

STUDY PERFORMANCE REPORT

State: Michigan

Project No.: F-81-R-6

Study No.: 230741

Title: Towards comprehensive databases and coordinated surveys for ecosystem management in the Great Lakes

Period Covered: October 1, 2004 to September 30, 2005

Study Objective: The study has several objectives that relate to improving quality of data collected during fish surveys in Lake Huron. A first objective is to compile, integrate, and evaluate Lake Huron fish/habitat data sources. A second objective is to enhance the use of data available and quantify changes in fish community structure in their relation with to stressors such as invasive species, nutrient fluctuations, and key environmental conditions. A third objective is to evaluate coherence and connectivity between fish communities in Saginaw Bay and Lake Huron main basin.

Summary: During this first study period data from Saginaw Bay trawl, gillnet, and creel surveys have been evaluated for consistency. Errors were communicated to MDNR personnel at the Alpena and Mt Clements research stations. Individual files from each survey have been reformatted and combined. Data that were not available electronically have been entered. Original forms with data from trawl surveys after 1996 were scanned to complete the electronic records available from DNR Lake St. Clair Fisheries Research Station. Metadata for the surveys have been created or updated.

Findings: Jobs 1 and 10 were scheduled for 2004-05, and progress is reported below.

Job 1. Title: Evaluate suitability of catch rates from each survey.

Saginaw Bay Fall Trawl Surveys—Data evaluated are from MDNR annual bottom trawl surveys, conducted in fall since 1989 by RV *Channel Cat*. Surveys are described in Fielder et al. 2002. Table 1 summarizes the number (IDNUMS) and distribution (Grids) of hauls from which data were evaluated. Tow information and catch data from each haul are stored in a series of individual files for each survey year. The files containing tow information and environmental data were updated with information available in original data sheets. The files containing catch data were reformatted and combined, so all years and all catch data are in a single file. Also, sampling protocols for processing the catch is being evaluated to guide future analysis. Catch data are originally stored in:

1. Files with total fish number and weight by species and age categories for 1986 to 1993 (mostly young of the year, age 1, age 1+, age 2+, all) and for later years with length frequencies in inches.
2. Files with individual fish by species with length in mm and weight in mg, sex, maturity and age.
3. Files with length frequencies in 1 mm size groups by species within sex age categories. Ages are estimated.
4. Files with frequencies in 1 to 5 age categories by species.

Combining trawl data in a single file will allow the analysis of catch data to produce model abundance indices in the next years of the study.

Saginaw Bay Fall Gillnet Surveys—Data evaluated are from gillnet surveys conducted in fall since 1989 from RV *Chinook*. The survey is described in Fielder et al. 2002. Table 2 summarizes the number of gillnet lifts and distribution (Stations) from which data were evaluated. Files containing lift information and environmental data were updated with information available in original data sheets. Files containing catch data were combined and updated with data that were recorded but not electronically available. Catch data are originally stored in single files and contain:

1. 1989-2001 data for individual fish on length (mm), weight (g), age, sex, and maturity excluding fish considered as bycatch.
2. 1989-1995 data containing records for individual fish on length (in) and total weight (kg) for species considered as bycatch.
3. 1989-2001 catch per unit effort data aggregated by set for all fish by species in the catch. This file includes the catch in the 38 mm mesh size panel added in 1995.
4. 1989-2001 catch per unit effort data excluding the 38 mm mesh size catch.

Numbers from length frequencies were aggregated to evaluate the calculations of total catch by lift, and errors were detected and reported. Because of the high number of inconsistencies found, the whole set of original data sheets was photocopied by DNR personnel and made available for the study. Each entry was evaluated and records were corrected when necessary. Missing data in electronic files, as detected by this evaluation, were entered from the original data sheets.

Up to 1992 the survey used 305 m (1000 ft) nets consisting of 10 panels. The mesh sizes were between 51 and 127 mm stretch mesh. In 1993, an 11th panel with a 38.1mm mesh was added. The change in net selectivity can have a significant influence in abundance estimation that requires investigation. Nevertheless, catch data were not available separately for the added panel and had to be entered from the original forms. Also catch data by panel, recorded for a few sets, were entered.

Combining gillnet data in a single file, and incorporation of new data, will allow the analysis to produce model abundance indices in the next years of the study.

Lake Huron Creel Survey—Data from non-charter boat fishing operations taking place in Michigan State waters of Lake Huron including Saginaw Bay and the main basin were evaluated. Preliminary analysis indicated that intensive data analysis is required to use catch per unit effort from these surveys to derive abundance indices. The main questions relate to define effective effort for individual species complicated by changes in target definitions, and management regulations.

Lake Huron charterboat data—Data from self-reported fishing operations by charter boat captains were evaluated. Comments on the analysis of data from creel surveys are applicable here.

Job 10. Title: Write progress report.—This progress report has been prepared.

Literature Cited:

Fielder, D. G. 2002. Sources of walleye recruitment in Saginaw Bay, Lake Huron, and recommendations for further rehabilitation. Michigan Department of Natural Resources, Fisheries Research Report 2062, Ann Arbor.

