MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS
FISHERIES DIVISION
JOB PROGRESS REPORT

STATE: MONTANA

PROJECT NUMBER: F-46-R-4
JOB NUMBER: VI-E

PROJECT TITLE: STATEWIDE FISHERIES INVESTIGATION
STATE TITLE: STATEWIDE SURVEYS AND INVENTORIES
JOB TITLE: ALTERNATIVE IRRIGATION STRUCTURES
PERIOD COVERED: JULY 1, 1990 TO JUNE 30, 1991

ABSTRACT

Grant funding was provided to one conservation district to purchase alternative irrigation diversion structures for demonstration purposes. Evaluation reports were received from five conservation districts on the steel plate alternative diversion structures. A contractor was employed to study problem diversions and recommend designs that will be environmentally sound.

OBJECTIVES AND DEGREE OF ATTAINMENT

1. To engineer and design irrigation diversion structures that will have minimal physical effects on stream channels and fish habitat. Design and funding was approved for one project and design recommendations were submitted on one project.

2. To evaluate cost, maintenance and effects on stream channel stability of diversion projects for demonstration purposes. Reports were received from four conservation districts.

PROCEDURES

Landowners with water rights or water use permits may divert water from rivers and streams for beneficial purposes. A common practice throughout Montana is to construct diversion dams by bulldozing up streambed material. This practice disrupts the armoring in the streambed and often causes stream channel instability resulting in erosion and sedimentation, thus adversely affecting fish habitat.

The Natural Streambed and Land Preservation Act (SB 310) administered by County Conservation Districts states that a permit is required on all activities undertaken by private individuals that affect the streambed and banks of perennial streams. Irrigation diversion structures that alter the streambed are no exceptions. However, many streambed material diversions are permitted because of a lack of less damaging alternatives.

In 1987 and 1988, Region 2 fisheries personnel experimentally developed a portable irrigation diversion structure that appeared to be a satisfactory alternative to diking up streambed materials. The structure consists of a 4 x 8 foot, ¼ inch steel plate with a 10 or 12 inch wide flange on the front that serves to anchor and

prevent underscouring of the plate when in the stream. The plates are placed side by side in the stream and topped with jacklegs to hold boards in place (Figures 1 and 2). Boards can be easily placed or removed from the structure to control water levels. A tractor with a front end loader is used to place and remove the plates from the stream.

Conservation districts were contacted throughout the state to sponsor these alternative irrigation diversions for demonstration purposes. A Memorandum of Understanding was signed by the Conservation District Board Chairman and the Department Director outlining terms of agreement for the financing of the structures.

A contract was consummated with a private consulting firm to study problem diversion sites and recommend designs that may be environmentally acceptable and affordable. Plans acceptable by the Department are recommended to conservation districts as an alterative diversion and would be eligible for cost sharing benefits.

RESULTS AND DISCUSSION

During this report period, only one Memorandum of Understanding was signed with a conservation district to demonstrate the portable irrigation diversion structures. Teton Conservation District was granted $2,000 and they contracted with a high school vo-ag department for construction of the diversions.

Conservation districts loan the structures to interested operators to evaluate. It is hopeful that successful operation at diversion sites will motivate irrigators to purchase or construct their own diversions. The individual 8 foot diversion plates can be constructed for about $200 a piece, while contracted prices will range from $250 to $300.

Evaluation reports were received from four conservation districts who participated in the program in 1990. A set of structures were placed in the Beaverhead River near Dillon and the following are quotes from the rancher who installed them. "So far I'm very impressed with how the structure has performed. This seems to be an excellent way to help both the irrigator and fishery at the same time". Ruby Valley Conservation District commented on structures that were placed in the Ruby River. They stated that according to the landowners who are involved in this project, "this diversion should have been invented a long time ago". Sweet Grass Conservation District wrote "the Board has been extremely pleased with the success for the diversion plates". Carbon Conservation District commented that the ranchers seemed to feel the structures work quite well. The structures have been placed in Red Lodge Creek near Boyd.

One common comment was that the structures were hard to place in streambed that contained large cobbles. Streambed preparation was necessary to place the plates. This was anticipated since previous

Figure 1. Portable steel plate alternative irrigation diversion structure in place on the Beaverhead River. Beaverhead County.

