Original: Fish Division
cc: Mr. Shetter
Mr. Ruhl

INSTITUTE FOR FISHERIES RESEARCH
DIVISION OF FISHERIES
MICHIGAN DEPARTMENT OF CONSERVATION
COOPERATING WITH THE
UNIVERSITY OF MICHIGAN

A. S. HAZZARD
DIRECTOR

ADDRESS
UNIVERSITY MUSEUMS
ANN ARBOR, MICHIGAN

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WINTER CONDITIONS ON THE NORTH BRANCH OF THE AU SABLE IN THE REGION OF LOVELLS, MICHIGAN

During the latter part of February (Feb. 26 and 27), the North Branch was examined by K. F. Lagler and myself. The stream was thoroughly inspected at several points between the Black Hole Camp Grounds and Dr. Douglas' estate, the latter being about two miles below Dam 4.

Weather Conditions

Compared with previous winters, the winter of 1936-1937 has been relatively mild, and the North Branch has been almost free of ice. On this particular visit, sheet ice was found only in the more quiet back waters and behind the stream improvement devices above Lovells. This varied in thickness from one-quarter of an inch to two inches in a few places.

Air temperature records from the Grayling Hatchery show that only on 3 days in January and 2 days in February of 1937 had there been any sub-zero weather. The lowest temperature, -12°F., recorded was on January 26, 1937. Water temperatures averaged about 34° Fahrenheit.

There has been very little snow in the region and the ground had no more than two inches of snow in any place.

Predators

Only one merganser was observed on the North Branch. The usual concentration of golden-eye were present, approximately 50 being observed in the two days spent on the river. A small number of black ducks also are wintering in the region of Lovells. It is therefore quite probable that the fish population is not suffering to any degree from bird predation.

Results of Seinings (See Table 1)

Catches of fish made by seining were rather similar to those made in the preceding winter with the exception that a concentration of legal brook trout was obtained at Anderson's Bridge as will be noted in the table.

Counts of the brook trout fry which hatched from last fall's spawning (1936) are probably inaccurate, since the fry have not yet grown to a very great size and could pass through the meshes of the smallest seines used.

It is extremely interesting to note that 51 of the fin-clipped hatchery brook trout fingerlings planted last October were taken in the Lovells-Twin Bridge area of the stream. 9,778 marked fish were planted October 13, 1936, half of them being placed at Anderson's Bridge and half of them about 1/8 of a mile above the Twin Bridges.

Fall seinings on October 30, 31 and November 2, 1936 showed a ratio of approximately 3.5 unmarked wild brook trout to 1 marked hatchery brook trout per seine haul (See Table 2) in the immediate locality where the fish had been planted on October 13, 1936. Marked hatchery brook trout were found at the Akron Club, 1/8 of a mile upstream from the Twin Bridge planting, also one marked fish was observed at Blanchard's midway between the plantings, which is about 1/2 mile from either location.

Winter seinings on February 25 and 26, 1937 show that fewer fish per seine haul were taken, but that the ratio of unmarked to marked fish taken per seine haul was only slightly less than the October-November seinings, being 3.25 to 1 (See Table 2).

From the recovery of 4 marked hatchery fingerling brook trout directly opposite the Post Office in Lovells, it is to be concluded that a portion of the hatchery planting has moved downstream at least two and a half miles since they were placed in the stream. Seinings at Eaman's estate and at the estate of W. B. Mershon below Lovells failed to take any trout at all.

Seinings upstream from the highest point of hatchery planting (Twin Bridges) failed to reveal any marked hatchery brook trout at Shoemaker's Cottage, the Akron Club, the Ranch, or at the Black Hole Camp Grounds (this last point is about 2 1/2 miles upstream from the Twin Bridges). From the results of these seinings, I think it may be concluded that any movement of the marked hatchery fingerlings has probably been in a downstream direction from the Twin Bridges, although why ~~no~~ marked fish were not taken between the Twin Bridges and Anderson's cannot be explained.

Twelve (12) seine hauls during February, 1936 yielded an average of 3 trout per seine haul. Of the 43 trout taken in February, 1936, 2, or approximately 5% were legal fish. The average number of fish per seine haul taken during February, 1937 was also approximately 3, but the total number taken was much greater due to the larger number of seine hauls made.

In February, 1937 the percentage of legal fish taken was much higher, 68 out of 369 (this includes 87 fry) being 7-10 1/2 inches in length, or 18.4 per cent. The average catch per seine haul during the 1937 seinings would undoubtedly have been higher had only those attempts in the Lovells-Twin Bridges area been considered, as the concentration of fish in the

regions of the Akron Club and Anderson's Bridge is much greater than it was in 1936, reflecting, I believe, a response by a part of the trout population to the milder weather conditions experienced during the winter just now passing.

Also of interest was the capture of 67 legal brook trout and one legal brown trout at a point slightly below Anderson's Bridge. One of these fish was a jaw-tagged brook trout which had been marked on July 1, 1936 about 1/8 of a mile upstream from the point of capture. 22 of these trout were preserved for scale samples, weights, and measurements, and stomach analysis. Table 3 of the Appendix presents the coefficient of condition of these legal trout. The average coefficient of condition of the 18 legal brook is 1.54, which according to Dr. Hazzard is relatively high in comparision to that obtained in early April from streams in the vicinity of Ithaca, New York. It is possible that the relative fatness of these fish may have been a result of the mild winter weather.

