

THE APPLICATION OF LAND USE TO FISHERIES MANAGEMENT IN MICHIGAN

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IN THE EARLY SPRING OF 1950, the Michigan Department of Conservation gave the green light to a pilot or experimental project involving the development of a watershed on a comprehensive land-use basis. This approval was the end result of a long period of discussion and study involving fish habitat and management work. It was believed by the majority of the staff of the Fish Division that a general land-use program taking into consideration agriculture, forestry, game, and fish--in fact, all aspects of a conservation program, using the word conservation in its broadest sense--could be justified from a fisheries angle alone. The resulting improved soil and water conditions would be reflected in the greater production of desirable fish. This really represented a considerable jump forward in thinking. It was necessary to overcome prejudices, the habit of thinking along lines of limited objectives, and the idea that, to benefit fish, work must be confined to water alone. Perhaps the most difficult hurdle of all was the very breadth and size of such an undertaking.

Work was started on July 1, 1950, using fish license money. Prior to this, a meeting had been called of all agencies that might have an interest in such a development. Included were the U. S. Soil Conservation Service, the U. S. Fish and Wildlife Service, the U. S. Forest Service, the U. S. Geological Survey, the U. S. Weather Bureau, the various divisions of the Michigan State Conservation Department, Michigan State College, and the University of Michigan. The direct result of this meeting was an operational plan whereby it was recommended that contact should be made with the county organizational units and the local village organizations. As the area selected was the Rifle River watershed in Ogemaw County, where no soil conservation district had yet been organized, it was necessary that the Fish Division employ a farm

planner. Shortly after the program was under way, the county did organize and the soil service and the Fish Division farm planners cooperated, their plans being interchangeable and acceptable to each group.

A great deal of time and effort went into the development of operational plans, but the purpose of this article is to relate the accomplishments in the two and one-half years that the watershed program on the Rifle River has been functioning.

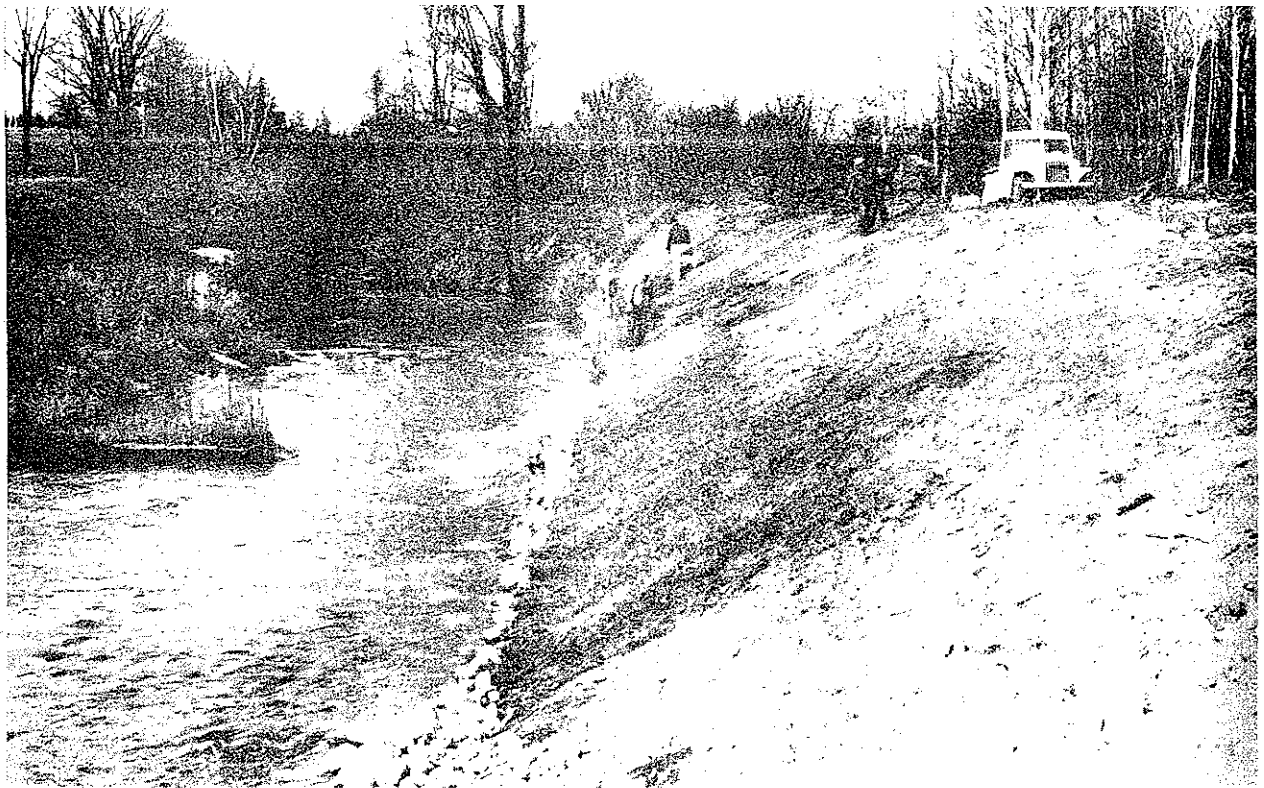
It was deemed essential at the start to provide a proper inventory and the necessary maps of the hundred thousand acres comprising the watershed. The area was flown and photographed, and from these pictures a drainage map was made. These aerial photos also provided the base for cover maps and, together with the soil surveys, for capability and ownership maps. From this material the problems of the area have been crystallized into a number of units:

