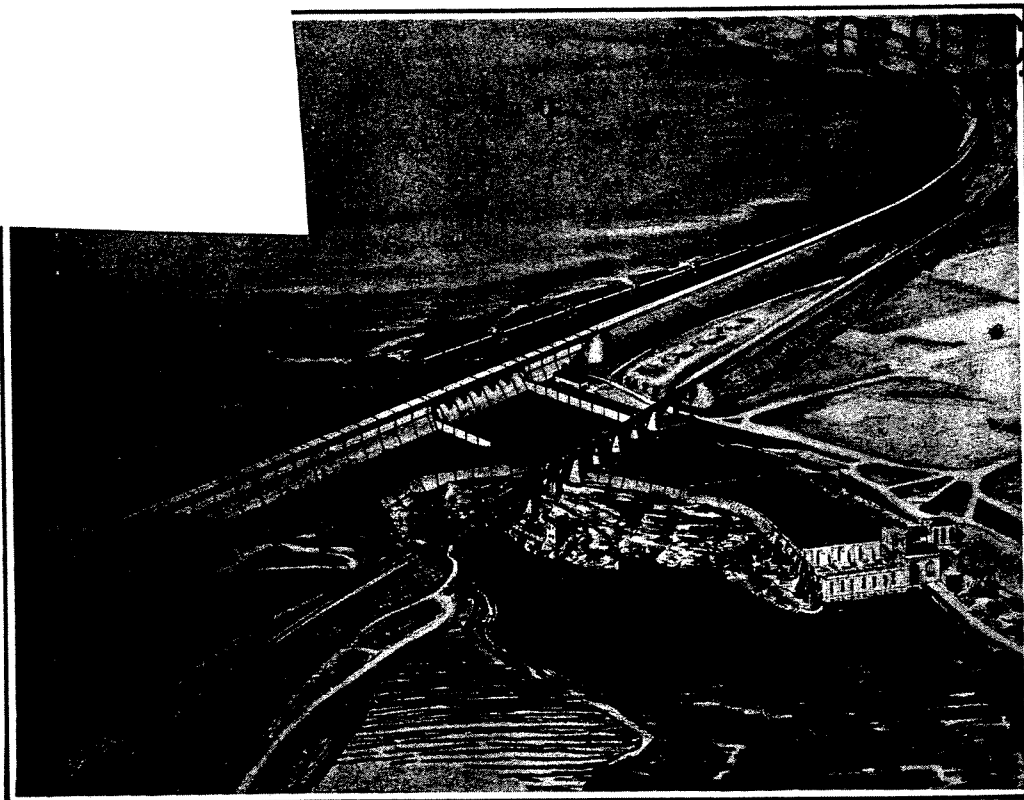


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AMERICAN FALLS DAM REPLACEMENT

UPPER SNAKE RIVER PROJECT
IDAHO - WYOMING



DEPARTMENT OF THE INTERIOR
Rogers C.B. Morton, Secretary



BUREAU OF RECLAMATION
Ellis L. Armstrong, Commissioner

FEASIBILITY REPORT
NOVEMBER 1972



IN REPLY 730
REFER TO:
123.-

United States Department of the Interior
BUREAU OF RECLAMATION

PACIFIC NORTHWEST REGIONAL OFFICE
FEDERAL BUILDING & U.S. COURTHOUSE
BOX 043-550 WEST FORT STREET
BOISE, IDAHO 83702

To: Commissioner, Bureau of Reclamation
From: Regional Director, Pacific Northwest Region, Boise, Idaho
Subject: Feasibility Report on American Falls Dam Replacement, Idaho--
Upper Snake River Project, Idaho-Wyoming

This is my report proposing the multipurpose replacement of the Bureau of Reclamation's American Falls Dam and Reservoir; we propose that the reservoir be maintained at its existing size--1.7 million acre-feet. The reservoir would continue to provide water for about 900,000 acres of irrigated land in the upper Snake River basin. The proposed project would also provide flood control, fish and wildlife enhancement, and recreation; and a safe, improved highway crossing would be built on the new dam.

The existing American Falls Dam does not meet current Bureau of Reclamation safety standards. This conclusion has been corroborated by a distinguished board of private consultants. Concrete in parts of the dam is in a relatively advanced state of deterioration. In the 45 years since the dam was built, the concrete has deteriorated due to a chemical reaction between the alkalis in the cement and the aggregates used in the dam's concrete. The occurrence and effects of this alkali-aggregate reaction were unknown at the time the dam was built. In addition, there is a lack of bond at some of the construction liftlines. As a result, the dam may become unable to resist shearing or sliding downstream under the thrust of the reservoir.

Reservoir filling has been limited to 66 percent of reservoir capacity to avoid excessive pressures on the dam. Because the concrete deterioration is continuing, further filling restrictions will probably be required in future years. The present operating restrictions will have severe adverse effects on water users. More severe filling restrictions or the complete loss of American Falls Reservoir storage would spell financial failure for hundreds of farmers and severe economic hardship for others. Important flood control, fish and wildlife, recreation, and other benefits would also be lost.

Based on comparative cost estimates and an analysis of water supply and other factors, it was concluded that replacement of the existing dam is preferable to the extensive rehabilitation that would be required. The decision to replace the dam rather than repair it is supported by a nearly unanimous vote of American Falls Reservoir spaceholders.

The proposed plan would continue important flood control on the Snake River, and it would provide additional flood control on the lower Columbia River through a proposed change in reservoir operation.

The fish and wildlife resources of the area would be enhanced by developing trout hatchery ponds, goose nesting islands, and other features. The Idaho Fish and Game Department plans to administer and share in the costs of building these facilities. The plan also includes measures to preserve the fishery just downstream from the existing dam.

Replacement of the dam would maintain American Falls Reservoir as an important recreation area. Public non-Federal agencies are going ahead with plans to develop and improve recreation areas at the reservoir under nonproject programs. The proposed project would provide basic facilities for public health and safety near the new dam during and after construction.

The proposed plan includes a modern, two-lane highway to carry Idaho State Highway 39 across the new dam, replacing the narrow, dangerous crossing on the existing dam.

The possibility of enlarging the reservoir was studied. Although enlargement would provide needed storage, it was rejected because of the adverse environmental effects it would cause, mainly in the Fort Hall Indian Reservation at the upper end of the reservoir. A lack of support of a majority of interests was also instrumental in rejecting the enlargement plan.

The proposed multipurpose plan for replacement of American Falls Dam is economically justified. Total benefits would exceed associated costs by a ratio of 4.52 to 1, and direct benefits would exceed costs by a ratio of 3.21 to 1. Total costs for the project are \$29,468,000. These costs provide for constructing a two-lane highway across the dam, but do not include \$1,500,000 added costs to be funded by the State Highway Department to provide a four-lane highway. Total annual equivalent benefits to be derived from irrigation, flood control, fish and wildlife enhancement, and recreation would be \$7,346,800; direct benefits would total \$5,210,000. All irrigation costs except for associated investigation costs would be reimbursable without interest over a 40-year repayment period.

In summary, the proposed multipurpose project would enhance the area's environment, while causing only minimal adverse environmental impacts.

An environmental statement on the proposal is being circulated for review as required by the National Environmental Policy Act of 1969. In addition, the proposal represents a good economic value. Each \$1 of costs would produce more than \$3 of direct benefits, and about two-thirds of the project's construction costs would be repaid to the U.S. Government. For these reasons and because of the critical condition of the existing dam, the proposed multipurpose replacement plan should be given high priority.

Summary

AMERICAN FALLS DAM REPLACEMENT, IDAHO

This report presents a proposed plan for replacing American Falls Dam and developing related multipurpose features. American Falls Dam is located on the Snake River in southeastern Idaho west of the town of Pocatello, as shown on the map at the front of this report. Completed by the Bureau of Reclamation in 1927, the dam now needs to be replaced or extensively repaired.

The 1.7 million acre-foot reservoir would be maintained at its existing size. The storage provided by this reservoir is the foundation of the existing irrigation development in the upper Snake River basin. The largest storage reservoir in the upper Snake River basin, American Falls Reservoir contributes almost half of the usable storage on the main stem of the upper Snake River. Nearly 900,000 acres of land now receive irrigation water from the reservoir. American Falls Reservoir and the other upper Snake River basin reservoirs are operated as a system to provide irrigation water to lands throughout the basin, as well as for flood control, recreation, fish and wildlife enhancement, and power production.

NEED FOR REPLACEMENT

The Bureau of Reclamation has concluded that American Falls Dam does not meet current safety standards and must therefore be replaced or extensively rehabilitated. This conclusion has been corroborated by a distinguished board of private consultants after a thorough study of the dam's condition.

Two conditions have made replacement or major rehabilitation mandatory:

(1) Concrete in portions of the dam is in a relatively advanced state of deterioration. In the 45 years since the dam was built, the concrete has gradually deteriorated due to a chemical reaction between the aggregate (sand and gravel) and the alkalis in the cement used in the dam's concrete. The occurrence and effects of this alkali-aggregate reaction were unknown at the time the dam was built. Freezing and thawing and wetting and drying have further aggravated the concrete deterioration.

(2) There is a lack of cohesion or bond at some of the construction liftlines. With this weakness at the joints, it is possible that the dam may become unable to resist shearing or sliding downstream under the thrust of the reservoir.

Summary

Winter reservoir filling was restricted for several years to avoid dangerous ice pressures on the thin upper part of the dam; this restriction caused losses of storage yield. Reservoir filling has now been further limited to only 66 percent of reservoir capacity at all times. This restriction will cause serious water shortages on many lands in dry years.

Because the concrete deterioration is continuing, further filling restrictions appear to be inevitable until little or no water can be stored in the reservoir. This situation would cause financial failure for hundreds of farm operators and severe economic hardship for others. These events would in turn cripple the upper Snake River basin's overall economy, which is heavily based on irrigation agriculture. In addition, important flood control, fish and wildlife, recreation, and other benefits would be lost.

