Assessment of Lake Trout Stocks in the Lake Michigan Basin

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Background

A combination of overharvest and changes in Great Lakes fish species led to extirpation of Lake Trout populations from Lake Michigan by the mid-1950s. By 1965, significant efforts were being made to restore Lake Trout in Lake Michigan – these efforts, which included stocking and harvest management, continue to this day by federal, tribal and state fisheries agencies. All of the Lake Michigan fisheries agencies work on coordinated lakewide Lake Trout assessment activities that are an important part of evaluating stocking practices (Photo 1). This effort also provides key data to develop total catch limits (also known as TACs), build decision-support tools, and support evaluation of other management activities.

Photo 1. Lake Trout assessments have been a regular part of R/V *Steelhead* operations since 1968.

Along with long-term assessment activities, shorter-term targeted research studies help increase our understanding of Lake Trout population fluctuations and the reasons behind natural recruitment bottlenecks and improve the likelihood of successful Lake Trout management in the Lake Michigan Basin. Some examples of questions answered by such studies are:

- What are the effects of predation on young Lake Trout?
- Are there naturally-reproducing Lake Trout populations in connected water bodies to Lake Michigan such as Elk Lake (Photo 2) and what can we learn about how they are successful?

The objectives of this project are: (1) To determine the relative abundance, length and age composition, and Sea Lamprey wounding and mortality rates for Lake Trout in Lake Michigan; (2) To conduct assessment netting to update biological data; (3) To determine the total allowable harvest limits for Lake Trout from management units within 1836 treaty waters; (4) To assess the amount and distribution of egg deposition on Lake Trout spawning sites in Lake Michigan; (5)To evaluate naturally-reproducing populations of Lake Trout in Elk Lake, a connected water to Lake Michigan.

Key study results

- During the 2015 field season, 1,504 Lake Trout were captured in lakewide assessment netting using the standardized lakewide protocols (Photo 2). Age determination and fish population analysis through 2014 were completed and Lake Michigan Lake Trout fishing regulations were developed using these data.

Photo 2. Fisheries Division technician Pat O'Neill collecting images and biodata to determine physical and genetic characteristics of the Elk Lake Lake Trout.

- Lake Trout egg deposition rates and the abundance of interstitial predators were measured at four sites in northern Lake Michigan. Standardized egg bags (N=30) were buried at each site in September and recovered in mid-November. Predator densities were slightly higher at sites in Little Traverse Bay and Elk Rapids when compared to the previous year. Numbers of deposited Lake Trout eggs remained low when compared to expected values for self-sustaining populations.
- Tissue analysis from inland and Great Lakes Lake Trout populations indicated that Elk Lake fish were genetically distinct from both historic Lake Michigan wild populations and contemporary hatchery populations including the Marquette genetic strain which had previously been stocked into the lake.

Study Details

Summary reports created to meet requirements of the 2000 Consent Decree can be found at (http://www.michigan.gov/dnr/0,1607,7-153-10364_36925---,00.html). Additional study information can be found at http://www.michigan.gov/dnr/0,4570,7-153-10364_52259_19056-333302--,00.html.