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INSTITUTE FOR FISHERIES RESEARCH

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RESULTS FROM THE TAGGING OF SMALLMOUTH BLACK BASS

TRANSFERRED FROM LAKE HURON TO LONG LAKE,

ALPENA AND PRESQUE ISLE COUNTIES

by

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For several years it has been the practice of the Fisheries Division of the Department of Conservation to transfer smallmouth black bass from certain Great Lakes areas to inland lakes of the state. These bass are obtained from commercial fishermen owning the proper type of gear who are issued special permits to collect the bass for the State. The commercial fishermen are paid for their work at the rate of 10 cents per fish regardless of the size of the bass (except that most smallmouth bass taken by the commercial gear will be 8 inches or larger). Long Lake, in Alpena and Presque Isle Counties, has been the recipient of such transfers since 1933, receiving from 400 to 1,000 adult bass each year (Table 1). During August, 1940, the author was able to jaw-tag a total of 200 smallmouth bass out of 1,005 adult fish released, and also 12 yellow perch, which were received from the commercial fishermen. This report will discuss the information obtained to date from the recoveries of tagged smallmouth bass reported to the Institute for Fisheries Research. No tagged perch have been reported as yet (December, 1941).

Locality and Time of Planting

The fish which were tagged were released on August 13 and August 16, 1940, and were collected from the live-traps of the commercial fishermen on the same

day that they were tagged and released in Long Lake. The tagging and measuring was done on the motorized planting unit as the fish were taken from the tanks for release.

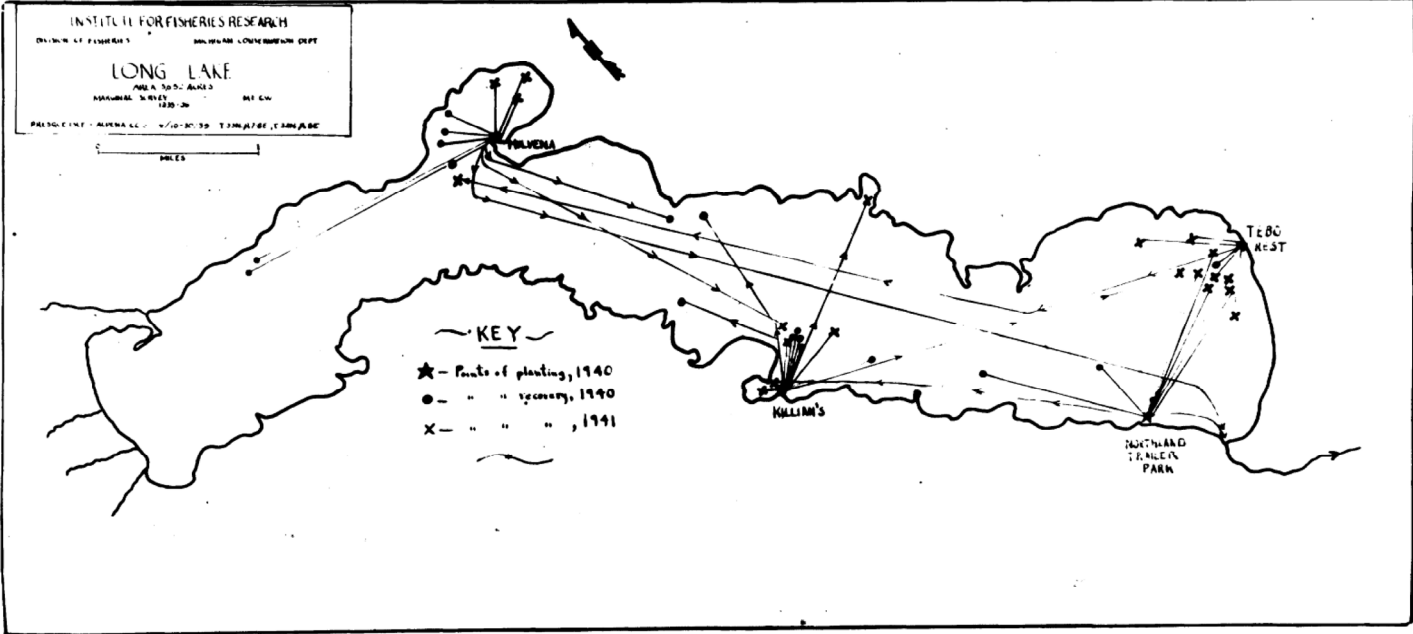
The tagged bass were planted at four different and quite widely separated localities, two on each side of Long Lake (See map). The number of fish planted at each locality and the number in each planting which were of legal size, and the average size of the fish is given in Table 2. The reader will note that only 41.5 per cent (83 of 117) of the fish tagged were of legal size (10 inches, total length) when released.

