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REPORT ON GENERAL CENSUS, 1935.

PART III

A summary of the trout catch—by months.

This part of the report on the 1935 general census concerns the three species of trout (Brooks, Rainbows and Browns) and includes only the trout taken in waters which are primarily trout waters. Trout waters were determined on the basis of species caught in the water, on our general knowledge of the water and, to some degree, by reliance on the Michigan Lakes and Streams Directory. Since portions of a stream may be trout waters while other portions may be too warm, the designation of the water was at times difficult. With exceptions, however, it is believed that the waters were correctly designated.

Certain minor differences will be noted by comparison of the data here included with data in earlier parts of this report. These minor and relatively insignificant differences are due to several changes in the use of the data. For example, the catch per hour by district for trout waters as given here differs slightly in one or two districts from the catch per hour given in Part 1. This is due to the fact that data for trout waters in Part 1 include all fish caught in trout waters; the data used in this section of the report include only the trout caught in trout waters. For this study, also, the rather fragmentary data for the several days of open trout season in September were not used and the limited data for District 7 for the entire season were discarded because they were inadequate. Due to these omissions there are also minor differences between fig-

ures given here and figures for somewhat similar data in Part 2.

This section includes data for each month by districts for all three trout species combined and for each species. The figures are probably more dependable for quality of fishing than for quantity. While there is perhaps some decrease in the amount of trout fishing as the summer progresses, this decrease is probably much less than the data indicate (catch of trout: May 5900, June 2093, July 1526, August 1038). The reasons for having more data for May than for the other three months combined are probably several: most lakes are closed to fishing at that time, fire hazards are less pronounced than later in the summer and the large tourist migration has not yet begun—ovbiously more time is available to the officers for census taking on trout waters in May than later in the season.

The total hours fished, number of trout taken, catch of trout per hour, and average size of trout caught are listed in Table 1 for the three species combined for each month in each district. The number, average size and percent of the total catch are listed for each species in the same table.

Analysis by districts. (See Table 1.)

District 1. All trout reports for this district were taken in May. Whether or not there was any considerable amount of trout fishing later in the summer cannot, of course, be determined from the data available. It is probable, however, that the limited number of small headwaters and spring feeders suitable for trout are more or less "fished out" by the end of May. Good fishing in these waters later in the summer would probably be dependent on the stocking of legal-sized trout at various times during the fishing season.

District 2. Almost all of the records are for the month of May. From the meager returns for other months it would appear that trout fishing was better later in the season but the records for months other than May were too few to be of value. The few Brown Trout reported were taken in May, the several Rainbow Trout were caught in June and August.

Table 1. Monthly trends in the trout catch, and in the proportion of each species in the catch, by Districts.

