

**CHAPTER 5**

**PROCEDURES USED TO DETERMINE  
ENVIRONMENTAL CONSEQUENCES**

The environmental and socioeconomic consequences of the alternatives are evaluated in chapters 6 through 9. For each alternative, four general categories of impacts are identified: operational impacts, construction impacts, cumulative impacts, and growth-inducing impacts. These categories and the approach used to evaluate the identified impacts are explained below. The purpose of this chapter is to define the impact categories, discuss the methods used to assess impacts, and identify mitigation and environmental monitoring concepts.

**OPERATIONAL IMPACTS**

All the alternatives carried forward for detailed analysis, including the No-Action Alternative, would result in "operational" impacts, defined as the socioeconomic and environmental consequences of modifying the existing flood control system to provide increased flood protection to Sacramento. These impacts are associated with (1) changes in the operation of Folsom Reservoir and the other CVP facilities north of the Delta to accommodate an increase in the space allocated to flood control at Folsom; (2) changes in the design and operation of the American River and Sacramento River levee systems to accommodate higher objective releases from Folsom Dam; and (3) changes in the geomorphology of the American River canyons resulting from the operation of a flood detention dam at the Auburn site.

**CHANGES IN CVP OPERATIONS**

Under the No-Action Alternative, the 1993 agreement (Agreement) between SAFCA and Reclamation, which has secured a temporary increase in the space allocated to flood control in Folsom Reservoir, would be indefinitely extended. For purposes of this final SEIS/EIR, it is assumed that by virtue of this extension, the operation of Folsom Reservoir and the other CVP facilities north of the Delta would be permanently modified, as necessary, to meet the requirements of the flood control diagram (1993 Diagram) contained in the Agreement. Two conditions were evaluated to determine the socioeconomic and environmental consequences of these operational modifications. The "Baseline Condition Scenario" assumes that as of October 31, 1999, the termination date of the Agreement, Folsom would revert to operation in accordance with the Corps' 1986 flood control diagram (1986 Diagram). Under this condition, the recreational improvements and temperature control shutters installed at Folsom Dam required under the Agreement remain in place, and

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CVP operations are adjusted to reflect reasonably foreseeable water demands for consumptive use and environmental needs through 2020. The No-Action ("permanent reoperation") scenario incorporates these demand assumptions, but adjusts CVP operations to comply with the 1993 Diagram. The No-Action Alternative is in turn used as the basis for evaluating (1) the adverse operational impacts associated with permanently increasing the amount of fixed storage space allocated to flood control as proposed under the Folsom Modification Plan and (2) the positive impacts of reverting Folsom Reservoir operations to the 1986 Diagram as proposed under the Detention Dam Plan.

## **CHANGES IN THE DESIGN OF DOWNSTREAM LEVEE SYSTEMS**

The Stepped Release Plan includes measures designed to improve the efficiency of flood control operations at Folsom and increase the conveyance capacity of the levee system for the lower American River and lower Sacramento River. Under this plan, the design release from Folsom Dam would be increased from 115,000 cfs to a maximum of 180,000 cfs. This plan would thus alter the flows in the American River channel, which local city and county interior drainage facilities and other infrastructure in the American River flood plain were designed to accommodate, and increase the flows in the lower reaches of the SRFCP beyond the current design of that system. The Stepped Release Plan includes measures intended to eliminate any adverse impacts to the interior drainage facilities that could result from these operational changes. The proposed measures are designed to ensure that the affected levees, infrastructure, and drainage facilities perform as reliably under the conditions created by the Stepped Release Plan as under the conditions of the No-Action Alternative.

## **CHANGES IN THE GEOMORPHOLOGY OF THE AMERICAN RIVER CANYONS**

Operation of the flood detention dam proposed under the Detention Dam Plan would significantly alter the geomorphology of the American River canyons upstream from the damsite. Two types of impacts could result: (1) loss of vegetation and related wildlife mortality due to periodic inundation and (2) destruction of environmental and recreational resources due to damage to the trail system from saturated soils along the canyon walls within the inundation zone. The potential for inundation mortality was measured by preparing an inventory of the plant species presently occupying the inundation zone, assessing the flood tolerance of these species, and modeling the frequency and depth of flooding likely as a result of the project.

