3.5 Terrestrial Vegetation and Wildlife

3.5.1 Affected Environment/Existing Conditions

Terrestrial biological resources include vegetation, wildlife habitats, wetlands, wildlife species, and threatened and endangered species. The information provided in this document describes the botanical resources and wildlife that occur in the vicinity of Folsom Reservoir.

The analysis area is dominated by aquatic habitat within Folsom Reservoir, but stands of native vegetation occupy much of the area adjacent to the shoreline. This area supports seven major terrestrial vegetation types that are typical of the foothills of California's Central Valley. The vegetation mosaic is a result of interactions between natural and human influences including: climate, soil type and depth, elevation, slope gradient, slope aspect, grazing, fire, physical disturbances by humans, reservoir fluctuations, and invasive exotic vegetation.

Native plant communities in the analysis area provide suitable habitat for a variety of native wildlife, including special-status species. The primary habitat types that occur within the analysis area include annual grassland, interior live oak woodland and savanna, blue oak woodland, chaparral, willow scrub, riparian forest, seasonal wetland, freshwater marsh, and aquatic (lake, pond, creek, and stream). Alteration in composition and structure of native vegetation is likely to have resulted in reduced populations of native wildlife not adapted to the changed environment. Additional changes to the natural ecosystems have resulted from the incursion of non-native species and the related increase in native wildlife species that have adapted to these vegetation changes. Land development within the vicinity of Folsom Reservoir (including the dams themselves) has created significant barriers to wildlife movement and altered patterns of animal migration.

3.5.1.1 Area of Analysis

Potential impacts to biological resources have been evaluated for the Folsom Dam and the area surrounding the reservoir. Acreages discussed in the analysis are limited to those affected by the maximum combined footprint for the construction phase of the project and do not include any sites for additional new embankments related to raise features. Impacted habitat acreages and compensatory mitigation acreages identified in the Draft Coordination Act Report (CAR) for the Folsom Dam Safety and Flood Damage Reduction Project (USFWS 2006) are estimated and being refined; impacts would be further minimized in coordination with the USFWS. The CAR does include areas of potential impact beyond the construction phase of the project. Subsequent environmental documents would address details of the construction of additional new embankments, if a raise feature is selected and new embankments are necessary.

3.5.1.2 Regulatory Setting

The following laws, ordinances, and regulations are applicable or potentially applicable to the project in the context of biological resources.

Federal

Endangered Species Act of 1973; 16 USC §1531 et seq.; 50 CFR Parts 17 and 222
This act includes provisions for protection and management of species that are federally listed as threatened or endangered or proposed for such listing and of designated critical habitat for these species. The administering agency for the above authority for non-marine species is the U.S. Fish and Wildlife Service (USFWS).

Migratory Bird Treaty Act: 16 USC §703-711; 50 CFR Subchapter B
This act includes provisions for protection of migratory birds, including basic prohibitions against any taking not authorized by federal regulation. The administering agency for the above authority is the USFWS.

Rivers and Harbors Act §10; 33 USC §201 et seq.
This act protects waters of the United States. The administering agency for the above authority is the U.S. Army Corps of Engineers (Corps).

Clean Water Act of 1977; 33 USC §1251-1376; 30 CFR §330.5(a) 26
These sections provide for the protection of wetlands. The administering agency for the above authority is the Corps.

Executive Order 11990, Protection of Wetlands (May 24, 1977)
This order provides for the protection of wetlands. The administering agency for the above authority is the Corps.

State

California Endangered Species Act of 1984, California Fish and Game Code §2050-2098
This act includes provisions for the protection and management of species listed by the state as endangered or threatened, or designated as candidates for such listing. This act includes a requirement for consultation "to ensure that any action authorized by a state lead agency is not likely to jeopardize the continued existence of any endangered or threatened species…or result in the destruction or adverse modification of habitat essential to the continued existence of the species" (§2090). Plants of California declared to be endangered, threatened, or rare are listed at 14 CCR §670.2. Animals of California declared to be endangered, threatened, or rare are listed at 14 CCR §670.5. The administering agency for the above authority is the California Department of Fish and Game (CDFG).

Native Plant Protection Act of 1977; California Fish and Game Code §1900 et seq.
This act lists state-designated rare and endangered plants and provides specific protection measures for identified populations. The administering agency for the above authority is the CDFG.

California Species Preservation Act of 1970; California Fish and Game Code §900-903
This act includes provisions for the protection and enhancement of the birds, mammals, fish, amphibians, and reptiles of California. The administering agency for the above authority is the CDFG.

California Fish and Game Code §900-903
This code section prohibits the taking or possessing of any bird egg or nest. The administering agency for the above authority is the CDFG.

California Fish and Game Code §3511 and 5050
This code section prohibits the taking or possessing of birds and reptiles listed as "fully protected." The administering agency for the above authority is the CDFG.

California Fish and Game Code §1930-1933
These code sections provide for the Significant Natural Areas program and database. The administering agency for the above authority is the CDFG.

California Environmental Quality Act (CEQA) PRC §21000 et seq.
This act provides for protection of the environment within the state of California. For the project, the administering agency for the above authority is the California State Lands Commission (CSLC).

Local
Local Native Tree Protection Ordinances
California State Senate Concurrent Resolution 17 and several city and county ordinances regulate effects on native oak and riparian trees and woodlands, as well as designated landmark or heritage trees. These local ordinances generally require permits for any activities that directly remove covered trees of specific size and species, or indirectly affect them by work under or adjacent to their canopy driplines. The ordinances typically have specific quantitative mitigation ratios for replacement of trees affected by projects.

3.5.1.3 Existing Conditions

Botanical Resources
The analysis area includes all construction use areas from Alternative 1 (no structural raise) to Alternative 5 (17-ft raise). This area is dominated by aquatic habitat within Folsom Reservoir, but stands of native vegetation occupy much of the area adjacent to the shoreline. This area supports seven major terrestrial vegetation types that are typical of the foothills of California's Central Valley. These types include: interior

live oak woodland, blue oak woodland and savanna, annual grassland, chaparral, cottonwood-willow riparian, freshwater marsh, and seasonal wetland.

Sensitive plant communities have special protection or consideration under federal, state, and local laws. Sensitive communities for this project are those that meet any of the following criteria: communities that are described as Significant Natural Areas (SNAs) by CDFG, communities that are either known or believed to be of high priority for inventory in the California Natural Diversity Database (CNDDB) due to their rarity or level of threat, riparian communities subject to Corps jurisdiction or CDFG jurisdiction, and communities that are protected or recognized as a community of special concern by the state or local ordinances. Sensitive plant communities in the study area and vicinity include valley oak, blue oak savanna and woodland, gabbroic northern mixed chaparral, riparian forest, riparian scrub, freshwater marsh, and seasonal wetlands.

Vegetation

Upland Plant Communities

- *Interior Live Oak Woodland.* This upland vegetation community (classified as interior live oak series by Sawyer and Keeler-Wolf [1995]) was present above the ordinary high water mark (OHWM) of the reservoir (as indicated by evidence of regular inundation), and is therefore not influenced by fluctuation of the reservoir water line. Dominant tree species are interior live oak (*Quercus wislizenii*), blue oak (*Quercus douglasii*), and foothill or gray pine (*Pinus sabiniana*). This community intergrades with blue oak woodland (Holland 1986). The shrub layer was relatively depauperate with an occasional elderberry (*Sambucus mexicana*), or ceanothus (*Ceanothus* sp.). The understory herb layer was occupied by exotic Mediterranean grasses (*Bromus* spp.) and other ruderal species including short-pod mustard (*Hirschfeldia incana*), telegraph weed (*Heterotheca grandiflora*), and yellow star thistle (*Centaurea solstitialis*). In areas of dense tree cover, bare ground or leaf litter was dominant. Approximately 81 acres of oak woodland, including interior live oak woodland, are present in the maximum extent of the project construction area. The potential future inundation zone portion of the CAR evaluation area includes a maximum extent 1,323 acres of interior live oak woodland.

- *Blue Oak Woodland and Savanna.* Blue oak woodland is a highly variable climax woodland dominated by blue oak, but usually including other oak species (coast live oak [*Quercus agrifolia*], and interior live oak) as well as foothill pine (Holland 1986). The community is described as blue oak series (Sawyer and Keeler-Wolf 1995) and blue oak woodland (Holland 1986) in the literature. Within the project area, blue oak woodlands are present outside of the reservoir fluctuation zone on relatively xeric sites. Canopy cover ranges from continuous to fairly open. Understory species are mainly

herbaceous and include Mediterranean grasses (*Bromus* spp.), dogtail grass (*Cynosurus echinatus*) and yellow star thistle (*Centaurea solstitialis*). Approximately 81 acres of oak woodland, including blue oak woodland, are present in the maximum extent of the project construction area. The potential future inundation zone portion of the CAR evaluation area includes 1,323 acres of oak woodland, including blue oak woodland.

- *Annual Grassland.* Annual grassland is a heterogeneous mix of non-native grasses, annual forbs and wildflowers. This community is classified as California annual grassland series (Sawyer and Keeler-Wolf 1995) and valley and foothill grassland or non-native grassland (Holland 1986). Dominant plant species in the annual grassland include introduced annual grasses such as wild oat (*Avena fatua*), ripgut brome (*Bromus diandrus*), barley (*Hordeum* spp.), dogtail grass and fescue (*Vulpia* spp.). Herbaceous forbs and wildflowers present in this vegetation include both native species such as fiddle neck (*Amsinckia* spp.), western ragweed (*Ambrosia psilostachya*), and popcornflower (*Plagiobothrys* spp.), and non-native species such as short-pod mustard, yellow star thistle, and dove weed (*Eremocarpus setigerus*). Approximately 180 acres of annual grassland are present in the maximum extent of the project construction area.

- *Chaparral.* Chaparral consists of a dense cover of perennial, mostly evergreen shrubs, generally 1 to 3 meters in height. Chaparral is common around Folsom Reservoir, especially on steep, west or south facing slopes. The dominant species include chamise (*Adenostoma fasciculatum*) and whiteleaf manzanita (*Arctostaphylos viscida*). Other common species present include toyon (*Heteromeles arbutifolia*), California coffeeberry (*Rhamnus californica*), buck brush (*Ceanothus cuneatus* var. *cuneatus*), poison oak (*Toxicodendron diversilobum*), and redbud (*Cercis occidentalis*). Small stands of this community occur within the project construction area, sometimes as understory to interior live oak woodland. These small units are not shown on the vegetation map. Approximately 1.5 acres of chaparral are present in the maximum extent of the project construction area. The potential future inundation zone portion of the CAR evaluation area includes 66 acres of chaparral.

- *Gabbroic Northern Mixed Chaparral.* This chaparral occurs on gabbro- and diorite-derived soils along the South Fork American River arm of Folsom Reservoir between Sweetwater and Weber Creeks. This community is a sensitive plant community. This community is defined by the presence of specific soil types (the Rescue Series), that are rich in iron and magnesium and other heavy metals which many common plant species do not tolerate. In the analysis area, this chaparral is typically dominated by chamise and supports scattered populations of several special-status plants, many of them

local endemics. These special-status plants occur in a fire-adapted plant community. However, this community does not occur within the project construction area.

Riparian and Wetland Plant Communities

- Riparian and wetland plant communities in the project construction area are found both outside of Folsom Reservoir and within the fluctuation zone of the reservoir between its ordinary high water line and the minimum pool elevation of the reservoir. Outside of the fluctuation zone of Folsom Reservoir, these communities may be found adjacent to the American River, tributary streams, drainage canals from reservoir dikes, or as isolated communities. Approximately 41 acres of woody riparian vegetation are present in the maximum extent of the project construction area. No woody riparian vegetation is present in the future inundation zone portion of the CAR evaluation area.

- *Cottonwood-Willow Riparian (Sensitive).* Vegetation communities dominated by Fremont cottonwood (*Populus fremontii* ssp. *fremontii*) and various species of willow (*Salix* spp.) are typically found on floodplains, riparian areas, and low-gradient depositions along the banks of rivers, seeps, and streams where soils are intermittently flooded. Cottonwood communities in the project area contain elements of both great valley cottonwood riparian forests and willow scrub described by Holland (1986) and the Fremont cottonwood series and mixed willow series described by Sawyer and Keeler-Wolf (1995).

- *Freshwater Marsh (Sensitive).* Freshwater marsh communities within the project area are wetland communities fed by seeps or springs and are permanently to semi-permanently flooded. The dominant species was cattail (*Typha latifolia*). The most applicable vegetation community described in the literature is coastal and valley freshwater marsh, a community dominated by perennial, emergent monocots including bulrush (*Scirpus* spp.) and cattail (*Typha* spp.) (Holland 1986). Approximately one acre of freshwater marsh is present in the maximum extent of the project construction area.

- *Riparian Vegetation Associated with the Reservoir Fluctuation Zone.* Scattered stands of willow and other woody vegetation are present within the reservoir fluctuation zone in the project area. Several categories have been mapped within this general vegetation type.

  The Gooding's willow community is created by mature Gooding's willow (*Salix goodingii*) trees that reached an average height of 30 feet. These communities are generally present within 100-200 feet below the OHWM within the heavily vegetated portion of the reservoir shoreline. Understory

species are common herbaceous species including Bermuda grass (*Cynodon dactylon*), spiny cocklebur (*Xanthium strumarium*) and rushes (*Juncus* sp.).

Mixed Riparian Areas within the Reservoir Fluctuation Zone are generally associated with depressions, or riparian areas within the reservoir fluctuation zone. These areas appeared to be frequently inundated and also likely received overland flow from upland areas. Species present include rushes, buttonwillow (*Cephalanthus occidentalis*), seep monkey flower (*Mimulus guttatus*) and other common species.

Shrub Willow vegetation within the Reservoir Fluctuation Zone is dominated by willow shrubs (*Salix* sp.) that occur at certain areas at the very lowest elevations of the reservoir shoreline. These areas are frequently inundated and had saturated soil conditions.

Seasonal Wetland Communities

Seasonal wetland communities were mapped both inside and outside of the reservoir-influenced zone. The majority of wetland areas within the project area are seasonal. These communities are exposed to wetland hydrology for a limited period of time, though it may be for long enough duration to show indicators of wetland soil and hydrology and to seasonally host hydric vegetation. Much of this area, however, does not meet all three wetland criteria. Approximately 5 acres of seasonal wetlands are present in the maximum extent of the project construction area. Descriptions of the various types of seasonal wetland communities observed in the project construction area are provided below. No seasonal wetland vegetation has been mapped in the future inundation zone portion of the CAR evaluation area.

Seasonal Depression Vegetation within the Reservoir Fluctuation Zone is generally associated with depressions, or riparian areas within the area influenced by the reservoir. These areas appear to be frequently inundated and also likely receive overland flow from upland areas. Species present include rushes, seep monkey flower and other common species.

Seasonal Wetland Slope Community within the Reservoir Fluctuation Zone is by far the most common vegetation community below the OHWM of the reservoir. Dominant species include Bermuda grass, sand spurrey (*Spergularia* spp.), rough cocklebur, and rushes, with each species alternating in dominance, depending on the site conditions. Rushes and rough cocklebur appear to dominate the more mesic sites and depressions while Bermuda grass and sand spurrey are more common in the drier areas.

- *Seasonal Depressions and Riparian Areas Outside the Reservoir Fluctuation Zone.* Seasonally wet areas in the project area outside the reservoir

fluctuation zone were also mapped. These communities receive water from seeps, drainages and from direct precipitation. Some areas are confined to a distinct channel, but one area with uneven terrain and a partly-exposed bedrock outcrop has what appears to be seasonal ponding. Dominant species include pointed rush (*Juncus oxymeris*), Baltic rush (*Juncus balticus*), and often scattered willow and cottonwood. During the dry season, these areas support annual upland vegetation such as non-native brome grasses (*Bromus* spp.) and other forbs.

Disturbed Areas

- *Reservoir Shoreline Fluctuation Zone: Barren Areas.* The reservoir shoreline fluctuation zone occurs between the 425-foot and 466-foot elevations, which corresponds with the minimum and maximum pool volumes for the reservoir. Barren areas within this zone are generally devoid of vegetation or supported less than 10 percent cover. Areas of deep sand and rock are prevalent in this zone.

- *Developed Areas.* Developed land is intensively used with much of the land paved or covered by structures. The urban community includes residential, commercial, and industrial development. Vegetation in urban areas generally consists of non-native landscape species (lawns, flowerbeds, shrubs, or ornamental trees) or cleared areas that are generally devoid of vegetation.

  Developed communities within the project area include rip-rap slopes of dams and dikes, roads, trails, or parking lots. These communities are generally outside of the OHWM except in the case of a dam or dike in which the toe of the structure would be within the OHWM. Dikes and dams are generally devoid of vegetation but sometimes hosted ruderal species such as Mediterranean grasses, short-pod mustard, telegraph weed, yellow star thistle and tree tobacco (*Nicotiana glauca*). Parks and other developed areas are outside of the reservoir influence and are dominated by horticultural or ruderal species. Approximately 35 acres of developed land are present in the project construction area (Table 3.5-1).

Table 3.5-1
Vegetation Community Acreages in the Maximum Project Construction Area

Vegetation Community	***Acres***
Oak Woodland (Interior Live Oak and Blue Oak)	81
Annual Grassland	180
Riparian	41
Freshwater Marsh	1
Seasonal Wetland	12
Reservoir Fluctuation Zone: Ruderal and Barren Areas	667*
Developed Areas	35

*Some of this area extends below the water line on the aerial images and is not included in this value

Special-Status Plant Species

Special-status plants in this document are species in any of the following categories: plants listed, proposed for listing, or candidates for possible future listing under the federal Endangered Species Act (endangered [FE], threatened [FT], candidate species for listing [FC] and species proposed for listing [FPE, FPT]), plants listed or proposed for listing under the California Endangered Species Act (endangered [CE], threatened [CT]), plants listed as rare or endangered under the California Native Plant Protection Act (Rare [CR]), plants that meet the definitions of rare or endangered under the State CEQA Guidelines, plants by the California Native Plant Society (CNPS) to be "rare, threatened, or endangered in California" (Lists 1B and 2), plants by CNPS as plants about which more information is needed to determine their status, and plants of limited distribution (Lists 3 and 4), which may be included as special-status species on the basis of local significance.

A list of special-status plants that are reported to occur or have potential to occur in the analysis area or vicinity was compiled based on consultation with the USFWS, and searches of the latest version of the CNDDB (2005a, 2006).

Based on known occurrences and quality of existing habitat, a total of five special-status plant species have potential to occur in the project area. A table of all special-status species reported from the project vicinity and an evaluation of their potential to occur is provided in Appendix C. The five plant species are San Joaquin spearscale (*Atriplex joaquiniana*), big-scale balsamroot (*Balsamorhiza macrolepis* var. *macrolepis*), El Dorado bedstraw (*Galium californicum* ssp. *sierrae*), Boggs Lake hedge-hyssop (*Gratiola heterosepala*), and Layne's butterweed (*Senecio layneae*). The following section provides a brief description of each species followed by their potential to occur in the project area.

San Joaquin spearscale (Atriplex joaquiniana) – CNPS List 1B.

A member of the Chenopodiaceae family, the San Joaquin spearscale is an annual herb that blooms from April to October. The San Joaquin spearscale is found in chenopod scrub, meadows, playas, valley and foothill grassland habitats or alkaline soils within the elevation range of 1 to 1,050 feet. This species has been found in Alameda, Contra Costa, Colusa, Glenn, Merced, Monterey, Napa, Sacramento, San Benito, Santa Clara [extirpated], San Joaquin [extirpated], Solano, Tulare [extirpated], and Yolo Counties (CNPS 2001).

It is unlikely that the San Joaquin spearscale would occur within the project area because there are no chenopod scrubs, playas, or alkaline areas within the project vicinity.

Big-scale balsamroot (Balsamorhiza macrolepis var. macrolepis) – CNPS List 1B.

The big-scale balsamroot is a perennial herb that blooms from March to June. A member of the Asteraceae family, the big-scale balsamroot is found in chaparral, cismontane woodland, valley and foothill grassland habitats and sometime serpentinite soils within an elevation range of 295 to 4,600 feet. The big-scale balsamroot has been within Alameda, Butte, Colusa, Lake, Mariposa, Napa, Placer, Santa Clara, Solano, Sonoma, and Tehama Counties (CNPS 2001).

Although there is no serpentinite within the project area, there is a possibility of finding the big-scale balsamroot on other substrates within woodland and grassland communities in the project area.

El Dorado bedstraw (Galium californicum ssp. sierrae) – FE, CR, CNPS List 1B.

The El Dorado bedstraw is a perennial herb that blooms from May to June. A member of the Rubiaceae family, this species is only found in El Dorado County. The El Dorado bedstraw is found within chaparral, cismontane woodland, lower montane and coniferous forest habitats and gabbroic soils within an elevation range from 100 to 585 meters (CNPS 2001). No critical habitat has been designated for this species.

It is unlikely that El Dorado bedstraw occurs in the project area based on the lack of chaparral and coniferous forest. However, the project area is in the lower extent of the elevation range for this species, and cismontane woodland is present. Therefore, there is a small possibility that this species could be present.

Boggs Lake hedge-hyssop (Gratiola heterosepala) – CE, CNPS List 1B.

Boggs Lake hedge-hyssop is an annual herb and a member of the Scrophulariaceae family. This species can be found in marshes, swamps (lake margins), and vernal pool habitats on clay soils ranging from 10 to 2,375 meters in elevation. Boggs Lake hedge-hyssops bloom from April to August and have been known to occur in Fresno, Lake, Lassen, Madera, Merced, Modoc, Placer, Sacramento, Shasta, Siskiyou, San Joaquin, Solano and Tehama Counties as well as parts of Oregon (CNPS 2001).

The project area is within the known range Boggs Lake hedge-hyssop. Small areas of seasonal wetland and marshy habitat are present within the project area, but are not on clay soils. This species is not expected to occur in the project area.

Amador rush-rose (Helianthemum suffrutescens) – CNPS List 3.

Amador (Bisbee Peak) rush-rose is an evergreen shrub in the Asteraceae family. This species is found on serpentinite, gabbroic, or Ione soils in chaparral at elevations from 45 to 840 meters (CDFG 2005). Amador rush-rose flowers from

April to May. This rush-rose has been reported from Amador, Calaveras, El Dorado, Sacramento, and Tuolumne Counties (CNPS 2001).

Most of the construction area for the project does not include suitable habitat for the Amador (Bisbee Peak) rush-rose, but it could occur at sites for new embankments/flood easements or in the area that would be inundated by a large flood event if the dams and dikes are raised.

Layne's butterweed (Senecio layneae) – FT, CR, CNPS List 1B.

The Layne's butterweed is a perennial herb that blooms from April to May in chaparral and cismontane woodland habitats on serpentinite, gabbroic and/or rocky soils. A member of the Asteraceae family, the Layne's butterweed is found in El Dorado, Tuolumne and Yuba Counties. Habitat areas fall within 200 to 1,000 meters in elevation (CNPS 2001). No critical habitat has been designated for this species.

Layne's butterweed is not likely to occur in the project construction area based on the limited chaparral and lack of serpentinite soils.

El Dorado mule-ears (Wyethia reticulata) – CNPS List 1B.

El Dorado mule-ears is a perennial herb in the Asteraceae family. This species is found on clay or gabbroic soils in chaparral, cismontane woodland, and lower montane coniferous forest at elevations from 185 to 630 meters (CDFG 2005). El Dorado mule-ears flowers from May to July. This mule-ears is known only from El Dorado County (CNPS 2001).

Most of the construction area for the project does not include suitable habitat for El Dorado mule-ears, but it could occur at sites for new embankments/flood easements or in the area that would be inundated by a large flood event if the dams and dikes are raised.

Wildlife

This section presents information on wildlife resources in the analysis area. Descriptions of wildlife resources are derived from the *American River Watershed, California Long-Term Study Final Supplemental Plan Formulation Report/ Environmental Impact Statement/ Environmental Impact Report (Corps 2002) and the Draft Resource Inventory Folsom Lake State Recreation Area* (LSA 2003).

Common Wildlife Habitats

Common habitats are distinguished from sensitive habitats on the basis of their local, regional, or statewide abundance. In the analysis area, common wildlife habitats include chaparral, annual grassland, and ruderal fields (Corps 2002).

Chaparral.

Chaparral provides important cover and foraging habitat for brush-dependent wildlife and a range of other wildlife species. Wrentits (*Chamaea fasciata*) and California thrashers (*Toxostoma redivivum*) are primarily chaparral-dependent wildlife species; other species that use the chaparral habitat include spotted towhees (*Pipilo maculatus*), California towhees (*Pipilo crissalis*), golden-crowned sparrows (*Zonotrichia atricapilla*), orange-crowned warblers (*Vermivora celata*), gray foxes (*Urocyon cinereoargenteus*), coyotes (*Canis latrans*), and mule deer (*Odocoileus hemionus*). Many species of reptiles occur in chaparral, including western rattlesnakes (*Crotalus viridis*), gopher snakes (*Pituophis melanoleucus*), western fence lizards (*Sceloporus occidentalis*), and western whiptails (*Cnemidophorus tigris*) (Corps 2002).

Annual Grassland.

Annual grasslands in the analysis area have moderate value as wildlife habitat. Grasslands provide foraging habitat for wide-ranging species such as red-tailed hawks (*Buteo jamaicensis*), coyotes, gray foxes, and bobcats (*Lynx rufus*). These species depend on grassland prey species that include California voles (*Microtus californicus*), California ground squirrels (*Spermophilus beecheyi*), gopher snakes, and western fence lizards. In addition, many species that nest or roost in adjacent woodlands, including western bluebirds (*Sialia mexicana*), western kingbirds (*Tyrannus verticalis*), and some species of bats may forage in grasslands (Corps 2002).

Ruderal Fields.

Ruderal fields have similar wildlife values to those of annual grasslands, except that they commonly support fewer wildlife species. They are dominated by non-native plants and, therefore, may offer sparse cover. In addition, ruderal fields are typically disturbed on a more or less ongoing basis by human activity, which further reduces their value for wildlife (Corps 2002).

Sensitive Wildlife Habitats

For purposes of this document, the term sensitive habitat is defined as plant communities and wildlife habitats composed of native species that are especially diverse, regionally uncommon, or of specific concern to state or federal agencies. Sensitive habitats in the analysis area include seasonal wetland, freshwater marsh, oak woodland and savanna, blue oak woodland and savanna, willow scrub, and riparian forest (Corps 2002).

Oak Woodland and Savanna.

Oak woodlands and savannas offer diverse, abundant, and valuable wildlife habitat. Oak trees provide nesting sites for cavity-nesting birds and small mammals, including acorn woodpeckers (*Melanerpes formicivorus*), Nuttall's

woodpeckers (*Picoides nuttallii*), northern flickers (*Colaptes auratus*), white-breasted nuthatches (*Sitta carolinensis*), oak titmice (*Baeolophus inornatus*), western bluebirds, western gray squirrels (*Sciurus griseus*), and raccoons (*Procyon lotor*). Oak trees also provide roosting sites for some species of bats including the hoary bat (*Lasiurus cinereus*) and pallid bat (*Antrozous pallidus*). Acorns are used by a variety of wildlife species, including California quail (*Callipepla californica*), wild turkeys (*Meleagris gallopavo*), northern flickers, western scrub-jays (*Aphelocoma californica*), western gray squirrels, and mule deer. Oak foliage provides a foraging substrate for insectivorous birds such as ruby-crowned kinglets (*Regulus calendula*), bushtits (*Psaltriparus minimus*), warbling vireos (*Vireo gilvus*), Hutton's vireos (*Vireo huttoni*), and Wilson's warblers (*Wilsonia pusilla*). Blackberries and elderberries are eaten by many species of birds and mammals, including American robins (*Turdus migratorius*), Bullock's orioles (*Icterus bullockii*), house finches (*Carpodacus mexicanus*), spotted towhees, California towhees, and gray foxes. Finally, the shrub understory of these habitats provide cover for many species of songbirds as well as for California quail, gopher snakes, common kingsnakes (*Lampropeltis getula*), bobcats, gray foxes, and a variety of rodents (Corps 2002).

Blue Oak Savanna.

Blue oak savanna has particularly high value for wildlife because blue oak trees provide excellent substrates for cavity-nesting wildlife. Wildlife use of blue oaks in the savanna setting is similar to the use of oak woodlands described above, except that the higher density of blue oaks provides a greater number of nesting sites for cavity-nesting birds and small mammals (Corps 2002).

Willow Scrub.

Willow scrub along the North Fork American River and South Fork American River has high value for wildlife. Willow scrub provides cover, nesting habitat, and foraging habitat for many wildlife species, including habitat particularly suitable for migratory songbirds. Belted kingfishers (*Ceryle alcyon*), Anna's hummingbirds (*Calypte anna*), bushtits, ruby-crowned kinglets, Wilson's warblers, yellow warblers (*Dendroica petechia*), and lesser goldfinches (*Carduelis psaltria*) also use the willow scrub environment, as do Pacific treefrogs (*Hyla regilla*), raccoons, striped skunks (*Mephitis mephitis*), and mule deer (Corps 2002).

Permanent Freshwater Marsh.

