7.8 GEOLOGY, SOILS, AND MINERAL RESOURCES

7.8 GEOLOGY, SOILS, AND MINERAL RESOURCES

7.8.1 INTRODUCTION

7.8.1.1 Content

This section describes the impacts of the Monterey Amendment and the Settlement Agreement related to geologic soil conditions, and mineral resources. Only some elements of the proposed project have the potential for direct impacts related to geology and soils. The elements of the proposed project with the potential to have impacts directly related to geology and soils are shown in Table 7.8-1. Although the proposed project would result in percolation pond construction in Kern County, the operation of the percolation ponds would result in no impact to existing mineral resources in the area, including oil and gas extraction. Therefore, no further analysis of current mineral resources is presented in the section.

TABLE 7.8-1

IMPACTS OF PROPOSED PROJECT ELEMENTS ON GEOLOGY, SOILS, AND MINERAL RESOURCES

Proposed Project Element	Potentially Affected Environmental Resources	Impact Number
Monterey Amendment		
Reallocation of water supplies in droughts	Changes in soil erosion with changes in agricultural practices	7.8-1
Permanent transfers of water	Changes in soil erosion with changes in agricultural practices	7.8-1
Transfer of Kern Fan Element lands	Changes in soil erosion with changes in agricultural practices and construction activities	7.8-3
Water supply management practices	Changes in soil erosion with changes in reservoir levels, agricultural practices, and construction activities	7.8-2, 7.8-4, 7.8-5
Restructured financial arrangements	NA	NA
Settlement Agreement		
Substitute Table A amount for entitlement	NA	NA
Disclosure of SWP delivery capabilities	NA	NA
Guidelines on permanent transfers	NA	NA
Guideline for public participation	NA	NA
Restrictions on Kern Fan Element lands	NA	7.8-3
Watershed forum in Plumas	Changes in soil erosion with construction activities	7.8-6
Amendment of Plumas SWP contract	NA	NA
Funding for plaintiffs	NA	NA

Note:
NA – Not Applicable.

No comment letters related to geology, soils, or mineral resource impacts were received in response to the NOP circulated for the proposed project.

7.8.1.2 Analytical Method

The analysis of potential geologic and soils impacts throughout the proposed project areas was based on *Geology of California*, Second Edition, by Robert M. Norris and Robert W. Webb, information from the *Natural Resources Conservation Service* (formerly the U.S. Soil Conservation Service); a large variety of publicly available technical reports, as well as published information describing the project SWP facilities and their geologic characteristics. The information obtained from these sources was reviewed and summarized to establish existing conditions and to identify potential environmental effects, based on the standards of significance presented in this section. In determining the level of significance, the analysis assumes that the proposed project would comply with relevant federal, State, and local regulations governing seismic safety, and hazards associated with unstable soils.

7.8.1.3 Standards of Significance

The following standards of significance are based on Appendix G of the CEQA Guidelines. For the purposes of this EIR, a significant impact related to geology and soils would occur if the proposed project would:

- result in substantial soil erosion or the loss of topsoil; or
- be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslides, lateral spreading, subsidence, liquefaction or collapse.

7.8.2 ENVIRONMENTAL SETTING

7.8.2.1 State Water Project Area Environmental Setting

The geological setting in the regions which the project traverses is varied and complex. Realistically, the geological setting for the SWP is equivalent to describing the geological setting for most of the state of California. The SWP traverses six of the 12 geomorphic provinces in California: the Sierra Nevada, the Great Valley, the Coast Ranges, the Transverse Ranges, the Peninsular Ranges, and the Colorado Desert. These geomorphic provinces are based on landforms and late Cenozoic structural and erosional history.[1]

7.8.2.2 Physical Setting in 1995

Southern Portion of San Joaquin County Including Kern Fan Element

The San Joaquin Valley basin is bordered to the south and east by the Sierra Nevada and Tehachapi mountains, which are composed of crystalline igneous and metamorphic rock. Exposed consolidated marine sedimentary rock from the Coast Range are evident in the layer of sediment above bedrock underlying the San Joaquin basin. The Kern Fan Element is a large, deep, and asymmetrical sedimentary basin located in the southern portion of the San Joaquin Valley.

