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INSTITUTE FOR FISHERIES RESEARCH  
UNIVERSITY MUSEUMS  
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Report 245

THE PROBLEM OF WINTER VERSUS SUMMER FISHING IN OTSEGO LAKE, OTSEGO COUNTY

We have been led to understand that there exists a local controversy of considerable proportions over the question of whether winter fishing on Otsego Lake is depleting the fish stock so as to interfere with the success of summer fishing. Naturally those interested in the resort business, as well as the summer resorters themselves, wish nothing to interfere with good summer fishing in this lake.

This conflict between resort interests and local residents is a very general one, wherever there is any extensive resort development. If summer fishing is thought to be poorer on a lake than it used to be or than it ought to be,—and this is a very general attitude,—the resort interests attribute this unfortunate condition to the spearing of "thousands" of fish by the "natives". The local fisherman, in their own defense, generally claim that the results of their winter fishing are too meager to seriously affect the enormous fish population of the lake.

It is no particular concern to the Institute for Fisheries Research whether the fish in a lake are caught in the winter or the summer. For this reason the Institute approaches this debated question with an impartial viewpoint.

This question was brought to the attention of the Institute by R. W. Eschmeyer, who had discussed the problem at some length with Conservation Officer Thomas Marlatt, and with F. A. Westerman.

Winter fishing in Otsego Lake can have a deleterious effect on the summer fishing for northern pike only. Winter fishing reports of the creel census for January to March, 1931, and for January to February, 1934, record 500 fish, all pike. Summer fishing records for the years 1928 to 1933 inclusive indicate 7 species being caught, as follows:

Fish caught in Otsego Lake in summers 1928 to 1933

	Number reported	Relative abundance
Northern pike	263	55.5 %
Perch	134	28.3 %
Small-mouth bass	35	7.4 %
Rock bass	24	5.1 %
Bluegill	11	2.3 %
Large-mouth bass	6	1.3 %
Bullhead	1	0.2 %

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Thus the winter fishing affects only a little more than half of the summer fishing in Otsego Lake, when the fishing is recorded in terms of number of fish caught irrespective of species, or weight. Placed on a weight basis, however, a considerably larger percentage of the summer fishing would be affected by the winter fishing. The average weight of the pike caught in Otsego Lake may be estimated at about two pounds, 13 ounces, since this is <sup>the</sup> weight corresponding to a length of 19.1 inches in Douglas Lake, for which we have drawn up a weight-length graph (19.1 inches is the average size of pike caught in Otsego Lake, according to the estimates in the creel census data). Since nearly two-thirds of the fish other than pike reported caught in Otsego Lake were perch, the average weight of these other species must be much less than that of the pike. The major part of the summer-caught fish, in terms of weight, may therefore be affected by the winter fishing.

No accurate figures are available on the total number of northern pike caught in Otsego Lake over the winter as compared with those caught in the summer. Considerable numbers, however, are certainly caught in the winter. The creel census reports for 1931 and 1934, by days, are as follows:

Date	No. pike reported in creel census tabulation	Conservation Officer reporting
Jan. 19, 1931	43	Ernest Slade
Jan. 21 "	12	"
Jan. 24 "	24	"
Jan. 25 "	5	"
Jan. 28 "	15	"

Date	No. pike reported in creel census tabulation	Conservation Officer reporting
Jan. 30, 1931	4	Ernest Slade
Jan. 31, "	6	"
Feb. 8, "	19	"
Feb. 11, "	64	"
Feb. 15, "	14	"
Feb. 18, "	23	"
Feb. 22, "	19	"
Mar. 1, "	13	"
Mar. 5, "	21	"
Mar. 19, "	23	"
Mar. 23, "	9	"
Mar. 27, "	5	"
Mar. 29, "	16	"
Mar. 31, "	4	"
Jan. 7, 1934	119	Thomas Marlatt
Jan. 22, "	6	"
Jan. 27, "	2	"
Feb. 11, "	1	"
Feb. 21, "	33	"
Number of days, 24	500 pike	

What percentage of the fishermen were contacted in obtaining these figures is not known. Since only one man worked at a time, and since the lake is a long one, it is very unlikely that anything approaching a complete census of all fish caught was made, except on January 7, 1934. On the other hand days when fishing was heavy were likely selected for the census operations. The average number of pike reported per day is 21. If we approach accuracy in guessing that 50 pike per day are actually taken on the average over the 90 day period from January 1 to March 31, the annual removal over this period would be about 4500. Such a removal would be expected to interfere with the success of summer fishing.

