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REPORT OF THE LAKE MICHIGAN TECHNICAL COMMITTEE

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

Status of Yellow Perch in Lake Michigan

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Northern Lake Michigan

Assessment data from this portion of the lake is sparse. Electrofishing was conducted in the fall (September) at night in Epoufette Bay from 1993 through 1997 by COTFMA. The resulting catches of yellow perch were predominantly young-of-the-year (YOY) fish less than 120 mm in total length. Yearly capture rates can be found in Figure 1. A total of 47 perch age 1+ or older were captured in 1997. The assessments were conducted to evaluate the survival and relative abundance of walleye and the associated fish community in the bay.

Central Michigan University conducted larval fish pushes and took zooplankton samples in Platte Bay, Frankfort and Crystal Lake in July and August. Although all samples have not been analyzed, it is believed that no larval perch were collected. YOY trawling and seining were also accomplished in July, August, and September. Three YOY perch were trawled from Platte Bay.

USGS-BRD was unable to trawl at Manistique, Frankfort, and Sturgeon Bay in the fall of 1997.

Green Bay

The Wisconsin DNR has conducted trawl assessments in the bay since 1978 at standard index sites and at deep index sites which were added in 1988. The deeper sites were developed in response to a trend in increasing abundance at a single deep site established in 1985 off Marinette. The standard and deep site

assessment data have been combined based upon the amount of habitat they represent and an adjustment made for standard site information prior to 1988 to account for the increased area of occupancy, creating a weighted area average value.

The number of YOY yellow perch caught per trawl hour in 1997 (80) ranked 18th in the past 20 years, since index sites were established in 1978. 1997 was below the median of 299 and mean catch of 883 per trawl hour. Figure 2 shows the catch per trawl hour for young-of-the-year from 1978 to 1997. Six consecutive relatively weak year classes appear to have occurred from 1992-97 in Wisconsin waters of the bay. A declining trend in the relative abundance of yearling and older perch captured in the trawls has also become apparent since 1988, with the exception of 1992 (Figure 3). In 1997 the weighted area average number of yearling and older perch caught per trawl hour was 86.1, down from 226.7 in 1996. The average number caught per trawl hour was higher at standard sites (124.88) than at deep sites (60.5). The total catch of all species was down somewhat in 1997.

Young-of-the-year (YOY) yellow perch assessment was intensified in southern Green Bay in 1997 with the participation and funding from Wisconsin Sea Grant. Sampling was conducted weekly at Little Tail Point from hatching (May 13) until October 6th. Pelagic larval perch were sampled by light trap, Miller sampler, and Neuston net. Benthic YOY perch were sampled by survey seine and trawl. Highest average numbers of larval perch caught during pelagic sampling occurred on June 9, with 5,054 per 1/8 mile Neuston net tow, 169 per 1/2 mile Miller sampler tow, and 253 per hour in the light traps. Highest average numbers caught during benthic sampling occurred on June 25, with 169 per 50 foot seine haul and 34 per 1/8 mile trawl tow. Figure 4 shows the weekly average catches for Miller sampler, seine, and trawl from May 29 to September 11. On June 9, at peak pelagic abundance YOY yellow perch averaged 8.9 mm total length. On June 25, at peak benthic abundance YOY yellow perch averaged 22.3 mm total length. Although high numbers of YOY yellow perch were sampled during pelagic and initial benthic sampling and YOY numbers were the third highest for the past 16 years of index station seining at 14 - 16 sites around southern Green Bay, by August index trawling catches appear to have declined substantially. Through 1991, (last strong yearclass) June-July index seine catch averages correlated much better with index trawl catch averages (R-Squared = 0.669) than since 1991, (R-Squared = .216). Based on 1994 and 1997 index seine catches, those years should have produced strong year classes. It appears that in 1994 and 1997 those yearclasses were lost after early July at which time the YOY averaged over 25 mm long.

The Michigan DNR has employed both trawls and gill nets (1 to 4" stretched mesh gill net) to assess perch stocks in Little Bay de Noc (LBDN) and Big Bay de Noc (BBDN). In LBDN trawl catch rates of perch less than 3.5"(90 mm) were much higher in 1997 (270%) than in 1996. The 1997 catch rate of 20.0/haul was slightly below the mean catch rate for perch <3.5" from 1988 through 1997 (23.4/haul). Although relatively weak year classes appear to have been produced in LBDN in 1992, 1994, and 1996, no trend in the relative abundance of YOY perch is apparent (Figure 5). The mean catch rate of 10.7/lift for all perch in the 1997 LBDN gill net assessments was 24% higher than in 1996 (8.6/lift), and 14% lower than the mean of 12.5/lift for the 1988-97 period (Figure 6).

Trawl catch rates in BBDN for perch less than 3.5" peaked in 1994 (141.7), then declined by 69% to 44.1/haul in 1995, and further declined by 48% to 22.8/haul in 1996. Catches leveled off in 1997 at 20.8/haul (Figure 5). Overall gill net catches in BBDN, however, increased by 200% from 1994 to 1996 due mainly to a 300% increase in perch less than 7"- perhaps due to recruitment from the 1994 year class (Figure 6). The 1997 overall gill net catch rate of 13.8/lift was down from 1996 (17.2/lift), and 25% higher than the overall mean rate of 11/lift for the 1988-97 period.

Sex ratios of fish >= 5" were skewed more toward females in 1997 (3.1F : 1M).

Central Lake Michigan

Assessment data for the central part of the lake is scarce. USGS-BRD did not collect any YOY perch at Port Washington, WI and were unable to sample at Ludington, MI.

Consumers Power at Ludington provided data for yellow perch caught in gill nets set near the barrier net for the pump storage facility in 1996 and 1997. 289 perch were collected in 1997, up from 155 fish in 1996 with most fish being greater than 7" and males (78%) (Table 1).

Southern Lake Michigan

Considerable assessment activity has been conducted annually in the southern portion of the lake for a number of years by Illinois, Indiana and Wisconsin (Milwaukee), and in 1995 the Michigan DNR reinstated perch assessment activities as well.

Catch per effort in the IL DNR spawning assessment (1.0 to 3.0" stretched mesh gill net) decreased 20% to 441 fish per 1000' of net per night (Figure 7). Approximately 85% of the perch captured were age-6 or older with age 9 (1988 yearclass) being the mode (48%). The 1995 yearclass (age-2) comprised about 7% of the catch. Males comprised about 94% of the assessment catch.

Michigan DNR gill net assessments (1.0 to 3.5" stretched mesh) at four southern ports (Grand Haven, Saugatuck, South Haven, and St. Joseph) had a combined CPE of 86 fish per 1000' per night in 1997 down from 171 fish per 1000' per night in 1996 (Table 2). The overall sex ratio remained near 50:50 in 1997.

The Wisconsin DNR graded mesh gill net assessment in 1997 had an overall CPE of 43 perch per 1000 feet of net per night (Table 3). Age-7 and older perch made up most of the catch. Males comprised 89% of the total catch.

Captures of YOY perch in the annual beach seine assessments in Illinois and Wisconsin remained very low in 1997 (0 and 0.05 perch/seine haul, respectively) (Figures 8 and 9).

