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MOVEMENT AND HARVEST OF NATIVE WALLEYES FROM IMPOUNDMENTS ON THE MUSKEGON RIVER

By

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Several tagging experiments were conducted in 1947-1954 to investigate the movements and recovery of walleyes native to the impoundments on the Muskegon River. For the most part the experiments involved walleyes from Hardy Pond, the largest of the reservoirs. They were undertaken primarily to determine whether walleyes native to the impoundments tend to leave them and migrate downstream. During the course of field investigations of the walleye fishery on the Muskegon River in 1947 and 1948, Eschmeyer (1950) inferred that native walleyes must leave the impoundments, but experimental evidence was lacking. Tagging experiments were initiated to confirm or disprove this belief. Results to May 1, 1957, of the experiments started in 1948 and continued through 1954, are summarized in this report.

Experiment 1

In 1948, during the months of May-September, 296 native walleyes, averaging 12.8 inches long, were tagged, and released in Hardy Pond. By May 1, 1957, 33 (11.1 percent) had been recaptured by anglers: 7 in 1948, 13 in 1949, 6 in 1950, 5 in 1951, and 2 in 1952. Of the 33

recaptures, 27 (82 percent) were from Hardy Pond, and 6 (18 percent) were from downstream locations--3 from Croton Pond, and 3 from the Muskegon River below Newaygo.

Experiment 2

In August, 1952, trap nets were again operated in Hardy Pond and 99 native walleyes (average length, 13.3 inches) were tagged and released in the impoundment. By May 1, 1957, 9 (9 percent) of them had been recaptured: 3 in 1952, 5 in 1953, and 1 in 1954. Seven of the recaptures were made by fishermen, one was picked up dead, and one was recaptured in a trap net in 1953. Two walleyes, found dead a day or two following tagging, were not included in the records of recapture. Of the 9 recaptures, 7 (78 percent) were from Hardy Pond, and 2 (22 percent) had moved through Hardy Dam into Croton Pond.

Experiment 3

In September, 1953, trap nets were again operated in Hardy Pond in an effort to secure more walleyes for tagging and to gain additional insight into the nature of the movements of the walleyes from Hardy Pond. In this experiment 102 walleyes (average length, 14.8 inches) were tagged. By May 1, 1957, 14 (13.7 percent) had been recaptured: 3 in 1953, and 11 in 1954. Twelve of the recaptures were made by fishermen and 2 were from trap nets in 1954. Of the recaptures 13 (93 percent) were caught in Hardy Pond, and 1 (7 percent) was caught in Croton Pond by a fisherman.

Experiment 4

Because the capture of native walleyes in Hardy Pond had proved to be rather time consuming, it was hoped that netting in the spring months might be more effective; so in 1954, during the last week of April we

again tried to capture walleyes for tagging. Netting efforts were somewhat more productive, but not so effective as expected. In all, 168 walleyes (average length 11.9 inches) were tagged and released. By May 1, 1957, there were 7 returns (4 percent) from this experiment: 1 in 1954, 2 in 1955, 2 in 1956, and 2 in 1957. Anglers accounted for 5 recaptures, a commercial fisherman caught one of the tagged fish, and one, a mature female, was captured in a dip net during the Newaygo transfer of 1957. In this experiment 5 (71 percent) of the recaptures were from Hardy Pond, and 2 (29 percent) were from downstream areas.

Experiment 5

Information secured from recapture records in earlier experiments had suggested that there might be a spawning migration of native walleyes to the upstream portion of Hardy Pond. Several anglers had reported the capture of tagged native walleyes below Rogers Dam (the first barrier upstream from Hardy Pond) during the spawning season. To gain more information on this matter, a dip net was installed near Rogers Dam in April, 1954, in an attempt to secure more walleyes for tagging, and to learn if natives from Hardy Pond did, in fact, ascend the river to the foot of Rogers Dam to reach a spawning site. The dip net was operated under the supervision of District Fisheries Supervisor E. H. Andersen, on April 8-19. All 56 walleyes (average length, 14.0 inches) captured were tagged before being released. Results from this experiment were inconclusive but nevertheless of interest. No walleyes tagged during earlier years were recaptured. About one fifth of the walleyes caught were immature and the rest, except for a single 16.2-inch female, were males. That these 56 fish were part of a spawning run is indicated by

the fact that most of them were mature, and by their average length (14.2 inches), which was 2.1 inches longer than the average length (11.9 inches) of native walleyes caught at about the same time in downstream localities in Hardy Pond.

