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Report 205

PROJECT FOR THE USE OF FEDERAL WELFARE LABOR FOR THE PREVENTION OF EROSION INTO THE PIGEON RIVER, MICHIGAN, AND FOR OTHERWISE IMPROVING CONDITIONS FOR TROUT AND TROUT FISHING IN THIS STREAM.

Drawn up for the Michigan Department of Conservation by the Institute for Fisheries Research, University of Michigan.

This definite project is in line with our general suggestion that some of the federal welfare labor may be used to very good advantage in improving the lakes and streams of Michigan. The objects are to increase the fish supply, and to improve the conditions for fishing. The reasons for, and the practicability of trout stream improvement are dealt with in our report No. 204 giving the general suggestions, and in Bulletin No. 1 of the Institute for Fisheries Research, entitled "Methods for the Improvement of Michigan Trout Streams".

The Pigeon River improvement project involves:

(1) Preventing erosion of the sand and clay banks by means of log constructions, planting of trees, etc. (Silting is a prime reason for the depletion of fish life.)

(2) Planting trees for shading the stream, to hold the temperature cold. (This is important.)

(3) Improving the conditions for trout life so as to increase the numbers of catchable trout. (According to such means as indicated in the bulletin on "Methods for the Improvement of Michigan Trout Streams").

(4) Removal of log jams, and restoration of river to make fishing and boating possible where it is now impossible, in the "spreads". (These "spreads" resulted from the damming of the stream in lumbering days.)

(5) Constructions of trails into and along the river. (To permit access to good fishing waters now almost inaccessible.)

The improvement of fishing on the Pigeon River tract is an integral part of the project of the Michigan Department of Conservation to develop this area to a maximum of all-around utility, economic and recreational, as a demonstration of what can be done to utilize the vast public holdings in the cut-over area.

The Pigeon River State Forest, which is located in northern Otsego and southern Cheboygan county, is a tract composed of sand and gravel moraines and sandy outwash plains. Within the forest area the Pigeon River is 30 to 40 feet wide and averages between 1½ and 2 feet deep. It has a good fall both in and below the forest, since in the forest area it is about 400 feet above Lake Huron level. The flood plain is relatively narrow and it is bordered by abrupt sandy banks, which in some places are quite high.

The large pine of this area was taken out many years ago, but the last hardwood lumbering operators took place in 1926. For driving logs down the river several dams were operated. The driving and flooding served to wash much sand into the river from banks at the bends. Also after the lumber was removed fires burned over certain areas, destroying the soil cover. In many places the cover has not been restored and erosion is still adding immense quantities of sand to the stream. In the upper part of the river from the Lansing Club dam in Section 19 of Corwith Township, down to the Forest Headquarters, in Section 10 of the same township, the banks are largely bare and exposed. Some trees are badly needed here to protect the banks and give shade. Trees along the banks would prevent erosion and silting.

In the Pigeon as in many other Michigan rivers sand which is being washed into streams is very harmful to fish life. It drifts down stream, filling up pools and hiding places and destroying food producing areas. Drifting sand converts a stream into an aquatic desert.

During 1931 and 1932 an effort was made to overcome some of the harmful effects of the sand silting and to prevent further erosion at stream bends. This was done by the installation of various types of deflectors (like the wing dams in the Mississippi River), which accelerated the current in certain places causing it to remove the sand and expose the gravel. Various types of devices were installed for the protection of eroding banks.

Other constructions were made for the purpose of producing pools and furnishing cover for the fish. Thus environmental conditions for trout were improved in the Pigeon by the forming of pools, the creation of cover and the production of food producing areas.

In all a little over two miles of stream was improved. 114 barriers or stream improvement devices were installed. The improvement work was divided into three sections. The first is in Section 17, Corwith township, the second in section 4 of the same township, Otsego County and the third is in Section 33 of Nunda township, Cheboygan County. These improvements have been carefully checked and it has been found that they have materially improved the environmental conditions in the sections in which they are installed.

These improvements, however, cover but a small portion of the stream within the forest which is in need of restoration and improvement. At present about 10 1/2 miles within the forest are in need of improvement. Certain areas are greatly in need of protection, especially the stretch in Sections 9 and 10, Corwith township. Here the stream banks are entirely bare and unprotected. At nearly every bend of the stream there are sand banks which are being eroded and adding

immense quantities of sand to the stream. In some cases these banks are as much as 60 to 70 feet high. They are bare, and small avalanches of sand are continually sliding down into the stream.

