

LAKE EDUCATION AND PLANNING SERVICES, LLC

HORSESHOE LAKE BARRON & POLK COUNTIES

2022 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 2022. The following actions were completed by LEAPS to assist the HLPRD in aquatic plant management and lake stewardship education.

- 2020-22 AIS education and planning grant status
- 2022 Eurasian watermilfoil/hybrid watermilfoil (E-HWM) management planning and implementation
- 2022 E-HWM aquatic plant survey
- 2023 preliminary E-HWM treatment plans
- 2023-27 Horseshoe Lake Aquatic Plant Management Plan
- 2022 water quality monitoring
- 2022 AIS monitoring and watercraft inspections
- 2023-24 Small-scale population control grant application

Each of these bullets will be discussed in greater detail in the following sections.

2020-22 AIS EDUCATION AND PLANNING GRANT

In February of 2020, the HLPRD was awarded a two year AIS planning grant to support AIS management planning and education. Several tasks were included in this project including annual E-HWM management planning, E-HWM/purple loosestrife aquatic plant survey work, AIS education efforts, and an update of the existing Aquatic Plant Management (APM) Plan for Horseshoe Lake including a repeat of the whole-lake, point-intercept, aquatic plant survey.

This project was originally supposed to end on December 31, 2021, but a request was made to extend the project through December 31, 2022. The request was approved on December 23, 2021.

2022 E-HWM MANAGEMENT PLANNING AND IMPLEMENTATION

The last time E-HWM was managed using aquatic herbicides was in 2019. Permit applications in 2020 and 2022 were denied by the WDNR leaving only physical removal using hand-pulling, rakes, and scuba divers. In 2020, a WDNR chemical application permit was submitted to chemically treat 9 beds of E-HWM using a granular 2,4-D product. No chemical application permit was submitted in 2021, instead physical removal was used. A scuba diver was contracted to do removal and local volunteers and LEAPS combined to do several days of diver removal using a SNUBA setup owned by a property owner on the lake. In 2022, a chemical application permit was submitted to treat two beds totaling 2.33 acres using ProcellaCOR.

The 2020 permit was denied due to the feeling using 2,4-D based herbicides on small areas would be ineffective, and the DNR determined it would no longer permit such treatment proposals. The 2022 permit was denied because the DNR felt that the application of ProcellaCOR was not explicitly defined in the existing APM Plan.

As mentioned, in 2021, diver removal using contracted services and volunteer services was completed. In 2022, when the chemical application permit was denied, the HLPRD again went to diver removal. Unfortunately, the diver used in 2021 was no longer available. In addition, the property owner with the SNUBA unit was unable to come up with time to implement that form of removal. Instead, LEAPS, along with a snorkeler, attempted to rake-remove E-HWM from

the lake on two different dates. This management action removed a lot of E-HWM, but it was impossible to make any significant dent in the E-HWM expanding distribution and density.



Figure 1: E-HWM removal in Horseshoe Lake, June 17, 2022

2022 E-HWM SURVEY WORK

The first E-HWM survey of Horseshoe Lake was completed on June 17, 2022. During that survey, physical removal was also used including rake removal and snorkel removal. During the survey, 8 beds of EWM were mapped totaling 3.76 acres, the largest being 2.7 acres (Figure 2). All of the beds, though small, had very dense E-HWM. A snorkeler spent the better part of an hour attempting to remove the bed of E-HWM off the point in the southwest end of the lake, but despite a lot of E-HWM being removed, a lot remained. It was quickly determined that the amount of E-HWM in the lake at this time made rake and snorkel removal ineffective.



Figure 2: June 17, 2022 E-HWM bed mapping (8 beds totaling 3.76 acres)

Another survey was completed on August 31, 2022. This survey served two purposes, 1) to get an up-to-date bed mapping, and to complete a sub-basin, point-intercept survey in areas expected to be included in a 2023 chemical application to control E-HWM. This survey mapped five areas totaling 6.85 acres, nearly double what was mapped in June. The beds ranged in size from 0.25 to 3.75 acres (Figure 3).

Also on August 31, 2022, a pre-treatment, sub-basin, point-intercept surveys was completed in three areas that will be included in a 2023 E-HWM herbicide application plan. The preliminary 2023 E-HWM treatment proposal includes three treatment areas totaling six acres. During the August 31, 2022 survey, 24 points spread through three treatment areas were rake sampled for E-HWM and native aquatic plants. Results from this survey can be used to compare changes to the E-HWM and native aquatic vegetation post-treatment in 2023, and in the year after treatment post survey in 2024.



Figure 3: August 31, 2022 E-HWM bed mapping (5 beds totaling 6.85 acres)



Figure 4: Pre and post-treatment point-intercept survey points for the 2023 E-HWM chemical treatment proposal

2023 PRELIMINARY E-HWM TREATMENT PROPOSAL (INCLUDED IN THE 2023-24 WDNR GRANT APPLICATION)

Based on late season E-HWM bed mapping in 2022, a preliminary chemical treatment proposal using ProcellaCOR has been developed. The 2022 survey identified five areas covering 6.85 acres (Figure 3). The 2023 chemical treatment proposal includes three of those areas to be chemically treated with ProcellaCOR at 4-5 pdus/acre-foot (Table 1, Figure 5).