In all instances where trout were captured by seining, they were taken in shallow water, usually where there was spring seepage or flow. This is especially true of the region about Anderson's Bridge. Usually these areas were weedy, often mucky and choked with Chara or watercress. All 67 of the legal trout were taken behind a wing deflector below Anderson's Bridge, which was in no place more than 10" deep, and which had a medium deposition of silt on which there had grown a thick bed of Chara. The trout seemed to be partially burrowed into the Chara and mucky silt, but were extremely active on our approach, and their efforts to escape the seine threw up small clouds of the fine silt as we approached them. Although the backwaters of other deflectors in the Anderson's Bridge area and at other points where the stream was seined had similar conditions, none could be found which had similar concentrations of trout.

Summary

1. The North Branch of the Au Sable has not been subject to extreme cold during the past winter.

2. There has probably been little or no predation by fish eating birds.

3. A portion of the marked hatchery fingerlings, and some of the wild stock, have wintered over in the Lovells-Twin Bridge area, as evidenced by recoveries of 51 marked hatchery fingerlings, 67 legal brook trout, 162 wild fingerlings, 1 legal brown trout and 1 fingerling brown trout. Some of the marked fingerlings are known to have moved downstream as far as Lovells, but no upstream movement could be proven by seinings.

4. Observations on the locality of capture of trout tend to show a preference by the trout of all sizes for shallow, mucky shores which are weedy and spring fed ~~which~~ and have only slight currents of water or no currents through them.

5. Calculations on the coefficient of condition (Table 8) show that those trout on which weights and measurements were taken were in good flesh and had every appearance of well being.

INSTITUTE FOR FISHERIES RESEARCH
David S. Shetter
David S. Shetter

Table 1

Results of Seining, North Branch of Au Sable,
Feb. 25 & 26, 1937. 10' Common Sense
Seine Except Where Indicated By 2/ and 3/

Location of Seining	No. of Seine Hauls Made	Trout Taken						Average Number of Fish Caught Per Seine Haul
		Legal Brook	Marked Brook Fingerling	Unmarked Brook Fingerling	Brook Fry	Legal Brown	Brown Fingerling	
Black Hole 1/	15	0	0	0	0	0	0	0
Ranch	5	0	0	0	0	0	0	0
Akron Club	8	0	0	9	76	0	0	1.6
Shoemaker's	6	0	0	2	0	0	0	0.3
Twin Bridge Camp	6	0	2	0	0	0	0	0.3
Twin Bridges	15	0	0	0	3	0	0	0.3
Blanchard's	5	0	0	0	0	0	0	0
Above Anderson's Br.	7 2/	0	11	8	0	0	0	2.6
Below Anderson's Br.	21 3/	67	34	122	10	1	1	10.7
Gravel Pit	9	0	0	0	0	0	0	0
Lovells	15	0	4	21	1	0	0	1.6
Hamen's Landing	7	0	0	0	0	0	0	0
High Banks Lodge	5	0	0	0	0	0	0	0
Totals	124	67	51	162	87	1	1	3.0

1/ These localities arranged in order from farthest upstream to farthest downstream.

2/ These hauls made with 30' x 6' x 3/8" seine.

3/ Three hauls made with 30' x 6' x 3/8" seine.

Table 2

Summary of Results of Seining, Oct.-Nov., 1936, and February, 1937, To Show Relative Abundance of Trout in the North Branch of the Au Sable in Mid-Fall and Late Winter (Excludes 87 Brook Trout Fry hatched in 1937)

Time of Seining	No. of Seine Hauls	Brook Trout			Brown Trout		Total Trout Caught	Ave. Number Taken Per Seine Haul
		Legal	Wild Fingerling	Marked Fingerling	Legal Browns	Fingerling		
Oct.-Nov., 1936	48	66 (1.4)[1]	599 (12.5)	166 (3.5)	1 (0.02)	9 (0.2)	841	17.5
February, 1937	124	67 (0.5)	162 (1.3)	51 (0.4)	1 (0.008)	1 (0.008)	282	2.3

[1] Indicates average number taken per seine haul.

Table 3

Calculated Coefficient of Condition for Brook Trout in Winter. Fish Taken From North Branch of the Au Sable, Feb. 25 & 26, 1937

Sex	Brook Trout Standard Length (Inches)[1]	Weight (Grams)	K
♀	5.875	51	1.54
♂	6.750	73	1.46
♂	6.750	79	1.58
♂	6.625	82	1.73
♀	7.125	86	1.45
♂	7.375	99	1.51
♂	8.000	123	1.47
♀	9.250	202	1.56
♀	6.500	64	1.42
♂	7.250	116	1.86
♂	8.125	123	1.41
♀	7.125	81	1.37
♂	8.875	160	1.40
♀	7.000	80	1.42
♂	6.625	77	1.62
♂	6.750	85	1.70
Imm. ?	4.375	19	1.39
Imm. ♂	3.500	10	1.42
Imm. ?	3.000	6.5	1.48
♂	4.000	16.5	1.55
♂	6.000	59.0	1.68
♀	6.000	51.0	1.45
	Brown Trout		
♀	8.375	150.5	1.58

K (Coefficient of Condition) =

$$\frac{100 \times \text{weight (in grams)}}{\text{Standard length}^3 \text{ (in cm.)}}$$

Average K for legal fish - 1.54 (18 fish)

Average K, all fish - 1.52 (22 fish)

[1] Standard length in centimeters used in obtaining K, but not shown in table.