

INTERIM STUDY REPORT

State: Michigan

Project No.: F-81-R-2

Study No.: 462

Title: Charter boat catch and effort from Michigan waters of the Great Lakes

Period Covered: April 1, 1997 to September 30, 2001

Study Objective: To obtain a continuous annual record of fishing effort as well as the number, type, and location of fish caught by charter boat anglers in Michigan waters of the Great Lakes.

Summary: This report will present results for the 2000 season as well as historical data. Similar data are being collected for the 2001 season; these will be summarized in next year's progress report.

Charter boat catch reporting data forms, grid maps of the Great Lakes, and instructions were sent to charter fishing operators prior to the 2000 and 2001 angling seasons. Completed data forms were returned to the Charlevoix Fisheries Research Station and entered into the computer throughout the year. Charter fishing operators who were delinquent with their reports were notified on a regular basis throughout the season via post card or certified mail. By the end of the 2000 season, data were compiled on 18,077 charter fishing excursions. Ninety-seven percent of all charter operators complied with the reporting requirements. In addition, an observation program conducted at eight Lake Michigan ports during the 2000 season indicated that a high percentage (75%) of boat excursions made by charter captains were reported to MDNR. A report was prepared which summarized the results by lake. This was mailed to all charter operators during March 2001.

Analysis of mean annual catch rates (April through October) from the Great Lakes Creel Survey (Study 427) and from the charter reporting program indicated that catch rates were significantly ($P < 0.05$) correlated for chinook salmon, rainbow trout, and lake trout on both lakes Michigan and Huron.

Charter boat catch data from the 2001 fishing season is currently being entered into the database.

Job 1. Title: Distribute data forms.

Findings: Reporting forms and grid maps of the Great Lakes were mailed to 508 charter operators during March, 2000. Charter operators were informed that they were required by law to complete the form each time they fished. The form was to be mailed by the tenth day of the following month to the Michigan Department of Natural Resources (MDNR), Charlevoix Fisheries Research Station.

During March 2001, reporting materials were mailed to 500 charter operators.

Job 2. Title: Data entry and compliance.

Findings: Completed data forms received at the Charlevoix Fisheries Research Station were logged, coded by port fished, and entered into the computer. Catch and effort data on 18,077 charter fishing excursions were recorded for the 2000 season. Incomplete forms received were logged and

returned to the charter operator explaining the reason the report was returned and requesting completion. Data entry continues at this time for the 2001 season.

Each month (June through October) post-card notices were sent to charter operators who had not filed a report for the previous month. Two notices were sent each month, the first after an operator was delinquent for 10 days and the second after 30 days.

In December 2000, letters were sent via certified mail to operators who had not filed reports for one or more months during May through September for the 2000 season. The letter informed the operator that this would be the last notice he or she would receive. If the recipient did not respond in writing within 14 days his or her name would be submitted to MDNR's Law Enforcement Division recommending non-issuance of an inspection certificate for the 2000 season. A list of 12 names of charter operators who had not complied with the reporting requirements was sent to MDNR's Law Enforcement Division in January 2001.

During 2000, an average of 38% of charter operators had not filed their monthly reports within 10 days after the date they were due. An average of 21% of all operators were delinquent for at least 30 days. The monthly average rate of non-compliance during 2000 was slightly greater than 1999. However, by end of December 2000, 97% of all charter operators had complied with the law. The final compliance rate for 2000 was the same as 1999.

MDNR has always tried to insure that the charter data are being reported in a timely manner. Charter operators have always been sent post card notices when their monthly reports were delinquent and letters via certified mail at the end of the season. These reminders have proven very useful. The final compliance rate during 1990-2000 ranged from 92-98% and averaged 96% per year.

