

Copies to all district
fisheries supervisors
1-26-42 (without graphs)
L.S.

Original: Fish Division
cc: Education-Game
Mr. Hans Peterson (with graphs)
Dr. Leonard

(W)

INSTITUTE FOR FISHERIES RESEARCH Mr. Crowe
DIVISION OF FISHERIES
MICHIGAN DEPARTMENT OF CONSERVATION
COOPERATING WITH THE
UNIVERSITY OF MICHIGAN

ALBERT S. HAZZARD, PH.D.
DIRECTOR

January 13, 1942

ADDRESS
UNIVERSITY MUSEUMS ANNEX
ANN ARBOR, MICHIGAN

REPORT NO. 728

SOME RESULTS OF THE TRANSFER OF ADULT SMALLMOUTH BASS
FROM LAKE HURON TO INLAND WATERS

by

Walter Crowe

The Michigan Department of Conservation has made a practice of stocking a limited number of adult smallmouth bass in various inland waters of the State. Commercial fishermen are issued permits and allowed to hold the smallmouth bass which are captured in their nets. The State pays the sum of ten cents for each smallmouth delivered in good condition to the Supervisor of Hatchery Operations in that district. The fish are then transferred by the hatchery crew. Information secured concerning the growth, survival and availability to fishermen of certain of these "transfers" will be presented in this report.

East Twin Lake, in Montmorency County, at the town of Lewiston, received 362 of these fish in 1939 and 277 in 1940. All of the 639 fish were from Lake Huron in the vicinity of Black River, Michigan. They were all released in East Twin Lake at the extreme northernmost corner. All were planted by the crew from the Harrisville Hatchery, assisted by the writer. In 1939, of the 362 fish planted, 237 were jaw-tagged, (the remaining 125 were fin-clipped). In 1940 all of the 277 fish planted were tagged with a metal tag around the lower jaw bone.

To date, 57, or 24.1 per cent of the fish tagged and planted in 1939 have been recovered. Forty, or 14.4 per cent of those planted in 1940 have been retaken. Ninety-seven, or 18.9 per cent of the total planting in East Twin Lake have been recovered.

Of the recaptured fish from the 1939 planting, 12, or 21.1 per cent, were recovered in 1939 between August 28 (date of planting) and September 24; forty-three, or 75.4 per cent, were recaptured in 1940, and 2, or 3.5 per cent, were taken in 1941.

Two plantings were made in 1940. The first, on July 2, consisted of 166 fish. From this planting there have been 31 retakes. Of these 31 recoveries, 30, or 18.1 per cent of the total planting were caught by fishermen and only one was found dead on shore. Thirty of the 31 recoveries were made before August 21, (the date of the second planting). The one dead fish was picked up on July 20, 1940. One recovery from this planting was made on September 12, 1940. It is of interest to note that of the 29 tagged fish captured by fishermen between July 2 and August 21, twenty-one were caught during the first three weeks following the planting, and only 8 in the last four weeks preceding the second planting on August 21.

The August 21 planting included 111 fish. Nine, or 8.1 per cent, have been caught by fishermen, 6 in 1940, and 3 in 1941. Of the six 1940 recoveries, 5 were caught within the first three weeks after planting, but there were few fishermen on the lake after August 21 so that these figures are not of so great interest as are those for the first planting.