Small areas of Permanent Freshwater Marsh are found at the toe of the Mormon Island Auxiliary Dam. Water birds and other wildlife depend on the freshwater marshes in these areas for foraging and/or rearing habitat. These species include Pacific treefrogs, western toads (*Bufo boreas*), common garter snakes

(*Thamnophis sirtalis*), beavers (*Castor canadensis*), raccoons, and muskrats (*Ondatra zibethicus*) (Corps 2002).

Special-Status Wildlife Species

Special-status wildlife in this document are species in any of the following categories: species that are federally listed as endangered (FE) or threatened (FT), species that are proposed for federal listing (FPE, FPT) or are candidates (FC) for possible future listing under the federal Endangered Species Act, species listed or proposed for listing under the California Endangered Species Act or other state statutes (endangered (CE), threatened (CT), rare (CR), species identified as state species of concern by CDFG (CSC), and state fully protected species (CFP). A list of special-status wildlife that are reported to occur or have potential to occur in the analysis area or vicinity was compiled based on consultation with the USFWS, and searches of the latest version of the CNDDB (2005, 2006).

Based on known occurrences and quality of existing habitat, a total of 27 special-status terrestrial wildlife species have the potential to occur in the project area (Table 3.5-2). These species include one invertebrate, three amphibians, three reptiles, sixteen birds and four mammals are described below. A table of all special-status wildlife species reported from the project vicinity and an evaluation of the likelihood of their occurrence in the project area is provided in Appendix C.

One special-status terrestrial invertebrate species with potential to occur is the valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*). Special-status amphibian and reptile species that may occur are California red-legged frog (*Rana aurora draytonii*), foothill yellow-legged frog (*Rana boylii*), western spadefoot toad (*Spea* [*Scaphiopus*] *hammondii*), western pond turtle (*Emys* [*Clemmys*] *marmorata marmorata*), California horned lizard (*Phrynosoma coronatum frontale*), and giant garter snake (*Thamnophis gigas*).

Special-status bird species with potential to occur are Cooper's hawk (*Accipiter cooperii*), tricolored blackbird (*Agelaius tricolor*), western burrowing owl (*Athene cunicularia hypugaea*), Aleutian Canada goose (*Branta canadensis leucopareia*), ferruginous hawk (*Buteo regalis*), Swainson's hawk (*Buteo swainsoni*), Vaux's swift (*Chaetura vauxi*), mountain plover (*Charadrius montanus*), white-tailed kite (*Elanus leucurus*), American peregrine falcon (*Falco peregrinus anatum*), bald eagle (*Haliaeetus leucocephalus*), loggerhead shrike (*Lanius ludovicianus*), long-billed curlew (*Numenius americanus*), osprey (*Pandion haliaetus*), white-faced ibis (*Plegadis chihi*), and bank swallow (*Riparia riparia*).

Special-status mammals that may occur are pallid bat (*Antrozous pallidus*), Pacific western big-eared bat (*Corynorhinus* [*Plecotus*] *townsendii townsendii*), spotted bat (*Euderma maculatum*), and greater western mastiff-bat (*Eumops perotis*

californicus). The following section provides a brief description of each species followed by the likelihood of their occurrence in the project area.

Table 3.5-2
Special-status Terrestrial Wildlife Species Potentially Occurring in the Project Area

Species	Status
Invertebrates	
Valley elderberry longhorn beetle	FT
Amphibians	
California red-legged frog	FT, CSC
Foothill yellow-legged frog	CSC
Western spadefoot toad	CSC
Reptiles	
Northwestern pond turtle	CSC
California horned lizard	CSC
Giant garter snake	FT, CT
Birds	
Cooper's hawk	CSC
Tricolored blackbird	CSC
Western burrowing owl	CSC
Aleutian Canada goose	FD
Ferruginous hawk	CSC
Swainson's hawk	CT
Vaux's swift	CSC
Mountain plover	CSC
White-tailed (=black shouldered) kite	CSC, CFP
American peregrine falcon	FD, CE
Bald eagle	FT, CE, CFP
Loggerhead shrike	CSC
Long-billed curlew	CSC
Osprey	CSC
White-faced ibis	CSC
Bank swallow	CT
Mammals	
Pallid bat	CSC
Pacific western big-eared bat	CSC
Spotted bat	CSC
Greater western mastiff-bat	CSC

Special-status Invertebrates

- *Valley Elderberry Longhorn Beetle (Desmocerus californicus dimorphus) – FT*. The valley elderberry longhorn beetle is associated with various species of elderberry (*Sambucus* spp.). This beetle generally occurs along waterways and in floodplains that support remnant stands of riparian vegetation. Both larvae and adult beetle feed on elderberry shrubs. Larvae feed internally on the pith of the trunk and larger branches, while adult beetles appear to feed

externally on elderberry flowers and foliage. Prior to metamorphosing into the adult life stage, the larvae chew an exit hole in the elderberry trunk, through which the adult beetle later exits the plant (CDFG 2003). Critical habitat has been designated for this species, but does not include the project area (Federal Register 1980).

The Folsom project area contains blue elderberry (*Sambucus mexicana*), the host plant of the valley elderberry longhorn beetle. Exit holes have been observed in the elderberry shrubs in the project area. Therefore, this species occurs within the project area. Results of protocol elderberry surveys conducted for the Folsom DS/FDR Action are shown in Figure 3.5-1 and Table 3.5-3.

Table 3.5-3
Elderberry Shrubs Within or Adjacent to the Folsom DS/FDR Action Area

Location	Stem Diameter (maximum at ground level)	Exit Hole on Shrub	Number of Stems Observed
Transplantable Shrubs[1]			
Non-Riparian	1-3 inches	No	147
		Yes	66
Non-Riparian	3-5 inches	No	91
		Yes	31
Non-Riparian	More than 5 inches	No	141
		Yes	27
Riparian	1-3 inches	No	5
		Yes	0
Riparian	3-5 inches	No	14
		Yes	0
Riparian	More than 5 inches	No	15
		Yes	0
Total Shrubs	150		
Non-Transplantable Shrubs[2]			
Non-Riparian	1-3 inches	No	5
		Yes	0
Non-Riparian	3-5 inches	No	4
		Yes	0
Non-Riparian	More than 5 inches	No	7
		Yes	1
Riparian	1-3 inches	No	7
		Yes	0
Riparian	3-5 inches	No	0
		Yes	0
Riparian	More than 5 inches	No	10
		Yes	0
Total Shrubs			11

1 indirect effects to 34 transplantable shrubs compensated for under earlier contracts
2 indirect effects to 9 non-transplantable shrubs compensated for under earlier contracts

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Special-status Amphibians

- *California red-legged frog (Rana aurora draytonii) - FT, CSC.* The California red-legged frog is a federally threatened species (Federal Register 1996) and a California species of special concern. Critical habitat for this species was designated in 2001. However, on November 6, 2002, the U.S. District Court for the District of Columbia entered a consent decree, vacating the critical habitat designation (except Units 5 and 31) and remanding the designation to the USFWS to conduct an economic analysis. The USFWS released a recovery plan in 2002 (USFWS 2002). Critical habitat was again designated on April 13, 2006 (Federal Register 2006). No proposed critical habitat is within the project area.

  Historically, the California red-legged frog occurred in coastal mountains from Marin County south to northern Baja California, and along the floor and foothills of the Central Valley from about Shasta County south to Kern County (Jennings et al. 1992). Currently, this subspecies generally only occurs in the coastal portions of its historic range; it is apparently extirpated from the valley and foothills and in most of southern California south of Ventura County. California red-legged frogs are usually associated with aquatic habitats, such as creeks, streams and ponds, and occur primarily in areas having pools approximately three feet deep, with adjacent dense emergent or riparian vegetation (Jennings and Hayes 1988). Adult frogs rarely move large distances from their aquatic habitat. California red-legged frogs breed from November to March. Egg masses are attached to emergent vegetation (Jennings and Hayes 1994) and hatch within fourteen days. Metamorphosis generally occurs between July and September.

  Within the project construction area, perennial and intermittent creeks and Folsom Reservoir may provide marginally suitable habitat for this species. This frog has been reported from a location upstream of the construction project area in a tributary to Folsom Reservoir (CDFG 2006b). The presence of centrarchids (including species of the warmwater fish community such as bass) and fluctuating reservoir levels that affect vegetation communities make Folsom Reservoir marginally suitable to unsuitable for this species. Perennial and intermittent creeks, seasonal wetlands, and ponds may provide marginally suitable habitat for adult California red-legged frog, but the lack of vegetation and/or the presence of centrarchids substantially reduce the value of aquatic habitat for spawning and rearing frogs.

- *Foothill Yellow-Legged Frog (Rana boylii) – CSC.* Foothill yellow-legged frogs inhabit foothill and mountain streams from sea level to about 6,000 feet in elevation. Their known range includes the Coast Ranges from the Oregon border south to the Transverse Mountains in Los Angeles County, most of

northern California west of the Cascade crest, and along the western flank of the Sierra south to Kern County. Most records are below 3,500 feet. The foothill yellow-legged frog is found in a variety of habitats, including valley-foothill hardwood, valley-foothill hardwood-conifer, valley-foothill riparian, ponderosa pine, mixed conifer, coastal scrub, mixed chaparral, and wet meadow types (Zeiner et al. 1988).

Home ranges are small, but these frogs may move several hundred meters to spawning habitat. Adult frogs congregate at suitable spawning sites as spring runoff declines, when water temperatures reach 54ºF to 59ºF (12ºC to 15ºC), usually any time from mid-March to May, depending on local water conditions. The breeding season at any locality is usually about two weeks for most populations. Spawning frogs favor low to moderately steep gradient streams (0 to 8 degrees). Females deposit eggs in shallow edgewater areas with low water velocities (Seltenrich and Pool 2002). Egg masses are often attached to the downstream sides of cobbles and boulders, or to gravel, wood, or other materials. Eggs hatch in approximately five days. Tadpoles transform in three to four months and stay for a time in spawning habitat but eventually disperse. Tadpoles feed on diatoms or algae on the surface of the substrate (Stebbins 1951). Tadpoles favor calm, shallow water.

Juvenile and adult frogs bask on midstream boulders or in terrestrial sites along riffles, cascades, main channel pools, and plunge-pools, often in dappled sunlight near low overhanging vegetation. Adults generally avoid deep shade. Foothill yellow-legged frogs are relatively strong swimmers and prefer faster water habitat than do other frog species in the foothills, such as the bullfrog (*Rana catesbeiana*) or the California red-legged frog.

Foothill yellow-legged frogs are not likely to occur in the project area, although they may occur in upstream areas. Fluctuating reservoir levels and the presence of exotic species (bullfrogs, crayfish and introduced fish) probably preclude the establishment of a viable population. The perennial and intermittent creeks provide potential habitat, however they are likely too small and lack the appropriate substrate to sustain a viable population (Wallace et al. 2003).

- *Western Spadefoot Toad (Spea [Scaphiopus] hammondii) – CSC.* This species ranges throughout the Central Valley and adjacent foothills from sea level to 4,500 feet, primarily in grasslands with shallow temporary pools, and occasionally in valley-foothill hardwood. The Western spadefoot toad typically lives underground in burrows up to 3 feet deep during most of the year, with the first rains of the year initiating movement to the surface. Terrestrial burrowing sites may be well removed from breeding sites.

Breeding occurs from late winter to late March. Western spadefoot toad utilizes shallow, temporary pools formed by heavy winter rains, with sand and gravel substrate, for breeding habitat and tadpole rearing. Sandy, gravelly washes or small streams (often temporary) may also be used. Egg masses, in clusters of 10 to 40, are attached to plant material, or the upper surfaces of small, submerged rocks, with eggs hatching within two weeks. During late spring, recently metamorphosed juveniles seek refuge in breeding ponds for several days after transformation (Zeiner et al. 1988, Stebbins 1972). However, aquatic breeding habitat is unsuitable in the presence of predators (bullfrogs, fish or crayfish) or in the presence of mosquitofish.

While most of the grassland/savanna communities in the project area appear suitable for adult toads, there is little suitable aquatic habitat for reproduction. Most of the seasonal wetlands in the project area are too small to hold water long enough for spadefoot larvae to reach metamorphosis (LSA 2003). There are few seasonal wetlands that may inundate long enough to serve as rearing habitat. Therefore, the lack of breeding habitat may limit the population within the project area.

Special-status Reptiles

- *Western pond turtle (Emys [Clemmys] marmorata marmorata) – CSC.* This turtle occurs in suitable aquatic habitat throughout California, west of the Sierra-Cascade crest, from sea level to about 6,000 feet (Zeiner et al. 1988). It is absent from desert regions except in the Mojave Desert along the Mojave River and its tributaries. It is found in permanent or nearly permanent water in a wide variety of habitat types with basking sites such as partially submerged logs, rocks, mats of floating vegetation, or open mud banks. Individuals are active all year where climates are warm but hibernate during cold periods elsewhere. During the spring or early summer, females move overland up to 325 feet to find suitable sites for egg-laying. Eggs are laid from March to August depending on local conditions and incubate from 73 to 80 days. Sexual maturity is reached at about eight years of age (Zeiner et al. 1988).

  Most of the creeks, ponds, and reservoir backwater areas in the project area are suitable for western pond turtles. They have been regularly observed in the vicinity of the project area at Avery's Pond since the 1970's (David Murth pers. obs., as cited in LSA 2003). Avery's Pond is a constructed pond near the reservoir shoreline at Rattlesnake Bar, more than 2.5 miles upstream from the construction Project area. Western pond turtles may also inhabit the preserve downstream from MIAD. However, Holland (1994) and Jennings and Hayes (1994) suggest that turtles that are found occupying reservoirs, stock ponds and the like represent displaced individuals and, therefore, do not represent viable populations.

- *California horned lizard (Phrynosoma coronatum frontale) - CSC.* The California horned lizard occurs in open country, especially gravelly or sandy areas, washes, flood plains and wind-blown deposits, sand dunes, alluvial fans, etc. Common habitats include valley foothill hardwood, conifer and riparian habitats, alkali flats, chaparral, as well as in pine-cypress, juniper and annual grass habitats. This lizard has a wide range in California occurring from Shasta County south, along the Sacramento Valley, east to the Sierra Nevada foothills (below 4,000 feet), west through much of the South Coast Ranges, and in the Southern California deserts and mountains below 6,000 feet. Horned lizards are generally active from April through October. The reproductive season for the California horned lizard varies from year to year and geographically depending on local conditions. Courtship generally occurs in the spring, and hatchlings first appear in mid-summer. Horned lizards prefer to eat ants, but they will also eat many other types of invertebrates, such as grasshoppers, beetles, and spiders.

  Suitable habitat is present for the California horned lizard within the project area. In addition, recorded observations of this species have occurred within five miles of the project site within the past 20 years (CDFG 2005a). It is likely that this species occurs within the project area.

- *Giant garter snake (Thamnophis gigas) - FT, CT.* The giant garter snake historically ranged in the Sacramento and San Joaquin valleys from Butte County in the north to Kern County in the south (Rossman et al. 1996). Its current range is much reduced, and it is apparently extirpated south of northern Fresno County (Bury 1971; Rossman et al. 1996). No critical habitat has been designated for this species.

  The giant garter snake inhabits marshes, sloughs, ponds, small lakes, low-gradient streams, and other waterways and agricultural wetlands, such as irrigation and drainage canals and rice fields. Giant garter snakes feed on small fishes, tadpoles, and frogs (Fitch 1941; Federal Register 1993). Habitat requirements consist of adequate water during the snake's active season (early-spring through mid-fall) to provide food and cover; emergent herbaceous wetland vegetation, such as cattails and bulrushes, for escape cover and foraging habitat during the active season; grassy banks and openings in waterside vegetation for basking; and higher elevation uplands for cover and refuge from flood waters during the snake's dormant season in the winter (Federal Register 1993). Giant garter snakes are absent from larger rivers and other waterbodies that support introduced populations of large, predatory fish, and from wetlands with sand, gravel, or rock substrates (Rossman and Stewart 1987; Brode 1988, Federal Register 1993).

The giant garter snake inhabits small mammal burrows and other soil crevices above prevailing flood elevations throughout its winter dormancy period (November to mid-March). Giant garter snakes typically select burrows with sunny aspects along south and west facing slopes. Upon emergence, males immediately begin wandering in search of mates. The breeding season extends through March and April, and females give birth to live young from late July through early September (Hansen and Hansen 1990). Brood size is variable, ranging from 10 to 46 young (Hansen and Hansen 1990). Young immediately scatter into dense cover and absorb their yolk sacs, after which they begin feeding on their own. Sexual maturity averages 3 years of age in males and 5 years for females.

It is unlikely that the seasonal wetlands in the project area hold water throughout the summer and into the fall. While potential habitat may exist within the vicinity of the project area, it is unlikely that a viable population occurs within the boundaries of the project.

Special-status Birds

- *Cooper's Hawk (Accipiter cooperii) – CSC.* The Cooper's hawk is a breeding resident throughout most of the wooded portion of the state. The Cooper's hawk, which can be found in elevations ranging from sea level to 8,860 feet, requires dense stands of live oak, riparian, deciduous, or other forest habitats near water when nesting. The breeding season begins in March and continues through August, with average clutch sizes of 4 to 5 eggs. During this period, the female will incubate the eggs while the male provides food. The hawk's primary food source is small birds, supplemented by reptiles and amphibians. More of an ambush predator, the Cooper's hawk will take prey from the ground, on branches or in mid-flight (Johnsgard 1990). Hunting takes place in broken woodland and habitat edges. The Cooper's hawk is seldom found in areas without dense tree stands. Some individuals are year-long residents of California, while others from the more northern areas winter in California. Cooper's hawks are commonly found in the southern Sierra Nevada foothills, New York Mountains, Owens Valley, and other local areas in southern California (Zeiner et al. 1990a).

  There is a high potential for the Cooper's hawk to occur within the project area because there is suitable nesting habitat and project sites are within their known range. A wintering Cooper's hawk was observed perched in an oak tree in the vicinity of Beal's Point behind Dike 6 on December 29, 2005 (Schell pers. comm. 2005).

- *Tricolored blackbird (Agelaius tricolor) – CSC.* The tricolored blackbird ranges throughout the Central Valley of California, typically nesting in colonies numbering several hundred. An adequate breeding ground for the

tricolored blackbird requires open water, protected nesting substrate (emergent wetland vegetation) and a foraging area with insect prey within a few kilometers (miles) of the colony. Tricolored blackbird foraging habitats in all seasons include pastures, agricultural fields and dry seasonal pools. Occasionally these birds will also forage in riparian scrub, marsh boarders and grassland habitats. Egg laying generally begins within 4 days of the colonies arrival, with one egg being laid per day and clutch size usually around three to four eggs. Tricolored blackbirds typically leave their wintering areas in late March and early April for breeding locations in Sacramento County and throughout the San Joaquin Valley (Beedy and Hamilton 1997).

There is potential for the tricolored blackbird to occur within the project area due to the presence of suitable foraging sites (i.e., grasslands) in an around the project area. No suitable nesting habitat is present due to the limited size of emergent marshland habitat.

- *Western burrowing owl (Athene cunicularia hypugaea) –CSC.* The western burrowing owl was formerly a common permanent resident throughout much of California. However, a decline that became noticeable in the 1940's (Grinnell and Miller 1944) has continued through to the present time. The western burrowing owl is a year-long resident of open, dry grassland and desert habitats often associated with burrowing animals. They have also been found to inhabit grass, forb, and shrub stages of pinyon and ponderosa pine habitats. Western burrowing owls commonly perch on fence posts or on top of mounds outside their burrows. Western burrowing owls are active both day and night, with a lessening in activity at the peak of the day. Western burrowing owls are opportunistic feeders and large arthropods comprise a majority of their diet. Small mammals, reptiles, birds, and carrion are also important components of the burrowing owl's diet (Zeiner et al. 1990a). The nesting season of the burrowing owl occurs from February through August, with a peak in breeding occurring from April to May. Western burrowing owls nest in burrows in the ground and often utilize old ground squirrel or other small mammal nests (Zeiner et al. 1990a). However, western burrowing owls may dig their own nests in areas of soft soil. Pipes, culverts, and nest boxes are also used in areas where burrows are scarce (Robertson 1929).

  Portions of the project area contain grassland habitat with small mammal burrows. Therefore, there is potential for Western burrowing owls to occur.

- *Aleutian Canada goose (Branta canadensis leucopareia) - FD.* The Aleutian Canada goose breeds in the Aleutian Island chain of Alaska and winters in California, Oregon and Washington. These geese are among the smaller of the Canada goose subspecies, and migrate south to wintering areas between

August and December, with the greatest number leaving the Aleutian Island chain in September. Aleutian Canada geese are omnivores, having a steady diet of arthropods, evergreen shrubs, roots, tubers, leaves, and stems during the breeding season; with all their water taken from vegetation. During the non-breeding season they feed on crops such as corn, wheat, barley, oats, and lima beans. They can be found wintering on lakes, reservoirs, ponds and inland prairies, and will forage on natural pasture or fields cultivated in grain (Sibley 2001).

There is moderate potential for the Aleutian Canada goose to occur within the project area because suitable wintering habitat is present, although the area is outside the reported wintering sites for this subspecies. A Canada goose (subspecies not identified) was observed in the vicinity of Beal's Point on November 17, 2005 (Colgate, pers. comm. 2005), and many Canada goose (subspecies not identified) were observed all around the reservoir on May 24 and 25, 2006 (Victorine, pers. comm. 2006).

- *Ferruginous hawk (Buteo regalis) - CSC.* The ferruginous hawk is an uncommon winter resident and migrant in the lower elevations and open grasslands of the Central Valley and Coast Ranges. It is a fairly common resident in the Southern Californian grasslands and agricultural areas. Ferruginous hawks favor open grasslands, sagebrush flats, desert scrubs, low foothills surrounding valleys and fringes of pinyon-juniper habitats. Requiring open, treeless areas to hunt, the ferruginous hawk feeds on rabbits, jackrabbits, ground squirrels, and mice, but also takes birds, reptiles and amphibians. It is speculated that the hawk’s population trend follows the lagomorph population cycles. There are no records of the ferruginous hawk breeding in California. Ferruginous hawks prefer to roost in open areas, usually in a lone tree or other elevated structure. Migration to California usually occurs in September, where the ferruginous hawk will remain until mid-April (Zeiner et al. 1990a).

  Roosting and foraging habitat for the ferruginous hawk is present in the vicinity of the project. Based on their reported distribution, the species is not likely to breed within the project area.

- *Swainson’s Hawk (Buteo swainsoni) – CT.* Swainson's hawk is restricted to portions of the Central Valley and Great Basin regions where suitable nesting and foraging habitat is still available. Swainson's hawk requires large, open grasslands with abundant prey in association with suitable nest trees. Suitable foraging areas include native grasslands or lightly grazed pastures, alfalfa and other hay crops, and certain grain and row croplands. Central Valley populations are centered in Sacramento, San Joaquin, and Yolo Counties. Over 85 percent of Swainson's hawk territories in the Central Valley are

associated with riparian systems adjacent to suitable foraging habitats. Swainson's hawk often nests peripherally to riparian systems, and is known to utilize lone trees or groves of trees in agricultural fields. Valley oak, Fremont cottonwood, walnut, and large willow with an average height of about 60 feet are the most commonly used nest trees in the Central Valley. Breeding occurs late March to late August, with peak activity from late May through July. Clutch size is two to four eggs (Zeiner et al. 1990a).

This species may use the riparian trees in the project area as nest sites, and they may forage on the uplands.

- *Vaux's swift (Chaetura vauxi) – CSC.* Vaux's swift is a summer resident of northern California, preferring redwood and Douglas-fir habitats. Between April and September, the Vaux's swift is a fairly common migrant throughout the state. Nesting typically takes place in hollow redwood, Douglas-fir, and occasionally other coniferous trees, with the nest near the bottom of the cavity. The Vaux's swift shows a preference to forage over rivers and lakes, but will forage over most terrain or habitat. They feed almost exclusively on flying insects taken in long continuous foraging flights. The Vaux's swift breeds from early May to mid-August, with a clutch size usually of four to five eggs (Zeiner et al. 1990a).

  Although it is unlikely that the Vaux's swift nests within the project area, there are adequate foraging sites in the project area.

- *Mountain Plover (Charadrius montanus) – CSC.* The mountain plover is known to winter in northern California, southern Arizona, New Mexico, and central Texas south into north-central Mexico, however has not been known to nest in California. The mountain plover avoids high and dense cover, preferring prairie grasslands, shortgrass plains and plowed fields with little vegetation. The mountain plover forages for large insects, in particular grasshoppers. Breeding takes place from late April through June with a peak in late May. The average clutch is three eggs. In years of abundant food, the male may incubate the existing clutch to allow the female to lay an additional clutch, often attended by another male (Zeiner et al. 1990a).

  The project area provides only marginal foraging habitat for the mountain plover, therefore this species is not likely to occur there.

- *White-Tailed Kite (Elanus leucurus) – CFP.* The white-tailed kite is a common to uncommon, year-long resident in coastal and valley lowlands, and is rarely found away from agricultural areas. This species inhabits herbaceous and open stages of most habitats in cismontane California, and uses herbaceous lowlands with variable tree growth, especially those with dense populations of voles. Substantial groves of dense, broad-leaved

deciduous trees are used for nesting and roosting. The white-tailed kite forages in undisturbed, open grasslands, meadows, farmlands, and emergent wetlands. White-tailed kites eat small rodents, especially the California vole as well as birds, snakes, lizards, frogs and large insects. Nests are built of twigs and sticks with an inner layer of grass or leaves in trees that are usually on habitat edges. Nest-building occurs January through August (Dunk 1995). Egg-laying begins in February and probably peaks in March and April. Peak fledging probably occurs in May and June with most fledging complete by October. Clutch size is most commonly four (Zeiner, et al. 1990a).

Suitable habitat for the white-tailed kite can be found within the project vicinity. Therefore, the white-tailed kite may occur within the project area.

- *American Peregrine Falcon (Falco peregrinus anatum) – FD, CE.* The American peregrine falcon is a medium-sized raptor that breeds from non-Arctic portions of Alaska and Canada south to Baja California (except the coast of southern Alaska and in British Columbia), throughout Arizona and into Mexico (locally). Nesting American peregrine falcons usually winter in their breeding range, with the exception of the more northern residents, which move south. The primary nesting habitat for the American peregrine falcon tends to be cliffs or series of cliffs that dominate the surrounding landscape. However, river cutbanks, trees, and manmade structures including tall towers and the ledges of tall buildings can also serve as suitable nesting sites. American peregrine falcons hunt their prey in the air, usually over open habitat types such as waterways, fields, and wetland areas, diving at speeds of up to 200 miles per hour to strike their targets. Bluejays, flickers, meadowlarks, pigeons, starlings, shorebirds, waterfowl, and other readily available species make up the American peregrine falcon's diet. The raptor may travel 10 to 12 miles from their nests in search of prey. Breeding takes place in later March and April, with a usual clutch size of three to four eggs.

  There is potential for the American peregrine falcon to occur within the project area. Adequate nesting sites and sufficient foraging habitat is available within the project area and vicinity.

- *Bald Eagle (Haliaeetus leucocephalus) – FT, FPD, CE, CFP.* This species is a permanent resident and uncommon winter migrant in California. Breeding is mostly restricted to Butte, Lake, Lassen, Modoc, Plumas, Shasta, Siskiyou, and Trinity Counties. About half of the wintering population is in the Klamath Basin. The bald eagle is fairly common as a local winter migrant at a few favored inland waters in southern California. The largest numbers of bald eagles occur at Big Bear Lake, Cachuma Lake, Lake Matthews, Nacimiento Reservoir, San Antonio Reservoir, and along the Colorado River. Bald eagles are typically found in coniferous forest habitats with large, old

growth trees near permanent water sources such as lakes, rivers, or ocean shorelines. This eagle requires large bodies of water with abundant fish and adjacent snags or other perches for foraging. Bald eagles prey mainly on fish and occasionally on small mammals or birds, by swooping from a perch or from mid-flight. This eagle also scavenges dead fish and other dead animals Nests are found in large, old growth, or dominant trees, especially ponderosa pine with an open branchwork, usually 50 to 200 feet above the ground. It breeds February through July, with peak activity from March to June. Clutch size is usually two. Incubation usually lasts 34 to 36 days (Zeiner et al. 1990a).

The bald eagle is known to occur within the project area and based on the availability of adequate nesting sites and foraging habitat within the project area and vicinity, the bald eagle will continue to utilize habitat within the project area. Bald eagles have over wintered in the area, but there are no reports of successful nest building activities. No critical habitat has been designated for this species.

- *Loggerhead Shrike (Lanius ludovicianus) – CSC.* The loggerhead shrike is a common resident and winter visitor in lowlands and foothills throughout California. It prefers open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches. Its highest density occurs in open-canopied valley foothill hardwood, valley foothill hardwood-conifer, valley foothill riparian, pinyon-juniper, juniper, desert riparian, and Joshua tree habitats. It occurs only rarely in heavily urbanized areas, but is often found in open cropland. It builds its nest on stable branches in densely foliaged shrubs or trees, usually well-concealed. Nest height is 1 to 50 feet above ground. It lays eggs from March into May, and young become independent in July or August. The loggerhead shrike is a monogamous, solitary nester with a clutch size of four to eight. Incubation lasts 14 to 15 days. Altricial young are tended by both parents and leave the nest at 18 to 19 days (Zeiner et al. 1990a).

