

STUDY PERFORMANCE REPORT

State: Michigan

Project No.: F-81-R-3

Study No.: 486

Title: Assessment of lake trout populations in Michigan's waters of Lake Michigan.

Period Covered: October 1, 2001 to September 30, 2002

Study Objectives: To determine the population structure, health, and reproductive success of lake trout in Michigan's waters of eastern Lake Michigan. To determine if spawning adults are present at the three stocked spawning reefs within the northern refuge and at traditional spawning reefs that lie within (Big Reef) and outside (Fisherman's Island and Dahlia Shoals) the boundaries of the northern refuge.

Summary: During the 2002 field season, lake trout sampling efforts focused on assessments of populations in eastern Lake Michigan from April to August and spawning reef assessments in northern Lake Michigan in October and November. A total of 814 lake trout were captured throughout Lake Michigan during the 2002 field season; 757 in spring lake-wide assessments, 52 in summer suspended gill net assessments, and 5 during fall spawning reef assessments conducted in northern Lake Michigan. Standard data – including total length, weight, clips, tags, lamprey wounding, and kidney samples – were collected from lake trout sampled during these assessments. Data entry and analysis for 2002 collections are ongoing. As in past years, we did not detect any indications of feral lake trout in Lake Michigan during 2002.

A 5-year report/draft manuscript is in the final stages of completion and will be submitted to the Fisheries Division's editing and finishing process. This manuscript will be published as a Fisheries Research Report during 2002-03, and submitted as a final report December 2003.

Findings: Jobs 2, 3, 4, 5, 6, 7, 8, and 9 were scheduled for 2001-02, and progress is reported below.

Job 2. Title: Search for feral lake trout.—During 2002, lake trout were collected in spring lake-wide assessment netting (N=757 fish), summer suspended gill net assessments (52 fish), and fall spawning assessments (5 fish). Data entry and analysis related to these assessment activities are not yet complete. As in previous years of this study, our sampling has provided no evidence of natural reproduction by lake trout in Lake Michigan. All lake trout stocked in Lake Michigan are marked, and the number of unmarked fish collected from each statistical district has been within the range expected for clipping or tagging error in all years sampled.

Investigators are also collaborating on a project funded through the Great Lakes Fishery Commission and the Ludington Pump Storage Trust entitled, "Effects of egg and fry predators on lake trout recruitment in Lake Michigan." Major objectives of this project are to evaluate the relative potential of lake trout spawning habitats in northern Lake Michigan and to determine egg deposition rates for existing lake trout populations. Comparisons will then be made among lake trout populations observed in Lake Huron, Lake Ontario and Lake Champlain. The project will provide a better indication of our potential for detecting feral lake trout in Lake Michigan, and will help to identify potential bottlenecks to production and survival in the early life stages of naturally-produced lake trout. Collaborative work on this project will continue through 2003.

Job 3. Title: Coordinate with other studies, process and analyze data; write reports.—We initiated a new lake-wide spring/early summer monitoring program in 1998. All agencies on Lake Michigan have agreed to follow standardized protocols that will enable us to better compare data and will help provide a lake-wide perspective on fishery population assessments. Since 1999, agencies on Lake Michigan have also adopted standard fall spawning assessment protocols using funding from the Great Lakes Fisheries Trust for a multiple-agency effort to assess the use of habitat by spawning lake trout in northern Lake Michigan. We are playing an active role in the implementation of each of these assessment programs.

In addition, we have coordinated closely with other agencies to develop age-structured lake trout population models for northern Lake Michigan, and have compiled past and present assessment data to contribute to this effort. Much of the data collected as part of Study 486 has been used in developing these models. Another product of this modeling effort is an annual publication titled "Summary status of lake trout and lake whitefish populations in the 1836 treaty-ceded waters of Lakes Superior, Huron, and Michigan in 2000, with recommended yield and effort levels for 2001."

Finally, for the last 2 years we have played a major role in producing a multi-agency report summarizing all of the collaborative Lake Michigan sampling efforts directed at lake trout. This report is submitted annually to the Great Lakes Fishery Commission, on behalf of the Lake Michigan Technical Committee.

Job 4. Title: Evaluate relevant literature on lake trout.—Literature on lake trout physiology, behavior, and habitats are being collected and catalogued in an Endnote bibliographic software file. Twice monthly, we evaluate Current Contents (a literature search program) search results from fisheries journals. Relevant articles and publications are obtained and integrated into the database.

Job 5. Title: Establish the distribution pattern, relative abundance, and origin of lake trout collected throughout eastern Lake Michigan from May through August.—We have implemented and followed a revised salmonid sampling protocol since 1997 to better define spatial and temporal variation in fish distributions. Our lake-wide netting efforts covered the Michigan waters of the lake, progressing from south to north during two cruises, spring and summer. In 2002, because of time constraints associated with other assessment activities, suspended gill net sets (N=11 net nights) were only completed in MM-6. The number of lake trout captured in this abbreviated effort (N=52 fish) was comparable to that observed in previous years. Additional analyses of catch rate, age composition, and diet from this summer assessment are ongoing. We intend to use these data to evaluate if lake trout diets vary for fish captured in nets at different depth strata. The results will help researchers determine if long-term lake trout population assessments can be conducted in concert with other salmonid sampling protocols.

Job 6. Title: Determine the timing of spawning, distribution patterns, relative abundance, and origin of lake trout collected on traditional spawning reefs from October through November.—The goal of this job is to evaluate the abundance of spawning lake trout at a given location by deploying a minimum of three nets in each of two net nights. In 2001, we conducted fall spawning assessments at two sites following the standard protocol, and in 2002 assessment netting was conducted at one site. Analyses of these data are ongoing. As with other assessments, this work is coordinated with other agency assessment efforts.

Job 7. Title: Obtain information on diets of lake trout in surface vs. bottom nets, throughout the spring and summer and during spawning, and from different spatial locations in eastern Lake Michigan.—Stomach samples were not collected from lake trout sampled during 2002. We

did collect stomach samples for diet analysis from 456 lake trout in 1998, 245 fish in 1999, 157 fish in 2000, and 206 fish in 2001. Evaluation and analysis of these previously-collected samples were ongoing during 2002.

We are participating in a collaborative lake-wide effort to consolidate information and publish a paper describing the diets and foraging relationships of lake trout collected throughout Lake Michigan in 1994 and 1995. A draft of this paper is in the final stages of review. The laboratory processing of stomachs collected in 1996 and 1997 is now complete, and a paper comparing the diet of burbot and lake trout during this time period is in the initial stages of preparation.

Job 8. Title: Monitor prevalence of bacterial kidney disease in populations of lake trout in eastern Lake Michigan.—We tested lake trout (N=205 fish) collected during 2002 assessments for the presence of BKD using the enzyme-linked immunosorbant assay technique (Kwik Dtect, Diagnostics, Inc., Wilton, CT). Evaluation and analysis of these samples are not complete at this time.

Job 9. Title: Analyze Data; Write annual report.—Data analyses are ongoing. We produced this annual progress report as scheduled. A 5-year report/draft manuscript is in the final stages of completion and will be submitted to the Fisheries Division's editing and finishing process. This manuscript will be published as a Fisheries Research Report during 2002-03, and submitted as a final report December 2003.

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