STATUS OF SEA LAMPREY CONTROL IN LAKE SUPERIOR

Adult Sea Lamprey:

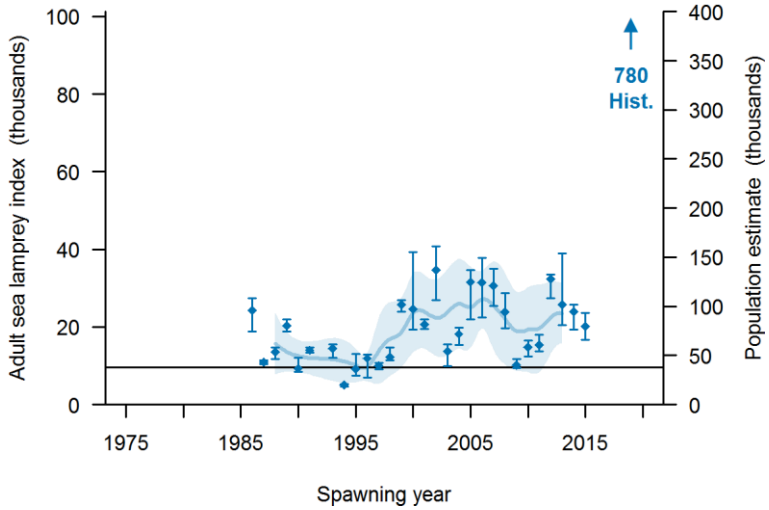

Figure 1. Index estimates with jackknifed ranges (vertical bars) of adult sea lampreys, including historic pre-control abundance (as a population estimate) and the five-year moving average (line) with 95% CIs (shaded area). The population estimate scale (right axis) is based on the index-to-population estimate conversion factor of 3.95. The adult index in 2015 was 20,000 with jackknifed range (17,000-24,000). 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).

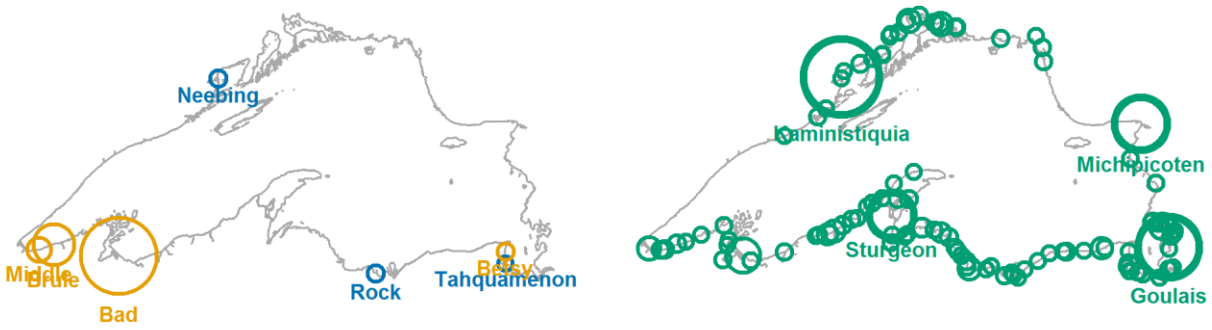

Figure 2. LEFT: Estimated index of adult sea lampreys during the spring spawning migration, 2015. Circle size corresponds to estimated number of adults from mark-recapture studies (blue) and model predictions (orange). All index streams are identified. RIGHT: Maximum estimated number of larval sea lampreys 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 adult sea lamprey index estimate is above the target.
- Sources of concern, including the Bad River and lentic areas of the Kam, Nipigon, Gravel, and Batchawana rivers are being addressed.
- The Black Sturgeon River is also a concern due to uncertainty about the future of a *de-facto* sea lamprey barrier presently in place on the river.

Lake Trout Marking and Relative Abundance:

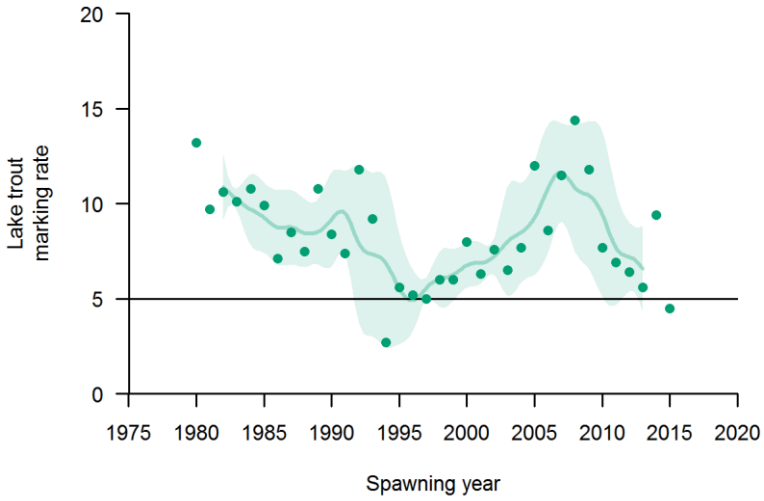

Figure 3. Number of A1-A3 marks per 100 lake trout > 532 mm from standardized assessments plotted against the sea lamprey spawning year, including the five-year moving average (line) with 95% CIs (shaded area). The marking rate of 4.5 in spawning year 2015 met the target of 5 A1-A3 marks per 100 lake trout > 532 mm (horizontal line).

