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INSTITUTE FOR FISHERIES RESEARCH
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MICHIGAN DEPARTMENT OF CONSERVATION
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# PARTIAL FISHERIES SURVEY AND POISONING OF SWETT'S POND, OCEANA COUNTY

By

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At the request of Mr. E. R. Swett of Muskegon, a brief survey was made of his private trout pond tributary to the North Branch of the White River, Oceana County. Mr. Louis Krumholz of the Institute assisted the writer. Transportation to the pond and back to White Cloud and a very fine dinner were provided by Mr. Swett. Our survey was made the afternoon of April 24, 1942.

The pond is located in Section 14, Otto Township (T. 13N. R. 16W. Section 14) and was built by the owner about six years ago. The site was formerly an old channel of the river long since abandoned by the stream. A spring-fed tributary, now used for a private trout rearing pond, contributes about 200 gallons per minute and there are a number of smaller springs entering the old channel at various places. The total estimated natural spring flow is 300 gallons per minute. In addition, the owner has drilled an artesian well near the head of the present pond which fills a three inch pipe. This was once used to supply a small rearing pond which did not prove successful. The water from these various sources is impounded by a dam about five feet high with a standpipe overflow emptying into the North Branch of the White River. The springs emerge at a temperature of 48° F. The artesian flow was found to be 47° F. The artesian well was diverted during poisoning of the pond.

According to Mr. Swett the pond was stocked with trout from his rearing ponds each year for the past five years and they did well until 1940 when the trout seemed to disappear and large numbers of suckers and horned dace were seen. He wished to remove all fish from the pond and start over.

Having advised Mr. Swett in advance to drain the pond to the lowest level possible we were able to measure the existing

channel and isolated pools and to determine the volume of water to be treated. This was done by chaining up the middle of the stream bed and by taking a number of width and depth measurements. The length of the pond to the extreme head where the artesian well entered was 2,287 feet. The width ranged from 3 to 42 feet with an average of 23.4 feet. The deepest point in the old stream bed contained 23 inches of water. The average depth of the water in the channel was .31 feet. The volume of water remaining in the pond was calculated at 14,795 cubic feet or 922,764 lbs. of water.

It was determined that treatment of the standing water would require 0.46 pounds of derris root, 5 % rotenone content in order to produce one half part per million of derris. This concentration has been found by Leonard (1939) to be toxic to several species of fish tested at temperatures of 60° F. or above.

Analysis of the outlet stream showed a methyl orange alkalinity of 176 parts per million and a pH of about 8.0. The water supply is therefore quite hard and definitely alkaline which is favorable to good food production but decreases somewhat the toxicity of Derris to fish.

We agreed to return Sunday, April 26 to poison the pond since this would be very little out of our way in travelling to Comstock Park from Kimes Lake. Unfortunately it turned colder the night of April 25 and the water temperature rose very slowly in the pond. At 11 a.m. in the channel above the spring the temperature was 59°; by 5 p.m. this had risen to 67° F. One pound of derris was mixed in the back pump sprayer and spraying started at 11:15 a.m. (About double the estimated quantity of Derris was used to allow for lower temperature and hardness of the water). A burlap sack containing 1½ pounds of derris was placed in the tributary stream below the lower dam and weighted down with stones. The caretaker was instructed to squeeze the sack each time he visited the rearing pond above the dam on this stream, 4 or 5 times a day, and to empty the sack and wash it out thoroughly at the end of two days. It was hoped that this procedure would keep the water entering the pond from this stream toxic to fish for at least 24 hours. As soon as spraying started the standpipe was replaced at the dam and the pond began to fill. It had been previously determined that it required about 48 hours for the pond level to reach the top of the standpipe. No fish were killed in the North Branch of the White River when the pond began to drain. Retention of the poisoned water for about two days probably destroyed much of the toxicity and since the river at this point has a flow of at least 25 c.f.s. dilution would have prevented any heavy loss even if the pond overflow was still lethal.

Fish began to show distress in the pond about twenty minutes after spraying commenced and by the end of an hour many were helpless

at the surface. All trout and some other fish which were seen in this condition were picked up with dip nets and transferred to the small pond immediately below the rearing pond to determine if they would recover in the fresh water. Each fish was measured and weighed and fin-clipped (right pectoral). Eleven brook trout, nine brown trout, four suckers, two pumpkinseed sunfish, two bluegills, six golden shiners and three bullheads were placed in this pond. The caretaker was instructed to hold the fish until about May 20 and to note any which died. Nearly all the fish placed in the pond had recovered their equilibrium within five hours. In addition to the marked fish there was a number of unmarked fish present in this small pool. A letter from Mr. Swett dated May 18 reported that when the pool was drained May 17 the following marked fish were removed: 11 brook trout, 7 brown trout, 4 suckers, 2 sunfish, 2 bluegills, 3 shiners and 2 bullheads. Also taken from the pond were 6 brook trout, 1 sunfish and 3 bluegills - all unmarked. Two trout and one bluegill (all fin-clipped) were reported dead in the pond at the end of the day they were put in. This experiment proves that if fish are picked up and transferred to cold, fresh water as soon as they are seen helpless at the surface they can be revived. This finding is not in agreement with the limited laboratory tests reported by Leonard but confirms those of Smith (1940). Conditions for this experiment were ideal as the rearing pond stream has a flow of some 200 gallons per minute at about 50° F. and is located close to the center of the pond which was treated. Fish could be transferred to the fresh water two or three minutes after being picked up.

No attempt was made to secure a complete pick-up of all the fish killed in the pond but it was noted that the population consisted of a large number of suckers of all sizes, golden shiners, bullheads, pumpkinseed sunfish, bluegills and a few good sized bass in addition to about fifty brook and brown trout mostly seven inches or larger. The reason for failure of trout fingerling plantings in this pond in recent years is probably accounted for by the large population of predaceous and competitive fishes. It has been our experience that trout will not thrive in a small pond if bass, bluegills and sunfish are present.

Mr. Swett reported that the treatment did not kill all of the fish in the pond but that a few sunfish or bluegills about 4 inches long and a few minnows were seen after the pond was filled. On October 5, 1942 he stated "the pond seems to be alive just now, probably shiners. There are a few bluegills or sunfish." It is possible that the derris used had lost some of its potency or that the volume of the pond or inlet stream was underestimated. It is also possible that some fish recovered in the upper section of the pond or managed to survive in the cold water of the rearing pond stream which may not have remained toxic long enough in spite of the sack of derris placed in it. It is not known whether enough rotenone would continue to leach out of the sack of derris over a period of 24 hours (or whatever time might be required to kill the last fish) to keep the water of this stream toxic. If not some fish could have collected in the large

pool fed by this stream and might have revived there.

Acknowledgements

The writer wishes to express his appreciation of the friendly hospitality extended him and Mr. Krumholz during this work. The cooperation of Mr. Swett in allowing the survival experiment to be performed and in recording the number of surviving fish was also much appreciated. The information derived from this experiment will be checked by more detailed studies and may be of value in future poisoning operations where some desirable fish are present and where facilities can be made available to rescue them.

Literature Cited

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