



Original: Fish Division

cc: Education-Game

Conservation Officer Bigelow

Mr. Claude Lydell

Mr. J. G. Marks

INSTITUTE FOR FISHERIES RESEARCH

Mr. Washburn

Mr. Carbine

DIVISION OF FISHERIES  
MICHIGAN DEPARTMENT OF CONSERVATION

Institute for Fish. Research

COOPERATING WITH THE

UNIVERSITY OF MICHIGAN

ALBERT S. HAZZARD, PH.D.  
DIRECTOR

ADDRESS  
UNIVERSITY MUSEUMS ANNEX  
ANN ARBOR, MICHIGAN

January 16, 1945

REPORT NO. 989

PARTIAL SURVEY OF DERBY LAKE, MONTCALM COUNTY

by

G. N. Washburn and W. F. Carbine

During the forepart of July, Mr. Earl Bigelow, local Conservation Officer of Montcalm County, requested that the Institute inspect Derby Lake to determine if that body of water was suitable for trout. The lake was inspected on August 31, 1944 by the writers, at which time physical and chemical conditions were checked and recorded.

Location and Drainage

Derby Lake is located in the central part of Montcalm County (T. 10 N., R. 7 W., Sec. 10). It lies about 3.5 miles south and west of the village of Stanton and is accessible by a good graveled county road which borders the lake along the south and east shore. Derby Lake has no inlets but does possess a small intermittent outlet (Fish Creek) which flows into the Maple River, a tributary to the Grand River. Local property owners have installed a small concrete barrier across this stream to control the lake water level. At the time of the inspection no water was flowing over the dam and the water level of the lake appeared to be about eight inches below normal. This lake lies in a natural depression, being surrounded on three sides by high banks whose slopes extend to the water's edge. In the area adjacent to the outlet no bluffs are present, this being the only place around the entire lake where no steep banks occur.

### Past and Present Uses

As far as is known, in the past Derby Lake has had no industrial use. At present the lake is quite popular among vacationers and fishing, swimming, and boating are the chief attractions. The entire shore line, with the exception of a road "right of way" along the southeast shore, is privately owned. The only public access is through boat rental, there being one establishment of this type on the lake which has six boats for public hire.

### Physical Characteristics

Derby Lake, having an estimated area of 85 acres, is oval in outline with the long axis running east and west. The greatest depth found during the inventory was 85 feet, located in the west-central portion. The shoal area (water depth of 0 to 10 feet) surrounds the entire lake but is restricted to a narrow band not more than 200 feet wide at any observed location. The shoals along the south and west shores were partially covered with sand, gravel, and some rubble, while in the deeper basin some marl deposits were present. The bottom slope of the lake was very steep, there being practically no transition between the deep and shallow water.

### Temperature and Chemical Characteristics

A temperature series taken from the surface to the bottom (85 feet) by the use of an electric thermocouple showed the presence of a thermocline which extended from 21 to 32 feet in depth. Presented below in Table 1 are the results of the temperature and chemical analyses. A recorded 70°F. surface temperature dropped to 41.5°F. at 80 feet. The range of water temperatures found in the thermocline was between 66° and 47°F.

Also, an abundant supply of dissolved oxygen was present in the thermocline, ranging from 9 to 12 parts per million (see Table 1). Oxygen samples taken from the surface to the bottom indicated that a sufficient amount was present for the maintenance of fish life down to a depth of 65 feet. The presence of a good supply of oxygen at these water temperatures

makes an ideal habitat for trout.

The water in Derby Lake is relatively hard, having a methyl orange alkalinity ranging from 122 parts per million at the surface to 114 at the 70 foot level. Moderately hard waters are favorable to the growth and maintenance of fish life.

Table 1  
Temperature and chemical series recorded from Derby Lake

Depth (feet)	Temperature (°F.)	Oxygen (Parts per million)	Ph. th.	Methyl Orange Alkalinity	pH
Surface	70		8.0	122	8.3
10	69.5				
15	69	9.2			
16	68.2				
17	67.8				
19	67.5				
20	67				
21	66				
22	65				
23	60				
24	56.5				
25	54	12.7			
30	49				
31	47.5				
32	47				
34	46.5				
35	46	10.8			
40	44.5				
45		8.4			
50	43				
55		7.8			
60	42				
65		5.6	0.0	110	7.3
70	41.6				
75		1.3			
80	41.5				
85 or 86 = bottom					

Fish Present

According to Conservation Officer Earl Bigelow, the following species of fish are present in the lake: bluegills, largemouth bass, smallmouth bass, perch, crappies, northern pike, and a few species of minnows. The most abundant fish in the lake are the first three species listed above.

The crappies and northern pike are not very plentiful. Though heavy fishing is conducted on the lake, the return according to Bigelow is quite light.

#### Pollution

There was no evidence of any type of pollution present. The water was clear and no sign of any excessive organic decomposition was observed.

#### Recommendations

1. The present classification of Derby Lake is in the "all other lakes" and should remain in this category. Should trout thrive, Derby Lake should be designated as open to fall rainbow trout fishing.
2. A complete inventory of the lake should be made during the summer of 1945 or as soon as conveniently possible.
3. A map should be prepared of Derby Lake whenever a mapping party is working in that near vicinity.
4. An experimental planting of 2,000 legal-sized rainbow trout should be made in the spring of 1945 providing that certain recommendations (see 5 below) are attained. Discontinue planting warm-water fish. Spawning conditions are suitable for all of the dominant warm-water species.
5. It is recommended that the state purchase frontage on Derby Lake for a public fishing site. During our investigation it was found that no public access to the lake was present other than at the boat livery. Steps have already been taken for the purchase of a public fishing site.
6. It is recommended that the local sportsmen's group install a screen in the outlet after the rainbow trout are planted.
7. It is desirable to obtain as much creel census data as possible. The local conservation officer could undoubtedly make arrangements with the boat livery owner and other interested parties to assist in collecting fishing data. Unless reliable records of trout capture are received,

Derby Lake should be netted in the fall of 1945 to determine the success of the planting.

INSTITUTE FOR FISHERIES RESEARCH

By G. N. Washburn and W. F. Carbine

Report approved by A. S. Hazzard

Report typed by V. M. Andres