Illinois Natural History Survey (INHS) trawling for YOY perch resulted in poor capture rates (0.042 perch/1000m^2). Trawling in the Indiana waters of Lake Michigan, Ball State University had similar results (10.4 perch/hour) Figure 10. The Michigan DNR also conducted some trawling in July and August of 1997 near Muskegon, Grand Haven, South Haven, and St. Joseph and had a trawl CPE of 2 YOY yellow perch per trawl each month (Table 4).

USGS-BRD bottom trawling in fall of 1997 was successful in capturing 4 YOY perch at Saugatuck at a depth of 13m (Figure 11). The mean capture rate for YOY was 0.06 per 10-minute trawl (39-foot bottom trawl) down from 0.13 in 1996. A total of 151 adult perch age 1 and older (149 at Saugatuck and 2 at Waukegan) were also captured and the mean capture rate was 2.25 per 10-minute trawl. The 1997 capture rate was 44% lower than the 1996 rate of 4.03 per 10-minute trawl.

Yellow perch egg masses were enumerated and collected south of Waukegan Harbor, IL at the abandoned US Steel intake line during June 1997. Peak density was 25.7 egg masses•100m^{-2} on 18 June. No egg masses were found prior to 09 June or after 18 June. Egg viability was estimated to be 95% for sampled egg masses returned immediately to the laboratory and viewed under a dissecting microscope.

Very few perch larvae were captured in comparison to pre-1994 sampling efforts. Larval perch were captured off Waukegan, IL in plankton nets on each night during the 1997 sampling period (10 June - 23 July, 11 nights sampled). Peak incidence of larval perch in our samples occurred on 17 June (10.25 larval perch•100m^{-3}). Zooplankton samples collected coincident with larval perch samples are still under analysis.

The effect of alewife predation on yellow perch larvae in Illinois waters is difficult to assess due to the near-absence of available larval yellow perch. Relatively few alewife had larval fish as a component of stomach contents (16 of 355) and none of the larval fish could be identified with certainty as larval perch. Most likely the larval fish were cyprinid spp., as cyprinid larvae were more numerous than perch in the ichthyoplankton samples. A maximum of 2 larval fish were found in 2 stomachs. Copepods, chironomid larvae, and terrestrial insects were the most common prey items and were found in 34, 63, and 31% of the

stomachs, respectively. Fifty-six stomachs contained spiny water flea (*Bythotrophes cederstromi*) tail spines (mean 51.2); one stomach contained 444 spines. Fifty stomachs were completely empty (14.1%). Several years of effort at various densities of perch larvae will be necessary to place any confidence on the percent of yellow perch recruitment foregone to alewife predation.

Light traps, deployed to sample post-larval stage perch off Waukegan IL, were successful in sampling non-target larval fish species (i.e., cyprinids and alewife) and unsuccessful in sampling larval perch. This was likely due to the near-absence of emergent perch larvae in the ichthyoplankton samples. Also, no post-larval stage perch were captured in Miller high-speed samplers fished at 1-m intervals between the surface and 5-m (bottom depth) during the day or at night. Additional sampling will be required, under conditions of higher larval perch density, to assess the efficiency of these gear for sampling larval and post-larval perch populations in southern Lake Michigan.

The University of Michigan, Center for Great Lakes and Aquatic Sciences conducted larval fish tows off Port Sheldon, South Haven, St. Joseph, Chicago, IL, and the Cook Plant at Bridgeman MI in June. A total of 39 larval perch were captured at Port Sheldon and 25 at South Haven. Bottom trawling was also undertaken in June (Port Sheldon and Cook Plant) and August (Port Sheldon) but no YOY perch were collected. Beach seining for YOY perch was also done at Port Sheldon and South Haven and one YOY perch was collected at Port Sheldon.

The Indiana DNR conducted dive assessments to enumerate egg masses from early May to late June. Larval push net samples were taken in June and early July with adult alewives sampled for stomach contents in late June. Varying sizes of Neuston nets were deployed from late June to mid-August. The push net and Neuston net samples have not yet been analyzed. Trawling for YOY perch was conducted from early August to early October and 10 YOY perch were collected.

A total of 21,753 yellow perch (Table 5) were tagged at 22 sites in Lake Michigan (including Green Bay) during the 1997 spawning season: Illinois (7 sites), Indiana (2 sites), Grand Traverse Bay (4 sites), southern Green Bay (4 sites), Michigan (3 sites), and Wisconsin (2 sites). During tagging, three tagged perch moved to a different spawning (tagging) site; one perch traveled 133-mi in 13 days (Mt. Baldy, IN to Milwaukee, WI). The majority (98%) of perch tagged in Illinois during 1996 were recaptured at Illinois sites one year later. A total of 990 tagged perch were recaptured during 1997 (Table 6). Eighty-three percent of the recaptured perch were caught by tagging-participants; sport and commercial recaptures accounted for 15 and 2%, respectively.

1997 Yellow Perch Harvest Restrictions

Following the initial harvest restrictions imposed by the four Lake Michigan states in 1995 and 1996, additional changes were implemented for 1997:

Sportfishing regulations:

1. Illinois continued the closed season for perch in June and instituted a 15 perch daily bag limit with an 8 to 10 inch slot limit. Perch less than 8 inches or greater than 10 inches must be released immediately.

2. Indiana reopened June for sportfishing and instituted a 15 perch daily bag limit.

3. Michigan continued to have June open and a daily bag of 35 perch.

4. Wisconsin maintained the June closure and daily bag limit of 5 perch.

Commercial regulations:

1. Illinois closed the perch fishery (120,000 pound quota) effective April 19.
2. Indiana closed the perch fishery (160,000 pound quota) effective January 1.
3. Michigan does not allow a commercial harvest.
4. Wisconsin perch fishery remained closed.

Yellow Perch Task Group Progress Report

Multi-Agency Research Initiative: Pre-demersal survival and alewife predation on larval perch.

A three year, lakewide research initiative was implemented by the Lake Michigan Management Agencies in 1997. Table 7 summarizes research activities by agency / institution. Although the agencies were able to conduct many of the proposed activities within their existing budgets, the lack of additional outside funding caused some gaps in sampling to occur in several areas. In particular, no larval perch collections were undertaken along most of the eastern shore of the lake, as well as at Milwaukee. Results from this component of the research initiative are discussed in the status section of this report along with the assessment data.

Zooplankton sampling - Zooplankton samples were collected in the waters of all four states, including Green Bay, during alewife collections. The zooplankton samples are currently being analyzed.

Reproductive indicators in yellow perch - Candy Schrank of the Wisconsin DNR is analyzing and comparing yellow perch from Lake Michigan and Lake Mendota (near Madison, WI) for a number of parameters including GSI, blood, plasma VTG, gonad histopathology, plasma protein, and liver enzyme activity. Preliminary data indicates that the ratio of gonad weight to body weight is lower for Lake Michigan perch of both sexes. It was also observed that perhaps 25% of the Lake Michigan males had deformed testes ('lumpy' or nodules).

Sue Marquenski, Wisconsin DNR also found that mean thiamine levels in Lake Michigan perch eggs were much higher than levels found in coho salmon eggs from the lake.

Geographic comparison of yellow perch early life stages - Fred Binkowski, University of Wisconsin-Milwaukee, compared the performance of early life stages of perch derived from Lake Michigan (Milwaukee), Green Bay, Lake Ontario, and Lake Mendota. He observed that first hatching typically occurred at 12 days under a rearing regime starting at 10°C with an increase of 1°C every two days. Hatching was not protracted, but typically occurred within about 24 to 48 hours. Lake Michigan larvae had difficulty in shifting from green tank water (rotifers, copepod nauplii) to the next larger food size (Brine shrimp nauplii). Early life history was monitored for 42 days. Yellow perch will be held for a period of three years to investigate survival, behavior, growth, sex ratio, and gamete quality.