The marine sedimentary rock is overlain by a thick series of continental rocks and semi-consolidated to unconsolidated sediments. These sediments are several thousand feet thick under the Kern Fan Element, and encapsulate the primary groundwater basin. The portion of this sediment that is usable for groundwater storage is located above the base of the fresh water in the basin. This area of the groundwater basin is dominated by the alluvial fan and lake material that comprise the Kern Fan Element. Further, groundwater development is limited to the upper portions of the fresh water aquifer system in this basin.

The southern San Joaquin Valley, including the Kern Fan Element is dominated by the alluvial fan deposited by the Kern River, and consists of thick deposits of sand and gravel with extensive but discontinuous silt and clay beds.[2] The sand and gravel deposits are remnants of old streambed channels which generally occur in long, winding, and interconnecting stingers and sheets that are prevalent throughout the Kern Fan Element, but less evident along its borders. These sand and gravel deposits are highly permeable, but are imbedded with less permeable areas comprised of fine-grained silt and clay deposits. These silt and clay deposits are more extensive along the edges of the alluvial fan and in some areas may intersect with clay beds deposited in lakes. In general, the upper layers of the alluvial fan deposits form an unconfined to semi-confined aquifer system that provides a large amount of groundwater recharge area.

Soils in the southern portion of the San Joaquin Valley, including the Kern Fan Element, range from highly permeable, coarse sandy soils to silty loam with very low permeability.[3] In general, the soils present are characterized as deep, well-drained sandy loam that have moderate to rapid permeability with low water retention, and have a slight erosion potential. These soils are interspersed with pockets of clay deposits that are characterized by low-permeability and are often associated with saline-alkali conditions.[4]

Castaic Lake

Castaic Lake is located in an area characterized by a series of mountain ranges in an east-west orientation that stretch directly across the dominant northwest trend of the other major structural and geomorphic features in the state. Castaic Lake is surrounded by the Sierra Pelona range to the east, the Piru mountains to the south, and the Pine and Topatopa mountains to the west. The topography in Castaic Lake is composed of steep hillsides with incised valleys originally formed by the confluence of Elizabeth Canyon Lake and Castaic Creeks.

Castaic Lake geological formations consist of stream channel alluvium and marine shales, mudstones, siltstones, and fine sandstones of the upper Miocene Castaic Formation. Evidence of deformation of the Castaic Formation is visible in the folding of the well-developed bedding in the sediments of nearby deposits. Further, irregular topography of nearby hills suggest considerable sliding, slumping, flow, and creep within these rocks.

Soils in the Castaic Lake area include stream channels and mountain slopes that are significantly different from one another. The stream channel deposits consist of sand, gravel, and cobbles that have high permeability. On the other hand, the mountain slopes consist of soils that contain clay, silty clay, and silty loams. These mountain deposits have a low to moderately rapid permeability and have a high soil erosion potential. On a site visit in April 2007, California Department of Water Resources (Department) staff observed a major landslide that occurred along the northeastern shore of the lake in 2005 and other areas where wind-wave erosion has formed cuts into the hillsides and induced slumping.

Lake Perris

Lake Perris is located in Riverside County, east of Interstate 15 in the Alessandro Valley. This area is part of the Peninsular Ranges physiographic province of California, which is characterized by steep, elongated ranges and valleys that lie in a northwesterly direction. Lake Perris is located in a structural upland known as the Perris Plain, a highly eroded, faulted mass of crystalline rock that has been stream-cut into valleys deeply filled with ancient alluvial deposits. Lake Perris is generally defined by a natural bowl, with a gently sloping topography towards the west, where the dam is located.

Soils in the Lake Perris area are generally derived from unconsolidated granitic alluvium derived from local igneous parent material. In general, the soils of the Perris Plain are fine- to medium-grained valley soils that develop shallow slopes, basins, old terraces, and alluvial fans. Soil classifications in this area include loam and sandy loam. These soils exhibit a relatively rapid permeability, but in some areas these soils have a moderately high runoff due to an impervious clay layer found at a depth of approximately two to four feet.

