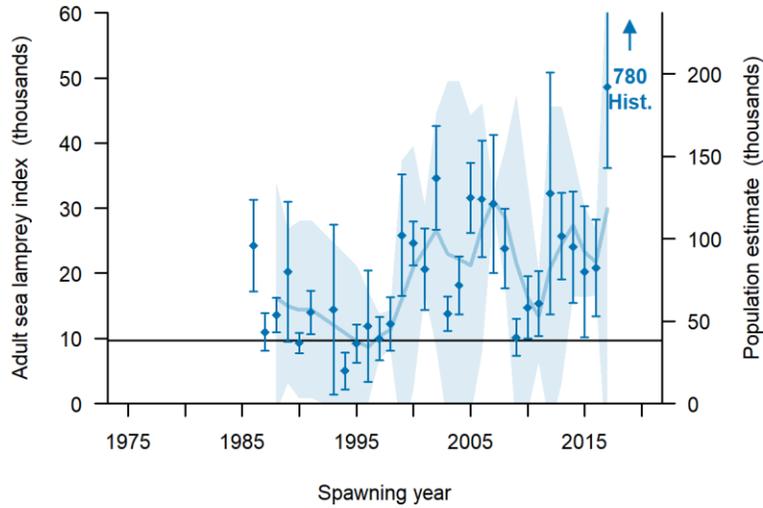
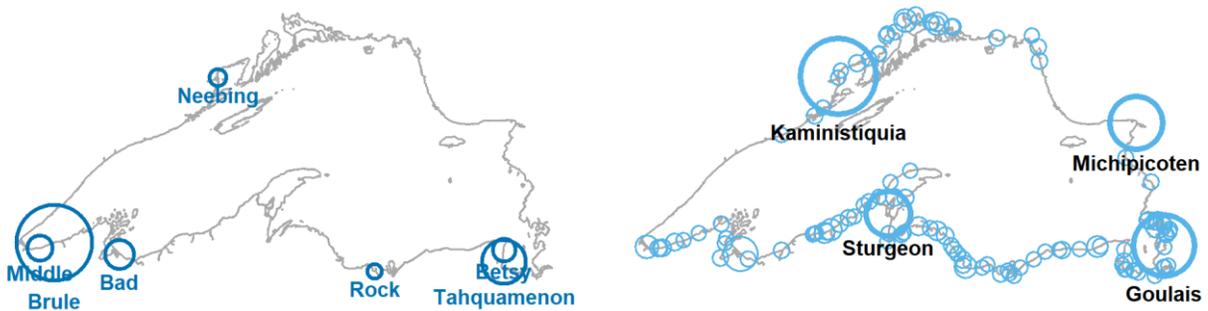


# STATUS OF SEA LAMPREY CONTROL IN LAKE SUPERIOR

## Adult Sea Lamprey:



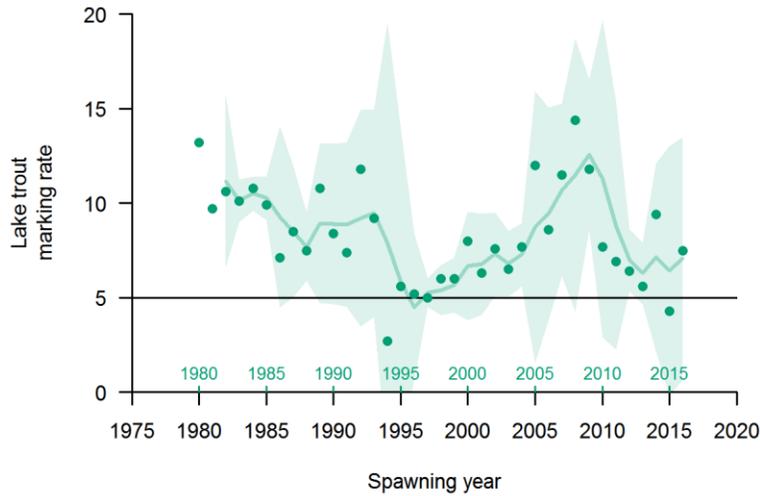
**Figure 1.** Index estimates with 95% confidence intervals (vertical bars) of adult sea lampreys, including historic pre-control abundance (as a population estimate) and the three-year moving average (line) with 95% CIs (shaded area). The population estimate scale (right vertical axis) is based on the index-to-PE conversion factor of 3.95. The adult index in 2017 was 49,000 with 95% confidence interval (36,000-61,000). The point estimate was above the target of 9,700. The index target was estimated as the mean of indices during a period with acceptable marking rates (1994-1998).



