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Institute for Fisheries
Research
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INSTITUTE FOR FISHERIES RESEARCH
DIVISION OF FISHERIES
MICHIGAN DEPARTMENT OF CONSERVATION
COOPERATING WITH THE
UNIVERSITY OF MICHIGAN

ALBERT S. HAZZARD, PH.D.
DIRECTOR

December 6, 1950

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UNIVERSITY MUSEUMS ANNEX
ANN ARBOR, MICHIGAN

Report No. 1269

The Fish Fauna of the Two Hearted River,

Luce County, 1950

By

Gerald P. Cooper

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ABSTRACT

The Two Hearted River, Luce County, has had brook and rainbow trout, but no brown trout prior to 1950. At least the brown has not been present in sufficient numbers to be noticed. In 1950, plantings of legal-size brown trout from hatcheries were made in the lower part of the main river. A fish-collecting survey, by electric shocker, of the lower part of the river and of some of the principal tributaries was made during October 6 to 10, 1950. The purpose was to determine the extent of survival of the planted brown trout, and the presence and abundance of other types of fish, particularly brook and rainbow trout. If the browns are to displace other trout, during the next decade or so, then a recheck on the fish fauna at a later date will show what the change has been.

The collecting in October revealed good survival of legal browns planted earlier the same season. The rainbow is quite prevalent throughout the waters which were surveyed. Brook trout were fairly common only in the East Branch and in Little Dawson Creek. (The upper part of the main Two Hearted River is reported to be good brook trout water, but was not studied.) The American brook lamprey, not the sea lamprey, was found to be abundant in the drainage.

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The Two Hearted River and its tributaries are located in Luce County, principally in the following Government Townships: T. 50 N., R. 9 W.; T. 49 N., R. 9, 10, and 11 W.; and T. 48 N., R. 9, 10, and 11 W. Prior to 1950, fish stocking in the Two Hearted River from State hatcheries was limited to brook and rainbow trout. During 1950 legal-size brown trout were planted in the river. The information on file would tend to indicate that the brown trout was not present in the Two Hearted system prior to this 1950 introduction. The question then arises as to whether or not the brown trout will become permanently established there from these plantings. If the brown should become established, and if it takes over much of the system at the expense of the brook and rainbow, this might afford an opportunity to obtain an understanding of the extent to which the brown might displace these other species and something of the important interrelationships in the process. At this point it should be emphasized that we have no positive proof that brown trout ever do drive brook trout out of a stream by some type of direct effect. There seems to be little doubt from records that browns have replaced brooks in many streams, but one feasible explanation is that the brook trout, being more susceptible to capture by anglers, is thus reduced in numbers more drastically than is the brown trout. It is anticipated that, if the brown does become established and abundant within the next 5 or 10 years,

a re-examination of the river at the end of that time, and a comparison of fish collections made in comparable ways, will show what the effect has been.

Fish planting records from State hatcheries, as summarized from planting sheets (presumably complete) on file in the Institute, for the Two Hearted River and its principal tributaries, for 1950, show the following: For the Two Hearted River itself, in Sections 1, 2, 9, 10, and 11 of T. 48 N., R. 11 W., in Section 31 of 49 N., 10 W., and Section 36 of 49 N., 11 W., a total of 1,250 legal brook trout, 7.3 inches average length, planted during June, July, and August; in Sections 1, 2, and 11 of 48 N., 11 W., Sections 1, 11, 12, 14, 15, 22, and 31 of 49 N., 10 W., Section 6 of 49 N., 9 W., and Section 32 of 50 N., 9 W., a total of 3,400 legal rainbows, 9.7 to 9.9 inches average length; and Sections 1, 11, and 12 of 49 N., 10 W., Section 6 of 49 N., 9 W., and Sections 32 and 33 of 50 N., 9 W., 1,200 legal brown trout, June 5 to 29, 9.3 inches average length. On the West Branch of the Two Hearted River, in Section 8 of 48 N., 11 W., 150 legal brook trout, 7.3 inches in length. On the East Branch of the Two Hearted River, in Sections 5, 7, 8, and 18 of 48 N., 9 W., and Sections 7, 18, 19, 29, and 30 of 49 N., 9 W., 1,500 legal brook trout, 7.3 inches average length, planted in May, July, and August. For Dawson Creek, in Sections 5, 8, 20, and 29 of 48 N., 10 W., a total of 600 legal brook trout, 7.3 inches in length, planted during June, July, and August. It will be noted, of course, that the brook trout plantings involve more of the headwater section of the main river and the tributaries, whereas the plantings of rainbows and browns have been made more in the lower section of the main river.

