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RECAPTURES OF TAGGED WALLEYES, STIZOSTEDION V. VITREUM (MITCHELL), IN  
HOUGHTON LAKE AND THE MUSKEGON RIVER, ROSCOMMON COUNTY, MICHIGAN

by

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In 1939, 1940 and 1942 extensive tagging experiments were carried on by the Michigan Institute for Fisheries Research at Houghton Lake and the Muskegon River as part of an investigation on the life history and habits of the northern pike, (Esox lucius, L.). The results of these investigations have already been assembled and presented elsewhere (Report Nos. 687, 811, 940, 1038). Coincident with the northern pike experiments at Houghton Lake, a total of 100 walleyes were taken in weirs, tagged, and released in 1939 and 1940. It was believed at the time of tagging that recovery of an adequate number of these marked fish would add to the little that is known of the movements and dispersion of the walleye in inland Michigan lakes. Houghton Lake is the largest inland lake in Michigan, 9 1/2 by 5 1/2 miles at its longest axis and having a maximum depth of 20 feet. Tagging was accomplished in both years, during the time of the spawning migration, at two points: (1) along the shore and in the tributaries of the North Bay of Houghton Lake, and (2) at a two-way fish weir

constructed in the Muskegon River one mile downstream from the river's origin in Houghton Lake. The weir was in operation in 1939 from April 7 until June 19 and in 1940 from March 31 until July 11. Tagging of walleyes in North Bay was accomplished within these same periods of time. Details of the construction and operation of this weir have already been described by Carbine and Shetter in the Transactions of the American Fisheries Society (1946?). All walleyes were jaw-tagged according to the procedure described by Shetter (1936, Pap. Mich. Acad. Sci., Arts and Letters, 21 [1935], 651-653).

Details concerning the recapture of tagged walleyes are incorporated in Table 1. The percentage of total recoveries of each tagging operation may be considered good in view of the large size of Houghton Lake (20,040 acres) and the relatively small number of walleyes tagged. Numbers tagged and totals and percentage recovered by place and date of tagging are as follows:

Place of tagging	Year of tagging	Number tagged	Total recoveries	
			over entire period 1939 - 1945	Percentage recovered
Muskegon River weir	1939	16	5	31.2
	1940	24	4	16.6
No. Bay of Houghton Lake	1939	21	3	14.3
	1940	<u>39</u>	<u>7</u>	17.9
		100	19	

These relatively high percentages of recovery reflect the intensity of the fishery for walleyes in Houghton Lake. The results of this tagging experiment and personal observations seem to indicate a high rate of exploitation and an early cropping of the walleyes soon after reaching the

legal length of 14 inches. The 100 walleyes that were caught, tagged and released again had an average total length of 373.2 millimeters or 14.7 inches at the time of tagging. Exactly 60 per cent of the walleyes taken for tagging were caught by angling and would indicate to some degree the size composition of the anglers' catch. Certain elements of human nature may also have contributed to the volume of recoveries. All of our recoveries were made by anglers and data were submitted to the Conservation Department purely on a voluntary basis since no intensive creel census has ever been in operation on Houghton Lake. Furthermore, at the time of tagging the majority of walleyes were just over legal length. Those that were not would, almost without exception, have attained legal length in the same season they were tagged. It seems logical to assume that the angler is more inclined to report data on the large fish in his creel than the undersized one he threw back.

It is interesting to note that the walleyes entering the Muskegon River to spawn were larger and probably older fish than those entering the small tributaries around the North Bay of Houghton Lake. The same phenomenon was <sup>also</sup> noted for northern pike. The average total lengths of the walleyes taken in the Muskegon River weir in 1939 and 1940 were 453.0 millimeters (17.8 inches) and 447.7 millimeters (17.6 inches) respectively. Walleyes caught and tagged along the shore and in the tributaries of North Bay averaged 307.7 millimeters (12.1 inches) in 1939 and 331.8 millimeters (13.1 inches) in 1940. These data suggest that the larger fish are seeking deeper and more extensive spawning grounds when the smaller tributaries around the lake shore are no longer adequate for these purposes. This is the only apparent explanation for the distinction in size between the samples examined.