		All trout			Brook Trout			Rainbow Trout			Brown Trout		
	Month	Hrs. fished	No. taken	Catch per hour	Ave. size	No. taken	Ave. size	% total trout catch	No. taken	Ave. size	% total trout catch	No. taken	Ave. size	% total trout catch
District 1.	May	89.5	89	1.0	9.3	74	8.7	83	1	8.0	1	14	12.4	16
District 2.	May	160.9	42	0.3	8.5	38	8.4	90	—	—	—	4	9.5	10
	June	3	2	0.7	7.2	1	7.2	50	1	7.2	50	—	—	—
	Aug.	5	3	0.6	8.6	1	7.7	33	2	9.0	67	—	—	—
	Total or Ave.	168.9	47	0.3	8.5	40	8.4	85.	3	8.4	6	4	9.5	9
District 3.	May	5242.1	3335	0.6	8.6	2240	8.4	67	469	8.8	14	626	9.4	19
	June	1266.7	970	0.8	9.0	343	8.5	35	338	9.0	35	289	9.6	30
	July	908.1	967	1.1	9.0	180	8.4	19	418	8.4	43	369	9.6	38
	Aug.	637.5	552	0.9	8.6	167	8.4	30	199	8.5	36	186	8.9	34
	Total or Ave.	8054.4	5824	0.7	8.7	2930	8.4	50	1424	8.7	24	1470	9.4	25
District 4.	May	1057.4	484	0.5	8.4	346	8.2	71	111	8.3	23	27	11.9	6
	June	200.7	97	0.5	9.8	52	8.5	54	16	10.0	16	29	12.2	30
	July	104.0	60	0.6	9.5	22	8.0	37	5	7.9	8	33	10.7	55
	Aug.	109.1	67	0.6	8.2	35	8.2	52	20	7.7	30	12	8.9	18
	Total or Ave.	1471.2	708	0.5	8.7	455	8.2	64	152	8.4	21	101	11.2	14
District 5	May	506.5	456	0.9	9.5	347	8.5	76	79	13.6	17	30	10.4	7
	June	287.6	185	0.6	9.7	149	9.9	80	19	8.8	10	17	9.0	9
	July	46.0	44	1.0	8.0	44	8.0	100	—	—	—	—	—	—
	Aug.	59.1	130	2.2	14.1	12	9.7	9	115	14.5	88	3	15.0	3
	Total or Ave.	899.2	815	0.9	10.2	552	8.9	68	213	13.7	26	50	10.2	6
District 6	May	442.5	183	0.4	9.0	172	8.9	94	9	12.4	5	2	9.0	1
	June	115.0	81	0.7	9.4	71	8.9	88	5	10.2	6	5	13.9	6
	July	58.0	49	0.8	8.9	42	8.7	86	3	8.7	6	4	11.5	8
	Aug.	30.0	10	0.3	9.7	9	9.8	90	1	9.0	10	—	—	—
	Total or Ave.	645.5	323	0.5	9.1	294	8.9	91	18	11.0	6	11	12.1	3
District 7	Data too few to be dependable.													
District 8	May	1204.9	1311	1.1	8.8	1242	8.7	95	69	10.4	5	—	—	—
	June	560.0	758	1.4	8.8	742	8.9	98	10	11.6	1	6	10.0	1
	July	197.5	406	2.1	9.7	384	9.6	95	22	10.5	5	—	—	—
	Aug.	136.5	276	2.0	9.4	266	9.4	96	10	9.7	4	—	—	—
	Total or Ave.	2098.9	2751	1.3	9.0	2634	9.0	96	111	10.5	4	6	10.0	trace

District 3. For trout waters, as well as for non-trout waters, a large number of records were obtained in this district. The data for this area are probably more reliable than for any other district.

In terms of catch per hour, fishing was best in July and poorest in May. The fish were slightly larger in June and July than in the other two months, due, in part at least, to changes in the composition of the catch.

Brook Trout were of a uniform average size for the season, they varied decidedly, however, in the trout catch. They constituted 67% of the catch in May, 35% in June, 19% in July and 30% in August. If the data were representative, the Brook Trout were largely replaced (in the catch) by the other species during the warm months. The decline of Brook Trout in the catch in July and August may be due to one or more of several causes: their numbers may have been greatly reduced by fishing in May, they may have migrated to the smaller, less accessible feeder streams, they may have changed their diet or they may not have been as active because of high (in places perhaps too high) water temperature. Since the catch per hour of trout increased in mid-summer it is possible also that the Browns and Rainbows took the hook more readily at that time. The latter, if true, would account for a decrease of Brook Trout in the catch. The data show the trend but do not explain the reasons for the trend; it is impossible therefore to indicate definitely the reasons for the change in the composition of the trout catch—a number of factors are probably responsible.

Rainbow Trout increased in the catch as the Brook Trout declined. They were most readily taken in July but were also of the smallest average size at that month. They represented only 14% of the total trout catch in May, 43% in July. Except in May when about 5 Brooks were taken for each Rainbow caught, the Rainbows equaled or exceeded the Brooks in the catch.

Brown Trout fluctuated less than Rainbows from month to month but the changes were somewhat similar for the two species. Browns were much less abundantly taken, in proportion, in May than in the three succeeding months. This

species, however, was the most stable of the three. The average size was relatively uniform for the first three months but dropped somewhat in August.