To determine the status of the fish population of the Two Hearted River system, after the completion of the 1950 trout fishing season, a collecting trip was organized. The party consisted of District Fisheries Supervisors L. R. Anderson and C. F. Long, plus A. S. Hazzard, D. S. Shetter, E. L. Cooper, and G. P. Cooper of the Institute staff. Fish collections were made on

October 6 to 10 inclusive, 1950. Generally, the 6 persons constituted 2 separate collecting parties, each operating a 500-watt, 120-volt, A. C. electric shocker. In each case, the shocker was hauled in a boat behind one of the party members. A total of 12 collections with the shockers were made. In each instance, a sizable stretch of the river was covered, working in an upstream direction, and covering most of the deep pools and available cover which were present. Records are given below for the individual collecting stations, and the collecting time as indicated represents the actual amount of time in the operation of the shocker in concerted collecting effort. All fish collected were recorded, and all except some of the larger trout were preserved for laboratory study. In the laboratory, the collections were rechecked by the writer. Dr. R. M. Bailey, Curator of Fishes in the Museum of Zoology, kindly verified the identifications of the adult American Brook Lampreys.

Fish collections were made at the following 12 stations on the Two Hearted River and its tributaries:

Station 1.--Two Hearted River, from a point 1/4 mile above the mouth to a point approximately 1/2 mile above the mouth, Section 27 of T. 50 N., R. 9 W., thus covering approximately 1/4 mile of stream, 12:30 to 1:30 p.m., October 6. To the collectors, fish in this section seemed to be generally rare. The entire collection included 1 perch, 3 common suckers, and 5 muddlers (2 species). Very few other fish were seen. A few "rises" were seen, of fish 6 to 8 inches long, possibly rainbow trout or menominee whitefish, and 1 rainbow trout 8.5 inches was taken by angling later in the afternoon by one of the party members.

Station 2.--Two Hearted River, Section 1 of 49 N., 10 W., 200 yards of the river immediately below the mouth of the East Branch, 4 to 5 p.m., October 9.

Station 3.--Two Hearted River, Section 11 of 49 N., 10 W., from the bridge near the center of Section 11, upstream for a distance of approximately 1/4 mile (by one party), and downstream approximately 250 yards (a second party), 9 to 10 a.m., October 6. Taken in this collection were 16 legal-size brown trout, obviously

survivors of the legal hatchery plantings.

Station 4.--Two Hearted River, Section 10 of 49 N., 10 W., in the SW 1/4 of the SE 1/4 of Section 10, covering 250 yards of stream, 10:45 to 11:30 a.m., October 10.

Station 5.--Two Hearted River, Section 31 of 49 N., 10 W., from the bridge in Section 31 downstream 200 yards, in the NE 1/4 of Section 31, 4 to 5 p.m., October 7.

Station 6.--Two Hearted River, Section 1 of 48 N., 11 W., at the mouth of its North Branch, worked 200 yards of river below the North Branch and 150 yards above it, 11 to 12 a.m., October 8, 1950.

Station 7.--Two Hearted River, Section 10 of 48 N., 11 W., approximately in the center of Section 10 examined 300 yards of stream, 10:30 to 11:10 a.m., October 9. Very few fish were seen, and practically all those seen were collected. No trout seen at all. Total collection included 1 ^{yearl dace} ~~creek chub~~, 3 muddlers, and 2 brook sticklebacks.

Station 8.--East Branch of Two Hearted River, Section 18 of 49 N., 9 W., from road bridge in center of section, upstream about 300 yards, 3 to 3:30 p.m., October 6.

Station 9.--East Branch, Two Hearted River, Section 30 of 49 N., 9 W., in the NE 1/4 of Section 30, about 300 yards of stream upstream from bridge, 10 to 11 a.m., October 9.

