

LAKE EDUCATION AND PLANNING SERVICES, LLC

# HORSESHOE LAKE WASHBURN COUNTY

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2022 MANAGEMENT SUMMARY REPORT  
WBIC: 2470000

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HORSESHOE LAKE PROPERTY ASSOCIATION

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## INTRODUCTION

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This report discusses lake management activities completed by the Horseshoe Lake Property Association (HLPAs) and Lake Education and Planning Services (LEAPS) throughout 2022. The following actions were completed by LEAPS to assist the HLPAs in aquatic plant management and lake stewardship education.

- 2020-21 Grant extension
- 2022 EWM management planning and implementation
- 2022-26 Aquatic Plant Management Plan
- 2022 WDNR Surface Water Grant Eligibility
- 2023-24 Small-scale Population Control grant application
- 2022 Water quality
- 2023 EWM management planning

Each of these bullet points are discussed in more detail in the following sections.

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### 2020-21 GRANT EXTENSION

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In March of 2020, the HLPAs was awarded a two year AIS Education, Planning, and Prevention grant (AEPP61320). The original project had an official end date of December 31, 2021. In late December 2021, the HLPAs requested an extension to that grant project. On December 28, 2021, the HLPAs received an email from the WDNR acknowledging the grant project extension for one year. The amendment grant (AEPP 61320.1) extends the project period end date to December 31, 2022. Activities and deliverable for this extension include: AIS surveys following WDNR protocols, continued zebra mussel monitoring, management planning, water quality monitoring, presentations of the Horseshoe APM Plan, and AIS education and signage.

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### 2022 EWM MANAGEMENT PLANNING AND IMPLEMENTATION

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Based on September 2021 fall EWM bed mapping, a preliminary EWM chemical application plan was drawn up in November 2021. The September 5<sup>th</sup> survey had good conditions and covered transects totaling 24.3km (15.1 miles). During the survey no EWM was found in the 2021 treatment area or in the 2016 and 2019 treatment areas. However, in the area just east of the narrows between the two basins of the lake, seven individual EWM plants that were mature and canopied were found and eliminated by rake removal. These plants were in an area where rake and scuba were used to manually remove plants in 2020 and early 2021. A dense cluster of seven plants was also found off the edge of a dock on the north shoreline in the east basin (Figure 1).

Although all of the plants found were raked out during the final survey in 2021, their proximity to the channel in an area that gets regular boat traffic might make a very limited chemical treatment in 2022 a consideration. Conversely, waiting to see how things look in the spring and continuing with manual removal is also a plausible management option. These findings were enough to at least propose and submit a WDNR chemical application permit for possible management in 2022. On April 14, 2022, a WDNR chemical application permit was submitted to the WDNR to treat two areas totaling 1.44 acres with ProcettaCOR at 4pdus/ac-ft (Figure 2). The permit was approved.

