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cc: Education-Game
Mr. John Brass 11-6-41
Dr. Roelofs

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

ADDRESS
UNIVERSITY MUSEUMS ANNEX
ANN ARBOR, MICHIGAN

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FISHERIES SURVEY OF WABASCON LAKE, CALHOUN COUNTY

by

Eugene Roelofs

Wabascon Lake is located in Sections 2 and 3 of Bedford Township, Calhoun County (T. 1 S., R. 8 W.). It lies seven miles north of Battle Creek; a county road at the east end of the lake makes it easily accessible to the public.

This lake may be classed as a river lake since Wabascon Creek flows through it from east to west. Several miles downstream from the lake, Wabascon Creek enters the Kalamazoo River.

A fisheries survey party* from the Institute for Fisheries Research prepared a map and made a biological survey of the lake on July 27-31, 1938. The map shows the lake outline, the depths, and the distribution of bottom soils and vegetation. The biological survey included a study of the vegetation, fish population, fish food organisms, and chemical analyses of the water. This report summarizes all the data obtained during the survey.

Wabascon Lake has been considered a good fishing lake, particularly for bluegills and bass. It has been heavily fished during both summer and

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* The party consisted of: R. C. Ball, leader; W. Crowe, P. Eschmeyer, and A. Whitelej, assistants.

winter. Winter fishing became very popular due to the large catches. Following a few years of intense winter fishing, during which time it is said that as many as 500 fishermen were on the lake at a single time, reports indicate a decline in the take of fish in both seasons. Petitions to close the lake to winter fishing were circulated, but no further action was taken.

The lake is not especially suited for resort development because of the marshy shoreline. At the time of the survey, there were 16 cottages along the south and east shores, most of them being situated on the summit of a bluff which parallels the lake a short distance from the shore. The reason for the heavy fishing on the lake is obviously its proximity to Battle Creek. Boats are available from two boat liveries.

As mentioned previously, the lake occupies a wide portion of the Wabascon Creek valley. It serves as a catch basin in the stream. It is approximately a mile long and averages less than 800 feet in width. There is a very narrow shoal and a rapid drop-off around nearly the whole lake.

While the entire margin is low and boggy, the land surrounding the lake is rather rolling. There is considerable waste land, a few farms, and several small woodlots.

The lake, through Wabascon Creek, has a watershed of several square miles and maintains a rather uniform water level. Both the inlet and outlet are 25 feet wide and 4 feet deep. There are no dams in the stream, so migrating fish have ready access to the lake.

The lake has a surface area of 70.2 acres and a maximum depth of 45 feet. The shoal area occupies about 20 per cent of the lake. The shoreline development is 2.16, which means that the shoreline is 2.16 times as long as it would be if the outline of the lake were perfectly circular. This results in a larger shoal area and thus increases the potential

productivity of the lake because shallower waters are quite generally more productive of fish foods and vegetation than are deeper waters.

The lake bottom varies with depth. The shoal area is largely a mixture of fibrous peat and marl. This type of bottom is generally very productive of vegetation; this lake conforms to the rule since almost the entire shoal is covered with dense weed beds. The bottom in the deeper portions of the lake consists of marl and pulpy peat.

The water in Wabascon Lake has a light brown color; the Secchi disc reading on the date of examination was between 8 and 8½ feet. The Secchi disc is a circular black and white metal disc used to indicate the depth to which visible light penetrates. This reading is important in fisheries work because the limit of light penetration controls to a certain extent the distribution of the vegetation.

The temperature and chemical nature of the water is also important because the kinds and abundance of fish food organisms as well as the suitability of the waters for various species of fish depend wholly or in part on these factors. They are summarized below for the data taken July 30-31, 1938.

Depth (ft.)		Temp. (°F.)		Oxygen (p.p.m.)		CO_2 (p.p.m.)		ph-th alkalinity (p.p.m.)		Methyl orange alkalinity (p.p.m.)		pH	
MD*	I**	MD	I	MD	I	MD	I	MD	I	MD	I	MD	I
3	...	80	...	6.5	...	0.0	...	9.0	...	183	...	8.3	...
...	5	...	77	...	6.8	...	0.0	...	11.0	...	180	...	8.1
9	...	77	...	5.6	...	0.0	...	9.0	...	200	...	8.0	...
...	12	...	75	...	3.2	...	7.0	...	0.0	...	198	...	7.6
15	...	67	...	1.7	...	7.0	...	0.0	...	182	...	7.6	...
21	...	60	...	0.2	...	8.0	...	0.0	...	200	...	7.6	...
27	...	55	...	0.0	...	8.0	...	0.0	...	200	...	7.6	...
39	...	47	...	0.0	...	11.0	...	0.0	...	200	...	7.4	...

