

2010 Charter Boat Operator Report
with emphasis on Catch and Effort
within Indiana Waters of Lake Michigan

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EXECUTIVE SUMMARY

- Eight-five charter operator licenses were issued to fish Indiana waters during 2010. Forty-five operators guided exclusively on Lake Michigan and 40 operators guided exclusively on other inland bodies of water including: Barbee Lake, Brookville Reservoir, Elkhart River, Geist Reservoir, James Lake, Monroe Reservoir, Patoka Lake, Pigeon River, Pike Lake, Raccoon Lake, Sugar Creek, St. Joseph River, Tippecanoe Lake, Tippecanoe River, Upper Long Lake, Webster Lake, and White River.
- Overall, 99% of the mandated reports were received, with 26% failing to meet time frame requirements.
- Operators submitted reports on 1,228 trips in Indiana waters; 589 in Indiana waters of Lake Michigan and 639 on inland waters. Lake Michigan trips accounted for the majority of the charter angler effort, followed by the Webster Lake area, Monroe Reservoir, White River, Raccoon Lake, Patoka Lake, Brookville Reservoir, Sugar Creek, Tippecanoe River, and Geist Reservoir.
- The total number of charter trips, anglers, and hours fished all increased between the 2009 and 2010 charter fishing seasons. Inland charters accounted for the largest positive percent change in total trips. This was due to significant increases observed in charter effort at Monroe Reservoir, Patoka Lake, Raccoon Lake, and Sugar Creek. Effort at each of these bodies of water was nearly twice what was reported in 2009.
- Salmonine species were the primary target for Lake Michigan operators; however, 105 fishing trips were conducted for yellow perch by 10 operators and 36 fishing trips were conducted for smallmouth bass by 2 operators. Inland charter operators targeted species based on fish populations within the body of water (s) fished (i.e. black bass at Monroe, Patoka, and White River; muskellunge at Webster, Barbee and Tippecanoe; temperate bass at Brookville, Monroe, Raccoon; walleye at Brookville, etc.). Sunfish species (bluegill/redear, crappie), bass (smallmouth and largemouth), temperate bass (hybrid striped bass, striped bass, and white bass), walleye, catfish species, and muskellunge comprised the bulk of the inland catch. Temperate bass were caught from inland waters at rates much greater than levels observed during 2008 and 2009.

TABLE OF CONTENTS

	<u>Page</u>
LIST OF TABLES.....	iv
LIST OF FIGURES.....	v
INTRODUCTION.....	1
METHODS.....	2
RESULTS.....	4
Charter licenses.....	4
Compliance.....	4
Charter effort and catch.....	4
Lake Michigan trout and salmon.....	6
Lake Michigan yellow perch.....	7
Lake Michigan smallmouth bass.....	8
DISCUSSION.....	8
RECOMMENDATIONS.....	12
LITERATURE CITED.....	12
APPENDIX I 312 I.A.C. 9-7-17 Charter fishing boat operator’s license.....	29
APPENDIX II State form 25789: Charter fishing boat operator reporting form.....	30

LIST OF TABLES

<u>Table</u>	<u>Page</u>
1. Number of charter licenses issued by Indiana Department of Natural Resources from 2001 through 2010.....	14
2. Fishing effort and catch reported by charter boat operators fishing Indiana waters during 2010, by body of water fished.....	15
3. Salmonine harvest and fishing effort reported by charter boat operators targeting trout and salmon within Indiana waters of Lake Michigan during 2010.....	16
4. Salmonine catch and fishing effort reported by charter boat operators targeting trout and salmon within Indiana waters of Lake Michigan, 2001 through 2010.....	17
5. Number of salmonine species released as reported by charter boat operators targeting trout and salmon within Indiana waters of Lake Michigan during 2010.....	18
6. Yellow perch harvest, number of yellow perch releases, and fishing effort reported by charter boat operators targeting yellow perch within Indiana waters of Lake Michigan during 2010.....	19
7. Weather variables and possible scores used in determining the mean daily weather conditions by month in the Lake Michigan creel survey, 2009 and 2010.....	20
8. Number of salmonine species stocked in Lake Michigan by Indiana Department of Natural Resources, 1998 through 2010.....	21

LIST OF FIGURES

<u>Figure</u>	<u>Page</u>
1. Total number of angler hours fished as reported by charter boat operators fishing Indiana State waters during 2010.....	22
2. Relative abundance (percent of catch) of sunfish species, black bass species, temperate bass species, walleye, muskellunge, and catfish species in the inland charter catch, 2008-2010.....	23
3. Salmonine harvest reported by charter boat operators targeting trout and salmon within Indiana waters of Lake Michigan, 2001 through 2010.....	24
4. Charter catch rate for all salmonine species caught in Indiana waters of Lake Michigan from 2001 through 2010, based on directed effort.....	24
5. Charter catch rate for coho salmon in Indiana waters of Lake Michigan from 2001 through 2010, based on directed effort.....	25
6. Charter catch rate for Chinook salmon in Indiana waters of Lake Michigan from 2001 through 2010, based on directed effort.....	25
7. Charter catch rate for steelhead in Indiana waters of Lake Michigan from 2001 through 2010, based on directed effort.....	26
8. Charter catch rate for brown trout in Indiana waters of Lake Michigan from 2001 through 2010, based on directed effort.....	26
9. Charter catch rate for lake trout in Indiana waters of Lake Michigan from 2001 through 2010, based on directed effort.....	27
10. Charter catch rate for yellow perch in Indiana waters of Lake Michigan from 2002 through 2010, based on directed effort.....	27
11. Number of salmonines stocked in Lake Michigan each year, 1998 through 2010.....	28
12. Mean daily weather scores by month from the Indiana Department of Natural Resources Lake Michigan creel survey, 2009 and 2010.....	28

INTRODUCTION

As a trout and salmon fishery developed within Indiana's waters of Lake Michigan in the mid 1960's, a sport and charter boat industry also developed and prospered. By the mid 1970's, Indiana Department of Natural Resources (IDNR) biologists believed that charter boat operators were harvesting a large number of salmonines each year (Braun and Hudson 1988). As the number of operators increased, information about their fishing effort and catch was important in understanding fishing quality and the impact they had on the Lake Michigan fishery. In 1976, a pilot program was established with reporting forms distributed to ten charter boat operators known to be fishing from Indiana ports. These operators expressed an interest in providing information about their fishing trips to supplement the IDNR creel survey data; however, the degree of cooperation varied from full to no cooperation (Braun and Hudson 1988). To obtain a continuous annual record of charter fishing effort and the numbers and species of fish harvested by charter boat anglers in Indiana, legislation was introduced, and passed in 1987, that required reporting of sport catch and effort by the charter fishing industry.

Indiana Administrative Code 312 I.A.C. 9-7-17, charter fishing boat operator's license, regulates sport fishing for hire within waters of the State, including Lake Michigan. An individual may not take another individual sport fishing for hire on Indiana waters, waters containing state-owned fish, or state boundary waters without a charter fishing boat operator's license issued by the director under Indiana Code (IC) 14-22-15-4 pursuant to I.A.C. 9-7-17. Initially enacted to assist biologists with understanding the Lake Michigan fishery, 312 I.A.C. 9-7-17 also provides fishery information on other bodies of water as a continuous record of charter fishing effort and numbers and species of fish harvested and released by charter boat anglers throughout the state.

Data from the charter industry are used to assist with fishery management efforts by providing valuable trend information concerning charter harvest and catch rates and provides an overview of the status of stocked fish (e.g. salmonine species).

METHODS

Catch and effort information were submitted by charter boat operators through the mandatory catch reporting system. Licensees provided catch information on a per trip basis for all paid trips for which all or part of the trip was conducted in Indiana waters. Reports were required to be submitted before the fifteenth day of the following month, as outlined in Administrative Code 312 I.A.C. 9-7-17 (Appendix I). The administration of the charter reporting program and compilation of the charter fishing catch and effort was part of the Division of Fish and Wildlife's Project/Grant 300FW1F10D43504. This projects focus was sport fish monitoring in Lake Michigan and its tributaries.

The information obtained from each report included: reporting period (month), name of licensee, name of body of water fished, license number, date of fishing trip, total number of anglers, total hours fished, and numbers of fish harvested and released (Appendix II). Space was also provided on the form for comments or observations. Per I.A.C. 9-7-17, only paid trips conducted wholly or partially in Indiana waters needed to be reported. Reports were required monthly, even if no fishing activity occurred as long as the license was active. If IDNR personnel did not receive a report for a given month, the operator was delinquent since one cannot distinguish those operators that did not fish from those that failed to submit a report.

Delinquencies were directly addressed by the Lake Michigan Fisheries office and the IDNR Law Enforcement Division in Michigan City. Operators who were missing required reports were either sent a written notice or telephoned requesting immediate report submission. If more than three notices were sent to an operator within the fishing season, the operator's name was submitted to Law Enforcement for enforcement action. A person who fails to keep accurate records of each day's catch of fish and other related information or fails to report monthly before the fifteenth day of each month commits a Class C infraction (312 I.A.C. 9-7-17; Authority I.C. 14-22-2-6, I.C. 14-22-15).