San Luis Reservoir

San Luis Reservoir was built on the border of the Eastern Franciscan and Sierran Blocks, two major formations of late Mesozoic and Cenozoic sedimentary rocks, where geologists have identified the Coast Range Thrust Zone.[5]

Soils in the San Luis Reservoir area include mountain slopes that are significantly different from one another. Mountain slopes to the east consist of soils characteristic of the terraces adjacent to the western edge of the San Joaquin Valley and on the foothills of the Coast Range. These soils on the eastern side of San Luis Reservoir are very deep to moderately deep, gently to strongly sloped, well drained soils that have high organic matter content on the foothills. The mountain slopes and the valleys to the west consist of shallow to moderately deep, steep and very steep, well drained to excessively drained soils with rock outcrops. These mountain deposits have a low to moderately rapid permeability and a relatively high soil erosion potential.

Lake Oroville

Lake Oroville is located in the western Sierra Nevada foothills, within the metamorphic belt of the Sierra Nevada geomorphic province. Most of the reservoir is situated within Mesozoic volcanic and metavolcanic rocks, with some areas of older (Paleozoic) metavolcanic rocks to the north. The eastern part of Lake Oroville is adjacent to granitic plutons associated with the Sierra Nevada Range.[6] The reservoir lies in an area that historically experienced relatively low seismic activity. The only known active fault in the area is the Cleveland Hill fault, approximately three miles from the dam, which ruptured in August 1975 and caused a magnitude 5.7 earthquake.

Soil profiles in the volcanic and metavolcanic rocks underlying the reservoir tend to be thick, while thin profiles are present on the granitic rocks to the east. The thinner soil profiles are readily eroded by wave/wind action. The amount of bank erosion for a particular length of shoreline is closely related to the underlying geologic material, soil cover, and wave/wind action. Moderately sloping banks, most prevalent in the main basin, are generally more susceptible to wave action from wind currents across a wide expanse of water, and from wave action caused by recreational powerboats. Lower elevations within the reservoir fluctuation zone are exposed to erosion less frequently than those areas near the normal maximum pool level.

Landslides are numerous along the banks of Lake Oroville and continue into the depths of the lake. However, the amount of material derived from active landslide activity is minimal when compared to the amount of incoming watershed sediment and material derived from shoreline erosion.[7]

7.8.2.3 Changes in Physical Setting between 1996 and 2003

Geological and soil conditions generally do not change within a short period of time and, therefore, the environmental setting described under 1994 conditions for southern San Joaquin Valley portion of Kern County (including the Kern Fan), Castaic Lake, Lake Perris, San Luis Reservoir, and Lake Oroville are generally the same under 2003 conditions.

Lake Perris

In 2005, the Department identified potential seismic safety risks in a section of the foundation of Perris Dam. While there is no imminent threat to life or property, in the interest of ensuring the maximum public safety for those using and living downstream of the lake, the Department decided to lower the water level approximately 25 feet while additional analysis was performed. This lowering is not related to the Monterey Amendment or Settlement Agreement water transfers.

Following an independent expert analysis, the Department announced in October 2005 it will move ahead with plans to repair Perris Dam. The Department is currently evaluating the best and most feasible repair alternatives to address the seismic concerns at Perris Dam. The decision on a preferred repair alternative was made earlier this year. In 2006, The Department decided to further reduce water levels to 60 percent full and observe other areas of the dam structure. It is expected that design work, environmental documentation and permitting will take approximately two to three years, followed by construction work. The Department estimates that all activities related to this project will be done by 2012.

Concurrently, the Department is performing a reconnaissance-level study to evaluate a wide range of options for the future long term use of the facility. This initial study is intended to narrow the possible options and may initiate further detailed studies of one or more preferred alternatives. Because these activities are temporary, these changes to Lake Perris are not used in the following analysis but will be evaluate in a separate project-specific environmental document.

Plumas County

Plumas County is located in the northern part of the Sierra Nevada geomorphic province. The Sierra Nevada province starts in the north at Lassen Peak in the Cascade Range and continues to the south where it meets the Tehachapi Mountains. The Sierra Nevada province is comprised principally of Cretaceous granitic plutons; remnants of Paleozoic and Mesozoic metavolcanic and metasedimentary rocks, and Cenozoic volcanic and sedimentary rocks. The Paleozoic and Mesozoic metavolcanic and metasedimentary rocks were intruded by the granitic plutons approximately 77 to 225 million years ago, resulting in local uplift and deformation of the overlying older rock. Regional uplift and rapid erosion of most of the overlying metamorphic rocks closely followed intrusion of the plutons, exposing the underlying granitic rocks. Continued uplift and erosion, accompanied by volcanic activity and alpine glaciation resulted in the present pattern of deep-walled valleys that characterize the Sierra Nevada.[8]