During June through September 2000, the project biologist used MDNR personnel from the Great Lakes Creel Survey Program (Study 427) to observe charter boat activity at eight selected ports (Leland, Glen Arbor, Frankfort, Onkama, Manistee, Ludington, Pentwater and Whitehall) on Lake Michigan. These ports accounted for 44% of the charter excursions that occurred on Lake Michigan during this time period. The objective of the observation program was to determine how well fishing effort (charter excursions) was being reported by charter operators. MDNR personnel were asked to record data on a form (Charter Boat Observation Form) that included fields for: date, time, port, captain's name, business name, and boat name (Figure 1). Space was also provided on the form for comments. The observations on charter boat activity were then cross-checked against the data in the charter boat harvest and effort database to determine whether those excursions were reported by the captains.

A total of 506 observations were made at all ports combined during June-September 2000 (Table 1). Seventy-five percent of those trips were contained in the charter boat database. The percentage agreement between ports was very similar, with the greatest agreement occurring at Whitehall/Pentwater followed by Frankfort/Onkama. However, the number of observations made at Whitehall/Pentwater (15) were not comparable to the other locations.

The combined port agreement rate of 75% is considered quite good by the project biologist, considering the following facts. Charter captains are not required to report trips for which money does not change hands. Many charter operators use their boats for personal use as well as business use. It is quite probable that many of the trips that were not found in the database were "fun trips" with family or friends. In addition, a number of captains are in the charter fishing business to help "write off" a large boat, which they might not be able to afford if they used it strictly for their own

pleasure fishing trips. These captains run relatively few "paying trips" each year. Also, when an observation was not found in the database, it was not uncommon to find a reported charter fishing trip in the database for the following day. On these occasions, charter captains could have been simply trying to find productive fishing depths or lures for the "paying trip" which was to occur the next day.

In reviewing these observations, we found most charter operators to have very good agreement between observed and reported trips; a minority of others did not. Therefore, these observations can be used by MDNR's Law Enforcement Division to target their efforts toward specific operators or toward operators who may be running illegal, non-inspected charter boats.

Job 3. Title: Quality control and education.

Findings: Presentations regarding the results and importance of the charter boat reporting program were made at several charter boat workshops held across Michigan during the winter months of 2001. The workshops were organized by the Michigan State University Extension Service (Sea Grant). The presentations stressed the need for accurate and timely information from charter operators. Adequate time was allowed at the end of each session for the project biologist to field questions from charter captains. In addition, presentations were made to various sportsmen's clubs and to other stakeholders, such as Watershed District workshops, regarding the results and trends noted in the charter boat data.

Several field trips were made by the project biologist during the 2000 and 2001 fishing seasons to various ports on lakes Michigan and Huron. The objectives of these trips were to promote the reporting program and talk informally to charter captains.

Job 4. Title: Compile data and write annual reports.

Findings: Charter boat operators submitted reports on a total of 18,077 charter excursions that took place during 2000. The majority of charter excursions (17,140) took place on the Great Lakes. Data from Great Lakes excursions were compiled and summarized by lake (Tables 2 through 6), and presented in a report titled *Charter Boat Catch and Effort from the Michigan Waters of the Great Lakes, 2000*. Copies of this report, as mandated by law, were mailed to all charter operators during March 2001 along with reporting forms to be used in 2001 and grid maps of the Great Lakes. The remaining charter excursions (5%) took place on tributaries to the Great Lakes.

Charter anglers spent 472,488 hours fishing Michigan's waters of the Great Lakes in 2000. The total catch was 58,673 yellow perch, 48,801 chinook salmon, 47,173 walleye, 32,559 lake trout, 19,336 coho salmon, 10,800 rainbow trout, and 4,285 brown trout.

In addition to the annual report which was sent to charter fishing operators, a MDNR Fisheries Technical Report titled *Charter boat catch and effort from the Michigan waters of the Great Lakes 1999* was completed during 2001 (Rakoczy and Wesander-Russell 2001).

Job 5. Title: Analyze data series.