The Lake Michigan office received all charter boat operator reports from licensed operators throughout the State of Indiana. Reports were organized and reviewed as they were received. Incomplete forms were returned to the charter boat operator with

an explanation of why the report was returned and a request that the operator correct and/or complete the report. Reports were entered into a database and summarized to describe fishing effort and catch of major sport fish. Brief summaries of inland fishing effort, harvest, and catch can be found within this report; however, the main emphasis is the Lake Michigan fishery since the majority of charter licenses issued to operate within Indiana waters are for individuals targeting Lake Michigan waters. Greater communication with licensees and improved data handling have increased the overall accuracy of the catch information since 1987; however, all estimates provided are based on unverified reports.

Charter data are used to summarize fishing effort, harvest, catch, and catch rates of sport fish listed on the charter boat form. Effort, or angler hours, is the total number of hours fished by all anglers. Harvest is the total number of fish caught and kept by an angler. Catch is the total number of fish harvested and released by an angler. Catch rates are the total number of fish caught within a given amount of time. Relative yearly comparisons of catch, independent of the magnitude of effort, are possible by expressing the catch on a per-unit-of-effort basis, known as catch rates (i.e. CPUE). With this measure, the long-term trend of fishing success by species can be presented for comparisons. Fishing effort was separated between groups of fish including salmonine (trout and salmon), percids (yellow perch), and other species (smallmouth bass) since fishing trips generally target one group. The catch rates provided are targeted, in that only the Lake Michigan trout and salmon catch and effort were utilized for the salmonine catch rates, only yellow perch catch and effort were utilized for the yellow perch catch rates, and only smallmouth bass catch and effort were utilized for the smallmouth bass catch rates. With the exception of yellow perch and smallmouth bass, all catch rates presented were standardized to 100 angler-hours because rates were significantly less than one fish caught for every hour spent angling.

RESULTS

Charter licenses

During 2010, 85 charter operator licenses were issued to fish Indiana waters (Table 1). Forty-five operators guided exclusively on Lake Michigan and 40 operators guided exclusively on other inland bodies of water including: Barbee Lake, Brookville Reservoir, Elkhart River, Geist Reservoir, James Lake, Monroe Reservoir, Patoka Lake, Pigeon River, Pike Lake, Raccoon Lake, Sugar Creek, St. Joseph River, Tippecanoe Lake, Tippecanoe River, Upper Long Lake, Webster Lake, and White River (Table 2). The majority of inland licenses issued were for operators targeting the Webster Lake area (including lakes located in the Tippecanoe River Watershed such as the Barbee Chain, and Lakes' James and Tippecanoe), Monroe Reservoir, Patoka Lake, and White River.

The number of licenses issued to fish Indiana waters continues to increase mainly due to annual license sales for chartering on inland bodies of water. Since 2001, the number of inland charter boat operator licenses sold nearly doubled.

Compliance

Overall, 99% of the total reports required were submitted. Ninety written notices were sent to operators regarding delinquent charter boat operator reports. Two written warnings and six citations were issued by the Division of Law Enforcement. Three inland operators failed to submit 11 reports for months including June, July, August, September, October, November, and December. From the reports received, 26% failed to meet time frame requirements (based upon the post-mark date on the mailing envelope or the hand-delivery date). Lake Michigan operators submitted 15% of their reports late, while 20% of the inland operators submitted their reports past the legal required time frame. Both Lake Michigan and inland charter operators' overall rate of compliance in 2010 was lower compared to the 2009 fishing season.

Charter effort and catch

Operators submitted reports on 1,228 trips in Indiana waters; 589 in Indiana waters of Lake Michigan and 639 on inland waters (Table 2). Lake Michigan trips

accounted for the majority of the charter angler effort at 15,240 hours or 56% of the total, followed by the Webster Lake area at 4,819 hours or 18% of the total, Monroe Reservoir at 2,392 hours (9%), White River at 1,144 hours (4%), Raccoon Lake at 1,043 hours (4%), Patoka Lake at 897 hours (3%), Brookville Reservoir at 768 hours (3%), Sugar Creek at 315 hours (1%), Tippecanoe River at 311 hours (1%), and Geist Reservoir at 136 hours (1%, Table 2, Figure 1).

The total number of charter trips, anglers, and hours fished all increased between the 2009 and 2010 charter fishing seasons. Inland charters accounted for the largest positive percent change in total trips (+17%), total number of anglers (+18%), and total hours fished (+13%). This was due to significant increases observed in charter effort at Monroe Reservoir, Patoka Lake, Raccoon Lake, and Sugar Creek. Effort at each of these bodies of water was nearly double compared to what was reported in 2009 (Palla 2010). Effort declined approximately 9% from the Webster Lake area between 2009 and 2010.

Charter operators reported a total of 26,361 fish caught from Indiana waters in 2010 (Table 2); a slight increase (+2%) compared to the 2009 catch of 25,915. The majority of these fish were caught from Lake Michigan (47%), followed by Monroe Reservoir (22%), Patoka Reservoir (15%), White River (7%), Brookville Reservoir (4%), Tippecanoe River (2%), Sugar Creek (2%), and the Webster Lake area (1%).

For Lake Michigan operators, trout and salmon were the primary target; however, 105 fishing trips were conducted for yellow perch by 10 operators and 36 fishing trips were conducted for smallmouth bass by 2 operators. One charter boat operator exclusively chartered for yellow perch.

Inland charter operators targeted species based on fish populations within the body of water (s) fished (i.e. black bass at Monroe, Patoka, and White River; muskellunge at Webster, Barbee and Tippecanoe; temperate bass at Brookville, Monroe, Raccoon; walleye at Brookville, etc.). Sunfish species (bluegill/redear, crappie), bass (smallmouth and largemouth), temperate bass (hybrid striped bass, striped bass, and white bass), walleye, catfish species, and muskellunge comprised the bulk of the inland catch (Table 2, Figure 2). Temperate bass were caught from

inland waters at rates much greater than levels observed during 2008 and 2009 (Figure 2).

Lake Michigan trout and salmon

Charter boat operators fishing Indiana waters of Lake Michigan reported 2,052 chartered anglers that fished 11,942 hours for trout and salmon (Table 3). Angler hours and total number of charter anglers decreased 3% compared to 2009. The number of salmonine excursions remained relatively stable at 447 trips (448 in 2009).

A total of 4,058 salmonines were harvested by chartered anglers during the 2010 season; this is a 40% decrease compared to the 2009 total harvest (6,803). Historically, the most abundant species in the charter harvest has been coho salmon; coho salmon continued to dominate the salmonine harvest, comprising 2,111 fish or 52% of the total (Table 3, Figure 3). In 2009, coho salmon accounted for 85% of the harvest. Percent of total harvest for other trout and salmon species during the 2010 season was as follows: Chinook salmon 22%, steelhead trout 14%, lake trout 9%, and brown trout 3%. Harvest and effort were greatest during the months of April and July (Table 3).

Charter total harvest and catch (total number of salmonines harvested and released) increased for Chinook salmon, steelhead trout, brown trout and lake trout; harvest and catch of coho salmon decreased. The coho catch decreased from 5,780 to 2,111 fish, a 63% decline relative to 2009 and the lowest number observed from the 2001-2010 data series (Table 4). Steelhead trout and lake trout were the only two species whose catch was higher than their 2001-2010 average. The rise in the number of steelhead caught was a direct result of the success anglers found in the summer months (June through August). Typically, the average number of steelhead caught between June and August is 170 fish (2001-2009 data series); in 2010, 488 steelhead were reported. The lake trout catch increase was a direct result of the fall sport fishery outside the Port of Indiana; nearly 40% of the lake trout captured by Lake Michigan charter anglers were taken during the month of November. The majority of those lake trout were released (Table 5).

The overall salmonine charter CPUE was 35.8 fish caught for every 100 hours spent trout and salmon angling; a considerable decline from the 2009 rate of 57.4 fish per 100 hours and lower than the ten-year average of 44.4 (Figure 4). The 2010 salmonine CPUE was the third lowest rate observed in Indiana waters of Lake Michigan during the 2001-2010 timeframe. Comparing targeted trout and salmon catch rates to 2009 data, Lake Michigan charter catch rates increased for Chinook salmon, steelhead trout, brown trout, and lake trout (Figures 6-9). Coho salmon CPUE dropped to one of the lowest observed during the 2001-2010 time series, 17.9 fish per 100 hours; a rate nearly half the observed ten-year average of 33.2 fish per 100 hours (Figure 5). Alternatively, steelhead trout and lake trout CPUE increased to the highest observed during the 2001-2010 time period, 4.8 steelhead per 100 hours and 4.6 lake trout per 100 hours, respectively.

Comparing 2010 catch rates with their long-term average, Chinook salmon, steelhead trout, and lake trout had rates that exceeded their ten-year mean (Figures 6, 7 and 9). Coho salmon and brown trout catch rates were 46% and 33% below their ten-year mean (Figures 5 and 8). Overall, brown trout were a minor portion of the Lake Michigan charter catch during 2010, 3% of the total catch.

Lake Michigan yellow perch

A total of 2,657 hours, representing 105 trips, were spent fishing for perch by 519 chartered anglers (Table 6). This was a 28% increase in effort and a 14% increase in anglers compared to the 2009 fishing season when 2,077 hours were fished exclusively for yellow perch by 455 chartered anglers (Palla 2010). A total of 7,274 perch were caught during 2010; a 9% decline relative to 2009 (7,995 fish). Largest yellow perch catches occurred during the months of July, followed by April then November. Yellow perch angler effort was greatest during July and April (Table 6).

Catch rates for yellow perch fell during 2010; a 29% decline from the observed 2009 perch CPUE (3.8 fish per hour) and 4% lower than the long-term average (2.8 fish per hour, Figure 10).