District 4. The average catch per hour in this district was relatively uniform from month to month. Average size varied from 8.2 inches in August to 9.8 inches in June.

Brook Trout varied in size from an average of 8.0 inches in July to an average of 8.5 inches in June. Changes in the catch were quite similar to changes in the catch for District 3, i. e. fewer were taken in June than in May, in proportion to other species of trout, still fewer were taken in July. In August the percentage of Brook Trout increased again.

Unlike the trend for District 3 where the percentage of catch for Rainbows fluctuated in one direction as the catch of Brook Trout fluctuated in another, the Rainbows in this district had a fluctuation similar to that of the Brook Trout. The number caught in June, July and August, however, were too few to permit comparison; the trend of Rainbows in the catch in this district cannot be determined with any degree of accuracy.

Brown Trout fluctuations in the catch were the opposite of those for Brook Trout. Brown Trout were most readily taken in July.

District 5. For District 5 the data fail to show the trends indicated in the other areas. An increase in the percentage of Brook Trout in June and again in July and an almost complete absence of Brook Trout in the catch in August strongly suggests that the data were not representative. The hours for July and August were too few to permit comparison for those months.

District 6. The trend of the catch in this district compares roughly with the trend in Districts 3 and 4. Data for July and August were inadequate.

District 7. Date for this area were too few to be significant.

District 8. Brook Trout constituted almost the entire catch reported each month. Data for other species were too few to be significant, due to the relative scarcity of these species, not to an inadequate number of records.

Analysis by months. (See Table 2.)

In Table 2 data for each species are compiled by months, and a weighted average for the percentage of each species in the catch is included. It will be noted that in May 76% of the trout were Brook Trout, in June 65% were Brook Trout, in July only 44% were Brook Trout, while in August this percentage increased to 47.

Rainbow Trout increased each month, the percentages for the four consecutive months being 13, 19, 29 and 33. Percentages for Brown Trout varied inversely with those for Brook Trout. They were, for the four consecutive months 12, 17, 27 and 20. Actually the variations for Rainbows probably followed the variation for Browns. The unusual percentage of Rainbows in August in District 5 was apparently not representative; if these data were omitted the percentage of Rainbows in the catch would be lower for August than for July.

There is a very definite correlation between temperature and the relative catch of each species. This correlation is indicated in Table 3 below:

Table 3. Mean monthly temperature and percentage of the catch for each species.

	May	June	July	August
Mean Temperature[1], degrees	55.3	64.7	68.2	65.0
Brook Trout[2], percentage	76	65	44	53
Rainbow Trout[2], "	13	19	29	26
Brown Trout[2], "	12	17	27	20

[1] Data represent an average of the mean monthly temperatures for 1928-1934, taken at the Houghton Lake State Forest Headquarter.

[2] Figures represent percent of total trout catch.

As air temperatures (therefore also water temperatures) increase, the relative catch of Brook Trout decreases and the relative catch of Rainbows and Browns increases. The relative catch of Brook Trout therefore declines in June, and again in July but starts increasing again in August; the reverse is true for the other two species.

It has been suggested in previous reports that in warm weather, warm-water fish tend to be taken more readily, in cool weather the "cool-water" fish tend to "bite" better. What applies to lake fishes seems to apply to trout also. It appears to be reasonable that fish would be more active and eat more when the environmental requirements, including temperature, are best suited for the species. This suggests again the desirability of stocking fish in environments best suited for them; perhaps otherwise it would not only be impossible to obtain a maximum yield of the species due to unfavorable conditions for growth etc., but the species might increase in number at the expense of the fish for which the environment was better suited—fish which there "bit" more readily and, for that reason, were more easily reduced in number.

