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FISHERIES DIVISION

TECHNICAL REPORT

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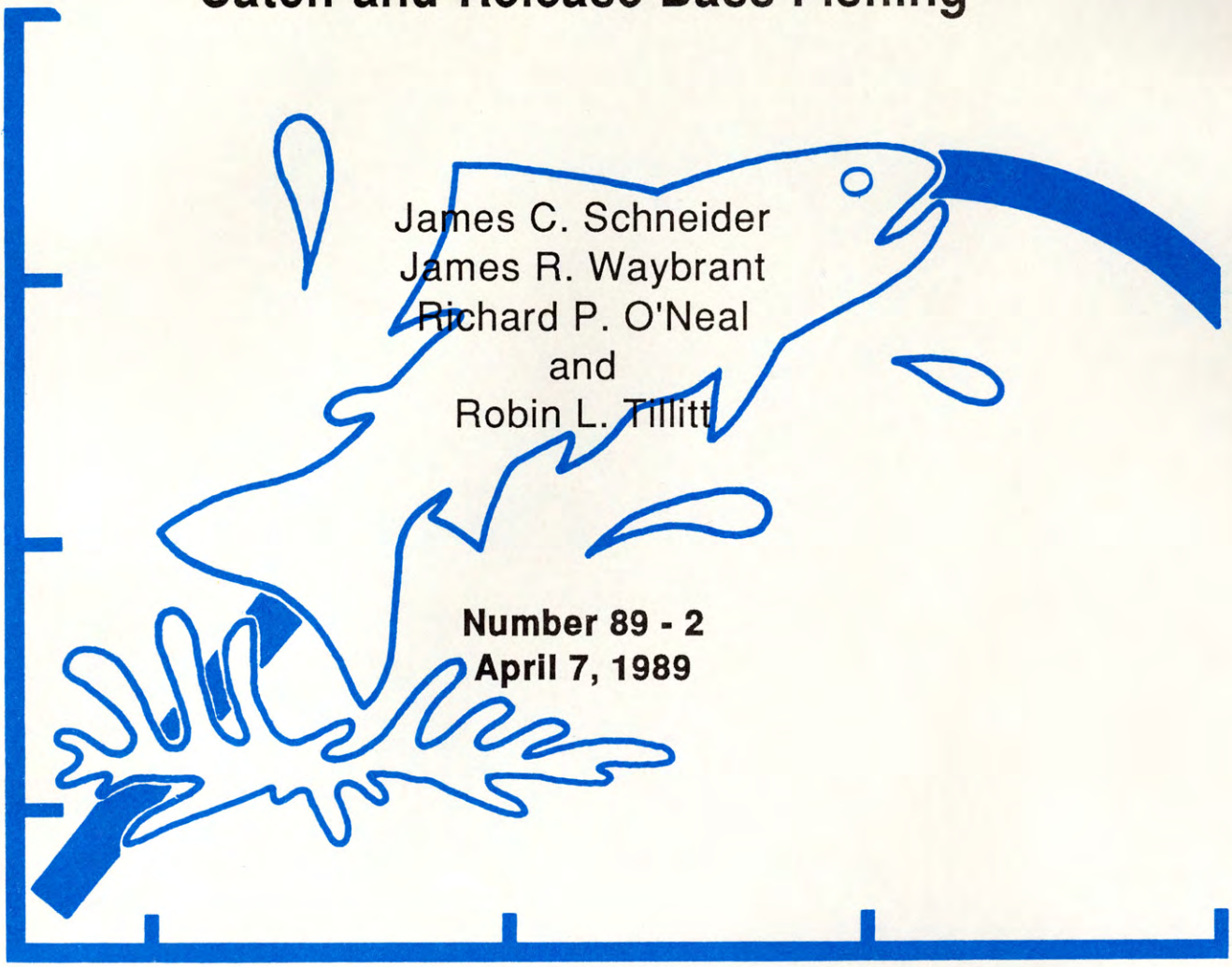

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Michigan Department of
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FISHERIES DIVISION

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FIRST-YEAR RESULTS OF EARLY-SEASON CATCH-AND-RELEASE BASS FISHING[1]

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[1] Contribution from Dingell-Johnson Project F-35-R, Michigan.

ABSTRACT

A special regulation allowing anglers to catch and release largemouth and smallmouth bass from April 1 to the Memorial Day weekend, prior to the normal bass season, is being tested on six lakes from 1988 to 1992. Effects on the fisheries and bass populations are being evaluated at five lakes by means of periodic creel census, opinion questionnaires, and bass population surveys. First-year results are as follows. About 81% of the anglers approved of this test and would approve of extending the concept to other lakes, 7% disapproved, and 12% had no opinion. Spring bass fishing pressure probably increased a modest amount over previous years, and based on angler opinions, a 38% gain is likely. Spring bass catch was also modest. Changes in the fisheries were relatively small mainly because many anglers (about 44% of all anglers and 69% of the frequent bass anglers) were already in the habit of fishing for bass prior to the normal bass season. Thus, to a large extent, the special season made angler behavior legitimate. A large percentage of all anglers (66%) said they usually release most of the bass they catch during the normal bass season. No unusual law enforcement or other problems were encountered. The test should proceed at least through 1990 to determine final equilibria.

INTRODUCTION

Over the last 30 years the popularity of bass fishing has increased tremendously (Schneider and Lockwood 1979). This has caused a drain on bass populations and created a demand for more bass fishing opportunities. Many bass anglers recognize that bass are in limited supply, and in a 1980 survey, 27% of all anglers said they usually release their bass catch (Goudy 1981). Some anglers now fish for bass prior to the statewide opening of bass season on the Saturday before Memorial Day even though it is technically illegal to "take or attempt to take" bass out of season. They question the need to protect bass populations from pre-season catch-and-release fishing in every lake. Likewise, fisheries managers believe that such fishing would not harm the resources or existing fisheries of many lakes and would generate many hours of additional recreational opportunity. The testing of this concept has been endorsed by the Bass Anglers Sportsmens Society, the Michigan United Conservation Club, and public forums held at lakes being considered as test sites.

Many northern Michigan lakes have been successfully managed under catch-and-release fishing for bass for some time. The most notable of these are 34 lakes in Sylvania Recreation Area where all bass must be released. In addition, lakes in the Big Island Lake complex and in Craig Lake State Park have an 18-inch minimum size limit on bass. In 1987, Wakeley Lake was opened to catch-and-release fishing for bass and all other species. These special fisheries are well received by anglers and serve to protect unique and vulnerable populations.

During 1950s and early 1960s, year-round bass fishing was tested for 8–10 years at three southern Michigan lakes (Schneider and Lockwood 1979). For that test anglers were allowed to harvest bass 10 inches and larger, which is substantially different from the new catch-and-release test. At those three lakes, spring fishing pressure increased by 67% or more, and 32–40% of the anglers fished for bass specifically. Up to 25% of the annual bass harvest was made in April and May. Total annual harvest increased at two lakes and declined very slightly at one lake. Smallmouth bass seemed to be more vulnerable to early spring fishing than largemouth bass. There was some indication that catch-per-hour rates declined because the available bass had to be split among more bass anglers and that some of the bass fisheries experienced a gradual decline. Causes for the decline could not be determined, but it did not seem wise to liberalize all Michigan lake fisheries to such an extent. Other northern states have also retained relatively conservative bass regulations.

Based on that study, and other literature, it was hypothesized that early-season catch-and-release bass fishing would have the following results: (1) spring fishing pressure would increase about 67% and summer pressure would stay about the same; (2) summer bass catch rates and total annual bass harvest would decline slightly because bass hooked and released in the spring (about 25% of the yearly total) are likely to be more wary the rest of the year;

(3) bass population characteristics such as recruitment, growth, total mortality, and standing crop would not be affected; (4) hooking mortality of fish released immediately would be under 10% and be compensated for by reduced harvest in summer; and (5) temporary removal of male bass guarding their redds should not significantly reduce bass recruitment for the population as a whole.

The Natural Resources Commission authorized a test of early catch-and-release bass fishing from April 1 to the regular opening day (the Saturday before Memorial Day), from 1988 to 1992, at Cass Lake, Pontiac Lake, Kent Lake (all in Oakland County), Muskegon Lake (Muskegon County), Holloway Reservoir (Genessee County), and Hardy Backwater (Newaygo County). A research study was developed to evaluate the test with the following objectives: (1) measure angler acceptance and use of pre-season catch-and-release bass fishing opportunities and (2) determine if growth, recruitment, and general abundance of bass populations are adversely affected over a 5-year period.