Research initiative activities planned for 1998 are summarized in Table 8. Larval perch collections have been expanded to address gaps in sampling at Milwaukee and along the eastern shore of the lake.

Several new research projects are being funded in 1998 and 1999 by the three Sea Grant Programs from Michigan, Wisconsin, and Illinois-Indiana. These projects will both complement and expand upon the multi-agency initiative. The Sea Grant Programs are providing a total of $375,000 to support the following projects and principal investigators:

- RECRUITMENT DECLINE OF YELLOW PERCH IN GREEN BAY, LAKE MICHIGAN: EVALUATION OF ENVIRONMENTAL INFLUENCES AND PREDATION - Fred Binkowski (Univ. of WI-Milwaukee), Clifford Kraft (Univ. of WI-Green Bay), and Brian Belonger (WDNR);

- RECRUITMENT DECLINE OF YELLOW PERCH IN GREEN BAY, LAKE MICHIGAN: RECRUITMENT MECHANISMS IN YELLOW PERCH (*Perca flavescens*): INTERACTIONS AMONG GROWTH, CONDITION AND PREDATION - Fred Binkowski (Univ. of WI-Milwaukee), Thomas Miller (Univ. of Maryland-Solomons), James Rice (North Carolina State Univ.-Raleigh), and Larry Crowder (North Carolina State Univ.-Raleigh) (4 year study);

- RECRUITMENT FAILURE OF YELLOW PERCH IN LAKE MICHIGAN: EVALUATION OF THE STARVATION AND PREDATION HYPOTHESES - David Jude (Univ. of MI - Center for Great Lakes and Aquatic Sciences), John Janssen (Loyola Univ.).

Task Group meetings

1. The task group met on October 20-21, 1997 at Michigan City, Indiana to discuss the results of the first year of field and laboratory work under the multi-agency initiative. The meeting was well attended and provided some new insight with regard to sampling techniques and effectiveness. Reports were presented by each task group member with regard to the activities they conducted.

2. Rich Hess, IL DNR, chairman of the task group, attended a meeting of the Fish Chiefs from the Lake Michigan Management Agencies on October 27, 1997 in Michigan City and presented an update on the status of assessment and research activities.

3. Representatives from the task group attended a Yellow Perch Research Workshop in Milwaukee on February 27 - March 1, 1998 hosted by the University of Wisconsin Sea Grant Institute and the University of Wisconsin System / University of Wisconsin-Milwaukee Great Lakes WATER Institute. The purpose of the workshop was to review the new Sea Grant funded projects and develop an organized, cooperative plan that addressed standardization of field sampling techniques, sample processing and quantitative procedures, and laboratory procedures and analysis.

4. The next meeting of the task group is scheduled for April 2, 1998 in Michigan City in preparation for the upcoming field season. Task group members will report on alewife stomach and plankton sampling results from 1997, and the status of examining historical data to correlate alewife abundance and yellow perch year class strength. Planned activities for 1998 will also be discussed and coordinated.

Table 1. Yellow perch catch (# of fish) at Consumers Power Ludington Pumped Storage Plant, April-May 1996-1997. **Values are actual number of perch** of each size class sampled. Percent of sample for each year is shown in parentheses. Catch rates at the Ludington facility are not directly comparable to those from the southern Lake Michigan assessment because net types and effort varied significantly. Ages of yellow perch collected in 1997 have not yet been determined.

Size class	1996			1997		
	Male	Female	Combined	Male	Female	Combined
<6"	0 (--)	0 (--)	0 (--)	1 (<1)	0 (--)	1 (<1)
6"	1 (1)	1 (1)	2 (2)	2 (1)	0 (--)	2 (1)
7"	28 (18)	0 (--)	28 (18)	8 (3)	0 (--)	8 (3)
8"	28 (18)	0 (--)	28 (18)	82 (28)	0 (--)	82 (28)
9"	31 (20)	1 (1)	32 (21)	72 (25)	5 (2)	77 (27)
10"	23 (15)	11 (7)	34 (22)	51 (18)	14 (5)	65 (23)
>10"	9 (6)	22 (14)	31 (20)	8 (3)	46 (16)	54 (19)
Combined	120 (77)	35 (23)	155 (100)	224 (78)	65 (22)	289 (100)
% Age 6 and older	87	82	86	NA	NA	NA
F:M Ratio			0.3:1			0.3:1

Table 2. Yellow perch catch-per-unit-effort (# per 1,000 feet of gill net per 24 h) at four southern Lake Michigan ports (Grand Haven, Saugatuck, South Haven, and St. Joseph), April 1996-1997. Values are for samples from the four ports combined. Percent of sample for each year is shown in parentheses. Ages of yellow perch collected in 1997 have not yet been determined (NA).

Size class	1996			1997		
	Male	Female	Combined	Male	Female	Combined
<6"	0 (--)	1 (<1)	1 (<1)	1 (<1)	<1 (<1)	1 (1)
6"	2 (1)	1 (<1)	3 (2)	1 (1)	1 (1)	2 (2)
7"	27 (16)	2 (1)	29 (17)	5 (6)	<1 (<1)	5 (6)
8"	36 (21)	2 (1)	38 (22)	26 (31)	1 (1)	27 (32)
9"	10 (6)	15 (9)	25 (15)	10 (12)	3 (4)	13 (16)
10"	2 (1)	32 (19)	34 (20)	1 (1)	10 (11)	11 (12)
>10"	2 (1)	39 (23)	41 (24)	1 (<1)	26 (30)	27 (30)
Combined	79 (46)	92 (54)	171 (100)	45 (52)	41 (48)	86 (100)
% Age 6 and older	87	92	90	NA	NA	NA
F:M Ratio			1.2:1			0.9:1

Table 3. Catch per Effort by age (fish/1000ft/night), and percent of each sex of yellow perch caught in standardized assessment graded mesh gill net sets conducted in January each year, WDNR, Lake Michigan Work Unit.

	Year											
Age	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
1	0	0	0	0	0	0	0	0	0	0	0	0
2	343	269	464	626	224	159	49	60	0	0	0	3
3	2662	526	453	1854	1037	865	276	98	25	0	0	13
4	368	3580	386	1012	938	323	715	402	58	28	0	6
5	134	541	701	1563	394	327	281	757	218	65	0	14
6	236	71	324	1880	381	83	181	165	141	120	19	55
7	13	72	12	155	96	82	126	49	48	76	51	194
8	1	3	3	1	0	32	73	16	11	65	71	83
9	0	0	0	0	0	0	14	0	0	24	31	9
10	0	0	0	0	0	0	0	0	0	2	12	0
11	0	0	0	0	0	0	0	0	0	0	3	0
%Male	54	56	56	69	61	72	82	86	89	90	95.2	89
%Female	46	44	44	31	39	28	18	14	11	10	4.8	11

Table 4. Yellow perch catch-per-unit-effort (# per trawl hour) at four Lake Michigan ports (Muskegon, Grand Haven, South Haven, and St. Joseph); values are for samples from the four ports combined. Percent of sample composed of Age 0 and Age 1 and older yellow perch is shown in parentheses. Samples were not collected at St. Joseph in September 1996 or at Muskegon in July 1997. Age class determinations are based on length frequency analysis.

