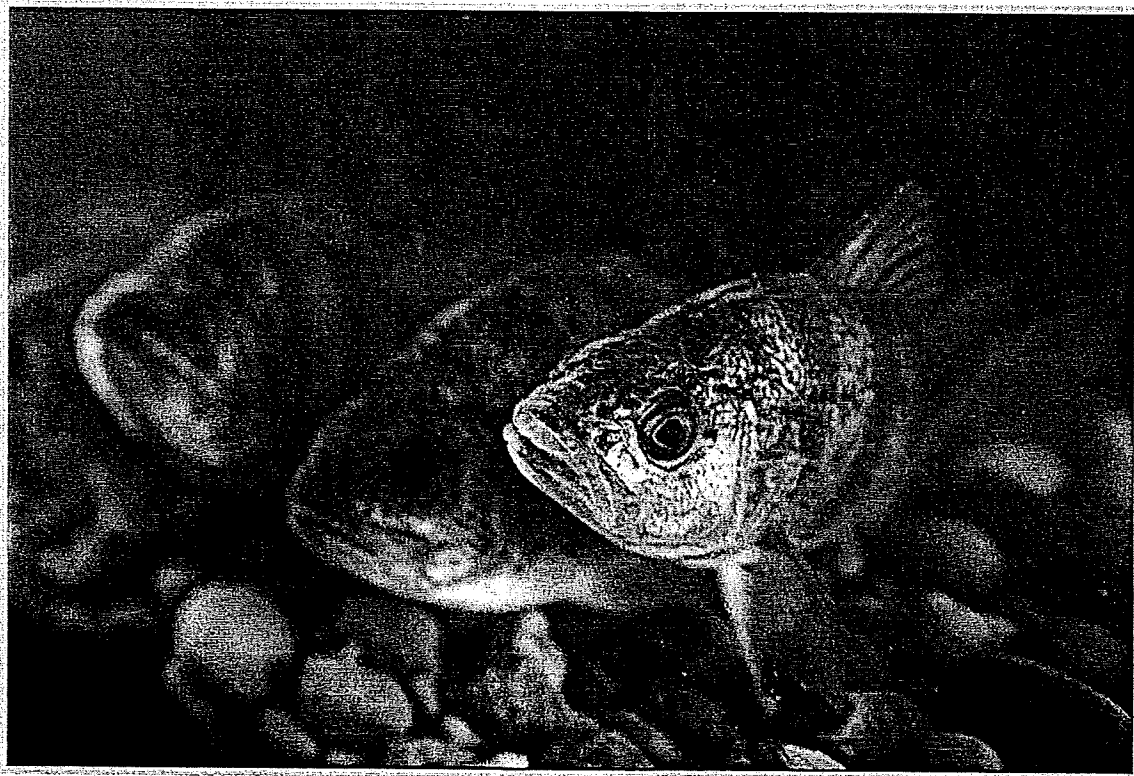


Lake Michigan Committee
Milwaukee, WI
March 19-20

Status of Yellow Perch in Lake Michigan and Yellow Perch Task Group Progress Report



REPORT OF THE LAKE MICHIGAN TECHNICAL COMMITTEE

Prepared by:
Dan Makauskas (ILDNR) and Paul Allen (BSU)

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.

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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 and size structure data available for different parts of the lake. The final section consists of estimates (or indices) of juvenile yellow perch recruitment: most of this data comes 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.

Adult Relative Abundance

The data assembled was collected with either gill nets or bottom trawls (Figures 1-4). Generally, this information shows a long-term decline in adult yellow perch abundance. The longer data series show a peak abundance in the mid- 1980s to early 1990s, followed by significant declines through the early 2000s (Figures 2 and 3). Adult yellow perch abundance decreased from 2001 levels in each of the jurisdictions reporting in 2002 (Figures 1-4). Since the mid 1990s there has been a general upward trend in the frequency of females within the adult assessments and comprised over 60% of the catch in Wisconsin and Indiana waters of Lake Michigan in 2002 (Figures 2 and 3).

Population Age and Size Structure

The yellow perch adult population age structure was determined by assessing otoliths, opercles, or spines by Lake Michigan management agency personnel and researchers. Although difference in aging techniques and collection methods and times occur between agencies, the 1998 class continued to dominate the adult population in 2002 (Figures 5-8). Only in Indiana waters of Lake Michigan was there any semblance of a second year class (2001) that contributed to the adult population (Figure 5).

The adult population size structure of yellow perch from Indiana waters of Lake Michigan exhibits a bimodal distribution (Figure 9). The first mode at 80 to 89 mm correlates with the 2001 year class, while the second mode at 150 to 169 mm expresses the 1998 year class. Although overall population abundance is low, growth rates for the 1998 year class are well below the rates exhibited by earlier year classes (Allen et al. 2002).

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 this information are collected using bottom trawls or beach seines. Recruitment of young-of-the-year YOY yellow perch were at there highest level since 1998 in Michigan, Wisconsin, Illinois, and Indiana (Figures 10-14). However, YOY abundance remained at relatively low levels when compared to the longer term data series from Wisconsin, Illinois, and Indiana (Figure 11 -14). Although data are reported for YOY caught in Indiana, recruitment is established as age 2 yellow perch, the age they are fully vulnerable to the bottom trawl. Thus, recruitment in Indiana of age 2 fish (2000 year class) to the fishery in 2002 was low (Figure 15).

