A Second Season of Creel Census on Fife Lake

R. W. ESCHMEYER

Institute for Fisheries Research, Michigan Department of Conservation, Ann Arbor, Mich.

Reprinted from

VOLUME 66 (1936) TRANSACTIONS OF THE
AMERICAN FISHERIES SOCIETY
INVESTMENT BUILDING, WASHINGTON, D. C.
1937

PRINTED IN U. S. A.

A SECOND SEASON OF CREEL CENSUS ON FIFE LAKE

R. W. ESCHMEYER

Institute for Fisheries Research, Michigan Department of Conservation, Ann Arbor, Mich.

Last year the writer discussed the fishing for a one year period on Fife Lake, Michigan.[1] Since that time another year's census on this lake has been concluded and comparative data for fishing during the two seasons are now available. The census was taken by a crew of specially selected men from the Fife Lake C.C.C. camp under Foreman Erwin Moody's direction and was similar to the census work of 1934-5; details of the census-taking procedure are therefore omitted in this discussion. Only summer fishing, extending from June 25th to September 30th and winter fishing for the period the lake was ice-covered are here considered. It is assumed that all fishermen were seen in summer except a few (less than five per cent) who fished at night. Of those who were seen, all except ninety-one were contacted. Records for these ninety-one fishermen are not included below except in the final table where the fishing of those not contacted is regarded as having been average in every respect. All the winter fishermen were seen and contacted.

Blanks used for recording the data were similar to those used the previous year except that the items "heavy wind," "light wind," and "calm" were added under weather.

SUMMER FISHING (1935)

Data for the summer fishing are summarized briefly below.

Number of fishermen.—Census returns were obtained for a total of 3,594 fisherman-days, 2,831 for men, and 763 for women. A daily average of 36.7 persons fished the lake for the ninety-eight day period.

Number of fish, catch per hour, fish per fishermen, and average size of all fish.—The 3,594 fisherman-days yielded a total of 11,375 fish having an average length of 8.1 inches, caught at the rate of 1.27 fish per hour. The fishermen averaged 3.2 fish per day's fishing (2.5 hours per fishing day). The catch per hour varied from 2.2 the first week to 0.7 late in the season.

Analysis of the catch by species (see Table 1). The number of fish of each species caught, their average size, and the catch per hour of each species are shown in Table 1. There was considerable fluctuation in average size and in catch per hour from week to week for each of

[1] Eschmeyer, R. W., 1936. Analysis of the Game-Fish Catch in a Michigan Lake. Trans Am. Fish. Soc. Vol. 65, pp. 207-223.

TABLE 1. ANALYSIS OF THE CATCH. FIFE LAKE, SUMMER OF 1935[2]

Date	Smallmouth bass			Largemouth bass			Bluegill			Sunfish		
	No. taken	Ave. size	Per hr.	No. taken	Ave. size	Per hr.	No. taken	Ave. size	Per hr.	No. taken	Ave. size	Per hr.
June 25-30	83	13.5	.12	90	13.9	.13	190	7.5	.26	128	7.2	.18
July 1-7	52	13.4	.05	37	14.4	.03	207	6.8	.18	136	6.8	.12
July 8-14	91	13.3	.09	82	13.0	.08	325	6.9	.31	63	6.7	.06
July 15-21	67	12.6	.09	42	13.1	.06	341	6.7	.46	122	6.4	.17
July 22-28	29	11.6	.05	32	12.6	.05	410	7.1	.64	85	6.5	.13
July 29-August 4	47	11.6	.07	22	13.1	.03	396	7.0	.58	183	6.6	.27
August 5-11	80	13.8	.07	49	13.6	.05	647	7.1	.60	258	6.5	.24
August 12-18	135	13.3	.14	41	14.4	.04	468	7.0	.49	168	6.9	.18
August 19-25	96	14.0	.09	27	13.2	.02	428	6.9	.39	174	6.6	.16
August 26-September 1	58	12.6	.14	24	14.2	.06	169	7.3	.40	31	6.8	.07
September 2-8	9	11.9	.05	2	11.0	.01	95	6.8	.53	39	6.5	.22
September 9-15	16	14.6	.15	8	15.2	.07	4	6.8	.04	17	7.1	.16
September 16-22	17	12.0	.12	9	14.2	.06	10	7.9	.07	13	6.8	.09
September 23-30	2	14.0	.05	5	14.0	.12	6	7.5	.14	1	9.0	.02
Total or Average	782	13.1	.09	470	13.6	.05	3696	7.0	.41	1418	6.7	.16

