Status of Yellow Perch in Lake Michigan 2010-2011

[Michigan DNR crew members Kendra Porath and Carl Christiansen display a few nice northern Lake Michigan yellow perch, 2011]

REPORT TO THE LAKE MICHIGAN COMMITTEE
Windsor, Ontario
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Prepared by:
Dan Makauskas (ILDNR) and David Clapp (MDNRE)

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Yellow Perch Task Group Contact List: 2011-2012

This report was prepared from information provided by the following Lake Michigan Yellow Perch Task Group members and 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).

NAME	AGENCY	E-MAIL	AREA
Brian Breidert	Indiana DNR	bbreidert@dnr.in.gov	Indiana
Wayne Brofka	Illinois Natural History Survey	wbrofka@uiuc.edu	Illinois
Bo Bunnell	USGS-GLSC	dbunnell@usgs.gov	Lakewide
Sergiusz Czesny	Illinois Natural History Survey	czesny@uiuc.edu	Illinois
Dave Clapp	Michigan DNR	clappd@michigan.gov	MM-8 to MM-3
Brad Eggold	Wisconsin DNR	Bradley.Eggold@wisconsin.gov	WM-5
Pradeep Hirethota	Wisconsin DNR	Pradeep.Hirethota@wisconsin.gov	WM-5
John Janssen	University of Wisconsin	jjanssen@uwm.edu	Wisconsin/Illinois
Dave Jude	Univ. of Mich., SNRE	djude@umich.edu	MM-8 to MM-7
Tom Lauer	Ball State University	tlauer@bsu.edu	Indiana
Chuck Madenjian	USGS-GLSC	chuck_madenjian@usgs.gov	Lakewide
Dan Makauskas	Illinois DNR	dan.makauskas@illinois.gov	Illinois
Janel Palla	Indiana DNR	jpalla@dnr.state.in.us	Indiana
Tammie Paoli	Wisconsin DNR	Tammie.Paoli@wisconsin.gov	Green Bay (WM-1)
Rebecca Redman	Illinois Natural History Survey	rredman@uiuc.edu	Illinois
Troy Zorn	Michigan DNR	zornt@michigan.gov	MM-1

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 in recent years. Current commercial and recreational regulations for all Lake Michigan jurisdictions are included as a final section of this status report.

The Yellow Perch Task Group generally produces a status report annually. However, a 2010 report was not produced due to commitments to produce a chapter for the "State of Lake Michigan, 2010" publication. As a result, the current report covers activities from two years, 2010 and 2011.

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, and 2005 year classes are particularly apparent in some data series (e.g., Figures 3 and 5). 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.

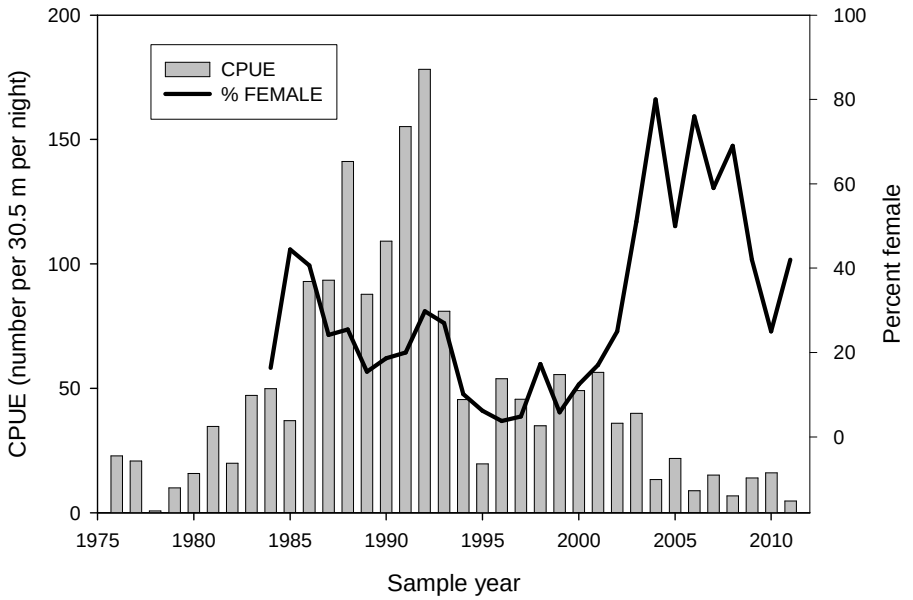


Figure 1. Adult yellow perch relative abundance and percent female in the Illinois waters of Lake Michigan. (ILDNR; data from spring gill net assessment, Chicago and Lake Bluff, IL, 1976 – 2011.)

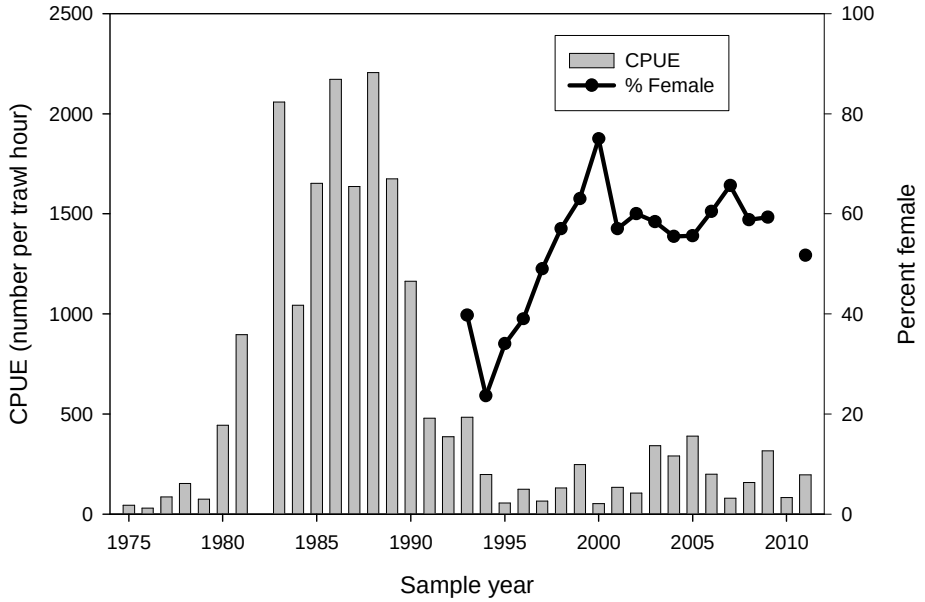


Figure 2. Adult yellow perch trawl CPUE and percent female in Indiana waters of Lake Michigan. (Ball State University; data from summer trawl survey at sites M and K in 1975 – 2011.)