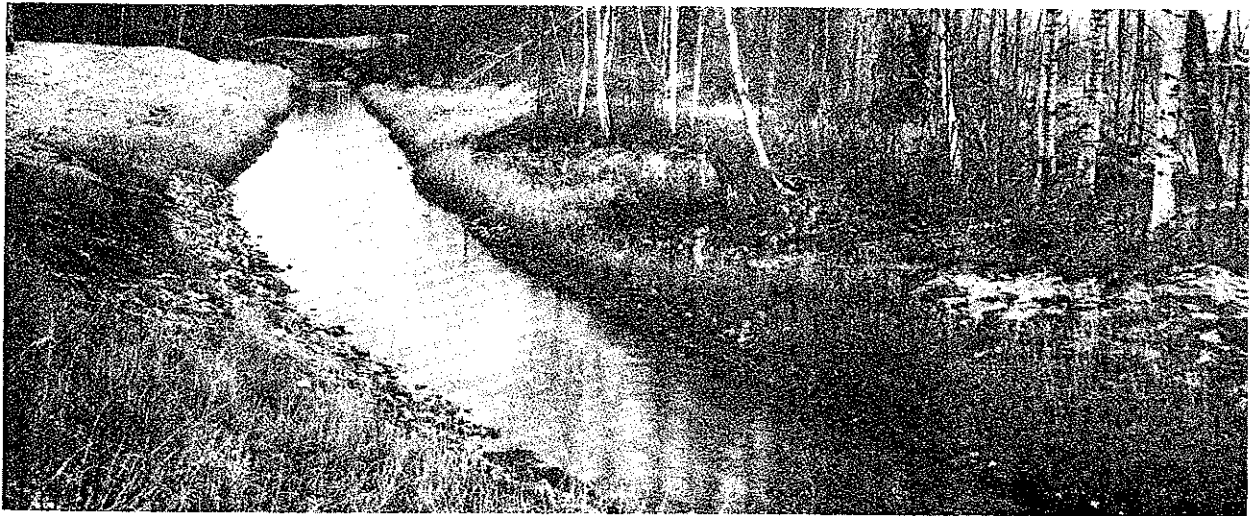
1. Ownership. This was subdivided into public and private ownership. The private ownership was divided into agricultural and nonagricultural land.
2. Erosional losses and the resulting siltation problems in the streams.
3. The types of agriculture practiced in the area and their effects on soil loss and ground water.
4. The degree of bank erosion on the streams, their sedimentation, suspended silt and bed loads, flood potential, and base flow.

(OPPOSITE PAGE)

