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INSTITUTE FOR FISHERIES RESEARCH
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SUMMARY OF COMMERCIAL NETTING OPERATIONS IN BLACK LAKE,

CHEBOYGAN COUNTY, MICHIGAN

by

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In October 1939 Mr. Ralph Curl of Black River, Michigan was issued a permit to remove suckers and other coarse fish from Black Lake. The fish removed were sold in New York. The netting was done on an experimental basis, and was supervised by the Department of Conservation. From these experimental operations considerable information of importance could be secured and the following questions answered:

1. Will the sport fishing be improved through the reduction of the coarse fish population?
2. Of what species is the adult population composed, and what is the relative abundance of each?
3. Will the removal of coarse fish (especially the common sucker) materially effect the balance of the population?

The officer responsible for the supervision of the netting was supplied with printed forms on which he was asked to tabulate the catch for each net lifted. A sample of one of these forms is attached. The location of the different nets was plotted on a map* of the lake, 21 different stations having been established. All fish taken were counted and recorded

* This map is filed with the Institute copy of the report at Ann Arbor.

FIELD TALLY SHEET—FISHERIES INVESTIGATIONS
CATCH OF FISH BY NUMBER AND SPECIES (*)

MICHIGAN DEPARTMENT OF CONSERVATION
and the
UNITED STATES BUREAU OF FISHERIES

Net Station No. Locality Date Page
 Number of nights out Depth of water in feet: beginning of lead; crib Kind of bottom Boat name
 Weather Condition of black bass Data recorded by:

(†)		WHITE SUCKERS (Fine Scaled)		YELLOW PIKE		PERCH		STURGEON SUCKERS (Red-Sided)		GRASS PIKE		LAWYERS		SUNFISH		BLACK BASS	
Legal	Illegal	Legal	Illegal	Legal	Illegal	Legal	Illegal	Legal	Illegal	Legal	Illegal	Large	Small	Legal	Illegal	Legal	Illegal
(‡)								MULLET (Coarse-Scaled)		BULL HEADS		CARP		ROCK BASS		DOG FISH	
Legal	Illegal							Legal	Illegal	Legal	Illegal	Large	Small	Large	Small	Large	Small

(*) The individual fish must be recorded irrespective of whether they are released or not. In the case of those commercial and game species for which a minimum size limit is provided by law, record as legal or illegal. In the case of all other species, whether marketed or not, record as large (of marketable size) or small (unmarketable size). If illegal or small (unmarketable) fish are taken dead, tally these separately as such in the proper column with explanatory notation.
 (†) Use blank column for recording species taken which are not listed, entering name in the column heading.
 (‡) Use reverse side or attach separate sheet for further details or explanations.

as "large" and "small" or legal and sub-legal (large and small refer to non-game species, and legal and sub-legal to game species). Suckers, dogfish, and mullet (redhorse) were kept, and the game species returned to the water in good condition. It is known that very few fish were killed as a result of being caught in the nets for the conservation officer was asked to record any game species killed by gilling. Twenty northern pike and 1 wall-eye were killed in this manner, which is a very insignificant number as compared with a total of 19,304 fish which were handled. It is interesting to note that northern pike were the only ones which were killed in any numbers. Their long snout and large teeth naturally made them more susceptible to gilling than the others.

The nets used were trap nets (called small subs by the commercial fishermen). They were constructed with a double pot ($2\frac{1}{2}$ " mesh stretched), a single 600 foot lead (4" mesh) and two wings or hearts about 20 feet long. As shown by the map, virtually all the netting was done in the northwest end of the lake in from 7 to 20 feet of water. The total catch for the period extending from October 23, 1939 to January 21, 1940 is tabulated below (Table I).

TABLE I

Total catch of adult fish from Black Lake, Cheboygan County, Michigan. For game species "large" indicates legal size, and "small" sub-legal. Relative population given in per cent.