The evaluation includes: (a) monitoring trends in bass populations at each lake in 1988, 1990, and 1992; (b) creel census for the entire season at two lakes in 1988 and 1992 for comparison with prior data; (c) opinion interviews during the spring season at five lakes in 1988, 1990, and 1992 to determine angler acceptance and usage. This report presents the first-year results of the 5-year study.

METHODS

Opinion questionnaire

An opinion questionnaire was developed to address questions about angler acceptance, likely change in fishing effort, types of anglers present, and bass fishing behavior. A draft questionnaire (Version 1, Appendix 1) was used for April 1 to early May 1988. A revision (Version 2, Appendix 2), with two additional questions (Numbers 10 and 11) and slight modifications in wording, was developed and used from early May into August 1988. The two versions gave similar results so they were eventually pooled.

Suspecting that anglers fishing during the special early bass season might have different attitudes and characteristics than anglers fishing during the normal bass season, questionnaires were administered in both seasons (pre- and post-Memorial Day weekend). An interviewing schedule was developed for Pontiac Lake, Muskegon Lake, and Holloway Reservoir which systematically covered each day of the week but especially weekends and hours of peak fishing activity. For Cass and Kent lakes, the opinion surveys were conducted along with the randomly scheduled creel surveys. Over 80 interviews were obtained per lake and date strata except for "post" surveys at Pontiac Lake (42) and Holloway Reservoir (18).

An angler was interviewed only once (Question 1), no matter how often he/she frequented the lake. The frequency of encountering the same angler more than once was low, less than 14%. The interviewers were instructed to point out to hesitant anglers that responses would be kept confidential and that no legal action would result if they admitted to fishing for bass prior to the normal bass season last year (Question 6b). As it turned out, few anglers balked at this question and we believe the great majority of answers were honest.

In addition to administering the questionnaire, interviewers at Holloway Reservoir and Muskegon Lake made periodic counts of anglers on the lake, or of boat trailers in parking lots, to obtain a measure of fishing effort.

Creel census

Standard random creel census surveys were conducted on Kent and Cass lakes from April 1 to August 28, 1988. The objective was to obtain estimates of fishing pressure, bass catch, and bass catch rate and to compare these to predata collected in 1986 (Cass Lake) and 1987 (Kent Lake). General methodology is given by Ryckman (1981) and Waybrant and Thomas (1988). See Appendix 3 for the modified interview form.

The census consisted of interviewing anglers to determine how long they fished and what they kept, and of making periodic counts of anglers to determine fishing pressure. Fishermen were also asked how many legal-length (12.0 inches and larger) and sublegal-length bass they released; however, this was not done consistently until after mid-July.

Each lake was sampled an average of 20 hours per week, during daylight hours, according to a stratified-random design. Strata were weekdays versus weekends and shore anglers versus boat anglers. Little fishing occurred on Cass Lake during midsummer due to power boating, making it difficult to obtain enough fishing data for reliable estimates.

For computing estimates of total catch and effort, length of a fishing day for Cass Lake was defined as follows (in hours): April (14), May (16), June-July (18), and August (17). For Kent Lake, which has restricted park access, these hours were used for the estimates: April (14); May, June, and July (16); and August (15).

Results from Opinion Questionnaire

Questionnaire results are detailed for each lake in Appendices 4–8. No important differences between Versions 1 and 2 were apparent; consequently, results were pooled and summarized in Table 1. Responses by all anglers will be discussed first, then responses of frequent bass anglers will be contrasted with those of anglers who do not fish for bass. Discussion will center on typical responses, differences between pre- and post-Memorial Day weekend, and differences among lakes.

All anglers (Table 1)

Question 2.—"Are you aware there is a special catch-release early bass season on this lake from April 1 to the Memorial Day weekend?" About 75% of the anglers were aware. Awareness tended to increase with time, as expected.

Question 3.—"Do you approve, disapprove, have no opinion of this early season?" Overall, about 81% approved, 7% disapproved, and 12% had no opinion. Disapproval was generally higher among early-season anglers, especially at Muskegon, Kent, and Cass lakes (11–14%). However, few of the disapprovers felt very strongly, as reflected in extra comments (Question 9) or expectation to fish less (Question 5).

Question 4.—"Would you approve of early catch-release fishing at other lakes?" Responses were strongly positive, as in Question 3, indicating the concept could be extended to some other lakes.

Question 5a—"Because of this early season, will you probably bass fish here more, the same, or less than before?" Average responses were: 24% more, 68% same, 1% less, and 7% no opinion. Kent Lake had a high percentage of "no opinion". Early-season fishermen responded "more" more frequently than normal-season fishermen. This difference was low at Kent Lake (2%) and high at Pontiac Lake (31%).

Question 5b.—"How much more or less: 2x, 3x, other?" For anglers who responded "more" to Question 5a, the average was 2.6; for those who responded "less", the average was 2.3. However, these averages may not be precise because anglers may have interpreted the question differently; for example, as two additional fishing trips per season rather than twice as many trips per season (as intended).

Question 6a.—"Last year, did you fish this lake before Memorial Day weekend?" About 45% said yes and 55% said no. The percentages were relatively low (27–28%) for Holloway Reservoir and Pontiac Lake, suggesting that some "new" anglers had been attracted there by the early bass season; an alternative explanation is that these two lakes normally have a high angler turnover rate from one year to the next. The main purpose of Question 6a was to set up Question 6b.

Question 6b.—"If yes, what species did you fish for?" A high percentage, 44%, admitted to fishing for bass. Some may have been aware this was technically illegal, others not. The percentage was lowest (12%) for Kent and Muskegon lakes, which have unusually attractive spring fisheries for other species. Oddly, a higher percentage of interviewees during the normal bass season admitted to usually fishing for bass prior to Memorial Day weekend. This was due to a higher proportion of bass anglers in the "post" samples than in the "pre" samples, and was reflected also in the responses to Questions 10 and 11.

Question 7.—"Generally, during the summer months, do you usually keep the legal bass you catch or release them?" Responses averaged 28% keep, 66% release, and 6% both (anglers who had trouble interpreting "usually"). Thus, a high fraction of all anglers interviewed were already practicing catch-release bass fishing most of the time. Anglers at Kent and Muskegon lakes were the most likely to want to harvest bass.

Question 8.—"Are you affiliated with a fishing organization? If yes, which one?" A surprisingly high fraction, 22%, of all interviewees belonged to fishing clubs. A wide variety of clubs was represented, not simply those concentrating on bass fishing. Only at one lake out of five (Pontiac) was the percentage of club members clearly higher during the early bass season than during the normal bass season (40% versus 22%). Thus, in the first year, the special season did not attract large numbers of organized bass fishermen or bass tournaments.

Question 9.—"Do you want to make other comments?" About 20% of the anglers took the opportunity to express their opinions. These ranged from endorsements of the concept and/or study to rather mild concerns about poaching and disturbance of nesting bass.

Question 10.—"On average, how many times a year do you fish for bass?" About 16% said they do not fish for bass. This was especially true at Kent Lake which affords much bank fishing opportunity and attracts large numbers of panfish anglers. A very high fraction, 53% overall, said they usually fish for bass more than 10 times a year. Thus, the majority of anglers were very interested in bass fishing. The responses of these two interest groups are contrasted in the next section.

Question 11.—"Did you fish for bass today?" Many (average 49%) early-season anglers took advantage of the opportunity to fish for bass legally. The percentage varied considerably: 14% at Muskegon Lake, 24% at Kent Lake, 57% at Cass Lake, 65% at Holloway Reservoir, and 87% at Pontiac Lake. However, for every lake except Pontiac, an even higher percentage of normal-season anglers had been fishing for bass.[2]

Frequent- versus non-bass anglers (Table 2)

Responses to Questions 3–7 were next stratified into two groups based on the response to Question 10: Responses from anglers who usually fish for bass more than 10 times a year versus responses from anglers who do not fish for bass. The attitudes of these two groups

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[2]Note that the wording of Question 11 was slightly different than a similar question in the creel survey (Appendix 3). Question 11 asked directly if the angler fished for bass today, whereas the creel question asked the angler to list species targeted (sought). From the latter were tabulated the responses which mentioned bass. Sometimes the questions gave quite different results. For example, in the early-season surveys, the average response to Question 11 was 49%, whereas the average response to the creel census version was 28%.

should represent the extremes within the fishing public—anglers with a strong personal interest on the one hand and anglers with nothing to gain on the other.

In response to Questions 3 and 4, frequent bass anglers expressed a high degree of approval (84%) of the early bass season but also some (12%) firm disapproval. Non-bass anglers were equally divided between those who approved (48%) and those with no opinion (50%).

In response to Question 5, the majority of frequent bass anglers projected they would fish the same amount (65%) or more (33% by a factor of 2.5 times), and only a few said less (1%) or no opinion (1%). As expected, most non-bass anglers responded "same" or "no opinion" since they were not strongly interested.

