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**AMERICAN RIVER WATERSHED, CALIFORNIA  
LONG-TERM STUDY**

**404(b)(1) WATER QUALITY EVALUATION  
SEVEN-FOOT DAM RAISE/482-FOOT FLOOD POOL ELEVATION  
TWELVE-FOOT DAM RAISE/487-FOOT FLOOD POOL ELEVATION**

**I. PROJECT DESCRIPTION**

**LOCATION**

The project alternatives are located in the American river Basin and include Folsom Dam and Reservoir and the land areas immediately adjacent to the reservoir, Lake Natoma, the lower American River channel, the Sacramento and Yolo Bypasses and associated sloughs along the lower Sacramento River.

**GENERAL DESCRIPTION**

For the purposes of this project, a variety of potential flood control measures were evaluated, and seven action alternatives were created for detailed evaluation along with the No-Action Alternative. The action alternatives being carried forward are: (1) 3.5-Foot Dam Raise/478-Foot Flood Pool Elevation, (2) Seven-Foot Dam Raise/482-Foot Flood Pool Elevation, (3) Twelve-Foot Dam Raise/487-Foot Flood Pool Elevation, (4) Stepped Release to 160,000 cfs, (5) Stepped Release to 160,000 cfs and New Outlet at Folsom Dam, (6) Stepped Release to 180,000 cfs, and (7) Stepped Release to 160,000 cfs and Seven-Foot Dam Raise. Both the Seven and Twelve-Foot Dam Raise Alternatives are presented in this evaluation since the direct construction impact between them is negligible. The general features are described below:

- Raise dam crest and construct a 3.5-foot parapet wall.
- Stabilize enlarged dam by a combination of constructing a concrete buttress on the downstream side of the spillway, and installing post-tension anchors in the dam. (This work would not be necessary under the Seven-Foot Dam Raise alternative.
- Replace all eight spillway gates.
- Extend and strengthen the existing spillway bridge piers.
- Replace the spillway bridge with one lane of traffic in each direction.
- Extend the stilling basin by 60 feet.
- Raise embankment dams and dikes.

- Modify the elevator tower.
- Enlarge L. L. Anderson Dam spillway.
- Construct a temporary construction bridge downstream of the dam. Following construction traffic would be routed back to the dam road at the discretion of the Bureau, and the temporary construction bridge would be removed.
- Borrow - take 150,000 cubic yards of borrow from the Peninsula site, and 1,350,000 cubic yards of material from the Mississippi Bar site. For the Seven-Foot Dam raise about 1/2 this amount of borrow would be needed.
- About 1/3 of a mile of Folsom Dam Road southeast of the left wing dam would be raised.
- Mooney Ridge - acquire flowage easements over 14-15 properties and acquire 1 property in fee title. Foundations of houses would be strengthened as necessary.
- Acquire flowage easements where the new high water mark would extend beyond project lands.

#### **AUTHORITY AND PURPOSE**

The basic authority for the overall study is the Flood Control Act of 1962 (Public Law [PL] 87-874), as follows:

The Secretary of the Army is hereby authorized and directed to cause surveys for flood control and allied purposes, including channel and major drainage improvements, and flood aggravated by or due to wind or tidal effects, to be made under the direction of the Chief of Engineers, in drainage areas of the United States and its territorial possessions, which include the following named localities: Sacramento River Basin and streams in northern California draining into the Pacific Ocean for the purposes of developing, where feasible, multipurpose water resource projects, particularly those which would be eligible under the provisions of title III of Public Law 85-500.