Age class	1996			1997		
	July	September	Combined	July	August	Combined
YOY	0 (--)	2 (9)	1 (1)	2 (6)	2 (40)	2 (12)
Age 1 and older	138 (100)	17 (91)	84 (99)	31 (94)	3 (60)	15 (88)
Combined	138 (100)	19 (100)	85 (100)	33 (100)	5 (100)	17 (100)

Table 5. Total catch, number of perch tagged during the 1997 spawning season in Lake Michigan, and recapture numbers of perch tagged in Illinois prior to 1996, by location.

Location	Total Catch	Perch Tagged	Recapture (pre-1996 IL tag)	Recapture (1996 IL tag)
Illinois	15,062	8,482	1	312
Indiana	3,395	2,950	0	0
Grand Traverse Bay	55	32	0	0
Green Bay	2,013	1,844	0	0
Michigan	5,563	3,292	0	1
Wisconsin	12,300	5,563	0	4
all sites	38,388	21,753	1	317

Table 6. Number and percent of participant (>24-hr at liberty), sport, and commercial recaptures from each location.

Location	Perch Tagged	Participant Recaptures	Sport Recaptures	Commercial Recaptures
Illinois	8,482	344 (4.1%)	55 (0.6%)	0
Indiana	2,950	65 (2.2%)	32 (1.1%)	0
Grand Traverse Bay	32	0	0	0
Green Bay	1,844	39 (2.1%)	10 (0.5%)	21 (1.1%)
Michigan	3,292	49 (1.5%)	35 (1.1%)	0
Wisconsin	5,563	327 (5.9%)	13 (0.2%)	0
all sites	21,753	824 (3.8%)	145 (0.6%)	21 a*

a* less than 0.1%

Table 7. 1997 Multi-agency yellow perch research initiative - activity summary.

	Egg sampling	Larval perch	Post-lar. perch	YOY perch	Hist. data correl.	Alewife monitor./ stomachs	Zooplank sampling	Perch tagging
BALL STATE Indiana				X_1	X 1 site	X_1	X_1	
IN DNR Mi. City	X	X	X	X	X	X	X	X Mi.City Whiting (2,950)
CGLAS Pt. Shel. S. Haven		X_1 4 sites	X 2 sites	X_1 1 site	X_1		X_1	
CMU Fr'fort Onekama		X Pl. Bay Frankf.		X Pl. Bay Onekama			X Pl. Bay	
MDNR E. Lake Michigan				X 4 ports	X	X 1 port (90 July)		X St. Joe. Cook Pl. (3,292)
IL DNR SW Lake Michigan				X 6 sites seine				
INHS Waukegan	X	X	X	X	X	X	X	X 8 sites (8,482)
WDNR-G. Bay L. Tail Pt.	X	X	X	X	X	X	X	X 1 site (1,844)
WDNR-L. Mich. Milwau.	X			X 22 sites seine		X	X	X 2 sites (5,158)
UWM-CGL (Lab)	egg viab. hatch success	devel. growth survival	devel. growth survival	growth survival sex ratio			X	
USGS-BRD Lakewide				X 3 trawl sites				
GTB G.T.Bay								X (32)

'X' indicates activity was conducted in 1997.

'X_1' indicates activity was conducted without funding in 1997.

Table 8. 1998 Multi-agency yellow perch initiative - Planned research activities

	Egg sampling	Larval perch	Post-lar. perch	YOY perch	Hist. data correl.	Alewife monitor./ stomachs	Zooplank sampling	Perch tagging
BALL STATE Indiana					X 1 site			
IN DNR Mi.City	X	X	X	X	X	X	X	X (3,000)
CGLAS Pt. Shel. S. Haven		X 2 sites	X 2 sites	X 2 sites	X	X 2 sites	X 2 sites	
CMU Fr'fort Onekama		X Pl. Bay Frankf.		X Pl. Bay Onekama		X Pl. Bay	X Pl. Bay	X Onekama (3-5,000)
MDNR E. Lake Michigan	X 2 ports	X 2 ports	X 2 ports	X 4 ports (trawl)	X	X 2 ports	X 2 ports	X GH-Mus. St. Joe. (6-10,000)
MDNR Bays dNoc				X 2 sites (trawl)				
IL DNR SW Lake Michigan				X 6 sites (seine)				
LOYOLA UNIV. Chicago		X	X	X		X	X	
INHS Waukegan	X	X	X	X	X	X	X	X 8 sites (9,000)
WDNR-G. Bay L.Tail Pt.	X	X	X	X	X	X	X	X 1site (3,000)
WDNR-L. Mich. Milwau.	X			X 22 sites (seine)		X	X	X 2 sites (5,000)
UWM-GLWI (Lab)	egg viab. hatch success	devel. growth survival	devel. growth survival	growth survival sex ratio			X	
USGS-BRD Lakewide				X 7 sites (trawl)				
GTB G.T.Bay								X (100)

'X' indicates activity is planned for 1998.

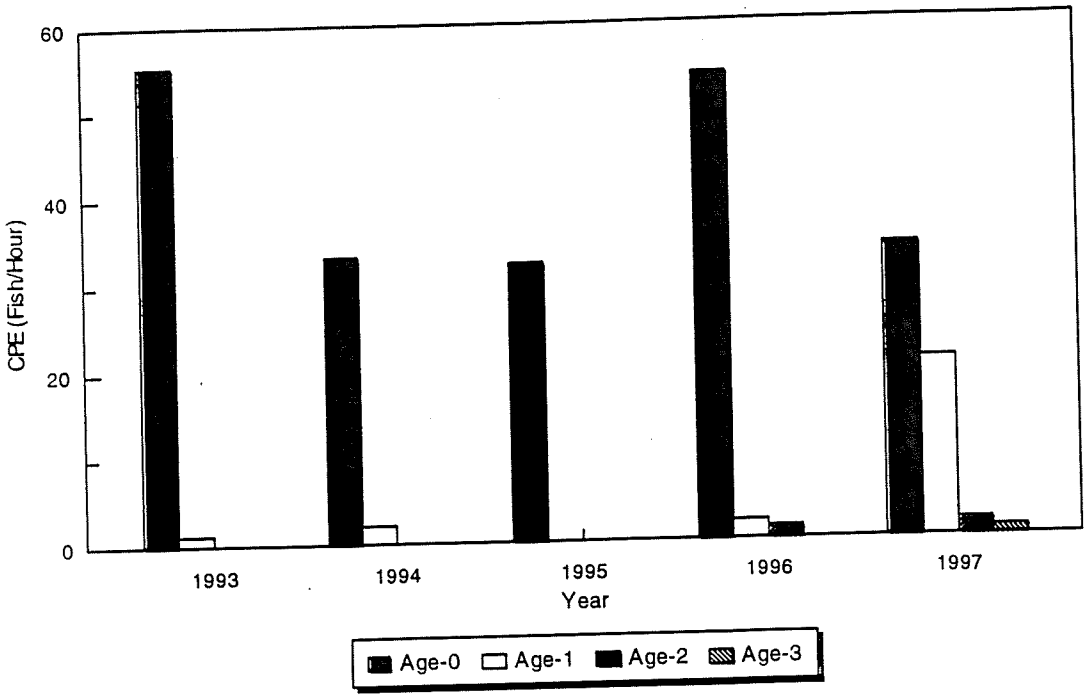


Figure 1. Catch per unit effort (fish/hr) of yellow perch during night-time electrofishing in Epoufette Bay during September 1993 - 1997.

