Chapter 7

Revisions to Chapter 7, "Summary"

Chapter 7 of this document (the Draft SEIS/REIR) is being revised in response to public comments received on the Draft EIS/EIR (Jones & Stokes 2003). Most of these changes would not change the text in such a way as to require recirculation for public comment. However, Reclamation and the State Water Board have deemed that the following changes to this chapter constitute significant new information. As a result, the lead agencies have included these changes here for public disclosure and comment. The complete revised chapter will be presented in the Final EIS/EIR.

Summary of Impacts

The new impacts associated with the action alternatives (Five Dam Removal, No Dam Removal, Six Dam Removal, and Three Dam Removal Alternatives) and the No Action Alternative, which are presented in this Draft SEIS/REIR, are identified in Table 7-1. Most significant impacts would be considered less than significant after implementing the appropriate mitigation measures for the specific resource area identified in Table 7-1. These new impacts and their mitigation measures are described in more detail in the appropriate resource section in Chapter 4.

Comparison of Alternatives

A comparison between the Proposed Action and each of the action alternatives (including the No Action Alternative) is provided below to summarize the relative differences in Chinook salmon and steelhead benefits and significant impacts that would be expected under each alternative. Table 7-2 presents how the environmental impacts of the action alternatives differ. Only impacts that are different among the alternatives are listed in Table 7-2; those impacts that are shared by all alternatives are not listed in this table.

Proposed Action (Five Dam Removal Alternative) and No Action Alternative

The Proposed Action would provide substantial beneficial effects to improve fish habitat and would not result in a substantial number of significant and unavoidable impacts to the environment (i.e., impacts that could not be reduced to less-than-significant levels with recommended mitigation measures).

The No Action Alternative would avoid environmental impacts associated with Restoration Project activities but would not offer substantial benefits to fish. The No Action Alternative would continue effects associated with the operation, maintenance, and upgrades of Hydroelectric Project facilities.

Fish

The No Action Alternative would continue flow and fish-passage conditions that were established under the original FERC license agreement. Beneficial effects for Chinook salmon and steelhead associated with minimum creek flows, spawning and rearing habitat availability, water temperatures, and fish passage would not occur.

Botanical, Wetland, and Wildlife Resources

The No Action Alternative would avoid short-term, constructed-related impacts on terrestrial biological resources near Hydroelectric Project facilities (e.g., potential disturbance or loss of special-status species habitat, potential disturbance or loss of waters of the United States). However, no long-term riparian and wildlife benefits would be provided along Battle Creek.

Hydrology

Under the No Action Alternative, Battle Creek hydrology would not change compared to baseline conditions. Instream flow releases below the diversion dams would be the minimum flows required by PG&E's FERC license agreement (i.e., 3 cfs minimum instream flow releases in North Fork Battle Creek and 5 cfs minimum instream flow releases in South Fork Battle Creek). Additionally, the No Action Alternative would not reduce the 10-, 25-, and 50-year floodwater surface profiles at Inskip Powerhouse because Coleman Diversion Dam would not be removed.

Table 7-1. Summary of New Impacts, Levels of Significance, and Recommended Mitigation Measures Presented in This Draft Supplemental EIS/Revised EIR for the No Action Alternative, Five Dam Removal Alternative (Proposed Action), No Dam Removal Alternative, Six Dam Removal Alternative, and Three Dam Removal Alternative

Impact	Level of Significance	Recommended Mitigation Measure(s)	Level of Significance after Mitigation	Page Number in the Draft SEIS/REIR
FISH				
Five Dam Removal Alternative (Proposed Action)				
Impact 4.1-8. Increased risk of a serious or catastrophic fish disease spreading from Battle Creek to fish communities throughout the state through stocking with MLTF and Darrah Springs State Fish Hatchery fish.	Significant	*Jeffcoat:* A pipeline will be installed to bypass the Jeffcoat facilities to prevent the potential contamination of MLTF's farmed trout with serious or catastrophic fish disease from Battle Creek water that is conveyed in Eagle Canyon Canal. Four pipeline alignment alternatives are proposed in this Draft SEIS/REIR. *Willow Springs:* Option A—A water treatment facility will be installed at the Willow Springs facility. Option B—Willow Springs will be relocated to raise trout at an off-site facility where the water source is not hydrologically connected to anadromous waters. Option C—MLTF will modify their operations at the Willow Springs facility to ensure that farmed trout are not distributed offsite. Option D—The Willow Springs aquaculture business will be acquired and the leasehold interest considered. *Asbury Diversion Dam:* Option A—An appropriate fish barrier will be constructed at Asbury Diversion Dam by structural or operational modification. Option B—An existing waterfall located downstream of Asbury Diversion Dam will be modified to prevent fish passage up to the dam.	Less than significant	4-2 through 4-13

Impact	Level of Significance	Recommended Mitigation Measure(s)	Level of Significance after Mitigation	Page Number in the Draft SEIS/REIR
No Dam Removal Alternative				
Impact 4.1-27. Increased risk of a serious or catastrophic fish disease spreading from Battle Creek to fish communities throughout the state through stocking with MLTF and Darrah Springs State Fish Hatchery fish (similar to Impact 4.1-8).	Significant	Same mitigation measures as recommended for Impact 4.1-8 for the Jeffcoat and Willow Springs MLTF facilities and Asbury Diversion Dam.	Less than significant	4-18
Six Dam Removal Alternative				
Impact 4.1-45. Increased risk of a serious or catastrophic fish disease spreading from Battle Creek to fish communities throughout the state through stocking with MLTF and Darrah Springs State Fish Hatchery fish (similar to Impact 4.1-8).	Significant	Same mitigation measures as recommended for Impact 4.1-8 for the Jeffcoat and Willow Springs MLTF facilities and Asbury Diversion Dam.	Less than significant	4-18
Three Dam Removal Alternative				
Impact 4.1-65. Increased risk of a serious or catastrophic fish disease spreading from Battle Creek to fish communities throughout the state through stocking with MLTF and Darrah Springs State Fish Hatchery fish (similar to Impact 4.1-8).	Significant	Same mitigation measures as recommended for Impact 4.1-8 for the Jeffcoat and Willow Springs MLTF facilities and Asbury Diversion Dam.	Less than significant	4-19