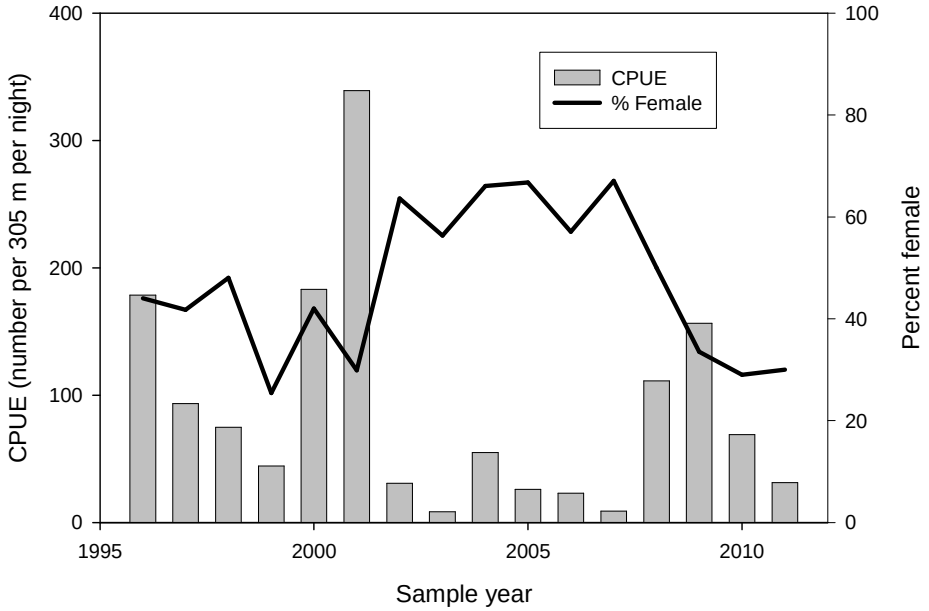


Figure 3. Adult yellow perch gill net catch-per-unit-effort and percent female in the catch at four southern Lake Michigan ports (Grand Haven, Saugatuck, South Haven, and St. Joseph, MI). (MDNR; data from April-June, 1996 – 2011.)

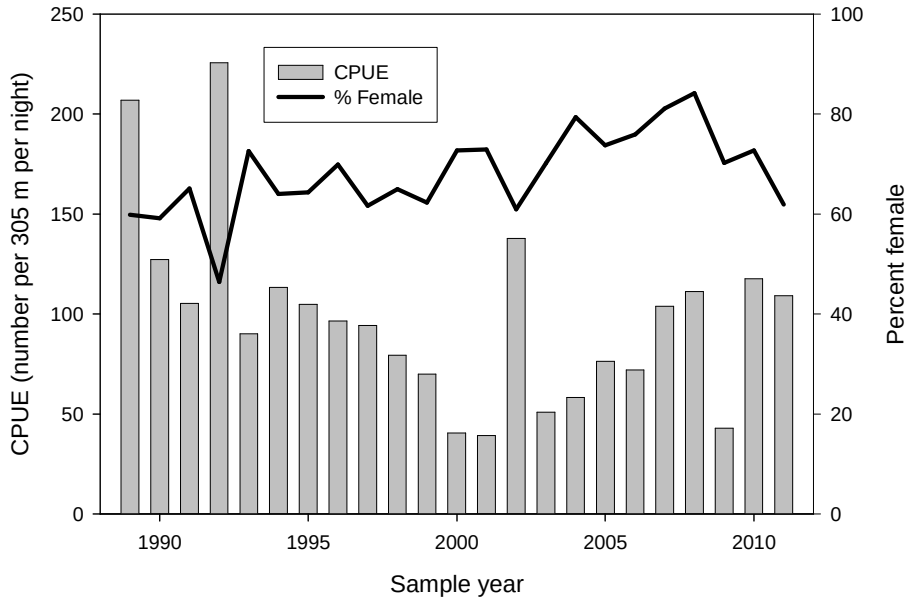


Figure 4. Adult yellow perch gill net catch-per-unit-effort and percent female in the catch in Bays de Noc. (MDNR; data from August to October, 1989 – 2011.)

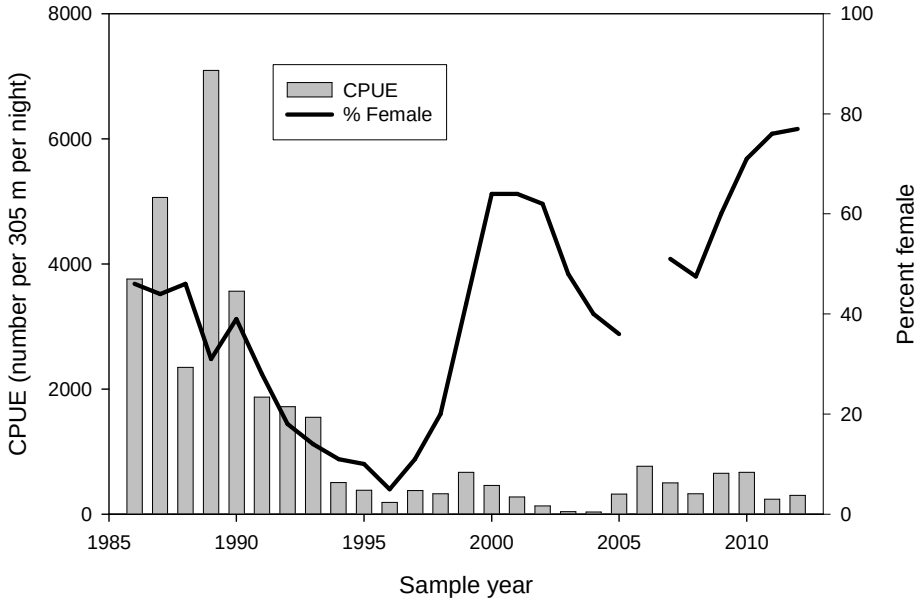


Figure 5. Adult yellow perch relative abundance and percent female in the Wisconsin waters of Lake Michigan. (WDNR; data from winter gill net assessment, Milwaukee, WI, 1986 – 2012.)

