



ILLINOIS NATURAL HISTORY SURVEY

T E C H N I C A L R E P O R T

A SURVEY OF SPORT FISHING IN THE ILLINOIS PORTION OF LAKE MICHIGAN

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INHS Division of Ecology and Conservation Sciences

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March through September, 2006

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Table 1. Common and scientific names of fishes appearing in this report of the survey of sport fishing in the Illinois portion of Lake Michigan. Only common names will be used in the following text.

Common Name	Scientific Name
Alewife	<i>Alosa pseudoharengus</i>
Black crappie	<i>Pomoxis nigromaculatus</i>
Bluegill sunfish	<i>Lepomis macrochirus</i>
Brown trout	<i>Salmo trutta</i>
Burbot	<i>Lota lota</i>
Chinook salmon	<i>Oncorhynchus tshawytscha</i>
Coho salmon	<i>Oncorhynchus kisutch</i>
Common carp	<i>Cyprinus carpio</i>
Freshwater drum	<i>Aplodinotus grunniens</i>
Lake trout	<i>Salvelinus namaycush</i>
Lake whitefish	<i>Coregonus clupeaformis</i>
Largemouth bass	<i>Micropterus salmoides</i>
Northern pike	<i>Esox lucius</i>
Pumpkinseed sunfish	<i>Lepomis gibbosus</i>
Rainbow smelt	<i>Osmerus mordax</i>
Rainbow trout	<i>Oncorhynchus mykiss</i>
Rock bass	<i>Ambloplites rupestris</i>
Round goby	<i>Neogobius melanostomus</i>
Sea lamprey	<i>Petromyzon marinus</i>
Smallmouth bass	<i>Micropterus dolomieu</i>
Yellow bullhead	<i>Ameiurus natalis</i>
Yellow perch	<i>Perca flavescens</i>

EXECUTIVE SUMMARY

The purpose of this study was to provide estimates of the non-charter sport fishing effort, harvest and expenditures of anglers fishing the Illinois portion of Lake Michigan. The information provided from this study is important to the management of the sport fisheries in the Illinois waters of Lake Michigan. A contact creel survey was used to collect data concerning the daily effort, harvest and expenditures on randomly selected days over a six month period (4/1 - 9/30). The data were summarized and extrapolated over the six month period to achieve estimates for specific locations as well as for the Illinois waters of the lake. The creel period was stratified by time period (segment = three week blocks) and type of day (workday vs. non-work day). Also, a March survey was conducted at selected sites along the Lake Michigan shoreline. That survey was stratified in a similar fashion as the main survey except that the segment is one month long instead of three weeks.

Conclusions:

1. 2006 saw a decrease in angler effort (down nearly 8% compared to 2005). Pedestrian and launched boat effort decreased nearly 12% and over 13% respectively, compared to 2005 but moored boat effort increased over 14%.
2. The number of yellow perch harvested increased 11% compared to 2005. The total harvest was 335,400 fish. The average weight and length of yellow perch in the survey increased compared to 2005. Mean length increased to 26.0 cm (10.24 in) and mean weight increased to 238 g (0.52 lb), a 1.5% and 11% increase respectively compared to 2005.
3. Coho salmon were the largest segment of the salmonid harvest in the Illinois waters of Lake Michigan and increased nearly 36% compared to 2005. The total harvest was 29,200 fish. The average size coho in 2006 weighed 1,600 g (3.52 lb), and measured 54.2 cm (21.3 in) in length, an increase of 11.4% in weight and 2.8% in length.
4. Chinook salmon harvest increased nearly 48% compared to 2005 with a harvest of 20,400. Chinook were larger compared to 2005 with an increase of 5.4% in length to 72.3 cm (28.5 in) and an increase of 18.6% in weight to 4,141 g (9.12 lb).
5. The rainbow trout harvest increased by 23% compared to 2005, with a harvest of 3,900 fish. Rainbow trout length and weight increased compared to 2005 with length increasing 6.1% to 67.9 cm (26.7 in) and an increase in weight of 20.5% to 3,233 g (7.12 lb).
6. The lake trout harvest declined by 10% compared to 2005 to 1,100 fish. The average size of lake trout harvested in 2006 was smaller than those fish harvested in 2005 with a decrease of 21.4% in weight to 2,325 g (5.12 lb) and a decrease in length of 6.2% to 60.5 cm (23.8 in).
7. The brown trout harvest increased by 11% compared to 2005 to nearly 2,600 fish. Average length decreased by 8.8% to 52.3 cm (20.6 in) and average weight decreased by 32.1% to 1,952 g (4.40 lb).
8. Total expenditures in 2006 were over \$7.3 million, 17% below 2005.
9. Weather data were collected throughout the creel season in 2006.
10. The 2006 March survey saw declines in effort and harvest (except for coho salmon) compared to 2005. Total effort was 12,687 angler hours, a 10% decrease compared to 2005. Harvest of yellow perch (3,856), brown trout (767) and rainbow trout (23) declined 36% for yellow perch, 31% for brown trout and 73% for rainbow trout. Coho salmon (386) increased 36%.

ABSTRACT

A survey of sport fishing in the Illinois portion of Lake Michigan was conducted from April 1 to September 30, 2006. The survey covered all legal sport fishing during that period excluding fishing from chartered boats and smelt fishing. It included angling by pedestrians and fishing from boats. The intent of the survey was to provide reliable estimates of sport fishing activity, sport fish harvest, expenditures for sport fishing, and the quality and distribution of sport fishing. Estimated total fishing effort for pedestrians and boaters was 456,400 angler-hours. Estimated total harvest included 335,400 yellow perch, 2,600 brown trout, 3,900 rainbow trout, 1,100 lake trout, 29,200 coho salmon, and 20,400 chinook salmon. Estimated expenditures for boats, motors, trailers, fishing gear, and automobile gas were over \$7.3 million. The yield value of the sport fishing harvest was approximately \$4.1 million.

One additional special survey was conducted. From March 1 to March 31 an early season survey was conducted at Waukegan Harbor, Montrose Harbor and Calumet Park for pedestrian anglers and Waukegan Harbor and Calumet Park for launched-boat anglers. Anglers from both groups fished a total of 12,700 hours and harvested 3,900 yellow perch, 800 brown trout, 20 rainbow trout and 400 coho salmon. Estimated expenditures for boats, motors, trailers, fishing gear, and automobile gas were over \$73,000.

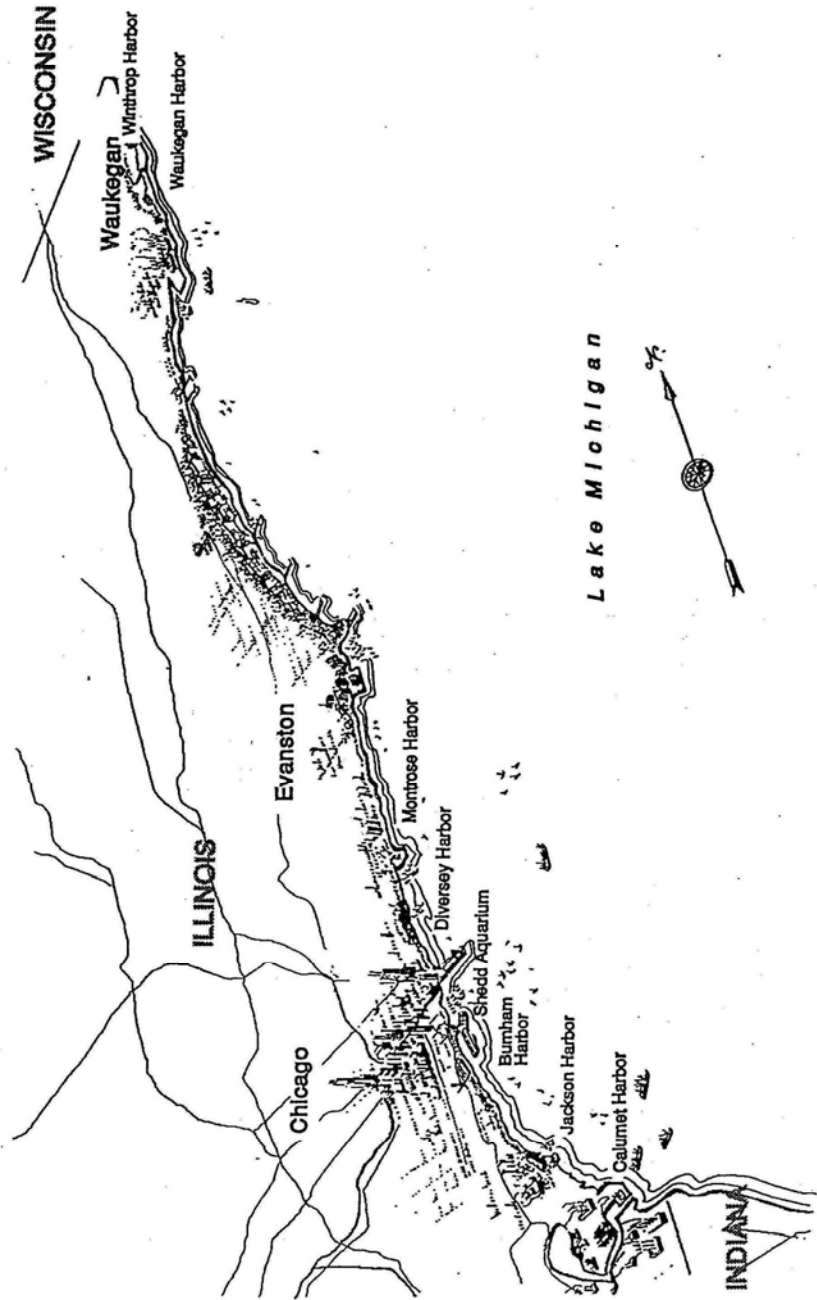
INTRODUCTION

This report summarizes a survey of sport fishing in the Illinois portion of Lake Michigan from April 1 to September 30, 2006. The survey covered all types of legal sport fishing during that period, with the exceptions of charter-boat fishing and smelt fishing. In addition, a supplemental survey of the early spring fishery from March 1 to March 31 was conducted. The intent of the project was to provide reliable estimates of sport fishing activity, sport fish harvest, expenditures for sport fishing, and quality of sport fishing. Biological data concerning length, weight, sea lamprey wounding and scarring and markings (fin clips and external tags) were also collected for individual fish. Results from the first twenty years of this series of annual surveys were reported elsewhere and were summarized by Brofka and Dettmers (2006). Prior to these reports, the most recent creel survey of this type in Illinois was conducted in 1979 by Muench (Muench 1981).

Geographic setting

The geographic setting of this survey was the 63 mile Illinois shoreline of Lake Michigan (Figure 1). This area is highly developed and heavily industrialized. Chicago covers roughly one-third of the shoreline, and a series of smaller cities cover almost all of the remainder. This section of Lake Michigan lacks significant tributary streams. The slope of the near-shore lake bottom becomes progressively steeper as one moves from south to north, a geographic feature that influences the distribution and success of sport fishing. This progression means that boaters from Chicago must go considerably farther from shore to reach good salmon waters than boaters departing from North Point Marina.

Figure 1. The Illinois shoreline of Lake Michigan.



METHODS

The following groups were considered separately: (1) Pedestrian and launched-boat anglers. These anglers were studied directly through personal interviews and direct head counts conducted between 1 April and 30 September. (2) Anglers using moored boats. The data presented here are based entirely on extrapolations from estimates for anglers using launched boats.

Pedestrians and launched-boat anglers

Estimates of effort and harvest by pedestrian and launched-boat anglers were made for selected primary fishing areas, and those estimates were extrapolated to less heavily fished areas. For each primary fishing area, a modified stratified random sampling design similar to that suggested by Malvestuto (1996) was used. The fishing day was the primary sampling unit. Daily estimates of variables of interest (total harvest by species, expenditures by category, etc.) for each primary site were combined to form seasonal estimates using the formula for stratified random samples given by Cochran (1977).

Use of primary fishing areas

The primary fishing areas for pedestrian anglers were North Point Marina, Waukegan Harbor, Montrose Harbor, Belmont Harbor, Burnham Harbor, McCormick Place, Jackson Park, and Calumet Park. The primary fishing areas for launched boats were North Point Marina, Waukegan Harbor, Diversey Harbor, Burnham Harbor, and Calumet Park. For each day of work, a creel clerk was assigned to visit three areas, two pedestrian areas and one launch area, in a prescribed order. The three areas were always one of four groups: (1) Waukegan Harbor (pedestrians), North Point Marina (pedestrians), North Point Marina (launched boats); (2) Montrose Harbor (pedestrians), Belmont Harbor (pedestrians), Diversey Harbor (launched boats); (3) Burnham Harbor (pedestrians), McCormick Place (pedestrians), Burnham Harbor ramp, (launched boats); and (4) Jackson Park (pedestrians), Calumet Park (pedestrians), Calumet Park (launched boats). The launch ramps at Waukegan Harbor were added in 2006 and were surveyed in the same manner as the launch ramp sites in the four groups. Estimates obtained for the primary fishing areas were extrapolated to all other areas based on the distribution of pedestrian anglers and boat trailers. These distributions were obtained by helicopter flights that were conducted on four weekends during the spring and summer. During each flight, pedestrian anglers were counted and recorded on a form divided by site and the type of pedestrian site: structure (piers and breakwalls), shore (shoreline) and harbor (inside enclosed harbors). Pedestrian anglers who were not at a recognized site were counted and listed in the vicinity of the closest recognized site; the sum of these became the total for "other areas" on the form. Boat trailers with a vehicle attached were counted in the parking lots of launch ramps and were listed on the form at the appropriate site. All of the data collected were combined for the season and averaged, and converted to percentages (Table 2).

Distribution of fishing

Pedestrians and launched boats

The survey recognized 26 fishing areas (Table 2). Helicopter flights in 1985-90 and 1992-2006 were used to determine the distribution of fishing. In 2006 the 26 areas accounted for 96.9% of the pedestrian anglers observed in the aerial surveys and 100% of the boat trailers parked near launch areas. Boats launched from the Calumet Yacht Club (25 to 50 launches per week in mid summer) were not included in this survey. In this survey, interviews were conducted at eight pedestrian fishing areas and five launch areas. The pedestrian areas (North Point Marina, Waukegan Harbor, Montrose Harbor, Belmont Harbor, Burnham Harbor, McCormick Place, Jackson Park, and Calumet Park) accounted for 89.9% of the pedestrian anglers observed during the helicopter flights. The four launch areas (North Point Marina, Waukegan Harbor, Diversey Harbor, Burnham Harbor, and Calumet Park) accounted for 84.4% of the boat trailers observed near launch areas.

Table 2. Distribution of pedestrian anglers and boat trailers along the Illinois shoreline of Lake Michigan, determined by helicopter flights in 2006.

Area	Pedestrian anglers (%)	Boat trailers (%)
1. IL Beach State Park & North Point Marina	1.3	29.9
2. Waukegan Power Plant discharge and pier	0.0	NA
3. Waukegan Harbor and breakwalls	15.5	36.1
4. Great Lakes Naval Training Station	0.2	0.3
5. Forest Park	0.0	5.5
6. Central Park	0.0	2.1
7. Winnetka (Lloyd and Tower Parks)	0.5	4.8
8. Wilmette Harbor	0.5	NA
9. Northwestern Univ. and Dawes Park	0.3	5.3
10. Farwell Avenue pier	0.6	NA
11. Hollywood Avenue pier	0.9	NA
12. Foster Avenue pier	0.5	NA
13. Montrose Harbor and breakwalls	54.1	NA
14. Belmont Harbor	4.6	NA
15. Diversey Harbor and breakwalls	1.0	6.7
16. North Avenue pier	0.1	NA
17. Navy Pier	0.7	NA
18. Monroe Street breakwalls	0.8	NA
19. Burnham Harbor and vicinity	9.6	4.4
20. McCormick Place seawall	0.9	NA
21. 31st Street pier	0.3	NA
22. 50th Street access area	0.2	NA
23. 59th Street Harbor	0.4	NA
24. Jackson Park Harbor and breakwall	2.7	0.6
25. Rainbow Park	0.0	NA
26. Calumet Park	1.2	7.3
27. other areas	3.1	0.0

Moored boats

The principal boat mooring areas are North Point Marina, Waukegan Harbor, Great Lakes Naval Training Station, Wilmette Harbor, and the Chicago Park District harbors. This survey did not include boats kept at moorings or on land (lift service) in the Calumet or Chicago river systems. We used the number of power boats kept at moorings as an index of fishing activity from moored non-charter power boats (Table 3). Although some fishing occurs from sail boats, we assumed that it was a negligible portion of all fishing. Both private lift services, referred to as I/O service in Table 3, were included in the survey (Larsen Marine, at Waukegan Harbor and Skipper Bud's at North Point Marina).

Table 3. Mooring locations along the Illinois shoreline of Lake Michigan and numbers of non-charter power boats moored at each location, as determined by the marinas and port authorities. Total number of power boats per port in bold.

<u>Mooring area</u>	<u>Number of power boats</u>
North Point Marina	1,143
Public Moorings	1,073
Skipper Bud's I/O service	70
Waukegan Harbor	694
Public Moorings	574
Larsen Marine I/O service	120
Great Lakes Naval Training Station	30
Wilmette Harbor	65
Chicago Park District	3,201
Diversey	600
Burnham	794
other harbor moorings	1,817

Early spring survey

Only two site groups were surveyed in March. The Lake County group consisted of Waukegan Harbor (pedestrians) and Waukegan Harbor (launched boats). The Chicago group consisted of Montrose Harbor (pedestrians), Calumet Park (pedestrians), and Calumet Park (launched boats). These sites included virtually all the open boat ramps and the areas of heaviest concentrations of open water pedestrian anglers this early in the season (based on personal observations and previous surveys). No attempt was made to estimate moored boat effort, harvest or expenditures in the March survey because very few boats are at moorings at that time.

Selection of dates in a stratified random sample

The core fishing season (1 April through 30 September 2006) was stratified by segment and type of day. Each date fell within one segment and was either a week day (non holiday Monday through Friday) or a weekend day (weekends and holidays). The following 18 strata were formed:

- | | |
|---------------------------|------------------------------|
| 1. week days 4/1 - 4/16 | 2. weekend days 4/1 - 4/16 |
| 3. week days 4/17 - 5/7 | 4. weekend days 4/17 - 5/7 |
| 5. week days 5/8 - 5/28 | 6. weekend days 5/8 - 5/28 |
| 7. week days 5/29- 6/18 | 8. weekend days 5/29- 6/18 |
| 9. week days 6/19 - 7/9 | 10. weekend days 6/19 - 7/9 |
| 11. week days 7/10 - 7/30 | 12. weekend days 7/10 - 7/30 |
| 13. week days 7/31 - 8/20 | 14. weekend days 7/31 - 8/20 |
| 15. week days 8/21 - 9/10 | 16. weekend days 8/21 - 9/10 |
| 17. week days 9/11 - 9/30 | 18. weekend days 9/11 - 9/30 |

Within each stratum, dates were selected at random with the restriction that all four groups of sites were sampled each week day (Monday through Friday) and each weekend. This sampling process was conducted separately for each of the four groups of three areas. Three dates were selected from each stratum except 1, 2, 17 and 18; in those strata, which were several days shorter than the others, fewer than three dates were selected for each group of areas. All three areas in each group were visited on the dates selected for that group.

The early spring survey (1 March through March 31) was treated in a similar fashion to the core survey except that the segment was one month.

- | | |
|-------------------------|----------------------------|
| 1. week days 3/1 - 3/31 | 2. weekend days 3/1 - 3/31 |
|-------------------------|----------------------------|

Data collection

Data collection at pedestrian fishing areas consisted of counting all pedestrian anglers at the start and finish of a two-hour interview period and interviewing a representative sample of anglers during the two hours. At the eight primary pedestrian areas the interview period was always 0600 to 0800 or 0830 to 1030. Each interview was designed for one angling party (i.e., one or more anglers fishing together) rather than for one individual angler. By interviewing parties instead of all individuals in a party more interviews can be conducted in a given time frame, redundant information can be avoided, and annoyance to the party is minimized. At launch ramps, all trailers with vehicles attached (except personal watercraft trailers) were counted in the parking lot at the beginning and end of the sampling period (between 1100 and 1300) and a representative sample of all returning fishing parties was interviewed.

The interviewers (referred to as creel clerks) gathered information related to effort (number of angler-hours, number of angler-trips), expenditures for the present fishing trip (by category: major = boat, motor, or trailer; minor = fishing gear; other = auto gas @ 10 cents per mile), species sought, and harvest (by species). Clerks also weighed and measured fish in possession of the anglers, noted clipped fins, and noted sea lamprey wounds and scars. The data form (Figure A1) and instructions to creel clerks are reproduced in Appendix A.

Variables measured for each date

The data collected in the interviews on one date at one area were reduced to a set of variables describing daily fishing activity: (1) Harvest per angler-hour was determined for each species as the number of fish harvested by all parties interviewed divided by the number of hours of fishing by individuals in those parties. (2) Expenditures per angler-trip were determined in each of three categories (major, minor, and other). For all expenditures, total expenditures by all anglers interviewed were divided by the number of anglers interviewed. (3) Angler-hours (i.e., total time spent fishing by all anglers) and (4) angler-trips (i.e., total number of anglers who fished) were determined differently for pedestrians and boaters. For pedestrians, angler-hours was the average number of anglers (at start and finish of interviews) multiplied by the number of hours in the day (from 0.5 hour before sunrise to 0.5 hour after sunset), and angler-trips was angler-hours divided by the average duration of a pedestrian fishing trip (3.56 hours for all interviews with conventional pedestrian anglers from 1997 - 2006 surveys). The number of fishing boats launched for the day was estimated by multiplying the number of fishing boats landing during the two-hour interview period by the estimated average ratio of the number of all boats returning in a day to the number returning between 11:00 and 13:00. That ratio was estimated to be 2.88 by monitoring all boat traffic at North Point Marina on 8 days in 2005 (data collection was attempted on ten dates in 2006 but poor weather caused the cancellation of seven attempts so the 2005 ratio was used again in 2006). Angler-trips were then estimated as the total number of boats launched for the day multiplied by the average number of anglers per boat (2.38, based on data from 1997 - 2006). Angler-hours were taken as angler-trips multiplied by the yearly average number of hours per angling trip by boaters (5.48, based on data from 1997 - 2006). (5) Harvest was determined for each species as harvest per angler-hour multiplied by angler-hours, and (6) expenditures were determined for each category as expenditures per angler-trip multiplied by angler-trips.