  There is a high potential for the loggerhead shrike to be present within the project area because of favorable riparian woodlands within the vicinity. A wintering loggerhead shrike was observed perched on barbed wire atop a chain-link fence behind the right-wing dam on December 29, 2005.

- *Long-billed curlew (Numenius americanus) – CSC.* In California, the long-billed curlew is known to nest on elevated interior grasslands and wet meadows, usually adjacent to lakes or marshes, in northeastern California. Breeding long-billed curlew will be present in northeastern California from April to September. Generally a solitary nester, the long-billed curlew may be loosely colonial in favorable habitats. Both parents incubate a mean clutch

size of four eggs for 27 to 28 days. The long-billed curlew prefers to winter in large coastal estuaries, upland herbaceous areas, and croplands. Some years, large numbers of nonbreeders remain in the Central Valley in the summer. The long-billed curlew uses its characteristic long bill to probe deep into substrate, or to grab prey from mud surfaces. During its inland stay, the long-billed curlew takes insects (adults and larvae), worms, spiders, berries, crayfish, snails, and small crustaceans. Occasionally they will take nestling birds. In coastal estuaries and intertidal zones, the long-billed curlew will prey on mud crabs, ghost shrimp, mud shrimp, insect pupae, gem clams and small estuarine fish (Zeiner et al. 1990a).

The long-billed curlew has the potential to occur in the project area based on the availability of grassland and lake habitat. However, this habitat is marginal at best.

- *Osprey (Pandion haliaetus) - CSC (Nesting).* The osprey occurs along seacoasts, lakes, and rivers, primarily in ponderosa pine and mixed conifer habitats. It preys mostly on fish at or below the water surface, but will also take small mammals, birds, reptiles, amphibians, and invertebrates. Large snags and open trees near large, clear, open waters are required for foraging. The osprey typically swoops from flight, hover, or perch to catch prey. In California, the osprey breeds primarily in the northern part of the state and typically builds its nests in large conifers, but may also use artificial platforms as nesting areas. The breeding season is from March to September. Nests are built on platforms of sticks at the top of large snags, dead-topped trees, on cliffs, or on human-made structures. A nest may be as much as 250 feet above ground and is usually within 1,000 feet of fish-producing water. Osprey need tall, open-branched "pilot trees" nearby for landing before approaching the nest and for use by young for flight practice. Typically, this species migrates in October south along the coast and the western slope of the Sierra Nevada to Central and South America (Zeiner et al. 1990a).

  The osprey has high potential to occur within the project area, because there is suitable foraging habitat in Folsom Reservoir and the nearby American River. Suitable nest trees (foothill pine) are also present. Osprey is frequently sighted at Folsom Reservoir.

- *White-faced ibis (Plegadis chihi) – CSC.* The white-faced ibis is a rare visitor to the Central Valley, and is more widespread in migration. The white-faced ibis prefers to feed in fresh emergent wetland habitats, shallow lacustrine waters, the muddy ground of wet meadows, and irrigated/flooded pastures or croplands. Within these habitats, the white-faced ibis feeds on earthworms, insects, crustaceans, amphibians, small fishes and miscellaneous invertebrates. The white-faced ibis uses its long bill to probe deep into mud.

It feeds in shallow water or on the surface. Preferred nesting sites are dense marsh vegetation near foraging areas in shallow water or muddy fields. The white-faced ibis no longer breeds regularly anywhere within California (Zeiner et al. 1990a).

It is unlikely that the white-faced ibis will occur within the project area. There is suitable foraging habitat on the margins of Folsom Reservoir; however, the fluctuating reservoir levels preclude the establishment of dense marsh vegetation, their preferred nesting habitat.

- *Bank swallow (Riparia riparia) – CT.* The bank swallow arrives in California from South America in early March and remains until early August when colonies are abandoned and migration begins. The bank swallow is found primarily in riparian and other lowland habitats in California west of the desert during the spring-fall period. The bank swallow is a common migrant within the interior of the state during the spring-fall period, and less common along the coast. There are few records of the bank swallow in California during the winter months. During the summer, the bank swallow is restricted to riparian, lacustrine, and coastal areas with vertical banks, bluffs, and cliffs with fine-textured or sandy soils. A colonial breeder, about 75 percent of the current breeding population in California nests along the banks of the Sacramento and Feather Rivers in the northern Central Valley. The bank swallow breeds from early May through July, digging horizontal nesting tunnels and burrows along the side of stream banks and cliffs. Most colonies have between 100 and 200 nesting pairs. The bank swallow feeds predominantly over open riparian areas, but will also forage over brushland, grassland, wetlands, water and cropland. A wide variety of aerial and terrestrial soft-bodied insects, including flies, bees and beetles make up the bank swallow's diet (Zeiner et al. 1990a).

  The bank swallow may occur within the project area due to suitable foraging habitat. However, the project area does not have vertical banks, bluffs or cliffs for nesting.

Special-status Mammals

- *Pallid Bat (Antrozous pallidus) – CSC.* The pallid bat ranges from western Canada to central Mexico. This species is usually found in rocky, mountainous areas near water, and in desert scrub. They are also found over more open, sparsely vegetated grasslands, and they seem to prefer to forage in the open. The pallid bat has three different roosts. The day roost is usually in a warm, horizontal opening such as in attics or rock cracks; the night roost is usually in the open, near foliage; and the hibernation roost, which is often in buildings, caves, or cracks in rocks (Miller 2002).

Although this species has not been recorded near the project vicinity, pallid bats are known to occur throughout California where suitable habitat exists (CDFG 2005a). Since suitable habitat exists within the project vicinity there is potential for the species to occur there.

- *Pacific Western Big-Eared Bat (Corynorhinus [Plecotus] townsendii townsendii) – CSC.* The Pacific Western big-eared bat (a subspecies of Townsend's big-eared bat) is known to occur in the coastal regions of north and central California to Washington. Townsend's big-eared bat can be found in a variety of habitats throughout California, from the moist coastal redwoods to the mid-elevation mixed conifers to the dry deserts, but are most commonly associated with desert scrub, mixed conifer, pinyon-juniper, and pine forest. Common roosting locations include limestone caves, lava tubes, mines, buildings and other structures. This species is extremely sensitive to disturbance in its roost. The Townsend's big-eared bat feeds primarily on small moths, but also takes other insects including flies, lacewings, dung beetles, and sawflies (Kunz and Martin 1982).

  This species could potentially utilize the project area as foraging habitat while using nearby buildings or other man-made structures as roosting habitat.

- *Spotted Bat (Euderma maculatum) – CSC.* Although spotted bats were once thought to be very rare (Zeiner et al. 1990b), this species is now known to range widely in western North America from southern British Columbia to Mexico (Pierson and Rainey 1998). In California, these bats probably occur throughout the state in suitable habitat. Spotted bats have been found foraging in many different habitats, from arid deserts to ponderosa pine forests and marshlands.

  Spotted bats have a patchy distribution that may be related to the distribution of suitable diurnal roosting sites (Pierson and Rainey 1998). Spotted bats roost in the small cracks found in steep cliffs and stony outcrops. They have been found as high as 3000 meters above sea level, and even below sea level in the deserts of California (Pierson and Rainey 1998).

  This species is usually found foraging in open areas (Pierson and Rainey 1998). In addition to the nightly migration to foraging sites, these bats might have a seasonal elevation migration from ponderosa pine high elevation habitats in June and July to lower elevations in August (Barbour and Davis 1969), although they are known to hibernate in some colder portions of their range (Pierson and Rainey 1998).

Due to the proximity of the project area to suitable roosting habitat and the recorded long-range nightly migrations of this species between roosting and foraging sites, this species may forage in the project vicinity, although spotted bats are unlikely to roost in the project area.

- *Greater Western Mastiff-Bat (Eumops perotis californicus) – CSC.* The greater western mastiff-bat occurs from central California to central Mexico. This bat is found in arid to semi-arid habitats, including conifer and deciduous woodlands, coastal scrub, grasslands and chaparral (Zeiner et al. 1990b). Preferred roosting sites include cracks and crevices in cliffs, trees, tunnels and buildings. Day roosts in cliffs are usually in large cracks in exfoliating slabs of granite or sandstone. Greater western mastiff-bats feed on both low-flying and high-flying insects and may forage as much as 195 feet above the ground (Zeiner et al. 1990b).

  This species has potential to occur in the project area based on the availability of preferred habitat, and the availability of roosting sites in trees and other man-made structures.

3.5.2 Environmental Consequences/Environmental Impacts

3.5.2.1 Assessment Methods

This section describes the potential impacts of action alternatives to biological resources that are associated with the project area. This analysis is based on the Folsom alternatives introduced in Chapter 2.0 of this EIS/EIR.

Information contained in previous documents prepared for Sacramento area flood protection measures, as well as field surveys conducted by ENTRIX, was used to characterize biological resources in the vicinity of the project area. Existing biotic resource surveys of the project vicinity, as described in Section 3.1.1, and a review of records from the CNDDB (CDFG 2006b) were used to develop a list of special-status species with potential to occur in the project area. Information used in developing these impact analyses was found in the following sources:

- The American River Watershed Project, California Final Supplemental Environmental Impact Statement/Environmental Impact Report (Corps 2006).
- Natural Resources, Animal Life, Folsom Lake State Recreation Area (Wallace, Todd, and Roberts et al. 2003).
- Folsom DS/FDR Action Biological Field Report (Appendix C).
- CNDDB (DFG 2006a).

Existing resource information, including the Draft CAR for the Folsom Dam Enlargement Plan Alternatives: Analysis and Recommendations American River Watershed Investigation (USFWS 2001), was used to develop the description of the environmental setting. The resources described in that section were evaluated in conjunction with activities associated with action alternatives to determine potential impacts and develop mitigation measures. The assessment of impacts is based on the most current information on the status and distribution of special-status species and the potential for changes in their habitat resulting from implementation of action alternatives. Impacted habitat acreages and compensatory mitigation acreages identified in the Draft CAR of the Folsom Dam Safety and Flood Damage Reduction Project (USFWS 2006) are estimates and are being refined; impacts will be further minimized in coordination with the USFWS. If Reclamation-owned land is not available or suitable for mitigation needs, then off-site mitigation would be sought. Reclamation will also discuss the potential for on-site mitigation in areas previously disturbed by construction activities with the USFWS.

The first step in the assessment was to evaluate the potential for species to occur based on recent field surveys, documented occurrences, and the availability of habitat for various life history stages (spawning, incubation, juvenile and adult rearing). The second step was to evaluate the potential for action alternatives to affect individuals and populations of those species likely to occur within project-affected areas, as well as potential impacts to their habitat.

Both direct and indirect effects are included in this analysis and the evaluation of the implementation of Best Management Practices (BMPs) and other measures designed to reduce impacts. Direct effects are those that occur at the same time and place of the project action. Indirect effects caused by project actions occur later in time or at another location. Examples of potential direct effects to species include disturbance, injury, or mortality that may occur during construction or maintenance activities, including alterations to habitat. Examples of potential indirect and secondary effects to species or habitats due to project activities could include alterations or loss of habitat that may occur later in time, such as alterations at borrow sites that potentially provide habitat or result in alterations to a species food base, changes in hydrology that affect the habitat or surrounding areas, introduction of toxic chemicals, and introduction of predators such as bullfrogs or mosquitofish.

Project Implementation Conditions:
The effects for the action alternatives were estimated based on the following conditions pertaining to project implementation:

- Excavation activities at borrow sites upstream of Folsom Dam would occur when sites are dry. Indirect effects to aquatic habitats may occur at these sites during the rainy season following excavation activities.

- Analyses for impacts of excavation of borrow sites upstream of Folsom Dam are based on the assumption that sites would be excavated to an approximate depth of 30 ft between the shoreline and the 400-ft contour and the reservoir rim, except for the Granite Bay area, which may be deepened to as much as 50 ft. Upon completion of borrow excavation activities, borrow areas would be sloped or restored to accommodate recreational foot traffic.

- Implementation of a spill prevention plan would reduce the risk of fuel or oil spills from construction and transportation equipment.

- The implementation of BMPs would control soil erosion due to construction activities, and minimize potential construction-related effects on water quality.

3.5.2.2 Significance Criteria

The mandatory findings of significance as explained in CEQA, Pub. Res. Code sec. 21083; guidelines sec. 15065, indicate that a project would have a significant effect on biological resources if it would:

- Substantially degrade environmental quality;

- Substantially reduce fish or wildlife habitat;

- Cause a fish or wildlife habitat to drop below self-sustaining levels;

- Threaten to eliminate a plant or animal community; or

- Reduce the numbers or range of a rare, threatened or endangered species.

Additional thresholds of significance for biological resources under CEQA have been used in the following evaluation. Impacts were significant if they would:

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFG, USFWS, or USFS;

- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by CDFG, USFWS, or USFS;

- Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means;

- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;

- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or

- Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

3.5.2.3 Environmental Consequences/Environmental Impacts

Environmental Consequence/Environmental Impacts of the No Action/No Project Alternative

Under the No Action/No Project Alternative, construction activities would not occur. No impacts to terrestrial, riparian, or wetland vegetation or to special-status species would occur from the No Action/No Project Alternative.

Environmental Consequences/Environmental Impacts of Alternative 1

Under Alternative 1, the main concrete dam would receive a number of modifications, but would not be raised. Under this alternative, the crests of the LWD, RWD, MIAD, and dikes 4 through 6 would be strengthened through placement of additional earthen material. The auxiliary spillway site would be excavated. Haul roads would be constructed, borrow sites would be developed at Beal's Point, staging areas, material processing plants developed at Folsom Point and Beal's Point, a concrete batch plant for the jet grout work at MIAD, and a concrete batch plant constructed in the vicinity of the Main Dam, either at the Observation Point, or downstream of the LWD. Contractor use areas and/or waste material disposal/stockpile sites would also be developed at Dike 7, MIAD, Folsom Point, the Observation Point, Beal's Point, and downstream of the LWD. Underwater blasting and dredging would also be required to construct the approach channel.

There would be direct or indirect impacts to special-status plant species from construction.

According to CDFG (2006a), several special-status plant species could potentially occur in the vicinity of construction sites of Alternative 1. Vegetation studies conducted in this area in 2002 did not report any special-status plant species, although these studies were not species surveys (LSA 2003). If any such species are present, or establish in the interim, these populations could be directly affected by construction activities.

This impact would be potentially significant but mitigable. Mitigation Measures BIO-1 through BIO-5 described in Section 3.5.4 would reduce the impact to a less-than-significant level.

There would be direct or indirect impacts to protected oak woodlands.

Oak woodlands are present within the construction areas and staging areas for Alternative 1 and may be affected by construction activities. These woodlands are protected under county tree ordinances.

This impact would be potentially significant but mitigable. Mitigation Measures BIO-1, BIO-2, BIO-4, VEG-1 and BIO-10 described in Section 3.5.4 would reduce the impact to a less-than-significant level.

There would be loss of other native vegetation.

Alternative 1 construction activities would result in permanent loss of native vegetation, including sensitive riparian habitat. This loss includes only the small portion of the area that would be displaced by a constructed structure (i.e., dam, spillway, and dike alterations). However, permanent habitat loss would have a less-than-significant impact on special-status species (other than for listed or candidate species under the State and Federal Endangered Species Acts) unless extensive areas of suitable habitat are degraded or somehow made unsuitable, or areas supporting a large proportion of the species population are substantially and adversely affected.

This impact would be less than significant. To further reduce this impact, any native vegetation affected including riparian and chaparral vegetation would be compensated for by addressing requirements in the CAR and through implementation of mitigation measures VEG-2, VEG-3, VEG-5, VEG-6 and BIO-10.

There would be no direct impact due to the Folsom Dam Security Enhancement Project.

Security measures would not impact to the flora or fauna surrounding the Folsom Dam Site. The installation of poles for security cameras would be constructed in areas already under construction and would be unlikely to contain any natural vegetation. There would be no impacts to Valley elderberry longhorn beetles. Work associated with the power poles would not start until all of the elderberry shrubs have been transplanted or other wise mitigated for. Also, work would not start until the areas 150 ft from the toe of each dike had been cleared for the placement of filters or other work that requires a 150-ft buffer from the structure (Folsom Dam Security Enhancement Project, 2006).

This impact would be less than significant.

There would be indirect impacts to native vegetation, including oaks.

Construction Activities implemented for Alternative 1 may result in indirect adverse impacts to vegetation and wetlands identified as sensitive by the state or by counties, including increased erosion and sedimentation, damage to roots of oaks and other tree species adjacent to areas where heavy equipment would be operated, dust impacts to roadside vegetation, and colonization of exposed substrate by exotic plant species.

This impact would be potentially significant but mitigable. Mitigation Measures BIO-6, BIO-7, VEG-5, VEG-6 and BIO-10 described in Section 3.5.4 would reduce the impact to a less-than-significant level.

There would be permanent loss of wetlands and other waters of the U.S.

Construction activities associated with Alternative 1 could result in the permanent loss of wetlands below the Right and Left Wing Dams, Dike 6, and below MIAD. There appears to be hydraulic connectivity between the area downstream of MIAD and the wetlands south of Green Valley Road in the State Preserve (Reclamation 2006b). Effects on the wetlands in the Preserve due to the construction activities at MIAD are unknown and would be monitored during all phases of construction at MIAD.

This impact would be potentially significant but mitigable. Mitigation Measures are described in Section 3.1.4 and 3.4.4 for monitoring the MIAD wetlands. VEG-4, VEG-7 and BIO-10 described in Section 3.5.4 would reduce the impact to a less-than-significant level.

There would be temporary disturbance of wetlands and other waters of the U.S.

Construction activities associated with Alternative 1 would result in the temporary loss of wetlands below the OHWM of the reservoir.

This impact would be potentially significant but mitigable. Mitigation measure VEG-6 and VEG-7 would be implemented. Mitigation Measure VEG-4 and BIO-10 described in Section 3.5.4 would reduce the impact to a less-than-significant level.

Construction activities and borrow site excavation may result in adverse effects to host plants for the valley elderberry longhorn beetle.

Elderberry shrubs, the host plant for the federally protected valley elderberry longhorn beetle, have been mapped at locations around the reservoir that could be affected by project construction activities, including excavation of borrow areas within the reservoir. Most of these elderberries are within the area potentially affected by Alternative 1. Actions resulting in adverse effects to elderberry shrubs in

the Alternative 1 area are significant. The following avoidance and minimization measures are summarized from the Conservation Guidelines for the Valley Elderberry Longhorn Beetle (USFWS 1999). These measures are subject to and contingent upon a Section 7 consultation with the USFWS. This consultation would occur prior to permitting of construction.

This impact would be potentially significant but mitigable. Mitigation Measures INV-1a through INV-1e, described in Section 3.5.4 would reduce the impact to a less-than-significant level.

There could be direct or indirect impacts to special-status amphibian species or their habitat due to temporary or permanent alteration of terrestrial habitat.

Terrestrial habitat for special-status amphibian species occurs in the vicinity of the Proposed Action. A portion of the grassland/savanna habitat, which may be utilized by western spadefoot toad, may be affected by construction activities. Direct mortality or indirect impacts from local alterations to habitat could occur. However, within the affected area affected by Alternative 1, western spadefoot toad appears to be limited by the lack of aquatic habitat for breeding rather than terrestrial habitat, so disturbance to grassland/savannah habitat is not likely to affect the overall habitat value of the Alternative 1 area for this species. California red-legged frog has the potential to be present in marginally suitable habitat.

This impact would be potentially significant but mitigable. Mitigation Measures BIO-1 through BIO-5, BIO-9, and AMP-1 described in Section 3.5.4 would reduce the impact to a less-than-significant level.

Excavation at borrow sites could alter amphibian (including special-status species) aquatic habitat.

Excavation at borrow sites would be implemented when the surface of the sites are dry, and therefore there would be no direct impacts to special-status amphibians or their aquatic habitat. However, the potential to indirectly affect aquatic habitat would occur if excavated areas pond water when inundated at the onset of the rainy season, creating seasonal or permanent ponds which potentially may be utilized by amphibians, including special-status amphibians California red-legged frog or western spadefoot toad.

All borrow sites upstream of Folsom Dam can be inundated by water from Folsom Reservoir, allowing the introduction of species that prey on amphibians. The rest of the borrow sites are downstream of the reservoir and would not be inundated from rising water levels in Folsom Reservoir. The presence of centrarchids and other species that prey on amphibians, as well as the influence of fluctuating water levels on vegetation, makes aquatic habitat marginally suitable to unsuitable for

amphibians. Therefore, direct or indirect impacts to amphibians or their habitat would generally not occur at these sites.

If, following excavation, ponds form in a portion(s) of the downstream D2 Pit site, it may create seasonal or permanent aquatic habitat during and following the next rainy season. If aquatic habitat of sufficient depth occurs for a sufficient time, it may provide additional breeding habitat for amphibian species. However, additional pond habitat, particularly if it contains permanent water, may be colonized by bullfrogs that prey on red-legged frogs. Furthermore, in ponds with permanent water, fish may be introduced, as they were to Avery Pond.

This impact would be potentially significant but mitigable. Mitigation Measure BIO-9 and AMP-1 described in Section 3.5.4 would reduce the impact to a less-than-significant level. With implementation of Mitigation AMP-1, the excavated area within the borrow site would be graded to drain water. Therefore, ponded areas would not be created.

Construction activities could directly or indirectly affect amphibians (including special-status species) or their aquatic habitat in permanent freshwater marshes.

There is a potential for direct or indirect effects to amphibians or their aquatic habitat if permanent freshwater marsh habitat is altered or lost. Construction activities associated with Alternative 1 could result in the temporary or permanent loss of wetlands below at the toe of the MIAD and the water that supplies the neighboring wetland across the road.

Construction activities would occur while reservoir elevations are at low levels, exposing borrow sites, haul routes and the Auxiliary Spillway approach. Because there areas would be dry at the time construction activities are performed direct impacts to amphibians are not likely to occur.

Although aquatic habitat within the area is generally marginally suitable to unsuitable for special-status amphibians, due to the presence of species that prey or compete with native amphibians, loss of any wetlands has the potential impact their habitat. Mitigation Measures BIO-5, VEG-2, VEG-4 and BIO-10 would implement a Revegetation Plan and Mitigation, Monitoring, and Reporting Plan which would replace lost acreage at a ratio stipulated in the CAR.

This impact would be potentially significant but mitigable. Mitigation Measures for monitoring the MIAD wetlands are described in Sections 3.1.4 and 3.4.4. Mitigation Measures BIO-5, VEG-2, VEG-4, VEG-7 and BIO-10 described in Section 3.5.4 would reduce the impact to a less-than-significant level.

Construction-related activities could result in temporary or permanent loss of terrestrial habitat for amphibians.

Within the footprint of construction activities at the main concrete dam, Auxiliary Spillway, left and right wing dam, and dikes 4 through 6, roads, staging areas, borrow material processing sites, and concrete batch plant, activities would occur on dry land and would not directly affect aquatic habitat with which amphibians are generally associated. Furthermore, aquatic habitat contiguous with these sites generally contains reservoir habitat that is only marginally suitable to unsuitable for amphibians. Therefore, impacts to amphibians from this impact are less than significant.

This impact would be less than significant. No mitigation is required or recommended.

Borrow site excavation and other construction activities could result in direct mortality to special-status wildlife species.

Excavation of borrow material above the fluctuation zone of the reservoir could result in mortality of special-status wildlife species, including California horned lizard and northwestern pond turtle. This impact would be potentially significant.

This impact would be potentially significant but mitigable. Mitigation Measures BIO-1 through BIO-5 described in Section 3.5.4 would reduce the impact to a less-than-significant level.

Borrow site excavation and other construction activities could result in temporary or permanent alteration of habitat for special-status wildlife species.

Excavation of the proposed borrow sites and other construction activities could result in the loss of special-status wildlife habitat, including habitat for California horned lizard, Cooper’s hawk, white-tailed kite, tricolored blackbird, American peregrine falcon, western burrowing owl, bald eagle, Aleutian Canada goose, loggerhead shrike, ferruginous hawk, long-billed curlew, Swainson's hawk, osprey, Vaux’s swift, white-faced ibis, mountain plover, bank swallow, pallid bat, spotted bat, Pacific western big-eared bat, and greater western mastiff-bat . However, permanent habitat loss is a less than significant impact on special-status species (other than for listed or candidate species under the State and Federal Endangered Species Acts) unless extensive areas of suitable habitat are degraded or somehow made unsuitable, or areas supporting a large proportion of the species population are substantially and adversely affected. This impact would be less than significant.

This impact would be less than significant. No mitigation is required or recommended.

Borrow site excavation and other construction activities could result in sedimentation in streams, creeks and seasonal wetlands.

Excavation and other construction activities could result in increased erosion and sedimentation. This may affect water quality (Section 3.1) and, therefore, habitat quality within the Alternative 1 area. Changes to water quality could substantially degrade aquatic or wetland habitat, which would be considered a significant impact.

This impact would be potentially significant but mitigable. Mitigation Measure BIO-6 described in Section 3.5.4 would reduce the impact to a less-than-significant level.

Borrow site excavation and other construction activities could result in impacts to burrowing owls and burrowing owl habitat.

Borrow site excavation above the fluctuation zone of the reservoir and other construction activities could result in loss of burrowing owl habitat or individuals. Because this species is a state species of special concern, this is a significant impact.

This impact would be potentially significant but mitigable. Mitigation Measures BIO-1 through BIO-5 described in Section 3.5.4 would reduce the impact to a less-than-significant level.

Borrow site excavation and other construction activities could result in direct impacts to migrating and wintering birds.

Folsom Reservoir is within the Pacific Flyway migration corridor and is therefore a stopover point for migrating and wintering birds. Bald eagles are known to winter and forage in the project area. Mountain plovers, ferruginous hawks, and Aleutian Canada geese are potential wintering species in the Alternative 1 area. Direct impact to individuals of these species is a significant impact.

This impact would be potentially significant but mitigable. Mitigation Measures BIO-1 and BIO-2 described in Section 3.5.4 would reduce the impact to a less-than-significant level.

Borrow site excavation and other construction activities could result in direct impacts to northwestern pond turtles.

Northwestern pond turtles, a California species of special concern, are known to occur in the project vicinity. They lay their eggs along wetland margins and upland areas near water. They excavate nests and bury their eggs. Pond turtles also rely on upland areas as basking sites. Direct impacts to turtles or turtle nests during in-reservoir borrow site excavation is to be adverse and significant.

This impact would be potentially significant but mitigable. Mitigation Measure BIO-1 through BIO-5 described in Section 3.5.4 would reduce the impact to a less-than-significant level.

Borrow site excavation and other construction activities could result in direct mortality to nesting birds protected by the Migratory Bird Treaty Act.

Take of bird eggs and nestlings protected by the Migratory Bird Treaty Act is prohibited and is an adverse significant impact.

This impact would be potentially significant but avoidable. Implementation of measures WIL-1, BRD-1 and BRD-2 described in Section 3.5.4 would avoid this impact.

Temporary loss of special-status wildlife habitat would result from construction activities.

Construction activities required for Alternative 1 that are temporary in nature and do not significantly alter natural processes (e.g., hydrology) are expected to leave such areas in a restorable condition. Such areas may include those used as haul routes and staging areas that would be vacated after the completion of Alternative 1.

However, permanent and temporary habitat loss is a less than significant impact (other than for listed or candidate species under the State and Federal Endangered Species Acts) unless extensive areas of suitable habitat are degraded or somehow made unsuitable, or areas supporting a large proportion of the species population are substantially and adversely affected. This impact would be less than significant.

This impact would be less than significant.

Borrow site excavation and other construction activities could result in loss of habitat for non special-status species.

Excavation of the proposed borrow sites and other construction activities could result in the loss of habitat for non-special-status wildlife. However, permanent habitat loss is a less than significant impact unless extensive areas of suitable habitat are degraded or somehow made unsuitable, or areas supporting a large proportion of the species population are substantially and adversely affected. This impact would be less than significant.

This impact would be less than significant. No mitigation is required or recommended.

There could be adverse noise effects on special-status bats from construction generated noise.

Noise generated by construction and blasting could potentially interfere with echolocating bats' roosting and breeding activities. Pallid bats are known to hibernate in rocky outcrops and may occur in rip-rap portions of the earthen dikes surrounding the reservoir. They are also intolerant of human disturbance. The greater western mastiff-bat may use the main concrete dam as roosting habitat. Both pallid and greater western mastiff-bats are known to utilize buildings as roosts. It has been shown that high frequency noise (4,000-18,000 Hz) produced a deterring effect on bat colonies (USEPA 1971). Similarly other studies have shown that a 60-dB high frequency noise was sufficient to produce physiological effects in hibernating bats (USEPA 1971). High frequency noise (>2,000 Hz) at a level in excess of 50-db at bat roosts would result in an adverse significant impact.

This impact would be potentially significant but mitigable. Mitigation Measure WIL-1 described in Section 3.5.4 would reduce the impact to a less-than-significant level.

There could be adverse noise effects on special-status birds.

Noise generated by construction and blasting could potentially interfere with bird roosting and breeding activities. It has been shown that noise in excess of 85-dB at the ear was sufficient to cause distress in birds. It has also been shown that noise generated by motor vehicles is sufficient to decrease breeding bird fecundity (Rheindt 2003, Reijnen et al. 1995, Reijnen and Foppen 1994, and Ferris 1979). Birds remaining within the blasting vicinity may sustain permanent hearing loss. Adverse impacts from construction-related noise on breeding special-status birds would be significant.

