

Original: Fish Division
cc: Education-Game
Mr. Stanley Shust 12-7-41
Dr. Roelofs

INSTITUTE FOR FISHERIES RESEARCH

DIVISION OF FISHERIES
MICHIGAN DEPARTMENT OF CONSERVATION
COOPERATING WITH THE
UNIVERSITY OF MICHIGAN

OK

ALBERT S. HAZZARD, PH.D.
DIRECTOR

ADDRESS
UNIVERSITY MUSEUMS ANNEX
ANN ARBOR, MICHIGAN

December 5, 1941

REPORT NO. 707

FISHERIES SURVEY OF CHICAGO AND

CRANE LAKES, DELTA COUNTY

by

E. W. Roelofs

Introduction

Chicago and Crane Lakes are located in the eastern part of Delta County, approximately 10 miles north of Isabella. Chicago Lake is one mile west of Cook's CCC Camp on Chicago Lake Truck Trail; Crane Lake is 5 miles northwest of Cook's CCC Camp on Crane Lake Truck Trail. Their specific locations are: Chicago Lake - T. 42 N., R. 18, 19 W., Sec. 7, 13 and 18; Crane Lake - T. 42, 43 N., R. 18 W., Sec. 3, 4, 33, 34.

The Institute for Fisheries Research^{*} conducted a biological survey of these lakes in August 1938. The maps used, showing the lake outline and depth contours, were provided by the U. S. Forest Service; bottom types and plant distribution were plotted in by the Institute. The biological survey included a study of the temperature and chemical condition of the water, and the kind and abundance of plants, fish and fish food organisms. The Institute is indebted to the U. S. Forest Service for their provision of transportation, meals, and lodging for the party.

* The party consisted of: H. Telford, leader; J. Bailey and L. Shettles, assistants.

According to reliable reports, there has been a tremendous change in fishing in Chicago Lake during the last 25 years. Formerly largemouth bass were taken in abundance--there being no pike present--but the reverse is now true. Pike are abundant and many are taken, but the Institute party, in four gill net sets and extensive seining, was unable to take a single largemouth.

Crane Lake has produced good fishing in years past and at present has a fair reputation.

There is no resort development on either of the lakes. Chicago Lake had no cottages and Crane Lake had but one at the time of the survey. The lakes are easily accessible and have suitable shorelines but their location in relation to population centers minimizes resort development. There are no boat liveries on either lake. Both lakes are public.

Physical Characters of the Lakes

These lakes lie in a hilly, wooded region, which is intermediate between the eastern "lowland" and the western "highland." The topography is the result of irregular glacial deposition and is a major factor limiting agricultural use of the land.

Chicago Lake lies in the Sturgeon River drainage system; it forms the headwaters of Eighteen Mile Creek, a tributary to the Sturgeon. Crane Lake occupies a position on the border between the Sturgeon River system on the west and Manistique River system on the east. In addition, the headwaters of Fishdam River, which flows directly into Lake Michigan (Big Bay de Noc), lie to the south within 1/4 mile of the lake. The lake itself has no inlet or outlet, but waters from the immediate vicinity contribute to the supply of all three rivers.

The watershed of both lakes is very small since they have no inlet streams but are fed by local surface drainage and seepage. Fluctuations in water level are small.

Some physical characters of the lakes are tabulated below

Lake	Area (acres)	Maximum depth (feet)	Per cent of shoal - less than 20 feet	Bottom types		Shore development
				Shoal	Depth	
Chicago Lake	188	15	100	Sand and pulpy peat	...	2.2
Crane Lake	115	35	65	Sand	Pulpy peat	1.8

The lakes are relatively shallow. This character is generally associated with high potential productivity because it indicates a large area on which plants can grow, ample room for the spawning of pan fish, adequate area for growth of young game fish and forage fish, and favorable habitats for larger fish food organisms. Shallow lakes also usually possess suitable chemical conditions for fish life throughout the entire lake.