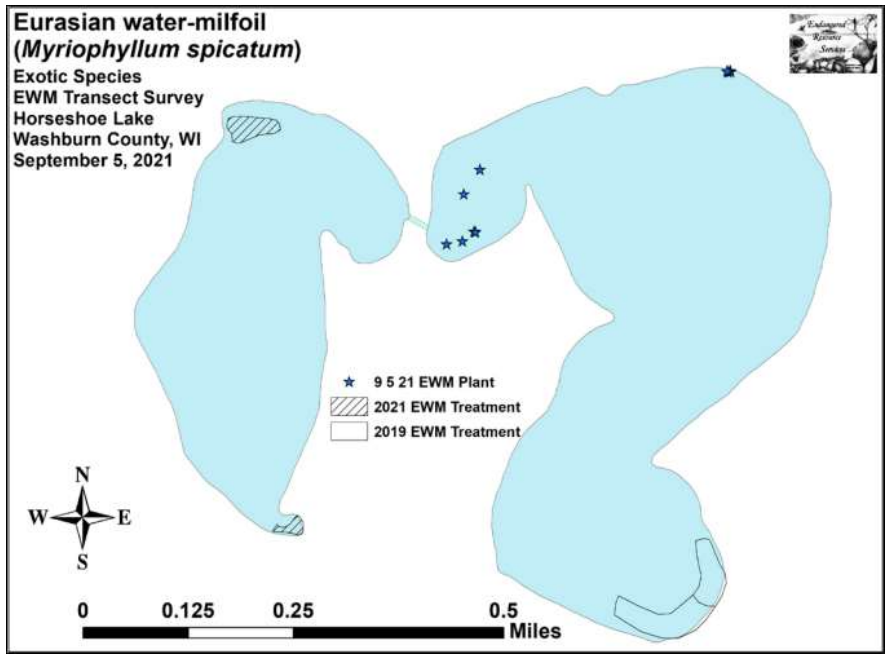


Figure 1: September 2021 fall EWM bed mapping survey results

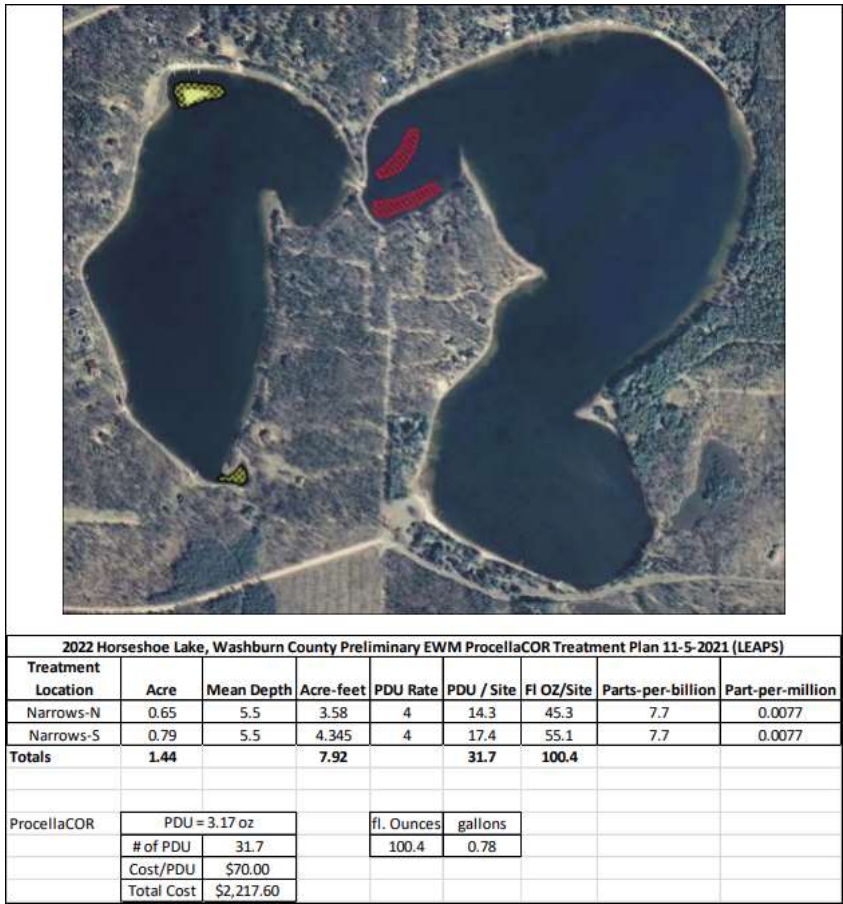


Figure 2: 2022 Horseshoe Lake preliminary EWM chemical treatment proposal

Pre-treatment survey work was completed by LEAPS on May 24, 2022 to determine if there was enough EWM remaining in the areas where it was physically removed in September 2021 to warrant completing the chemical

treatment. While several EWM plants were found and removed (Figure 3), it was decided by the HLPAs and LEAPS to not do the chemical treatment and instead to concentrate on additional physical removal during the 2022 season.



**Figure 3: May 24, 2022 Pre-treatment EWM survey results (yellow points are EWM that was found and removed)**

On June 14, 2022 LEAPS again surveyed the lake and at the same time, brought a snorkeler with to dive overboard and remove plants by hand directly from the bottom of the lake when found. During this survey, 5.09 miles of transects were completed and eleven areas had plants removed from them. Most of the plants removed were single or stem or very small clumps, none of them were canopied (Figure 4).

On August 7, 2022 Endangered Resource Services (ERS) completed its first summer meandering survey and physical removal. Water levels in 2022 were down sharply (at least several feet) following the exceptionally high levels we observed throughout the summer of 2021. Clarity on August 7<sup>th</sup> was very good with visibility down to 7-8ft. In total, ERS completed 5.1 miles of transects looking for evidence of EWM. During this survey, the only evidence of EWM anywhere in the lake was three small plants that were raked out around a dock on the north shore of the east basin (Figure 5).