## **CONSTRUCTION IMPACTS**

Construction of the Folsom Modification Plan or the Stepped Release Plan would commence in 1999, and all work would be completed 9 years later. Construction of the

Detention Dam Plan would begin in the year 2000 and be completed 8 years later. The construction process would result in a number of significant short-term impacts on existing resources in the areas where construction would take place. Depending on the alternative, these impacts include the impacts associated with structurally modifying Folsom Dam, the impacts associated with modifying the downstream levee system, and the impacts associated with constructing a flood detention dam at Auburn.

## **FOLSOM DAM MODIFICATIONS**

These modifications include the construction impacts resulting from lowering the Folsom Dam spillway, enlarging the eight river outlets through the main dam, and modifying the auxiliary spillway gates and selected dam embankments to permit increased surcharge storage. These impacts will be discussed primarily in connection with the Folsom Modification Plan. With minor exceptions, noted in the text, these same structural modifications are included in the Stepped Release Plan.

## **DOWNSTREAM LEVEE IMPROVEMENTS**

These modifications include impacts resulting from raising and strengthening portions of the lower American River levee system to carry increased objective releases from Folsom; modifying interior drainage facilities, bridges, and other infrastructure to accommodate the higher flows; lengthening the Sacramento Weir and widening the Sacramento Bypass to ensure that the increase in American River flows is conveyed to the Yolo Bypass and does not increase flood stages in the Sacramento River downstream from the confluence; raising and strengthening levees in the Yolo Bypass to ensure that the risk of flooding on adjacent lands in Yolo and Solano Counties is not worsened; and raising and strengthening a portion of the east levee of the Sacramento River downstream from the mouth of the Natomas Cross Canal to ensure that the lands within the Natomas basin are protected to the same level as the lands in the American River flood plain outside Natomas.

Impacts associated with strengthening levees of the American and Sacramento Rivers would occur under all alternatives carried forward for detailed analysis, including the Detention Dam Plan. These impacts will be discussed in connection with the Folsom Modification Plan. The impacts associated with raising the American River levees, redesigning the infrastructure in the American River Parkway, and increasing the conveyance capacity of the bypass system will be discussed primarily in connection with the Stepped Release Plan.

## **DETENTION DAM CONSTRUCTION**

In addition to the levee strengthening listed above, this group includes all the impacts associated with constructing a flood detention dam near Auburn and relocating Highway 49, as proposed under the Detention Dam Plan.

## **CUMULATIVE IMPACTS**

Cumulative impacts are those which result from the incremental impact of any given action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or individual undertakes such other actions. These impacts are briefly discussed below.

### **IMPACTS TO THE CVP**

The cumulative socioeconomic and environmental effects of adding permanent reoperation to other reasonably foreseeable demands on the CVP are accounted for in the scenario's developed to measure the differences between operating Folsom Reservoir under the 1993 Diagram (No-Action Alternative) versus the 1986 Diagram (Baseline). The scenarios treat reasonably foreseeable demands as constants to identify the relative difference in (cumulative) impacts between the two operations. The Folsom Modification Plan is evaluated to determine the extent to which this difference in cumulative impacts would be increased by expanding the space allocated to flood control in Folsom Reservoir. The detailed discussions of converting from the Baseline condition to the future with-project condition are contained in chapter 10.

### **IMPACTS TO WETLAND AND RIPARIAN RESOURCES**

Construction of levee improvements anticipated under the Stepped Release Plan would result in unavoidable impacts to wetland and riparian habitat, for which mitigation would be required. For wetlands, the requirements of Executive Order 11990 dictate no net loss of wetlands, and as such wetland losses would be fully replaced. For riparian losses, mitigation would seek to replace lost habitat value. These unavoidable, but mitigated, losses will be added to other losses of similar habitat along the Sacramento River Flood Control Project resulting from ongoing levee and bank improvement projects to estimate the rate at which wetlands and riparian habitat are being affected on a cumulative basis and to evaluate the relative success of the various mitigation and restoration efforts to offset these effects.

### **GROWTH-INDUCING IMPACTS**

Growth-inducing impacts are those that result indirectly from growth facilitated by the project. Although the project will have a negligible effect on long-term regional growth, provision for a 100-year level of flood protection to the lands within the American River flood plain under the No-Action Alternative would enable development which might otherwise locate outside the flood plain to proceed as planned on about 1,200 acres in the Meadowview Community Plan area of the City of Sacramento.