Expansion of daily estimates

The formula given by Cochran (1977) for stratified random samples was employed to expand the daily estimates to form seasonal area-specific estimates of effort, harvest, and expenditures.

Seasonal averages of harvest per angler-hour were obtained for each primary fishing area by taking unweighted averages of daily values. In these calculations, seasonal averages for yellow perch included only data from anglers who were fishing for perch, and seasonal averages for salmonids included only data from anglers who were fishing for salmonids. Anglers who did not specify what they were fishing for were excluded from these calculations.

Extrapolation to other areas

Extrapolations of seasonal estimates from primary fishing areas to other areas were based on the distributions of pedestrian anglers and boat trailers (Table 2). The distribution of boat trailers was assumed to reflect the distribution of launched-boat anglers. In the extrapolations, harvest, effort, and expenditures at areas not visited were estimated by extension of estimates for the nearest primary fishing areas. Thus, for pedestrian anglers, estimates for Waukegan Harbor were extended to all other areas (except North Point Marina) north of and including

Wilmette Harbor; estimates for Montrose Harbor were extended to all remaining areas north of Belmont Harbor; estimates for Belmont Harbor were extended to all remaining areas north of the Monroe Street breakwalls; estimates for Burnham Harbor were extended to all remaining areas north of McCormick Place; estimates for McCormick Place were extended to all remaining areas north of 31st Street; estimates from Jackson Park were extended to all remaining areas north of Rainbow Park; and estimates from Calumet Park were extended to all remaining areas south of (and including) Rainbow Park. For launched boats, estimates for Waukegan Harbor were extended to all launch ramps north of Wilmette (including the "other" areas listed in Table 2); estimates for Diversey were extended to Dawes Park; and results for Calumet Park were extended to the ramp at Jackson Park.

Moored boats

Estimates of effort, harvest, and expenditures by anglers using moored boats were extrapolated from calculations for launched boats. First, the ratios of moored fishing boats to launched fishing boats for North Point Marina, Diversey Harbor, and Burnham Harbor were estimated. On thirteen dates during the spring and summer of 2006 counts were made of the numbers of fishing boats returning to moorings while simultaneous counts were made of the number of fishing boats returning to the launch ramp. Charter boats were excluded from the counts. The ratio of moored to launched boats was 0.76 in North Point Marina, 1.13 in Diversey Harbor, and 0.75 in Burnham Harbor. Using these figures, seasonal estimates of effort, harvest, and expenditures by anglers using launched boats at North Point, Diversey, and Burnham harbors were extrapolated to moored boats. Thus, for example, the moored boat harvest at North Point Marina for a given segment was estimated to be the launched boat harvest for that segment multiplied by 0.76. Values so derived for North Point, Diversey, and Burnham harbors were then extrapolated to other moored boats based on the distribution of moored power boats (Table 3). Estimates for North Point Marina were extrapolated to boats moored in Waukegan Harbor, Wilmette Harbor, and Great Lakes Naval Training Station, and the combined estimates for Diversey Harbor and Burnham Harbor were extrapolated to all other boats moored in Chicago.

Changes in creel survey methods

Creel survey methods have varied during the past twenty-one years of the creel survey, so comparisons should be made with caution, especially where estimates for anglers using moored boats are concerned.

The most important changes in the methods of collecting and analyzing data since 1997 are as follows: (1) Several parameters used in deriving estimates are themselves estimated. The estimated values were updated during those ten years. Table 4 lists the values of these parameters used each year. (2) The inputs to the formulae for extrapolating harvest, effort, and expenditures by anglers using launched boats to estimate harvest, effort and expenditures for anglers using moored boats varied in the past ten years. This modification of inputs occurred because the estimated ratios of moored boat traffic to launched boat traffic for North Point Marina, Diversey Harbor and Burnham Harbor changed greatly among, 1997 – 2000 and 2003 - 2006 (Table 4) as new data became available. (3) Changes in the average length of pedestrian and boat angler trips and the average number of anglers per boat each year were modified, based on data collected from 1997 through 2006 (Table 5).

Table 4. Parameters used in deriving estimates. Parameter values given for each year are estimated from all available data from the ten previous years.

Parameter	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Duration of fishing trip (hours)										
summer pedestrians	3.65	3.63	3.62	3.61	3.64	3.64	3.66	3.65	3.62	3.63
launched boats	5.00	5.02	5.03	5.01	5.02	5.00	5.00	5.01	5.03	5.08
Number of anglers per launched boat	2.58	2.57	2.57	2.56	2.55	2.52	2.52	2.41	2.41	2.38
Ratio of number of launched boats returning in a day to the number returning during 1100 to 1300.	3.10	3.39	2.77	3.19	3.19	3.19	3.09	2.95	2.88	2.88
Ratio of number of moored boats used for fishing on any day to number of launched boats used for fishing.										
North Point Marina	0.62	0.85	0.65	0.78	0.78	0.78	0.90	0.71	0.73	0.76
Diversey Harbor	1.91	4.00	2.67	1.80	1.80	1.80	1.73	3.50	0.87	1.13
Burnham Harbor	0.33	1.40	0.43	0.47	0.47	0.47	0.40	0.33	1.67	0.75
Distributions of pedestrian anglers, launched boats, and moored boats (Tables 1 and 2).										
										Differences between years were slight.

Table 5. Average angler trip lengths and number of anglers per boat, 1997- 2006

Year	Pedestrian angler trip length (hours)	Boat angler trip length (hours)	Anglers per boat
1997	3.37	4.83	2.56
1998	3.36	5.19	2.49
1999	3.44	5.19	2.49
2000	3.56	4.75	2.47
2001	4.01	5.12	2.46
2002	3.76	4.66	2.16
2003	3.87	5.01	2.46
2004	3.55	5.27	2.04
2005	3.79	5.34	2.48
2006	3.56	5.48	2.38
Mean \pm 1SD	3.63 \pm 0.22	5.08 \pm 0.22	2.40 \pm 0.18

Confidence intervals and bias

Estimates of harvest, effort, and expenditures are presented without confidence intervals. Confidence intervals presented without estimates of bias are meaningful only if bias is assumed to be negligible, an assumption that we are not willing to make. Although we have collected and will continue to collect data with which to partially assess biases, we are presently unable to make such assessments. Table 4 lists the parameters used in our estimation procedures. Those parameters, to the extent that they are incorrect, introduce bias into the estimation process. Other sources of bias in this survey include the assumption that fishing effort and harvest rates during the times of our interview sets (0600 to 0800 or 0830 to 1030 for pedestrians; 1100 to 1300 for launched boat anglers) are, on average, representative of the entire day.

Yield values

Here the term yield value means the hypothetical market price of the sport fish harvest. For salmonids, approximate market prices of whole fish, headed and gutted were used. For yellow perch, market prices of fillets were used. The estimated harvest for each species was multiplied by the average individual weight of fish weighed in our survey. That estimated harvested round weight was then multiplied by a factor to estimate the harvested market weight. For salmonids, the factor was 0.75 because approximately 25% of the weight of a salmonid is in the head and viscera. For yellow perch the factor was 0.40 because approximately 60% of the fish is wasted in the filleting process. Total harvested marketable weight was then multiplied by approximate market prices (prices observed on the Internet by W.A. Brofka).

Missing data

On some dates creel clerks were unable to complete their assigned interviews. When data were missing from some but not all of the assigned dates in a stratum, estimates for the stratum were based only on data from the completed dates. In these cases, the sample size was smaller than for strata where all interview sets were completed and the estimates were not as precise as estimates derived from full data sets.

Alternate sites/ altered sites

Sometimes, because of unforeseen circumstances (i.e. construction) a primary site may be closed or less accessible during part or all of a sampling season. In 2006 major construction work was generally completed in areas surveyed along Chicago's shoreline and harbors. Northerly Island (formerly Meigs Field) was open to the public and greatly increased the surveyed area at Burnham Harbor. Belmont Harbor replaced Diversey Harbor as one of the pedestrian sites (heavier usage). The launch ramp at Waukegan was added as the increased emphasis on spring yellow perch fishing was not represented at North Point Marina. The fishing pier at North Point Marina wasn't put in place until the second half of April.

Weather

Weather data were collected during the course of the creel survey using a combination of on-site observations at the Lake Michigan Biological Station (LMBS) and the daily Lake Michigan forecasts and observations broadcast by the National Weather Service for Illinois and Indiana waters. Variables recorded each day were: wind speed, wind direction, wave height, air temperature, percent of cloud cover and precipitation. In the analysis each variable was subjectively assigned a point value based on expected effect (based on personal observation and experience) on angler effort, and a composite score was produced for each day (Table 6). The possible range of scores was from 7 to 29 with higher scores reflecting better weather.

Table 6. Weather variables and possible scores used in determining the mean daily weather conditions by three week segment in 2006.

<u>Wind speed</u>		<u>Wave height</u>		<u>Air temperature</u>		<u>Precipitation</u>	
Knots	Points	Feet	Points	Degrees F	Points	Yes	Points
0 - 15	5	0 - 2	5	below 20	1	Yes	0
10 - 20	4	1 - 3	4	20 - 39	2	No	5
15 - 25	3	2 - 4	3	40 - 59	3		
20 - 30	2	3 - 5	2	60 - 80	4		
25+	1	4+	1	80+	3		

<u>Wind direction</u>		<u>Cloud cover</u>		<u>Composite</u>	<u>Ratings</u>
Direction	Points		Points	Scores	
N	1	Cloudy	3	26 - 29	Perfect to nearly perfect
NE	1	Clear	5	23 - 25	Good
E	1			20 - 22	Fair
SE	2			17 - 19	Mediocre
S	2			11 - 16	Poor
SW	4			7 - 10	Atrocious
W	4				
NW	3				

(If wind speed is under 10 - 20, score is always 5 for wind direction)

Note: This rating system gauges the effect of weather on angler effort, not angler success. Sometimes outstanding angler success occurs under inclement weather conditions. However, inclement weather conditions generally cause angler effort to be light.

RESULTS

All estimates derived in this survey are given here without qualification; for simplicity of expression, the word "approximately" is not repeated with each estimated value. Estimates are rounded in the following paragraphs.

Total fishing effort in the Illinois portion of Lake Michigan during the study period was 495,700 angler-hours. Anglers harvested 335,400 yellow perch, 29,200 coho salmon, 20,400 chinook salmon, 3,900 rainbow trout, 2,600 brown trout and 1,100 lake trout. Expenditures for boats, motors, trailers, fishing gear, and automobile gas used on Lake Michigan fishing trips during the study period were over \$7.3 million. The yield value of the Illinois sport fishing harvest was over \$4.1 million.

Detailed results for 2006 are presented in Tables 7 - 18. Table 7 summarizes all expenditure and angler trip estimates for April - September, 2006. Table 8 summarizes all expenditure and angler trip estimates for March, 2006. Tables 9 and 10 list seasonal harvest and effort (angler hours) estimates for anglers. Tables 11 and 12 present effort and harvest for each segment. Tables 13 and 14 present harvest rates for pedestrians and launched boaters for each segment. Table 15 provides yield values. Table 16 presents average weights of the six most important species, with separate average weights given for the harvest of boaters and pedestrians. Table 17 lists fin clip abbreviations; fin clips observed by our creel clerks are listed in Table 18, with the number of occurrences of each clip or clip combination listed by species, season and angler type. Table 18 can assist in determining the contributions of different stockings of fish to the sport fishery in the Illinois portion of Lake Michigan.

Tables 4 and 5 and 19 - 22 describe comparisons of the 2006 data with data from previous years. Tables 4 and 5 describe parameters used in deriving estimates concerning length of fishing trips, anglers per boat, ratios of moored to launched fishing boats and the ratio of fishing boats returning during 1100 to 1300 compared to the rest of the day. Tables 19 and 20 report angler trips and expenditures among angler types and among years. Tables 21 and 22 compare angler hours and harvest by fish species between angler types and for each year.

Tables C1 and C2 concern a comparison between charter and non - charter boat harvest species composition. Table C1 describes the percent species composition and directed angler hours for the non - charter boat salmonid harvest (boats only) among years. Table C2 describes the percent species composition and angler hours for the charter boat harvest among years.

Pedestrian fishing

From April 1 - September 30, 2006, pedestrian anglers made over 75,000 trips to Lake Michigan (Table 7) and spent over 272,000 hours fishing (Table 9). Yellow perch was the predominant species in the harvest, with a harvest of nearly 155,000 fish (Table 9). Chinook salmon were the next most important species for pedestrian anglers, with a harvest of over 1,700 (Table 9). Pedestrian anglers spent \$456,000 (\$6.07 per trip) for fishing gear and \$124,000 (\$1.65 per trip) for automobile gas (Table 7).

Fishing by boaters using launched boats

Anglers who used launched boats made nearly 19,000 trips to Lake Michigan (Table 7) and spent nearly 96,000 hours fishing (Table 9). The most abundant species in their harvest were yellow perch (91,000), coho salmon (15,600), chinook salmon (10,000), rainbow trout (1,900), and lake trout (600) (Table 9). For salmonids, North Point Marina was the most productive of the five primary launch areas, accounting for 54% of the lake trout, rainbow trout, chinook salmon, and coho salmon taken by anglers who used launched boats (Table 9). Waukegan launch ramp accounted for 67% of the yellow perch harvested by launched boat anglers (Table 9). Expenditures by anglers using launched boats were \$3,679,000 (\$195 per trip), with nearly 90% of that amount going for boats, motors, and trailers (Table 7).

Fishing by boaters using moored boats

Our estimates for boaters using boats kept at moorings were derived by extrapolation from estimates for boaters using launched boats. This group of anglers harvested 89,500 yellow perch, 13,500 coho salmon, 8,600 chinook salmon, 1,700 rainbow trout, and 500 lake trout (Table 9), and spent nearly \$3.1 million for boats, motors, trailers, fishing gear, and automobile gas (Table 7). Mooring costs were excluded.

Yield values

The estimated yield values of the three most commonly harvested sport species were \$2,081,000 for chinook salmon, \$1,075,000 for coho salmon, and \$750,000 for yellow perch (Table 15). Currently, none of the species listed in Table 15 are commercially available from Lake Michigan except yellow perch from the Wisconsin portion of Green Bay. The values of all species are derived from the retail prices of those species commercially harvested or raised in other waters.

Comparisons with preceding years

Total angler fishing effort in 2006 decreased by 7.9% compared to 2005 (Table 21). Pedestrian effort decreased by 11.6%, launched boat effort decreased by 13.4% and moored boat effort increased by 14.9% compared to 2005 (Table 21 and Figure 2). Angler success for salmonids (number of fish per angler hour) increased for boat anglers but fell for pedestrian anglers compared to 2005 (Figure 3a). Angler success for yellow perch increased for boat anglers but fell for pedestrian anglers compared to 2005 (Figure 3b). Directed angler effort for salmonids increased for pedestrian anglers but decreased for boat anglers compared to 2005 (Figure 4a) and directed angler effort for yellow perch decreased for pedestrian anglers but increased for boat anglers compared to 2005 (Figure 4b).

Biomass of both yellow perch and salmonids harvested increased, compared to 2005 (Figure 5).

The yellow perch harvest of 335,388 represented an increase of 11.4% compared to the 2005 harvest (Table 21 and Figure 6). The average weight of yellow perch kept by anglers increased to 238g (0.52 lb.) (Table 15). The average length increased to 260 mm (Figures 7 and 8). Perch fishing was sensational for Waukegan boat anglers in the spring, good in June, closed in July, and good after the closure (Tables 11 and 12, Figure 9).

The 2006 harvest of coho salmon increased by 35.5% compared to 2005 (Table 21 and Figure 10). Weight 1,600 g (3.52 lb.) of creel coho salmon increased 11.4% and length (542 mm) increased 2.8% compared 2005 (Table 15,

Figures 11 and 12). The bulk of the harvest occurred from late April through mid June (Tables 11 and 12, Figure 13).

The chinook salmon harvest increased to 20,354 fish for 2006 (Table 21 and Figure 14). Average length was 723 mm, an increase of 5.4% compared to 2005 and the average weight decreased to 4,141 g (9.12 lb.), an increase of 18.6% compared to 2005 (Table 15, and Figures 15 and 16). Chinook salmon harvest distribution was similar to the twenty year mean (Tables 11 and 12, Figure 17).

The 2006 harvest of lake trout was 1,095, a decrease of 10% compared to 2005, continuing a harvest decline since 2001 (Table 21 and Figure 18). The average weight decreased by 21.4% and the average length decreased by 6.2% compared to 2005 (Table 15, Figures 19 and 20). Harvest was roughly evenly distributed between segments 3 through 8 (May 8 – September 10) (Tables 11 and 12, Figure 21).

The 2006 brown trout harvest (2,579) increased 10.9% compared to 2005 (Table 21, Figure 22). The average length (523 mm) decreased by 9.0% compared to 2005 and the average weight of 1,952 g (4.30 lb.) decreased by 32.1% (Table 15 and Figures 23 and 24). The harvest pattern in 2006 was similar compared to the twenty year mean (Tables 11 and 12, Figure 25).

The 2006 rainbow trout harvest (3,915) increased by 11% compared to 2005 (Table 21 and Figure 26). The average length (679mm) and weight 3,233 g (7.12 lb.) of creel rainbow trout increased compared to 2005 (increases in length of 6.2% and weight of 20.5%) (Table 15 and Figures 27 and 28). Over 63% of harvest occurred during segments 5 through 7 (June 18- August 20), (Tables 11 and 12, Figure 29).

Estimated expenditures for boats, motors, and trailers decreased by 18.2% compared to 2005 (Table 19). Minor expenditures decreased by 13.3% and other expenditures decreased by 13.0%.

Weather data were collected throughout the creel season in 2006. The weather was more severe during the summer, cutting into overall launched boat effort (Figures 30 and 31). As in previous years, fish availability had more effect than weather for pedestrian anglers (Figure 32). Salmon and trout being close to shore early and late in the sampling period and the closing and opening of yellow perch season seem to drive pedestrian effort more than weather. Ongoing collection of weather data during the creel survey will permit evaluation of how significantly weather affects fishing in relation to other factors.

A comparison of the percentage of different species in the charter and non - charter boat salmonid fishery was made (Appendix C). The differences in species composition between the two groups were minor with charter anglers having coho salmon being a higher percentage of total harvest compared to non - charter boat anglers and rainbow trout and chinook salmon being a higher percentage of total harvest of non - charter boat anglers compared to charter anglers (Tables C1 and C2). Harvest per unit effort between charter and non - charter boat anglers were compared and were similar (Figure C1). Salmonid charter and non - charter harvest were combined for a total salmonid harvest by all angler types from 1997 - 2006 (Figure C2).

Minor species

In addition to the species for which results are presented in detail in Tables 9 - 22, creel clerks reported several other species of fish in possession of anglers. For some species, an estimate has been made of the total number of fish harvested and numbers caught (numbers in parentheses). For other species, because so few fish were observed just the actual number observed is reported. Most of the minor species were harvested in or near the harbors. **Rock bass**, 6,696 (38,661); **bluegill sunfish**, 550 (5,133), **pumpkinseed sunfish**, 28 (303); (Figure 33); **common carp**, 147 (732); **freshwater drum**, 2,990 (3,593) (Figure 34); **smallmouth bass**, 46 (9,549); **largemouth bass**, 97 (4,820) (Figure 35); **black crappie**, 3 fish observed **burbot**, 1 fish observed; **northern pike**, 2 fish observed; unspecified **bullhead**, 1 fish observed; anglers also harvested **alewives** for use as bait and caught **round gobies** (some were retained for food, most were not retained). **Round gobies** were observed being caught by anglers at all of our pedestrian sites.

The 2006 early spring survey decreased in all categories except for coho salmon compared to 2005. Angler effort decreased nearly 10% compared to 2005. Harvest of salmonids decreased 30.8% for brown trout, 73% for rainbow trout but increased 36% for coho salmon. A yellow perch harvest of 3,856 fish was 33.5% below the 2005 harvest. Most of these fish were caught by boat anglers in the Calumet River (Table 22).

DISCUSSION

Changes in the fishery and the creel survey in 2006

Belmont Harbor replaced Diversey Harbor as one of the pedestrian sites for the North Chicago Cluster (Diversey Harbor remained the launch ramp site). The launch ramp at Waukegan was sampled directly for the first time since 1990. The data entry and analysis of the data was completely overhauled switching from a DOS based RBase database to Windows based Access.

Angler effort

Total angler fishing effort in 2006 decreased for pedestrian anglers and launched boat anglers but increased for moored boat anglers compared to 2005. Effort decreased 13.4% for launched boats, 11.6% for pedestrians but increased 14.9% for moored boats.

Yellow perch

Annual yellow perch harvests in Illinois were well over one million fish each year from 1986 through 1993 with the exception of 1989. Beginning in 1994 however, harvest fell to under 600,000 and by 1997 fell to well under 60,000. The 2001 increased harvest reached 166,510 due to the combination of the repeal of the slot limit and moving the month closure to July. The 2002 harvest increased slightly to 169,233. The 2003 harvest increased again slightly to 174,200 though harvest per unit effort fell compared to 2002. 2004 saw a strong increase in harvest to 221,923. 2005 saw another strong increase in harvest to 301,085. Primarily through the boat fishery in Waukegan harvest increased again in 2006 to 335,388 even though the pedestrian fishery fell by 43% to 154,904. Preliminary analysis of yellow perch aged caught by anglers show that the fishery is now supported by two year classes, 2002 and 2003, with the 2002 year class now dominating the harvest (Rebecca Redman, INHS, personal communication). Yellow perch harvest increased 11.4%, angler effort for yellow perch decreased by 12.8% and HPE (harvest per angler effort expressed in fish per angler hour) increased 27.1% to 1.78 yellow perch per angler hour in 2006 (due primarily to the boat fishery out of Waukegan).

Coho salmon

Coho salmon have been the main component of both the boat and pedestrian salmonid fishery. In the boat fishery, coho salmon make up 60 to 70% of the salmonids harvested in a typical year. 2006 was another atypical year with coho salmon accounting for only 53% of salmonids harvested by the non-charter fishery. The 2006 harvest of over 29,200 coho salmon was a 35.5% increase compared to 2005. Mean weight of harvested coho salmon during 2006 was 1,600 g which was 8% heavier than the twenty-one year mean.