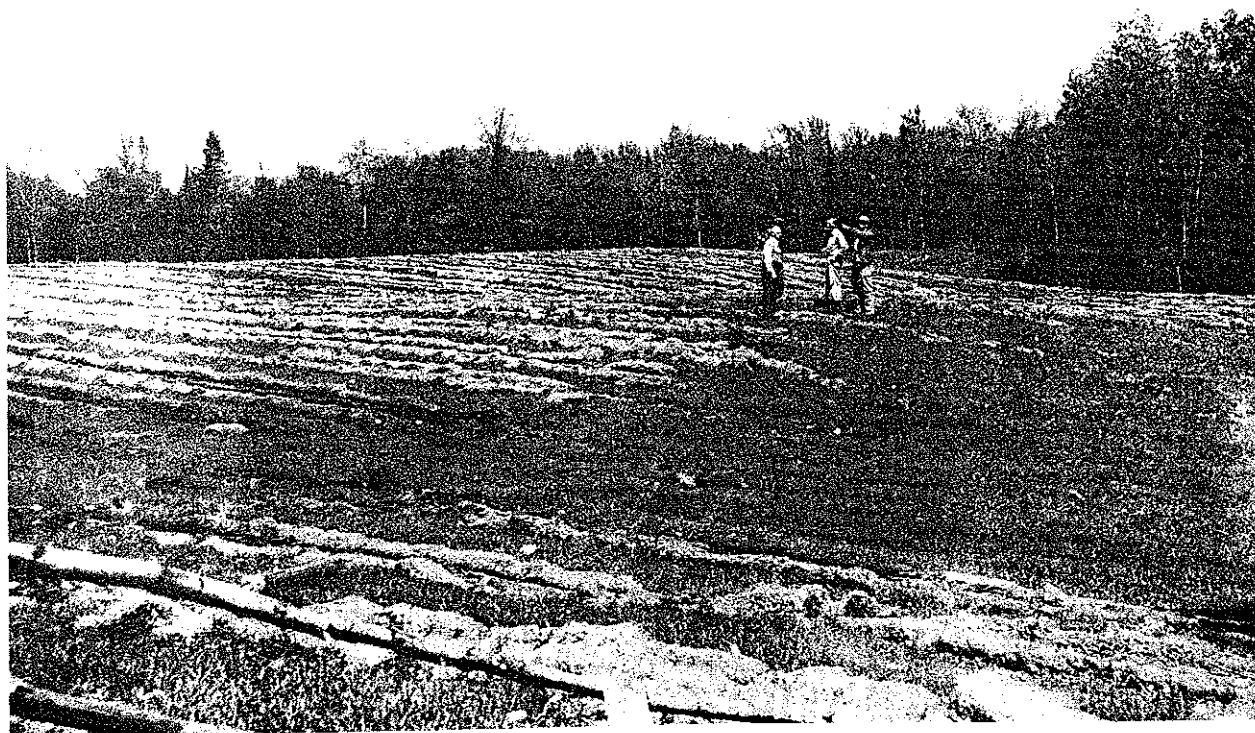
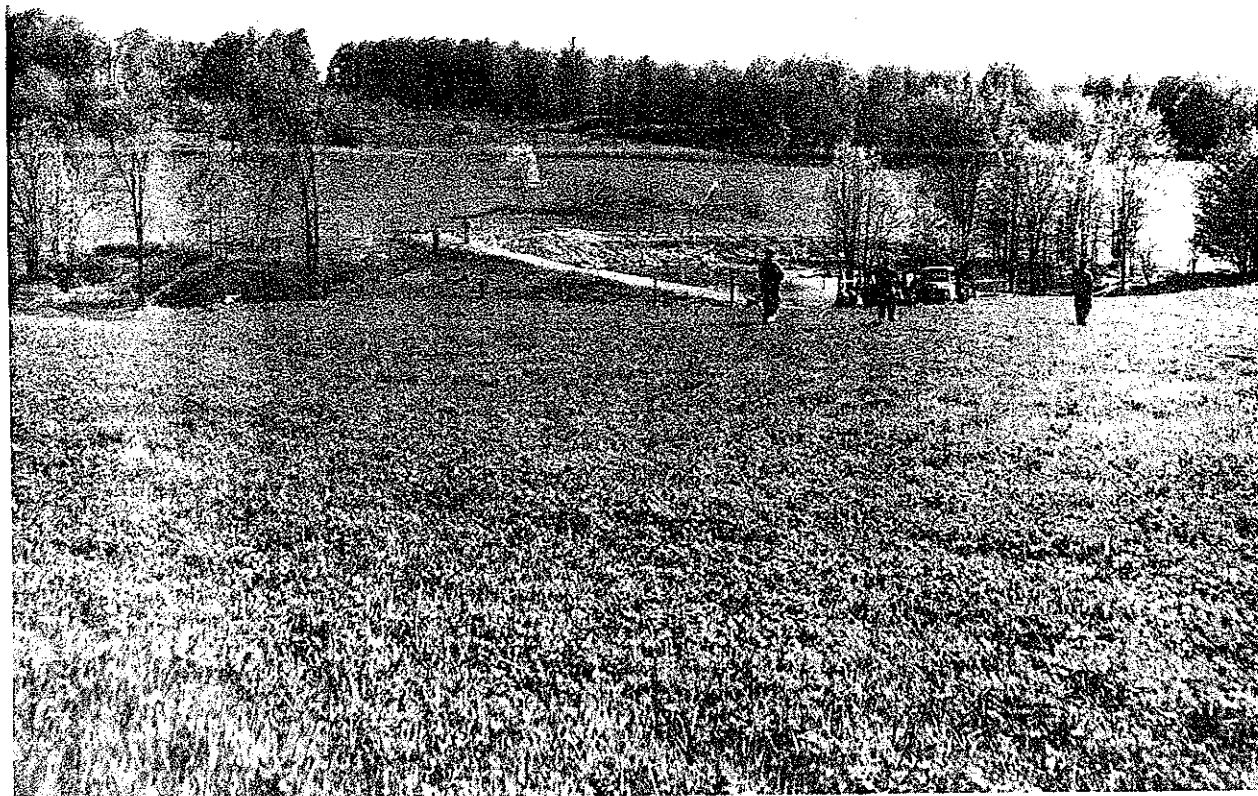
TOP: Stabilization of an eroding bank by reduction of slope, sodding, and riprap.
BOTTOM: Same stream section after completion, with fence to limit stock access.