For these reasons, the replacement or rehabilitation of American Falls Dam should be given high priority.

PROPOSED PLAN

Replacement of the dam and reservoir at their existing size is proposed. Based on comparative cost estimates and on an analysis of water supply and other factors, it was concluded that replacement of the existing dam is preferable to the extensive rehabilitation that would be required. The cost for a replacement dam was estimated to be slightly higher than either of the rehabilitation schemes investigated in detail. This cost difference was judged to be minor, however, when weighed against the fact that the replacement dam would be a completely new structure, while the life expectancy of a rehabilitated dam would be limited to the remaining life of the existing portions of the dam.

In addition, since rehabilitation would require evacuation and controlled filling of the reservoir during construction, serious water shortages could result. Replacement would not involve this chance of water shortages because the existing dam would remain in operation during the entire construction period. The decision to replace the dam rather than rehabilitate it was supported by a nearly unanimous vote of American Falls Reservoir spaceholders on March 28, 1969.

The proposed multipurpose plan would enhance several aspects of the area's environment and would have minimal adverse environmental impacts. A detailed statement on the environmental impacts of the proposal is being circulated for review as required by the National Environmental Policy Act of 1969.

Nearly the entire cost of the existing dam has been repaid by the irrigation water users, even though it has long been clear that other

Summary

interests were receiving major benefits from the reservoir. Under current water-resource planning criteria, the other functions such as flood control, fish and wildlife, and recreation can be identified and fully developed; and cost allocation, repayment, and other analyses can incorporate all the functions benefiting from American Falls Reservoir.

The proposed plan is attractive from an economic and financial standpoint. Direct benefits would exceed costs by a ratio of 3.21 to 1, and total benefits would exceed costs by a ratio of 4.52 to 1. About two-thirds of the cost of constructing the proposed project would be repaid to the U.S. Government.

The major feature of this proposal is the construction of a concrete and earthfill replacement dam just downstream from the existing American Falls Dam. Other proposed facilities include (1) flood forecasting facilities, (2) fish and wildlife enhancement and fishery mitigation features, (3) a two-lane highway crossing on the new dam, and (4) basic facilities for public health and safety near the new dam. Following construction of the replacement dam, the existing dam would be removed.

After Congress authorizes the proposed project and appropriates funds for its construction, major work on the replacement dam could be completed by the beginning of the fifth year. All other construction could be completed by the end of the sixth year.

The proposed American Falls Dam Replacement Project would serve the functions of irrigation, flood control, fish and wildlife enhancement, recreation, highway improvement, and future power production.

Irrigation

The replacement of American Falls Dam would guarantee uninterrupted irrigation water service to an 892,650-acre area which has for many years been the foundation of the economy of southeastern Idaho. These lands make up half of the entire acreage irrigated from surface water in the upper Snake River basin. The 34 irrigation organizations which now own 1,655,000 acre-feet of space in American Falls Reservoir would continue this arrangement; no change in existing irrigation rights or entitlements is proposed.

The remaining 45,000 acre-feet of reservoir space is now used for private power production. For convenience of analysis in this report, it was assumed that this space would be used to meet irrigation needs in unspecified areas. Alternative uses of this space will be considered during preconstruction planning.

All construction costs allocated to irrigation would be repaid to the U.S. Government, except for investigation costs which would be

Summary

nonreimbursable in accordance with recent legislation. Payment capacity studies show that water users could repay all reimbursable irrigation costs in a 40-year period as set forth in Sec. 3 of the Reclamation Act of 1939, after meeting annual operating costs allocated to irrigation.

Flood Control

Under the proposed plan, the reservoir would create major flood control benefits in three categories:

(1) Along the Snake River upstream from American Falls Reservoir to the existing Palisades Reservoir by permitting controlled releases from Palisades.

(2) Along the Snake River from American Falls Dam downstream to the Idaho-Oregon border where the river enters the Hells Canyon reach.

(3) Downstream on the lower Columbia River.

The first two benefits would be created by the operation of the reservoir for its other purposes. The third benefit would be achieved by operating up to 600,000 acre-feet of reservoir space to partially control the largest floods. The reservoir would be operated to insure the filling of this space for the irrigators who have contracted for its use. The proposed plan includes flood forecasting facilities representing the American Falls Reservoir share of the proposed multi-agency Columbia River Hydromet (hydrologic-meteorological) System.

Fish and Wildlife Enhancement

The proposed plan would enhance both the fish and the wildlife resources of the area; all enhancement measures upon which the Idaho Fish and Game Department has agreed to share costs have been included in the plan. The Fish and Game Department would administer these enhancement features. The plan also includes the measures recommended by the U.S. Bureau of Sport Fisheries and Wildlife to preserve the important fishery just downstream from the existing dam; the replacement project would not damage wildlife.

Proposed enhancement measures include new hatchery ponds, a trout incubation channel, goose nesting islands, fisherman access areas, control of water temperatures in the reservoir and in downstream releases through coordinated operation of the outlet works and spillway gates, and a fishing bridge across the Snake River below the American Falls.

Summary

Recreation

Enough lands are available to insure future public access to the reservoir for recreation; included are several hundred acres of Federal land recently leased by non-Federal public agencies for long-term recreational use. Existing and planned recreational areas being developed at the reservoir under nonproject programs eliminate the need to fund recreational developments under the proposed plan. To recognize the recreational value of the reservoir, net recreational benefits are credited to the proposed plan.

Highway Improvement

The replacement of the American Falls Dam would permit construction of a new river crossing for State Highway 39 to replace the narrow and dangerous crossing on the existing dam. Studies have shown that a modern highway crossing on the new dam would be more economical than a crossing at any other location. The proposed plans therefore include a wide, two-lane highway crossing on the crest of the replacement dam. This crossing would be twice as wide as the existing highway; it would meet the current traffic standards of the Idaho Department of Highways. The difference in cost between a direct replacement of the existing highway crossing and the construction of the wider crossing to meet current traffic standards would be assigned to the highway improvement function and would be nonreimbursable.

The Idaho Department of Highways has stated that it intends to fund the difference in cost between the two-lane highway included in the proposed plan and a wider, four-lane highway; the four-lane highway is desired because of projected future traffic loads. The four-lane highway crossing would be built on the new dam if the Department of Highways provides the required funds (\$1,500,000) prior to construction.

Future Power Production

The proposed replacement dam would include four capped power penstocks in order to avoid precluding the future construction of a powerplant just downstream from the dam. These penstocks are included in line with current planning guidelines. The need for the penstocks will be reevaluated during preconstruction planning.

POSSIBLE RESERVOIR ENLARGEMENT

The possibilities of enlarging American Falls Reservoir were also evaluated. A December 1966 information report outlining the results of studies on replacement and on possible reservoir enlargement was widely circulated. The comments on that report showed that while support for

Summary

replacement is virtually unanimous, many interests oppose enlargement. Opposition has centered on the inundation and other adverse environmental effects which enlargement would cause, particularly in the Fort Hall Indian Reservation. For these reasons, this report proposes the replacement of American Falls Dam at its existing size.

POSSIBLE FEDERAL POWERPLANT

The current investigation included reconnaissance studies on the potential for constructing a Federal powerplant at the American Falls site to serve summer powerloads. Under current economic criteria, a powerplant is unjustified. The future potential for a powerplant will be reevaluated during preconstruction planning on the dam.

Reconnaissance studies also showed that a reregulating dam and a powerplant at the Eagle Rock site downstream from American Falls are unjustified at this time.

STUDY AUTHORITY

This report is authorized to be made by the Federal Reclamation laws (Act of June 17, 1902, 32 Stat. 388, and acts amendatory thereof or supplementary thereto). This feasibility investigation on American Falls Dam Replacement was specifically authorized by Public Law 89-561 (Act of September 7, 1966, 80 Stat. 707).

ACKNOWLEDGMENTS

The following agencies, organizations, and individuals made important input to this multipurpose investigation: the U.S. Bureaus of Indian Affairs, Land Management, Outdoor Recreation, Public Roads, Mines, and Sport Fisheries and Wildlife; the U.S. Bonneville Power Administration, Corps of Engineers, Environmental Protection Agency, Geological Survey, National Park Service, and Public Health Service; the Idaho Water Resource Board; the Idaho Departments of Environmental Protection and Health, Fish and Game, Highways, Parks and Recreation, and Water Administration; the Idaho Historical Society; Idaho State University; Bannock, Bingham, and Power Counties; City of American Falls; the watermaster of Snake River Water District Number 1; the Committee of Nine; and water users and their representatives throughout the upper Snake River basin. Their valuable contributions are gratefully acknowledged.

Data Sheets

AMERICAN FALLS DAM REPLACEMENT, IDAHO

LOCATION

American Falls Dam is located on the Snake River in Power County in southeastern Idaho; the 1,700,000 acre-foot American Falls Reservoir also extends into Bingham and Bannock Counties.

NEED FOR REPLACEMENT

American Falls Dam has deteriorated badly in the 45 years since it was built. The dam must be replaced because it no longer meets Bureau of Reclamation safety standards. Rehabilitation was rejected because it would be nearly as costly as replacement, would not last as long as replacement, and could cause severe water shortages during construction.

FUNCTIONS SERVED

The current analysis assumes that the storage capacity in American Falls Reservoir would be used to maintain existing irrigation development. The proposed plan also provides for flood control, fish and wildlife enhancement, recreation, highway improvement, and future power production.

Irrigation

Existing irrigation uses would continue unaltered under the proposed replacement plan. The reservoir now stores an essential component of water supply for 892,650 acres of land in 34 irrigation organizations.

Flood Control

The reservoir would provide flood control (1) on the Snake River from Palisades Dam downstream to Weiser, Idaho, and (2) on the lower Columbia River. No storage space would be assigned exclusively to flood control. The lower Columbia River flood control would be provided by using up to 600,000 acre-feet of reservoir capacity for flood control during the largest floods. Refill of this space for irrigation use would be assured. Flood forecasting facilities would be provided.