Other salmonids

Coho salmon harvest has traditionally been concentrated in the spring and early to mid-summer. Other salmonids, especially lake trout and chinook salmon, make up the majority of the harvest from mid-summer through the fall. The lake trout harvest was stable from 1991 through 1997 with the exception of 1996. The lake trout harvest in 1998 was exceptional, the highest that this survey has ever seen. 1999 and 2000 saw harvest return to the low level recorded in 1996. The 2001 harvest was very close to the twenty year mean but in 2002 through 2005 returned to the levels seen in 1999 and 2000. The harvest in 2006 (1,095) was the lowest ever observed by this survey. The charter fishery also showed a similar decrease in harvest (Robillard, 2006).

The chinook fishery before 1988 was the mainstay of the summer/fall salmonid fishery. Chinook salmon are highly prized because they can attain a very large size and are extremely powerful fighters. Bacterial kidney disease (BKD) was blamed for die offs of chinook salmon beginning in 1988. Since 1987, the mean harvest of chinook salmon has been around 10,000 fish. The harvest bottomed out in 1994 with 2,900 chinook taken. Chinook salmon are now closely monitored in the hatchery and in the wild for BKD (Clark, 1996). 2006 saw an increase in harvest

of nearly 48% compared to 2005, to over 20,000 fish. Mean weight increased by 650g to 4,141 g (9.12 lbs) compared to 2005.

Brown trout are an important component of the spring salmonid fishery with an average harvest of 4,100 fish annually. Pedestrian angling normally accounts for 70% of those fish. The 2006 harvest of 2,600 browns was an increase of nearly 11% from the 2005 harvest. The mean weight decreased to 1,950 g (4.30 lbs).

Rainbow trout are a component of the spring and summer fishery. Some mature fish are caught in the spring by pedestrian anglers, but the majority of the fish are caught by the boat fishery. The annual mean harvest has been 5,000. 1998 saw the highest harvest of rainbow trout at 11,500. 2006 saw an increase of 22.9% compared to 2005 with a harvest of over 3,900 fish. The mean weight increased 20.5% to 3,200g (7.12 lbs) in 2006.

Minor species

Certain species that have been present in the areas surveyed since the survey began have recently grown in prominence. Black bass (smallmouth and largemouth bass) inhabiting the harbors and shoreline of the Illinois portion of Lake Michigan have increasingly been the focus of bass anglers nationwide, as indicated by the national B.A.S.S. tournament based at Burnham Harbor July 19 - 23, 2000. Common carp and freshwater drum are being targeted both by anglers fishing for food and catch and release anglers using European carp tournament fishing techniques.

Panfish other than yellow perch are being targeted or kept incidentally by pedestrian anglers, with rock bass presently being the most numerous; their numbers equal from 1% to nearly 57% of the annual yellow perch harvest in the past ten years. Ten percent of total angling effort was directed at minor species in 2006.

Expenditures

2006 saw decreases in all expenditure categories compared to 2005. Major expenditures (boat, motor and trailers) decreased over 18%. Minor expenditures (tackle, bait, downriggers, etc.) decreased over 13% and other expenditures (mileage) decreased 13%.

Early spring (March) survey

The March survey is heavily influenced by the weather in March and the severity of the winter preceding March. In 1995, the first year of the survey, the entire shoreline and harbors were free of ice and no severe lake storms occurred (storms with sustained high winds of an easterly direction generating high seas, damage and erosion to the shoreline). Fishing was good for both coho salmon and brown trout. In 1996 the shoreline and harbors were locked in ice for the first three weeks of March (Brofka and Marsden, 1997). A severe lake storm occurred in the third week. Effort was only 35% of what it had been in 1995 with almost half the effort concentrated at the power plant discharge in Waukegan (Brofka and Marsden, 1997). Harvest of brown trout and coho salmon were much lower than in 1995. In 1997 the shoreline and harbors were free of ice and the shoreline did not suffer from any severe storms. March 1997 saw high harvests of both coho salmon and brown trout; angler effort was four times higher than in 1996. 1998 and 1999 were similar years with a generally mild winter which kept ice formation to a minimum and a powerful storm early (second week). 2000 saw a very mild winter and a relatively calm March. 2003 saw similar conditions as in 1996 with the exception of major lake storms. 2004 was a marked improvement over 2003 with increases in all categories except lake trout and chinook salmon (which remained the same at zero harvested). 2005 saw a decline in all categories. The beginning of the 2006 survey found all of the harbors frozen. Of the ten years of March surveys, 2006 would rank ninth in effort, fourth in yellow perch, ninth in brown trout, and ninth in rainbow trout and sixth in coho salmon. The brown trout and rainbow trout harvest would have been higher if the Waukegan power plant discharge and pier had been open to the public as it had been prior to 2004.

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Table 7. Fishing effort (angler-trips) and expenditures (major, minor, and other) by non-charter anglers in the Illinois portion of Lake Michigan during April-September, 2006. NA = not applicable, Wau. = Waukegan

Type of effort	Area	Effort (angler- trips)	Expenditures		
			Major (boat etc.)	Minor (gear)	Other (travel)
Pedestrians	North Point	1,080	NA	\$4,793	\$2,388
	Wau.Harbor	7,738	NA	\$84,401	\$35,329
	Montrose	37,603	NA	\$101,507	\$36,722
	Belmont	5,279	NA	\$25,599	\$10,720
	Burnham	4,552	NA	\$105,350	\$10,380
	McCormick	563	NA	\$25,732	\$1,689
	Jackson	3,229	NA	\$32,617	\$4,521
	Calumet	1,009	NA	\$24,128	\$1,766
	other	12,179	NA	\$52,229	\$20,704
TOTALS	75,111	NA	\$456,356	\$124,219	
Launched boats	North Point	5,263	\$1,480,951	\$51,106	\$23,907
	Waukegan	7,738	\$628,216	\$154,738	\$28,101
	Diversey	919	\$278,623	\$7,004	\$1,545
	Burnham	406	\$0	\$14,064	\$1,441
	Calumet	1,433	\$467,096	\$29,320	\$4,590
	others	3,100	\$446,264	\$52,689	\$9,770
	TOTALS	18,859	\$3,301,150	\$308,921	\$69,354
Moored Boats	TOTALS	17,310	\$2,742,306	\$283,793	\$60,801
Season Totals (rounded)		111,000	\$6,043,000	\$1,049,000	\$254,000

Table 8. Fishing effort (angler-trips) and expenditures (major, minor, and other) by non-charter anglers at selected sites along the Illinois portion of Lake Michigan during March, 2006. NA = not applicable, Wau. = Waukegan, Cal. = Calumet, Peds = Pedestrian

Location	Effort (angler- trips)	Expenditures		
		Major (boat)	Minor (gear)	Other (travel)
Wau. Harbor	980	NA	\$11,277	\$1,535
Wau. Ramp	40	\$0	\$6,220	\$73
Montrose	1,717	NA	\$31,812	\$2,919
Cal. Park Peds	488	NA	\$13,699	\$1,523
Cal. Park Ramp	182	\$0	\$3,497	\$370
Total (rounded)	3,400	\$0	\$66,500	\$6,400

Table 9. Effort (anglers-hours) and harvest (by species) by non-charter anglers in the Illinois portion of Lake Michigan during April-September, 2006. Wau. = Waukegan, N. Point = North Point, Peds = Pedestrian, Lau'd = Launched boat

Type of angler	Area	Effort (angler-hours)	Harvest					Chinook salmon
			Yellow perch	Brown trout	Rainbow trout	Lake trout	Coho salmon	
Peds	North Point	3,920	141	0	0	0	0	0
	Wau. Harbor	34,911	14,513	59	15	0	23	672
	Montrose	136,498	106,772	146	96	0	61	317
	Belmont	19,163	8,144	131	43	0	19	191
	Burnham	16,522	1,520	22	87	0	20	13
	McCormick	2,044	395	0	0	0	0	11
	Jackson	11,720	3,254	0	0	0	9	124
	Calumet	3,664	41	0	0	0	70	0
	other	44,210	20,124	114	63	0	38	416
TOTALS	272,652	154,904	472	304	0	240	1,744	
Lau'd	North Point	26,736	515	133	1,097	302	8,763	5,419
	Wau. Harbor	39,309	61,023	327	577	224	4,527	3,275
	Diversey	4,667	3,765	143	0	0	252	63
	Burnham	2,063	1,131	12	68	0	210	109
	Calumet	7,280	3,643	140	0	0	313	146
	others	15,750	20,942	219	167	65	1,524	1,013
	TOTALS	95,805	91,019	974	1,909	591	15,589	10,025
Moored	TOTALS	87,936	89,466	1,133	1,703	504	13,478	8,586
Summer Totals		456,393	335,388	2,579	3,915	1,095	29,188	20,354

Table 10. Effort (anglers-hours) and harvest (by species) by non-charter anglers at selected sites along the Illinois portion of Lake Michigan during March, 2006. Wau. = Waukegan, Cal. = Calumet, Peds = Pedestrian

Location	Effort (angler-hours)	Harvest					Chinook salmon
		Yellow perch	Brown trout	Rainbow trout	Lake trout	Coho salmon	
Wau. Harbor	3,557	0	169	19	0	0	0
Wau. Ramp	203	10	136	0	0	0	0
Montrose	6,231	0	237	0	0	48	0
Cal. Park Peds	1,773	0	124	4	0	74	0
Cal. Park Ramp	923	3,846	101	0	0	264	0
Total	12,687	3,856	767	23	0	386	0

Table 11. Effort and harvest for each segment by pedestrian anglers of the Illinois portion of Lake Michigan during April-September, 2006. Wau. = Waukegan

Time Period	Area	Effort (angler-hours)	Harvest					
			Yellow perch	Brown trout	Rainbow trout	Lake trout	Coho salmon	Chinook salmon
4/1-	North Point	82	0	0	0	0	0	0
4/16	Wau. Harbor	2,188	0	48	0	0	0	0
	Montrose	7,145	400	75	0	0	17	0
	Belmont	1,762	0	71	0	0	19	0
	Burnham	749	0	22	0	0	0	0
	McCormick	0	0	0	0	0	0	0
	Jackson	320	0	0	0	0	9	0
	Calumet	789	0	0	0	0	70	0
	others	2,723	33	69	0	0	21	0
4/17- 5/7	North Point	496	0	0	0	0	0	0
	Wau. Harbor	1,976	0	11	0	0	0	0
	Montrose	4,377	22	70	0	0	45	0
	Belmont	585	0	46	0	0	0	0
	Burnham	927	5	0	5	0	0	0
	McCormick	186	0	0	0	0	0	0
	Jackson	289	0	0	0	0	0	0
	Calumet	263	0	0	0	0	0	0
others	1,793	3	36	1	0	4	0	
5/8- 5/28	North Point	14	0	0	0	0	0	0
	Wau. Harbor	1,513	909	0	16	0	0	0
	Montrose	13,509	19,048	0	79	0	0	70
	Belmont	1,299	1,262	0	0	0	0	0
	Burnham	1,798	1,254	0	0	0	0	0
	McCormick	245	69	0	0	0	0	0
	Jackson	1,235	1,598	0	0	0	0	0
	Calumet	294	0	0	0	0	0	0
others	3,184	3,301	0	12	0	0	6	
5/29- 6/18	North Point	484	0	0	0	0	0	0
	Wau. Harbor	4,983	1,173	0	0	0	23	0
	Montrose	33,827	35,039	0	0	0	0	0
	Belmont	4,683	3,922	0	0	0	0	0
	Burnham	7,871	951	0	82	0	0	0
	McCormick	794	219	0	0	0	0	0
	Jackson	3,184	1,098	0	0	0	0	0
	Calumet	372	0	0	0	0	0	0
others	10,977	6,354	0	23	0	7	0	
6/19- 7/9	North Point	546	0	0	0	0	0	0
	Wau. Harbor	2,833	764	0	0	0	0	0
	Montrose	27,870	21,697	0	17	0	0	0
	Belmont	1,109	303	0	43	0	0	0
	Burnham	2,038	282	0	0	0	0	0
	McCormick	70	0	0	0	0	0	0
	Jackson	1,723	224	0	0	0	0	0
	Calumet	546	0	0	0	0	0	0
others	4,433	2,367	0	27	0	0	0	

Table 11 continued.

Time Period	Area	Effort (angler-hours)	Harvest					
			Yellow perch	Brown trout	Rainbow trout	Lake trout	Coho salmon	Chinook salmon
7/10-	North Point	823	0	0	0	0	0	0
7/30	Wau. Harbor	1,462	242	0	0	0	0	0
	Montrose	12,439	3,395	0	0	0	0	0
	Belmont	1,472	0	0	0	0	0	0
	Burnham	681	18	0	0	0	0	0
	McCormick	0	0	0	0	0	0	0
	Jackson	932	71	0	0	0	0	0
	Calumet	30	0	0	0	0	0	0
	others	2,951	390	0	0	0	0	0
7/31-	North Point	991	141	0	0	0	0	0
8/20	Wau. Harbor	9,261	11,411	0	0	0	0	0
	Montrose	22,386	27,172	0	0	0	0	0
	Belmont	2,268	2,657	0	0	0	0	0
	Burnham	1,821	264	0	0	0	0	0
	McCormick	244	107	0	0	0	0	0
	Jackson	819	264	0	0	0	0	0
	Calumet	1,182	41	0	0	0	0	0
	others	7,147	7,671	0	0	0	0	0
8/21-	North Point	250	0	0	0	0	0	0
9/10	Wau. Harbor	5,301	0	0	0	0	0	344
	Montrose	8,473	0	0	0	0	0	148
	Belmont	2,837	0	15	0	0	0	94
	Burnham	922	0	0	0	0	0	13
	McCormick	91	0	0	0	0	0	0
	Jackson	270	0	0	0	0	0	0
	Calumet	0	0	0	0	0	0	0
	others	4,474	0	9	0	0	0	191
9/11-	North Point	234	0	0	0	0	0	0
9/30	Wau. Harbor	5,394	0	0	0	0	0	329
	Montrose	6,471	0	0	0	0	0	98
	Belmont	3,148	0	0	0	0	0	98
	Burnham	780	0	0	0	0	20	0
	McCormick	413	0	0	0	0	0	11
	Jackson	2,946	0	0	0	0	0	124
	Calumet	187	0	0	0	0	0	0
	others	5,749	0	0	0	0	6	228

Table 12. Effort and harvest by anglers using launched boats of the Illinois portion of Lake Michigan during April-September, 2006.

Time Period	Area	Effort (angler-hours)	Harvest					
			Yellow perch	Brown trout	Rainbow trout	Lake trout	Coho salmon	Chinook salmon
4/1-	North Point	533	0	19	19	0	96	0
4/16	Waukegan	2,181	39	244	22	0	395	22
	Diversey	609	0	143	0	0	36	0
	Burnham	0	0	0	0	0	0	0
	Calumet	989	0	104	0	0	131	0
	others	1,206	11	191	7	0	156	7
4/17 -	North Point	3,095	0	42	38	13	3,995	275
5/7	Waukegan	6,671	24,196	0	24	0	1,771	170
	Diversey	152	0	0	0	0	0	0
	Burnham	279	0	0	0	0	0	0
	Calumet	964	0	35	0	0	9	9
	others	2,156	7,007	4	7	0	514	50
5/8 -	North Point	3,374	36	0	147	60	2,391	266
5/28	Waukegan	5,961	9,687	0	29	39	972	213
	Diversey	76	0	0	0	0	0	0
	Burnham	203	25	12	25	0	0	0
	Calumet	482	150	0	0	0	0	20
	others	1,838	2,822	0	8	11	281	64
5/29 -	North Point	4,380	0	0	36	49	955	510
6/18	Waukegan	4,676	6,402	0	49	56	252	197
	Diversey	1,184	863	0	0	0	0	0
	Burnham	533	619	0	0	0	0	0
	Calumet	1,125	1,011	0	0	0	0	0
	others	2,380	2,624	0	14	16	73	57
6/19 -	North Point	4,912	0	0	186	50	993	737
7/9	Waukegan	5,830	6,172	0	273	17	742	414
	Diversey	1,361	2,586	0	0	0	75	0
	Burnham	414	162	0	20	0	119	0
	Calumet	1,539	862	0	0	0	38	47
	others	2,896	3,849	0	79	5	276	125
7/10 -	North Point	3,551	31	21	154	31	260	734
7/30	Waukegan	2,283	0	10	117	32	292	908
	Diversey	152	0	0	0	0	47	0
	Burnham	152	0	0	0	0	0	40
	Calumet	913	561	0	0	0	17	0
	others	880	63	3	34	9	122	263
7/31 -	North Point	2,790	171	25	302	49	60	1,232
8/20	Waukegan	3,805	6,335	45	63	42	48	174
	Diversey	837	316	0	0	0	95	63
	Burnham	482	325	0	23	0	91	68
	Calumet	710	1,610	0	0	0	0	70
	others	1,818	2,194	13	18	12	86	106

Table 12 continued.

Time Period	Area	Effort (angler-hours)	Harvest					
			Yellow perch	Brown trout	Rainbow trout	Lake trout	Coho salmon	Chinook salmon
8/21 -	North Point	2,959	30	13	216	50	13	1,581
9/10	Waukegan	3,019	1,917	27	0	27	55	302
	Diversey	296	0	0	0	0	0	0
	Burnham	0	0	0	0	0	0	0
	Calumet	177	0	0	0	0	0	0
	others	1,119	555	8	0	8	16	87
9/11 -	North Point	1,141	0	14	0	0	0	85
9/30	Waukegan	4,883	6,276	0	0	11	0	875
	Diversey	0	0	0	0	0	0	0
	Burnham	0	0	0	0	0	0	0
	Calumet	380	0	0	0	0	0	0
	others	1,457	1,817	0	0	3	0	253

Table 13. Harvest rates by pedestrian anglers of the Illinois portion of Lake Michigan during April - September, 2006. For yellow perch, only data from anglers fishing for yellow perch were used. For the five salmonid species, only data from anglers fishing for salmonids were used. Asterisks represent instances when creel clerks found no anglers fishing for the species in question or that location was closed to fishing. Wau. = Waukegan.

Time Period	Area	Harvest per angler-hour					
		Yellow perch	Brown trout	Rainbow trout	Lake trout	Coho salmon	Chinook salmon
4/1-	North Point	*	0.000	0.000	0.000	0.000	0.000
4/16	Wau. Harbor	*	0.021	0.000	0.000	0.000	0.000
	Montrose	0.556	0.021	0.008	0.000	0.033	0.004
	Belmont	*	0.053	0.000	0.000	0.011	0.000
	Burnham	0.000	0.123	0.000	0.000	0.000	0.000
	McCormick	*	0.000	0.000	0.000	0.000	0.000
	Jackson	0.000	0.000	0.000	0.000	0.041	0.000
	Calumet	*	0.000	0.000	0.000	0.248	0.000
4/17-	North Point	*	0.000	0.000	0.000	0.000	0.000
5/7	Wau. Harbor	0.000	0.008	0.000	0.000	0.000	0.000
	Montrose	0.056	0.020	0.000	0.000	0.014	0.000
	Belmont	*	0.117	0.000	0.000	0.000	0.000
	Burnham	0.000	0.020	0.000	0.000	0.000	0.000
	McCormick	0.000	0.000	0.000	0.000	0.000	0.000
	Jackson	0.000	0.000	0.000	0.000	0.000	0.000
	Calumet	*	0.000	0.000	0.000	0.000	0.000
5/8-	North Point	*	0.000	0.000	0.000	0.000	0.000
5/28	Wau. Harbor	0.693	0.000	0.000	0.000	0.000	0.000
	Montrose	1.345	0.000	0.125	0.000	0.000	0.087
	Belmont	0.945	*	*	*	*	*
	Burnham	0.000	0.000	0.000	0.000	0.000	0.000
	McCormick	0.148	0.000	0.000	0.000	0.000	0.000
	Jackson	1.677	0.000	0.000	0.000	0.000	0.000
	Calumet	0.000	*	*	*	*	*

Table 14. Harvest rates by anglers using launched boats of the Illinois portion of Lake Michigan during April - September, 2006. For yellow perch, only data from anglers fishing for yellow perch were used. For the five salmonid species, only data from anglers fishing for salmonids were used. Asterisks represent instances when creel clerks found no anglers fishing for the species in question or that location was closed to fishing.

Time Period	Area	Harvest per angler-hour					
		Yellow perch	Brown trout	Rainbow trout	Lake trout	Coho salmon	Chinook salmon
4/1-4/16	North Point	*	0.029	0.000	0.008	0.145	0.000
	Waukegan	0.342	0.041	0.004	0.000	0.082	0.004
	Diversey	*	0.089	0.000	0.000	0.022	0.000
	Burnham	*	*	*	*	*	*
	Calumet	*	0.065	0.000	0.000	0.072	0.000
4/17-5/7	North Point	0.000	0.006	0.003	0.001	0.489	0.027
	Waukegan	2.078	0.000	0.005	0.000	0.371	0.036
	Diversey	*	0.000	0.000	0.000	0.000	0.000
	Burnham	*	0.000	0.000	0.000	0.000	0.000
	Calumet	0.000	0.011	0.000	0.000	0.005	0.005
5/8-5/28	North Point	*	0.000	0.023	0.003	0.388	0.046
	Waukegan	0.968	0.000	0.022	0.003	0.333	0.055
	Diversey	*	0.000	0.000	0.000	0.000	0.000
	Burnham	0.217	0.000	0.000	0.000	0.000	0.000
	Calumet	0.526	0.000	0.000	0.000	0.000	0.079
5/29-6/18	North Point	0.684	0.000	0.003	0.005	0.096	0.031
	Waukegan	0.815	0.000	0.011	0.010	0.043	0.037
	Diversey	0.326	*	*	*	*	*
	Burnham	0.328	0.000	0.000	0.000	0.000	0.000
	Calumet	0.687	0.000	0.000	0.000	0.000	0.000
6/19-7/9	North Point	*	0.000	0.012	0.002	0.067	0.052
	Waukegan	1.221	0.000	0.022	0.001	0.104	0.047
	Diversey	0.594	0.000	0.000	0.000	0.104	0.000
	Burnham	0.340	0.000	0.029	0.000	0.169	0.000
	Calumet	0.425	0.000	0.000	0.000	0.280	0.351
7/10-7/30	North Point	0.220	0.002	0.010	0.002	0.024	0.150
	Waukegan	*	0.002	0.013	0.004	0.042	0.139
	Diversey	*	0.000	0.000	0.000	0.246	0.000
	Burnham	*	0.000	0.000	0.080	0.000	0.084
	Calumet	1.438	0.000	0.000	0.000	0.179	0.000
7/31-8/20	North Point	0.673	0.004	0.048	0.007	0.008	0.158
	Waukegan	1.094	0.000	0.008	0.008	0.072	0.097
	Diversey	0.132	0.000	0.000	0.000	0.258	0.172
	Burnham	1.196	0.000	0.089	0.000	0.356	0.267
	Calumet	1.411	0.000	0.000	0.000	0.000	0.275
8/21-9/10	North Point	*	0.001	0.038	0.004	0.001	0.192
	Waukegan	0.842	0.006	0.000	0.006	0.011	0.084
	Diversey	0.000	0.000	0.000	0.000	0.000	0.000
	Burnham	*	*	*	*	*	*
	Calumet	0.000	*	*	*	*	*

Table 14 continued.

