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REPORT NO. 361

A STUDY OF THE PERCH IN
SECTION 4 LAKE, OTSEGO CO.

A population of perch from one of the Pigeon River Forest "pot-hole" lakes (South Twin Lake) was studied and was discussed in Report No. 334. For comparison, the perch in another of these lakes (Section 4 Lake) were studied, though in less detail than those taken from South Twin Lake.

The two lakes from which the perch were taken are similar in origin, shape and in certain other respects. Both are described in Report No. 336. Section 4 Lake is the smaller, is considerably deeper, and contains marl on the shoal and slope (South Twin Lake bottom is sand and peat). The two lakes differed decidedly in one respect: beaver were present in Section 4 Lake and apparently had been present for some time. They were noted in 1932 by the Institute survey party. A net which had been set in deep water in the summer of 1934 contained an abundance of beaver faeces when it was lifted. It is possible that the fertility of this lake was increased decidedly by the beaver. There was no indication of the presence of beaver in South Twin Lake.

The perch were removed from Section 4 Lake because they were fished for relatively little and because the lake apparently would be a good trout lake if the perch could be removed. Three hundred brook trout had been planted in 1933 but none were taken at the time the perch were removed. A few were caught in nets in the summer of 1934 and a few were probably still present when the lake was poisoned in September, 1935. Whether these were not affected by the poison or were killed and sank could not be ascertained. Rainbow trout have since been planted. It is probable that a creel census will be taken on this lake during the coming fishing season.

On September 19, 1935, Dr. Hazzard and the writer distributed approximately 75 pounds of derris root (powdered, 5% rotenone content) in the lake. This had been mixed with water and was broadcast from a boat. The poisoning was started at about 10:00 a.m.; the first indication of distress was at about 11:30 a.m. About 50 perch were picked up at noon; more were taken in the afternoon. Most of the perch were taken on the 20th and on the morning of the 21st. Fish were still dying at noon (on the 21st), approximately 50 hours after the poisoning. Since the party left at that time, it is not known when the effects of the poisoning ended or how many fish came to the surface later. Only those fish which floated or which sank in shallow water were recovered; how many actually died could not be determined. What percentage of the population actually survived likewise could not be determined. Some indication regarding the survival should be obtained from the creel census study which will probably be initiated. The rotenone apparently affected the smaller fish first; this may have been due to the different depth distribution of the several sizes or to variation in susceptibility.

Total Population

A total of 1736 fish were recovered from this 3.3 acre lake (determined to be 3.3 acres by the Institute's Lake Survey party in 1932). A total of 526 fish per acre was therefore definitely accounted for; the actual population was probably considerably greater. The fish recovered had a total weight of 76.36 pounds (34,700 grams) or a weight, per acre, of 23.1 pounds. A total of 955 fish per acre (weight approximately 29 pounds) were accounted for in South Twin Lake. The fish in Section 4 Lake were obviously fewer in number but they had a greater average weight.

Size and Age Distribution

All fish recovered were measured to the nearest millimeter and weighed to the nearest tenth-gram after several months' preservation in formaldehyde and alcohol. The fish in the 0 group were weighed in lots, all other fish were weighed individually. The size distribution, irrespective of age is shown in Table 1 where the fish are grouped in 10 mm. classes. It will be noted that no really large perch were recovered. The table shows that several age groups are represented.

Table 1

Size distribution of all perch recovered from Section 4 Lake by 10 mm. classes. (Standard length)

Size Class	Both sexes	Males	Females
49.5 - 59.5	1	...	1
59.5 - 69.5	91	51	40
69.5 - 79.5	322	180	142
79.5 - 89.5	34	25	9
89.5 - 99.5	90	72	18
99.5 - 109.5	250	200	50
109.5 - 119.5	592	539	53
119.5 - 129.5	246	122	124
129.5 - 139.5	72	12	60
139.5 - 149.5	27	1	26
149.5 - 159.5	7	...	7
159.5 - 169.5	3	...	3
169.5 - 179.5	1	...	1
Total	1,736	1,202	534

The ages for approximately 50% of the perch were determined by a study of the scales under a binocular microscope. It was noted that many of the fish could be definitely placed in the correct age group without actual study of the scales. Of the number which were placed in the age groups without the scale study, the age of not more than a very small percentage was misjudged since all those of extreme size for any age group were actually studied. Table 2 gives the distribution of the several sexes by age groups, also the length, weight and coefficient of condition for each sex in each age group.