This impact would be potentially significant but mitigable. Mitigation Measures BIO-1, BIO-3, BRD-1 and BRD-2 described in Section 3.5.4 would reduce the impact to a less-than-significant level.

There could be adverse noise effects on non-special-status wildlife.

Noise generated by construction and blasting activities could potentially cause adverse impacts to non-special-status wildlife. Noise can alter con-specific communication, predator avoidance calls, and behaviors. However, this impact would be less than significant.

This impact would be less than significant. No mitigation is required or recommended.

Blasting impacts and their associated mitigation measures would be the same for most actions as for Alternative 1.

Aquatic habitat would be altered when the stilling basin is extended

The stilling basin contains nonnative fish species that are known to prey on native amphibian species, and therefore is not likely to contain suitable habitat for amphibians.

No impacts to amphibians or their habitat would occur.

Adverse effects to wildlife could result from underwater blasting.

The use of blasting is particularly disruptive to wildlife (including special status species). Excessive noise associated with blasting can cause birds to abandon nests and bats to abandon roosts and hibernacula. Blasting can also cause direct mortality to any animals remaining within the blasting zones.

This impact would be potentially significant but mitigable. Mitigation Measures BIO-1 through BIO-5 would be implemented to reduce the impact to a less-than-significant level.

Environmental Consequences/Environmental Impacts of Alternative 2

Alternative 2 includes the additional modifications to those described for Alternative 1. The main concrete dam would receive strengthening of the existing parapet wall. The Auxiliary Spillway would receive a partially or completely lined spillway, a 350 to 400-foot wide fuseplug, and a tunnel with 3 submerged tainter gates. The Left and Right Wing Dams would receive a 0.5-foot earthen raise with a 3.5-foot parapet concrete wall, toe drains and half-height filters. MIAD and all dikes would receive a 4-foot earthen raise. Excavated material would be processed downstream of the LWD, or at the Observation Point. A borrow site would be established Beal's Point, as well as a processing plant. An additional staging area would be developed at Granite Bay.

Areas of lower elevation not protected by existing embankments would receive a new embankment. The numbers of new embankments required and their exact locations have not been determined. Typical construction of new embankments would involve the use of scrapers, loaders, and other equipment to create earthen berms. Access roads for construction and maintenance would also be required.

Under Alternative 2, flood control operations would utilize the temporary extra reservoir capacity afforded by dam and dike raises during flood events for as long as it takes to safely release water through the concrete dam into the American River.

Impacts to vegetation, invertebrates, amphibians, and wildlife species from construction at all facility sites and their associated mitigation measures would be similar to those for Alternative 1.

Inundation caused by emergency flood retention could adversely affect special-status plant species.

Inundation caused by emergency flood retention could adversely affect special status plant species if any are present in the inundated area and if the inundation is of sufficient duration.

Because such inundation would be a rare event and even for a 151-year flood would last for less than two days, with the water being progressively lowered, little or no adverse effects are expected to occur.

This impact is less than significant. No mitigation is required or recommended.

Inundation caused by emergency flood retention could adversely affect native oaks.

Inundation caused by emergency flood retention could adversely affect native oaks if the inundation is of sufficient duration. Blue oaks can be sensitive to inundation for as few as seven days, and evergreen oaks are likely to be more sensitive.

This impact would be potentially significant but mitigable. Mitigation Measure BIO-8 described in Section 3.5.4 would reduce the impact to a less-than-significant level.

Inundation caused by emergency flood retention could adversely other native vegetation.

Inundation caused by emergency flood retention could result in temporary loss of native upland vegetation. However, this habitat loss would have a less-than-significant impact on special-status species (other than for listed or candidate species under the State and Federal Endangered Species Acts) unless extensive areas of suitable habitat are degraded or somehow made unsuitable, or areas supporting a large proportion of the species population are substantially and adversely affected.

This impact would be less than significant. No mitigation is required or recommended.

Inundation caused by emergency flood retention could adversely affect valley elderberry longhorn beetles.

Inundation above the OHWM, associated with emergency retention of flood waters, could inundate elderberry plants that were previously not subjected to inundation. Depending on the duration of this flooding, elderberry plants could be adversely affected.

This impact would be potentially significant but mitigable. Mitigation Measure BIO-8 would reduce the impact to a less-than-significant level.

Construction activities could potentially result in temporary or permanent alteration of terrestrial habitat for special-status amphibians at new embankments/flood easements for lower topography.

Potential impacts to special-status amphibians, in particular California red-legged frog and western spadefoot toad, would be the similar as to Alternative 1.

This impact would be potentially significant but mitigable. Mitigation Measures BIO 1- through BIO-5 and BIO-9 would be implemented. Mitigation Measure AMP-1 would protect amphibians and would reduce the impact to a less-than-significant level. However, this impact would be further analyzed in subsequent environmental documents.

Construction of new embankments/flood easements for lower topography would result in loss of terrestrial and aquatic habitat for amphibian species

Construction activities at some new embankment/flood easement locations would occur in creek drainages and could directly affect aquatic habitat with which amphibians are generally associated. Aquatic habitat contiguous with these sites contains habitat that is marginally suitable for amphibians could potentially contain amphibians.

This impact would be potentially significant, but mitigable. Mitigation Measures BIO-1 through BIO-5 would be implemented and would reduce the impact to a less-than-significant level. However, this impact would be further analyzed in subsequent environmental documents.

Inundation caused by emergency flood retention could adversely affect special-status amphibians.

Inundation above the OHWM could adversely affect special status amphibians such as California red-legged frogs, foothill yellow-legged frogs and western spadefoot toads. Emergency action may cause the temporary loss of upland habitat for amphibians.

Flood stage usually occurs during spring runoff, which may affect frog breeding activities as well. Frogs may take advantage of flooded areas to breed and lay eggs. If these areas are dewatered by release of floodwaters through the spillway before the eggs hatch, there could be an impact to eggs as a result of desiccation. Additionally, California red-legged frog egg masses could be affected if rising waters knock egg masses loose from anchor vegetation, because drifting egg masses are subject to high mortality.

Because such inundation would be a rare event and even for a 151-year flood would last for less than two days, with the water being progressively lowered, little or no adverse effects are expected to occur.

This impact is less than significant. No mitigation is required or recommended.

Inundation caused by emergency flood retention could adversely affect other special-status wildlife.

Inundation above the OHWM could adversely affect special status wildlife such as western burrowing owls, northwestern pond turtles, California horned lizards, giant garter snakes, long billed curlew, white faced ibis, mountain plovers, and various bat species.

Emergency action may cause the temporary loss of upland habitat for reptiles and ground nesting and foraging birds. Reptiles that utilize burrows above the OHWM but below the new maximum reservoir elevation after implementation of Alternative 2 could be drowned. Species that are known to hibernate in such burrows are particularly susceptible. Inundation of upland northwestern pond turtle nests could result in the drowning of hatchling turtles or rupturing of eggs due to hydrostatic pressure.

Because such inundation would be a rare event and even for a 151-year flood would last for less than two days, with the water being progressively lowered, little or no impacts to reptiles and to ground-foraging birds that do not breed in the project area would occur.

The nests of ground nesting birds may be inundated if emergency retention occurs after eggs have been laid. Any western burrowing owls that occupy areas that lie between the current OHWM and the maximum reservoir elevation that would result from implementation of the project could be subject to drowning, loss of burrows and loss of eggs.

This impact would be potentially significant and unavoidable. Mitigation Measure BIO-8 would be implemented. Even with implementation of Mitigation Measure BIO-8, this impact would still be significant.

Inundation caused by emergency flood retention could adversely affect non special-status wildlife.

Inundation above the OHWM caused by retention of emergency flood waters could adversely affect non special status wildlife through temporary loss of upland habitat and mortality caused by drowning.

This impact is less than significant. No mitigation is required or recommended.

Environmental Consequence/Environmental Impacts of Alternative 3.
Alternative 3 includes the same modifications as Alternative 2 with the following exceptions. A gated auxiliary spillway would be constructed with construction of the approach channel into the reservoir. All structures would receive a 3.5-foot parapet concrete wall. A borrow site and processing plant would be developed at Beals Point.

Environmental Consequence/Environmental Impacts of Alternative 4.
Alternative 4 includes the same modifications as Alternative 2 with the following exceptions. Under Alternative 4, the main concrete dam and all earthen structures would be raised 7 ft. Under Alternative 4, the Granite Bay borrow site would be developed and an additional processing plant would be installed at Granite Bay.

Impacts to vegetation, invertebrate, amphibian, and wildlife species and their associated mitigation measures would be generally be similar to Alternative 3, but the extent of impacts would be greater due to the borrow site and processing plant at Granite Bay.

No additional mitigation measures are required or proposed.

Environmental Consequences/Environmental Impacts Alternative 5
Alternative 5 includes the same modifications as Alternative 4 with the following exception. The main concrete dam along with all the earthen dams would be raised 17 feet. No Auxiliary Spillway would be constructed under this alternative. Excavation and replacement of the downstream foundation would be done at MIAD. Borrow sites under Alternative 5 would include Beal's Point, R1/R2, D1/D2, L1/L2 and Granite Bay. An additional processing plant would be necessary at Beal's Point and staging would be required at MIAD. Stockpiles of various types of material would be located at Folsom Point, Dike1/Dike2, Beal's Point, Granite Bay, D1, D2 and at the Left Wing Dam. Underwater blasting and dredging would not be conducted under Alternative 5.

Impacts to vegetation, invertebrate, amphibian, and wildlife species and their associated mitigation measures would be the same as for Alternatives 1 and 2 because the analyses for similar construction activities were based on the assumption that all borrow sites upstream of Folsom Dam would be utilized and construction would occur at all existing and new dam and dike locations.

No additional mitigation measures are required or proposed.

3.5.3 Comparative Analysis of Alternatives

Table 3.5-4 presents a summary of the potential impacts to terrestrial biological resources. The No-Action Alternative would have no impacts from project-related construction activities.

Alternative 1 would have no impacts related to construction of new embankments or an increase in reservoir elevation during large flood events. Alternatives 2, 3, 4 and 5 could have adverse impacts on wildlife associated with construction of new embankments. These impacts would be further analyzed in subsequent environmental documents.

The other potential impacts of Alternatives 1 through 5 on special-status plant species are the same under all alternatives, and are less than significant or less than significant with mitigation. Because Alternatives 4 and 5 would require additional borrow sites, impacts to vegetation would be more extensive than for Alternatives 1, 2, and 3. There may be additional wildlife impacts associated with the additional borrow sites for Alternatives 4 and 5. Alternatives 3 and 4 could have adverse impacts to wildlife associated with blasting that would not occur with Alternatives 1, 2, and 5. All of these impacts would be less than significant with mitigation (Table 3.5-4**)**.

Table 3.5-4
Summary Comparison of Impacts of Alternatives

Affected Resource and Area of Potential Impact	***Alternative***					
	No Action Compared to Existing Conditions	***1***	***2***	***3***	***4***	***5***
Biological Resources						
(1) Direct or indirect impacts to special-status plant species from construction.	N	SM, A	SM, A	SM, A	SM, A	SM, A
(2) Direct or indirect impacts to protected oak woodlands	N	SM, A	SM, A	SM, A	SM, A	SM, A
(3) Loss of other native vegetation	N	LS	LS	LS	LS	LS
(4) Indirect impacts to native vegetation	N	SM, A	SM, A	SM, A	SM, A	SM, A
(5) Permanent Loss of wetlands and Other Waters of the U.S.	N	SM, A	SM, A	SM, A	SM, A	SM, A
(6) Temporary disturbance of wetlands and Other Waters of the U.S.	N	SM, A	SM, A	SM, A	SM, A	SM, A
(7) Inundation caused by emergency flood retention could adversely affect special-status plant species.	N	N	LS	LS	LS	LS
(8) Inundation caused by emergency flood retention could adversely affect native oaks.	N	N	SM, A	SM, A	SM, A	SM, A
(9) Removal of host plants for the valley elderberry longhorn beetle	N	SM, A	SM, A	SM, A	SM, A	SM, A
(10) Inundation of host plants of the valley elderberry longhorn beetle.	N	N	SM, A	SM, A	SM, A	SM, A
(11) Direct or indirect impacts to special-status amphibian species or their habitat due to temporary or permanent alteration of terrestrial habitat.	N	SM, A	SM, A	SM, A	SM, A	SM, A
(12) Alteration of amphibian (including special-status species) aquatic habitat associated with excavation of borrow sites.	N	SM, A	SM, A	SM, A	SM, A	SM, A
(13) Direct or indirect effects to amphibians (including special-status species) or their aquatic habitat in permanent freshwater marshes.	N	SM, A	SM, A	SM, A	SM, A	SM, A
(14) Temporary or permanent loss of terrestrial habitat for amphibians.	N	LS	LS	LS	LS	LS

Table 3.5-4
Summary Comparison of Impacts of Alternatives

Affected Resource and Area of Potential Impact	***Alternative***					
	No Action Compared to Existing Conditions	***1***	***2***	***3***	***4***	***5***
(15) Direct or indirect impacts to special-status amphibian species or their habitat due to temporary or permanent alteration of terrestrial habitat at new embankments for lower topography.	N	N	SM, A	SM, A	SM, A	SM, A
(16) Construction of new embankments for lower topography would result in loss of terrestrial habitat.	N	N	LS	LS	LS	LS
(17) Inundation by emergency retention could result in adverse impacts to special status amphibians.	N	N	LS	LS	LS	LS
(18) Alteration of aquatic habitat when the stilling basin is extended.	N	N	N	N	N	N
(19) Direct mortality to special-status wildlife species from excavation and other construction activities	N	SM, A	SM, A	SM, A	SM, A	SM, A
(20) Impacts to special-status wildlife habitat from borrow site excavation and other construction activities	N	LS	LS	LS	LS	LS
(21) Sedimentation of wildlife habitat in streams, creeks and seasonal wetlands	N	SM, A	SM, A	SM, A	SM, A	SM, A
(22) Impacts to burrowing owls and burrowing owl habitat	N	SM, A	SM, A	SM, A	SM, A	SM, A
(23) Impacts on migrating and wintering birds	N	SM, A	SM, A	SM, A	SM, A	SM, A
(24) Direct impacts to northwestern pond turtles	N	SM, A	SM, A	SM, A	SM, A	SM, A
(25) Direct impacts to nesting birds protected by the Migratory Bird Treaty Act	N	SAV, A	SAV, A	SAV, A	SAV, A	SAV, A
(26) Temporary loss of special-status wildlife habitat	N	LS	LS	LS	LS	LS
(27) Loss of habitat for non-special-status species	N	LS	LS	LS	LS	LS
(28) Noise effects on special-status bats	N	SM, A	SM, A	SM, A	SM, A	SM, A
(29) Noise effects on special-status birds	N	SM, A	SM, A	SM, A	SM, A	SM, A
(30) Noise effects on non-special-status wildlife	N	LS	LS	LS	LS	LS
(31) Inundation caused by emergency retention would result in adverse impacts to special status wildlife.	N	N	SU, A	SU, A	SU, A	SU, A
(32) Inundation caused by emergency retention would result in adverse impacts to non-special status wildlife.	N	N	LS	LS	LS	LS
(33) Adverse impacts to wildlife associated with blasting	N	N	N	SM, A	SM, A	N

Key:

SM = Significant but mitigable impact (CEQA)
SU = Significant and unavoidable impact
LS = Less than Significant Impact (CEQA)
N = No Impact (CEQA, NEPA)
B = Beneficial Impact (NEPA)
A = Adverse Impact (NEPA)
AV = Avoidable

Other potential impacts of alternatives 1 through 5 on special-status amphibians and their habitat are the same under all alternatives, and would be no impact, less than significant or less than significant with mitigation (Table 3.5-4).

Other potential impacts of alternatives 1 through 5 on other terrestrial wildlife and their habitat are the same under all alternatives, and would be less than significant or less than significant with mitigation (Table 3.5-4).

3.5.4 Mitigation Measures

This section lists all of the recommended mitigation measures for impacts common to all biological resources (BIO), or specific to vegetation (VEG), all wildlife (WIL), invertebrates only (INV), amphibians only (AMP), and birds only (BRD).

BIO-1: Within the project footprint, pre-construction surveys would be conducted by qualified biologists in areas that may contain suitable habitat for special-status plant, invertebrate, or wildlife species. The biologists would identify locations of special status plant, invertebrate, or wildlife species and take necessary measures to provide protection.

BIO-2: To the extent consistent with project implementation needs, any populations of special-status plant, invertebrate, or wildlife species would be avoided by placing fencing around the population and a suitable buffer area. Environmental monitors would regularly inspect any fenced sensitive biological resources to ensure no disturbance.

BIO-3: If populations of special-status plant, invertebrate, or wildlife species are found that cannot be avoided, USFWS and CDFG would be consulted and mitigation measures developed for those populations.

BIO-4: All construction personnel at the Folsom DS/FDR construction site would receive environmental awareness training from agency biologist(s) associated with the project, or suitably trained representative(s), regarding the potential presence of listed, special-status, and protected (e.g., oak trees) species in the project area and the importance of avoiding impacts to the habitat and reporting sightings.

BIO-5: A Revegetation Plan would be developed to address potential losses to all habitats impacted within the project footprint. The Revegetation Plan would be implemented immediately following construction in accordance with requirements in the SWPP, CAR, and Mitigation, Monitoring, and Reporting Plan (MMRP).

BIO-6: Standard erosion and sedimentation control measures (BMPs), as described in mitigation measures HWQ-1 through HWQ-3 in Section 3.1.4, would be implemented for all grading, filling, clearing of vegetation, or excavating that occurs in site preparation.

BIO-7: To minimize dust impacts to vegetation, wetlands, and breeding wildlife, unpaved access roads would be frequently watered with raw water using a sprayer truck during periods when trucks and other construction vehicles are using the roads,

except during periods when precipitation has dampened the soil enough to inhibit dust. The speed limit on unpaved roads would be limited to avoid visible dust.

BIO-8: In the event of emergency operations that increase the reservoir surface elevation of Folsom Reservoir above the normal OHWM, supplemental environmental compliance will be completed. It is anticipated that surveys would be completed after the event and post-inundation surveys would be compared to the most recent pre-inundation survey data available to assess impacts and compensatory mitigation. The responsible Federal agency would contact other federal, state, and local agencies to develop appropriate mitigation measures. These measures would be based on the extent and duration of the emergency inundation and survey data. Based on the results of these surveys, formal Section 7 consultation would be reinitiated by the responsible federal agency and consultation with CDFG would also be conducted.

BIO-9: Qualified biologists (monitors) would be available throughout the construction period to identify any at-risk special-status species. The biologist would consult with the appropriate agency to remove individuals from the project area, according to USFWS and CDFG laws, handling guidelines, licenses, and permits.

BIO-10: Follow recommendations in the CAR and complete mitigation in the CAR for all affected habitats.

*VEG-1***:** Native oaks and oak woodlands impacted by construction would be compensated for at a ratio stipulated in the CAR and MMRP.

VEG-2: Riparian vegetation outside the OHWM of the reservoir impacted by construction will be compensated for at a ratio stipulated in the CAR and MMRP.

VEG-3: Chaparral vegetation impacted by construction will be compensated for at a ratio stipulated in the CAR and MMRP.

VEG-4: Wetlands impacted by construction will be compensated for at a ratio stipulated in the CAR and MMRP.

VEG-5: Prior to bringing in equipment from other sites, contractors will clean all mud, soil, and plant/animal material from the equipment. This will help prevent the importation of plants or animals that are exotic or invasive.

VEG-6: All revegetated or disturbed areas would be monitored annually for invasive non-native plant species, particularly French broom and pampas grass, for five years following completion of construction, with the assistance of a qualified botanist. If invasive species are becoming established on areas disturbed by project activities

during the five-year period, invasive species will be removed at times that preclude the plants from setting new seed.

VEG-7: During jet grouting or excavation and replacement of the foundation at MIAD, wetlands downstream of MIAD will be flagged and clearly delineated. No equipment will be staged within 25 ft of a wetland, nor will work take place within 25 ft of a wetland.

INV-1a: Where avoidance is compatible with the construction of the Folsom DS/FDR Action, a 100-foot buffer zone will be established and maintained around all elderberry plants containing stems measuring 1.0 inches or greater in diameter at ground level. USFWS will be consulted before any disturbances within the buffer area occur.

INV-1b: Elderberry plants that cannot be avoided during Folsom DS/FDR construction activities will be transplanted to a conservation area approved by USFWS. All elderberry plants containing stems measuring 1.0 inches or greater in diameter at ground level will be transplanted to a conservation area if technically feasible, per Biological Assessment that was submitted to USFWS and Biological Opinion that is anticipated from USFWS as well as the Valley Elderberry Longhorn Beetle (VELB) conservation guidelines (USFWS 1999).

INV-1c: Each elderberry stem measuring 1.0 inch or greater in diameter at ground level that is adversely affected (e.g., those that are transplanted or destroyed) will be compensated, in the conservation area, with elderberry seedlings and associated native plant seedlings per the Biological Opinion for the Project and USFWS's 1999 VELB Conservation Guidelines. A minimum survival rate of at least 60 percent of the elderberry plants will be maintained throughout the monitoring period (see *INV-1e*). If survival drops below this level, additional seedlings or cuttings will be planted. Stock for plantings will be obtained from local sources.

INV-1d: Native plants associated with elderberry plants at the Folsom DS/FDR Action site, or at similar reference sites, will be planted at ratios provided in the Biological Opinion for the Project. A minimum survival rate of at least 60 percent of the associated native plants must be maintained throughout the monitoring period (see *INV-1e*). If survival drops below this level, additional seedlings or cuttings will be planted. Only stock from local sources will be used.

INV-1e: A conservation area will be established distinct from the project area and will be protected in perpetuity as a compensation site for transplanted elderberry plants and associated native vegetation. This area will provide at least 1,800 square feet for each transplanted elderberry plant. The condition of the valley elderberry longhorn beetle, elderberry shrubs, and general condition of the conservation area will be monitored over a period of ten consecutive years or for seven years over a

15-year period occurring on the first, second, third, fourth, fifth, seventh, tenth, and fifteenth years.

AMP-1: The excavated areas within the proposed borrow sites will be graded to drain water to prevent attraction to the artificial pools by amphibian species as well as prevent fish stranding with changing reservoir water surface elevations.

WIL-1: To the extent possible, excavation and construction activities would be initiated during non-breeding seasons for special-status and protected wildlife. Habitat for special status and protected species would be removed during the non-breeding season if practicable to preclude return to the project area by the species during construction activities.

BRD-1: To the extent possible, removal of vegetation and potential bird breeding habitat in the Folsom DS/FDR project area would occur between September 1 and February 28, when birds are not expected to be nesting within the project area, in order to comply with the Migratory Bird Treaty Act (MBTA). Impacts to non-breeding birds still may occur between September 1 and February 28, because they are not reproductively constricted to the project area during that period. During the period from March 1 to August 31, bird reproduction is occurring and therefore the potential for impacts to nesting birds exists.

BRD-2: To mitigate and monitor construction-related impacts to birds during the breeding season, a bird monitoring plan would be developed as part of the MMRP and implemented to comply with the MBTA and Executive Order 13186. Mitigation will include but is not limited to a nest monitoring zone of an adequate size, per the Migratory Bird Act, to avoid or significantly reduce impacts to breeding birds at active construction sites. Also, methods to deter nesting, and/or to acclimate birds to construction noise and activities made. One potential method would be to use acoustic recordings within 500 ft of blasting sites to deter birds from nesting near blasting areas or allow them to become habituated to the noise. Also, an appropriate buffer zone around active nests of special status bird species would be implemented.

3.5.5 Cumulative Effects

Table 5-1 provides a list of past, present and probable future projects in the general vicinity of the study area that are included in the cumulative effects analysis.

The following analysis evaluates the impacts of the Folsom DS/FDR Action on terrestrial biological resources when added related past, present and reasonably foreseeable projects. This analysis includes the potential impacts of the Folsom Bridge Project, the Future Redundant Water Pipeline for Roseville, Folsom, and San Juan Water District the Lower American River Common Features Project, and the Sacramento Municipal Utility District Transmission Line Project. The Folsom Dam

Road Closure and the Folsom Historic District Traffic Calming Program are not likely to affect biological resources and are not included in this evaluation.

Construction of any of the Folsom DS/FDR actions will not significantly alter current Folsom Facility operations. During construction and upon completion of structural modifications current operational parameters as summarized above and defined in appropriate agreements and authorities will remain in effect until the current flood operations agreement expires, or a new Flood Management Plan is developed and implemented, or if there are new Congressional authorizations, directives or mandates.

Vegetation
The Folsom Bridge Project is expected to result in limited impacts to native vegetation, in part in areas also potentially affected by the Folsom DS/FDR Action. These impacts include impacts to jurisdictional wetlands. The project provides mitigation to reduce these impacts to a less-than-significant level. The Sacramento Municipal Utility District Transmission Line Project would result in limited impacts to native vegetation, primarily in areas also potentially affected either by the Folsom Bridge Project or the Folsom DS/FDR Action. Additional impacts to native vegetation in the Folsom DS/FDR Action area are not expected from this project. Potential alterations to stream flow due to modification of the spillway at French Meadows Reservoir would be attenuated in the long distance between L.L. Anderson Dam and the Folsom DS/FDR Action area and are not likely to affect vegetation in the Folsom DS/FDR Action area. Although work related to the Lower American River Common Features Project is on-going, it is close to completion and consists primarily of levee work outside the floodway.

Therefore, the effects of these projects in combination with the Folsom DS/FDR Action would not be cumulatively considerable for vegetation in general, for riparian vegetation, or for wetland vegetation.

Special-status Plant Species
The Folsom Bridge Project is not expected to result in impacts to special-status plant species. The SMUD Transmission Line Project is not expected to result in impacts to special-status plant species. Potential alterations to stream flow due to modification of the spillway at French Meadows Reservoir would be attenuated in the long distance between L.L. Anderson Dam and the Folsom DS/FDR Action area and are not likely to affect vegetation in the Folsom DS/FDR Action area. Although work related to the Lower American River Common Features Project is on-going, it is close to completion and consists primarily of levee work outside the floodway.

Cumulative impacts to federally or state-listed plant species from the Folsom DS/FDR Action are not expected to occur because species in those categories are unlikely to occur in the project area. In addition, other special-status plant species are

unlikely to be affected by the Folsom DS/FDR Action. While complete avoidance of such species may not be possible, should they be found in the interim, the proposed mitigation measures would reduce the impact to a less-than-significant level. The implementation of the Folsom DS/FDR Action, its implementation along with the Folsom Bridge Project would not result in cumulatively considerable impacts.

Therefore, the effects of these projects in combination with the Folsom DS/FDR Action would not be cumulatively considerable for special-status plant species.

Special-status Wildlife Species
Construction-related disturbances for all alternatives of the Folsom DS/FDR Action have the potential to affect elderberry shrubs, the host plant for the valley elderberry longhorn beetle. Mitigation measures specified in Section 3.5.2 would reduce this impact to a less-than-significant level. Mitigation for these impacts may be compensated in a joint area with elderberry compensation for the Folsom Bridge Project to provide better quality habitat and greater cost efficiency.

Construction-related disturbances for all alternatives of the Folsom DS/FDR Action have the potential to affect only small amounts of existing amphibian aquatic habitat, most of which is unsuitable to marginally suitable for amphibian species, including special-status species. Terrestrial habitat potentially utilized by western spadefoot toad may be altered temporarily or permanently, but since the distribution of this species appears to be limited by the lack of aquatic breeding habitat rather than terrestrial habitat, none of the proposed alternatives are likely to affect the overall habitat value for this species. Mitigation measures, such as performing pre-construction surveys and implementation of a Mitigation, Monitoring and Reporting Plan for wetlands affected by the project, would reduce both direct and indirect impacts to a less-than-significant level. Therefore, these impacts would result in only a very minor contribution to ongoing cumulative effects caused by other projects within the region.

Construction-related disturbances for all alternatives of the Folsom DS/FDR Action have the potential to affect special-status reptiles, birds, and bats and their habitat, and other breeding migratory birds. However, other habitat is available adjacent to the project area. With the mitigation measures described in Section 3.5.2, these potential impacts would be reduced to a less-than-significant level.

The DEIS/EIR for the Folsom Bridge project (Corps 2006b) found there would be no adverse effects to the California red-legged frog or the giant garter snake from any of the alternatives evaluated for that project because "…no suitable habitat for special-status reptiles, amphibians, or invertebrates was noted during the wetland delineation for the proposed project" (Corps 2006b). The DEIS/EIR for the Folsom Bridge project did identify potential impacts to the white-tailed kite and for the bald eagle if

these species were to be present during construction. This document also provided mitigation measures to reduce any potential impacts to a less-than-significant level.

Construction activities for three other projects would be implemented concurrently with, and generally within the footprint of, construction activities implemented for the Folsom DS/FDR Action. Therefore, they would not contribute to additional direct or indirect impacts. These projects include the Reliable Water Supply Project for the City of Roseville, City of Folsom, the San Juan Water District project and the Sacramento Municipal Utility District Transmission Line Project.