Thirty percent of the total yellow perch caught were released, representing a total of 2,188 perch (Table 6). Perch were released most often in April, followed by July then November.

Lake Michigan smallmouth bass

Black bass species continue to play an important role in the diverse fish community found within Lake Michigan. Two Lake Michigan operators took advantage of this diversity by offering smallmouth bass charter trips during the 2010 fishing season. In 2010, chartered anglers caught 336 smallmouth bass; all bass were released. Largest smallmouth catches occurred in April and May.

The targeted charter smallmouth CPUE was 0.5 fish per angler hour which was slightly lower than the 2009 charter rate of 0.7 fish per angler hour (Palla 2010).

DISCUSSION

The Lake Michigan recreational catch continues to be influenced by numerous variables including the environment (i.e. weather, water temperatures), changes in lake-wide stocking levels and forage levels, and threats from the unintentional introduction of aquatic invasive species such as *Dreissenid* mussels which have significantly changed the pelagic productivity of Lake Michigan.

The overall 2010 salmonine charter CPUE of 35.8 fish/100 angler-hours, one of the lowest observed from the prior ten-year period, was the direct result of a poor coho salmon fishing season. The coho catch decreased from 5,780 to 2,111 fish, a 63% decline relative to 2009 and the lowest number observed from the 2001-2010 data series. Had it not been for the above-average Chinook salmon, steelhead trout and lake trout catch rates, the 2010 Lake Michigan charter season would have been marginal.

Typically, the majority of coho salmon caught from the lake occurs in April and May. In April and May, the average number of coho caught from Indiana's portion of Lake Michigan by chartered anglers is 4,000 fish based on the 2001-2009 fishing seasons; representing 73% of the seasons' total coho catch. Angler effort averages 9,000 hours; representing 55% of the total charter salmonine effort. In 2010, only

1,372 coho were reported; 64% of the seasons' total coho catch. Angler effort was 4,818 hours; 40% of the total charter salmonine effort. The decline in coho catch and angler effort could be attributed to a combination of declines in coho salmon abundance in Lake Michigan coupled with poor spring weather conditions.

Coho stocking reductions, primarily by the Michigan Department of Natural Resources (MDNR) from 2007-2009 and by the Wisconsin Department of Natural Resources (WDNR) in 2008, contributed to the spring coho catch decline (Figure 11). MDNR's standard coho stocking level of 1.6 million fish per year was not met between 2007- 2009 due to budgetary constraints and hatchery production issues. Only 931,897 yearlings were stocked in 2007, 1.2 million yearlings in 2008 and 670,000 yearlings in 2009. WDNR coho fingerling stocking level dropped 58% between 2007 and 2008. Given that the average size of coho salmon harvested in April and May from Indiana's Lake Michigan creel survey was 20.2 in (± 1.70 ; $n=283$), or age 2+ fish, this corresponds directly with the WDNR 2008 fingerling and MDNRE 2009 yearling coho stocking reductions.

Additionally, in 2010 the weather was generally poorer compared to 2009, especially during May week days and April and May weekend days (Figure 12). Weather data were collected throughout the course of the 2010 Lake Michigan creel survey using on-site observations. Variables recorded each day the survey was performed included: wind direction, wind speed, wave height, air temperature, average sky, and precipitation. 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 7). Scores ranged from 7 to 29, with higher scores reflecting better weather.

The rise in the number of Chinook salmon, steelhead, and lake trout caught was a direct result of the success anglers found during the summer months from June to August. The Chinook salmon summer catch was 6.7 times the 2009 catch, steelhead trout summer catch was 15 times the 2009 catch, and the lake trout summer catch was 3.8 times the 2009 catch (Palla 2010). Catch rates for these three species were also the highest to one of the highest reported from the 2001-2010 time period. Cold nearshore water temperatures can explain the higher salmonine catch observed during

this three-month period. Preliminary temperature data collected by Cary Troy (Assistant Professor, Hydraulics and Hydrology Group, School of Civil Engineering, Purdue University) using an autonomous underwater vehicle (AUV) off Michigan City July 26, 2010, showed water temperatures of 51 to 54F in waters \geq 20 ft (Brian Breidert, personal communication). Temperature measurements collected by Lake Michigan office field staff July 28, 2010 confirm these colder water temperatures with surface readings of 78F and temperatures ranging from 50 to 60F between 40 and 50 ft of water. Those colder temperature pockets concentrated trout and salmon in nearshore areas at a time when these fish are usually found in offshore waters in depths greater than 150 ft. The June-August charter salmonine effort increased from 2,804 hours (95 trips) in 2009 to 5,983 hours (221 trips) in 2010, demonstrating that charter fishing boat operators concentrated fishing efforts within Indiana waters.

Whether these above-average catch rates can be sustained is dependent upon lake-wide stocking levels, fish availability, forage levels and environmental variables such as water temperatures. Declines in Chinook salmon abundance likely reduced the overall demand on the prey fish population resulting in better survival of older salmonine age classes (Claramunt et al. 2010). However, Lake Michigan prey fish biomass levels still remain much lower than levels found in the 1990s (Warner et al. 2010). Total 2010 prey fish biomass was the third lowest biomass from the Great Lakes Science Center (GLSC) lake-wide survey of the fish community in Lake Michigan since 1973 (Brian Breidert, personal communication). The abundance of young alewives (age 0) in 2009 from the GLSC and MDNR acoustic surveys was the lowest of any acoustic survey which may negatively influence future salmonine growth and survival. However, the 2010 alewife year-class was the second largest in the time series which could positively affect future salmonine survival, especially if this year-class successfully over-wintered.

Management of salmonine populations in Lake Michigan will remain a balancing act with the continued adjustment of stocking and harvest levels in an attempt to better match forage abundance along with other ecosystem components (Clapp and Horns 2008). Indiana stocking levels remain stable; the number of salmonines

stocked by the IDNR between 1998 and 2010 has averaged 1.1 million fish each year (Table 8).

The yellow perch charter fishing season was average which is reflected in the perch CPUE of 2.7 fish per h. Perch fishing should remain average to above average in the short term as a result of the dramatic surge in yellow perch reproduction in 2005 (Makauskas and Clapp 2010). The current yellow perch population continues to be supported mainly by the 2003 and 2005 year classes (age-5 and age-7 fish).

Poor year-classes have been produced since 2005, lake-wide, which directly impacts future adult yellow perch abundance. Although yellow perch assessments throughout the lake continue to show sustained low adult yellow perch abundance, recent increases in the catch of age-0 perch in 2009 and 2010 may increase future perch abundance. Recruitment in 2009 and 2010, however, was still relatively low in most areas of the lake in comparison to long-term averages (Brian Breidert, personal communication). Since the 2010 lake-wide sampling did not provide evidence that the yellow perch population abundance is changing and their abundance still remains much lower than historical levels, current management actions will remain in place to protect the remaining stocks.

Lake Michigan charter boat operators offer an important recreational service for individuals who want to experience Great Lakes fishing. Many individuals choose to charter a fishing boat, fully equipped with lines, lures, fish location technology, and an experienced captain. Charter fishing is also an important contributor to tourism along Indiana's Lake Michigan coastline. A recent study completed by Michigan Sea Grant and Michigan State University's Center for Economic Analysis found that charter fishing generated an average of 465,417 employment hours per year and brought an average of \$19.8 million per year into Michigan's coastal communities over the past twenty years (O'Keefe and Miller 2011). Although limited data exists for the economic impact of Indiana charter fishing to local communities, fishing related expenditures including charter fees and tips, fishing licenses, lodging, fuel for vehicles, food and beverages, restaurants, souvenirs, and shopping represent a large monetary value.

O'Keefe and Miller (2011) reported the top factors charter customers considered when choosing a charter boat included: the ability of captain to find fish, safety features of vessel, appearance of boat and captain, boat or port easy to get to, and appearance of website and/or ads. Customer satisfaction was largely influenced by the hospitality of captain and mate, comfort of the vessel, and number of fish caught. The source of information customers utilized when choosing a boat to charter was mainly the Internet which played a key role in marketing. Understanding charter customers, successful marketing strategies, and economic impacts to communities as a result of charter fishing can help charter businesses remain solvent and link environmental and societal changes to trends in tourism generated by charter fishing (O'Keefe and Miller 2011).

RECOMMENDATIONS

Since both Lake Michigan and inland charter operators' overall rate of compliance in 2010 dropped compared to the 2009 fishing season, the Lake Michigan office should continue working with District 10 Law Enforcement to improve compliance from repeat delinquent operators. A need to revisit the Lake Michigan office charter compliance policy with the Division of Law Enforcement may be required in order to determine the most feasible solution to decrease future delinquencies.

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Table 1. Number of charter licenses issued by Indiana Department of Natural Resources from 2001 through 2010.

