.3 ug/L, respectively (Table 6; Table 7). Chlorophyll samples were collected three times in the Central Basin and the South Basin. They averaged 21.1 ug/L (Central) and 12.3 ug/L (South) (Table 6; Table 7). Secchi disk readings were taken six times in the Central Basin for an average of 4.6 feet and seven times in the South Basin for an average of 5.3 feet (Table 6; Table 7). These results gave the Central Basin and the South Basin TSI scores of 55.7 and 54.3, respectively (Table 6; Table 7). These TSI scores place all three basins in the eutrophic range, which is consistent with the results of previous years. Eutrophic lakes are characterized by decreased water clarity, oxygen-depleted bottom waters in the summer, extensive plant growth, and algal blooms. These conditions accurately describe Rice Lake in 2021.

**Table 5. 2021 North Basin water quality data**

Sample Date	TP (ug/L)	Chl- <i>a</i> (ug/L)	Secchi (ft)	
04/12/2021	-	-	6.0	
06/22/2021	-	-	4.3	
07/20/2021	-	-	5.0	
08/12/2021	-	-	3.0	
09/12/2021	-	-	4.5	
10/05/2021	-	-	5.8	
<b>Average</b>	-	-	<b>4.8</b>	
<b>Average TSI</b>	-	-	<b>54.8</b>	<b>= 54.8</b>

**Table 6. 2021 Central Basin water quality data**

Sample Date	TP (ug/L)	Chl- <i>a</i> (ug/L)	Secchi (ft)	
04/12/2021	33.8	-	7.0	
06/22/2021	38.6	26.1	4.0	
07/20/2021	38.5	27.8	3.5	
08/12/2021	43.0	9.5	3.0	
09/12/2021	-	-	4.3	
10/05/2021	-	-	5.8	
<b>Average</b>	<b>38.5</b>	<b>21.1</b>	<b>4.6</b>	
<b>Average TSI</b>	<b>56.0</b>	<b>57.0</b>	<b>55.7</b>	<b>= 56.1</b>

Table 7. 2021 South Basin water quality data

Sample Date	TP (ug/L)	Chl- <i>a</i> (ug/L)	Secchi (ft)	
04/12/2021	26.2	-	7.0	
06/22/2021	27.9	8.5	8.0	
07/13/2021	-	-	6.0	
07/20/2021	-	7.7	6.5	
08/12/2021	30.7	20.7	3.5	
09/12/2021	-	-	2.8	
10/05/2021	-	-	3.0	
<b>Average</b>	<b>28.3</b>	<b>12.3</b>	<b>5.3</b>	
<b>Average TSI</b>	<b>54.0</b>	<b>53.0</b>	<b>54.3</b>	<b>= 53.9</b>

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## 2022 PRELIMINARY MANAGEMENT PLANNING

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### EWM/HWM

Preliminary EWM/HWM management planning was completed in support of an AIS small-scale population control grant that was applied for and awarded to the RLPRD to support management in 2022. The grant was applied for because although EWM/HWM currently occupies a small percentage of Rice Lake’s surface area, it is becoming well established and has now spread from being contained in Clearwater Bay to the South Basin, making eradication an unrealistic expectation. The productive Rice Lake system is highly conducive to supporting the growth of EWM/HWM, and active management is recommended to slow its spread. A combination of chemical treatment, diver removal, and monitoring should become a high priority for the RLPRD and the lake coordinator. It has been recommended that the lake coordinator should monitor for AIS *at least* every other week through the growing season. Volunteers should also be encouraged to search for and remove AIS. The lake coordinator should also make AIS education a priority in order to educate constituents on the harmful impacts of AIS and how to identify, prevent, and remove them.

An EWM/HWM chemical management proposal was completed in late 2021, first in support of a possible fall chemical treatment which was ultimately denied by the WDNR, and then in support of an early season chemical treatment in the spring of 2022. The preliminary chemical treatment plan lays out 8 separate treatment areas, some in Clearwater Bay and some in the South Basin, total 6.10 acres. The use of ProcellaCOR is recommended, as it has shown extremely effective against both EWM and HWM in other lakes over the last few years. It has never been used in Rice Lake before. ProcellaCOR is much more expensive to use than traditional 2,4-D based herbicides, but has been shown to provide control for two or more years without the need for retreatment. It has also been shown to impact EWM/HWM that is not directly in a treatment area, meaning it could kill EWM that has not been identified yet in Rice Lake.

The AIS population control grant that was awarded to the RLPRD requires that pre and post-chemical treatment plant survey and herbicide concentration testing work be completed in support of the treatment. These tasks will be completed by LEAPS with assistance from the LD Coordinator. Physical removal and possibly diver removal will continue in 2022 and in 2023. Monitoring for EWM/HWM will continue in Clearwater Bay, the South Basin, and at least once in the larger central and north basins.

### CLP

Activities to support the management of CLP and actual management of CLP in the lake will be continued in 2022. Harvesting CLP should also remain as a priority for the RLPRD. The 2021 growing season was exceptional

in many lakes for CLP growth, and Rice Lake was no exception. The last time CLP was as extensive in Rice Lake as it was in 2021 was in 2010. Massive amounts of CLP were harvested from the lake in 2021, more than what had been harvested in the last 10 years. The chemical treatment along Lakeshore Drive was highly effective as the area became one of the only areas of the lake not overrun with CLP in 2021.

There has been some discussion with the RLPRD to continue management of CLP using herbicides in 2022. The 2020 APM Plan lays out criteria for when herbicides should be considered for use to manage CLP. While in most cases, management of CLP using herbicides is completed along Lakeshore Drive, like in 2021, and in the South Basin, a provision is made for chemically treating along the east shore south of the Red Cedar River inlet when the area exceeds 10 acres of CLP with a rake density of 3. This was the case during bedmapping in 2021. As such, a proposal to chemically treat 18.85 acres along the east shore has been completed. WDNR permitting will still need to be approved for this management action to continue.

Despite the high level of CLP mapped in 2021, the east shore will be the only area targeted for chemical control of CLP in 2022. And even this will be dependent on the level of CLP growth that is identified during a pre-treatment readiness survey.

The RLPRD will continue to harvest CLP from other areas of the lake. Continuing to harvest will help reduce CLP biomass and the dispersal of turions.

Reducing CLP in Rice Lake has come at a high economic cost to the RLPRD, and it has also likely had an impact on the native aquatic plant community and may have contributed to the spread of HWM from Clearwater Bay into the South Basin. The nature of EWM/HWM suggests that it would have spread from the Bay to the South Basin regardless of harvesting, however, there is little doubt the activity contributed to the spread of EWM/HWM in 2021.

Future harvesting plans should account for limiting HWM fragmentation by minimizing harvester contact with areas suspected to have higher levels of HWM. Ultimately, the amount of CLP and HWM growth the RLPRD is comfortable with will determine how much, if any, management occurs in Rice Lake. LEAPS will continue to provide management recommendations and education to the RLPRD by working with the lake coordinator and attending RLPRD meetings.