STATUS OF SEA LAMPREY CONTROL IN LAKE MICHIGAN

Adult Sea Lamprey:

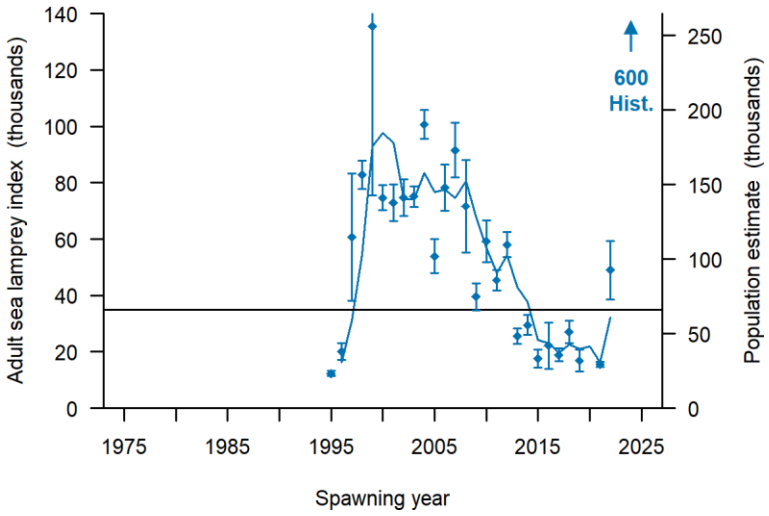

Figure 1. Index estimates with 95% confidence intervals (vertical bars) of adult sea lampreys, including historic pre-control abundance (as a population estimate) and the three-year moving average (line). The population estimate scale (right vertical axis) is based on the index-to-PE conversion factor of 1.89. The adult index in 2022 was 49,000 with 95% confidence interval (39,000-59,000). The three-year (2020-2022) average of 32,000 met the target of 35,000. The index target was estimated as 5/8.9 times the mean of indices (1995-1999).

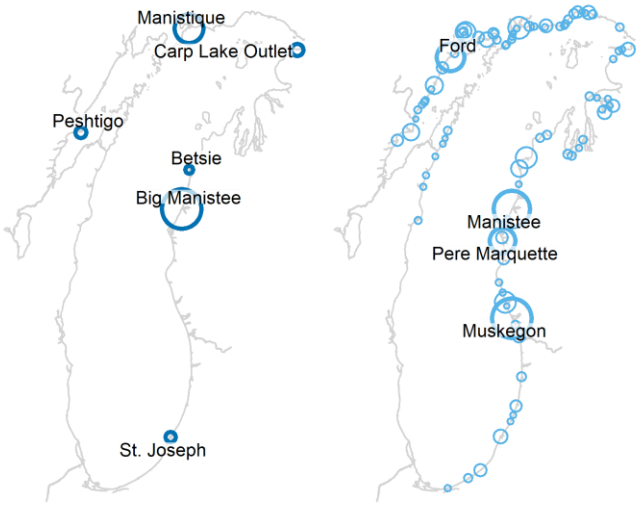

Figure 2. LEFT: Estimated index of adult sea lampreys during the spring spawning migration, 2022. Circle size corresponds to estimated number of adults from mark-recapture studies (blue) and model predictions (orange). All index streams are labelled. RIGHT: Maximum estimated number of larval sea lampreys in each stream surveyed during 1995-2012. Tributaries composing over half of the estimated maximum lake-wide larval population are identified (Muskegon 4,500,000; Manistee 3,600,000; Ford 1,800,000; Pere Marquette 1,400,000).

- Boardman River – The Commission and its partners are working to develop fish passage technologies to pass desirable fishes while blocking sea lamprey. A selective, bi-directional fish passage experimental research facility (FishPass) is planned for construction at the Union Street Dam. The FishPass Project is on hold pending

the outcome of litigation. Fish community surveys, telemetry studies, automated surveillance of fish jumping behavior, and hydrodynamic measurements using infrared cameras continue to be performed while construction is on hold. Additionally, a guild analysis is underway to support decisions on sorting tools that could be used in passing Great Lakes and Boardman River fish species.

- Barrier removals/modification – Partner agencies were consulted to ensure blockage at barriers at 53 sites in 16 streams.

Lake Trout Marking and Relative Abundance:

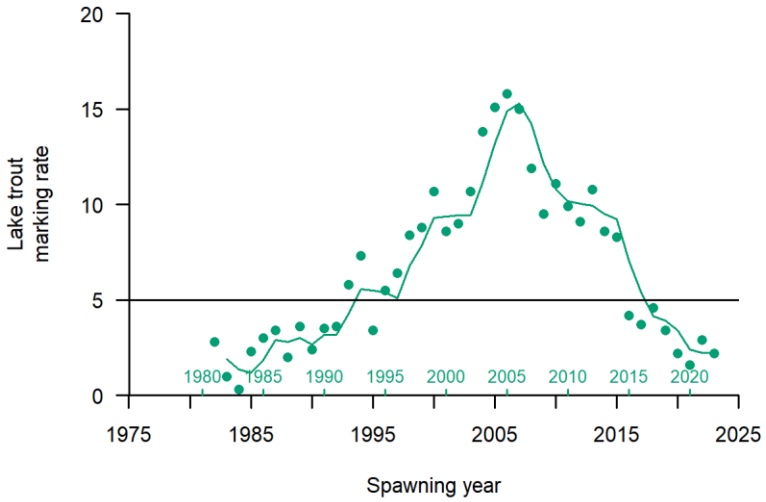

Figure 3. Number of A1-A3 marks per 100 lake trout > 532 mm from standardized assessments during August-November plotted against the sea lamprey spawning year, including the three-year moving average (line). The three-year (spawning years 2021-2023) average marking rate of 2.2 met the target of 5 A1-A3 marks per 100 lake trout > 532 mm (horizontal line). A second x-axis shows the year the lake trout were surveyed.

