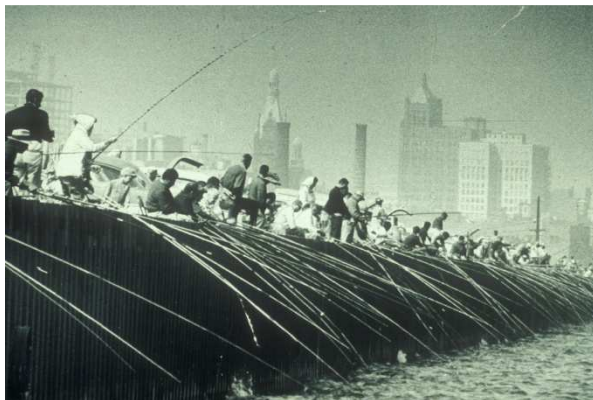


# Status of Yellow Perch in Lake Michigan 2012-2014



[Anglers enjoying pier fishery for yellow perch – photos presented during the March 2014 Yellow Perch Summit in Chicago, Illinois]

REPORT TO THE LAKE MICHIGAN COMMITTEE  
Ypsilanti, Michigan  
March 27, 2015

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## Yellow Perch / Inshore Fish Working Group Contact List: 2014-2015

This report was prepared from information provided by the following contributors. Questions regarding data from a specific area of Lake Michigan, or concerning a specific aspect of Lake Michigan yellow perch research, should be directed to the contributor of that information (see Appendix 1 for a map of lake areas).

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## Status of Yellow Perch in Lake Michigan

Yellow perch assessment activity is occurring throughout the lake, with numerous agency and university personnel sampling perch utilizing various gear types in different seasons. Selected parts of this information are presented here, in three sections. The first section covers the relative abundance of adult (age 1 and older) yellow perch. The second section examines the most recent age structure data available for different parts of the lake. The final section consists of estimates (or indices) of juvenile yellow perch recruitment: most of these data come from collections of age-0 yellow perch. Coordinated regulation of yellow perch harvest has been an important part of perch management since the 1990s. Current commercial and recreational regulations for all Lake Michigan jurisdictions are included as a final section of this status report, along with data showing trends in yellow perch harvest over time.

Since its formation in 1994, the Lake Michigan Yellow Perch Task Group has generally produced an annual status report. However, a 2010 report was not produced due to commitments to produce a chapter for the “State of Lake Michigan, 2010” publication. Instead, a report covering activities from two years, 2010 and 2011, was produced in 2012. The current (2015) report updates the status of Lake Michigan yellow perch populations to include data collected during 2012-2014

### Adult Relative Abundance

The data assembled were collected with either gill nets or bottom trawls (Figures 1 to 7). Generally, this information shows a long-term decline in adult yellow perch abundance. The data series show a peak abundance in the mid- 1980s to early 1990s, followed by significant declines through the early 2000s. Increases in catch-per-unit-effort resulting from recruitment of the 1998, 2002, 2005, and 2010 year classes are particularly apparent in some data series (e.g., Figures 3, 5, and 6). Data from common gear types (graded-mesh gill net) fished in all jurisdictions are presented in Figure 7; these index data show that current abundance remains well below the historically observed abundance of the late 1980s and early 1990s.

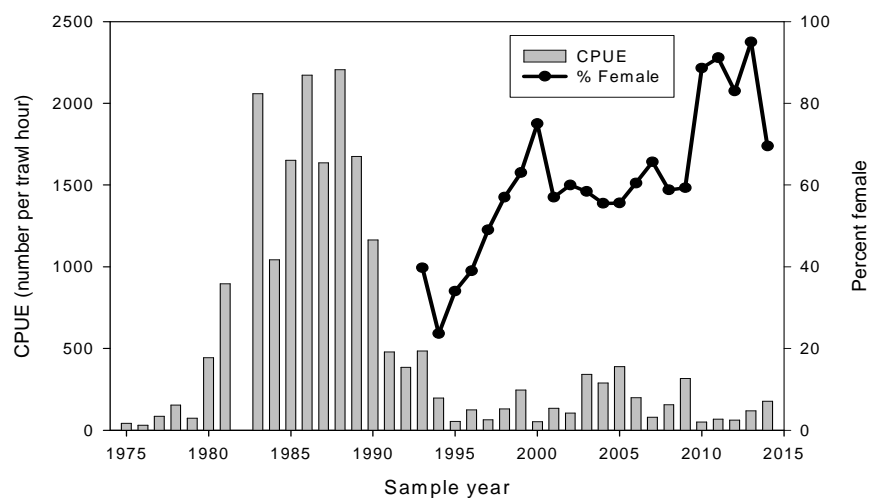


Figure 1. Adult yellow perch trawl CPUE and percent female in Indiana waters of Lake Michigan. (Ball State University; data from summer trawl survey at sites M and K in 1975 – 2014.)

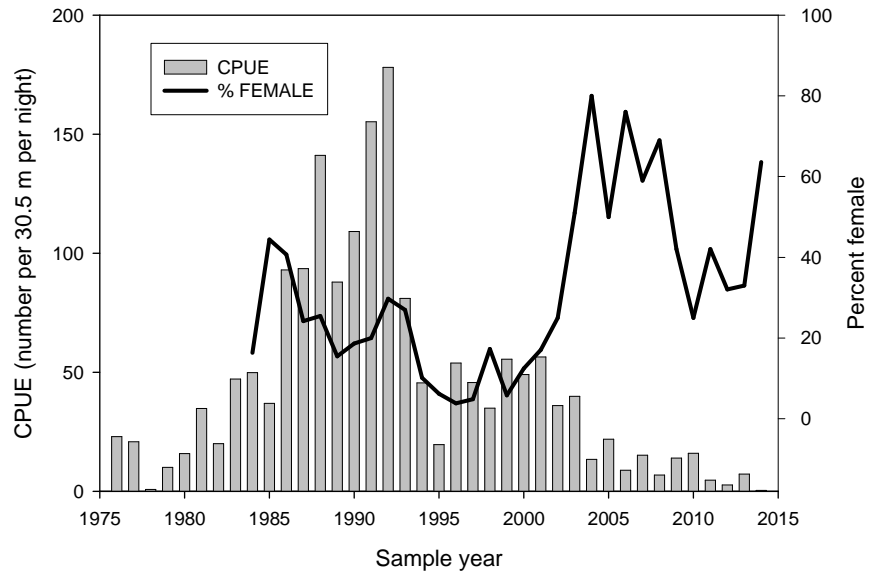


Figure 2. Adult yellow perch relative abundance and percent female in the Illinois waters of Lake Michigan. (ILDNR; data from spring gill net assessment, Chicago and Lake Bluff, IL, 1976 – 2014.)