In response to Question 6, 49% of both types of anglers fished prior to Memorial Day weekend last year. However, the species sought were markedly different: Bass were admittedly sought by 69% of the bass anglers as compared to 1% of the non-bass anglers.

In response to Question 7, 76% of the frequent bass anglers usually release bass and 13% usually keep bass. These percentages were essentially reversed for non-bass anglers.

Results of Creel Census

Cass and Kent lakes

Monthly estimates of 1988 fishing effort and catch for Cass Lake and Kent Lake are given in Appendices 9 and 10, respectively. The most pertinent estimates are summarized in Table 3, where they are compared to similar data collected in previous years (1986 or 1987) to determine if there were changes caused by the early bass season.

The comparison indicates that the early bass season had little effect on the fisheries of these two lakes. Considering first amount of fishing pressure—pressure indices (angler hours or boat counts) were lower (rather than higher) in 1988 compared to prior years. This was true in both pre- and post-Memorial Day weekend periods, indicating that any positive effects of the early bass season on angler usage were more than offset by uncontrolled and unknown negative factors. However, amount of pre-effort directed specifically at bass (bass hours, or boat counts multiplied by bass fishing percent) increased at both lakes because significantly higher percentages (12–23%) of spring anglers targeted for bass. Not all of the increase can be attributed to the special regulation, though, because higher percentages also targeted for bass in the post period. Note that at Cass Lake a considerable proportion (17%) admitted to illegally fishing for bass prior to Memorial Day weekend in 1986. Consequently, legalizing this activity in 1988 had no large effect on angler behavior.

Considering next the bass fisheries during the pre-period—census data show that no bass were kept in either year and the data on released bass were inadequate for comparison.

Statistics from the post-period suggest that largemouth bass catches and catch rates were lower in 1988 and that smallmouth bass fishing improved; however, none of these changes were statistically significant and were unimportant. Additional background creel census data on the fisheries of Cass and Kent lakes may be found in reports by Waybrant and Thomas (1988), Goudy (1981), and Ryckman and Lockwood (1985).

Other lakes

Muskegon Lake.—A tabulation of data on effort, species sought, and catch collected during the partial census is given in Appendices 11 and 12. The most pertinent data are summarized in Table 4. These data indicate that relatively few anglers fished for bass during the early season compared to the normal season (27% versus 67%) and that catch rate was slightly better (0.70 versus 0.58 bass per bass-hour). Total number of bass caught and released appears to have been modest. The early bass season test probably had no significant effect on total fishing pressure or bass fishing pressure because estimates of the percentage of anglers fishing for bass before Memorial Day weekend in 1988 were similar to the estimates of the percentage which acknowledged illegal spring fishing in 1987 (14–27% versus 12–31%; Tables 1 and 4).

Holloway Reservoir.—Creel census data on catch and effort from this lake are of limited value but, clearly, bluegill and black crappie were the principal species caught (Appendices 13 and 14). Some bass were caught, but records were not clear as to how many were kept and how many were released. Bass possession violations were observed, but probably were no more frequent in 1988 then in previous years.

The special regulation did not generate more bass fishing. The percentage of anglers fishing for bass was 31% during the early season and 54% during the normal season. These percentages are lower than those derived from Question 11 of the opinion survey (Table 1, Appendix 5) but are more reliable because they are based on more interviews. A comparable percentage of anglers admitted to fishing bass illegally in previous years (Table 1). Thus, the early bass season probably did not cause any detectable change in the fishery.

DISCUSSION

Anglers using these lakes strongly approved (81%) of the special early bass season and a large proportion (49%) said they had fished for bass on the day they were interviewed. About 24% of the anglers said they would fish more (about 2.6 times), and based on those statistics we project that the amount of spring bass fishing pressure would increase about 38%. Based on research conducted many years ago, we had expected total fishing pressure to increase about 67% (see Introduction). At Cass and Kent lakes, where we had prior creel census data, total

spring fishing pressure declined but spring bass fishing pressure increased in 1988. The impression gained from all test lakes was that no major increase in bass fishing took place. A change as small as 38% would be difficult to detect anyway due to statistical variability in creel census sampling and variations in fishing pressure caused by weather, employment rate, etc.

Relatively little increase occurred in spring fishing activity because, for the most part, the special regulation simply legitimized existing behavior. According to the opinion questionnaire, about 44% of all anglers (69% of the frequent bass anglers) who fished prior to Memorial Day weekend in 1987 fished for bass (illegally). Statistics derived from the creel survey indicate a lower, but still appreciable, amount of bass fishing activity. Thus, in recent years, the closed season on bass has not been much of a deterrent to bass fishing; consequently, the special season did not stimulate much additional interest.

The catch-and-release aspect of the special season was readily accepted by anglers. Few (no more than normal) bass possession violations were reported by interviewers and Conservation Officers, and from an enforcement perspective the test went smoothly. Questionnaire results indicate that even during the normal bass season a high proportion of anglers (66% of all interviewees and 76% of the frequent bass anglers) usually release most of the legal bass caught. Thus, the catch-and-release concept is, already, widely practiced on a voluntary basis. This undoubtedly has been of great benefit to bass stocks and fisheries throughout the State.

There was concern at the outset that the early bass season might attract large numbers of "professional" bass fishermen and bass tournaments. Such was not the case, as just 19% of the early season anglers were members of fishing clubs of any type and no early season tournaments were held. Some local bass fishing clubs, sensitive to this concern, agreed not to hold tournaments prior to Memorial Day weekend in 1988.

To summarize, indications from the first year of the special early bass season are that anglers are appreciative and are fishing somewhat more, and that no problems have been created. Although these early results indicate the special regulation is unlikely to have a significant effect on fisheries or bass populations, test monitoring should continue at least through 1990 to allow time for angler behavior patterns to stabilize and bass populations to respond.

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Table 1. Summary of angler responses to the opinion questionnaire stratified by lake and pre- and post-Memorial Day weekend, 1988. Numbers are percentages except for Question 5b.

Question and answer	Lake and date										Simple average
	Cass		Holloway		Kent		Muskegon		Pontiac		
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	
2. Aware early season											
Yes	71	83	94	100	65	73	63	66	85	53	75
No	29	17	6	0	35	27	37	34	15	47	25
3. Approve											
Yes	72	87	96	100	58	71	79	87	92	65	81
No	11	4	3	0	11	11	14	9	1	5	7
No opinion	17	9	1	0	30	18	7	4	6	30	12
4. Approve other lakes											
Yes	73	85	94	100	60	75	75	84	90	87	82
No	10	5	3	0	10	6	19	13	2	5	7
No opinion	17	10	3	0	30	19	6	3	8	8	11
5a. Change fishing											
More	27	19	28	0	24	22	27	10	56	25	24
Same	55	79	67	100	40	73	72	89	39	67	68
Less	3	0	1	0	3	1	0	1	1	0	1
No opinion	15	2	4	0	33	4	2	0	4	8	7
5b. Average multiple											
More	2.4	2.2	2.6	—	2.3	2.2	2.7	3.4	2.6	3.0	2.6
Less	2.8	—	—	—	2.0	2.0	—	—	—	—	2.3
6a. Fished pre-Memorial Day last year											
Yes	48	31	28	86	65	50	57	40	27	22	45
No	52	69	72	14	35	50	43	60	73	78	55
6b. Species fished for											
Bass	25	74	41	83	12	52	12	31	48	67	44
Other	52	19	59	17	61	46	84	67	33	33	47
Any	23	6	0	0	27	2	4	2	19	0	9
7. Usually											
Keep bass	28	27	9	0	37	52	37	28	14	48	28
Release bass	71	69	91	100	62	44	44	54	85	45	66
Both	1	4	0	0	1	4	19	18	1	7	6

Table 1. Continued:

Question and answer	Lake and date										Simple average
	Cass		Holloway		Kent		Muskegon		Pontiac		
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	
8. Club member											
Yes	9	18	16	44	8	4	23	38	40	22	22
No	91	82	84	56	92	96	77	62	60	78	78
9. Comments											
Yes	27	15	0	0	7	6	41	51	41	15	20
No	73	85	100	100	93	94	59	49	59	85	80
10. Average bass trips per year											
0	18	9	0	—	48	30	12	2	0	21	16
1–3	11	13	7	—	14	12	5	5	0	10	9
3–10	18	16	71	—	13	28	19	16	0	18	22
10+	52	62	21	—	25	30	64	77	100	50	53
11. Fished for bass today											
Yes	57	83	65	100	24	40	14	51	87	42	56
No	43	17	35	0	76	60	86	49	13	58	44

Table 2. Responses, in percent and pooled for all lakes and dates in 1988, of frequent bass anglers compared to non bass anglers. Answers to Question 10 (Version 2) were stratified according to anglers who said they average more than 10 bass fishing trips per year (458 respondents) versus anglers who said they average no-bass fishing trips per year (236 respondents).