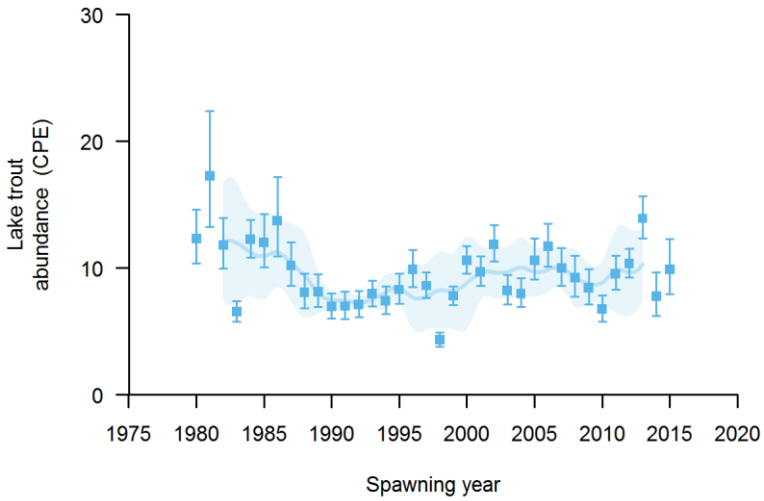

Figure 4. Lake trout relative abundance (May assessments using 4.5 inch gillnets) plotted against sea lamprey spawning year, including the five-year moving average (line) with 95% CIs (shaded area). CPE = fish/km/net night of lean lake trout > 532 mm (21") total length.

- The marking rate has been declining and is below the target for the first time since 1994.
- 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 held steady since the 1980s.
- The apparent disconnect between adult sea lamprey and lake trout marking is being investigated.
- 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:

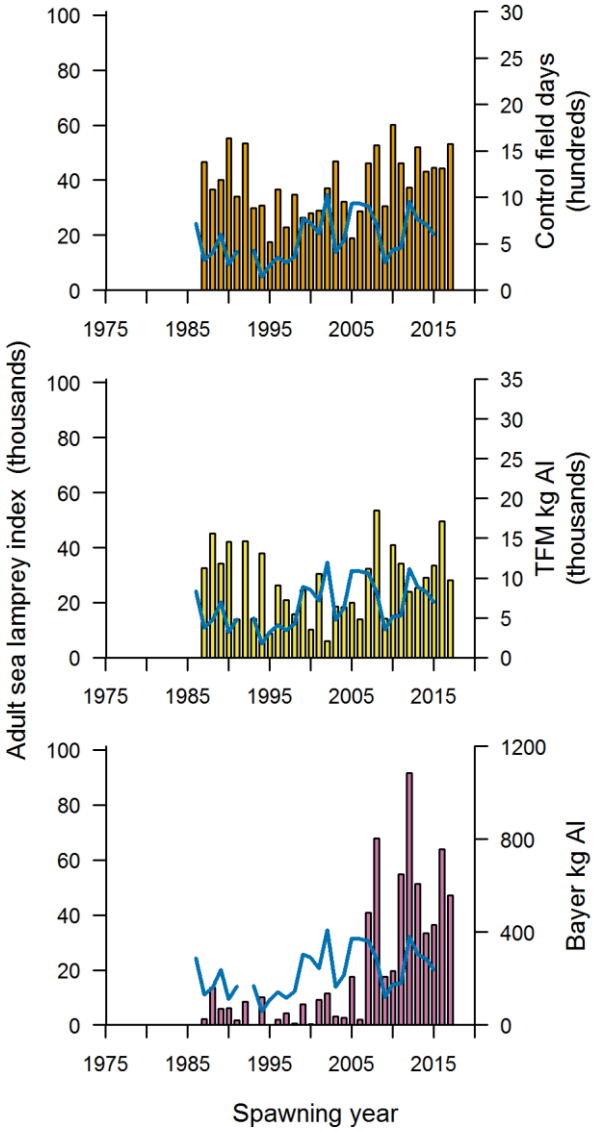

Figure 5. Index of adult sea lampreys (blue lines) and number of control field days (orange bars), TFM used (kg active ingredient; yellow bars), and Bayluscide used (kg active ingredient; purple bars). Field days, TFM, and Bayluscide are offset by 2 years (e.g., field days, TFM, and Bayluscide applied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

- 28 tributaries were treated each year from 2013 to 2014 and 41 during 2015 (2015 to 2017 spawning years).
- Six lentic areas were treated during 2013, eight during 2014, and 13 during 2015 (2015 to 2017 spawning years).
- Many of the lentic areas of concern have been treated during recent years.
- In general, the increase in control effort that began in 2000 (2002 spawning year) and then again in 2006 (2008 spawning year) has helped reduce marking rates on lake trout to the target.