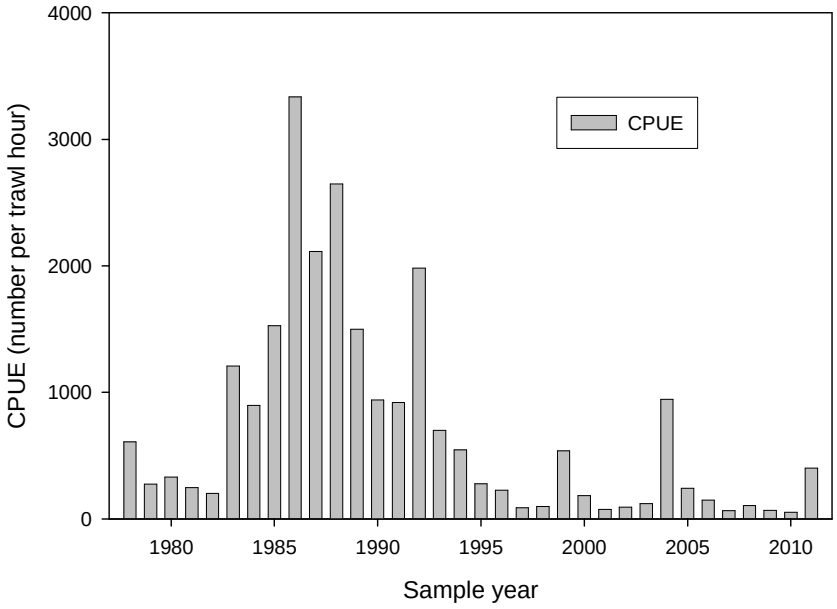


Figure 6. Adult yellow perch relative abundance in the Wisconsin waters of Green Bay. (WDNR; data from summer trawl assessment, Green Bay, WI, 1978 – 2011.)

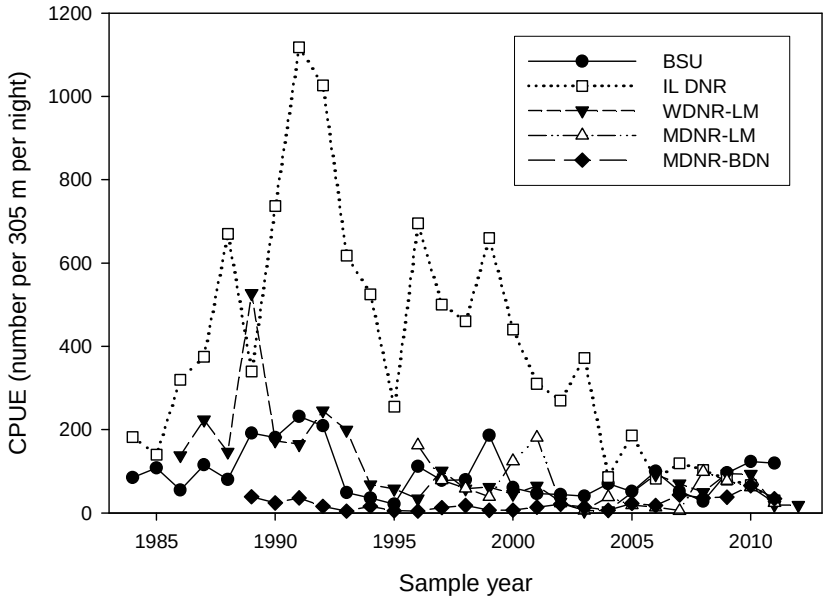


Figure 7. Yellow perch CPE (number of fish per 305 m) in graded mesh gill net consisting of equal length panels of 51-mm, 64-mm, and 76-mm stretched mesh, 1984-2012. (Data from BSU, ILDNR, WDNR, and MDNR; 1997-2000 & 2002-2011 MDNR-LM values calculated from 1996 and 2001 selectivity evaluations.)

Population Age Structure

The yellow perch adult population age structure was determined by evaluating otoliths, opercles, or spines. Although differences in aging techniques and collection methods and times occur among agencies, assessments continued to show contribution to the adult population from the 2005 year class in data collected in most assessments (e.g., Figures 9-10, 12); yellow perch from the 2005 year class still made up from approximately 2-38% of the adult population in the various state waters. Continued survival of the 1998 year class (age 13) is also apparent in data collected in Illinois (Figures 8-9; approximately 2% of the adult population), Michigan (Figure 10; 1%), and Wisconsin (Figure 12; 1%) waters of Lake Michigan. Significant contributions to adult yellow perch populations by more recent year classes (2007, 2009) are apparent in data from Illinois (Figures 8 and 9), Indiana (Figure 14), and Green Bay / Bays de Noc (Figures 11 and 13) waters of Lake Michigan.

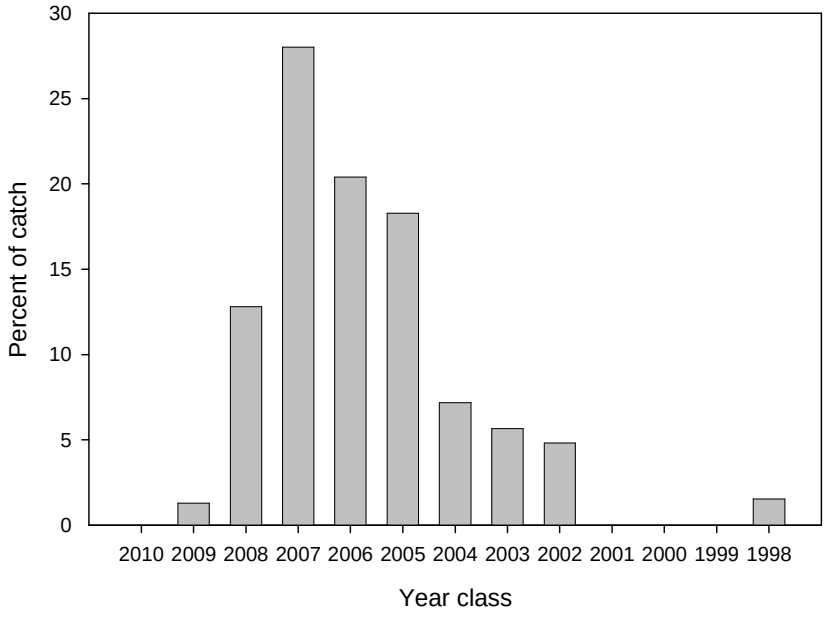


Figure 8. Yellow perch age structure from the Illinois waters of Lake Michigan. (ILDNR; data from spring gill net assessment, Chicago and Lake Bluff, IL, 2011. Ages determined using otoliths.)

