

CHAPTER 7

ENVIRONMENTAL CONSEQUENCES FOLSOM MODIFICATION PLAN

Under this plan, a new flood control diagram for Folsom would be developed, increasing the amount of fixed space storage allocated to flood control in the reservoir from 400,000 acre-feet to 475,000 acre-feet and increasing the maximum variable space component from 670,000 acre-feet to 720,000 acre-feet. In addition, the emergency spillway release diagram would be modified to reflect use of surcharge storage.

Folsom Dam. Lower the five main spillway bays 15 feet and replace the main spillway gates, enlarge the eight existing river outlets, and modify the three emergency spillway gates and strengthen the core of dikes 5 and 7 and Mormon Island Dam to permit increased surcharge storage.

Lower American River. Construct a slurry wall in the core of the Federal and non-Federal levees along both banks of the lower American River.

Downstream From American River. Strengthen and raise approximately 12 miles of levees along the east bank of the Sacramento River below Verona.

OPERATIONAL IMPACTS

The operational impacts of concern under this alternative are those related to the adjustments in CVP operations that would be needed to accommodate the requirements of the Folsom Modification Plan flood control diagram. These impacts, which include water supply, hydropower, recreation, cultural resources, fisheries, vegetation and wildlife, and visual resources, were identified by completing a model study comparing CVP operations under the No-Action Alternative to operations required for the variable storage requirement of 475,000 to 720,000 acre-feet of seasonal storage using the same methodology developed in the preceding discussion of the No-Action Alternative. This analysis was completed using the model runs conducted for the 475,000-670,000 acre-foot diagram. This was projected for the maximum drawdown since the reservoir would be drawn down past 670,000 acre-feet only 4 years during the period of analysis. A comparison of project peak outflow from Folsom Dam for the No-Action Alternative and the Folsom Modification Plan is presented in table 7-1.

SEIS 7-1

Table 7-1

**Comparison of Projected Peak Outflows from Folsom Dam
for Selected Flood Events**

	Alternative	
	No-Action Alternative 400/670 115,000 cfs (objective release)	Folsom Modification Plan 475/720 115,000 cfs (objective release)
5-Year Peak Duration \geq 25,000	60,000 3 days	74,000 2.2 days
10-Year Peak Duration \geq 25,000	90,000 4 days	115,000 3.8 days
20-Year Peak Duration	115,000 5.5 days	115,000 5.6 days
50-Year Peak Duration	115,000 10 days	115,000 7.6 days
100-Year Peak Duration	115,000 15 days	115,000 10 days
200-Year Peak Duration	450,000 16 days	196,000 12 days
400-Year Peak Duration	560,000 19 days	488,000 15 days

WATER SUPPLY

CVP/SWP Water Delivery

No-Action Condition. As described in chapter 6, the No-Action Alternative was used as the criteria for conducting this analysis.

Significance Criteria. Any deficiency in the amount of water which would have been delivered under existing projects is considered to be a significant adverse effect.

Impacts

The results of the modeling study indicate that the Folsom Modification Plan would significantly reduce CVP/SWP water deliveries by comparison to the No-Action Plan because additional space would be allocated to flood control at Folsom Reservoir. The average annual reduction would be about 13,000 acre-feet. Chapter VI of the Main Report and chapter 6 of this final SEIS/EIR has additional information on water delivery impacts.

Mitigation

Effects to water supply under the Folsom Modification Plan result primarily from changing the minimum required space for flood storage. Mitigation for this effect could be accomplished by purchasing a larger volume of water to meet replacement needs. Purchasing CVP supplies could reduce demand on reservoirs and allow them to refill to prereoperation levels. This is an extension of the No-Action Alternative mitigation discussed in chapter 10. The estimated cost of water supply mitigation is \$7.2 million.

LOCAL WATER SUPPLY

No-Action Condition

As described in chapter 6, the No-Action Alternative was used as the basis for this analysis.

Significance Criteria.

Any reduction in supply or increase in the cost of surface water supply delivery is considered a significant adverse effect.

Impacts

Under the Folsom Modification Plan, reduced water storage in Folsom Reservoir would affect the pumping energy consumption of local water agencies receiving water directly from Folsom. Therefore, the Folsom Modification Plan would result in additional effects to surface-water supplies at Folsom. These conditions are similar to those described in the No-Action Plan. Under the Folsom Modification Plan, lower reservoir surface elevations would require more pumping for local surface water supplies. Availability of water would not usually be affected. Increased pumping energy by local water agencies would be about 0.3 GWh per year at a cost of about \$30,000 per year above the No-Action Alternative. In very unusual years such as 1976 and 1977, reoperation of this extent could contribute to very low reservoir levels (if not mitigated) and affect water supply. Chapter VII of the Main Report contains more information on this topic.

Mitigation

Because of the change in flood control storage under the Folsom Modification Plan, purchasing replacement power on an annual basis to meet additional pumping costs is not cost effective. Mitigation for this effect would be accomplished by reimbursing water agencies for anticipated pumping costs. The annual cost is anticipated to be \$30,000. Effects to local water supply availability that may occur in an unusual year would be mitigated by the CVP water supply mitigation plan. This plan would restore Folsom water levels to prereoperation elevation by the end of the water year.

HYDROPOWER

No-Action Condition

The hydropower effect associated with the Folsom Modification Plan can be segmented into two basic types: (1) effects to project capacity and (2) effects to project energy production. Hydropower effects are experienced when CVP/SWP reservoirs are drawn down lower (reduced capacity at the powerplants and efficiency for releases), when releases are diminished (reduced energy), or when project uses are increased (increased energy and capacity requirements).

Significance Criteria

Any reduction in hydropower capacity or power generation attributable to increased flood control storage of the Folsom Modification Plan is regarded as a significant adverse effect.

Impacts

The model studies indicate that the changes in Folsom Reservoir storage, release, and pumping patterns produced by the Folsom Modification Plan diagram relative to the No-Action Alternative would significantly reduce CVP hydropower generation and capacity. Average maximum seasonal capacity reduction would be about 12 MW and the average energy reductions about 6 GWh/yr. Table 6-3 shows the effects of all the alternatives. These effects are a small percentage of the total CVP north of Folsom (about 4,700 GWh and capacity of about 1,200 MW). Folsom energy production is about 620 GWh/yr, capacity is about 180 MW, and other American River Watershed (PG&E and SMUD) energy and capacity are about 1,000 GWh and 1,000 MW.

Mitigation

As a result of reoperation of Folsom Dam and Reservoir, there will be hydropower effects leading to generation and capacity losses. To mitigate for hydropower effects, the

generation and capacity lost would have to be replaced. The generation and capacity could be replaced by importation from another part of the Western Area Power Administration hydropower grid where supply is in excess of demand.

Electrical capacity and energy have a time-dependent value. In California, during the summer when the demand for electricity is high, its value is somewhat greater than during the winter when electric demand is lower. Recognizing these value differences is desirable to evaluate the costs of any alternative. However, since the time-dependent values cannot be determined for all months of all years used in the studies, a constant value of \$72,000 per GWh was used regardless of month or year. Capacity was valued at \$6,000 per MW/month.

The average annual cost of about \$1.3 million could be paid to WAPA to compensate for reduced power production.

RECREATION

No-Action Condition

Folsom Reservoir. The exceedence frequencies for boating and swimming activities at Folsom Reservoir under the no-action condition are described here. All boat ramps would be out of operation 1 percent of the time (5 out of 350 months) during the peak season and 2 percent of the time (9 out of 490 months) during the off-season. Boat ramp availability would be limited 26 percent of the time (92 out of 350 months) during the peak-use season and 52 percent of the time (255 out of 490 months) during the off-season. Usable surface area for boating would become constrained 8 percent of the time (29 out of 350 months) during the peak-use season and 32 percent of the time (157 out of 490 months) during the off-season. The optimal lake elevation for boating would be exceeded 40 percent of the time during the peak-use season.

Swimming and beach use areas would be inundated 27 percent of the time (94 out of 350 months). The optimal lake elevation threshold for swimming and beach use would be exceeded 40 percent of the time (140 out of 350 months).

The lake level threshold at which boat ramp availability becomes constrained would be exceeded for five 2-year periods during the peak-use season and for seven 2-year periods during the off-season.

Under the No-Action Condition, use at Folsom Reservoir is predicted to be 2.27 million visitor-days during the April through August peak-use period.

Lower American River. The exceedence frequencies for both boating and swimming activities on the lower American River are described here. The minimum impact threshold for boating activities would be exceeded 23 percent of the time (64 out of 280 months).

The optimal impact threshold for boating activities would be exceeded 46 percent of the time (130 out of 280 months). For swimming activities, the impact threshold would be exceeded 18 percent of the time (51 out of 280 months), whereas the water temperature impact threshold would be exceeded 48 percent of the time (131 out of 276 months).