If trees were planted along these banks, devices built to prevent the slipping of the sand and barriers placed at the base of the banks to prevent farther erosion by the stream, these banks could be reclaimed and the stream would be saved from further damage. Erosion must be checked and the proper environment must be produced and preserved in order to insure the productivity of our streams.

For this work on the Pigeon River it is proposed that 75 laborers, 5 foremen, 5 teamsters with teams, 1 truck driver and 1 technical supervisor be used. The men would be divided into 5 crews of 15 men, each crew under a foreman. There would need be one team and teamster with each crew to draw material to the river. If the camp is located at any considerable distance from the working points on the river, additional transportation facilities to carry the men to and from work will need be provided. We assume that such additional transportation would be called for in the Pigeon River work.

It would be important that the foremen for the beginning of the work would be selected from men who have had experience in the work in previous years. The supervisor would give instructions to the foremen, would lay out the work and would help organize the crews so as to produce efficient operation--as explained in our general proposal for the use of the welfare labor in this type of work.

The improvements recommended to increase and facilitate fishing on the Pigeon River State Forest are as follows:

(1 to 3) Installing devices to retard erosion and silting; planting shade along banks and improving conditions for the shelter, feeding and reproduction of trout in the stream. These several activities would be carried on

simultaneously in each section of the stream, and would require approximately the number of crews and time specified below.

T. 32 N., R. 1 W. :

Sec. 17, 1/2 mile of stream to be improved.....1 crew, 9 days
Sec. 9, 1 1/2 miles.....(1 crew, 6 days / (1 crew, 14 days
Sec. 10, 1 1/4 miles.....(1 crew, 1 day / (1 crew, 15 days
Sec. 4, 1/2 mile.....1 crew, 5 days

T. 33 N., R. 1 W.:

Sec. 33, 1/2 mile..... 1 crew, 4 days
Sec. 28, 1 1/4 miles..... 1 crew, 7 days
Sec. 21 and 17, 2 miles..... 1 crew, 4 days
Sec. 8,1 mile..... 1 crew, 7 days
Sec. 5, 1 mile..... 1 crew, 7 days

T. 34 N., R. 1 W.:

Sec. 32 and 31, 1 mile..... 1 crew, 7 days
Sec. 31 and 30, 1 mile..... 1 crew, 7 days

Total crew-days 93

(4) Cleaning log jams and "spreads", to obtain material for improvement constructions and to restore river conditions to make fishing and boating possible.

T. 32 N., R. 1 W.:

Sec. 4, first "spread"..... 1 crew, 5 days
second "spread"..... 1 crew, 5 days

Total crew-days, 10

(5) Construction of trails.

T. 33 N., R. 1 W.:

Sec. 33, clearing foot trail along river, 1 1/4 miles and clearing wagon trail into river, 1/2 mile...1 crew, 1 day

Sec. 28, making foot trail along river, 1 1/2 miles.... 1 crew, 3 days

Sec. 21 and 17, making foot trail along river, 3 miles. 1 crew, 5 days

clearing wagon trail, 1/2 mile..... 1 crew, 1 day

Sec. 8, making foot trail along river, 1 1/2 miles..... 1 crew, 3 days

Sec. 5, making foot trail along river, 1 1/4 miles..... 1 crew, 3 days

T. 34 N., R. 1 W.:

Sec. 32, repairing bridge across small creek..... 1 crew, 1/2 day

Sec. 32 and 31, making foot trail along river, 1 mile.. 1 crew, 2 1/2 days

Sec. 31 and 30, making foot trail along river, 1 1/4 miles 1 crew, 3 days

Total crew-days, 22 days

Total crew-days for entire project, 125 days

The total time for the project, using 5 crews working for 5 days per week, is therefore 5 weeks.

A detailed plan for the location each of the five crews in each section of the stream for each day has been drawn up.

In order to carry on the work effectively certain equipment and a supply of materials will be needed. The estimate for these items follows:

Equipment for the 5 crews..... $754.84

Supplies for the 5 crews, at $22.55 per week per crew (for 19 crew weeks spent in stream improvement)..... 428.45

Total $1183.29

A detailed list of equipment and supplies is appended.