In mid-August, a volunteer surveying the lake identified a new bed of EWM in the east basin. The bed was confirmed as EWM by LEAPS and ERS (Figure 6). It was found in an area of the lake that had never previously had EWM (Figure 7). The new bed was approximately 0.05 acres in size containing 50 or more plants clumped together. On August 21, 2022 LEAPS and a snorkeler spent about an hour diving on the new bed to remove as much as possible (Figure 6).





Figure 4: June 14, 2022 EWM survey and removal

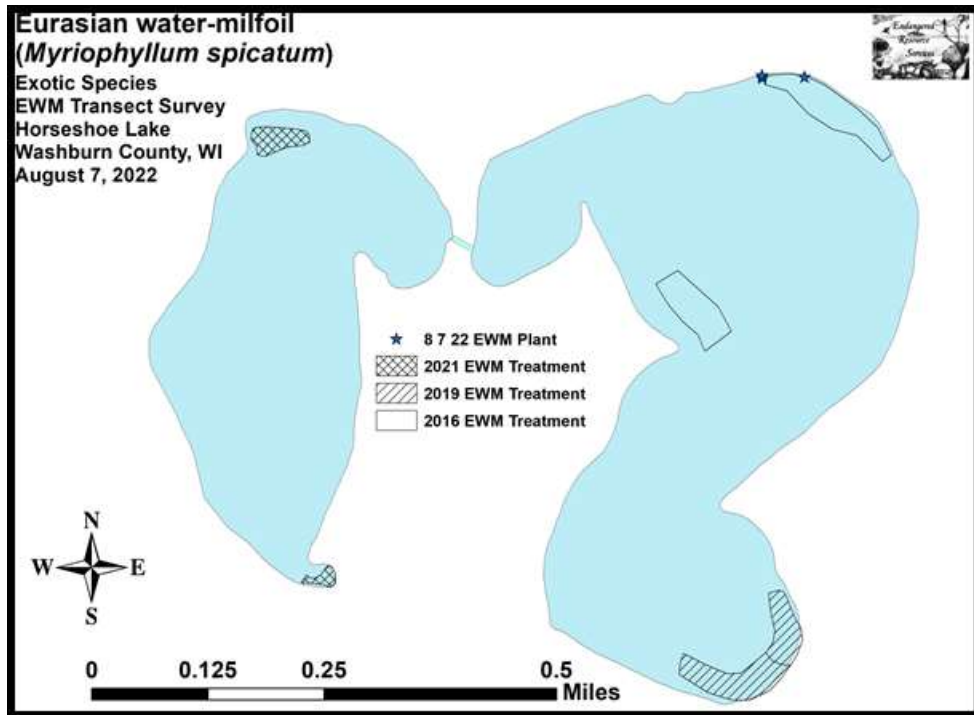


Figure 5: August 7, 2022 EWM survey with removal - ERS



Figure 6: New EWM bed identified by a volunteer in mid-August 2022. Physical removal completed August 21, 2022



Figure 7: August 21, 2022 EWM bed along the east shore of the East Basin of Horseshoe Lake



ERS came back for one more meandering survey with removal on September 24, 2022. During that survey, and despite a further drop in water levels, clarity continued to be good, and, with calm conditions, visibility was down to 8-9ft. In total this search covered 12.1 miles. Again, no evidence of EWM was found anywhere in the 2019 treatment area in the east basin or in the 2021 treatment areas in the west basin. No EWM was found in the SCUBA removal area just east of the channel, although a single plant just northeast of that area was rake removed. However, along the eastern shoreline where LEAPS removed plants in mid-August, an additional 16 plants all of which were relatively young sprouts were found and rake removed (Figure 8). Along the north shoreline where just three plants were found in August, an additional 18 individual plants all of which were relatively recent sprouts were rake removed (Figure 8). Despite an exhaustive search throughout each of these areas, no evidence of larger parent beds was found so it's possible the plants on the north shoreline grew from fragments that drifted in from the east/central patch found in August.

