

AUBURN-FOLSOM SOUTH UNIT,
CENTRAL VALLEY PROJECT, CALIFORNIA

LETTER

FROM THE

SECRETARY OF THE INTERIOR

TRANSMITTING

A REPORT ON THE AUBURN-FOLSOM SOUTH UNIT
**PROPOSING EXPANSION OF THE CENTRAL VALLEY
PROJECT IN CALIFORNIA, PURSUANT TO SECTION 9(a)
OF THE RECLAMATION PROJECT ACT OF 1939 (53 STAT.
1187), AND SECTION 2 OF THE AMERICAN RIVER BASIN
DEVELOPMENT ACT OF OCTOBER 14, 1949 (63 STAT. 852)**



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CHAPTER III

WATER SUPPLY

American River Basin

The American River, which rises on the western slopes of the Sierra Nevada, has an average annual runoff of approximately 2,700,000 acre-feet for the 49-year period from 1905 through 1954 as measured just upstream from the river's mouth. A runoff of slightly over 500,000 acre-feet was observed during 1924, the driest year of record. During some of the higher water supply years the runoff has been in excess of 5 million acre-feet.

Precipitation over the area occurs principally during winter months and averages about 50 inches annually over the basin. The average annual precipitation ranges from a minimum of 18 inches at Sacramento to 80 inches in the northeast portion of the basin. During winter months the precipitation in the higher elevations is usually in the form of snow and a season accumulation of 15 to 20 feet is not uncommon. However, snowfall is rarely seen at Sacramento at the basin outlet. Due to heavy precipitation and to the accumulation of snow in the upper areas, the sustained basin runoff is usually highest during the spring months and gradually lowers to stable summer flow upon the melting of the snowpack by about June or early July.

Inflow to Auburn Reservoir

The annual flow at Auburn Dam site for the 20-year period from 1921 to 1941 averaged in excess of 1,300,000 acre-feet. During 1924, the lowest water supply year of record, runoff at the damsite was slightly over 300,000 acre-feet. During the year 1938, which was one of the larger runoff years of the American River Basin, the runoff at the Auburn site was in excess of 2½ million acre-feet.

Existing upstream depletions to Auburn Reservoir inflow average 14,000 acre-feet annually including a 10,000-acre-foot diversion from the North Fork American River via Lake Valley Reservoir to the Pacific Gas & Electric power system in the adjacent Bear River Basin. The other depletion to Auburn Reservoir inflow is the irrigation use of 4,000 acre-feet by the Georgetown Divide Public Utility District.

Under future Auburn Reservoir operation it is anticipated that upstream depletions will average 133,000 acre-feet annually. This increased depletion involves further development by the Georgetown Divide Public Utility District, a reserve for development on the Forest Hill Divide, and an annual diversion to the South Fork American River by the Sacramento Municipal Utility District for the operation of their power system. The latter depletion is by far the greatest and averages about 90,000 acre-feet per year.

The Middle Fork American River project under study by the Placer County Water Agency would develop water supply in addition to that developed by Auburn Dam and Reservoir. The agency proposes to divert this additional yield into western Placer County through its proposed Auburn tunnel. Therefore no depletion or gain to Auburn Reservoir is assumed to result from construction of the agency's project.

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Auburn Reservoir accomplishments

Auburn Dam would be constructed on the North Fork of the American River 16 miles upstream from Folsom Dam. It will control runoff from 982 square miles of drainage area, including that of the Middle Fork of American River. The Middle Fork is tributary to the North Fork about 4½ miles upstream from Auburn Dam.

A reservoir of 1 million acre-feet gross capacity behind Auburn Dam will provide 850,000 acre-feet of storage for conservation use. The other 150,000 acre-feet of gross storage capacity will be reserved for a minimum power pool. The reservoir will be operated to provide irrigation, municipal and industrial water service, power, and flood control. It also will provide incidental recreation, and contain space for deposition of river sediment and mining debris.

When operated coordinately with the downstream Folsom Reservoir and with other units of the Central Valley project, Auburn Reservoir will provide an additional annual 265,000-acre-foot diversion yield for irrigation and municipal and industrial uses. The projected operation of Auburn Reservoir to provide this yield recognizes and makes allowances for the Sacramento Municipal Utility District system operation in accordance with their 1955 report¹ and for other future depletions. The yield of Auburn Reservoir is determined from the additional water supply which would have been made available during the critical 7-year period, 1928 through 1934, had the reservoir been operating. Auburn unit would have contributed a full reservoir at the beginning of this period, and during the critical dry period would have conserved an additional 800,000 acre-feet of spill, which Folsom Reservoir and the operation of the Sacramento Municipal Utility District system would have been unable to control.