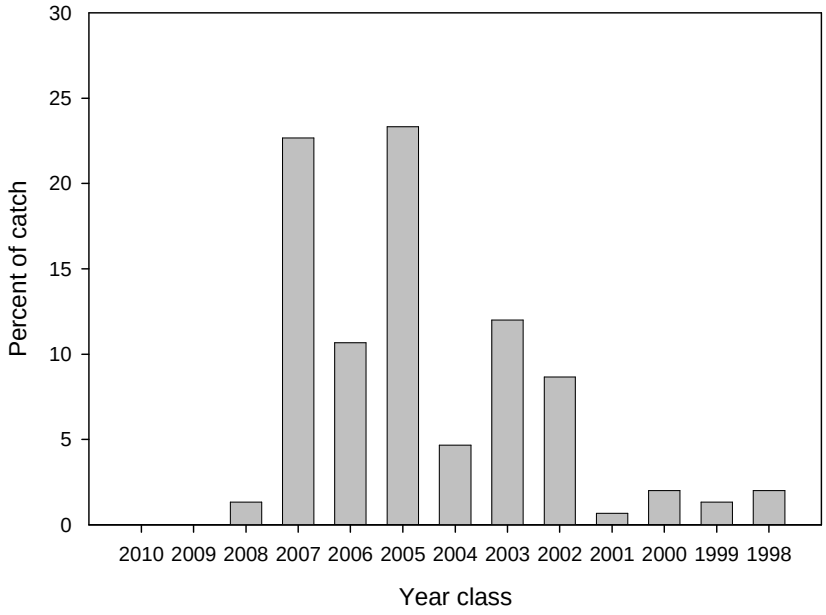


Figure 9. Yellow perch age structure from the Illinois waters of Lake Michigan. (Illinois Natural History Survey; data from spring gill net survey at Waukegan and Lake Forest, Illinois, 2011. Ages determined using otoliths.)

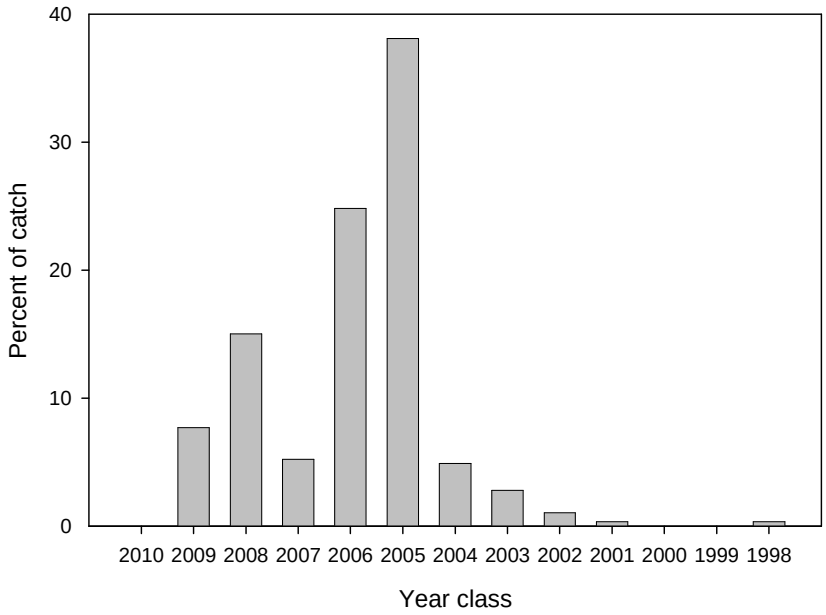


Figure 10. Yellow perch age structure from the Michigan waters of Lake Michigan. (MDNR data from spring gill net assessment, combined three southern Lake Michigan ports – Grand Haven, Saugatuck, and South Haven, MI – 2011. Age determined using spines.)

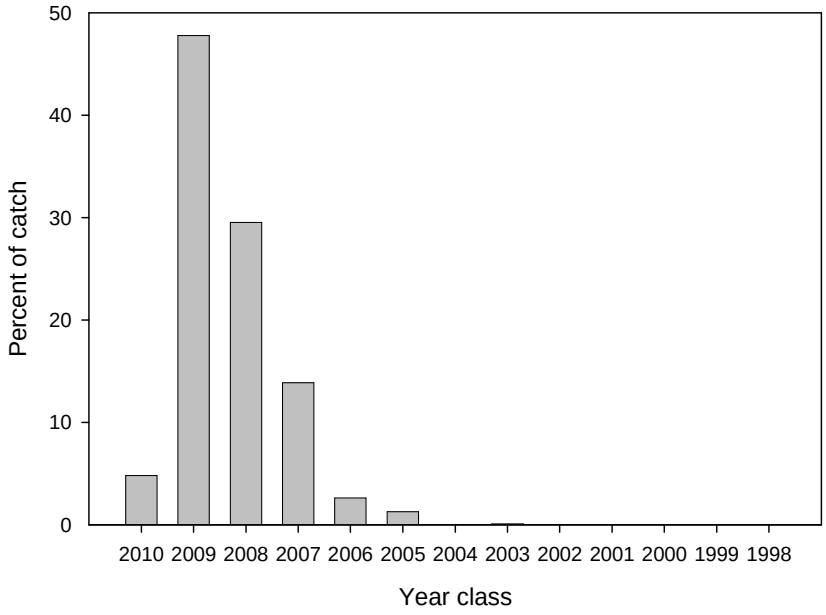


Figure 11. Yellow perch age structure from the Michigan waters of Lake Michigan. (MDNR data from August – October gill net assessment, Bays de Noc, MI – 2011. Age determined using spines.)

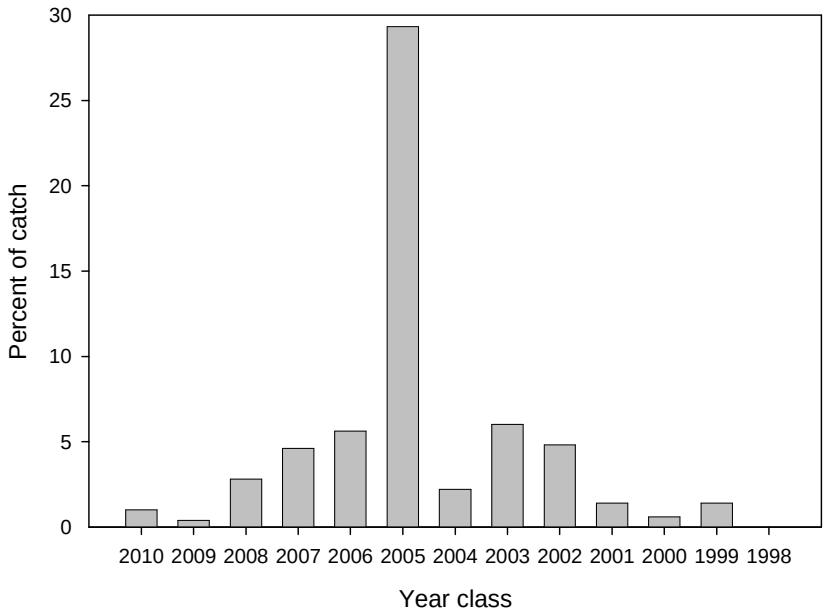


Figure 12. Yellow perch age structure from the Wisconsin waters of Lake Michigan. (WDNR; data from winter gill net assessment, Milwaukee, WI, 2012. Ages determined using spines.)