For fishing activities, the fisheries analysis found that water temperature and flow fluctuations under the No-Action Condition had no substantial effect on available fish habitat.

Significance Criteria

Effects on boating, swimming, fishing, and wading at Folsom Reservoir and along the lower American River were considered significant if changes in flows or water temperature would result in a 10 percent reduction in recreational use and availability of recreational facilities when compared to the No-Action Alternative.

Impacts

Folsom Reservoir. The exceedence frequencies for boating and swimming activities under the Folsom Modification Plan are described here. All boat ramps would be out of operation 1 percent of the time (5 out of 350 months) during the peak season and 2 percent of the time (12 out of 490 months) during the off-season. Boat ramp availability would be limited 31 percent of the time during the peak-use season (109 months) and 80 percent (393 months) during the off-season. Usable surface area for boating would become constrained 13 percent of the time (45 months) during the peak-use season and 37 percent (181 months) during the off-season. The lake elevation would fall below the optimal level for boat ramp availability 47 percent of the time (163 months) during the peak-use season. When compared to the No-Action Alternative, the significance criteria of 10 percent is not exceeded.

Swimming and beach use areas would be inundated 28 percent of the time (94 out of 350 months). The optimal lake elevation threshold for swimming and beach use would be exceeded during the peak-use season 47 percent of the time (163 months). When compared to the No-Action Alternative, the significance criteria of 10 percent is not exceeded.

The lake level at which boat ramp availability becomes constrained would be exceeded for five 2-year periods during the peak use season, the same as under the No-Action Alternative. For the off-season, the threshold would be exceeded for seven 2-year periods, the same as under the No-Action Alternative.

Fishing opportunities are not expected to be adversely affected because suitable habitat for warmwater sport fish would not change substantially from that under the No-Action Alternative.

Recreation use during the peak use season for the Folsom Modification Plan is predicted to decrease by approximately 6,900 visitor-days, which represents a decrease of approximately 0.3 percent from use under the No-Action Alternative of 2.3 million user days per year.

Effects on recreation at Folsom Reservoir under the Folsom Modification Plan are considered less than significant during the peak use season because exceedence frequencies of important recreation thresholds would be similar to those under the No-Action Alternative, and differences would be within the 10 percent significance threshold; the exceedence duration of important thresholds would decrease during the peak-use season and increase during the off-season but would fall within the 10 percent significance threshold, and peak season use would decrease slightly. Effects on recreation during the off-season are considered significant because of the reduced availability of boat launching facilities, as indicated by a 32 percent change from the No-Action Alternative.

Lower American River. Under the Folsom Modification Plan, minimum-flow impact thresholds for boating activities would be exceeded 23 percent of the time (65 out of 280 months) on the lower American River. Optimal-flow impact thresholds (<3,000 cfs) for boating activities would be exceeded 47 percent of the time (132 months). For swimming activities, impact thresholds (<1,500 cfs) would be exceeded 18 percent of the time (51 months), whereas water temperature impact thresholds (<65 °F) would be exceeded 48 percent of the time (132 out of 276 months). When compared to the No-Action Alternative, the significance criteria of 10 percent is not exceeded.

Temperature and flow fluctuations would result in little change in the quantity and quality of fish habitat relative to the No-Action Alternative. Because fish habitat would not be substantially affected, it is assumed that sportfishing opportunities would not change from those under the No-Action Alternative.

Effects on recreation along the lower American River under the Folsom Modification Plan are considered less than significant because the frequency with which important thresholds for swimming and boating would be exceeded would be similar to the frequency under the No-Action Alternative, and temperature and flow fluctuations are not expected to substantially change the availability of sport fish.

Mitigation

Reoperation under the Folsom Modification Plan could potentially cause significant adverse effects to off-season recreation at Folsom Reservoir as a result of low availability of boat-launching facilities. This impact would be reduced to a less than significant level by extending a low-water boat ramp as proposed by Reclamation and SAFCA as part of interim reoperation of Folsom Dam and Reservoir (SAFCA, 1994). If lake levels do not fall low enough to implement this measure during the period of interim reoperation, existing facilities (Granite Bay, Hobie Cove, Brown's Ravine Marina, and Dike 8) should be modified as

necessary to provide continued access during low-water periods after permanent reoperation is implemented. These modifications could include the extension of boat-launching ramps, dredging of channels, and extension of access roads.

CULTURAL RESOURCES

No-Action Condition

Under the No-Action Alternative, conditions to cultural resources resulting from reservoir operation could include, but are not limited to, (1) vandalism, (2) physical destruction by waves, (3) shoreline erosion, and (4) development of a new zone of frequent wet-dry cycling (Corps, 1992b). Large fluctuations in water levels cause the formation of a very wide shoreline band in which the potential for physical destruction of resources by vandalism, wave action, and alternative submergence and emergence makes preservation of sites within this zone very difficult (Clark, 1989).

Based on information from the California Historical Resources Information Center, 143 known sites in the Folsom Reservoir inundation zone could be affected under the No-Action Alternative. Additional sites that have not been identified in previous surveys also may be present. Of the 143 known sites, 35 are within 0.25 mile of designated recreation areas and are therefore subject to a higher degree of disturbance than those farther away. All the 143 known sites and any unidentified sites would continue to be subjected to effects of wave action, vandalism, alternative drying and inundation, and inadvertent damage by offroad vehicles.

Significance Criteria

For the purposes of the this analysis, impacts to cultural resources are considered significant if the affected property is a site, building, structure, or object which is recognized as culturally or historically significant based on the institutional, public, or technical criteria described in chapter 6 under Cultural Resources for the No-Action Alternative.

Impacts

Folsom Reservoir. Operation of Folsom Reservoir under the No-Action Alternative would periodically expose cultural resources along the reservoir shoreline between elevations 426 and 392 to the impacts associated with a fluctuating reservoir pool, as described above. Operational impacts do not lend themselves to quantitative analysis and, as such, are more difficult to articulate. In general, these impacts are associated with increased patrol time to control illegal vehicle access and natural and cultural resources damaged by illegal vehicle access. This access is gained by lower water-surface elevations which allow vehicles into areas formerly barricaded by water features of the reservoir. As water-surface elevations are lowered, the shoreline recedes, inlets dry up, and areas previously inaccessible are now

subject to access. Most of the access is by four-wheel-drive vehicle over the dewatered lakebed. In addition to natural resource damage, historic and prehistoric cultural resources are damaged as a result of the increased access. The Folsom Modification Plan would expand the area subject to disturbance by 12 feet on an annual basis and expose resources between elevations 426 and 414 to a significantly greater risk of damage or loss.

The same number of sites would be exposed to various potential impacts under both the No-Action Alternative and the Folsom Modification Plan. The only difference is the degree of impact. The surface-water elevation in the Folsom Reservoir inundation zone tends to fluctuate more under the Folsom Modification Plan than under the No-Action Alternative. However, a review of the hydrologic modeling indicates that this impact would be minor. In general, sites at higher elevations would be exposed to the greatest levels of impact, both from wave action and from human actions.

Under 2020 demand conditions, one known site in the reservoir inundation zone would not be affected by exposure-related impacts. The remaining known sites would continue to be affected by wave action and exposure similar to the effects described under the No-Action Condition. An unknown number of additional cultural resource sites that have not been identified also could be affected in a similar manner. Implementing the Folsom Modification Plan would contribute slightly to the ongoing significant effects on cultural resources. This contribution to ongoing effects is considered significant.

Lower American River and Shasta and Clair Engle Reservoirs. The impacts on cultural resources would be unchanged from the No-Action Alternative. However, flooding in excess of the current level of protection could cause significant damage to a number of the prehistoric and historic archeological sites along the terraces of the lower American River.

Mitigation

Compliance with the National Historic Preservation Act would reduce the potentially significant impacts on Folsom Reservoir sites likely under the Folsom Modification Plan to a less-than-significant level. Toward that end, at the direction of the SHPO, a Research Design was prepared to serve as a foundation for determinations of eligibility for inclusion of Folsom Reservoir sites into the NRHP (National Register of Historic Places). The research design also serves to identify additional areas for inventory. Future actions to achieve compliance with the National Historic Preservation Act call for preparing an agreement document; field work to aid in the determination of eligibility process; developing a Findings of Effects document; and preparing a treatment plan for select resources and select treatment, including stabilization of appropriate sites.

FISHERIES

No-Action Condition

Conditions for fisheries and aquatic habitat would be similar to those under the No-Action Alternative.

Significance Criteria

For purposes of this evaluation, fisheries impacts were considered significant if operation of the project would substantially interfere with the movement of any resident or migratory fish, substantially diminish habitat for fish, or involve discharge of material which poses a hazard to fish.

Impacts

Folsom Reservoir.