Adult Relative Abundance

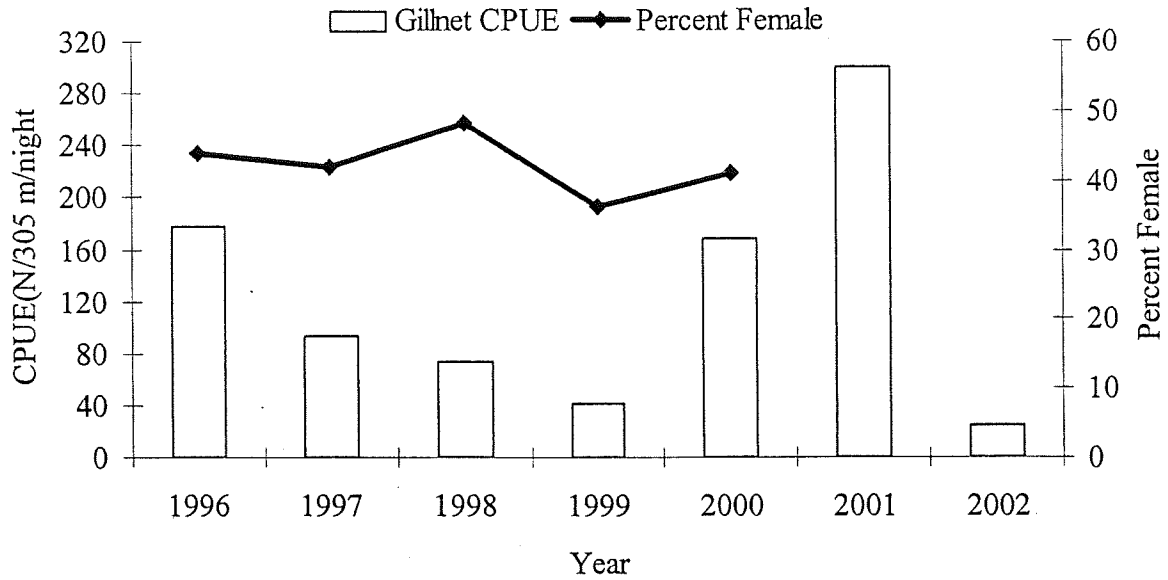


Figure 1. Adult yellow perch gill net catch-per-unit-effort and percent of females in the catch at four southern Lake Michigan Ports (Grand Haven, Saugatuck, South Haven, and St. Joseph, MI). (MDNR data from April-June, 1996 – 2002).

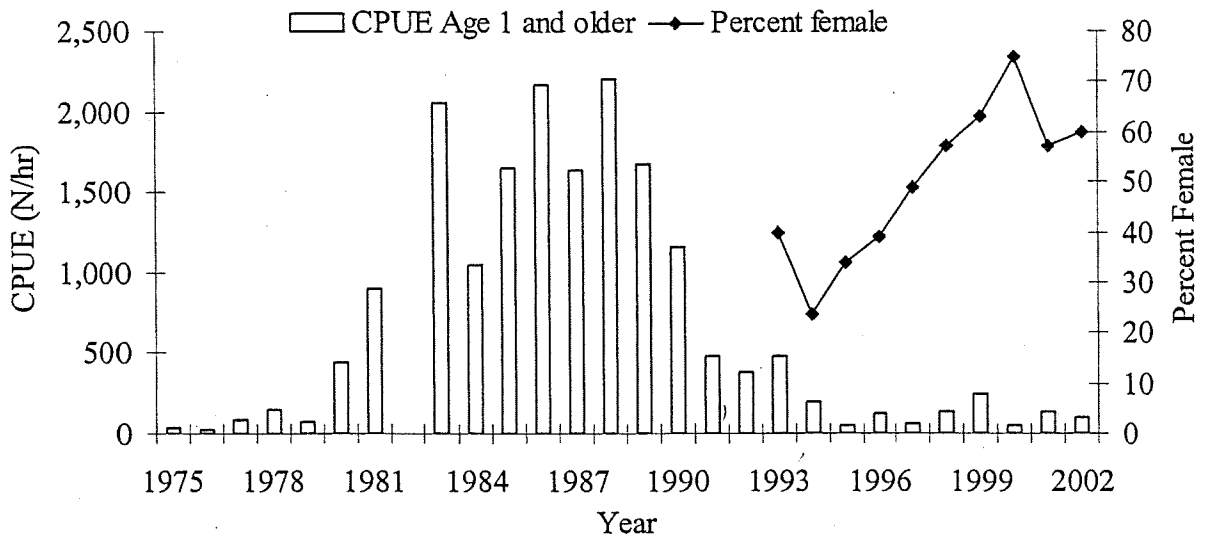


Figure 2. Adult yellow perch trawl CPUE and percent female in Indiana waters of Lake Michigan. (Ball State University; data from summer trawl survey at sites M, K, and G in 1975 – 2002).

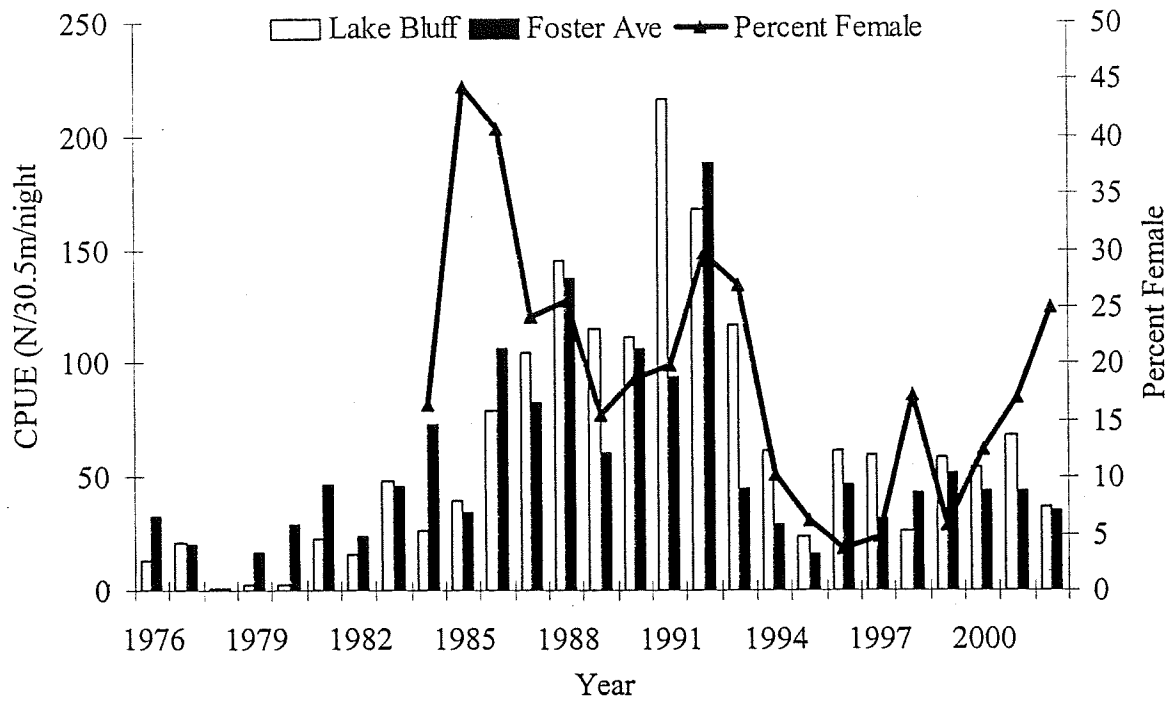


Figure 3. Adult yellow perch relative abundance and percent female in the Illinois waters of Lake Michigan. (ILDNR; data from spring gill net assessment, Chicago and Lake Bluff, IL, 1976 – 2002).