Impact	Level of Significance	Recommended Mitigation Measure(s)	Level of Significance after Mitigation	Page Number in the Draft SEIS/REIR
BOTANICAL, WETLAND, AND WILDLIFE RESOURCES				
Five Dam Removal Alternative (Proposed Action)				
Impact 4.2-5. Potential disturbance to valley elderberry longhorn beetle habitat.	Significant	Reclamation will mitigate impacts on valley elderberry longhorn beetle according to standard valley elderberry longhorn beetle compensation guidelines (U.S. Fish and Wildlife Service 1999) through Section 7 consultation with the U.S. Fish and Wildlife Service. In general, the guidelines require compensation for direct and indirect impacts in the form of transplanting shrubs and planting seedling elderberry shrubs at a secure mitigation site. Avoidance of impacts requires a 100-foot no-disturbance buffer between the shrub and construction activities.	Less than significant	4-27
Impact 4.2-6. Potential disturbance to California red-legged frogs and their habitat.	Significant	Reclamation will conduct U.S. Fish and Wildlife Service protocol-level surveys before construction begins to determine the presence of California red-legged frogs. If protocol-level surveys do not detect the presence of California red-legged frogs, Reclamation will implement the following mitigation measures at the Asbury Diversion Dam project site and the Jeffcoat and Willow Springs mitigation sites to avoid and minimize impacts on the species and its habitat: request a qualified biologist to conduct preconstruction surveys and instruct all project personnel in worker awareness training, limit activities to after October 15 or the onset of the rainy season, confine vehicles to existing roadways, request a qualified biologist to ensure that the route for any backhoe equipment is clear, cease construction activities until any red-legged frogs are relocated, and restore any disturbed habitat.	Less than significant	4-29

Impact	Level of Significance	Recommended Mitigation Measure(s)	Level of Significance after Mitigation	Page Number in the Draft SEIS/REIR
Impact 4.2-11. Potential disturbance to nesting California black rails in emergent marsh.	Significant	A qualified biologist will conduct a tape-playback survey to determine presence of California black rails in the emergent marsh near the proposed Eagle Canyon pipeline mitigation; construction activities will be seasonally restricted to avoid disturbance during the rails' nesting season.	Less than significant	4-31
Impact 4.2-13. Possible loss of woody riparian vegetation along PG&E canals.	Less than Significant	None required.	Not applicable	4-32
Impact 4.2-15. Potential disturbance of annual grassland habitat.	Less than significant	None required.	Not applicable	4-32
No Dam Removal Alternative				
Impact 4.2-24. Potential disturbance to valley elderberry longhorn beetle habitat (similar to Impact 4.2-5).	Significant	Same mitigation measure as recommended for Impact 4.2-5.	Less than significant	4-32
Impact 4.2-25. Potential disturbance to California red-legged frogs and their habitat (similar to Impact 4.2-6).	Significant	Same mitigation measure as recommended for Impact 4.2-6.	Less than significant	4-33
Impact 4.2-30. Potential disturbance to California black rails in emergent marsh (similar to Impact 4.2-11).	Significant	Same mitigation measure as recommended for Impact 4.2-11.	Less than significant	4-33
Impact 4.2-32. Possible loss of woody riparian vegetation along PG&E canals (similar to Impact 4.2-13).	Less than significant	None required.	Not applicable	4-33
Impact 4.2-34. Potential disturbance of annual grassland habitat (similar to Impact 4.2-15).	Less than significant	None required.	Not applicable	4-33

Impact	Level of Significance	Recommended Mitigation Measure(s)	Level of Significance after Mitigation	Page Number in the Draft SEIS/REIR
Six Dam Removal Alternative				
Impact 4.2-42. Potential disturbance to California red-legged frogs and their habitat (similar to Impact 4.2-6).	Significant	Same mitigation measure as recommended for Impact 4.2-6.	Less than significant	4-34
Impact 4.2-47. Potential disturbance to nesting California black rails in emergent marsh (similar to Impact 4.2-11).	Significant	Same mitigation measure as recommended for Impact 4.2-11.	Less than significant	4-34
Impact 4.2-49. Possible loss of woody riparian vegetation along PG&E canals (similar to Impact 4.2-13).	Less than Significant	None required.	Not applicable	4-34
Impact 4.2-51. Potential disturbance of annual grassland habitat (similar to Impact 4.2-15).	Less than significant	None required.	Not applicable	4-34
Three Dam Removal Alternative				
Impact 4.2-61. Potential disturbance to California red-legged frogs and their habitat (similar to Impact 4.2-6).	Significant	Same mitigation measure as recommended for Impact 4.2-6.	Less than significant	4-35
Impact 4.2-66. Potential disturbance to nesting California black rails in emergent marsh (similar to Impact 4.2-11).	Significant	Same mitigation measure as recommended for Impact 4.2-11.	Less than significant	4-35
Impact 4.2-68. Potential loss of woody riparian vegetation along PG&E canals (similar to Impact 4.2-13).	Less than Significant	None required.	Not applicable	4-35
Impact 4.2-70. Potential disturbance of annual grassland habitat (similar to Impact 4.2-15).	Less than significant	None required.	Not applicable	4-35