Data Sheets

Fish and Wildlife

The plan includes the fish and wildlife enhancement features recommended by the U.S. Bureau of Sport Fisheries and Wildlife on which the Idaho Fish and Game Department intends to share costs. The plan also includes fishery mitigation measures to conserve the area's fishery.

Recreation

The reservoir would provide enough water surface to accommodate all lake recreation use expected to develop in this area. Public non-Federal agencies plan to develop and improve recreation areas at the reservoir under nonproject programs.

Highway Improvement

The proposed plan includes a wide, two-lane highway across the new American Falls Dam to replace the narrow crossing for State Highway 39 on the existing dam. This new two-lane crossing would meet the current traffic standards of the Idaho Department of Highways. If the Idaho Department of Highways provides the additional funds for its desired four-lane crossing, the wider four-lane highway would be built. The Department of Highways has stated that it intends to provide these funds.

Future Power Production

The proposed plan includes four capped power penstocks to permit the future construction of a powerplant at the dam. The need for these penstocks will be reevaluated during preconstruction planning.

PROJECT FEATURES

American Falls Dam Replacement

Type: Concrete and earthfill

Height above streambed: 90 feet

Crest length: 4,210 feet (plus 1,000 feet of existing embankment)

Spillway: Concrete overflow weir; controlled by six 48' x 17' radial gates

Capacity at elevation 4354.5--75,200 c.f.s.

Outlet works: Nine conduits through base of dam; each controlled by 7' x 7' slide gates

Capacity at elevation 4354.5--22,000 c.f.s.

Penstocks: Four 11.5'-diameter penstocks for future powerplant

Data Sheets

American Falls Reservoir

Total capacity: 1,700,000 acre-feet
 Active capacity: 1,700,000 acre-feet
 Water-surface elevation at total capacity: 4354.5 feet
 Area at total capacity: 87.5 square miles (56,000 acres)
 Length at total capacity: 22 miles

Permanent Operating Facilities and General Service Equipment Warehouse-workshop building and radio equipment

Basic Public Health and Safety Facilities Parking areas and related facilities near new dam

Fishery Mitigation Facilities Relocation of part of Idaho Power Company forebay dam Control valve in penstock of new American Falls Dam

Fish and Wildlife Enhancement Facilities Hatchery ponds and trout incubation channel Fishing bridge across Snake River downstream from dam Eight fisherman accessways with parking and other facilities Fifty goose nesting islands

Flood Forecasting Facilities Weather stations and related facilities

COSTS (July 1972 prices)

	Construction costs	Annual OM&R ^{2/}
American Falls Dam and Reservoir		
Replacement	\$28,321,000	\$48,400
Dam and reservoir	(22,906,000)	-
Penstocks for future powerplant	(1,454,000)	-
Highway improvement	(1,861,000)	-
Removal of existing dam	(2,100,000)	-
Permanent operating facilities	143,000	2,400
General service equipment	43,000	
Basic public health and safety facilities	88,000	12,600
Fishery mitigation	546,000	600
Fish and wildlife enhancement	196,000	20,000
Flood forecasting facilities	131,000	10,000
Total costs	\$29,468,000 ^{1/}	\$94,000

- ^{1/} Includes the cost of constructing a two-lane highway, but does not include the \$1,500,000 in added costs to be funded by the State Highway Department to provide a four-lane highway across the dam.
- ^{2/} Annual operation, maintenance, and replacement costs.

Data Sheets

COST AND REPAYMENT SUMMARY

<u>Total Project Costs</u>	\$29,468,000
<u>Nonreimbursable Costs</u>	
Recreation	1,226,000
Fish and Wildlife Enhancement	1,422,000
Flood Control	4,348,000
Highway Improvement	1,861,000
Health and Safety	88,000
Investigation Costs	
Reimbursable functions	337,500 1/
Nonreimbursable functions	(142,500) 2/
Subtotal	(480,000)
 Total Nonreimbursable	 \$ 9,282,500
<u>Reimbursable Costs</u>	
Irrigation	\$18,659,000
Fish and Wildlife Enhancement	96,500
Power (deferred)	1,430,000
 Total Reimbursable	 \$20,185,500
<u>Reimbursable Interest During Construction</u>	
Fish and Wildlife Enhancement (3.649%)	\$ 5,000
Power (deferred - 5.5%)	113,000
 Total	 \$ 118,000
<u>Repayment</u>	
Reimbursable irrigation	\$18,659,000
Repaid by waterusers	18,659,000
Percent payout	(100)
Reimbursable fish and wildlife enhancement	\$ 101,500 3/
Repaid by non-Federal public body	101,500
Reimbursable power (deferred)	\$ 1,543,000 3/
Total Reimbursable	\$20,303,500

1/ Includes cost of investigation for irrigation, \$312,000; fish and wildlife enhancement, \$1,500; and power, \$24,000.

2/ Investigation costs amounting to \$142,500 are included in the nonreimbursable costs, apportioned to each function.

3/ Includes interest during construction at 3.649 percent.

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CHAPTER 4

I R R I G A T I O N

Storage in American Falls Reservoir provides part of the irrigation water supply for nearly 900,000 acres of land. Irrigation benefits from American Falls Reservoir storage have been estimated at more than \$6.6 million annually. Intensive cash-crop farming and livestock production are the principal land uses.

The chapter presents information on (1) lands served by the project, (2) water requirements, and (3) agricultural economy. Chapter 12, Economic and Financial Analysis, presents information on the status of repayment on the existing dam.

LANDS

The lands served from American Falls storage presently total 892,650 acres. The productivity of the lands served from American Falls Reservoir has been demonstrated by many years of successful irrigation agriculture.

For study purposes the lands were divided into two geographic areas: The "lower area" (569,470 acres) is located downstream from American Falls Dam. This area contains the lands of eight irrigation organizations. The "upper area" (323,180 acres) is located above American Falls Dam and contains the lands of 26 irrigation organizations. The general location of the lands in these two areas is shown on the upper Snake River basin map at the front of this report.

Climatic differences between the two areas, although not significant, are identifiable. Crop yields are higher, and more of the land is adapted to intensive cropping in the lower area. Burley, elevation 4200, was selected as representative of the lower area. The Burley area averages 133 days between killing frosts, and average April through October temperatures range from 49 to 74 degrees. Idaho Falls, elevation 4700, is representative of the upper area. The Idaho Falls area averages 126 days between killing frosts, and the average April through October temperatures range from 45 to 69 degrees.

Soils, Topography, and Drainage

The soils of the area have formed under semiarid conditions. Most of the soils are light colored, relatively low in organic matter, and have good water-holding capacities. Harmful concentrations of soluble salts affect only small areas.

The irrigated lands occupy low-lying terraces of recent alluvium, more prominent terraces of older gravelly alluvium, old lake sediments,

Irrigation

or areas of basalt mantled by loess (wind-laid silt). The well established gravity irrigation practices have resulted, in part, because of the favorable soils and topography. However, topographic breaks, bluffs, or other irregularities along different levels of stream terraces and bottom lands affect irrigation patterns.

The lands are generally well drained because of their favorable soils and topography and because the underlying basaltic and lakebed materials generally transmit water well. Where drainage problems have developed in some local areas, they have generally been easily corrected.

Land Classification

The lands served from American Falls Reservoir storage were placed in classes 1 through 4 according to their suitability for irrigated agriculture. Class 1 lands are of the highest quality for irrigation. Class 2 and 3 lands are somewhat less productive or more expensive to farm, while class 4 lands have more severe deficiencies. As the following summary shows, the lands to be served from the replaced American Falls Reservoir storage are generally of high quality; two-thirds of the lands are in classes 1 and 2.

Irrigable Acreage Summary

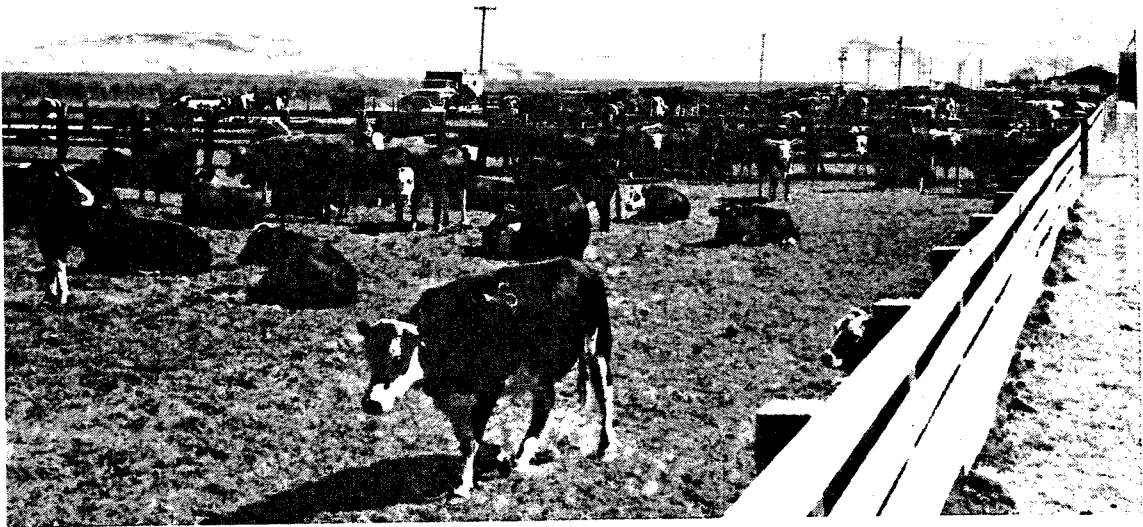
Land Class	Upper Area		Lower Area		Total	
	Acres	Percent	Acres	Percent	Acres	Percent
1	38,090	12	175,640	31	213,730	24
2	154,780	48	222,370	39	377,150	42
3	115,640	36	121,840	21	237,480	27
4	<u>14,670</u>	<u>4</u>	<u>49,620</u>	<u>9</u>	<u>64,290</u>	<u>7</u>
Total	323,180	100	569,470	100	892,650	100

The total of 892,650 acres is the amount reported as irrigated in 1964 by subscribers to American Falls Reservoir storage. The distribution by land classes was derived primarily from the Bureau of Reclamation reconnaissance land classification made for the Palisades Project in 1953.

