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REPORT NO. 1076

1946 FINGERLING LAKE TROUT MARKING FOR
EXPERIMENTAL PLANTING IN LAKE MICHIGAN
(Report No. III)

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by

David S. Shetter

By previous direction of the Lake Trout Committee, Michigan was responsible for carrying out the fingerling lake trout marking in 1944, Wisconsin in 1945 and Michigan again in 1946. Mimeographed reports on the 1944 and 1945 operations have been issued. This report will give the details pertaining to the 1946 marking work, which was carried on for the third successive year at the U. S. Fish and Wildlife Service Fisheries Station at Charlevoix, Michigan. The 1946 marking operations were conducted under the supervision of Robert C. Barber, Fisheries Research Technician of the Michigan Department of Conservation.

The personnel who carried out the 1946 works was as follows:

for Michigan: Robert C. Barber
O. M. Corbett
Dexter B. Reynolds
H. B. Houseworth
Emerson Krieg

for Wisconsin: Sidney C. Miller
Thayre N. McCutchin

for the U. S. Fish and Wildlife Service:
George Roff
Grover C. Geneit, Jr.

The crew started fin-clipping on September 10, 1946 and worked until September 16, 1946. Planting was accomplished between September 16 and September 18, 1946. For 1946, the labor contribution of the cooperating agencies in terms of 8-hour man-days was as follows: Michigan, 28.5; Wisconsin, 13.5; and U. S. Fish and Wildlife Service, 6.1.

Mark used and method of operation

The mark used to make the 1946 lake trout fingerlings distinguishable from the previous releases was the excision of the left pectoral fin. The actual fin-clipping procedure and method of counting has been described in detail in the previous two reports, and will not be repeated here.

Number of fish handled; mortalities

The number of lake trout fingerlings handled each day, the subsequent mortalities, and the grand totals, are listed in Table 1. A total of 154,072 lake trout fingerlings was drawn from the Charlevoix Station. Of these, 153,072 were clipped, 1,500 clipped fingerlings and 1,000 unmarked fingerlings were set aside for the control experiments at Marquette Hatchery, 148 were lost in the clipping operations, and 22 died as the result of handling during the planting operations. The total number of left pectoral-clipped lake trout fingerlings released alive in Lake Michigan in 1946 was 151,402.

Mortality was recorded by troughs containing previously counted numbers of clipped fish, and was checked on daily during the marking operations. Each trough was inspected immediately following completion of clipping, 24 hours later, and daily thereafter. Any fish found dead were removed and tallied. Mortality ascribable to the clipping and anesthesia varied from 0 in 4,763 to 13 in 3,732. For the entire number of fish marked, clip mortality amounted to 135 fish of 153,072, or 0.09 per cent. Twenty-four-hour

mortality was 13 fish, and no post-twenty-four hour mortality was noted. The entire mortality, including 22 deaths noted in the planting tanks and probably caused by the handling in transferal from shore to ship, amounted to 170 fish of 153,072, or 0.11 per cent.

The Control Experiments

As in the previous two years, control experiments were established on the mark used in 1946. For a check on comparative growth and mortality, 1,000 left pectoral-clipped and 1,000 unmarked fish were drawn at random from the stock used for marking. For a study of regeneration of the left pectoral mark, 500 marked fish were also taken at random from the troughs containing marked fish. All control fish were measured individually, and were weighed in groups of from 10 to 25 fish in water on Chatillon spring scales of a platform type which could be read with accuracy to 1 gram. The marked and unmarked fish held for the growth and mortality comparisons were kept separately from the marked fish retained for regeneration study. Both lots were shipped via tank truck to the State Fish Hatchery at Marquette on September 19, 1946.

The average size of the 1946 control fish was as follows:

Mortality and growth experiment:

1,000 left pectoral-clipped fish	- average length 81.92 millimeters, average weight, 4.01 grams.
1,000 unmarked fish	- average length 80.58 millimeters, average weight 4.01 grams.

Regeneration experiment:

500 left pectoral-clipped fish	- average length 82.17 millimeters, average weight 4.13 grams.
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The planting operations

Patrol Boat #1 of the Michigan Department of Conservation was employed

again to transport the marked fish to the planting sites in northeastern Lake Michigan. The fish were carried in the tanks described in the 1944 report. Because the siphoning hose had given some trouble in 1945, the actual release of fish was performed by placing approximately 500 fish (about two scap loads) in a five-gallon pail and dropping them about four feet into the water from the deck of the boat.

Two planting sites were visited in four runs from the Charlevoix Station. On September 13 and 18, 1946, the fish were planted between the Fox Islands, and on September 17 the plantings were made on Big Reef, 9 miles northwest of Charlevoix. The details of the plantings are given in Table 2. The weather during planting was relatively calm and mild.