Question and answer	Non-bass anglers	Frequent-bass anglers
3. Approve		
Yes	48	84
No	2	12
No opinion	50	4
4. Approve other lakes		
Yes	46	85
No	2	12
No opinion	52	3
5a. Change fishing		
More	9	33
Same	47	65
Less	0	1
No opinion	44	1
5b. Average multiple		
More	2.1	2.5
Less	—	2.0
6a. Fished pre-Memorial Day last year		
Yes	49	49
No	51	51
6b. Species fished for		
Bass	1	69
Other	82	17
Any	9	14
7. Usually		
Keep bass	80	13
Release bass	19	76
Both	1	11

Table 3. Creel census estimates of percentage of anglers fishing for bass, total fishing effort in angler hours, and bass catch and catch per hour for Cass and Kent lakes prior to the early bass season test (1986 or 1987) compared to after (1988), for two time periods. Estimates for 1986 and 1987 were recalculated according to these time periods from data of Waybrandt and Thomas (1987 and unpublished). Two standard errors in parentheses.

	Cass Lake				Kent Lake			
	Apr 1-Memorial weekend		Memorial weekend-Jun 30		Apr 1-Memorial weekend		Memorial weekend-Jun 30	
Characteristic	1986	1988	1986	1988	1987	1988	1987	1988
Pressure								
Bass fishing (%)	16.8	39.5	51.6	57.8	0.7	12.6	16.0	41.5
	(7.7)	(7.1)	(6.2)	(8.7)	(0.8)	(3.2)	(4.0)	(7.3)
Angler hours	—	8,419	12,133	10,137	47,577	30,595	40,032	22,352
	—	(1,371)	(3,551)	(3,078)	(13,662)	(8,290)	(6,908)	(6,805)
Average weekend boat count	7.17	5.43	—	—	—	—	—	—
	(1.79)	(2.83)	—	—	—	—	—	—
Bass hours[1]	—	3,323	6,261	5,860	333	3,851	6,405	9,283
	—	(807)	(1,981)	(1,986)	(392)	(1,433)	(1,946)	(3,262)
Bass fishery								
Largemouth	0	0	229	108	0	0	834	562
Number kept	(0)	(0)	(247)	(187)	(0)	(0)	(707)	(595)
Kept/bass hour	0.000	0.000	0.366	0.018	0.000	0.000	0.130	0.060
Released/bass hour	0.395[2]	—[3]	0.186	—[3]	0.000	—[3]	0.024	—[3]
Smallmouth	0	0	36	108	0	0	139	186
Number kept	(0)	(0)	(40)	(187)	(0)	(0)	(142)	(390)
Kept/bass hour	0.000	0.000	0.006	0.018	0.000	0.000	0.022	0.200
Released/bass hour	0.062[2]	—[3]	0.079	—[3]	0.000	—[3]	0.011	—[3]

[1]Equal to fraction fishing for bass multiplied by estimated angler hours. For the early period at Cass Lake, a similar index of bass fishing pressure would be bass fishing percent multiplied by average weekend boat counts: 1.20 for 1986 and 2.14 for 1988—a 78% increase.

[2]Equal to observed catch divided by observed hours (286) times fraction fishing for bass (0.168).

[3]Data not collected.

Table 4. Creel census observations on percentage of anglers fishing for bass, bass kept, bass released, and bass caught per hour for Muskegon Lake during early- and normal-bass seasons, 1988.

Characteristic	Season	
	Early	Normal
Bass fishing (%)	27	67
Bass fishery[1]		
Number kept	0	26
Number released	104	313
Total/hour	0.70	0.58

[1]Largemouth and smallmouth bass combined.

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Report approved by W. C. Latta

Word Processor – G. M. Zurek

Appendix 1. Special questionnaire (one per fisherman).

Special Questionnaire (One per fisherman)

Hello, I'm taking a survey of fisherman opinions and would like to ask you some questions. Your answers will be kept confidential.

1. Have we interviewed you earlier this year about your bass fishing attitudes? Yes... No...
   (If yes, terminate interview.)

2. Are you aware there is a special catch-release early bass season on this lake from April 1 to the Memorial Day weekend? Yes...No...

3. Do you approve... disapprove...no opinion ... of this early season?

4. Would you approve of early catch-release bass fishing at other lakes? Yes... No... No opinion...

5. Because of this early season, will you probably bass fish here more... the same... or less... than before? No opinion...

   How much more or less?: 2x... 3x... other ...

6. Last year, did you fish this lake before Memorial weekend? Yes... No...
   If yes: What species did you fish for? Bass... Panfish... Pike...Walleye...Salmonids...Anything...Other:.....
   (Prompt about bass and assure no legal overtone)

7. Do you usually keep the legal bass you catch..... or release them?.....

8. Are you affiliated with a fishing organization? Yes... No...
   If yes: Which one?.....

9. Do you want to make other comments?.....
   .....

Thank you!

Note: After the regular bass season opens, change question 5 to:

5. Because of this early season, did you bass fish here prior to the regular season more...the same... or less...than usual?.

   How much more or less?: 2x... 3x... other ...

Appendix 2. Special questionnaire Version #2 (one per fisherman).

Lake.....
Date.....

Special Questionnaire Version #2 (One per fisherman)

Hello,I'm taking a survey of fisherman opinions and would like to ask you some questions. Your answers will be kept confidential.

1. Have we interviewed you earlier this year about your bass fishing attitudes? Yes... No... (If yes, terminate interview)

10. On average, how many times a year do you fish for bass? None.... 1-3.... 3-10....10 or more.....

2. Are you aware there is a special catch-release early bass season on this lake from April 1 to the Memorial Day weekend? Yes...No...

11. Did you fish for bass today? Yes...No...(Don't ask if known)

3. Do you approve... disapprove...no opinion ... of this early season?

4. Would you approve of early catch-release bass fishing at other lakes? Yes... No... No opinion...

5. Because of this early season, will you probably bass fish here more... the same... or less... than before? No opinion...

How much more or less?: 2x... 3x... other ...

6. Last year, did you fish this lake before Memorial weekend? Yes... No...
If yes: What species did you fish for? Bass... Panfish... Pike...Walleye...Salmonids...Anything...Other:.....
(Prompt about bass and assure no legal overtone)

7. Generally, during the summer months, do you usually keep the legal bass you catch.....or release them?.....

8. Are you affiliated with a fishing organization? Yes... No...
If yes: Which one?.....

9. Do you want to make other comments?.....
.....

Thank you!

Note: After the regular bass season opens, change question 5 to:

5. Because of this early season, did you bass fish here prior to the regular season more...the same... or less...than usual?.

How much more or less?: 2x... 3x... other ...

Appendix 3. Angler party interview form.

ANGLER PARTY INTERVIEW FORM

Project #:|_ _ _ _|

Init:|_ _| Soc. Sec. #:|_ _ _|-|_ _|-|_ _ _ _| Date:|_ _|/|_ _|/|_ _| Seq. #:|_ _ _ _|

Interview site:|_ _ _|
Fishing site: |_ _ _|

Site name:|_____|
Site name:|_____|

Fishery type
☐Gt Lk ☐Anad
☐In Lk ☐In St

Mode of fishing
☐Boat ☐Shore ☐Open ice
☐Charter ☐Non-f. shore ☐Non-f. open ice
☐Non-f. boat ☐Pier/dock ☐Shanty ice
☐Non-f. pier/dock

Start date:|_ _|/|_ _|/|_ _| Day of week:|_|
1 = Monday 5 = Friday
2 = Tuesday 6 = Saturday
3 = Wednesday 7 = Sunday
4 = Thursday 8 = Holiday

End time:|_ _|:|_ _|
Start time:|_ _|:|_ _|
Hrs fished:|_ _|.|_|
Comp. trip:☐Y ☐N

Military hr:

Morning AM											Noon							Evening PM						
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	0
													1	2	3	4	5	6	7	8	9	10	11	12

Angler #	Trips	Sex	Age	Zip code	Residence (county/state)	Cnty code	Fishing methods: Bait	Artif.
1	|_ _|	|_|	|_ _|	|_ _ _ _ _|	|_____|	|_ _|	☐	☐
2	|_ _|	|_|	|_ _|	|_ _ _ _ _|	|_____|	|_ _|	☐	☐
3	|_ _|	|_|	|_ _|	|_ _ _ _ _|	|_____|	|_ _|	☐	☐
4	|_ _|	|_|	|_ _|	|_ _ _ _ _|	|_____|	|_ _|	☐	☐
5	|_ _|	|_|	|_ _|	|_ _ _ _ _|	|_____|	|_ _|	☐	☐
6	|_ _|	|_|	|_ _|	|_ _ _ _ _|	|_____|	|_ _|	☐	☐
7	|_ _|	|_|	|_ _|	|_ _ _ _ _|	|_____|	|_ _|	☐	☐
8	|_ _|	|_|	|_ _|	|_ _ _ _ _|	|_____|	|_ _|	☐	☐

Use this side or use this side, not both!

