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REPORT NO. 337

FISH COUNTS MADE IN THE EAST BRANCH OF THE BLACK RIVER

In the summer of 1931 a stream improvement project was undertaken in the East Branch of the Black River by the Black River Ranch. The project was financed by the Ranch, while the work was carried out under the direction of the writer. Since it was desired to secure data on the effects and results of environmental modification by the installation of various devices, such as deflectors, dams, and covers, this project was considered to be an experimental project. Therefore, fish counts and quantitative food counts were made in certain sections before improvement, in order to determine the original conditions at that time. Four years after improvement, in 1935, counts were again made in these sections to determine, insofar as possible, the changes brought about by the devices installed in the river.

In this report it is proposed to report only on the fish counts. Originally, four counts were made. It was possible to get checks on only two of them. In the case of the first count, the C.C.C. men, whose duty it was to keep the barrier nets clean, just would not work. The result was that the nets clogged up and the count had to be abandoned. Count two which is near the farm had to be given up due to the immense amount of peaty material which was stirred up from the bottom and which floated down against the net, completely plugging it. It was possible, fortunately, to get good rechecks on the other two sections.

In making the original counts the following procedure was followed. A certain section of stream, believed to be representative of that part of the stream which was under control, was selected as the section in which the count was to be made. It was

judged best to choose sections approximately 100 feet in length which were fairly representative of the stream but which were of such a nature that they could be seined effectively. The chosen sections were blocked off at their upper and lower ends by stretching seines across the stream. The fish in this enclosed section were then caught by small seines. Recounts were made in the original sections.

Count Number One

This count is located a little over 100 yards below the upper dam. At the time of the original count on July 3, 1931, it was a gravel bottom section with a moderate current. The banks were low and grassy and there was a shallow, mucky bottomed, side channel on the east side of the stream. About 90% of the bottom was covered with gravel and about 10% was covered with a mucky deposit. Only a small portion of the section was shaded. The pools were not especially good and what cover was present was furnished by an undercut bank at the upper end of the section. There were no plant beds. The normal rate of the current at the surface in the center of the stream was 1.4 ft. per second. The section was of uniform depth, which averaged about 11.2 inches. After improvement the average depth was 13.3 inches. This section had an average width of 35 feet. The results of the count made in 1931 are as follows:

Fish Count Number One, July 3, 1931

Lengths in inches	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	Total
Brook Trout		57			2	1	1			61
Horned Dace		6	1							7
Black Nose Dace		32								32
Common Shiner		2								2
Red Belly Dace		1								1
Stickleback		1								1
Johnny Darter		9								9
Cottus		7								7
Crayfish		27								27
								Total		<u>147</u>

It was thought that some period should elapse before a recount was made so that the fish population would have a chance to stabilize itself under the new conditions. A wing deflector and a bank cover were installed in this section. The deflector almost doubled the speed of the current and in its immediate vicinity considerably deepened

the stream, as the average depth at that point was 22.2 inches. The average depth along the bank cover was deepened from 17 inches to 26 inches. In other parts of the section however conditions for fish became less favorable due to the dam above. While the dam was in place, it was frequently repaired by the addition of large quantities of sand. This sand eventually reached the stream and was deposited in the section below. When the dam went out, a good part of the fill was washed out with the resultant addition of more sand. The addition of these large quantities of sand to the stream has converted the section below the dam from one with a gravel bottom to one which is largely covered with sand. The whole upper half of the section in which the fish count was made was covered with sand to a depth of 2 to 4 inches. Such a covering of sand is harmful. While it may be washed away in the future, it has done a good deal of damage to the food supply.

The recount in this section was made on May 24, 1935. The stakes for holding the seines in place were driven the fall before, in fact, the stakes for all the sections were driven at that time. In the recounts the same technique was used as in the original counts. The seines were held by stakes and they were supported by chicken wire placed across the stream in front of the stakes. After improvement the organic material and debris in the section greatly increased, and thus when the various improvement devices were removed in order to make the recounts, a great deal of this material floated down against the seines. This made it necessary to station men at the lower seine to keep it clean of debris. Since, as has been stated before, the men failed to do this, the seines were torn, ruining the count. The catch made previous to the failure of the nets can be given. Since trout are generally the last fish to be caught, we secured only a small proportion of them. Several fairly large trout were seen, but we caught only one.

Recount Number One, May 24, 1935

Lengths in Inches	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	Total
Brook Trout	16						1				17
Horned Dace	42	11	9	7		7		1		1	78
Cottus	12	2									14
Crayfish											43
Lawyer (Ling)									1	1	2
Black Nose Dace	34	16	2	1							53
Common Shiner	9	15	3	1							28
Suckers	5	6	1						1		13
Red Belly Dace	10	1									11
Lampreys	A great many adults, but they could not be counted due to spawning.										
Stickleback	3										3
Long Nose Dace		1									1
Johnny Darter	17	7									24
										Total	287

Fish Count Number Two

Count two was made in the open section of stream between the farm and the aspen grove. The section selected for the count was 125 feet long and had an average width of 30.3 feet. At the time of the original count, the depth was 16.6 inches. This section was uniformly straight and deeper than the average for the stream, although it did not have any outstanding pools. Shade was totally absent and the banks were grassy, abrupt, and about 3 to 4 feet high. There were no silt flats or plant beds. In this section the stream flows over an ancient cedar bog and the stream bottom consists of a thin coating of gravel and sand over a layer of peat several feet in thickness. In making this count the same technique was used as for Count One.

