

LAKE EDUCATION AND PLANNING SERVICES, LLC

HORSESHOE LAKE BARRON & POLK COUNTIES

2021 MANAGEMENT SUMMARY REPORT
WBIC: 2630100

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HORSESHOE LAKE INLAND LAKE PROTECTION AND
REHABILITATION DISTRICT

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INTRODUCTION

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

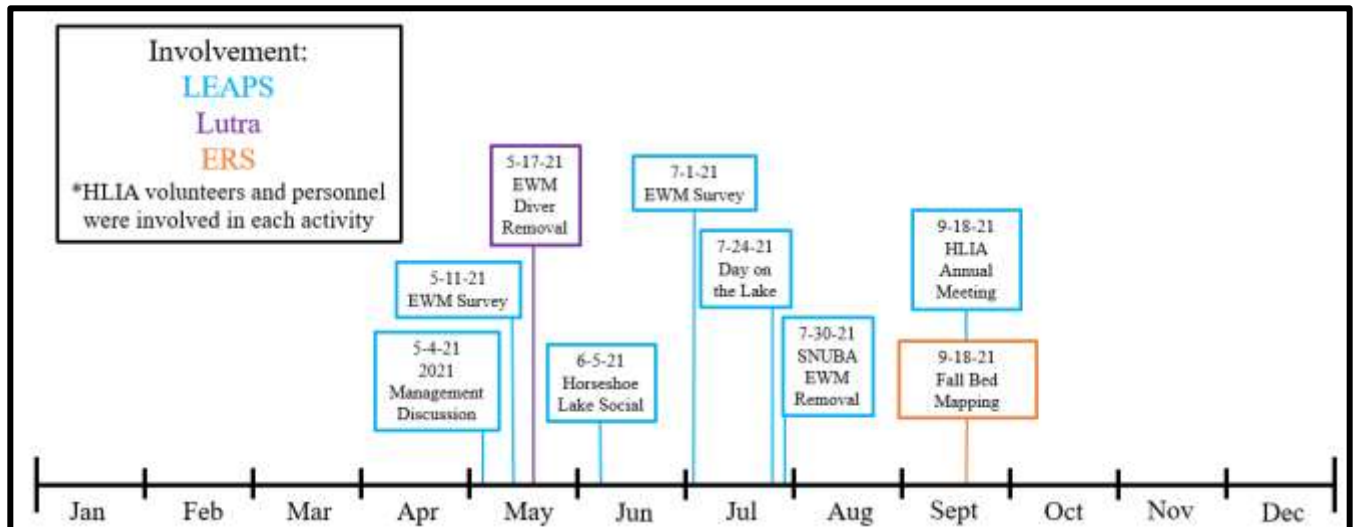


Figure 1. Timeline of 2021 Horseshoe Lake management events involving LEAPS and other hired contractors

2021 EWM MANAGEMENT

The HLPRD participated in Hybrid Eurasian Watermilfoil/Eurasian Watermilfoil (HWM/EWM) management in 2021 as approved by the Wisconsin Department of Natural Resources. Following the 2021 EWM Management Discussion, it was determined that hand removal and monitoring of EWM was the most appropriate course of action. On 5-11-21, LEAPS performed a meandering littoral survey to search for EWM (Figure 2). Lutra Biological, LLC (Lutra), used this information to hand remove EWM using scuba equipment on 5-17-21 (Figure 2). LEAPS returned to the lake on 7-1-21 to perform another littoral survey for EWM and found more (Figure 2). On 7-30-21, LEAPS, accompanied by HLPRD volunteers used SNUBA equipment owned by lake association members to hand remove additional EWM in the same area Lutra removed EWM (Figure 2). Snuba uses an underwater breathing system similar to scuba, except that the air supply comes from the surface through long tubes that act as extended snorkels, allowing divers to explore up to 30 feet from the generator that supplies the oxygen.

Endangered Resource Services, LLC (ERS) traveled to Horseshoe Lake on 9/5/2021 to conduct a meandering littoral survey for any surviving EWM. There was only one EWM plant found in the dive area (Figure 3). However, there were several dense areas of EWM/HEWM found on the northwest corner of the main lake (Figure 3).