Species	Large	Small	Gilled in net	Total	Per cent of total
Suckers					
<u>C. commersonii</u>	7,090	135	0	7,225	37.4
Rock bass					
<u>A. rupestris</u>	4,206	1,897	0	6,103	31.6
Wall-eye					
<u>S. vitreum</u>	2,472	257	1	2,730	14.1
Bullhead					
<u>A. nebulosus</u>	714	26	0	740	3.8
Northern pike					
<u>E. lucius</u>	603	104	20	727	3.8
Mullet					
<u>M. rubregues</u>	630	38	0	668	3.5
<u>M. anisurum</u>					
Pumpkinseed					
<u>L. gibbosus</u>	348	198	0	546	2.8
Dogfish					
<u>A. calva</u>	308	3	0	311	1.6
Yellow perch					
<u>P. flavescens</u>	152	20	0	172	0.9
Small-mouth bass					
<u>M. dolomieu</u>	54	1	0	55	0.3
Other	27	0	0	27	0.1
Whitefish (9)					
Bluegill (5)					
Large-mouth (5)					
Sturgeon (3)					
Lawyer (3)					
Muskellunge (2)					
	16,597	2,686	21	19,304*	99.9

* There were also 118 lampreys (I. unicuspis) taken off fish, but they are not included above because many were allowed to escape, and per cent of the fish carrying lampreys could not be determined.

Weights and lengths were obtained from suckers and mullet. Two hundred and twenty-three suckers and 57 mullet were weighed and measured and from these average lengths and weights were computed. These averages are given below (Table II).

TABLE II

Average weight in pounds and average total length in inches for three species of coarse fish from Black Lake. Number of specimens used to compute average given in parentheses.

Species	Average weight	Average total length
Common sucker <u>C. commersonii</u> (223)	2 lbs. 4 oz.	17.7
Greater redhorse <u>M. rubreques</u> (11)	6 lbs. 2 1/2 oz.	23.7
Silver mullet <u>M. anisurum</u> (26)	5 lbs. 5 oz.	22.9
Mullet* both species (20)	7 lbs. 1 1/4 oz.	24.6
Mullet** both species (20 37)	6 lbs. 2 oz.	23.6

* These specimens weighed and measured by Mr. Curl are unidentified as to species.

** Combined average for both identified and unidentified specimens.

Scale samples were taken from 325 suckers. Because the lengths and weights of the suckers taken did not vary greatly, those of the suckers from which scale samples were taken (325) are not included in Table II for the sample of 223 was sufficiently large to determine the averages. The scales from the common suckers have not been examined yet, but the average lengths and weights (Table II) indicate that the fish are in good condition in Black Lake. Rate of growth cannot be definitely determined

till the scales are examined, but it is probably quite rapid. Only a few scale samples were taken from the mullet, but several specimens were preserved in order to check on the identification, and scales from these will augment the present series. They also average quite large and probably grow well in the lake. It has been reported that in the spring there is a large sucker run in Black River, and it is very likely that many of the suckers spawn in the streams entering Black Lake.

An attempt has been made to analyze the catch but no very definite conclusions can be drawn at this time. If the sucker population had been materially reduced during the netting period, the catch would be expected to show a definite decrease from week to week. Although the suckers show this in a more definite manner than do the other species, wall-eyes and rock bass, which were not kept, also show a general downward trend, both in total catch and in average number per lift. So few of the other species were caught that their increase and decrease in the catch does not mean a great deal. The weekly catches are plotted in the following graphs. (Figures 1 and 2).

Figure 1, showing the average catch per lift for a period of 13 weeks, indicates that the catch of suckers fell off throughout the period. The second peak during the week of January 4-10 occurred when new nets were placed in the lake. For the other two important species (wall-eye and rock bass), this downward trend is less noticeable. No downward trend should be evident, however, since these fish were returned to the water, unless the fish became "net shy" after one or more captures or unless they became less active as the winter progressed. Figure 2, showing the total weekly catch for the three dominant species, is much more uniform than Figure 1, but this uniformity is probably caused by the fact that as the season progressed there were fewer nets in the lake, and those that were there had been in for some little time and were not taking fish so efficiently

Figure 1
Average catch per lift, of 3 dominant
species in Black Lake, Cheboygan Co.,
Michigan, for a period of 13 weeks.