P17-100-567



P601-100-50



Though rowcrops such as potatoes and sugar beets are important, much of the land served from American Falls Reservoir is used to grow alfalfa (above) and other forage crops. Beef-feeding operations (below) use a large share of the production from these lands.

Irrigation

Cropping patterns vary between the upper and lower areas, mostly because of climatic differences--the lower area has a longer growing season. Current land use is not expected to change as a result of dam replacement because the water users would have the same water rights and supplies after replacement as they have now.

Land Ownership

The lands served by the American Falls Reservoir space are for the most part held in relatively small individual ownerships. An analysis of the ownership data for 840,000 acres out of the total of 892,650 acres served by the project disclosed that the average amount of irrigable land per ownership amounted to less than 63 acres. This illustrates that small family-type farms are the dominant characteristic of the area served by the project. The 160-acre limitation provisions of Reclamation Law are currently applicable to much of the land area, and the replacement of American Falls Dam will not affect the size of these holdings. However, some of the lands served by the project are exempt from the 160-acre limitation because spaceholders have paid the obligation for American Falls storage and do not have any other Reclamation contractual obligations requiring conformance with the 160-acre limitation. Application of the 160-acre limitation to these lands will necessitate some adjustment on the size of holdings.

Analysis of the records discloses that nearly 1.4 million acre-feet of the space in American Falls Reservoir, which is used as an irrigation supply for about 650,000 acres, is held by contractors now covered by the acreage limitation provisions of Reclamation Law, and about .2 million acre-feet are used on 230,000 acres of land currently exempt from these provisions. A rough estimate of the adjustment of ownerships that would be occasioned by application of the 160-acre limitations to the latter group is shown by the following data on land ownerships in the Twin Falls South Side and Enterprise Irrigation Districts, the principal contractors presently exempted from the 160-acre limitation.

<u>Category</u>	<u>Number of Ownerships</u>	<u>Total Acres</u>
A. Ownerships apparently not affected by acreage limitations	3,707	183,300
B. Ownerships apparently affected by acreage limitations	<u>53</u>	- <u>25,300</u>
C. All ownerships	3,760	208,600

It is assumed that (1) a reexamination of the ownerships would be required before new contracts are negotiated for repayment, and (2) the

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new contracts would be made on the basis that landowners would comply with the acreage limitation provisions of Reclamation Law.

Crop Yields

Average crop yields for the principal crops by land class are shown in the following tabulation for both the upper and lower areas. These yields were used in the farm budgets prepared for the payment capacity analysis.

<u>Crop and Land Class</u>	<u>Yield</u>	
	<u>Upper Area</u>	<u>Lower Area</u>
Alfalfa hay (tons)		
classes 1 and 2	4.0	5.0
class 3	3.7	4.7
Pasture (AUM's)		
class 3	9.0	10.0
Wheat (bu.)		
classes 1 and 2	60	65
class 3	55	60
Barley (bu.)		
classes 1 and 2	60	65
class 3	55	60
Dry beans (cwt.)		
class 1	-	22
class 2	-	20
Sugar beets (tons)		
class 1	17	-
class 2	16	-
Potatoes (cwt.)		
class 1	195	250
class 2	185	240

Irrigation Benefits

The irrigation benefits associated with replacement of American Falls Dam total \$6,605,100 annually. These benefits are the sum of:

Irrigation

1. Direct irrigation benefits of \$4,425,400 annually--the net farm income attributable to American Falls Reservoir irrigation storage, and
2. Indirect benefits of \$2,179,700 annually--the increased profits from processing and marketing the agricultural production attributable to American Falls Reservoir irrigation storage.

The representative farm budgets prepared for the payment capacity analysis were used in estimating irrigation benefits. Farm production and expenses were projected to reflect conditions expected to prevail at about the economic midpoint of the 100-year period of analysis. Adjusted normalized prices were used in the benefit analysis.

The benefits are those associated with the average annual yield of irrigation water to spaceholders in American Falls Reservoir and are the net benefits for storage--benefits associated with the distribution system are not included.

Payment Capacity

American Falls Dam would be replaced to assure continued water service to existing irrigated farms. Farm budgets representative of current farming conditions were prepared for use in estimating payment capacity. Budgets were prepared for each major land class in both the upper and lower areas. The small amount of class 4 lands has been included with the class 3 lands in this analysis.

Farm size for each of the farm budgets is 155 irrigable acres. Cash crops, grown in soil-conserving rotation with alfalfa hay and grain, were used to represent production on class 1 and 2 lands in the upper and lower areas. Livestock (beef) budgets were prepared for the class 3 lands in both areas.

Farm organization and financial summary for each of the representative farms are shown in table 1.

The payment capacity determinations reflect the amount which the representative water users have available to meet the costs associated with irrigation water service after deducting all farm expenses, average operation, maintenance, and replacement assessments levied by the districts, and allowing for a 25 percent contingency factor. It should be noted that in many instances the existing district conveyance and distribution systems will, in the future, require substantial rehabilitation. For example, the Burley Irrigation District located in the Lower Area is entirely dependent upon the continued operation of three pumping plants.

Irrigation

Table 1.--Farm organization and financial summary for representative farms

Item	Unit	UPPER AREA				LOWER AREA			
		Class 1	Class 2	Class 3 & 4		Class 1	Class 2	Class 3 & 4	
		Land	Land	Land		Land	Land	Land	
Farm Budget No.		1	2	3		4	5	6	
Farm size	Irr.ac.	155	155	155		155	155	155	
Land Use									
Alfalfa	acre	65	65	60		65	65	60	
Barley	acre	17	17	40		17	17	40	
Wheat	acre								
Sugar Beets	acre	34	34			34	34		
Potatoes	acre	34	34			34	34		
Beans	acre								
Pasture	acre			50				50	
Other	acre	5	5	5		5	5	5	
Total Irrigable		155	155	155		155	155	155	
Type of Farm		Cash-Crop	Cash-Crop	Beef-Feeder		Cash-Crop	Cash-Crop	Beef-Feeder	
Family labor	hrs.	2,322	2,394	2,402		2,281	2,357	2,741	
Farm Investment									
Cash Farm Receipts	\$	64,230	62,990	54,288		62,555	61,315	54,576	
Farm Privileges	\$	24,032	23,067	25,410		25,222	24,262	29,497	
Gross Farm Income	\$	710	710	665		710	710	665	
Farm Expenses 1/	\$	24,742	23,777	26,075		25,932	24,972	30,162	
		13,529	13,488	17,694		13,301	13,201	19,698	
Net Farm Income	\$	11,213	10,289	8,381		12,631	11,771	10,464	

1/ Includes 6 percent interest on 20 percent of total farm investment.

Irrigation

The pumps, motors, and electrical facilities were installed some 65 years ago and should be modernized since an outage during the height of the irrigation season would have catastrophic effects upon the economy of the area.

Further, the residual payment capacity does not reflect construction payments on existing indebtedness such as the outstanding contractual obligation of the American Falls Reservoir District No. 2, the A&B Irrigation District, and the Falls Irrigation District. It was not feasible in this study to develop the payment capacity determinations to the point where they would reflect the actual conditions for each entity utilizing American Falls Reservoir storage. Hence, the representative farm budgets show the general level of payment capacity in prospect. It is important to understand that significant variations in payment capacity exist among the various contracting entities.

The residual payment capacity is shown on table 2 by land class and ranges from \$0.90 to \$3.50 per acre-foot.

Table 2.--Payment capacity on representative farms

Item	Upper Area			Lower Area		
Land class	1	2	3 & 4	1	2	3 & 4
Farm budget No.	1	2	3	4	5	6
	dollars	dollars	dollars	dollars	dollars	dollars
Net farm income	11,213	10,289	8,381	12,631	11,771	10,464
Income deductions						
Equity allowance ^{1/}	3,083	3,024	2,606	3,003	2,943	2,620
Family labor	3,019	3,112	3,123	2,965	3,064	3,563
Return to management	1,121	1,029	838	1,263	1,177	1,046
Gross payment capacity						
Per farm	3,990	3,124	1,814	5,400	4,587	3,235
Per acre	25.74:	20.15:	11.70:	34.84:	29.59:	20.87
Less distrib. sys. OM&R	-3.14:	-3.14:	-3.14:	-4.94:	-4.94:	-4.94
Remaining payment capacity						
per acre	22.60:	17.01:	8.56:	29.90:	24.65:	15.93
Adjusted payment cap. ^{2/}						
Per acre	17.00:	12.80:	6.40:	22.40:	18.50:	12.00
Per acre-foot ^{3/}	2.40:	1.80:	.90:	3.50:	2.90:	1.90

^{1/} Assumes 6 percent on 80 percent of total farm investment.

^{2/} Reduced 25 percent for contingencies

^{3/} Based on an estimated average diversion of nearly 7 acre-feet per acre in upper area and nearly 6.5 acre-feet per acre in lower area.

CHAPTER 9

W A T E R

Under the proposed replacement program, water supplies, rights, and uses would remain as they are now. For purposes of this report, two assumptions were made: (1) a joint operation for partial control of large floods is proposed, and (2) the analysis presented in this report assumes that the entire reservoir capacity would be considered as used for irrigation.

WATER SUPPLY

Runoff from the 13,600 square-mile drainage area above the reservoir has averaged nearly 5 million acre-feet per year. Annual runoff has ranged from a minimum of 2.8 million acre-feet to a maximum of over 7 million acre-feet. Because of its relatively early storage rights and its location near the lower end of the basin, American Falls Reservoir has filled nearly every year since it was built.