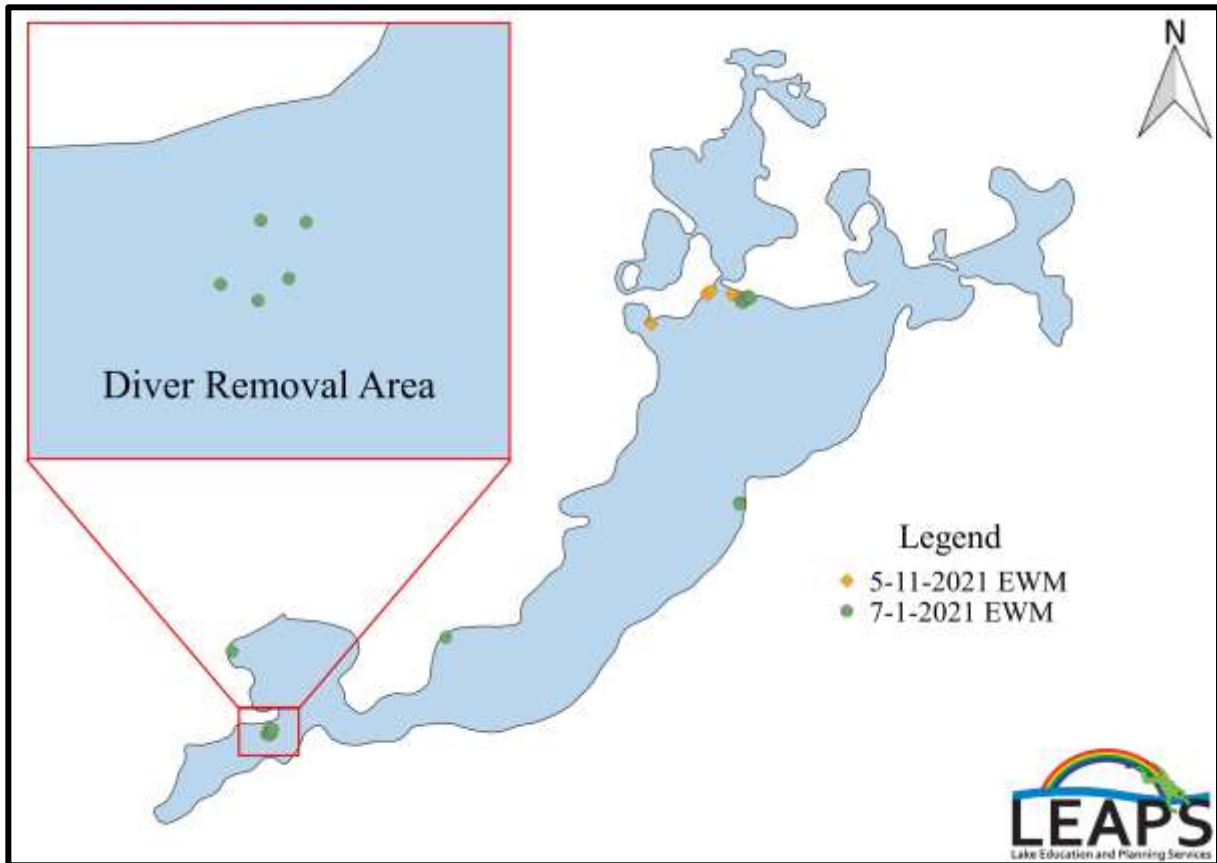


Figure 2. 2021 Horseshoe Lake EWM management

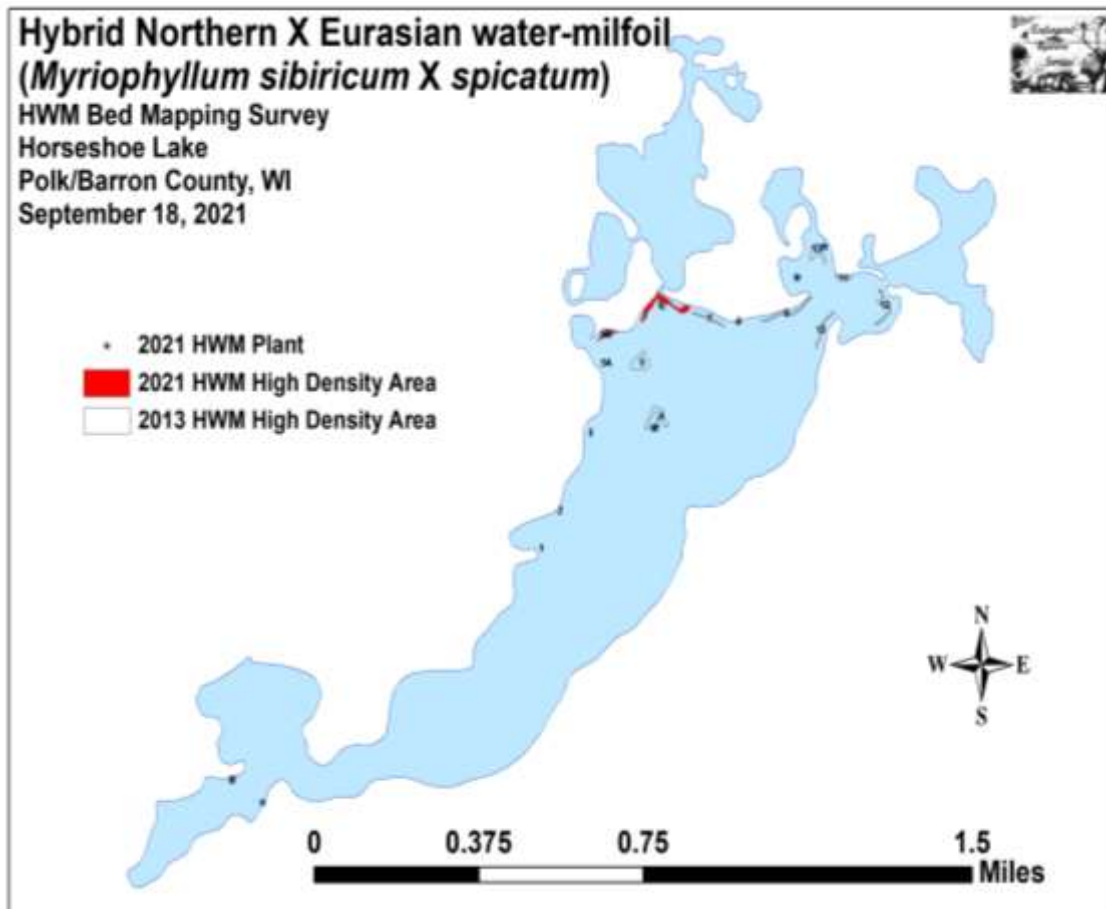


Figure 3. 2021 Horseshoe Lake EWM late summer high density areas

2021 CITIZEN LAKE MONITORING

Water quality data was collected by volunteers in 2021 from the deep hole site (Station ID: 493139) in Horseshoe Lake. Total phosphorus (TP) samples were collected on six dates at the deep hole site and averaged 23.0 ug/L (Table 1). Chlorophyll samples were collected five throughout the summer at the deep hole site and averaged 12.3 ug/L (Table 1). Secchi disk readings and dissolved oxygen and temperature profiles were likely taken in the summer of 2021, but have not been entered into the WDNR SWIMS database by HLPRD volunteers.

These results gave the lake an average Trophic Status Index (TSI) score of 52.6, placing the lake in the eutrophic range, which is consistent with the results of previous years (Figure 4). Eutrophic lakes are characterized by decreased water clarity, plant overgrowth, and oxygen-depleted bottom waters in the summer. These conditions accurately describe Horseshoe Lake in 2021.

LEAPS supports the collection of these data and uses it to inform management decisions and educate HLPRD members and lake users about the lake.

Table 1. 2021 Horseshoe Lake water quality data Deep Hole (Station ID: 493139)

Sample Date	TP (ug/L)	Chl- <i>a</i> (ug/L)	Secchi (ft)	
4/25/2021	29.6	-	-	
6/30/2021	21.6	4.8	-	
7/24/2021	17.8	9.4	-	
8/16/2021	19.4	23.5	-	
9/30/2021	28.2	13.9	-	
10/24/2021	21.3	9.8	-	
Average	23.0	12.3	-	
Average TSI	52.2	53.0	-	= 52.6

