STATUS OF SEA LAMPREY CONTROL IN LAKE ERIE
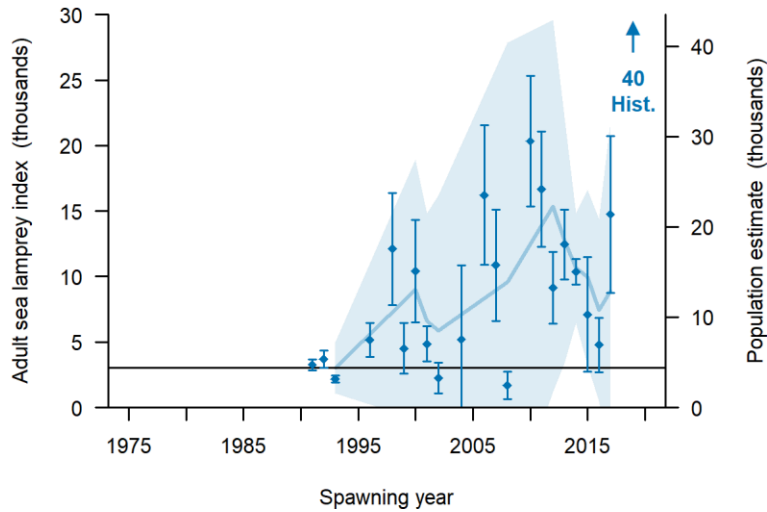
Adult Sea Lamprey:

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 1.45. The adult index in 2017 was 15,000 with 95% confidence interval (8,700-21,000). The point estimate was above the target of 3,000. The index target was estimated as the mean of indices during a period with acceptable marking rates (1991-1995).
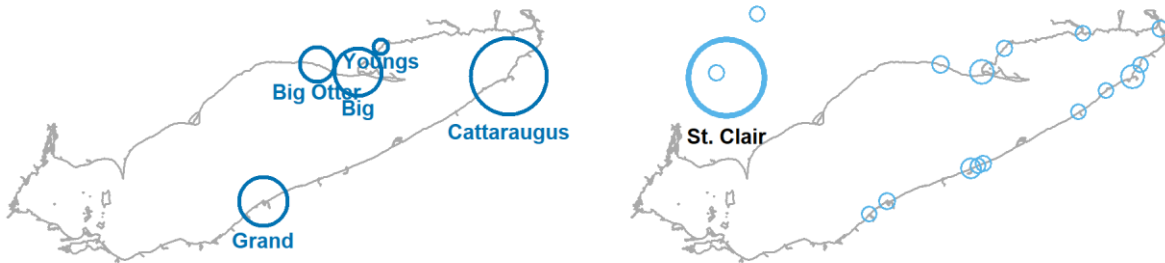

Figure 2. LEFT: Estimated index of adult sea lampreys during the spring spawning migration, 2017. Circle size corresponds to estimated number of adults from mark-recapture studies (blue) and model predictions (orange). All index streams are identified. RIGHT: Maximum estimated number of larval sea lampreys in each stream surveyed during 1995-2012. Tributaries composing over half of the lake-wide larval population estimate are identified (St. Clair 920,000).

- 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 reasons for the relatively high three-year average adult index estimate in Lake Erie are not completely apparent at this time. Sources to watch include hard to treat tributaries like Cattaraugus Creek and the potential for unidentifed sea lamprey producing tributaries and lentic areas (i.e. the Detroit and St. Clair rivers, and western basin of Lake Erie).

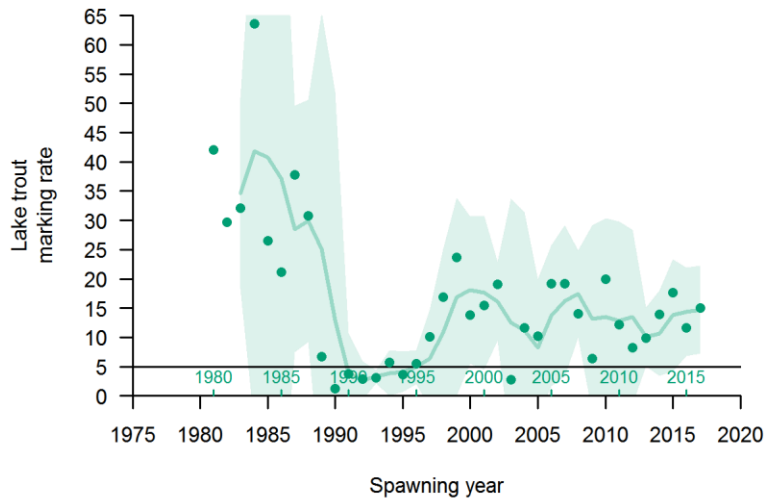**Lake Trout Marking and Relative Abundance:**