A comparison of summer and winter fishing in Otsego Lake can be made on the basis of fish caught per hour. In 1931 the winter take per hour was much less than in 1934. (In 1931 the recorded take was entirely by spear, and in 1934 only 9 fisherman fishing 13 1/2 hours were listed as using lines, all other data referring to spearing.) The catch per hour figures are as follows:

	Summers 1928 to 1932	Winter, 1931 Jan.-Mar.	Winter, 1934 Jan.-Feb.
No. of fish reported (with hours of fishing)	433	267	161
Northern pike	0.66	0.17	0.57
Perch	0.26	-	-
Small-mouth bass	0.08	-	-
Rock bass	0.06	-	-
Bluegill	0.03	-	-
Large-mouth bass	0.01	-	-
Bullhead	Trace	-	-
All species	1.10	0.17	0.57
		Average 0.32	

It is evident that more fish are caught per hour in the summer than in the winter, probably 3 or 4 times as many. But if the northern pike alone are considered, the number caught per hour in the winter may approach the summer average, though it probably averages about half as many. This indicates again that the winter fishing may have a distinct bearing on the success of summer fishing for pike in Otsego Lake.

A remarkable feature about the pike of Otsego is said to be their small size. This popular idea is thoroughly confirmed by the creel census data:

Season	No. of pike reported with size indicated	Average size
May-July, 1930	10	18.0"
Jan.-Mar., 1931	327	19.4"
September, 1933	1	24.0"
Jan.-Feb., 1934	161	18.5"
Whole period	499	19.1"

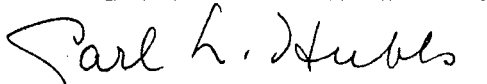
The suggestion has been made, that the small size of the pike in Otsego Lake may be due to overcrowding and dwarfing. Further, if this proved true, it would appear probable that the removal of considerable numbers of the pike from

Otsego Lake over the winter would reduce their concentration, permitting an increased growth-rate in the survivors. In order to subject this idea to a test, a number of scale samples of Otsego Lake pike were collected. Scale samples from a number of other lakes were gathered together for the necessary comparative study. The age and growth determinations of the pike, based on an examination of their scales, were made by Gerald P. Cooper of the Institute staff whose report is appended hereto.

Cooper's conclusion is that the average pike of Otsego Lake are not dwarfed, but that they are small because they are relatively young—two and three years old. There is therefore no good indication that the pike of Otsego Lake are overcrowded and dwarfed. On the contrary there is evidence of overfishing. It is a well recognized result of overfishing, that the average age of the fish is reduced. The older fish tend to be caught off leaving the young ones dominant. The intensity of the fishery prevents many of these small fish from reaching a large size. Since the most prolific spawners are thus removed, in time the young themselves will decrease. In this way the depleting effect of overfishing is accelerated.

These facts and deductions indicate that winter fishing for pike in Otsego Lake definitely detracts from summer pike fishing in the lake. Prohibiting winter fishing, or at least winter spearing in this lake, would be expected to increase the summer catch of pike. No recommendations are made, since these would involve Departmental policy.

INSTITUTE FOR FISHERIES RESEARCH



Carl L. Hubbs  
Director

Appendix to Report 245

GROWTH OF NORTHERN PIKE IN OTSEGO LAKE COMPARED WITH THE GROWTH IN  
OTHER MICHIGAN WATERS

By Gerald P. Cooper  
of the Institute for Fisheries Research staff,  
University of Michigan

Contraversy over winter fishing on Otsego Lake has been the stimulus for the investigation on which this report is based. Since the pike in this lake seem to run small in size though they are numerous, it has been thought they might be over-crowded, resulting in a slow growth rate.

A comparative study of the growth rate of pike from several lakes has been made with the idea of finding out whether or not the Otsego Lake fish have a sub-normal growth rate. Scale samples from Otsego Lake have been obtained through the efforts of Conservation Officer Thomas Marlatt and R. W. Eschmeyer. A large series of scale samples, furnished by Dr. Edwin P. Creaser of the Museum of Zoology, University of Michigan, was collected in Douglas Lake, Cheboygan County. The single ten year old Douglas Lake specimen was recorded by Dr. Carl L. Hubbs. Some scale samples from other lakes were collected during the lake surveys by the Institute for Fisheries Research. Unfortunately the Otsego Lake series is not a large one; still it is sufficient to give some idea of the growth rate in that lake.

The data are given entirely in the accompanying table and graph. In comparing the sizes of the same year groups in different lakes, it should be noted that the fishes from the first 5 lakes listed were taken in January while the others were collected in the three summer months, as indicated. Examinations of scales

taken at different times in the year indicate that, as a rule, this species resumes growth in late spring or early summer and that growth is rapid during July and August. Thus two-year old fish taken in August would be expected to be larger than two-year old fish taken in January, other factors being equal. The fact that Otsego Lake is situated in the coldest section of the Lower Peninsula might naturally result in a somewhat slower growth rate for that lake than for lakes in the counties of Mason, Newaygo, Manistee and Cheboygan. With these factors in mind, and comparing the growth rate of the various lakes, the growth of the pike in Otsego Lake does not appear, from the few specimens available, to be below normal.