Target sp.:|_____|
code:|_ _|

☐Anything ☐Salmon ☐Trout ☐Salmon & Trout ☐Walleye & Perch
☐Bass ☐Panfish ☐Bass & Bluegill ☐Pike & Bass ☐Pike & Perch

Catch data

Code	Species	# kept	Code	Species	# kept	Code	Species	# kept
ATL	Atlantic salmon	|_ _ _|	MUS	Muskellunge	|_ _ _|	BUF	Buffalo (spp)	|_ _ _|
BRT	Brook trout	|_ _ _|	TMU	Tiger musky	|_ _ _|	LNS	Longnose sucker	|_ _ _|
BNT	Brown trout	|_ _ _|	BCR	Black crappie	|_ _ _|	QIL	Quillback	|_ _ _|
CHS	Chinook salmon	|_ _ _|	BLG	Bluegill	|_ _ _|	RHS	Redhorse (spp)	|_ _ _|
COH	Coho salmon	|_ _ _|	GSF	Green sunfish	|_ _ _|	CWS	White sucker	|_ _ _|
LHR	Lake herring	|_ _ _|	LMB	Largemouth bass	|_ _ _|	BOW	Bowfin	|_ _ _|
LAT	Lake trout	|_ _ _|	LSF	Longear sunfish	|_ _ _|	BUR	Burbot	|_ _ _|
LWF	Lake whitefish	|_ _ _|	OSF	Orange. sunfish	|_ _ _|	DRU	Freshwater drum	|_ _ _|
PKS	Pink salmon	|_ _ _|	PSF	Pumpkinseed	|_ _ _|	GAR	Gar (spp)	|_ _ _|
RBT	Rainbow trout	|_ _ _|	RSF	Redear sunfish	|_ _ _|	GZS	Gizzard Shad	|_ _ _|
RWF	Round whitefish	|_ _ _|	RKB	Rockbass	|_ _ _|	MOO	Mooneye	|_ _ _|
SPL	Splake	|_ _ _|	SMB	Smallmouth bass	|_ _ _|	STR	Sturgeon	|_ _ _|
SMT	Rainbow smelt	|_ _ _|	WAR	Warmouth	|_ _ _|	LLR	Lmb12rel(Atlantic)	|_ _ _|
SAU	Sauger	|_ _ _|	WCR	White crappie	|_ _ _|	SLR	Lmb<12rel(Brook)	|_ _ _|
WAE	Walleye	|_ _ _|	BLB	Black bullhead	|_ _ _|	LSR	Smb12rel(Chinook)	|_ _ _|
YEP	Yellow perch	|_ _ _|	BRB	Brown bullhead	|_ _ _|	SSR	Smb<12rel (Coho)	|_ _ _|
WHB	White bass	|_ _ _|	CCF	Channel catfish	|_ _ _|	OTH	Other	|_ _ _|
WHP	White perch	|_ _ _|	YLB	Yellow bullhead	|_ _ _|	|_ _ _|	_____	|_ _ _|
NOP	Northern pike	|_ _ _|	CAR	Carp	|_ _ _|	|_ _ _|	_____	|_ _ _|

Appendix 4. Opinion questionnaire results for Cass Lake, 1988.

Question, answer (code)	Pre-Memorial weekend						Post-Memorial weekend Version 2	
	Version 1		Version 2		Version 1+2			
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
1. Interviewed before								
Blank (0)	0	—	0	—	0	—	0	—
Yes (1)	12	7.8	7	9.0	19	8.2	9	5.7
No (3)	141	92.2	71	91.0	212	91.8	150	94.3
2. Aware								
Blank (0)	0	—	0	—	0	—	2	—
Yes (1)	98	69.5	52	73.2	150	70.8	123	83.1
No (2)	43	30.5	19	26.8	62	29.2	25	16.9
3. Approve								
Blank (0)	1	—	0	—	93	—	0	—
Yes (1)	93	66.4	59	83.1	152	72.0	130	86.7
No (2)	20	14.3	3	4.2	23	10.9	6	4.0
No opinion (3)	27	19.3	9	12.7	36	17.1	14	9.3
4. Approve other lakes								
Blank (0)	1	—	0	—	1	—	3	—
Yes (1)	99	70.7	55	77.5	154	73.0	125	85.0
No (2)	18	12.9	2	2.8	20	9.5	7	4.8
No opinion (3)	23	16.4	14	19.7	37	17.5	15	10.2
5a. Fish more								
Blank (0)	1	0.7	0	0.0	1	0.5	17	11.3
More (1)	34	24.3	22	31.0	56	26.5	25	18.8
Same (2)	81	57.9	35	49.3	116	55.0	105	78.9
Less (3)	6	4.3	1	1.4	7	3.3	0	0.0
No opinion (4)	19	13.6	13	18.3	32	15.2	3	2.3
5b. How much								
More								
Blank (0)	0	0.0	1	4.5	1	1.8	0	0.0
2x (2)	15	44.1	16	76.2	31	56.4	19	76.0
3x (3)	18	52.9	5	23.8	23	41.8	6	24.0
4x+ (4)	1	2.9	0	0.0	1	1.8	0	0.0
Less								
Blank (0)	1	16.7	1	100.0	2	28.6	0	—
2x (2)	1	20.0	0	—	1	20.0	0	—
3x (3)	4	80.0	0	—	4	80.0	0	—
4x+ (4)	0	0.0	0	—	0	0.0	0	—
6a. Pre-Memorial Day last year								
Blank (0)	0	—	0	—	0	—	0	—
Yes (1)	69	48.9	32	45.1	101	47.6	47	31.3
No (2)	72	51.1	39	54.9	111	52.4	103	68.7
6b. Fished for								
Blank (0)	72	—	39	—	111	—	103	—
Bass (1)	12	17.4	13	40.6	25	24.8	35	74.5
No bass (2)	44	63.8	9	28.1	53	52.5	9	19.1
Anything (3)	13	18.8	10	31.3	23	22.8	3	6.4

Appendix 4. Continued:

Question, answer (code)	Pre-Memorial weekend						Post-Memorial weekend	
	Version 1		Version 2		Version 1+2		Version 2	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
7. Usually								
Blank (0)	2	—	6	—	8	—	4	—
Keep bass (1)	38	27.3	19	30.6	57	28.4	39	26.7
Release (2)	101	72.7	41	66.1	142	70.6	101	69.2
Both (3)	0	0.0	2	3.2	2	1.0	6	4.1
8. Club member								
Blank (0)	1	—	1	—	2	—	0	—
Yes (1)	17	12.1	2	2.9	19	9.0	27	18.0
No (2)	123	87.9	68	97.1	191	91.0	123	82.0
9. Comments								
Blank (0)	0	—	0	—	0	—	0	—
Yes (1)	22	53.7	8	11.3	30	26.8	22	14.7
No (2)	19	46.3	63	88.7	82	73.2	128	85.3
10. Average bass trips/year								
Blank (0)	—	—	0	—	—	—	0	—
1–3 (1)	—	—	8	11.3	—	—	20	13.3
3–10 (2)	—	—	13	18.3	—	—	24	16.0
10+ (3)	—	—	37	52.1	—	—	93	62.0
None (4)	—	—	13	18.3	—	—	13	8.7
11. Fish bass today								
Blank (0)	—	—	1	—	—	—	2	—
Yes (1)	—	—	40	57.1	—	—	123	83.1
No (2)	—	—	30	42.9	—	—	25	16.9

Appendix 5. Opinion questionnaire results for Holloway Reservoir, 1988.