Black Bass Spawning and Rearing Habitat. Under the Folsom Modification Plan, differences in annual black bass spawning and rearing habitat values would range from a 7 percent decrease (140 acres) in spotted bass spawning habitat to a 19 percent increase (436 acres) relative to the No-Action Alternative. Median differences in habitat values would be 2 percent. Therefore, there would be no significant changes in black bass spawning and rearing success relative to the No-Action Alternative.

Spawning Success Of Warmwater Fish. No changes would occur in the frequency of reservoir drawdowns of 2 feet or more per month during the primary spawning months for warmwater game fish (March through July). Therefore, impacts of reservoir drawdown on the spawning success of warmwater game fish would not change relative to the No-Action Alternative.

Coldwater Fish Habitat. Average monthly reservoir storage would be reduced by 3 to 9 percent in December through March, 1 to 2 percent in May through October, and by less than 1 percent in April. Storage reductions would peak in February. Reductions in reservoir storage during winter are not expected to cause significant adverse impacts on the reservoir trout fishery because coldwater habitat is unlikely to be limiting the abundance of stocked trout, especially during the colder months when the reservoir is thermally mixed. Lower reservoir storage during winter may actually improve feeding opportunities for rainbow trout by increasing prey availability.

Lower American River.

Flow Impacts. The frequency with which lower American River flows would meet or exceed the Hodge flows would increase by 5 percent in October through February

(182 out of 350 months), 2 percent in March through June (151 out of 280 months), and 1 percent in July through September (161 out of 210 months). Chinook salmon spawning flows may improve slightly. In general, flow conditions on physical habitat in the lower American River would be similar to those under the No-Action Alternative.

Water Temperature Impacts. Water temperature impacts on lower American River fisheries resources based on an analysis of monthly water temperatures are described below. An additional analysis of daily exceedence frequencies based on the historical relationship among reservoir storage, lower American River discharge, and maximum daily water temperatures in the lower American River was not required because the alternatives to be analyzed include operation of a temperature control device at Folsom Dam, which is expected to alter the relationship among storage, discharge, and water temperatures.

Chinook Salmon. The frequency with which monthly water temperatures would exceed optimal water temperatures for chinook salmon spawning and incubation (56 °F) in October and November would be increased by 1 to 2 percent (1 to 7 additional months) compared to the No-Action Alternative. The frequency with which temperatures at Nimbus Hatchery could exceed 56° F (based on monthly water temperatures at Nimbus Dam) would increase by 1 percent (1 additional month). Therefore, there would be no significant changes in temperature impacts on in-river and hatchery production of chinook salmon.

A 1 percent decrease to a 1 percent increase in exceedence frequencies would occur in spring relative to the chinook salmon rearing and emigration threshold, depending on distance downstream from Nimbus Dam. Therefore, water temperature impacts on chinook salmon rearing and emigration success would not change significantly relative to the No-Action Alternative.

Steelhead Trout. The frequency with which monthly water temperatures would exceed optimal water temperatures for steel head trout spawning and incubation (52 °F) would decrease by 3 to 6 percent (6 to 14 fewer months).

As under the No-Action Alternative, monthly water temperatures in summer would continue to exceed the rearing threshold (60 °F) in all years. A 1 percent decrease or no change would occur in exceedence frequencies relative to the steelhead trout emigration threshold. Therefore, there would be no significant adverse impacts on the success of steelhead trout rearing and emigration.

American Shad, Striped Bass, Sacramento Splittail. No changes would occur in frequency with which monthly water temperature would exceed spawning temperature thresholds (68 °F) for American shad, striped bass, and Sacramento splittail. Therefore, water temperature for the spawning success of these species would be similar to those under the No-Action Alternative.

Flow Fluctuation Impacts. The frequency of flow reduction of 50 percent or more during the chinook salmon spawning and incubation period would remain unchanged in October through January, increase by 6 percent in November through February, and decrease by 1 percent in December through March. The frequency of 50 percent flow reduction during the steelhead trout spawning and incubation period would increase by 1 percent in January through April and by 6 percent in February through May. Therefore, redd stranding impacts were considered less than significant for steelhead trout and chinook salmon.

Potential stranding impacts on Sacramento splittail would be similar to those under the No-Action Condition. The frequency of reductions in river stage of 1 foot or more would decrease by 1 percent during the principal splittail spawning and early rearing period.

Downstream From American River. Flow and water temperature conditions on fishery resources in the lower Sacramento River would be similar to those under the No-Action Alternative. Changes in average monthly flow at Freeport ranged from a 1 percent decrease in March and April to a 3 percent increase in November.

Delta outflows and total Banks and Tracy exports for fishery resources would be similar to those under the No-Action Alternative. Average monthly Delta outflow would decrease by 1 percent in March and April and increase by 3 percent in November. Differences would be less than 1 percent in the remaining months. Changes in average Delta exports would range from a 1 percent decrease in April to a 2 percent increase in November.

Shasta Reservoir and Upper Sacramento River. Implementing the Folsom Modification Plan would have little or no effect on Shasta Reservoir fish habitat and populations. Average monthly reservoir storage differed by less than 1 percent from storage levels under the No-Action Alternative.

The frequency with which end-of-month September storage levels would meet the 1.9 million-acre-feet carryover storage criterion for water temperature control in the upper Sacramento River (specified by NMFS in its 1993 biological opinion for winter-run chinook salmon) would not change. Therefore, storage-related water temperature impacts on winter-run chinook salmon spawning success would be similar to those under the No-Action Alternative.

Flows in the upper Sacramento River would be similar to flows under the No-Action Alternative. Changes in average monthly flow at Keswick Dam would be less than 1 percent. The frequency with which flows would meet the October through March minimum release criterion of 3,250 cfs at Keswick Dam would not change.

The frequency with which monthly water temperatures would exceed the chinook salmon spawning and rearing thresholds in the upper Sacramento River would slightly decrease or increase, depending on the critical spawning and incubation months for each salmon run. The frequency with which monthly water temperatures would exceed the

chinook salmon rearing and emigration threshold would not change. Therefore, there are no significant temperature impacts on chinook salmon spawning and rearing success in the upper Sacramento River under the Folsom Modification Plan.

Mitigation

No significant impacts on fisheries were identified for the Folsom Modification Plan; consequently, no mitigation is required.

VEGETATION AND WILDLIFE

No-Action Condition

Conditions for vegetation and wildlife for the Folsom Modification Plan are expected to be similar to those under the No-Action Alternative.

Significance Criteria

For purposes of this analysis, impacts were considered significant if construction of the project would substantially interfere with the movement of any resident or migratory wildlife species, a substantially diminish habitat for wildlife, or involve the disposal of material which could pose a hazard to wildlife or plant populations.

Impacts

Folsom Reservoir. Implementation of the Folsom Modification Plan would result in no substantial changes in the acreage or condition of willow scrub vegetation in the Folsom Reservoir drawdown zone. Therefore, special-status wildlife such as migrant willow flycatchers would not experience any decrease of potential habitat. This conclusion is based on analysis of projected lake elevations indicating that lake elevations higher than 430 feet for 3 or more consecutive months during the willow growing season could be in approximately 64 percent of years (13 percent less than under the No-Action Alternative). Under the No-Action Alternative, half or more of the existing willow scrub may be eliminated by drowning when lake levels are no longer abnormally low because of prolonged drought. The amount of this expected loss could be slightly less under the Folsom Modification Plan because lake levels are above 430 feet for extended periods during substantially fewer years.

Changes in reservoir operations would have no effect on vegetation or special-status plants above the spillway elevation of Folsom Reservoir because these resources are not maintained by water in the reservoir. Also, no adverse effect to the wildlife in the area would be realized.

Implementation of the Folsom Modification Plan would result in no significant habitat or population changes in black bass or warmwater fish or coldwater fish at Folsom Reservoir relative to the No-Action Alternative. No change would occur because drawdown would not be significant enough to cause concentration of fish. Therefore, wildlife that rely on fish for prey are unlikely to experience any adverse effects under this alternative, and any impacts would be less than significant.

There would be no change in the amount of open water habitat at Folsom Reservoir relative to the No-Action Alternative. The large amount of open water that would remain in the reservoir under this alternative would be expected to provide sufficient habitat for waterfowl, grebes, and other water birds. Migrant and resident songbirds that visit patches of willows in the drawdown zone could potentially experience an increase in habitat which could offer slight benefits to their populations.

Riparian and wetland vegetation at Lake Natoma would not be measurably affected because water levels in the lake would not change substantially under this plan. No adverse impacts to wildlife at Lake Natoma would be expected.

Lower American River. Implementation of the Folsom Modification Plan would not result in long-term net reductions in riparian plant communities or wetland vegetation along the lower American River. This conclusion is based on a comparison of mean monthly river stages by water-year type. This comparison indicated the following:

In most year types, river stage occasionally would average up to 0.6 foot higher under this plan than under the No-Action Alternative during some winter months, which may slightly improve ground-water recharge in the riparian zone.