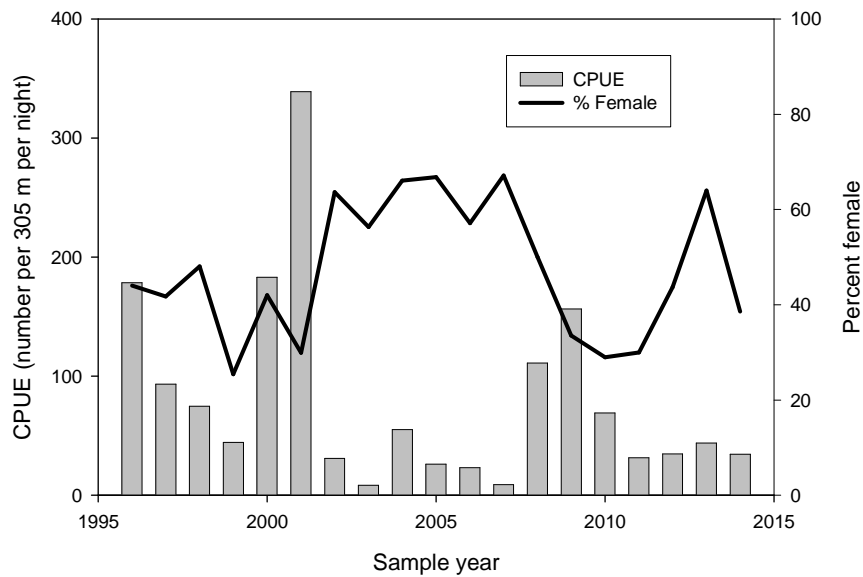


Figure 3. Adult yellow perch gill net catch-per-unit-effort and percent female in the catch at four southern Lake Michigan ports (Grand Haven, Saugatuck, South Haven, and St. Joseph, MI). (MDNR; data from April-June, 1996 – 2014.)

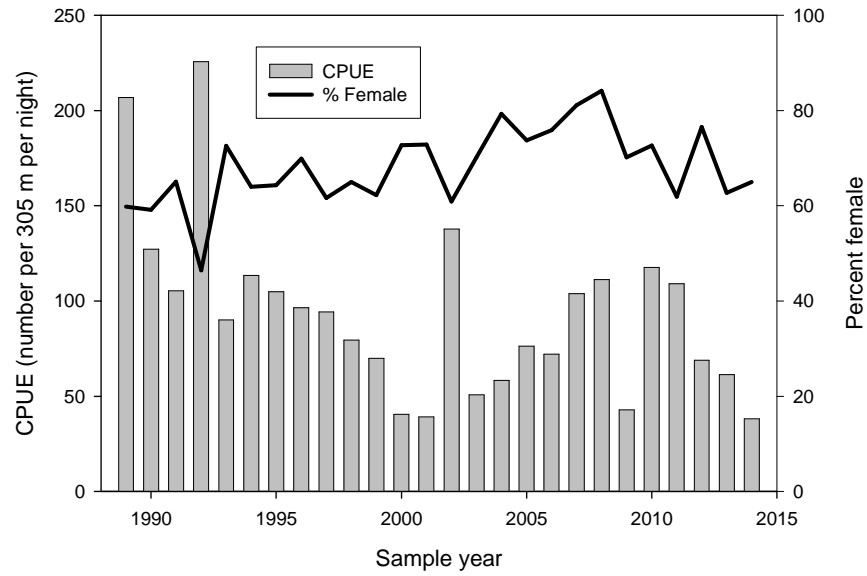


Figure 4. Adult yellow perch gill net catch-per-unit-effort and percent female in the catch in Bays de Noc. (MDNR; data from August to October, 1989 – 2014.)

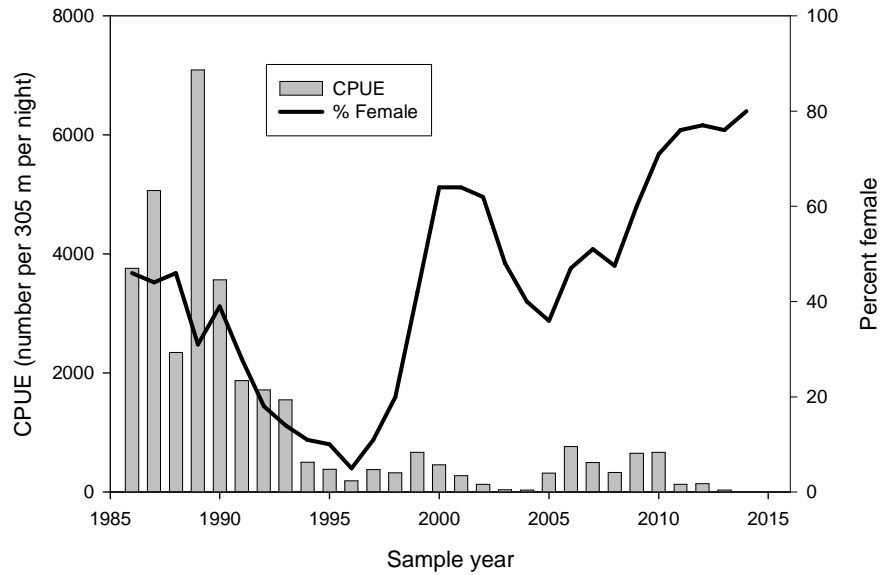


Figure 5. Adult yellow perch relative abundance and percent female in the Wisconsin waters of Lake Michigan. (WDNR; data from winter gill net assessment, Milwaukee, WI, 1986 – 2014.)