Because environmental documents to fulfill NEPA/CEQA requirements have not yet been completed for the redundant water pipeline for the City of Roseville, City of Folsom, the San Juan Water District project, or the Sacramento Municipal Utility District Transmission Line Project impacts to wildlife and wildlife habitat, including special-status species, have not been identified. However, any alternative that would install a new intake and redundant delivery pipeline would affect habitat already disturbed by the existing infrastructure. Furthermore, a substantial portion of the construction-related impacts would occur concurrently with, and within the footprint of, construction activities for the Folsom DS/FDR Action. Likewise, a substantial portion (possibly all) of the construction-related impacts for Sacramento Municipal Utility District Transmission Line Project would occur within the footprint of, construction activities for the Folsom DS/FDR Action or the Folsom Bridge project.

Two projects, the L.L. Anderson Dam Project and the Lower American River Common Features Project would not affect local or proximate populations of wildlife, including special-status species. Potential alterations to stream flow due to modification of the spillway at French Meadows Reservoir would be attenuated in the long distance between L.L. Anderson Dam and the Folsom DS/FDR Action area. Although work related to the Lower American River Common Features Project is on-going, it is close to completion. Impacts to wildlife and their habitat due to the Folsom DS/FDR Action are less-than-significant with mitigation and, therefore, would not contribute to cumulative impacts with the remaining levee work.

Therefore, the effects of these projects in combination with the Folsom DS/FDR Action would not be cumulatively considerable for wildlife in general or for special-status wildlife.

3.6 Soils, Minerals, and Geological Resources

This section discusses the effects that construction may have on soils, minerals, and geologic resources in the study area.

3.6.1 Affected Environment/Existing Conditions

This section describes the soils, minerals, and geological resources in the study area as well as the regulatory setting relevant to these resources.

3.6.1.1 Area of Analysis

The area of analysis for this section includes Folsom Reservoir and the area surrounding the reservoir.

3.6.1.2 Regulatory Setting

Federal Regulations

The Clean Water Act (CWA) includes provisions for reducing soil erosion relevant to water quality. The CWA made it unlawful for any person to discharge any pollutant from a point source (including construction site), into navigable waters, unless a permit was obtained under its provisions. This pertains to construction sites where soil erosion and storm runoff as well as other pollutant discharges could affect downstream water quality. Further details are provided in Section 3.1, Hydrology, Water Quality, and Groundwater.

The National Pollutant Discharge Elimination System (NPDES) process, established by the CWA, is intended to meet the goal of preventing or reducing pollutant runoff. Projects involving construction activities (e.g., clearing, grading, or excavation) involving land disturbance greater than one acre must file a Notice of Intent with the applicable Regional Water Quality Control Board (RWQCB) to indicate their intent to comply with the State General Permit for Storm Water Discharges Associated with Construction Activity (General Permit). This Permit establishes conditions to minimize sediment and pollutant loading and requires preparation and implementation of a Storm Water Pollution Prevention Plan (SWPPP) prior to construction. Section 3.1 provides further details.

The Clean Air Act (CAA) also includes provisions for reducing soil erosion relevant to air and water quality. On construction sites, exposed soil surfaces are vulnerable to wind erosion and small soil particulates are carried into the atmosphere. Suspended particulate matter (PM10 and PM2.5) is one of the six criteria air pollutants of the CAA. PM standards and additional details on the CAA are provided in Section 3.3, Air Quality.

State Regulations

State regulations including the Porter Cologne Act and Fish and Game Code 1600 provide provisions to reduce soil erosion. The Porter Cologne Act established the

State Water Resources Control Board (SWRCB) and nine regional boards that regulate water quality. The regional boards carry out the NPDES permitting process for point source discharges and the CWA Section 401 certification program. Additional information is provided in Section 3.1.

Fish and Game Code 1600 requires notification for projects that are planned to occur in or in close proximity to a river, stream, lake, or its tributaries. Applicants are to enter into a "streambed alteration agreement" with the Department of Fish and Game when a construction activity would 1) divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake, 2) use material from a stream bed, or 3) result in the disposal of disposition of debris, waste, or other material containing crumbled, flaked, or ground pavement that could pass into a river, stream, or lake. The Federal Government is not required to submit a Fish and Game code 1600 permit; however, the same impacts will be addressed under a 401, and a 404 permit.

The 1972 Alquist-Priolo Earthquake Fault Zoning Act (California Public Resources Code (CPRC) Section 2621 et *seq*.) requires local agencies to regulate development within earthquake fault zones to reduce the hazards associated with surface fault ruptures. It also regulates construction in earthquake fault zones.

The 1990 Seismic Hazards Mapping Act (CPRC Sections 2690-2699.6) addresses strong ground shaking, liquefaction, landslides, or other ground failures as a result of earthquakes. This Act requires statewide identification and mapping of seismic hazard zones which would be used by cities and counties to adequately prepare the safety element of their general plans and protect public health and safety (California Geological Survey 2003). Local agencies are also required to regulate development in any seismic hazard zones, primarily through permitting. Permits for development projects are not issued until geologic investigations have been completed and mitigation has been developed to address any issues.

The Surface Mining and Reclamation Act (SMARA) of 1975 (CPRC Sections 2710 *et seq*.) addresses surface mining and requires mitigation to reduce adverse impacts to public health, property, and the environment. SMARA applies to anyone (including a government agency) that disturbs more than one acre or removes more than 1,000 cubic yards of material through surface mining activities, even if activities occur on federally managed lands (California Department of Conservation, Office of Mine Reclamation 2006). Local city and county "lead agencies" develop ordinances for permitting that provide the regulatory framework for mining and reclamation activities. The permit generally includes a permit to mine, a reclamation plan to return the land to a useable condition, and financial reports to ensure reclamation would be feasible. The State Mining and Geology Board reviews lead agency ordinances to ensure they comply with SMARA (California Department of Conservation Office of Mine Reclamation 2006).

The Asbestos Airborne Toxic Control Measure for Construction, Grading, Quarrying, and Surface Mining Operations (See Title 17 CCR Section 93105) contains the requirements for construction operations that would disturb any portion of an area that is located in a geographic ultramafic rock unit or that has naturally-occurring asbestos, serpentine, or ultramafic rock. Construction or grading operations on property where the area to be disturbed is greater than one acre, require an Asbestos Dust Mitigation Plan to be submitted and approved by the air quality management district before the start of construction. The Asbestos Dust Mitigation Plan must be implemented at the beginning and must be maintained throughout the duration of the operation. In order to receive an exemption from this Airborne Toxic Control Measure, a registered geologist must conduct a geologic evaluation of the property and determine that no serpentine or ultramafic rock is likely to be found in the area to be disturbed. This report must be presented to the executive officer or air pollution control officer of the air pollution control or air quality management district, who may then grant or deny the exemption.

The Asbestos Airborne Toxic Control Measure for Surfacing Applications (17 CCR Section 93106) applies to any person who produces, sells, supplies, offers for sale or supply, uses, applies, or transports any aggregate material extracted from property where any portion of the property is located in a geographic ultramafic rock unit or the material has been determined to be ultramafic rock, or serpentine, or material that has an asbestos content of 0.25 percent or greater. Unless exempt, the use, sale, application, or transport of material for surfacing is restricted, unless it has been tested using an approved asbestos bulk test method and determined to have an asbestos content that is less than 0.25 percent. Any recipient of such materials may need to be provided a receipt with the quantity of materials, the date of the sale, verification that the asbestos content is less than 0.25 percent, and a warning label. Anyone involved in the transportation of the material must keep copies of all receipts with the materials at all times.

Local Regulations

The General Plans for El Dorado, Placer, and Sacramento Counties have a goal of minimizing threat to life, injury, and property from seismic and geological hazards. El Dorado County plans to accomplish this through the adoption and enforcement of development regulations, including building and site standards that provide protection against seismic and geologic hazards and the continued evaluation of seismic-related hazards such as liquefaction, landslides, and avalanches (El Dorado County 2004).

The Sacramento County General Plan calls for a geotechnical report and appropriate mitigation measures for new development in seismic and geologically sensitive areas; a draft of an ordinance to establish a program for the removal or strengthening of poorly anchored parapets, unreinforced masonry walls, and architectural detailing; support efforts of local, State, and Federal agencies in investigating and mitigating

geologic hazards; and prohibits development on slopes that exceed 40 percent (County of Sacramento 1993b).

Placer County's General Plan also calls for a variety of policies that focus on minimizing geologic and seismic hazards. These include the preparation of soils reports as well as soils engineering and geologic seismic analysis prior to development in geologic and seismic sensitive areas; appropriate investigation, site selection, and design provisions pertaining to structures that may encounter potential landslides, expansive soils, liquefaction, seismic ground shaking, as well as fault rupture and/or creep; appropriate mitigation for habitual structure and sewage systems located on critically expansive soils; preparation of drainage plans for development in hillside areas; prohibition of activities that may alter land in a manner that increases the potential for landslides; and the support of scientific investigations on geologic and seismic hazards (Placer County 1994).

3.6.1.3 Environmental Setting

This section describes the geological resources, mineral resources, and soils within the study area. Information on the topography, geology, seismicity, landslides, and subsidence is provided in the geological resources section. The mineral resources section focuses on minerals that could be extracted for economically beneficial purposes and the soils section describes the soil characteristics within the study area.

Geological Resources

Topography

The study area is located in the American River watershed which ranges in elevation from 10,000 ft in the Sierra Nevada Mountains (Sierras) to 10 ft above mean sea level (amsl) at the confluence with the Sacramento River. Folsom Reservoir is in the foothills of the Sierras, residing in a valley at the confluence of the North and South Forks of the American River. The reservoir extends into the canyons of the North and South Forks of the American River with an elevation of 466 ft at the Main Concrete Dam spillway. The slope surrounding Folsom Reservoir is generally steep to moderate with exception to the flatter areas of the Peninsula Campground area, Goose Flat, and Granite Bay.

Geology

The study area is between the Central Sierra Nevada and the Central Valley Geomorphic Provinces. The Sierra Nevada geomorphic region is characterized by a north-northwest trending mountain belt with extensive foothills on the western slope. The Folsom Reservoir geomorphic region primarily consists of rolling hills and upland plateaus between major river canyons. There are three major geologic divisions within the study area. The oldest consists of a north-northwest trending belt of metamorphic rocks. Younger granitic plutons have intruded and obliterated some of the metamorphic belt. The youngest geologic division consists of relatively flat deposits of volcanic ash, debris flows, and alluvial fan deposits. These deposits

overlie the older rocks. Figure 3.6-1 shows the local geologic characteristics surrounding Folsom Reservoir.

Igneous, metamorphic, and sedimentary rock types are present within the study area. The four major rock divisions of the study area include 1) ultramafic intrusive rocks, 2) metamorphics, 3) granodiorite intrusive rocks, and 4) volcanic mud flows and alluvial deposits.

Ultramific rocks originate from oceanic sediments including volcanic pillow basalts and andesite breccia. These rocks have been lifted from deep beneath the earth's crust through faulting and underthrusting of the earth's crust. Outcrops of ultramafic rock are relatively resistant to erosion and often form topographic highs. The largest exposure occurs on Flagstaff Mountain on the Folsom Reservoir Peninsula. Ultramafic rock consists of serpentine minerals (antigorite, chrysotile, and chlorite) and chromite, minor nickel, talc and naturally-occurring asbestos.

Metamorphic rocks are found in a north-northwest trending band that is east of Rattlesnake Bar through most of the peninsula that is between the two arms of the reservoir. Metamorphic rocks are also a part of the Copper Hill Volcanics along the southern portion of the study area. These rocks originate from an ancient chain of volcanic islands and seafloor sediments that have been subjected to heat and pressure forming metavolcanic and metasedimentary rocks that are mainly composed of metamorphosed basaltic breccia, pillow lava, and ash.

Granodiorite intrusive rocks are similar to granite. They are composed of a coarse grained crystalline matrix with slightly more iron and magnesium-bearing minerals and less quartz than granite. The feldspar and hornblend of the granodiorite is less resistant than the quartz crystals and easily weathers. When weathering occurs, the remaining feldspars separate from the quartz resulting in decomposed granite. The granodiorite intrusive rocks occur in the study area in two intrusive plutons, the Rocklin and Penryn Plutons. The Rocklin Pluton is on both sides of Folsom Reservoir and extends to Lake Natoma. The Penryn Pluton is upstream of the Rocklin Pluton.

The volcanic mud flows and alluvial deposits are found downstream of Folsom Reservoir. These deposits form two major formations, the Merhten and Laguna Formation. The Laguna and Merhten Formations occur in a small area in the southeast corner of the Folsom Reservoir. The Merhten Formation is a complex unit of volcanic sediments mixed with volcanic mudflows. It contains volcanic conglomerate, sandstone, and siltstone, all derived from andesitic sources. Portions of the Merhten are gravels deposited by ancestral streams. The Laguna Formation, deposited on the Merhten Formation is a sequence of gravel, sand and silt derived from granitic sources. It was deposited mainly as debris flows.

The western side of Folsom Reservoir is bounded by igneous rocks, primarily granodiorite intrusive rocks. The eastern side of Folsom Reservoir is bounded by a metamorphic intrusive complex that includes the Copper Hill Volcanics and Ultramafic rocks. Naturally-occurring asbestos may be found in both of these formations. Near MIAD in the southeast corner of Folsom Reservoir are the Laguna and Merhten Formations.

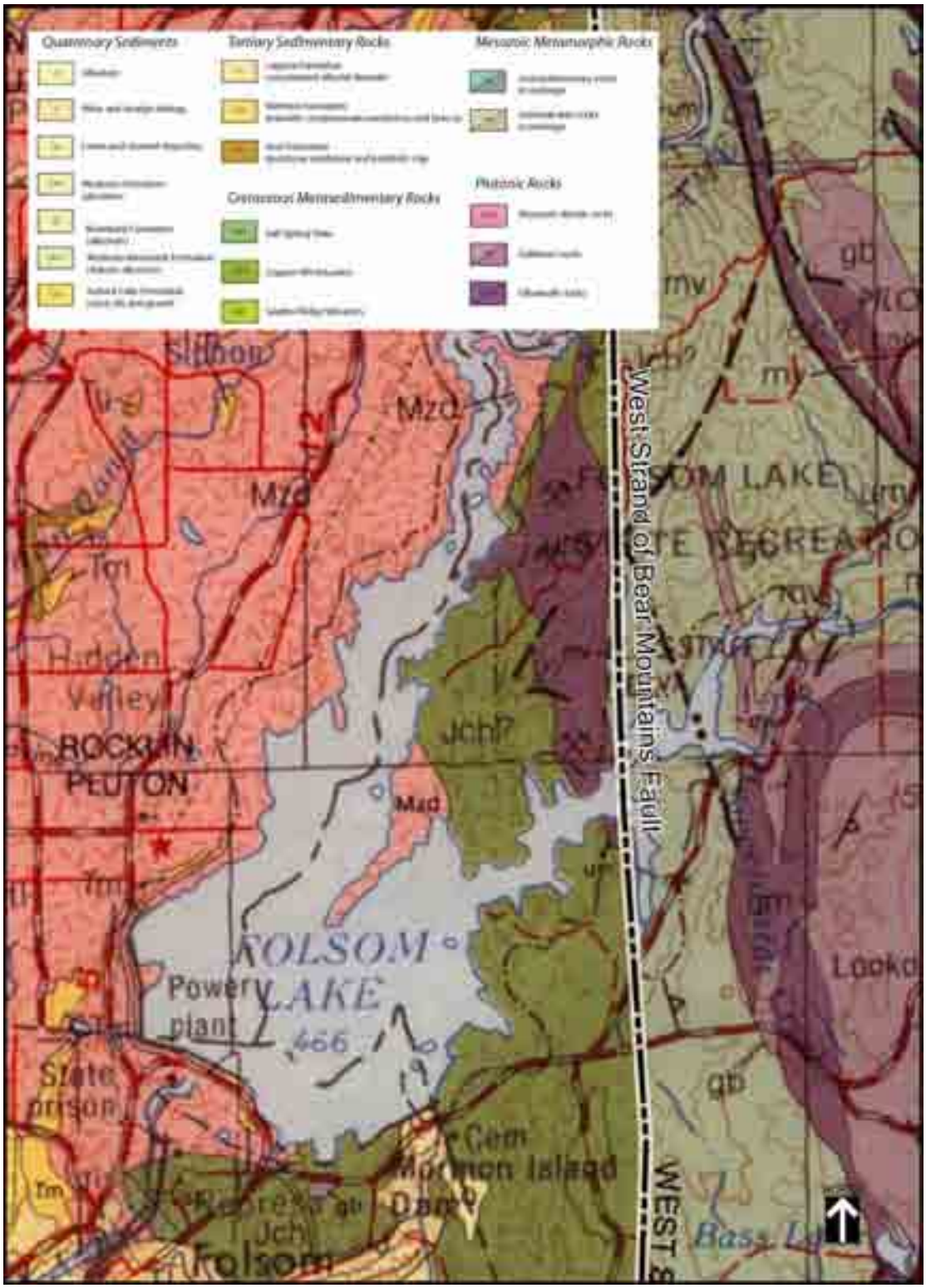
Seismicity

The study area is in the Foothills Fault system which is located in the metamorphic belt. This system consists of northwest trending vertical faults and is divided into two zones, the western Melones Fault zone and the western Bear Mountains Fault zone. The west trace of the Bear Mountains Fault zone transects the upper reaches of the North Fork arm near Manhattan Bar Road, and crosses the South Fork arm in the region of the New York Creek. Figure 3.6-1 shows the location of the west strand of the Bear Mountains Fault. The last major movement of this system occurred 140 million years ago and the United States Geological Survey has not designated the Bear Mountains Fault as an active fault (Corps 2006b).

Faults 11 to 102 miles away could potentially generate earthquakes with a magnitude of 6.5 to 7.9 (Wallace, Roberts, and Todd et al. 2003). However, risk of shaking at the study area is relatively low given the distance, hard bedrock, and thin soil cover. The California Geological Survey Seismic Shaking Hazard Map, Figure 3.6-2, shows the study area lies within the 10-20 percent acceleration of gravity zone. This means that within the study area, there is a 10 percent probability that the seismic ground motion will exceed 10 percent to 20 percent of the acceleration of gravity within the next 50 years.

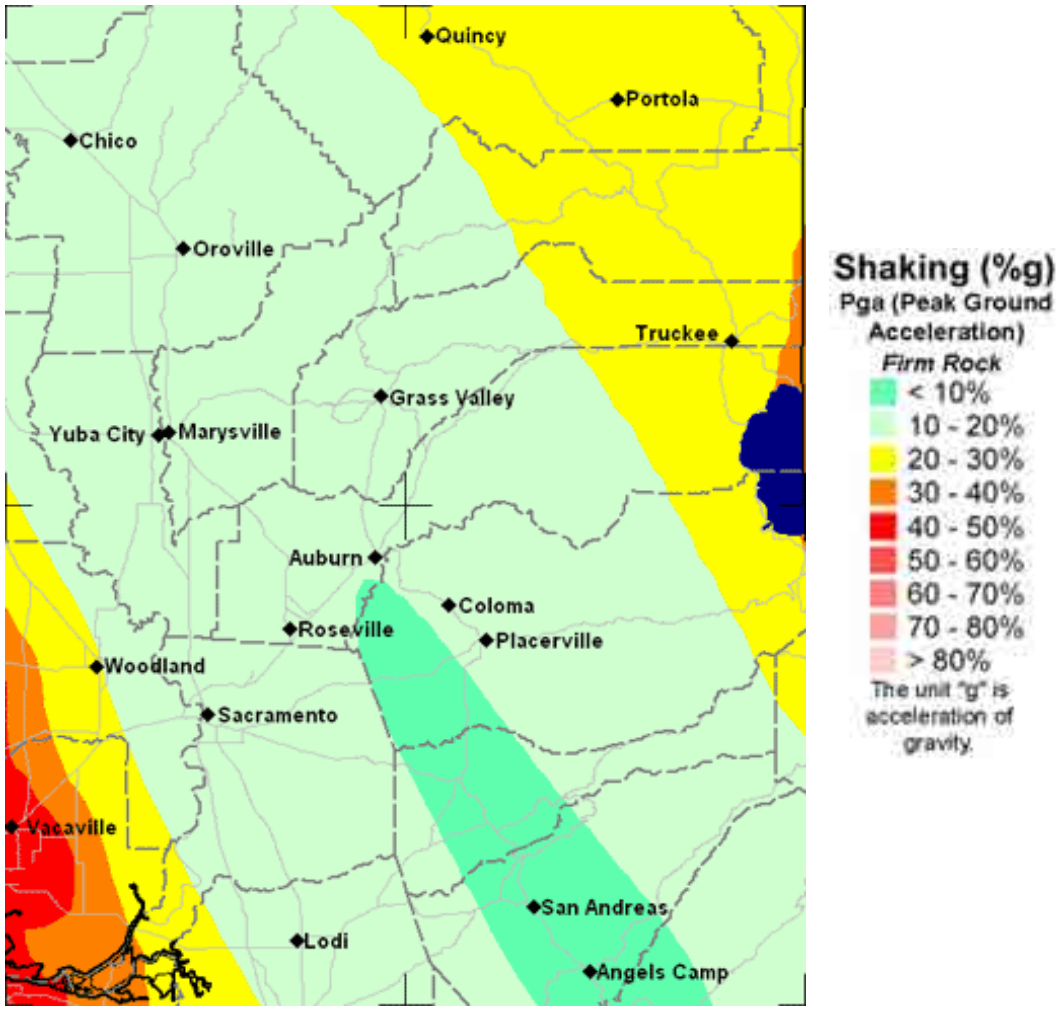
Although the risk of shaking is relatively low, the seismic safety of the Folsom Facility is important considering the large downstream population. Studies in the late 1980s indicated that all features of the Folsom Facility were stable assuming a Maximum Earthquake of Magnitude 6.5 occurring 15 km on the East Branch of the Bear Mountains Fault Zone with exception of risk to MIAD and the Main Concrete Dam. The Corps identified a potential risk of liquefaction of the foundation materials at MIAD. Liquefaction occurs when soils lose their strength and stiffness as a result of earthquake shaking or rapid loading. Soils are not able to support structures resulting in collapse and damage.

In response to risk of liquefaction, Reclamation, in cooperation with the Corps, took actions to reduce this risk through jet grouting. In 1995, after several tests, Reclamation discovered that the lower portion of the foundation was not treated. Although Reclamation has determined the technical risks for liquefaction are low, the foundation at MIAD requires additional treatment to ensure safety.



Source: Wallace, Roberts, and Todd et al 2003

Figure 3.6-1
Local Geology of Folsom Reservoir



Source: California Geologic Survey, Seismic Shaking Hazard Map, http://www.consrv.ca.gov/CGS/rghm/pshamap/pshamain.html

Figure 3.6-2
California Geological Survey Seismic Shaking Hazard Map

Land Subsidence

Land subsidence is the gradual or sudden sinking, or settling of the ground surface. The potential for a possible hazard as a result of subsidence in the study area is very low. Conditions that generally result in subsidence include natural geologic processes such as a cavern collapse or peat oxidation and human activities involving groundwater extraction as well as oil and gas mining. Local collapse of small mines in the Flagstaff mountain area could potentially occur, yet is unlikely. The surrounding rocks of the mines appear to be stable and the extent of the mine shaft is

limited. Generally, conditions that may cause subsidence are not of scale to warrant substantial risk of subsidence in the study area (Wallace, Roberts, and Todd et al. 2003).

Landslides
Factors that influence slope stability include slope inclination, bedrock geology, geologic structure, geomorphology, weathering, vegetation, and granitic rocks. Studies along the Highway 50 corridor have shown slides to occur where metamorphic and granitic rocks are in contact as well as where metamorphic and Tertiary sedimentary rocks are in contact. These geologic conditions are present within the study area where the sedimentary Laguna Formation overlies the metamorphic bedrock and along the north side of Folsom Reservoir where the Mehrten Formation tops the granite hills. Despite these geologic formations, landslides are not a major hazard in the study area because soils are thin and the slopes are not particularly steep (Wallace, Roberts, and Todd et al. 2003).

Mineral Resources
A variety of mineral resources are present within the study area. Resources such as chromite, minor nickel, talc, and asbestos are associated with the ultramific rocks and past mining has occurred within the region. The richest chromite mining area of the western foothill region is located on Flagstaff Hill where sporadic mining occurred from 1894 to 1955. Chromite mining also occurred on the peninsula between the Forks of the two rivers. Abandoned or idle pit mines of talc and asbestos also occur on the peninsula. Mineral resources associated with the metamorphic belt include disseminated gold, lode gold, copper, limestone, and zinc. Limestone is mined on the north side of the peninsula across from Rattlesnake Bar.

Placer gold is associated with the Merhten Formation which is exposed in the bluffs northwest of upper Lake Natoma. Mine and dredge tailings in the area have been left from previous placer gold mining activities. The majority of the tailings are found along Lake Natoma, but they can also be found below and to the south of MIAD. The mine and dredge tailings are made up of well-washed large gravel, cobbles, and boulders that have been left in large piles along the river banks. The well-rounded cobbles and boulders could be mined for landscape rock.

Decomposed granite may also be considered a resource within the study area. Although this rock has not been used for commercial purposes, decomposed granite would be used as fill material for the potential dike and dam raises of the selected alternative.

Soils
Soils in higher elevations of the study area are generally thin and have numerous outcroppings of igneous and metamorphic rock. Loose soils of decomposed granite are found on the north and west portions of Folsom Reservoir. These soils are highly

erodible and excessive erosion has been observed along the north shore. Clayey and denser soils are concentrated on the south end. Generally, all soils within the study area are of low shrink-swell potential. Serpentine soil and rock are located on the Peninsula between the North and South Forks and south of the South Fork of the American River at Iron Mountain. These soils are high in nickel, chromium, and manganese which limit the variety of plant species that can grow. This soil is also corrosive and generally is not suitable for leach fields (Wallace, Roberts, and Todd et al. 2003).

3.6.2 Environmental Consequences/Environmental Impacts

3.6.2.1 Assessment Methods

Potential impacts associated with each alternative were assessed through a qualitative evaluation. Information presented in the existing conditions discussion above as well as the following factors were considered during the evaluation process:

- Proximity to faults and frequency of seismic activity;
- The types of mineral resources that would be excavated;
- The amount and location of on-site material displacement including stripping, borrow, and fill material; and
- Existing regulatory controls in place to offset and/or mitigate adverse effects.

3.6.2.2 Significance Criteria

Under criteria based on the CEQA Guidelines and agency guidance, the Folsom DS/FDR action would be considered to have significant impacts on geology, soils, and mineral resources if it would:

- Expose people or structures to potential substantial adverse effects, including the risk of loss, or injury, or death involving:
    - Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault,
    - Strong seismic ground shaking,
    - Seismic-related ground failure, including liquefaction,
    - Landslides;

- Result in the loss of availability of a known mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan that would be of value to the region and the residents of the State;
- Result in substantial soil erosion or loss of topsoil; and
- Airborne naturally-occurring asbestos could expose workers to health risks.

3.6.2.3 Environmental Consequences/Environmental Impacts

Environmental Consequence/Environmental Impacts of the No Action/No Project Alternative

The No Action/No Project Alternative assumes that no action would be taken by any agency. As described in Section 3.6.1, seismic concerns have been identified for the foundations of both MIAD and the Main Concrete Dam. Liquefaction of the MIAD foundation could occur during seismic activity. The MIAD foundation materials have been treated, yet subsequent testing and analysis revealed that methods to densify the foundation material did not fully treat the lower portion of the foundation. Under the No Action/No Project Alternative, the current seismic risk posed to these facilities would remain into the future.

The No Action/No Project Alternative would retain current risks associated with seismic activity, would not result in a loss of mineral resources or topsoil, and would not disturb naturally-occurring asbestos.

Environmental Consequences/Environmental Impacts of Alternative 1

Alternative 1 could result in adverse effects associated with seismic activity.

In order to excavate the Auxiliary Spillway channel, and to produce fill material for MIAD, wing dams, and dikes, blasting would be necessary when hard materials are encountered. Blasting is not expected to affect the nearest active or inactive faults (Sherer 2006a). The nearest faults are too distant from the Folsom DS/FDR site to be affected; therefore, construction of Alternative 1 would not induce earthquake activity along the fault.

In addition, modifications to MIAD and the Main Concrete Dam would provide seismic benefits. The stabilization of both dam foundations would provide additional assurance that seismic activity would not cause severe structure damage.

Potential effects associated with seismic activity would be less than significant.

Alternative 1 could result in adverse effects associated with landslides.

As described in Section 3.6.1, landslides are not a major hazard in the study area because soils are thin and the slopes are not particularly steep. Excavation would be

conducted in a manner to further minimize the potential for landslides (e.g., excavation may be terraced to stabilize slopes).

Impacts associated with landslides would be less than significant.

Alternative 1 would result in adverse effects associated with the loss of decomposed granite and other minerals which would be extracted from the reservoir bed and used for construction.

Shell material (this includes decomposed granite in addition to impervious soil and miscellaneous shell soil) would be excavated from the designated borrow locations and the Auxiliary Spillway. This material would be used to harden the crests of the earthen dam/dike embankments.

As shown in Figure 3.6-3, decomposed granite would be excavated in the western and northern portions of the study area. Decomposed granite would be a major portion of material removed. This excavation would occur at the bottom of the reservoir and in the Auxiliary Spillway. If borrow material is excavated east of the Left Wing Dam, talc, chromite, and asbestos could be encountered. Although the extraction of these materials as well as decomposed granite may be considered a loss of a known resource, there is no future potential for the commercial mining of these materials.