Irrigation service.—A future irrigation supply of 713,000 acre-feet of water annually (measured at the point of diversion) is needed for the Sacramento and San Joaquin County service areas. Toward this, Folsom Reservoir integrated with the Central Valley project will be capable of supplying 587,000 acre-feet. The remaining 126,000 acre-feet of the required diversion at Nimbus can be provided from storage in Auburn Reservoir operationally coordinated with other Central Valley project features. The Bureau of Reclamation is now studying and developing plans for supplying this water through the Folsom South Canal. The surface supply when used in conjunction with existing ground water will furnish a full irrigation supply to this area except during the low runoff years of 1931 and 1934. During such years an irrigation deficiency of 50 percent of the project water supply would occur during the months of April through October. However, when the deficient import supply is combined with the local available water supply to the areas from ground water pumping and other sources the overall deficiency of irrigation water to the project irrigators will be only about 35 percent during the deficient years.

Municipal and industrial water services.—The Bureau of Reclamation studies show that 139,000 acre-feet of water can be made available annually at Lake Natoma (Nimbus Reservoir) for municipal and industrial purposes, when Auburn Reservoir is integrated with the Central Valley project. Of this amount 65,000 acre-feet would be made available for the city of Stockton. The remaining 74,000 acre-feet could be made available for diversion for other local, delta, and/or bay areas on a nearly constant-flow basis.

¹Report for Sacramento Municipal Utility District on Upper American River Project," F. E. Bonner, Sept. 15, 1955.

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Power.—The high dam required to create a reservoir of 1 million acre-foot capacity makes very substantial heads available for the generation of hydroelectric power as the water is released. The opportunities to generate dependable power are particularly good at Auburn Dam since water released through the powerplant can be recaptured in Folsom Reservoir and then released as required for conservation needs. Maximum flexibility is thus possible in operations for power generation at Auburn.

Under conditions of full operation of Auburn unit the necessary minimum head for satisfactory operation of Auburn powerplant would be maintained by providing 150,000 acre-feet inactive storage capacity. This will leave 850,000 acre-feet of the reservoir capacity available for regulation uses. Plate 5 illustrates the joint uses of Auburn Reservoir storage space.

During the early years of the project, before the irrigation and municipal and industrial water use demands build up to the planned amounts, somewhat less active reservoir storage capacity would be needed to provide the required streamflow regulation; and higher operating levels at Auburn Reservoir, as well as Folsom Reservoir, could be maintained than in subsequent years.

Analyses of the power operation of Auburn unit, and the expected accomplishments, are given in a later chapter.

Flood control.—The areas along the Lower American River and downstream along the Sacramento River have long been subject to recurring flood damage from high runoff of the American River and by the addition of American River runoff to that of other streams along the lower reaches of the Sacramento River and in its delta. The construction and operation of Folsom Reservoir has done much to alleviate the situation. However, even with this and the extensive downstream levee construction, risk of flood damage still remains.

The most severe flood in recent times occurred in December 1955. This flood had a peak discharge of approximately 220,000 cubic feet per second at Folsom Reservoir and 127,000 cubic feet per second at Auburn Reservoir. Fortunately, ample storage space was available in Folsom Reservoir which had just been placed in operation and the flood was controlled without significant damage to the downstream area. Other major floods (at the Fair Oaks gage a few miles downstream from Folsom Reservoir) in recent years as estimated by the U.S. Geological Survey, are given in the following tabulation:

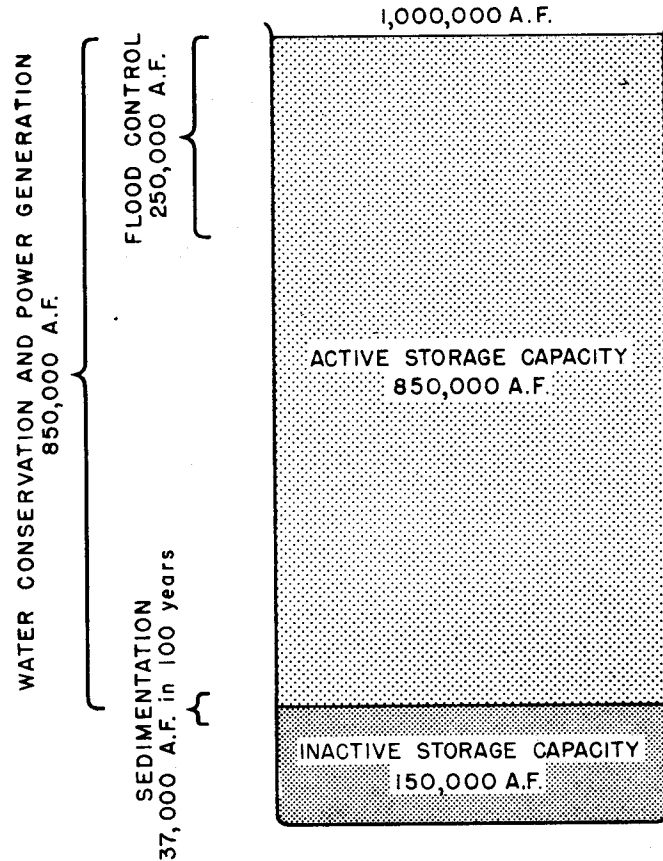
Flood event	Peak discharge	5-day volume
	<i>Cubic feet per second</i>	<i>Acre-feet</i>
November 1950.....	180,000	802,000
January 1943.....	152,000	404,000
December 1937.....	114,000	326,000