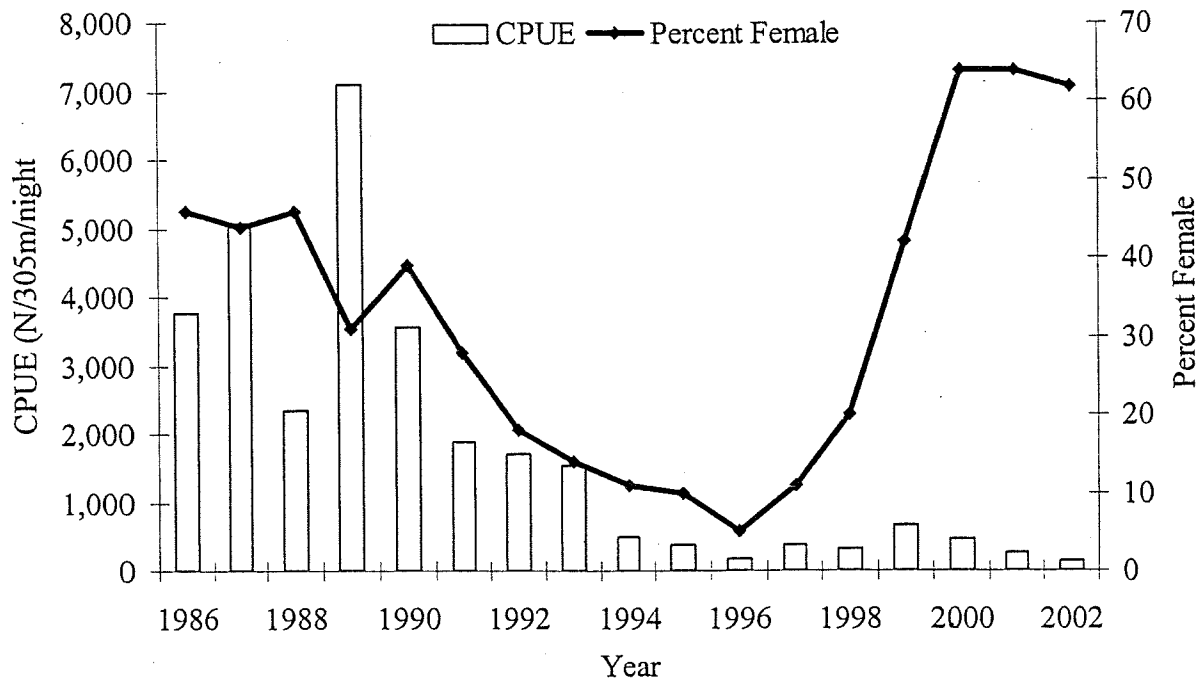


Figure 4. Adult yellow perch relative abundance and percent female in the Wisconsin waters of Lake Michigan. (WDNR; data from winter gill net assessment, Milwaukee, WI, 1986 – 2002).

Population Age and Size Structure

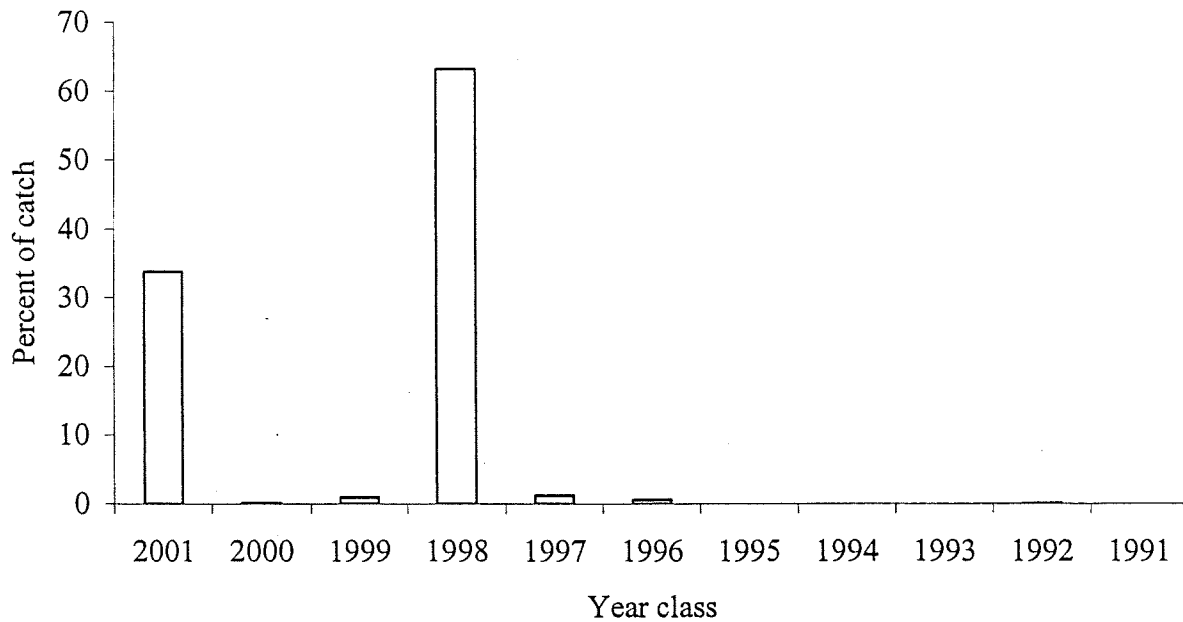


Figure 5. Yellow perch age structure from the Indiana waters of Lake Michigan. (Ball State University; data from summer trawl survey at sites M, K, and G Indiana, 2002. Ages determined using opercles).

