STATUS OF SEA LAMPREY CONTROL IN LAKE HURON

Adult Sea Lamprey:

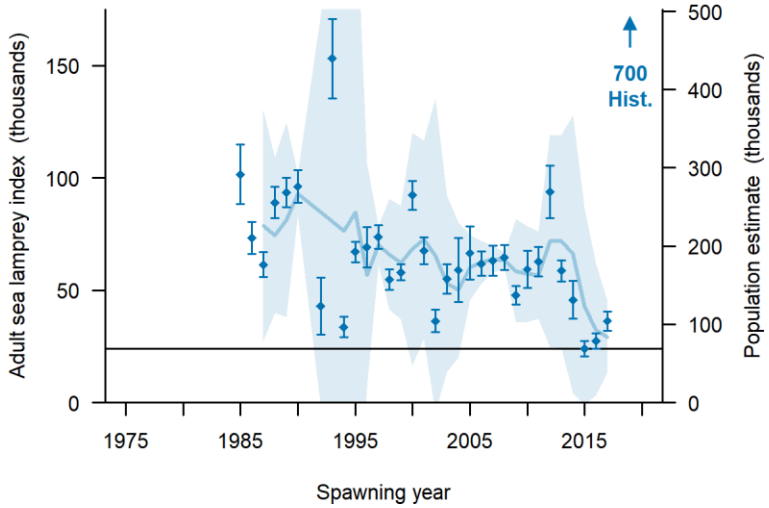

Figure 1. Index estimates with 95% confidence intervals (vertical bars) of adult sea lampreys, including historic pre-control abundance (as a population estimate) and the three-year moving average (line) with 95% CIs (shaded area). The population estimate scale (right vertical axis) is based on the index-to-PE conversion factor of 2.87. The adult index in 2017 was 36,000 with 95% confidence interval (32,000-41,000). The point estimate was above the target of 24,000. The index target was estimated as 0.25 times the mean of indices (1989-1993).

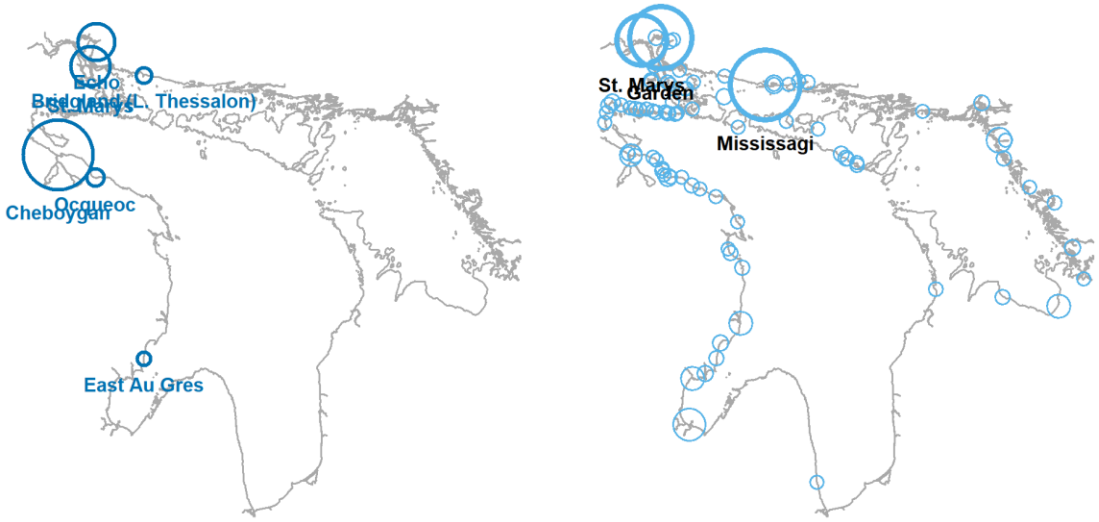

Figure 2. LEFT: Estimated index of adult sea lampreys during the spring spawning migration, 2017. Circle size corresponds to estimated number of adults from mark-recapture studies (blue) and model predictions (orange). All index streams are identified. RIGHT: Maximum estimated number of larval sea lampreys 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. The 3-year adult index is at a historic low.
- 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:

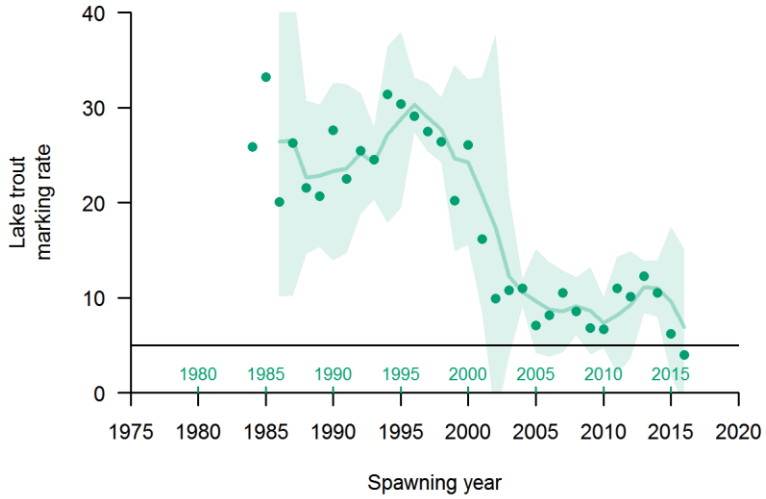

Figure 3. Number of A1-A3 marks per 100 lake trout > 532 mm from standardized assessments plotted against the sea lamprey spawning year, including the three-year moving average (line) with 95% CIs (shaded area). The marking rate of 4 in spawning year 2016 met the target of 5 A1-A3 marks per 100 lake trout > 532 mm (horizontal line). A second x-axis shows the year the lake trout were surveyed.