In below normal and dry years, river stage would average slightly lower under the Folsom Modification Plan during June through September; however, no increased drought stress on riparian forest and scrub vegetation or dewatering of freshwater marsh vegetation is expected because the average amount of river stage decline during summer months would be small, generally less than 0.2 foot. Decreased mean river stage during March and April of up to approximately 0.7 foot could facilitate increased establishment of willows in some riverbank locations.

Changes in water-surface elevations during floods are not expected to be substantially different. Small changes in water-surface elevations would not measurably affect border zone or riparian zone vegetation. No wildlife species associated with this habitat would be adversely affected.

Implementation of the Folsom Modification Plan would result in no significant reductions in freshwater marsh or riparian forest and scrub communities at the off-channel ponds on Sacramento Bar. This conclusion is based on a comparison of mean monthly river stages by water-year type and an evaluation of pond hydrology and bathymetry (appendix B

of the Folsom Dam and Reservoir Permanent Reoperation Study report). This evaluation indicates that in below normal and dry years, pond levels occasionally would average slightly lower under this plan than under the No-Action Alternative during June through September. The amount of this decrease (generally less than 0.2 foot) probably is too small to measurably reduce vegetation acreage or condition in and around the ponds. No wildlife species associated with this habitat would be adversely affected.

Flood releases made during flood events under the Folsom Modification Plan would not significantly affect fish, vegetation, or wildlife resources, since the maximum objective release does not change from the No-Action Alternative objective release of 115,000 cfs.

Impacts to wildlife along the lower American River for all habitat types is considered to be less than significant because of the lack of measurable change in habitat.

Downstream From American River. Implementation of the Folsom Modification Plan would result in no substantial hydrologic changes likely to affect riparian or wetland vegetation or special-status plants along the Sacramento River or in the Delta. This conclusion is based on Sacramento River and Delta outflow simulations indicating that changes in average monthly flow measured at Freeport and Delta outflow would decrease by 1 percent in March and April, increase by 3 percent in November, and change by less than 1 percent in remaining months. Changes in this area would not substantially affect wildlife habitats or populations.

Mitigation

No significant impacts on vegetation or wildlife were identified for the Folsom Modification Plan; consequently, no mitigation is required.

ENDANGERED SPECIES

No-Action Condition

Operation of the features included in the Folsom Modification Plan would potentially affect the winter-run chinook salmon (FT) and steelhead trout (Federally petitioned). The conditions in the project area that support these species have been previously described (see Endangered Species discussions in chapters 4 and 6 and in appendix K).

Significance Criteria

For the purposes of this analysis, any action taken directly in connection with, or indirectly caused by, the project which may affect the continued existence of a threatened or endangered species is considered a significant adverse impact.

Impacts

Folsom Reservoir. Implementation of the Folsom Modification Plan would result in no change to sensitive species in Folsom Reservoir relative to the No-Action Alternative.

Lower American River and Downstream From American River. The Folsom Modification Plan would increase the potential for stranding winter-run chinook salmon juveniles and steelhead trout redds and juveniles as a result of increases in the frequency and magnitude of flow fluctuations in the lower American River during winter and spring (February through May). However, because this change was small, 1 to 6 percent, there would be no significant adverse effects. Further discussion is presented in the fisheries section and in appendix K.

Mitigation

No significant adverse effects to endangered species were identified for the Folsom Modification Plan; consequently, no mitigation is required.

WATER QUALITY

No-Action Condition

Water quality along the lower American River is generally good to excellent for all beneficial uses. However, dissolved oxygen and temperature do not meet some beneficial objectives during low-water years when flows in the river are reduced. These low flows periodically result in high water temperatures that may jeopardize juvenile fish. Runoff from the portions of the lower American River area north of the river is collected and discharged into the American River. Runoff from areas south of the river is collected and discharged into the Sacramento River.

Significance Criteria

For purposes of this analysis, any degradation in water quality below standards established by the SWRCB or EPA would constitute a significant adverse effect. Hydrologic models were completed using the January 1994 EPA standards, D-1485 standards, and the December 1994 Bay/Delta standards as parameters to determine adverse affects to water quality in the lower American River and the Delta. (See the Water Quality section of chapter 4 and Montgomery Watson, 1996.)

Impacts

Folsom Reservoir. Water-quality problems, including low dissolved oxygen concentrations and microorganism blooms that contribute to taste and odor problems in

domestic water supplies, are largely attributable to elevated water temperatures. In Folsom Reservoir, these problems are typical during the summer when storage falls below about 400,000 acre-feet and water temperatures exceed about 70 °F. The Folsom Modification Plan would not significantly increase the frequency at which these conditions would be expected. Therefore, significant adverse impacts on water quality are not anticipated.

Lower American River. Water quality in the lower American River could be adversely affected by elevated water temperatures. Hydrologic models completed using EPA and SWRCB water quality standards (Montgomery Watson, 1996) showed no increase in water temperatures above the standards.

Downstream From American River. Reclamation is required under the 1994 Bay Delta Standards to maintain water-quality standards in the Delta. Compliance with the conditions in the 1994 Bay Delta Standards was an inherent assumption in the hydrologic modeling performed in connection with this final SEIS/EIR. Hydrologic modeling showed no increase in water temperatures. Therefore, the Folsom Modification Plan would not affect water quality in the Delta.

Shasta and Clair Engle Reservoirs. Water quality in these reservoirs would remain subject to a similar operational regime to which it has been subject under the No-Action Condition. Therefore, the Folsom Modification Plan would not affect water quality in these reservoirs.

Mitigation

No significant adverse effects to water quality were identified for the Folsom Modification Plan; consequently, no mitigation is required.

VISUAL RESOURCES

No-Action Condition

The No-Action Condition is similar to the conditions under the Folsom Modification Plan. Potentially, the quality of visual resources in the Folsom Reservoir area would be affected along a portion of the lower American River and along the Sacramento River levees in west Natomas.

Significance Criteria

Reduction in water-surface elevation of 10 feet or more is discernible to most of the general public, and a reduction of 15 feet or more is demonstrably negative and would be considered significant.

Impacts

Folsom Reservoir. Visual resource impacts are much greater in frequency and magnitude under the Folsom Modification Plan than under the No-Action Alternative because the average flood control space is greater. The reservoir surface would average about 12 feet lower in the winter flood season. This is considered to be less than significant.

Lower American River and Shasta and Clair Engle Reservoirs. The impacts to visual resources in these areas would be the same as for the No-Action Alternative.

Mitigation

No mitigation is necessary for this resource.

CONSTRUCTION IMPACTS

The construction impacts of concern under the Folsom Modification Plan are those related to modifying Folsom Dam's outlet works to permit more aggressive flood control releases, strengthening portions of the dam and enlarging gates to permit increased surcharge storage, strengthening the levees along the American River to ensure greater reliability in the performance of these levees, and strengthening a portion of the east levee of the Sacramento River to optimize the level of flood protection for Natomas. Prior environmental studies (Corps, 1991) indicate that constructing these improvements could result in short-term impacts to recreation, fish and aquatic habitat, vegetation and wildlife, water quality, air quality, transportation, noise, and visual resources. These impacts and appropriate mitigation measures to be used during construction are discussed below.

RECREATION

No-Action Condition

Folsom Reservoir. Folsom Reservoir supports numerous water-based activities such as boating, waterskiing, and fishing. The shoreline provides sandy swimming beaches, both formal (with lifeguard services) and informal. Surrounding Folsom Reservoir is a landscape with important scenic, natural, and cultural values. Recreational facilities include camping and picnic areas, boat launch ramps, restrooms, concessions, bicycle and mountain bike trails, and equestrian trails and staging areas.

Lower American River. Earthen levees 20 to 30 feet high border much of the lower half of the American River parkway, blocking out surrounding urban development and activity. These physical barriers and extensive stands of mature riparian forest give the

parkway a "wilderness in the city" quality. The Jedediah Smith Trail provides bicycle, pedestrian, and equestrian trails from Discovery Park to Folsom Reservoir and is one of the parkway's most popular features. The trail also connects with the Sacramento River Trail and Old Sacramento State Historic Park. The 23 miles of river below Nimbus Dam is included in both the State and Federal wild and scenic river systems.

Downstream From American River. Recreation along the Sacramento River is almost exclusively water-related.

Significance Criteria

Impacts to recreational resources were considered significant if construction would cause substantial long-term disruption of an existing recreational activity which is institutionally recognized.

Impacts

Folsom Reservoir. Spillway lowering and gate modification would be accomplished by installing a watertight bulkhead or stoplog system to allow work to be done without requiring reservoir drawdown. No adverse effects would be realized.