Brief summary of the three plantings

With the completion of the 1946 marking work, one phase of the investigation has been completed. The pertinent statistical details are listed in Table 3, and the numbers of fish planted and the planting sites will be found in Table 4.

In the past three years, a total of 419,888 lake trout fingerlings were marked, of which 411,394 were planted. As experience in the work was accumulated, it was possible to reduce the mortality among the experimental fish very noticeably and to increase the efficiency of operation. Although only slightly more than 100,000 fish were marked in 1944, over 150,000 were clipped in both 1945 and 1946. As might be expected, the mortality among the 1944 (dorsal and adipose-clipped) experimental fish was much higher (even if the 1,024 lost by accidental oxygen depletion are eliminated from consideration) than in either the 1945 and 1946 marks (pectoral-clipped), and it also took more time to remove two fins than to clip a single fin.

As will be noted in Table 4, the fish have been released in two localities. On the Big Reef, 9 miles northwest of Charlevoix some 227,832 marked fingerling lake trout have been released in 1945 and 1946, while in the area between the Fox Islands a total of 183,562 marked fish from the 1944, 1945, and 1946 markings has been planted.

Acknowledgements

This series of three experimental plantings of marked lake trout fingerlings could not have been carried out successfully without the cooperation of all parties concerned: the Conservation Departments of Michigan and Wisconsin and the U. S. Fish and Wildlife Service.

Thanks are due to E. M. Geer, Foreman at the Charlevoix Station until 1945, and to George Roff, who succeeded Mr. Geer, for making sleeping accommodations available for the various crews, and for many helpful favors during the course of the work.

The author is grateful to H. L. Thompson, District Fisheries Supervisor, State Fish Hatchery, Oden, Michigan, for arranging for the transportation of the control fish to the Marquette Hatchery each year.

We are also indebted to Captain C. M. Allers of Patrol Boat #1 for advice and assistance in the planting, and for the hospitality extended us on Patrol Boat #1 during the course of the plantings.

INSTITUTE FOR FISHERIES RESEARCH

by David S. Shetter

Report approved by A. S. Hazzard

Report typed by Mary H. Loux

Table 1

Summary of fin-clipping operations on fingerling lake trout at Charlevoix Station, (U. S. Fish and Wildlife Service), 1946, for experimental planting in Lake Michigan. Left pectoral fin clipped.

Trough Number	Number clipped	Clip Mortality	Alive after clip	Removed for Controls	Left for planting	Mortality 24 hour post-planting	Totals for 24 hour planting	Date Clipped
Upper 5-6	4,553	6	4,547	49	4,498	1	4,497	9/15
7-8	4,804	11	4,793	49	4,744	0	4,744	9/14
9-10	5,060	1	5,059	40	5,019	0	5,019	9/13
11-12	4,863	3	4,860	40	4,820	0	4,820	9/12
13-14	3,994	1	3,993	40	3,953	0	3,953	9/12
15-16	4,039	8	4,031	40	3,991	1	3,990	9/11
x 17-18	4,166	14	4,152	40	4,112	1	4,111 X	9/10
19-20	4,198	0	4,198	40	4,158	0	4,158	9/10
21-22	4,038	11	4,027	40	3,987	0	3,987	9/11
23-24	5,350	1	5,349	40	5,309	0	5,309	9/12
25-26	4,758	2	4,756	40	4,716	2	4,714	9/13
27-28	4,441	0	4,441	40	4,401	0	4,401	9/13
29-30	4,291	0	4,291	40	4,251	0	4,251	9/14
31-32	4,883	3	4,880	40	4,840	0	4,840	9/13
33-34	4,704	4	4,700	49	4,651	1	4,650	9/14
35-36	4,716	4	4,712	49	4,663	1	4,662	9/15
37-38	5,244	2	5,242	49	5,193	0	5,193	9/16
39-40	5,247	2	5,245	58	5,187	0	5,187	9/16
Lower 5-6	4,184	0	4,184	50	4,134	1	4,133	9/15
7-8	4,325	1	4,324	49	4,275	0	4,275	9/15
9-10	4,574	1	4,573	40	4,533	0	4,533	9/14
11-12	4,763	0	4,763	40	4,723	0	4,723	9/13
13-14	3,732	13	3,719	40	3,679	1	3,678	9/12
15-16	3,561	3	3,558	40	3,518	0	3,518	9/12
17-18	3,631	0	3,631	40	3,591	1	3,590	9/11
19-20	3,350	4	3,346	40	3,306	1	3,305	9/10
21-22	3,475	2	3,473	40	3,433	0	3,433	9/10
23-24	3,983	0	3,983	40	3,943	0	3,943	9/10
25-26	4,313	8	4,305	40	4,265	1	4,264	9/11
27-28	4,185	0	4,185	40	4,145	0	4,145	9/12
29-30	4,307	3	4,304	40	4,264	0	4,264	9/13
31-32	4,042	3	4,039	40	3,999	0	3,999	9/14
33-34	4,839	10	4,829	40	4,789	1	4,788	9/14
35-36	4,410	5	4,405	49	4,356	0	4,356	9/15
37-38	4,049	9	4,040	49	3,991	0	3,991	9/16
TOTALS	153,072	135	152,937	1,500	151,437	13	151,424 ⁺