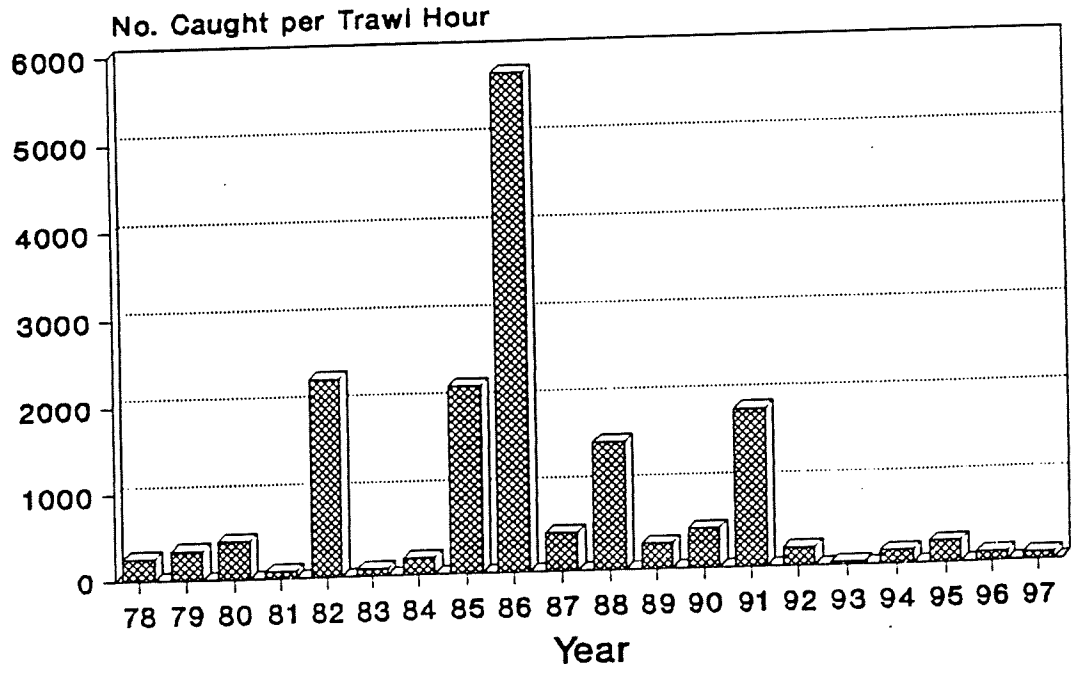


Figure 2. Trawl index of relative abundance (fish/hr) of young-of-the-year yellow perch (weighted area average) from the Wisconsin waters of Green Bay.

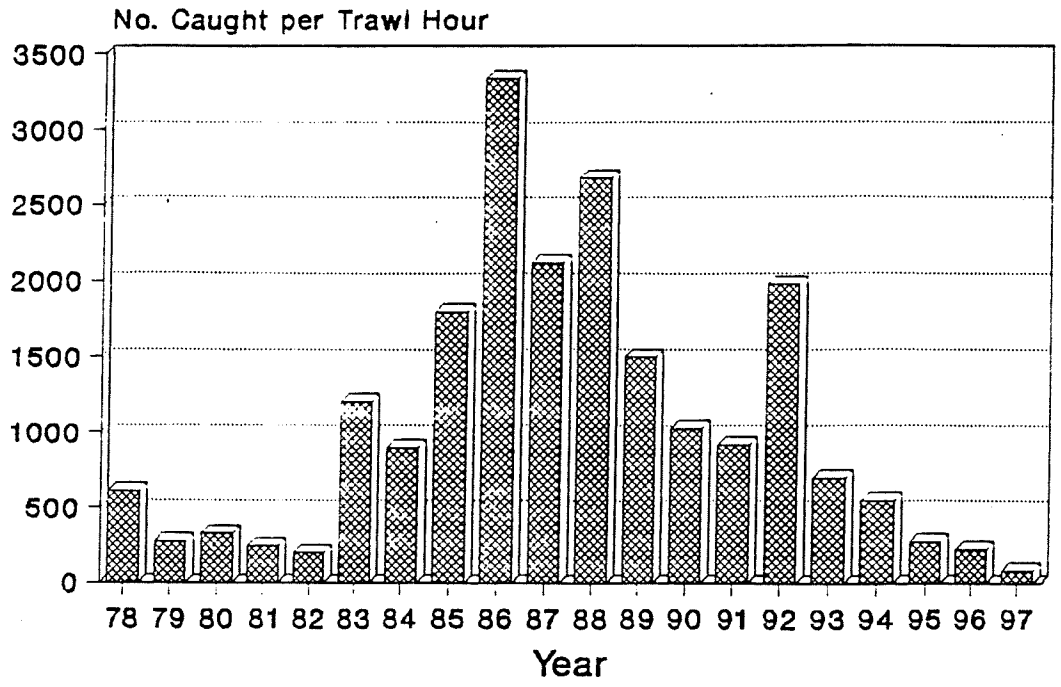


Figure 3. Trawl index of relative abundance (fish/hr) of yearling and older yellow perch (weighted area average) from the Wisconsin waters of Green Bay.

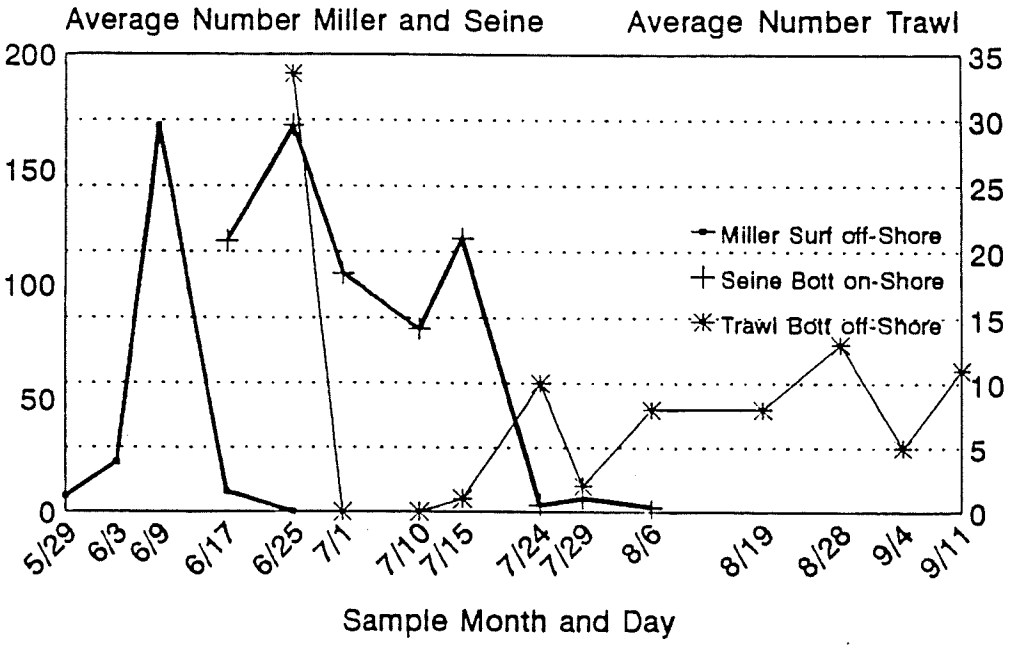


Figure 4. Number of young-of-the-year yellow perch captured per sample off Little Tail Point in southern Green Bay.