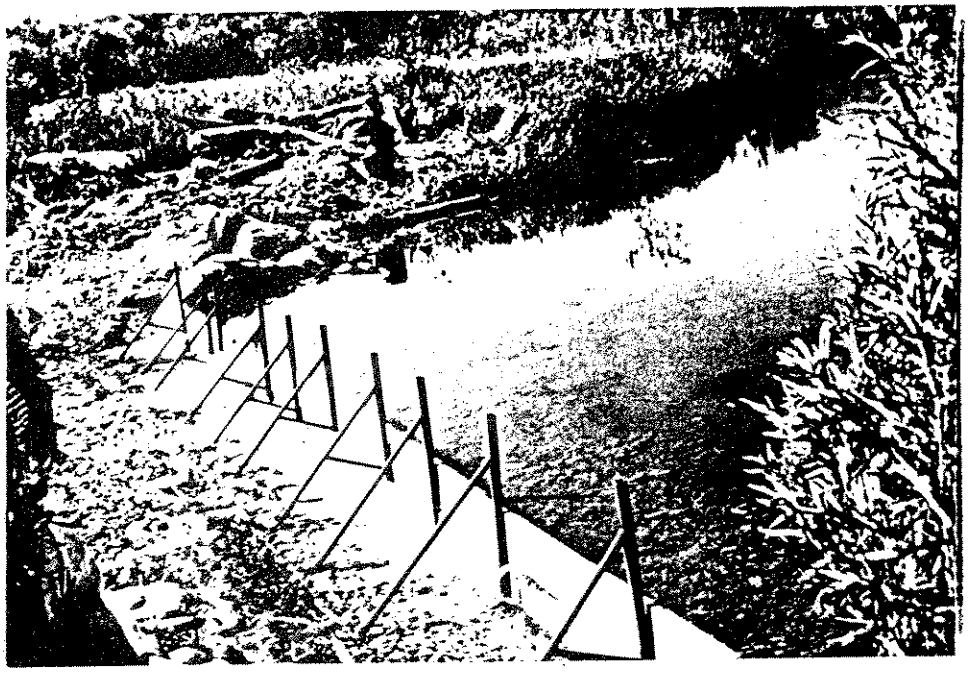

Figure 2. Portable steel plate alternative irrigation diversion structure on Clear Creek, Madison County.

experimenting revealed large streambed material was not very conducive to plate placement.

Such was the a case on the Big Blackfoot River where Lewis and Clark Conservation District loaned structures to an operator. The streambed at the diversion location was primarily cobble and boulder. The plates would not set on the streambed evenly and washed out when the jacklegs and boards were placed on them. The water needed to be backed up about three feet in depth which put too much hydraulic pressure on the plates. This site will be used for another alternative design.

A small contract was awarded to a private engineering firm to study problem diversion sites and recommend designs that would be environmentally sound and economical. Sites were limited to those recommended by fishery biologists. Design and plans were recommended on one site on the Dearborn River, an important spawning tributary to the Missouri River. The proposed design will replace a quarter-mile long dike of streambed materials. We are awaiting a decision from the landowner and conservation district on project implementation.

RECOMMENDATIONS

Conservation Districts not already involved in the Alternative Irrigation Diversion program did not show much interest this report period. However, two districts indicated interest this coming year. While those districts involved in the program expressed satisfaction with the diversion plates, other ideas need to be implemented for situations not adaptable to the plates.

A committee of SCS engineers and technicians have been identifying new and innovative ideas/concepts/criteria for low cost environmentally sound irrigation diversions. The project leader attended the last committee meeting and offered biological expertise to the list of ideas and concepts that were developed. A rough draft of a committee report handbook will be completed later this year where the various diversion techniques will be presented. The handbook is intended for use for conservation districts, landowners and technical personnel. It is recommended that funding assistance be offered to help publish and distribute the handbook. Grant funding will be offered to conservation districts to sponsor demonstration projects patterned after designs featured in the handbook.

Renewing of the contract with a private engineering firm to study and design alternative diversions is recommended. Regional fishery personnel will recommend those diversions where they desire assistance from the contractor.

Prepared by: Al Wipperman

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