⁺ Twenty-two fish died from handling during planting operation, making number of marked fingerlings released alive in the lake 151,402.

Table 2

Summary of planting data on the 1946 left pectoral-clipped lake trout fingerlings released in Lake Michigan from Patrol Boat #1

Tank Number	Marked fish in tanks	Planting Mortality	Total Planted Alive	Where Planted	Date Planted
19-20 L [↓]	3,305	Between North and South Fox Islands, Lake Michigan, approximately 1/2 mile north-west of South Fox Island.	9-16-46
21-22 L	3,433	.....	.....
19-20 U [Ⓢ]	4,158	.....	.....
21-22 U	3,987	.....	.....
23-24 U	5,309	.....	.....
25-26 U	4,714	.....	.....
23-24 L	3,943	.....	.....
25-26 L	4,264	.....	.....
Subtotal	33,113	3	33,110		
15-16 L	3,518	On Big Reef, 9 miles north-west of Charlevoix.	9-17-46
15-16 U	3,990	.....	.....
17-18 L	3,590	.....	.....
17-18 U	4,111	.....	.....
27-28 L	4,145	.....	.....
27-28 U	4,401	.....	.....
29-30 L	4,264	.....	.....
29-30 U	4,251	.....	.....
5-6 L	4,133	.....	.....
5-6 U	4,497	.....	.....
Subtotal	40,900	6	40,894		
7-8 L [↓]	4,275	On Big Reef, 9 miles north-west of Charlevoix.	9-17-46
7-8 U	4,744	.....	.....
9-10 L	4,533	.....	.....
9-10 U	5,019	.....	.....
35-36 L	4,356	.....	.....
37-38 L	3,991	.....	.....
35-36 U	4,662	.....	.....
37-38 U	5,193	.....	.....
39-40 U	5,187	.....	.....
Subtotal	41,960	7	41,953		
11-12 L	4,723	Between North and South Fox Islands, Lake Michigan, approximately 1/2 mile north-west of South Fox Island.	9-18-46
11-12 U	4,820	.....	.....
13-14 L	3,678	.....	.....
13-14 U	3,953	.....	.....
31-32 L	3,999	.....	.....
31-32 U	4,840	.....	.....
33-34 L	4,788	.....	.....
33-34 U	4,650	.....	.....
Subtotal	35,451	6	35,445		
GRAND TOTALS	151,424	22	151,402

↓ - Lower battery of troughs
 Ⓢ - Upper battery of troughs

Table 3

Summary of pertinent statistics on the 1944, 1945, and 1946
experimental markings of lake trout fingerlings at the Charlevoix hatchery.

Year	Mark Used	Number Marked	Total Mortality	Percentage of Mortality	Total Re- moved for Control Exp.	Total Planted Alive	Average Size [√]		Man-days of Clipping	Average clip per man-day (8 hrs.)
							length (mm)	weight (gms)		
1944	Dorsal-adipose	105,349	2,059	1.95	3,010	100,280	73.96	3.22	51.5	2,046
1945	Right pectoral	161,467	255	0.16	1,500	159,712	81.87	4.73	58.1	2,778
1946	Left pectoral	153,072	170	0.11	1,500	151,402	81.43	4.03	48.1	3,182

[√]Average sizes based on measurements of the following numbers of specimens in the various years: 1944, 1,200; 1945, 2,500; 1946, 2,500.

Table 4

Summary of planting data for the three experimental plantings
of marked lake trout fingerlings released in Lake Michigan

Year	Number planted	Locality of planting
1944	100,280	Between North Fox and South Fox Islands.
1945	159,712	Between Charlevoix and Fox Islands (14,727) and remainder (144,985) on Big Reef, 9 miles northwest of Charlevoix.
1946	151,402	Between North Fox and South Fox Islands (68,555), on Big Reef 9 miles northwest of Charlevoix (82,847).