Count Number Two, July 5, 1931

Lengths in Inches	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	Total
Brook Trout	1	8		1	3	2					15
Suckers			1								1
Horned Dace			11								11
Lawyer or Lata						2	2			1	5
Cottus		1									1
Johnny Darter		4									4
Common Shiner		1									1
Crayfish											106
Black Nose Dace		56									56
										Total	200

The improvements which were installed in this section consisted of a bank cover and a wing deflector. Both the deflector and cover brought about a deepening of the water. In several places the gravel covering was removed and a hole was formed in the peaty material which eroded easily. The average depth for the section was increased to 17.2 inches. The water along the edge of the cover was deepened on the average from 25 inches to 27.7 inches.

It was impossible to complete the recount in this section, as previously stated, due to the fact that great amounts of the peaty material were stirred up from the bottom. This material so effectively plugged the seines that they soon went out. Before the seines gave way four trout were caught. Two of them were between 5 and 6 inches long and two were between 6 and 7 inches long. This recount was undertaken May 28, 1935.

Fish Count Number Three

This count was made about 200 yards above the ford. This section is straight, flat, and shallow. It has no deep pools, but the banks are wooded and the shade is good, and there are hiding places along the left side under the projecting brush. The length of the section blocked off for this count was 112 feet. This portion of the stream had an average width of 44 feet and an average depth of 8.1 inches. The maximum pool depth was 16 inches. Mucky areas and plant beds were not present and the bottom was almost all gravel and rubble, but there was a narrow mucky deposit along the left bank. The current in this section was about two feet per second. After improvement the average depth for the whole count had been increased to 9.6 inches. The pool depth was increased to a maximum of 23 inches. The pool on the left side was enlarged so it extended over half the length of the section, besides being considerably deepened. Conditions were greatly improved for larger fish. The improvements installed in this section consisted of two bank covers and an A deflector. The results of the fish count and the recheck are as follows:

Fish Count Number Three, July 8, 1931

Lengths in Inches	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	Total
Brook Trout		10	3								13
Black Nose Dace		22									22
Long Nose Dace		9	8								17
Cottus		1									1
Suckers				2							2
Horned Dace		3	2								5
Crayfish											25
										Total	85

Recheck Fish Count Number Three, May 27, 1935

Length in Inches	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	Total
Brook Trout	5				2	2		1			10
Suckers			3				2	2	4		11
Crayfish											41
Long Nose Dace	1	5	11								17
Black Nose Dace		2									2
Common Shiner		9	2								11
Horned Dace		1									1
Red Belly Dace	16	6	3								25
Rock Bass		1									1
										Total	119

It will be noted that while the number of trout have decreased by three, there are larger trout present in this section. In the first count there are no legal trout while in this latter there would be 3 to 5 legal trout by the end of the season if they were allowed to grow.

Count Number Four

This count was made in a portion of the stream typical of the sandy bottom section of the river. The count was made in a wide, flat, moderately deep section. The bottom was all sand except for some chara beds on the right side where the bottom was silt or muck. The surface current in this section was about 1.1 ft. per sec. The only cover was the chara beds and the overhanging alders along the left side. The banks are low, grassy, and rather flat. The chara beds covered about 400 square feet. They were totally destroyed when the first count was made and they never came back to their

original state. The alders furnish shade on the left side, but there is no shade on the right side. This count was 114 feet long and 41.3 feet wide. Before improvement this section had an average depth of 14.9 inches and after improvement it was 15.2 inches.

Fish Count Number Four, July 28, 1931

		Total
Brook Trout	2 trout two to three inches and 1 trout five and one-half inches	3
Crayfish		252
Lamprey Eels		8
Johnny Darters		3
Mud Minnow		1
Perch		1
Suckers	2 of these were 10 inches long	27
Cottus		53
Black Nose Dace		73
Horned Dace		62
	Total	483

Recheck of Fish Count Number Four

The improvements in this count consisted of a wing-deflector and a long bank cover. The deflector deepened the water to a maximum depth of 33 inches, uncovered a gravel area of 600 square feet, and built up a muck-covered bar of about 1000 square feet in area. About 200 square feet of this bar was thinly covered with aquatic plants. The average depth was increased to 13.3 inches.

Results of Recheck, May 25, 1935

Lengths in Inches	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	Total
Brook Trout	14			1	4			1	20
Lawyer					1		11		3
Common Shiner		1	2	8	1				12
Suckers		1	2	2			1		6
Cottus	1	1	2						4
Johnny Darter	13	18	1						32
Black Nose Dace	6	2	1						9
Crayfish									27
Red Belly Dace	8	16	1						25
Horned Dace	4				1				5
Long Nose Dace	1	1							2
Lampreys	Not counted due to a spawning concentration								
							Total		215

It will be noted that the number of trout in this section has increased several fold while the numbers of crayfish and minnows have greatly decreased. This decrease in crayfish, minnows and suckers is regarded as a distinct improvement.

While the above counts give valuable information, they are by no means conclusive and to reach a definite conclusion, more counts should be made.

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