Date	Rock bass			Perch			Walleye			Northern pike		Bullhead	
	No. taken	Ave. size	Per hr.	No. taken	Ave. size	Per hr.	No. taken	Ave. size	Per hr.	No. taken	Ave. size	No. taken	Ave. size
June 25-30	618	8.1	.76	442	7.7	.62	16	19.6	.02	5	24.0	19	10.2
July 1-7	308	7.6	.27	402	7.1	.35	11	23.8	.01	4	24.3	8	9.9
July 8-14	298	7.2	.29	260	7.2	.25	15	22.5	.01	1	20.0	20	8.3
July 15-21	159	7.5	.22	100	7.0	.14	15	19.1	.02	1	24.0	..	...
July 22-28	177	7.2	.28	52	7.0	.08	28	21.3	.04	2	18.5	2	10.0
July 29-Augcst 4	174	6.9	.26	103	7.2	.15	32	22.3	.05	5	22.8	3	12.7
August 5-11	223	6.9	.21	241	7.1	.22	21	21.3	.02	8	22.1	8	10.1
August 12-18	135	7.6	.14	313	7.1	.33	7	19.9	.01	7	23.0	6	12.2
August 19-25	166	7.3	.15	190	7.3	.17	1	25.0	tr.	4	20.0	4	10.0
August 26-September 1	46	7.6	.11	148	7.4	.35	5	18.8	.01	1	17.0	2	11.5
September 2-8	18	7.3	.10	22	6.8	.12	1	26.0	.01	2	21.5	..	....
September 9-15	6	8.3	.06	22	8.2	.21	..	....	...	5	23.4	..	....
September 16-22	39	7.8	.28	14	7.4	.10	..	....	...	6	16.5	..	....
September 23-30	17	9.1	.40	31	7.5	.72	2	16.0	.05	2	16.5	..	....
Total or Average	2384	7.5	.27	2340	7.3	.26	154	21.3	.02	53	21.5	72	10.0

[2] Black crappies were also taken. They constituted an insignificant portion of the total catch.

the various species, but the fluctuation was ordinarily not uniform. Most species were taken most readily the first week of the season. Fishing for bluegills and sunfish was best in mid-season. The catch included 782 smallmouth bass, having an average length of 13.1 inches and taken at the rate of one fish per eleven hours of fishing; 470 largemouth bass, having an average length of 13.6 inches and taken at the rate of one fish per twenty hours of fishing; 3,696 bluegills, average size 7.0 inches and caught at the rate of approximately one fish per two and one-half hours of fishing; 1,418 sunfish, average size 6.7 inches, caught at the rate of one fish per six hours of fishing; 2,384 rock bass, average size 7.5 inches and taken one every four hours; 2,340 perch, average size 7.3 inches long and taken at the same rate as the rock bass; also 154 walleyes, fifty-three northern pike, seventy-two bullheads, and six black crappies. It is understood, of course, that the data on catch per hour are based on all fishing. A person fishing for smallmouth bass did not ordinarily fish eleven hours to catch a bass. The four large game species represented 12.8 per cent of the entire catch.

Methods of fishing and kinds of bait used (see Tables 2 and 3).—Approximately ninety-five per cent of the fishermen used only one method in their day's fishing. Of the records indicating only one method sixty-nine per cent were for still-fishing, twenty-three per cent were for trolling, and eight per cent for casting. The method which yielded the most fish also yielded the smallest; the method which produced the fewest fish also produced, by a narrow margin, the largest.