Question, answer (code)	Pre-Memorial weekend						Post-Memorial weekend Version 2	
	Version 1		Version 2		Version 1+2			
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
1. Interviewed before								
Blank (0)	0	—	0	—	0	—	0	—
Yes (1)	8	5.7	24	25.3	32	13.6	9	50.0
No (3)	133	94.3	71	74.7	204	86.4	9	50.0
2. Aware								
Blank (0)	5	—	5	—	10	—	1	—
Yes (1)	119	92.2	64	97.0	183	93.8	8	100.0
No (2)	10	7.8	2	3.0	12	6.2	0	0.0
3. Approve								
Blank (0)	5	—	3	—	8	—	1	—
Yes (1)	121	93.8	68	100.0	189	95.9	8	100.0
No (2)	6	4.7	0	0.0	6	3.0	0	0.0
No opinion (3)	2	1.6	0	0.0	2	1.0	0	0.0
4. Approve other lakes								
Blank (0)	5	—	7	—	12	—	1	—
Yes (1)	119	91.5	63	100.0	182	94.3	9	100.0
No (2)	6	4.6	0	0.0	6	3.1	0	0.0
No opinion (3)	5	3.8	0	0.0	5	2.6	0	0.0
5a. Fish more								
Blank (0)	8	6.2	9	12.7	17	8.5	2	22.2
More (1)	42	34.4	10	16.1	52	28.3	0	0.0
Same (2)	73	59.8	51	82.3	124	67.4	7	100.0
Less (3)	1	0.8	0	0.0	1	0.5	0	0.0
No opinion (4)	6	4.9	1	1.6	7	3.8	0	0.0
5b. How much								
More								
Blank (0)	34	81.0	2	22.2	36	70.6	0	0.0
2x (2)	4	50.0	4	57.1	8	53.3	0	0.0
3x (3)	3	37.5	2	28.6	5	33.3	0	—
4x+ (4)	1	12.5	1	14.3	2	13.3	0	—
Less								
Blank (0)	1	—	0	—	1	—	0	—
2x (2)	0	—	0	—	0	—	0	—
3x (3)	0	—	0	—	0	—	0	—
4x+ (4)	0	—	0	—	0	—	0	—
6a. Pre-Memorial Day last year								
Blank (0)	13	—	18	—	31	—	2	—
Yes (1)	41	34.2	8	15.1	49	28.3	6	85.7
No (2)	79	65.8	45	84.9	124	71.7	1	14.3
6b. Fished for								
Blank (0)	37	—	63	—	100	—	3	—
Bass (1)	11	35.5	5	62.5	16	41.0	5	83.3
No bass (2)	20	64.5	3	37.5	23	59.0	1	16.7
Anything (3)	0	0.0	0	0.0	0	0.0	0	0.0

Appendix 5. Continued:

Question, answer (code)	Pre-Memorial weekend						Post-Memorial weekend Version 2	
	Version 1		Version 2		Version 1+2			
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
7. Usually								
Blank (0)	20	—	18	—	38	—	4	—
Keep bass (1)	3	2.7	12	22.6	15	9.0	0	0.0
Release (2)	110	97.3	41	77.4	151	91.0	5	100.0
Both (3)	0	0.0	0	0.0	0	0.0	0	0.0
8. Club member								
Blank (0)	5	—	4	—	9	—	0	—
Yes (1)	25	17.5	9	13.4	34	16.2	4	44.4
No (2)	118	82.5	58	86.6	176	83.8	5	55.6
9. Comments								
Blank (0)	0	—	0	—	0	—	0	—
Yes (1)	0	0.0	0	0.0	0	0.0	0	0.0
No (2)	135	100.0	71	100.0	206	100.0	9	100.0
10. Average bass trips/year								
Blank (0)	—	—	57	—	—	—	7	—
1–3 (1)	—	—	1	7.1	—	—	1	50.0
3–10 (2)	—	—	10	71.4	—	—	1	50.0
10+ (3)	—	—	3	21.4	—	—	0	0.0
None (4)	—	—	0	0.0	—	—	0	0.0
11. Fish bass today								
Blank (0)	—	—	51	—	—	—	2	—
Yes (1)	—	—	13	65.0	—	—	7	100.0
No (2)	—	—	7	35.0	—	—	0	0.0

Appendix 6. Opinion questionnaire results for Kent Lake, 1988.

Question, answer (code)	Pre-Memorial weekend						Post-Memorial weekend	
	Version 1		Version 2		Version 1+2		Version 2	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
1. Interviewed before								
Blank (0)	0	—	0	—	0	—	0	—
Yes (1)	12	6.0	11	8.3	23	6.9	12	3.3
No (3)	187	94.0	122	91.7	309	93.1	356	96.7
2. Aware								
Blank (0)	1	—	0	—	1	—	0	—
Yes (1)	121	65.1	80	65.6	201	65.3	258	72.5
No (2)	65	34.9	42	34.4	107	34.7	98	27.5
3. Approve								
Blank (0)	1	—	0	—	1	—	0	—
Yes (1)	110	59.1	70	57.4	180	58.4	252	70.8
No (2)	23	12.4	12	9.8	35	11.4	39	11.0
No opinion (3)	53	28.5	40	32.8	93	30.2	65	18.3
4. Approve other lakes								
Blank (0)	0	—	0	—	0	—	0	—
Yes (1)	113	60.4	73	59.8	186	60.2	268	75.3
No (2)	20	10.7	10	8.2	30	9.7	22	6.2
No opinion (3)	54	28.9	39	32.0	93	30.1	66	18.5
5a. Fish more								
Blank (0)	1	0.5	0	0	1	0.3	86	24.2
More (1)	38	20.4	36	29.5	74	24.0	58	21.5
Same (2)	85	45.7	37	30.3	122	39.6	198	73.3
Less (3)	11	5.9	0	0.0	11	3.6	4	1.5
No opinion (4)	52	28.0	49	40.2	101	32.8	10	3.7
5b. How much								
More								
Blank (0)	3	7.9	1	2.9	4	5.6	1	1.7
2x (2)	23	65.7	27	81.8	50	73.5	48	84.2
3x (3)	12	34.3	6	18.2	18	26.5	9	15.8
4x+ (4)	0	0.0	0	0.0	0	0.0	0	0.0
Less								
Blank (0)	3	25.0	0	—	3	25.0	1	25.0
2x (2)	9	100.0	0	—	9	100.0	3	100.0
3x (3)	0	0.0	0	0.0	0	0.0	0	0.0
4x+ (4)	0	0.0	0	0.0	0	0.0	0	0.0
6a. Pre-Memorial Day last year								
Blank (0)	0	—	0	—	0	—	4	—
Yes (1)	121	64.7	81	66.4	202	65.4	177	50.3
No (2)	66	35.3	41	33.6	107	34.6	175	49.7
6b. Fished for								
Blank (0)	66	—	41	—	107	—	176	—
Bass (1)	11	9.1	13	16.0	24	11.9	93	51.7
No bass (2)	74	61.2	49	60.5	123	60.9	83	46.1
Anything (3)	36	29.8	19	23.5	55	27.2	4	2.2

Appendix 6. Continued:

Question, answer (code)	Pre-Memorial weekend Version 1 Number	Pre-Memorial weekend Version 1 Percent	Pre-Memorial weekend Version 2 Number	Pre-Memorial weekend Version 2 Percent	Pre-Memorial weekend Version 1+2 Number	Pre-Memorial weekend Version 1+2 Percent	Post-Memorial weekend Version 2 Number	Post-Memorial weekend Version 2 Percent
7. Usually								
Blank (0)	2	—	2	—	4	—	9	—
Keep bass (1)	63	34.1	49	40.8	112	36.7	182	52.4
Release (2)	120	64.9	71	59.2	191	62.6	151	43.5
Both (3)	2	1.1	0	0.0	2	0.7	14	4.0
8. Club member								
Blank (0)	2	—	1	—	3	—	5	—
Yes (1)	18	9.7	5	4.1	23	7.5	15	4.3
No (2)	167	90.3	116	95.9	283	92.5	336	95.7
9. Comments								
Blank (0)	0	—	0	—	0	—	0	—
Yes (1)	19	10.2	3	2.5	22	7.1	20	5.6
No (2)	168	89.8	119	97.5	287	92.9	338	94.4
10. Average bass trips/year								
Blank (0)	—	—	0	—	—	—	0	—
1–3 (1)	—	—	17	13.9	—	—	56	11.7
3–10 (2)	—	—	16	13.1	—	—	50	28.2
10+ (3)	—	—	30	24.6	—	—	121	30.1
None (4)	—	—	59	48.4	—	—	129	30.1
11. Fish bass today								
Blank (0)	—	—	0	—	—	—	0	—
Yes (1)	—	—	29	23.8	—	—	143	40.2
No (2)	—	—	93	76.2	—	—	213	59.8

Appendix 7. Opinion questionnaire results for Muskegon Lake, 1988.