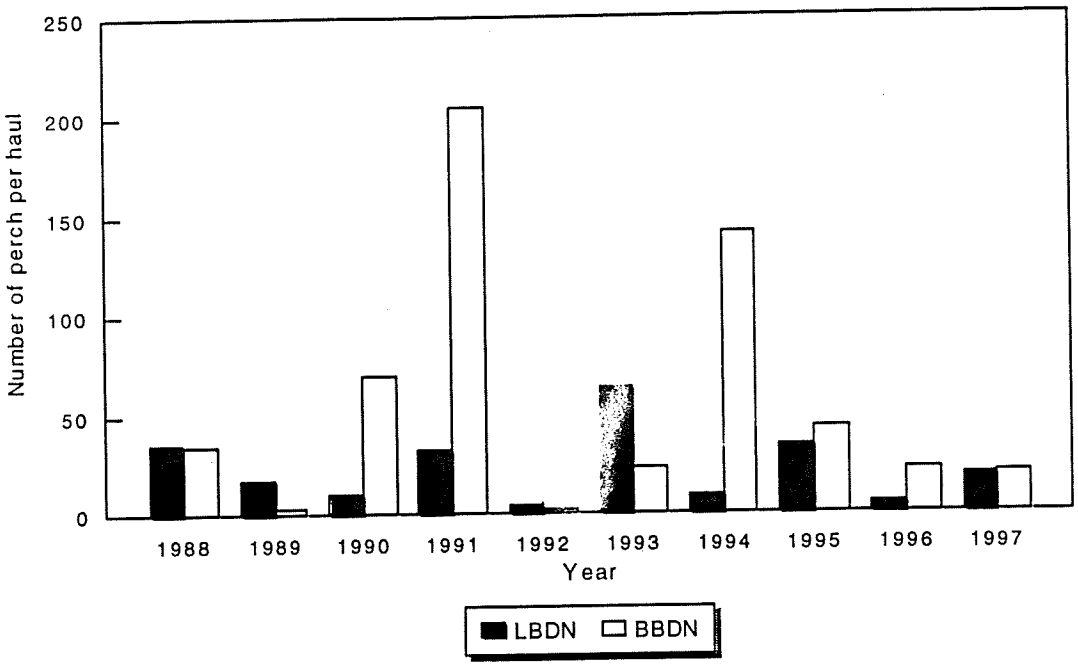


Figure 5. Catch per effort for yellow perch <3.5" in 10-minute trawl hauls in Little Bay De Noc (LBDN) and Big Bay De Noc (BBDN), MI. 1988 -1997.

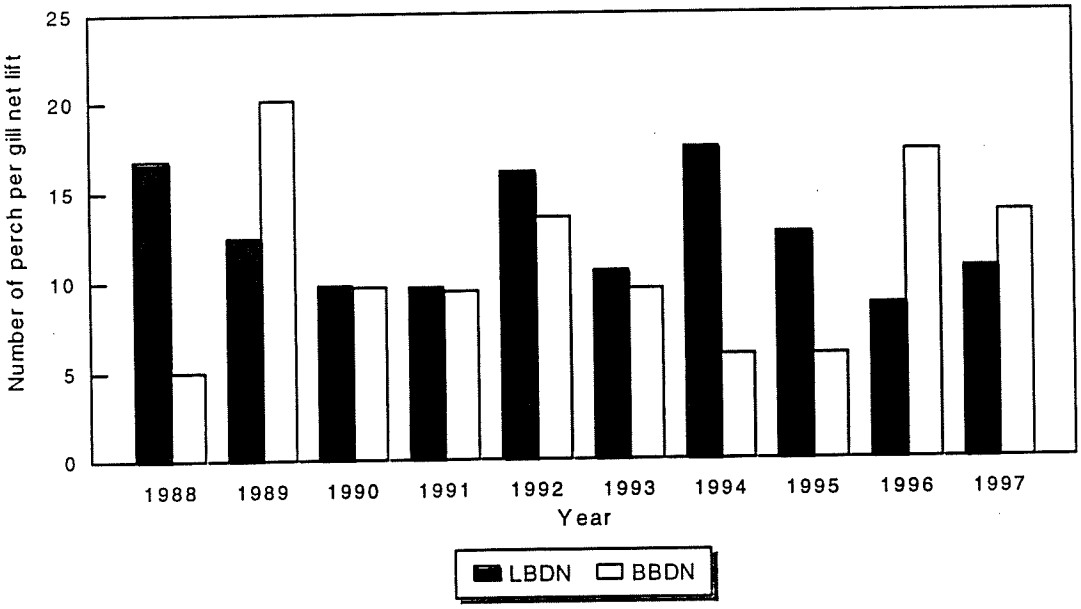


Figure 6. Catch per effort for yellow perch in 24-hour, 60' gill nets (1 - 4"mesh) in Little Bay De Noc (LBDN) and Big Bay De Noc (BBDN) MI. 1988 - 1997.

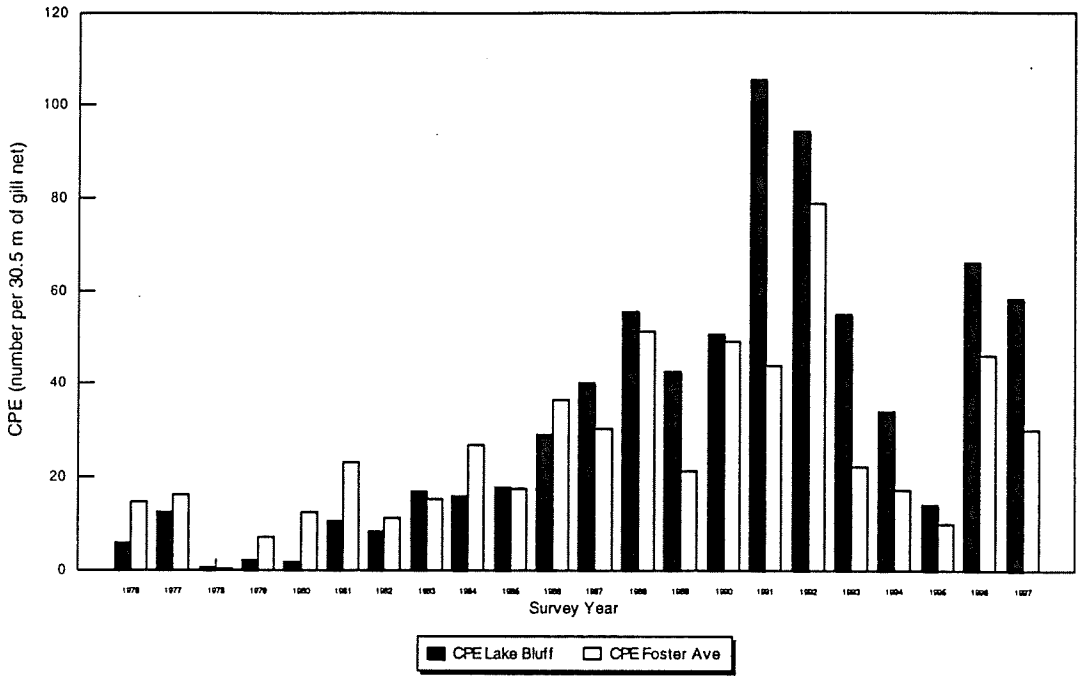


Figure 7. Catch per effort in graded mesh gill nets (1.5" - 3.0") for the Illinois waters of Lake Michigan 1976 - 1997.