Lower American River. During construction of the slurry wall, users of the portion of the American River bike trail on top of the levee would experience a short-term disruption.

Downstream From American River. The levee work along the Sacramento River would not interfere with recreation associated with the Sacramento River, because the work would be done exclusively along the landward levee slope. No impacts to recreation are expected as a result of this work.

Mitigation

Mitigation for recreation impacts would include the installation of detours with guide signs to route recreation traffic around construction areas. Portable fencing would surround the construction sites.

FISHERIES

No-Action Condition

Folsom Reservoir supports both coldwater and warmwater fisheries. However, Folsom's productivity is low because of low levels of nutrients and annual reservoir water-surface fluctuations. The DFG maintains the existing coldwater fishery, consisting of

previously planted, land-locked populations of salmon and ongoing hatchery plantings of rainbow trout. These fish reproduce naturally in streams leading to the lake, but instream factors (barriers, water temperature, and fluctuating flows) limit reproduction. The reservoir supports many resident nongame fish and warmwater game fish, including large and smallmouth bass, white catfish, brown bullhead, channel catfish, and several sunfishes.

Lower American River flows are regulated by Folsom Dam. Since construction of the dam, the public has expressed concerns that insufficient minimum flows would harm the river's fishery. Although the minimum flows required for the fishery are still debated, several decisions affecting flows have been issued by the State and by the courts. State Water Resources Board Decision 893 established minimum flows from 250 cfs to 500 cfs.

Significance Criteria

For purposes of this analysis, impacts were considered significant if construction of the project would substantially interfere with the movement of any resident or migratory fish species, substantially diminish habitat for fish, or involve the disposal of material which could pose a hazard to fish populations.

Impacts

The construction features of this alternative would affect few of the biological resources in the area. The fishery would remain undisturbed. The major construction features and their effect on fish are:

Folsom Reservoir. This alternative would require alteration of the Folsom Dam spillway and outlet works to allow for an increase in design releases. About 2,000 cubic yards of concrete would be removed and a new concrete lining installed. The main spillway would be lowered, the river outlets enlarged, and the stilling basin downstream lengthened by 50 feet. Excavated concrete would be hauled to the Sacramento County landfill at Grant Line and Kiefer Roads. No impacts to fish are anticipated because work would be restricted to the internal portions of the dam and to the spillway face.

Lower American River. The construction of 24 miles of slurry wall would not affect the fishery, since work would be done away from the river or any other water source.

Downstream From American River. Levee stabilization berms along the landward slopes of the east (left) levee of the Sacramento River in Natomas would be strengthened and raised. The levee work along the Sacramento River would not interfere with the Sacramento River, as the work would be done exclusively along the landward levee slope. Therefore, no fishery impacts would occur.

Mitigation

Since the construction impacts to fish are not significant, no mitigation is needed outside the normal precautions taken during construction to limit runoff, dust, and construction traffic. These conditions are considered under separate sections of this report and would be minor.

VEGETATION AND WILDLIFE

No-Action Condition

Folsom Reservoir. The land around the perimeter of Folsom Reservoir supports two vegetation cover types, live oak woodland and savanna-grassland. The savanna-grassland grows primarily at the southern end of the reservoir, while live oak woodland, with tree canopy frequently exceeding 30 percent cover, grows in the upslope areas surrounding most of the reservoir. Although grassland species comprise the dominant ground cover in both cover types, the live oak woodland includes a substantial midstory shrub layer. The most dramatic land feature influencing vegetation, especially during the summer, is the drawdown zone around the margin of the reservoir, which is incapable of sustaining vegetation, especially woody species, because of the erratic inundation/dewatering cycles associated with normal reservoir operations.

The area around Folsom Reservoir supports an animal community characteristic of the lower Sierra Nevada western slope. The woodland and savannah-grassland habitats support birds, mammals, and reptiles, which use the area for feeding, nesting, and perching. Characteristic species are scrub jay, California quail, coyote, grey fox, kingsnake, and Pacific rattlesnake. There are fewer species of wildlife around the perimeter of Folsom Reservoir than downstream. The drawdown zone is relatively lifeless.

Lower American River. The lower American River, although highly modified over the past 150 years, supports diverse and valuable biological resources. The 24-mile-long reach encompasses about 4,800 acres of flood plain containing large areas of grasslands and pasture (1,700 acres), riparian cottonwood and oak woodland (960), herbaceous plants and riparian scrub (960), bare sand and gravel (480), and surface waters of the river and associated sloughs and dredge ponds (700).

Downstream From American River. The landward levee slope/berm area along the east (left) levee/bank of the Sacramento River where construction is proposed supports a grassland habitat with limited wildlife resources. No fishery is in this area. Typical wildlife species include those described for the reservoir area. Riparian vegetation along the Sacramento River supports a nesting population that includes the redtail hawk, Swainson's hawk, and the great horned owl.

Significance Criteria

For purposes of this analysis, impacts were considered significant if construction of the project would substantially interfere with the movement of any resident or migratory wildlife species, substantially diminish habitat for wildlife, or involve the disposal of material which could pose a hazard to wildlife or plant populations.

Impacts

The construction features of this alternative would affect few of the biological resources in the area. Vegetation would be marginally affected. Wildlife would be disturbed, but would not suffer significant adverse impacts. The major construction features and their effect on vegetation and wildlife are as follows:

Folsom Reservoir. This alternative would require alteration of the Folsom Dam spillway and outlet works to allow for an increase in design releases. About 2,000 cubic yards of concrete would be removed and a new concrete lining installed. The main spillway would be lowered, the river outlets enlarged, and the stilling basin downstream lengthened by 50 feet. Excavated concrete would be hauled to the Sacramento County landfill at Grant Line and Kiefer Roads. Wildlife would not suffer any losses or disturbance because the work takes place on the existing dam structures.

Lower American River. The construction of 24 miles of slurry walls would cause minimal impact to scattered grass areas along the fringes of the levee crown. The operation of construction equipment could cause a short-term disturbance to wildlife. Based on the limited scope of the work and the temporary construction effort, impacts from slurry wall construction to vegetation or wildlife would not be significant.

Downstream From American River. Levees along the landward slopes of the east (left) levee of the Sacramento River would be strengthened and raised. The levee work along the Sacramento River would not interfere with the Sacramento River, since the work would be done exclusively along the landward levee slope. Impacts would be minor to scattered grassland areas along existing levees on the landward slope. Since the work involves construction atop existing berms, trees or any other significant vegetation would not be affected. There would be short-term disturbance to local wildlife associated with construction. A population of Swainson's hawks has historically nested in the riparian fringe along the Sacramento River adjacent to this construction area. Nesting Swainson's hawks could be affected by this construction.

Mitigation

Since the construction impacts to vegetation and wildlife are not significant, no mitigation is needed outside the normal precautions taken during construction to limit runoff, dust, and construction traffic. These conditions are considered under separate sections of this

report and would be minor. Potential mitigation for impacts to nesting Swainson's hawks is discussed in the endangered species section.

ENDANGERED SPECIES

No-Action Condition

Construction of the features included in the Folsom Modification Plan would potentially affect the State-listed threatened Swainson's hawk. The conditions in the project area which supports this species has been previously described (see Endangered Species discussions in chapters 4 and 6 and appendix K).

Significance Criteria

For purposes of this evaluation, any action undertaken directly in connection with, or indirectly caused by, the project which may affect the continued existence of a threatened or endangered species is considered a significant adverse impact.

Impacts

Folsom Reservoir. Modifications to the dam face would not result in adverse impacts to any endangered species at the reservoir. The modifications could be done without lowering the water-surface elevation, so no adverse impacts are expected.

Lower American River. No endangered species would be adversely affected by the construction of this alternative. The placement of the slurry wall would cause minimal effects to surrounding resources.

Downstream From American River. Swainson's hawk potentially nest near construction areas along the Sacramento River east bank levee. If active nests are near construction activity, the hawks could abandon the nests, resulting in losses to the species. Suitable nesting habitat is adjacent to the construction area. Historical nests for State-threatened Swainson's hawk have been documented in the project vicinity. Nesting Swainson's hawk could be affected in this area.

Mitigation

To avoid adverse effects to the Swainson's hawk, the Corps would implement seasonal restrictions on construction activity according to DFG guidelines for mitigating adverse effects on the Swainson's hawk (DFG, 1994).

WATER QUALITY

No-Action Condition

Water quality along the lower American River is generally good to excellent for all beneficial uses. However, dissolved oxygen and temperature do not meet some beneficial objectives during low-water years when flows in the river are reduced. These low flows periodically result in high water temperatures that may jeopardize juvenile fish. Runoff from the portions of the lower American River area north of the river is collected and discharged into the American River. Runoff from areas south of the river is collected and discharged into the Sacramento River.