Findings: One of the most important ways to employ the charter boat data is for determining trends that may be present in the salmonine fisheries on lakes Michigan, Huron, and Superior, or in the

yellow perch and walleye fisheries on lakes Huron, St. Clair, and Erie. For example, the chinook salmon catch rate data showed the improvement of the Lake Michigan fishery since 1995 (Table 7). On Lake Huron, catch rates for chinook salmon began to improve during 1993 and peaked during 1997. While the catch rates for chinook salmon on Lake Huron have declined somewhat since 1997, they still are above the ten year (1990-99) average of 11.4 fish per 100 angler hours. Another example of the importance of these data series is the information they provide on lake trout catch rates for Lake Superior. Lack of a trend here indicated the continued health of that fishery (Table 7). Recent catch rates for yellow perch and walleye on Lake Erie were slightly above their ten-year average of 52.2 and 80.2 fish per 100 angler hours, respectively (Table 8).

Since the inception of the charter catch reporting program, charter operators have reported the numbers of sea lamprey observed attached to chinook salmon and lake trout. Historically, incidence rates (number of sea lamprey per 100 fish) of attached sea lamprey have been much higher on Lake Huron than the other Great Lakes (Table 9). No trends in attachment rates on lakes Michigan and Superior for chinook salmon or lake trout were evident. The Lake Superior charter fishery harvests few chinook salmon and therefore incidence rates for chinook are probably not significant. In general, rates of sea lamprey attachments have declined since 1990 for chinook salmon on Lake Huron.

Providing for timely reporting of charter catch and effort is important, however providing for accuracy is another matter. One way to test the accuracy of the charter reporting program is to compare it to an independent data set, such as the Great Lakes creel survey (Study 427), that has been collected during the same time period. Catch rates for major species on the Great Lakes should show the same annual trends in both data sets. Correlation analysis of mean annual catch rates (April through October) from the creel survey and from the charter reporting program indicate that catch rates were positively ($P < 0.05$) correlated for chinook salmon, rainbow trout, and lake trout on both lakes Michigan and Huron (Table 10). Catch rates for coho salmon correlated significantly on Lake Michigan but not on Lake Huron. The reason for this could be that coho salmon are not a significant part of the Lake Huron sport fishery. Fewer than 500 coho salmon were harvested by Lake Huron charters during 2000 (Table 3), while over 18,000 were harvested by the Lake Michigan charter fishery (Table 2).

Walleye catch rates for charter and sport anglers on Lake Erie (May through July) were not correlated (Table 10). This fishery is quite different than the salmonine fisheries on the other Great Lakes. Many charter operators only fish for walleye for 1-2 months before moving their boats to other lakes to fish for salmonines. Also, many Lake Erie fishing trips (charter and non-charter) originate at a Michigan port, but the actual fishing occurs outside the State's waters in the State of Ohio or in the Province of Ontario, Canada. Charter captains do not report these trips since the harvest does not come from Michigan waters.

Literature Cited:

Rakoczy G.P and D. Wesander-Russell. 2001. Charter boat catch and effort from the Michigan waters of the Great Lakes, 1999. Michigan Department of Natural Resources, Fisheries Technical Report, Ann Arbor.

Prepared by: Gerald P. Rakoczy

Dated: September 30, 2001

Charter Boat Observation Form

Date	Time	Port	Captain's Name	Business Name	Boat Name	Comments

Figure 1.-Charter boat observation form.

Table 1.—Number of charter trips observed by MDNR personnel at select Lake Michigan ports, and the number and percentage of those trips reported by charter operators, June through September 2000.

Area	Total number of trips observed	Number of trips on catch reports	Percentage agreement
Leland/Glen Arbor	146	110	75%
Frankfort/Onkama	134	104	77%
Manistee/Ludington	211	157	74%
Pentwater/Whitehall	15	12	80%
Total	506	383	75%

Table 2.—Total catch per hour, catch per excursion, number caught, and fishing effort (angler hours, trips, and charter excursions) for charter boats on Lake Michigan, 2000.

