

STUDY PERFORMANCE REPORT

State: Michigan

Project No.: F-81-R-8

Study No.: 230721

Title: Design, analysis, and implementation of aquatic resource inventory in Michigan.

Period Covered: October 1, 2006 to September 30, 2007

Study Objectives: (1) Assist in the continued design, analysis and reporting of a sampling plan for a statewide inventory of aquatic resources that Fisheries Division is responsible for.

Summary: I have continued to present training on statistical methods, and have continued to work on the analysis of different sampling designs. I started new modeling work to better integrate results from the resource inventory sampling into management-relevant decision tools.

Findings: Jobs 2 through 6 were scheduled for 2006-07, and progress is reported below.

Job 2. Title: Develop and present training modules.—I presented the two-day continuing education course on the theoretical basis and application of statistical sampling I had developed in 2003 (and had presented in 2004, and 2005) in August of 2007 to a total of 14 participants.

Job 3. Title: Analyze statistical properties of proposed modifications.—Findings for Job 3 are presented in:

Wagner, T., J. R. Bence, M. T. Bremigan, D. B. Hayes, and M. Wilberg. 2007. Regional trends in fish mean length at age: components of variance and the statistical power to detect trends. *Canadian Journal of Fisheries and Aquatic Sciences* 64:968–978.

Job 4. Title: Development of analysis and reporting tools.—I attended research meetings in October of 2006 discussing strategies for the development of analysis and reporting tools. Limitations to data collection during 2005 and 2006 have hampered further work on this job. At the request of Michigan Department of Natural Resources, Fisheries Division, biologists Steve Sendek and Andy Nuhfer, I developed an Excel-based program designed to utilize resource inventory data to address questions regarding appropriate length regulations for stream trout. Inputs to this model include information on growth rate, survival rate, density, recruitment, hooking mortality, catchability, fishing effort, and voluntary release rate. The primary decision variable in this application is minimum size or no-kill regulation. Model outputs include the ability to compare fish density by age and size, catch rates by age and size, harvest rates by age and size across decision variables. Refinements are needed to rectify potential discrepancies between age-structured and size-structured approximations, but model outputs have proven useful in guiding management discussions. The model is currently being used to assess management options in the Au Sable River below Mio Dam.

Job 5. Title: Production of status of aquatic resources report.—Fisheries Division held a number of internal meetings to discuss reporting needs for the general public as well as for use by resource managers. I attended some of these meetings and have participated in the ongoing discussion of how to best develop and produce these reports.

Job 6. Title: Prepare annual report and communicate results.—This performance report was completed as scheduled. In addition Wagner et al. was published (see Job 3).

Prepared by: Daniel Hayes

Dated: September 30, 2007