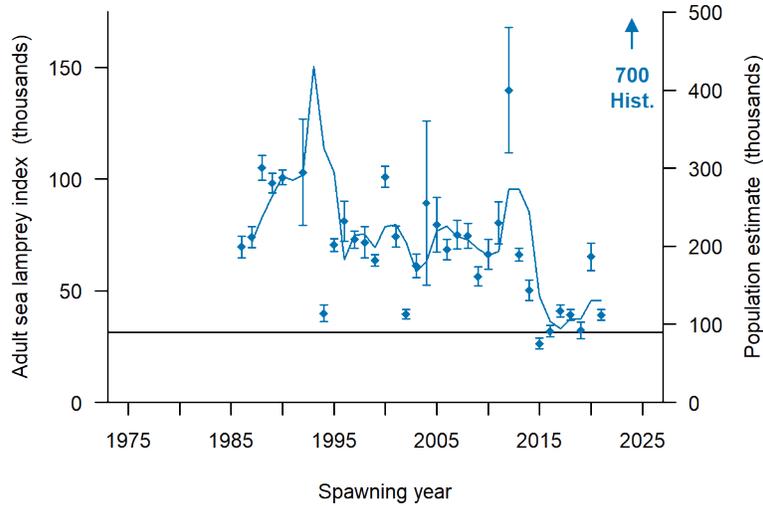
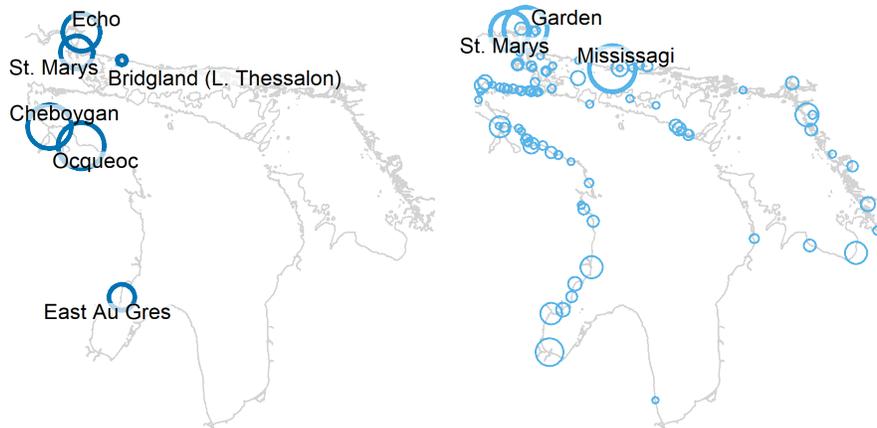


# STATUS OF SEA LAMPREY CONTROL IN LAKE HURON – SPRING 2022

## Adult Sea Lamprey:



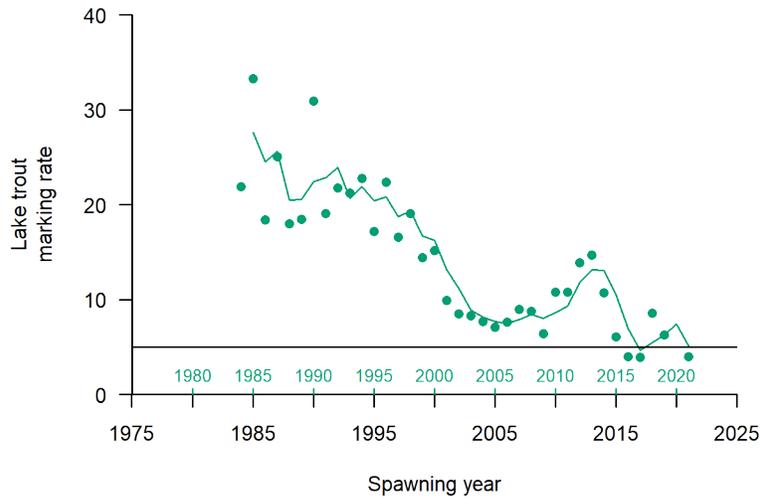
**Figure 1.** Index estimates with 95% confidence intervals (vertical bars) of adult sea lampreys, including historic pre-control abundance (as a population estimate) and the three-year moving average (line). The population estimate scale (right vertical axis) is based on the index-to-PE conversion factor of 2.86. The adult index in 2021 was 39,000 with 95% confidence interval (37,000-42,000). The three-year (2019-2021) average of 46,000 was above the target of 31,000. The index target was estimated as 0.25 times the mean of indices (1989-1993).



