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REPORT OF THE STREAM IMPROVEMENT WORK CARRIED ON IN THE PIGEON  
RIVER IN 1931 AND 1932

by

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FISH DIVISION

I. NEW WORK IN 1932

The stream improvement work carried on in the Pigeon River in 1932 was made possible through the cooperation of the Department of Conservation, which made available for the work its fire wardens and towermen in that vicinity. A teamster was hired by the Fish Division. Since the wardens and towermen could work only during damp or wet weather when there was little fire hazard the work was necessarily irregular. The number in the crew varied from 1 to 10 and the average number of men present during the working period was 3 or 4. In all, two weeks were devoted to the work. The teamster did not serve for the entire two weeks.

The work was carried on in two different sections. The first section begins at the south line of section 17, Corwith Township, and extends down stream for 1/4 mile. It is a very poor section. There is very little shade and what there is consists of low bushes. For a stream the width of the Pigeon, trees are needed to give adequate shade. The pools which were already present were exposed and needed some form of cover over them. Plant beds were entirely absent as were also extensive muck flats. Thus aside from more shade the section needed cover in the pools for large fish; plant beds to serve as shelter for young fish

and as food and shelter for the insects on which the trout feed; muck areas for the production of food for both young and old trout, and shelter for the young trout.

Various types of cover for large fish were installed over pools or where pools were to be made.

Wing deflectors were installed for the purpose of creating still mucky areas in the still water behind them. Plants will in many cases establish themselves in these still-water mucky areas. Wings were likewise installed for the purposes of: (1) exposing gravel by the removal of the sand, (2) confining the current, (3) making riffles and (4) producing new pools, in combination with certain covers. Last year a new method was developed for producing cover for young trout. This consists of wiring alder or other <sup>F</sup>brush by their butt ends to the top log of a wing and allowing the tops to float in the water back of the barrier. The young fish which normally stay in the quiet water behind the wings can swim into this brush and thus be safe from both large fish and birds.

In this first improvement section 18 barriers were installed. This number comprised 4 <sup>wing</sup> deflectors, 8 bank covers, 3 triangle covers, 1 V-deflector, 1 A-deflector and 1 brush cover, which included 5 separate brush piles, in a secondary channel of the stream.

Just below the improved section another section of equal length <sup>t</sup> was left without improvement. The purpose was to have two sections of the same length—one improved and one left as it was—for comparison. The lower unchanged section was originally a little the better of the two, since it had better shade and better pools. These two sections taken together comprise a half mile of stream <sup>which</sup> ~~is~~ is usually fished in combination, since the "getting-in place" is at the beginning of the first section at the old Vanderbilt bridge, and the "getting-out place" is at the end of the second section which is at "The Meadows". This will result in having both these sections fished at the same time so that a good comparison

of results may be secured.

The second improved section begins at the Meadows where the former unimproved section ends. The plans had been to continue this section down stream until it joined the first improvement section of 1931. Due to limited time and labor the plan was not finished. There now remains about 100 yards of unimproved stream between these two improved portions. It would be well to continue the improvements down to the 1931 section and then, starting at the end of that section, to improve the stream down to the Ford.

In this second section of improvement, 24 barriers were constructed. This total number was made up of 7 wing-deflectors, 6 bank covers, 3 square cover, 3 raft covers, 1 A-shaped cover, 1 brush shelter, 2 I-deflectors, and 1 V-deflector.

In all, 42 barriers were installed last year. This raises the total number installed in the Pigeon River to 113. About 5/8 mile of river was improved last year.

## II. CHECK OF 1931 WORK

During times when no men were available for the work a complete check was made of the work carried on in 1931. The condition of each barrier was noted, as well as the extent and area of mucky flats and plant beds which were produced. Depths were taken across the stream to find the general deepening caused by the barriers, and the depths of pools were noted. The amount of gravel bottom created by the removal of sand was also noted.

Three flood tests have been made on these barriers. The first one was in September,—the other two later in the fall. The first one, which raised the river 22 inches above normal, was higher than a usual spring raise and it brought down huge logs which had been lying along the bank for many years. These piled up on the second barrier, which was a wing deflector. The other two floods were

even larger than the first one. The second one was 25 inches above normal water and the third one was 32 inches above normal water. These floods brought down large logs, roots and stumps and hurled them against the barrier, testing them severely. In spite of these floods only a few of the barriers were lost. Only one was completely carried away, and it was made of stumps weighted with stone. Two others, wings made of large logs, were swung in the bank, one due to the fact that the flood lifted it over the stone which was holding it, and one ~~and~~ because it was not staked securely. Both of these can be made to stay. Stumps, however, are difficult things to fasten in a certain place. They usually move down stream with a flood until they catch on some bar where the high water cannot move them. In all, 7 barriers were damaged.

Mucky areas have been produced behind the deflectors. A mucky area of as much as 1000 sq. ft. has been found behind a single deflector. These areas are the natural homes of many insects and they greatly improve the total food production in that section of the stream. Plants are beginning to grow on these areas and some beds are covering as much as 100 sq. ft. These plant beds are a great benefit to the stream. Chara and Potamogeton pectinatus are the plants that are becoming established. A great deal of sand has been moved to expose gravel. In the second section of the improvements one barrier has uncovered over 1,500 sq. ft. of gravel bottom, by the removal of sand. This sand is piled up in bars below the barriers. In some cases these bars project above the water when it is at normal stages. One bar projects out of the water 8 inches, is 10 ft. wide, and 40 ft. long. Shifting the sand into thick deposits like these is much better than having it thinly scattered over the gravel bottom, since even a thin layer of sand will ruin the area for food production.

Many pools have been formed. Some of these are now as deep as 5 ft. In the

second section of the improvement work the results are most noticeable. Formerly, this section was<sup>a</sup> very poor, flat, sandy stretch. Now there are numerous exceptional pools and hides. In June 1932 a fisherman made a catch in this section of twelve brook trout and they were all at least 12 inches long. This is a very remarkable catch from such a stretch as this, which it undoubtedly would have been impossible to make the year before the improvements were put in. The shelters installed are holding well and they have increased the productivity of the stream for large trout by giving much needed cover.

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