Worms were used as bait more extensively than all other baits combined. They took the most fish per hour, also the smallest fish. Minnows, plugs, spinners, artificial flies and insects were used. The number of fish taken per hour by different types of baits was inversely proportional to the average size of fish taken.

TABLE 2. GENERAL DATA ON METHODS OF FISHING, FIFE LAKE, SUMMER OF 1935

Method	Repts. covering each method[3] No.	Repts. covering each method[3] Per cent	Fish taken by each method	Fish per day's fishing	Fish per hour	Ave. length of fish inches	Repts. indicating no. fish caught No.	Repts. indicating no. fish caught Per cent
Trolling	770	23	1095	1.4	0.6	11.2	383	50
Casting	281	8	339	1.2	0.5	11.3	170	60
Still-fishing	2346	69	9558	4.1	1.6	7.6	733	31

[3] This computation does not include those records indicating the use of several methods of fishing in one day or not indicating which method was used.

TABLE 3. GENERAL DATA ON EFFECTIVENESS OF VARIOUS KINDS OF BAIT USED, FIFE LAKE, SUMMER OF 1935 [4]

Bait used	No. of records	Per cent getting no fish	Hrs. per fishing day	Catch per hour	No. of fish taken	Average size of all fish (inches)
Artificial:						
Spinner	137	52	2.3	0.5	169	11.2
Plug	412	62	2.4	0.4	352	12.7
Artificial fly	25	36	1.9	1.1	53	9.4
Natural:						
Minnows	701	34	2.6	1.2	2067	8.9
Worms	1747	28	2.6	1.7	7467	7.4
Insects	14	14	3.3	1.6	77	8.4

[4] Not including those records for which no bait was listed or records indicating use or several baits in one fishing day.

Largemouth bass were most successfully fished for with plugs; smallmouth bass and perch with minnows; rock bass, sunfish and bluegills with worms; walleyes with spinner; and northern pike equally well with spinner and with minnows. Data for only the four most used baits (worms, minnows, spinners, and plugs) were utilized in making these determinations.

Relation between fishing and weather (see Table 4).—The records indicated three sets of weather conditions, with reference to clearness (clear, cloudy, rain), roughness (heavy wind, light wind, calm), and temperature (cold, mild, warm). One item in each category was checked. A large number of combinations of the nine weather conditions are possible, but data were compiled only for each condition irrespective of the others. Fish, in general, were best caught when the weather was mild, when there was a light wind and when the sky was clear. Whether fishing was best on a mild, clear day with light wind is not known since the combination of three factors may not necessarily produce good fishing even though each factor may be best when not considered in combination with the others.

The weather conditions under which each species bit best were:

Largemouth bass: Mild, light wind, rain.

Smallmouth bass: Cold, little preference with respect to wind and cloudiness.

Rock bass: Mild, calm, clear. Bit very poorly in cold weather.

Bluegill: Mild, windy, clear. Bit least in rainy weather.

Sunfish: Warm, light wind, clear. Bit least in cold weather.

Perch: Mild, light wind, rain. Poorest when cold and when calm.

Walleyes: Mild or warm, calm, clear.

Northern pike: Cold. Number taken were too few to show other preferences.

Bullhead: No preferences apparent. Number too few to permit comparison.

TABLE 4 NUMBER OF FISHERMEN, CATCH PER HOUR FOR ALL FISH AND FOR EACH SPECIES, UNDER VARIOUS WEATHER CONDITIONS, FIFE LAKE, SUMMER OF 1935