The 4 two-year old fish from Otsego Lake had an average total length of 432 mm. at the end of their second year. The single two-year old fish from Turtle Lake had attained a total length of 406 mm. in two growing seasons, or less than those of Otsego Lake. The 4 two-year old fish of Hamlin Lake taken in June, had made an average growth in their third summer of approximately 42 mm. (computed by direct proportions between scale measurements and body length). Thus these 4 Hamlin Lake fish, averaging 476 mm. in June of their third summer, had an average length of about 434 mm. at the end of their second year, being then of approximately the same size as the Otsego Lake of the same age. Comparison of the Otsego and Douglas Lake fish becomes a little more involved.

The Douglas Lake specimens were all, except the young of the year, collected by gill, trammel and fyke nets. Since the smallest two-year old was no larger than the smallest one-year old fish of the Douglas Lake series, it is quite evident that these nets used were selective for the larger fish of the one-year class. Therefore the fact, that the one-year old Douglas Lake fish are ~~much~~ larger than the two-year old Otsego specimens, is not as significant as it might appear. Most of the Douglas Lake specimens were collected in July and August and the scales of the two-year old class indicated, from scale measurements, that this year class had made an average growth of about 50 mm. in their third summer. Thus the Douglas Lake two-year old

fish had obtained a length of about 445 mm at the end of their second growing season, only slightly more than those of Otsego Lake. Likewise in the three-year old class the 6 Otsego Lake specimens had a better growth than those of Hamlin Lake and compare very favorably with those of Douglas Lake if the added fourth summers growth of the Douglas Lake specimens is taken into consideration. The growth rate appears, from the study of a very few specimens, to be somewhat better in Bass, Bear, Chief and Crapo Lakes than in Otsego.

It is very likely that various normal environmental factors other than crowding may be responsible for the variation of growth rate in these several lakes.

The small size of the pike in Otsego Lake, to conclude, is apparently due to their youth and not to dwarfing. That few large pike occur in this lake, but that these small ones are common, indicate almost certainly that this lake is over-fished for pike. Therefore winter fishing appears to be deleterious to summer fishing in Otsego Lake.



Table I. Age and growth of Esox lucius in several Michigan localities. Total lengths are given in millimeters. The appended figure is the number of specimens upon which the average is based.

Locality	County	Month of capture	Annuli on scales *										
			0	I	II	III	IV	V	VI	VII	VIII	IX	X
Otsego L.	Otsego	January, 1934	-	-	432 <sub>4</sub>	519 <sub>6</sub>	-	-	-	-	-	-	-
Crapo L.	Otsego	January, 1934	-	-	-	622 <sub>2</sub>	-	-	-	-	-	-	-
Turtle L.	Otsego	January, 1934	-	-	406 <sub>1</sub>	-	-	-	-	-	-	-	-
Corner L.	?	January, 1934	-	-	-	-	559 <sub>2</sub>	-	-	-	-	-	-
Hess L.	Newaygo	January, 1934	-	-	-	-	-	610 <sub>1</sub>	836 <sub>1</sub>	-	-	-	-
Hamlin L.	Mason	June 1931-1932	-	-	476 <sub>4</sub>	505 <sub>10</sub>	623 <sub>13</sub>	625 <sub>2</sub>	-	-	-	-	-
Bass L.	Mason	June, 1932	-	-	591 <sub>2</sub>	649 <sub>2</sub>	715 <sub>3</sub>	-	-	-	-	-	-
Bear L.	Manistee	July, 1932	-	-	558 <sub>2</sub>	640 <sub>3</sub>	-	-	-	-	-	-	-
Chief L.	Manistee	July, 1932	-	-	-	700 <sub>1</sub>	-	-	-	-	-	-	-
Douglas L.	Cheboygan	June, July, Aug., 1925, 1928, 1929.	85 <sub>2</sub>	460 <sub>5</sub>	495 <sub>34</sub>	557 <sub>40</sub>	626 <sub>14</sub>	632 <sub>5</sub>	645 <sub>3</sub>	669 <sub>2</sub>	816 <sub>1</sub>	810 <sub>1</sub>	1066 <sub>1</sub>
Stream near Cheboygan	Cheboygan	July, 1928	170 <sub>5</sub>	-	-	-	-	-	-	-	-	-	-

\* January 1st is arbitrarily taken as the beginning of the growth year although growth does not ordinarily begin until sometime in late spring or early summer. While this method appears to be inconsistent, it eliminates confusion in the interpretation of the data. Thus the scales of the fish collected in January, were considered as having an annulus at their margin although no annulus had as yet been formed.

