

STUDY PERFORMANCE REPORT

State: Michigan

Project No.: F-81-R-16

Study No.: 230466

Title: Fish community status in Saginaw Bay,
Lake Huron

Period Covered: October 1, 2014 to September 30, 2015

Study Objective: The study objectives are: (1) to document reproductive success and recruitment to the populations of key species of management interest including Walleye *Zander vitreus* and Yellow Perch *Perca flavescens*; (2) to document trends in age structure and mortality rates of key species; (3) to assess the overall relative abundance of all fish species vulnerable to the sampling gear; and (4) to track the presence, abundance and effects of invasive species.

Summary: The annual fall survey was performed in 2015 as scheduled, but only preliminary observations are available in time for this report. Based on the gill-net portion of the survey, Yellow Perch abundance greatly increased in 2015 from the record lows in 2014 to near-record levels for the time series (since 1989). Trawl catch rates for yearling and older Yellow Perch in 2015 increased only slightly however. With both gears, the higher catch of Yellow Perch came from a concentrated area. While further analysis is necessary, it appears the overall abundance of Yellow Perch is likely only modestly improved in 2015. Based on the completed 2014 survey, the overall forage index in the bay declined to the third-lowest level since 1971 and was attributed to ongoing high abundance of Walleyes in Saginaw Bay. Preliminary analysis of the 2015 gillnetting indicates a lower Walleye abundance compared to 2014 that is still commensurate with the average since recovery in 2009. Growth rates of Walleyes remain around the state average for most ages.

Findings: Jobs 1, 2, and 4 were scheduled for 2014-15, and progress is reported below.

Job 1. Relative abundance and community structure.—The 2015 survey has not been fully summarized or analyzed but preliminary examination indicates that adult walleye abundance was lower in 2015 compared to 2014 but similar to the average gill-net catch rate since recovery in 2009. Most notable in 2015 was a greatly improved Yellow Perch catch rate, measuring the fourth greatest since the gillnetting survey component was added in 1989. Preliminary results from the 2015 trawl survey differed somewhat from the gill-net results. Age-0 Yellow Perch catch rates increased about 3-fold from 2014. Trawl catch rates for yearling and older Yellow Perch only showed a modest increase from 2014, however, and that increase was largely a function of increased catch rates at two of the eight sampling stations. Yearling and older Walleye catch rates for the trawl survey were much lower than in 2014, and may be among the lowest since Walleye recruitment surged in 2003. Catch rates for native benthic forage species such as Spottail Shiners *Notropis hudsonius* and Trout-Perch *Percopsis omiscomaycus* remained depressed in 2015.

The rest of the information presented in this progress report stems from the analysis of the 2014 survey. The overall forage biomass index based on Saginaw Bay trawling of eleven indicator species reached the third lowest level since 1971 and represented the 12th year of steady decline (Figure 1). We believe this is indicative of increased predation pressure by the recovered Walleye population. Also observed in 2014 was the lowest age-0 Yellow Perch trawling catch rate in 12 years. This was taken as a possible sign that the adult Yellow Perch broodstock may be low

enough to cause recruitment limitations. This information, in combination with low abundance of adult Yellow Perch in 2014 served as part of the motivation for fishery managers to institute changes in Walleye and Yellow Perch management including liberalization of Walleye recreational harvest regulations. Reproductive success of Walleye in 2014 was consistent with other years since 2007 that have shown strong recruitment.

Job 2. Process and analyze survey data.—Analysis is complete for 2014 and analysis of the 2015 collections will take place in the coming months. Age structure of Yellow Perch collected with gill nets in 2015 may help explain the origins of the sudden surge in gillnet catch rates. Since the trawl collections of Yellow Perch did not mirror the high gill-net catch, and the fish appeared to be concentrated in a small area, we suspect that the true overall abundance of Yellow Perch in 2015 is not as great as indicated by the gill-net catch rate. Further analysis will seek to provide some additional explanation for the fishery managers. Walleye growth rates remained steady in 2014 just below the state average for most age groups.