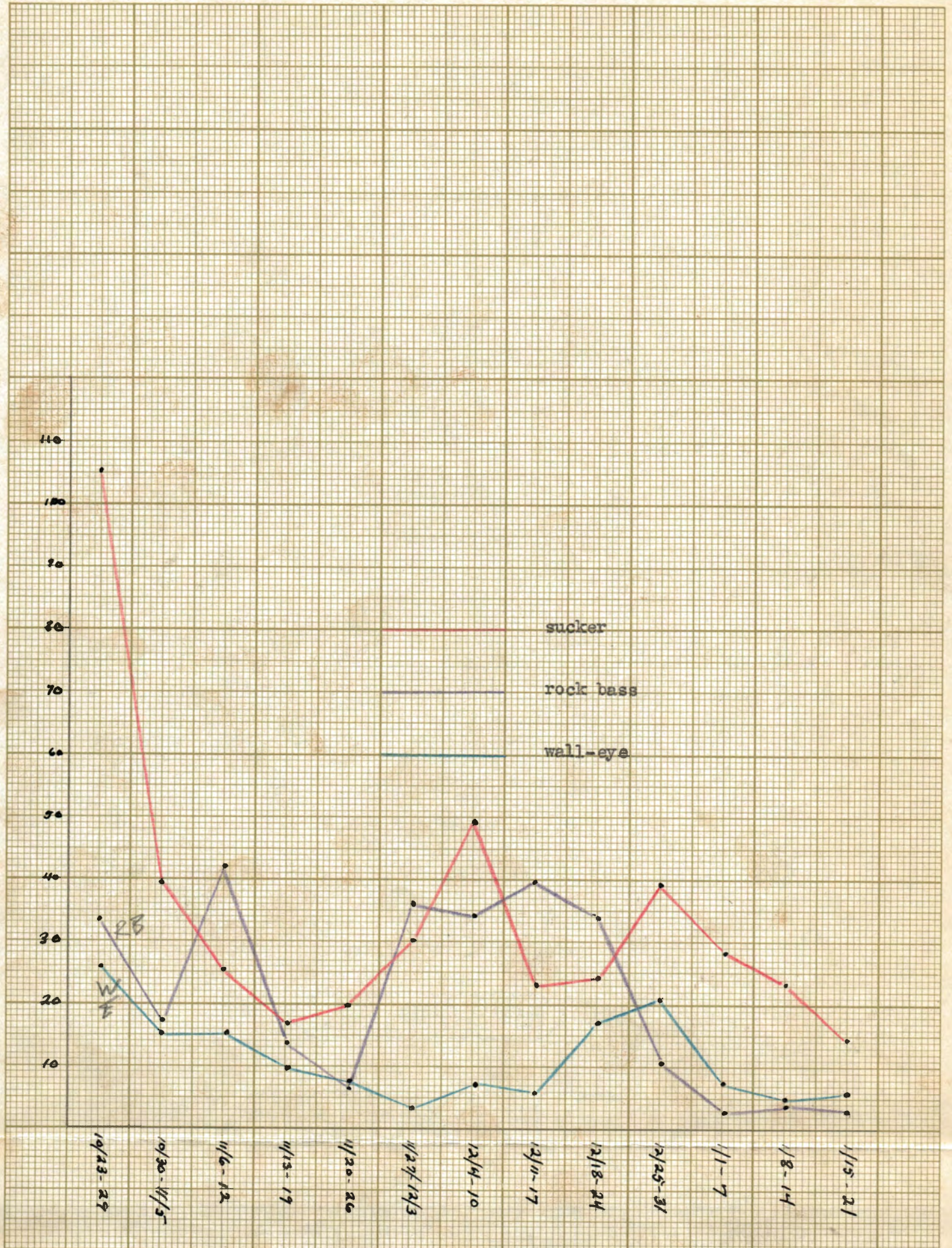