Significance Criteria

For the purposes of this analysis, any degradation in water quality below relevant standards established by the SWRCB or EPA would constitute a significant impact.

Impacts

Folsom Reservoir. Lowering the dam spillway and increasing the objective releases from Folsom Reservoir could result in more severe sedimentation impacts in the lower American River than would be experienced under the No-Action Alternative. Again, assuming proper construction procedures were implemented, the effects of construction on water quality would be minimized.

Lower American River. This alternative would involve a slurry wall along the lower American River, possibly causing sediment to enter the river. Assuming proper construction procedures (for example, construction during low-flow periods, use of clean materials, and revegetation of disturbed sites), the effects of construction on water quality would be minimized. No long-term significant impairment of water quality is expected.

Downstream From American River. This alternative involves raising and stabilizing 12 miles of levee along the east side of Natomas. Assuming proper construction procedures (for example, construction during low-flow periods, use of clean materials, and revegetation of disturbed sites), the effects of construction on water quality would be minimized. No long-term significant impairment of water quality is expected.

Mitigation

No mitigation would be necessary because typical construction activities require the use of containment barriers and dikes to reduce sedimentation. Neither the lower American River nor Folsom Reservoir would require mitigation.

CULTURAL RESOURCES

No-Action Condition

Conditions are the same as those identified in the operational impacts section.

Significance Criteria

The significance criteria are the same as those outlined for operational impacts.

Impacts

Project construction is not expected to contribute significantly to impacts on cultural resources. Potential impacts to cultural resources as a result of implementation of the Folsom Modification Plan are described under operational impacts.

Mitigation

No mitigation is required.

AGRICULTURAL/PRIME AND UNIQUE FARMLANDS

These resources will not be affected as a result of the Folsom Modification Plan. Levees would not be placed on any lands with the above designation.

HAZARDOUS, TOXIC, AND RADIOLOGICAL WASTE

There are no known HTRW sites that would be adversely affected by the Folsom Modification Plan.

TRANSPORTATION

No-Action Condition

Folsom Reservoir. Folsom Dam Road, a two-lane roadway, crosses the top of the dam and runs beneath the mobile crane. Reclamation allows public use of the roadway between 6 a.m. and midnight. The roadway lanes are substandard in width and have no shoulders; however, the road is one of the few crossings of the American River in the area and represents an important arterial connecting the City of Folsom and western El Dorado County to communities in northeastern Sacramento County and southern Placer County.

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Lower American River. The transportation network serving the lower American River area is radial; its major streets start at, and then radiate outward from, the city's central business district. In the downtown area, the surface streets are laid out in a grid. The most traveled corridors are served by one-way facilities. The areas away from downtown exhibit typical suburban roadway design with major arterials serving commercial-office-industrial corridors and providing access to the regional freeway network. A system of collector streets provides access from local residential areas to the arterial system.

Downstream From American River. The Garden Highway is a two-lane highway generally used by local traffic only. Recreation access to the Sacramento River is a secondary use of the road.

Significance Criteria

Three criteria were used to determine if project-generated traffic and transportation impacts would be significant. First, where project-added traffic volumes would contribute to or degrade any peak-hour intersection level of service (level of service D or below), the project was considered to have a significant impact. Second, in instances where project traffic would create a substantial safety risk, this impact was considered significant. Third, where project vehicle weight would exceed roadbed design standards, potential impacts to road surfaces were considered significant.

Impacts

Folsom Reservoir. The roadway on top of the dam could be used by the public for the entire construction period, except for short periods during transport of materials and equipment. An access bridge would be constructed across the face of the main and auxiliary spillway and into the left abutment for use in moving materials, equipment, and personnel and to ease adverse effects on the dam road. Extensive scaffolding would be attached to the downstream face of the dam to provide working surfaces for modifying the spillways. Bulkheads would be prepared ahead of time for closure of spillway bays and outlets. These measures would limit disruption to traffic. Transportation delays such as those experienced in 1995 due to gate repair would not occur.

Lower American River. The stabilization of levees along the lower American River would cause increased truck traffic on roads near the construction staging area.

Downstream From American River. The stabilization and raising of levees along the Sacramento River would result in periodic closure of Garden Highway and could cause increased truck traffic on roads near the construction staging area. Additional traffic would result during transport of borrow material to the construction sites. Contractors would comply with existing limitations on all access roads. No significant adverse effects are expected.

Mitigation

To reduce the direct construction impacts associated with the various project alternatives in all project areas, the following typical construction measures would be implemented:

- Contractors would avoid public roads when hauling materials to construction sites. If this is not feasible, contractors would prepare a transportation plan with information on haul routes and the number of trucks per day, as well as a traffic engineering analysis indicating that potential affected intersections have adequate turning radii for oversized vehicles.
- Contractors would avoid hauling on public roads during weekday peak traffic periods, such as 6:30-9:30 a.m. and 3:30-6:30 p.m., especially in developed areas. If this is not feasible, contractors would prepare traffic engineering studies to include peak-hour capacity calculations at affected intersections along haul routes, demonstrating that acceptable levels of service would be maintained. These studies would be prepared for the Corps and would conform to appropriate local standards. Contractors would also allow pertinent agencies and concerned neighborhoods to comment on the transportation plan and traffic engineering studies. Where construction access was by local roads, residents would receive prior notification.
- Traffic would be rerouted to avoid construction areas.

AIR QUALITY

No-Action Condition

Most of the lower American River is in the Sacramento Valley Air Basin. The principal air pollutants in this area are ozone, nitrous oxides, and CO (carbon monoxide). Although ozone tends to be a regional problem dispersed over wide areas, CO problems are usually localized and result from a combination of high traffic volumes and traffic congestion. The two primary sources of air pollution in the American River area are motor vehicles and stationary industrial facilities and operations.

The Folsom Reservoir area is heavily influenced by air contaminants originating in the Sacramento region and from agricultural burning in the Sacramento Valley. Interstate 80, Highway 50, and local industries are also sources of air pollution. Air contaminants concentrate most often when the atmosphere is stable and winds are light for long periods of time.

The Sacramento Air Quality Management Area is not expected to reach attainment for ozone or CO before the year 2000. Traffic-related hydrocarbons, nitrogen oxides, and

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carbon monoxide will increase and worsen the basin's nonattainment status. The primary causes will be increased auto traffic associated with increased development and land use changes in the area. Most hydrocarbon and nitrogen oxide emissions will come from vehicle trips that originate outside the City of Sacramento, primarily from people commuting and shopping and also from through traffic.

Significance Criteria

According to appendix G of the State CEQA Guidelines, a project will normally have a significant effect on the environment if it will violate any ambient air-quality standard, contribute substantially to an existing or projected air-quality violation, or expose sensitive receptors to substantial pollutant concentrations.

Significance criteria developed by the SMAQMD (Sacramento Metropolitan Air Quality Management District) and by the EPA were used in determining the significance of project-related air-quality impacts. Project-related emissions were considered significant if emissions exceeded the SMAQMD's thresholds of:

- 85 pounds per day (ppd) of ROG,
- 85 ppd of NO_x, or
- 275 ppd of PM10 (SMAQMD, 1994).

Also, project-related annual emissions were considered significant if emissions exceeded EPA's general conformity thresholds. Those conformity thresholds are based on the de minimis thresholds included in EPA's general conformity guidance regulation for the Sacramento area (40 CFR Part 51 Subpart W and 40 CFR Part 93 Subpart B). The threshold levels equal:

- 25 tons per year for ROG
- 25 tons per year of NO_x,
- 100 tons per year for CO, or
- 100 tons per year for PM10.

Impacts

Under the Folsom Modification Plan, emissions would be produced during modifications to Folsom Dam and from raising and strengthening levees along the lower American River and the Sacramento River. Construction of this alternative would be completed by the year 2007.

Upper American River. The Folsom Modification Plan would generate no emissions in the upper American River.

Folsom Reservoir. This plan would generate emissions in the Folsom Dam area from modifications to the spillway and outlet works. Table 7-2 summarizes emissions associated with those modifications.

Lower American River. This plan would generate emissions in the lower American River area as a result of levee strengthening.

Downstream From American River. This plan would generate emissions along the Sacramento River as a result of levee raising and strengthening.

Table 7-2 shows that emissions of ROG, NO_x, and CO would exceed the daily or annual emission thresholds established for the Sacramento area. This is considered a significant impact.

As shown in table 7-2, emissions associated with the Folsom Modification Plan exceed the tons-per-year conformity thresholds established by the EPA. Consequently, a conformity analysis would be conducted to show that this alternative would not violate the Sacramento area's State Implementation Plan if this alternative is authorized for construction.

