

## MONTANA STATE DEPARTMENT OF FISH AND GAME

## FISHERIES DIVISION

## PROGRESS REPORT ON

## AN EVALUATION OF THE BOX ELDER CREEK WATERSHED PROJECT

## PROJECT 29-H-0

## Introduction

During 1959 the Soil Conservation Service, USDI, undertook the planning of a flood control project on Box Elder Creek above Plentywood, Sheridan County, Montana. This project, proposed under the Watershed Protection and Flood Prevention Act (PL 566) will include improvements of land use practices in the 20 square mile watershed and a flood control reservoir located about one-half mile above Plentywood. In accordance with a recent amendment to the above Act (PL 85-865), the Montana Fish and Game Department was invited to assist in evaluating the potential value of this project to fish and wildlife and to make recommendations for measures to enhance these values. Under the above mentioned amendment, the planning agency is authorized to include measures designed to enhance the fish and wildlife value of a watershed project and the Department of Agriculture is authorized to assume one-half of the cost of including these measures. The remaining 50 percent of the cost is to be met by local interests. The Soil Conservation Service has proposed altering the flood control structure by adding eight feet of dead storage in order to provide water depth for fishery purposes. The Montana Fish and Game Department was requested to participate financially in the project by Mr. J. E. Rucker, City Attorney, Plentywood.

Information included in this report was obtained in the following manner:

A meeting was held at the reservoir site on July 24, 1959 with the following persons attending: Mr. Glenn Stucky, Party Leader, Watershed Section, Soil Conservation Service; Mr. Louis Moos, Biologist, Soil Conservation Service;

Mr. William Driver, Work Unit Conservationist, Soil Conservation Service; Mr. Cliff W. Hill, Project Biologist, Montana Fish and Game Department. At this meeting Mr. Stucky explained the general plans for the project and a discussion was held on the possibility of increasing the head storage pool for fishery purposed in the project.

A field inspection at the reservoir site was made on October 14, 1959 by Mr. Joe Haltermann, Biologist, Missouri River Basin Studies, U. S. Fish and Wildlife Service, and Cliff W. Hill. At this time additional specifications on the project had been supplied by Mr. Stucky.

A meeting between Mr. Haltermann and Cliff W. Hill was held on January 19, 1960. At this time a tentative evaluation made by Mr. Haltermann and based on information received since the previous meeting was discussed.

A meeting was held on January 28, 1960 with Messrs. Stucky, Moos, Haltermann, and Hill attending. The evaluation of fish and wildlife potential of the project previously made by Haltermann and Hill was discussed.

#### Description of the Project

Box Elder Creek is an intermittent stream located in Sheridan County, Montana. The city of Plentywood is situated along both banks of the stream a short distance above its confluence with Big Muddy Creek. A severe flash flood a few year ago caused considerable damage in Plentywood and resulted in the planning of the project under discussion. The major feature of the project will consist of a flood control reservoir located about one-half mile above Plentywood. This reservoir will intercept flood waters which will then be discharged at a controlled rate via the present stream channel below the dam.

The drainage area above the proposed dam is 20.02 square miles, average annual precipitation is 13.7 inches, and average annual runoff at the dam site is 133 acre feet. The watershed above the dam site is almost entirely range land, with a small amount of hay land in the stream bottom. Except for a small amount of shrubs along the stream, grass and forbs are the predominant vegetation.

The original plans for the flood control structure called for a principal spillway at an elevation of 2080 with a dead storage for sediment accumulation of 325 acre feet. The proposed revision for fish and wildlife purposes would place the principal spillway at 2088, with an additional storage capacity of 715 acre feet. Surface area at the top of this fish and wildlife pool would be 92 acres. Temporary floodwater storage would occur above the principal spillway under both alternatives.

Because of the broad, flat nature of the proposed reservoir site, the amount of available runoff water is the major factor limiting the usefulness of the reservoir for fish management purposes. In order to determine the water levels which might be expected, Mr. Stucky prepared a graph of water levels which would have occurred if the structure had been in place during the period of 1938-1958. This graph was based on precipitation and weather conditions occurring in those years, with allowances for evaporation at the rate of 64 inches per year, and for seepage at a rate dependent on the depth and area inundated.

In order to avoid oxygen depletion under snow and ice cover and subsequent winter kill of fish, it was determined that a substantial area of the reservoir should have a water depth of at least 15 feet in the beginning of the winter. This depth requirement, somewhat higher than the depth requirement used by the Montana Fish and Game Department for accepting ranch ponds for fish management, was arrived at because of the following considerations:

1. This reservoir will be located in the Northeast corner of the state, where winters are long and severe, resulting in a long period of ice and snow cover.

2. The fact that a considerable expenditure of funds, both federal and local, would be necessary in order to add the fish and wildlife pool to the reservoir requires that the requirements for evaluation the potential of the proposed addition be realistically stringent.

From a topographic map of the site it was determined that an area of 15 acres (about one-sixth of the area at the elevation of the principal spillway) occurs at elevation 2070. A goal water elevation of 2085 in October was chosen for evaluating the reservoir. It was determined that in only three of the twenty-one years charted would the October water level be at or above this elevation. At the end of the period evaluated (1958) the reservoir would be completely dry.

The period of available weather records used in the above evaluation begins at the end of a drought period and includes a portion of the recent dry period. The majority of the period consists of a series of years of moderately high precipitation for the area. It is reasonable to assume that the entire period (1938-1958) represents an average, or wetter than average, period for the area. The above evaluation represents a realistic, if not a somewhat optimistic forecast of what might be expected if the reservoir were built with the fish and wildlife pool.

#### Recommendations

It is recognized that little opportunity for sport fishing exists in the Northeast corner of Montana. If runoff conditions and reservoir basin shape were more favorable, the inclusion of the fish and wildlife pool in the Beaver Creek Flood Control Reservoir would be a worthwhile addition to the fishery resources of the area. Unfortunately, conditions are such that the possibility of producing a substantial fishery in this way are slight. During periods of dry years, such as has occurred recently, the fishery in the proposed reservoir would suffer the same fate as other existing marginal fisheries in the area (Peterson Lake, for example). It is not recommended that the Montana Fish and Game Department participate in an attempt to produce a fishery in this reservoir.

We are engaged at present in evaluating the cost of restoring Neiser Reservoir, located about ten miles south of Plentywood. This reservoir, if restored at a reasonable cost, would offer far greater potential for providing

fishing for people of the Plentywood area. It has a more favorable runoff-capacity ratio and a basin shape more conducive to maintaining adequate water depths during periods of dry years. A more complete report on this reservoir will be made when the economic evaluation is completed.

Prepared by: Cliff W. Hill

Approved by: George D. Holton

Date: February 1, 1960