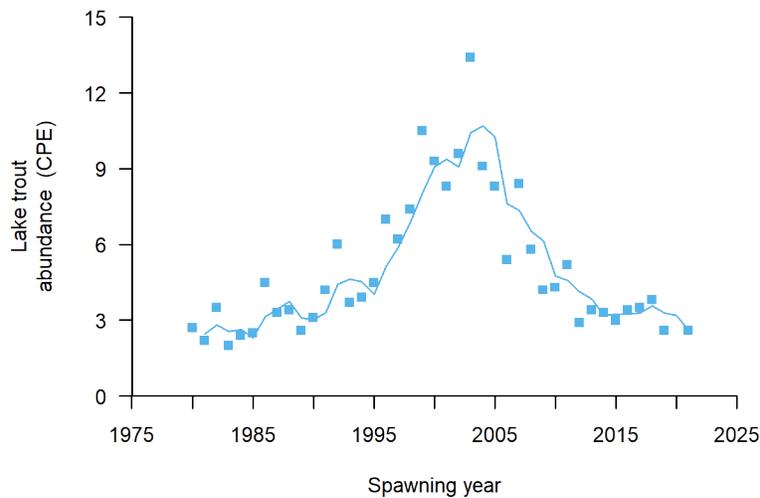
**Figure 2.** LEFT: Estimated index of adult sea lampreys during the spring spawning migration 2021. Circle size corresponds to estimated number of adults from mark-recapture studies (blue) and model predictions (orange). All index streams are identified. RIGHT: Maximum estimated number of larval sea lampreys in each stream surveyed during 1995-2012. Tributaries composing over half of the lake-wide larval population estimate are identified (Mississagi 8,100,000; Garden 7,000,000; St. Marys 5,200,000).

- The 3-year average adult index estimate is above the target and the adult index has been holding steady over the past five years.
- Mark-recapture estimates were generated for all six index streams.
- Sources to watch include the St. Marys River, productive tributaries in the northern portion of the lake (e.g. Cheboygan and Mississagi rivers), and the Manistique River (Lake Michigan).