None of the proposed action alternatives would induce flood plain development, since the magnitude of such development would be the same under each of these alternatives as under the No-Action Alternative. The fundamental conditions necessary to remap the 100-year flood plain in Sacramento, clearing the way for development, would be fulfilled by actions undertaken either in advance of the alternatives evaluated in this final SEIS/EIR or in lieu of these alternatives. These actions include (1) stabilization of the east levee of the Sacramento River, completed in 1993; (2) improvement of the levees around the Natomas basin and in portions of the lower Dry and Arcade Creek watershed which is being carried out with local funding by SAFCA and will be completed by the end of 1996; and (3) indefinite extension of SAFCA's agreement with Reclamation which would take place if Congress fails to take action on any of the alternatives evaluated in this final SEIS/EIR.

Since the remapping of the 100-year flood plain in Sacramento would permit the city to proceed with land uses contemplated in its current general plan, the impacts associated with such development are evaluated in (1) the final environmental impact report which the city certified in 1988 in connection with its adoption of the current plan and (2) the series of more focused supplemental environmental documents issued by the city. Additional analysis of flood plain development impacts may be found in (1) the final EIS/EIR issued by the Corps of Engineers and The Reclamation Board in connection with the American River Watershed Investigation in 1991, (2) the final EIR and related supplemental environmental documents issued by SAFCA in connection with the Natomas Area Flood Control Improvement project, and (3) the final EIR for Interim Reoperation of Folsom Dam and Reservoir.

### **MITIGATION AND ENVIRONMENTAL MONITORING**

This section discusses the mitigation monitoring plans which will be developed to ensure that the mitigation measures identified in chapters 7, 8, and 9 and summarized in chapter 1 (Summary) will be accomplished. These mitigation measures consist of habitat preservation, restoration, or improvement and other actions required to minimize or compensate for unavoidable impacts of the proposed alternatives. In accordance with Section 906 of the Water Resources Development Act of 1986 and Section 8611 of the

## Procedures Used to Determine Environmental Consequences

California Water Code, mitigation for direct project impacts, including land acquisition and vegetative plantings, will be accomplished prior to or concurrent with project construction. This mitigation will be an authorized project feature and will be cost shared by the Federal Government and the project's non-Federal sponsor.

The goal of mitigation features of this project is to create habitat values which will be equal to or greater than those for the various sites affected by the project construction. Proposed mitigation measures are presented in the mitigation section for each alternative and are described more thoroughly in appendix H.

Specific and detailed mitigation monitoring plans will be developed after project authorization. A final mitigation and monitoring program will be completed during the project design phase, and the appropriate jurisdictional agencies will have the opportunity to review the proposed project and mitigation measures and provide guidance relative to the monitoring of those measures. The final mitigation monitoring plan will be completed and presented for approval when the State Lead Agency adopts findings as required by the California Environmental Quality Act.

## FEDERAL REQUIREMENTS

To ensure that mitigation for direct project impacts is accomplished, a mitigation monitoring plan will be prepared by the District Engineer in consultation with the non-Federal sponsors and appropriate resource agencies. The plan will define appropriate mitigation monitoring criteria and outline the methods needed to ensure that these criteria are fulfilled.

## STATE REQUIREMENTS

Pursuant to the California Environmental Quality Act, Public Resources Code 21081.6, public agencies shall adopt a reporting or monitoring program for the mitigation measures identified as necessary to mitigate or avoid significant effects to the environment.

In addition, the California Water Code section 8611 requires The Reclamation Board to prepare a mitigation plan in consultation with the Department of Fish and Game prior to construction of a flood control, channel clearance, or bank stabilization project. This plan must contain:

- A description of actions to be taken to ensure that the project meets all mitigation requirements required by law and causes no net loss of riparian, fishery, or wildlife habitat.
- A designation of the agency or agencies responsible for implementing and maintaining each element of the mitigation plan.

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- A schedule of mitigation implementation, ensuring that the mitigation measures would be accomplished prior to or concurrent with construction of the project, unless The Reclamation Board determines that to do so would be impracticable.
- A financing plan, identifying the sources of funds, the share of mitigation costs attributable to each source, and schedule of when the funds are to be provided.