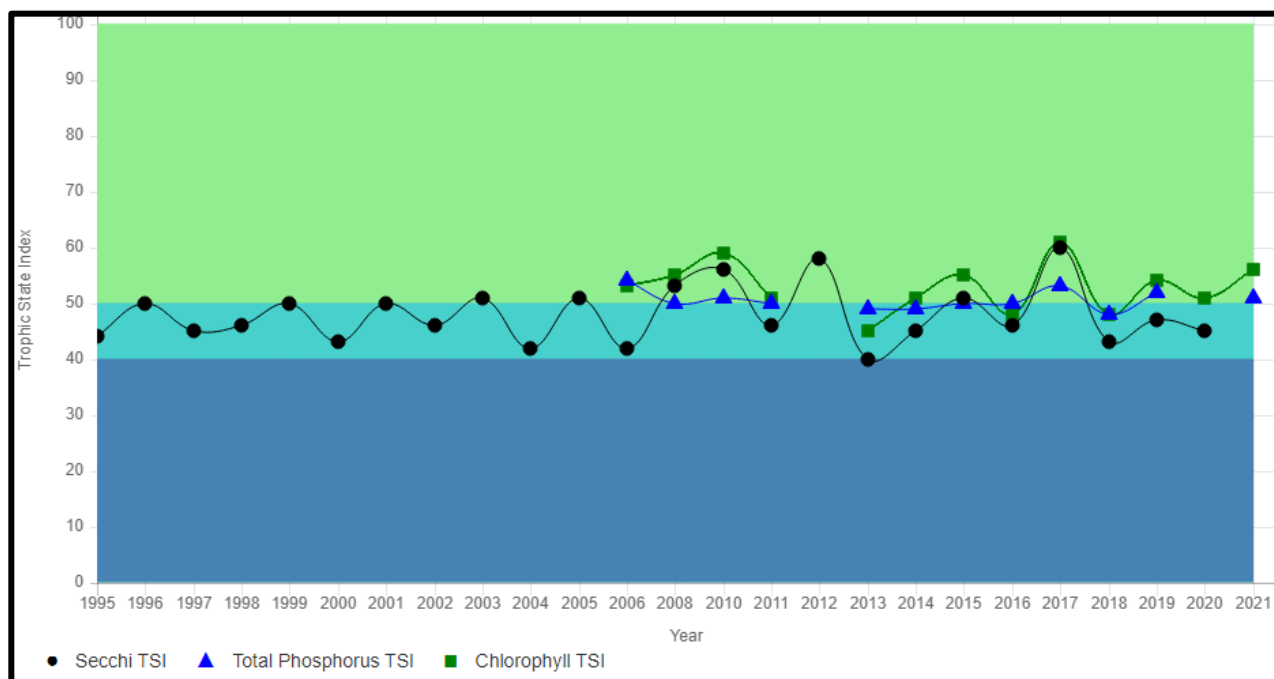


Figure 4. 2014-2021 Horseshoe Lake Deep Hole summer (July and August) TSI

2021 AQUATIC PLANT MANAGEMENT PLAN

LEAPS worked on updating the Aquatic Plant Management Plan (APMP) for Horseshoe Lake as part of the Horseshoe Lake, Barron/Polk PI and Update of APM Plan project (Grant #: AEPP60820.1). LEAPS also assisted the HLPRD in asking for an extension on the grant while waiting for, and incorporating, WDNR and public feedback. The extension was approved, allowing the HLPRD and LEAPS to finalize the plan in 2022.

2021 AIS MONITORING

HEWM was first discovered in Horseshoe Lake in 2006. Since then, volunteers have performed aquatic invasive species (AIS) monitoring on a regular basis in addition to actively managing HEWM/EWM according to regularly updated Aquatic Plant Management Plans. Purple loosestrife and curly leaf pondweed are also known to be in the lake, and volunteers make an effort to at least remove the flowering heads of purple loosestrife each year. Several other invasive species are known to be in the immediate area. 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 HLPRD meetings.

2022 EWM PRELIMINARY MANAGEMENT PLANNING

Hybrid water-milfoil currently occupies a small percentage of Horseshoe Lake's surface area, but it is well-established, making eradication an unrealistic expectation. Active management has reduced the levels of HWM from 2.54 acres (0.64% of the lake's surface area) in 2013 to 1.05 acres (0.26% coverage) in 2021 – a decline of -58.66%. Managing Hybrid water-milfoil has come at a high economic cost, and, as herbicides are non-selective, it has likely also had significant impacts on the aquatic plant community. In the future, maintaining HWM at its current low levels using targeted manual removal and chemical applications will likely continue to produce satisfactory control while simultaneously minimizing financial and ecological costs. Ultimately, the amount of HWM growth the HLPRD is comfortable with will determine how much, if any, management occurs on Horseshoe Lake in 2022.

A 2022 preliminary EWM chemical treatment plan has already been completed by LEAPS. At present it includes chemical treatment of EWM in two areas of the lake, in the narrows just up the lake from the boat landing, and in the Mud Lake entry bay. The first site is the location of a lot of diver removal of “regular” EWM. The second is one of the toughest locations in the lake that supports the growth of hybrid EWM. Together the two sites total 4.33 acres. At present there are two proposals, one using just 2,4-D based herbicides, and the other using ProcellaCOR.

Both locations have been chemically treated in past years, but not in 2020 or 2021.