Impact	Level of Significance	Recommended Mitigation Measure(s)	Level of Significance after Mitigation	Page Number in the Draft SEIS/REIR
WATER QUALITY				
Five Dam Removal Alternative (Proposed Action)				
Impact 4.4-3. Potential reduction in beneficial uses of waters used at MLTF and Darrah Springs State Fish Hatchery.	Significant	Same mitigation measure as recommended for Impact 4.1-8 for the Jeffcoat and Willow Springs MLTF facilities and Asbury Diversion Dam.	Less than significant	4-37
Impact 4.4-4. Potential reduction in beneficial uses of California waters from the distribution of infected MLTF and Darrah Springs State Fish Hatchery fish.	Significant	Same mitigation measure as recommended for Impact 4.1-8 for the Jeffcoat and Willow Springs MLTF facilities and Asbury Diversion Dam.	Less than significant	4-39
No Dam Removal Alternative				
Impact 4.4-10. Potential reduction in beneficial uses of waters used at MLTF and Darrah Springs State Fish Hatchery (similar to Impact 4.4-3).	Significant	Same mitigation measure as recommended for Impact 4.1-8 for the Jeffcoat and Willow Springs MLTF facilities and Asbury Diversion Dam.	Less than significant	4-40
Impact 4.4-11. Potential reduction in beneficial uses of California waters from the distribution of infected MLTF and Darrah Springs State Fish Hatchery fish (similar to Impact 4.4-4).	Significant	Same mitigation measure as recommended for Impact 4.1-8 for the Jeffcoat and Willow Springs MLTF facilities and Asbury Diversion Dam.	Less than significant	4-40
Six Dam Removal Alternative				
Impact 4.4-14. Potential reduction in beneficial uses of waters used at MLTF (similar to Impact 4.4-3).	Significant	Same mitigation measure as recommended for Impact 4.1-8 for the Willow Springs MLTF facility and Asbury Diversion Dam.	Less than significant	4-40
Impact 4.4-15. Potential reduction in beneficial uses of California waters from the distribution of infected MLTF fish (similar to Impact 4.4-4).	Significant	Same mitigation measure as recommended for Impact 4.1-8 for the Willow Springs MLTF facility and Asbury Diversion Dam.	Less than significant	4-41

Impact	Level of Significance	Recommended Mitigation Measure(s)	Level of Significance after Mitigation	Page Number in the Draft SEIS/REIR
Three Dam Removal Alternative				
Impact 4.4-21. Potential reduction in beneficial uses of waters used at MLTF (similar to Impact 4.4-3).	Significant	Same mitigation measure as recommended for Impact 4.1-8 for the Willow Springs MLTF facility and Asbury Diversion Dam.	Less than significant	4-41
Impact 4.4-22. Potential reduction in beneficial uses of California waters from the distribution of infected MLTF fish (similar to Impact 4.4-4).	Significant	Same mitigation measure as recommended for Impact 4.1-8 for the Willow Springs MLTF facility and Asbury Diversion Dam.	Less than significant	4-41
AESTHETICS				
Five Dam Removal Alternative (Proposed Action)				
Impact 4.8-4. Potential reduction in scenic resources visible from canals caused by closure of PG&E canals.	Less than significant	None.	Not applicable	4-43
Impact 4.8-5. Temporarily reduced scenic resources along the Eagle Canyon Canal as a result of construction of Eagle Canyon pipeline.	Less than significant	None.	Not applicable	4-44
No Dam Removal Alternative				
Impact 4.8-9. Potential reduction in scenic resources visible from canals caused by closure of PG&E canals	Less than significant	None.	Not applicable	4-44
Impact 4.8-10. Temporarily reduced scenic resources along the Eagle Canyon Canal as a result of construction of Eagle Canyon pipeline (similar to Impact 4.8-5).	Less than significant	None.	Not applicable	4-44
Six Dam Removal Alternative				
Impact 4.8-14. Potential reduction in scenic resources visible from canals caused by closure of PG&E canals (similar to Impact 4.8-4).	Less than significant	None.	Not applicable	4-45

Impact	Level of Significance	Recommended Mitigation Measure(s)	Level of Significance after Mitigation	Page Number in the Draft SEIS/REIR
Three Dam Removal Alternative				
Impact 4.8-19. Potential reduction in scenic resources visible from canals caused by closure of PG&E canals s (similar to Impact 4.8-4).	Less than significant	None.	Not applicable	4-45
CULTURAL RESOURCES				
Five Dam Removal Alternative (Proposed Action)				
Impact 4.15-4. Potential impact on cultural resources at the Jeffcoat aquaculture facility.	Significant	Reclamation will consult with the SHPO and the Advisory Council on Historic Preservation and any other consulting parties in the Section 106 review process. An MOA will be developed between Reclamation, the SHPO, and any identified consulting parties if eligible cultural resources would be adversely affected by the proposed undertaking. The MOA will describe methods to mitigate the adverse effects. Mitigation measures may include data recovery excavations and avoidance through project design.	Less than significant	47
No Dam Removal Alternative				
Impact 4.15-7. Potential impact on cultural resources at the Jeffcoat aquaculture facility (similar to Impact 4.15-4).	Significant	Same mitigation measure as recommended for Impact 4.15-4 for the Willow Springs facility and Asbury Diversion Dam.	Less than significant	48
Six Dam Removal Alternative				
New cultural resources were not identified at the sites applicable to the Six Dam Removal Alternative.	Not applicable	None.	Not applicable	Not applicable
Three Dam Removal Alternative				
New cultural resources were not identified at the sites applicable to the Three Dam Removal Alternative.	Not applicable	None.	Not applicable	Not applicable

Impact	Level of Significance	Recommended Mitigation Measure(s)	Level of Significance after Mitigation	Page Number in the Draft SEIS/REIR
OTHER NEPA ANALYSES				
SOCIOECONOMICS				
Five Dam Removal Alternative (Proposed Action)				
Effect 4.16-5. Potential socioeconomic risk to MLTF fish marketing program.	Not applicable	Implementing the mitigation measures recommended for Impact 4.1-8 for the Jeffcoat and Willow Springs facilities will address socioeconomic effects on MLTF's fish marketing program.	Not applicable	4-55
Effect 4.16-6. Potential construction-related loss in revenue at Oasis Springs Lodge.	Not applicable	Measures developed in consultation with the lodge operators may be implemented to further reduce socioeconomic effects associated with construction-related activities near Oasis Springs Lodge.	Not applicable	4-56
Effect 4.16-7. Potential long-term loss in revenue at Oasis Springs Lodge.	Not applicable	None.	Not applicable	4-56
No Dam Removal Alternative				
Effect 4.16-10. Potential socioeconomic risk to MLTF fish marketing program (similar to Effect 4.16-5).	Not applicable	Same mitigation measures as recommended for Impact 4.1-8 for the Jeffcoat and Willow Springs facilities	Not applicable	4-58
Effect 4.16-11. Potential construction-related loss in revenue at Oasis Springs Lodge (similar to Effect 4.16-6).	Not applicable	Same measure as recommended for Effect 4.16-6.	Not applicable	4-58
Effect 4.16-12. Potential long-term loss in revenue at Oasis Springs Lodge (similar to Effect 4.16-7).	Not applicable	None.	Not applicable	4-58