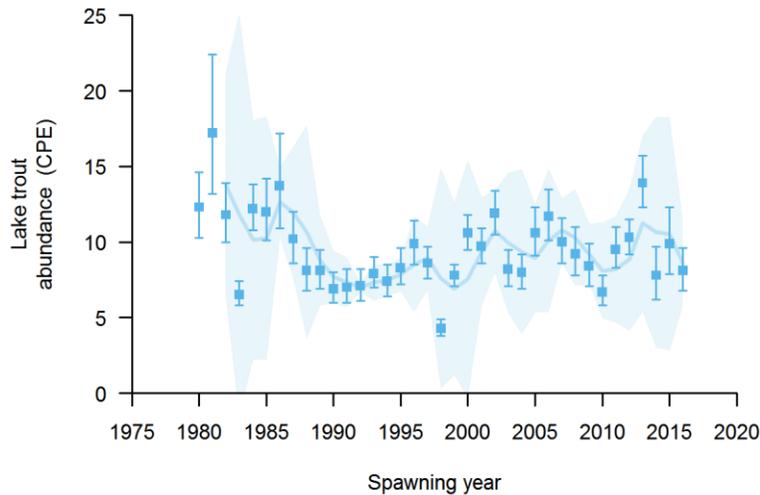
**Figure 2.** LEFT: Estimated index of adult sea lampreys during the spring spawning migration, 2017. Circle size corresponds to estimated number of adults from mark-recapture studies (blue) and model predictions (orange). All index streams are identified. RIGHT: Maximum estimated number of larval sea lampreys in each stream surveyed during 1995-2012. Tributaries composing over half of the lake-wide larval population estimate are identified (Kaministiquia 6,600,000; Goulais 5,000,000; Michipicoten 4,100,000; Sturgeon 3,300,000).

- 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 adult index estimate are not fully apparent. Sources being monitored, include the Bad River and lentic areas of the Chippewa, Nipigon, Gravel, and Batchawana rivers.
- The Black Surgeon River is a concern due to uncertainty about the future of *de-facto* sea lamprey barrier presently in place on the river. The St. Louis River could become a concern due to habitat restoration and environmental clean up.

**Lake Trout Marking and Relative Abundance:**



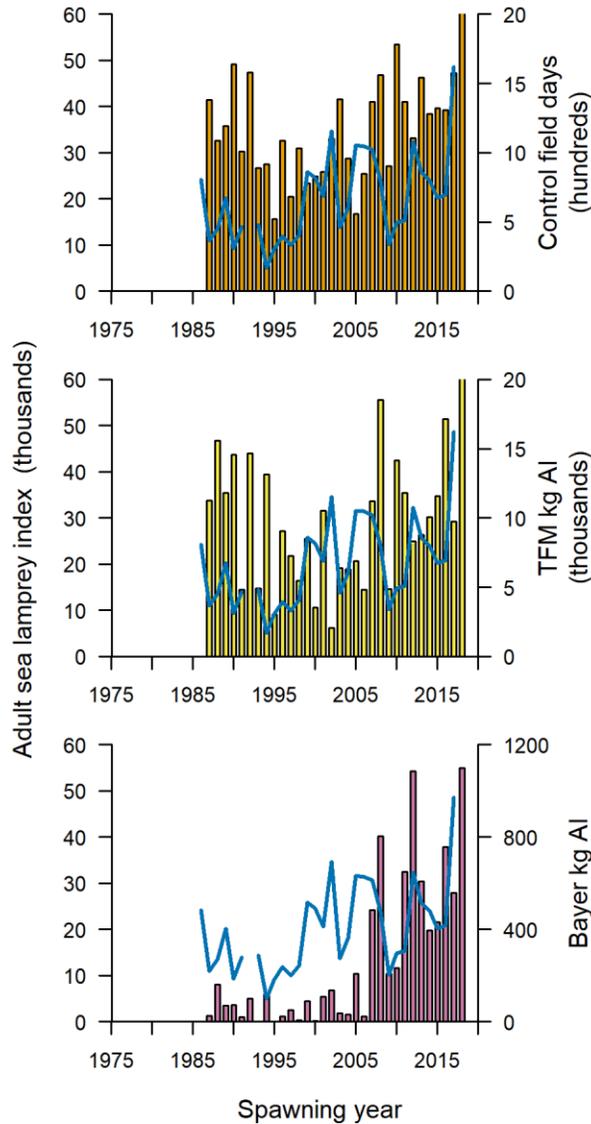
**Figure 3.** Number of A1-A3 marks per 100 lake trout > 532 mm from standardized assessments plotted against the sea lamprey spawning year, including the three-year moving average (line) with 95% CIs (shaded area). The marking rate of 7.5 in spawning year 2016 was above the target of 5 A1-A3 marks per 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 (May assessments using 4.5 inch gillnets) plotted against sea lamprey spawning year, including the three-year moving average (line) with 95% CIs (shaded area). CPE = 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 holding steady over the past 5 years.
- Marking is currently highest in some of the Michigan portions of the lake, but marking has declined in Minnesota waters during recent years.
- Catch-at-Age modeling in some Michigan waters shows that sea lamprey mortality exceeds the mortality caused by the fishery (fishing mortality is low, however, in Michigan waters).
- Lake trout relative abundance has been holding steady over the past 5 years.
- The Commission, in collaboration with management agencies, is building lake trout marking and abundance databases to advance 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.
- Twenty-eight tributaries were treated during 2014, 28 during 2015, and 50 during 2016 (2016 to 2018 spawning years).
- Eight lentic areas were treated during 2014, six during 2015, and 12 during 2016 (2016 to 2018 spawning years).
- A targeted treatment strategy was implemented in 2016. The three-year average adult index will fully reflect the impact of these efforts in 2018.