<u>Year</u>	<u>Inland Licenses</u>	<u>Lake Michigan Licenses</u>	<u>Total Licenses</u>
2001	23	41	64
2002	28	47	75
2003	21	53	74
2004	21	54	75
2005	20	55	75
2006	29	55	84
2007	29	50	79
2008	35	45	80
2009	37	43	80
2010	40	45	85

Table 2. Fishing effort and catch reported by charter boat operators fishing Indiana waters during 2010, by body of water fished

	<u>Anglers</u>	<u>Hours</u>	<u>Trips</u>	<u>BAS</u> ¹	<u>CFS</u> ¹	<u>CAP</u> ¹	<u>FWD</u> ¹	<u>LWF</u> ¹	<u>MUE</u> ¹	<u>NOP</u> ¹	<u>ROG</u> ¹	<u>SAT</u> ¹	<u>SUC</u> ¹	<u>SUN</u> ¹	<u>YEP</u> ¹	<u>TMP</u> ¹	<u>WAE</u> ¹
Brookville Reservoir	128	768	53	10	181	0	0	0	0	0	0	0	0	127	0	395	329
Elkhart River/ St. Joseph River	8	23	3	59	0	0	0	0	0	0	0	0	0	0	0	0	0
Geist Reservoir	23	136	10	0	56	0	0	0	0	0	0	0	0	26	0	0	0
Lake Michigan	2,657	15,240	589	342	0	3	99	1	0	0	20	4,282	0	0	7,274	0	0
Monroe Reservoir	368	2,392	131	95	20	0	0	0	0	0	0	0	0	4,528	0	1,062	13
Patoka Lake	186	897	58	140	24	0	0	0	0	0	0	0	0	3,668	0	20	1
Pigeon River	7	28	3	27	0	0	0	0	0	0	0	0	0	0	0	0	0
Pike Lake	7	47	2	8	1	0	0	0	0	1	0	0	0	10	0	0	15
Raccoon Lake	153	1,043	53	3	0	0	0	0	0	0	0	0	0	2	0	227	0
Sugar Creek	40	315	21	438	0	0	0	0	0	0	0	0	1	9	0	30	0
St. Joseph River	12	85	4	13	0	0	0	0	0	0	0	7	0	0	0	0	0
Tippecanoe River	37	311	20	456	15	0	0	0	0	2	0	0	0	1	0	20	31
Webster Lake Area	631	4,819	219	14	0	0	0	0	291	2	0	0	0	0	0	0	0
White River	160	1,144	62	1,664	3	0	0	0	0	0	0	0	0	232	0	63	0
TOTAL	4,417	27,248	1,228	3,269	300	3	99	1	291	5	20	4,289	1	8,603	7,274	1,817	389

¹BAS = Black Bass species; ¹CFS=Catfish species; ¹CAP=Common Carp; ¹FWD=Freshwater Drum; ¹LWF=Lake Whitefish; ¹MUE=Muskellunge; ¹NOP=Northern Pike
¹ROG=Round Goby; ¹SAT=Salmon and Trout species; ¹SUC=Sucker species; ¹SUN=Sunfish species; ¹YEP=Yellow Perch; ¹TMP=Temperature Bass species;
¹WAE=Walleye

Table 3. Salmonine harvest and fishing effort reported by charter boat operators targeting trout and salmon within Indiana waters of Lake Michigan during 2010.

	MONTH									
	<u>MAR.</u>	<u>APRIL</u>	<u>MAY</u>	<u>JUNE</u>	<u>JULY</u>	<u>AUG.</u>	<u>SEPT.</u>	<u>OCT.</u>	<u>NOV.</u>	TOTAL
<u>HARVEST</u>										
Coho	109	1,074	275	297	277	61	18	0	0	2,111
Chinook	0	60	186	116	413	87	26	0	1	889
Steelhead	0	40	36	64	340	84	5	0	2	571
Brown Trout	19	72	3	4	15	8	2	0	0	123
Lake Trout	2	17	163	45	101	19	4	0	13	364
TOTAL	130	1,263	663	526	1,146	259	55	0	16	4,058
<u>Angler-</u>										
Hours	366	3,002	1,816	1,427	3,523	1,033	506	0	269	11,942
Anglers	62	574	293	227	581	183	89	0	43	2,052
Trips	14	114	63	46	130	45	20	0	16	448

Table 4. Salmonine catch and fishing effort reported by charter boat operators targeting trout and salmon within Indiana waters of Lake Michigan, 2001 through 2010.

<u>Year</u>	<u>Coho</u>	<u>Chinook</u>	<u>Steel-head</u>	<u>Brown Trout</u>	<u>Lake Trout</u>	<u>Angler Hours</u>	<u>No. Anglers</u>	<u>Trips</u>
2001	10,129	675	305	272	192	19,295	3,576	744
2002	8,518	1,420	713	349	177	21,164	3,946	841
2003	8,777	818	889	176	63	22,201	4,000	862
2004	6,946	2,354	449	276	85	25,852	4,535	990
2005	3,697	1,371	453	286	68	18,449	3,229	703
2006	3,474	444	115	207	118	10,300	1,916	407
2007	2,196	476	245	287	434	11,143	2,019	415
2008	3,267	338	196	235	280	9,712	1,738	379
2009	5,845	666	141	81	306	12,259	2,138	447
2010	2,134	899	571	125	547	11,942	2,052	448
Five-year Average (’06 - ’10)	3,383	565	254	187	337	11,071	1,973	419
Ten-year Average	5,498	946	408	229	227	16,232	2,915	624

Table 5. Number of salmonine species released as reported by charter boat operators targeting trout and salmon within Indiana waters of Lake Michigan during 2010.

<u>SPECIES</u>	<u>MONTH</u>									<u>TOTAL</u>
	<u>MAR.</u>	<u>APRIL</u>	<u>MAY</u>	<u>JUNE</u>	<u>JULY</u>	<u>AUG.</u>	<u>SEPT.</u>	<u>OCT.</u>	<u>NOV.</u>	
Coho	0	22	1	0	0	0	0	0	0	23
Chinook	0	0	10	0	0	0	0	0	0	10
Steelhead	0	0	0	0	0	0	0	0	0	0
Brown Trout	0	2	0	0	0	0	0	0	0	2
Lake Trout	0	0	8	7	3	1	0	0	164	183
TOTAL	0	24	19	7	3	1	0	0	164	218

Table 6. Yellow perch harvest, number of yellow perch releases, and fishing effort reported by charter boat operators targeting yellow perch within Indiana waters of Lake Michigan during 2010.

	MONTH									
	<u>MAR.</u>	<u>APRIL</u>	<u>MAY</u>	<u>JUNE</u>	<u>JULY</u>	<u>AUG.</u>	<u>SEPT.</u>	<u>OCT.</u>	<u>NOV.</u>	TOTAL
<u>Yellow Perch</u>										
No. Harvested	0	1,549	143	427	1,881	496	0	0	590	5,086
No. Released	0	938	35	92	678	115	0	0	330	2,188
TOTAL	0	2,487	178	519	2,559	611	0	0	920	7,274
Angler-Hours	18	759	89	249	1,061	219	0	0	262	2,657
Anglers	6	157	17	44	210	36	0	0	49	519
Trips	1	30	4	12	41	8	0	0	9	105

Table 7. Weather variables and possible scores used in determining the mean daily weather conditions by month in the Lake Michigan creel survey, 2009 and 2010.

<u>Wind direction</u>		<u>Wave height</u>		<u>Air temperature</u>		<u>Cloud cover</u>	
Wind direction	Points	Feet	Points	Degrees F	Points		Points
N	1	0-3	4	below 20	1	Cloudy	3
NE	1	3-5	2	20 – 39	2	Clear	5
E	2	5+	1	40 – 59	3		
SE	4			60 – 80	4		
S	4			80+	3		
SW	3						
W	2						
NW	1						
<u>Wind speed</u>		<u>Precipitation</u>		<u>Composite</u>			
0 – 15	5	Yes	0	Scores		Ratings	
10 – 20	4	No	5	26 – 29		Perfect	
15 – 25	3			23 – 25		Good	
20 – 30	2			20 – 22		Fair	
30+	1			17 – 19		Mediocre	
				11 – 16		Poor	
				7 – 10		Atrocious	

Note: This subjective rating system gauges the effect of weather on angler effort, not angler success. Outstanding angler success does occur under inclement weather conditions, however, inclement weather generally results in light angler effort.

Table 8. Number of salmonine species stocked in Lake Michigan by Indiana Department of Natural Resources, 1998 through 2010.

<u>Year</u>	LAKE MICHIGAN				ST. JOSEPH RIVER		
	<u>Chinook Salmon</u>	<u>Coho Salmon</u>	<u>Steelhead Trout</u>	<u>Brown Trout</u>	<u>Chinook Salmon</u>	<u>Coho Salmon</u>	<u>Steelhead Trout</u>
1998	386,525	148,320	183,715	0	206,987	0	299,869
1999	264,608	146,882	319,082	0	150,811	0	252,491
2000	267,865	157,208	174,136	0	149,911	0	220,439
2001	297,195	157,048	297,971	0	153,520	0	293,475
2002	253,000	224,797	298,884	35,000	0	0	306,297
2003	232,395	233,248	309,134	40,400	0	0	282,857
2004	237,052	236,026	334,968	46,238	0	0	278,109
2005	251,281	237,009	645,576	36,371	0	0	287,471
2006 ¹	225,000	79,018	257,206	42,900	0	0	234,211
2007 ²	217,389	231,342	349,497	41,110	0	0	279,255
2008	215,770	248,667	295,489	22,446	0	0	276,511
2009	206,714	239,846	314,177	23,039	0	0	288,268
2010	232,789	243,296	305,163	35,053	0	8,890	261,007
Totals	3,287,583	2,582,707	4,084,998	322,557	661,229	8,890	3,560,260

¹Due to the shut-down and rehabilitation of Mixsawbah State Fish Hatchery in 2006, the coho salmon plantings were reduced by 60%; the spring release skamania steelhead were stocked in the fall of 2005 as fingerlings, Michigan steelhead (winter-run) were stocked in 2007 as yearlings instead of December 2006 as fingerlings; and the St. Joseph River fall steelhead plantings were reduced by approximately 40,000 fish to offset changes to the Trail Creek and Little Calumet steelhead stockings.