Truck movements (not including extra transportation required to take men to and from work) would amount to about 500 miles per week, which at $.10 per mile would figure $250.00 for the Pigeon River project.

The technical supervisor would drive about 300 miles per week, which at $.06 per mile would figure $90.00 per the project.

Total for transportation $340.

The following personnel is involved in the work as planned:

1 technical supervisor, at $35.00 per week.....	$175.00
5 foremen, at $10.00 per week (?).....	250.00
1 truck driver, at $10.00 per week (?).....	50.00
5 teamsters with teams at $25.00 per week.....	625.00
75 laborers, at $7.00 per week.....	2625.00
Total for labor	$3725.00

The total cost of all the items as listed is $5248.29.

The equipment item as applied to this job is too high, because most of the equipment should last two years or more, and would thus be available for other similar projects. Furthermore, cheaper prices in wholesale lots ought to be obtained.

APPENDIX

Detailed list of equipment and supplies

General equipment (for all 5 crews)

2 Hand Saws (Rip saw 26 in. long) at $1.85..... 5 saws should be purchased at the time then 2 can be kept and three passed on to the next unit of crews formed so there shall always ~~be~~ be 5 saws available at the beginning of the work on each river when they are needed the most.	$3.70
1 Hand Saw Set.....	.95
2 Cross Cut Saw Sets at .29..... Includes cross cut saw filer, jointer, raker gauge, side filer, anvil and two set gauges.	.58
2 Saw Filing Vises at .75.....	1.50
1 Saw Filing Guide at 1.55.....	1.55
1 Brace.....	.35
7 Bits 1/4 - 3/8 - 1/2 - 5 /8 - 3/4 - 7/8 and 1 inch.....	2.00
2 Grindstones at 5.25.....	10.50
Assorted Bolts.....	1.00
10 Clevisis 2 1/2 by 6 inches at .13.....	1.30

100 feet, 1 1/4 inch rope	$5.98
30 lbs. of 10 penny nails at $2.65 cwt	.78
10 lbs. 60 penny spikes at $2.50 cwt	.25
5 lbs. 20 penny spikes at $2.50 cwt The three above articles should be bought in 100 lbs. kegs and then they could be distributed to the various crews.	.15
Lumber for platforms 30 platforms of various heights.	15.00
Planking for stone boats	10.00
	$57.09

Equipment for each crew of 15 men

5 Railroad picks with handles (25 inch heads) at 1.24	$6.20
5 Long handle round point shovels (solid shank) at 1.15	5.75
2 6-ft. cross cut saws at 4.75	9.50
4 (4 1/ or 5 ft.) cedar saws at 2.20	8.30
1 Carpenter Adze	1.85
5 Carpenters Hammers (Ripping Hammers) at .65	3.25
3 4-lb. Blacksmith Hammers at 1.10	3.30
6 Cant Hooks at 2.00	12.00
8 Double Bit Axes 3 1/2 and 4 1/2 lb. heads at 1.98	15.60
6 pair of Wire Cutters, 10 inches long at .85	5.10
2 Logging Chains 1/2 inch (long chain) at 3.60	7.20
3 13-lbs. Post Mauls at 1.000	3.00
4 18-lbs. Post Mauls at 1.40	5.60
2 Pike Poles at 1.00	2.00
3 Crow Bars at .90	2.70
2 Boats at 12.50	25.00
3 Flat Files 8-10 and 12 inches long	.50
3 Slim Taper Saw Files, 8 in. long	.45

1 Abrasive Fire or Corundum Stone.....	$ .75
50 feet Wire Cable.....	1.00
Additional.....	20.00
Total per crew	$139.55
Total per 5 crews	697.75

Supplies per week per crew

No. 9 wire, 500 lbs. at $3.00 cwt.....	$ 15.00
2" staples, galvenized, 70 lbs. at $3.50 cwt.....	2.45
#80 spikes, 20 lbs., at $3.00cwt.....	.60
Gloves (15 pairs at $.10).....	1.50
Additional.....	3.00
Total per crew per week	$22.55

Total for 19 crew-weeks spent in erosion control, stream plantings and stream improvements proper (about 6 crew-weeks scheduled for making trails, clearing "spreads", etc.)..... $428.45