Species	Total catch per hour	Total catch per excursion	Month							Season
			Apr	May	Jun	Jul	Aug	Sep	Oct	
Coho salmon	0.057	1.604	1,567	3,280	3,055	2,699	5,444	2,692	48	18,785
Chinook salmon	0.124	3.505	459	4,685	4,542	11,495	15,956	3,844	76	41,057
Rainbow trout	0.030	0.848	574	771	1,491	3,019	2,809	721	553	9,938
Brown trout	0.013	0.355	1,053	607	554	1,028	790	117	11	4,160
Lake trout	0.060	1.684	23	2,601	3,346	6,425	6,793	537	0	19,725
Yellow perch	0.073	2.079	5,642	764	2,650	4,619	9,186	1,492	2	24,355
Walleye	0.005	0.138	2	163	390	273	296	144	346	1,614
Other	0.002	0.052	13	31	342	130	42	35	13	606
Lamprey on:										
Chinook salmon			4	10	14	80	63	8	0	179
Lake trout			2	28	42	98	86	9	0	265
Angler hours			15,204	35,564	45,966	84,903	111,003	32,238	6,534	331,411
Angler trips			2,718	5,888	7,539	14,236	18,270	5,581	918	55,150
Anglers										
Resident			2,099	3,796	5,198	10,106	13,549	4,018	356	39,122
Nonresident			624	2,092	2,341	4,130	4,728	1,563	562	16,040
Charter excursions			375	1,139	1,577	2,983	4,065	1,312	263	11,714

Table 3.—Total catch per hour, catch per excursion, number caught, and fishing effort (angler hours, trips, and charter excursions) for charter boats on Lake Huron, 2000.

Species	Total catch per hour	Total catch per excursion	Month							Season
			Apr	May	Jun	Jul	Aug	Sep	Oct	
Coho salmon	0.006	0.146	4	195	84	63	53	4	0	403
Chinook salmon	0.121	2.774	18	572	1,005	2,395	3,117	543	5	7,655
Rainbow trout	0.013	0.302	38	120	96	242	301	37	0	834
Brown trout	0.002	0.044	3	6	18	36	41	17	0	121
Lake trout	0.128	2.929	3	1,302	1,832	2,246	2,539	161	0	8,083
Yellow perch	0.039	0.899	0	0	164	723	1,062	531	0	2,480
Walleye	0.042	0.962	0	29	98	1,742	766	19	0	2,654
Other	0.008	0.186	0	17	68	215	188	25	0	513
Lamprey on:										
Chinook salmon			1	29	75	208	237	12	0	562
Lake trout			0	33	27	59	57	3	0	179
Angler hours			659	6,251	9,611	20,466	21,651	4,462	40	63,140
Angler trips			113	1,093	1,658	3,553	3,790	819	5	11,031
Anglers										
Resident			92	1,053	1,403	3,097	3,227	753	5	9,630
Nonresident			21	40	255	456	563	66	0	1,401
Charter excursions			36	268	406	895	954	198	3	2,760

Table 4.—Total catch per hour, catch per excursion, number caught, and fishing effort (angler hours, trips, and charter excursions) for charter boats on Lake Erie, 2000.

Species	Total catch per hour	Total catch per excursion	Month							Season
			Apr	May	Jun	Jul	Aug	Sep	Oct	
Coho salmon	0.000	0.000	0	0	0	0	0	0	0	0
Chinook salmon	0.000	0.000	0	0	0	0	0	0	0	0
Rainbow trout	0.000	0.004	0	0	4	3	0	0	0	7
Brown trout	0.000	0.000	0	0	0	0	0	0	0	0
Lake trout	0.000	0.001	0	0	0	1	0	0	0	1
Yellow perch	0.535	14.830	0	287	729	259	9,703	11,872	4,378	27,228
Walleye	0.829	22.994	249	3,081	17,754	16,983	3,533	617	0	42,217
Other	0.033	0.915	82	379	787	333	68	31	0	1,680
Lamprey on:										
Chinook salmon			0	0	0	0	0	0	0	0
Lake trout			0	0	0	0	0	0	0	0
Angler hours			522	5,286	22,475	14,212	4,859	2,659	924	50,936
Angler trips			53	904	3,913	2,510	918	497	187	8,982
Anglers										
Resident			35	744	3,431	2,187	845	471	173	7,886
Nonresident			18	160	482	323	73	26	14	1,096
Charter excursions			18	195	787	515	188	94	39	1,836

Table 5.—Total catch per hour, catch per excursion, number caught, and fishing effort (angler hours, trips, and charter excursions) for charter boats on Lake Superior, 2000.