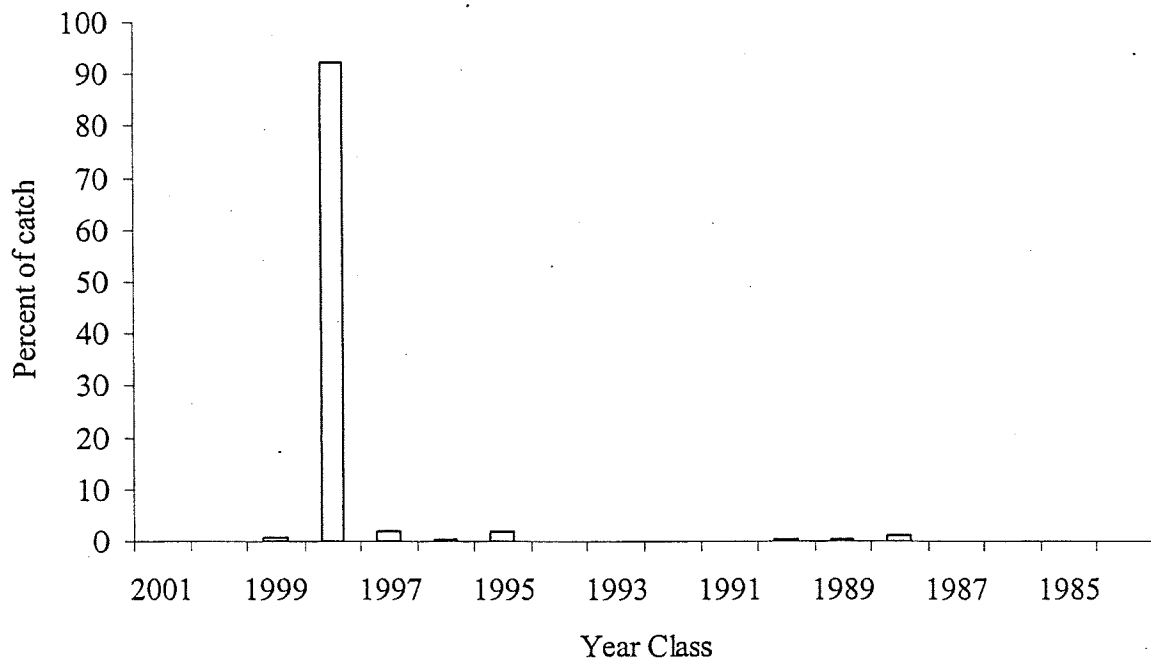


Figure 6. Yellow perch age structure from the Illinois waters of Lake Michigan. (ILDNR; data from spring gill net assessment, Chicago and Lake Bluff, IL, 2002. Ages determined using otoliths).

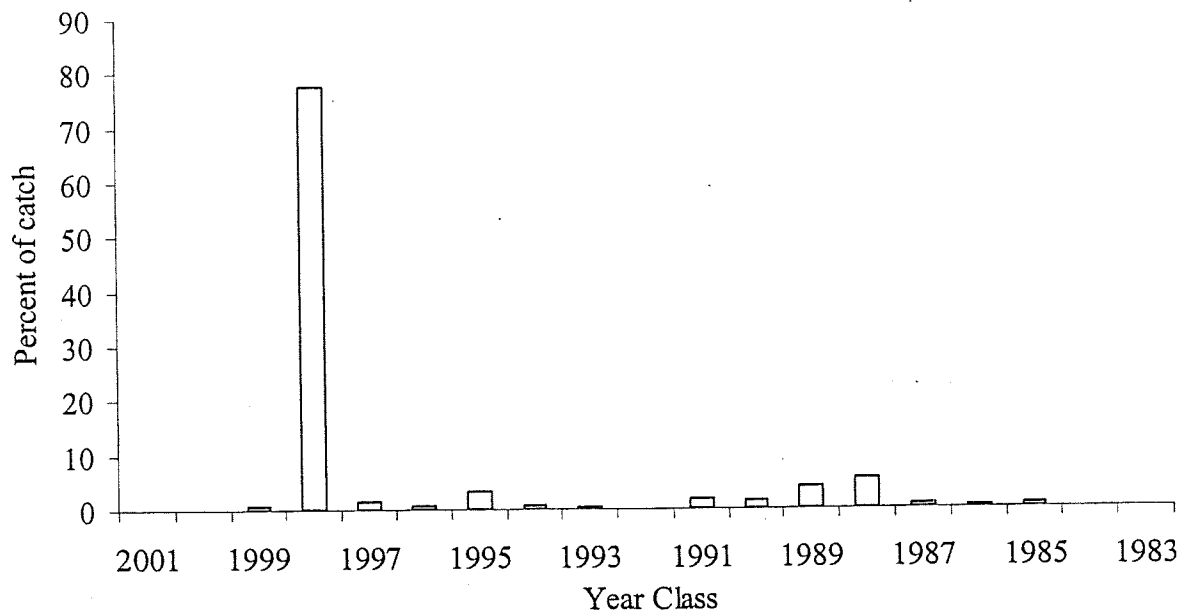


Figure 7. Yellow perch age structure from the Illinois waters of Lake Michigan. (INHS; data from spring fyke net sampling, Waukegan and Lake Bluff, IL, 2002. Ages determined using otoliths).