Time Period	Area	Harvest per angler-hour					
		Yellow perch	Brown trout	Rainbow trout	Lake trout	Coho salmon	Chinook salmon
9/12- 9/30	North Point	*	0.003	0.000	0.000	0.000	0.037
	Waukegan	1.543	0.000	0.000	0.010	0.000	0.146
	Diversey	*	*	*	*	*	*
	Burnham	*	*	*	*	*	*
	Calumet	0.000	0.000	0.000	0.000	0.000	0.000

Table 15. Yield values of fish harvested by non-charter sport anglers in the Illinois waters of Lake Michigan during April - September 2006. Yellow perch are assumed to be prepared as fillets with 60% waste and salmonids as whole gutted fish with 25% waste. Prices for all except brown trout (used rainbow trout value) are those current in national markets in April, 2007.

Species	Total harvest	Av. wt (lbs)	Round wt (lbs)	Market wt (lbs)	Price per pound	Yield value
Yellow perch	335,388	0.52	174,402	69,761	\$10.75	\$749,931
Brown trout	2,579	4.30	11,090	8,317	\$5.95	\$49,486
Rainbow trout	3,915	7.12	27,875	20,906	\$5.95	\$124,391
Lake trout	1,095	5.12	5,606	4,205	\$6.95	\$29,225
Coho salmon	29,188	3.52	102,742	77,056	\$13.95	\$1,074,931
Chinook salmon	20,354	9.12	185,629	139,221	\$14.95	\$2,081,354

Combined yield value of all species: \$4,109,318

Table 16. Average weights of fish harvested in the Illinois waters of Lake Michigan during 2006. Weights are in grams. n = number of fish weighed. Seasons are defined by the following dates: early spring = 3/1-3/31, spring = 4/1-5/7, early summer = 5/8-6/18, midsummer = 6/19-7/30, late summer = 7/31-9/10, early fall = 9/11-9/30. Asterisks represent situations where no fish were weighed.

Species	Angler type		----Spring----		-----Summer-----			----Fall----
			early	mid-late	early	mid	late	early
Coho salmon	boaters	av.	1,069	1,150	1,856	2,251	2,511	*
		n	16	49	72	84	9	0
	pedestrians	av.	745	975	880	*	*	1,750
		n	9	12	1	0	0	1
Chinook salmon	boaters	av.	*	4,600	2,671	4,033	4,498	3,083
		n	0	4	14	93	84	18
	pedestrians	av.	*	*	4,400	*	5,125	5,105
		n	0	0	1	0	14	21
Rainbow trout	boaters	av.	*	3,500	2,098	3,935	3,430	*
		n	0	1	5	30	10	0
	pedestrians	av.	1,990	860	2,000	3,400	*	*
		n	2	1	2	1	0	0
Lake trout	boaters	av.	*	*	2,767	2,640	2,033	2,000
		n	0	0	3	7	3	1
	pedestrians	av.	*	*	*	*	*	*
		n	0	0	0	0	0	0
Brown trout	boaters	av.	1,842	1,985	*	3,100	3,738	1,160
		n	11	43	0	1	4	1
	pedestrians	av.	1,728	1,630	*	*	3,500	*
		n	33	27	0	0	1	0
Yellow perch	boaters	av.	104	366	316	298	259	276
		n	21	31	128	64	47	5
	pedestrians	av.	*	70	191	224	209	*
		n	0	5	223	107	158	0

Table 17. Fin clip abbreviations.

Name of fin or bone	Abbreviation
Adipose fin	ad
Dorsal fin	do
Left maxillary bone	lm
Right maxillary bone	rm
Left pectoral fin	lp
Right pectoral fin	rp
Left ventral fin	lv
Right ventral fin	rv

Table 18. Fin clip summary for salmonids harvested by non-charter anglers in the Illinois waters of Lake Michigan during 2006. Seasons are defined by the following dates: early spring = 3/1-3/31, spring = 4/1-5/7, early summer = 5/8-6/18, midsummer = 6/19-7/30, late summer = 7/31-9/10, early fall = 9/11-9/30. Occurrences of clips are shown separately for two types of anglers: boaters (b), and pedestrians (p). Typically, only a portion of the salmonids stocked each year are marked. However, all lake trout stocked are clipped. Lake trout examined by clerks which exhibit no fin clips are one of four possibilities: 1. the lake trout is naturally produced (wild). 2. the lake trout failed to receive a fin clip in the hatchery. 3. the lake trout regenerated the missing fin or fins. 4. the clerk did not examine the lake trout thoroughly enough and missed the clip or clips.

Species	Clip	----- SPRING -----				-----SUMMER-----						-----FALL	
		early		mid-late		early		mid		late		early	
		b	p	b	p	b	p	b	p	b	p	b	p
Coho salmon	ad	1	0	7	2	27	0	14	0	3	0	0	0
	lm	0	0	0	0	0	0	1	0	0	0	0	0
	lp,rp	0	1	0	0	0	0	0	0	0	0	0	0
	no clips	16	7	41	10	77	1	80	0	6	0	1	0
Chinook salmon	ad	0	0	0	0	1	0	2	0	1	0	0	0
	ad,rp	0	0	1	0	0	0	0	0	0	0	0	0
	lp	0	0	0	0	0	0	0	0	1	1	0	1
	rp	0	0	0	0	0	0	1	0	0	0	0	0
	no clips	0	0	5	0	13	1	96	0	81	14	14	24
Brown trout	ad,lv	0	0	1	0	0	0	0	0	0	0	0	0
	ad,rm	0	3	3	2	0	0	0	0	0	0	0	0
	ad,rp	0	0	0	1	0	0	1	0	0	0	0	0
	lp	0	1	0	1	0	0	0	0	1	0	0	0
	lp,rp	0	0	0	1	0	0	0	0	0	0	0	0
	lp,rv	0	0	0	0	0	0	0	0	0	0	0	0
	rp	0	3	1	0	0	0	0	0	0	0	0	0
	no clips	10	35	34	36	1	0	0	0	3	1	1	0

Table 18, continued

Species	Clip	----- SPRING -----				-----SUMMER-----						-----FALL		
		early		mid-late		early		mid		late		early		
		b	p	b	p	b	p	b	p	b	p	b	p	
Rainbow trout	ad,lp	0	0	0	1	0	0	2	0	0	0	0	0	0
	ad,rp	0	0	0	0	0	0	4	1	0	0	0	0	0
	ad,rv	0	0	0	0	1	0	0	0	0	0	0	0	0
	lv	0	0	0	0	0	0	1	0	0	0	0	0	0
	lv,rv	0	0	0	0	0	0	1	0	0	0	0	0	0
	rm	0	0	0	0	0	0	3	0	0	0	0	0	0
	rp	0	1	0	0	1	0	6	0	2	0	0	0	0
	rv	0	0	0	0	0	0	0	0	1	0	0	0	0
	no clips	0	2	1	0	2	2	23	0	7	0	0	0	0
Lake trout	ad	0	0	0	0	1	0	2	0	1	0	0	0	0
	lp	0	0	0	0	0	0	2	0	0	0	0	0	0
	rp	0	0	0	0	1	0	2	0	1	0	1	0	0
	rv	0	0	0	0	0	0	1	0	0	0	0	0	0
	no clips	0	0	0	0	0	0	1	0	1	0	0	0	0

Table 19. Estimated number of angler trips and expenditures by non-charter anglers in the Illinois portion of Lake Michigan, during 1997 - 2006. NA = not applicable.

Type of angler	Year	Effort (angler- trips)	Expenditures		
			Major (boat)	Minor (gear)	Other (travel)
Pedestrians	1997	76,937	NA	\$587,000	\$120,000
	1998	62,586	NA	\$589,000	\$105,000
	1999	60,978	NA	\$232,000	\$87,000
	2000	61,414	NA	\$358,000	\$93,000
	2001	70,781	NA	\$529,000	\$112,000
	2002	64,924	NA	\$636,000	\$109,000
	2003	69,578	NA	\$747,000	\$117,000
	2004	81,507	NA	\$909,000	\$140,000
	2005	85,449	NA	\$574,000	\$153,000
	2006	75,111	NA	\$456,000	\$124,000

Table 19, continued.

Type of angler	Year	Effort (angler- trips)	Expenditures		
			Major (boat)	Minor (gear)	Other (travel)
Launched Boats	1997	33,134	\$4,044,000	\$411,000	\$126,000
	1998	38,572	\$3,240,000	\$1,079,000	\$150,000
	1999	22,428	\$2,169,000	\$326,000	\$69,000
	2000	24,234	\$3,191,000	\$411,000	\$93,000
	2001	27,886	\$4,475,000	\$437,000	\$96,000
	2002	26,592	\$2,772,000	\$456,000	\$103,000
	2003	25,677	\$3,857,000	\$447,200	\$107,000
	2004	23,335	\$5,753,000	\$728,000	\$95,000
	2005	22,169	\$4,109,000	\$375,000	\$83,000
	2006	18,859	\$3,301,000	\$309,000	\$69,000
Moored Boats	1997	23,322	\$3,786,000	\$251,000	\$84,000
	1998	38,857	\$2,808,000	\$1,043,000	\$143,000
	1999	18,196	\$1,688,000	\$235,000	\$52,000
	2000	18,240	\$1,731,000	\$298,000	\$69,000
	2001	21,595	\$2,994,000	\$385,000	\$71,000
	2002	20,039	\$2,600,000	\$292,000	\$73,000
	2003	24,629	\$2,693,000	\$381,000	\$90,000
	2004	20,175	\$6,271,000	\$447,000	\$66,000
	2005	15,413	\$3,277,000	\$261,000	\$56,000
	2006	17,310	\$2,742,000	\$284,000	\$61,000
Season Totals	1997	133,393	\$7,831,000	\$1,249,000	\$331,000
	1998	140,015	\$6,047,000	\$2,712,000	\$398,000
	1999	101,602	\$3,857,000	\$793,000	\$208,000
	2000	103,887	\$4,923,000	\$1,067,000	\$255,000
	2001	120,262	\$7,469,000	\$1,351,000	\$279,000
	2002	111,555	\$5,372,000	\$1,383,000	\$285,000
	2003	119,884	\$6,550,000	\$1,576,000	\$313,000
	2004	125,017	\$12,024,000	\$2,084,000	\$301,000
	2005	123,031	\$7,386,000	\$1,210,000	\$292,000
	2006	111,280	\$6,043,000	\$1,049,000	\$254,000

Table 20. March fishing effort and expenditures by non-charter anglers at selected sites in the Illinois portion of Lake Michigan, during 1995 – 2000 and 2003 - 2006. NA = not applicable

Type of angler	Year	Effort (angler- trips)	Expenditures		
			Major (boat)	Minor (gear)	Other (travel)
Pedestrians	1995	4,818	NA	\$16,000	\$17,000
	1996	3,129	NA	\$110,000	\$8,000
	1997	11,723	NA	\$134,000	\$30,000
	1998	4,590	NA	\$61,000	\$13,000
	1999	5,100	NA	\$72,000	\$12,000
	2000	7,538	NA	\$90,000	\$20,000
	2003	1,987	NA	\$24,000	\$4,000
	2004	4,231	NA	\$94,000	\$8,000
	2005	2,652	NA	\$49,000	\$6,000
	2006	3,185	NA	\$57,000	\$6,000
Launched Boats	1995	1,428	\$0	\$11,000	\$2,000
	1996	228	\$2,000	\$2,000	\$400
	1997	1,133	\$684,000	\$14,000	\$2,000
	1998	584	\$38,000	\$12,000	\$2,000
	1999	665	\$118,000	\$69,000	\$2,000
	2000	745	\$313,000	\$48,000	\$2,000
	2003	356	\$0	\$1,000	\$700
	2004	787	\$0	\$36,000	\$2,000
	2005	566	\$0	\$19,000	\$1,300
	2006	222	\$0	\$10,000	\$400
March Totals	1995	8,802	\$0	\$27,000	\$19,000
	1996	3,357	\$2,000	\$112,000	\$8,400
	1997	12,856	\$684,000	\$148,000	\$32,000
	1998	5,174	\$38,000	\$73,000	\$15,000
	1999	5,765	\$118,000	\$141,000	\$14,000
	2000	8,283	\$313,000	\$138,000	\$22,000
	2003	2,343	\$0	\$25,000	\$5,000
	2004	5,017	\$0	\$130,000	\$10,000
	2005	3,218	\$0	\$68,000	\$7,600
	2006	3,407	\$0	\$67,000	\$6,400

Table 21. Fishing effort and harvest by non-charter anglers in the Illinois portion of Lake Michigan, in 1997 - 2006. Peds = Pedestrian, Lau'd = Launched boat anglers, Moo'd = Moored boat anglers.

Angler type	Year	Effort (angler- hours)	Harvest					
			Yellow perch	Brown trout	Rainbow trout	Lake trout	Coho salmon	Chinook salmon
Peds	1997	283,410	50,125	3,552	212	0	16,057	913
	1998	227,018	30,329	816	952	31	3,639	498
	1999	221,243	56,122	739	1,451	0	2,606	2,494
	2000	222,315	34,833	2,787	469	22	7,240	2,235
	2001	255,552	141,499	697	433	71	4,734	2,335
	2002	234,979	144,320	4,131	161	0	10,400	776
	2003	253,679	141,300	1,184	212	0	4,925	1,080
	2004	296,781	176,895	1,517	449	14	4,357	2,741
	2005	308,471	273,065	1,274	260	0	2,253	2,496
	2006	272,652	154,904	472	304	0	240	1,744

Table 21. Continued.

Angler type	Year	Effort (angler- hours)	Harvest					
			Yellow perch	Brown trout	Rainbow trout	Lake trout	Coho salmon	Chinook salmon
Lau'd	1997	160,396	6,592	1,031	1,853	3,464	39,463	2,375
	1998	192,117	4,377	529	5,226	6,063	18,075	4,541
	1999	111,285	1,099	585	2,160	1,533	6,955	5,826
	2000	121,893	2,173	885	1,148	1,391	18,154	4,632
	2001	140,929	14,040	549	3,496	2,708	22,350	3,179
	2002	133,909	13,947	560	2,271	1,768	24,429	4,574
	2003	126,378	14,310	130	1,576	1,063	12,759	5,538
	2004	116,676	12,214	296	1,455	1,056	13,984	6,685
	2005	110,653	15,346	587	1,762	725	11,617	6,834
	2006	95,805	91,019	974	1,909	591	15,589	10,025
Moo'd	1997	106,766	2,386	531	1,183	2,408	27,671	1,600
	1998	186,803	1,208	487	5,317	5,950	21,333	4,330
	1999	85,614	79	573	1,558	1,136	5,878	4,432
	2000	91,741	752	659	869	1,013	14,150	3,620
	2001	110,414	10,971	277	2,488	1,839	18,745	2,371
	2002	101,127	10,966	261	1,630	1,236	19,932	3,156
	2003	118,100	18,601	84	1,312	915	11,432	4,951
	2004	100,880	32,814	362	968	665	9,364	4,805
	2005	76,532	12,674	464	1,164	490	7,671	4,461
	2006	87,936	89,466	1,133	1,703	504	13,478	8,586
Season	1997	550,572	59,103	5,114	3,249	5,872	83,191	4,888
	1998	605,938	35,916	1,833	11,494	12,044	43,045	9,369
	1999	418,142	57,300	1,897	5,169	2,670	15,439	12,752
	2000	435,950	37,758	4,331	2,486	2,427	39,544	10,486
	2001	506,894	166,510	1,524	6,417	4,618	45,828	7,885
	2002	470,015	169,233	4,952	4,062	3,005	54,761	8,506
	2003	498,884	174,234	1,398	3,195	1,978	29,115	11,569
	2004	514,337	221,923	2,175	2,872	1,735	27,705	14,231
	2005	495,656	301,085	2,325	3,186	1,215	21,541	13,791
	2006	456,393	335,388	2,579	3,915	1,095	29,188	20,354

Table 22. March fishing effort and harvest by non-charter anglers at selected sites in the Illinois portion of Lake Michigan, in 1995 – 2000 and 2003 - 2006. Peds = Pedestrian, Lau'd = Launched boat anglers

Angler type	Year	Effort (angler-hours)	Harvest					
			Yellow perch	Brown trout	Rainbow trout	Lake trout	Coho salmon	Chinook salmon
Peds	1995	35,501	0	1,692	566	0	2,459	26
	1996	13,495	0	756	223	0	81	0
	1997	53,420	0	3,866	344	32	7,365	27
	1998	19,735	0	960	35	0	1,059	0
	1999	23,202	0	1,709	189	0	913	0
	2000	34,366	364	3,712	375	0	8,036	0
	2003	9,136	0	175	22	0	15	0
	2004	18,848	170	1,396	360	0	469	0
	2005	11,244	492	762	85	0	173	0
	2006	11,561	0	530	23	0	122	0
Lau'd	1995	6,694	0	241	14	0	1,175	0
	1996	1,146	0	217	0	0	30	0
	1997	5,722	0	288	0	0	2,165	0
	1998	2,922	0	187	0	0	32	0
	1999	3,131	0	82	16	0	80	0
	2000	3,699	412	376	42	0	2,242	7
	2003	1,780	4,145	10	0	0	0	0
	2004	3,935	9,464	198	9	0	88	0
	2005	2,830	5,308	346	0	0	111	0
	2006	1,126	3,856	237	0	0	264	0
March	1995	42,195	0	1,933	580	0	3,634	26
Totals	1996	14,641	0	973	223	0	111	0
	1997	59,143	0	4,154	344	32	9,530	27
	1998	22,657	0	1,147	35	0	1,091	0
	1999	26,333	0	1,791	205	0	993	0
	2000	38,065	776	4,088	417	0	10,278	7
	2003	10,916	4,145	185	22	0	15	0
	2004	22,783	9,634	1,594	369	0	557	0
	2005	14,074	5,800	1,108	85	0	284	0
	2006	12,687	3,856	767	23	0	386	0

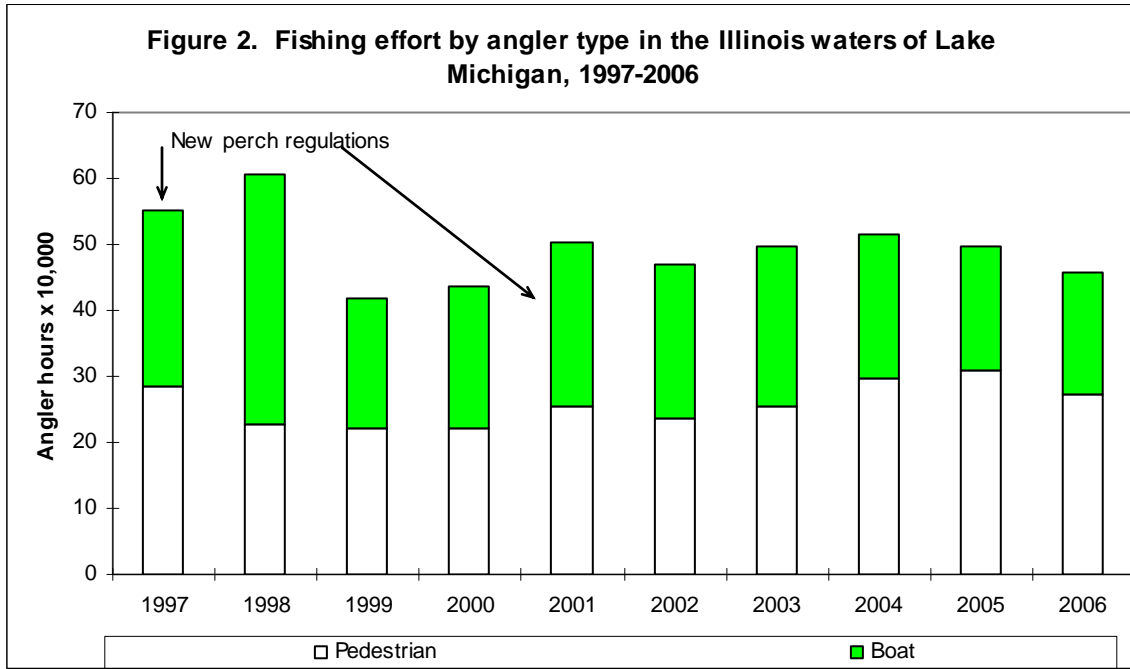


Figure 3 (a). Salmonid harvest per unit effort, derived from the Illinois sport fishing surveys of Lake Michigan, 1997-2006