A rather high shore development (ratio between the length of shoreline and the circumference of a circle having the same area) has less significance in shallower lakes. In large, deep lakes, this character is important because it indicates more shoal area and the presence of protected bays and coves which, in such lakes, are often the only highly productive parts of the lake.

The Secchi disc (a black and white circular metal disc) disappeared from view at depths of 8 feet and 11 feet in Chicago and Crane Lakes respectively. This is an expression of light penetration which is important in plant and animal distribution.

Temperature and Chemical Characters

The table on page 5 summarizes the temperature and chemical data taken by the survey party.

From the standpoint of temperature and chemical conditions, these two lakes have qualities usually associated with high productivity and good fish growth. The water is relatively warm, enabling fast growth of fish; there is adequate oxygen at all depths except the deeper waters of Crane Lake; the water is moderately soft and the pH is suitable.

The water in these lakes does not stratify thermally, i.e., there is no zonation of water with respect to temperature. This accounts for the distribution of oxygen throughout nearly the entire lake. In lakes which stratify, oxygen may be absent in the lower waters during late summer and early fall and water without oxygen is of little value as far as fish life is directly concerned.

There is no evidence of pollution in either lake.

Chicago Lake 8/12/37						Crane Lake 8/9/37											
						Station 1 [∇]						Station 2 ^{**}					
Depth (ft.)	Temp. °F.	O ₂ p.p.m.	CO ₂ p.p.m.	M.O. alk. p.p.m.	pH	Depth (ft.)	Temp. °F.	O ₂ p.p.m.	CO ₂ p.p.m.	M.O. alk. p.p.m.	pH	Depth (ft.)	Temp. °F.	O ₂ p.p.m.	CO ₂ p.p.m.	M.O. alk. p.p.m.	pH
0	77	8.3	0	45	8.1	0	76	8.9	0	58	8.9	0	78	...	...	...	...
4	75	...	...	...	...	6	76	...	...	...	...	3	75	...	...	...	...
10	73	...	...	...	...	15	71	9.0	0	59	8.1	6	75	...	...	...	...
14	71	6.7	2	56	6.9	24	67	2.9	...	...	...	9	75	...	...	...	...
						32	63	0.4	12	67	6.8	14	70	9.6	0	60	8.3

[∇] Center of main body of the lake.

^{**} In the long bay, 500 feet south of its junction with main body.

Biological Characters

The various combinations of physical and chemical conditions are closely associated with the biological nature of lakes. The distribution of oxygen largely regulates animal distribution; the shape of the basin and the nature of the bottom, along with other factors, regulate plant growth; dissolved mineral salts influence the type of invertebrate forms present. In turn, the vegetation influences the type of bottom soil and over a period of years contributes to the filling up and modification of the basin.

Plants recorded by the survey party are as follows:

Common name ✓	Scientific name	Chicago Lake	Crane Lake
Sedge	Carex sp.	Abundant	Rare
Musk grass	Chara sp.	Rare	...
Spike rush	Eleocharis sp.	Rare	...
Scouring rush	Equisetum sp.	Rare	Rare
Pipewort	Eriocaulon septangulare	Few	...
Blue flag	Iris versicolor	Few	Rare
Quillwort	Isoetes sp.	Few	...
Duckweed	Lemna and/or Spirodela	...	Rare
Water milfoil	Myriophyllum tenellum	Rare	...
Bushy pondweed	Najas flexilis	Few	...
Yellow water lily	Nuphar advena	Few	Common
White water lily	Nymphaea odorata	Few	Abundant
Pondweed	Potamogeton gramineus	Present	Present
White-stem pondweed	Potamogeton praelongus	Present	...
Other pondweeds	Potamogeton sp.	Abundant ✓	Common ✓
Bulrush	Scirpus	Common	Common
Burreed	Sparganium sp.	Few	...
Cattail	Typha sp.	...	Rare
Water plantain	Alisma Plantago-aquatica	Rare	...