Mitigation

The Corps will prepare a dust suppression plan and submit it to the SMAQMD for review before initiating construction activities. The plan will include as many of the following mitigation measures as are applicable to each project site:

- Cover, enclose, or water active storage piles at least twice daily;
- Cover inactive storage piles;
- Pave all haul roads;
- Cover securely or maintain at least 2 feet of freeboard on all haul trucks when transporting material;
- Water all active construction sites at least twice daily. Frequency should be based on the type of operation, soil, and wind exposure;
- Maintain the natural topography to the extent possible to eliminate the need for extensive land clearing, blasting, excavating, grading, and cutting and filling operations;
- Prohibit all grading activities during periods of high wind (that is, greater than 30 miles per hour);

TABLE 7-2

Construction Equipment Emissions - Folsom Modification Plan

Year	Carbon Monoxide (CO)		Reactive Organic Compounds (ROG)		Nitrogen Oxides (NO _x)		Sulfur Oxides (SO _x)		Inhalable Particulate Matter (PM ₁₀)	
	Tons per Year	Pounds per Average Work Day	Tons per Year	Pounds per Average Work Day	Tons per Year	Pounds per Average Work Day	Tons per Year	Pounds per Average Work Day	Tons per Year	Pounds per Average Work Day
2000	105	918	13	115	256	2,225	28	240	37	395
2001	92	920	12	115	225	2,231	24	241	34	395
2002	117	893	13	104	268	2,068	29	219	36	128
2003	211	1,533	24	175	480	3,515	52	376	49	217
2004	211	1,533	24	175	480	3,515	52	376	49	217
2005	211	1,533	24	175	480	3,515	52	376	49	217
2006	211	1,533	24	175	480	3,515	52	376	30	217
2007	173	1,290	20	148	395	2,965	42	316	109	1,273
2008	72	573	8	67	165	1,327	18	140	95	1,171
2009	0	0	0	0	0	0	0	0	0	0
2010	0	0	0	0	0	0	0	0	0	0
Maximum	211	1,533	24	175	480	3,515	52	376	109	1,273

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- Apply chemical soil stabilizers on inactive construction areas (disturbed lands within construction projects that are unused for at least 4 consecutive days);
- Apply nontoxic binders (for example, latex acrylic copolymer) to exposed areas after cut and fill operations and hydroseed area;
- Plant tree windbreaks on the windward perimeter of construction projects if they are adjacent to open land;
- Plant ground cover in disturbed areas as soon as possible;
- Install wheel washers for all exiting trucks;
- Sweep streets if visible soil is carried onto adjacent public roads; and,
- Post a publicly visible sign at the project site to specify the telephone number and person to contact regarding complaints. This person shall be responsible for responding to complaints and taking corrective action within 48 hours.

Incorporate NO_x mitigation measures into construction plans:

- Require injection timing retard of 2 degrees on all diesel vehicles, where applicable;
- Install high-pressure injectors on all vehicles, where feasible;
- Encourage the use of reformulated diesel fuel;
- Use Caterpillar prechamber diesel engines (or equivalent) and properly maintain and operate;
- Electrify equipment, where feasible;
- Maintain equipment in tune with manufacturer's specifications, except as otherwise stated above;
- Install catalytic convertors on gasoline-powered equipment;
- Substitute gasoline-powered for diesel-powered equipment, where feasible; and,
- Use compressed natural gas or onsite propane mobile equipment instead of diesel-powered equipment, where feasible.

Conformity. As shown in table 7-2, emissions associated with this plan exceed the tons-per-year conformity thresholds established by EPA. Consequently, a conformity analysis would be conducted to show that this alternative would not violate the Sacramento

metropolitan area's SIP. If this plan is selected, a conformity analysis would be completed after authorization and prior to construction.

NOISE

No-Action Condition

Existing adjacent uses at Folsom Reservoir, the lower American River, and areas downstream from the American River include waterside recreation and landward-side commercial, industrial, and residential uses. The ambient background levels range from 51.1 to 61.6 dBA. Structures are within 20 to 100 feet from some construction sites.

Significance Criteria

The significance criteria used to evaluate anticipated noise conditions are based upon project-related incremental noise increases at the construction sites. Noise from construction activities would be compared to the city's criteria for nontransportation-related noise sources. An increase in noise of 3 dB or less is typically not perceptible, while a 5 dB increase is usually perceived as being distinctly perceptible. Consideration is given to the magnitude of the change in assessing significance.

Noise impacts were assessed at each of the sites by comparing project-generated construction and operational noise levels, existing noise levels, and the criteria and standards contained in applicable planning documents. The criteria applicable in this case are primarily for noise-sensitive residential uses and are intended to provide a suitable environment for indoor communication and sleep. The noise standard that would apply to each project improvement site is contained in the General Plan Noise Element for that respective jurisdiction. All respective noise elements cite 60 dBA L_{dn} as the established daytime residential noise standard. Short-term construction-generated noise is normally exempt from these noise standards. Nevertheless, potential noise impacts on sensitive receptors must be evaluated.

Impacts

Folsom Reservoir. This alternative would require alteration of the Folsom Dam spillway and outlet works to allow for an increase in design release events. To complete construction of a gate during a construction season would require working 20 hours each day and require the use of materials handling and stationary source construction equipment similar to that listed in figure 7-1. These pieces of equipment can produce noise in the 70 to 88 dBA range as measured 50 feet from the noise source. In addition to these pieces of equipment, jackhammers would probably be used to break up concrete below the spillway.

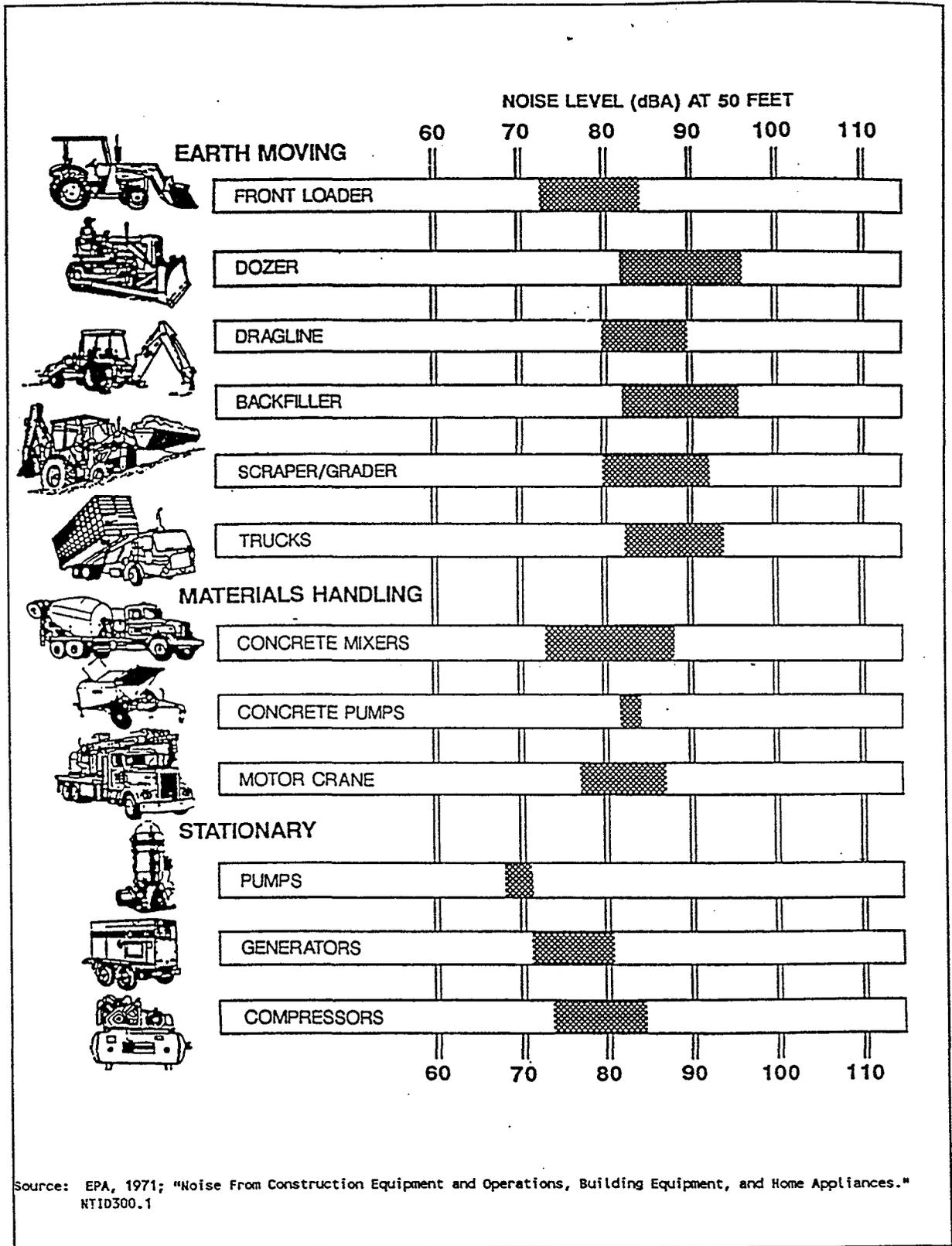


Figure 7-1 Construction Equipment Noise Levels

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Jackhammers can produce noise levels of up to 90 dBA at 50 feet. Delivery truck traffic and other mobile sources would also add to construction noise at the improvement site. This impact would be considered significant and unavoidable. The above information is based on the results of the Montgomery-Watson study for the Corps entitled "American River Flood Control Project Task 2: Lowering Folsom Spillway" (March, 1994).