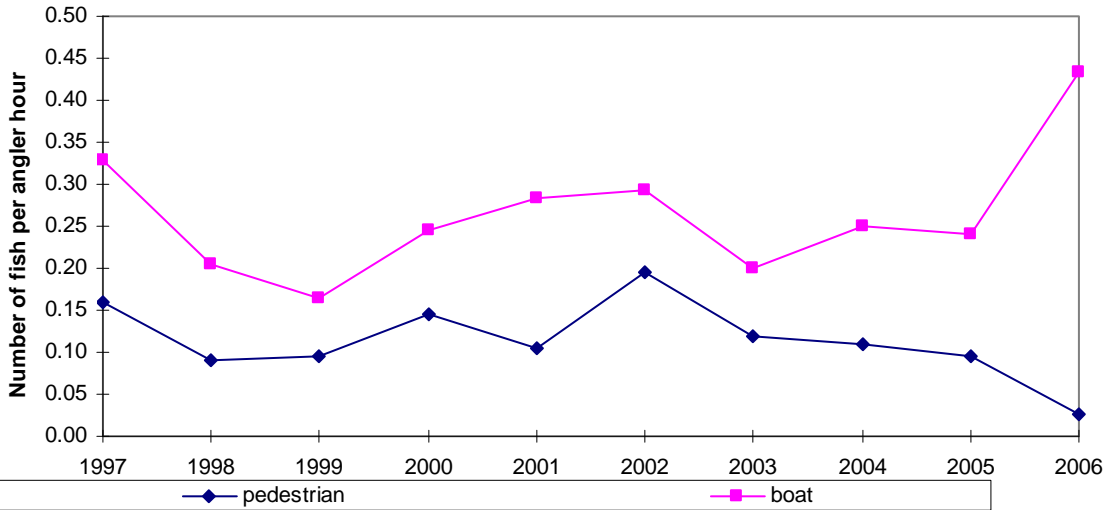
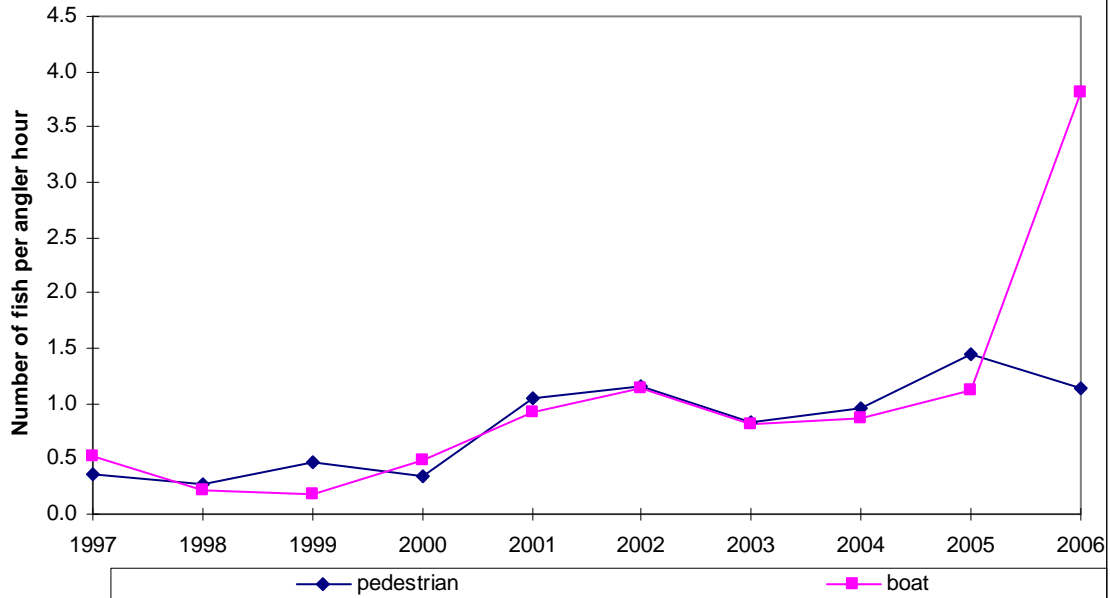
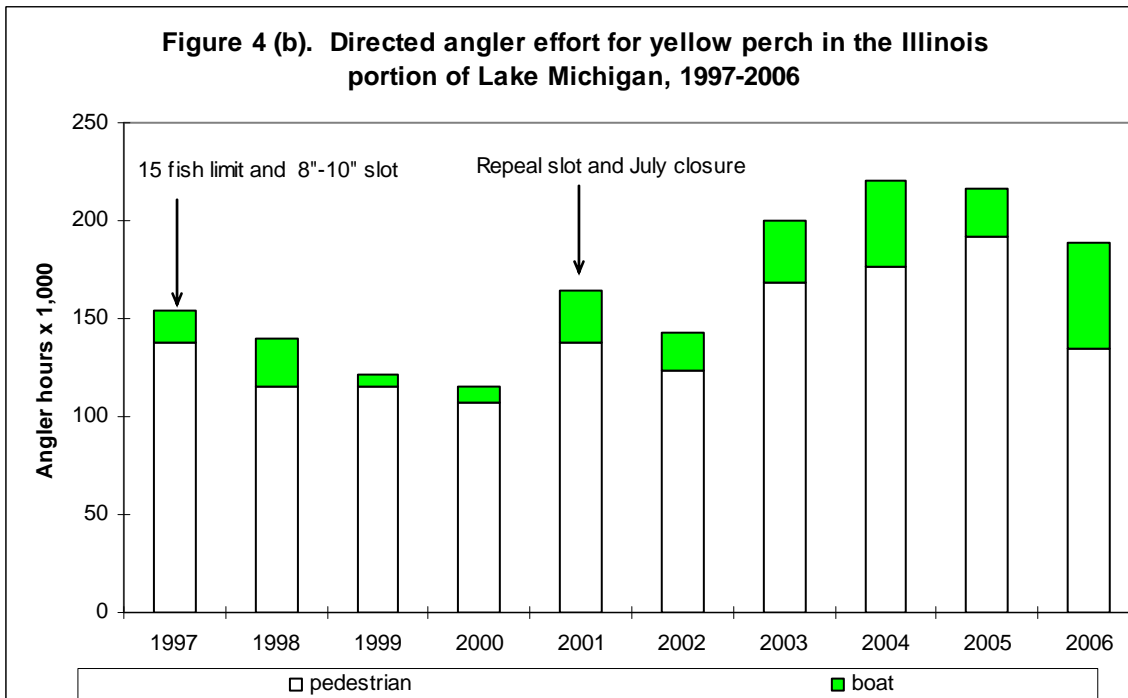
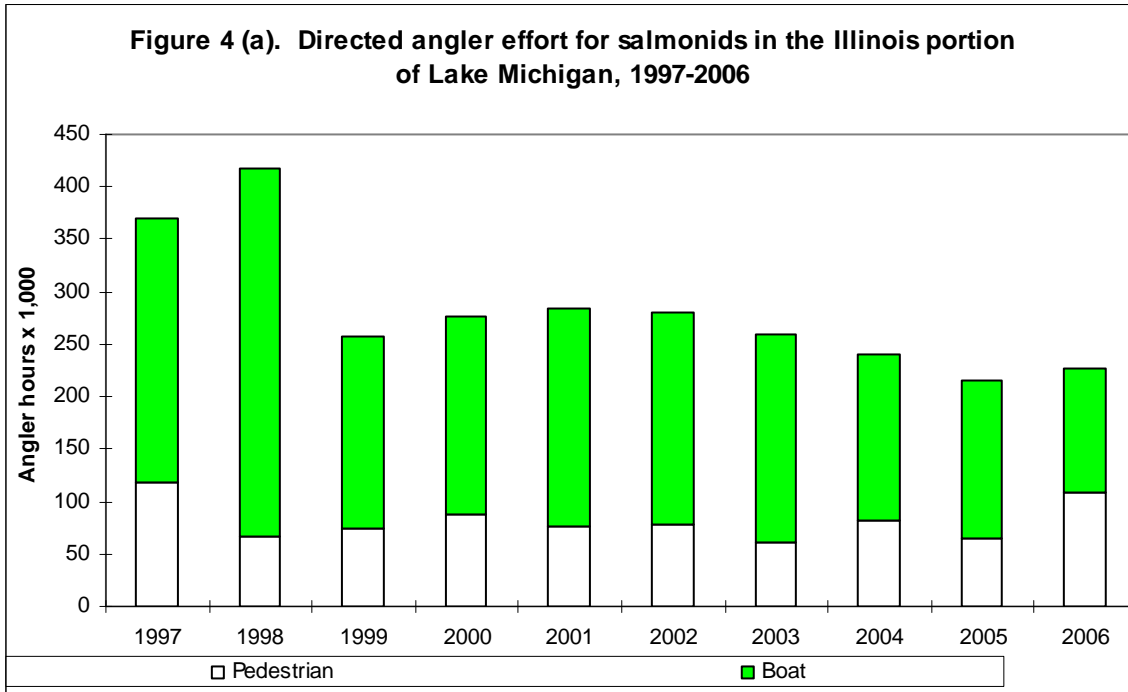
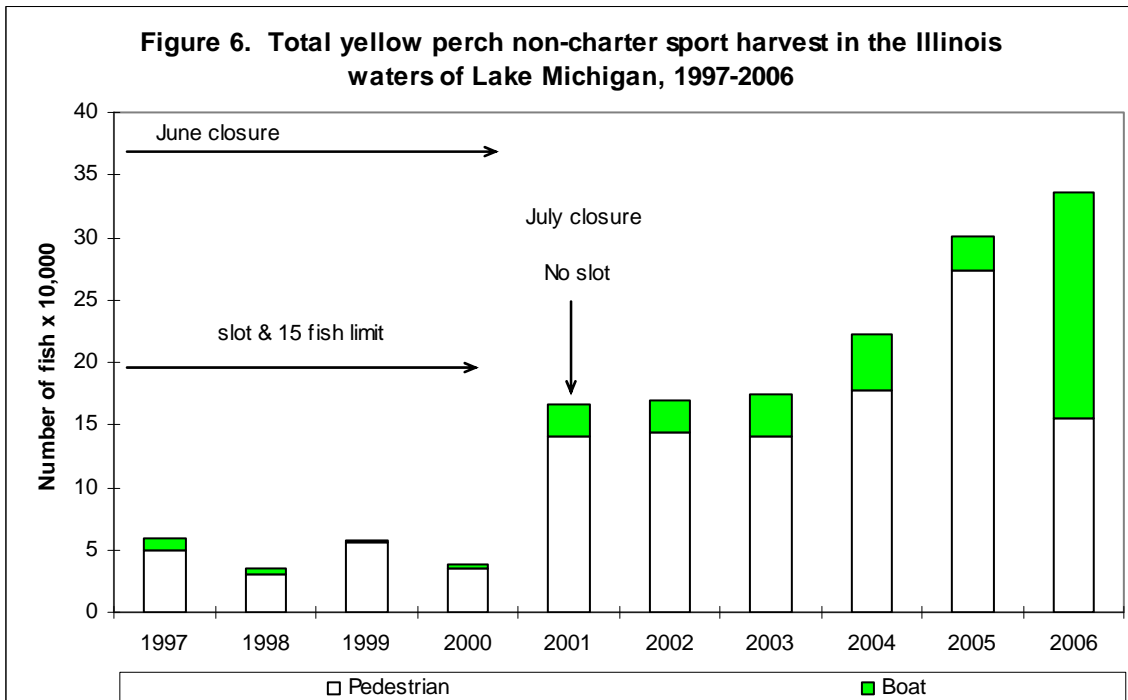
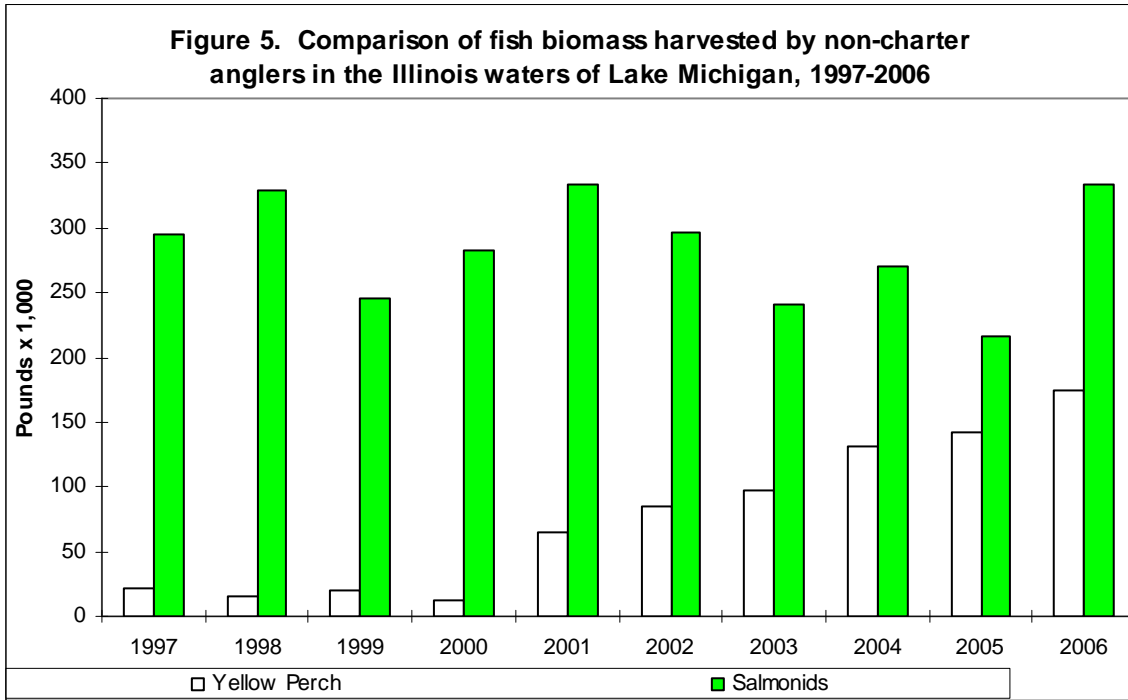
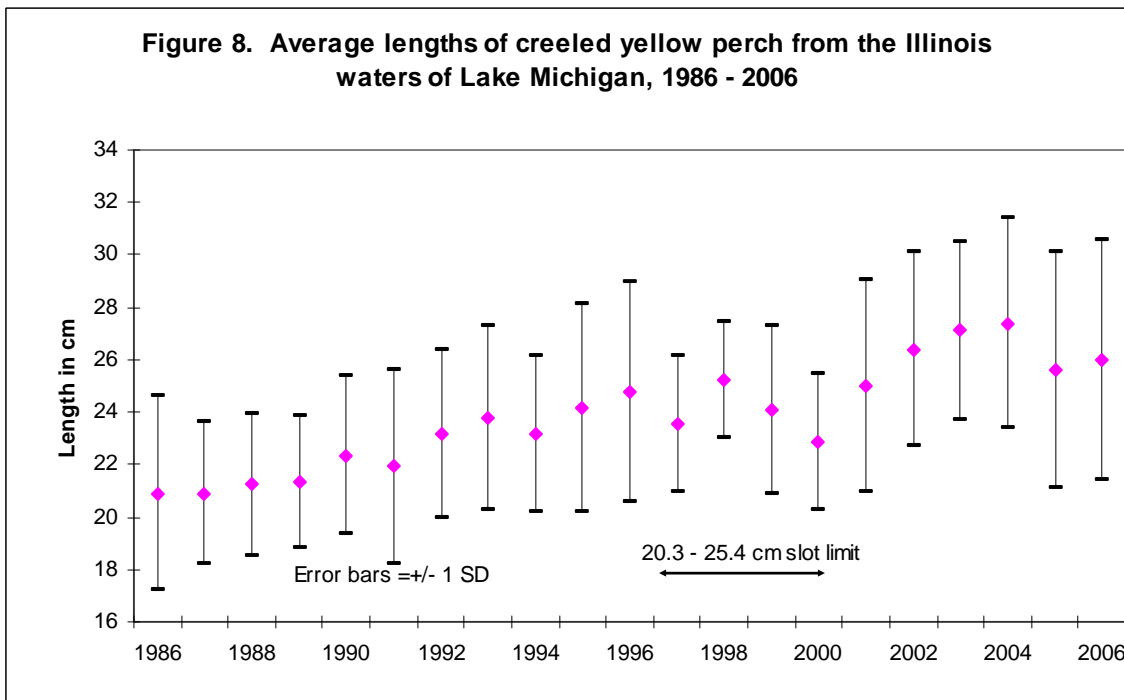
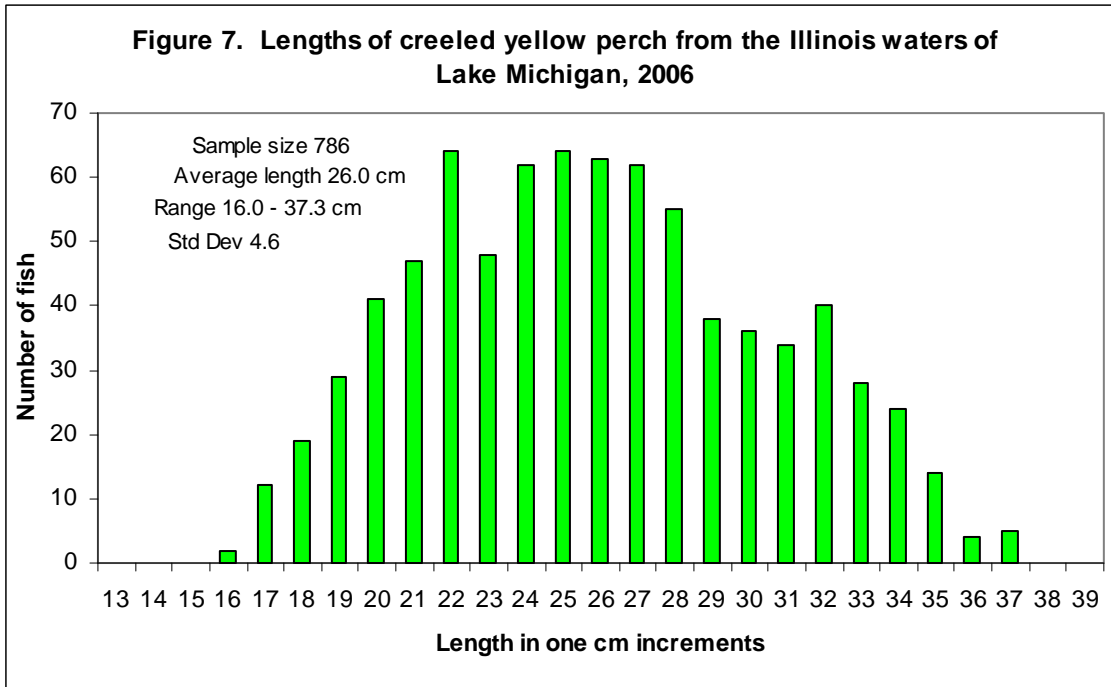


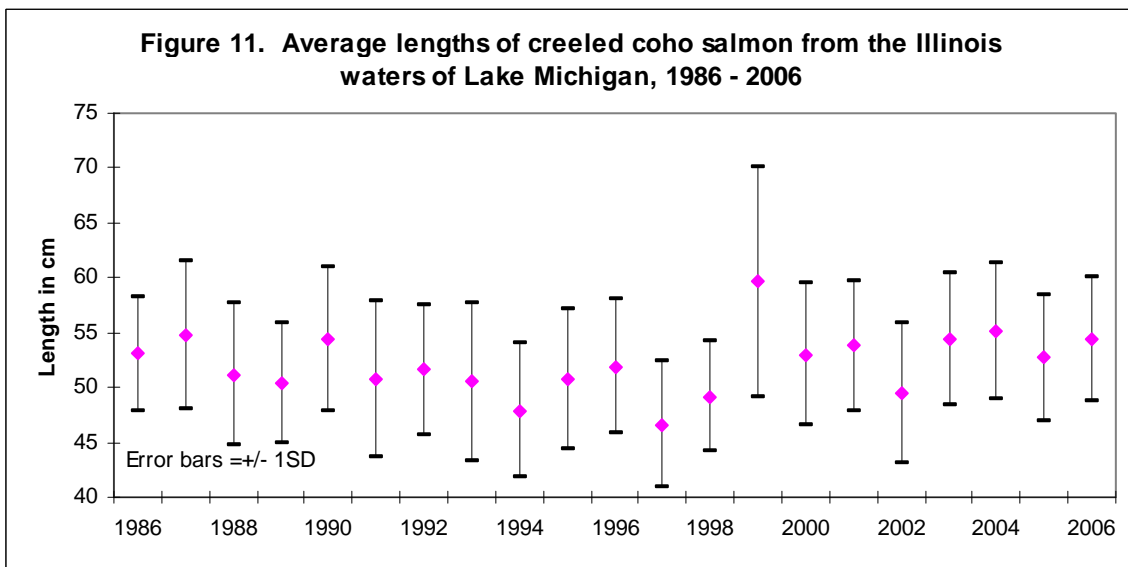
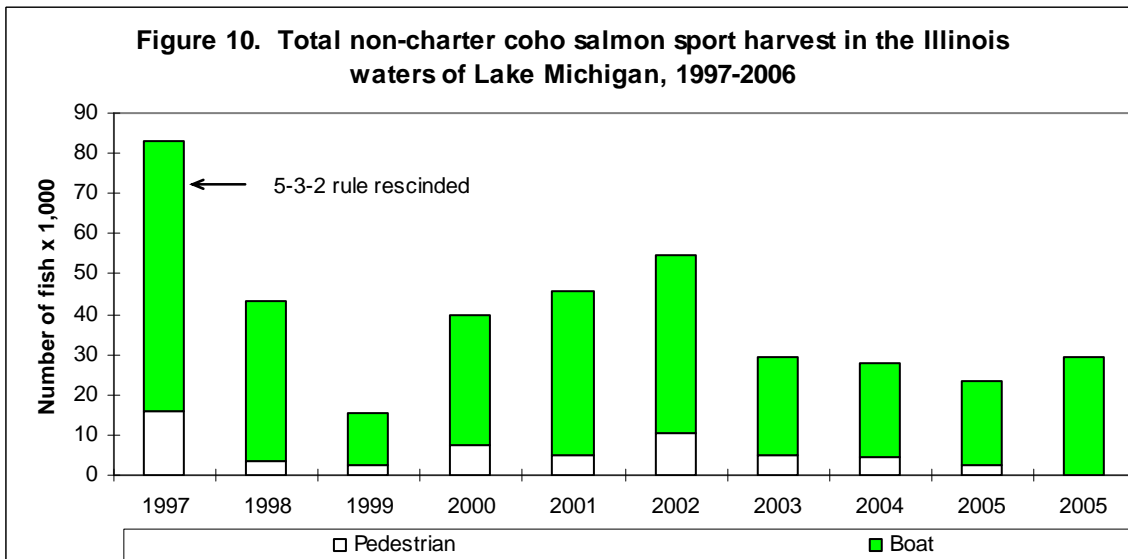
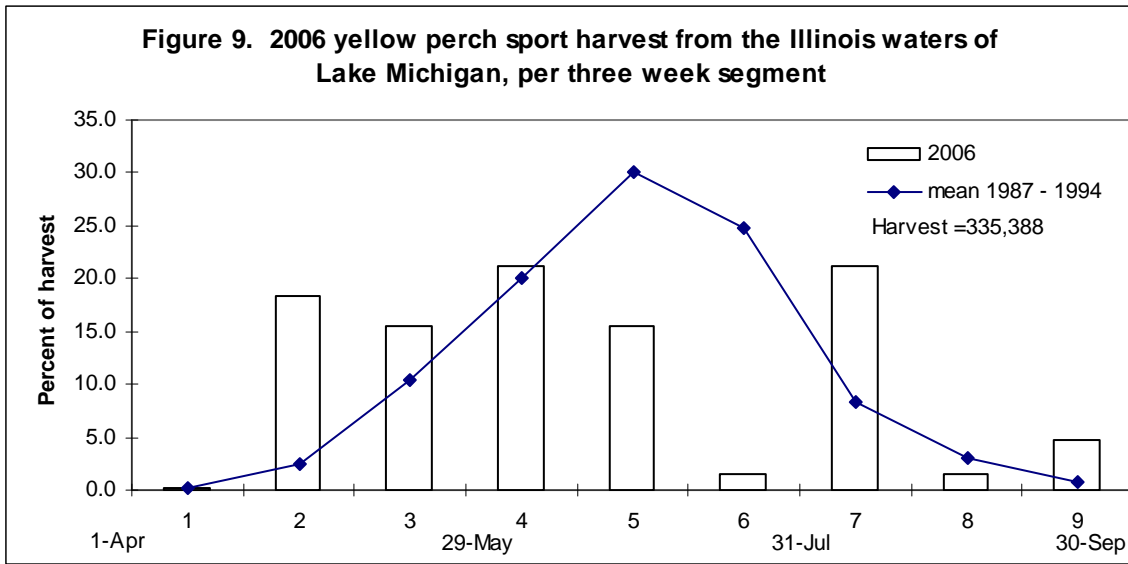
Figure 3 (b). Yellow perch harvest per unit effort, derived from Illinois sport fishing surveys of Lake Michigan, 1997-2006