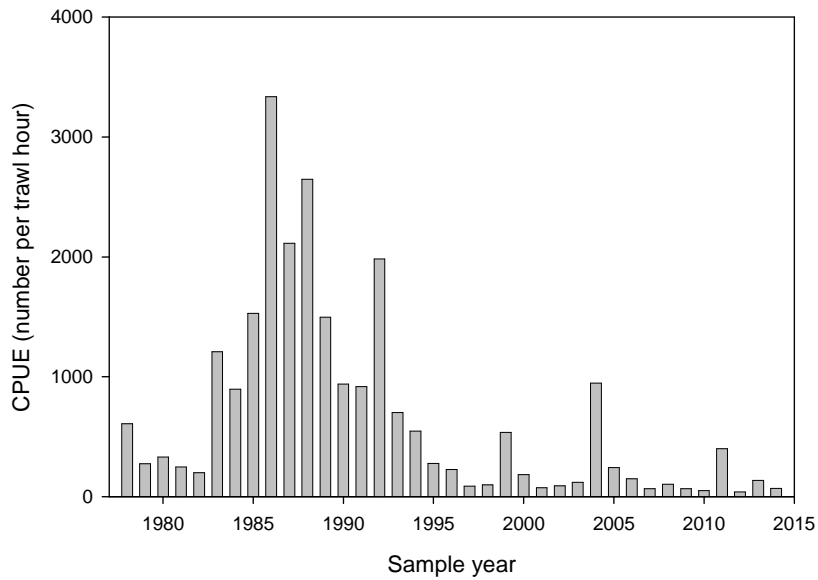


Figure 6. Adult yellow perch relative abundance in the Wisconsin waters of Green Bay. (WDNR; data from summer trawl assessment, Green Bay, WI, 1978 – 2014.)

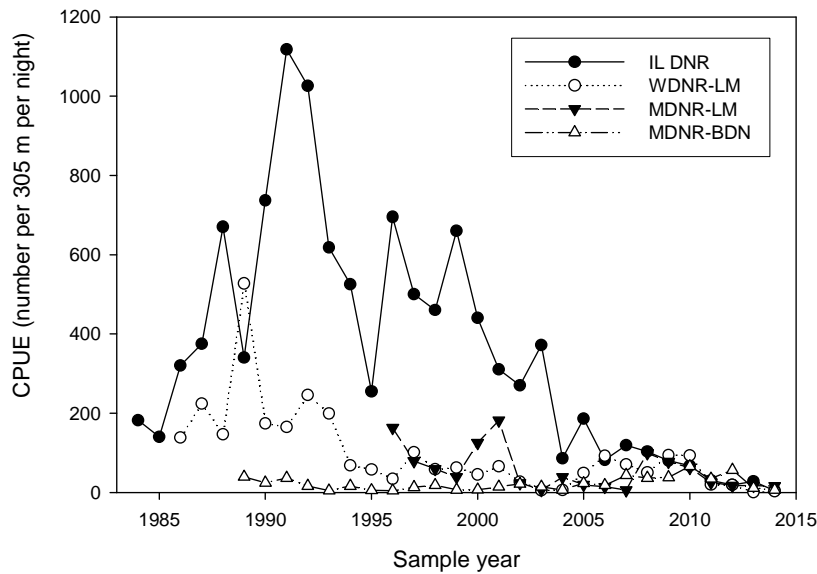


Figure 7. Yellow perch CPE (number of fish per 305 m) in graded mesh gill net consisting of equal length panels of 51-mm, 64-mm, and 76-mm stretched mesh, 1984-2014. (Data from ILDNR, WDNR, and MDNR; 1997-2000 and 2002-2014 MDNR-LM values calculated from 1996 and 2001 selectivity evaluations.)

## **Population Age Structure**

The yellow perch adult population age structure was determined by evaluating otoliths, opercles, or spines (see figures for agency-specific information). The 2010 year class was predominant in some areas of the lake, making up greater than 35% of the yellow perch population in Illinois waters (Figure 9) and greater than 70% in eastern Lake Michigan (Figure 10). Significant contribution of the 2005 year class was still apparent (45%) in Wisconsin waters of western Lake Michigan (Figure 12), although samples sizes for 2014 collections were very low. In Wisconsin and Michigan waters of Green Bay, most yellow perch collected were from 2010 or later year classes (Figures 11 and 13).

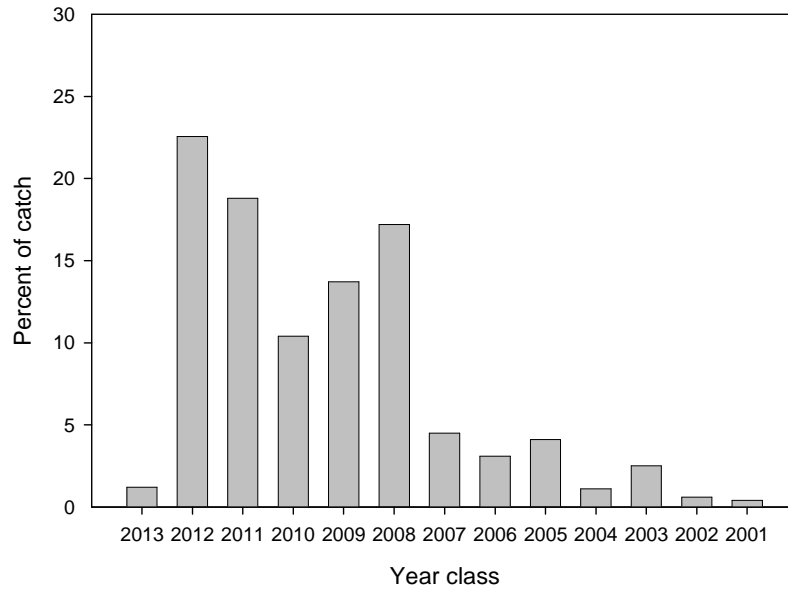


Figure 8. Yellow perch age structure from the Indiana waters of Lake Michigan. (BSU; data from June-July gill net catch, female yellow perch only, 2014. Ages determined using opercles.)