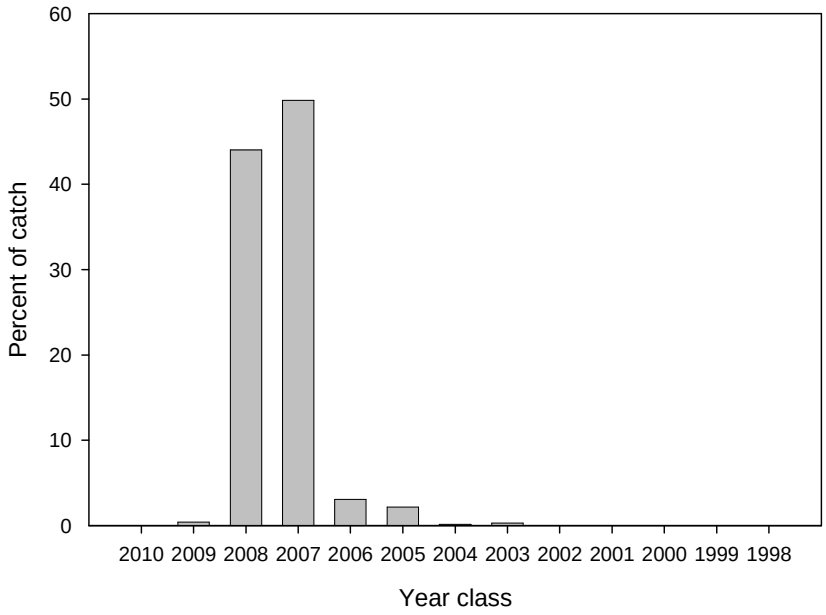


Figure 13. Yellow perch age structure from the Wisconsin waters of Green Bay. (WDNR; data from commercial harvest – all gear types, Green Bay, WI, 2010. Ages determined using spines.)

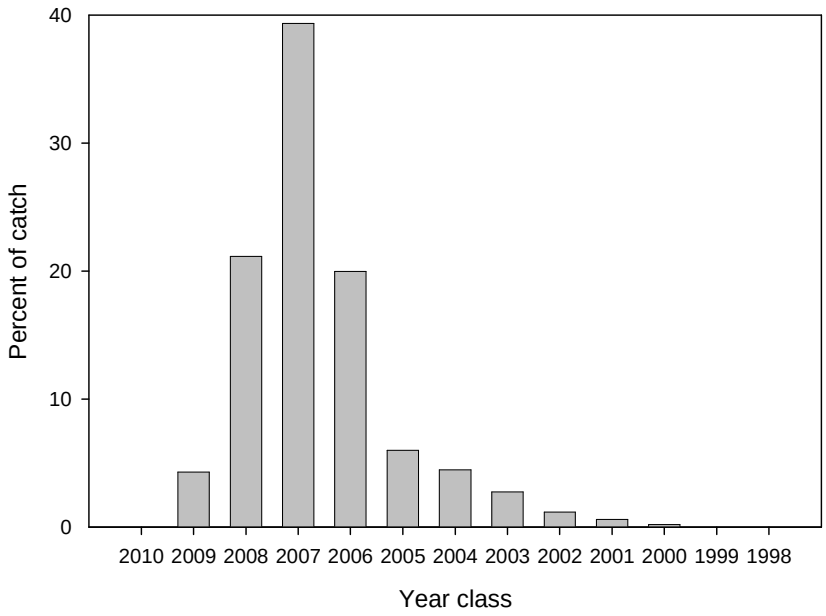


Figure 14. Yellow perch age structure from the Indiana waters of Lake Michigan. (BSU; data from June-July gill net catch, female yellow perch only, 2011. Ages determined using opercles.)

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 (Figures 15-17, 19-21). However, observations of the lack of production of YOY yellow perch in 2011 were just as consistent; indices of YOY yellow perch production in 2011 were near zero in all jurisdictions except Green Bay (Figure 20).

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 are included in a separate section of this report, following this "Recruitment" section.

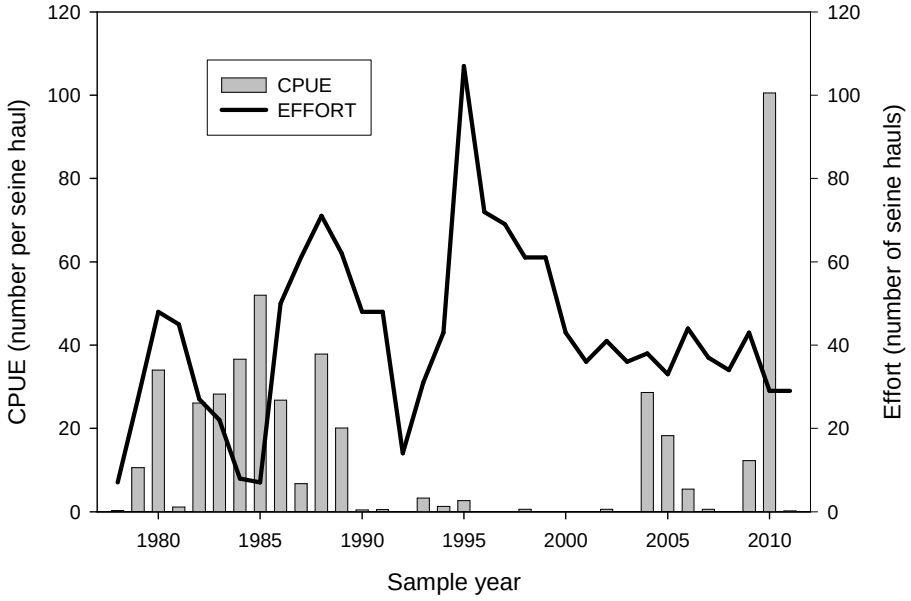


Figure 15. CPUE of YOY yellow perch from the Illinois waters of Lake Michigan. (ILDNR; data from summer beach seining along the Illinois shoreline, 1978 – 2011.)

