

STUDY PERFORMANCE REPORT

State: Michigan

Project No.: F-53-R-13

Study No.: 483

Title: Status of the fish community and fisheries of the St. Marys River with potential effects of ship passage.

Period Covered: April 1, 1996 to March 31, 1997

Study Objective: To map the distribution of spawning lake herring, determine the location of important spawning grounds, describe spawning habitat, document and quantify fish strandings on the ice shelf during ice-out caused by vessel traffic, and up-date the status of the fish populations and the sport fishery.

Summary: Sampling in the fall of 1996 represented the final field effort of this study. Egg pumping was employed in suspected spawning areas to help confirm their usage by spawning lake herring. An additional 6 gill net sets were made to confirm the timing and presence of spawning lake herring which moves the study total to 131 sets since 1993. As previously reported, certain key areas have been identified in the St. Marys River as important lake herring spawning locations. Characteristics in common among these locations appears to include naturally deep troughs away from the faster currents of the navigation channel. The gill net catch data has been incorporated into a GIS data set with analysis by sex and maturity stage to determine differential usage of the river by lake herring. Additional analysis using the St. Marys River flow model from Clarkson University is allowing the prediction of egg transport and final incubation location. Comment was provided to the U. S. Coast Guard on ice breaking proposals for the St. Marys River based on this research. A final interagency meeting is scheduled for July 1997, at which time, these findings will be presented along with recommendations regarding the effects of shipping on lake herring. A final Research Report is expected during the summer of 1997.

This work on the lake herring population of the St. Marys River lead to a joint project with South Dakota State University for the development of a standard weight equation for lake herring. Length / weight data sets were collected from herring populations throughout the species range. The regression-line-percentile technique was then employed to derive the final standard weight equation. From this, relative weights, a popular expression of fish condition, can be calculated and reported. This work is being submitted to the Canadian Journal of Zoology for publication.

The fish population survey of 1995 will be documented in a Technical Report next year. Work has continued on the follow through and implementation of the recommendations from that report. Most notable was the formation of a St. Marys River Fishery Management Task Group under the Lake Huron Technical Committee of the Great Lakes Fishery Commission. It will be this group's agenda to work towards multiagency cooperation in the management of the fisheries of the river. Included will be joint monitoring and creel surveys, a walleye tagging study, harmonization of sport fishing regulation and management planning.

The ice stranding of fish monitoring was concluded in 1996. The results from 1996 confirmed those of 1995 that the phenomenon of fish being stranded on the receding ice shelf during vessel passage is one limited to a relatively narrow window of time and location. Recommendations are being formulated on how to minimize the strandings. It will be included in the write-up of the spawning ground Research Report.

The creel survey was again postponed in 1996 due to ceilings on position (staff) numbers and funding problems.

Job 1. Title: Mapping of the distribution of spawning lake herring.

Findings: Areas that were identified to be important spawning locations in previous years were re-explored in 1996, the final field season of this project. Gill netting was again used to confirm the presence and timing of spawning lake herring. Egg pumping was utilized to collect lake herring eggs for additional confirmation that spawning was in fact taking place as suspected. Eggs were successfully located on three occasions. All the gill net data (131 sets) dating back to the first year of the study (1993) has now been compiled into a GIS data set. That data has then in turn been analyzed by sex and maturity stage. Out put has been graphically produced with 3-D plots of abundance by area. This analysis has been used to confirm earlier observations regarding migration by spawning herring upstream in the river with in the spawning season. It has also been used to help confirm observations about preferred locations by herring with in the river for spawning. Using these findings, several predictions have been simulated using the St. Marys River flow model at Clarkson University regarding egg transport. The model was fine tuned to our needs based on observations of the behavior of fertilized and water hardened eggs in a fluvial chamber. That analysis is continuing but is expected to help confirm where lake herring eggs are actually incubating after release.

Conclusions and recommendations are being formulated based on the findings of this work. They will include the findings of the U. S. Geological Survey whose companion study investigated the effects of ship passage on lake herring egg incubation. Together, the two studies can begin to address the original concern of the effects of early spring navigation and ice breaking operations. Recommendations will orient around suggested speed limits for freighters operating in the area and the preservation of certain natural deep troughs that serve as spawning locations for lake herring. This work will be compiled as a Research Report during the summer of 1997 and its major findings and recommendations reported the St. Marys River Navigation Study Group in July of 1997.

The analysis of biological data collected from lake herring during this work and the fish population survey conducted in 1995 indicated a need to develop a new method for expressing the condition of lake herring. Relative weight statistics have become popular in recent years because they not only allow an expression of condition, but they allow comparisons among populations and with in populations between years. Relative weight requires the availability of a standard weight equation which describes the species' range of length / weight relationships. No such equation was available for lake herring. This was pursued as a joint project with South Dakota State University and included the compiling of nearly 30 different data sets from as many different lake herring populations from around North America. The regression-line-percentile technique was then employed to derive the final equation. Once accepted, this equation will facilitate the study of lake herring populations in the St. Marys River and else where. The

standard weight equation is being submitted for publication with the Canadian Journal of Zoology.

Job 3. Title: Fish population survey.

Findings: This job was completed in 1996, and the results will be documented in a Technical Report. The report is undergoing final editing and will be available next year. The report included several recommendations. Work has continued to implement these recommendations. A walleye tagging effort has been instituted to learn more about the walleye population in the St. Marys River. A comparison of walleye genetics between the St. Marys River and Little Bay de Noc (which has previously served as the brood source for stocking) is being compared. Perhaps most significant, was the formation of a St. Marys River Fishery Management Task Group under the Lake Huron Technical Committee of the Great Lakes Fishery Commission. This group will work to coordinate the fishery management efforts of over seven different agencies concerning five different fisheries. Chief among those efforts will be to determine mortality partitioning for certain species, harmonizing sport regulations, management planning, reduction of mortality for some species, and coordinating future surveys.

Job 4. Title: Creel Survey.

Findings: The creel survey was originally scheduled for 1996 and was intended to provide up-dated information on the sport fishery as well as additional insight into the status of the fish populations. The survey, however, was canceled due to ceilings on the number of personnel and funding problems. It is hoped that a creel survey can still be achieved in the near future.

Job 5. Title: Analyze data and prepare annual report.

Findings: Data were analyzed and this report was prepared on time.

Prepared by: Dave Fielder

Dated: March 31, 1997