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FISH DIVISION

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Report No. 34

REPORT ON INVESTIGATION OF STREAMS AT BLACK RIVER RANCH,

MONTMORENCY COUNTY

On October 18, I made an examination of trout streams on property of the Black River Ranch, Montmorency County. This investigation was, of course, rather a limited one, due to the short time that could be spent.

The East Branch of the Black River was examined in section 9 of Montmorency township (T32N, R1E), and above at section 15 of the same township. The main Black River was examined at the southern boundary of the ranch property.

The purposes of the investigation were: (1) to give a general evaluation of present conditions for trout (2) to make recommendations regarding improvement of stream conditions (3) to make recommendations regarding construction of a rearing station at the site which has been selected.

At the time of my visit to the streams, there was much snow on the ground and it was, of course, impossible to make any judgement of the warm weather temperature range of the streams. However, I was informed that temperatures were taken on hot days of the past summer and that these did not exceed about 62 degrees Fahrenheit. The streams may be classed, according to this information, as very cold waters, suitable for brook trout. (See also temperatures given in summaries of field reports, pages 2-4).

Present conditions for trout are fairly good and Mr. Horace Colby informed me that he took trout from both streams during the past season. He took as many as a dozen fish,

ranging in size up to about 11 inches, on several occasions when conditions were good for fly-fishing.

The history of the streams is known to me from what has been told me. The streams are said to have produced large catches of brook trout at past times, before present ownership, and is said to have been seriously fished out. Under present conditions of protection, trout are reported to be increasing. No brown trout or rainbow trout are reported present.

Considerable information pertaining to the Black River and tributaries is in the files of the Institute. The stream and its tributary, the East Branch, were examined at several points by Jan Metzelaar and T. H. Langlois during 1925 and 1926 and by Smith and McPhee during 1927.

The headwater streams are very cold and conditions are good for brook trout for many miles downward. Gradually, the water warms as it proceeds downstream and trout disappear, and are replaced by warm-water species. This is indicated by survey cards which are on file. The information on these reports is summarized as follows:

Langlois No. 36.—Tributary of East Branch near headwaters in cedar swamp. Montmorency Co., Vienna Township (31N, R1E) at section 30,31 line. Width 2 1/2 feet. Temperature air 76, water 46 on May 28, 1926. Reported a fine nursery for brook trout and 6,500 planted this date. Another report (Langlois A) of June 9, 1925 records brook trout, and muddlers (Cottus cognatus) in stream at section 30.

Metzelaar and Langlois No. 189—East Branch. Montmorency Co., Montmorency township, (32N, R1E) at section 22. Width 25-30 ft. Temperature 72.5 on July 15, 1925. Fish collected here were: one brook trout yearling and 3 fingerlings, muddler (Cottus bairdii) numerous, muddler (C. cognatus) 7, johnny darter (Boleosoma nigrum) 1, common sucker (Catostomus commersonnii) 3, black-nosed dace (Rhinichthys atronasus) 2, lamprey eel (Entosphenus appendix) 3. Planting recommendations were made for brook trout.

Smith and McPhee No. 3058-Hodges Creek, tributary to Black River, Otsego Co., township 31 N, R1W, at section 13. Width 4 ft. Temperature 53 (air 75) on August 8, 1927. Two brook trout fingerlings were seined and brook trout were recommended.

Smith and McPhee No. 3057-Hardwood Creek, tributary to Black River. Otsego Co., township 32 N, R.1W at section 23. Width 5 ft. Temperature 56 (air 75) on August 8, 1927. Brook trout were found and advanced fry or fingerlings were recommended planted.

Metzelaar and Langlois No. 190-Main Black River. Montmorency Co., Montmorency township (32N, R1E) at section 16, 21 line. Width 40-50 ft. Fish collected here: brook trout, 38 fingerlings collected with one haul of 30 ft. seine, muddler (Cottus cognatus) 6, muddler (C. bairdii) 3, mud minnow (Umbra limi) 2, common sucker (Catostomus commersonii) 7, creek chub (Semotilus atromaculatus) 10, black-nosed dace (Rhinichthys atronasus) numerous, long-nosed dace (Rhinichthys cataractae) 12, common shiner (Notropis cornutus) 14, lamprey eel (Entosphenus appendix) 4. The date of the examination was July 16, 1925. A notation was made that the stream seemed to have young trout enough (no planting recommendation).

Metzelaar No. 247-Main Black River less than 2 miles below the preceding examination, just above junction with East Branch. Examined in section 8 of same township. Temperature 63.5 on August 13, 1925. Fish collected here: 5 yearling brook trout and 12 fingerlings, muddler (Cottus bairdii) numerous, muddler (C. cognatus) numerous, johnny darter (Boleosoma nigrum) 1, ling (Lota maculosa) 1, common sucker (Catostomus commersonii) numerous, long-nosed dace (Rhinichthys cataractae) 4, black-nosed dace (Rhinichthys atronasus) numerous, creek chub (Semotilus atromaculatus) numerous, common shiner (Notropis cornutus) 3, lamprey eel (Entosphenus appendix) numerous. Recommendations made were to plant brook trout farther up.