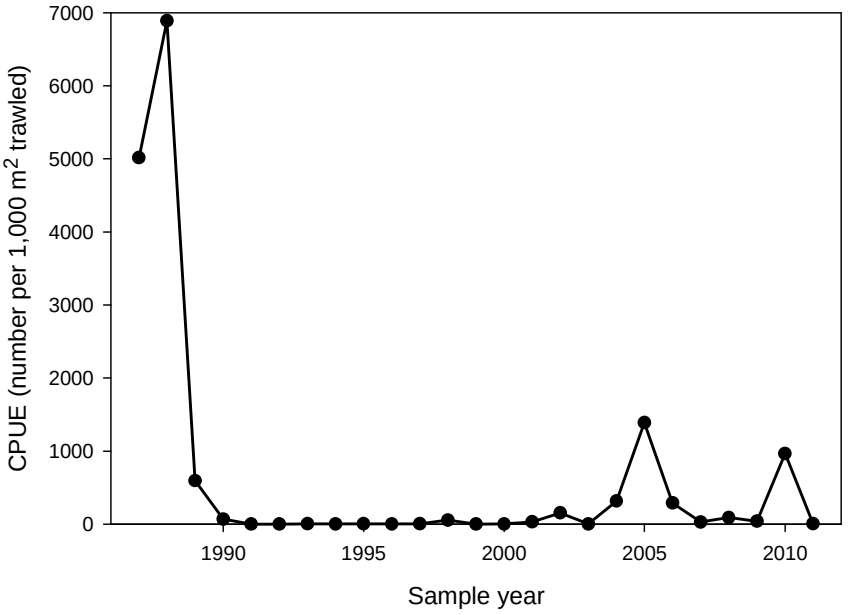


Figure 16. CPUE of age-0 yellow perch in the Illinois waters of Lake Michigan. (INHS; data from summer and fall bottom trawls off Waukegan, IL, 1987 – 2011.)

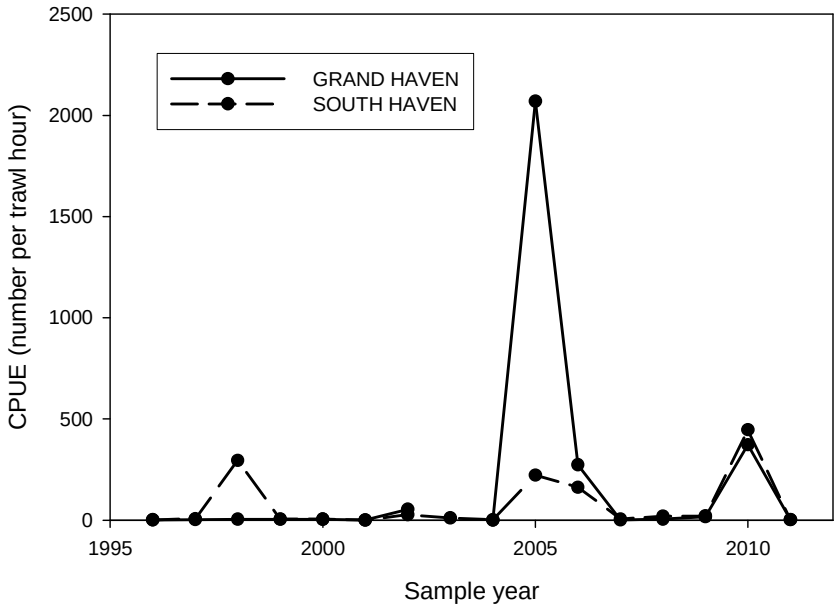


Figure 17. CPUE of age-0 yellow perch in the Michigan waters of Lake Michigan. (MDNR; late summer bottom trawl data from Grand Haven and South Haven, 1996 - 2011. Grand Haven was not sampled in 2003.)

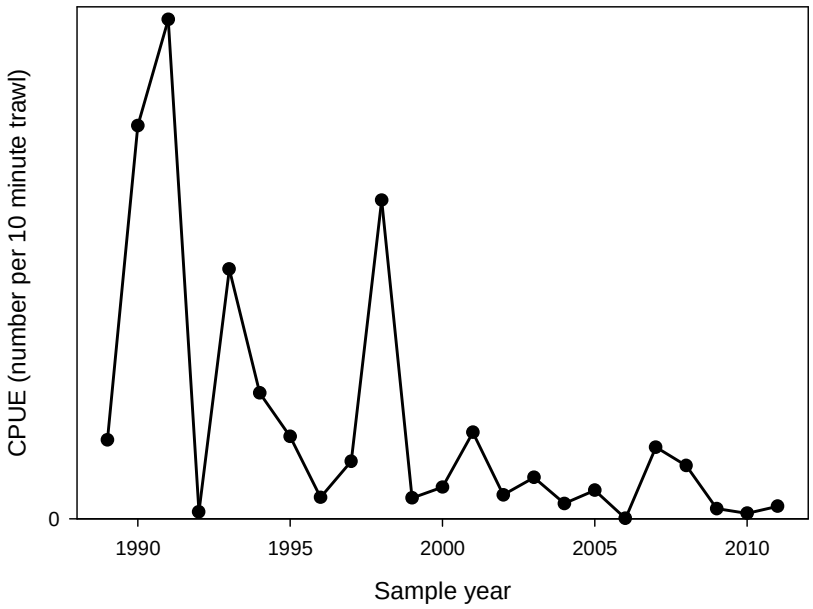


Figure 18. CPUE of age-0 yellow perch in Bays de Noc, Lake Michigan. (MDNR; summer bottom trawl data, 1989 - 2011.)

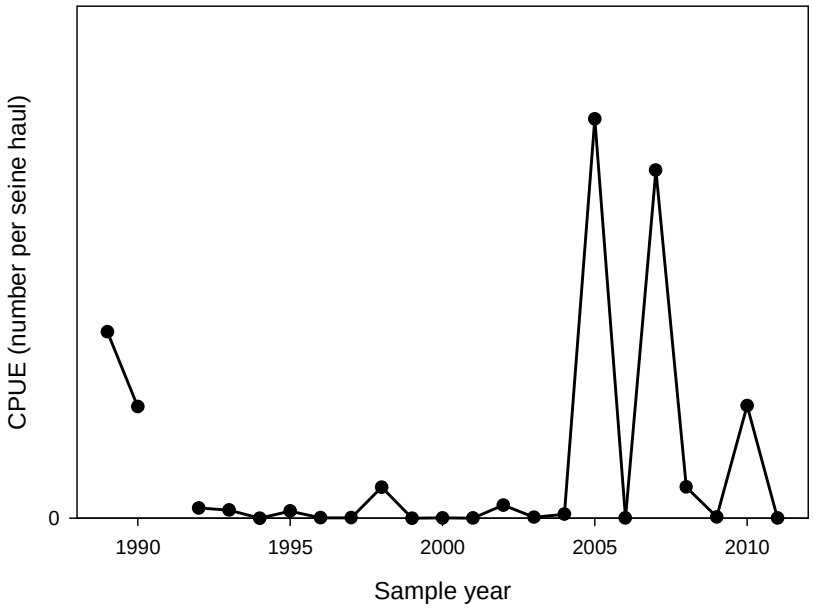


Figure 19. CPUE of age-0 yellow perch from the Wisconsin waters of Lake Michigan. (WDNR; data from summer beach seine assessments along the southern Wisconsin shoreline, 1989 – 2011.)