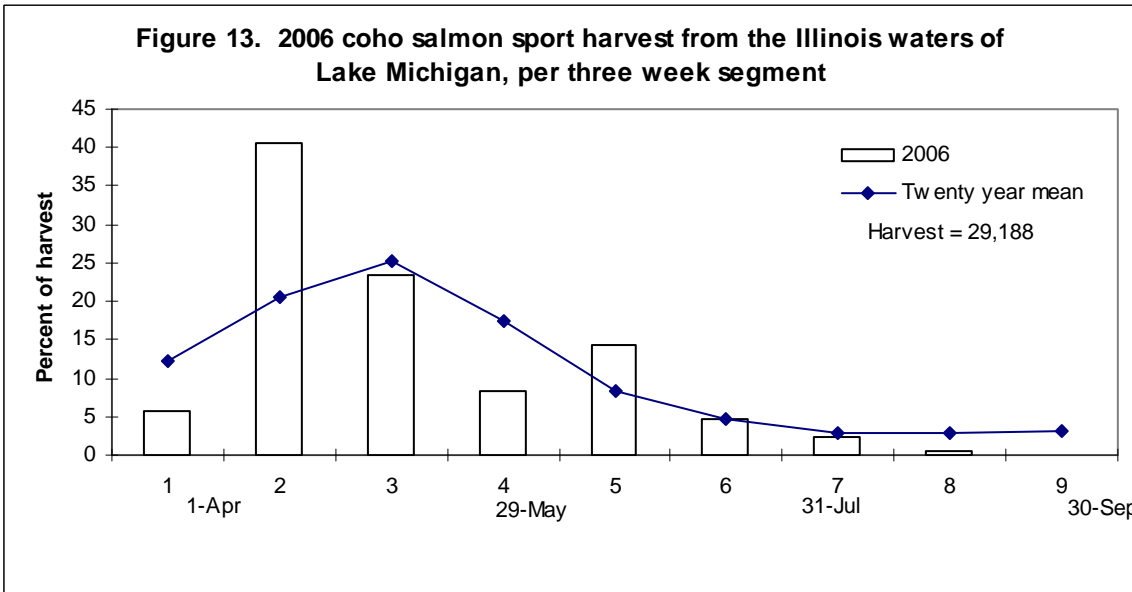
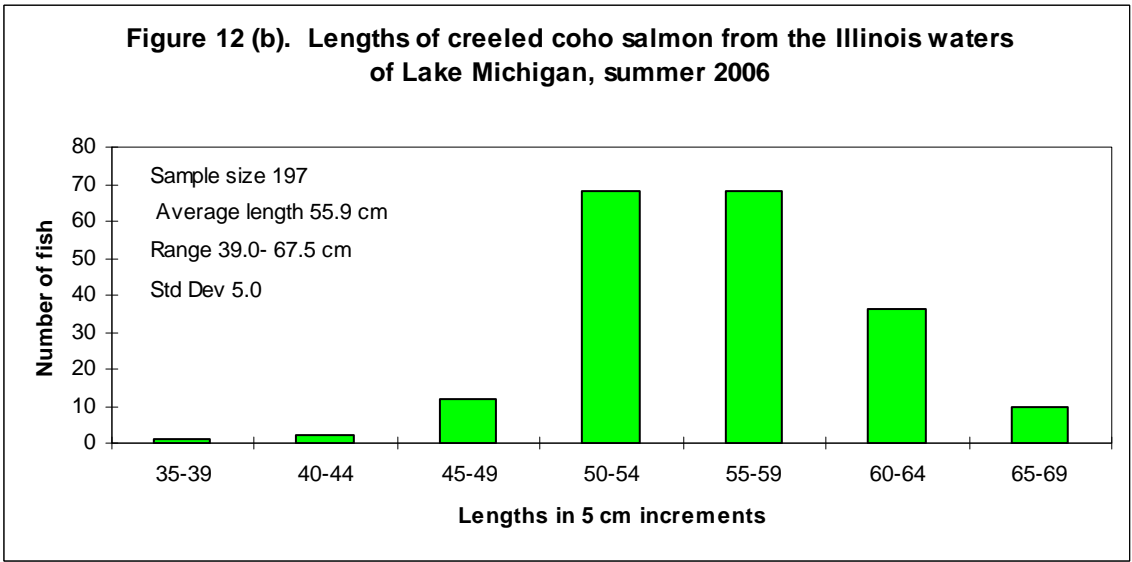
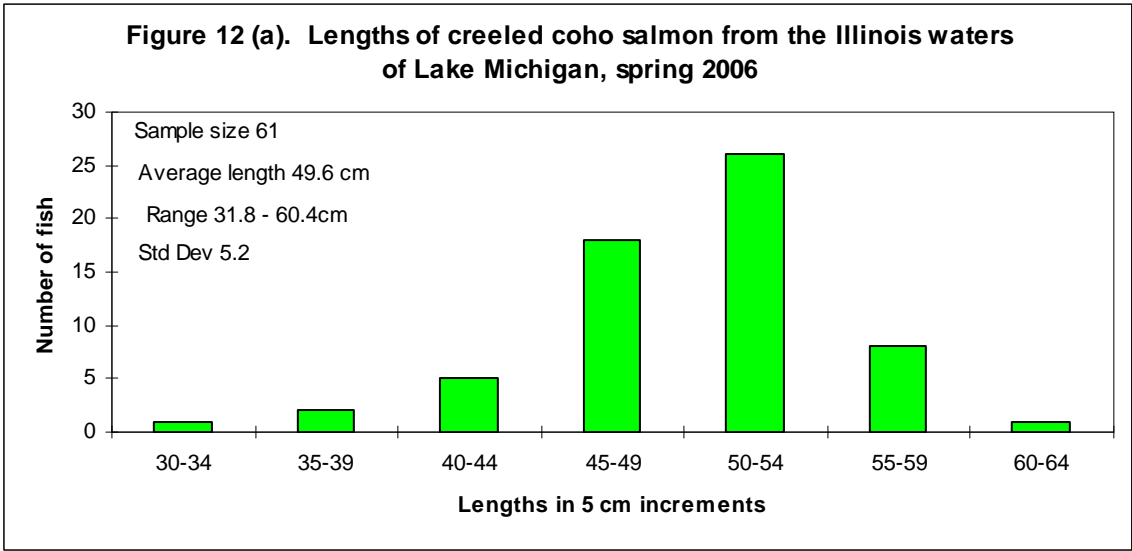


Figure 14. Total non-charter chinook salmon sport harvest in the Illinois waters of Lake Michigan, 1997-2006

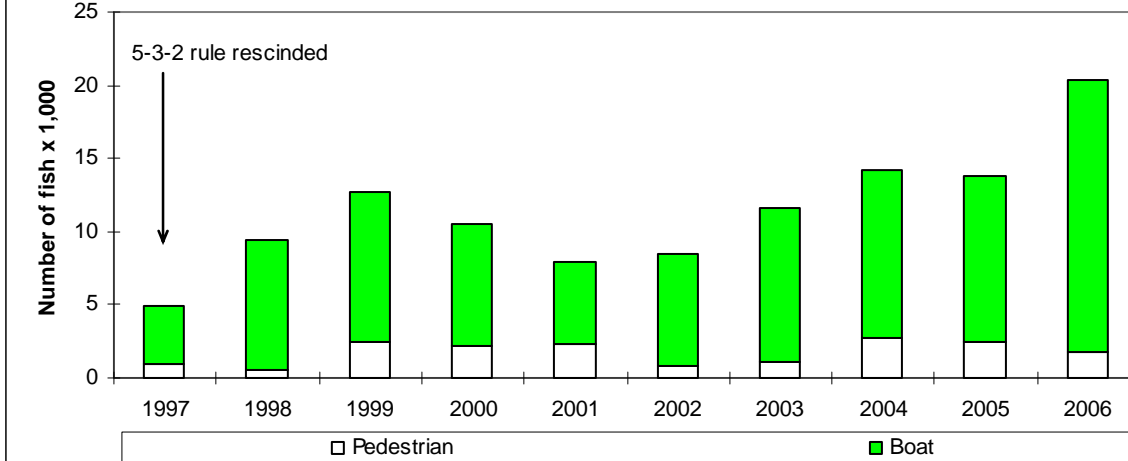


Figure 15. Average lengths of creel chinook salmon from the Illinois waters of Lake Michigan, 1986 - 2006

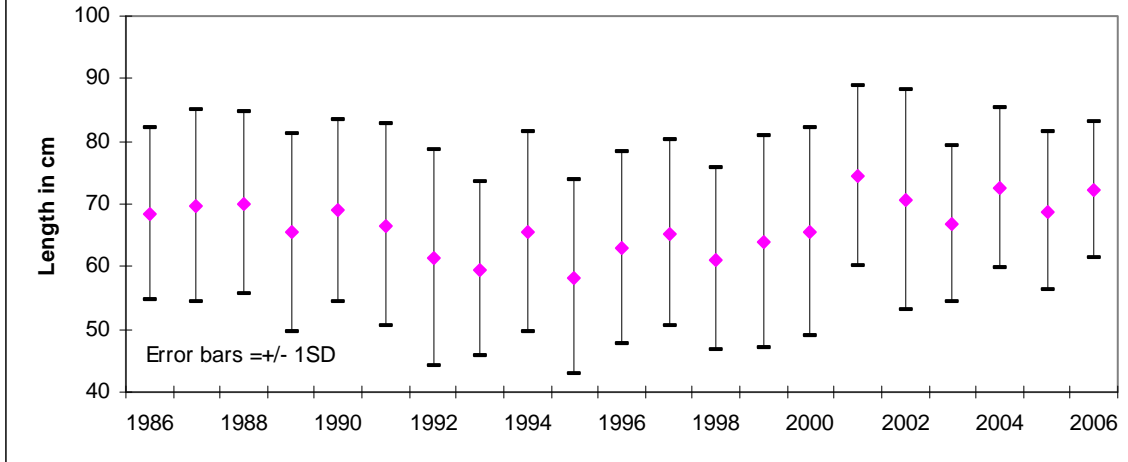


Figure 16 (a). Lengths of creel chinook salmon from the Illinois waters of Lake Michigan, summer 2006

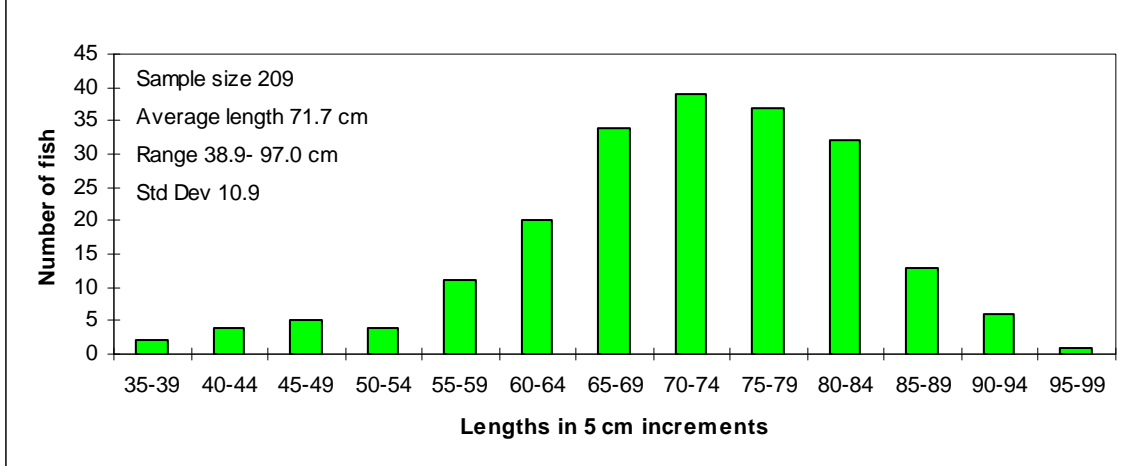


Figure 16 (b). Lengths of creelred chinook salmon from the Illinois waters of Lake Michigan, fall 2006

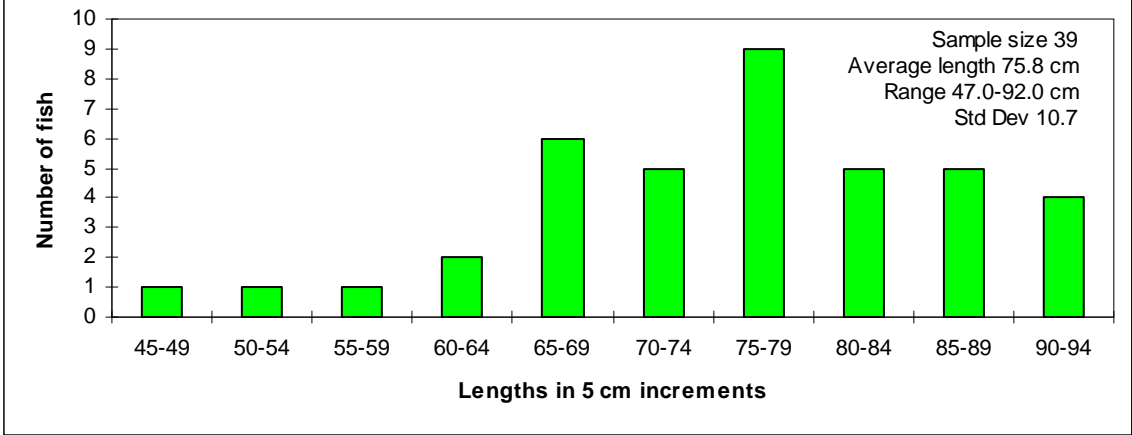


Figure 17. 2006 chinook salmon sport harvest from the Illinois waters of Lake Michigan, per three week segment

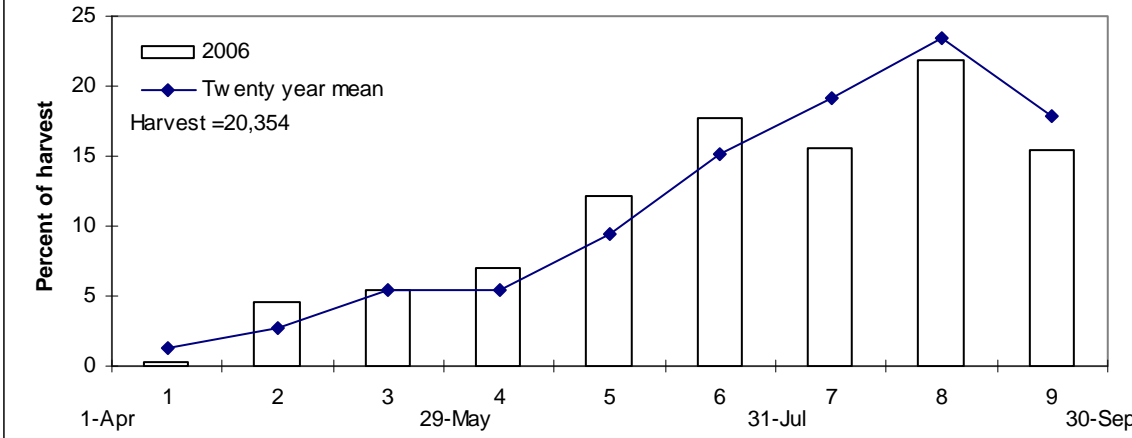


Figure 18. Total non-charter lake trout sport harvest in the Illinois waters of Lake Michigan, 1997-2006

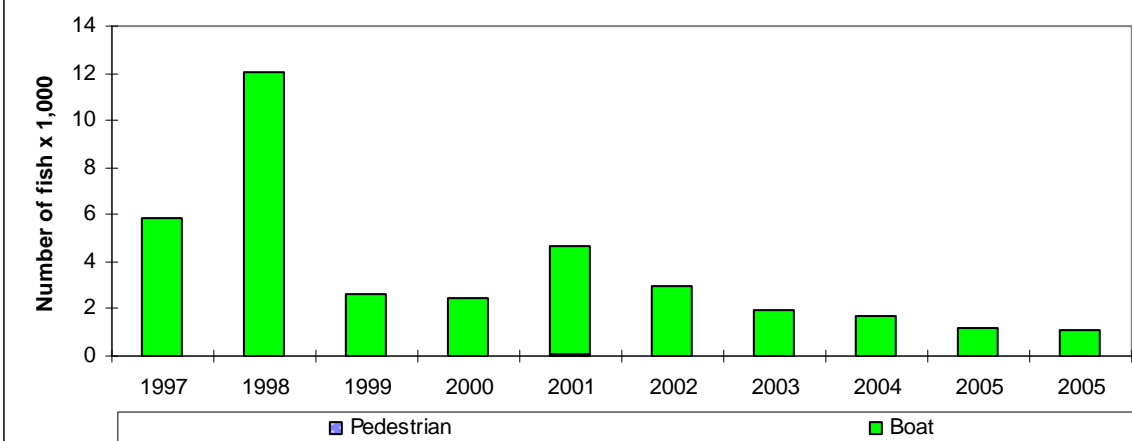


Figure 19. Average lengths of creeded lake trout from the Illinois waters of Lake Michigan, 1986 - 2006

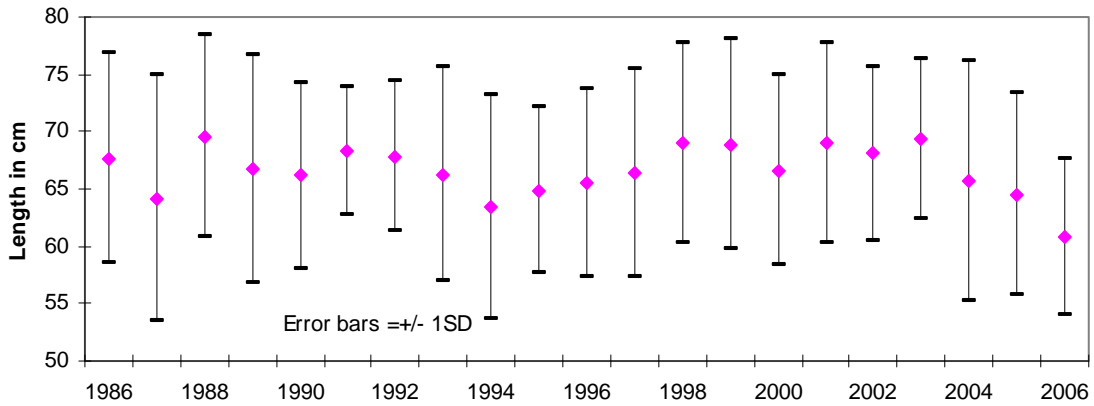


Figure 20. Lengths of creeded lake trout from the Illinois waters of Lake Michigan, 2006