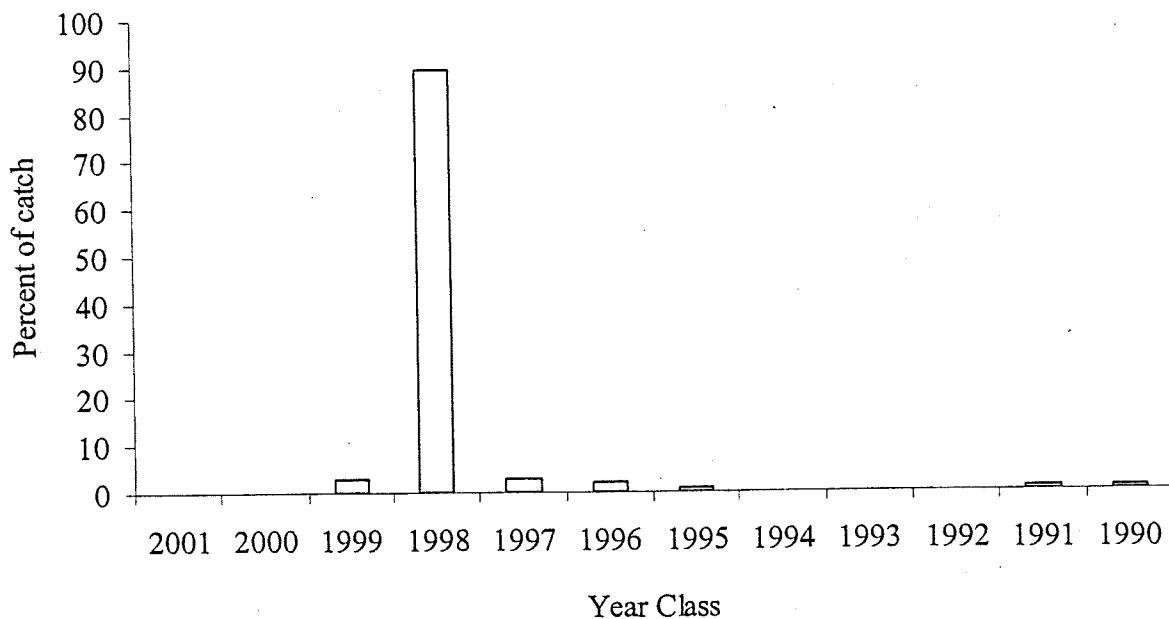


Figure 8. Yellow perch age structure from the Wisconsin waters of Lake Michigan. (WDNR; data from winter gill net assessment, Milwaukee, WI, 2002. Ages determined using spines).

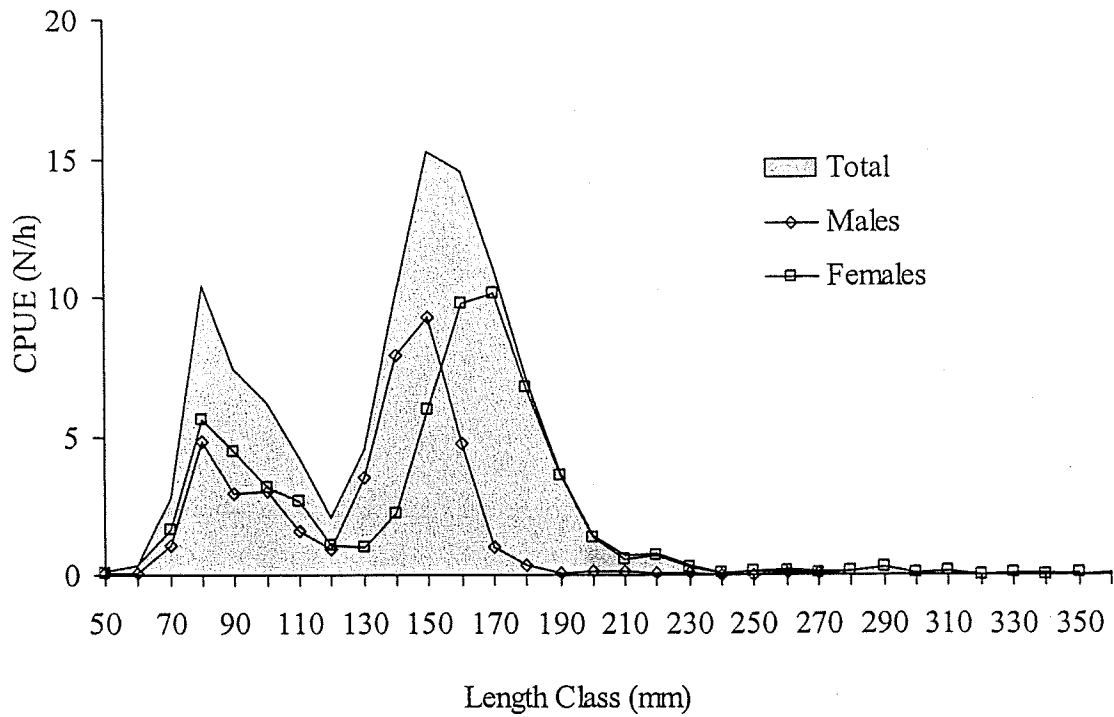


Figure 9. Length composition of the trawl catch of yellow perch age ≥ 1 in Indiana waters of Lake Michigan, 2002.

Recruitment

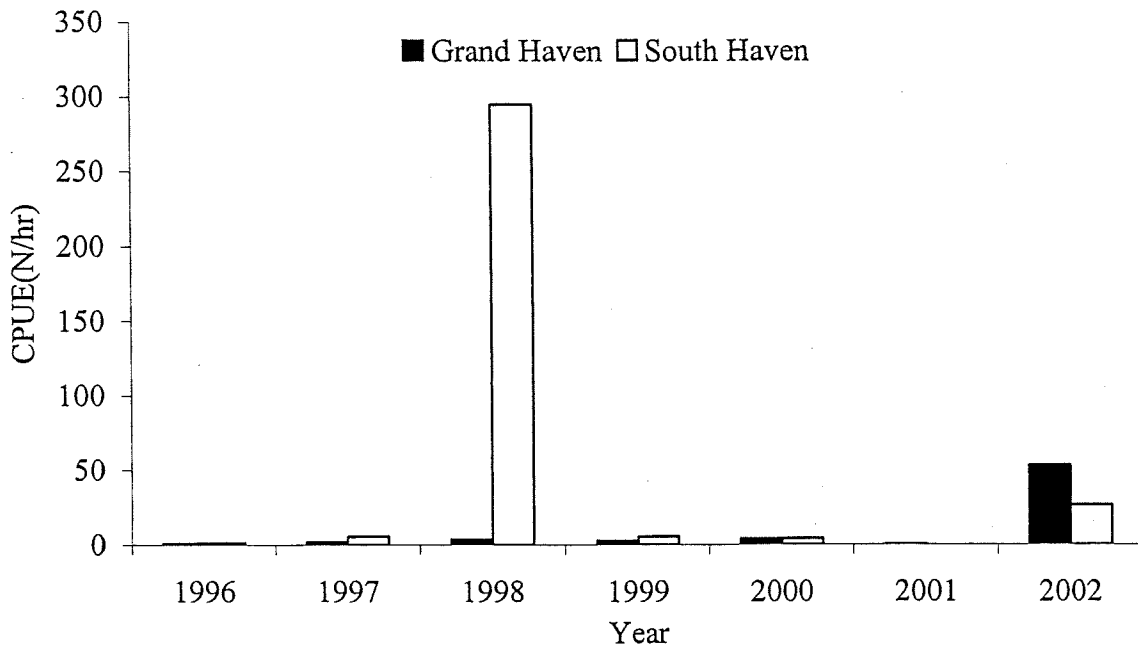


Figure 10. Bottom trawl data from Grand Haven and South Haven, Michigan 1996 - 2002.