Metzelaar and Langlois No. 248-Main Black River. Cheboygan Co., Maple Grove township (33 N, R1E) at section 11, 12 line. Temperature 67 on August 13, 1925. Fish collected here were: one brook trout of 7 inches, muddler (Cottus bairdii) 1, johnny

darter (Bolecsoma nigrum) 12, black-sided darter (Hadropterus maculatus) 1, chub  
 (Nocomis sp.) 1, long-nosed dace (Rhinichthys cataractae) 1, black-nosed dace  
 (Rhinichthys atronasmus) numerous, creek chub (Semotilus atromaculatus) numerous,  
 common sucker (Catostomus commersonii) numerous, common shiner (Notropis cornutus)  
 numerous, lamprey eel (Ichthyomyzon sp.) few. Recommendations made were to plant  
 fingerling brook trout and brown trout only if desired.

Metzelaar and Langlois No. 254 -Main Black River. Cheboygan Co., Forest Grove  
 township (34 N, R1E) at section 10. The point of examination was at mill pond there.  
 Temperature was 72.5 on August 15, 1925. No trout were found. Rock bass and 9 other species  
 of fish were collected. It was recommended that small-mouthed bass be planted.

Metzelaar and Langlois No. 255-Main Black River. Cheboygan Co., Waverly township  
 (35N, R1E) at section 5. This point is less than 2 miles above Black Lake. The  
 width of the river is given as 60 feet. Temperature 70.7 on August 15, 1925. No trout  
 were found. Perch and rock bass were numerous and wall-eyed pike were reported present.  
 Thirteen other species of fish were collected. Wall-eyed pike were recommended.

It may be seen from the above summaries of examinations, that brook trout are  
 found in the Black River as far downstream as Maple Grove township (Section 11, 12) in  
 Cheboygan County. (Metzelaar and Langlois No. 248). Still farther downstream, the river  
 ceases to become a trout stream and warm-water fish are present near Black Lake.

Examination of the East Branch of the Black River was made by me in sections 9 and  
 15 of Montmorency township. The stream is about 25 feet wide, and ranges from a few  
 inches to several feet in depth. Over much of its area the depth is less than 1 1/2  
 feet. The current is strong. The bottom is predominantly gravel, but there is  
 considerable sand and black muck. There are also many sticks and other small pieces of  
 water-logged wood which form part of the bottom. Weed beds are small but numerous and the  
 majority of the vegetation patches are formed by musk grass (Chara).

Although chemical tests were not made, it may be inferred that the water is hard,

being rich in lime. Stones of the bottom are thickly encrusted with a carbonaceous deposit which is formed in the presence of certain algae which grow in waters which are rich in lime.

At the upper point of examination (section 15) the stream was formerly dammed. At this point a brief survey of the stream was covered, seining being done in swift water where there were many large stones and in more quiet places, as in shelter of Chara patches. The stream appears to have a fair population of brook trout at this point as 5 specimens were obtained. Trout food organisms may be classed as common here, on the basis of this examination. In the swift water there were no large plants but the rocks were covered with a thin coating of lower plants, diatoms and algae. Animal life was quite common, particularly insect life. Immature stoneflies (nymphs) of the genera Perla and Acroneuria, caddis-fly larvae of the genus Hydropsyche, fish fly larvae of the genus Chauliodes and mayfly nymphs of the genus Heptagenia were found in these riffles. Just above the swifter water there were several areas of vegetation (Chara) and these were surrounded by deposits of black muck. In or near such vegetation the following fish were found: brook trout (Salvelinus fontinalis) 5, black-nosed dace (Rhinichthys atronasus) 4, horned dace (Semotilus atromaculatus) 4, muddler (Cottus bairdii) 1, larval lampreys (Ichthyomyzon unicolor) 3. Insects and other fish food organisms were common. The following were collected: crayfish (Cambarus propinquus), snails (Physa), clams (Pisidium), dragon-fly nymphs (Cordulegaster), damsel-fly nymphs (Agrion), crane-fly larvae (Elliptera) and may-fly nymphs (Ephemera).

The main Black River, at the southern boundary of the Black River Ranch is much like the East Branch but is wider, being 35 to 40 feet across. It is also deeper, having pools which are at least four feet deep. Aside from these points of differences, conditions are probably much like those noted for the East Branch. Collections were obtained in the Black River in 1925 (Metzelaar and Langlois No. 190, on p. 3).

At present, both streams may be considered as good brook trout streams. Habitat conditions are suitable for trout and trout are present. However, both streams are rather poor in trout pools. Many stretches of streams were noted where the water is

shallow and flows swiftly along without becoming deep enough to form a really good trout pool. Streams which have good pools are the ones which ordinarily furnish good trout fishing. Conditions in the Black River and East Branch can be improved by construction of better shelter or pool conditions for trout.