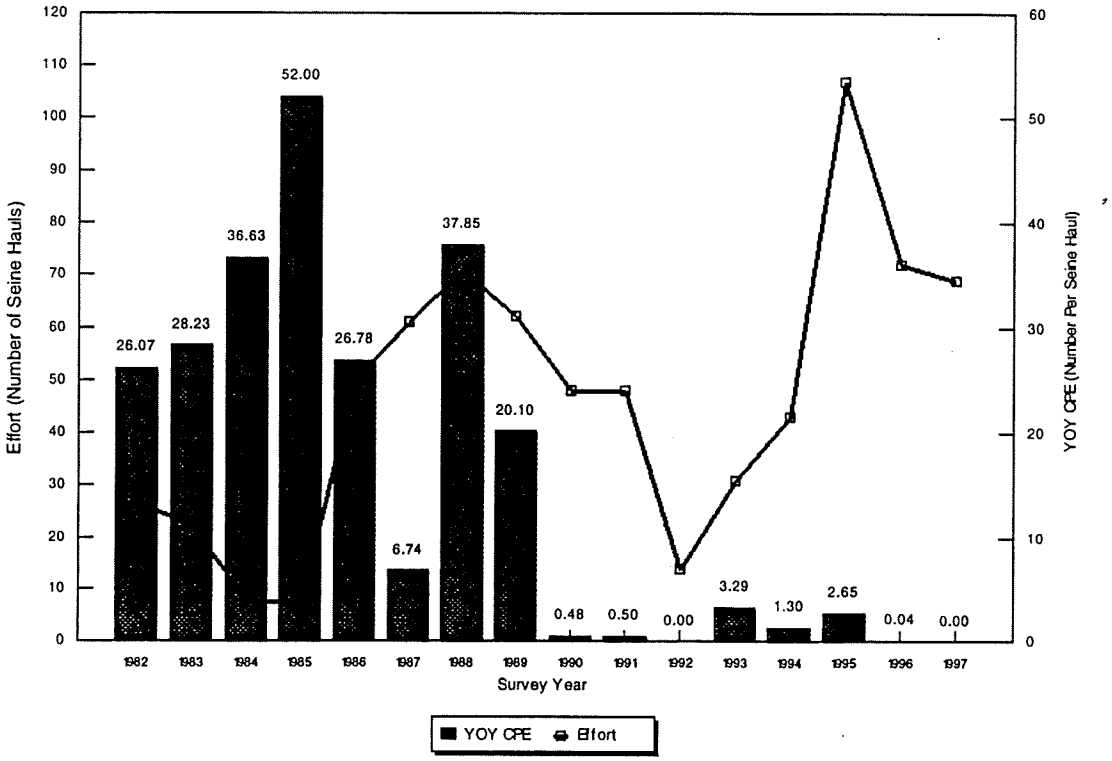


Figure 8. Young-of-the-year (YOY) yellow perch catch per effort and effort for beach seining along the Illinois shoreline of Lake Michigan 1982 - 1997.

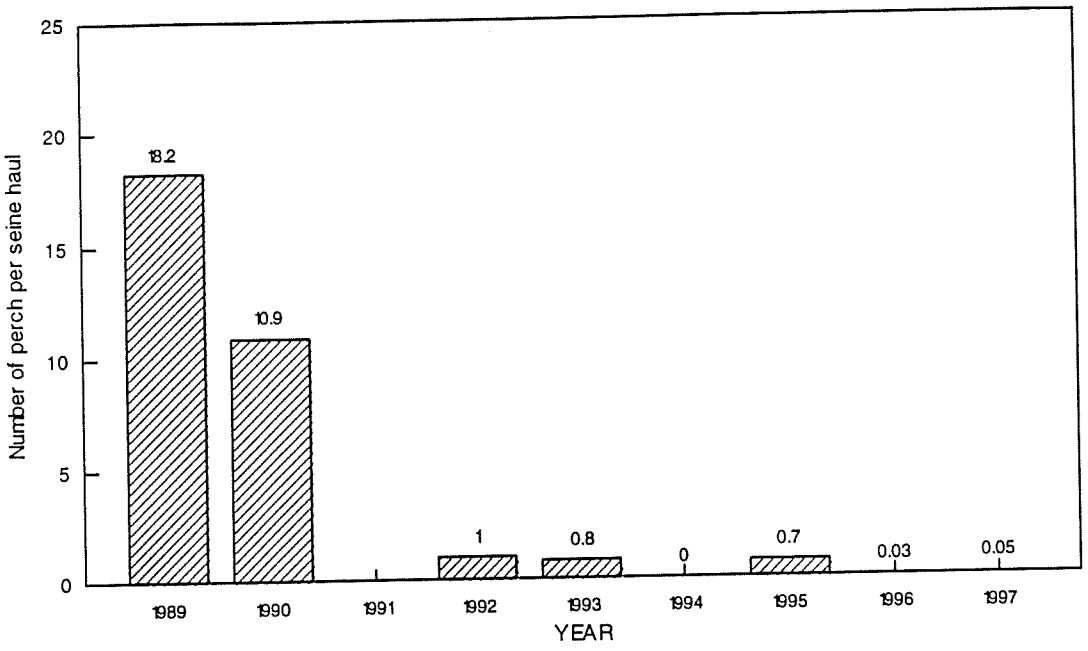


Figure 9. Young-of-the-year yellow perch catch per effort for the Wisconsin waters of southern Lake Michigan 1989 - 1997.

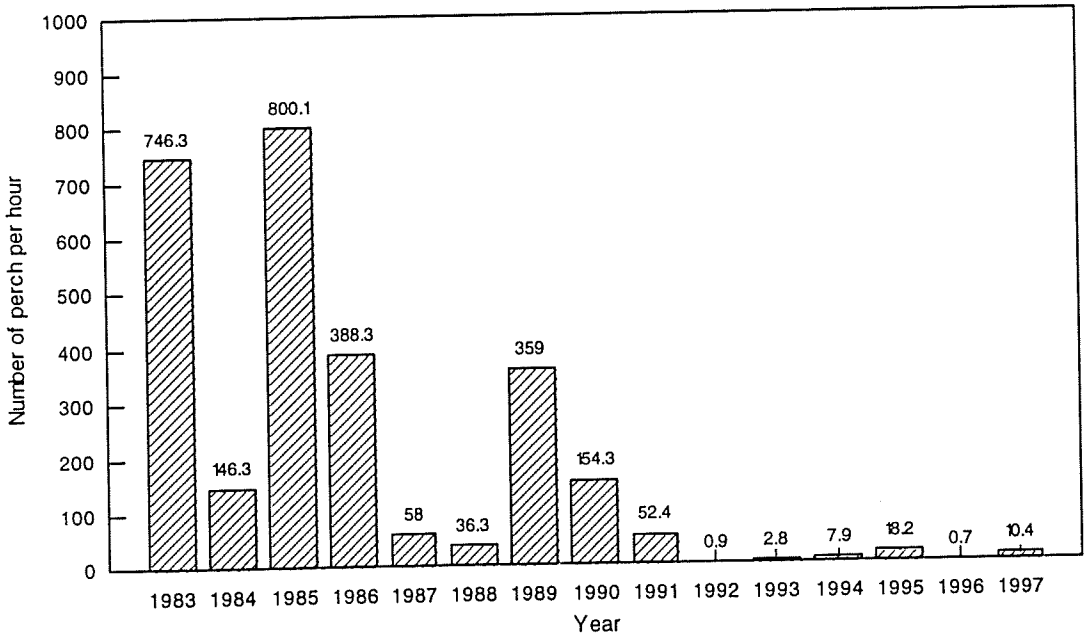


Figure 10. Trawl catch per effort for young-of-the-year yellow perch from the Indiana waters of Lake Michigan 1983 - 1997.