Question, answer (code)	Pre-Memorial weekend						Post-Memorial weekend	
	Version 1		Version 2		Version 1+2		Version 2	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
1. Interviewed before								
Blank (0)	0	—	0	—	0	—	0	—
Yes (1)	0	0.0	0	0.0	0	0.0	0	0.0
No (3)	79	100.0	97	100.0	176	100.0	105	100.0
2. Aware								
Blank (0)	0	—	0	—	0	—	0	—
Yes (1)	47	59.5	64	66.0	111	63.1	69	65.7
No (2)	32	40.5	33	34.0	65	36.9	36	34.3
3. Approve								
Blank (0)	0	—	0	—	63	—	0	—
Yes (1)	63	79.7	77	79.4	140	79.5	91	86.7
No (2)	13	16.5	11	11.3	24	13.6	10	9.5
No opinion (3)	3	3.8	9	9.3	12	6.8	4	3.8
4. Approve other lakes								
Blank (0)	0	—	0	—	0	—	0	—
Yes (1)	59	74.7	74	76.3	133	75.6	88	83.8
No (2)	17	21.5	16	16.5	33	18.8	14	13.3
No opinion (3)	3	3.8	7	7.2	10	5.7	3	2.9
5a. Fish more								
Blank (0)	0	0.0	0	0.0	0	0.0	0	0.0
More (1)	22	27.8	25	25.8	47	26.7	11	10.5
Same (2)	54	68.4	72	74.2	126	71.6	93	88.6
Less (3)	0	0.0	0	0.0	0	0.0	1	1.0
No opinion (4)	3	3.8	0	0.0	3	1.7	0	0.0
5b. How much								
More								
Blank (0)	0	0.0	0	0.0	0	0.0	2	18.2
2x (2)	16	72.7	8	33.3	24	52.2	2	22.2
3x (3)	4	18.2	9	37.5	13	28.3	1	11.1
4x+ (4)	2	9.1	7	29.2	9	19.6	6	66.7
Less								
Blank (0)	0	—	0	—	0	—	1	100.0
2x (2)	0	—	0	—	0	—	0	—
3x (3)	0	—	0	—	0	—	0	—
4x+ (4)	0	—	0	—	0	—	0	—
6a. Pre-Memorial Day last year								
Blank (0)	1	—	0	—	1	—	0	—
Yes (1)	51	65.4	48	49.5	99	56.6	42	40.0
No (2)	27	34.6	49	50.5	76	43.4	63	60.0
6b. Fished for								
Blank (0)	28	—	54	—	82	—	63	—
Bass (1)	7	13.7	4	9.3	11	11.7	13	31.0
No bass (2)	42	82.4	37	86.0	79	84.0	28	66.7
Anything (3)	2	3.9	2	4.7	4	4.3	1	2.4

Appendix 7. Continued:

Question, answer (code)	Pre-Memorial weekend Version 1 Number	Pre-Memorial weekend Version 1 Percent	Pre-Memorial weekend Version 2 Number	Pre-Memorial weekend Version 2 Percent	Pre-Memorial weekend Version 1+2 Number	Pre-Memorial weekend Version 1+2 Percent	Post-Memorial weekend Version 2 Number	Post-Memorial weekend Version 2 Percent
7. Usually								
Blank (0)	2	—	0	—	2	—	0	—
Keep bass (1)	32	41.6	33	34.0	65	37.4	29	27.6
Release (2)	31	40.3	45	46.4	76	43.7	57	54.3
Both (3)	14	18.2	19	19.6	33	19.0	19	18.1
8. Club member								
Blank (0)	0	—	0	—	0	—	0	—
Yes (1)	18	22.8	23	23.7	41	23.3	40	38.1
No (2)	61	77.2	74	76.3	135	76.7	65	61.9
9. Comments								
Blank (0)	0	—	0	—	0	—	0	—
Yes (1)	33	41.8	39	40.2	72	40.9	53	50.5
No (2)	46	58.2	58	59.8	104	59.1	52	49.5
10. Average bass trips/year								
Blank (0)	—	—	0	—	—	—	0	—
1–3 (1)	—	—	5	5.2	—	—	5	4.8
3–10 (2)	—	—	18	18.6	—	—	17	16.2
10+ (3)	—	—	62	63.9	—	—	81	77.1
None (4)	—	—	12	12.4	—	—	2	1.9
11. Fish bass today								
Blank (0)	—	—	0	—	—	—	0	—
Yes (1)	—	—	14	14.4	—	—	54	51.4
No (2)	—	—	83	85.6	—	—	51	48.6

Appendix 8. Opinion questionnaire results for Pontiac Lake, 1988.

Question, answer (code)	Pre-Memorial weekend						Post-Memorial weekend Version 2	
	Version 1		Version 2		Version 1+2			
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
1. Interviewed before								
Blank (0)	0	—	0	—	0	—	0	—
Yes (1)	2	3.1	0	0.0	2	2.5	2	4.8
No (3)	63	96.9	15	100.0	78	97.5	40	95.2
2. Aware								
Blank (0)	0	—	0	—	0	—	0	—
Yes (1)	51	81.0	15	100.0	66	84.6	21	52.5
No (2)	12	19.0	0	0.0	12	15.4	19	47.5
3. Approve								
Blank (0)	0	—	0	—	57	—	0	—
Yes (1)	57	90.5	15	100.0	72	92.3	26	65.0
No (2)	1	1.6	0	0.0	1	1.3	2	5.0
No opinion (3)	5	7.9	0	0.0	5	6.4	12	30.0
4. Approve other lakes								
Blank (0)	0	—	0	—	0	—	0	—
Yes (1)	55	87.3	15	100.0	70	89.7	34	87.2
No (2)	2	3.2	0	0.0	2	2.6	2	5.1
No opinion (3)	6	9.5	0	0.0	6	7.7	3	7.7
5a. Fish more								
Blank (0)	0	0.0	0	0.0	0	0.0	0	0.0
More (1)	34	54.0	10	66.7	44	56.4	10	25.0
Same (2)	26	41.3	4	26.7	30	38.5	27	67.5
Less (3)	1	1.6	0	0.0	1	1.3	0	0.0
No opinion (4)	2	3.2	1	6.7	3	3.8	3	7.5
5b. How much								
More								
Blank (0)	0	0.0	0	0.0	0	0.0	0	0.0
2x (2)	20	58.8	8	80.0	28	63.6	3	30.0
3x (3)	6	17.6	0	0.0	6	13.6	4	40.0
4x+ (4)	8	23.5	2	20.0	10	22.7	3	30.0
Less								
Blank (0)	1	100.0	0	—	1	100.0	0	—
2x (2)	0	—	0	—	0	—	0	—
3x (3)	0	—	0	—	0	—	0	—
4x+ (4)	0	—	0	—	0	—	0	—
6a. Pre-Memorial Day last year								
Blank (0)	0	—	0	—	0	—	0	—
Yes (1)	17	27.0	4	26.7	21	26.9	9	22.5
No (2)	46	73.0	11	73.3	57	73.1	31	77.5
6b. Fished for								
Blank (0)	46	—	11	—	57	—	31	—
Bass (1)	9	52.9	1	25.0	10	47.6	6	66.7
No bass (2)	4	23.5	3	75.0	7	33.3	3	33.3
Anything (3)	4	23.5	0	0.0	4	19.0	0	0.0

Appendix 8. Continued:

Question, answer (code)	Pre-Memorial weekend						Post-Memorial weekend	
	Version 1		Version 2		Version 1+2		Version 2	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
7. Usually								
Blank (0)	0	—	0	—	0	—	0	—
Keep bass (1)	10	15.9	1	6.7	11	14.1	19	47.5
Release (2)	52	82.5	14	93.3	66	84.6	18	45.0
Both (3)	1	1.6	0	0.0	1	1.3	3	7.5
8. Club member								
Blank (0)	0	—	0	—	0	—	0	—
Yes (1)	21	33.3	10	66.7	31	39.7	9	22.5
No (2)	42	66.7	5	33.3	47	60.3	31	77.5
9. Comments								
Blank (0)	0	—	0	—	0	—	0	—
Yes (1)	29	46.0	3	20.0	32	41.0	6	15.0
No (2)	34	54.0	12	80.0	46	59.0	34	85.0
10. Average bass trips/year								
Blank (0)	—	—	0	—	—	—	2	—
1–3 (1)	—	—	0	0.0	—	—	4	10.5
3–10 (2)	—	—	0	0.0	—	—	7	18.4
10+ (3)	—	—	15	100.0	—	—	19	50.0
None (4)	—	—	0	0.4	—	—	8	21.1
11. Fish bass today								
Blank (0)	—	—	0	—	—	—	0	—
Yes (1)	—	—	13	86.7	—	—	17	42.5
No (2)	—	—	2	13.3	—	—	23	57.5

Appendix 9. Estimated catch per hour, number of fish harvested or released, and fishing pressure for Cass Lake, Oakland County, 1988. Two standard errors in parentheses.