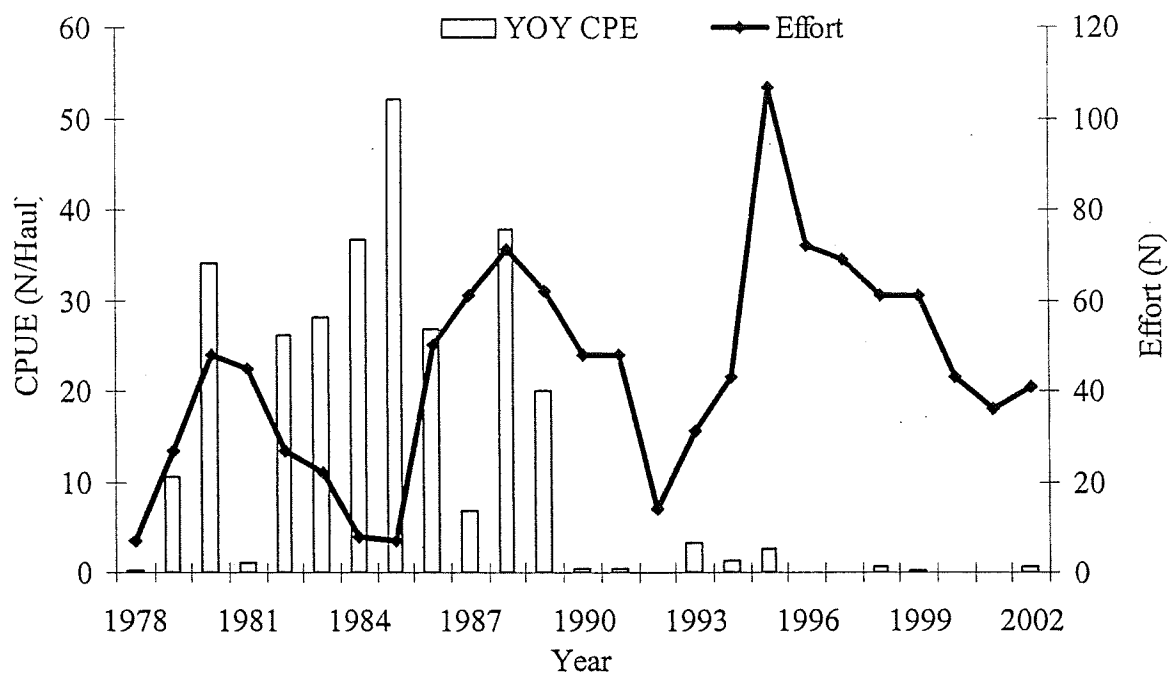


Figure 11. CPUE of YOY yellow perch from the Illinois waters of Lake Michigan. (ILDNR; data from summer beach seining along the Illinois shoreline, 1978 – 2002).

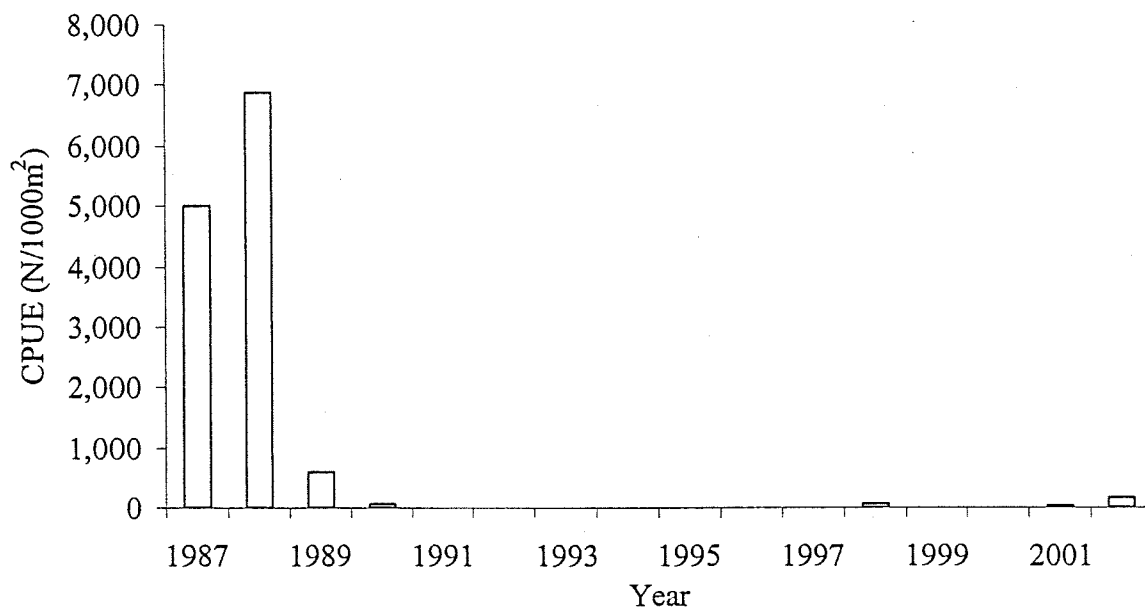


Figure 12. CPUE of age-0 yellow perch in the Illinois waters of Lake Michigan. (INHS; data from summer and fall bottom trawls off Waukegan, IL, 1987 – 2002).