Impact	Level of Significance	Recommended Mitigation Measure(s)	Level of Significance after Mitigation	Page Number in the Draft SEIS/REIR
Six Dam Removal Alternative				
Effect 4.16-15. Potential socioeconomic risk to MLTF fish marketing program (similar to Effect 4.16-5).	Not applicable	Same mitigation measures as recommended for Impact 4.1-8 for the Willow Springs facility.	Not applicable	4-58
Effect 4.16-16. Potential construction-related loss in revenue at Oasis Springs Lodge (similar to Effect 4.16-6).	Not applicable	Same measure as recommended for Effect 4.16-6.	Not applicable	4-59
Effect 4.16-17. Potential long-term loss in revenue at Oasis Springs Lodge (similar to Effect 4.16-7).	Not applicable	None.	Not applicable	4-59
Three Dam Removal Alternative				
Effect 4.16-20. Potential socioeconomic risk to MLTF fish marketing program (similar to Effect 4.16-5).	Not applicable	Same mitigation measures as recommended for Impact 4.1-8 for the Willow Springs facility.	Not applicable	4-59
Effect 4.16-21. Potential construction-related loss in revenue at Oasis Springs Lodge (similar to Effect 4.16-6).	Not applicable	Same measure as recommended for Effect 4.16-6.	Not applicable	4-60
Effect 4.16-22. Potential long-term loss in revenue at Oasis Springs Lodge (similar to Effect 4.16-7).	Not applicable	None.	Not applicable	4-60

Notes:

Draft SEIS/REIR = Draft Supplemental Environmental Impact Statement/Revised Environmental Impact Report.

MLTF = Mount Lassen Trout Farm.

PG&E = Pacific Gas and Electric Company.

Table 7-2. Comparison of Benefits and Impacts Associated with Each Action Alternative[1]

Impact/Effect	Five Dam Removal Alternative	No Dam Removal Alternative	Six Dam Removal Alternative	Three Dam Removal Alternative
Section 4.1, Fish				
Draft EIS/EIR				
Increased survival of adults and increased spawning success because removal of five dams and the construction of more reliable, effective fish ladders would facilitate passage of Chinook salmon and steelhead (migration habitat).	Impact 4.1-14 Beneficial		Impact 4.1-48 Beneficial	Impact 4.1-66 Beneficial
The construction of more effective fish ladders on North Battle Creek Feeder, Eagle Canyon, Wildcat, South, Inskip, and Coleman Diversion Dams would facilitate passage of Chinook salmon and steelhead, which would increase survival of adults and increase spawning success.		Impact 4.1-31 Beneficial		
Potentially increased spawning success and fry production because separating the powerhouse water discharge from the normal stream channel would facilitate the return of adult Chinook salmon and steelhead to natal spawning habitat in South Fork and North Fork Battle Creek (migration and habitat stability).	Impact 4.1-15 Beneficial		Impact 4.1-49 Beneficial	Impact 4.1-67 Beneficial
Substantially increased survival of juvenile steelhead and Chinook salmon during downstream movement and migration as a result of eliminating some diversions and constructing fish screens at the remaining diversions from North Fork and South Fork Battle Creek (entrainment).	Impact 4.1-16 Beneficial		Impact 4.1-50 Beneficial	Impact 4.1-68 Beneficial
Constructing fish screens at the remaining diversions from North Fork and South Fork Battle Creek would substantially increase the survival of juvenile steelhead and Chinook salmon during downstream movement and migration.		Impact 4.1-32 Beneficial		
Reduction of predation-related mortality as a result of removing dams and improving fish ladders (predation, pathogens, and food).	Impact 4.1-17 Beneficial		Impact 4.1-52 Beneficial	Impact 4.1-69 Beneficial
Reduction of predation-related mortality as a result of improving fish ladders (predation, pathogens, and food).		Impact 4.1-33 Beneficial		

[1] This table lists only those impacts that are different among the alternatives. Impacts that are shared by all alternatives are not listed in this table.

Impact/Effect	Five Dam Removal Alternative	No Dam Removal Alternative	Six Dam Removal Alternative	Three Dam Removal Alternative
Substantially increased production of food for fish resulting from increased minimum instream flows (predation, pathogens, and food).	Impact 4.1-18 Beneficial	Impact 4.1-34 Beneficial	Impact 4.1-51 Beneficial	Impact 4.1-70 Beneficial
Supplemental EIS/Revised EIR				
None identified				
Section 4.2, Botanical, Wetland, and Wildlife Resources				
Draft EIS/EIR				
Substantial increase in quantity of bat roosting habitat in the South Canal tunnels due to termination of water flow through the tunnels.	Impact 4.2-15 Beneficial		Impact 4.2-42 Beneficial	
Supplemental EIS/Revised EIR				
None identified				
Section 4.3, Hydrology				
Draft EIS/EIR				
Coleman Diversion Dam removal could reduce the 10-, 25-, and 50-year floodwater surface profiles at Inskip Powerhouse.	Impact 4.3-2 Beneficial		Impact 4.3-6 Beneficial	Impact 4.3-8 Beneficial
Supplemental EIS/Revised EIR				
None identified				
Total number of beneficial impacts from each alternative	**7**	**4**	**7**	**6**