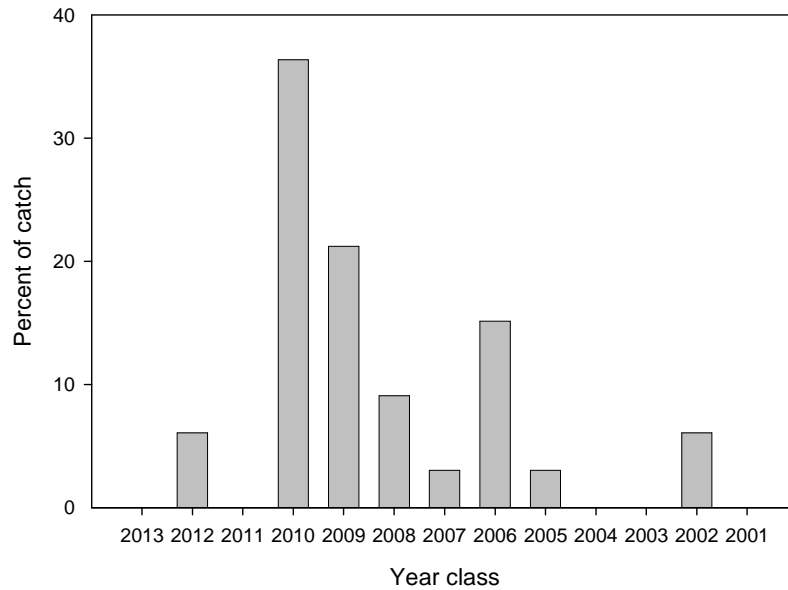


Figure 9. Yellow perch age structure from the Illinois waters of Lake Michigan. (ILDNR; data from spring gill net assessment, Chicago and Lake Bluff, IL, 2014. Ages determined using otoliths.)

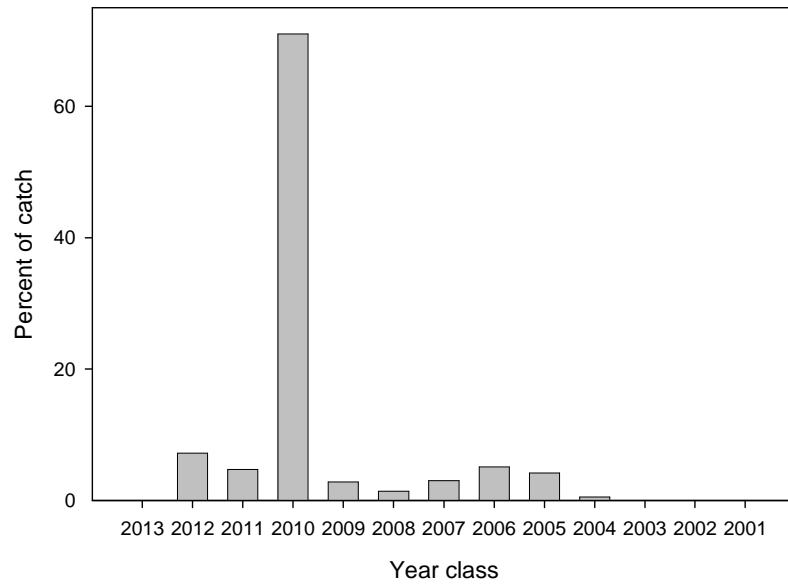


Figure 10. Yellow perch age structure from the Michigan waters of Lake Michigan. (MDNR data from spring gill net assessment, combined three southern Lake Michigan ports – Grand Haven, Saugatuck, and South Haven, MI – 2014. Age determined using spines.)

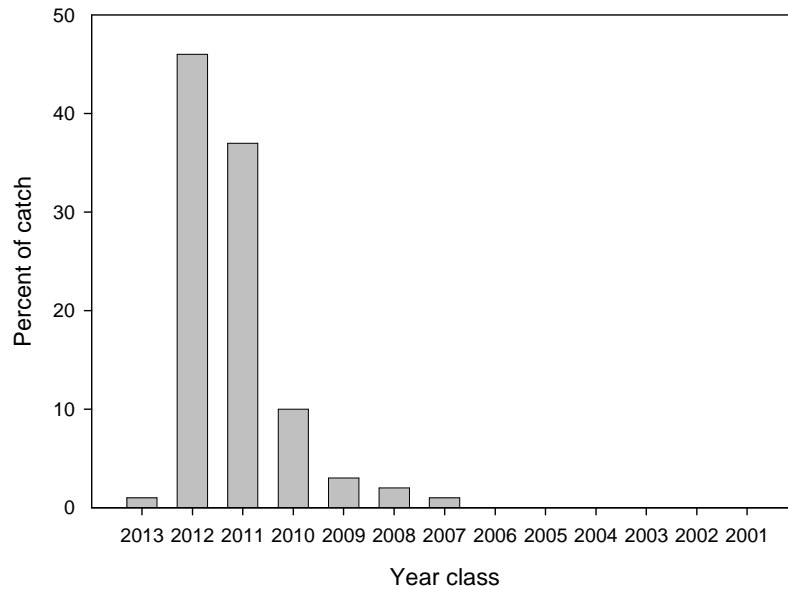


Figure 11. Yellow perch age structure from the Michigan waters of Lake Michigan. (MDNR data from August – October gill net assessment, Bays de Noc, MI – 2014. Age determined using spines.)