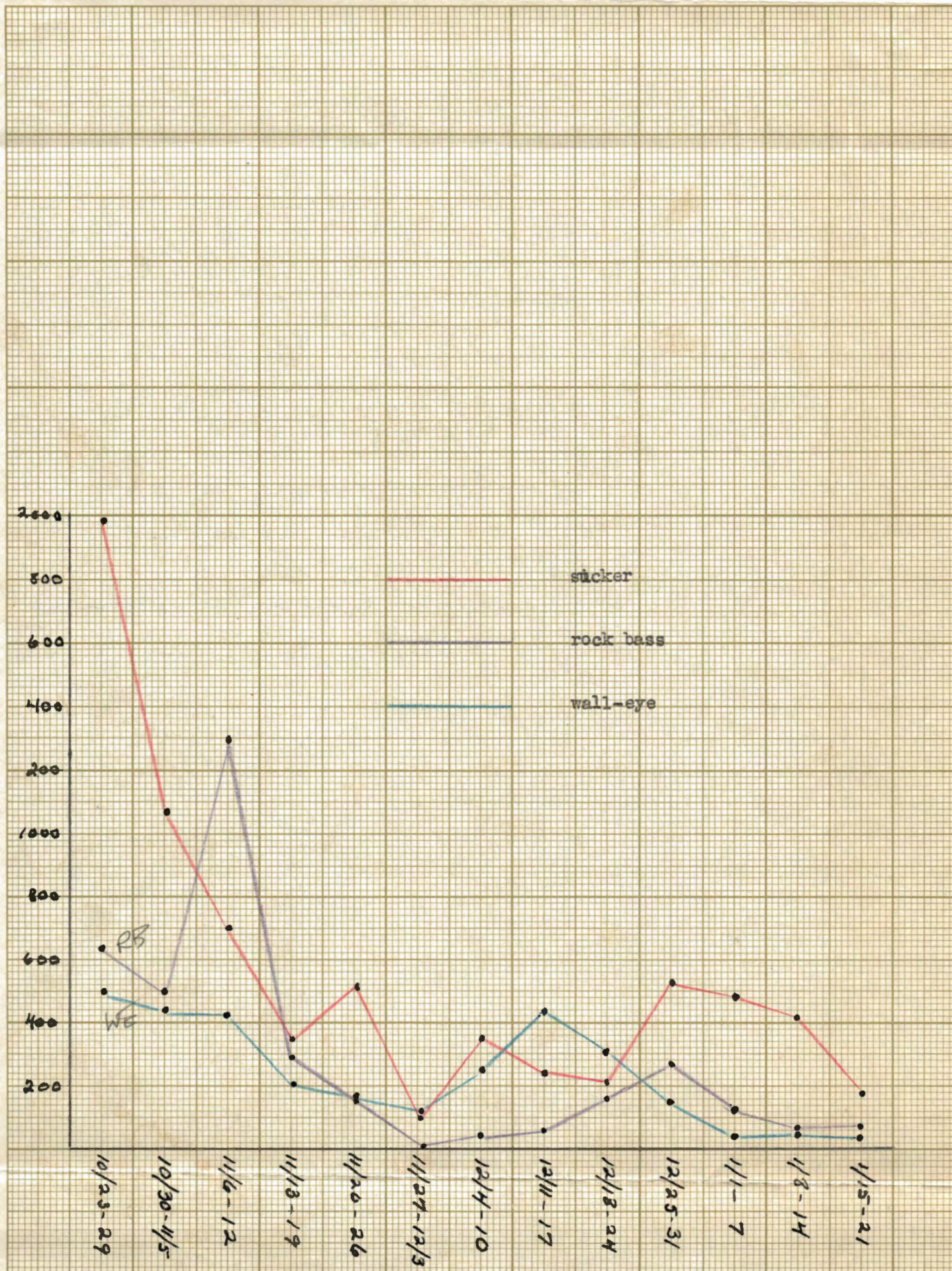