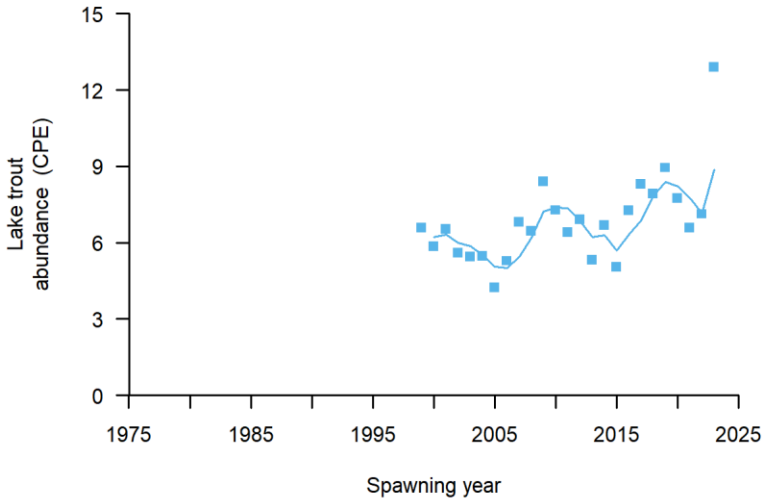

Figure 4. Lake trout relative abundance plotted against sea lamprey spawning year, including the three-year moving average (line). CPE = fish/1000'/net night of lean lake trout > 532 mm (21") total length caught in the Lake Wide Assessment Plan nets (the plan began in the late 1990s).

- Due to calculation and data changes in the lake trout trend information, the scale of this plot has changed slightly from previous plots, though the trend is very similar.

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

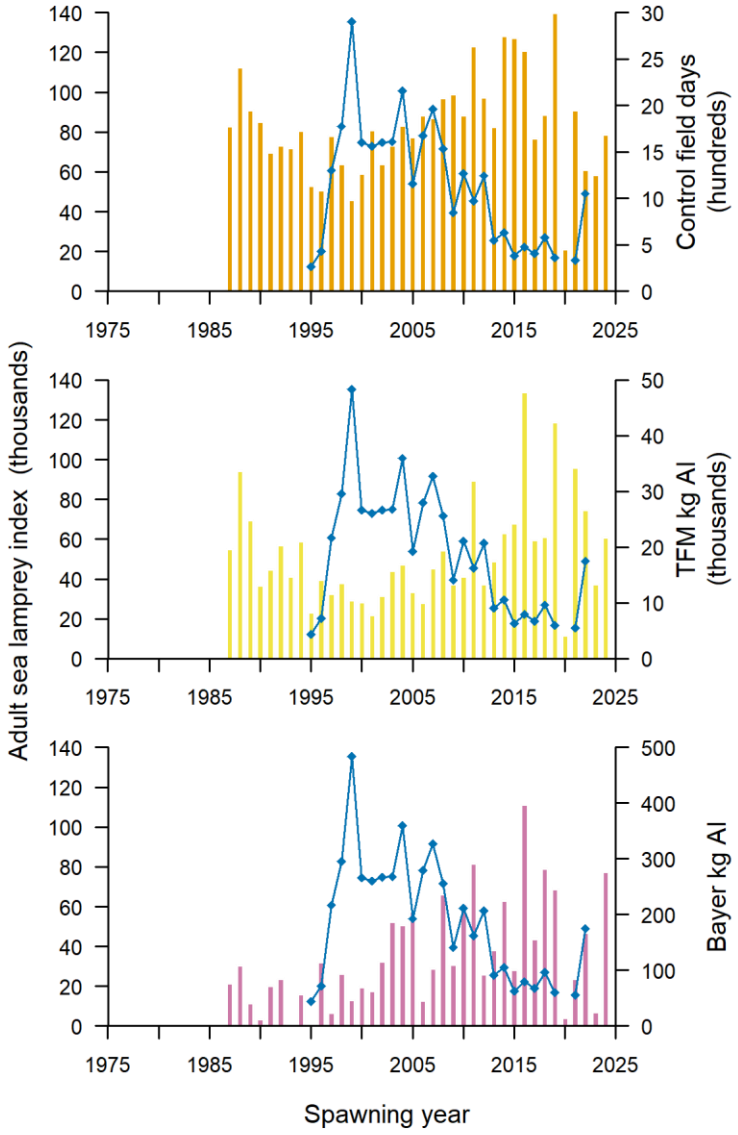

Figure 5. Index of adult sea lampreys (blue lines) and number of control field days (orange bars), TFM used (kg active ingredient; yellow bars), and Bayluscide used (kg active ingredient; purple bars). Field days, TFM, and Bayluscide are offset by 2 years (e.g., field days, TFM, and Bayluscide applied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

- Lampricide treatments were completed in 11 tributaries and 1 lentic area.
- Department and Service personnel collaborated to treat just over 490 km of the Manistique River. A portion of the upper West Branch was not treated due to low stream discharge and has been rescheduled for 2023.
- High densities of large sea lamprey larvae were observed during the lentic treatment near the mouth and offshore from the Manistique River.
- The Muskegon River was treated in close coordination with the Michigan Department of Natural Resources (MIDNR), Little River Band of Ottawa Indians (LRBOI), and Consumers Energy.