Although this authorization applies to the overall study of the American River watershed, specific direction for the current effort is provided by Section 566 of the Water Resources Development Act (WRDA) of 1999 (PL 106-53):

#### **SEC. 566. FOLSOM DAM AND RESERVOIR ADDITIONAL STORAGE AND ADDITIONAL FLOOD CONTROL STUDIES**

- (a) FOLSOM FLOOD CONTROL STUDIES-
  - (1) IN GENERAL - The Secretary, in consultation with the State of California and local water resources agencies, shall undertake a study of increasing surcharge flood control storage at Folsom Dam and Reservoir.
  - (2) LIMITATIONS - The study of the Folsom Dam and Reservoir undertaken under paragraph (1) shall assume that there is to be no increase in conservation storage at the Folsom Reservoir.
  - (3) REPORT - Not later than March 1, 200, the Secretary shall transmit to Congress a report on the results of the study under this subsection.
- (b) AMERICAN AND SACRAMENTO RIVERS FLOOD CONTROL STUDY -
  - (1) IN GENERAL - The Secretary shall undertake a study of all levees on the American River and on the Sacramento River downstream and immediately upstream of the confluence of such Rivers to assess opportunities to increase potential flood protection through levee modification.
  - (2) DEADLINE FOR COMPLETION - Not later than March 1, 2000, the Secretary shall transmit to Congress a report on the results of the study undertaken under this subsection.

Flood control alternatives considered in this study focus on increasing Folsom Dam flood control storage, modifying lower American River and downstream levees, and a combination of modifying lower American River and downstream levees and increasing Folsom Dam storage.

#### **GENERAL DESCRIPTION OF DREDGED OR FILL MATERIAL**

Construction of this alternative would be accomplished primarily in upland areas. About 750,000 cubic yards of borrow material would be needed for the Seven-Foot Raise and 1,500,000 cubic yards of borrow material would be needed for the Twelve-Foot Raise. This material would be used for enlarging the embankment dams and dikes and constructing the temporary construction bridge would be placed. Fill material would be excavated from the reservoir at the Peninsula site, and also from Mississippi Bar.

Borrow material from Mississippi Bar would be excavated and transported across Lake Natomas by barge and then hauled by truck up to Folsom Dam. Some dredging or a pier may need to be installed in order to provide barge access at both the loading area and the offloading area at Willow Creek Recreation Area.

#### **DESCRIPTION OF PROPOSED DISCHARGE SITE (S)**

(1) Location. The proposed discharge sites are located in the immediate vicinity of Folsom Dam.

(2) Size. The construction area consists of the tops of the dam as well as the embankment dams and dikes, and a temporary construction bridge about 1 mile long.

(3) Type of Site. All of the work proposed under this alternative would occur in an area that has been developed as flood control facility for at least 40 years.

(4) Type(s) of Habitat. This work will be accomplished in a variety of cover types, primarily upland, but also areas of riparian woodland and oak woodland.

(5) Timing and Duration of Discharge. Construction of these alternatives would be completed in about 6 years. Construction could occur year round.

## **DESCRIPTION OF DISPOSAL METHOD**

Concrete to construct the piers and parapet walls would be trucked on to site using local suppliers from the Bradshaw/Kiefer area. Fill material needed for foundation work would be excavated from both the Peninsula and Mississippi Bar borrow sites. Borrow material would be hauled to the work sites around the reservoir and to the temporary construction bridge site. This material would be compacted into place at the work site.

## **II. FACTUAL DETERMINATIONS**

### **a. Physical Substrate Determinations**

(1) Substrate Elevation and Slope. Work on the embankment dams and dikes would be accomplished in an upland area. Construction of the temporary construction bridge could affect some riparian areas. Following construction these areas would be graded to pre-project conditions and the areas would be stabilized using hydroseeding methods after construction is complete.

(2) Sediment Type. The sediment type will be similar to that found in the project area now.

(3) Dredged/Fill Material Movement. Material used for foundation work and the temporary construction bridge would be compacted into place. Where feasible, the construction areas would be hydroseeded.

(4) Physical Effects on Benthos. No in-water work is anticipated under this alternative, therefore the benthic community would not be affected.

(5) Other Effects. Not Applicable.

(6) Actions Taken to Minimize Impacts. The work has been restricted to the smallest possible area, restricted to the upland area where possible. Best management construction practices will be implemented to minimize potential effects to the reservoir and downstream waters.

b. Water Circulation, Fluctuation and Salinity Determinations

(1) Water. Construction could result in short term increases of sediment loads near the work sites.