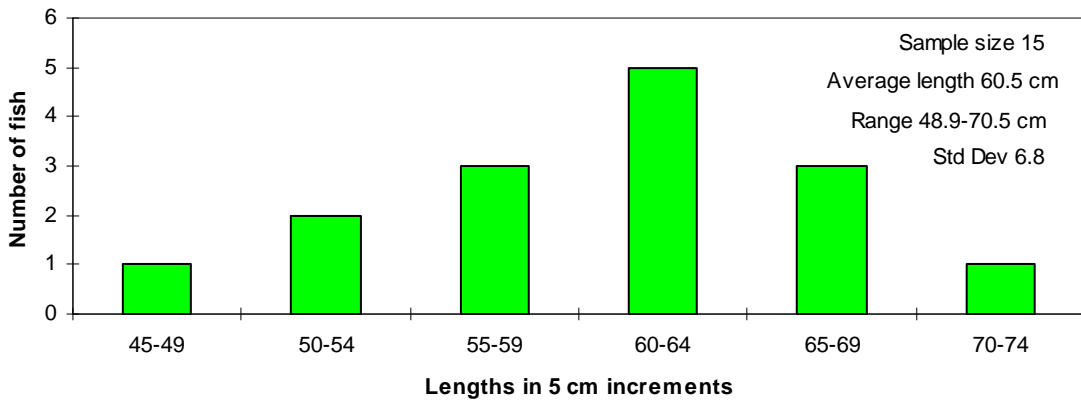
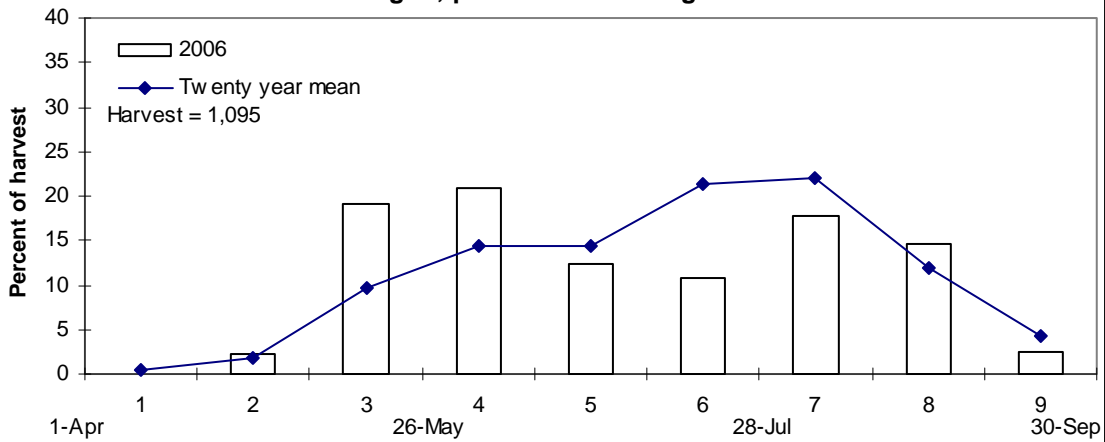
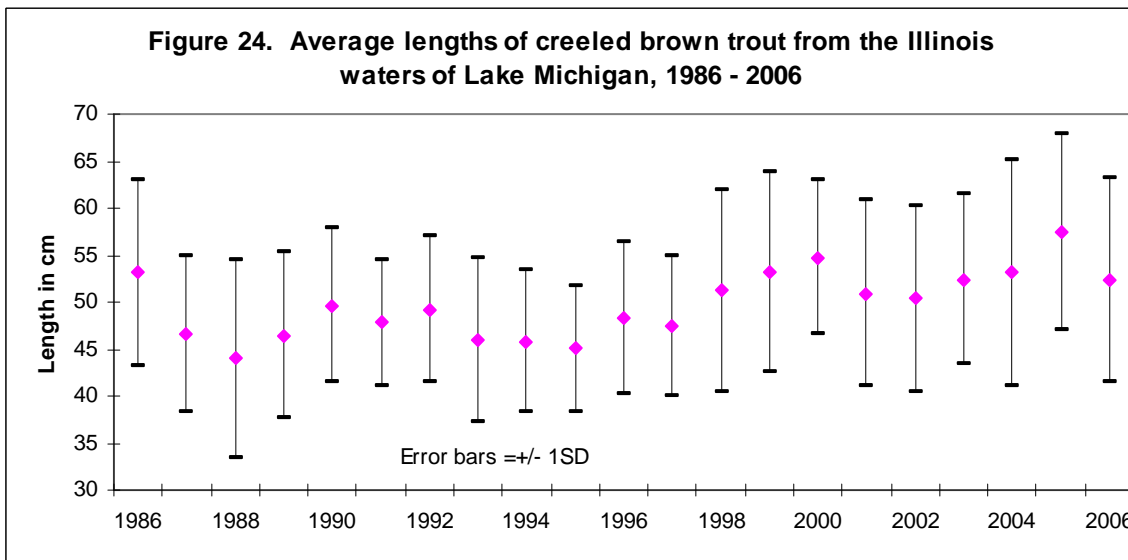
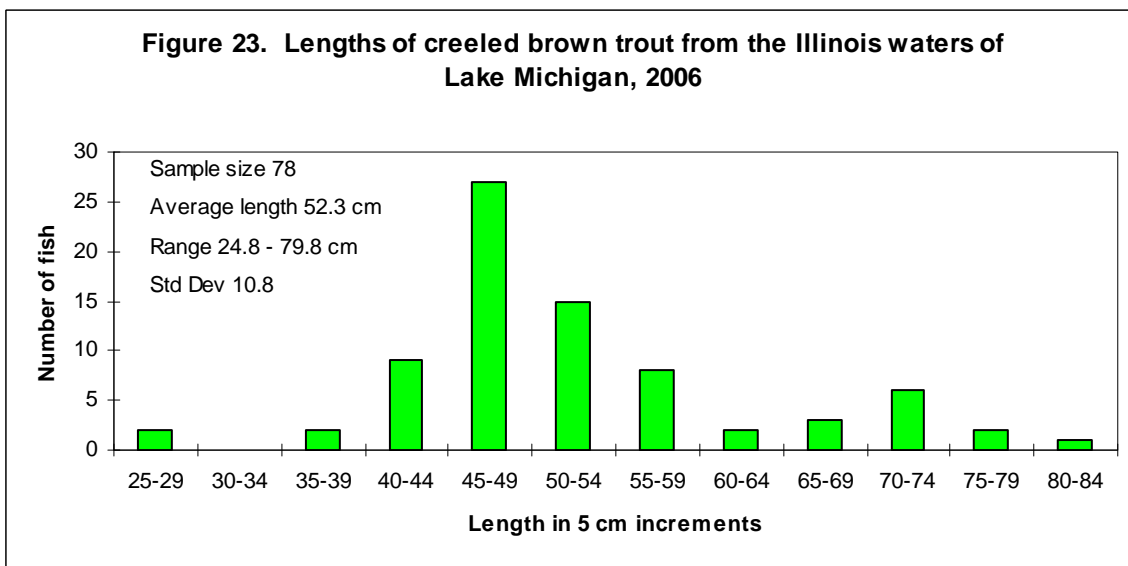
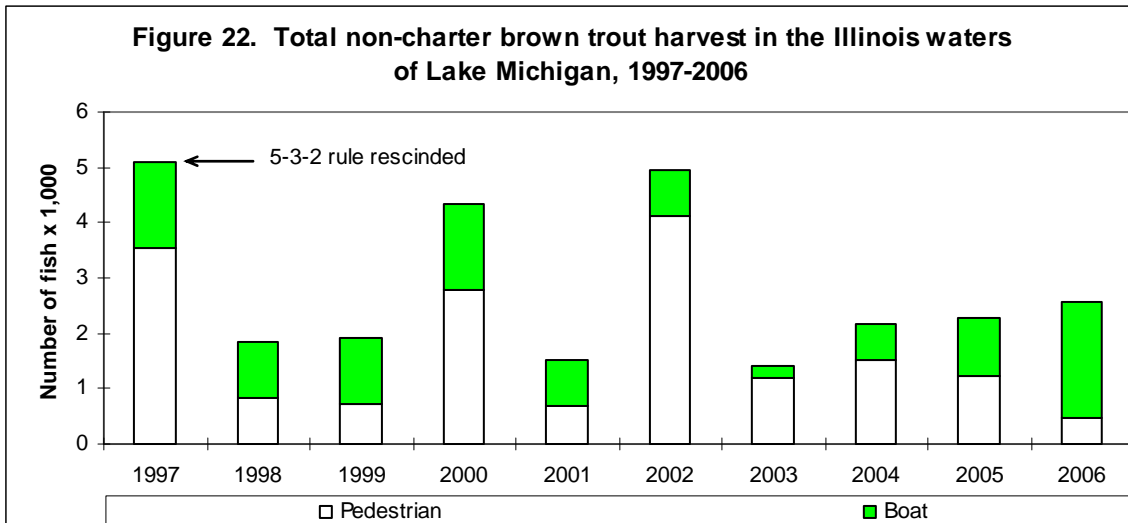
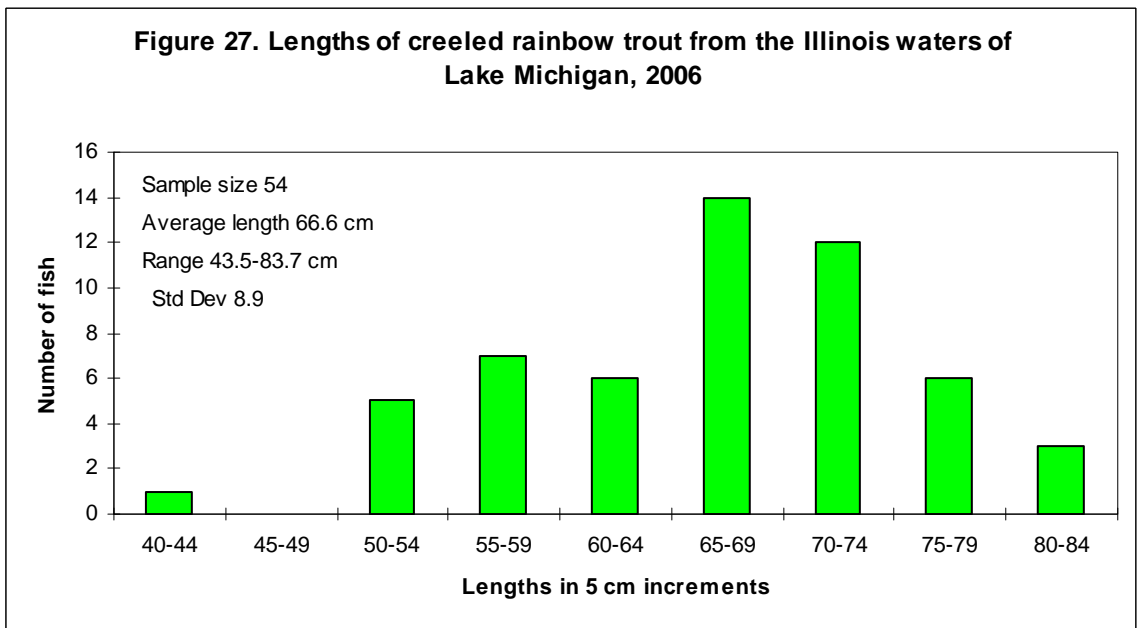
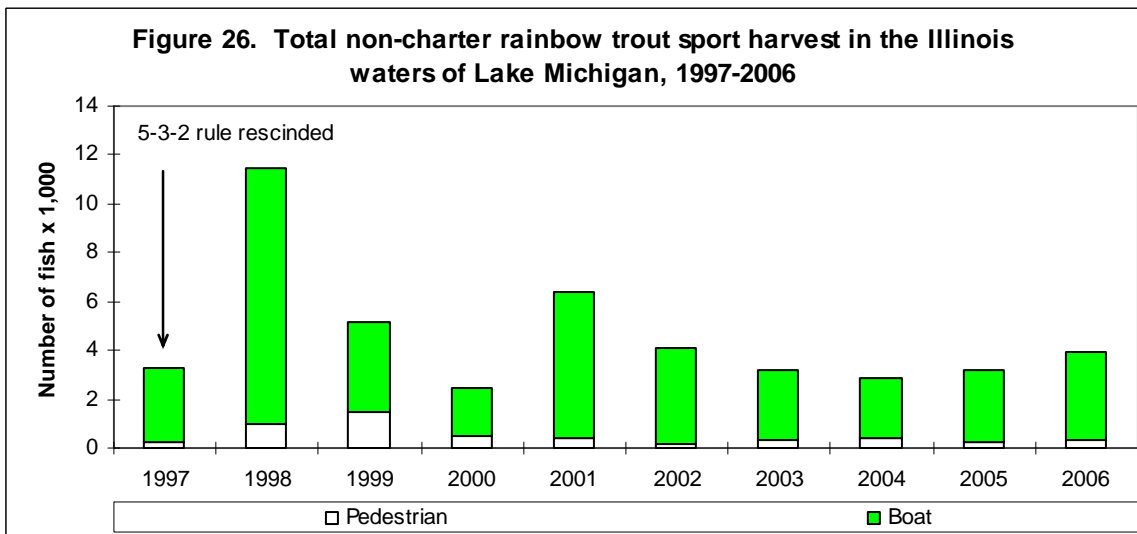
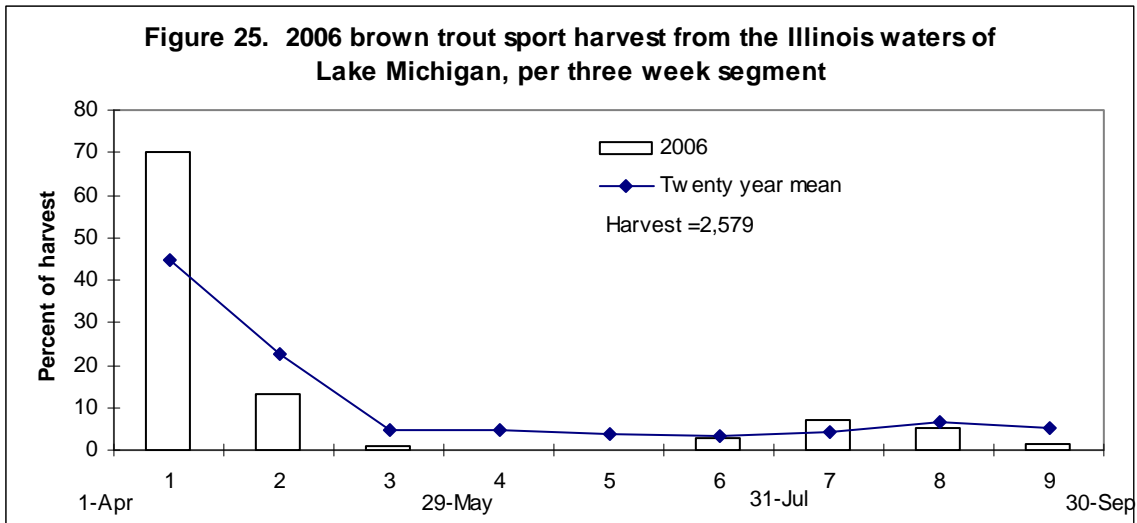
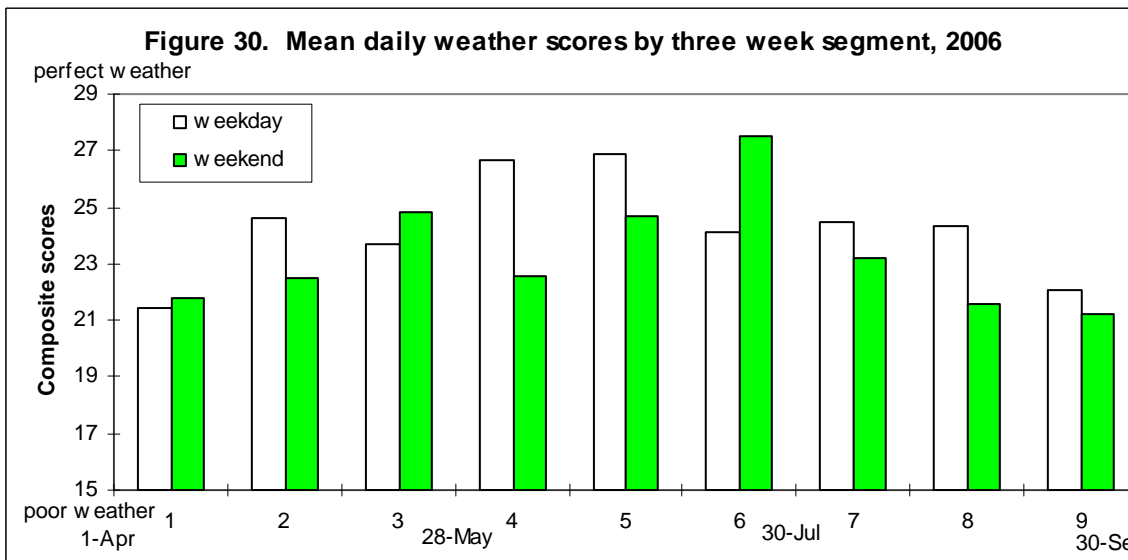
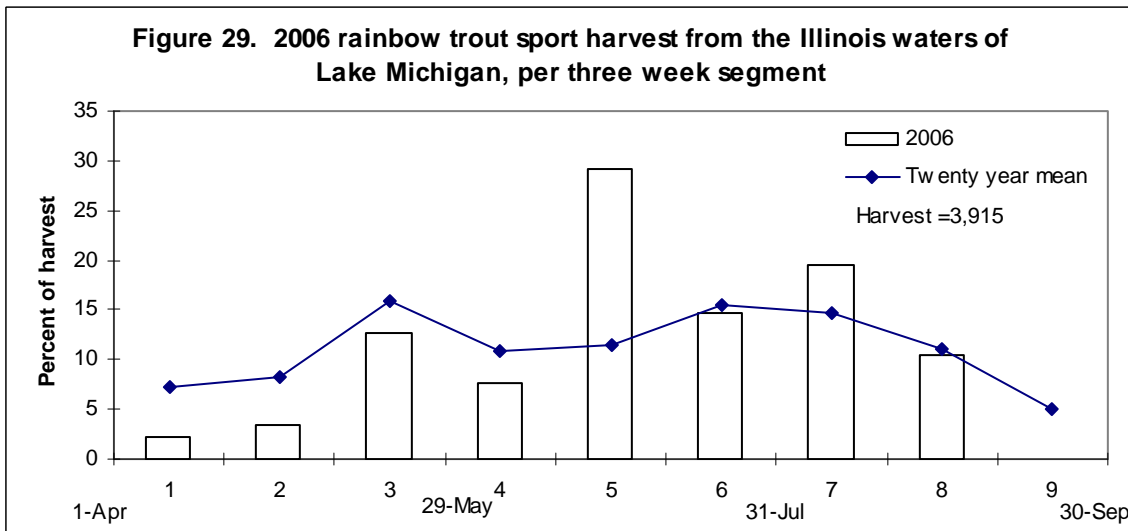
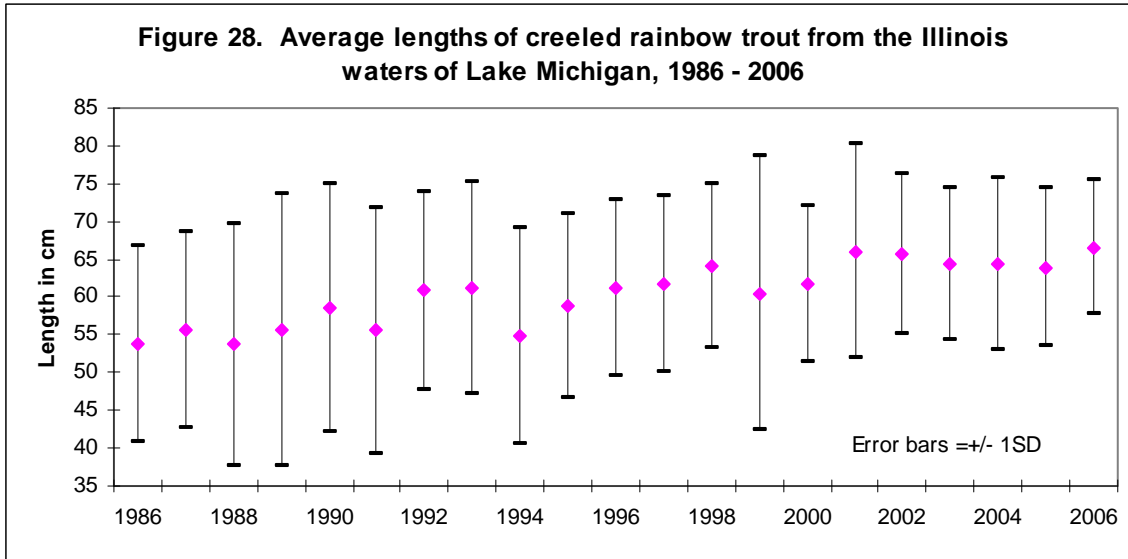


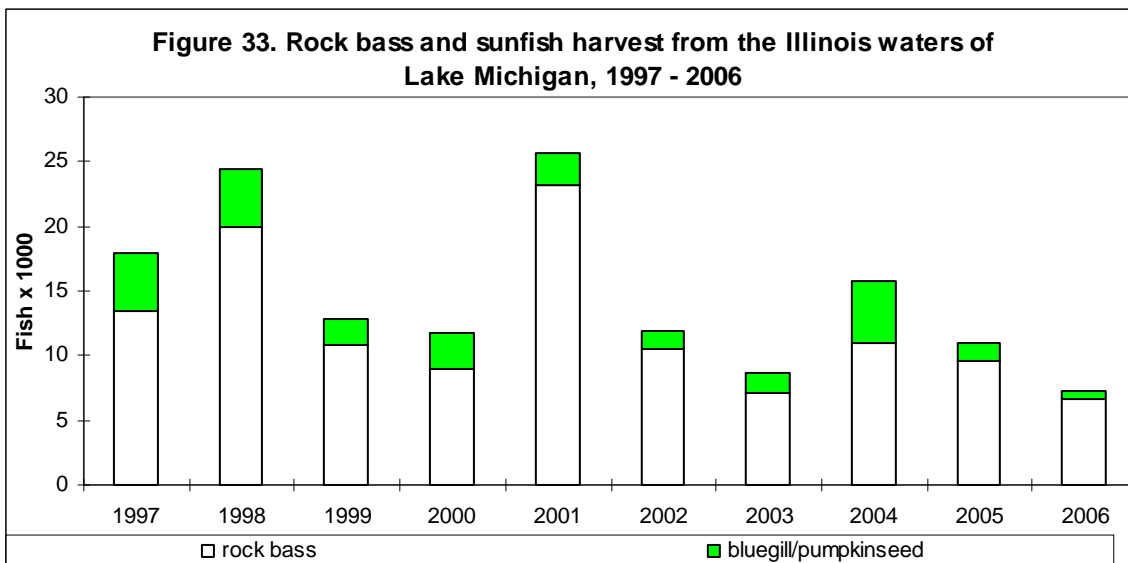
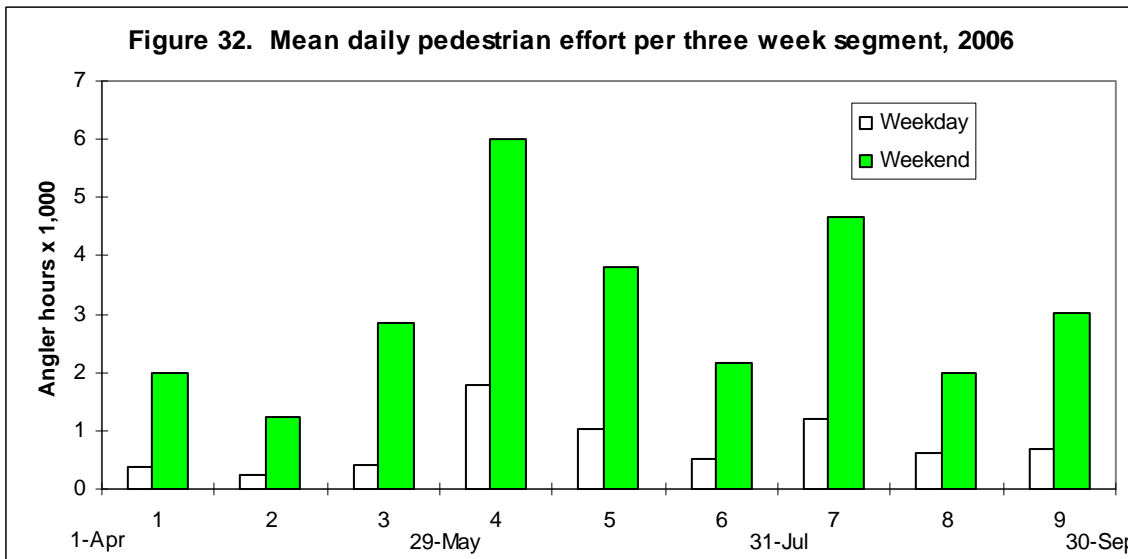
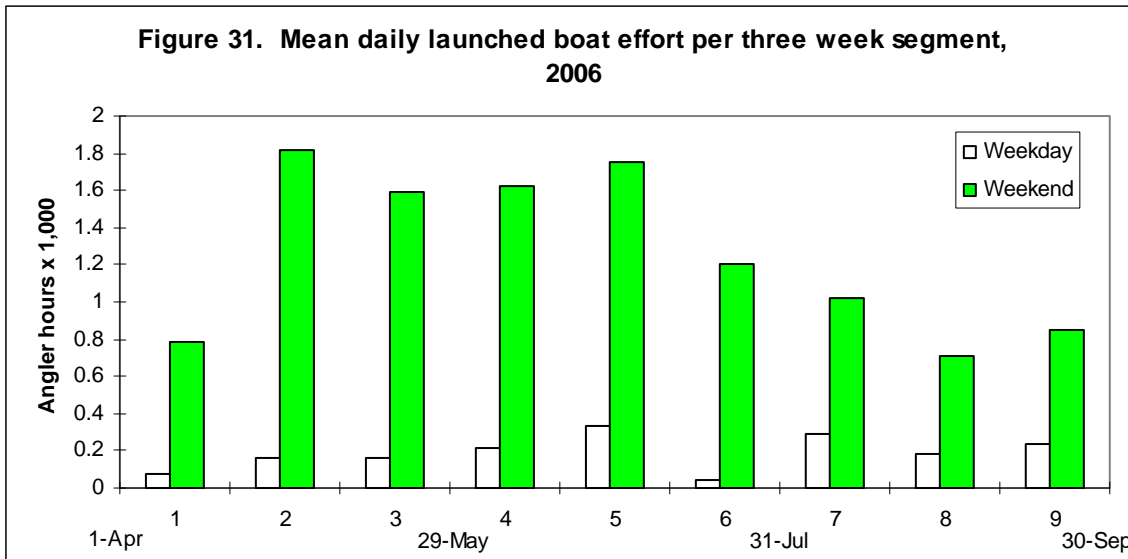
Figure 21. 2006 lake trout sport harvest from the Illinois waters of Lake Michigan, per three week segment