Tagged walleyes were recovered as early as 15 days and as late as 796 days after tagging. Of 19 recoveries, 6 were made in the year of tagging (average 49.7 days), 9 were made one year after tagging (average 413.4 days), and 4 were made two years after tagging (average 782.3 days). There is no apparent reason for the recaptures being greater in number a year after tagging than in the same season of tagging.

Recaptures were too few in number to indicate any pattern of movement for walleyes in Houghton Lake. That they are far-ranging in habit is evident. Recoveries were scattered throughout the length and breadth of the lake irrespective of the point of tagging. Distances traveled in the lake varied from 0.5 to 7.5 miles. Extreme cases of wandering were recorded. One walleye, tagged in 1939 at the Muskegon River weir, was recaptured in 1940 south of the Big Rapids Dam which is 130.5 miles downstream from the point of tagging. Two other walleyes, tagged at the same point in 1940, were recovered a year later just above and just below the Big Rapids Dam, having covered the same distance in a like period of time.

Four, or approximately one-fifth, of the recoveries were made, one to two years after tagging, somewhere along the Muskegon River. Three of these fish had wandered approximately 130 miles downstream and it seems hardly feasible that they would return again to the lake. We may then have in these figures, an approximate measure of the walleyes migrating into the Muskegon River to spawn that are lost to Houghton Lake.

Growth data was recorded for only 13 recoveries and is far too inadequate to draw any conclusions. Data for individual specimens are included in Table 1 and are presented merely as a matter of record.

INSTITUTE FOR FISHERIES RESEARCH

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TABLE 1

## SUMMARY OF RECOVERIES OF TAGGED WALLEYED PIKE IN HOUGHTON LAKE AND THE MUSKEGON RIVER

	Tag number	Days out	Where recovered	Distance traveled (miles)	Total length at tagging (inches)	Total length at capture (inches)	Growth increment (inches)
<u>1939 Tagging - Muskegon River Weir</u>							
Number tagged - 16							
1939 Recoveries:	4212	60	Middle Grounds	7.25	19.5	20.0	0.5
1940 Recoveries:	4215	497	North Bay	3.0	16.2	...	...
	4206	401	North Bay	3.0	18.9	...	...
	4209	359	South of Big Rapids Dam <sup>‡</sup>	130.5	19.6	20.0	0.4
1941 Recoveries:	4201	780	Off Houghton L. village	7.5	17.5	18.5	1.0
<u>1940 Tagging - Muskegon River Weir</u>							
Number tagged - 24							
1941 Recoveries:	12114	442	Houghton Lake	...	17.8	20.5	2.7
	12109	360	Below Big Rapids Dam <sup>‡</sup>	131.0	18.8	19.0	0.2
	12105	452	Above Big Rapids Dam <sup>‡</sup>	130.0	20.9	...	...
1942 Recoveries:	12111	791	Muskegon River	4.0	20.9	21.5	0.4
<u>1939 Tagging - No. Bay of Houghton Lake</u>							
Number tagged - 21							
1939 Recoveries:	4213	24	Middle Grounds	5.0	13.6	14.8	1.2
1941 Recoveries:	4225	762	North Bay	1.0	13.8	14.4	0.6
	4127	796	Houghton Lake	...	12.9	13.5	0.6
<u>1940 Tagging - No. Bay of Houghton Lake</u>							
Number tagged - 39							
1940 Recoveries:	12342	15	North Bay	1.0	11.3	...	...
	12338	18	North Bay	0.5	13.2	15.0	1.8
	12341	112	North Bay	1.0	13.0	13.0	0.0
	12593	69	North Bay	0.5	16.2	...	...
1941 Recoveries:	12350	382	North Bay	0.0	12.5	...	...
	12333	393	Houghton Lake	...	14.0	14.75	0.75
	12344	435	Off Houghton Heights	5.0	14.0	14.25	0.25

<sup>‡</sup> Muskegon River.