(2) Current Patterns and Circulation. Work under this alternative would be conducted on top of Folsom Dam and the embankment dam and dikes. Current patterns and circulation would not be affected by the work. Construction of the temporary construction bridge would not affect flows in the lower American River.

(3) Normal Water Level Fluctuations. None of the work would affect normal water level fluctuations.

(4) Salinity Gradients. Not applicable, the American River is a fresh water system.

(5) Actions That Will Be Taken to Minimize Impacts. The work has been restricted to the smallest possible area, restricted to the upland area where possible. Best management construction practices will be implemented to minimize potential effects to the reservoir and downstream waters.

c. Suspended Particulate/Turbidity Determinations

(1) Expected Changes in Suspended Particulates and Turbidity Levels in Vicinity of Disposal Site. Work under this alternative does not involve any in-water activities and should not result in an increase in turbidity levels.

(2) Effects (degree and duration) on Chemical and Physical Properties of the Water Column - light penetration, dissolved oxygen, toxic metals and organics, pathogens, aesthetics, others as appropriate. The activities under this alternative would not substantially change the physical and chemical properties of the water column.

(3) Effects on Biota. See discussion under Aquatic Ecosystem and Organism Determinations below.

(4) Actions Taken to Minimize Impacts. The work has been restricted to the smallest possible area, restricted to the upland area where possible. Best management construction practices will be implemented to minimize potential effects to the reservoir and downstream waters.

d. Contaminant Determinations. There would be no contaminants introduced into the aquatic environment as a result of this work because all borrow material would be secured from a borrow source certified as being free from contaminants.

e. Aquatic Ecosystem and Organism Determination

(1-4) Effects on plankton, benthos, nekton, and the aquatic food web. The benthic community would not be affected, since no in-water work is anticipated.

(5) Effects on Special Aquatic Sites. The proposed action would not affect any special aquatic sites.

(6) Threatened and Endangered Species. Construction activities at Folsom Reservoir would adversely affect the valley elderberry longhorn beetle which may inhabit 40 elderberry shrubs in the construction footprint.

(7) Other Wildlife. Construction of this alternative would affect 29.8 acres of oak and pine-oak woodland, 10.3 acres of riparian woodland, and 0.3 acres of seasonal wetland.

(8) Actions to Minimize Impacts. Mitigation for these losses would consist of planting 10.3 acres of riparian woodland and 0.3 acres of seasonal wetland at the Bureau's Mormon Island Wetland Preserve, and planting 79 acres of oak and pine-oak woodland on project land around Folsom Reservoir. A total of 40 elderberry shrubs would be directly impacted from construction. Compensation for these shrubs would be included in the oak woodland plantings around the reservoir.

f. Proposed Disposal Site Determinations

(1) Mixing Zone Determination. No work would be in any river currents.

(2) Determination of Compliance with Applicable Water Quality Standards. Water-quality management by the Central Valley Regional Water Quality Control Board includes establishment of beneficial uses and water-quality objectives. Protection and enhancement goals for identified beneficial uses determine the overall water-quality objectives. Beneficial uses of Folsom Reservoir includes municipal and industrial supply, irrigation, power, water contact and non-contact recreation, warm and cold freshwater habitat, warm freshwater spawning habitat, and wildlife habitat. The standards for these uses will not be violated since best management practices would be employed to limit turbidity and sediment transport.

(3) Potential Effects on Human Use Characteristics

*a. Municipal and Private Water Supply.* The work under this alternative would not affect any municipal or private water supply.

*b. Recreational and Commercial Fisheries.* Commercial and recreational fisheries would not be affected by the work under this alternative.

*c. Water Related Recreation.* Work under this alternative would not affect water related recreation

*d. Aesthetics.* The aesthetics of the local area would not be affected. Following construction the area would appear much as it does today.

*e. Parks, National and Historical Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves.* None of these types of resources would be affected by this work.

g. Determination of Cumulative Effects on the Aquatic Ecosystem. The construction activities under this alternative would result less-than-significant adverse effects on the aquatic ecosystem.

h. Determination of Secondary Effects on the Aquatic Ecosystem. The proposed activities would not result in secondary impacts to the aquatic ecosystem in the region.