Job 4. Title: Write annual performance report.—This performance report was prepared. In addition, a study summary was prepared (Attachment 1).

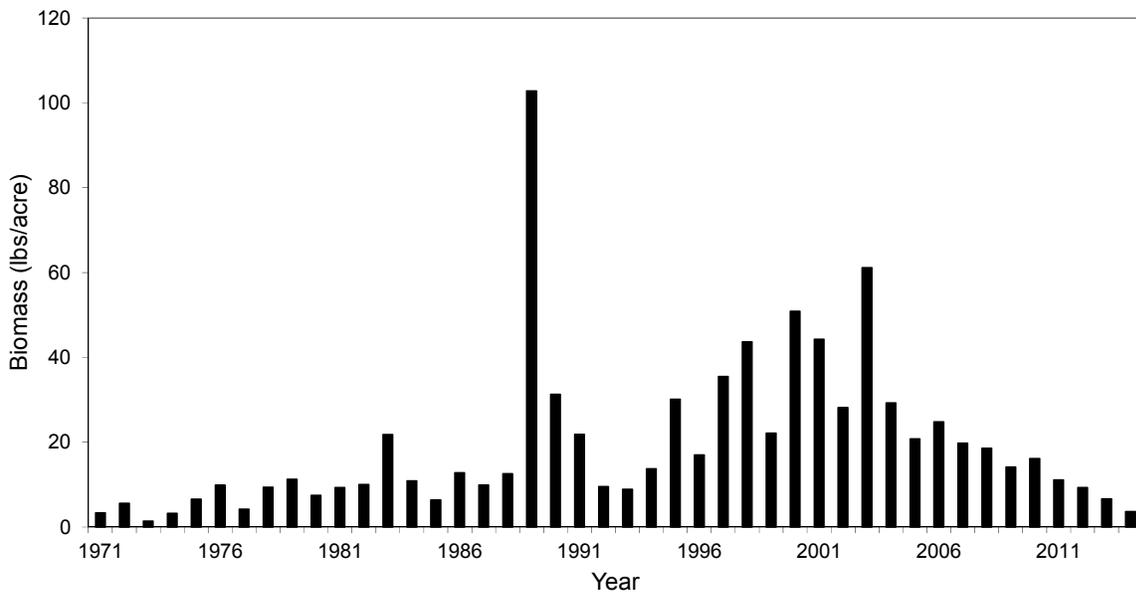


Figure 1.—Saginaw Bay forage fish biomass (lbs/acre) as determined by trawling, 1971–2014. Index based on combined biomass of Alewife *Alosa pseudoharengus*, Emerald Shiner *Notropis atherinoides*, Gizzard Shad *Dorosoma cepedianum*, Rainbow Smelt *Osmerus mordax*, Spottail Shiner, Round Goby *Neogobius melanostomus*, Trout-Perch, Age-0 White Bass *Morone chrysops*, Age-0 White Perch *Morone americana*, Age-0 Yellow Perch, and Mimic Shiner *Notropis volucellus*.

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Date: September 30, 2015

Fish Community Status in Saginaw Bay, Lake Huron

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Background

Saginaw Bay supports a renowned Walleye fishery and is the target of substantial Yellow Perch fishing effort, both of which are recreationally important to anglers and economically important to local communities. Successful management of these fisheries requires knowledge of the entire fish community, and for more than 40 years this study has been the basis for much of what Fisheries Division and its stakeholders know about Saginaw Bay. Data on the fish community of the Bay are collected annually using two sampling efforts in September: 1) a bottom trawl survey conducted since 1971 by the Lake St. Clair Fisheries Research Station (Photo 1); and 2) a gill-net survey conducted since 1989 by the Alpena Fisheries Research Station (Photo 2). The bottom trawl survey collects young-of-year Walleye and Yellow Perch as well as prey fish (including juveniles of other species), while the gill-net survey collects some juvenile fish and adult Walleye, Yellow Perch, and other species. The bottom trawl and gill-net surveys complement each other and do an excellent job of sampling the entire fish community. Logistical support throughout the duration of the survey is provided by the Southern Lake Huron Management Unit.