Table 2

Number of female and male perch
in each year group, and average length,
weight and condition of fish in each group¹

	0	I	II	III	IV
Number of fish:					
Females	192	82	171	82	7
Males	255	149	786	12	..
Average standard length (mm.):					
Females	72.8	104.7	123.5	136.9	157.9
Males	76.5	100.0	115.2	131.3	..
Average weight (grams):					
Females	6.2	17.2	28.6	41.0	63.1
Males	6.0	15.8	24.3	34.4	..
Average total length (inches, approximate):					
Females	3.5	4.9	5.8	6.5	7.4
Males	3.6	4.8	5.4	6.2	..
Average weight (ounces):					
Females	.2	.6	1.0	1.4	2.2
Males	.2	.55	.9	1.2	..
Average value of K:					
Females	1.66	1.53	1.54	1.59	1.60
Males	1.38	1.63	1.60	1.53	..

¹ Since these fish were taken in mid-September, they were actually almost one growing season older than the figures (annuli) indicate.

It will be noted in Table 2 that with the exception of the 0 group the females grew more rapidly than the males; even in the 0 group the females had a greater average weight than the males. By comparison with Table 2 of Report No. 334 (South Twin Lake perch), it will be noted that the Section 4 Lake perch grew more rapidly. A comparison shows also that in both lakes the females grew more rapidly than the males, and the older fish were all females.

The approximate number of legal sized perch was determined. As for the South Twin Lake all fish with a total length of 150 mm. (preserved) were considered legal. The fish of this length included 156 females and 33 males, a proportion of approximately 5 to 1. Ten and nine-tenths per cent of all fish recovered were of legal size (150 mm. or more), representing 57 perch per acre. The proportion of legal fish was greater in this lake than in South Twin Lake, the number of legal fish per acre was slightly below that in South Twin Lake.

Sex Ratio

The ratio of females to males was 44 females per 100 males. In the younger fish (0, I and II groups) the males predominated rather decidedly. Fish in the III group were mostly females and all fish in the IV group were females. The dominance of males in young fish and females in the older fish was noted also in the South Twin Lake perch.

Condition of Perch

In general the perch were in good condition. In the 0 group the females were decidedly in better condition. After the first year the males declined slightly in condition each year while the females improved slightly each year. In general the perch were in much better condition than those taken from South Twin Lake.

General Characteristics of the Population

The perch from Section 4 Lake, poisoned in September, 1934, showed the following characteristics:

1. Most of the fish were young fish, only 7 of them were over 3 winters (4 summers) old.
2. In general the larger and older fish were females.
3. The females grew more rapidly than the males.
4. The males predominated decidedly in the total population and in each of the first three age groups.
5. The II group predominated; 957 of the 1736 fish were of this group.

6. The O group was well represented (compare with South Twin Lake perch).
7. Approximately 11% of the fish were of legal length (57 per acre).
8. The total population recovered represented 526 fish (23.1 lb.) per acre.
9. The fish grew at a moderate rate and were in fair condition (compared with perch from several other inland lakes).
10. The condition of the males decreased slightly each year after the first, while the condition of the females increased slightly each year after the first.
11. Only a very few extremely thin, emaciated individuals were recovered.

The writer was assisted in preparing these data by Mr. James Daza of the Works Progress Administration.

INSTITUTE FOR FISHERIES RESEARCH

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