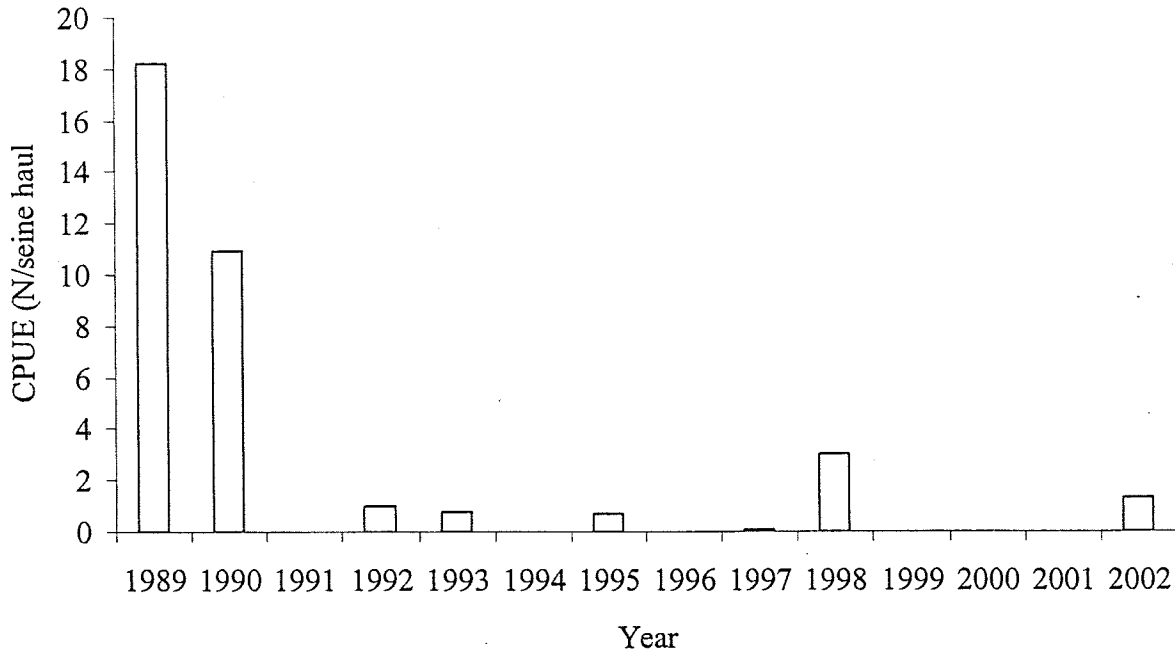


Figure 13. CPUE of age-0 yellow perch from the Wisconsin waters of Lake Michigan. (WDNR; data from summer beach seine assessments along the southern Wisconsin shoreline, 1989 – 2002).

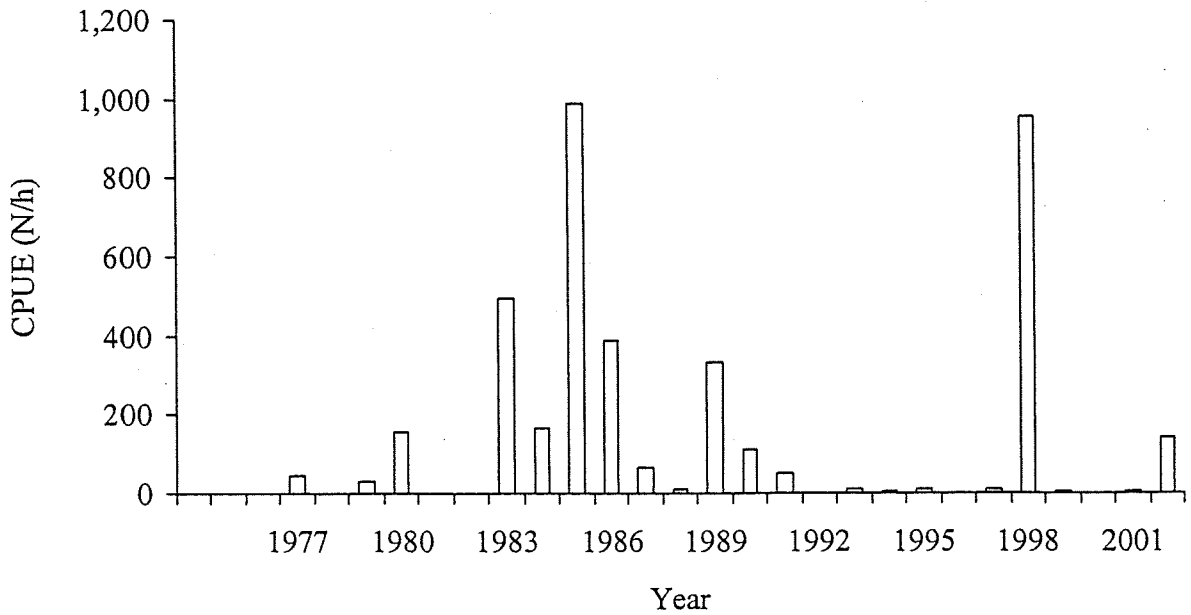


Figure 14. Mean trawl CPUE of age-0 yellow perch for pooled June-August sample periods in Indiana waters of Lake Michigan.