✓ Plants identified by Mr. Carl O. Grassl, University of Michigan Botany Department.

✓✓ Pondweeds in general abundant, P. gramineus and P. praelongus identified.

✓✓✓ Pondweeds in general common, only P. gramineus identified.

Bottom food studies indicated a good supply in Chicago Lake but a limited supply in Crane Lake. Plankton, too, was more abundant in Chicago Lake.

A summary of the fish (kinds and relative abundance) is given in the following table. Stocking records for 1936-1940 inclusive are also given.

Fish	Chicago Lake		Crane Lake	
	Abundance	No. stocked 1936-1940	Abundance	No. stocked 1936-1940
Northern pike	Abundant	...	Abundant	...
Yellow perch	Common	8,400 adults	Common	...
Smallmouth bass	Reported	1,500 - 3 months 205 - adults	Rare	60 adults
Largemouth bass	Reported	1,550 - 3 months 10,000 - 1"-5", U. S. B. F.	Reported	750 - 3 months 5,000 - 1"-5", U.S.B.F.
Walleye	...	1,350,000 fry	...	300,000 fry
Bluegill	Abundant	58,180 - 3-6 months	Rare	11,000 - 4 months
Pumpkinseed	Rare	...	...	...
Rock bass	Rare	...	Rare	...
COARSE FISH				
Sucker	...	...	Reported	...
Bullhead	...	...	Reported	...
FORAGE FISH				
Black-nosed shiner	Common	...	Rare	...
Black-chin shiner	Common	...	...	...
Mimic shiner	...	...	Rare	...
Common shiner	...	...	Rare	...
Golden shiner	Common	...	Rare	...
Blunt-nosed minnow	...	...	Rare	...
Menona killifish	...	...	Rare	...
Mud minnow	...	...	Common	...
Johnny darter	Few	...	Rare	...
Least darter	...	...	Rare	...
Iowa darter	Common	...	...	...
Brook stickleback	...	...	Common	...

Growth studies were made on the larger game fish and are summarized in the following table.

Fish	Age group	Chicago Lake		Crane Lake	
		No. of specimens	Average length (inches)	No. of specimens	Average length (inches)
Northern pike	I	9	12.5	7	18.0
	II	7	20.5	2	24.1
	III	4	23.4	1	27.3
	IV	6	24.8	1	25.8
	V	...	...	1	26.2
Perch	II	...	...	3	6.7
	III	1	6.0	7	7.2
	IV	3	6.5	6	8.3
	V	2	6.2	2	8.6
	VI	1	7.8	2	8.5
	Bluegill	II	1	5.0	...
	III	12	5.3	...	...
	IV	2	6.5	...	...
	V	1	8.5	...	...
Rock bass	II	...	...	2	5.7

These data indicate a more rapid growth of young perch and pike in Crane Lake than in Chicago Lake. Differences in the older pike, however, are less noticeable, while the perch in Crane Lake grow consistently faster.

The growth rates are opposite from those expected on the basis of food studies. Differences in population may account for this variation, although more detailed population studies would be necessary for substantiation.

Management Suggestions

Both lakes are classed as "all other" lakes. Attempts to establish walleyes, smallmouth bass, and largemouth bass have met with little success, largely due, perhaps, to the large northern pike population. Stocking efforts of this type seem futile and should not be encouraged.

In view of the large northern pike population and perch and the scarcity of other game fish, except for bluegills in Chicago Lake, it is recommended that the designation of these lakes be changed to "pike" lakes. Both lakes contain adequate food, cover, and spawning facilities

for pike and perch.

Stocking of all species should be discontinued at least for the present.

Water levels are relatively uniform and require no control.

Parasites and predators are not serious. No regulation seems necessary.

INSTITUTE FOR FISHERIES RESEARCH

Eugene W. Roelofs
Junior Aquatic Biologist

Report approved by: A. S. Hazzard

Report typed by: V. Andres