(All photographs courtesy the author.)



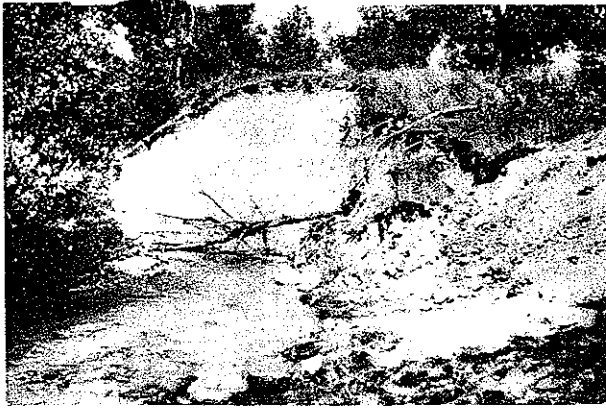


TOP: Control by riprap of an eroding bend in stream.
CENTER: Stream section in process of improvement.
BOTTOM: Same stream section after completion of improvement measures.



TOP: Headwater retention reservoir.

BOTTOM: Tree planting in cooperation with land owner to restrict run-off waters.



Bank before work.



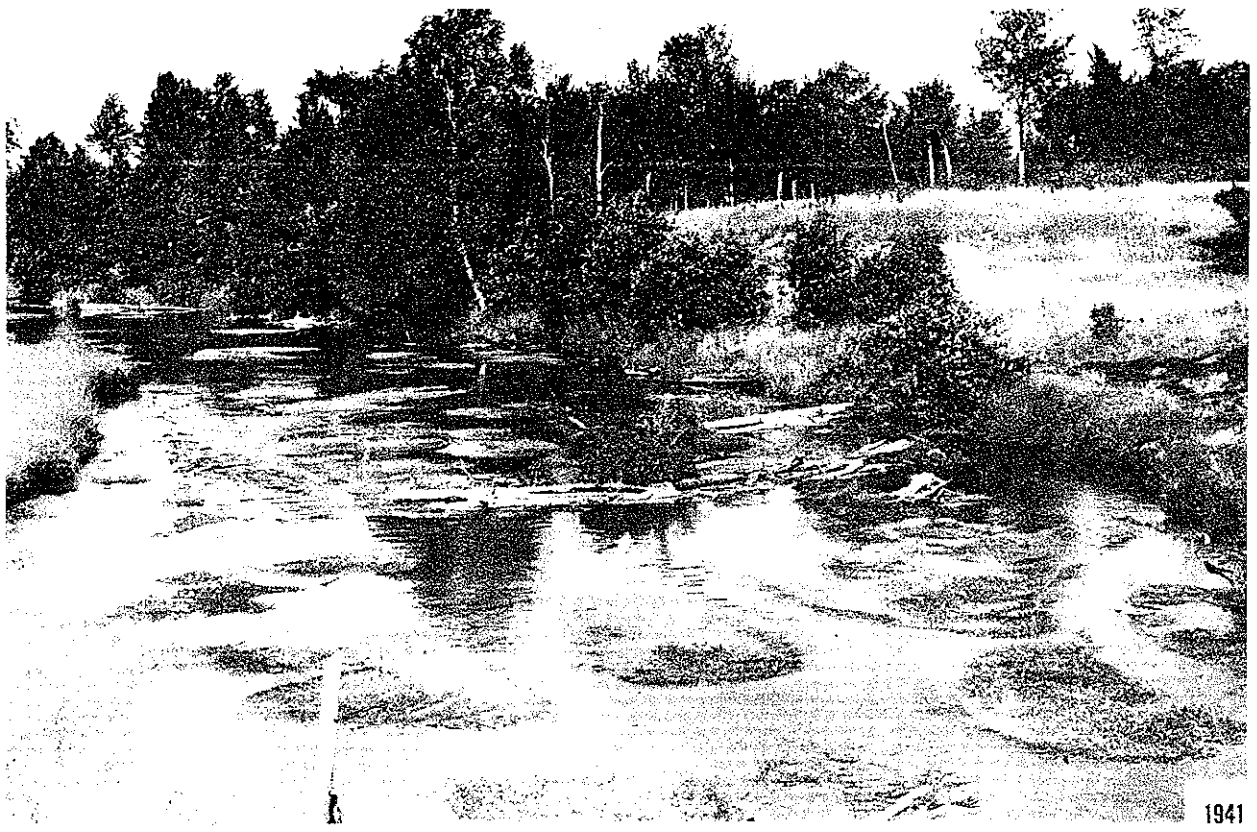
Same bank after stabilization.



