

STUDY PERFORMANCE REPORT

State: Michigan

Project No.: F-81-R-3

Study No.: 485

Title: Assessment of chinook and coho salmon populations and their prey in eastern Lake Michigan

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

Study Objectives: To assess the health of chinook and coho salmon stocks in Lake Michigan through continuous monitoring of distribution, relative abundance, growth, mortality, diet composition, and clinical indicators of disease.

Summary: Data collection through fishery-independent sampling programs is an essential component of fisheries stock assessment and management. Michigan Department of Natural Resources (MDNR) experimental sampling of Pacific salmon in Michigan waters of Lake Michigan began only in 1990, and we were not routinely successful in collecting these fish until 1994. This study is a continuation of the sampling program initiated in 1990; a revised design of our netting program was implemented in 1997. During 2002, chinook (N=76 fish) and coho salmon (N=3 fish) were sampled from Statistical District MM-6 during June to August, following the MDNR salmonine assessment protocol. An additional 14 chinook and 1 coho salmon were collected during spring assessment activities. Complete biological data were recorded for all salmonines collected. This data included information on age and growth, incidence of bacterial kidney disease (BKD), diet, and lamprey wounding. These data are currently being evaluated.

Analyses of chinook and coho salmon sampling strategies, distribution, relative abundance, growth, mortality, diet, and disease will be presented in a 5-year report / draft manuscript, to be submitted to the Fisheries Division's Editing and Finishing Process for Publication of Research and Technical reports by December 31, 2002. The manuscript will be published as a Fisheries Research Report during 2002-03.

Findings: Jobs 1, 3, 4, 5, 6, 7, and 8 were scheduled for 2001-02, and progress is reported below.

Job 1. Title: Establish the distribution pattern, relative abundance, and origin of chinook and coho salmon in eastern Lake Michigan.—In 2002, because of time constraints associated with other assessment activities, suspended gill net sets (N=11 net nights, following the MDNR salmonine assessment protocol) were only completed in MM-6 during June to August. Both chinook (N=76 fish) and coho salmon (N=3 fish) were collected during this abbreviated sampling effort (Table 1). An additional 14 chinook and 1 coho salmon were collected during spring assessment activities. Data from all of these assessments are being evaluated (along with data from previous years of this study) to determine distribution and relative abundance of both salmonines in Lake Michigan.

Job 3. Title: Coordination with other studies, process and analyze data; write report.—This performance report was completed on schedule. The information presented was also used in preparing MDNR research summaries to the Great Lakes Fishery Commission and Lake Michigan Technical Committee. Coordination activities included study design assistance and fish collection for a Great Lakes Fishery Trust-funded study investigating disease incidence and energy dynamics in Lake Michigan chinook salmon (Mike Jones and Jim Bence, Michigan State

University unit of the Partnership for Ecosystem Research and Management - PERM, principal investigators).

A 5-year report / draft manuscript will be submitted to the Fisheries Division's Editing and Finishing Process for Publication of Research and Technical reports by December 31, 2002. The manuscript will be published as a Fisheries Research Report during 2002-03.

Job 4. Title: Determine growth rates of chinook and coho salmon in eastern Lake Michigan.–

Complete biological data were recorded for all salmonines collected. These data included scale samples, coded wire tags (CWT), diet samples, and information on fin clips, incidence of bacterial kidney disease (BKD), and lamprey wounding. Scales were collected from chinook and coho salmon captured in 2002 assessment netting, but age determinations have not been completed. Age determinations for all chinook salmon and coho salmon collected will be made based on scale, coded-wire tag, and fin clip analysis (as appropriate). These data are currently being evaluated. Age composition and length- and weight-at-age for both species will be presented in a Fisheries Research Report.

Job 5. Title: Determine survival rates of chinook and coho salmon in eastern Lake Michigan.–

Preliminary estimates of total annual mortality were calculated for chinook salmon based on catch-at-age data from assessment netting conducted during 1994-95. These estimates were presented in previous reports. We are continuing to collect chinook and coho salmon with standard sampling gear to obtain better estimates of mortality. Updated survival rate estimates will be presented in a Fisheries Research Report.

For chinook and coho salmon collected during previous study years, rate of lamprey wounding was extremely low. Wounds were generally observed on less than 1% of chinook salmon in all districts; none of the coho salmon collected showed any evidence of lamprey attack. Lamprey wounding data from 2001-02 are currently being evaluated and will be presented in a Fisheries Research Report.

Job 6. Title: Obtain data on diet of chinook and coho salmon.–Stomach contents were collected from assessment-caught chinook and coho salmon in 2002. Processing of these samples is not yet complete. During the 2001-02 reporting period, processing was completed for stomach samples collected from chinook and coho salmon during 1998-99 assessments.

Data on chinook salmon diets from MDNR survey vessel collections is combined with that collected in other jurisdictions according to the Lake Michigan Technical Committee lakewide diet assessment protocol (Elliott et al. 1996); this collaborative effort will continue for the foreseeable future. One use of this information is in ongoing work by the Lake Michigan Technical Committee to develop Decision Analysis models incorporating information on lake-wide predator-prey dynamics.

Job 7. Title: Monitor prevalence of bacterial kidney disease in populations of chinook and coho salmon in eastern Lake Michigan.–During 2002 sampling, the incidence of bacterial kidney disease (BKD) among populations of chinook salmon and coho salmon was assessed using FELISA procedures. Processing of these samples is ongoing, and data will be presented in a Fisheries Research Report.

Job 8. Title: Measure relative abundance, species composition, and size structure of forage fish in the vicinity of salmonine sampling locations.–The survey revisions implemented in 1997

included forage fish assessments. Forage fish assessment nets (50' or 100' deep, 1-2.5" graded mesh gill nets) were attached to suspended gill nets designed for salmonine assessments. Forage samples were not collected in 2002, but analysis of forage fish data collected in 1997-2001 is ongoing.

Literature Cited:

Elliott, R.F., and eight co-authors. 1996. Conducting diet studies of Lake Michigan piscivores – a protocol. Lake Michigan Technical Committee (internal report).

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Table 1.—Catch (number of fish) of chinook salmon and coho salmon in assessment netting in eastern Lake Michigan, 1994-2002.

Sample year	Chinook salmon	Coho salmon
1994	719	4
1995	898	20
1996	1,072	12
1997	409	24
1998	479	42
1999	186	181
2000	134	33
2001	124	23
2002	76	3