²Due to the shut-down and rehabilitation of Mixsawbah State Fish Hatchery in 2006, the spring release skamania steelhead were stocked in the fall of 2006 as fingerlings.

Lake Michigan (LM)
 Webster Lake area (WEB)
 Monroe Reservoir (MON)
 White River (WR)
 Raccoon Lake (RAC)
 Patoka Lake (PA)
 Brookville Reservoir (BR)
 Sugar Creek (SC)
 Geist Reservoir (GS)
 Tippecanoe River (TPR)

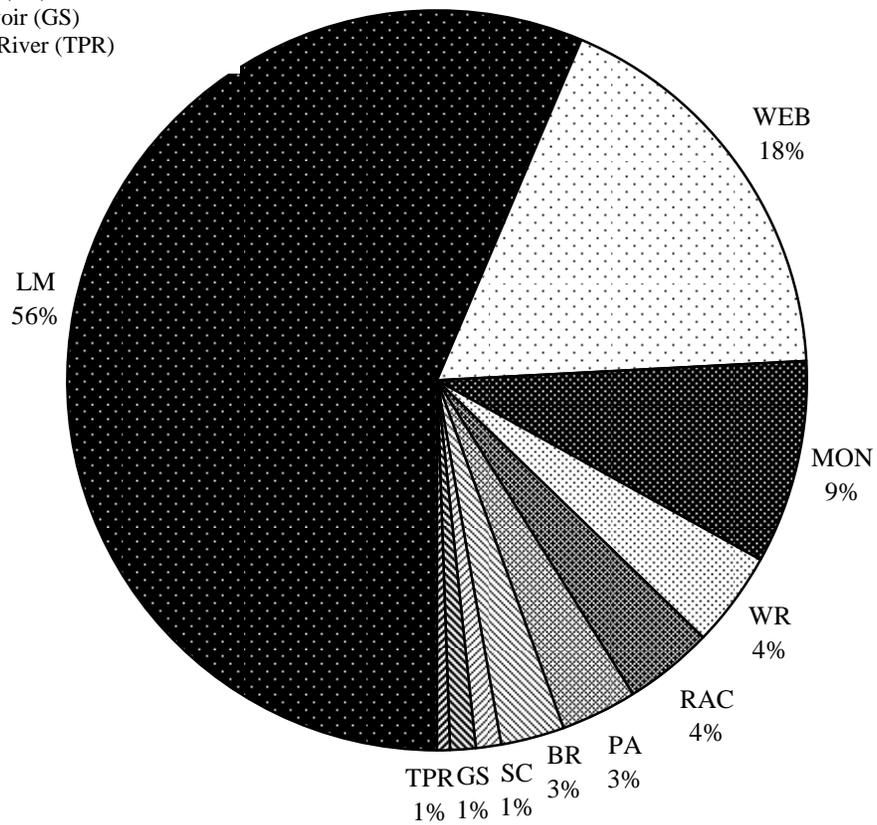
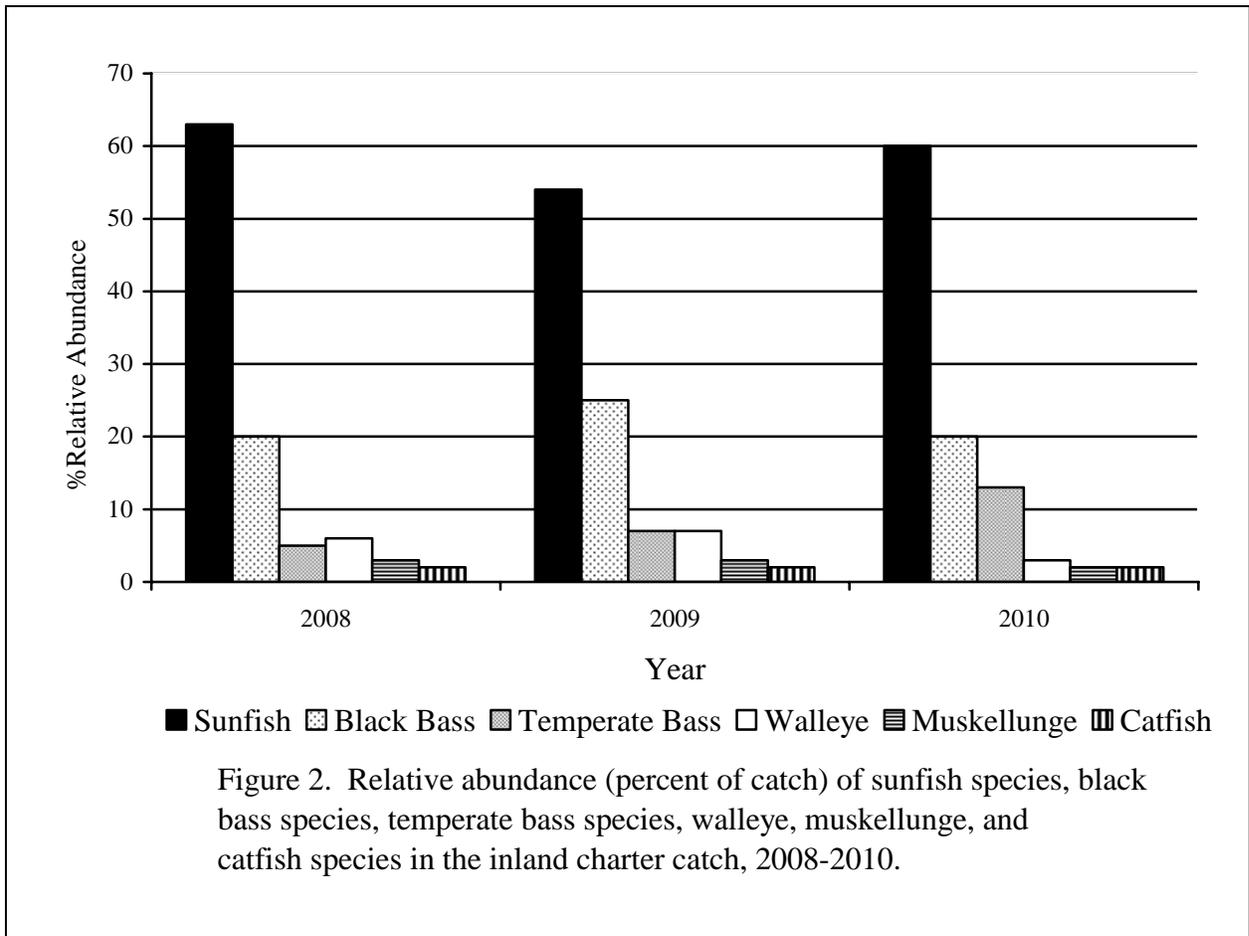


Figure 1. Total number of angler hours fished as reported by charter boat operators fishing Indiana State waters during 2010.



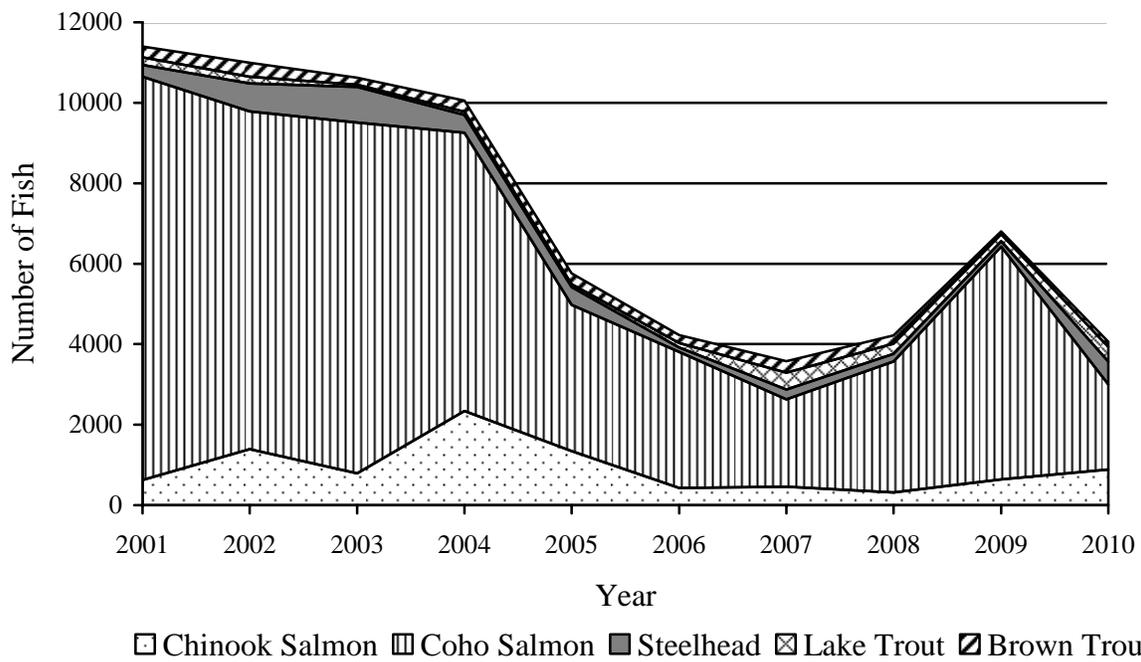


Figure 3. Salmonine harvest reported by charter boat operators targeting trout and salmon within Indiana waters of Lake Michigan, 2001 through 2010.