Prepared by: Sara Adlerstein

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Table 1.—Number of hauls in the fall MDNR trawl survey by statistical grid and month. Grids *107, 211, 316 and 404* constitute fixed grids for index stations.

| Year | Hauls | IDNUMS | Grids | Month |
|------|-------|------------------------|---|-----------|
| 1986 | 29 | 5160-5189 | <i>107</i> 112 306 308 406 414 | September |
| 1986 | 24 | 5190-5213 | 104 <i>107</i> 119 201 304 <i>404</i> 405 | October |
| 1987 | 40 | 8046-8054 2120-2151 | <i>107</i> 109 112 117 221 212 <i>316</i> 325 421 <i>404</i> 424 | September |
| 1987 | 46 | 8055-8073 2152-2178 | 104 <i>107</i> 109 114 <i>316</i> 322 308 <i>404</i> 413 423 | October |
| 1988 | 39 | 8109-8116 2312-2340 | <i>107</i> 109 108 103 201 214 <i>316</i> 313 <i>404</i> 414 419 | September |
| 1988 | 41 | 8117-8128 2341-2371 | <i>107</i> 108 109 113 209 207 308 <i>316</i> 324 425 <i>404</i> 405 | October |
| 1989 | 15 | 1300-1311 | <i>107</i> 109 <i>211</i> <i>316</i> <i>404</i> | October |
| 1990 | 16 | 1300-1315 | 108 109 <i>211</i> <i>316</i> <i>404</i> | October |
| 1991 | 16 | 3500-3515 | <i>107</i> 109 <i>211</i> <i>316</i> <i>404</i> | September |
| 1992 | 28 | 3500-3526 | 113 116 203 219 <i>316</i> <i>404</i> 411 425 | September |
| 1992 | 10 | 3527-3536 | <i>107</i> 109 | October |
| 1993 | 38 | 3501-3538 | <i>107</i> 109 113 <i>211</i> 219 308 <i>316</i> 321 <i>404</i> 411 | September |
| 1994 | 27 | 3501-3528 | 208 <i>211</i> 213 <i>316</i> 321 <i>404</i> 411 | September |
| 1994 | 7 | 3529 3535 | 103 <i>107</i> 109 | October |
| 1995 | 39 | 3501-3539 | <i>107</i> 109 <i>211</i> 213 321 208 <i>316</i> <i>404</i> 411 414 510 523 | September |
| 1996 | 30 | 3501-3530 | <i>107</i> 108 208 <i>211</i> 308 <i>316</i> 321 <i>404</i> 411 | September |
| 1997 | 34 | 3501-3534 | 103 <i>107</i> 208 <i>211</i> 308 <i>316</i> 321 402 <i>404</i> | September |
| 1998 | 27 | 3501-3527 | <i>107</i> 208 <i>211</i> 308 <i>316</i> 321 402 <i>404</i> | September |
| 1999 | 28 | 3501-3528 | <i>107</i> 208 <i>211</i> 302 <i>316</i> 323 402 <i>404</i> 409 416 | September |
| 2000 | 37 | 3501-3537 | <i>107</i> 117 208 213 308 <i>316</i> 322 323 402 <i>404</i> 423 | September |
| 2001 | 26 | 3501-3533 | 109 212 315 <i>316</i> 323 402 <i>404</i> | September |
| 2002 | 47 | 3501-3545 | 105 <i>107</i> 115 <i>211</i> 213 308 <i>316</i> 323 402 <i>404</i> 406 | September |

Table 2.—Number of lifts from the gillnet survey from which data were evaluated.

| Station | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 |
|-----------------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Saginaw River | 2 | — | — | — | — | — | — | — | — | — | — | — | — |
| Pt. Lookout (2) | 1 | — | — | 1 | 1 | 1 | 4 | 3 | 1 | 1 | 1 | 1 | 1 |
| AuGres River | — | — | 2 | 1 | 1 | 1 | 1 | 1 | — | — | — | — | 1 |
| Pt. AuGres | 2 | — | 2 | 2 | 1 | 2 | 6 | 6 | 2 | 2 | 2 | 2 | 2 |
| Black Hole | 2 | 3 | 2 | 2 | 2 | 2 | 6 | 5 | 2 | 2 | 2 | 2 | 2 |
| Coreyon Reef | — | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 2 |
| Fish Pt. | — | — | — | — | 2 | 2 | 3 | 5 | 2 | 2 | 2 | 2 | 2 |
| North Island | — | — | — | — | — | 1 | 6 | 5 | 2 | 2 | 2 | 2 | 2 |
| Oak Pt. | — | — | — | — | 1 | 1 | 6 | 5 | 2 | 2 | 2 | 2 | 2 |
| Charity Is. | — | — | — | — | — | — | 3 | 2 | 2 | 2 | 2 | 2 | 2 |
| Tawas | — | — | — | — | — | — | 2 | 2 | 2 | 2 | 2 | 2 | 2 |