Table 3.6-1 provides estimated quantities of material that would be excavated and/or placed (as shell material, filter material, bank protection, etc.) for all alternatives. Excavated material includes material extracted from the Auxiliary Spillway site and material stripped from the Left Wing Dam, Right Wing Dam, Dikes 1 through 8, and MIAD prior to placement of filter material and additional shell material.

Table 3.6-1
Folsom Facility Estimated Material Quantities

Alternative	***Estimated Quantity of Excavated and Applied Material (CY)***
No Action/No Project	0
#1	5,821,000
#2	11,964,000
#3	3,564,000
#4	6,525,000
#5	7,161,000

The impacts associated with the loss of mineral resources would be less than significant.

Alternative 1 would result in effects associated with asbestos disturbance.

Figure 3.6-3 shows the location of where naturally-occurring asbestos may be present in the Copper Hill Volcanics and ultramafic rocks in the southern and eastern portions of the reservoir. Samples collected from D1/D2 borrow site investigations in the vicinity of MIAD and Dike 8 were subject to a petrographic examination of amphibolite schist bedrock. Termolite, an asbestoform mineral, was one of the main minerals in the amphibolite schist. Additional screening level tests (using a polarized light microscope) revealed that about 97 percent of the amphibole schist samples were positive for less than 1 percent regulated asbestos (from a regulatory perspective, the shape/size and mineralogy may constitute concern) (Reclamation 2006d).

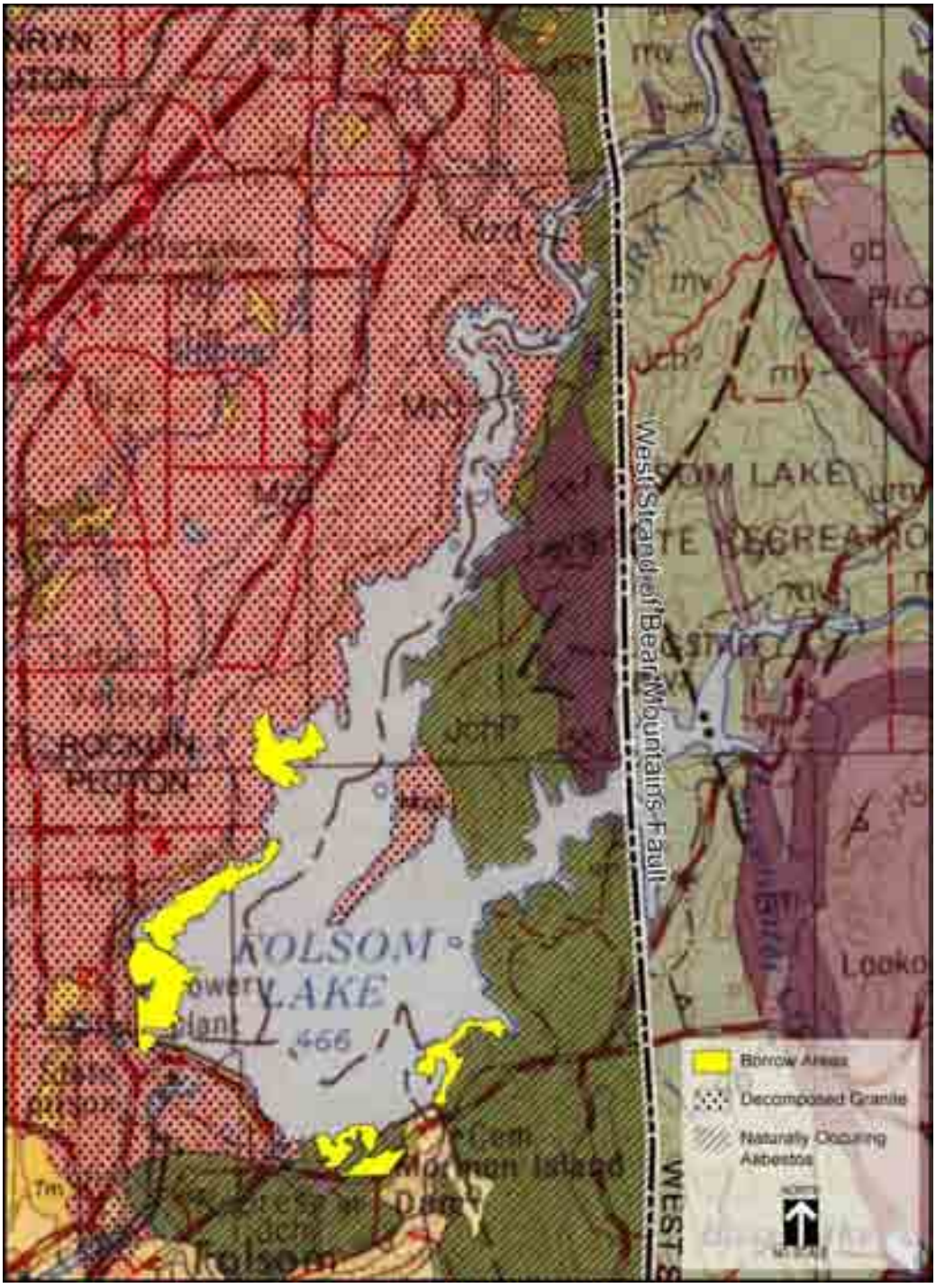
In accordance to the Asbestos Airborne Toxic Control Measure for Construction, Grading, Quarrying, and Surface Mining Operations (Title 17 CCR Section 93105), the Sacramento and El Dorado Counties Air Quality Management District were notified of the positive tests. Permits would be required prior to any earth displacement in this location of the Folsom DS/FDR study area. In order to obtain the permits from both Sacramento and El Dorado Counties, a geologic site characterization report (signed by a California Registered Geologist) must be prepared as well as a county approved Dust Mitigation Plan. These measures are in place to reduce impacts associated with asbestos excavation.

The impacts associated with the excavation of asbestos would be significant. Mitigation Measure GR-1 would reduce impacts to a less than significant level.

Alternative 1 would result in adverse effects associated with the loss of topsoil.

The Auxiliary Spillway, borrow areas, wing dam, and dike embankments would be stripped of organics prior to excavation and borrow development. This would result in a loss of topsoil. However, the majority of this soil is not of high ecological or agricultural value due to either the shallow nature of soil over granitic bedrock, the origin of the material was either excavated from the local granitic borrow sites when the facility was constructed during the 1950s, or the borrow is excavated from the bottom of the reservoir. (Ecological impacts associated with excavation are provided in Section 3.5, Terrestrial Vegetation and Wildlife).

Adverse effects associated with the loss of topsoil would be less than significant.



Source of geologic formations: Geotechnical Consultants 2003

Figure 3.6-3
Decomposed Granite and Asbestos

Alternative 1 would result in significant impacts associated with an increased potential for soil erosion.

Construction activities would expose bare ground surface through stripping and excavation as well as through the use of staging/processing areas and movement of large construction equipment. These activities remove the vegetative root structure that stabilizes soil and contributes to the protection of the soil surface from wind and soil erosion. The newly exposed surface is exposed to storm water runoff during the rainy season and remains vulnerable until new vegetation has the opportunity to become established.

Impacts from soil erosion would be significant. Mitigation Measure GR-2 would reduce impacts to a less than significant level.

Environmental Consequences/Environmental Impacts of Alternative 2
The potential impacts associated with seismic activity, landslides, and asbestos disturbance would be the same as for Alternative 1. The potential for loss of minerals and topsoil through excavation and soil erosion would be greater than Alternative 1. This is because more material would be excavated for shell placement. Table 3.6-1 provides estimated quantities of material that would be excavated and placed for each alternative. All impacts would be less than significant with the exception of impacts from soil erosion and asbestos disturbance. Mitigation Measures GR-1 and GR-2 would reduce impacts to a less than significant level.

Environmental Consequence/Environmental Impacts of Alternative 3
The potential impacts associated with seismic activity, landslides, asbestos disturbance, and loss of minerals and topsoil through excavation and soil erosion would be similar to Alternative 1. Less material would be excavated for fill (Table 3.6-1) as parapet walls would potentially be constructed. All impacts would be less than significant with the exception of soil erosion and asbestos disturbance. Mitigation Measures GR-1 and GR-2 would reduce impacts to a less than significant level.

Environmental Consequences/Environmental Impacts of Alternative 4
The potential impacts associated with seismic activity, landslides, asbestos disturbance, and loss of minerals and topsoil through excavation and soil erosion would be greater than Alternatives 1 and 3. This is because additional material would be excavated to raise all earthen structures. Table 3.6-1 provides estimated quantities of material that would be excavated and placed for this alternative. All impacts would be less than significant with the exception of soil erosion and asbestos disturbance. Mitigation Measures GR-1 and GR-2 would reduce impacts to a less than significant level.

Environmental Consequences/Environmental Impacts of Alternative 5
The potential impacts associated with seismic activity, landslides, asbestos disturbance, and loss of minerals and topsoil through excavation and soil erosion would be greater than Alternatives 1, 3, and 4. This is because no Auxiliary Spillway would be constructed and all shell material would be excavated from within the reservoir and at the D1/D2 location. All potential borrow sites would be developed under Alternative 5. Table 3.6-1 provides estimated quantities of material that would be excavated and placed for this alternative. All impacts would be less than significant with the exception of soil erosion and asbestos disturbance. Mitigation Measures GR-1 and GR-2 would reduce impacts to a less than significant level.

3.6.3 Comparative Analysis of Alternatives

None of the impacts associated with each alternative would be significant with the exception for the potential for asbestos disturbance and soil erosion. Asbestos disturbance and soil erosion impacts would be mitigated through Mitigation Measures GR-1 and GR-2, respectively.

Table 3.6-1 shows the estimated amount material that would be excavated and placed for each alternative. With exception to the No Action/No Project Alternative, Alternative 3 requires the least amount of material handling and processing. Consequently, Alternative 3 has the least potential for adverse effects associated with asbestos disturbance, loss of topsoil, and erosion. In contrast, Alternative 2 involves the greatest amount of material handling as a result of tunnel construction and it would result in the largest potential for adverse effects. The amount of material and associated impacts for the remaining alternatives in increasing order are Alternatives 1, 4, and 5.

3.6.4 Mitigation Measures

Implementation of Mitigation Measures GR-1 and GR-2 would reduce asbestos, soil, and geological resource impacts to a less than significant level.

GR-1: In order to obtain air quality permits from both Sacramento and El Dorado Counties, a geologic site characterization report (signed by a California Registered Geologist) and a county approved Dust Mitigation Plan must be prepared. The geologic site characterization report will be useful for mitigation purposes by identifying areas of naturally-occurring asbestos. The Dust Mitigation Plan will specify the activities and Best Management Practices (BMPs) required to minimize airborne naturally-occurring asbestos. These activities and BMPs are specified in the Airborne Toxic Control Measure regulation as well as the more restrictive county requirements. These include, but are not limited to, the following:

- Pre-wet work area and keep area sufficiently wet during construction operations. An approved palliative material may also be used to seal loose fibers to the parent material;
- Limit vehicle access and speed on serpentine and other materials containing asbestos;
- Cover areas that are exposed to vehicle travel;
- Material transfers and stockpiles of loose material must be covered, kept adequately wet, or sealed by an approved palliative; and
- Worker safety precautions and monitoring should be considered. Written employee notifications should be provided, notifying employees of the potential health risk and requirements of the asbestos dust mitigation plan (El Dorado County 2003).

GR-2: Prior to construction activity, a Notice of Intent must be filed with the Central Valley RWQCB to indicate the intent to comply with the General Permit. The General Permit establishes conditions to minimize sediment and pollutant loading and requires preparation and implementation of a SWPPP prior to construction (see Section 3.1 for more details). The purpose of this Plan is to prevent the movement of construction pollutants (in contact with storm water) into receiving water. This is accomplished through the selection of BMPs which are measures that are applied to control erosion and sediment transport. The SWPPP lists the BMPs that will be used and identifies the placement of the BMPs (State Water Resources Control Board 2006). BMPs will be used during the construction period to stabilize the soil in affected areas (e.g., Auxiliary Spillway and borrow and fill sites) until vegetation will be reestablished as well as reduce the intensity of stormwater runoff and intercept sediment prior to offsite transport. BMPs may include the installation of hay bales, sediment traps, fiber rolls, sediment fences, and rock check dams. Proper installation, monitoring and maintenance of BMPs will be implemented and enforced. Additional details are provided in Section 3.1.

3.6.5 Cumulative Effects

Construction activities associated with the Folsom DS/FDR action in combination with construction of the projects identified in Table 5-1 would not have any non-mitigable significant cumulative effects on soil, mineral, or geological resources.

Combined construction activities would not result in cumulative adverse effects associated with seismic activity. Projects that are within close proximity to the study area include the New Folsom Bridge. Blasting could potentially be required for the New Folsom Bridge. However, blasting would be of sufficient distance from the Bear Mountains Fault system and would not trigger seismic activity. Seismic activity

is also unlikely given that the Bear Mountains Fault system is not designated as an active fault and that the risk of seismic shaking is relatively low. Cumulative adverse effects associated with seismic activity would be less than significant.

Combined construction activities would not result in cumulative adverse effects associated with landslides. Although the construction of the New Folsom Bridge and the Folsom DS/FDR actions would involve a substantial amount of soil and material displacement, the potential for landslides within the study area is low and construction techniques would be implemented to minimize the potential for landslides. Cumulative adverse effects associated with landslides would be less than significant.

Combined construction activities would result in adverse effects associated with the loss of minerals or topsoil which would be extracted and used for construction. Although the construction of the New Folsom Bridge and the Folsom DS/FDR actions would involve a substantial amount of soil and material displacement, impacts associated with this loss would be less than significant. Any minerals that would be excavated would not be used for commercial purposes and therefore would not be considered an economic loss. Similarly, excavated topsoil is not of a high ecological or agricultural value. Cumulative adverse effects associated with soil losses would be less than significant.

Combined construction activities would result in significant impacts associated with an increase potential for soil erosion. Construction activities for the Folsom DS/FDR Action and the New Folsom Bridge would expose bare ground surface through stripping and excavation as well as through the use of staging/processing areas and movement of large construction equipment. This would substantially increase erosion potential. However, both actions would be mitigated through the implementation of BMPs set forth in the SWPPP. These BMPs would reduce erosion and intercept sediment present in stormwater runoff. The SWPPP and implementation of the BMPs would effectively mitigate impacts associated with soil erosion. Cumulative adverse effects associated with soil erosion would be significant. The development and implementation of an SWPPP for each action would effectively mitigate impacts to a less than significant level.

3.7 Visual Resources

Both natural and artificial landscape features contribute to perceived visual images and the aesthetic value of a view. The value is determined by contrasts, forms and textures exhibited by geology, hydrology, vegetation, wildlife, and man-made features. Individuals respond differently to changes in the physical environment, depending on prior experiences and expectations and proximity and duration of views. Therefore, visual effects analyses tend to be highly subjective in nature.

This section describes the existing conditions with respect to the visual resources in the Folsom DS/FDR area. The existing conditions describe the visual character of the area and identify potentially sensitive visual resources. This section also identifies the potential environmental impacts on visual resources that could result from each of the proposed alternatives.

3.7.1 Affected Environment/Existing Conditions

3.7.1.1 Area of Analysis

The study area of visual resources for this EIS/EIR includes Folsom Reservoir and lands adjacent to it in the Folsom Lake State Recreation Area (FLSRA) and the surrounding area that are in visible range of the areas of activity for each alternative (e.g., Folsom Dam, potential dike construction zones, potential borrow areas, potential contractor use areas, and processing and concrete mixing areas). These areas consist of Folsom Reservoir itself (including marinas and boat launching facilities), other public facilities (including campgrounds, day use facilities, roads, numerous hiking trails along Folsom Reservoir), and private properties (including residential housing along Folsom Reservoir and the surrounding hillsides).

3.7.1.2 Regulatory Setting

Reclamation and the California Department of Parks and Recreation (CDPR) do not have regulations or specific guidance on how to evaluate impacts to visual resources. As a result, this analysis uses the Scenery Management System (SMS) developed by the U.S. Department of Agriculture (USDA) Forest Service as a guide to assess visual impacts.

3.7.1.3 Environmental Setting

FLSRA represents an important visual and scenic resource within the region. Although the manmade reservoirs were created for flood control, water supply and power generation, the resulting waterfront setting affords visitors with dramatic panoramas of the water and the surrounding natural landscape. The growing urban development around the reservoir also affords visitors with views of less scenic urban elements such as the dam, electric transmission facilities, industrial areas, and residential subdivisions and roadways. Together, the length and configuration of the FLSRA's shoreline, coupled with the hilly topography, provide substantial variety in

both viewpoint orientation and available viewsheds and create a wealth of viewing conditions and opportunities. These resources include a combination of panoramic views in which the reservoir forms the dominant foreground element and the surrounding Sierra Foothills landscape forms the background, as well as distinctive landscape and built features.

Numerous visual resources, such as panoramic views, vista points, landscape features, and built features contribute to an existing positive visual experience for FLSRA users. There are also, however, a number of visual features or characteristics in the FLSRA and vicinity that detract from the quality of the views and scenic character. Some of these features are within the FLSRA (e.g., parking lots, utility corridors) while others are outside the FLSRA boundaries. In addition, visual resources include public views of the FLSRA from external viewpoints, including from private properties and local roadways. There are no historic buildings or scenic highways in the area of analysis; however there are cultural resources. These are described in Section 3.11, Cultural Resources.

The remaining portions of this Environmental Setting section describe these visual resources. Much of the content of these descriptions was taken from the FLSRA Resource Inventory (Wallace, Roberts, and Todd et al. 2003). Visual resources are described in the context of the scenery management system, which is used by the USDA Forest Service to evaluate impacts to visual resources. Scenic attractiveness classifications are a key component of the SMS and are used to classify visual features into the following categories (USDA Forest Service 1995):

- Class A "distinctive." Areas where landform, vegetation patterns, water characteristics, and cultural features combine to provide unusual, unique, or outstanding scenic quality. These landscapes have strong positive attributes of variety, unity, vividness, mystery, intactness, order, harmony, uniqueness, pattern, and balance.

- Class B "typical." Areas where landform, vegetation patterns, water characteristics, and cultural features combine to provide ordinary or common scenic quality. These landscapes generally have positive, yet common, attributes of variety, unity, vividness, mystery, intactness, order, harmony, uniqueness, pattern, and balance.

- Class C "indistinctive." Areas where landform, vegetation patterns, water characteristics, and cultural features have low scenic quality. Often water and rock form of any consequence are missing in Class C landscapes. These landscapes have weak or missing attributes of variety, unity, vividness, mystery, intactness, order, harmony, uniqueness, pattern, and balance.

Class A and B visual resources typically include state or federal park, recreation, or wilderness areas, including rivers and reservoirs. Class C resources generally include areas that have low scenic quality and contain more common landscapes.

In addition, the SMS uses three primary distance zones as part of the assessment of visibility (USDA Forest Service 1995). These distance zones, described below, are foreground, middleground, and background.

- Foreground (0 to 0.5 mile): At a foreground distance, people can distinguish small boughs of leaf clusters, tree trunks and large branches, individual shrubs, clumps of wildflowers, medium-sized animals, and medium-to-large birds.

- Middleground (0.5 to 4 miles): At a middleground distance, people can distinguish individual tree forms, large boulders, flower fields, small openings in the forest or tree line, and small rock outcrops. Form, texture, and color remain dominant, and pattern is important.

- Background (4 miles to horizon): At a background distance, people can distinguish groves or stands of trees, large openings in the forest, and large rock outcrops. Texture has disappeared and color has flattened, but large patterns of vegetation or rocks are still distinguishable, and landform ridgelines and horizon lines are the dominant visual characteristics.

Panoramic Views

The FLSRA's most notable visual resources are dramatic and high quality panoramic views. These panoramas include views across the reservoir, views from the reservoir, and views out over the surrounding nonpark landscape. East-facing views from the western shores of Folsom Reservoir include the sweep of the reservoir surface (Figure 3.7-1) in the foreground with the regionally characteristic landscape of rolling hills, open grasslands, and scattered oak and gray pine woodlands on the peninsula. Views north from Folsom Dam provide a sweeping view of Folsom Reservoir framed by foothills. Each of these panoramas includes a unique combination of water, sky, and natural and built features.

Vista Points

Because of the varied topography and sheer length of shoreline within the FLSRA, there are innumerable points from which to enjoy the area's visual resources. However, limitations on vehicle access around the reservoirs prevents visitation to some vista points and increases visitation at accessible sites. Lake Overlook—the highest point within the park—is one of the best-known vista points. From Lake Overlook, one is presented with sweeping views of Lake Natoma, the Sierra Foothills, Nimbus Flat, Nimbus Dam, Nimbus Shoals, and urban development in the valley below. Observation Point by Folsom Dam provides sweeping views of

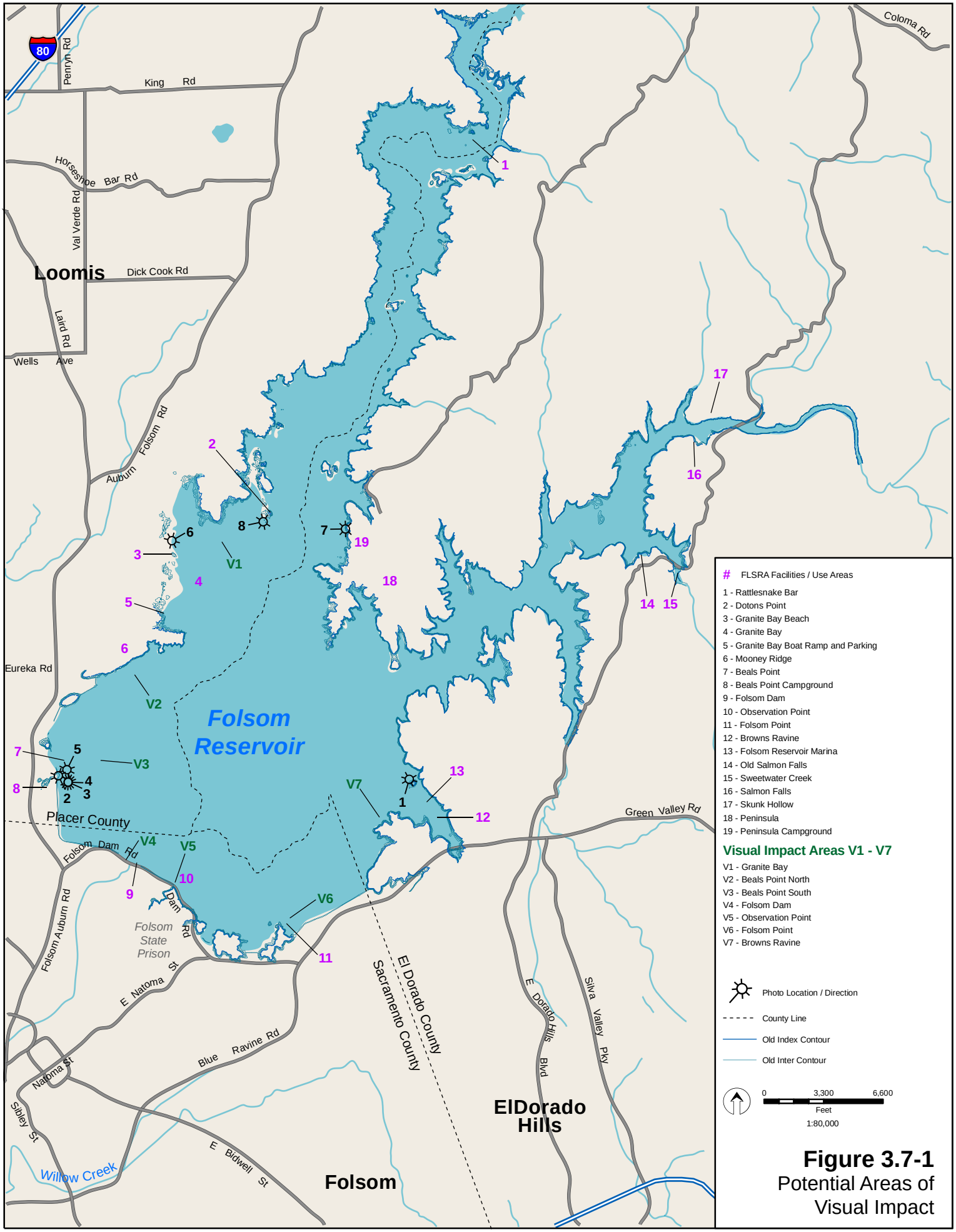


Figure 3.7-1
Potential Areas of Visual Impact

Source: ENTRIX

Folsom Reservoir, the dikes, and the rugged oak-studded hills of the peninsula. In addition to these vista points, other frequently visited viewing areas that provide sweeping vistas of the FLSRA are near public facilities along the reservoir shoreline, such as the Folsom Reservoir Marina, Folsom Point, Beal's Point, Granite Bay, Doton's Point, etc. (Figure 3.7-1).

Other vista points are accessible only by trail and receive much lower visitation due to their more limited access and remote location. For example, a vista point exists at the tip of the peninsula on the eastern shore of Folsom Reservoir. This vista point is visited primarily by mountain bikers and hikers on the Danington Trail. From this vantage point, views extend from the rugged eastern shore of the North Fork of the American River, south toward Folsom Dam, and west toward the beaches at Granite Bay.

Landscape Features

The rugged peninsula separating the North and South Forks of the American River at Folsom Reservoir is visible from many parts of the park and contributes to a sense of wild undeveloped countryside due to the limited development. Flagstaff Hill (at over 1,400 feet) and Shirttail Peak (at over 1,300 feet) mark the highest points of the prominent ridgeline that forms the peninsula. Nearby Iron Mountain, where New York Creek meets the South Fork of the American River, also stands out on the eastern shore of Folsom Reservoir rising almost 300 feet above the water. Along the western shore of Folsom Reservoir where it meets the North Fork of the American River, a substantial ridgeline rises above the water between North Granite and Horseshoe Bar. Steep gorges further upstream on both the North and South Forks of the American River (as they extend toward the Sierra Foothills) are even more impressive.

Distinctive Built Features

The aesthetic value of built features in the natural landscape is subject to different interpretations. Whereas such features are often distinctive because of their contrast with their setting, determining whether their aesthetic contribution is positive or negative can be quite subjective. For example, the damming of the American River at Folsom has resulted in a number of distinctive built features within the FLSRA. The major feature is Folsom Dam, a concrete structure more than 1,400 feet long and 340 feet high (Reclamation 2006). Associated structures include earthen dikes that emerge from Folsom Dam and form the eastern and western shores at the south end of Folsom Reservoir. While certainly visually distinctive, the effect of these features on the visual character of the FLSRA is mixed. The large engineering projects detract from the "natural" character of the setting, and the natural character of the FLSRA is one of its scenic strengths.

Built Features within the FLSRA

In several locations throughout the FLSRA, built features or human intervention detract from the overall visual quality and ultimately the visitor experience. These features include the dams, parking lots, utility corridors, and temporary structures associated with park activities. A complete description of parking lots, utility corridors, and temporary structures associated with park activities has been included in the FLSRA Resource Inventory (Wallace, Roberts and Todd et al. 2003).

Exposed Shoreline of Folsom Reservoir

Seasonal fluctuation in water levels results in considerable impacts on the visual quality of Folsom Reservoir. The highest elevations occur in late winter or early spring when storm and snowmelt runoff fill the reservoir; the lowest in late fall or early winter following the dry season. As a result, the elevations drop continuously—up to about 70 feet in normal years—from the start of the peak recreation season around Memorial Day through the season's end at Labor Day. Unlike bodies of water under tidal influence or natural riparian corridors as found upstream in the South and North Forks of the American River, Folsom Reservoir does not have the advantage of habitats that can adapt to such large changes in environmental condition. This leaves much of the exposed shoreline devoid of vegetation. The relatively gradual slope to the reservoir bottom results in a greater area of exposed shoreline with lower water levels, resulting in the "bathtub ring" effect common to California reservoirs. As the water level elevation and water surface area within Folsom Reservoir shrink over the course of the recreation season, so does the quality of the views along its 75 miles of shoreline. This condition is further exacerbated by visitors who drive their vehicles out onto the exposed slopes, causing rutting and erosion of the exposed areas. In some years, this condition is minimized by a striking display of wildflowers along shorelines with a particular aspect, including along the eastern shoreline between New York Creek and Old Salmon Falls.

External Views

Public views of the FLSRA from external viewpoints are limited due to the topography of the area, the heavy vegetation within the FLSRA boundaries, and the nature of land ownership around the FLSRA. Views from private property, particularly of Folsom Reservoir, are impressive as reflected by the high-end residential estate development occurring around the reservoir. In El Dorado County, this style of development commands the hills along the majority of the eastern boundary of Folsom Reservoir to Salmon Falls. As this development extends from Salmon Falls Road north of Green Valley Road, property size increases dramatically as Folsom Reservoir views become a major selling factor. Along the western boundary of Folsom Reservoir in Placer County, most of the choice properties with reservoir views have been developed (e.g., the housing development along Mooney Ridge). In addition, several exclusive gated subdivisions currently exist on the ridge

above the reservoir. As a result, few clear public access points exist from which to view Folsom Reservoir.