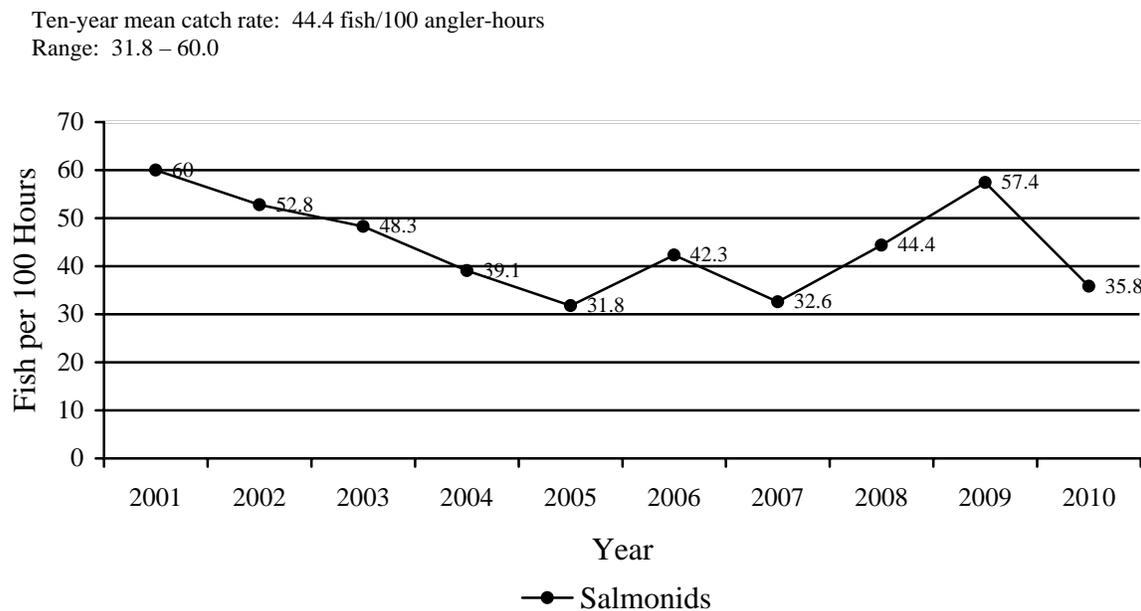


Figure 4. Charter catch rate for all salmonine species caught in Indiana waters of Lake Michigan from 2001 through 2010, based on directed effort.

Ten-year mean catch rate: 33.2 fish/100 angler-hours
Range: 17.9 – 52.5

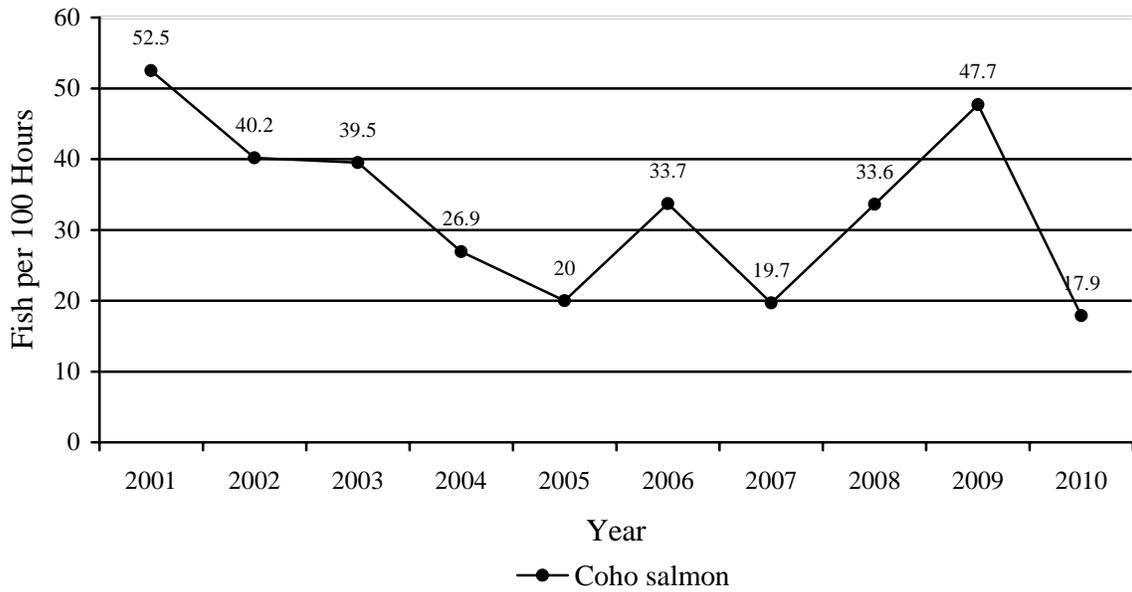


Figure 5. Charter catch rate for coho salmon in Indiana waters of Lake Michigan from 2001 through 2010, based on directed effort.

Ten-year mean catch rate: 5.5 fish/100 angler-hours
Range: 3.5 – 9.1

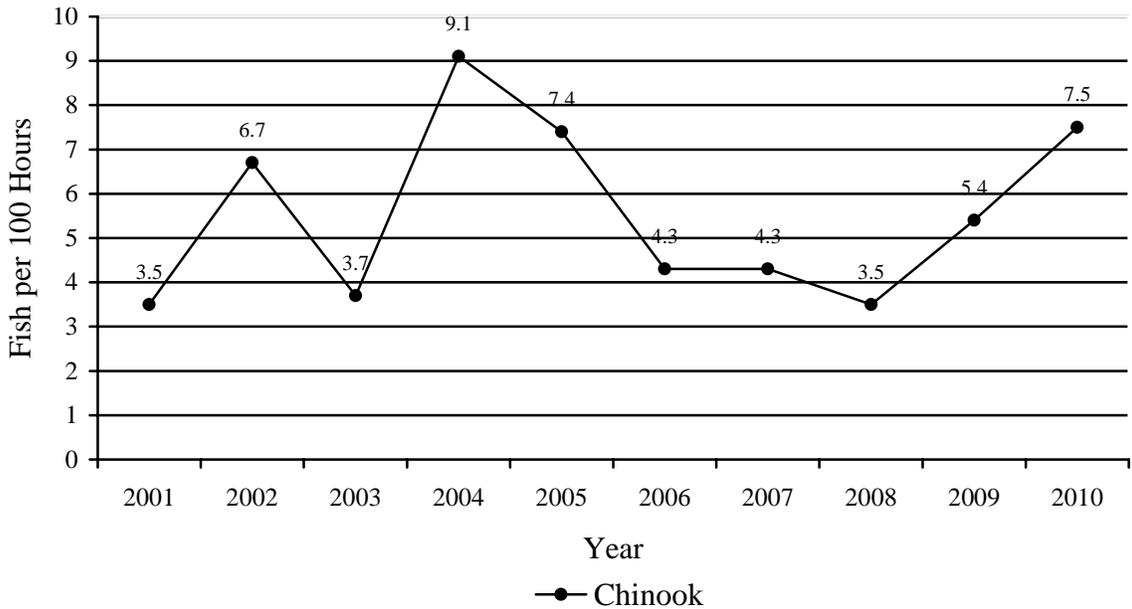


Figure 6. Charter catch rate for Chinook salmon in Indiana waters of Lake Michigan from 2001 through 2010, based on directed effort.

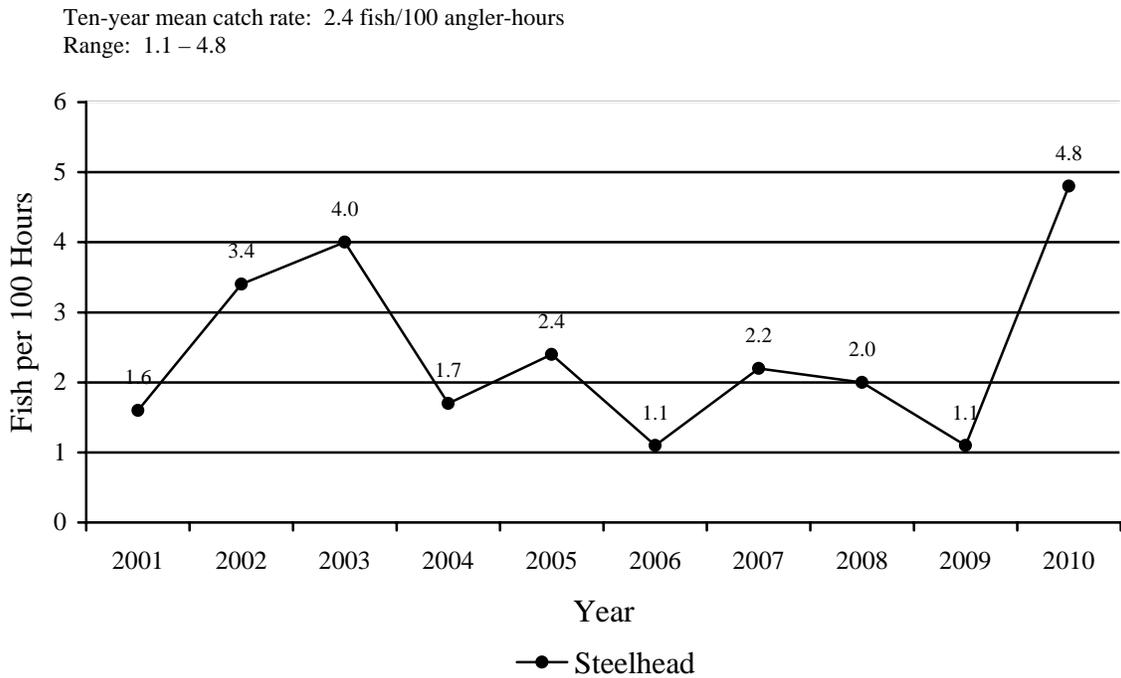


Figure 7. Charter catch rate for steelhead in Indiana waters of Lake Michigan from 2001 through 2010, based on directed effort.