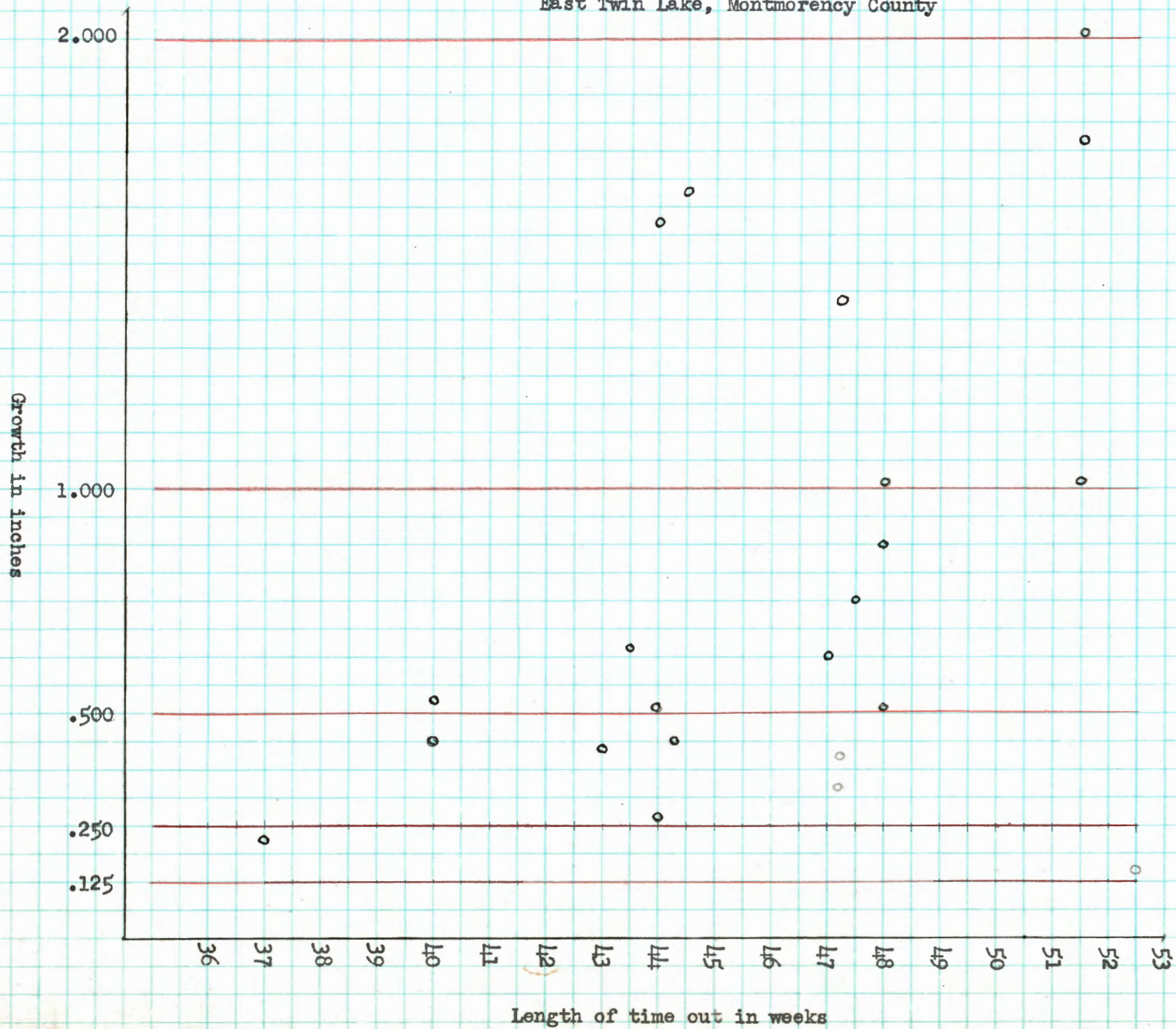
The amount of data obtained relative to the growth of the transferred fish is limited because most of the fish were caught shortly after being transferred, so that growth was negligible, and also because many of the recaptured fish were not accurately measured by the fishermen. Mr. Boyd Walker,

who obtained a creel census on East Twin during the summer of 1940, secured accurate measurements whenever possible, but the number obtained is meager. The growth of a few specimens is shown in Figure 1. As can be seen from the figure, the 22 fish from which accurate measurements were secured had been at liberty in the lake for a period of from 37 to 52 weeks. The range in their growth during this period was from just short of $1/4$ of an inch to just over 2 inches. (All the fish were of legal size and better when caught). As shown in the figure (Figure 1) 2 had grown less than $1/4$ of an inch, 6 less than $\frac{1}{2}$ of an inch, 7 had grown more than $\frac{1}{2}$ but less than 1 inch, 6 had grown more than 1 inch, and 1 had grown just over 2 inches. The average growth for the lot over about one year's growing period was 0.8 of an inch. According to data compiled by Dr. W. C. Beckman of the Institute Staff, this growth is about average for the species in the State. Also, 2 specimens which had been at liberty for just two years should be mentioned. Numbers 9914 and 9951 showed growths of 105 and 120 mm. respectively, or over 2 inches a year.

East Twin Lake was visited in the spring of 1940 when the smallmouth were spawning. Two tagged fish were observed guarding nests but neither could be captured, although every effort was made to do so. However, since according to our records there were only 5 native smallmouth with tags in the lake at the time, it seems very probable that these spawners represented Lake Huron fish.

It has been suggested that smallmouth bass transferred from the Great Lakes might be a contributing factor in the spreading of the bass tapeworm, Proteocephalus ambloplitis. Three specimens of the 1940 planting in East Twin were examined by Mr. Leonard Allison and no infestation of Proteocephalus was found. Other parasites were present, but not in sufficient numbers to cause harm to the fish. Later and more extensive examinations of fish from