### Lake Trout Marking and Relative Abundance:



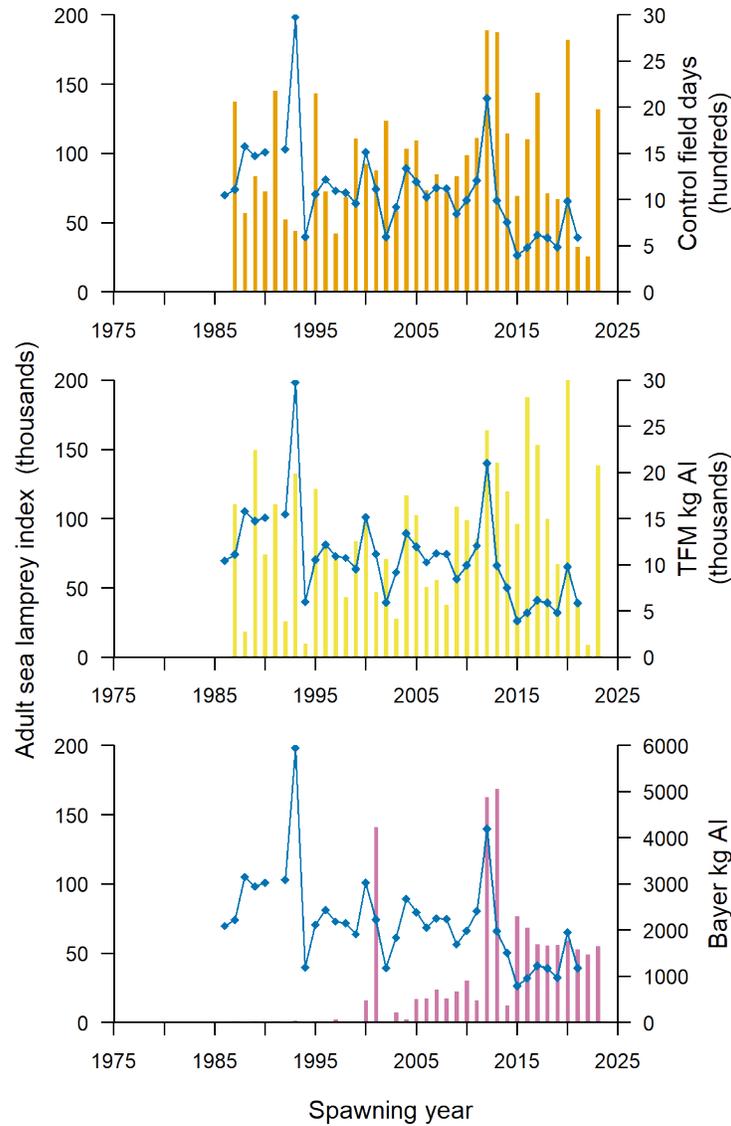
**Figure 3.** Number of A1-A3 marks per 100 lake trout > 532 mm from standardized assessments plotted against the sea lamprey spawning year, including the three-year moving average (line). The three-year (spawning years 2019-2021) average marking rate of 5.2 was above the target of 5 A1-A3 marks per 100 lake trout > 532 mm (horizontal line). A second x-axis shows the year the lake trout were surveyed.



**Figure 4.** Lake trout relative abundance from standardized surveys (spring 2-6 inch mesh) in U.S. waters of the main basin plotted against sea lamprey spawning year, including the three-year moving average (line). CPE = geometric mean of fish/km/net night of lean lake trout > 532 mm (21") total length.

- The 3-year average marking rate is above target and the marking rates have been steady over the past five years.
- During the early 1990s, marking and mortality on lake trout were so large that restoration efforts were suspended until the 1999 large-scale treatment of the St. Marys River.
- Lake trout relative abundance has been holding steady over the past five years, but relative abundance of wild lake trout has increased dramatically in many areas during recent years.
- Recent analysis of lake trout survey data resulted in the exclusion of some previously used data based on intermittent occurrences and uncertainty of survey gear used resulting in a trend change during the time series.
- Marking rates on corigonids has been increasing and may be important initial hosts for juvenile sea lampreys.
- The FishLamp workgroup is working to provide clarity to the often murky relationship between sea lamprey abundance, lake trout abundance, and sea lamprey marking rate on lake trout.

**Lampricide Control - Adults vs. Field Days, TFM, and Bayluscide:**



**Figure 5.** Index of adult sea lampreys (blue lines) and number of control field days (orange bars), TFM used (kg active ingredient; yellow bars), and Bayluscide used (kg active ingredient; purple bars). Field days, TFM, and Bayluscide are offset by 2 years (e.g., field days, TFM, and Bayluscide applied during 1985 is plotted on the 1987 spawning year, when the treatment effect would first be observed in adult sea lamprey populations).

- Thirteen tributaries were treated during 2019, five during 2020, and 22 during 2021 (2021 to 2023 sea lamprey spawning years)
- Four lentic areas were treated during 2019, one during 2020, and one during 2021 (2021 to 2023 sea lamprey spawning years).
- Targeted treatment effort since 2010 has likely resulted in historically low sea lamprey abundance.
- Lake Huron likely benefits from the treatment of large producers in the northern part of Lake Michigan.
- Treatment delays on the Garden and Mississagiri rivers have yet to impact sea lamprey abundance, but the potential impacts will continue to be monitored.