Weather	No. of fishermen	Total No. of fish taken	Hours fished	Catch per hour, all fish	Catch per hour: Largemouth bass	Smallmouth bass	Rock bass	Bluegill	Sunfish	Perch	Walleye	Northern pike	Bullhead
Cold	68	156	174¼	.90	.04	.12	.08	.38	.09	.17	tr.	.04	.01
Mild	2,008	6,753	4,756¾	1.42	.07	.09	.33	.44	.16	.30	.02	.01	.01
Warm	1,468	4,293	3,912	1.10	.04	.08	.20	.38	.17	.21	.02	.02	tr.
Heavy wind [5]	365	1,038	886¾	1.17	.04	.09	.20	.48	.14	.19	.01	.01	.01
Light wind	1,962	5,954	4,896	1.22	.05	.08	.20	.44	.17	.25	.01	.01	.01
Calm	848	2,293	2,104½	1.09	.04	.09	.23	.39	.14	.17	.03	.01	tr.
Clear	1,929	6,354	4,897½	1.30	.05	.08	.27	.44	.17	.25	.02	.01	.01
Cloudy	1,477	4,434	3,647¼	1.22	.05	.09	.25	.38	.15	.27	.01	.01	.01
Rain	156	415	363¼	1.14	.07	.09	.25	.29	.10	.29	.01	.01	.01
Catch per hour for entire season irrespective of weather ...					.05	.09	.27	.41	.16	.26	.02	.01	.01

[5] Data on roughness were not recorded early in the season.

It should be understood that the estimates of temperature are with respect to summer temperature, a "cold" day is not cold in comparison with winter or annual temperature.

Comparison of fishing success of men and women.—It was reported in the previous paper that fewer women than men took no fish. The data were analyzed in greater detail for the 1935 fishing. It was found that for three of the fourteen weeks men took more fish, in proportion, than women; for two weeks both took equal numbers; during all other weeks the women caught more fish per hour than did the men. For the entire season the catch was 1.4 fish per hour for women and 1.2 fish per hour for men. The women fished for a slightly shorter average period than the men (2.3 hours and 2.5 hours respectively) but nevertheless caught more fish per fishing day.

With the exception of the last two weeks, when few people fished, the men invariably caught fish of a larger average size. It is probable that women primarily still-fished with worms while a greater proportion of men used other methods or other baits which produced fewer but larger fish. The average size of fish caught by men and women was 8.3 and 7.5 inches respectively.

Comparison of residents and non-residents.—Of the 3,594 records, 1,249 or approximately thirty-five per cent were for non-residents. The list of states and number from each state are: Ohio 596; Indiana 318; Illinois 229; Kentucky 56; Pennsylvania 44; Minnesota 3; Maryland 2; and Iowa 1. It will be noted that most of the non-residents were from three states, Ohio, Indiana and Illinois, with Ohio contributing approximately one-half of the entire number.

Residents from a large number of communities fished the lake. By approximate air-line distance the number represented in each 25 mile "zone" are as follows: 0 to 25 miles 1117; 25 to 50, 9; 50 to 75, 6; 75 to 100, 12; 100 to 125, 89; 125 to 150, 182; 150 to 175, 122; 175 to 200, 795; and 200 to 225 miles 2. It is interesting to note that with few exceptions the fishermen were either local or were from 100 or more miles away. Of the large number in the 175-200 mile zone, 704 were from Detroit. Including the non-residents, over half of the fishing on Fife Lake was by persons living over 175 miles by air-line (probably over 200 miles by road) from the lake.

The catch per hour and average size of fish caught were almost identical for residents and non-residents, the residents having a very slight advantage in both. Non-residents took approximately a third of the fish. Fishing is apparently a major factor in the tourist and resort business which is rated among Michigan's three leading industries.

Comparison of Fishing—Summers of 1934 and 1935

There were some rather marked differences in the fishing for the two seasons, especially in the composition of the catch. Whether or not

changes in the catch reflect changes in the fish population is not yet evident, but some close relationship probably exists between the two. A comparison of some of the factors is made below:

Number of fishermen.—Including the fishermen seen but not contacted, a total of 2,580 fisherman-days are recorded for 1934; 3,685 for 1935, an increase of forty-three per cent in 1935 over the previous season. This change is probably due, in large part, to an increase in the number of resorters and tourists as a result of improved economic conditions. In 1934 women accounted for 23.5 per cent of the fishing; in 1935, 21.2 per cent of the records were for women.