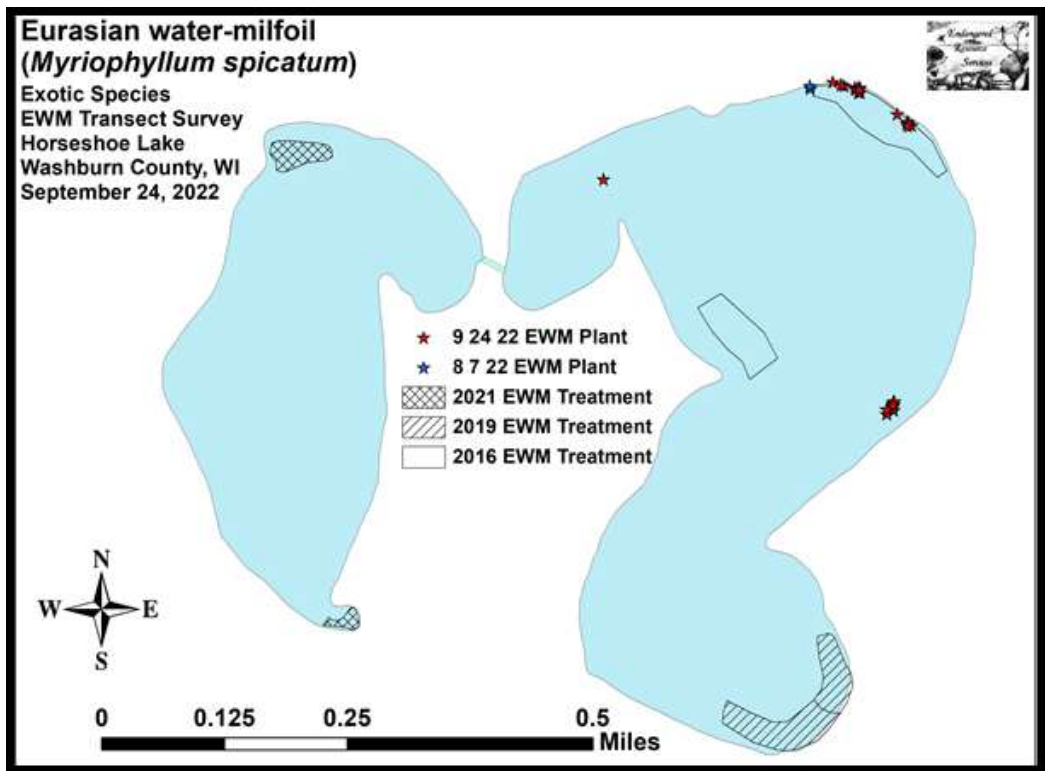


Figure 8: September 24, 2022 EWM survey and rake removal results – ERS

ERS had the following to say about 2022 survey and removal work. “Despite finding two areas in the east basin with recurring plants in 2022, it seems reasonable, based on their small size, to continue with manual removal in 2023. Similarly, how much monitoring will be needed in 2023, if any, is a conversation that needs to take place. Ultimately, the HLP, LEAPS, and the Wisconsin Department of Natural Resources will have to decide on a course of action. In the meantime, lake residents should remain on the lookout for any signs of EWM.

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**2022-26 AQUATIC PLANT MANAGEMENT PLAN**

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A completed draft of the 2022-26 Horseshoe Lake Aquatic Plant Management Plan was submitted to the WDNR for approval on December 14, 2021. The APM Plan was approved by the WDNR on March 3, 2022.



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## 10 YEAR GRANT ELIGIBILITY

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In September of 2022, the WDNR requested that the HLPAs submit new paperwork necessary to determine whether or not the HLPAs are still eligible for WDNR surface water grants. This was done, and on Sept 29, 2022, the HLPAs received a letter from the WDNR confirming that they are eligible for DNR grants as a Qualified Surface Water Management Organization under NR 193.03(40).

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## 2023 GRANT APPLICATION

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At present there are no plans to complete chemical treatment of EWM in 2023, only physical removal using a rake, scuba, divers, or diver-aided suction harvest (DASH). A 1-year small-scale AIS population control grant application has been submitted to the WDNR to support survey and physical removal efforts in 2023.

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## 2022 CITIZEN LAKE MONITORING

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Horseshoe Lake - Deep Hole was sampled 7 different days during the 2022 season. The average summer (July-Aug) secchi disk reading for Horseshoe was 11 feet. Typically the summer (July-Aug) water was reported as clear and green. Chlorophyll samples, the green pigment found in algae, were collected three times throughout the summer at the deep hole site and averaged 2.6 ug/L. It is likely that total phosphorus samples were also collected, but for some reason the data is not included in the 2022 SWIMS CLMN report.