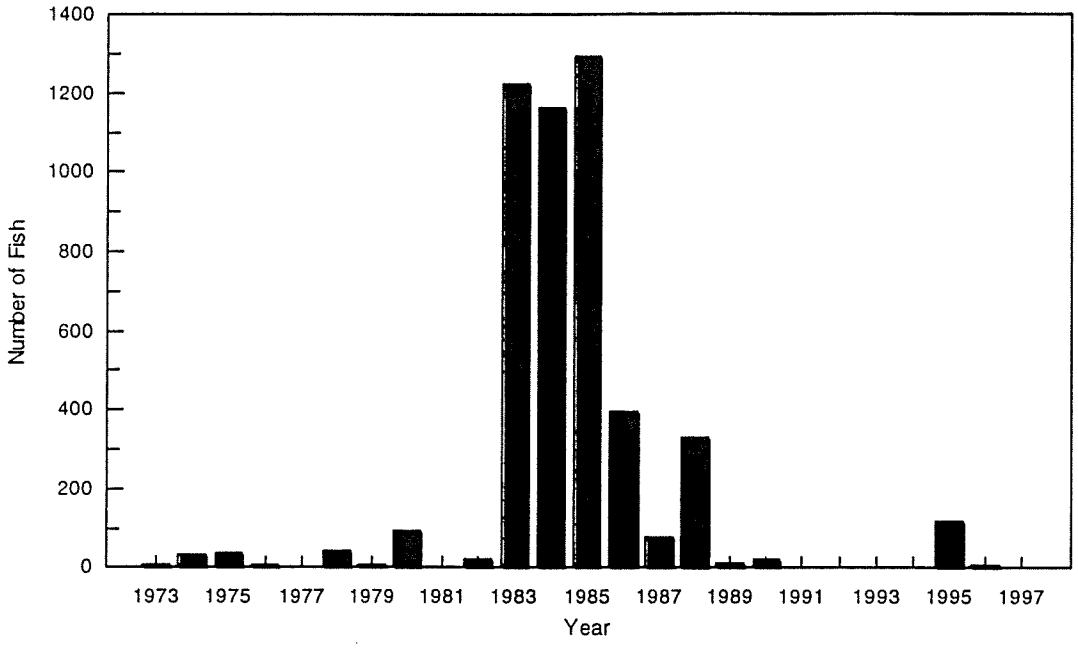
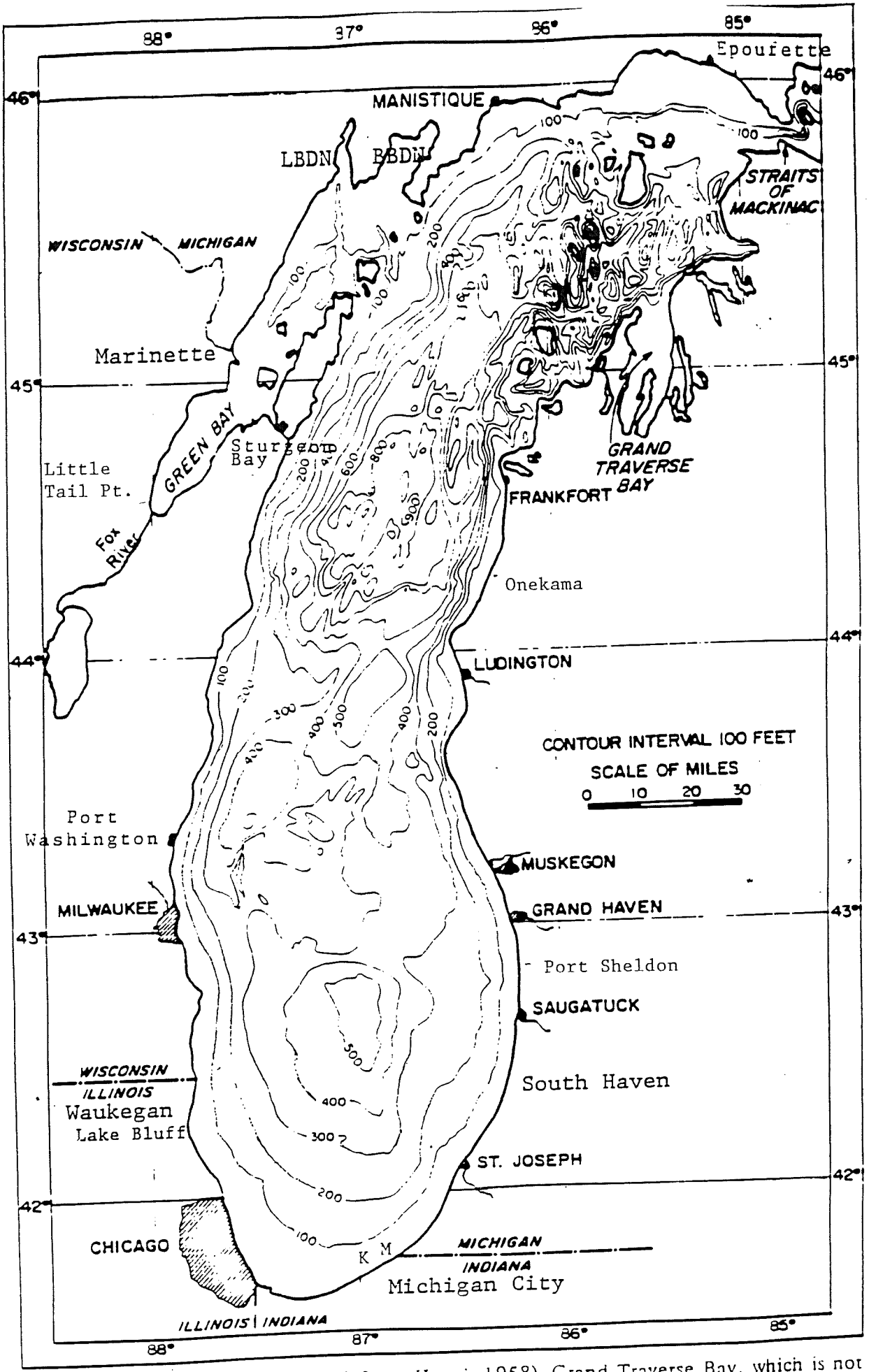


Figure 11. Total catch of age-0 yellow perch taken in USGS-BRD bottom trawls in Lake Michigan, 1973 - 1997. (Note: trawling was conducted only at Saugatuck, Waukegan, and Port Washington in 1997.)



Lake Michigan (modified from Hough 1958). Grand Traverse Bay, which is not contoured, has a steeply sloping bottom and a maximum depth of about 600 feet.