Hours fished and catch per hour.—Records show a total of 6,187¾ hours of fishing in 1934 and a total of 8,971½ hours in 1935. The total catch was somewhat larger in 1935, consisting of 11,375 fish as compared with 10,656 in 1934. The actual catch was almost identical for the two years since a greater percentage of fishermen was not contacted the first summer (see Table 5). The difference in total catch was not nearly so great, in proportion, as the difference in number of fishermen and number of hours fished. The total crop was slightly larger in 1935, but the catch per fisherman and catch per hour were lower during that season. The catch per hour in 1934 was 1.72, in 1935, 1.27, a decrease of approximately thirty-five per cent over 1934.

An increase of forty-three per cent in fishing accounted for an increase of less than two per cent in the total crop removed (including data for fishermen seen but not contacted). If only a very small per cent of the total fish population were caught annually, it might be anticipated that twice the number of fishermen would take, approximately, twice the number of fish. The fact that a very considerable increase in fishing failed to produce an appreciable increase in the total number of fish taken, might suggest the possibility that the lake is being fished to or beyond capacity, and that the annual crop or "take" is large as compared with the total population of fish. This is further suggested by the fact that the fish caught in 1935 averaged smaller than the 1934 fish (8.1 inches and 8.33 inches, respectively). The suggestion that the lake is overfished is so well expressed by the data, that it might easily be assumed as the truth by the "swivel-chair" investigator. An examination of the fishing, however, will show that a large number of fishermen tended to concentrate on one area of the lake, and inquiry would have revealed that these fishermen were interested primarily in catching walleyes which, though not taken frequently, were of a relatively large size. Had they preferred to catch pan fish, the number of fish taken would probably have been much greater. Each year, according to reports and, for the last several years, according to the census, the average size of the walleyes increases over the previous year, and the species appears to attract more of the anglers' attention. A decline in the catch

per hour, therefore, does not necessarily indicate that a lake is being fished to or beyond capacity.

Comparison of the catch by species.—Differences in the fish catch of the two seasons were relatively great. They may be noted by a comparison of the figures given below:

Total Number of Fish Taken

	1934	*1935*
Smallmouth bass	992	782
Largemouth bass	294	470
Bluegill	1,970	3,696
Sunfish	1,016	1,418
Rock bass	2,129	2,384
Perch	3.755	2,340
Walleye	119	154
Northern pike	48	53
Bullhead	303	72

The total number of bass taken each year was almost the same, but the number of smallmouth bass declined decidedly in 1935, while the number of largemouth bass increased decidedly. The number of bluegills almost doubled while the sunfish and rock bass each increased considerably. The perch catch dropped decidedly in 1935. The total catch of the four species of pan fish combined, increased somewhat in 1935 (8,872 in 1934, 9,838 in 1935). In both the bass and the pan fish, there seems to be some evidence in support of the contention that as one species declines another (competing species) increases. The proportion of the four large predator species combined was almost identical for the two seasons. It may be, of course, that these changes in the catch are not in proportion to changes in the actual fish population. Walleyes and northern pike both increased in the catch, but these two species were not taken in abundance either year. The decided change in the figures for bullheads may be of very little significance. Since most bullheads are apparently caught after dark, the catch is primarily dependent on the amount of night fishing for bullheads and the figures are dependent also on the percentage of night fishing reported by the census.

Average Size of Fish Taken (Inches)

	1934	*1935*
Smallmouth bass	12.25	13.1
Largemouth bass	13.5	13.6
Bluegill	7.2	7.0
Sunfish	6.8	6.7
Rock bass	7.9	7.5
Perch	7.4	7.3
Walleyes	20.1	21.3
Northern pike	21.8	21.5
Bullheads	10.5	10.0

In general, the average size for each species did not vary much. The smallmouth bass and walleyes both increased considerably, while pan

fish decreased slightly in size. The catch per hour dropped for the fish as a whole; increases and decreases in the per hour catch were, naturally, in proportion to increases and decreases in the total catch.

Methods and baits.—There was considerable variation in effectiveness of the different methods and baits and in the number of persons using them, but the two seasons agreed perfectly in one important respect; in both years the method or bait taking the largest fish took also the fewest per hour and was the least likely to take any fish at all; the reverse was true for the method or bait taking the smallest fish, and similar relationships invariably applied for methods and baits taking fish of intermediate size.