Figure 1
Growth of Tagged Smallmouth in
East Twin Lake, Montmorency County

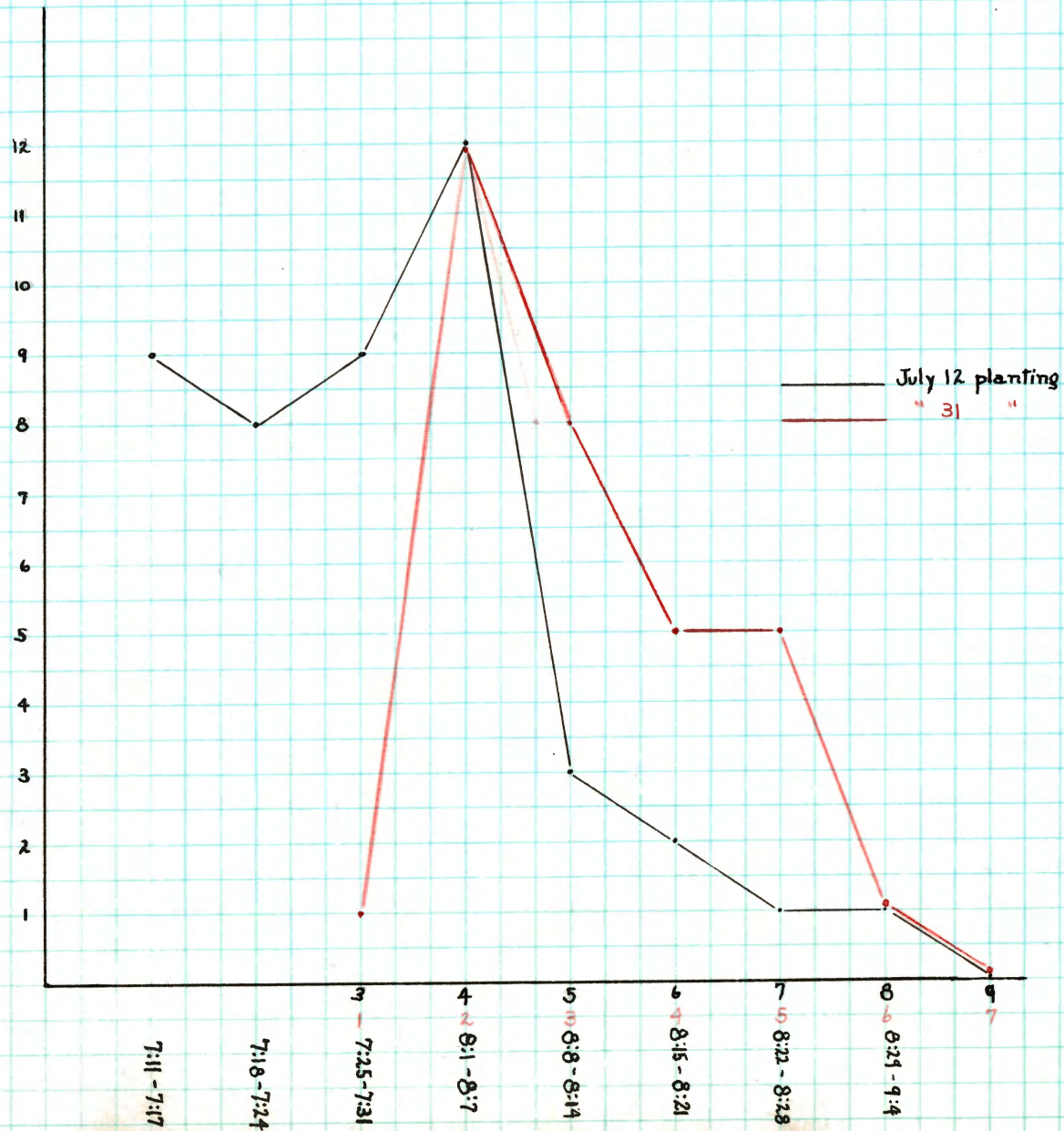


near the same source have shown that a rather high percentage (33 per cent) of smallmouth bass in this part of Lake Huron may be infected with both the adult and the larval stage of this worm (I.F.R. Memo. No. 116).

Big Bear Lake, in Otsego County, Michigan, also received two plantings of these fish from Lake Huron in the summer of 1941. Two hundred and thirty-three smallmouth were introduced into Bear Lake on July 12, and 141 on July 31. To date 19.7 per cent of the first planting have been caught by fishermen, and 7.7 per cent have been picked up dead on shore. Presumably there are 169 fish from the first planting still present in the lake. Twenty-two and seven tenths per cent of the second planting have been caught and 4.2 per cent found dead, leaving 103 of the fish from this planting still theoretically present in the lake. There are then 272 tagged smallmouth still presumed to be present in Big Bear Lake. Data concerning the two plantings are summarized in the table. (Table I). That there was some difference in the mortality of the two plantings can probably be explained by the fact that the fish in the first group were handled one more time than those of the second planting. Also, since the first load of fish was delivered at Bear Lake on the evening of July 11, they had to remain crowded in a rather small live box over night, as they could not be measured, tagged and released. The next morning 13 were found dead in the live box. These are not included in the figures given. Of the 46 fish from the first planting which were caught by anglers, 39, or 84.8 per cent, were caught within the first 4 weeks after planting. Of the second planting, 26, or 81.2 per cent, were captured within 4 weeks after their release. The accompanying graph (Figure 2) shows the weekly catch of tagged fish. It might be mentioned that the July 31 planting was made in the late afternoon, and several of the fish could be seen lying in shallow water near where they were released,