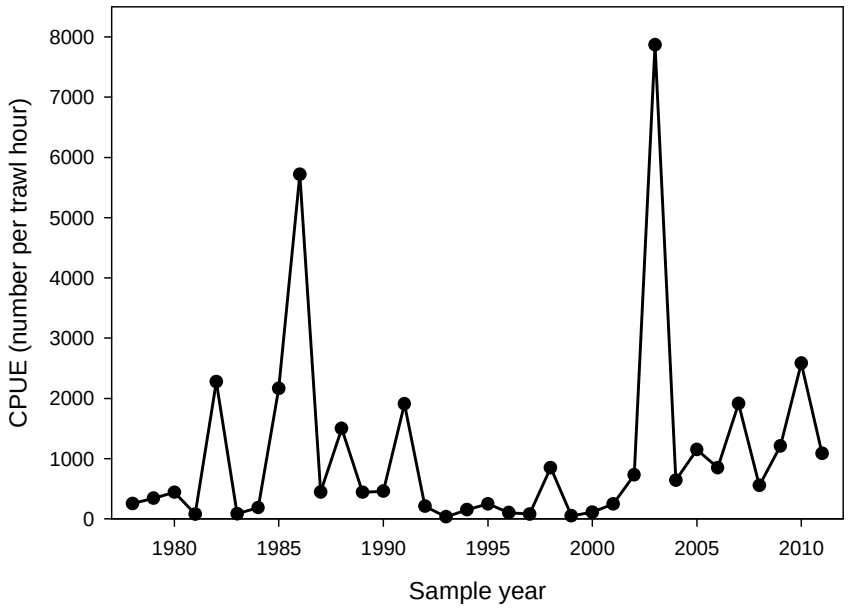


Figure 20. CPUE of age-0 yellow perch from the Wisconsin waters of Green Bay. (WDNR; data from summer trawl assessments, 1978 – 2011.)

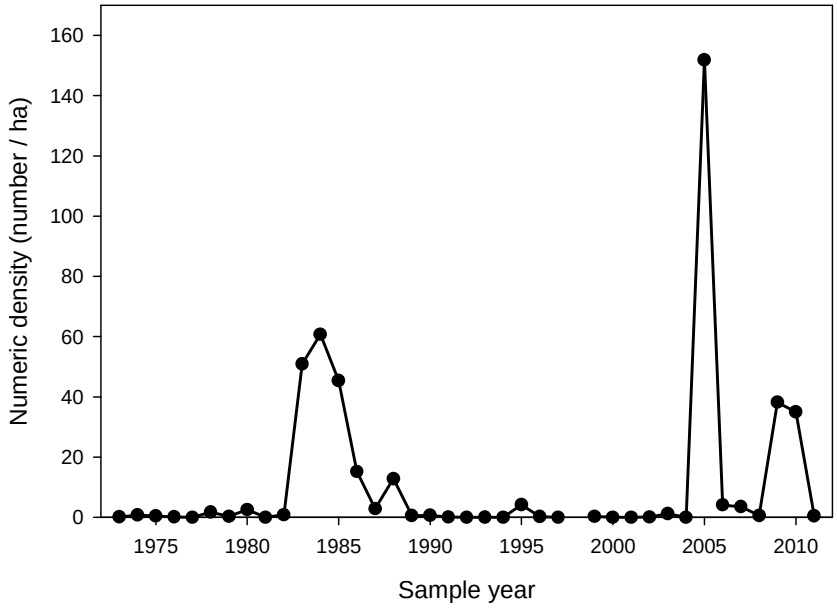


Figure 21. CPUE of age-0 yellow perch, lakewide. (USGS; data from fall bottom trawl assessments, 1973 – 2011.)

Lakewide Assessment Plan – Micromesh Gill Net Evaluation

A Lakewide Assessment Plan being developed by the YPTG will formalize the standard procedures utilized to sample yellow perch throughout Lake Michigan. The yellow perch section of the Lakewide Assessment Plan will be appended to the plans previously developed for lake trout, burbot, and Chinook salmon by the Lake Michigan Technical Committee. Work to address this charge is ongoing; this section of the YPTG report addresses, in part, the charge to "achieve compatibility of information".

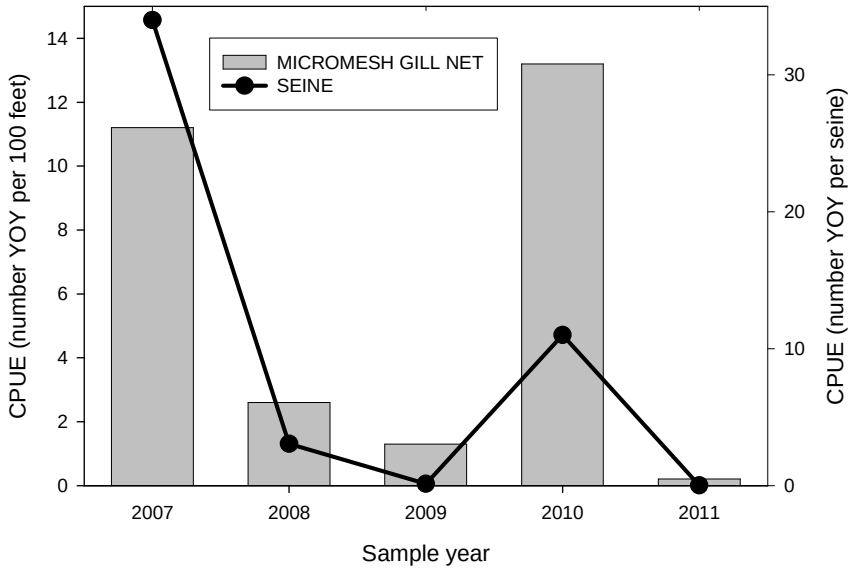
During the winter 2006 YPTG meeting, member agencies agreed to implement standardized spring adult yellow perch assessments (beginning in spring 2007), to coincide with other LMTC spring lakewide assessments (for lake trout and burbot). The results of this standardized spring adult yellow perch sampling are presented in the first section of this report (Figure 7, including *post hoc* standardized data from years prior to 2007), and have been presented annually since 2008.

In addition, 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 due to habitat restrictions. Some preliminary sampling with micromesh nets had been conducted prior to 2007 (Jude and Janssen 2008; Janssen and Luebke 2004), but agencies were able to implement this new survey lakewide in summer 2007 (Makauskas and Clapp 2008). At the winter 2012 meeting of the Lake Michigan Technical Committee, YPTG members in attendance agreed to begin a formal evaluation of the success of this standardized assessment for young-of-year yellow perch. Data from the Wisconsin DNR and Michigan DNR assessments are presented below, to document a portion of this ongoing evaluation. The data presented (Table 1, Figures 22-23) compare results across regions and between gears within regions (Wisconsin – micromesh gill net catches versus seine catches; Michigan – micromesh gill net catches versus trawl catches).