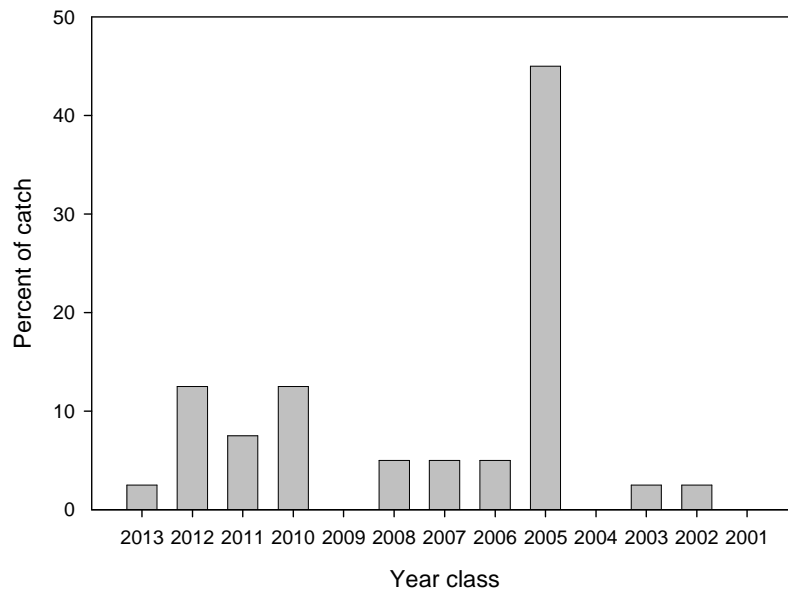


Figure 12. Yellow perch age structure from the Wisconsin waters of Lake Michigan. (WDNR; data from winter gill net assessment, Milwaukee, WI, 2014. Ages determined using spines.)

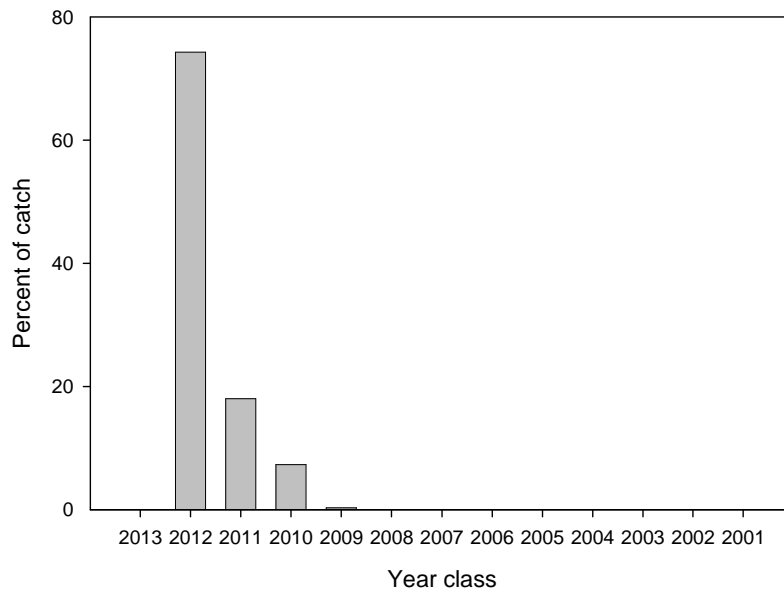


Figure 13. Yellow perch age structure from the Wisconsin waters of Green Bay. (WDNR; data from commercial harvest – all gear types, Green Bay, WI, 2014. Ages determined using spines.)

## **Recruitment**

Having a reliable indicator of future inputs to an adult population is vital to understanding the dynamics of the fish population and helping predict changes in abundance. An early indicator of recruitment is most beneficial to managers. In Lake Michigan, indicators of yellow perch recruitment have traditionally been collected using bottom trawls or beach seines. Data collected using these traditional gears indicated excellent production of young-of-year yellow perch occurred in many areas of Lake Michigan in 2010. However, recent observations of lack of production of YOY yellow perch have been just as consistent; indices of YOY yellow perch production have been at low levels in nearly all jurisdictions since 2011.

The YPTG agreed to implement a lakewide summer “micromesh” gill net assessment (beginning in summer 2007) to standardize assessment of young-of-year yellow perch production, especially in areas where standard trawl and seine surveys cannot be implemented. Preliminary evaluation of five years of data from this assessment were included in the 2012 report; this survey is continuing, and additional data analyses are ongoing.

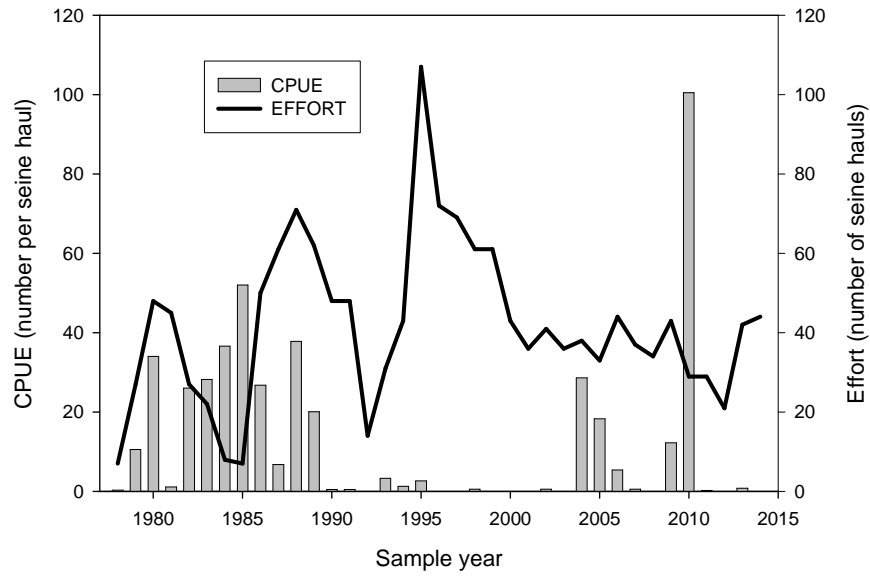


Figure 14. CPUE of YOY yellow perch from the Illinois waters of Lake Michigan. (ILDNR; data from summer beach seining along the Illinois shoreline, 1978 – 2014.)

