STUDY PERFORMANCE REPORT

State: Michigan **Project No.:** F-81-R-16

Study No.: 230451 **Title:** Assessment of Lake Trout stocks in Lake Huron

Period Covered: October 1, 2014 to September 30, 2015

Study Objectives:

1. To collect fishery-independent biological samples for measuring growth, condition, maturity, diet, and Sea Lamprey *Petromyzon marinus* wounding rates of Lake Trout *Salvelinus namaycush* from Lake Huron.
2. To provide fishery-independent measures of Lake Trout stocks in Lake Huron including catch rates, post-stocking survival, natural recruitment, age composition, spatial distribution, and movement among regions.
3. To compare and synthesize multiple sources of data for Lake Trout stocks in Lake Huron including the primary fishery-independent surveys, recreational fisheries (F-81 Study 230499), tribal and Ontario commercial fisheries, and additional fishery-independent surveys conducted by other fisheries agencies.

Summary: This project met all job requirements for 2014–15. Findings from 2015 surveys confirmed the 2014 observation on the balanced lake-wide Lake Trout size structure with an overall wild composition greater than 50%. Timely data analyses helped the Lake Huron Technical Committee to reach a consensus on recommending cessation of Lake Trout stocking in Lake Huron. We published peer-reviewed papers (Attachments 1 and 2) documenting the development of using maxillae to estimate ages of Lake Trout and documenting Lake Trout and Walleye rehabilitation in Michigan waters of Lake Huron.

Findings: Jobs 1–4 were scheduled for 2014-15, and progress is reported below.

Job 1. Conduct surveys

1) The fall gillnetting survey in 2014 consisted of seven gill-net sets off Rockport, three gill-net sets for baseline monitoring in Thunder Bay, and nine additional gill-net sets in the area with new reefs built in recent years. A total of 4,900 feet of gill net was fished.
2) The spring and summer gillnetting survey in 2015 accomplished 58 gill net sets at 14 stations, with a total gill-net effort of 97,200 feet.
3) The summer bottom trawl survey in 2015 consisted of 30 10-min tows in Thunder Bay and 10 10-min tows off the Black River, covering a depth range from 40 to 110 feet.

Job 2. Measure biological samples

1) Age assignments to 181 Lake Trout, 1 Northern Pike *Esox Lucius*, 3 Burbot *Lota lota*, and 7 Walleye *Zander vitreus* collected during the fall 2014 survey were completed. Biological measures for those fish included total length (mm), weight (kg), sex, maturity, Sea Lamprey wounds, and gonad weight (g).
2) The spring and summer surveys in 2015 collected 1,057 fish samples. Biological measures included total length (mm), weight (kg), sex, maturity, Sea Lamprey wounds, and diet composition.

3) We used a subsample of 149 Lake Trout to analyze weight-based diet composition.
4) We used the same subsample to analyze muscle dry weight percentage.
5) Age assignments for 726 Lake Trout were completed using 409 maxillae, 234 maxilla and fin-clip combinations, and 83 coded-wire-tags. Age assignment using scales for wild Lake Trout smaller than 450 mm total length is in progress.
6) Age assignments for 196 Lake Whitefish *Coregonus clupeaformis* and 14 Burbot collected during 2015 spring and summer surveys were completed using otoliths. Additional age assignments to Walleye, Yellow Perch *Perca flavescens*, and salmonid species using spines or scales are in progress.
7) Age assignments for 600 Lake Trout collected from recreational fisheries are in progress.
8) We published a management brief in the North American Journal of Fisheries Management documenting the development of using maxillae to estimate ages of Lake Trout (provided):

   Wellenkamp, W., J. X. He, and D. Vercnocke. 2015. Using maxillae to estimate ages of Lake Trout. North American Journal of Fisheries Management 35:296-301.

Job 3. Update and analyze data

1) We updated the shared relational database with 2014 data in time for the February 15 deadline. Multiple agencies accessed the shared database through the Great Lakes Fisheries Commission.
2) We updated the time series of Sea Lamprey wounding rates using 2015 data, and submitted the update to the Great Lakes Fisheries Commission.
3) We updated the status of Lake Trout using 2015 survey and multi-agency data, and used the update to help the Lake Huron Technical Committee reach a consensus on a recommendation to the Lake Huron Committee to cease Lake Trout stocking. The analyses included: a) Lake Trout stocking numbers, b) post-stocking survival index, c) trend of wild recruitment, d) adult catch per unit effort, and e) spawning stock biomass.
4) A manuscript on time-varying balance in the main basin Lake Huron Lake Trout population is in review with the Transactions of American Fisheries Society.
5) We published an article in the North American Journal of Aquaculture documenting the rehabilitation of Lake Trout and Walleye in Michigan waters of Lake Huron (provided):

   Johnson, J. E., J. X. He, and D. G. Fielder. 2015. Rehabilitation stocking of Walleyes and Lake Trout: restoration of reproducing stocks in Michigan waters of Lake Huron. North American Journal of Aquaculture 77:396-408.

Job 4. Write annual performance report–This progress report was prepared on schedule. In addition, a project summary was completed (Attachment 1).

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Date: September 30, 2015