Recoveries Made During 1940

Nine of the twenty recoveries reported during the 1940 bass season were of fish which were less than ten inches at the time of tagging. Since these nine fish ranged in size from 8 to 9 $\frac{7}{8}$ inches total length when tagged, and were recovered very soon after release (3 to 16 days), obviously they were taken before they had grown to the legal size of 10 inches. The eleven other recoveries were all larger than legal size when tagged, and also on recovery. Table 3 presents the data obtained from the recoveries made during the 1940 season.

The reader will note also for the 1940 recoveries (solid circles on map) that the average distance moved was not over a mile from the locality of any one release. The longest movements recorded were from the fish released at Mulvena, two of which were recovered in the north end of the lake on McDaniel's Reef, approximately 1 $\frac{3}{4}$ miles away.

Considering the entire number of recoveries of tagged fish made in 1940, twenty of 200 tagged fish released were recaptured or reported, a recovery percentage of 10 per cent up to the close of the 1940 season. These recovered smallmouth black bass were free an average of 9.7 days, moved an average of



0.7 miles between the tagging and the recovery locality, and on the basis of measurements reported on 10 of the 20 recoveries, grew at the rate of approximately 1 millimeter per day--about $1/25$ of an inch during late August and September, 1940.

Recoveries Made During 1941

Since 17 of the tagged fish had been removed by angling in 1940 (20 recovered but 3 were returned to the water), 183 tagged smallmouth black bass were available, theoretically, for the 1941 angling season. To date (December 1, 1941), a total of 25 recoveries have been reported or 13.1 per cent of the fish theoretically present.

Of the 25 tagged fish recovered in 1941, 11 were fish which were larger than 10 inches when tagged, while 14 grew to a length of 10 inches or more during the intervening winter.

The 1941 recoveries have been separated and analyzed according to locality of release (Table 4) and also to size at time of tagging (larger than, or smaller than 10 inches). The results of the latter groupings are shown in Table 5.

Approximately the same number of recoveries were made from all localities of release in 1941.

The average number of miles moved was somewhat higher for the 1941 recoveries since they had had a longer time in which to scatter if they so desired. Comparing the 1940 and 1941 recoveries each as a group, the average recovery in 1940 was only 0.7 miles away from the locality of release, whereas the 1941 recoveries were found to be an average of 1.1 miles from the point of liberation. The growth of the 1940 recoveries was faster (approximately 1 mm. per day of freedom) whereas the average growth per day for the 1941 recoveries was only about one seventh as rapid (0.13 mm. per day) over the longer time

period. The explanation for this apparently slower rate of growth for the 1941 recoveries is that for much of the winter (1940-41) before their recovery they experienced no growth, and did not begin to grow again until early summer in 1941, and the calculated growth per day is therefore small. Comparison of Tables 3 and 4 will show, however, that the average total increase of the 1941 recoveries is considerably greater than that noted for 1940 recoveries.

Two of the most interesting reports were from two tagged smallmouth bass which migrated out of Long Lake after release, and were recaptured in Huron Bay, in Lake Huron, by the same commercial fisherman who originally delivered certain of the fish for Long Lake. These two fish were taken 365 and 387 days respectively after release. The first fish was 311 mm. at tagging and had gained 19 mm.; the second was 457 mm. at tagging and had not increased in length. The largest fish was planted on August 13, 1940, at Mulvena Point, which was the point of release most distant from the outlet, while the smaller fish was released at Northland Trailer Park on August 16, 1940, the planting locality closest to the outlet. Both were returned to Long Lake after recapture.