WATER RIGHTS

The right to store water in American Falls Reservoir is certified by a 1921 Idaho permit. Thirty-five water user organizations now subscribe to the 1,700,000 acre-feet of space in American Falls Reservoir under contracts with the United States. Table 7 in Chapter 12, Economic and Financial Analysis lists the current holders of American Falls Reservoir space. Thirty-four of these subscribers are irrigation users who hold 1,655,000 acre-feet of space. The Idaho Power Company, under a contract executed in 1923, has been utilizing 45,000 acre-feet of space for spilling water over Milner Dam during the late summer months for use at its Shoshone Falls and Twin Falls powerplants. In addition, the 1923 contract contains certain provisions which permit reregulatory privileges at American Falls Reservoir under which the company can use up to 255,000 acre-feet of space during specified periods, essentially the nonirrigation season when the reservoir is filling, to regulate flows for use at its American Falls powerplant. The Idaho Power Company has an application for a Federal license to operate its powerplant now pending before the Federal Power Commission and the 1923 contract by its terms indicates that it is subject to whatever determination might be made in connection with the Federal license which may or may not be issued under that act.

WATER USE

American Falls Reservoir would continue to be operated in coordination with the other reservoirs of the upper Snake River system. As shown on the following page, the reservoir contains nearly half of the total active storage capacity on the main stem of the upper Snake River.

Water

	Active Capacity	
	<u>Acre-feet</u>	<u>Percent</u>
Jackson Lake	847,000	22
Palisades Reservoir	1,200,000	31
American Falls Reservoir	1,700,000	45
Lake Walcott (Minidoka Dam)	<u>95,000</u>	<u>2</u>
Totals	3,842,000	100

The yield from American Falls Reservoir storage is high because of its early right and its favorable location with respect to winter return flow from upstream irrigation. Yield from the reservoir averages 98 percent of capacity; that is, each 100 acre-feet of reservoir space yields an average of 98 acre-feet of water annually.

Currently, the upper 11.3 feet (575,000 acre-feet--34 percent of reservoir capacity) of American Falls Reservoir is not filled. This filling restriction has been imposed to limit pressures on the weakened portions of the concrete section of the dam. This restriction, which will cause losses of storage to the upper Snake River reservoir system, would of course not apply to the replacement dam.

Though the banks around American Falls Reservoir have eroded in the more than 40 years since the dam was built, sedimentation has not significantly reduced the capacity of the reservoir. During the current studies, a reservoir capacity of 1,700,000 acre-feet was used--the same as when the reservoir was first impounded.

A change in the existing operation of the reservoir provides major flood control benefits. Accordingly, it is proposed that up to 600,000 acre-feet of American Falls Reservoir space be used jointly to reduce the flood peaks. It is anticipated that the proposed flood control operation would not reduce the reservoir's effectiveness or yield for irrigation.

Water would be maintained in the American Falls Reservoir in all but extremely dry years through coordinated operation of the entire upper Snake River storage system. This action would be in the best interest of improving the reservoir esthetics.

CHAPTER 14

REASONS FOR AND AGAINST ENLARGEMENT

Even though analysis of measurable factors such as engineering feasibility and economic efficiency shows that the enlargement of American Falls Reservoir is desirable, enlargement has been excluded for the proposed replacement plan. While support for replacement is virtually unanimous, many local interests oppose enlargement. American Falls Reservoir spaceholders and others have objected to enlargement because of the increased inundation and shoreline erosion it would cause, as well as for other reasons. Others have stated that preserving the ecosystems of the Fort Hall Bottoms and protecting the quality of the Fort Hall Indians' environment are reasons enough to reject enlargement. Because of these objections and the fact that the existing dam must be replaced without delay, this report proposes the replacement of American Falls Dam at its existing size.

NEED FOR ENLARGEMENT

New storage is desirable at American Falls because it is one of the few remaining large and economical storage sites in the upper Snake River basin. New space at American Falls could capture flows that cannot be stored at potential upstream sites. Since the long-range needs for new water supplies in the upper Snake River basin far exceed the available water resources, a high degree of regulation of the surface water supply is essential to irrigation, water quality control, and other uses.

Findings of Previous Studies

The possible enlargement of American Falls Reservoir has been suggested for many years. Enlargement was first evaluated more than 30 years ago, less than 10 years after the dam was built; the prolonged drouth of the 1930's was the reason for this study. The study considered increasing reservoir storage from 1.7 million acre-feet to a total of 3.1 million acre-feet.

Enlargement was briefly reevaluated for the 1961 joint Corps of Engineers-Bureau of Reclamation basin report, Upper Snake River Basin. That report concluded that the enlargement of American Falls Reservoir was one of the 33 projects in the entire Snake River basin above Hells Canyon which deserved the earliest consideration in future planning. Accordingly, the current study included reconnaissance appraisals of the possible enlargement of American Falls Reservoir.

Full Use of Site

Since American Falls Dam must be replaced anyway, a large amount of new storage could be added economically at the time of replacement.

Reasons for And Against Enlargement

Because the reservoir covers such a large area, each foot of increase in dam height would add over 50,000 acre-feet of new storage space.

The dam and reservoir site could physically permit a maximum enlargement of over 20 feet, which would create about 1.4 million acre-feet of new storage. Because of the severe adverse effects at the higher elevations, however, an enlargement of about 13 feet was found to be the largest that should be considered. A 13-foot enlargement would provide nearly half as much new storage space as in the existing reservoir or about half as much space as in either Palisades Reservoir or the potential Lynn Crandall Reservoir.

Optimum Use of Snake River

To be usable in meeting identified needs in the Upper Snake River Basin, uncommitted flows must be regulated by new storage. These unregulated flows average over 900,000 acre-feet. The annual amount varies from nothing in dry years to well over a million acre-feet per year in wet years.

Potential storage sites upstream from American Falls, such as Lynn Crandall Reservoir, could store a substantial amount of the Milner spills. Because of its location near the lower end of the basin, however, an enlarged American Falls Reservoir could store tributary inflows and winter irrigation return flows which cannot be captured at the Lynn Crandall site or other upstream sites.

Lack of Alternative Sites

The enlargement of American Falls Reservoir is one of two remaining large upper Snake River storage opportunities in Idaho; the other is the potential Lynn Crandall Reservoir, which is strongly opposed by a number of interests. New storage at desirable upstream sites in Wyoming is unlikely in the near future; such storage is opposed both by conservation interests and by those who object to building dams in Wyoming to store water for Idaho water users.

During the current study, a number of main stem and offstream storage sites in the American Falls vicinity were studied as possible alternatives to enlarging American Falls Reservoir. While these sites may offer possibilities for storage under changed economic conditions, the preliminary studies showed that under current conditions the costs of storage at these sites would exceed their benefits in all cases. The cost of storage space in these alternatives would be much higher than the space in an enlargement. Chapter 19, Alternatives to Enlargement, presents the findings of these studies.

Reasons for and Against Enlargement

Needs for New Storage

According to the recent Federal-State comprehensive framework study on the Columbia-North Pacific Region and other studies, the upper Snake River basin has more long-range multipurpose needs than water available to serve them. While the further use of the area's large ground water resource can meet some of these future needs, optimum development of the basin's land and other resources and improvement of water quality cannot be achieved without substantial amounts of new storage.

The upper Snake River basin contains more high quality dry land than water to irrigate it. The Columbia-North Pacific study has identified 4 million acres of dry lands with long-range irrigation potential. Of this, 2.5 million acres of lands were placed in classes 1 and 2, indicating good-to-excellent potential. Without irrigation, most of this land is usable only for limited grazing. In addition, about half a million acres of irrigated lands were found to be short of water and in need of supplemental supplies from the Snake River or other sources.

Current Reclamation studies have defined the water needs of a third of a million acres of lands downstream from American Falls. These lands lie south of the Snake River in the potential Oakley Fan and Raft River Divisions of the Upper Snake River Project. About half of these lands are now irrigated, but many have critical water supply problems.

New sources of water must be found for the Oakley Fan and Raft River areas. In the Oakley Fan area (along Goose Creek south of the town of Burley) and in the adjacent Raft River valley, ground water is the only source of supply for much of the land now irrigated. Ground water supplies have in places become seriously depleted, however, and irrigators have had to deepen some wells and abandon others. The Idaho Department of Water Administration has designated large portions of these areas as critical ground water areas. The Department prohibited the drilling of new ground water wells in these areas and has shut down some of the newer wells.

The irrigators in these areas want to import surface water from the Snake River to recharge their ground water aquifers and to irrigate the interspersed tracts of high quality dry lands. Needed wildlife habitat could also be developed. Since new storage is needed to develop this surface water supply, these irrigators were among the strongest advocates of enlarging American Falls Reservoir.

New storage is also needed to improve Snake River water quality, particularly in Milner Lake. Milner Lake is a 33-mile long diversion pool created by Milner Dam, a structure about 75 miles downstream from American Falls. The most serious pollution problems on the river are in Milner pool; wastes dumped into the river by potato and sugar processors and by other industries and nearby towns have created serious pollution problems.

Reasons For and Against Enlargement

The Environmental Protection Agency and the Idaho Department of Environmental Protection and Health have recommended (1) treatment of wastes to reduce the pollution and (2) flows for dilution and water quality control, particularly in midwinter when the Milner pool is ice-covered. About 200,000 acre-feet of new storage space would provide most of the recommended flows; additional space would be required to fully provide the recommended flows. If new storage were provided to insure minimum Snake River flows, recreation and fish and wildlife would also be benefited.

Some interests also desire new storage for use in exchange for the existing irrigation space in Jackson Lake. Providing this new storage would permit Jackson Lake to remain full for the heavy summer recreational use in Grand Teton National Park and could be used to improve streamflows in the potential wild river reach of Snake River downstream from Jackson Lake.

A large amount of new upper Snake River basin storage is required for flood control. While the existing American Falls Reservoir can provide the flood control storage required at that location, flood control space requirements will compete with the requirements for other purposes at other sites, thus increasing the overall upper Snake River basin storage need.