Station 10.--East Branch of Two Hearted River, Section 5 of 48 N., 9 W., upstream from C. C. C. bridge, 250 yards of stream, 11:30 a.m. to 12:30 p.m., October 9.

Station 11.--East Branch of Two Hearted River, Section 18 of 48 N., 9 W., at Potter's, in NE 1/4 of Section 18 from Potter's Bridge 150 yards upstream, 11:30 to 12 a.m., October 10,

Station 12.--Little Dawson Creek, Section 8 of 48 N., 10 W., from the north line of Section 8 upstream 500 yards, 3 to 4 p.m., October 9.

The fish present in the several collections are recorded in the accompanying table. The total numbers of fish included in these collections appear to be small in proportion to the amount of effort which was expended in the collecting and the area of stream which was involved. Conditions for fish collecting by the shocker generally were quite favorable. Water in the Two Hearted River was brown in color, and slightly turbid due no doubt to fall rains, but the water was not unduly high, the stream was fairly easy to wade in most areas, and visibility in the water was sufficient so that shocked fish could be seen quite readily at depths up to 3 or 4 feet. Some of the pools were too deep and too large to be worked effectively by the A. C. shocker, and it is probable that some fish were missed in the deeper pools. Yet it was the opinion of the several members of the collecting party that a majority of the fish which were turned over by the shocker were actually collected (therefore included in the present tabulation). Especially noteworthy are the opinions, furnished in separate communications, of the two persons on the collecting party who had considerable prior experience with the A.C. shocker on trout streams, namely D. S. Shetter and E. L. Cooper. The general substance of their views was that we were not missing any large proportion of the fish population which was present, except perhaps at Station 1 where a uniformly wide and deep river channel made the operation of the shocker quite ineffective.

A few items of special interest, with respect to the present fish population in the river, are given below.

The collections indicate at least a fair survival to October 10 of the legal-size hatchery brown trout. There was no evidence of these browns having moved upstream very far from the point of stocking, that is, above Section 11 of T. 49 N., R. 10 W. Also it is noteworthy that we found no young brown trout, in

fact none except the legal hatchery fish, indicating that there has been no natural reproduction of the species in this river up to the present time.

A fair number of legal-size rainbow trout were taken, and at least some of these could be quite positively identified on the basis of their rather drab color, as of hatchery origin. One 13.3-inch rainbow trout, of bright silvery coloration and with pink flesh, was taken from the Two Hearted River just below the mouth of the East Branch; obviously this was a fresh-run "steelhead" recently up from Lake Superior. A large number of fingerling rainbow trout were taken in the collections, indicating successful natural reproduction.

A moderate number of brook trout were collected in the East Branch, and in Little Dawson Creek, but very few were obtained from the Two Hearted River and these only at two upstream stations (5 and 6). A number of the larger brook trout were readily recognized by their drab coloration as being legal hatchery fish. Others among the larger brook trout were highly colored presumably native fish. A modest number of fingerling brook trout in the collections indicated some natural reproduction in the East Branch and in Little Dawson Creek. Gill lice were noted on brook trout in Little Dawson Creek and in the East Branch.

The lower portion of the main stream of the Two Hearted, including the West Branch, is considered to be low-grade brook trout water, judging from our field collections. Insufficient time and difficulties of access made it impossible to include the upper end of the river in the present field study. We were informed by Mr. Hugo Kilpela, of Newberry, that the upper portion of the river, in sections 16, 21 and 28 of T. 48 N., R. 11 W., is "good" brook trout water; the fact that the stream here has a sizeable population of brook trout may be at least partly attributable to the fact that access is difficult and therefore fishing intensity is light.

Lampreys, both ammocoetes and newly transformed adults, were among the most abundant kinds of fish in the river. Lampreys were included in 9 of the