Species	Total catch per hour	Total catch per excursion	Month							Season
			Apr	May	Jun	Jul	Aug	Sep	Oct	
Coho salmon	0.008	0.307	0	5	81	35	11	16	0	148
Chinook salmon	0.005	0.183	0	2	4	6	5	71	0	88
Rainbow trout	0.001	0.044	0	1	11	2	2	5	0	21
Brown trout	0.000	0.008	0	0	1	2	1	0	0	4
Lake trout	0.272	9.855	0	129	1,057	1,795	1,425	334	10	4,750
Yellow perch	0.000	0.000	0	0	0	0	0	0	0	0
Walleye	0.000	0.000	0	0	0	0	0	0	0	0
Other	0.000	0.017	0	0	0	0	0	8	0	8
Lamprey on:										
Chinook salmon			0	0	0	0	0	1	0	1
Lake trout			0	0	4	10	4	0	0	18
Angler hours			0	405	3,937	6,720	4,915	1,453	36	17,464
Angler trips			0	53	479	883	637	233	6	2,291
Anglers										
Resident			0	39	269	420	255	120	6	1,109
Nonresident			0	14	210	463	382	113	0	1,182
Charter excursions			0	12	90	180	138	61	1	482

Table 6.—Total catch per hour, catch per excursion, number caught, and fishing effort (angler hours, trips, and charter excursions) for charter boats on Lake St. Clair and the St. Clair River, 2000.

Species	Total catch per hour	Total catch per excursion	Month							Season
			Apr	May	Jun	Jul	Aug	Sep	Oct	
Coho salmon	0.000	0.000	0	0	0	0	0	0	0	0
Chinook salmon	0.000	0.003	0	0	0	0	0	1	0	1
Rainbow trout	0.000	0.000	0	0	0	0	0	0	0	0
Brown trout	0.000	0.000	0	0	0	0	0	0	0	0
Lake trout	0.000	0.000	0	0	0	0	0	0	0	0
Yellow perch	0.483	13.247	0	138	1,362	684	790	735	901	4,610
Walleye	0.072	1.977	0	60	134	306	154	34	0	688
Other	0.439	12.037	0	167	789	1,338	1,166	634	95	4,189
Lamprey on:										
Chinook salmon			0	0	0	0	0	0	0	0
Lake trout			0	0	0	1	0	0	0	1
Angler hours			0	449	1,909	2,713	2,328	1,464	675	9,537
Angler trips			0	107	320	437	354	220	95	1,533
Anglers										
Resident			0	107	312	400	335	217	88	1,459
Nonresident			0	0	8	37	19	6	7	77
Charter excursions			0	20	76	99	82	50	21	348

Table 7.—Catch rates (fish per 100 angler hours) by charter anglers for salmonines on lakes Michigan, Huron, and Superior during 1990-2000.

Species	Year										
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Michigan											
Coho salmon	3.9	2.8	3.4	4.5	2.6	2.2	2.9	3.8	4.8	3.4	5.7
Chinook salmon	7.4	7.0	4.9	4.0	4.0	5.0	9.0	9.6	8.1	8.9	12.4
Rainbow trout	4.0	7.2	6.5	5.0	5.2	3.0	6.3	4.8	4.0	3.4	3.0
Brown trout	0.6	0.8	0.4	0.7	1.1	0.7	1.1	1.5	0.6	0.7	1.3
Lake trout	8.4	8.7	7.6	9.7	10.4	10.2	7.5	7.2	9.4	6.2	6.0
Huron											
Coho salmon	0.2	0.2	0.2	0.3	0.3	0.1	0.4	0.2	0.4	0.9	0.6
Chinook salmon	6.0	6.4	6.4	7.2	8.3	11.7	11.8	18.5	16.1	15.7	12.1
Rainbow trout	0.3	0.6	0.7	1.4	1.3	2.6	2.6	2.0	1.3	1.3	1.3
Brown trout	0.1	0.2	0.7	1.7	2.1	1.9	0.8	0.4	0.6	0.2	0.2
Lake trout	9.8	7.9	6.6	4.3	6.3	6.6	9.4	9.8	12.6	11.7	12.8
Superior											
Coho salmon	1.2	3.2	1.3	1.0	1.6	1.7	1.9	1.1	0.7	2.3	0.8
Chinook salmon	0.3	0.4	0.3	0.3	0.1	0.2	0.3	0.1	0.7	0.6	0.5
Rainbow trout	0.3	0.3	0.1	0.2	0.3	0.3	0.3	0.3	0.2	0.3	0.1
Brown trout	0.1	0.2	0.1	0.0	0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1
Lake trout	28.5	27.9	25.5	28.2	25.3	26.2	28.5	26.9	25.2	26.3	27.2