Table 1. Summary of micromesh gill net surveys by Wisconsin DNR and Michigan DNR, 2007-2011.

State	Year	# of sites	# of net sets	Total effort (feet)	# of YOY yellow perch captured	CPUE (YOY per 100 feet)	Mesh sizes fished (bar length, mm)
Wisconsin	2007	2	2	400	45	11.2	6, 8
	2008	2	4	880	23	2.6	Mixed
	2009	2	4	1,000	13	1.3	6
	2010	2	6	1,200	158	13.2	6
	2011	2	5	1,000	2	0.2	6
Michigan	2007	4	12	1,200	1	0.1	8
	2008	5	13	2,600	22	0.8	6, 8
	2009	2	4	800	0	0	6, 8
	2010	4	6	1,200	254	21.2	6, 8
	2011	5	10	2,000	10	0.5	6, 8

A) WISCONSIN - MICROMESH VS. SEINE



B) MICHIGAN - MICROMESH VS. TRAWL

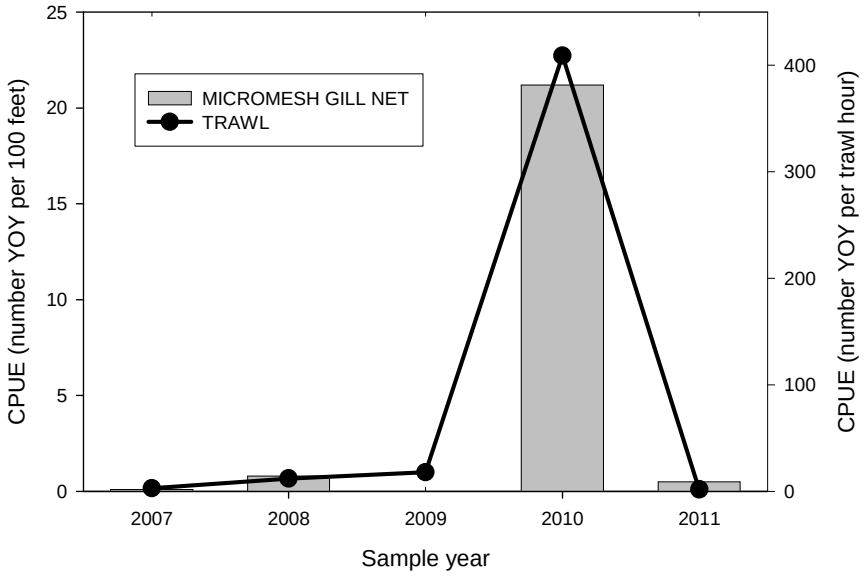


Figure 22. Comparison between standard micromesh assessment catches and traditional YOY yellow perch assessment catches in Wisconsin (A; traditional gear = seine) and Michigan (B; traditional gear = trawl) waters, 2007-2011.

As seen in Figure 22, there was excellent correspondence between micromesh gill net results and traditional methods of YOY yellow perch assessments in Wisconsin and Michigan waters. While still quite good, correspondence across states for micromesh results was not quite as dramatic (Figure 23). Micromesh assessments in both states captured the good production of

YOY yellow perch in 2010, and catches were generally low in both states in 2008, 2009, and 2011. However, 2007 results were not consistent between the two regions of Lake Michigan.

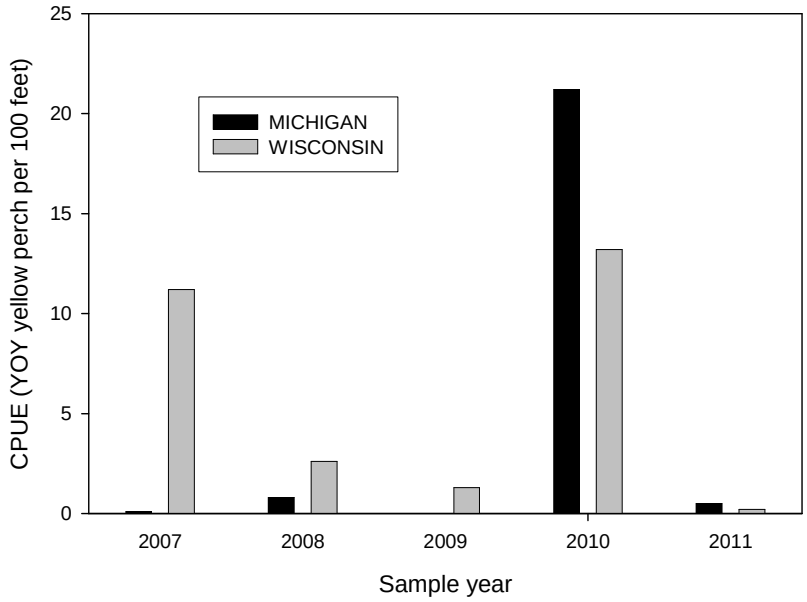


Figure 23. Comparison between standard micromesh assessment catches in Wisconsin and Michigan waters, 2007-2011.

In addition to doing an adequate job of sampling YOY yellow perch, micromesh gill nets caught good numbers of older perch, including yearlings; this gear appears to be beneficial for assessment of yearling fish that are not yet susceptible to standard adult survey gear. For example, while MDNR nets caught 287 YOY perch during the period 2007-2011, an additional 294 yearling and older yellow perch were sampled during this period. As expected, the catch of yearling yellow perch was closely linked to previous years' production of YOY fish. Additional analyses will be completed during 2012 and will be presented in the 2013 annual report, but early indications are that this will be a valuable assessment for providing a comparable measure of young-of-year yellow perch abundance across all nearshore habitats in Lake Michigan.

2012 Yellow Perch Harvest Restrictions

Sportfishing regulations:

- Illinois
  - July closed to sportfishing for yellow perch (exception: under 16 years of age – 10 fish bag limit)
  - 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 45th parallel) / 50 fish (north of 45th 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 2012 is 100,000 pounds)

Task Group Meetings

Outside of the regular summer and winter LMTC meetings, no additional meetings of the YPTG were convened during 2010-11. However, during this period members of the YPTG did complete the "Inshore and Benthivore Objectives" chapter of the 2010 State of Lake Michigan draft publication.

References

Janssen, J., and M. A. Luebke. 2004. Preference for rocky habitats by age-0 yellow perch and alewives. Journal of Great Lakes Research 30:93-99.

Jude, D., and J. Janssen. 2008. Impact of round gobies on yellow perch recruitment success. Annual progress report to U.S. EPA.

Makauskas, D., and D.Clapp. 2008. Status of Yellow Perch in Lake Michigan, and Yellow Perch Task Group Progress Report. Minutes of the Lake Michigan Committee.

Appendix 1. Lake Michigan statistical districts.