The Diamond Mountains and Sierra Nevada Range traverse through the County in a northwesterly direction. The Diamond Mountains dominate the eastern portion of the County, while the Sierra Nevada Range dominates the southwestern portion of the County. Between the two mountain ranges is the Plumas Trench. Several faults have resulted in the uplift of the Diamond and Sierra Nevada ranges, with the northwesterly tending Melones fault traversing through the County and forming the major structural boundary between the two ranges. Many of the valleys formed from this fault and were once filled with glacial lakes. The glaciers eroded the underlying granitic rocks on the mountain peaks and formed a vast alluvial meadow system in the headwaters of the Feather River.[9]

The soils in the valleys or low-lying areas of Plumas County are dominated by highly erodible granitic and sedimentary deposits.[10] To date, there have been no soil surveys conducted by the U.S. Department of Agriculture, National Resources Conservation Services (NRCS) for Plumas County. However, an erosion study conducted by the USDA has shown that soils in Plumas County have low permeability and are prone to erosion from storm water runoff.[11]

7.8.2.4 Regulatory Setting in 1995

Regulations related to geologic hazards and soil erosion relevant to the proposed project are described below.

Federal

There are no applicable federal regulations pertaining to seismic hazards or soil erosion applicable to the proposed project.

State

Major State regulations include the California Code of Regulations, Title 24, Part 2, the *California Building Code* and California Public Resources Code, Division 2, Chapter 7.8, the *Seismic Hazards Mapping Act*. Both these regulations apply to public buildings and a large percentage of private buildings intended for human occupancy. The California Building Code (CBC) is based on the Uniform Building Code (UBC), which is used widely throughout United States (adopted on a state-by-state or district-by-district basis) and has been modified for California conditions with numerous more detailed and/or more stringent regulations.

<u>Other Geotechnical Considerations</u>

Chapter 18 of the CBC regulates the excavation of foundations and retaining walls, and Appendix Chapter 33 regulates grading activities, including drainage and erosion control, and construction on expansive soils. Construction activities are subject to occupational safety standards for excavation, shoring, and trenching as specified in Cal-OSHA regulations (Title 8 of the CCR) and in Section A33 of the CBC.

Other State regulations pertaining to the management of erosion and sedimentation are described in Section 7.1. Although the primary purpose of these regulations and standards is the protection of surface water resources from the effects of land development (such as turbidity caused by sedimentation), measures included in such regulations and standards also reduce the potential for erosion and soil loss resulting from construction activities. Such regulations include, but are not limited to, the National Pollutant Discharge Elimination System (NPDES) program for management of construction and municipal stormwater runoff, which is part of the federal CWA and is implemented at the State and local level through issuance of permits and preparation of site-specific pollution protection plans. Sections 1600 through 1607 of the CDFG

Code regulates activities that would alter stream characteristics, including sedimentation caused by erosion.

Local

General Plans of Riverside, Merced, Los Angeles, Kern, and Butte counties contain goals and policies to address potential hazards associated with geologic and soil constraints. Based on the impact analyses presented below, there are no aspects of the proposed project that would be considered inconsistent with general plan policies pertaining to geotechnical hazards or safety.

7.8.2.5 Changes in Regulatory Setting between 1996 and 2003

There has been no change in geology and soils regulations. Therefore, the regulatory setting described under 1995 conditions applies to 2003.

7.8.3 IMPACTS AND MITIGATION MEASURES

7.8-1 Implementation of the proposed project could potentially change rates of erosion in the southern San Joaquin Valley portion of Kern County as a result of changes in agricultural practices.

1996 — 2003

The Monterey Amendment enables various changes in the way the Department allocates water among contractors during times of shortage and surplus and enables agricultural contractors to retire and transfer a portion of their Table A amounts. The effect of these changes was to increase the reliability of water supplies but decrease the total amount of Table A water available to farmers in Kern County. The reliability and availability of agricultural water supplies is one factor that may contribute to the amount and types of crops and associated land disturbance activities.

It is possible that some land was converted to permanent crops as a result of the proposed project, and that these changes in agricultural practices could have reduced the frequency and type of land disturbance within the KCWA's boundaries. Consequently, associated wind-generated erosion would have been limited or reduced.