12 collections. This involved a total of 95 lampreys of which 80 were ammocoetes and 15 were newly transformed adults. The 15 adults were distributed among 6 collections. The newly transformed adults, when examined in the laboratory, were readily identifiable, by their dentition, as the American Brook Lamprey (Entosphenus lamottenii). Where all of these newly transformed adults were positively identified as the American Brook Lamprey, one might suppose that all of the ammocoetes, since they were collected from the same mud banks and the same stream sections, would also be the American Brook Lamprey. It might be safely concluded, on this basis, that at least some of these ammocoetes are American Brook Lampreys, but it would not necessarily be safe to infer, on this basis alone, that all of them are. There seems to be some question as to the degree of reliability in identification of ammocoetes from known characters. A recent publication from the Quebec Department of Fisheries "Larvae of Eastern American Lampreys, I.--Species with two dorsal fins" by V. D. Vladykov, 1950, has been referred to, and following the characteristics cited by Vladykov, the writer is quite confident that all of the Two Hearted River ammocoetes are correctly identified as the American Brook Lamprey. The distribution of pigment on the ventral side of the caudal peduncle, around the tip of the proterocercal tail, and along the sides of the branchial basket and mouth, are characteristics by which Petromyzon and Entosphenus differ (according to Vladykov), and these differences were verified in a rather hasty comparison of the Two Hearted ammocoetes with ammocoetes of Petromyzon preserved in the Museum of Zoology. At least it seems safe to state that, at the present time, the American Brook Lamprey is the abundant species of lamprey in the Two Hearted system, rather than the Sea Lamprey.

INSTITUTE FOR FISHERIES RESEARCH

Gerald P. Cooper

Report approved by A. S. Hazzard

Report typed by M. E. Keyser

Table 1.

Numbers of fish collected at 12 stations on the Two Hearted River System,
Luce County, October 6-10, 1950

| Species ✓ | Stations | | | | | | | | | | | | Total |
|------------------------------------|-------------------------------------|---------------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------------|-------------------------------|------------------------------|-------------------------------|-------------------------------------|-------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
| | Two Hearted R. Just above mouth. | Two Hearted R. Just below East Br. | Two Hearted R. 49N, 10W, S. 11 | Two Hearted R. 49N, 10W, S. 10 | Two Hearted R. 49N, 10W, S. 31 | Two Hearted R. Mouth of N. Br. | Two Hearted R. 48N, 11W, S. 10 | East Branch 49N, 9W, S. 18 | East Branch 49N, 9W, S. 30 | East Branch 48N, 9W, S. 5 | East Branch 48N, 9W, S. 18 | Little Dawson Cr. 48N, 10W, S. 8 | |
| Brown trout, legal size | | 3 | 16 | | | | | | | | | | 19 |
| Rainbow trout, legal size | | 1 | 4 | | 1 | 4 | | | | 1 | | | 11 |
| Rainbow trout, fingerlings | | 2 | 2 | 2 | 16 | 16 | | 3 | 13 | 29 | | 26 | 109 |
| Brook trout, legal size | | | | | 1 | | | 2 | 5 | | 1 | 1 | 10 |
| Brook trout, fingerlings | | | | | 3 | 1 | | 1 | 5 | 3 | 2 | 30 | 45 |
| White sucker | 3 | | 5 | 1 | | 4 | | | | | | 13 | 26 |
| Creek chub | | | | | | | | 1 | | | | | 1 |
| Pearl dace | | 5 | | 1 | 2 | 5 | 1 | | | | | | 14 |
| Blacknose dace | | 3 | 1 | | | | | | | | | 4 | 8 |
| Longnose dace | | | 9 | | 1 | 8 | | 1 | | 2 | | 1 | 22 |
| Finescale dace | | 1 | | | | | | | | | | | 1 |
| Muddler (<i>C. bairdii</i>) | 2 | 5 | 7 | 3 | 3 | 3 | 3 | 1 | | | | 4 | 31 |
| Muddler (<i>C. cognatus</i>) | 4 | 3 | 19 | 6 | 5 | 22 | | 8 | 15 | 29 | 6 | 20 | 137 |
| Mudminnow | | | | | 1 | | | | | | | | 1 |
| Brook stickleback | | | | 2 | | | 2 | | | | | 2 | 6 |
| Yellow perch | 1 | | | | | | | | | | | | 1 |
| American brook lamprey, adults | | 4 | | 1 | 3 | 1 | | | 1 | 2 | 1 | 15 | 15 |
| American brook lamprey, ammocoetes | | 13 | 1 | 2 | 15 | 23 | | | 3 | 2 | 1 | 20 | 80 |

✓ "Fingerlings" here include fish up to 6.9 inches in length, but mostly fish 3 to 5 inches.