Table 8.—Catch rates (fish per 100 angler hours) by charter anglers for yellow perch and walleye on lakes Huron, St. Clair, and Erie during 1990-2000.

Species	Year										
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Huron											
Yellow perch	9.2	7.4	6.3	4.0	4.9	3.7	2.8	1.6	2.5	8.4	3.9
Walleye	5.1	7.1	6.7	7.4	6.7	3.5	3.4	3.0	3.7	3.4	4.2
St. Clair											
Yellow perch	13.8	16.8	15.1	40.4	85.5	66.9	100.3	103.3	42.9	41.3	48.3
Walleye	32.4	20.4	12.5	18.4	12.3	15.5	12.3	13.1	16.1	16.3	7.2
Erie											
Yellow perch	29.4	34.1	43.3	43.9	28.7	51.7	78.4	74.6	70.4	67.2	53.5
Walleye	74.5	62.8	78.5	81.4	69.6	82.4	82.2	83.9	106.7	80.0	82.9

Table 9.—Sea lamprey incidence (lamprey per 100 fish) for chinook salmon and lake trout harvested by the charter fishery in the Michigan waters of the Great Lakes, 1990-2000.

Species/Year	Lake		
	Michigan	Huron	Superior
Chinook salmon			
1990	0.5	18.6	0.0
1991	0.3	13.9	8.0
1992	0.2	13.6	0.0
1993	0.1	7.6	0.0
1994	0.3	7.1	0.0
1995	0.3	6.2	3.0
1996	0.1	3.9	0.0
1997	0.2	4.7	0.0
1998	0.4	5.2	0.0
1999	0.2	4.6	0.0
2000	0.4	7.3	1.1
Lake trout			
1990	1.8	6.6	1.8
1991	1.2	5.7	1.6
1992	0.8	4.6	0.8
1993	0.6	2.1	0.5
1994	0.6	3.3	1.1
1995	1.0	2.7	0.7
1996	0.7	1.9	1.0
1997	1.1	3.0	0.6
1998	1.1	2.1	0.5
1999	1.2	1.8	0.5
2000	1.3	2.2	0.4

Table 10.—Pearson correlation coefficients (r) of charter and creel survey catch rates for various species on lakes Michigan, Huron and Erie, 1990-2000. P<0.05 determined significance.

Species	Lake		
	Michigan ¹	Huron ²	Erie ³
Chinook salmon			
r	0.983	0.943	
P	0.000	0.000	
Coho salmon			
r	0.855	0.522	
P	0.001	0.122	
Rainbow trout			
r	0.813	0.949	
P	0.002	0.000	
Lake trout			
r	0.807	0.757	
P	0.003	0.011	
Walleye			-0.301
r			0.368
P			

¹ Analysis included the Lake Michigan ports of St. Joseph/Benton Harbor, Grand Haven, Muskegon, Ludington, Manistee and Frankfort/Elberta during April through October, 1990-2000.

² Analysis included the Lake Huron ports of Rogers City, Rockport, Alpena, Harrisville, Oscoda and the area from Eagle Bay to Harbor Beach during April through October, 1991-2000. Creel sampling did not cover all of the included ports during 1990.

³ Analysis used May through July data.