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 15 in spawning year 2016 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.
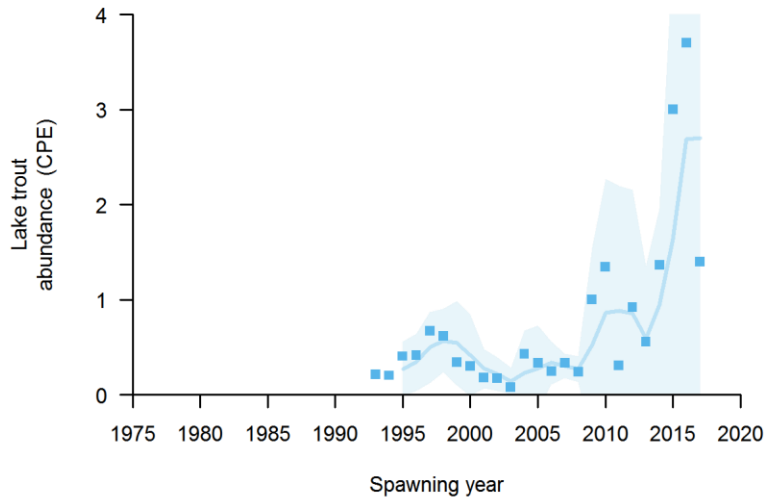

Figure 4. Lake trout relative abundance from standardized spring surveys plotted against sea lamprey spawning year, including the three-year moving average (line) with 95% CIs (shaded area). CPE = number per lift of lean lake trout age 5 and older.

- The 3-year average marking rate is above the target and marking rates have been holding steady over the past 5 years.
- Lake trout relative abundance has been holding steady over the past 5 years.
- Marking rates on burbot and steelhead have been increasing and are a concern.
- The Commission, in collaboration with management agencies, is building lake trout marking and abundance databases to advance the assessment and guidance of the program.

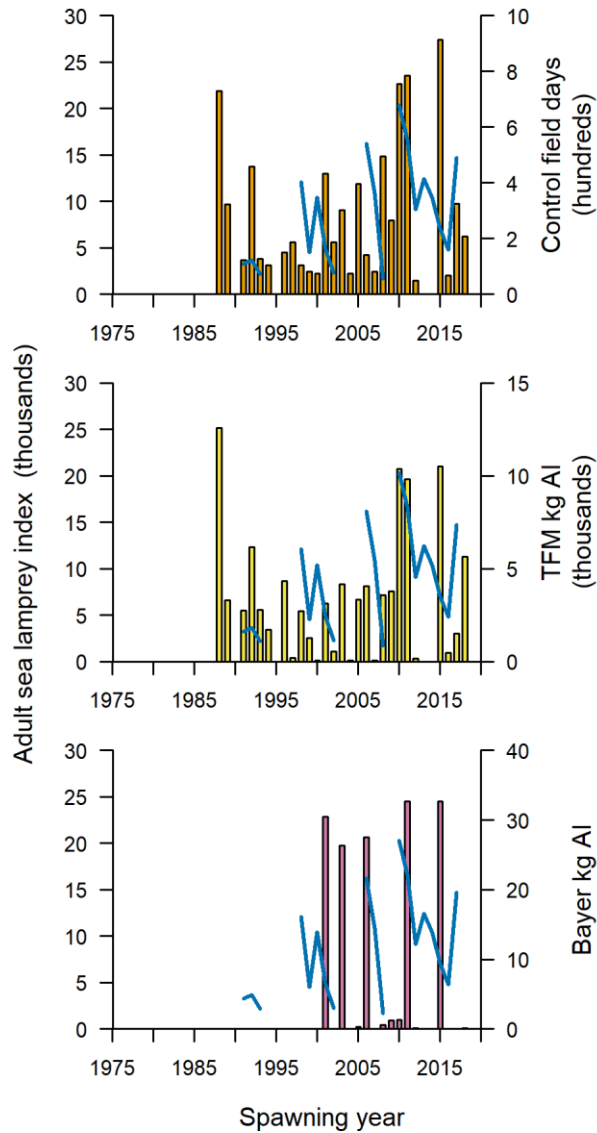**Lampricide Control - Abundance vs. Field Days, TFM, and Bayluscide:**

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.
- Two tributaries were treated during 2014, seven during 2015, and three during 2016 (2016 to 2018 spawning year).
- Increased control effort has been implemented since 1999 (2001 spawning year) and a targeted treatment strategy in which all known sea lamprey producing streams were treated in consecutive years was implemented during 2008 – 2010; however the adult index was not reduced to target.
- Unidentified sources of sea lampreys remains a concern; intensive larval survey efforts have been conducted and are ongoing to identify previously undetected populations.