DISADVANTAGES OF ENLARGEMENT

The enlargement of American Falls Reservoir would cause several adverse effects: inundation of additional lands; increased reservoir bank erosion; waterlogging of lands with the larger enlargements; and fish, wildlife, archeological, and other losses. The impact of these adverse effects, particularly on the Fort Hall Bottoms, is outlined below. Details on the amount of land inundated and on the extent of the other adverse effects under the specific reservoir enlargements analyzed are shown in Chapter 17, Enlargement Plans.

Inundation and Bank Erosion

Enlargement would inundate additional lands around the existing reservoir. For example, a 6-foot enlargement would inundate 6,000 acres of additional land, and a 13-foot enlargement would inundate about twice that area. Although most of these lands have already been acquired for the existing reservoir, some added lands would have to be acquired. Most of the lands which would be needed are in the Fort Hall Bottoms of the Fort Hall Indian Reservation. The possibility of building dikes to limit inundation from enlargement was considered but was found to be impractical.

The banks around American Falls Reservoir have eroded continuously since water was first stored more than 40 years ago; this erosion is shown

Reasons For and Against Enlargement

in the photographs on the next page. No economical method has yet been found for controlling this erosion. According to estimates, the existing reservoir will erode about 1,500 acres of additional land in a 100-year period. Raising the reservoir's water surface would aggravate this problem, although a moderate enlargement would not bring stored water into contact with different types of shoreline materials. A 13-foot enlargement, for example, would more than double the projected shoreline erosion to an estimated total of 3,600 acres in a 100-year period.

A substantial enlargement would require relocation or protection of such existing facilities as highways and roads, railroad fills, communication and powerlines, and recreational facilities. For example, a 13-foot enlargement would eventually require \$2.7 million of relocations when the projected shoreline erosion is taken into account.

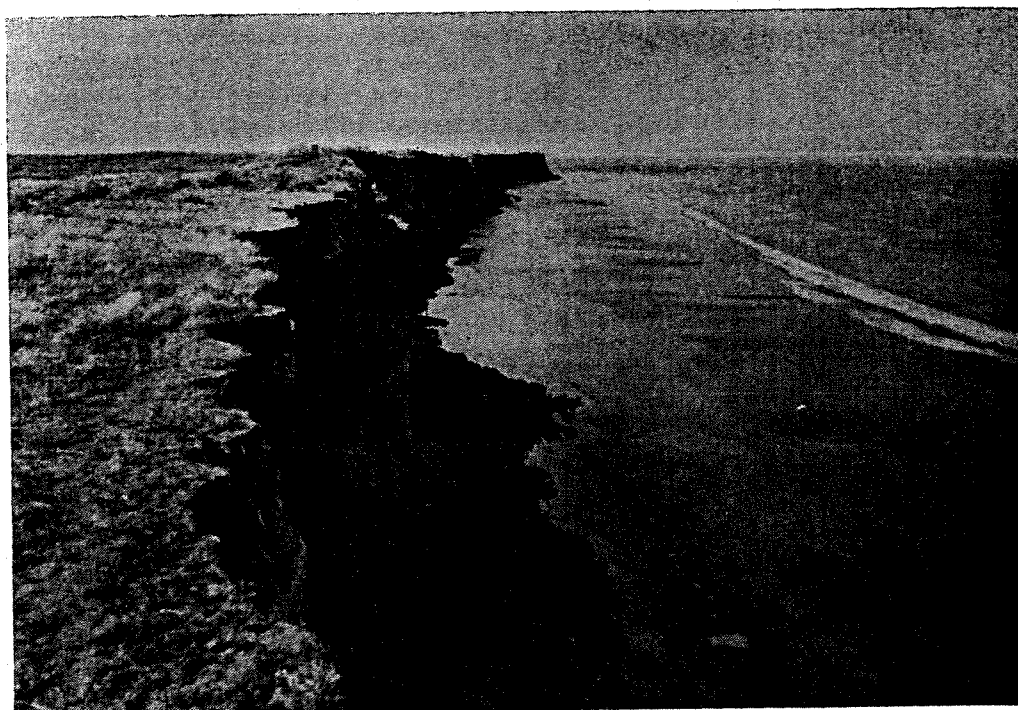
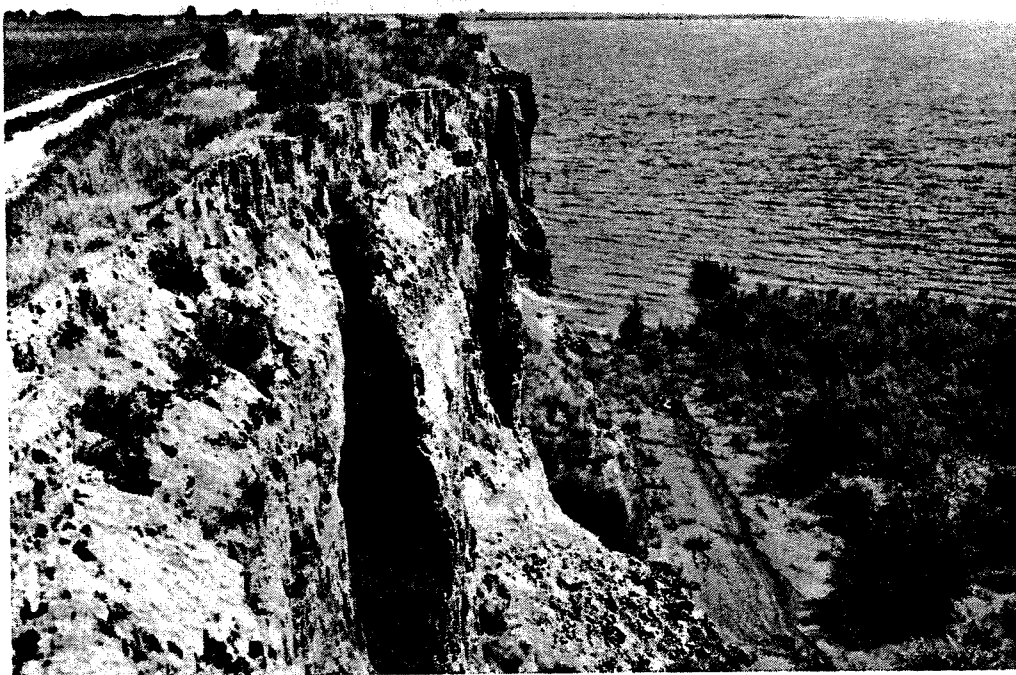
Waterlogging of Lands

Some low-lying lands west of the reservoir in the Aberdeen to Springfield area are subject to waterlogging. Studies have shown that enlargements of up to 10 feet would only slightly aggravate the problem in areas already waterlogged. Above that level, however, waterlogging would become more of a problem. With a 13-foot enlargement, for example, it is estimated that as much as 4,000 additional acres would be waterlogged. With enlargements much in excess of 13 feet, waterlogging would become so extensive that this adverse effect alone is a strong argument against seriously considering enlargements much in excess of 13 feet.

Reservoir Leakage and Interference with Ground Water Inflows

Though there has been concern that enlargement might cause increased reservoir leakage or interfere with ground water inflows, studies showed that both of these problems would be minor with enlargement. According to U.S. Geological Survey findings, reservoir leakage would increase slightly in proportion to the amount of enlargement but that most of the increased seepage would return to the Snake River above major downstream diversion points and would therefore be reusable.

One of the major areas in which the Snake Plain aquifer discharges ground water is in the American Falls reach of the Snake River. Studies have shown that enlargements of up to 13 feet would have little effect on these inflows. Few springs would be directly affected. On those that would be affected, discharges would not be reduced significantly by a full reservoir; they would only be delayed.



Though the reservoir's banks have stabilized in places in the more than 40 years since American Falls Dam was built, shoreline retreat continues to some degree along 85 miles of the 155-mile-long reservoir shore. These photographs show extreme examples of erosion. The upper photograph shows erosion on the western shore near Aberdeen, and the lower photograph shows the cliffs on the eastern shore in the Michaud Flats area. Enlargement would cause increased shoreline erosion.

Reasons For and Against Enlargement

Effect on Fish and Wildlife

The enlargement of American Falls Reservoir would inundate part of the Snake River and other streams tributary to the reservoir, thus reducing spawning areas and fish production. Because reservoir drawdown would be increased, access to the reservoir would be more difficult. Enlargement would also inundate upland game and waterfowl habitat, particularly in the Fort Hall Bottoms and on the private lands at the upper end of the reservoir.

While preliminary Bureau of Sport Fisheries and Wildlife studies show that these damages could be mitigated, a number of interests still oppose enlargement because of its adverse effects on fish and wildlife. This subject is discussed further under "Fish and Wildlife" in the next chapter.

Archeological, Historical, and Other Losses

Under contract with the National Park Service, Idaho State University studied the archeological values that would be affected by enlargement. Concentrating on the Fort Hall Bottoms, the Idaho State University study concluded that enlargement would seriously damage archeological and paleontological resources. The generally accepted site of old Fort Hall would be inundated. The fort, an important supply station on the old Oregon Trail, is listed in the National Register of Historic Places. In addition, the study listed potential damage to the plants, animals, and overall ecology of the area. After evaluating the findings of the university's study, the National Park Service recommended that any plan for enlargement include funds for archeological and historical survey and salvage prior to inundation of additional lands.

Effect on Fort Hall Bottoms

Much of the opposition to enlargement has centered on enlargement's adverse effects on the Fort Hall Bottoms. Some of the adverse effects of enlargement would be most severe in this area; the potential damages to the bottom lands were a major factor leading to the conclusion that the reservoir should not be enlarged.

The Fort Hall Bottoms contain about 16,000 acres above the flowline of the existing reservoir and between the Snake and Portneuf Rivers; this entire area is a part of the Fort Hall Indian Reservation. As the photograph on the following page shows, this river-bottom area is covered by trees and brush. Watered by numerous springs, the area is unique on the Snake River Plain, which in its natural state is a semiarid desert. The bottom lands are valuable as fish and wildlife habitat and as livestock grazing lands.