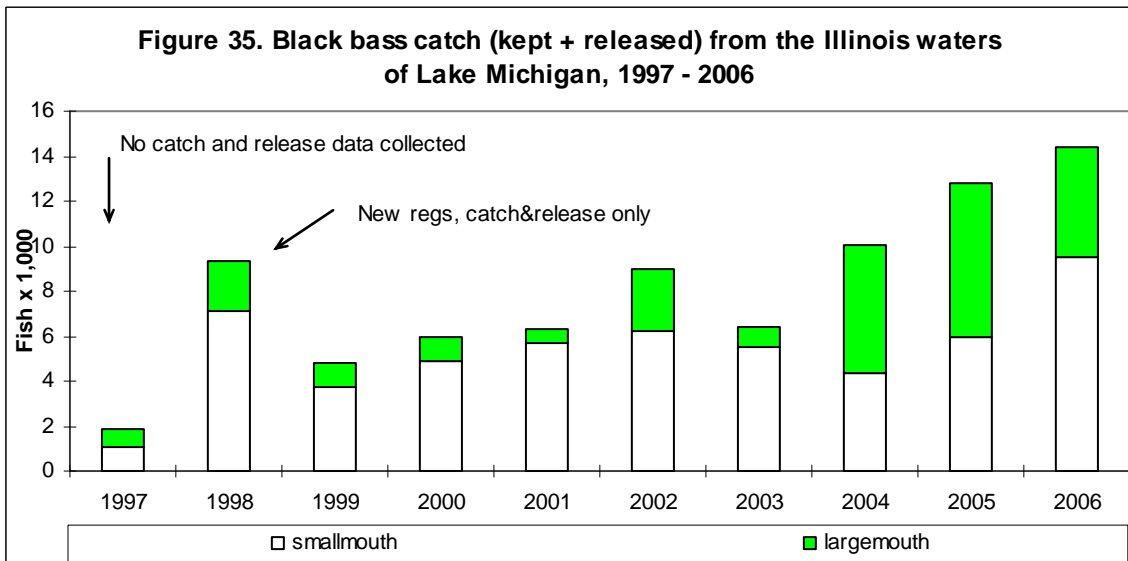
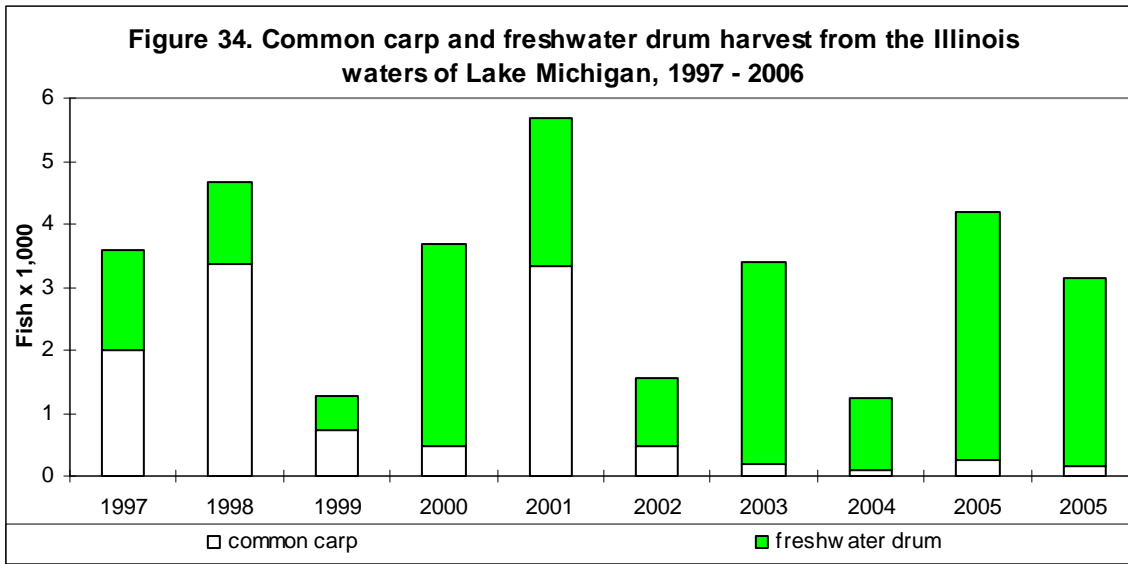












APPENDIX A - DATA FORM AND INSTRUCTIONS TO CLERKS

We record data on the Interview Form and a modified version of the same. The modified version is sometimes used by a helper in connection with interviews of boaters (see "Instructions to Clerks -- Work Assignments").

One important general rule applies to both forms: "Fill in all the blanks". If you don't know a particular value, draw a diagonal slash through that space on the form. The only exception to this rule is the "numbers in possession" section of the Interview Form. In that section, blanks are interpreted as zeros.

Interviews are obtained in sets. For each set, you visit a site and interview a number of angling parties. Each interview involves data for an entire angling party, although you might only speak with one individual angler. The interviews are taken from pedestrian anglers or from boaters returning to a launch ramp.

When pedestrian anglers are being interviewed, interview either all present or all that can be interviewed in the assigned period (usually two hours). Counts of pedestrian anglers are made at the start and finish of the interview set. When all pedestrian fishing parties cannot be interviewed, interview a representative sample of the anglers present. Thus, if the site includes harbor, shore, and structure areas (see maps), you interview parties from all three areas in proportion to their numbers. Approach all types of people (men, women, Chinese, Hispanic, white, polite, surly, etc.) without special favor for or against any. To assure impartiality skip a fixed number of anglers between interviews, with the number to skip determined so that the entire site is covered during the interview period. If you encounter an angling party that has already been interviewed in our creel survey that day, skip them.

When counting anglers, ignore spectators (casual passers-by) but include members of the angling party who are not fishing at the moment. This can include family members (spouses and children over five years old) who are accompanying the angler.

When boaters are interviewed, stay at the ramp for a predetermined time (usually two hours) and record data for all returning boats. Sometimes it is not possible to interview all angling boats. When that happens, you will interview a representative sample of boats containing anglers. When a boat is not interviewed, you record an ID number (see below), the time (under "end time"), and one of four notes (in the right-hand margin): "ANI" (anglers - no interview), "PNA" (power - no anglers), "SAIL" (sail boat), and "CH" (charter fishing boat). Counts of trailers are made at the start and finish of the interview period. It is important that the counts indicate the number of trailers at the times when you start and finish your interview set. Sail boats, non-angling power boats, and charter boats are never interviewed.

Record the total number of trailers of all types, excluding jet ski trailers, but only count empty trailers (those without boats on them) with vehicles attached. Only count trailers at the west ramp area when covering Burnham Harbor.

The interview form has four areas for recording data: 1) Site Data, 2) Party Record, 3) Catch Record, and 4) Fish Record.

1) Site Data. This area is a condensed version of the Instantaneous Counts Form. Counts are recorded at the start and finish of each interview set. Remember the rule: "Fill in all the blanks". When conducting boat interviews, record slashes in the pedestrian spaces. When conducting pedestrian interviews of any kind, enter a slash in the trailers space. When conducting pedestrian interviews with "regular peds", always enter slashes for all three types of "special peds", and vice-versa.

2) Party Record and 3) Catch Record. These areas are filled-in during the interviews. Column headings are explained here:

ID - Interviews (and non-interviewed boats) are sequentially numbered. For pedestrians, assign a number to each pedestrian party interviewed. For boaters, assign a number to each boat that returns to the ramp, including those that are not interviewed. Each clerk assigns one series of numbers each day, with no repeats. Thus, for example, when you conduct more than one interview set in a day, do not begin the second set with number 1; continue numbering where you left off in numbering the previous set.

angler type - One of six mutually exclusive possibilities is circled: har (harbor), sho (shore), str (structure), lau (launched), sna (snagger), and ice (ice-angler).

angs - For each party record the total number of anglers (tot) and the number who are Illinois residents (res). Remember, as in the Instantaneous Counts Form, include members of the angling party who are not fishing at the moment.

lines - For each party record the number of fishing rods (rod) and the number of power lines (pwr) in use by that party. Trolley lines are counted as power lines here.

trip times - Record three times: the time the fishing trip started, the time of the interview, and the time the trip ended (or is expected to end). Always record times in 24-hour time (e.g., two o'clock p.m. is 1400). When the fishing trip has started the previous day, still record the time of day that fishing started. Fishing trips by pedestrians are considered to start when the angling party arrives at the shoreline. Fishing trips using boats are considered to start when the boat leaves the ramp and to end when the boat arrives back at the ramp.

expenses - Three specific items are recorded. Remember, that data you record applies to the entire party interviewed. You record only costs of items acquired since the last fishing trip on Lake Michigan. If this is the first trip that an angler has ever made to Lake Michigan, include the total purchase price of all items in each category, regardless of when purchased. Notice that we are not concerned with when the item was paid for, only with when it was acquired and what it cost. 1) This category applies to launched boat anglers only. For major expenses (**maj**), record the purchase price of boat, motor, and /or trailer, if acquired since the last fishing trip on Lake Michigan. Include newly purchased used equipment. 2) For minor expenses (**min**), record the purchase price of any fishing equipment (rods, reels, downriggers, line, hooks, lures, bait, nets, etc.) purchased since the last fishing trip on Lake Michigan. Include only things directly used in the capture of fish. Do not include electronic equipment, food and drink, and items for the boat. 3) In the column headed "**other**", record the estimated cost of driving to this site. Here we assume a cost of **ten cents per mile**, so you simply record the round trip mileage divided by ten. This should be the total round trip distance **for all cars** used for this trip by members of the fishing party.

sought - Record species sought as p (perch), s (salmonid), ps ("whatever bites"), or o (other specific target species).

numbers in possession - Record only the numbers of fish in possession of the angling party. Fish names are abbreviated as follows: BN - brown trout, RB - rainbow trout, CO - coho salmon, LT - lake trout, CH - chinook salmon, YP - yellow perch, SM - smallmouth bass, RK - rock bass, PK - pumpkinseed sunfish, BG - bluegill sunfish, CP - common carp, FD - freshwater drum, OTHER - any species of fish that does not have a named column. Write the name or names of the other species in the margin next to the interview and a number breakdown if there is more than one other species. Accurate identification is extremely important; don't hesitate to use your key if you have any doubt about the identification of any fish. If the fish in possession of an angling party include some caught at any other site, exclude those from the numbers recorded here.

(# floy tags on yellow perch) - Ask the angler how many floy tags he/she has seen on **yellow perch** presently in possession. Record that number here.

4) Total Catch Record. In 1998 we will also be recording the total catch of anglers, including fish that were released. If when asked, an angler states that he has released some or all of his catch that day, record the number released of each species caught on the line immediately below the original interview for that party. Just record the catch data; do not give this line an id number or include any of the other data from the original interview row. For example, an angler states that he kept his limit of 5 coho but caught and released 4 more. So on the first row you would write down all of the pertinent data needed for a complete interview including 5 in the coho column. On the next row you would just record 4 in the coho column and leave the rest of the row blank. Record your next interview on the following row.

5) Fish Record. Here you record physical measurements made in connection with the interviews. Above this section you record the time your interview set was scheduled to start (usually 0600, 0830, or 1100). You should be able to weigh, measure, and examine for clips (for purposes of this form, we count floy tags under the heading "clips"), scars, and wounds on all salmonids that you encounter in possession of anglers. When an angler has more than 5 yellow

perch, select five fish at random from the catch to weigh, measure, and examine for floy tags (you don't need to look for clipped fins or lamprey marks on yellow perch). In addition to the five randomly selected perch, record data for any other yellow perch on which the angler has found a floy tag. On some occasions anglers will have removed floy tags from fish before you arrive. If it is not possible to know which specific fish the tag came from, record all information printed on the tag in the margin of the form and keep the tag. Column headings are explained here:

ID - Record the same number recorded in "Party Record" for the angling party that caught this fish.

species - Record the two-letter abbreviation of the species name. The abbreviations are those that appear as headings in the "Catch Record" section.

weight - Record the weight of the fish in grams. Do not record weights of gutted or beheaded fish. Be sure to "zero" the scale and to use the appropriate scale for the size of the fish being weighed.

length - Record total length (distance from tip of snout to tip of tail) in centimeters.

clipped fins - As outlined above you will examine all salmonids for clipped fins and floy tags, and you will examine some yellow perch for floy tags only. You record abbreviations for what you find (for purposes of data recording, assume that perch never have clipped fins or lamprey scars or wounds). The permitted entries are do (dorsal), ad (adipose), lp (left pectoral), rp (right pectoral), lv (left ventral), rv (right ventral), fl (floy tag), lm (left maxillary), rm (right maxillary) and none. Also, when you encounter a floy tag, record all the information printed on the tag. Remember, leave no blank spaces on the form; if you are unable to examine the fish, draw diagonal slashes through the spaces.

Remember all stocked lake trout have at least one fin clipped and possibly as many as three. Other salmonids may have none or up to three fins clipped so examine these fish carefully. Some fish are marked with a coded wire tag buried in the snout. These fish (primarily chinook salmon, lake trout and rainbow trout) have the adipose fin removed but no other fins are missing. Ask permission from the angler and collect the head for later tag extraction. Fill out the form included in the head bag and give the angler a copy.

scars and # wounds - This refers to marks left by sea lampreys; we are not interested in scars and wounds from other causes. The distinction is that wounds are still all or partly red, while scars are not. Since yellow perch are not examined for scars and wounds, always draw slashes through these boxes for perch.

APPENDIX B - PROJECT F-52-R21 PERFORMANCE REPORT

The foregoing report does not directly discuss progress toward each of the specific objectives listed in the AFA for this project. The purpose of this appendix is to list the jobs defined in that AFA and to comment on progress toward the objectives of those jobs.

Study 101. Contact creel survey

Job 101.1. Field interviews (core creel).

Objective: To gather fishery data from anglers.
Progress: Completed.

Job 101.2. Field interviews (re-estimation of constants).

Objective: To re-estimate constants used to extrapolate creel data to non-creeled sites, times and fishing modes.
Progress: Completed.

Job 101.3. Data entry

Objective: To enter data into computer files.
Progress: Completed.

Job 101.4. Analysis and reporting

Objective: To produce and summarize estimates of fishing effort and harvest.
Progress: Completed.

REPORT OF EXPENDITURES, 2006 - 2007

		Proposed	Actual
Study 101	Contact creel survey		
Job 101.1	Field interviews (core creel)	\$94,000	\$94,000
Job 101.2	Field interviews (re-estimation of constants)	\$37,000	\$37,000
Job 101.3	Data entry	\$8,240	\$8,240
Job 101.4	Analysis and reporting	\$24,000	\$24,000
Total Cost		\$166,240	\$166,240
Federal share		\$124,680	\$124,680
State share		\$41,560	\$41,560

APPENDIX C - COMPARISON OF THE CHARTER AND NON - CHARTER SALMONID BOAT FISHERY

A comparison was done to see if the charter and non - charter boat salmonid fisheries were targeting the same species (Tables C1 and C2). In general they have with similar percents of total harvest for both groups. A comparison of harvest per unit effort is also presented (Figure C1). As can be imagined the charter fishery generally out performed the non - charter boat fishery in all years except 2006 at a factor of 2 or 3 per angler hour. The combined harvest of both charter and non - charter anglers (boats and pedestrians) for 1997 - 2006 is presented (Figure C2). Harvest from early spring surveys and previous snagging surveys are not included in the total.

Table C1. Non-charter boat harvest composition (boats only) 1997 - 2006.

Year	Effort	Percent of total harvest					Total salmonids
	(angler-hours)	Brown trout	Rainbow trout	Lake trout	Coho salmon	Chinook salmon	
1997	251,790	1.90	3.70	7.20	82.30	4.90	81,579
1998	356,687	1.40	14.70	16.70	54.80	12.40	71,851
1999	184,165	3.80	12.10	8.70	41.90	33.50	30,618
2000	188,887	3.20	4.30	5.20	69.40	17.70	46,520
2001	207,991	1.40	10.30	7.80	70.90	9.60	58,001
2002	201,605	1.40	6.50	5.00	74.20	12.90	59,819
2003	199,369	0.50	7.30	5.00	60.80	26.40	39,760
2004	158,290	1.70	6.10	4.30	58.90	29.00	39,640
2005	151,010	2.90	8.20	3.40	53.90	31.60	35,774
2006	117,800	3.90	6.60	2.00	53.30	34.20	54,492

Table C2. Charter boat harvest composition 1997 - 2006.

Year	Effort	Percent of total harvest					Total salmonids
	(angler-hours)	Brown trout	Rainbow trout	Lake trout	Coho salmon	Chinook salmon	
1997	108,597	1.30	4.00	7.40	82.50	4.80	76,527
1998	118,691	1.80	9.40	18.80	56.90	13.10	55,664
1999	113,542	1.40	7.60	9.50	68.50	13.10	44,931
2000	112,391	2.20	4.30	6.30	78.20	9.00	68,480
2001	109,171	0.90	6.40	8.10	75.00	9.50	63,104
2002	121,160	1.60	3.70	5.00	79.50	10.30	87,840
2003	114,734	1.00	4.10	6.20	68.30	20.40	55,202
2004	114,671	1.80	3.20	5.80	60.90	28.30	52,666
2005	113,477	2.40	8.60	4.10	51.60	33.30	58,002
2006	102,904	1.50	5.40	3.20	52.90	37.00	52,857

Figure C1. Comparison of charter and non-charter boat salmonid harvest rates for the Illinois portion of Lake Michigan, 1997-2006

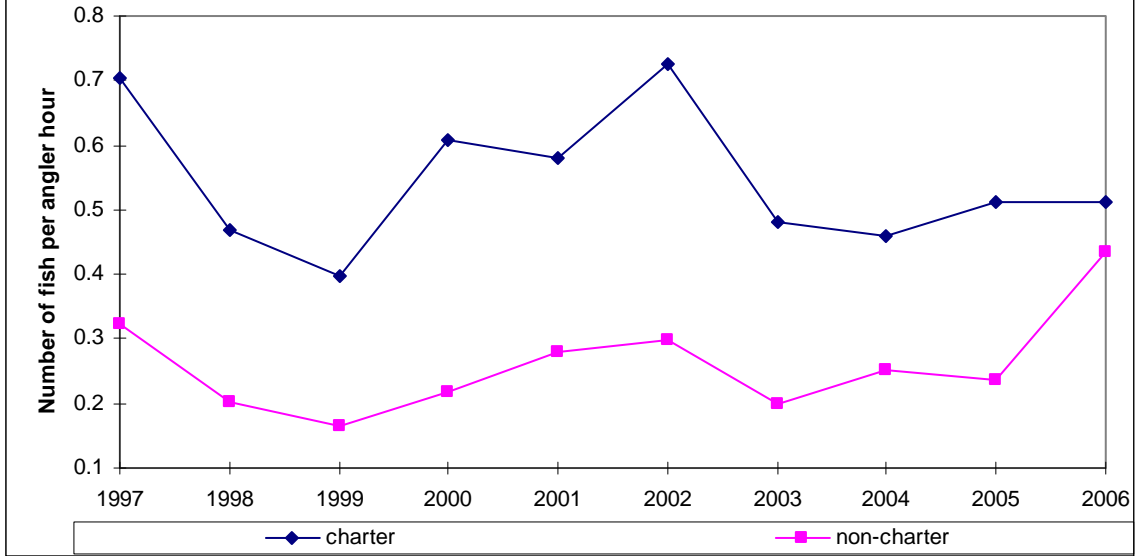


Figure C2. Illinois Lake Michigan sportfishing harvest (charter & regular combined) 1997 - 2006