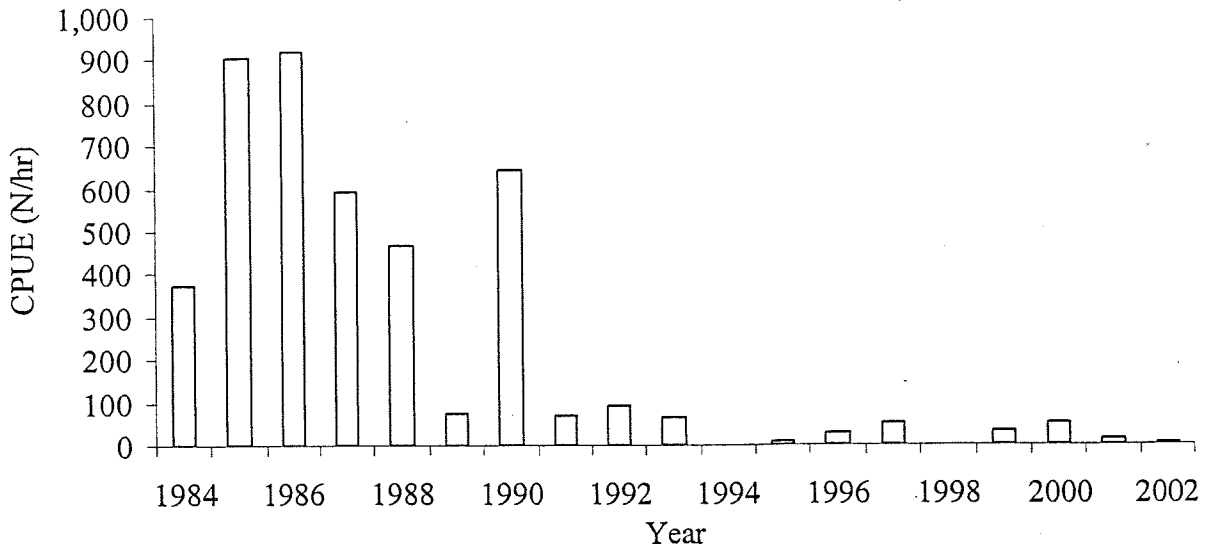


Figure 15. CPUE of age-2 yellow perch from the Indiana waters of Lake Michigan. (Ball State University; data from summer bottom trawl assessments, 1984 – 2002).

2002 Yellow Perch Harvest Restrictions

Sportfishing regulations:

- Illinois
 - July 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 45th parallel)
- Wisconsin (Lake Michigan)
 - May 1 through June 15; closed to sportfishing for yellow perch (per 2002 emergency rule)
 - Daily bag limit 5 fish
- Wisconsin (Green Bay)
 - March 16 through May 15; closed to sportfishing for yellow perch
 - Daily bag limit 10 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 is 20,000 pounds)

Yellow Perch Task Group Progress Report

The Yellow Perch Task Group (YPTG) was formally given the following four new charges by the Lake Michigan Committee in May 2000:

1. **Develop a Lakewide Assessment Plan for yellow perch and associated fish species by formalizing the procedures utilized to achieve compatibility of information and to standardized sampling methodology for yellow perch;**
2. **Formally summarize, in a GLFC report, a Fisheries article, or through other means, the work previously conducted by the Yellow Perch Task Group that addressed the original hypothesis set forward for yellow perch recruitment failure;**
3. **Identify any additional work necessary to address the original hypotheses for yellow perch recruitment failure; and**
4. **Develop and implement a lakewide population model that describes the yellow perch population in Lake Michigan providing estimates of total abundance, age and size structure, and geographical distribution.**

The following section of this report provides a brief summary of the progress made towards the completion of these four charges.

Charge #1: Lakewide Assessment Plan.

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.

Currently, researchers are attempting to develop an ideal sampling strategy as well as alternative strategy for offshore sampling. This will require vessel determination, transect design and equipment, and day versus nighttime sampling. The anticipated completion date for this charge is December 2003.

Charge #2: Formalize YPTG work.

This charge was completed January 2003 with the submission of a manuscript to Fisheries. The article describes the development of a yellow perch research initiative on Lake Michigan and the progress made towards addressing yellow perch recruitment questions derived from previous charges from the LMC.

Charge #3: Identify any additional work to address yellow perch recruitment failure.

2002 marked the sixth year of the lakewide research initiative implemented by the Lake Michigan Management Agencies in 1997. The goal of this research effort is to identify likely causes for the lack of perch recruitment observed in Lake Michigan in the early 1990s. The Lake Michigan Yellow Perch Task Group has addressed several hypotheses that may be limiting the

survival of yellow perch (see the 2000 and 2001 YPTG Progress Report for a list of hypotheses and the work conducted to address the hypotheses).

A lakewide yellow perch tagging database is being developed in hopes of providing better direction for future research in the areas of perch movement such as spawning-site fidelity, home range, and directional preference. The Illinois Natural History Survey will perform a double tagging study in 2003 and 2004 to compliment the lakewide mark and recapture performed from 1996 to 2000 by Illinois, Wisconsin, Michigan, and Indiana.

Researchers are the process of developing a study that focuses on off-shore transport of larval yellow perch in Lake Michigan and how that may effect perch recruitment. Their study would require sampling the areas of the lake 10 to 20 miles offshore and further, which compliments the near-shore larval sampling already occurring on an annual basis. They are attempting to address the issues of the time it takes for larval yellow perch move offshore and how they make it back to near-shore areas.

Charge #4: Develop and implement a lakewide yellow perch population model.

Three different statistical catch-at-age models were developed for each of three regions of Lake Michigan (Illinois, Wisconsin, and Indiana-Michigan). Indiana and Michigan were combined due to a limited long-term data set from Michigan and insufficient commercial fishery data from Indiana. Each model modeled sex separately from age 2 to 9 for the years 1986 to 2001. The natural mortality rate was established at 37% and fishing mortality was year and age specific. Selectivity was modeled as a function of length and the model incorporated a growth model to track changes in mean length at age over time for both sexes.

Findings:

1. Illinois and Indiana/Michigan model showed the population in 2001 at 9% of what it was in 1986, while Wisconsin was at 3%.
2. The estimated spawning stock biomass for all of southern Lake Michigan, biomass of females 21 cm and larger is about the same as in 1986.
3. Fishery was being over fished.

Concerns:

1. Aging error-which can affect the mean length at age as well as blur patterns in recruitment over time.
2. Selectivity of the commercial fishery was difficult to estimate.

Needs:

1. Good fishery independent survey.
2. Accurate estimates of length or age composition of fish harvested and total harvest.
3. Annual sampling is a must. If one year is missed immediately follow-up the next year.
4. Models probably need five years of data to see effects of regulation changes to the fishery.

Task Group Meetings

The spring 2002 meeting of the YPTG was held at the Nature Center in Indiana Dunes State Park on April 9th. Arrangements were made by Brian Breidert.

The winter 2002 of the YPTG meeting was held in conjunction with the Midwest Fisheries Conference on December 2 – 3 in Bettendorf, Iowa. Arrangements were made by Paul Allen.

The spring 2003 meeting of the YPTG was held on March 18th at the Great Lakes Water Institute in Milwaukee, Wisconsin. Arrangements were made by Pradeep Hirethota and John Janssen.

References

Allen, P. J., T. E. Lauer, and T. S McComish. 2002. Year two progress report: dynamics and models of the yellow perch in Indiana waters of Lake Michigan and near-shore fish community characteristics. Report of Ball State University to Indiana Department of Natural Resources, Division of Fish and Wildlife, Indianapolis.

Appendix 1 Lake Michigan statistical districts.