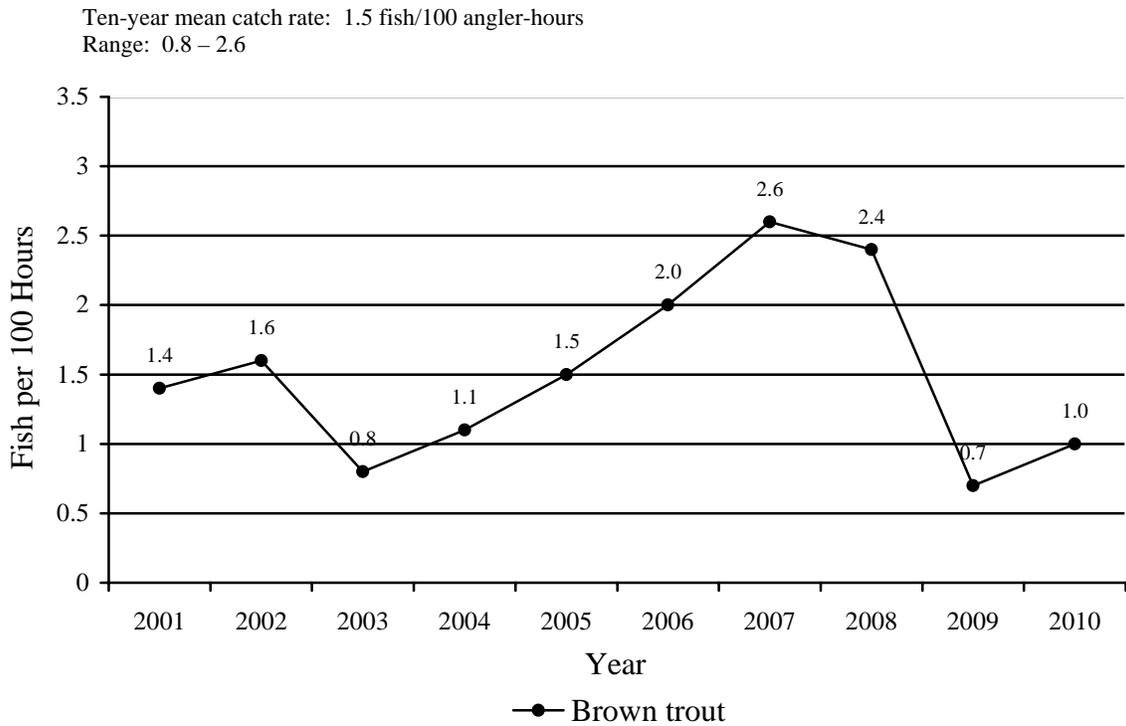


Figure 8. Charter catch rate for brown trout in Indiana waters of Lake Michigan from 2001 through 2010, based on directed effort.

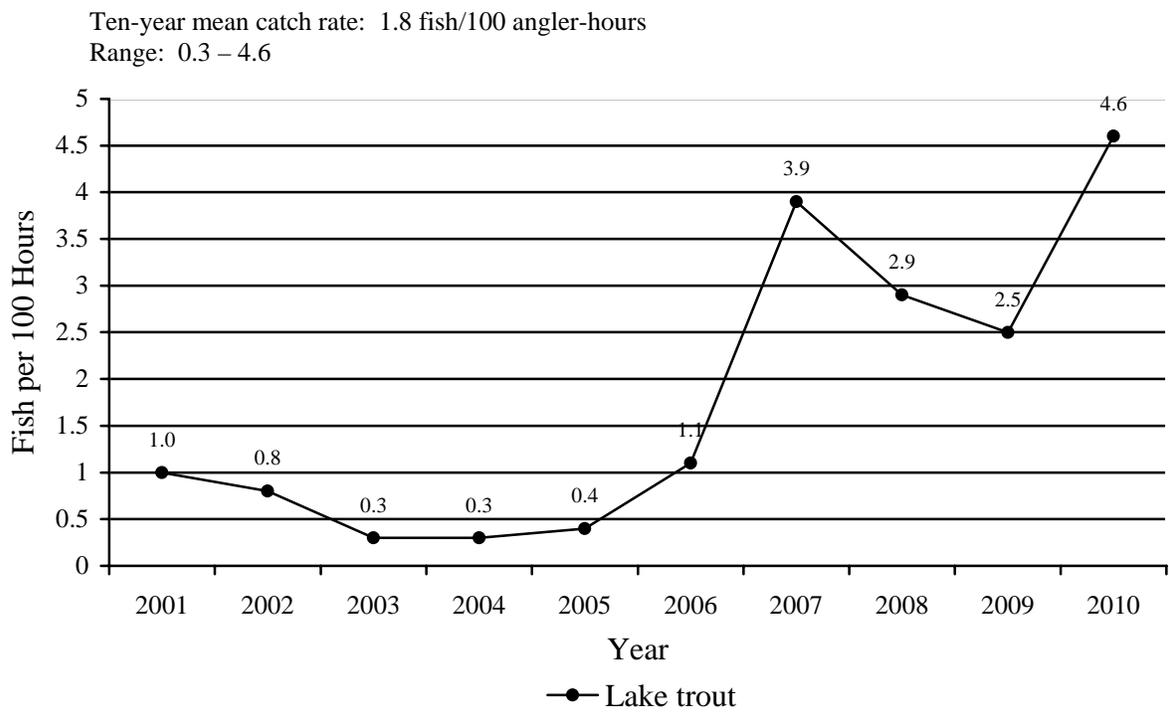


Figure 9. Charter catch rate for lake trout in Indiana waters of Lake Michigan from 2001 through 2010, based on directed effort.

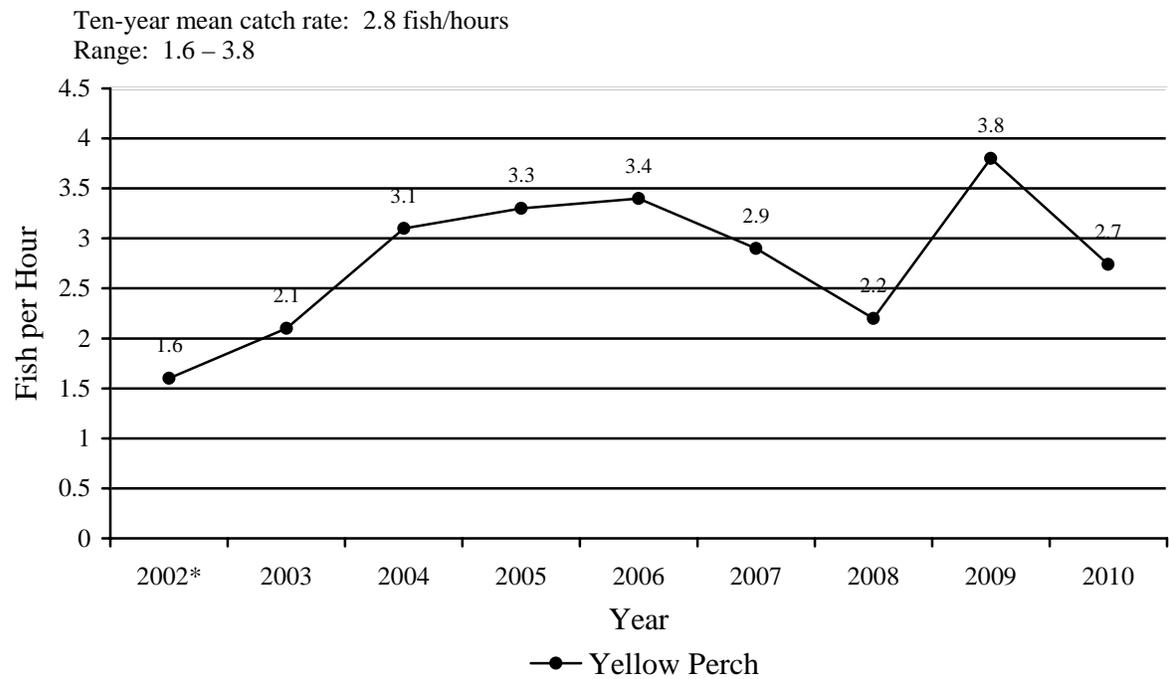


Figure 10. Charter catch rate for yellow perch in Indiana waters of Lake Michigan from 2002 through 2010, based on directed effort.

* Yellow perch charter catch rate data not available prior to 2002.