Figure 2

Graph showing weekly catch of tagged fish in Bear Lake



so that a fisherman fishing on the west side of the lake had a chance of taking one of these fish. Most of the fishing is done on the east side of the lake, which perhaps explains why more of the fish were not caught the day of their release, and yet makes it readily possible that a fisherman in the right place might catch one of the marked fish almost immediately after release. If this one fish is excluded from the graph, it can be seen that the fish planted on July 31 come into the catch of tagged fish after the fish from the July 11 planting have become rather uncommon. The first week of August, along with the opening week of the season, afforded the best fishing of the summer, which may, in part, explain the high catch of tagged fish of both plantings that week. It does not seem likely that the good fishing was caused by the plantings. An examination of the creel census blanks reveals that the percentage of tagged smallmouth in the catch for the week August 1 to 7 was not so high as it was in the catch of smallmouth for the week July 11 to 17, the latter being a poor fishing week, although it also immediately followed a planting.

Little information on the growth of the Lake Huron fish is available at the present time. Few fish were measured upon recovery, for it was felt that growth would be negligible. Several of the tagged fish were measured after they had been in the lake for periods ranging from 3 days to 4 weeks, and no appreciable growth was noted. Scale samples were obtained from a few fish at the time of planting. Seven fish in their fourth summer ranged in size from $8\frac{1}{2}$ inches to $14\frac{3}{8}$ inches, the average being $9\frac{5}{8}$ inches. Seven 4-year-old fish ranged in size from $9\frac{1}{4}$ to $15\frac{1}{2}$ inches, the average being $11\frac{1}{8}$ inches. Since the average size of the fish in the planting was $10\frac{1}{2}$ inches, the fish were probably about equally divided between 3 and 4-year-olds.

Commercial nets used in making population estimates were present in the lake after the plantings were made and many recoveries of tagged fish were secured in these. Of the total planting, 244, or 65.2 per cent, were captured at least once. Thanks to the nets, the wanderings of the fish about the lake can be followed rather closely in many instances. Some of the more interesting recoveries are plotted on the maps (Figures 4-17). The location of the various nets in the lake is given in Figure 3. The point of first recovery after release is shown in Figure 18. Table II gives an analysis of the movements of fish whose movements are plotted on the maps. A frequency table showing the number of fish caught one or more times is given in Table III. Table IV gives a complete analysis of all movements of captured fish. As can be seen from a perusal of the maps, the fish spread very much at random throughout the lake, from the central point of release. Figure 18 also shows this, except that the fish from the first planting, shown in red, were caught mostly at station 1a, the closest to their point of release.*

Four specimens of the 1941 smallmouth planting in Bear Lake were examined for the presence of the bass tapeworm but no infestation was found, though other parasites were found in small numbers.

Conclusions:

1. Smallmouth bass transferred from the Great Lakes, (Lake Huron specifically) are readily caught by fishermen for at least the first month following planting. This may be explained by their considerable movements about the lake.

*Figures 4 to 17, Fig. 3, Fig. 18, Table II, Table IV, because of their detailed nature, are included only in the file copy at the Institute for Fisheries Research.

2. They survive in inland waters for at least two years following planting.
3. Their growth rate in inland waters is at least average for the species.
4. They probably spawn successfully in inland waters.
5. Their importance as a factor in the spread of the bass tapeworm should be thoroughly investigated.

INSTITUTE FOR FISHERIES RESEARCH

By Walter Crowe

Report approved by: A. S. Hazzard

Report typed by: R. Bauch

Table I

Information relative to plantings of smallmouth bass from
Lake Huron in Big Bear Lake, Otsego County, Michigan

Date	Number fish	Average length mm.	Caught by fishermen	Found dead	Accounted for
7-12-41	233	266	46 (19.7 per cent)	18 (7.7 per cent)	64 (27.4 per cent)
7-31-41	141	261	32 (22.7 per cent)	6 (4.2 per cent)	38 (26.9 per cent)
Totals	374	264	78 (20.9 per cent)	24 (6.4 per cent)	102 (27.3 per cent)

Table III

Netting frequency of tagged smallmouth
in Big Bear Lake

Number of times caught	Number of fish
1	51
2	59
3	47
4	27
5	12
6	11
7	8
8	1