

Original: Fish Division
cc: Mr. Titus
Harrietta Hatchery
Mr. Ruhl

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

ALBERT S. HAZZARD, PH.D.
DIRECTOR

March 31, 1939

ADDRESS
UNIVERSITY MUSEUMS
ANN ARBOR, MICHIGAN

REPORT NO. 530

BOARDMAN LAKE,* GRAND TRAVERSE COUNTY, MICHIGAN

C. J. D. Brown

Boardman Lake is a natural lake formed by an enlargement of the Boardman River about two miles upstream from its mouth. In 1854 a grist mill dam was built about half way between the lake and the outlet of the river at Grand Traverse Bay. According to reports this 12 foot dam raised the original level of the lake about 6 to 8 feet. At present this dam is owned by the Michigan Public Service Company and a more or less constant level is maintained in the lake above. There are no tributaries aside from the Boardman River.

Boardman Lake has an area of about 340 acres and a maximum depth of 64 feet. About 40% of the lake is shoal (water less than 20 feet deep), the bottom of which is composed of sand and gravel except for the south end which is filled with silty clay. The bottom of the deeper areas is also covered with a silty clay.

The water is clear, at least during the summer, and shows no evidence of harmful pollution. The surface temperature at the time of the survey (July 15, 1938) was 67°F. at the upper end near the inlet and 74°F. over the deep portion at the lower end. There was a distinct thermocline

* Survey was made by Mr. George M. Moore, William C. Beckman, G. Stanley Baker, and Floyd Ames.

(zone in which water temperature changes very rapidly) situated between 25 and 35 feet. The temperature at 57 feet was 53°F.

The water is distinctly alkaline with a pH range between 7.2-8.2 and total alkalinity (methyl orange) ranging between 147 and 162 parts per million. The dissolved oxygen averaged 7.3 ppm. in the upper 25 feet of water and 3.5 ppm. in the deeper water. There was 1.1 ppm. of oxygen and 7.0 ppm. of carbon dioxide within one foot of the bottom.

The aquatic vegetation was very abundant between the 3 and 20 foot depths. Even on the sand and gravel shoals, dense submerged patches of Potamogeton and Myriophyllum occurs. The only emergent and floating vegetation ~~was~~ found in the extreme south end of the lake. Snails and clams were the most abundant invertebrate organisms present. Huge clam beds cover the entire sandy shoals. A considerable number of amphipods (fresh water shrimp) were found in the weed beds as well as snails and midge larvae. The bottom samples from the deeper water contained many aquatic worms and midge larvae. Plankton forms were rather scarce, which is to be expected in a river lake having considerable current.

The game fish, in the order of their abundance, included rock bass, perch, northern pike, large and smallmouth bass and sunfish. Rock bass seemed to be the only really abundant fish in the lake. Surprisingly enough, there were very few forage fish. The blunt-nosed minnow, Johnny darter, Iowa darter and muddler were the only forage fish present and these in very small numbers. The only other fish taken was the common sucker which did not appear to be very abundant.

On the basis of the rather small number of fish collected, it appears that neither the perch, rock bass, nor largemouth bass, reached legal length until their fourth or fifth year of life. The northern pike averaged 19 inches in total length in the summer of their second year

and 23 inches in the summer of their third year. On the whole, the fish seemed to be in poor condition. This is rather to be expected because all of the game species are fish eaters and at the same time only a few forage fish are present.

No fish have been planted in this lake in the past five years and it has been very lightly fished during this time. It seems likely then that the fish population is near the maximum which the lake can produce, at least for those species present.

A summary of the creel census records for this lake taken by conservation officers in connection with regular patrol duties bear out what has already been said about the fish population. During the four years from 1935 to 1938 some 78 fishermen's catches were recorded. Only one-third of this number took any fish at all even though the average time fished was 3 hours. A list of the fish taken is as follows:

Rock Bass	137
Northern Pike	66
Yellow Perch	61
Sunfish	6
Smallmouth bass	4
Largemouth Bass	2
Walleye Pike	2
	<u>278</u>

The great majority of the records were for ice fishing. Most of the pike were taken during the winter by the use of ice lines.

Recommendations

The temperature as well as other physical and chemical conditions in this lake make it more suitable for trout than for warm water species. Even though fish food conditions are fair to good in this lake, we are inclined to believe that the low temperature of the water is prohibitive to good growth of perch, bass or pike. On the other hand, if this water

is suited to trout, they should be there since trout inhabit the Boardman River above and have access to the lake.

We are of the opinion that even though trout do have access to this lake, they could not establish themselves in the midst of such predacious fish as pike and perch. The removal of the present fish population, which does not seem feasible at present, would almost surely make it possible to establish trout.

We do not have enough information on Boardman Lake to make positive recommendations. Further study might suggest a solution to the problem.

INSTITUTE FOR FISHERIES RESEARCH

By C. J. D. Brown
Associate Aquatic Biologist