Impact/Effect	Five Dam Removal Alternative	No Dam Removal Alternative	Six Dam Removal Alternative	Three Dam Removal Alternative
Section 4.1, Fish				
Draft EIS/EIR				
Mortality of fish eggs and larvae and reduced reproductive success of fish and other aquatic species as a result of removing South, Coleman, and Eagle Canyon Diversion Dams, which would release currently stored fine sediment to the stream channel.	Impact 4.1-3 Significant *(Coleman and South Diversion Dams)*		Impact 4.1-37 Significant *(Eagle Canyon, Coleman, and South Diversion Dams)*	Impact 4.1-55 Significant *(Eagle Canyon and Coleman Diversion Dams)*
Supplemental EIS/Revised EIR				
Increased risk of a serious or catastrophic fish disease spreading from Battle Creek to fish communities throughout the state through stocking with MLTF and Darrah Springs State Fish Hatchery fish. *Note: Mitigation at the Jeffcoat mitigation site is not required for the Six Dam Removal and Three Dam Removal Alternatives.*	Impact 4.1-8 Significant *(Jeffcoat, Willow Springs, and Asbury Diversion Dam)*	Impact 4.1-28 Significant *(Jeffcoat, Willow Springs, and Asbury Diversion Dam)*	Impact 4.1-47 Significant *(Willow Springs and Asbury Diversion Dam)*	Impact 4.1-68 Significant *(Willow Springs and Asbury Diversion Dam)*
Section 4.2, Wildlife Resources				
Draft EIS/EIR				
Potential disturbance or loss of woody riparian vegetation and associated wildlife habitat[2].	Impact 4.2-1 Significant *(7.2 acres)*	Impact 4.2-16 Significant *(4.1 acres)*	Impact 4.2-28 Significant *(7.2 acres)*	Impact 4.2-43 Significant *(6.0 acres)*
Potential disturbance of breeding habitat for yellow-breasted chat and little willow flycatcher. *Note: Breeding habitat for little willow flycatcher would not be affected under the Three Dam Removal Alternative.*	Impact 4.2-8 Significant	Impact 4.2-23 Significant	Impact 4.2-35 Significant	Impact 4.2-50 Significant *(only yellow-breasted chat)*
Potential loss or disturbance of waters of the United States (including wetlands)[3].	Impact 4.2-3 Significant *(12.1 acres)*	Impact 4.2-18 Significant *(11.6 acres)*	Impact 4.2-30 Significant *(12.1 acres)*	Impact 4.2-45 Significant *(11.6 acres)*

[2] Acreage values listed here for affected habitat were calculated for the July 2003 Draft EIS/EIR; acreage values will be updated for the Final EIS/EIR.

Table 7-2. Continued

Impact/Effect	Five Dam Removal Alternative	No Dam Removal Alternative	Six Dam Removal Alternative	Three Dam Removal Alternative
Supplemental EIS/Revised EIR				
Possible loss of woody riparian vegetation along PG&E canals.	Impact 4.2-13 Less than significant *(includes Wildcat, South, and a portion of Eagle Canyon Canals)*	Impact 4.2-32 Less than significant *(includes a portion of Eagle Canyon Canal)*	Impact 4.2-49 Less than significant *(includes Wildcat, South, and Eagle Canyon Canals)*	Impact 4.2-68 Less than significant *(includes Wildcat and Eagle Canyon Canals)*
Section 4.3, Hydrology				
Draft EIS/EIR				
Removal of Eagle Canyon Diversion Dam could result in minor increases to downstream bed elevations.			Impact 4.3-4 Less than significant	Impact 4.3-7 Less than significant[4]
Supplemental EIS/Revised EIR				
None identified				
Section 4.4, Water Quality				
Draft EIS/EIR				
Removal of South and Coleman Diversion Dams could cause erosion of minor amounts of sediment from behind the dam.	Impact 4.4-3 Less than significant		Impact 4.4-10 Less than significant	Impact 4.4-15 Less than significant *(only Coleman Diversion Dam)*
Minor amounts of sediment released by the removal of Coleman Diversion Dam would be deposited at the County Road Bridge.	Impact 4.4-4 Less than significant		Impact 4.4-11 Less than significant	Impact 4.4-16 Less than significant

[3] Acreage values listed here for affected waters of the United States were calculated for the July 2003 Draft EIS/EIR; acreage values will be updated for the Final EIS/EIR.

[4] This impact was unintentionally left out of the 2003 Draft EIS/EIR and will be included in the Final EIS/EIR. This impact is similar to Impact 4.3-4 as discussed in the 2003 Draft EIS/EIR.

Impact/Effect	Five Dam Removal Alternative	No Dam Removal Alternative	Six Dam Removal Alternative	Three Dam Removal Alternative
Short-term increased turbidity and settleable material load on the Coleman National Fish Hatchery water treatment plant as a result of removing Coleman Diversion Dam.	Impact 4.4-5 Less than significant		Impact 4.4-12 Less than significant	Impact 4.4-17 Less than significant
Supplemental EIS/Revised EIR				
None identified				
Section 4.8, Visual Resources				
Draft EIS/EIR				
Construction of the channel with armoring or revetment would alter views of the South Fork creek bank.				Impact 4.8-11 Significant and unavoidable
Supplemental EIS/Revised EIR				
Potential reduction in scenic resources visible from canals caused by closure of PG&E canals.	Impact 4.8-4 Less than significant *(Includes Wildcat, South, and a portion of Eagle Canyon Canals)*	Impact 4.8-9 Less than significant *(Includes a portion of Eagle Canyon Canal)*	Impact 4.8-14 Less than significant *(Includes Wildcat, South, and Eagle Canyon Canals)*	Impact 4.8-18 Less than significant *(Includes Wildcat, South, and Eagle Canyon Canals)*
Temporarily reduced scenic resources along the Eagle Canyon Canal as a result of construction of Eagle Canyon pipeline.	Impact 4.8-5 Less than significant	Impact 4.8-10 Less than significant		
Section 4.15, Cultural Resources				
Draft EIS/EIR				
Removal of historic properties.	Impact 4.15-1 Significant and unavoidable		Impact 4.15-6 Significant and unavoidable	Impact 4.15-9 Significant and unavoidable