Views from Key Observation Points

Key observation points were identified based on the methods described in the Assessment Methods section below. These key observation points were selected if features of one or more alternatives were within a line of site and if they represented foreground or middleground views (i.e., within 4 miles of the key observation point). Identified Key Observation Points include Folsom Reservoir (on-reservoir viewpoint), Browns Ravine/Folsom Reservoir Marina, Beal's Point, Granite Bay, Peninsula Campground, various Folsom Reservoir trails, and a few private residential neighborhoods. These key observation points and associated alternative views, which are listed on Table 3.7-1 and shown on Figure 3.7-1, are described below.

Folsom Reservoir

Folsom Reservoir is used throughout the year for various boating activities. Although most recreational boats are launched from the various boat launch facilities including Folsom Reservoir Marina (at Browns Ravine) and Granite Bay Marina, views for boaters are not limited to these areas. With the exceptions of views of the marina and other man-made features, these on-reservoir views are Class A and B visual resources (as discussed in the next section). Also, boaters have access to areas in close proximity to all construction activities occurring along the reservoir's shoreline. As a result, all construction activity areas may represent foreground views depending on the location of the boat at any one time.

Browns Ravine/Folsom Reservoir Marina

Browns Ravine/Folsom Reservoir Marina consist of a marina with both boat docks and upland boat storage areas, and a picnic area on the adjacent point to the west of the marina. Most views from the marina toward the reservoir are obstructed by the presence of boats and/or docks, which are aligned along the relatively narrow ravine. The best views are available from the picnic area west of the marina. These views are Class A or B visual resources. With the exception of the potential borrow area and processing facility at Browns Ravine (V7), all construction activity areas are either not in the line of sight or are at least 3.5 miles away. With the exception of the immediately adjacent shoreline, views out over the reservoir capture largely background views, where ridgelines and horizon lines are the dominant visual characteristic. Stands of trees and open grass fields are distinguishable, but specific features (e.g., individual building structures) are barely noticeable. Along the immediate shoreline area, foreground views of tree stands and grass fields are present, with natural features readily distinguishable. The closest portion of the Browns Ravine (V7) activity area is within 0.25 mile of the marina picnic area (Figure 3.7-1); this area is shown on Figure 3.7-2.

Table 3.7-1 Viewing Distances from Use Areas to Visual Impact Areas

View Area	Potential Visual Impact Areas													
	Granite Bay V1		Beals Point North V2		Beals Point South V3		Folsom Dam V4		Observation Point V5		Folsom Point V6		Brown's Ravine V7	
	Activity Area visible?	Distance to Activity Area (miles)	Activity Area visible?	Distance to Activity Area (miles)	Activity Area visible?	Distance to Activity Area (miles)	Activity Area visible?	Distance to Activity Area (miles)	Activity Area visible?	Distance to Activity Area (miles)	Activity Area visible?	Distance to Activity Area (miles)	Activity Area visible?	Distance to Activity Area (miles)
FLSRA Facilities/Use Areas														
Folsom Lake Areas														
On Folsom Lake*	Yes	various	Yes	various	Yes	various	Yes	various	Yes	various	Yes	various	Yes	various
Brown's Ravine/Folsom Lake Marina*	Yes	3.9	Yes	4.2	Yes	4.6	Yes	4.0	Yes	3.6	No	--	Yes	0.75
Folsom Point (closed during construction)	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--
Observation Point (closed to visitors along with Folsom Dam)	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--
Beals Point Day Use Facility*	No	--	Yes	1.25	Yes	0.0	Yes	1.25	Yes	1.6	Yes	3.25	Yes	4.1
Beals Point Campground	No	--	No	--	No	--	No	--	No	--	No	--	No	--
Granite Bay*	Yes	0.0	Yes	0.5	No	--	No	--	No	--	Yes	4.0	Yes	3.75
Old Salmon Falls	No	--	No	--	No	--	No	--	No	--	No	--	No	--
Sweetwater Creek	No	--	No	--	No	--	No	--	No	--	No	--	No	--
Peninsula Campground*	Yes	2.0	Yes	2.5	Yes	4.6	No	--	No	--	No	--	No	--
Folsom Lake River Access Areas	No	--	No	--	No	--	No	--	No	--	No	--	No	--
Skunk Hollow and Salmon Falls	No	--	No	--	No	--	No	--	No	--	No	--	No	--
Folsom Lake Trails														
Pioneer Express Trail*	Yes	0.1	Yes	0.1	No	--	No	--	No	--	No	--	Yes	3.75
Los Lagos Trail	No	--	No	--	No	--	No	--	No	--	No	--	No	--
Dotoni's Point ADA Trail*	Yes	0.75	Yes	1.6	No	--	Yes	4.1	Yes	4.0	Yes	4.25	Yes	3.75
Granite Bay Multi-Use Trails*	Yes	0.1	Yes	0.5	No	--	No	--	Yes	4.0	Yes	4.25	Yes	4.0
Folsom Point/Brown's Ravine Trail*	Yes	3.5	Yes	3.75	Yes	4.6	Yes	4.0	Yes	3.6	Yes	2.5	Yes	1.0
Sweetwater Creek Trail	No	--	No	--	No	--	No	--	No	--	No	--	No	--
Darrington Trail	No	--	No	--	No	--	No	--	No	--	No	--	No	--
Peninsula ADA Trail*	Yes	2.0	Yes	3.0	Yes	4.0	Yes	3.75	Yes	3.6	Yes	3.3	Yes	2.25
Private Residential Neighborhoods	Yes	various	Yes	various	Yes	various	Yes	various	Yes	various	Yes	various	Yes	various

Definition of Visual Impact Areas
Granite Bay V1 includes two aggregate processing facilities and the adjacent potential borrow area just northeast of Granite Bay.
Beals Point North V2 includes one aggregate processing facility and the adjacent potential borrow area northeast of Beals Point.
Beals Point South V3 includes one combined aggregate processing/concrete facility and the adjacent potential borrow area surrounding Beals Point.
Folsom Dam V4 includes the dam and associated upgrades.
Observation Point V5 includes one combined aggregate processing/concrete facility and the adjacent potential construction area.
Folsom Point V6 includes one aggregate processing facility and the adjacent potential borrow area and potential construction area surrounding Folsom Point.
Brown's Ravine V7 includes a combined aggregate processing/concrete facility, an aggregate processing facility and the adjacent potential borrow area west of Browns Ravine.

NA - not applicable
* Key observation point based on potential visual impact areas being in direct line of sight to and within 3 miles

Figure 3.7-2
View of Browns Ravine from Folsom Reservoir Marina
(Photo Location 1 in Figure 3.7-1)

Beal's Point

Beal's Point consists primarily of picnic grounds, beach/swimming areas and associated facilities. Along the perimeter of Beal's Point, there are unobstructed views of most areas of Folsom Reservoir. These views are Class A or B visual resources. With the exception of the immediately adjacent shoreline to the northeast, views out over the reservoir capture largely background views, where ridgelines and horizon lines are the dominant visual characteristic. Stands of trees and open grass fields are distinguishable, but specific features (e.g., individual building structures) are barely noticeable. Along the immediate shoreline area, foreground views of tree stands and grass fields are present, with natural features, dikes and houses readily distinguishable. Beal's Point is within the Beal's Point South (V3) construction activity area (foreground), which includes a potential borrow area and a processing facility. In addition, Beal's Point North (V2), Folsom Dam (V4), Observation Point (V5), and Folsom Point (V6) construction activity areas are within the middleground of Beal's Point (Figure 3.7-1). Figure 3.7-3 views the dikes between Beal's Point and Folsom Dam, and is the location of a proposed processing facility in the foreground. Figure 3.7-4 views Folsom Dam (V4) where proposed dam raising activities would occur. Figure 3.7-5 views the shoreline between Folsom Dam and Browns Ravine, which include proposed borrow areas and concrete and process facilities associated with middleground views of Observation Point (V5) and Folsom Point (V6). Figure 3.7-6 views the potential borrow areas and processing facility of Beal's Point South

(V3) (foreground) and Beal's Point North (V4) (middleground), including the Mooney Ridge residential development on the ridge overlooking Folsom Reservoir.

Figure 3.7-3
View from Beal's Point at Right Wing Dam
(Photo Location 2 in Figure 3.7-1)

Figure 3.7-4
View from Beal's Point South toward Folsom Dam
(Photo Location 3 in Figure 3.7-1)

Figure 3.7-5
View from Beal's Point toward Folsom Point
(Photo Location 4 in Figure 3.7-1)

Figure 3.7-6
View from Beal's Point North toward Mooney Ridge
(Photo Location 5 in Figure 3.7-1)

Granite Bay

Granite Bay consists of a marina with launching ramps, picnic grounds, beach/swimming areas and associated facilities. Reservoir views are generally toward Doton's Point, the Peninsula, and Browns Ravine on the eastern side of the reservoir. These views are Class A or B visual resources. With the exception of the immediately adjacent shoreline to the south and to Doton's Point to the northeast, views out over the reservoir capture largely background views, where ridgelines and horizon lines are the dominant visual characteristic. Stands of trees and open grass fields are distinguishable, but specific features (e.g., individual building structures) are barely noticeable. Along the immediate shoreline area, foreground views of tree stands and grass fields are present, with natural features readily distinguishable. The potential borrow area and processing facilities at Granite Bay (V1) and a small portion of the borrow area at Beal's Point North (V2) are within the foreground view of Granite Bay facilities. All other construction activity areas are either not in sight or are at least 3.5 miles away. Figure 3.7-7 shows a view from Granite Bay beach of the potential borrow area and processing facilities to the northeast.

Figure 3.7-7
View from Granite Bay to northeast
(Photo Location 6 in Figure 3.7-1)

Peninsula Campground

Peninsula Campground, which is present along the shoreline of the west side of the Peninsula, has unobstructed views of the west side of Folsom Reservoir. These views are Class A or B visual resources. With the exception of the immediately adjacent Peninsula shoreline, views out over the reservoir capture largely background views, where ridgelines and horizon lines are the dominant visual characteristic. Stands of trees and open grass fields are distinguishable, but specific features (e.g., individual building structures) are barely noticeable. Along the immediate shoreline area, foreground views of tree stands and grass fields are present, with natural features readily distinguishable. Only views of potential borrow areas and processing facilities at Granite Bay (V1) and Beal's Point North (V2) are present within the middleground, while no potential construction activity areas are within the foreground views. Figure 3.7-8 shows a view from the Peninsula campground toward the potential borrow area and processing facilities at Granite Bay (V1).

Figure 3.7-8
View from Peninsula Campground West Toward Granite Bay
(Photo Location 7 in Figure 3.7-1)

Folsom Reservoir Trails

Folsom Reservoir trails offer a variety of views of the reservoir and its shorelines from different vantage points, several of which are key observation points. These trails include Pioneer Express Trail, Doton's Point ADA Trail, Granite Bay Multi-use Trails, Folsom Point/Browns Ravine Trail, and Peninsula ADA Trail. Selected views along each of these trails represent Class A or B visual resources. With the exception of the immediately adjacent shoreline, views out over the reservoir capture largely background views, where ridgelines and horizon lines are the dominant visual characteristic. Stands of trees and open grass fields are distinguishable, but specific features (e.g., individual building structures) are barely noticeable. Along the immediate shoreline area, foreground views of tree stands and grass fields are present, with natural features, dikes and houses readily distinguishable. With the exception of the Peninsula ADA trail, each of these trails appears to have foreground views of one or more potential borrow areas (including associated processing facilities). Figure 3.7-9 shows a view from Doton's Point toward the potential borrow area and processing facilities at Granite Bay (V1).

Figure 3.7-9
View to the West from Doton's Point Toward Granite Bay
(Photo Location 8 in Figure 3.7-1)

Residential Properties
Some private residential developments are along the shoreline of Folsom Reservoir with varying scenic views. Residential homes with direct unobstructed views of the reservoir have Class A or B visual resources. With the exception of the immediately adjacent shorelines, views out over the reservoir largely capture background views, where ridgelines and horizon lines are the dominant visual characteristic. Stands of trees and open grass fields are distinguishable, but specific features (e.g., individual building structures) are barely noticeable. Along the immediate shoreline area, foreground views of tree stands and grass fields are present, with natural features, dikes and houses readily distinguishable. With a few exceptions, views of construction activity areas represent middleground to background views. Notable exceptions include selected homes along Mooney Ridge, which have foreground and middleground views of Beal's Point North (V2) and Beal's Point South (V3).

3.7.2 Environmental Consequences/Environmental Impacts

3.7.2.1 Assessment Methods

In this analysis, the assessment methods are guided by the SMS developed by the USDA Forest Service in 1995 and outlined in *Landscape Aesthetics: A Handbook for Scenery Management, Agriculture Handbook Number 701*. The SMS is an evolved and updated version of the Visual Management System (USDA Forest Service 1995). The SMS allows for improved integration of aesthetics with other biological, physical, and social/cultural resources in the planning process. This assessment describes the effects of each alternative on known sensitive visual resources and landscapes in the area of analysis. The analysis discusses the effects of each alternative, including excavation from potential borrow areas, operation of processing and concrete facilities, use of construction and contractor-use areas, transportation of materials, and raising the Folsom structures.

The implementation of any action alternative addressed within this EIS/EIR is limited solely to the construction activities associated with the various improvements proposed therewith. Such construction activities anticipated for any of the action alternatives would only affect the water level of Folsom Reservoir temporarily during rare, large flood events, and would not permanently increase the “bathtub ring” effect along the reservoir’s shoreline. As explained in Chapter 1, any subsequent changes in the operation of the Folsom Facility, which could alter water levels in the Reservoir, would not be decided until after the approval of the selected proposed improvements. The environmental effects of such reoperation, including those associated with any potential change in water levels, would be addressed in a supplemental environmental document. Effects addressed below were evaluated based on the significance criteria described in the following section. The SMS-based assessment methods were applied to the alternatives used the following steps:

- Identify visually sensitive areas. Sensitivity is rated highest for views seen by people driving to or from recreational activities, or along routes designated as scenic corridors. Views from relatively moderate to high-use recreation areas were also rated sensitive.

- Define the landscape character. Landscape character gives a geographic area its visual and cultural image and consists of the combination of physical, biological, and cultural attributes that make each landscape identifiable or unique. Landscape character embodies distinct landscape attributes that exist throughout an area. A description of landscape character as it applies to Key Observation Points is provided in Section 3.7.1, Affected Environment/Existing Conditions, for each of the visually sensitive areas identified.

- Identify visually sensitive observation points. Potential impacts to visual resources from the implementation of any one alternative could include the presence of construction equipment and processing and concrete facilities. This step identifies visually sensitive observation points within FLSRA and from external areas (private properties and roadways). This step compares these views to potential visual impact areas (V1 through V9) associated to one or more alternative. If direct views of any potential visual impact area from any of these observation points were present, then distances to each applicable potential visual impact area (i.e., to midpoint of defined area) was measured. In addition to these visual impact areas, earthwork would occur along dikes (i.e., dikes) along the southern shoreline areas for all alternatives. However, because these areas are in close proximity to these identified visual impact areas, they were not evaluated separately for the purposes of this assessment. Table 3.7.1 includes results from this step.

- Identify visually affected key observation points. Based on the location and distance of potential visual impact areas from these visually sensitive observation points, only a portion of the observation points may be significantly affected. This analysis further evaluated observation points to determine if visual impact areas were (1) in the direct line of site and (2) within the foreground (0 to 0.5 mile) and middleground (0.5 to 4 mile) views. This “screening’ method was selected because (1) alternative construction features are generally small (e.g., construction equipment less than 30 feet high), (2) no color contrasts are expected as a result of excavation in the borrow areas, and (3) small features become indistinct when viewed from distances of three miles or more. Also, further limitations were not employed due to earth curvature issues because reservoir levels would be low at the time of alternative activities and would not likely limit the view of the features. Observation points with visual impact areas in the direct line of site or within the foreground and background view are referred to as key observation points. These key observation points are described

in the subsection titled *Views from Key Observation Points* above and identified in Table 3.7-1.

- Classify scenic attractiveness. Scenic attractiveness classifications are a key component of the SMS and were used to classify visual features into the following categories (USDA Forest Service 1995). Classifications include Class A "Distinctive", Class B "Typical", and Class C "Indistinctive". These classifications are described in 3.7.1.3.

A total of seven key observation points that had Class A or B scenic attractiveness classifications were used to evaluate potential visual impacts. These classifications have been applied to these key observation points in Section 3.7.1, subheading Views from Key Observation Points.

3.7.2.2 Significance Criteria

Pursuant to the CEQA Guidelines, a proposed alternative would result in potentially significant impacts if it would:

- Have a substantial adverse effect on a scenic vista
- Substantially damage scenic resources, including, but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway
- Substantially degrade the existing visual character or quality of the site and its surroundings.

In addition to using these significance criteria to assess potential visual impacts, a consideration was made regarding the rate of visitation to the FLSRA at the time of construction. Because in-reservoir area borrow excavation would generally be implemented between October and March when reservoir levels are low, visual impacts from this construction activity would only affect visitors or residents during this time period.

3.7.2.3 Environmental Consequences/Environmental Impacts

Environmental Consequence/Environmental Impacts of the No Action/No Project Alternative

Under the No Action/No Project Alternative, there would not be any dam raise or improvements made to the Folsom Facility and no action would be taken by any of the agencies. The visual setting would remain the same as existing conditions.

The No Action/No Project Alternative would not affect visual resources.

Environmental Consequences/Environmental Impacts of Alternative 1
Under Alternative 1, construction activities, including, Auxiliary Spillway excavation, borrow development near Beal's Point, and operating concrete and processing facilities would occur at visual impact areas V3 through V6. As a result, impacts have been identified at the following Key Observation Points: Folsom Reservoir (on-reservoir viewpoint), Beal's Point, Folsom Reservoir Trails, and a few private residential developments.

Construction would affect boaters' views from the reservoir.
Boaters would have access to portions of the reservoir in close proximity (i.e., foreground views) to all visual impact areas and may experience a different view and opinion towards the Class A and B visual resources. The primary use of the reservoir by boaters is during summer months when the majority of the in-reservoir borrow sites would be inundated. During these months, the primary visual impact would be construction equipment on tops of the dikes and dams (V-3, V-4, and V-6) and construction of the inlet for the Auxiliary Spillway (V-5). Excavation of borrow sites during the fall and winter would have less of a visual effect because of less frequent visitor usage (about 16 percent of the annual visitor use occurs from October through March). Construction would result in a less than significant impact to boaters.

Construction-related impacts to visual resources experienced by boaters from multiple viewpoints would be less than significant.

Construction-related facilities would affect views from Beal's Point.
The potential borrow area and associated borrow material processing facilities at Beal's Point (V3) (which also includes Dikes 5 and 6) would be within the foreground views from most all vantage points at Beal's Point. These activities would significantly impact Class A and B visual resources. The processing facilities would be at the least visible location relative to the beach area, minimizing this visual impact. The view of construction at Dike 4 would be within the middleground views from the Beal's Point Beach.

Although activities at Folsom Dam (V4) (which includes Right and Left Wing Dams) and Observation Point (V5) (which includes the Auxiliary Spillway construction and borrow development) are within 3 miles of Beal's Point, impacts to these views would not be significant because of the existing alterations in landscape represented by the dam and associated dikes, and the fact that these areas are closed to the general public.

The visual impact to views from Beal's Point would be potentially significant. There are no mitigation measures available to reduce these impacts; therefore these impacts are significant and unavoidable until completion of construction.

Construction-related facilities would affect views from Granite Bay.
Under Alternative 1, there would be no activity at the proposed Granite Bay borrow area and associated processing facility (V1), which would be within the foreground views from the beach area at Granite Bay. Construction at Dikes 1, 2, and 3 would also not be implemented as part of this alternative, though these dikes are generally not visible from beach/recreation areas of Granite Bay. Therefore, there would be no impact to Class A and B visual resources as viewed from Granite Bay for this alternative.

There would be no construction-related impacts to visual resources experienced from Granite Bay under Alternative 1.

Construction-related activities would impact views from Peninsula Campground.
Peninsula Campground has distant middleground views of visual impact areas at Beal's Point. However, because of the distance and relatively small size of construction equipment that would be used in these areas, impacts to Class A and B visual resources as viewed from Peninsula Campground would be less than significant.

Construction-related impacts to visual resources as experienced from Peninsula Campground would be less than significant.

Folsom Reservoir Trails would be affected by construction activity.
Three trails would have foreground Class A and B visual resource views that would include visual impact areas. Portions of Pioneer Express Trail and Granite Bay Multi-use Trails pass in close proximity to Beal's Point. Visual impacts may be experienced by regular trail users at certain locations along these trails. However, because of the distance between the view points and the construction areas, the impacts would be less than significant for Alternative 1. Detours would be provided for all trails that would come in close proximity to haul trucks, staging areas, or other equipment for public safety reasons. These detours would help to lessen the visual impacts of the construction equipment and disturbed areas.

Construction-related impacts to views from Folsom Reservoir Trails across the reservoir toward construction sites would be less than significant.

Construction activities would affect views from selected residential developments.
Several private residential developments contain homes with reservoir views, usually consisting of Class A or B visual resources. Some of these homes would have views of visual impact areas, including construction equipment and staging and borrow areas. Specifically, homes with reservoir views on Mooney Ridge, between Granite Bay and Beal's Point, would have foreground views of the potential borrow area, middleground views of the potential borrow processing facilities at Beal's Point South (V3) and Observation Point (V5), and middleground views of the Folsom Dam

construction (V4). For these Mooney Ridge homes with reservoir views, the visual impacts on foreground views would be significant and unavoidable. Although relatively few homes have these reservoir views, these residents would potentially view construction activities throughout the day and evening throughout the duration of the Folsom DS/FDR.

Construction-related impacts to visual resources at selected residential developments are significant and cannot be mitigated to a less than significant level. Therefore, the impact would be significant and unavoidable until completion of construction.

Modifications of the Folsom Facility would permanently alter the visual character of the reservoir setting.
Alternative 1 does not involve the raising of any structures and only minimal embankment raise, therefore, the current visual character of the Folsom Facility would not be changed to any notable degree. Alternative 1 would not have a significant permanent effect on visual resources.

Facility modification-related impacts to visual resources would be less than significant.

Implementation of security measures would impede views around the Folsom Facility.
Due to the security enhancement project taking place at Folsom Dam, there would be an additional impact of lighting and security camera poles being permanently installed on the site. While construction is taking place, temporary generators would be onsite to maintain power to both the cameras and the lighting until utility lines are permanently installed. Construction of the security powerlines would be coordinated with construction of the other components of the Folsom DS/FDR action. Visual impacts from the generators would be temporary, for two years maximum. After the installation, the generators would be removed with power provided by underground electrical lines.

Security-related impacts to visual resources would be less than significant.

Environmental Consequences/Environmental Impacts of Alternative 2
Under Alternative 2, impacts to visual resources at key observation points would generally be the same as for Alternative 1. Both alternatives involve the use of the same potential borrow areas and associated concrete and processing facilities, and construction staging areas. Although Alternative 2 would involve earthen raises of Dikes 1, 2, and 3, views from Granite Bay would be not be impacted because construction at Dikes 1, 2 and 3 would occur behind the recreation area.

The impact associated with all view areas, including Granite Bay, would be less than significant.

Construction of parapet walls would affect views from trails established on the tops of the wing dams.
The construction of concrete parapet walls would impair middle and background views of the Left and Right Wing Dams. The parapet walls would be constructed of concrete and would stand out from the existing earthen wing dams.

This impact would be potentially significant. Mitigation Measure VIS-3 would reduce this impact to a less than significant level.

The construction of parapet walls on tops of Left and Right Wing Dams would impair views of hikers. This view impact would be further impaired by placement of a safety rail at the top of each wall to prevent walking on top of and falling off of the walls. Due to their height limitations, the view impairment would mostly affect youth and children.

This impact would be a potentially significant impact that cannot be mitigated to a less than significant level. Therefore, the impact would be significant and unavoidable.

Implementation of security measures would impede views around the Folsom Facility.

Impacts would be the same as those described under Alternative 1.

Modifications of the Folsom Facility would permanently alter the visual character of the reservoir setting.
Alternative 2 involves the raising of all structures thereby altering the current visual character of the Folsom Facility. The 4-ft earthen raise would not likely be noticed following construction because it would simply involve the placement of 4 feet of earth material on top of the existing dikes and MIAD. However, parapet walls constructed atop the wing dams would result in a significant, unavoidable impact to the character of those structures. Alternative 2 would have a permanent, significant adverse affect on visual resources.

Facility modification would have significant, unavoidable adverse impacts to visual resources that cannot be mitigated.

Construction of new embankments could have visual impacts.
Existing embankments would be raised by approximately 4 feet and new embankments could be constructed to provide localized flood damage reduction. They could impair view of the reservoir from the shoreline, depending on the exact viewing location and relative viewing height.

Construction of new embankments would have a potentially significant impact that cannot be mitigated to a less than significant level. Therefore, the impact would be significant and unavoidable.

Environmental Consequence/Environmental Impacts of Alternative 3
Alternative 3 includes similar modifications as Alternatives 1 and 2 except all structures would have a potential 3.5-ft raise via a concrete parapet wall. Impacts to visual resources at key observation points would generally be the same as for Alternative 2 because the same borrow areas and associated processing facilities would be used.

Construction of parapet walls would affect views.
The construction of concrete parapet walls would impair views of the Folsom Facility including Right Wing Dam, Left Wing Dam, MIAD, and Dikes 1 through 8.The parapet walls would be constructed of concrete and would stand out from the existing earthen wing dams, dikes and MIAD.

This impact would be potentially significant. Mitigation Measure VIS-3 would reduce this impact to a less than significant level.

The construction of parapet walls would impair views of hikers. This view impact would be further impaired by placement of a safety rail at the top of each wall to prevent walking on top of and falling off of the walls. Due to their height limitations, the view impairment would mostly affect youth and children.

This impact would be a potentially significant impact that cannot be mitigated to a less than significant level. Therefore, the impact would be significant and unavoidable.

Modifications of the Folsom Facility would permanently alter the visual character of the reservoir setting.
Alternative 3 involves the raising of all structures using parapet walls, thereby altering the current visual character of the Folsom Facility. The parapet walls constructed atop of all dams and dikes would result in a significant, unavoidable impact to the character of those structures. Therefore, Alternative 3 would have a permanent, significant adverse affect on visual resources.

Facility modification would have significant, unavoidable adverse impacts to visual resources that cannot be mitigated.

Implementation of security measures would impede views around the Folsom Facility.

The impacts from the implementation of the security measures would be the same as those described under Alternative 1.

Construction of new embankments could have visual impacts.
Under this alternative, new embankments may be constructed for flood damage reduction of residential properties along the boundary of the reservoir. The exact need, location, and size/height of such improvements would be determined in conjunction with future more detailed planning, should this alternative be selected. If new embankments/walls are constructed, they could impair view of the reservoir from the shoreline.

Construction of new embankments would have a potentially significant impact that cannot be mitigated to a less than significant level. Therefore, the impact would be significant and unavoidable.

Environmental Consequences/Environmental Impacts of Alternative 4
Under Alternative 4, construction activities, including, Main Concrete Dam modifications, Auxiliary Spillway excavation, borrow development near Beal's Point, Granite Bay, MIAD Left, MIAD Right, MIAD D1/D2 and operating concrete and processing facilities would occur at visual impact areas V-1 through V-7. As a result, impacts have been identified at the following Key Observation Points: Folsom Reservoir (on-reservoir viewpoint), Beal's Point, Folsom Reservoir Trails, and several private residential developments.

Construction would affect boaters' views from the reservoir.
Boaters would have access to portions of the reservoir in close proximity (i.e., foreground views) to all visual impact areas and may experience a different view and opinion towards the Class A and B visual resources. The primary use of the reservoir by boaters is during summer months when the majority of the in-reservoir borrow sites would be inundated. During these months, the primary visual impact would be construction equipment on tops of the dikes and dams (V-1 to V-4, and V-6 and V-7) and construction of the inlet for the Auxiliary Spillway (V-5). Excavation of borrow sites during the fall and winter would have less of a visual effect because of less frequent visitor usage (about 16 percent of the annual visitor use occurs from October through March). Construction would result in a less than significant impact to boaters.

Construction-related impacts to visual resources experienced by boaters from multiple viewpoints would be less than significant.

Construction-related facilities would affect views from Beal's Point.
The potential borrow area and associated borrow material and concrete processing facilities at Beal's Point (V3) (which also includes Dikes 5 and 6) would be within the foreground views from most all vantage points at Beal's Point. These actions would significantly impact Class A and B visual resources. The processing facilities would be the least visible location relative to the beach area, minimizing this visual

impact. The view of construction at Dike 4 would be within the middleground views from the Beal's Point Beach.

Although activities at Folsom Dam (V4) (which includes Right and Left Wing Dams) and Observation Point (V5) (which includes the Auxiliary Spillway construction and borrow development) are within 3 miles of Beal's Point, impacts to these views would not be significant because of the existing alterations in landscape represented by the dam and associated dikes, and the fact that these areas are closed to the general public.

The visual impact to views from Beal's Point would be significant. No mitigation measures are available; therefore, this impact would be significant and unavoidable until completion of construction.