* Main Depression - in west end.

** Near Inlet - east end.

There seems to be a limited supply of oxygen in the deeper waters of Wabascon Lake. The upper layers (0-12 feet) contain sufficient oxygen and are rather warm. It is noted also that the river contains more oxygen than the lake water. This is generally true because agitation of the surface water increases the amount of dissolved oxygen and the demand for oxygen in a stream carrying no pollution is not as great as it is in a lake where plants and animals are more abundant and where there is much more decomposition of organic material. In winter, the stream undoubtedly brings in fresher water and keeps the oxygen supply at a higher level than the lake could maintain alone.

The lake water is hard (M.O. alkalinity 180-200 p.p.m.) and alkaline (pH 7.4-8.3). These characters are often associated with high productivity and a good growth rate of fish.

The position of the thermocline (zone where there is a rapid change in temperature) in Wabascon Lake is rather high, beginning at 10 or 12 feet and continuing down to 36 feet. The lower half of the thermocline and the hypolimnion (area below the thermocline--below 36 feet in this case) contain little or no oxygen during the large part of the summer, because this water does not circulate but stagnates instead. This includes the water from a depth of 22 feet to the bottom, and fish are unable to use this region, except for possible short periods. This condition is not especially critical in Wabascon Lake, however, since it only exists in the west portion of the lake. The east end and center are not as deep and are closer to the supply of fresh water. Hence, all depths contain waters suitable for fish life.

Vegetation in a lake is important from the standpoint of food and cover for fish. Wabascon Lake has a limited area suitable for plant growth, but all of this area is utilized by the plants. The kinds and abundance of plants and their distribution with regard to depth and bottom soils are given

in the following table.

Common name	Scientific name	Abundance	Bottom soil*	Depth (ft.)
Waterweed	Anacharis canadensis	Common	M, FP+M, M	1 - 8
Sedge	Carex sp.	Common	Mk+M, FP+M, FP	0 - ½
Coontail	Ceratophyllum demersum	Abundant	M+FP, M+Mk, M	1 - 19
Muck grass	Chara sp.	Abundant	M+FP, M+Mk, M	1 - 7
Loosestrife	Decodon verticillatus	Abundant	M+FP, M+Mk	0 - 2
Duckweed	Lemna trisulca	Few		0
Water Milfoil	Myriophullum sp.	Few	M+Mk, M	2 - 6
Bushy pondweed	Naias flexilis	Common	M+FP, M	1 - 6
White water lily	Nymphaea odorata	Abundant	M+FP, M+Mk, M	1 - 3
Yellow water lily	Nuphar advenum	Common	M+FP	1 - 5
Arrow arum	Peltandra virginica	Abundant	M+FP, M+Mk	0 - 3
Pickerel weed	Pontederia cordata	Rare	M+FP	1 - 3
Sago pondweed	Potamogeton pectinatus	Common	M+FP, M	2 - 8
Pondweed	P. panormitanus var. minor	Few	M+Mk, M	2 - 5
Flat-stem pondweed	P. zosteriformis	Common	M+FP, M+Mk, M	2 - 12
Soft-stem bulrush	Scirpus validus	Common	M+FP, M+Mk,	0 - 3
Bur reed	Sparganium sp.	Few	M+Mk	0 - 1
Duckweed	Spirodela polyrhiza	Common		0
Cattail	Typha latifolia	Common	M+FP, M+Mk	0 - 2
Bladderwort	Utricularia vulgaris var. americana	Rare	M+FP	2 - 8

* Bottom soils: M=Marl, Mk=Muck, FP=Fibrous peat.