The lands of the Fort Hall Bottoms at the head of American Falls Reservoir are a part of the Fort Hall Indian Reservation. The Shoshone-Bannock Tribes use these lands for hunting, fishing, and livestock grazing. The Fort Hall Indians and others strongly oppose enlargement because it would inundate part of this area.

Reasons For and Against Enlargement

Any enlargement would inundate part of the Fort Hall Bottoms, though adverse effects from bank erosion would be minor. For example, a 6-foot enlargement would inundate 22 percent (3,550 acres) of these lands at full pool; a 13-foot enlargement would inundate 43 percent (6,850 acres) of the bottoms. The reservoir map in Chapter 17 shows the extent of this inundation. More than 80 percent of the lands that would be inundated by a 6-foot enlargement and over 50 percent of the lands that would be inundated by a 13-foot enlargement have already been acquired as right-of-way in connection with the existing reservoir. The Indians now have the right to use these existing right-of-way lands for hunting, fishing, and livestock grazing; they would probably have similar rights on any lands that would have to be acquired for an enlarged reservoir.

If American Falls Reservoir were enlarged, the Shoshone-Bannock Tribes would be compensated as fully as possible for any values lost through inundation and other adverse effects on their lands. It must be recognized, however, that there is no way of placing a monetary value on some of these losses. The Indians place such high traditional and cultural values on the Fort Hall Bottoms that the loss of part of this area could not be fully compensated by money, and other means of compensation also appear to be unacceptable. For example, it has been suggested that the Indians be given valuable lands in place of the lands in the Fort Hall Bottoms which would be inundated. This suggestion has been rejected by the Shoshone-Bannock Tribes, however, principally because there are no other large land areas in the vicinity which are identical to the bottom lands.

REACTION TO DECEMBER 1966 REPORT

The Bureau of Reclamation prepared and widely circulated a December 1966 information report which summarized the findings to that date on the replacement and possible enlargement of American Falls Reservoir. The report included a discussion of the major advantages and disadvantages of enlargement.

In summary, comments on that report revealed only scattered support for enlargement, while opposition was widespread. The Idaho Water Resource Board has evaluated enlargement and has heard statements for and against it, but neither the board nor the State of Idaho has taken a formal stand either for or against enlargement.

The principal objections to enlargement have come from the Shoshone-Bannock Tribes and others who are convinced that the tangible and intangible values lost through enlargement outweigh the admitted material benefits that would be gained. These objections, plus the fact that controversy over an enlargement proposal could delay the early replacement of the dam, led to the decision to exclude enlargement from the proposed plan.

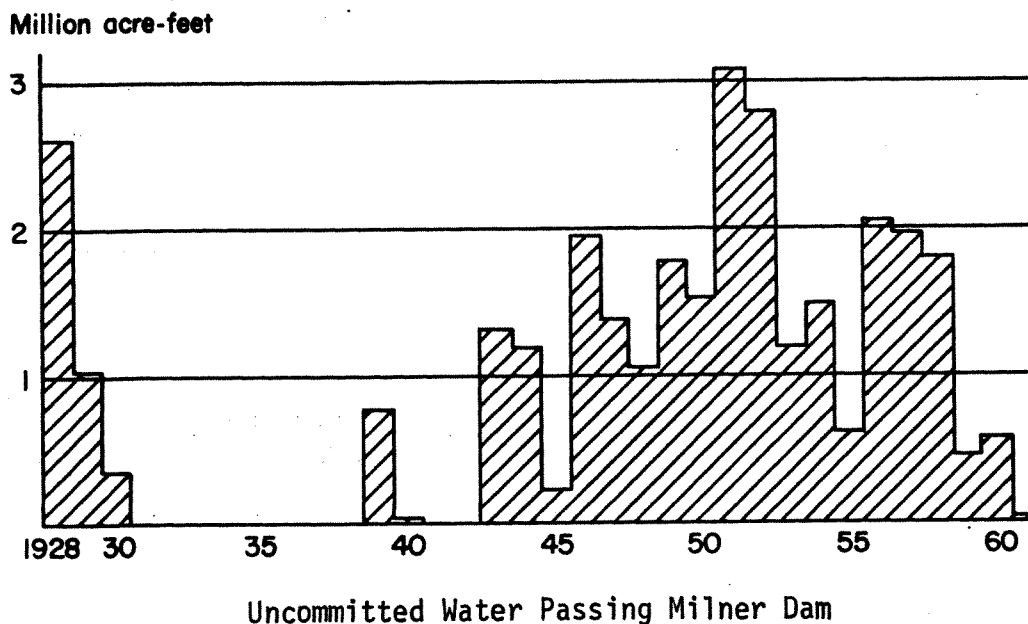
CHAPTER 16

WATER FOR ENLARGEMENT

In all enlargement studies, it was assumed that the first 1,700,000 acre-feet of capacity in an enlarged reservoir would be operated exactly as in a direct replacement of the existing reservoir (see Chapter 9, Water). This discussion of water supply, requirements, and use is therefore confined to the enlargement space only.

WATER SUPPLY

The water supply for an enlargement of American Falls Reservoir is the uncommitted runoff of the upper Snake River basin. This uncommitted runoff can be defined as "Milner spills," that is, water flowing over Milner Dam and out of the upper basin unused and in excess of downstream power requirements. In a repetition of the 34-year period from 1928 through 1961 and assuming the present level of storage development including the Teton Reservoir, Milner spills would average 924,000 acre-feet annually. The distribution of these flows is shown on the chart below.



As the chart shows, large quantities of water would be storable at an enlarged American Falls Reservoir in over half of the years in this

Water for Enlargement

period. However, in a dry year such as 1961 or in most years of a dry cycle such as 1931 through 1942, little water is available for new storage because nearly all the Snake River water is appropriated by existing users. As a result, ground water must be used as a dry-year water supply in connection with any annual use of new upper Snake River basin storage. In some cases, this ground water supply can be provided by pumping within a specific project area; in other cases, ground water will have to be pumped from the highly productive Snake Plain aquifer north of the Snake River in exchange for surface supplies which can then be applied to new uses.

An enlarged American Falls Reservoir, because of its strategic location at the lower end of the upper Snake River system, could control more of the unused Snake River flows than other potential storage sites in the upper Snake River basin. Although new storage on the Snake River above American Falls would reduce the amount of new storage needed at American Falls, the enlargement of American Falls Reservoir would still be required to fully control the flows of tributaries which enter the Snake River below other existing reservoirs and potential storage sites.

WATER REQUIREMENTS

There are many demands for the additional water supply which could be made available by enlarging American Falls Reservoir because the upper Snake River basin has more long-range multipurpose needs than water to meet them. Among these needs are supplemental water for irrigated lands, the irrigation of dry lands, and the provision of water quality and fishery flows. These needs were discussed in Chapter 14.

In the current economic analysis of enlargement, it was assumed that all enlargement space would be used to serve new annual irrigation needs in the potential Oakley Fan Division. The lands in this division would be served by diverting water from the Snake River and by pumping ground water. The diversion requirement is estimated at 5.25 acre-feet per acre for the water supplied from the Snake River. This requirement is based on a crop irrigation requirement of 1.70 acre-feet per acre and a farm delivery requirement of 3.40 acre-feet per acre. The diversion requirement from local ground water supplies would be somewhat less than the requirement from the Snake River because of smaller conveyance system losses.

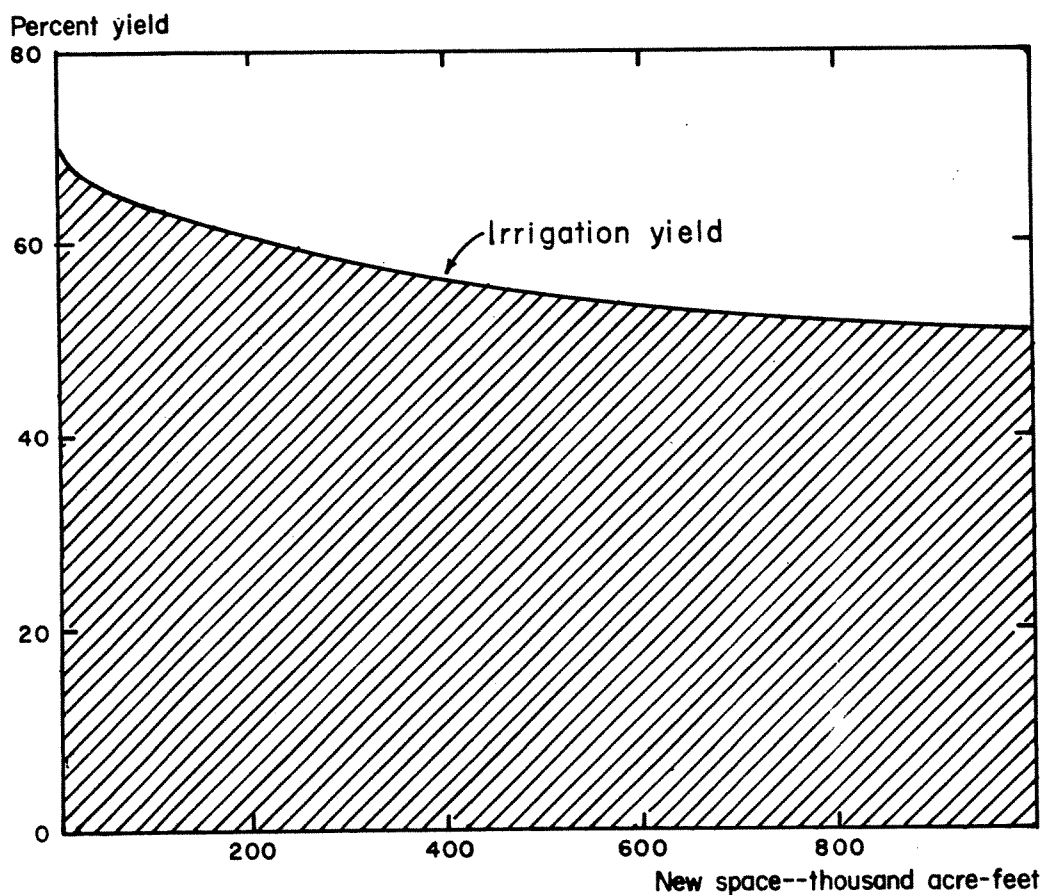
STORAGE YIELD

Because replacement space, the bottom 1,700,000 acre-feet in the reservoir, would be operated just as set forth under the proposed replacement plan, the storage yield from the first 1,700,000 acre-feet of an enlarged reservoir would be just the same as under the replacement program--98 percent. The yield from this space is high because of the early storage right associated with the existing reservoir.