Impact/Effect	Five Dam Removal Alternative	No Dam Removal Alternative	Six Dam Removal Alternative	Three Dam Removal Alternative
Supplemental EIS/Revised EIR				
Potential impact on cultural resources at the Jeffcoat aquaculture facility.	Impact 4.15-4 Significant	Impact 4.15-7 Significant		
Section 4.16, Other NEPA Analyses				
Draft EIS/EIR				
Power Generation and Economics: Increased cost of project power[5].	Effect 4.16-1 *($3.6 million)*	Effect 4.16-2 *($2.2 million)*	Effect 4.16-3 *($4.8 million)*	Effect 4.16-4 *($3.7 million)*
Supplemental EIS/Revised EIR				
Power Generation and Economics: Indirect environmental effects associated with the loss of hydropower and renewable replacement power.	Effect	Effect *(some degree of magnitude less than the Five Dam Removal Alternative)*	Effect *(some degree of magnitude greater than the Five Dam Removal Alternative)*	Effect *(some degree of magnitude less than the Five Dam Removal Alternative)*
Socioeconomics: Potential socioeconomic risk to MLTF fish marketing program.	Effect 4.16-5	Effect 4.16-10	Effect 4.16-15 *(some degree of magnitude less than the Five Dam Removal Alternative)*	Effect 4.16-20 *(some degree of magnitude less than the Five Dam Removal Alternative)*
Total number of impacts under each alternative	**16**	**11**	**15**	**16**

[5] The cost information listed here was calculated for the July 2003 Draft EIS/EIR; the cost of project power will be updated for the Final EIS/EIR.

Water Quality

The No Action Alternative would not affect water quality because the Hydroelectric Project would continue to operate consistent with the current FERC license agreement. The temperature regime of Battle Creek under the No Action Alternative likely would not support anything more than remnant populations of coldwater habitat users, as described in the Restoration Project purpose and need, except for fall-run Chinook salmon.

In contrast, the Proposed Action would improve coldwater habitat and fish passage conditions and thereby support steelhead, spring-run Chinook salmon, and winter-run Chinook salmon.

Groundwater

The No Action Alternative would not affect groundwater: groundwater conditions in the Restoration Project would continue as they have historically, and there would be no impact on groundwater resources. The No Action Alternative would not have the potential for hazardous spills to occur from construction.

Land Use

The No Action Alternative would not result in the conversion of land away from open space and other current uses.

Geology and Soils

The No Action Alternative would not result in changes to geology or soils. The No Action Alternative would avoid impacts from erosion or falling rock hazards.

Aesthetics and Visual Resources

The No Action Alternative would avoid the visual impacts associated with construction of fish facilities, removal of existing diversion dams, construction of the Eagle Canyon pipeline, and closure of the Wildcat and South Canals. The No Action Alternative would also avoid the significant and unavoidable aesthetic impacts to Oasis Springs Lodge and Rocky Springs Ranch associated with the improvements to the South Powerhouse and Inskip Diversion Dam facilities.

Transportation

The No Action Alternative would not result in changes to current transportation facilities.

The Proposed Action would result in impacts on traffic, roads, and emergency vehicle passage, but these impacts are considered less than significant.

Noise

The No Action Alternative would avoid significant noise and vibration impacts associated with short-term construction-related activities and truck traffic.

Air Quality

The No Action Alternative would avoid construction-related air quality impacts associated with construction equipment and construction activities.

Public Health and Safety

The No Action Alternative would not result in impacts on public health and safety beyond those already anticipated as part of the current operations of the existing facilities. The No Action Alternative would avoid impacts:

- on construction workers and the general public from increased risk of exposure to hazardous materials from construction-related activities,
- on the public from increased vehicle traffic along access roads, and
- on the public from potentially increased mosquito breeding grounds created as a result of dewatering at various restoration sites.

Public Services and Utilities

The No Action Alternative would avoid impacts on public services and utilities associated with temporary, construction-related increase in the demands on police, fire, and emergency vehicle operators.

Recreation

The No Action Alternative would avoid the significant and unavoidable impact on the loss of recreational activities at the Oasis Springs Lodge. In addition, the No Action Alternative would generally avoid the temporary impacts on recreational opportunities along Battle Creek.

Cultural Resources

The No Action Alternative would avoid the significant and unavoidable impact associated with the removal of historic dams, including Wildcat and Coleman Diversion Dams. In addition, the No Action Alternative would avoid impacts on the cultural resources at Eagle Canyon and Inskip Diversion Dam and would avoid the potential to damage archeological deposits as a result of vehicular traffic during construction.

Other NEPA Analyses

Power Generation and Economics

The No Action Alternative would not result in change to the production of hydroelectric power by the Hydroelectric Project and, therefore, would not result in any indirect environmental impacts from securing replacement energy.

The Proposed Action would result in a power production loss of approximately 30%, which may be replaced by a renewable resource such as wind power. Environmental impacts typically associated with wind power production include impacts to biological resources (particularly raptors), aesthetics and visual resources, and noise.

Socioeconomics

The No Action Alternative would avoid the socioeconomic effects on the MLTF's fish marketing program caused by the potential spread of the IHN virus and on the Oasis Springs Lodge caused by short-term, construction-related activity. In addition, the No Action Alternative would not result in the slight socioeconomic benefits associated with increased sales and construction jobs in the region.

Proposed Action (Five Dam Removal Alternative) and No Dam Removal Alternative

Fish

The No Dam Removal Alternative would provide new fish screens and fish ladders at North Battle Creek Feeder, Eagle Canyon, Wildcat, South, Inskip, and Coleman Diversion Dams, which would provide improved fish passage conditions similar to those under the Proposed Action. However, the more secure passage benefits and complete absence of diversion-related effects provided by removal of Wildcat, South, and Coleman Diversion Dams under the Proposed Action would not occur under the No Dam Removal Alternative. In addition, under the No Dam Removal Alternative, no additional spawning and rearing habitat would occur in Soap, Ripley, and Baldwin Creeks, as under the Proposed Action.

