

PRELIMINARY INVESTIGATION

REPORT

BIG LOST RIVER WATERSHEDS
No. 3 (Idaho 36)

Custer County, Idaho

March 1962

information needed to (1) reach tentative agreement on the nature and scope of the project and on levels of flood protection and project development, (2) estimate project costs and benefits, and (3) develop a work outline for future planning.

Investigations to date have been based on the assumption that any major structural program must be justified to a large extent by Agricultural Water Management Benefits (irrigation or drainage). Any flood prevention or erosion control benefits derived from the measures considered would alter cost sharing and improve the Benefit-to-Cost ratio. No attempt has been made to evaluate flood or erosion benefits in the preliminary investigations.

Land Treatment measures needed on the watershed have not been itemized nor evaluated in this review.

Feasibility

It appears that economically feasible and physically practical projects of multi-purpose, flood water retarding and irrigation water storage, or single purpose irrigation ^{storage} ~~watershed~~ may be developed on this watershed. Benefits from these projects would accrue to lands in watersheds No. 1, 2 & 4 that is outside the boundaries of this watershed. Land use on this watershed is practically all range, forest, and wildlife.

Watershed problems above Mackay reservoir include the need for land treatment to improve range lands. In

addition there is a need to stabilize water supply to the ranchers above the reservoir and/or to the reservoir itself, and also provide drainage benefits in 1,000 springs area.

Reduction of floodwater damages would have some benefits in these watersheds. No attempt was made to evaluate these benefits at this time. It seems quite apparent that AWM measures will be the principle element in this project.

The maps accompanying the four applications indicated that these areas were incorrectly designated.

We have prepared suggested changes to meet the requirements of PL-566.

Storage Above Mackay Reservoir

Storage on the Big Lost River above the Mackay Reservoir would supply late season water that normally would escape the Lost River Valley as surface flow during the peak of the runoff and as underflow in the gravels of the valley. Flood water benefits resulting from such storage would be only incidental.

Yield. The 80 percent chance annual yield to two possible storage reservoirs, one on the North Fork and one on the East Fork of the Big Lost is estimated to be 84,000 acre feet. The combined estimated storage in the two sites is 19,000 acre feet. The water stored would serve to regulate discharge past the Howell ranch and the storage could be used in the following three ways:

I. Purely flood control to remove flood peaks. This would affect only the peaks, however because the available sites could not store entire snowmelt runoff. The primary benefits would be the prevention of overflow on pasture and farm land. The structures would function primarily as flood control structures. Under PL 566 the maximum limited to 5,000 ac. ft. per reservoir. This would limit the use of these sites for flood prevention.

II. Irrigation water supply with water rights remaining as they are at present. This would provide irrigation flows earlier in the spring and later in the summer than at present with natural runoff conditions. Operation of the reservoirs would include (1) filling during winter months, (2) release

in early spring before the snowmelt season, (3) refilling during the highest snowmelt season, and (4) release after the high flows have passed.

Proper operation of upstream storage could provide these irrigation benefits and provide some flood control at the same time.

III. Irrigation Water Supply with Adjusted Water Rights:

This would entail a restatement of the water rights of the upper basin users to provide for a given number of acre feet per season rather than the present system of given flows during certain river stages. The upper basin users could then use upstream storage to deliver their water at the most advantageous times of the season.

Shifting of water from one basin to the other is not necessarily involved--only shifting the season of use of the same quantity of water.

A less direct benefit of upstream storage would be the reduction of seepage past Mackay Dam during the non-irrigation season by reducing the water depth in the Mackay Reservoir.

Records of storage in the reservoir and flow below the dam indicate seepage to be 7,600 acre feet per month when the reservoir contains 30,000 acre feet, but only 6,200 acre feet per month when the reservoir contains 20,000 acre feet. Operating upstream storage to minimize storage in the non-irrigation season would keep more of the total water supply above ground and available for distribution in the canal system.

Upper North Fork Dam - Proposed

The height of the dam (95) feet) was selected that appeared to offer the minimum cost per acre foot of storage. The dam will be founded on gravel and sands with a positive cut off to bedrock. The fill will be of zoned construction with a minimum core section width of 10 feet plus the depth of water above the point.

The estimated costs are:

Capacity = 7,000 ac. ft.

Construction Cost	\$1,021,300	
Installation Cost	1,347,000	Per ac.ft.Storage \$192
Total Amortization Cost	48,600	
O & M	5,000	
Total Annual Cost	\$ 53,600	per ac.ft.Storage \$7.66
Local Cost	\$ 728,000	per ac.ft.Storage \$104
Local Amortization	26,300	
O & M	5,000	
Local Annual Cost Total	\$ 31,300	per ac.ft.Storage \$4.48

Castle Rock Dam - Proposed

The height of the dam (100) feet was selected arbitrarily without attempting to determine the use of stored water. This estimate will only be useful to indicate range of cost per acre foot of storage. The dam will be founded on gravels and sand with a positive cut off to bedrock. The fill will be of zoned construction with a minimum core section width of 10' plus the depth of water above the point.

2

The estimated costs are:

Capacity — 12,000 ac. ft.

Construction costs	\$1,204,000
Installation cost	1,948,000 per ac.ft.storage \$162
Total Amortization Cost	70,400
O & M	9,000
Total Annual Cost	\$ 79,400 per ac.ft.storage \$6.61

Local Costs	\$1,051,000 per ac.ft.storage \$87.75
Local Amortization	38,000
O & M	9,000
Annual Local Cost	\$ 47,000 per ac.ft.storage \$3.91

No attempt has been made to reduce the costs or benefits to a per acre basis. The water needs and benefits will vary widely depending upon where the water is to be used. Existing water rights will need to be adjusted or agreements reached as to amounts and use of stored water before a reasonably good evaluation of these projects can be carried out.