Lower American River. Construction of a slurry wall within the existing levees along both sides of the American River would generate construction noise near residential areas. These impacts would be considered short-term adverse in most areas since construction activities would be temporary and would take place during the day. Because short-term construction-generated noise is normally exempt from noise standards, this would not be a significant impact.

Downstream From American River. Noise impacts would be associated with raising and strengthening the levees along the Sacramento River. Heavy-equipment noise would be the major concern during levee-related and dam construction activities. Primary sources of noise in these cases would be engine exhaust, fans, transmissions, and other mechanical equipment. These impacts would be considered short term. Because short-term construction generated noise is normally exempt from noise standards, this would not be a significant impact.

Mitigation

Typical mitigation for construction site noise includes fitting heavy equipment with mufflers and using engine enclosures to allow operation in noise-sensitive areas. Thus, the source of noise may be controlled within technological limits by requiring adequate mufflers and enclosures on heavy equipment and other noise-producing tools.

When reasonably controlled, construction noise is often accepted by the public during the day (7 a.m. to 5 p.m.). People are less tolerant of noise and may complain if nonemergency construction activities continue at night. Preventing nighttime construction near noise-sensitive receptors could effectively reduce public concerns. The following measures are therefore recommended to reduce the project's short-term construction-related noise impacts on adjacent noise-sensitive land uses.

- Provide mufflers for all project-related heavy construction equipment and stationary noise sources (such as diesel generators). Stationary noise sources would be located at least 300 feet from occupied residences, or contractors would be required to provide appropriate noise-reducing engine-housing enclosures.
- Place equipment warmup areas, water tanks, and equipment storage areas in a central area as far away from existing residences as is feasible.

Implementation these measures for onsite construction noise mitigation would reduce the project's short-term noise impacts to the greatest extent feasible. However, because of the nearness of noise-sensitive receivers (residences), construction noise impacts of the project would remain significant and unavoidable at Folsom Dam.

Construction-related traffic noise could be reduced at noise-sensitive receiver locations by ensuring that all traffic complied with applicable noise emission standards. Traffic routing can be selected to minimize exposing these areas to heavy truck traffic. To reduce the project's mobile source construction noise impacts, the following measures are recommended.

- Equip all onroad mobile construction vehicles (dump trucks) with mufflers.
- Allow all dump truck haul trips to follow only the haul routes analyzed unless the appropriate agency grants a waiver.
- Prohibit dump truck haul trips in residential areas prior to 8 a.m. or after 6 p.m.

VISUAL IMPACTS

No-Action Condition

Construction of the features included in the Folsom Modification Plan would potentially affect the quality of visual resources in the Folsom Reservoir area, along a portion of the lower American River, and along the Sacramento River levees in west Natomas.

Significance Criteria

For a project to have a significant impact, the project or features of a project would change the visual quality of sensitive viewing components within the observable scene. A large number of viewers would notice a significant change to the character of the existing setting. Such changes may include a project feature significantly blocking a desirable viewing component or replacement of valuable environmental resources previously regarded as a visual amenity.

Impacts

Folsom Reservoir. Modification to outlets of the reservoir and the lowering of its spillway would cause visual disruption during construction. Construction equipment would be in place at various stages during the 9-year period needed to lower the spillway. Two

very tall tower cranes would be visible from a great distance. Concrete trucks and pumps would be present during the entire construction period. Scaffolding would be constructed across the face of the dam and would also be in place the entire 9 years needed to lower the spillway. Other construction equipment would be at the dam during various stages of construction.

Lower American River. Construction of the slurry wall would cause short-term visual disruption along the river. Following construction, the levee would be reseeded to offset the visual impact.

Downstream From American River. Levee work along the east bank of the Sacramento River would have short-term effects to visual resources. This is not considered to be significant because the work would be constructed mainly in rural areas. Levees would be reseeded after construction.

Mitigation

As part of the levee work, levees which would be improved would be seeded with a mix of grasses and forbs to control erosion.

CUMULATIVE IMPACTS

Cumulative impacts for the Folsom Modification Plan are summarized in chapter 10.

GROWTH-INDUCING IMPACTS

Construction of the Folsom Modification Plan would not cause growth beyond growth that would occur under the No-Action Alternative. The current 100-year level of flood protection (No-Action Alternative) provides flood protection for regionally planned growth. While not inducing growth, the Folsom Modification Plan would reduce the risk of damages from more severe storms.

SUMMARY OF IMPACT CONCLUSIONS AND ENVIRONMENTAL COMMITMENTS

SIGNIFICANT UNAVOIDABLE ADVERSE IMPACTS

The CEQA Guidelines state that any significant environmental effects which cannot be avoided if the proposal is implemented must be described. This description extends to those significant effects which can be mitigated but not reduced to a level of insignificance. Implementation of the Folsom Modification Plan would result in significant unavoidable impact to the shoreline vista of Folsom Reservoir as previously discussed in the visual resources section. The Folsom Modification Plan would result in lower water-surface levels during the winter months (up to 12 feet) in about 35 years of the 70-year record. Summer water-surface levels would not be significantly lower under the Folsom Modification Plan. Based on the recreation exceedence frequency analysis, Folsom Reservoir water-surface elevations would be lower in only 5 years of the 70-year record. No feasible mitigation is available for the impact. Construction activities at Folsom Dam would result in a significant unavoidable increase in noise during the construction season.

SIGNIFICANT IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

No significant irreversible environmental changes would result from the Folsom Modification Plan, since this alternative would not commit nonrenewable resources to uses that future generations would be unable to reverse. Folsom Reservoir operations could always be returned to the No-Action Condition should that become the prudent course of action.

SHORT-TERM USES OF THE ENVIRONMENT VS. LONG-TERM PRODUCTIVITY

The model studies comparing Folsom Reservoir operations under the 1993 Diagram and Folsom Modification Plan diagram indicate that the Folsom Modification Plan would result in locally significant socioeconomic impacts to water supply, hydropower, recreation, and cultural resources, but would have only minor effects on the physical environment, principally related to periodic seasonal changes in water storage levels at Folsom Reservoir.

EFFECTS FOUND TO BE SIGNIFICANT

The summary table in chapter 1 lists the significant impact determinations.

ENVIRONMENTAL COMMITMENTS

It would be anticipated that SAFCA would provide mitigation for adverse operational effects from this plan. Environmental commitments for each of the action alternatives is as follows:

- Effects to the CVP water deliveries could be mitigated by purchasing water to meet replacement needs. Purchasing CVP supplies would reduce demands on reservoirs and allow them to refill to prereoperation levels.
- Water contractors who obtain their supplies directly from Folsom Reservoir may experience increased pumping costs due to permanent reoperation. Mitigation for this effect would be accomplished by reimbursing water agencies for anticipated pumping costs.
- Effects to hydropower generation and capacity would be mitigated by replacing the loss. This could be accomplished by purchase from another part of the grid where supply is in excess of demand.
- Effects to off-season recreational use of boat launching facilities at Folsom Reservoir would be mitigated through the extension of boat launching ramps, dredging of channels, and extension of access roads on an as-needed basis. Signs would be installed to route recreation traffic around construction areas. Portable fencing would surround the construction sites.
- Seasonal restrictions on construction activity would be in accordance with DFG guidelines and would be implemented to avoid effects to Swainson's hawk.
- SAFCA would fund a research program that would serve as a foundation for determination of eligibility for inclusion of Folsom Reservoir sites into the NRHP. The research program would serve to identify additional areas for inventory.
- Contractors would prepare a transportation plan and traffic engineering studies if necessary. Where possible, traffic would be rerouted.
- A dust suppression plan for the construction areas would be prepared and implemented. An Air Quality Conformity Plan would be prepared and coordinated

with the appropriate agencies. A detailed general conformity analysis would be conducted should this plan be selected for implementation.

- To avoid or reduce the increase in ambient noise levels, the construction equipment would be equipped with appropriate mufflers, and stationary sources would be shielded. The increase in noise levels from construction would result in significant and unavoidable effects that may not be mitigated to a less than significant level. This impact would last for the duration of the construction.
- No construction-related adverse effects to habitat along the lower American River are anticipated with construction of this plan. No vegetation mitigation would be required.