The American River levee system with a safe channel capacity of 115,000 cubic feet per second will, in conjunction with Folsom Reservoir, control American River floods having a frequency of once in approximately 200 years.

The flood protection for the Sacramento area will be increased with the addition of flood control space in Auburn Reservoir. The Corps of Engineers has computed an American River standard project

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PLATE 5.—JOINT USES OF AUBURN RESERVOIR STORAGE SPACE



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flood. This flood has a peak inflow to Folsom Reservoir of about 460,000 cubic feet per second and a 5-day volume of 1,300,000 acre-feet. The peak inflow to Auburn Reservoir would be about 300,000 cubic feet per second. A flood of this magnitude is rare and substantially greater than any flood of record. It is estimated that 250,000 acre-feet of flood control storage in Auburn Reservoir used with Folsom Reservoir would control the flood to 115,000 cubic feet per second, the safe channel capacity of the downstream levees.

The Corps of Engineers has tentatively estimated average annual flood damages of \$487,000 to the suburban residential and urban areas of Sacramento and North Sacramento with the present level of flood protection. The addition of Auburn flood control storage would reduce the annual damages to \$112,000, thus giving a net reduction in annual damages of \$375,000.

Studies are currently being conducted with the Corps of Engineers to establish detailed operating criteria for the combined flood control space in Folsom and Auburn Reservoirs. In addition to determining the most effective use that can be made of the flood control space, the studies will establish the outlet and spillway characteristics that will

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be required at Auburn to efficiently coordinate the operation of the two reservoirs. Auburn flood control space will be used for conservation storage after the flood season is past.

Sedimentation

The average annual sediment production rate of the American River drainage area above Auburn Reservoir is estimated to be 0.38 acre-feet per square mile annually. With a trap efficiency of 97 percent for Auburn Reservoir the sedimentation accumulation over a 100-year period of reservoir operation is expected to be about 37,000 acre-feet. This accumulation of sedimentation in Auburn Reservoir will of course decrease the present rate of sediment accumulation in the downstream Folsom Reservoir. The construction of Auburn Dam will inundate the North Fork debris dam. Its debris-catching function will be assumed by Auburn Reservoir.

Water quality

The runoff of the American River Basin has always been of excellent quality for irrigation and has long been used for that purpose. The dissolved solids are usually less than 100 parts per million. The sodium component rarely exceeds 20 percent. No toxic salts which would impair the quality of the water for irrigation have been observed.

Water from Folsom Reservoir, which is comparable in quality to that to be stored in Auburn Reservoir, is now being supplied to areas in the vicinity of the city of Sacramento for municipal and industrial purposes after appropriate treatment.

Reservoir evaporation

The annual and monthly rates of evaporation from Auburn Reservoir are considered to be the same as those from Folsom Reservoir located immediately downstream. Previous studies have shown the net evaporation from Folsom Reservoir to average 3 acre-feet annually per acre of reservoir surface. Due to the smaller water surface area in Auburn Reservoir, as compared to Folsom Reservoir, the Auburn net evaporation will be less than that from Folsom. The annual amount of water lost by evaporation from Auburn Reservoir is expected to average 18,000 acre-feet annually.

Water rights

The proposed plan for the Auburn unit will put the unappropriated waters of the American River to the beneficial uses of irrigation, power, and flood control. The State of California, Department of Water Resources, has included Auburn Reservoir as a feature of the California water plan, and the proposed development is compatible with that plan. Public support is further evidenced by local and regional interest in the unit.

On May 20, 1959, applications 18721, 18722, and 18723 were filed by the United States for the storage and diversion of water supplies for the operation of the Auburn unit. On December 30, 1959, the Bureau of Reclamation requested the assignment of applications 7936 and 7937 to the United States. The State of California, looking toward a coordinated water plan, filed these applications in 1934 for the appropriation of American River water at the Auburn Dam site. It is anticipated that following administrative procedures established by the California State Water Rights Board, permits and licenses will follow in due course.