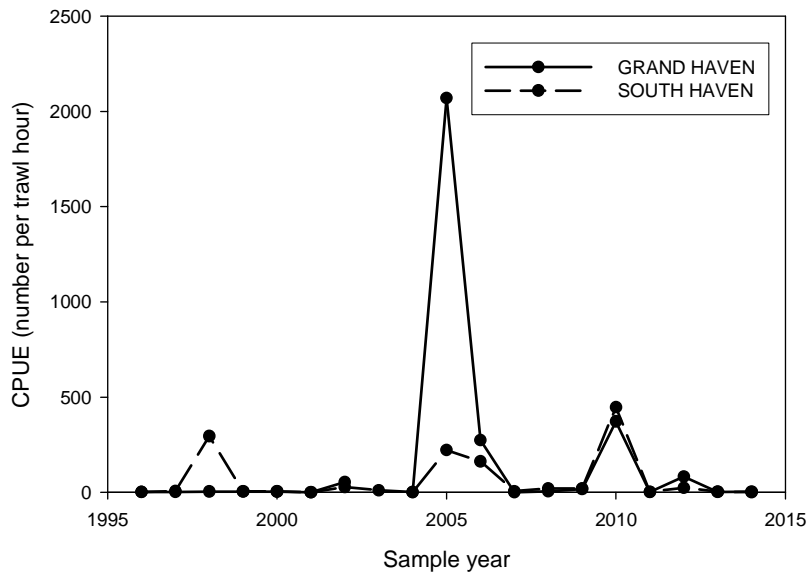


Figure 15. CPUE of age-0 yellow perch in the Michigan waters of Lake Michigan. (MDNR; late summer bottom trawl data from Grand Haven and South Haven, 1996 - 2014. Grand Haven was not sampled in 2003.)

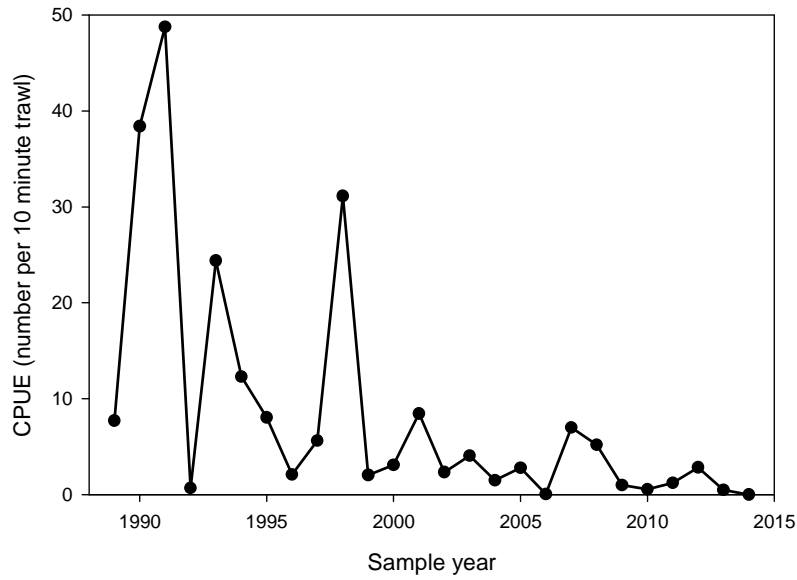


Figure 16. CPUE of age-0 yellow perch in Bays de Noc, Lake Michigan. (MDNR; summer bottom trawl data, 1989 - 2014.)

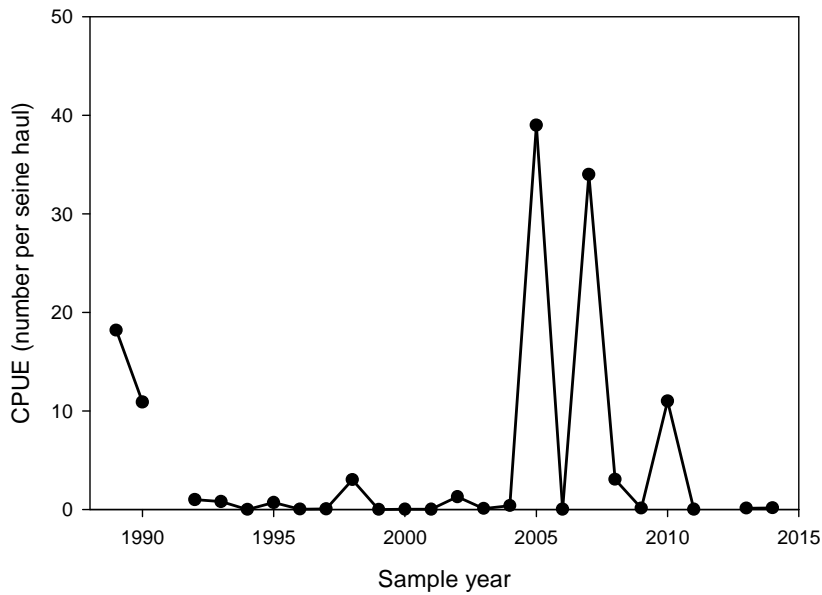


Figure 17. CPUE of age-0 yellow perch from the Wisconsin waters of Lake Michigan. (WDNR; data from summer beach seine assessments along the southern Wisconsin shoreline, 1989 – 2014.)