Although changes in agricultural practices potentially altered the rate of soil erosion within the KCWA's boundaries, the changes would not be considered significant. Furthermore, soils in Kern County can generally be characterized as being slightly erodible; therefore, this impact is considered ***less than significant***.

<u>Mitigation Measures</u>

None required.

Future Impacts

As discussed in Section 7.6, Agricultural Resources, the proposed project would have little or no impact on the acreage of irrigated land in the southern San Joaquin Valley in the future. Assuming that any land is taken out of irrigated production as a result of the proposed project, it would remain in agricultural use as dry farmed or fallow land. In addition, the trend of replacing irrigated annual crops with permanent crops is expected to continue in the future with or without the proposed project. While it is possible that additional land could be converted to permanent crops as a result of the proposed project, no clear trend can be attributable to the proposed project that can be discerned for the historical analysis period. Therefore any change in agricultural practices would not be expected to result in a dramatic change in soil disturbance and associated wind-generated erosion.

Although changes in agricultural practices could potentially alter the rate of soil erosion within the KCWA's boundaries, the changes would not be considered significant. Furthermore, soils in Kern County can generally be characterized as being slightly erodible; therefore, this impact is considered ***less than significant***.

<u>Mitigation Measures</u>

None required.

7.8-2 Implementation of the proposed project could potentially change rates of erosion in the southern San Joaquin Valley portion of Kern County (excluding the Kern Fan Element) as a result of construction of new groundwater storage facilities.

1996 — 2003

The Monterey Amendment enabled SWP contractors to store water outside their service areas for later use within their service areas. To take advantage of this, several M&I contractors have entered into agreements with water agencies in the southern San Joaquin Valley to temporarily store SWP water in groundwater banks. Between 1996 and 2003, Semitropic WSD, Arvin-Edison WSD and the Kern Water Bank Authority (KWBA) developed or expanded water banks.[12] The water bank developed by the KWBA is discussed separately under Impact 7.8-3.

The water banking program developed by Semitropic WSD was an "in lieu" program, did not involve the construction of new facilities, and had no effect on the rates of erosion. Arvin-Edison's water banking program involved the construction of 520 acres of percolation ponds at two sites referred to as the North Canal Spreading Works and the South Canal Spreading Works. Vacant land or cropland was converted to percolation ponds by the construction of one or two-foot high perimeter levees.[13] Grading was required to construct the percolation ponds. However, construction of the ponds and associated levees occurred on topography that is relatively flat and required only minor grading and compaction of soils. In addition, soils in the area are classified as slightly to very slightly erodible by wind.[14] Although replacement of 520 acres of vacant land or cropland with percolation ponds changed rates of erosion, this impact is considered ***less than significant***.

<u>Mitigation Measure</u>

None required.

Future Impacts

As noted above for impact during 1996 – 2003, the Monterey Amendment enabled SWP contractors to store water outside their service areas for later use within their service areas.

Between 1996 and 2003, several contractors began storing water in groundwater banks in the southern San Joaquin Valley. It is expected that in the future, contractors would increase their use of groundwater banks. If future increased groundwater banking involved active recharge then new percolation ponds would be built. It is anticipated that an additional 500 acres of ponds would be constructed. Grading would be required to construct the percolation ponds. However, construction of the ponds and associated levees would occur on topography that is relatively flat and would require only minor grading and compaction of soils that are classified as slightly to very slightly erodible by wind.[15] Further, future projects would be required to comply with CEQA and prepare environmental documentation in addition to this EIR to complete proposed percolation ponds. Therefore, the construction of additional percolation ponds would result in a ***less-than-significant impact*** attributed to changing rates of soil erosion.

Mitigation Measures

None required.

7.8-3 Rates of erosion in the Kern Fan Element could potentially be affected by changes in land use.

1996 — 2003

Prior to 1996, approximately 3,034 acres of shallow percolation ponds existed in the Kern Fan Element. The KWBA also constructed the Kern Water Bank Canal, and a six-mile long earthen canal extending from the Kern River to the California Aqueduct.[16] Between 1996 and 2003, an additional 1,665 acres were converted to shallow percolation ponds, for a total of 4,699 acres in 2003 in the Kern Fan Element. As previously described, grading was required to construct the percolation ponds. However, construction of the ponds and associated levees occurred on topography that is relatively flat and required only minor grading and compaction of soils. Furthermore, soils in the Kern Fan Element can generally be characterized as being slightly erodible. Therefore, although conversion of approximately 1,665 acres of land to percolation ponds changed rates of erosion, this impact is considered ***less than significant***.