The recapture of these marked fish in Lake Huron indicates that at least one per cent (possibly even higher) of the transplanted fish migrate out of Long Lake after their release. It may then be estimated that of the 1,000 fish released in this lake in 1940, ten or more returned to their native waters via the outlet.

As shown in Table 5, a slightly higher percentage of tagged fish was recovered which were longer than 10 inches at the time of release (15.1 to 12.7), although they were free a longer average period of time (348 days to 339 days). Growth of the fish which were legal at the time of release was the same as for those fish which were less than 10 inches at the time of planting. The under-sized fish moved approximately $\frac{1}{2}$ mile less on the average than did the larger

fish (0.90 miles as compared with 1.47 miles). In these calculations the two fish moving into Lake Huron were excluded. If these fish were included, the average migration of the legal fish would be in the vicinity of 5 miles.

On the accompanying map, all tag recoveries with adequate locality data have been plotted. Of the 45 recoveries reported to date, 29 (64.4 per cent) moved one mile or less, 10 (22.2 per cent) moved from 1 1/8 to 5 miles, and 2 (4.4 per cent) moved between 15 and 25 miles (to Lake Huron). These two fish are represented on the map by arrows ending at the outlet (lower right on map). Four records did not have locality data (8.8 per cent).

From the pattern of the recovery data for each planting locality, it will be noted that the large majority of the tagged fish were captured not much more than a mile from the vicinity of planting. With the possible exception of the fish moving more than a mile, the plotted localities of recovery also suggest that the lines of migration roughly follow the shoreline and rocky reefs, except in the shallow southeastern corner. The author cannot explain the absence of reports from the northwestern corner of the lake, as this area appears, from a study of the survey maps, to be just as suitable for smallmouth bass as the remainder of the lake. Possibly this area is not fished as heavily, or possibly anglers fishing that territory who recovered tagged bass failed to report them.

Conclusions

1. From the data secured from the recovery of smallmouth black bass transferred from Lake Huron to Long Lake and tagged at the time of release, it may be concluded that at least 25 per cent of the fish transferred (and probably more) will be recaptured by anglers within a year, depending on the time of transfer and release.

2. The majority of the transplanted fish appear to stay within a radius of 1 1/4 miles of the point of planting. However, one or more per cent return

to Lake Huron through the outlet stream, as proven by the recovery of two tagged smallmouth bass recaptured in Huron Bay.

3. The average growth of the transplanted fish appears to be about 1 3/4 inches per year. This increase in size is slightly less than found by Bennett (1938) for the smallmouth bass of northern Wisconsin for fish of a similar size. Both categories of fish, those which were sub-legal and those which were larger than 10 inches at release, gained in length at approximately the same rate.

4. The average migration of the fish which were of legal size when tagged appears to be about one third farther than the average migration of the marked fish which were less than 10 inches long at the time of release. If further transplantings are contemplated, it is possible that planting fish of a size range of 8 - 11 inches would be of greater benefit to Long Lake anglers since the smaller fish grow just as fast and appear to range less widely. Release from three localities on each side of Long Lake would seem to give anglers in all localities a fair chance to catch the transplanted individuals.

Acknowledgements

The author is indebted to Floyd Potts, Supervisor of Fisheries Operations at the Harrisville Hatchery, and his staff who aided in the planting and marking of the fish. Thanks are due also to the many fishermen who voluntarily reported the recapture of tagged fish, and particularly to Orville Murch, Secretary of the Long Lake Improvement Association, who gave freely of his time and efforts to obtain recovery information from the various resort and cottage owners on the shores of Long Lake.

1938. Bennett, George W.

Growth of the Smallmouth Black Bass, Micropterus dolomieu Lacépède, in Wisconsin Waters. Copeia, 1938, No. 4, December 10, pp. 157-170, 10 tables, 4 figures.