Species	Total catch per hour	Month					Total
		Apr	May	Jun	Jul	Aug	
Harvested							
Largemouth bass	0.0153	0	0	104	275	90	469
	(0.0139)	(0)	(0)	(180)	(394)	(130)	(452)
Smallmouth bass	0.0160	0	0	104	162	224	490
	(0.0140)	(0)	(0)	(180)	(196)	(334)	(427)
Walleye	0.0021	0	0	65	0	0	65
	(0.0034)	(0)	(0)	(104)	(0)	(0)	(104)
Bluegill	0.0815	60	142	1,687	366	224	2,479
	(0.1081)	(123)	(220)	(3,173)	(6,540)	(482)	(3,273)
Pumpkinseed	0.0004	0	0	0	2	0	12
	(0.0008)	(0)	(0)	(0)	(25)	(0)	(25)
Black crappie	0.0113	0	95	87	120	45	347
	(0.0113)	(0)	(137)	(176)	(239)	(96)	(341)
Yellow perch	0.0098	0	233	0	0	67	300
	(0.0163)	(0)	(472)	(0)	(0)	(145)	(494)
Carp	0.0021	0	0	64	0	0	64
	(0.0044)	(0)	(0)	(135)	(0)	(0)	(135)
Released							
Largemouth bass							
Legal	0.0157	—	—	—	51	431	482
	(0.0305)	—	—	—	(107)	(925)	(931)
Sublegal	0.0255	—	—	—	375	408	783
	(0.0281)	—	—	—	(540)	(654)	(848)
Smallmouth bass							
Legal	0.0070	—	—	—	0	215	215
	(0.0151)	—	—	—	(0)	(463)	(463)
Sublegal	0.0706	—	—	—	110	2,057	2,167
	(0.1010)	—	—	—	(230)	(3,060)	(3,069)
Angler hours		3,019	6,666	8,659	7,446	4,865	30,703
		(907)	(1,535)	(2,928)	(2,806)	(4,367)	(6,177)
Angler days		907	1,425	1,679	2,104	1,347	7,532
		(340)	(488)	(526)	(882)	(1,291)	(1,788)
Angler trips		1,036	1,721	1,866	2,169	1,347	8,209
		(370)	(546)	(546)	(888)	(1,291)	(1,812)

Appendix 10. Estimated catch per hour, number of fish harvested or released, and fishing pressure for Kent Lake, Oakland County, 1988. Two standard errors in parentheses.

Species	Total catch per hour	Month					Total
		Apr	May	Jun	Jul	Aug	
Harvested							
Largemouth bass	0.0135	0	0	514	618	114	1,246
	(0.0095)	(0)	(0)	(560)	(640)	(135)	(861)
Smallmouth bass	0.0078	0	0	135	168	412	715
	(0.0062)	(0)	(0)	(284)	(285)	(393)	(562)
Walleye	0.0083	0	0	93	547	123	763
	(0.0064)	(0)	(0)	(153)	(524)	(194)	(579)
Northern pike	0.0002	0	0	0	0	15	15
	(0.0004)	(0)	(0)	(0)	(0)	(31)	(31)
Bluegill	0.2782	827	4,843	2,916	6,274	10,755	25,615
	(0.1058)	(665)	(4,096)	(1,817)	(3,156)	(7,046)	(8,951)
Pumpkinseed	0.0044	0	106	24	271	0	399
	(0.0051)	(0)	(226)	(51)	(381)	(0)	(445)
Black crappie	0.3595	4,297	15,443	4,098	5,575	3,684	33,097
	(0.1587)	(3,043)	(11,933)	(2,720)	(3,762)	(3,954)	(13,742)
Yellow perch	0.0328	150	496	125	1,427	820	3,018
	(0.0297)	(164)	(660)	(194)	(2,465)	(825)	(2,694)
Rock bass	0.0216	0	227	570	690	498	1,985
	(0.0131)	(0)	(349)	(653)	(730)	(531)	(1,168)
Other	0.0016	54	0	0	0	89	143
	(0.0020)	(104)	(0)	(0)	(0)	(147)	(180)
Released							
Largemouth bass							
Legal	0.0141	—	—	—	—	1,297	1,297
	(0.0171)	—	—	—	—	(1,562)	(1,562)
Sublegal	0.0074	—	—	—	—	678	678
	(0.0081)	—	—	—	—	(735)	(735)
Smallmouth bass							
Legal	0.0137	—	—	—	—	1,265	1,265
	(0.0285)	—	—	—	—	(2,624)	(2,624)
Sublegal	0.0083	—	—	—	—	765	765
	(0.0096)	—	—	—	—	(875)	(875)
Angler hours		11,692	24,804	18,619	22,841	14,119	92,075
		(4,051)	(10,209)	(5,270)	(5,902)	(2,787)	(13,821)
Angler days		3,103	5,930	4,423	5,467	5,443	24,366
		(1,186)	(25,283)	(1,422)	(1,369)	(1,479)	(3,726)
Angler trips		3,513	6,639	4,423	5,523	5,443	25,541
		(1,319)	(2,717)	(1,422)	(1,378)	(1,479)	(3,903)

Appendix 11. Tabulation of angler interview forms for Muskegon Lake creel census, spring 1988. Early catch-and-release bass season was April 1-May 27.

Statistic	Period		
	Apr 1–30	May 1–27	May 28-Jun 30
Number of interviews	26	38	85
Angler hours	176	378	805
Target species			
Bass spp.	5	11	52
Bass spp. and northern pike	—	1	1
Bass spp. and walleye	—	—	4
Northern pike	—	1	1
Northern pike and yellow perch	—	—	1
Walleye and northern pike	—	2	—
Walleye	1	3	10
Walleye and yellow perch	1	2	1
Yellow perch	17	5	4
Panfish	—	4	6
Salmonid spp.	—	—	—
Anything	2	9	5
Blank	—	—	—
Number caught			
Largemouth bass			
Kept	—	—	3
>12" released	9	15	88
<12" released	—	11	79
Smallmouth bass			
Kept	—	—	23
>12" released	—	35	68
<12" released	—	34	78
Walleye	—	—	—
Northern pike	—	3	4
Yellow perch	356	78	34
Bluegill	1	30	22
Black crappie	—	22	57
Rock bass	—	21	2
Pumpkinseed	—	9	—
Channel catfish	—	4	7
Freshwater drum	—	—	4
Brown trout	1	—	—

Appendix 12. Counts of all fishing boats on Muskegon Lake and of all boat trailers parked at adjacent launching ramps (Cottage Grove, Gidding Street, and Snug Harbor) on selected weekends in spring 1988. Note that trailer counts include boaters on Lake Michigan as well as boaters on Muskegon Lake. Boat counts were made from these launching ramps and North Muskegon State Park.

Date (1988)	Day	Time	Number counted	
			Boats	Trailers
Apr				
16	Sat	2 pm	15	36
24	Sun	2 pm	14	36
30	Sat	1 pm	31	70
May				
7	Sat	2 pm	48	91
14	Sat	3 pm	39	89
22	Sun	1 pm	44	103
28	Sat	1 pm	56	105
Jun				
5	Sun	12 pm	44	58
11	Sat	11 am	45	109

Appendix 13. Tabulation of angler interview forms for Holloway Reservoir creel census, spring 1988. Early catch-and-release bass season was April 1-May 27.[1]

Statistic	Period	
	Apr 1-May 27	May 28-Jun 5
Number of interviews	163	28
Angler hours	529	100
Target species		
Bass spp.	49	15
Bass spp. and northern pike	1	—
Walleye	4	—
Walleye and yellow perch	1	—
Panfish	28	2
Channel catfish	1	—
Anything	5	2
Blank	74	11
Number caught		
Largemouth bass		
Kept	76[2]	27[2]
>12" released	—	—
<12" released	—	—
Smallmouth bass		
Kept	8[2]	7[2]
>12" released	—	—
<12" released	—	—
Walleye	28	11
Northern pike	9	4
Bluegill	294	7
Black crappie	106	4[3]
Channel catfish	27	6
Freshwater drum	3	3
Carp	—	—

[1]Many interview forms were incomplete, difficult to interpret, or likely inaccurate. This summary excludes forms in which the catch data section was left blank. Since some of these blanks may have represented zero catch, catch per hour should not be computed from these data.

[2]All bass catches were reported on the "kept" line of the interview form, but surely some bass were released.

[3]These were recorded as white crappie.

Appendix 14. Counts of fishing boats and shore anglers on Holloway Reservoir, April 1988.

Date	Day	Time	Number counted	
			Boats	Shore
Apr				
1	Fri	7 pm	5	6
2	Sat	7 am	14	9
5	Tue	7 am	4	7
7	Thur	8 pm	2	5
10	Sun	8 am	24	15
11	Mon	12 pm	2	3
15	Fri	9 am	1	2
16	Sat	2 pm	6	3
20	Wed	8 pm	0	0
22	Fri	1 pm	4	3
24	Sun	5 pm	13	5
26	Tue	6 pm	4	3