## **MITIGATION FOR PROJECT IMPACTS**

To the extent feasible, FWS guidance will be followed relative to the sequential preference of mitigation options. These mitigation steps in order of preference are:

1. Avoidance of Impacts
2. Minimization of Impacts
3. Rectification of Impacts
4. Reduction or Elimination of Impacts Over Time
5. Compensation for Impacts

All adverse environmental impacts will be avoided or minimized to the greatest extent possible.

Mitigation for impacts to local drainage and water quality, air quality, traffic patterns, and noise resulting from construction will generally be accomplished through avoidance by requiring contractors to adhere to appropriate standards for operating heavy equipment, complying with local regulations and standards for air-quality attainment, submitting spill containment plans for handling petroleum products and hazardous materials, conforming to applicable local standards for operating equipment on public roadways, properly disposing of trash and refuse generated by construction activities and workers, and constructing such facilities required to prevent sediment from being introduced into the aquatic environment as a result of construction activities. These requirements will be included in the plans and specifications of the construction contracts issued in connection with the project.

Impacts to upland and grasslands as a result of construction will be rectified onsite. For replacement of grasslands, the construction contractor will monitor and guarantee the survival of all grass-seeded areas for 6 months. Successful seeding will result in at least 50 percent cover of the seeded site, or 50 percent germination and survival of planted seeds. Seeded areas which fail to germinate or are otherwise damaged may be replaced until March 1. After this date, areas where plants must be replaced will be reseeded the following fall between September 1 and December 1 in accordance with the original seeding plan.

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In general, where adverse environmental impacts cannot be avoided and offsite mitigation would be necessary to compensate for these impacts, the mitigation contractor will maintain and monitor mitigation areas for 3 years after plantings. All plantings will receive watering, weed control, and protection from predation during the establishment period, and dead and dying trees will be replaced. Watering and maintenance will be required for a period of 3 years or until the plants are self-sufficient and capable of self-regeneration. Monitoring during this period will be coordinated with FWS and DFG.

## PERFORMANCE CRITERIA, REMEDIATION, AND DOCUMENTATION

The mitigation monitoring plan will contain specific measures and performance criteria to ensure that impacts to wildlife habitat are mitigated as planned and that adequate habitat values result from mitigation efforts. The Corps will lead a monitoring team consisting of members from the appropriate resource agencies and the non-Federal sponsor. The team will monitor all mitigation areas annually for years 4 through 10, and then every 5 years until the project has met or exceeded success criteria. For years zero through 3, mitigation areas will be monitored by the mitigation contractor in coordination with the Corps, non-Federal sponsor, and jurisdictional agencies.

Failure to meet performance criteria for any component of the mitigation plan, such as the losses or damage to trees planted for mitigation, will require replacing or restoring plants or trees in accordance with the Operation and Maintenance manual which will be developed in accordance with the mitigation objectives for the project. These recommendations will be included in the annual monitoring report.

## FEDERAL PARTICIPATION IN PERMANENT REOPERATION OF FOLSOM RESERVOIR

Implementation of the temporary agreement between SAFCA and Reclamation to change the operation of Folsom Reservoir from the Baseline condition of 400,000 acre-feet of fixed flood storage reservation to a flexible storage reservation of between 400,000 and 670,000 acre-feet has resulted in impacts to several resource categories. SAFCA has provided mitigation for the impacts which would result from the 5-year period of the agreement. The 400,000 to 670,000 acre-foot operation is the No-Action Alternative to which the action alternatives are compared for determining project impacts and mitigation requirements. This comparison results in separating the impacts of changing the operation from 400,000 acre-feet to the No-Action Alternative (400,000/670,000 acre-feet) or to the Folsom Modification Plan (475,000/720,000 acre-feet) into smaller increments, none of which are significant. The impacts from permanently reoperating Folsom Reservoir have been identified and evaluated and are discussed in chapter 6 for the No-Action Alternative (the impact discussion also covers the reoperation component of the Stepped Release Plan,

since reoperation under this plan is the same) and chapter 7 for the Folsom Modification Plan.

Should the Federal Government authorize a project which includes a permanent reoperation component, mitigation would likely be provided for the impacts of changing from the Baseline condition of 400,000 acre-feet of fixed storage to the Stepped Release Plan (400,000 to 670,000 acre-feet) or the Folsom Modification Plan (475,000 to 720,000 acre-feet), as these would be the impacts for which mitigation would be provided should either plan become the authorized Federal project. Further information on including permanent reoperation as part of the Federal project is contained in chapter 10.