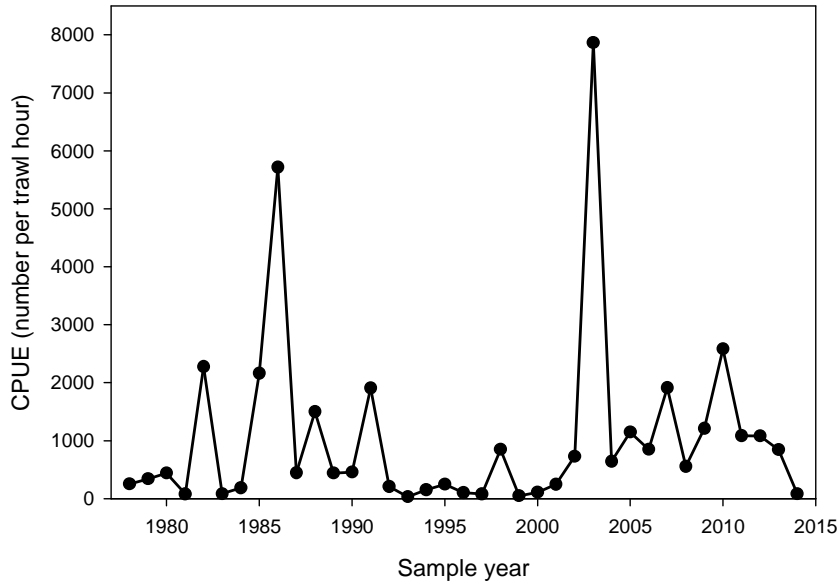


Figure 18. CPUE of age-0 yellow perch from the Wisconsin waters of Green Bay. (WDNR; data from summer trawl assessments, 1978 – 2014.)

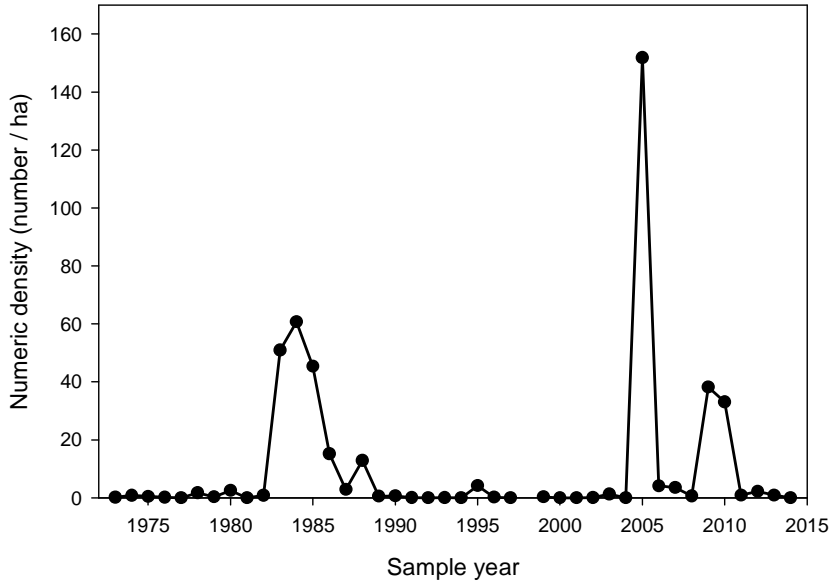


Figure 19. Density of age-0 yellow perch, lakewide. (USGS; data from fall bottom trawl assessments, 1973 – 2014.)



## 2015 Yellow Perch Regulations and Harvest Trends

### Sportfishing regulations:

- Illinois
  - May 1 through June 15; closed to sportfishing for yellow perch
  - Daily bag limit 15 fish
- Indiana
  - No closed season for yellow perch
  - Daily bag limit 15 fish
- Michigan
  - No closed season for yellow perch
  - Daily bag limit; 35 fish (south of the 45<sup>th</sup> parallel) / 50 fish (north of 45<sup>th</sup> parallel and Grand Traverse Bays)
- Wisconsin (Lake Michigan)
  - May 1 through June 15; closed to sportfishing for yellow perch
  - Daily bag limit 5 fish
- Wisconsin (Green Bay)
  - March 16 through May 19; closed to sportfishing for yellow perch
  - Daily bag limit 15 fish

### Commercial regulations:

- Illinois perch fishery remained closed
- Indiana perch fishery remained closed
- Michigan does not allow a commercial harvest (outside of 1836 Treaty waters)
- Wisconsin perch fishery remained closed (outside of Green Bay, where quota for 2015 is 100,000 pounds)

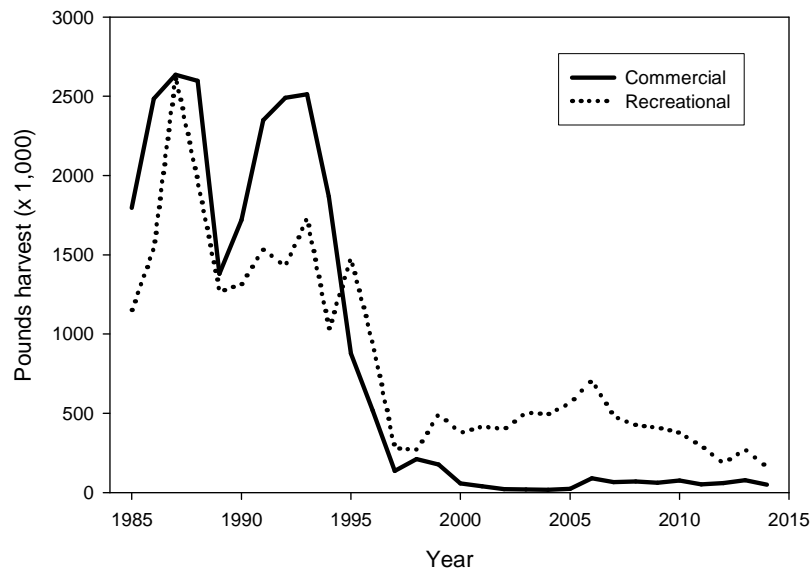


Figure 20. Lake Michigan harvest (lakewide) of yellow perch by commercial and recreational fisheries, 1985-2014. (All jurisdictions; data from Lake Michigan Committee lakewide extractions database, B. Breidert.)