Figure 2
Total weekly catch of 3 dominant species in Black Lake,
Cheboygan Co., Michigan, for a period of 13 weeks.



as when first placed in the lake. However, the two graphs give some indication, though it is far from clear cut, that the sucker population in the northwest end of the lake was reduced to some extent. No clear conclusions can be drawn at this time as to the effect the netting has had on the population. Too many factors tend to obscure any results which might be evident if there was uniformity in the netting which there was not for the following reasons:

1. Nets catch more fish when first placed in the water than they do after they have been there for some time. Of the 21 stations established, 13 show a definite decrease in the catch from week to week. The remaining 8 stations had fresh nets placed in them at least once during the operations.
2. More fish are taken in nets set at some stations than at others. More fish per lift were taken at stations 1, 2, 3, 4, 5, and 7 than at any others.
3. Nets were constantly being moved; new nets were being put in to take their places, or the nets were set at new locations.
4. Mr. Curl was interested in catching suckers, not average samples of the population.

However, from evidence presented in a population study of another lake in the same region (East Twin, Institute Report No. 590) it is more than likely that these netting operations have had some effect on the adult sucker population.

An analysis of the fish catch at each station is presented in Table III. It can be readily seen that suckers formed the largest part of the catch at nearly all stations (4, 7, 12, 14, 19, 20 are exceptions). Rock bass

show a dominance at some stations. From an examination of the map, there seems little to choose from between the stations, but it is quite evident that nets set at some stations caught more fish than those set at others. Nets at 10, 15, 16, 17, and 21 were definitely weak, but whether this is because few lifts were made at those stations or because the fish were not abundant is difficult to say.

Conclusions

1. Providing a CCC project is approved, a creel census will be conducted on Black Lake from May 15 to September 15 this year. The results of this creel census will not be of great value this year since we have very little data for comparison. However, if the creel census is continued, it will show whether the trend in the catch is upward or downward following this removal of suckers.

2. Common suckers, rock bass, and wall-eyed pike are the most abundant species in the lake. Together they comprise 83% of the adult population. Bullheads, northern pike, mullet, pumpkinseed sunfish, and dogfish account for the greater part of the remaining adult population. Yellow perch, small-mouth bass, whitefish, bluegills, large-mouth bass, sturgeon, lawyers, and muskellunge are present, but in very small numbers as compared with the other species. The apparent numerical minority of the perch may be accounted for by the fact that the nets took only perch which were well over legal size. However, it is probable that the perch do not average large in the lake. The northern lamprey (I. unicuspis) is quite abundant in the lake.

3. No definite conclusions can be drawn at this time as to the effect the removal of coarse fish has had on the whole population, but it seems very probable that the removal of something over 11 tons of coarse fish should materially change the balance for at least two or three years.

TABLE III

Analysis of the fish catch at each station, Black Lake, Cheboygan County, Michigan. Relative abundance of each species in per cent given in parentheses under number of each.