Construction-related facilities would affect views from Granite Bay.
Under Alternative 4, there would be activity at Granite Bay borrow area and associated processing facilities (V1), which would be within the foreground views from the beach area at Granite Bay and could affect Class A and Class B visual resources. Construction at Dikes 1, 2, and 3 would occur as part of this alternative, but these dikes are generally not visible from beach/recreation areas of Granite Bay. The construction-related impacts to views at Granite Bay would be significant.

The construction-related impacts to visual resources experienced from Granite Bay would be significant. Mitigation Measure VIS-2 would reduce visual impacts of the borrow areas from the beach. Even with mitigation, it is likely that sections of the borrow areas, construction equipment, or processing plants would still be visible. No mitigation would reduce these impacts to less than significant; therefore, these impacts would be significant and unavoidable until completion of construction.

Construction-related activities would impact views from Peninsula Campground.
Peninsula Campground has distant middleground views of alternative visual impact areas at Beal's Point and Granite Bay. However, because of the distance and relatively small size of construction equipment that would be used in these areas, impacts to Class A and B visual resources as viewed from Peninsula Campground would be less than significant.

Construction-related impacts to visual resources as experienced from Peninsula Campground would be less than significant.

Construction-related activities would impact views from Browns Ravine/Folsom Reservoir Marina.
Browns Ravine/Folsom Reservoir Marina has distant views of alternative visual impact areas at Beal's Point and Granite Bay. Because of the distance and relatively small size of construction equipment that would be used in these areas, impacts to

visual resources as viewed from Browns Ravine/Folsom Reservoir Marina would be less than significant. The borrow area and processing plant at MIAD Left would be within the foreground views from most all vantage points at Browns Ravine/Folsom Reservoir Marina.

Construction-related impacts to visual resources as experienced from Browns Ravine/Folsom Reservoir Marina would be significant. Mitigation Measure VIS-1 would help to reduce visual impacts from the processing plant. However, no mitigation measures are available to reduce impacts from the borrow area; therefore, the impacts would be significant and unavoidable until completion of construction.

Folsom Reservoir Trails would be affected by construction activity.
Three trails would have foreground Class A and B visual resource views that would include visual impact areas. Portions of Pioneer Express Trail and Granite Bay Multi-use Trails pass in close proximity to Beal's Point and Granite Bay. Visual impacts may be experienced by regular trail users at certain locations along these trails and also along the trails near Browns Ravine. However, because of the distance between the view points and the construction areas, the impacts would be less than significant. Detours would be provided for all trails that would come in close proximity to haul trucks, staging areas, or other equipment for public safety reasons. These detours would help to lessen the visual impacts of the construction equipment and disturbed areas.

Construction-related impacts to views from Folsom Reservoir Trails across the reservoir toward construction sites would be less than significant.

Construction activities would affect views from selected residential developments.
Several private residential developments contain homes with reservoir views, usually consisting of Class A or B visual resources. Some of these homes would have views of visual impact areas, including construction equipment and staging and borrow areas. Specifically, homes with reservoir views on Mooney Ridge, between Granite Bay and Beal's Point, would have foreground views of the potential borrow area, middleground views of the potential borrow area and concrete and processing facilities at Beal's Point South (V3) and Observation Point (V5), and middleground views of the Folsom Dam construction (V4). For these Mooney Ridge homes with reservoir views, the visual impacts on foreground views would be significant and unavoidable. Although relatively few homes have these reservoir views, these residents would potentially view construction activities throughout the day and evening for the duration of the construction.

Construction-related impacts to visual resources at selected residential developments are significant and cannot be mitigated to a less than significant level.

Therefore, the impact would be significant and unavoidable until completion of construction.

Modifications of the Folsom Facility would permanently alter the visual character of the reservoir setting.
Alternative 4 would involve the raising of all structures by 7 feet, thereby permanently altering the current visual character of the Folsom Facility. The raises of all dams and dikes would result in a significant, unavoidable impact to the character of those structures. Several homes around the Mooney Ridge and Granite Bay area may have significant visual impacts and may be unable to see Folsom Reservoir because of the magnitude of the raise. Therefore, Alternative 4 would have a permanent, significant adverse affect on visual resources.

Facility modification would have significant, unavoidable adverse impacts to visual resources that cannot be mitigated.

Implementation of security measures would impede views around the Folsom Facility.

Impacts from installing security measures would be the same as Alternative 1.

Construction of new embankments could have visual impacts.
Under this alternative, new embankments may be needed to provide for localized flood damage reduction. If new embankments are constructed, they could impair views of the reservoir from the shoreline.

Construction of new embankments would have a potentially significant impact that cannot be mitigated to a less than significant level. Therefore, the impact would be significant and unavoidable.

Environmental Consequences/Environmental Impacts of Alternative 5
Alternative 5 would have the same construction activities as Alternative 4. Alternative 5 would include the same impacts to visual resources as Alternative 4 except there would be a potential 17-foot earth raise to all structures. Impacts to visual resources at key observation points would be greater than for Alternative 4 because of the complete development of all potential borrow areas and processing sites throughout the Folsom Facility. Impacts to visual resources associated with Alternative 5 would be greater as a result of greater duration of activities at Beal's Point and Granite Bay, as well as a longer construction period. Mitigation Measures VIS-1 and VIS-2 would apply.

Construction-related activities would impact views from Browns Ravine/Folsom Reservoir Marina.
Browns Ravine/Folsom Reservoir Marina has distant views of alternative visual impact areas at Beal’s Point and Granite Bay. Because of the distance and relatively

small size of construction equipment that would be used in these areas, impacts to visual resources as viewed from Browns Ravine/Folsom Reservoir Marina would be less than significant. The borrow area and processing plant at MIAD Left would be within the foreground views from most all vantage points at Browns Ravine/Folsom Reservoir Marina.

Construction-related impacts to visual resources as experienced from Browns Ravine/Folsom Reservoir Marina would be significant. Mitigation Measure VIS-1 would help to reduce visual impacts from the processing plant. However, no mitigation measures are available to reduce impacts from the borrow area; therefore, the impacts would be significant and unavoidable until completion of construction.

Modifications of the Folsom Facility would permanently alter the visual character of the reservoir setting.
Alternative 5 would involve the raising of all structures by 17 feet, thereby permanently altering the current visual character of the Folsom Facility. The raises of all dams and dikes would result in a significant, unavoidable impact to the character of those structures. Several homes around the Mooney Ridge and Granite Bay area may have significant visual impacts and may be unable to see Folsom Reservoir because of the magnitude of the raise. Therefore, Alternative 4 would have a permanent, significant adverse affect on visual resources.

Facility modification under Alternative 5 would have significant, unavoidable adverse impacts to visual resources.

Implementation of security measures would impede views around the Folsom Facility.

Impacts from installing security measures would be the same as Alternative 1.

Construction of new embankments could have visual impacts.
Under this alternative, new embankments may be needed to provide for localized flood damage reduction. If new embankments are constructed, they could impair views of the reservoir from the shoreline.

Construction of new embankments would have a potentially significant impact that cannot be mitigated to a less than significant level. Therefore, the impact would be significant and unavoidable.

3.7.3 Comparative Analysis of Alternatives

Table 3.7-2 summarizes effects of the five action alternatives on visual resources. This analysis was based on the intended use of all potential borrow areas and associated concrete and processing facilities among five alternatives. Based on the

common locations planned for the borrow areas and associated processing facilities, impacts of these facilities would be similar for Alternatives 1, 2, and 3, and greater for Alternatives 4 and 5.

Table 3.7-2
Comparison of Alternative Effects on Visual Resources

Visual Impact	*Alternative 1*	*Alternative 2*	*Alternative 3*	*Alternative 4*	*Alternative 5*
Construction-Related Impacts to Visual Resources experienced by boaters from multiple viewpoints	Foreground views of visual impact areas V2 through V6 Less than significant	Foreground views of visual impact areas V2 through V6 Less than significant	Foreground views of visual impact areas V2 through V6 Less than significant	Foreground views of visual impact areas V1 through V7 Less than significant	Foreground views of visual impact areas V1 through V7 Less than significant
Construction-Related Impacts to Visual Resources as viewed from Browns Ravine/Folsom Reservoir Marina.	No Impact	No Impact	No Impact	Foreground views of visual Impact area at Browns Ravine (V7) Significant and unavoidable	Foreground views of visual Impact area at Browns Ravine (V7) Significant and unavoidable
Construction-Related Impacts to Visual Resources as viewed from Beal's Point.	Foreground views of visual impact area at Beal's Point South (V3) Significant and unavoidable	Foreground views of visual impact area at Beal's Point South (V3) Significant and unavoidable	Foreground views of visual impact area at Beal's Point South (V3) Significant and unavoidable	Foreground views of visual impact area at Beal's Point South (V2) and North (V3) Significant and unavoidable, second highest impact	Foreground views of visual impact area at Beal's Point South (V2) and North (V3) Significant and unavoidable, highest impact
Construction-Related Impacts to Visual Resources as viewed from Granite Bay.	No Impact	No Impact	No Impact	Foreground views of visual impact area at Granite Bay (V1) Significant and unavoidable after mitigation, second highest impact	Foreground views of visual impact area at Granite Bay (V1) Significant and unavoidable after mitigation, highest impact
Construction-Related Impacts to Visual Resources as viewed from Peninsula Campground.	Middleground views of visual impact areas V2 and V3 Less than significant	Middleground views of visual impact areas V2 and V3 Less than significant	Middleground views of visual impact areas V1 through V3 Less than significant	Middleground views of visual impact areas V1 through V3 Less than significant	Middleground views of visual impact areas V1 through V3 Less than significant,

Table 3.7-2 Comparison of Alternative Effects on Visual Resources (continued)					
Visual Impact	***Visual Impact***	***Visual Impact***	***Visual Impact***	***Visual Impact***	***Visual Impact***
Construction-Related Impacts to Visual Resources as viewed from along Folsom Reservoir Trails.	Foreground views of visual impact areas V1 through V7 Less than significant	Foreground views of visual impact areas V1 through V7 Less than significant	Foreground views of visual impact areas V1 through V7 Less than significant	Foreground views of visual impact areas V1 through V7 Less than significant	Foreground views of visual impact areas V1 and V2 Less than significant,
Construction-Related Impacts to Visual Resources as viewed from Selected Residential Developments.	Foreground and middleground views of various visual impact areas Significant and unavoidable	Foreground and middleground views of various visual impact areas Significant and unavoidable	Foreground and middleground views of various visual impact areas Significant and unavoidable	Foreground and middleground views of various visual impact areas Significant and unavoidable, second highest impact	Foreground and middleground views of various visual impact areas Significant and unavoidable, highest impact
Permanent Facility Impacts Following Construction	No Impact; facility changes would be for the most part be unnoticed	Significant and unavoidable impact as a result of parapet wall raises	Significant and unavoidable impact as a result of parapet wall raises	Significant and unavoidable impact as a result of earth raises	Significant and unavoidable impact as a result of earth raises
Impacts to Visual Resources from construction of new embankments	No Impact	Significant and unavoidable	Significant and unavoidable	Significant and unavoidable	Significant and unavoidable
Security Project	Less than significant	Less than significant	Less than significant	Less than significant	Less than significant

The implementation of Alternative 1 would have less overall impact on visual resources because excavation and construction activities are generally shorter in duration or would not occur (e.g., no excavation and construction at Granite Bay), and the structures would not be raised to increase flood storage. Impacts to visual resources would be greater for Alternatives 4 and 5 because the duration of borrow development activities would be longer, more borrow would be required and the heights of the raises. Alternatives 4 and 5 would have the greatest permanent visual impacts because they would involve raises of 7 and 17 feet respectively. These raises would permanently alter views of the reservoir from recreation areas and from residential areas around Mooney Ridge and Granite Bay. The implementation of Alternatives 2 through 5 would have impacts to visual resources along trails because portions of Pioneer Express Trail, Doton's Point Trail, and Granite Bay Multi-use Trails pass in close proximity to Granite Bay (V1), and Beal's Point (V-2), which would have active construction and excavation activities.

3.7.4 Mitigation Measures

Implementation of Mitigation Measures VIS-1 and VIS-2 would help reduce potentially significant impacts to the Browns Ravine and Granite Bay recreation sites; however there could still be significant impacts after mitigation.

VIS-1: To minimize the impact to a less than significant level, move the processing facility at Browns Ravine (V7) southeast into the cove area so that there is no direct view of it from the picnic grounds area (at Folsom Reservoir Marina). This would also minimize any impacts to the residential community on the northeast side of the marina.

VIS-2: To lessen the visual impacts directly in front of the Granite Bay beach area, reduce the size of the potential borrow area (at Granite Bay V1) so that no excavation activities occur directly in front of the beach area.

VIS-3: To less the visual impacts of the concrete parapet walls, a coloring agent will be added to the concrete to help it blend in with the natural surroundings.

3.7.5 Cumulative Effects

Cumulative effects on visual resources were evaluated considering the effects of past, present, and reasonably foreseeable projects. Table 5-1 summarizes projects in the cumulative analysis. Under the cumulative condition, only the New Folsom Bridge Project and Folsom DS/FDR would affect visual resources within the local visual setting. However, because the Bridge Project would not be visible from the same FLSRA view points, it would not create a noticeable change in the characteristic visual landscape. The Folsom DS/FDR would not contribute to any cumulative effects.

3.8 Agricultural Resources

This section presents an analysis of potential impacts on agricultural resources from construction of the Folsom DS/FDR alternatives.

3.8.1 Affected Environment/Existing Conditions

This section discusses Federal and State programs designed to protect agricultural land. This section also describes the existing agricultural land use conditions.

3.8.1.1 Area of Analysis

Construction activities that could affect agricultural resources would occur around Folsom Reservoir in portions of Placer, El Dorado, and Sacramento Counties. The area of analysis, therefore, will include the area immediately surrounding Folsom Reservoir in these counties.

3.8.1.2 Regulatory Setting

Conversion of farmland into other uses is a public issue in most agricultural regions experiencing rapid urbanization. California's multi-billion dollar agricultural industry depends on a large supply of fertile farmland for both crop and animal production. California's growing population necessitates further development of land, threatening existing and potential agricultural lands. This elevating conflict has led to the development of several Federal and State programs aimed towards protecting farmland. The following sections describe Federal and State programs that exist to promote the preservation of agricultural lands.

3.8.1.2.1 Federal Programs

Farmland Protection Policy Act

Congress passed the Agriculture and Food Act of 1981 (Public Law 97-98), which includes the Farmland Protection Policy Act (FPPA) to minimize the effect that Federal programs would have on conversion of farmland to other, non-agricultural uses. FPPA does not exclude fallow farmland, but includes land designated as prime farmland, unique farmland, and land of statewide or local importance. Categories of land are forestland, pasture land, cropland, or other land, as long as it is not water or developed urban land (USDA NRCS 2006a). The FPPA specifically requires that federal agencies use the criteria provided in Section 658.5 to identify and assess federal project effects on the protection of farmland (USDA NRCS 2006b).

Conservation Reserve Program

The Conservation Reserve Program (CRP) is a Federal program administered by the Farm Services Agency. The CRP is a voluntary program that offers annual rental payments, incentive payments, and annual maintenance payments for certain activities, and cost-share assistance to establish approved cover on eligible cropland. To be eligible for placement in the CRP, land must be (1) cropland that is planted or considered planted to an agricultural commodity in two of the five most recent crop

years (including field margins) and that is physically and legally capable of being planted in a normal manner to an agricultural commodity or, (2) marginal pastureland that is either enrolled in the Water Bank Program or suitable for use as a riparian buffer to be planted to trees.

Wetlands Reserve Program
The Wetlands Reserve Program (WRP) is a voluntary program offering landowners the opportunity to protect, restore, and enhance wetlands on their property. The USDA Natural Resources Conservation Service (NRCS) provides technical and financial support to help landowners with their wetland restoration. The NRCS goal is to achieve the greatest wetland functions and values, along with optimum wildlife habitat, on every acre enrolled in the program. This program offers landowners an opportunity to establish long-term conservation and wildlife practices and protection. In California, the WRP has focused on the restoration of a variety of wetland types throughout the state, including seasonal wetlands, semi-permanent marsh, and vernal pools along the perimeter of the Central Valley, riparian corridors, and tidally-influenced wetlands.

3.8.1.2.2 State Programs
Williamson Act
The California Land Conservation Act, better known as the Williamson Act, has been the State's premier agricultural land protection program since its enactment in 1965. The California Legislature passed the Williamson Act in 1965 to preserve agricultural lands by discouraging premature and unnecessary conversion to urban uses. The act creates an arrangement whereby private landowners contract with counties and cities to voluntarily restrict their land to agricultural and compatible open space uses. The vehicle for these agreements is a rolling term, 10-year contract (unless either party files a "notice of nonrenewal," the contract is automatically renewed on an annual basis to maintain the 10-year commitment duration). In return, restricted parcels are assessed for property tax purposes at a rate consistent with their actual use, rather then potential market value. The Williamson Act also establishes a Farmland Security Zone, which introduces a 20-year contract between a private landowner and a county that restricts land to agricultural or open space uses.[1]

California Farmland Conservancy Program
The California Farmland Conservancy Program (CFCP) is a voluntary state program that seeks to encourage the long-term, private stewardship of agricultural lands through the use of agricultural conservation easements. The CFCP provides grant funding for projects that use and support agricultural conservation easements for

[1] A farmland security zone is essentially an area created within an agricultural preserve by a board of supervisors (board) upon request by a landowner or group of landowners. An agricultural preserve defines the boundary of an area within which a city or county will enter into Williamson Act contracts with landowners. The boundary is designated by resolution of the board or city council having jurisdiction. Agricultural preserves must generally be at least 100 acres in size.

protection of agricultural lands. An agricultural conservation easement is a voluntary, legally recorded deed restriction that is placed on a specific property used for agricultural production. The goal of an agricultural conservation easement is to maintain agricultural land in active production by removing the development pressures from the land. Such an easement prohibits practices that would damage or interfere with the agricultural use of the land. Because the easement is a restriction on the deed of the property, the easement remains in effect even when the land changes ownership.

Farmland Mapping and Monitoring Program

The Farmland Mapping and Monitoring Program (FMMP) was established in 1982 and produces maps and statistical data used for analyzing effects on California's agricultural resources. The maps are updated every 2 years with the use of aerial photographs, a computer mapping system, public review, and field reconnaissance. The FMMP rates agricultural land according to soil quality and irrigation status and denotes the best quality land Prime Farmland. FMMP characterizes land use into the following categories:

- **Prime Farmland**[2] – Land with the best combination of physical and chemical features able to sustain long-term production of agricultural crops. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. Land must have been used for production of irrigated crops at some time during the two update cycles prior to the mapping date.

- **Farmland of Statewide Importance** – Land similar to Prime Farmland that has a good combination of physical and chemical characteristics for the production of crops. This land has minor shortcomings, such as greater slopes or less ability to store soil moisture than Prime Farmland. Land must have been used for production of irrigated crops at some time during the two update cycles prior to the mapping date.

- **Unique Farmland** – Lesser quality soils used for the production of the state's leading agricultural crops. This land is usually irrigated, but may include non-irrigated orchards or vineyards as found in some climatic zones in California. Land must have been cropped at some time during the two update cycles prior to the mapping date.

- **Farmland of Local Importance** – Land of importance to the local agricultural economy as determined by each county's board of supervisors and a local advisory committee.

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[2] The term 'Prime' as it refers to rating for agricultural uses has two meanings in California. FMMP determines the location and extent of 'Prime Farmland' as described above; while under the state's Williamson Act, land may be enrolled under the 'Prime Land' designation if it meets certain economic or production criteria.

- **Grazing Land** – Land on which the existing vegetation is suited to the grazing of livestock.
- **Urban and Built-Up Land** – Land occupied by structures with a building density of at least one unit to 1.5 acres, or approximately six structures to one 10-acre parcel.
- **Other Land** – Land that does not meet the criteria of any other category.
- **Water** – Water areas with an extent of at least 40 acres.

Interim Farmland Mapping Categories[3]

- **Irrigated Farmland –** Cropped land with a developed irrigation water supply that is dependable and of adequate quality. Land must have been used for irrigated agricultural production at some time during the 4 years prior to the mapping date.
- **Non-irrigated Farmland –** Land on which agricultural commodities are produced on a continuing or cyclic basis using stored soil moisture.

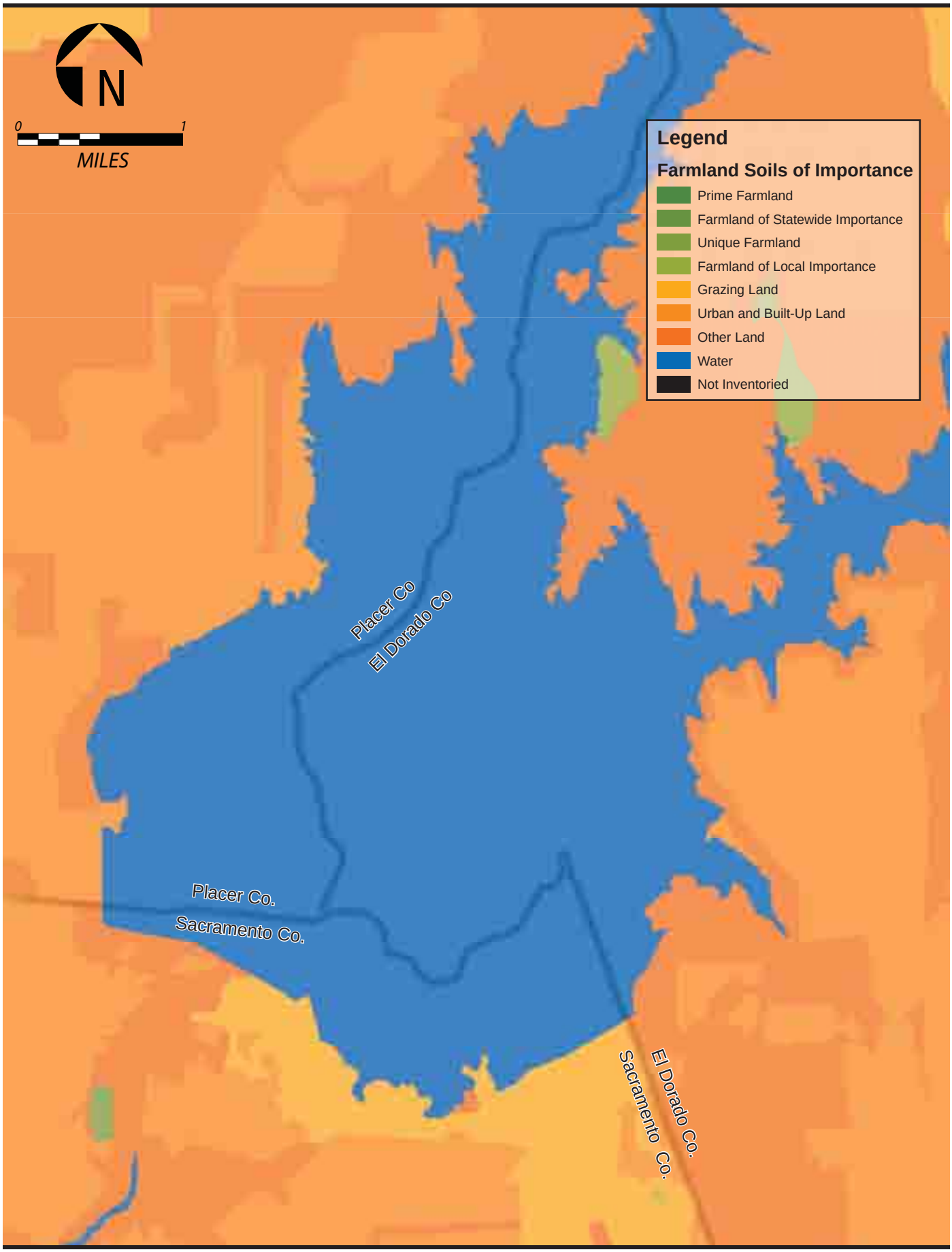
3.8.1.3 Environmental Setting

This section describes the environmental setting for agricultural resources for the Folsom DS/FDR impact zone (the Folsom Facility and immediate vicinity) by county. Information on agricultural land use and zoning is based on county and City of Folsom land use maps. Information on agricultural land classification is compiled from FMMP reports and maps.

El Dorado County

According to El Dorado County land use maps (Figure 3.12-3), agricultural land adjacent to Folsom Reservoir occurs along the South Fork of the American River right bank across from Salmon Falls. According to FMMP maps, this area is also classified as Farmland of Local Importance (Figure 3.8-1). Additional land in the County adjacent to Folsom Reservoir also classified as Farmland of Local Importance by FMMP is an area along the North Fork of the American River left bank near the terminus of Rattlesnake Bar Road. Further upstream from Folsom Reservoir along both forks of the American River are lands classified as grazing. None of these areas are within the footprints of the Folsom Facility.

[3] For farmed areas lacking modern soil survey information and for which there is expressed local concern on the status of farmland, Irrigated and Non-irrigated Farmland substitute for the categories of important farmland.



W:\REPORTS\Folsom EIR\Graphics\Farmland Soils of Importance_Fig3.8-1.ai 10/31/06 JJT

Figure 3.8-1
Farmland Soils of Importance

CDM

Placer County
The Placer County land use map (Figure 3.12-2) does not show any agricultural land use adjacent to Folsom Reservoir. FMMP maps display land classified as grazing upstream from the Folsom Reservoir along the North Fork of the American River.

Sacramento County
The City of Folsom land use map (Figure 3.12-4) shows land zoned as agriculture adjacent to Folsom Reservoir east of Folsom Dam Road and north of East Natomas Street. This land is classified as grazing by the FMMP. These areas occur adjacent to Dikes 7 and 8 and MIAD. None of these areas are within the footprint of the Folsom Facility.

3.8.2 Environmental Consequences/Environmental Impacts

3.8.2.1 Assessment Methods

Potential impacts associated with each alternative were assessed qualitatively. Information presented in the affected environment/existing conditions discussion as well as the following factors were considered during the evaluation process:

- Proximity of agricultural resources to the Folsom DS/FDR footprint; and
- Classification of agricultural resources within the area of analysis.

3.8.2.2 Significance Criteria

Based on criteria in the CEQA guidelines, the Folsom DS/FDR would be considered to have significant impacts on agricultural resources if it would:

- Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance as shown on maps prepared pursuant to the FMMP to non-agricultural use or involve other changes in the existing environment which, because of their location or nature would also result in conversion; or,
- Conflict with existing zoning for agricultural use, or a Williamson Act contract.

3.8.2.3 Environmental Consequences/Environmental Impacts

Environmental Consequence/Environmental Impacts of the No Action/No Project Alternative
The No Action/No Project Alternative would not convert farmland to non-agricultural uses.

There are no areas within or adjacent to the area of analysis that have been classified as Prime, Unique, or Statewide Importance Farmland. The No Action/No Project Alternative would not cause the conversion of Prime, Unique, or Statewide Importance Farmland to a non-agricultural use.

The No Action Alternative would have no effect on agricultural resources associated with conversion on Prime, Unique, or Statewide Importance Farmland.

The No Action/No Project Alternative would not conflict with existing agricultural land use zoning or Williamson Act contracts.

Lands adjacent to Dikes 7 and 8 and MIAD are zoned agricultural by the City of Folsom. However, no dam safety or flood damage reduction measures would be taken under the No Action/No Project Alternative and there are no proposed changes in land use that would require a change in zoning. No Williamson Act lands were identified in the area of analysis.

The No Action/No Project Alternative would have no effect on land use zoning or Williamson Act contracts.

Environmental Consequences/Environmental Impacts of Alternative 1
Construction of this alternative would not convert Prime, Unique, or Statewide Importance Farmland.

There are no areas within or adjacent to the area of analysis that have been classified as Prime, Unique, or Statewide Importance Farmland. Therefore, actions under Alternative 1 would not convert farmland with these classifications to non-agricultural use. There are no areas meeting these definitions within the footprint of the Folsom Facility.

There would be no conversion of Prime, Unique, or Statewide Importance Farmland from construction of Alternative 1.

Construction activities would not conflict with existing agricultural land use zoning or Williamson Act contracts.

Lands adjacent to Dikes 7 and 8 and MIAD are zoned agricultural by the City of Folsom. However, actions under Alternative 1 do not propose any changes in land use that would require a change in agricultural land use zoning. No Williamson Act lands were identified in the area of analysis.

Construction would have no effect on land use zoning or Williamson Act contracts.

Environmental Consequences/Environmental Impacts of Alternative 2
Alternative 2 would have the same effect on agricultural resources as Alternative 1.

Environmental Consequence/Environmental Impacts of Alternative 3
Alternative 3 would have the same effect on agricultural resources as Alternative 1.

Environmental Consequences/Environmental Impacts of Alternative 4
Alternative 4 would have the same effect on agricultural resources as Alternative 1.

Environmental Consequences/Environmental Impacts of Alternative 5
Alternative 5 would have the same effect on agricultural resources as Alternative 1.

3.8.3 Comparative Analysis of Alternatives

None of the alternatives, including the No Action/No Project Alternative would affect agricultural resources.

3.8.4 Mitigation Measures

None of the alternatives would significantly affect agricultural resources. Therefore, no mitigation measures are necessary.

3.8.5 Cumulative Effects

Because none of the alternatives would affect agricultural resources, there would be no cumulative effects.