Thus, although a spawning run from Hardy Pond is known to have occurred, we have little information on its magnitude. By May 1, 1957, 5 (9 percent) of the walleyes tagged below Rogers Dam had been recaptured--all of them by anglers fishing in Hardy Pond. Two were caught in 1954, and three in 1955.

Experiment 6

In July, 1948, 6 walleyes (average length, 11.0 inches) native to Newaygo Pond were tagged and released there. One of these was recaptured by an angler in Newaygo Pond in 1948, and in 1949 another was caught in the river below Newaygo by an angler.

Experiment 7

To learn more about the effect on walleyes of passing through turbines, 6 tagged walleyes, ranging in length from 11.6 to 14.2 inches, were dropped directly into the turbine at Croton Dam on August 27, 1952. One, recovered just below the dam a short time later, was dead. Post-mortem examination revealed extensive internal damage. No information on the remaining 5 walleyes has been secured.

Experiment 8

Passage through dams by walleyes native to the impoundments doubtless results in some mortality. In 1954, an experiment was conducted to test whether direct transfer to the river below the lowest barrier might result in a higher rate of return of the native walleyes. On May 1, 1954, 82

walleyes (average length, 12.3 inches) which had been captured in Hardy Pond were tagged and released in the Muskegon River below Newaygo Dam. Returns from this experiment have been few. One of the fish was found dead about 3 miles downstream after an interval of 10 days, and a second was caught near the release point in June, 1954.

Experiment 9

In an effort to secure additional information about the movements of native walleyes, an expert angler was issued a permit to tag immature walleyes in Hardy Pond. Results of this experiment are given by Eschmeyer and Crowe (1955). In 1949, he tagged 251 Hardy Pond walleyes which had been captured by hook and line. Poor results from this experiment may be attributed to mortality of the tagged fish resulting from injury by the hook, and faulty tagging technique by the angler. To date there have been only 2 recoveries from this experiment--one from Hardy Pond in 1949, and one from Muskegon Lake in 1950.

Summary of experiments

In the following summary results from experiments 7, 8, and 9 are not included. In experiment 7, few fish were involved, but more importantly, the walleyes were dropped directly into the turbine, so that their treatment after tagging was not the same as that of walleyes in other experiments. In experiment 8 no dams were involved, and again experimental procedure was atypical. The last experiment (9) has been eliminated from the summary because of the suspected high mortality of the tagged fish.

In the six other experiments conducted in 1948-1954 to provide facts concerning the movements of walleyes native to the impoundments of the

Muskegon River, 727 walleyes (average length, 13.0 inches) were tagged and released in the impoundments (721 in Hardy Pond). By May 1, 1957 there were 70 recaptures (10 percent). Downstream movement was recorded for 12 (17 percent) of the recaptures, and the remaining 58 recaptures were recovered in the impoundment of release. Recoveries were obtained as late as the fifth fishing season after tagging; 17 in the first season, 35 in the second, 9 in the third, 7 in the fourth, and 2 in the fifth. Anglers accounted for 64 of the recoveries, 3 were recovered in trap nets, 1 came from a commercial fisherman, 1 from a dip net during the Newaygo transfer, and 1 was found dead. Of the 12 tagged fish which had moved downstream, 6 had passed Hardy Dam, 1 had passed Newaygo Dam, and 5 had passed Hardy, Croton, and Newaygo dams.

