

STATUS OF SEA LAMPREY CONTROL IN LAKE HURON

Adult Sea Lamprey:

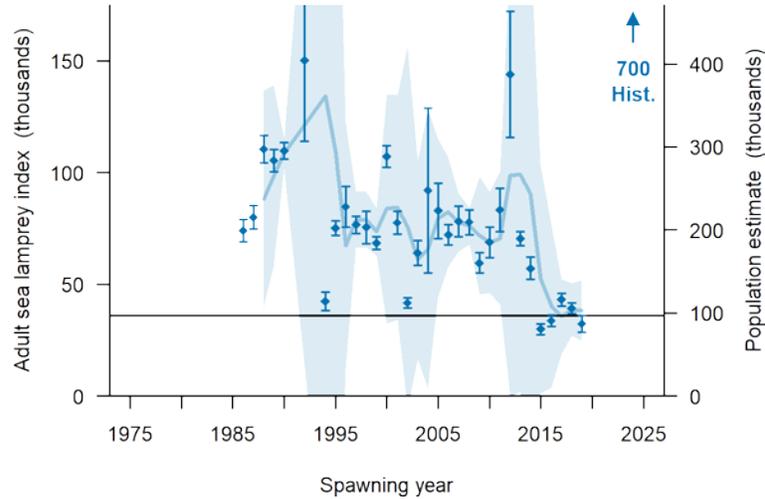


Figure 1. Index estimates with 95% confidence intervals (vertical bars) of adult sea lampreys, including historic pre-control abundance (as a population estimate) and the three-year moving average (line) with 95% CIs (shaded area). The population estimate scale (right vertical axis) is based on the index-to-PE conversion factor of 2.69. The adult index in 2019 was 32,000 with 95% confidence interval (29,000-36,000). The three-year average of 38,000 was above the target of 36,000. The index target was estimated as 0.25 times the mean of indices (1989-1993).

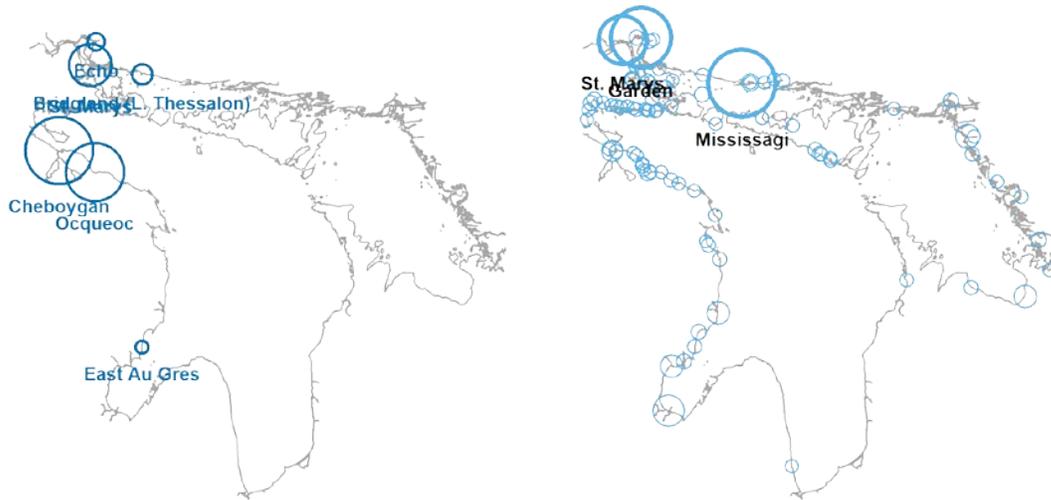


Figure 2. LEFT: Estimated index of adult sea lampreys during the spring spawning migration, 2018. Circle size corresponds to estimated number of adults from mark-recapture studies (blue) and model predictions (orange). All index streams are identified. RIGHT: Maximum estimated number of larval sea lampreys 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 5 years.
- 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:

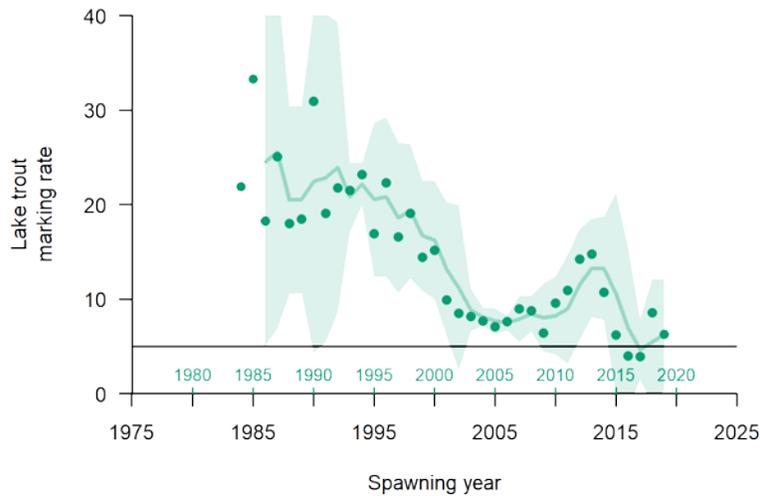


Figure 3. Number of A1-A3 marks per 100 lake trout > 532 mm from standardized assessments plotted against the sea lamprey spawning year, including the three-year moving average (line) with 95% CIs (shaded area). The marking rate of 6.3 in spawning year 2017-2019 was above the target of 5 A1-A3 marks per 100 lake trout > 532 mm (horizontal line). A second x-axis shows the year the lake trout were surveyed.