Each year most fishermen still-fished, but trolling and casting increased decidedly in 1935 as compared with 1934. Trolling and casting produced relatively similar results each year in catch per hour, but in 1934 trolling produced the fewest and largest, while in 1935 casting replaced trolling in these respects. The catch per fishing day for trolling and casting was better in 1935 than in 1934, while the catch for still-fishing and for fishing in general declined.

The use of artificial bait increased decidedly in 1935 as did the use of worms, but minnows were used less extensively in 1935 than in 1934, and this despite an almost fifty per cent increase in the fishing. Artificial flies and insects, while relatively effective in taking fish, were used by very few fishermen. For comparison the number of records, catch per hour and average size of fish for each bait are shown:

	Number of records		*Catch per hour*		*Avg. length in inches*	
	1934	*1935*	*1934*	*1935*	*1934*	*1935*
Spinner	102	137	0.9	0.5	12.5	11.2
Plug	75	412	0.5	0.4	14.5	12.7
Art. fly	10	25	2.3	1.1	8.2	9.4
Minnows	857	701	1.9	1.2	8.4	8.9
Worms	832	1,747	1.9	1.7	7.8	7.4
Insects	27	14	1.7	1.6	9.3	8.4

The effectiveness of the various baits in taking fish differed relatively little with relation to each other; all were less effective in taking fish in 1935 than in 1934. Of the four most used baits, minnows were most effective both years in taking perch and smallmouth bass. Walleyes were best taken on spinners each year. Largemouth bass were best taken on plugs in 1935, on spinners in 1934. Northern pike were largely caught on spinners in 1934 and equally well on spinners and worms in 1935.

In Table 5 certain summary data for the two seasons are listed for comparison. This table includes data for the fishermen seen but not contacted as well as for those whose records are available. It is assumed in this table that the fishing of those not contacted was average in every respect.

TABLE 5. COMPARISON OF ALL FISHING, FIFE LAKE, SUMMERS OF 1934 AND 1935 [a]

	1934		1935	
	Total Fishing	Per Acre	Total Fishing	Per Acre
Hours fished	6,676.25	8.3	9,199	11.5
Number of fisherman-days	2,580	3.2	3,685	4.7
Hours per fisherman-day	2.6	....	2.5	....
Number of fish	11,460	14.3	11,666	14.6
Fish per fisherman-day	4.4	....	3.2	....
Fish per hour	1.72	....	1.27	....
Average size of all fish	8.33	....	8.1	....
Perch				
Number	4,038	5.1	2,399	3.0
Perch per hour	0.61	....	0.26	....
Average size	7.4	....	7.3	....
Rock bass				
Number	2,289	2.9	2,445	3.1
Rock bass per hour	0.34	....	0.27	....
Average size	7.9	....	7.5	....
Bluegill				
Number	2,118	2.6	3,789	4.7
Bluegills per hour	0.32	....	0.41	....
Average size	7.2	....	7.0	....
Smallmouth bass				
Number	1,066	1.3	802	1.0
Smallmouth bass per hour	0.16	....	0.09	....
Average size	12.25	....	13.1	....
Sunfish				
Number	1,092	1.4	1,465	1.8
Sunfish per hour	0.16	....	0.16	....
Average size	6.8	....	6.7	....
Largemouth bass				
Number	316	0.4	481	0.6
Largemouth bass per hour	0.04	....	0.05	....
Average size	13.5	....	13.6	....
Bullhead				
Number	326	0.4	73	0.1
Average size	10.5	....	10.0	....
Northern pike				
Number	52	....	53	....
Average size	21.8	....	21.5	....
Walleye				
Number	128	0.15	158	0.2
Average size	20.1	....	21.3	....
Sucker				
Number	10	....	....	....
Black crappie				
Number	16	....	6	....

[a] Including data for fishermen seen but not contacted. It is assumed in this table that fishing by those seen but not contacted was average in every respect.

