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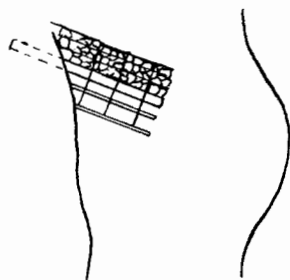
STREAM IMPROVEMENT IN THE HIAWATHA AND MARQUETTE
NATIONAL FORESTS

George Frisbie, Wildlife Technician for the Upper Michigan National Forest (which includes the Hiawatha and Marquette Forests), met me at the Munising Ranger Station on the morning of August 23. Using a Forest Service pick-up truck, we visited the following streams in the Hiawatha Forest to examine improvement work:

Alger Co. (1) Rock River - T. 46 N., R. 21 W., Sections 10 and 15. The stream at this point had considerable stretches of bed rock bottom over which the water ran in a shallow layer. No shelter for fish and little for fish food exists in these stretches. The use of dynamite to blast out pools was suggested by Mr. Frisbie. I agreed it would be worth an experiment and pointed out that breaking up the rock would also increase the fish food supply through an increase in shelter and clinging surface. A few excellent natural pools exist in such stretches due to fractures in the rock.

In the gravel covered stretches between the bedrock outcrops, a number of stream improvement devices had been installed. These consisted mainly of wing deflectors held in place by a pole and wire mat loaded with rock, as stakes could not be driven far enough. The construction of the mats is illustrated below.

(Width
exaggerated)



After the mat is in place rock and gravel are loaded on and the top log of the deflector is spiked in place. Sod is used to cover the top of the structure. Stumps had been anchored in several places to the banks and deflectors, no doubt to the annoyance of fishermen who may trip over the wires or lose good fish which may wrap the leader around them.

It was suggested to Mr. Frisbie that he write to the Denver office of Region 2 of the U. S. Forest Service for a description of the method developed by C. N. Feast to anchor covers and other structures in rocky streams. Star drills are used to make holes in bedrock or boulders and expansion screw eye bolts inserted to which structures are fastened by wire. Such anchors are easily installed, are inconspicuous and permanent.

Alger Co.

(2) Joe's Creek - T. 45 N., R. 20 W., Section 7. The road crosses the stream very close to its outlet from Joe's Lake, a privately owned trout lake. When the land in this region was lumbered, tops and debris were thrown into the stream, creating an impenetrable tangle and spreading the water out in a thin sheet 30 to 50 feet wide. Pools were lacking and the stream was perhaps impassable to fish.

The stream bed was cleared of slash and log deflectors installed to narrow and deepen the channel. The labor in doing this must have been considerable and there is no doubt but that conditions for trout have been improved. A number of good catches were reported here this spring.

Several fingerling bass were observed at the bridge together with a number of recently planted trout. Temperatures at 1 p.m. of a moderately warm day preceded by a cold night were 70° F. at the bridge; 68° about

300 yards below the bridge.

If bass have run up this stream since it was cleaned and have entered Joe's Lake, the harm to trout fishing there may more than counterbalance the seasonal trout fishing provided by the stream below. However, if bass were present both above and below the formerly impassable stream, little harm may have been done. Whether improvement work is justified on such a small, warm stream may be questioned.

Alger Co.

(3) sturgeon River - T. 45 N., R. 20 W., Section 36. This stream was examined for 100 yards above and 300 yards below the bridge to determine need for improvement. Apparently beaver occupied this stream for a long period of years before exhausting their food supply. Old dams were removed by the Forest Service. The restored current has cut some fine natural pools in the old meadows, but some deflectors to expose more gravel and narrow the channel would be desirable and bank plantings with alder and willow might help to lower the temperature. Whether such improvement is justified depends upon whether dangerous temperatures are reached at present and if so whether these could be lowered by improvements.

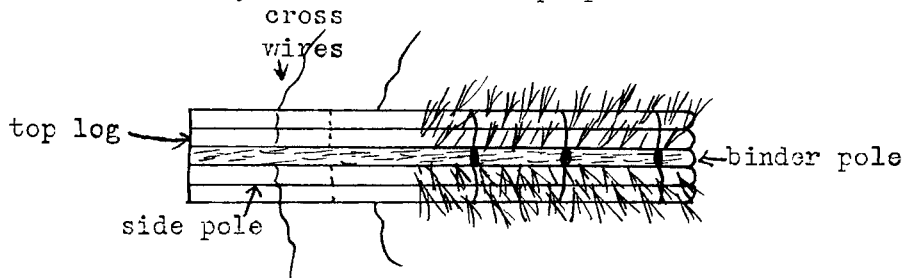
Alger Co.

(4) Little Indian River - T. 45 N., R. 19 W., Sections 25 and 30. Another stream extensively beavered in the past, has been cleared of dams by the Forest Service. Deflectors and table covers have been used to narrow and deepen the channel in the upper, meadow section. Trout are reported caught here only during the first month or two of the season. At 3 p.m. the air temperature was 74°; the surface water 68°. The stream was alive with horned dace up to 7 or 8 inches in length. On hot days the water in this upper section doubtless reaches temperatures which would be fatal to trout.

In the lower section examined, where work was in progress, the stream runs through dense alder cover. At the upper end of the covered section the water temperature was 67°; downstream about 1/8 mile 66.5°. If this cover is maintained for some distance, water temperatures should be

suitable for trout on the hottest days.