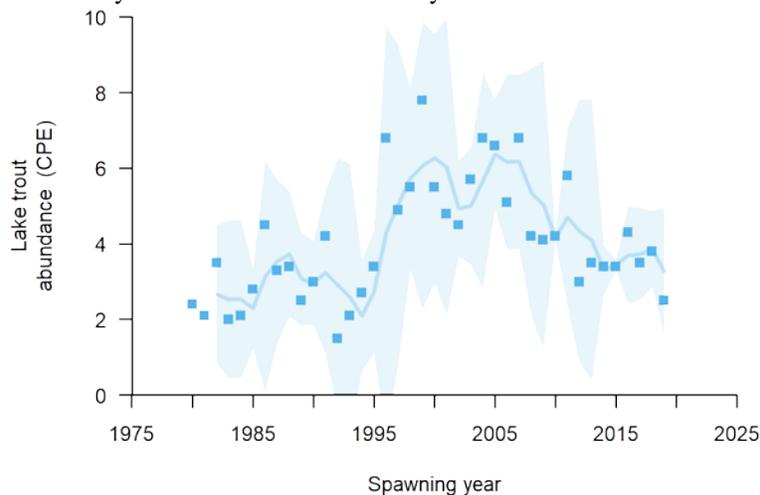


Figure 4. Lake trout relative abundance from standardized surveys (spring 2-6 inch mesh) in U.S. waters of the main basin plotted against sea lamprey spawning year, including the three-year moving average (line) with 95% CIs (shaded area). CPE = geometric mean of fish/km/net night of lean lake trout > 532 mm (21") total length.

- The 3-year average marking rate is above the target and the marking rate has been steady over the past 5 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 5 years, but relative abundance of wild lake trout has increased dramatically in many areas during recent years.
- Marking rates on corigonids has been increasing and may be important initial hosts for juvenile sea lampreys.
- The Commission, in collaboration with management agencies, maintains lake trout marking and abundance data sets to advance assessment and guidance of the program.
- A workgroup (FishLamp) 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 - Abundance vs. Field Days, TFM, and Bayluscide:

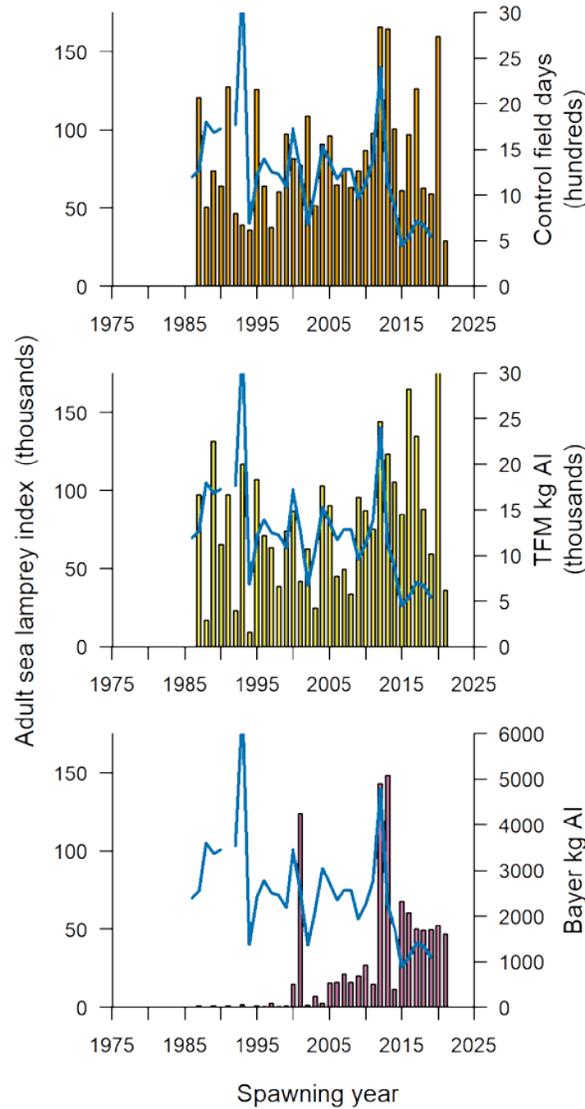


Figure 5. Index of adult sea lampreys (blue lines) and number of control field days (orange bars), TFM used (kg active ingredient; yellow bars), and Bayluscide used (kg active ingredient; purple bars). Field days, TFM, and Bayluscide are offset by 2 years (e.g., field days, TFM, and Bayluscide applied 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 with TFM and four lentic areas including the St. Marys River were treated with granular Bayluscide during 2019 (2021 sea lamprey spawning year).
- Twenty-four tributaries were treated during 2016, 16 during 2017, and 34 during 2018 (2018 to 2020 sea lamprey spawning years)
- Four lentic areas were treated during 2016, two during 2017, and six during 2018 (2018 to 2020 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 Mississagi rivers could impact sea lamprey abundance during 2020, but the Mississagi River was treated during 2019 and the Garden River is scheduled for treatment during 2020.