These experiments, and other investigations on the impoundments, have provided information on several points, and experience leads us to believe that more tagging would only supplement and confirm information already on hand. Walleyes native to the impoundments can, and do, by-pass the dams. Evidence of walleye production in the impoundments, especially in Hardy Pond, Croton Pond, and Newaygo Pond was obtained by fish collecting done with gill nets, seines, and trap nets, in 1947-1956. Hardy and Croton ponds provide satisfactory walleye habitat, and as judged from fish collection records, juvenile walleyes, in the 8- to 14-inch range, are more abundant in these impoundments than in the others. Walleye fingerlings (2 to 5 inches long) were collected on several occasions in Newaygo Pond. Possibly the greater abundance of juvenile walleyes in Hardy and Croton ponds results from the more suitable habitat or from the fact that both of these impoundments are formed by high dams (100, and 40 feet, respectively), which tend to retard downstream migration. At Hardy Dam,

water has not been spilled since its construction, and at Croton, water is spilled very infrequently. At Big Rapids, Rogers and Newaygo dams water often goes over the spillway.

Apparently anglers harvest the native walleyes at only one third to one half the rate they harvest the walleyes transferred from the Muskegon River below Newaygo Dam. Lower rate of exploitation might be expected since many of the native walleyes were tagged while still of less than legal length. Other items which may have contributed to a lower rate of recapture are mortality subsequent to tagging, and emigration from the impoundments.

The above sections give information obtained from experiments concerned with walleyes reared in the impoundments. There are a few pertinent facts concerning the Newaygo transfer which should be mentioned for completeness. The large walleyes transferred to the impoundments from the river below Newaygo Dam provide a fairly high rate of return to anglers on the impoundments. Since 1947, anglers have reported, each year, the recapture of about 20 percent of the tagged fish. We may assume that untagged walleyes from the transfer are harvested at about the same rate. The indicated harvest is minimal, for it is based on voluntary reports. The exploitation rate compares favorably with the harvest rate in other waters of Michigan, and in other parts of the United States and Canada. The transferred walleyes also tend to move downstream and are able to by-pass the dams. Movements of the transferred fish have been fully documented by Eschmeyer (1950) and Eschmeyer and Crowe (1955). Records obtained after the publication of the two papers cited above have been of a supplementary nature.

In 1953 and 1954 a tagging experiment was conducted to determine the numerical abundance of the spawning run up the Muskegon River to Newaygo.

Results of this experiment were published by Crowe (1955). The investigation showed that, from the standpoint of benefits derived, the transfer of 10,000 walleyes to the upstream impoundments was a conservative program. Tag returns in the years 1953-1956 indicated that each year anglers fishing in the Muskegon River below Newaygo Dam caught about as many walleyes as were transferred to the impoundments above the barrier. It was assumed that fish tagged in Muskegon Lake in 1953 and 1954 were randomly distributed among the untagged walleyes. In 1953, the transfer amounted to 7,661 walleyes. Among these were 42 walleyes bearing tags. The same year, anglers reported the recapture of 52 tagged walleyes, so their total catch from the river between Newaygo and Lake Michigan must have been about 9,500 walleyes. In 1954, the transfer involved 7,840 walleyes. Of these, 38 had tags, compared to 42 marked walleyes caught during that year by anglers below Newaygo. In 1955, 46 tagged fish were caught during the transfer, and 21 by anglers below Newaygo. In 1956 the figures were 12 for the dip nets, and 10 for anglers. These data suggest that the downstream (below Newaygo) anglers derive far more benefit from the spawning run than do the anglers on the impoundments. The latter can expect to harvest 2,000-2,500 walleyes annually (1/5 to 1/4 of the transfer, when the established maximum of 10,000 fish is transferred) whereas downstream fishermen perhaps can harvest as many as 10,000 walleyes annually, i.e., 5 to 10 percent of the run. For both groups the number of walleyes harvested will be proportional to the number of fish available.

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