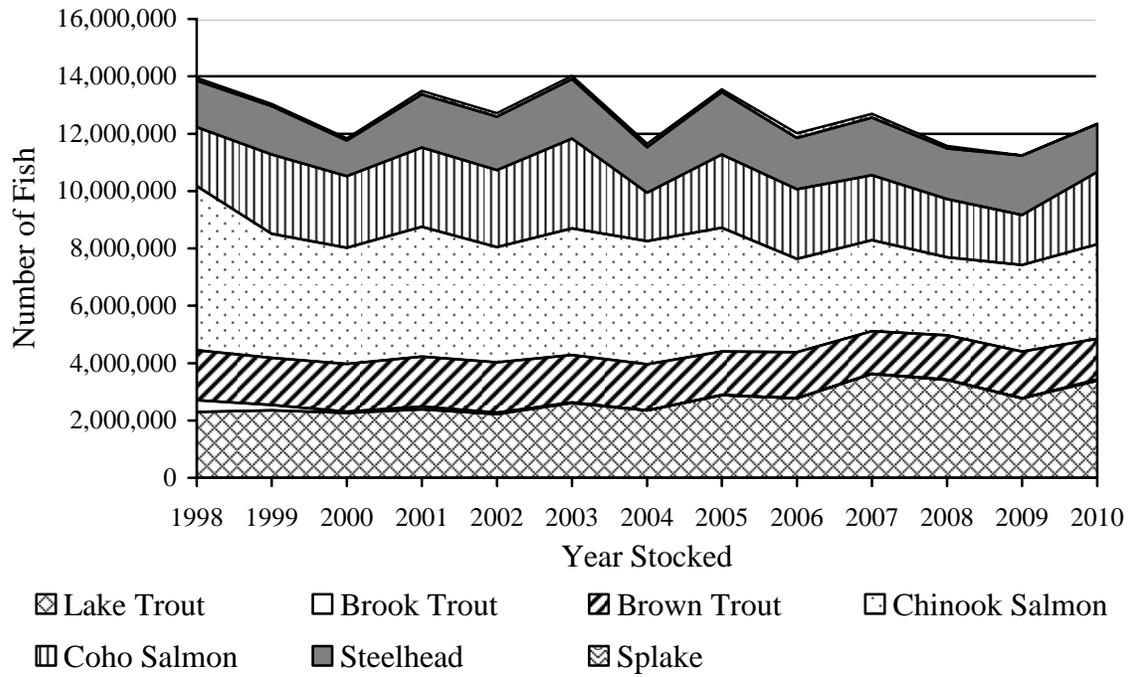


Figure 11. Number of salmonines stocked in Lake Michigan each year, 1998 through 2010.

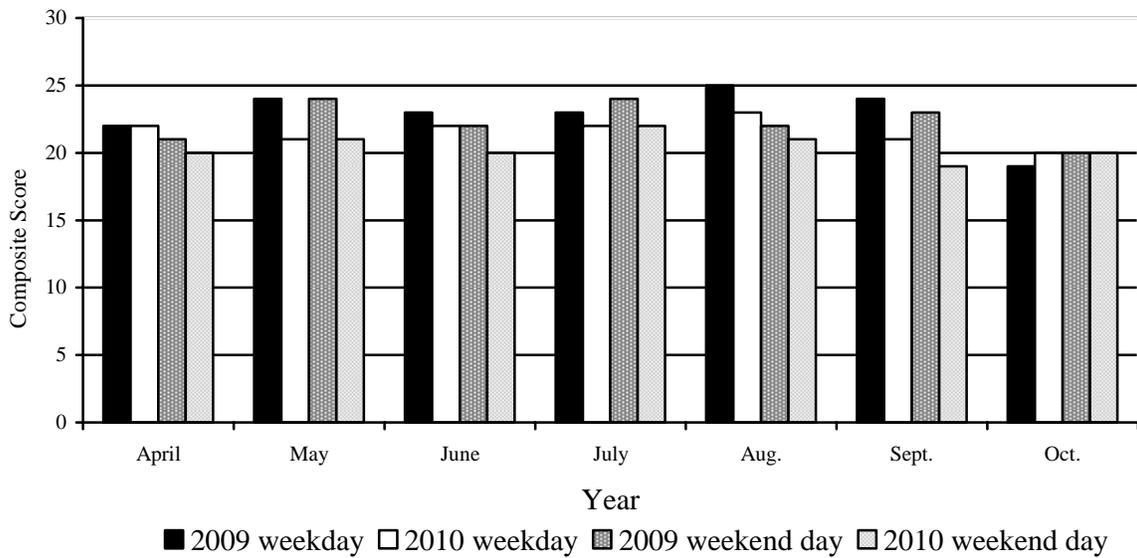


Figure 12. Mean daily weather scores by month from the Indiana Department of Natural Resources Lake Michigan creel survey, 2009 and 2010.

APPENDIX I

312 I.A.C. 9-7-17 Charter fishing boat operator's license

Authority: IC 14-22-2-6; IC 14-22-15

Affected: IC 14-22-15-4

Sec. 17. (a) An individual may not take another individual sport fishing for hire on:

- (1) Indiana waters;
- (2) waters containing state-owned fish; or
- (3) state boundary waters;

without a charter fishing boat operator's license issued by the director under IC 14-22-15-4 and this section.

(b) A license holder under this section shall, on a departmental form, keep legible and accurate daily fishing records of the:

- (1) species;
- (2) numbers, locations, and dates of fish taken; and
- (3) number of fishermen and hours fished;

while engaged in charter fishing. These daily records shall be recorded before the licensed fishing person departs the boat at the conclusion of the fishing trip.

(c) A license holder under this section shall, on a departmental form, prepare a monthly report of the information maintained on the daily fishing records. The monthly report shall be submitted to the director or the director's representative before the fifteenth day of each month following the month covered. The report shall be submitted each month regardless of whether charter fishing activity occurs in the month covered unless the license holder has submitted an Inactive License Form to signify that no fishing activity will take place for the remainder of the calendar year. The Inactive License Form shall be submitted to the director or the director's representative before the fifteenth day of the month following the month the license is deemed inactive.

(d) The director or the director's representative may, at any reasonable time, inspect the daily fishing records required under subsection (b) or IC 14-22-15-4. (*Natural Resources Commission; 312 IAC 9-7-17; filed May 12, 1997, 10:00 a.m.: 20 IR 2721; filed May 28, 1998, 5:14 p.m.: 21 IR 3723; filed Dec 26, 2001, 2:40 p.m.: 25 IR 1540; readopted filed Jul 28, 2003, 12:00 p.m.: 27 IR 286*)

INSTRUCTIONS FOR COMPLETING FORM
(numbers correspond to numbers on the reverse side)

1. TRIP DATE. Daily fishing trips shall be recorded before the licensed fishing person departs the boat at the conclusion of the charter boat fishing trip (see *administrative rule* 312 AC 9-7-17). Only trips for which all or part of the trip was conducted in **Indiana** waters need to be accounted for. Record the day of the month the fishing activity occurred. If more than one charter boat fishing trip occurs per day, record each trip on a separate line using the same trip date. For example, if you had 3 trips on April 17th, April 17th will occupy three separate lines.
2. NUMBER OF ANGLERS. Daily records shall include the number of anglers fishing in the chartered party. If the captain or first mate's license is used to fish additional poles for the trip or if their license is used for bag limits to count toward the catch, these should be included in the total number of anglers fishing on the boat.
3. LENGTH OF TRIP. Record the number of hours fished in **Indiana** waters. If only a portion of the total trip was conducted in Indiana waters, estimate the total hours that were actually fished in Indiana waters.
4. TOTAL HOURS FISHED. The total hours fished is arrived at by multiplying the number anglers times the hours fished in Indiana waters. For example, if 4 anglers fished 6 hours, the total hours fished is 24.
5. NUMBER OF FISH HARVESTED. Record only fish harvested while fishing in Indiana jurisdictional waters. Use "OTHER" columns for species not listed. **Indicate** what those species are and the **number** harvested in the appropriate boxes. Use the fish abbreviation codes listed. If a code is **not** listed, use the comments box to define the species. For example, if 2 smallmouth bass, 3 largemouth bass and 5 channel catfish were harvested, the fish would be recorded as 2SMB/3LMB in the black bass harvested column and 5CHC in the catfish harvested column.

Black Bass: smallmouth bass (SMB)
 largemouth bass (LMB)

Northern Pike / Muskellunge: northern pike (NOP)
 muskie (MUE)

Temperate Bass: white bass (WHB)
 striped bass (STB)
 hybrid striped bass or wiper (HSB)

Walleye / Sauger: walleye (WAE)
 sauger (SAE)

OTHER: carp (CAP)
 freshwater drum (FWD)
 sunfish family (SUN): includes bluegill, crappie, green sunfish, longear sunfish, pumpkinseed, redear, rock bass, warmouth, etc.

6. NUMBER OF FISH RELEASED. Record only fish that were landed but then released while fishing in Indiana jurisdictional waters. Use "OTHER" columns for species not listed. **Indicate** WHAT those species are and the **number** released in the appropriate box. Use the fish abbreviation codes listed above. If a code is **not** listed, use the comments box to define the species. For example, if 3 walleye, 10 crappie and 2 bluegill were released, the fish would be recorded as 3WAE in the walleye/sauger released column and 12SUN in the other released column.
7. SIGNATURE OF CHARTER OPERATOR. Sign and date the form. Forms must be submitted monthly, even if no fishing activity occurred. Reports are due in the Fish and Wildlife's Michigan City office on or before the 15th of the month following the report month.

NOTE: Return the original copy (*white*) to the Michigan City address displayed below. This report is due in the Division's Michigan City office on or before the 15th of the month following the report month. At any time you may place your license into inactive status by completing an Inactive Report form. Once your license becomes inactive it may not be used for the remainder of the year.

Return to:
Lake Michigan HQT
100 West Water Street
Michigan City, IN 46360-1310