Substantially greater production of Chinook salmon and steelhead would be expected under the No Dam Removal Alternative relative to the No Action Alternative; however, the No Dam Removal Alternative would not incorporate the additional flexibility provided by the higher flow requirements for the Proposed Action and future adaptive management of flow targets for habitat, fish passage, and water temperature considerations. In addition, powerhouse tailrace connectors and penstock bypass facilities would not be constructed to prevent the mixing of North Fork and South Fork Battle Creek flows.

Botanical, Wetland, and Wildlife Resources

Although the same construction impacts on biological resources would occur under either alternative, the No Dam Removal Alternative would generally result in less impact on biological resources from construction than the Proposed Action because the existing facilities would be upgraded rather than removed. The No Dam Removal Alternative would also avoid the loss of riparian habitat along Wildcat and South Canals caused by cessation of flows in these canals and would result in the loss of only approximately 4 acres of woody riparian vegetation (compared to the loss of approximately 7 acres under the Proposed Action). The No Dam Removal Alternative would also result in slightly less loss of waters of the United States (approximately 11.6 acres) compared to the Proposed Action (approximately 12.1 acres)[1]. However, the No Dam Removal Alternative would not provide the additional biological benefits associated with increased amphibian habitat from increased minimum instream flows or increased bat habitat from dewatering South Canal.

[1] The acreage calculations of affected riparian and wetland habitats will be updated for the Final EIS/EIR.

Hydrology

Under the No Dam Removal alternative, the minimum flow requirements (i.e., AFRP minimum flow requirements) below the diversion dams would be higher than the instream flows recommended for the No Action Alternative (i.e., FERC minimum flow requirements) but would be generally less than the instream flows recommended under the Proposed Action (i.e., MOU minimum flow requirements) (Section 4.3, Hydrology). The No Dam Removal Alternative also would not achieve the potential benefits of minimized flow fluctuations during canal and powerhouse outages that would be provided by connectors at South and Inskip Powerhouses and in the channel below Wildcat, South, and Coleman Diversion Dams.

Water Quality

Both the No Dam Alternative and Proposed Action would have short-term, construction-related sedimentation and erosion impacts, which would be mitigated to less-than-significant levels. The No Dam Removal Alternative would generally have a slightly lower impact to water quality because of relatively less construction activity because no dams would be removed under this alternative. In addition, the No Dam Removal Alternative would not have the benefits associated with reducing the 10-, 25-, and 50-year floodwater surface profiles at Inskip Powerhouse because the Coleman Diversion Dam would not be removed.

Groundwater

The No Dam Removal Alternative and the Proposed Action would have similar impacts on groundwater, although localized differences in impacts could occur on a temporary basis.

Land Use

The No Dam Removal Alternative and the Proposed Action would have similar impacts on land use, although localized differences could occur on a temporary basis.

Geology and Soils

The No Dam Removal Alternative and the Proposed Action would have similar impacts on geology and soils, although localized differences in impacts could occur on a temporary basis.

Aesthetics and Visual Resources

In general, the No Dam Removal Alternative and the Proposed Action would have similar impacts on aesthetics and visual resources; however, the No Dam Removal Alternative would avoid the visual impacts associated with ceasing flows in Wildcat and South Canals.

Transportation

The No Dam Removal Alternative and the Proposed Action would have similar impacts on transportation, although localized differences in impacts could occur on a temporary basis.

Noise

The No Dam Removal Alternative and the Proposed Action would have similar impacts on noise, although localized differences in impacts could occur on a temporary basis.

Air Quality

The No Dam Removal Alternative and the Proposed Action would have similar impacts on air quality, although localized differences in impacts could occur on a temporary basis.

Public Health and Safety

The No Dam Removal Alternative and the Proposed Action would have similar impacts on public health and safety, although localized differences in impacts could occur on a temporary basis.

Public Services and Utilities

The No Dam Removal Alternative and the Proposed Action would have similar impacts on public services and utilities, although localized differences in impacts could occur on a temporary basis.

Recreation

The No Dam Removal Alternative and the Proposed Action would have similar impacts on recreation, although localized differences in impacts could occur on a temporary basis.

Cultural Resource

The No Dam Removal Alternative would avoid the significant and unavoidable impact associated with the removal of historic dams, including Wildcat and Coleman Diversion Dams.

Other NEPA Analyses

Power Generation and Economics

The No Dam Removal Alternative would result in a reduction of hydropower produced by the Hydroelectric Project of approximately 17%, whereas the Proposed Action would result in a reduction of approximately 30%[2].

The No Dam Removal Alternative would also require the replacement of lost hydropower. The likely renewable resource to replace lost hydropower would be wind power. Environmental impacts typically associated with wind power production include impacts to biological resources (particularly raptors), aesthetics and visual resources, and noise. Compared to existing conditions, the No Dam Removal Alternative would require replacing less energy (approximately 40,000 MWh annually) than the Proposed Action (approximately 69,000 MWh annually). Therefore, although the indirect effects of securing replacement energy would be similar to the Proposed Action, it is likely that the magnitude of these effects would be less under the No Dam Removal Alternative.

[2] The information on power generation and economics as presented in Table 4.16-9 will be updated for the Final EIS/EIR.

Socioeconomics

The No Dam Removal Alternative and the Proposed Action would have similar impacts on socioeconomics.

Proposed Action (Five Dam Removal Alternative) and Six Dam Removal Alternative

Fish

The Six Dam Removal Alternative and the Proposed Action would generally result in similar Chinook salmon and steelhead production and overall benefits to fish and fish habitat. However, under the Six Dam Removal Alternative, Eagle Canyon Diversion Dam would be removed, which would potentially provide more secure passage benefits to fish in this reach. Removal of Eagle Canyon Diversion Dam would also result in a slightly greater impact on fish egg and larvae mortality than the Proposed Action because of the release of fine sediment from behind the dam.

Botanical, Wetland, and Wildlife Resources

The Six Dam Removal Alternative would generally result in slightly greater construction-related biological impacts than the Proposed Action. Improvements under the Six Dam Removal alternative would be the same as under the Proposed Action, except Eagle Canyon Diversion Dam and its appurtenant facilities would also be removed. Because the Eagle Canyon Canal would also be closed, the Six Dam Removal Alternative would result in more impacts from the loss of riparian habitat along the canal compared to the Proposed Action. The overall loss of riparian habitat, however, would be approximately 7 acres under the Six Dam Removal Alternative, which is similar to the Proposed Action. The loss of waters of the United States would be approximately 12 acres under the Six Dam Removal Alternative, which is the same as under the Proposed Action[3].