Table 1: 2023 Horseshoe Lake preliminary chemical treatment proposal details

2023 Horseshoe Lake, Barron/Polk County Preliminary Spring EWM/HWM ProcellaCOR Chemical						
New Name	Location	Acres	Mean Depth (feet)	Acre-feet	Treatment PDU/acft	PDU Application
Bed1-23	Channel	1.15	6.00	6.90	5.00	34.50
Bed2-23	Big Bay	1.19	5.00	5.95	4.00	23.80
Bed3-23	Mud Lake Entry	3.73	5.00	18.65	4.00	74.60
		6.07		31.50		132.90
ProcellaCOR	PDU = 3.2 oz		fl. Ounces	gallons		
	132.9		425.28	3.3		
Total Cost	Cost/PDU = \$75.00					
	\$9,967.50					
\$10,267.50	Trip Fee	\$300.00				



Figure 5: 2023 Preliminary E-HWM chemical treatment map

The two remaining beds as well as multiple individual plants would be removed by divers or diver aided suction harvest (DASH) services in 2023. A pre-treatment sub-basin point-intercept survey has already been completed in the proposed beds (August 2022) and would be repeated in August 2023 and likely 2024. Herbicide concentration testing would also be completed in 2023.

2023-27 HORSESHOE LAKE AQUATIC PLANT MANAGEMENT PLAN

One of the main goals of the 2020-22 AIS education grant was to update the APM Plan for Horseshoe Lake. The last plan ended in 2020. The new APM Plan was completed in late 2022 and approved by the WDNR on November 11, 2022. It covers management goals, objectives and actions through the end of 2027. The management actions proposed for 2023 are covered under the management goals, objectives, and actions for E-HWM in the new APM Plan.

2022 WATER QUALITY MONITORING

Horseshoe Lake - Deep Hole was sampled 4 different days during the 2022 season. Parameters sampled included:

- total phosphorus
- chlorophyll

Chemistry data was collected on Horseshoe Lake - Deep Hole. The average summer Chlorophyll was 6.8 µg/l (compared to a Northwest Georegion summer average of 15.8 µg/l). The summer Total Phosphorus average was 13.8 µg/l. Lakes that have more than 20 µg/l and impoundments that have more than 30 µg/l of total phosphorus may experience noticeable algae blooms.

The overall Trophic State Index (based on chlorophyll) for Horseshoe Lake - Deep Hole was 49 (Figure 6). The TSI suggests that Horseshoe Lake - Deep Hole was mesotrophic. Mesotrophic lakes are characterized by moderately clear water, but have a increasing chance of low dissolved oxygen in deep water during the summer.

Secchi disk readings and dissolved oxygen and temperature profiles were likely taken in the summer of 2022, but have not been entered into the WDNR SWIMS database by HLP RD volunteers.

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

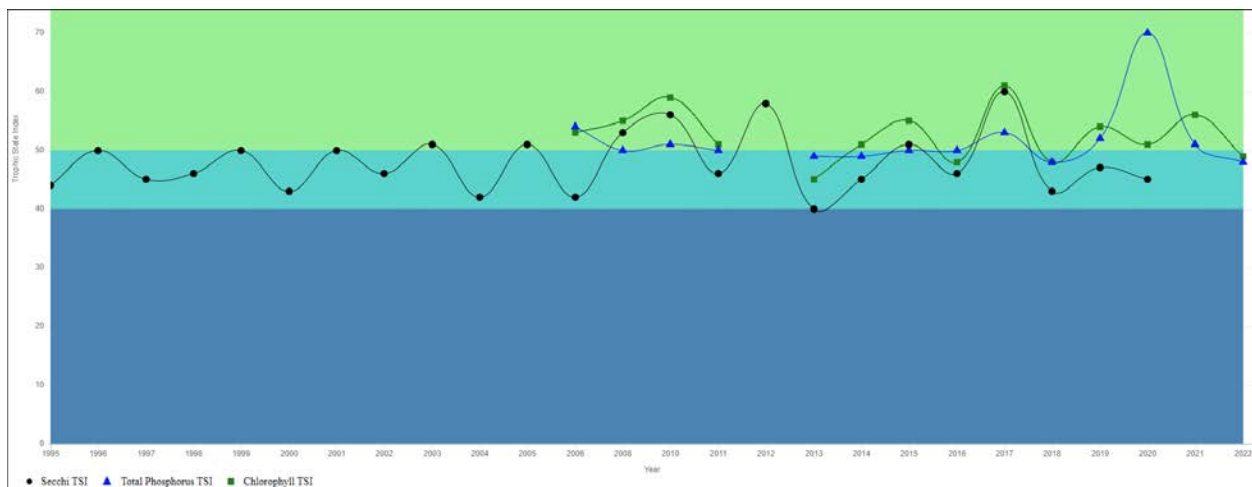


Figure 6: 2014-2022 Horseshoe Lake Deep Hole summer (July and August) TSI

2022 AIS MONITORING

E-HWM 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 E-HWM 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. Volunteer divers on the lake search for CLP in areas of the lake where this invasive has been found before. 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.

In the past, the HLPRD has implemented a watercraft inspection program following CBCW guidelines. However, in 2022, they were not able to get volunteers or a paid person to complete inspections. In 2023, the HLPRD is planning on contracting CBCW services through an outside entity, likely LEAPS. They will attempt to get at least 200 hours of inspection time at the landing in 2023.