The heavy production of vegetation results in ample provision of fish food organisms. Bottom foods are not particularly abundant, however. Bottom samples taken during the survey showed that fresh-water shrimp and midge larvae (blood-warms) are common, while other forms such as aquatic earthworms, leeches, water mites, mayflies, dragonflies, and caddisflies were present in very small numbers. Studies have shown that considerably more food is harbored in the vegetation than in the bottom soil in most Michigan lakes.

Plankton (microscopic free-swimming animals and plants) is not particularly abundant. This is often true in lakes of this type. Many of the stream forms which are carried into the lake cannot adjust themselves to lake conditions, and many of the typical lake forms cannot exist in a current or under more or less stream conditions.

A fish collection was made by the survey party. The following table gives a list of the species present and their relative abundance. Stocking reports for 1936 through 1940 are included.

Fish	Abundance	Number planted (1936-40, inc.)
GAME FISH		
Northern pike	Few - reported	
Yellow perch	Few	
Smallmouth bass	Present - reported	2,000
Largemouth bass	Common	1,100
Bluegill	Common	119,000
Long-eared sunfish	Few	
Pumpkinseed	Common	
Bluegill x pumpkinseed	Rare - 1 taken	
Black crappie	Rare - 1 taken	
COARSE FISH		
Lake chub sucker	Few	
Yellow bullhead	Rare - 1 taken	
OBNOXIOUS FISH		
Dogfish	Rare - 1 caught by fisherman	
FORAGE FISH		
Black-chin shiner	Few	
Black-banded topminnow	Abundant	

A growth study of the game fish was made. Ages are determined from scales taken at the time of the survey. The average length and weight are given for each age group of each species in the following table.

Fish	Age group	Number of specimens	Average length (inches)	Average weight (ounces)
Largemouth bass	II	2	7.8	3.2
	III	1	10.4	7.4
	IV	1	12.9	15.9
Perch	II	1	7.2	2.6
	III	1	7.9	3.2
	VII	3	9.3	6.0
Bluegill	I	3	3.6	0.7
	II	5	5.4	1.6
	IV	2	6.9	3.7
	VI	1	9.9	12.0
Pumpkinseed	I	1	4.2	1.0
	II	5	4.4	1.1
	V	1	6.9	4.5
Bluegill x pumpkinseed	I	1	3.6	0.5
Long-eared sunfish	II	2	2.8	0.3
	V	1	4.1	0.9

This study indicates that the fish are growing at an average rate. More data should be obtained before definite conclusions can be made but, on the basis of the data available, it seems that the bluegills reach legal size during their fourth summer. This is the average rate of growth for bluegills in the state as a whole according to W. C. Beckman.* Largemouth bass reach legal size during their fourth summer. Data on perch are inadequate.

Management Suggestions

Wabascon should remain in the class of "all other" lakes since it produces largely bluegills and bass.

While there is a relatively limited shoal area, it is believed that spawning facilities are more than adequate to maintain a supply of fish for which there is a suitable food supply. Natural propagation, therefore, should be adequate for bass, bluegills, and related species. Stocking of

* W. C. Beckman, 1941. Meet Mr. Bluegill. Mich. Conservation, Vol. X, No. 7, pp. 6-7, 11.

these species should be discontinued for the present, at least, and it is more than likely that the supply of larger fish which may have been temporarily reduced by intensive winter fishing will be replaced as the young get a chance to mature. Evidence that this is already occurring is found in creel census records taken during the last half of July and the first week in August of 1938, which show that bluegills averaging 7.4 inches were caught at the rate of slightly over 2 fish per hour. This rate of take is above the average for Michigan lakes as a whole.

Indications are that fishing is getting better and in a few years may reach its former level. Most fish seem to mature in cycles, i.e. they are taken in large numbers for several years and then for a time catches decrease. Increases are easily absorbed but decreases are always much more noticeable, but periods of poor fishing can be soon remedied by the fast growth of the young fish.

The only probable predators observed were a few western painted turtles which are known not to use fish extensively.

Parasites were found only in the intestinal tract of a few of the game fish; their control is both unnecessary and impractical.

The lake has ample cover in the vegetation. Weed beds occupy nearly all of the suitable waters and provide adequate food and cover.

The water level is subject to only slight fluctuations and requires no regulation.

INSTITUTE FOR FISHERIES RESEARCH

By Eugene Roelofs
Junior Aquatic Biologist

EWR:VA

Report approved by: A. S. Hazzard