Mitigation Measure

None required.

Future Impacts

As a result of the proposed project, it is expected that the KWBA would construct an additional 1,200 acres of percolation ponds in the Kern Fan Element.

The Habitat Conservation Plan for the Kern Fan Element allows developed uses on about 4,000 acres of the Kern Fan Element.[17] Developed uses include farming, permanent facilities for the Kern Water Bank and commerce. Approximately, 490 acres is designated for possible commercial use. Between 1994 and 2003, no development occurred on the 490-acre parcel. The Settlement Agreement prohibits development of this parcel and so under the proposed project the parcel would remain undeveloped.

As a consequence of the proposed project, approximately 1,200 acres of land would be converted to percolation ponds. Grading would be required to construct the percolation ponds. However, construction of the ponds and associated levees would occur on topography that is relatively flat and that would require only minor grading and compaction of soils. Furthermore, soils in the Kern Fan Element can generally be characterized as being slightly erodible. Further, construction of ponds would require additional CEQA documentation. Therefore, conversion of approximately 1,200 acres of land to percolation ponds would not substantially change rates of erosion, and impacts are considered ***less than significant***.

<u>Mitigation Measures</u>

None required.

7.8-4 Implementation of the proposed project could potentially affect rates of erosion at Castaic Lake and Lake Perris.

1996 — 2003

Article 54 of the Monterey Amendment allowed SWP contractors to borrow water from Castaic Lake and Lake Perris under certain conditions which could affect water surface elevations in these reservoirs. As described in Section 7.1, Surface Water Hydrology, Water Quality, and Water Supply, the average water surface elevations at Castaic Lake and Lake Perris was about four feet higher between 1996 and 2003 than in the pre-Monterey Amendment period before 1995. The average water surface elevation at Castaic Lake from 1996 to 2003 was about 20 feet higher than between 1974 and 1995. The higher water surface elevations in the period 1996 to 2003 resulted in a reduction in the width of the band of exposed soil and rock around the perimeter of the two reservoirs and a consequent reduction in potential erosion.

The proposed project had a ***less-than-significant impact*** on erosion between 1996 and 2003.

<u>Mitigation Measure</u>

None required.

Future Impacts

As noted earlier, Article 54 of the Monterey Amendment allows SWP contractors to borrow water from Castaic Lake and Lake Perris under certain conditions which could affect water levels in these reservoirs. The effects of borrowing of water on water surface elevations in the two reservoirs in the future will depend on the extent to which the contractors that can borrow from the reservoir make use of Article 54 and future hydrologic conditions. Table 6-27 in Chapter 6 shows MWDSC's expected future use of flexible storage in Castaic Lake and Lake Perris. It is quite possible that future borrowing would draw down the reservoirs to a greater extent than occurred between 1996 and 2003, a relatively wet period.

If the contractors borrowed the maximum amounts of water provided for under Article 54 and the water was not replaced for the maximum permitted duration of five years, 160,000 AF would be borrowed from Castaic Lake, about half its maximum capacity of 323,700 AF, and 65,000 AF would be borrowed from Lake Perris, about half its maximum capacity of 131,500 AF. The reservoirs would remain drawn down for five years. Although this worst-case condition could occur, it would be unlikely (see Section 6.4.3.1 in Chapter 6).

If the worst-condition were to occur, the reduction in reservoir elevations would drop dramatically and increase the potential for soil erosion by exposing a larger ring of soil around the perimeter of the reservoirs to wind and rain.

Because the soils at Castaic Lake are characterized as clays; even though the slopes are steep along the perimeter, exposed soil would be subject to limited wind and/or water erosion. Slopes at Lake Perris exhibit a gentle to flat topography but the soils are characterized as sandy which would be subject to increased rates of soil erosion. Therefore, soils at Lake Perris could be subject to increased rates of wind and rain erosion associated with exposure from a potential extended drawdown attributed to Article 54. Mitigation measures such as hydroseeding or landscaping to prevent erosion are not economically or physically feasible to cover such a wide area to prevent runoff of soil into the lake. Therefore, this impact would be ***potentially significant and unavoidable***.