Station no. and no. of lifts	Common sucker	Rook bass	Walleyed pike	Brown bull-head	Northern pike	Mullet (two species)	Pumpkin-seed sunfish	Dogfish	Yellow perch	Small-mouth bass	Other species*	Ave. no. per lift	Total catch
1	463	303	84	51	60	37	76	32	7	5	1	124	1,119
(9)	(41.4)	(27.1)	(7.5)	(4.6)	(5.4)	(3.3)	(6.8)	(2.9)	(0.6)	(0.4)	(0.0)		
2	326	232	80	23	81	14	27	29	1	0	0	136	813
(6)	(40.1)	(28.5)	(9.8)	(2.8)	(10.0)	(1.7)	(3.3)	(3.6)	(0.1)	(0.0)	(0.0)		
3	650	621	203	164	109	76	46	54	5	4	0	114	1,932
(17)	(33.6)	(32.1)	(10.5)	(8.5)	(5.6)	(2.4)	(2.4)	(2.8)	(0.3)	(0.2)	(0.0)		
4	610	725	202	77	74	53	14	48	28	2	0	167	1,833
(11)	(33.3)	(39.6)	(11.0)	(4.2)	(4.0)	(2.9)	(0.8)	(2.6)	(1.5)	(0.1)	(0.0)		
5	1,229	221	409	1	31	53	3	0	0	0	2	115	1,949
(17)	(63.0)	(11.3)	(20.9)	(0.0)	(1.5)	(2.7)	(0.1)	(0.0)	(0.0)	(0.0)	(0.1)		
6	144	0	33	0	12	0	0	0	0	0	1	63	190
(3)	(75.7)	(0.0)	(17.3)	(0.0)	(6.3)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.5)		
7	948	1,354	815	332	171	228	256	134	12	11	16	158	4,277
(27)	(22.2)	(31.7)	(19.1)	(7.8)	(4.0)	(5.3)	(6.0)	(3.1)	(0.3)	(0.3)	(0.4)		
8	428	77	93	10	35	113	9	5	0	5	3	43	778
(18)	(55.0)	(9.9)	(12.0)	(1.3)	(4.5)	(14.6)	(1.2)	(0.6)	(0.0)	(0.6)	(0.4)		
9	151	19	24	0	3	23	1	0	3	0	1	45	225
(5)	(67.1)	(8.4)	(10.6)	(0.0)	(1.3)	(10.2)	(0.4)	(0.0)	(1.3)	(0.0)	(0.4)		
10	83	11	7	1	2	5	0	1	3	0	0	23	113
(5)	(73.4)	(9.7)	(6.1)	(0.8)	(1.7)	(4.4)	(0.0)	(0.8)	(2.6)	(0.0)	(0.0)		
11	505	332	197	14	44	12	34	3	16	1	0	68	1,158
(17)	(43.6)	(28.6)	(17.0)	(1.2)	(3.7)	(1.0)	(2.9)	(0.2)	(1.3)	(0.0)	(0.0)		
12	155	304	187	7	27	0	5	3	2	1	0	138	691
(5)	(22.4)	(43.9)	(27.0)	(1.0)	(3.9)	(0.0)	(0.7)	(0.4)	(0.2)	(0.1)	(0.0)		
13	326	244	138	25	21	3	16	0	14	6	0	66	793
(12)	(41.1)	(30.8)	(17.4)	(3.2)	(2.6)	(0.4)	(2.0)	(0.0)	(1.8)	(0.6)	(0.0)		
14	4	92	54	21	14	5	13	0	4	1	1	104	209
(2)	(1.9)	(44.0)	(25.8)	(10.0)	(6.6)	(2.3)	(6.2)	(0.0)	(1.9)	(0.4)	(0.4)		
15	71	27	11	0	3	1	8	0	3	1	0	31	125
(4)	(56.8)	(21.6)	(8.8)	(0.0)	(2.4)	(0.8)	(6.4)	(0.0)	(2.4)	(0.8)	(0.0)		
16	3	2	3	0	1	6	0	0	0	0	0	15	15
(1)	(20.0)	(13.3)	(20.0)	(0.0)	(6.6)	(40.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)		
17	98	10	5	0	3	6	1	0	3	1	0	32	127
(4)	(77.1)	(7.8)	(3.9)	(0.0)	(2.4)	(4.7)	(0.7)	(0.0)	(2.4)	(0.7)	(0.0)		
18	543	246	121	7	10	26	12	2	15	15	1	55	998
(18)	(54.4)	(24.6)	(12.1)	(0.7)	(1.0)	(2.6)	(1.2)	(0.2)	(1.5)	(1.5)	(0.1)		
19	182	617	40	0	5	5	9	0	4	1	1	58	864
(15)	(20.9)	(71.4)	(4.6)	(0.0)	(0.5)	(0.5)	(1.0)	(0.0)	(0.4)	(0.1)	(0.1)		
20	240	650	19	1	3	2	12	0	51	1	0	75	979
(13)	(24.5)	(66.3)	(1.9)	(0.1)	(0.3)	(0.2)	(1.2)	(0.0)	(5.2)	(0.1)	(0.0)		
21	66	16	5	6	18	0	4	0	1	0	0	23	116
(5)	(56.9)	(13.8)	(4.3)	(5.2)	(15.6)	(0.0)	(3.4)	(0.0)	(0.9)	(0.0)	(0.0)		
	7,225	6,103	2,730	740	727	668	546	311	172	55	27		19,304

* Whitefish, sturgeon, lawyer, bluegill, large-mouthed bass, muskellunge.

Whether this will be to the benefit or detriment of the sport fishing cannot be predicted.

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