Photo 1. Research Vessel (R/V) Channel Cat used by the Lake St. Clair Fisheries Research Station for the trawl survey of Saginaw Bay.



Photo 2. Research Vessel (R/V) Chinook used by the Alpena Fisheries Research Station for the gill-net survey of Saginaw Bay.

This survey has also been crucial in documenting the presence or absence and effects of invasive species. Most of the biological data (such as age, growth rates, reproductive success, and diet) from Walleye and Yellow Perch in Saginaw Bay, as well as overall predator and prey balance information, is generated by this study. These data, in combination with fish population (also known as stocks) assessment tools and an annual creel survey form the three-legged stool that supports Fisheries Division's understanding of the Saginaw Bay fishery. In addition to the data

collected from the fish captured by these surveys, Fisheries Division provides specimens collected from this study to many of its project partners for genetics and fish health testing, and many university and partner agency researchers have used data from this project to support additional science efforts that provide even more information on this critical fishery.

Long-term studies like this one are rare in fisheries science and when combined by the mass of information that has informed fisheries managers on how to manage this system lead to this study being recognized as the National Sport Fish Restoration Project of the Year in 2009 by the American Fisheries Society (AFS) Fisheries Administration Section. Additionally, the study results were featured as an invited presentation at the 75th Anniversary observation of the Sport Fish Restoration Act at the 2012 Annual AFS meeting.

What are the key findings?

The annual fall survey was performed in 2015 as scheduled, but only preliminary observations are available at this time. Based on the gill-net portion of the survey, Yellow Perch abundance greatly increased in 2015 from the record lows in 2014 to near-record levels for the time series (since 1989). Trawl catch rates for yearling and older Yellow Perch in 2015 increased only slightly however. With both gears, the higher catch of Yellow Perch came from a concentrated area. While further analysis is necessary, it appears the overall abundance of Yellow Perch is likely only modestly improved in 2015. Based on the completed 2014 survey, the overall forage index in the bay declined to the third-lowest level since 1971 and was attributed to ongoing high abundance of predatory Walleyes in Saginaw Bay. Preliminary analysis of the 2015 gillnetting indicates a lower Walleye abundance compared to 2014 that is still commensurate with the average since recovery in 2009. Growth rates of Walleyes remains around the state average for most ages.

Where can I find detailed results?

Data and analysis from this study have been published in many journal articles, citations for which are available from the lead biologists. Every five years the findings of this project are summarized in a multi-year Fisheries Division report, which can be found on the Fisheries Division website. The latest report, which summarizes findings through 2011, is currently in press and will be available soon. Additional detailed information can be found at http://www.michigan.gov/dnr/0,4570,7-153-10364_52259_19056-333302--,00.html.

What does this project do for fisheries managers and anglers?

Information from this study allows fisheries managers to fulfill their public trust responsibility for the wise stewardship of the Saginaw Bay fishery, which generates millions of dollars in annual economic activity. For example, the growth rate of age-3 Walleyes from this study serves as Fisheries Division's primary measurement for gauging walleye health in Saginaw Bay. The annual Alewife catch rate, which has been zero in recent years, was the primary data driving annual Walleye stocking decisions (that were suspended in 2006 as alewives continue to remain scarce). Fisheries managers also use the information from this project to set fishing regulations, such as minimum size limits and daily bag limits, which specify the size and number of fish that an angler can harvest in one day. Walleye and Yellow Perch regulations for Saginaw Bay can be found along with the rules for other species by clicking "Rules & Regs" on the Michigan Department of Natural Resources' Fisheries Division website at <http://www.michigan.gov/fishing>.