The Institute during the past summer, has begun an extensive study of the methods of "re-snagging" streams, and of the results of such pool improvement work. It is planned to continue experimental studies of this problem on other streams, both in public waters and in private waters. In cases of the latter nature, the Institute will undertake to make advisement regarding methods of doing such work, provided the owners of the waters will agree to cooperate in experimental phases of the work by keeping data on costs of work and on improvement in fishing conditions as these are reflected in catches. Actual costs of the work in private waters, are to be borne by owners. In the case of the Black River Ranch property, this matter has been discussed and it is the expectation that work will be carried on during the coming summer. For these streams it is advisable to consider putting in both stone and log barriers. Methods of making trout pools will not be discussed in detail here.

My advice has been asked, in regard to the proposed restoration of the dam in the East Branch of the Black River at the point of examination in section 15. Considered from the point of view of the stream such a dam should prove desirable since it would create a large trout pool. Since the brook trout is not highly migratory and is known to be a permanent resident of small streams there is slight chance of trout passing down over the dam. There would be every expectation that enough trout would remain above to serve to stock that section of the water. Before the building of such a dam could take place, permission would have to be obtained from the State Conservation Department.

The site of the proposed rearing station on the East Branch was examined. The plan, I understand from Dr. Snyder, was to excavate a large pond in an ox-bow bend of the stream

and to rear brook trout fry to a much larger size. By fertilizing such a pond it was expected that enough natural food could be produced to rear a large number of trout without artificial feeding. The labor of excavating such a pond is very great and I have suggested, as an alternative, the construction of a ditch across the narrow point of the ox-bow, *This ditch will carry the water of the stream and the natural bed of the stream in the long outbow* can then be made available as a rearing pond. It would first have to be cleared of all sticks and other obstructions that would hinder the recapture of fish placed there. In order that the amount of water going through it could be controlled it would be necessary to construct a dam at the head. The intake should be screened to prevent escape of fish and a screen would be necessary at the foot of such a rearing pool. This type of rearing station has been successfully operated at White River and elsewhere, on a plan of hand feeding the trout. The disadvantage of such a rearing pool in comparison to rearing fish in troughs is that any disease affecting any trout in the pool is liable to affect the entire stock, since they are all together. If disease does not become serious, such a rearing pool would probably be successful on a basis of artificial feeding.

Considering the matter of rearing trout on natural food, as has been suggested in the present case, it will be necessary to bear in mind certain difficulties. In order to get a rich production of food organisms in a pond, it is necessary to fertilize heavily. Good results have been obtained in ponds by draining them and putting in manure over the winter. In early spring, water is allowed to enter and the pond becomes richly supplied with plant life which supports animal life, so that the pond becomes rich in fish food. Some progress has been made in raising trout in ponds of this sort and the fish find a natural supply of food, provided too many fish are not put into the body of water. In order to carry out this plan in a pool constructed in an ox-bow bend of the East Branch, it would be necessary to have water tight dams at the head and foot of the pool so that the pond could be drained and fertilized and so that the water could be very carefully

controlled. Unless these conditions obtain, a high concentration of food could not be expected. In the case of the proposed rearing station it hardly seems possible to make dams so tight as to allow draining of the pond formed between them. If raising on natural food is tried, it may be possible to get a good culture of food organisms by fertilizing and allowing the pond to stand with all water cut off. Such seepage as would enter from fairly tight dams would probably not sweep away the fertilizing substances. After a good culture of food organisms appeared, a moderate amount of water should be supplied to the pond and the fish could be placed into it. Of course, it cannot be expected that as many fish could be held there on natural food as could be supported in the same body of water under hand feeding. The advantage of fish reared on natural food is that they may be expected to be more adept at getting their own living than the hand-fed ones would be. In the case of the East Branch rearing station the project of raising brook trout on natural food is probably desirable as an experiment. How successful it might prove to be, cannot be predicted with certainty.

It is certain, however, that the best production that could be expected in a rearing pond of this size, on natural food, would not exceed about three thousand fingerlings. This maximum estimate is based on the following figures: results in culture of bass in pond conditions, from work done by the U. S. Bureau of Fisheries, show that the production of 10,000 bass fingerlings per acre is a good yield under high fertilization; it could not be expected that this yield would be bettered in raising of trout since the water must be kept at a lower temperature; there are 43,560 square feet in an acre and allowing for a rearing pond 500 feet long and 25 feet wide there would be 12,500 square feet or less than one third of an acre.

The policy for stocking trout in the Black River and tributaries should take definite account of the fact that brook trout are the only species now established and that the waters are well adapted to them. Brown trout and rainbow trout should not be stocked for there is reason to believe that they tend to replace brook trout in streams



where they become established. It is hoped that other species of trout will be kept out of the Black River system. At present, rainbows are established in Burt Lake, Cheboygan County. There seems small likelihood of their migrating into the Upper Black River because of the impassable dam at Alverno (Cheboygan Co.). This dam is 13 feet high and is listed in the Institute files as impassable to fish. A dam of the same height is located in the Cheboygan River at Cheboygan and is a barrier to upward migration of Great Lakes fish.

INSTITUTE FOR FISHERIES RESEARCH

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