<u>Mitigation Measures</u>

None available.

7.8-5 Implementation of the proposed project could potentially affect rates of erosion at San Luis Reservoir and Lake Oroville.

1996 — 2003

Various provisions of the Monterey Amendment affect water surface elevations in San Luis Reservoir. Water surface elevation in Lake Oroville would not be affected by the proposed project.

Most of the time, the proposed project raised water levels in San Luis Reservoir by 10 to 20 feet under 2003 conditions. The higher water surface elevations in the period 1996 to 2003 resulted in a reduction in the width of the band of exposed soil and rock around the perimeter of the reservoirs and a consequent reduction in potential erosion. Occasionally, the Article 56 provisions of the Monterey Amendment would result in a reduction in water surface elevation in San Luis Reservoir in the spring of wet years relative to the baseline scenario. Surface water levels could be reduced by up to 50 feet, but the reduction would typically persist for only a few months and would not significantly affect erosion rates. Therefore, the proposed project had a ***less-than-significant impact*** on erosion between 1996 and 2003.

<u>Mitigation Measure</u>

None required.

Future Impacts

As noted earlier, provisions of the Monterey Amendment could affect water levels in San Luis Reservoir. In the future, most of the time, the proposed project would raise water levels in San Luis Reservoir by 10 to 20 feet under 2020 conditions. Occasionally, the Article 56 provisions of the Monterey Amendment would result in a reduction in water surface elevation in San Luis Reservoir in the spring of wet years relative to the baseline scenario. Surface water levels could be reduced by up to 50 feet, but the reduction would typically persist for only a few months and would not be expected to affect erosion rates. Therefore, the proposed project had a ***less-than-significant impact*** on erosion.

Mitigation Measures

None required.

7.8-6 Implementation of the proposed project could potentially increase the rate of soil erosion in Plumas County as a result of watershed improvement projects.

1996 — 2003

Because the Settlement Agreement was not executed in this period, there were no impacts from the proposed project within Plumas County. Therefore, the project had ***no impact***.

Future Impacts

The Settlement Agreement resulted in funding for Plumas County to establish a watershed forum and implement watershed improvement projects. The watershed forum would identify opportunities for watershed improvements and would oversee the implementation of individual projects. Watershed improvement projects take many forms but most involve actions to prevent erosion and restore wildlife habitat along streams and rivers. In general, projects of this type improve the stability of stream banks and native vegetation by returning them to a more natural condition, therefore, reducing the rate of soil erosion.

The number and size of watershed improvement projects that would result from the proposed project are relatively small. The projects would be expected to improve conditions along a few miles of streambank in a county with thousands of miles of stream channels. The proposed project would result in short-term construction impacts that would be regulated by State water quality regulations, as discussed in Section 7.1, for the prevention of erosion and sedimentation from construction activities. The proposed project would reduce soil erosion rates in Plumas County and impacts would be ***less than significant***.

Mitigation Measures

None required.

ENDNOTES

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6. California Division of Mines and Geology, *Geologic Map of California*, 1977.

7. California Department of Water Resources, *Oroville Facilities FERC Project No. 2100, Preliminary Draft Environmental Assessment*, Volume III, Section 5.3 (Geology, Soils, and Paleontological Resources), January 2005.

8. California Public Utilities Commission, *Pacific Gas and Electric Company's Application for Authorization to Divest Its Hydroelectric Generating Facilities and Related Assets, Draft Environmental Impact Report, Volume 7, Chapter 4*, November 200, page 4.16-7.

9. Plumas County Flood Control and Water Conservation District, *Draft Feather River Watershed Management Strategy*, January 15, 2004, page 5.

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11. Plumas County Flood Control and Water Conservation District, *Draft Feather River Watershed Management Strategy*, January 15, 2004, page 7.

12. Conant, Ernest, Young Wooldridge, personal communication with John Davis, EIP team, October 2003.

13. Arvin-Edison Water Storage District, *Arvin-Edison Water Management Program Negative Declaration*, 1994.

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16. Parker, Jonathon, Kern Water Bank Authority, personal communication with John Davis, EIP team, October 2003.

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