The overall Trophic State Index (based on chlorophyll) for Horseshoe Lake - Deep Hole was 42 (Figure 9). The TSI suggests that Horseshoe Lake - Deep Hole was mesotrophic. Mesotrophic lakes are characterized by moderately clear water, but have an increasing chance of low dissolved oxygen in deep water during the summer.

Additional Secchi disk readings of water clarity were collected in the West Basin of Horseshoe Lake. Horseshoe Lake - West Basin was sampled 7 different days during the 2022 season. The average summer (July-Aug) secchi disk reading for Horseshoe Lake was 9 feet. Typically the summer (July-Aug) water was reported as clear and green. This suggests that the secchi depth may be mostly impacted by algae. Algal blooms are generally considered to decrease the aesthetic appeal of a lake because people prefer clearer water to swim in and look at. Algae are always present in a balanced lake ecosystem.

The overall Trophic State Index (based on secchi) for Horseshoe Lake - West Basin was 45 (Figure 10). Like in the East Basin (Deep Hole) this TSI suggests that Horseshoe Lake - West Basin was mesotrophic. Mesotrophic lakes are characterized by moderately clear water, but have an increasing chance of low dissolved oxygen in deep water during the summer.

LEAPS supports the collection of these data and uses it to inform management decisions and educate HLPAs members and lake users about the lake. At the present time, water quality maintains a pretty steady trend, unchanging in its TSI level. Water clarity readings may be declining as average summer readings in the last couple of years are worse than previous years (Figure 11). This may not be a fully established trend yet, but it should be watched in the future.