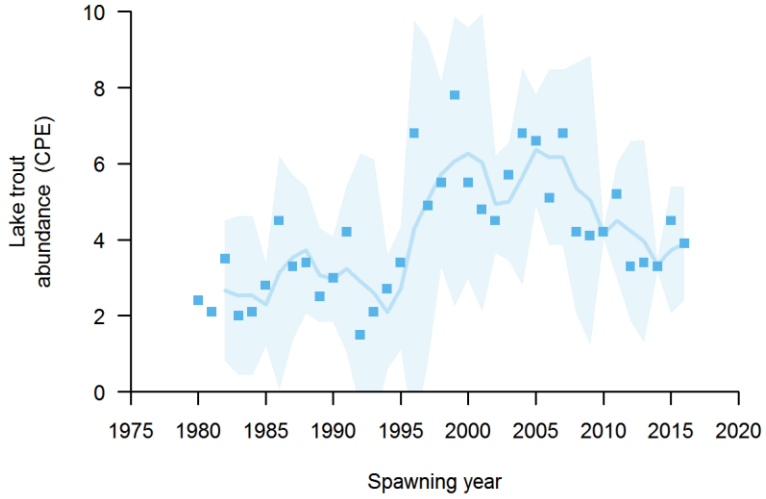

Figure 4. Lake trout relative abundance from standardized surveys (spring 2-6 inch mesh) in U.S. waters of the main basin plotted against sea lamprey spawning year, including the three-year moving average (line) with 95% CIs (shaded area). CPE = geometric mean of fish/km/net night of lean lake trout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

- The 3-year average marking rate is above target and marking rates have 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 whitefish and ciscoes have been increasing and may be important initial hosts for juvenile lampreys.
- The Commission, in collaboration with management agencies, is building lake trout marking and abundance databases to advance the assessment and guidance of the program.

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

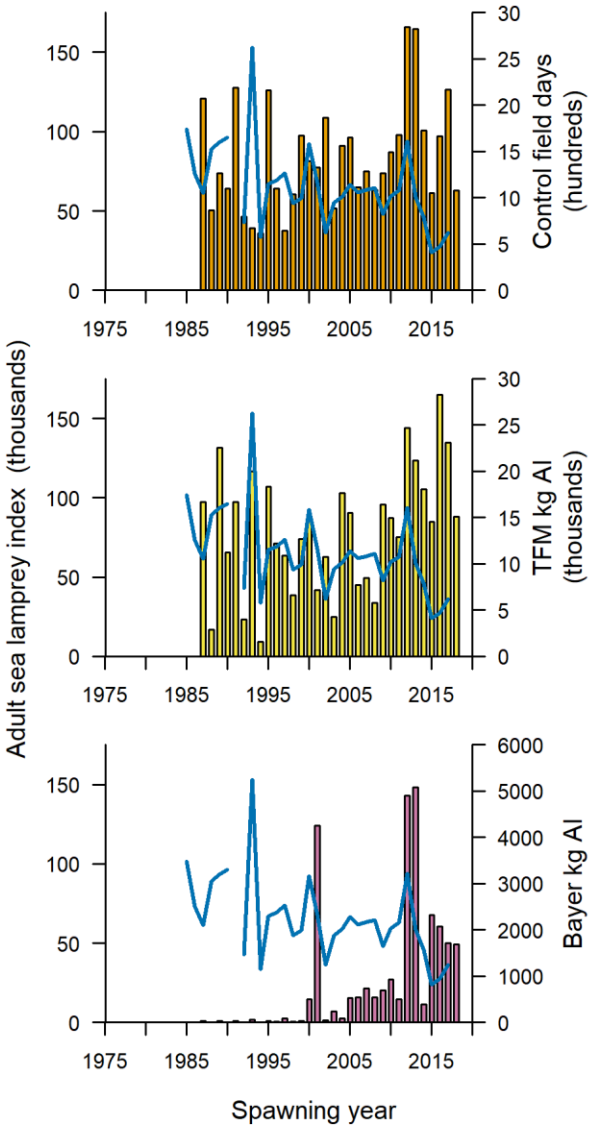

Figure 5. Index of adult sea lampreys (blue lines) and number of control field days (orange bars), TFM used (kg active ingredient; yellow bars), and Bayluscide used (kg active ingredient; purple bars). Field days, TFM, and Bayluscide are offset by 2 years (e.g., field days, TFM, and Bayluscide applied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

- 2017 lampricide treatments are ongoing.
- Thirteen tributaries were treated during 2014, 28 during 2015, and 24 during 2016 (2016 to 2018 spawning years).
- One lentic area was treated during 2014, six during 2015, and four during 2016 (2016 to 2018 spawning years).
- Targeted treatment strategies in Lake Huron employed since 2010, including two large-scale treatments of the St. Marys River, and increased annual granular Bayluscide treatment in the St. Marys River (from ~100 hectares to ~300 hectares) have contributed to the historic low three-year average adult index estimate; another round of targeted treatment is scheduled for 2018.
- Lake Huron likely benefits from the treatment of tributaries in the northern portion of Lake Michigan (e.g. Manistique River).