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Table 1

Number of Adult Smallmouth Black Bass Released
in Long Lake, By Years, 1933-1940, According
to Fish Division Planting Records

Year	Number of adult smallmouth bass released in Long Lake
1940	1,005
1939	1,040
1938	461
1937	442
1936	668
1935	...
1934	605
1933	709
Total	4,930

Table 2

Planting Data on Tagged Smallmouth Black Bass
Released in Long Lake During August, 1940
(Figures in Parentheses Are in Inches)

Date of release	Locality	Number released	Number of legal fish	Number of sub-legal fish	Average size of all fish
August 13, 1941	Tebo's Resort (T. 32 N., R. 8 E., Sec. 11)	41	26	15	252(9.9)
August 13, 1941	Mulvena Point (T. 33 N., R. 8 E., Sec. 29)	48	17	31	253(9.9)
August 16, 1941	Killian's (T. 32 N., R. 8 E., Sec. 5)	57	18	39	241(9.5)
August 16, 1941	Northland Trailer Park (T. 32 N., R. 8 E., Sec. 15)	54	22	32	252(9.9)
Totals or averages		200	83	117	249(9.8)

Table 3

Tagging and Recovery Data For the Tagged Smallmouth
 Black Bass Recovered From Long Lake
 During the 1940 Fishing Season
 (Figures in Parentheses Are in Inches)

Locality	Number released	Number recovered	Percentage of recovery	Average number of			
				Days out	Miles moved	mm. of growth	mm. of growth per day
Tebo	41	2	4.9	↓ 16.0	↓ 0.3	↓ 3 (0.1)	0.18
Mulvena	48	7	14.6	11.1	0.9	↓ 3 (0.3)	0.72
Killian's	57	7 ↕	12.3	7.8	0.5	↓ 3 (0.1)	0.38
Northland Trailer Park	54	4	7.4	8.8	↓ 0.6	↓ 22 (0.9)	2.50
Totals or averages	200	20	10.0	↓ ¹⁹ 9.7	↓ ¹⁸ 0.7	↓ ¹⁰ 9.5 (0.4)	0.98

↓ Indicates number of recoveries on which average is based where all recoveries were not usable.

↕ Three recoveries returned to the water after recording tag number.

Table 4

Tagging and Recovery Data For the Tagged Smallmouth
Black Bass Recovered From Long Lake During
the 1941 Fishing Season
(Figures in Parentheses Are in Inches)

Locality	Number released	Number recovered	Percentage of recovery	Average number of			
				Days out	Miles moved	mm. of growth	mm. of growth per day
Tebo	39	6	15.4	362.3	↓ ⁵ 1.4	49 (1.9)	0.13
Mulvena	41	6	14.6	332.5	↓ ^a 0.9	54 (2.1)	0.16
Killian's	53	6	11.3	339.4	↓ ⁵ 1.1	45 (1.8)	0.13
Northland Trailer Park	50	7	14.0	338.0	↓ ⁶ 1.1	38 (1.5)	0.11
Totals or averages	183	25	13.7	342.0	↓ ²¹ 1.1	46 (1.8)	0.13

↓¹ Indicates number of recoveries on which averages were based where all recoveries were not usable.

↓^a One fish from each of these releases left Long Lake and these fish have not been used in calculating the average miles moved.

Table 5

Comparison of Recovery Results Between Tagged Smallmouth Black Bass of Long Lake Which Were Larger Than and Smaller Than 10 Inches on Release (Only 1941 Recoveries Considered)
(Figures in Parentheses Are in Inches)

Size of fish when tagged	Number available	Number recovered	Percentage of recovery	Average size at tagging	Average number of			
					Days out	Miles moved	mm. growth	mm. growth per day
Longer than 10 inches	73	11	15.1	293 (11.5)	¹⁰ 348	⁸ 1.47	¹⁰ 47 (1.8)	0.13
Shorter than 10 inches	110	14	12.7	230 (9.1)	339	¹³ 0.90	46 (1.8)	0.13
Totals or averages	183	25	13.6	258 (10.2)	342	²¹ 1.1	²⁴ 46 (1.8)	0.13

¹ Indicates number of recoveries on which averages were based where all recoveries were not usable.