

Original: Fish Division
cc: Mr. Paul Travis
Mr. Carbine
Mr. Ruhl



INSTITUTE FOR FISHERIES RESEARCH
DIVISION OF FISHERIES
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ALBERT S. HAZZARD, PH.D.
DIRECTOR

ADDRESS
UNIVERSITY MUSEUMS
ANN ARBOR, MICHIGAN

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THE PLANTING OF FORAGE FISH
IN LITTLE LONG LAKE

Little Long Lake in Osceola County, a lake privately owned by Paul Travis, has been turned over to the Institute for Fisheries Research for experiments in methods to increase game fish production. This lake is stocked with large-mouthed bass, small-mouthed bass, perch and bluegills. When a survey was made in September, 1936, by members of the Institute staff, the only forage fish obtained were Iowa darters, of little value as food for the larger game species. No minnows were found in this lake.

As a result of the survey, it was recommended that a planting of minnows be made. Dr. A. S. Hazzard and members of the Institute staff decided that the fat-headed minnow, Pimephales promelas, and the red-bellied dace, Chrosomus eos, would be best suited for conditions found in this lake.

The fat-headed minnow is one of the smaller species of minnows; the maximum length attained is about three inches. It has a prominent black spot on the anterior part of the dorsal fin, about half way up from the base. Its robust body is moderately compressed and has crowded pre-dorsal scales. The breeding male has a tubercled snout and chin, and a spongy area on the back between the head and dorsal fin. In general appearance it resembles the bluntnose minnow, differing in the terminal

oblique position of the mouth and in having an incomplete lateral line. Its spawning habits are similar to the bluntnose minnow, but are not as specialized. It will spawn beneath practically any submerged object--logs, sticks, slabs, rocks, or the under surface of lily pads. The eggs are sometimes deposited in two layers, whereas the bluntnose deposits its eggs in only one layer.

During the summer of 1936, Dr. Hazzard and Dr. Leonard found an over abundant population of this fat-headed minnow in the Danahar Pond of the Pere Marquette Club. On May 15, 1937, with permission of the Pere Marquette Club, Dr. Leonard and the writer went in to Danahar Pond to obtain a series of the fat-headed minnow to be transported to Little Long Lake.

At this time of the year most of the minnows were apparently congregated in the deeper waters of the pond. Because of this condition we were unable to get a sufficient supply of the larger specimens with the seines available and had to be content to take the smaller fish. After four hours of seining we had taken all of the fish that could be transported safely. The fat-heads and a very few red-bellied dace were sorted out from the long-nosed dace, sticklebacks, common suckers, darters and stonerollers, which were returned to the water. The minnows taken were divided up among six cans, the water temperature in the cans being 63° F., and the air temperature 67° F.

On arriving at Little Long Lake (a trip of about two hours) we had lost about a dozen minnows in each can. The water in the can on arriving was 64.5° F. and the lake water was 63° F. The fish were weighed and a sample was saved for record. The total weight of the minnows planted was 3.5 pounds. One and a half pounds were planted along the north shore, and two pounds were planted along the east and south shores of the lake.

On being liberated the minnows swam vigorously away and seemed to be in excellent condition.

The majority of the fish planted were fat-headed minnows, with a very few red-bellied dace. The sample saved weighed 1/8 of a pound, and contained 244 fish, or 1,952 minnows per pound. Based on calculations from the sample and the total weight, the number planted was 6,700, discounting approximately 100 lost during seining, transporting and handling. The average size of these fish was about one inch. Not more than 100 fish were mature enough to spawn during the early part of the summer of 1937. As the fat-headed minnow normally reaches maturity in one year, the fish planted in Little Long Lake should have spawned some time during the latter part of the summer of 1937 if any escaped the perch and bass.

On June 17, 1937, we made a second trip to Danahar Pond to get another load of minnows. The minnows were still congregated in the deeper water and again it was impossible to get the larger minnows. Enough minnows were taken to fill 10 cans. The water temperature upon leaving Danahar Pond was 67°F. and the air temperature 72°F. To avoid trouble, all cans were iced at Baldwin, Michigan.

Upon arriving at Little Long Lake, the water in the cans was 61°F. and there were no dead fish. The fish were tempered gradually, weighed and planted. A total of nine pounds were planted--four pounds along the north shore and five pounds along the east and south shores. Upon being liberated, the fish immediately swam away, and appeared to be in excellent condition. The following day no dead fish were found along the shore of the lake.

The random sample of fish saved weighed one-half pound and contained 487 fish or 974 to the pound. On this basis, a total of 8,766 fish were

estimated in this planting. The combined total of the minnows planted in both trips was estimated at 15,466. On the whole, the last group of minnows were larger than the first. They ranged in length from 2.4-3.9 cm. standard length to 2.9-4.8 cm. total length, averaging 3.4 cm. or about 1 1/2 inches total length. The larger fish were mature and ready to spawn. The majority of these fish should spawn during the summer of 1937 if they escape the perch and bass.

Mr. George Travis told me on June 17, 1937 that he had seen several schools of the minnows from the first planting in various places along the shore, in shallow water. On June 17 the writer observed several of these schools of minnows from the first planting along the north and east shores. On June 18 many minnows were seen along the same shores.

An examination of Little Long Lake July 24 and 25, 1937, was made by David Shetter and Edwin Cooper of the Institute staff. Their report follows:

On the above dates, we seined the sandy beaches on the north and south ends of Little Long Lake with a 10 foot common sense minnow seine in an attempt to determine whether or not the fat-headed minnow (Pimephales promelas) had spawned. No fry of this species were found, but two of the planted fish were taken at the bathing beach on the north end of the lake. No Pimephales were encountered at the southeastern beach.

The dominant species in the shallow waters which could be reached by the seine was the bluegill. On both the north and south beaches young of the year were found in large numbers. Two large-mouthed bass fry were also taken, one at each beach, which would indicate that this year's nesting was at least partially successful.

In addition to the seining, a large collection of bluegills and bass was made by fly, plug, and worm fishing. Scales, stomachs, lengths, and weights were recorded. Although the stomach contents of these fish

were only casually noted in the process of preserving them, we feel sure that some of the fat-headed minnows will be found in the large-mouthed bass stomachs, indicating that a large number of the forage minnows may have been already eaten by the abundant bass.

The shallow waters along the shore were carefully observed both from a boat and by wading for evidence of fry of the fat-headed minnow, but none were seen. Logs and slabs which appeared to have evidence of spawning work were turned over but there were no eggs found.

A series of small bluegills and all large-mouthed bass fry and all Pimephales were preserved for scale study and stomach analyses, in addition to the rod collections already mentioned.

A list of fish taken follows:

1. Large-mouthed bass (Adult and fingerling)
2. Bluegill (Adult and fingerling)
3. Perch (Adult)
4. Bullhead (Adult)
5. Fat-headed minnow (Adult ?)
6. Iowa Darter (Adult)

* * * * *

A survey of Little Long Lake was made September 6-9, 1937 by Lowell Woodbury and the writer. At this time all of the shallow waters along the entire lake shore were carefully observed for evidences of spawning, fry and adult minnows, but none were found. Exhaustive seining was attempted along all shores, but no fat-headed minnows were taken. Small bluegills were to be found in abundance in the shallow areas.

Whether some of the fat-headed minnows survived the ravages of the bass and perch cannot be ascertained until the summer of 1938.

INSTITUTE FOR FISHERIES RESEARCH

W. F. Carbine

By W. F. Carbine
Research Assistant