On the basis of the relatively close correlation between the catch of the several species and temperature it is possible to predict what the results would be if the trout season were extended through September. Since the temperature decreases in September, the relative catch of Brook Trout would probably increase, in other words, an extension of the open season to include September would probably favor the two perhaps less desirable species since, in proportion, fewer fish of these species than of Brook Trout would be taken. If Brook Trout are considered preferable to the other two species an extension of the season would appear to be especially undesirable. On the other hand a later opening of the season would work in favor of the native brook trout.

Chances of taking trout.

Since some fishermen were contacted soon after they started fishing and records for others were taken when they had only partially concluded the day's fishing,

a determination could not be made of the number or percent of fishermen who took no fish. Many who had none when contacted probably caught some later. For this reason the number of hours for records indicating "no fish" were used rather than the number of records. These hours are listed below, together with the percentage of fishing for records which indicated no fish.

	Tot. hrs. fished.	Hrs. for records indicating no catch.	Percent indicating no catch.
May	8,703.8	2,959.9	34
June	2,433.0	700.3	29
July	1,313.6	370.6	28
August	977.2	272.6	28
Total or ave.	13,427.6	4,303.4	32

The chances of taking trout were better in June, July and August than in May. If a person went trout fishing in 1935 the chances were slightly better than 2 to 1 (68 to 32) that he would catch trout.

Conclusion.

Some of the data recorded above are indicated briefly below:

1. May was decidedly the "Brook Trout month." Three-fourths of the trout taken in May were Brook Trout, in July and August less than half of the trout recorded were Brook Trout.

2. In general, changes in the average size of all trout or of any species were not uniform from month to month.

3. Browns and Rainbows were most caught, in proportion, in July.

4. Monthly fluctuations in the relative catch of Browns and of Rainbows were similar.

5. In general, July was the best month for trout fishing, i. e. the catch per hour was greatest for that month.

6. There was a close correlation between the relative abundance of the species in

Table 2. Number and percent of the total trout taken, by species, by months.

District	May						June						July			
	Brook		Rainbow		Brown		Brook		Rainbow		Brown		Brook		Rainbow	
	No.	% tot.	No.	% tot.	No.	% tot.	No.	% tot.	No.	% tot.	No.	% tot.	No.	% tot.	No.	% tot.
1	74	83	1	1	14	16	—	—	—	—	—	—	—	—	—	—
2	38	90	—	—	4	10	1	50	1	50	—	—	—	—	—	—
3	2240	67	469	14	626	19	343	35	338	35	289	30	180	19	418	43
4	346	71	111	23	27	6	52	54	16	16	29	30	22	37	5	8
5	347	76	79	17	30	7	149	80	19	10	17	9	44	100	—	—
6	172	94	9	5	2	1	71	88	5	6	5	6	42	86	3	6
8	1242	95	69	5	—	—	742	98	10	1	6	1	384	95	22	5
Tot. or Ave.	4459	76	738	13	703	12	1358	65	389	19	346	17	672	44	448	29

August*							
Brown		Brook		Rainbow		Brown	
No.	% tot.	No.	% tot.	No.	% tot.	No.	% tot.
—	—	—	—	—	—	—	—
—	—	1	33	2	67	—	—
369	38	167	30	199	36	186	34
33	55	35	52	20	30	12	18
—	—	12	9	115	88	3	3
4	8	9	90	1	10	—	—
—	—	266	96	10	4	—	—
406	27	490	47	347	33	201	20

*Exclusive of data for District 5 the totals and averages for August are: Brook Trout 478, 53%; Rainbow Trout 232, 26%; Brown Trout 201, 20%. Since data for District 5 for August were obviously not representative, the figures given here are the more reliable.

the catch and the mean monthly temperature. With increases in temperature, Brook Trout decreased in the catch while the other two species increased.

7. An Extension of the trout season would probably favor the Browns and Rainbows since it would very likely result in the catch, relatively, of more Brook Trout; shortening the season would probably have the opposite effect.

8. The chances were 2 to 1 that a trout fisherman would catch trout.

Part IV of the 1935 general census, indicating monthly changes in the catch of warm-water species, will be prepared in the near future.

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