Water for Enlargement

Because its storage right would be junior to all existing rights, an acre-foot of enlargement space would not yield as much water as an acre-foot of replacement space. However, yield from the enlargement would be no less than the yield from any other potential new upper Snake River storage site, and it would be somewhat greater than the yield from an upstream site such as Lynn Crandall Reservoir because of the additional flows that could be stored at an enlarged American Falls Reservoir.

The analysis of American Falls Reservoir Enlargement in this report assumes that enlargement would be the next storage added in the upper Snake River basin. As shown on the chart on the next page, yields from storage for new annual irrigation use would decrease somewhat as the amount of enlargement increases. Yield from the 6-foot enlargement (334,000 acre-feet of space) in the current analysis would average 57 percent (190,400 acre-feet of yield) for irrigation of Oakley Fan area lands, and yield from the 13-foot enlargement (790,000 acre-feet of space) would average 52 percent (410,800 acre-feet of yield).



Average Annual Yield from Enlargement Space
Used for New Irrigation

Water for Enlargement

Average yields from enlargement space used for other purposes would vary from the above amounts. Storage for water quality control, for example, would yield slightly less than storage for annual irrigation use, while storage used only for dry-year supplemental irrigation needs would yield only a fraction of the above amounts.

Economic and Financial Analysis

Table 7.--Current Spaceholders of American Falls Reservoir

Item	Original Space- holders ac.-ft.	Exchange for Jackson Lake Space: ac.-ft.	Current Space- holders ac.-ft.
<u>Upper Valley</u>			
Aberdeen Springfield Canal Co.	87,532	-31,941	55,591
Blackfoot Irrigation Co.	20,133	-7,370	12,763
Burgess Canal and Irrigation Co.	14,979	-5,483	9,496
Butte and Market Lake	7,361	-2,695	4,666
Corbett Slough Ditch Co.	5,357	-1,961	3,396
Dilts Irrigation Co.	1,397	-511	886
Enterprise Canal Co., Ltd.	14,075	-5,152	8,923
Enterprise Irrigation District	16,071	-5,883	10,188
Falls Irrigation District	23,300	0	23,300
Harrison Canal and Irrigation Co.	18,968	-6,943	12,025
Idaho Irrigation District	36,141	-13,230	22,911
Klussman, Johanna (Nordof)	301 1/	-110	191
Lenroot Canal Co.	6,102	-2,234	3,868
Martin Canal Co.	3,165	-1,159	2,006
Michaud Division, Fort Hall			
Indian Reservation	47,700	0	47,700
New Sweden Irrigation District	40,588	-14,857	25,731
Peoples Canal and Irrigation Co.	33,780	-12,365	21,415
Poplar Irrigation District	1,062	-389	673
Progressive Irrigation District	19,694	-7,209	12,485
Reid Canal Co.	4,021	-1,472	2,549
Rudy Irrigation Canal Co.	4,179	-1,530	2,649
Smith, C. D.	33 1/	-12	21
Smith Ditch (J. H. Austin)	79	-29	50
Snake River Valley Irrigation District	41,592	-15,225	26,367
Trego Ditch Co.	2,072	758	1,314
Utah Idaho Sugar Co. (Osgood)	21,230 1/	-7,771	13,459
Woodville Canal Co.	9,538	-3,491	6,047
Subtotal Upper Valley	480,450	-149,780	330,670
<u>Lower Valley</u>			
American Falls Reservoir District No. 2	400,000	0	400,000
Burley Irrigation District	18,162	139,780	157,942
Hillsdale Irrigation District	41,146	0	41,146
Millner Low Lift Irrigation District	45,687	0	45,687
Minidoka Irrigation District	83,563	0	83,563
North Side Canal Co., Ltd.	387,214	10,000	397,214
North Side Pumping Division, Minidoka Project	47,593	0	47,593
Twin Falls Canal Co.	151,185	0	151,185
Subtotal Lower Valley	1,174,550	149,780	1,323,330
Total	1,655,000 2/	0	1,655,000

1/ Contracts pending on part of this storage.

2/ Exclusive of 45,000 acre-feet of space used by Idaho Power Company.

Economic and Financial Analysis

Table 8.--Summary and status of repayment contracts.
September 30, 1972

Contractor	Contr. No.	Space Owned Prior		Space Purchased After		Total Reservoir Space	
		Authorization of	Amount	Contr. No.	Authorization of	Amount	Unpaid
		Date	Acres-Feet		Date	Acres-Feet	
American Falls Res. Dist. 1/ Aberdeen-Springfield Canal Co.	11-168	8/15/22, etc.	477,421	14-06-W-24	10/22/52	477,421	2,219,293.82
Blackfoot Irrigation Co.	12-1073	12/15/25	29,534.98	14-06-W-29	12/12/52	51,390	230,120.34
Burgess Canal & Irrigation Co.	12-1196	7/28/25	15,033	14-06-W-31	12/12/52	20,133	92,276.10
Burley Canal & Lake Canal Co.	11-1122	12/17/25	7,496	14-06-W-38	12/12/52	14,979	67,684.72
Corbett Slough Ditch Co.	11-654	7/28/25	3,002	14-06-W-32	12/12/52	7,361	33,039.51
			4,000	14-06-W-12	12/12/52	5,357	24,578.28
Dills Irrigation Co. Ltd.	12-1174	2/25/26	1,034	14-06-W-32	12/12/52	1,397	6,492.11
Enterprise Canal Co., Ltd.	12-1177	7/28/25	10,509	14-06-W-15	12/12/52	14,075	64,575.80
Enterprise Irrigation Dist.	11-217	4/1/24	12,000	14-06-100-1912	6/2/60	16,071	109,566.95
Harrison Canal & Irrigation Co.	12-1326	7/28/25, etc.	11,994	14-06-W-30	12/12/52	18,968	86,461.47
Idaho Irrigation District	Unnumbered	7/28/25	26,986	14-06-W-33	12/12/52	36,141	165,987.78
Ray Andrus (Hollen Bros.)	12-1132	7/28/25	225			225	1,050.00
Lanroot Canal Co.	12-1131	7/28/25	4,504	14-06-W-22	12/12/52	6,102	27,979.85
New Sweden Irrigation Dist.	11-84	9/25/22	28,528	14-06-W-14	12/12/52	40,588	180,176.42
Peoples Canal & Irrig. Co.	12-1176	7/28/25	22,519	14-06-W-44	12/18/52	33,780	154,186.50
Poplar Irrigation District	12-1550	7/28/25	3,745	14-06-W-45	12/18/52	4,920.10	9,920.10
Progressive Irrigation Dist.	12-1458	7/28/25	14,609	14-06-W-47	12/18/52	12,694	92,210.58
Raid Canal Company	12-1198	7/28/25	3,002	14-06-W-10	12/12/52	4,021	18,450.85
Budy Irrigation Canal Co.	11-659	4/1/38	2,000	14-06-W-37	12/12/52	4,179	26,717.17
Sam Sakaguchi (C. D. Smith)	12-1250	1/6/26	79			79	374.03
Snake River Valley Irrigation Dist.	11-247	2/6/23	27,643	14-06-W-35	12/12/52	41,592	184,927.32
Trego Ditch Co.	12-1199	5/14/26, etc.	1,462	14-06-W-23	12/12/52	2,072	9,664.40
Utah-Idaho Sugar Co.	11-538	6/6/25	15,852			15,852	73,917.03
Hillsdale Irrigation Dist.	11-252	7/2/23	4,146			4,146	188,356.83
Miner Low Lift Irrigation Dist.	11-125	7/29/22	34,113	14-06-W-92	1/7/55	45,687	202,553.64
Minidoka Irrigation District	11-115	2/11/27	50,000	14-06-100-1833	2/2/60	83,563	368,097.32
Martin Canal Company				14-06-W-36	12/12/52	915	3,996.60
Woodville Canal Company				14-06-W-49	12/18/52	538	2,349.91
North Side Canal Co.				14-06-W-28	12/12/52	108,380	473,388.95
Burley Irrigation District				14-06-W-48	12/18/52	18,162	79,329.12
Utah-Idaho Sugar Co.				Contract Pending		5,378	23,490.37
Ray Andrus				"		76	331.96
Sam Sakaguchi				"		33	144.14
Subtotal--American Falls Res. Div.			821,407			1,136,407	5,216,689.97
Gooding Division							
American Falls Res. Dist. No. 2							
North Side Pump Division							
A & B Irrigation District							
Michael Flats Project							
Falls Irrigation District							
Fort Hall Indian Agency							
TOTALS							
			5/ 1,221,407			5,612,803.11	
							23,490.37
							331.96
							144.14
							23,822.33
							5,192,667.64
							1,514,374.46
							257,615.44
							200,246.36
							6,386.02
							211,309.79
							6,932,571.25
							578,516.52

1/ Includes the following companies:
 Company Acres-Feet
 Aberdeen-Springfield Canal Co. 36,152
 Martin Canal Co. 2,250
 Woodville Canal Co. 9,000
 North Side Canal Co. 278,834
 Twin Falls Canal Co. 151,185
 Total 477,421

2/ Payout in FY 2000
 3/ Payout in FY 2020
 4/ Payout in FY 2018
 5/ Exclusive of 45,000 acre-feet of space used by Idaho Power Company under contract No. 11-733.