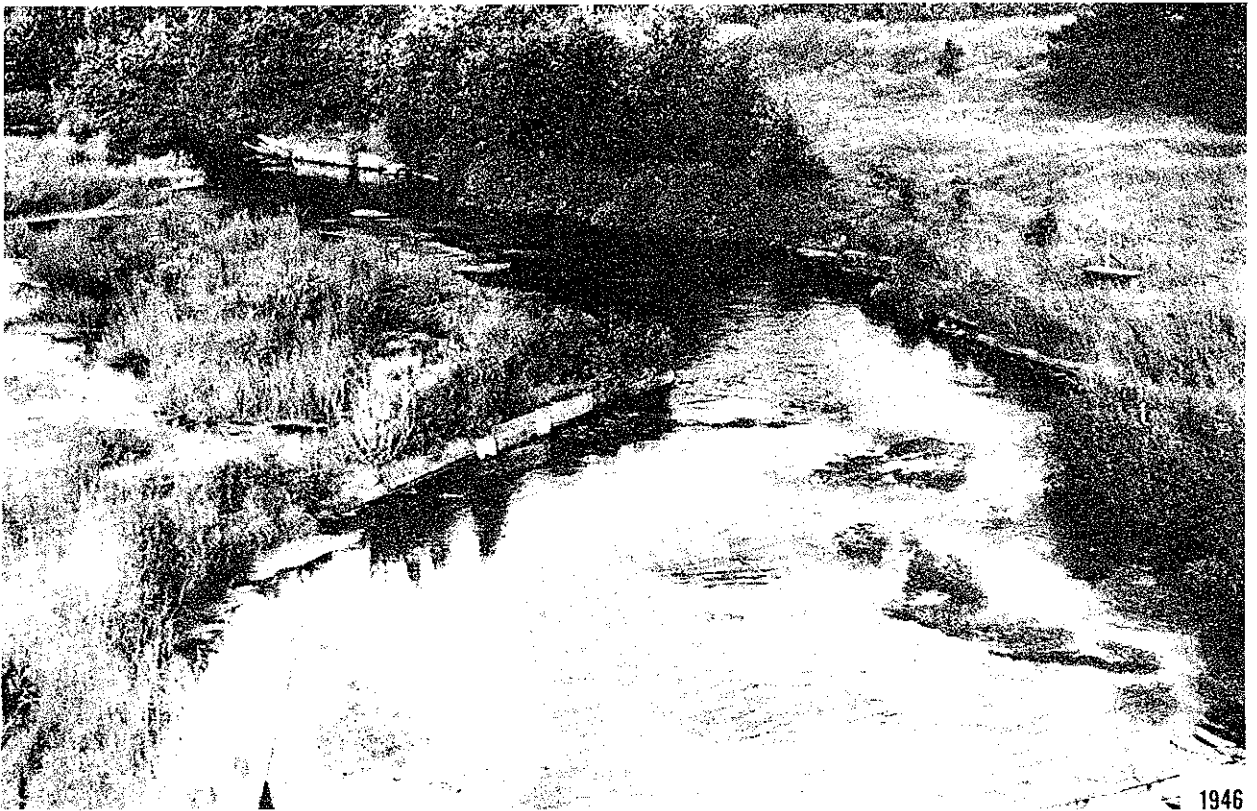
Bank controls.