## Meetings and Other Yellow Perch-Related Happenings in the Lake Michigan Basin, 2012-2014

- Outside of the regular summer and winter LMTC meetings, no additional meetings of the YPTG were convened during 2012-2014.
- The report “The State of Lake Michigan in 2011” was published in early 2012. This report included a chapter title “Inshore and Benthivore Fish Communities” that covered the status of Lake Michigan yellow perch populations from 2006-2010. Members of the LM YPTG contributed significantly to completion of this report chapter.
- At its March 2013 annual meeting, the Lake Michigan Committee decided to dissolve the Yellow Perch Task Group. The LMC established the YPTG in 1994 at a time when yellow perch research and management needed extensive focus and organization. The primary objectives for establishing the YPTG were; 1) consolidate available data on yellow perch in Lake Michigan, and evaluate the compatibility of those data, and 2) evaluate knowledge regarding the discreteness of yellow perch stocks, and/or develop a study plan to address the question. The LMC believes that the primary objectives described in the original, as well as subsequent, charges to the YPTG have been fulfilled, and there is no longer a need for the LMC to maintain a specialized task group for this purpose. Ongoing and additional yellow perch-related work and research activities will be incorporated into the existing LMTC Inshore Fish Working Group.
- The Lake Michigan Committee convened a multijurisdictional Yellow Perch Summit at the University of Illinois Chicago on March 22, 2014. This informational meeting was hosted by the Illinois Department of Natural Resources (ILDNR) and the GLFC. Michigan Sea Grant hosted a live-streaming webinar for stakeholders unable to travel to Chicago in person. The purpose of the meeting was to update anglers and stakeholders about changing Lake Michigan ecology and the current status of yellow perch populations, fishing and management. The program included nine presentations by invited experts and a breakout session where smaller groups of constituents could comment and provide input to Lake Michigan fishery managers. The presentations and breakout session wrap-up are archived online at: [http://www.glfc.org/lakecom/lmc/yellow\\_perch\\_videos.html](http://www.glfc.org/lakecom/lmc/yellow_perch_videos.html). A conference summary report can be obtained at: [http://www.glfc.org/lakecom/lmc/Lake\\_Michigan\\_Yellow\\_Perch\\_Summit\\_Report\\_2014.pdf](http://www.glfc.org/lakecom/lmc/Lake_Michigan_Yellow_Perch_Summit_Report_2014.pdf)
- Following the lake-wide Yellow Perch Summit, the Wisconsin DNR formed a team to investigate use of both stocking and habitat improvement to create a better, localized perch fishery in Lake Michigan harbors and estuaries. This team will create a plan that will outline steps needed to accomplish these improvements; including funding, collaboration with other state and Federal agencies, appropriate yellow perch strain(s), rearing location, stocking numbers, marking requirements, and post-stocking evaluation. Additional details can be found at the following site: <http://dnr.wi.gov/topic/fishing/lakemichigan/LakeMichiganYellowPerchPublicMeeting.html>

**References / Recent Publications** (*Lake Michigan-specific, or in cooperation with Lake Michigan Inshore Fish Working Group*)

- Bacheler, Nathan M., Tammie J. Paoli, and Garret M. Schacht. "Controls on abundance and distribution of yellow perch: predator, water quality, and density-dependent effects." *Transactions of the American Fisheries Society* 140.4 (2011): 989-1000.
- Creque, Sara M., and Sergiusz J. Czesny. "Diet overlap of non-native alewife with native yellow perch and spottail shiner in nearshore waters of southwestern Lake Michigan, 2000–2007." *Ecology of Freshwater Fish* 21.2 (2012): 207-221.
- Creque, Sara M., et al. "Mapping bottom substrate in Illinois waters of Lake Michigan: linking substrate and biology." *Journal of Great Lakes Research* 36.4 (2010): 780-789.
- Forsythe, P. S., J. C. Doll, and T. E. Lauer. "Abiotic and biotic correlates of yellow perch recruitment to age-2 in southern Lake Michigan, 1984–2007." *Fisheries Management and Ecology* 19.5 (2012): 389-399.
- Grzybowski, Michael, et al. "Genetic variation of 17 wild yellow perch populations from the Midwest and east coast analyzed via microsatellites." *Transactions of the American Fisheries Society* 139.1 (2010): 270-287.
- Irwin, Brian J., et al. "Applying structured decision making to recreational fisheries management." *Fisheries* 36.3 (2011): 113-122.
- Janetski, David J., et al. "Recruitment dynamics of age-0 yellow perch in a drowned river mouth lake: assessing synchrony with nearshore Lake Michigan." *Transactions of the American Fisheries Society* 142.2 (2013): 505-514.
- Makauskas, D., and D. F. Clapp. "Status of yellow perch in Lake Michigan, 2010-2011." *Report to the Lake Michigan Committee*. Windsor, ON (2012).
- Miehls, Scott M., and John M. Dettmers. "Factors influencing habitat shifts of age-0 yellow perch in southwestern Lake Michigan." *Transactions of the American Fisheries Society* 140.5 (2011): 1317-1329.
- Redman, Rebecca A., et al. "Old tales in recent context: current perspective on yellow perch recruitment in Lake Michigan." *Transactions of the American Fisheries Society* 140.5 (2011): 1277-1289.
- Rosauer, Daniel R., et al. "Development of yellow perch (*Perca flavescens*) broodstocks: initial characterization of growth and quality traits following grow-out of different stocks." *Aquaculture* 317.1 (2011): 58-66.
- Rydell, J. J., T. E. Lauer, and P. S. Forsythe. "The influence of abiotic factors on gillnet catch rates of yellow perch in southern Lake Michigan, 1989–2006." *Fisheries Management and Ecology* 17.3 (2010): 284-290.
- Walters, Justin T. *Yellow perch *Perca flavescens* gonadal development and spawning in the Indiana portion of Lake Michigan during 2009*. Diss. Ball State University, 2010.
- Weber, Michael J., John M. Dettmers, and David H. Wahl. "Growth and survival of age-0 yellow perch across habitats in southwestern Lake Michigan: early life history in a large freshwater environment." *Transactions of the American Fisheries Society* 140.5 (2011): 1172-1185.
- Wiener, James G., et al. "Toxicological significance of mercury in yellow perch in the Laurentian Great Lakes region." *Environmental Pollution* 161 (2012): 350-357.

**Appendix 1. Lake Michigan statistical districts.**