The work consisted of single and double wing deflectors to deepen the pools and table covers below for shelter. As in all Forest Service work examined, sod had been placed on structures. However, a method of holding the sod was being used here which seemed very effective. Cross wires are placed beneath the top log and around the poles nailed on each side. After the sod is placed, a binder pole is laid lengthwise along the top and the wires fastened securely around it. The purpose of this is to hold the



sod securely until the roots are grown into the deflector. This takes little additional time and should be well worth the effort.

Delta Co. (5) Fish Dam River - T. 42 N., R. 18 W., Sections 8, 17 and 21. Work was done on this stream in 1935 and a crew from the nearby camp are improving the stream in the lower section at present. In the upper section single and double wing deflectors, underpass logs, and table and bank covers were used. Willow plantings are growing in most instances. Before improvement, the stream was reported to have been an open ditch with little cover. It provided no trout fishing whatever. Fairly good catches of trout were made in the improved section early in the season.

Below the highway the problem was mainly to eliminate the effects of old beaver dams which had widened the stream and exposed it to the sun. Long wings or dikes of logs and soil have been used and have effectively narrowed and deepened the channel. A number of good pools have been formed.

Temperature 69° at 1/2 mile above highway; 68° at highway bridge; 62° about one mile below the highway and 64° at the lowest point examined. A series of hot days probably makes this stream too warm for trout over most of the course.

F. H. Strubble, Camp Foreman, has used a cushion of brush at the upstream ends of deflectors to prevent undercutting. This will doubtless be annoying to fishermen, but may prevent too much digging at these points.

The use of small trees with the leaves on as binders to hold sod in place on deflectors and covers may prove to be efficient, but are very unsightly. I question this procedure except possibly as an experiment on this particular stream.

Chippewa Co. (6) East Branch Tahquamenon River - T. 46 N., R. 5 W., Section 29 and 32; T. 46 N., R. 6 W., Section 22. The work on the upper river, done in 1935, appeared to be effective in creating large, deep pools and in narrowing the stream. Some cutting of alders along the stream above the bridge might be questioned, but here the alder canopy is so complete that without the openings made it would be impossible to fish except with bait. Since the stream is cold (54 degrees at 11 a.m.), it should do no harm to open sections of the stream to the sunlight and the fly fisherman. Some un-fishable areas are perhaps needed on streams, but the work done in clearing was not extensive enough to be detrimental.

The dam built above the bridge in 1935 should not have been constructed. Spring fed gravel areas ideal for brook trout spawning were flooded by this structure. It would seem advisable to remove a part of the center of this structure to create more of a current over these spawning beds.

Pole piling was used on the downstream sides of some deflector ends. This practice may be very desirable where considerable washing is to be expected as in very soft bottom.

At the lower station where work was in progress, the stream is rather exposed and the bed was cleared during the construction of the new bridge. Single and double wing deflectors of log and stone and of stone and chloride sacks filled with sand were being installed. Mr. Frisbie and I agreed that this was poor construction, as the chloride sacks were already beginning to collapse and the whole structure would soon be lost in a flood. He suggested using the pole and wire mat with rocks and a log core as described under (1) Rock River, and elimination of chloride sacks except empty between the rocks to better seal the deflectors. We also agreed that more care should be used in placing the rocks. They should be fitted or "toed in" rather than piled loosely. Planting of spruce and balsam along the stream margin below the highwater level appeared to us as futile.

The bank erosion control by log crib and rock fill at the base with grading and sodding of the slope, mostly done in 1936, seemed to be holding nicely.

We visited the Sullivan Creek Rearing Ponds built by the Forest Service, under the U. S. Bureau of Fisheries specifications, for operation by the Bureau. The only criticism of the site might be the prevailing low temperatures (with air at 84° at 4 p.m., the water at the head screen was 51°; at the lower end of the pond series 54°). The temperature drops to about 45° at night. During most of the rearing season temperatures will be below the optimum for rapid growth of trout. However, since no one knows whether a 2-inch trout stands a poorer chance of survival than a 5-inch trout, perhaps it makes little difference how fast the growth is. Certainly food consumption will be less (and possibly loss from disease) at lower temperatures.

Mackinac Co. (7) Silver Creek - T. 42 N., R. 5 W., Sections 7, 8, 17 and 20. This stream was rather carefully examined because of recent criticisms by Robert Gillie of Moran of stream improvement and beaver dam removal. Our

conclusions regarding this work are given in Institute Report No. 431, entitled "Stream Cleaning and Beaver Dam Removal in Mackinac County."

Summary and Conclusions

The U. S. Forest Service is taking an active interest in stream improvement in the Marquette and Hiawatha Forests. According to Mr. Frisbie, they have five crews actively engaged in maintenance and construction at present.

In general, the work appears to be carefully planned, fairly well supervised and efficiently carried out. A real effort to make the work as permanent and inconspicuous as possible is apparent. The only serious question might be the type of streams chosen in some instances, e.g. Little Indian River, Fish Dam River and Joe's Creek. These streams are evidently marginal, if not submarginal, for trout during the summer months, because of high temperatures. However, since temperatures were taken before improvement and since improvement was designed to lower these, the results will be exceedingly interesting in determining the value of work on streams of this character and may amply justify the effort. It would have been especially valuable if fish yield studies and population censuses could have been conducted before and after improvement.

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