Winter Fishing (Winter of '35-36)

Winter fishing extended from December 1, 1935 to April 30, 1936. During this five month period 191 fishermen fished the lake for a total of 1,002¾ hours. The fishing yielded a total of 136 fish taken at the rate of about 0.14 fish per hour. The fish had an average length of 12.0 inches; the catch included ninety-four perch of an average size of 7.0

inches, forty northern pike averaging 24.0 inches long and two six-inch bluegills. Fife Lake produced, for the winter period, about one fish per six acres, a little more than one per cent of the annual "take". The winter catch was obviously too small to make any material difference in the next summer's fishing results.

Comparative data for the two winter seasons are given below. It will be noted that the catch per hour was almost identical for the two seasons; fishing was only about half as intensive during the 1935-'36 season however, as during the 1933-'34 season. Perch increased, in proportion, in the catch while northern pike decreased.

TABLE 6. COMPARISON OF WINTER FISHING, WINTERS OF '33-'34 AND '35-'36 [7]

	1933-'34	1935-'36
Hours fished	2,098.25	1,002.75
Number of fisherman-days	467	191
Number of fish	286	136
Fish per hour	0.13	0.14
Average size of all fish (inches)	16.9	12.0
Perch		
Number	133	94
Average size	9.0	7.0
Northern pike		
Number	116	40
Average size	25.4	24.0

[7] A few bullheads, walleyes, suckers and shiners were also taken in 1933-'34; two bluegills were taken in 1935-'36.

General Comments

The Fife Lake census is now almost completed for the third consecutive year. During the past summer a biological, chemical and physical survey of this lake was made by one of the Institute's lake survey parties. Scale samples of a number of fish were taken for growth rate studies. Some lake improvement devices have been installed. Stocking records for the last 60 years are available. Interpretations of the data are gradually being made and it appears that, within another year or two, a few of the factors which influence the production of fish in this lake will be a little better understood.

August 23, 1935

Report No. 308

AN ESTIMATE OF THE 1934 FISH CATCH FROM MICHIGAN'S INLAND LAKES.

The areas of 3902 Michigan lakes are listed in the Michigan Lakes and Streams Directory. Tabulation of these areas gave a total area for the 3092 lakes as 699,123 acres. The tabulations were not rechecked and may be inaccurate to a total of several hundred acres. The areas as listed in the "Directory" were based primarily on estimates, apparently mostly by township supervisors. Experience has shown that these estimates are often too high or too low. The average area of the lakes, based on the figures in the "Directory", is about 180 acres (179.2 acres).

For 286 lakes the areas were not listed in the "Directory". Assuming that these were of average size, their total area is close to 50,000 acres. The "Directory" obviously does not list all Michigan lakes. On this source of information the total area of our inland lakes is about 830,000 acres, nearly 2 % of the land area of the state.

If the area of Fife Lake is 800 acres, as estimated in the "Directory", the lake produced 16.3 fish per acre in 1934. Fife Lake is probably more productive than the average upper Michigan lake and less productive than the average lower Michigan lake. If the Fife Lake production was about average for the state, which seems probable, and if the figures listed above are correct, the inland lakes of Michigan produced about 13,500,000 fish in 1934.

The Fife Lake fish had an average length of 8.5 inches. If this length was average for all fish and if all above figures are correct, the catch for 1934 if laid end for end would have been about 1800 miles long, a distance approximately equal to that from Detroit to Spokane, Washington or from southwestern Michigan to Los Angeles, California (air line distances.)

Since about half a million licenses were issued in 1934 there were probably about half a million lake fishermen; the number of licensees who fished only in streams was probably about compensated for by the children under 18 who fished lakes without licenses.

If half a million people fished the lakes and if all above figures were correct, the average fisherman caught approximately 27 fish.

Obviously there are entirely too many "ifs" in these calculations and at best the figures can be regarded only as a very rough estimate; however, they do give some idea of the total catch. This estimate is probably as reliable as any others which may have been made. After the creel census data being gathered in other lakes have been tabulated, a more reliable estimate will be available.

INSTITUTE FOR FISHERIES RESEARCH

R.W. Eschmeyer