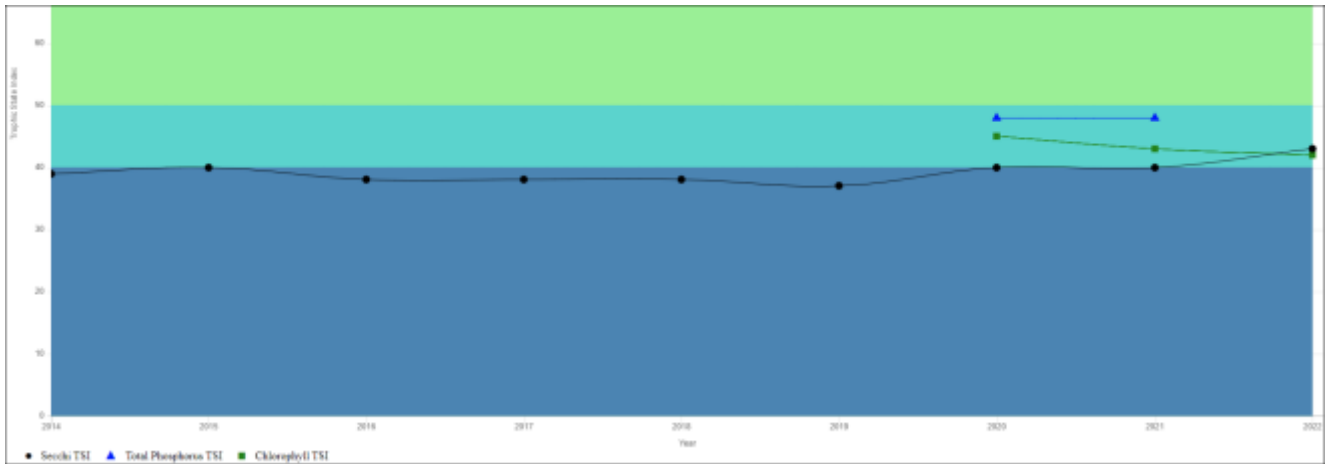


Figure 9: 2014-2022 TSI values for the Deep Hole – East Basin of Horseshoe Lake

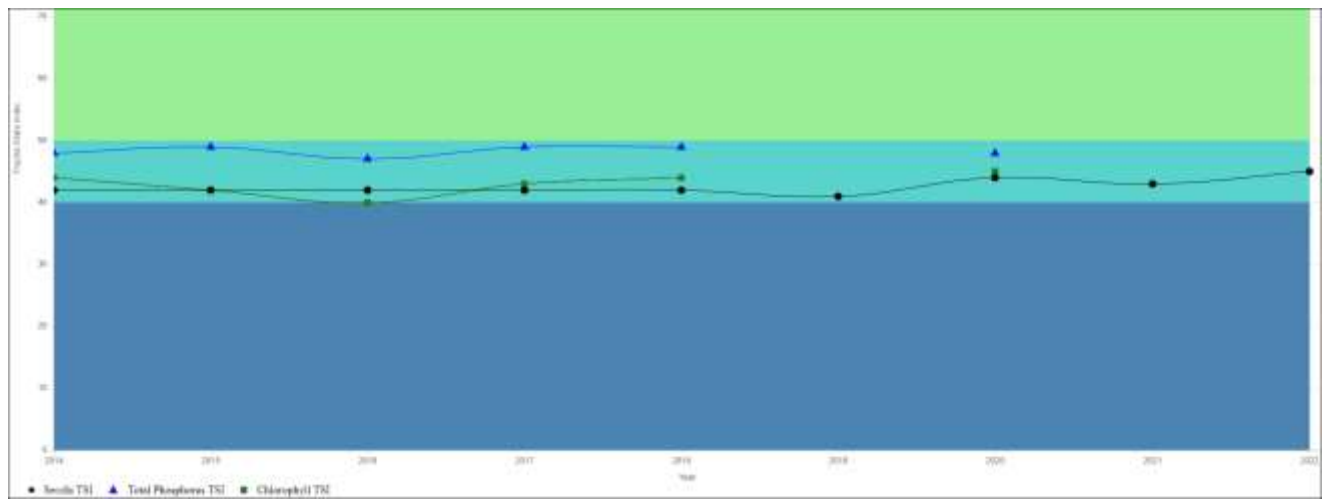


Figure 10: 2014-2022 TSI values for the West Basin of Horseshoe Lake

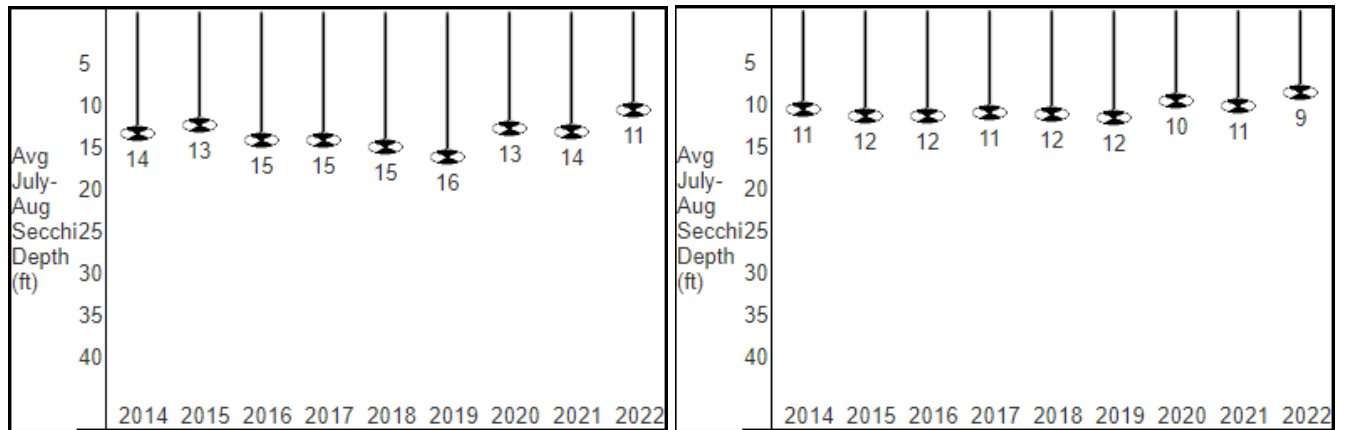


Figure 11: Average summer Secchi disk readings of water clarity Deep Hole – East Basin (left), West Basin (right)

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## 2022 AIS MONITORING

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EWM was first discovered in Horseshoe Lake in 2011. Since then, volunteers and resource professionals have performed aquatic invasive species (AIS) monitoring on a regular basis. No other AIS are verified on the lake, but purple loosestrife, Japanese knotweed, and several other species are known to be in the immediate area. The fact that the new bed of EWM in the east basin was identified by a HLPAs volunteer in 2022, shows that the efforts to familiarize its constituency about EWM has paid off for the HLPAs. The HLPAs has both educated surveyors and even individual capable of diving on EWM to remove it. 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 HLPAs meetings.

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## 2023 EWM PRELIMINARY MANAGEMENT PLANNING

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As mentioned, only physical removal of EWM using hand-pulling, rake removal, snorkelers, scuba divers, and possibly DASH are planned for 2023. A one-year grant has been submitted to the WDNR to support these efforts in 2023. Survey work will be continued in 2023 as well.