(THE NEXT THREE PHOTOGRAPHS)

The two photographs on the next page and the photograph on the following page show the effects of 11 years of stream improvement work. These photographs were taken in 1941, 1946, and 1952, respectively. Note the narrowing of the channel.



1941



1946



Third view (1952) of the same stream shown in the two preceding photographs.

It became apparent at the start that the problem was going to be confined largely to the agricultural land under private ownership and to the destructive methods employed to provide highway drainage on the secondary roads. At this initial stage there was begun a system of data collecting which will indicate the efficacy of many techniques employed. A brief listing of these may be of interest:

1. Meteorological data; automatic recording rain gauges on a grid basis over the area. These were supplemented by many manually operated gauges. A complete weather station was installed in cooperation with the U. S. Weather Bureau.

2. Four recording stream-flow gauges with automatic recording thermographs to measure water temperatures were installed at strategic points along the stream system. These were installed and operated on a cooperative basis with the U. S. Geological Survey. In addition, a gauge station located a short distance from the mouth of the Rifle River has been in operation for a number of years.

3. In cooperation with the U. S. Soil Conservation Service, estimates of soil loss were made on the basis of soil characteristics, precipitation records, topography, and land use.

4. Fish population studies and estimates were made by staff members of the Institute for Fisheries Research (the research organization of the Fish Division of the Michigan Department of Conservation).

5. In cooperation with the U. S. Geological Survey, seepage runs were made as nearly simultaneously as possible on all the major tributaries of the Rifle River above Selkirk, Michigan.

The collection of all these data will continue. It is hoped that an evaluation of the project may be made from them.

The construction work on the Rifle River was largely completed at the end of 1952. This was approximately 2 years ahead of schedule and at a fourth less than the original estimated cost (which was \$200,000, to be spread over a 4-year program). Measures to conserve soil and water, as well as a farm cooperative program, are a continuing part of a watershed program and are essential if the full benefits are to be realized.

To a great extent, the cooperative effort with the private land owners and the various agencies has assured the success of the program. Seventy-five percent of the farmers are cooperators, and the percentage is continually increasing. These farmers are furnished the approved type of farm plan mutually acceptable



A raw, vertical eroding bank dressed back and under complete control.

to the Conservation Department, the U. S. Soil Conservation Service, and the individual farmer. These plans are based on the soil capabilities as outlined in the Soil Conservation Service farm plans, which involve agricultural recommendations, stream bank control, grassed waterways, infiltration and flood-control reservoirs, current deflectors, tree plantations, and the limiting of stock access to the streams. The work that is largely of benefit to the individual property owner under the farm plan was done by him, and the work that is of major benefit to the watershed was done by the Department of Conservation. The determination of this benefit rested entirely with the Department. Prior to the initiation of the watershed program, a policy was adopted requiring only the permission of the land owner for the Department to construct and maintain essential devices on private land. This arrangement has worked admirably.

Accomplishments to date are itemized as follows:

A diversion channel ($\frac{1}{2}$ mile long) was constructed in Gamble Creek, bypassing Devoe Lake. At the diversion head a two-way control weir was built to permit the cold base flow of the stream to enter directly into the Rifle River. This reduces the temperature of the Rifle River during the critical hot

months. The other portion of the weir permits the flood water to pass directly into Devoe Lake, stabilizing the flow of the upper Rifle. Construction effort on the watershed included the following items: (1) 8 miles of grass waterways; (2) 191,000 trees planted on critical eroding areas; (3) 7,110 feet of fence for protection of new tree plantations. The construction work completed on the stream phase of the project is as follows: (1) 113 eroding banks stabilized with rock riprap, jetties, grading, sodding, etc.; (2) 9 miles of stream improved by the addition of 106 structures for formation of pools, cover, spawning, and food purposes; (3) 24,900 feet of streamside fence to protect stream banks and vegetation; (4) 400,000 trees planted along streams for shade, trout cover, and bank stabilization purposes.

Tremendous interest has been shown in this project by people of the State of Michigan, other States, and foreign countries. This is evidenced by the fact that during the 2 years approximately 4,000 individuals have visited the area. This number represents only those belonging to organized groups making conducted tours. Many requests--throughout the State and at the Department's Training School at Higgins Lake--for formal meetings to discuss the watershed approach were made and fulfilled.