Closure of Eagle Canyon Canal under the Six Dam Removal Alternative would also cease the hydrologic connection between the Restoration Project and MLTF's Jeffcoat facilities. Mitigation to prevent the risk of spreading catastrophic anadromous fish disease would still need to be addressed at MLTF's Willow Springs facility and Darrah Springs Fish Hatchery. The mitigation described in Section 4.1 at the Jeffcoat site would not be needed under the Six Dam Removal Alternative. The Six Dam Removal Alternative would not have impacts related to implementing the mitigation at the Jeffcoat site.

[3] The acreage calculations of the affected riparian and wetland habitats will be updated for the Final EIS/EIR.

Hydrology

The Six Dam Removal Alternative and the Proposed Action would result in similar impacts on hydrology. Although there is an additional impact associated with the removal of Eagle Canyon Dam from minor increases in downstream bed elevations, this impact is considered less than significant.

Water Quality

Both the Six Dam Removal Alternative and the Proposed Action would result in short-term, construction-related sedimentation and erosion impacts, which would be mitigated to less-than-significant levels. The Six Dam Removal Alternative, however, would generally have slightly greater impact to water quality because of slightly greater construction and dam removal activity under this alternative.

Groundwater

The Six Dam Removal Alternative and the Proposed Action would result in similar impacts on groundwater.

Land Use

The Six Dam Removal Alternative and the Proposed Action would result in similar impacts on land use.

Geology and Soils

The Six Dam Removal Alternative and the Proposed Action would result in similar impacts on geology and soils.

Aesthetics and Visual Resources

The Six Dam Removal Alternative and the Proposed Action would result in similar impacts on aesthetics and visual resources. The Six Dam Removal Alternative would avoid the temporary visual impact from constructing Eagle Canyon pipeline; however, this impact is considered less than significant under the Proposed Action.

Transportation

The Six Dam Removal Alternative and the Proposed Action would result in similar impacts on transportation.

Noise

The Six Dam Removal Alternative and the Proposed Action would result in similar impacts on noise, although potentially greater noise impacts could result from the blasting and removal of Eagle Canyon Diversion Dam under the Six Dam Removal Alternative.

Air Quality

The Six Dam Removal Alternative and the Proposed Action would result in similar impacts on air quality, although potentially greater air quality impacts could result from the removal of Eagle Canyon Diversion Dam under the Six Dam Removal Alternative.

Public Health and Safety

The Six Dam Removal Alternative and the Proposed Action would result in similar impacts on public health and safety.

Public Services and Utilities

The Six Dam Removal Alternative and the Proposed Action would result in similar impacts on public services and utilities.

Recreation

The Six Dam Removal Alternative and the Proposed Action would result in similar impacts on recreation.

Cultural Resource

The Six Dam Removal Alternative would have slightly greater impacts on historic dams on Battle Creek than the Proposed Action because Eagle Canyon

Diversion Dam would be removed, in addition to Wildcat and Coleman Diversion Dams.

Other NEPA Analyses

Power Generation and Economics

The Six Dam Removal Alternative would result in a reduction of hydropower produced by the Hydroelectric Project of approximately 41%, whereas the Proposed Action would result in reduction of approximately 30%[4].

The Six Dam Removal Alternative would also require the replacement of lost hydropower. The likely renewable resource to replace lost hydropower would be wind power. Environmental impacts typically associated with wind power production include impacts to biological resources (particularly raptors), aesthetics and visual resources, and noise. Compared to existing conditions, the Six Dam Removal Alternative would require replacing more energy (approximately 94,000 MWh annually) than the Proposed Action (approximately 69,000 MWh annually). Therefore, although the indirect effects of securing replacement energy would be similar to the Proposed Action, it is likely that the magnitude of these effects would be greater under the Six Dam Removal Alternative.

Socioeconomics

Although the mitigation measure at the Jeffcoat site would not be needed because of the closure of Eagle Canyon Canal, the Six Dam Removal Alternative would nevertheless result in a socioeconomic effect on MLTF because of the risk to their fish marketing program from the potential spread of catastrophic anadromous fish diseases at the Willow Springs facility. Otherwise, socioeconomic effects associated with the Six Dam Removal Alternative and the Proposed Action are similar.

Proposed Action (Five Dam Removal Alternative) and Three Dam Removal Alternative

Fish

The Three Dam Removal Alternative would provide new fish screens and fish ladders at North Battle Creek Feeder, South, and Inskip Diversion Dams and

[4] The information on power generation and economics as presented in Table 4.16-9 will be updated for the Final EIS/EIR.

would remove Coleman, Wildcat, and Eagle Canyon Diversion Dams. The more secure passage benefits and complete absence of diversion-related effects provided by the removal of South Diversion Dam under the Proposed Action would not be realized under the Three Dam Removal Alternative. However, Eagle Canyon Diversion Dam would be removed under the Three Dam Removal Alternative, potentially providing more secure passage benefits because of the complete absence of diversion-related effects.

The Three Dam Removal Alternative would not incorporate the additional flexibility provided by the higher flow requirements for the Proposed Action and future adaptive management of flow targets for habitat, fish passage, and water temperature considerations. The Three Dam Removal Alternative would also maintain No Action conditions in Soap and Ripley Creeks. As a result, the Three Dam Removal Alternative would not provide the additional spawning and rearing habitat that would occur in Soap and Ripley Creeks under the Proposed Action.

Botanical, Wetland, and Wildlife Resources

Although the Three Dam Removal Alternative would result in the same type of significant construction-related impacts on biological resources as the Proposed Action, the Three Dam Removal Alternative would generally result in less construction-related impacts because this alternative would not involve removing South, Soap Creek Feeder, or Lower Ripley Creek Feeder Diversion Dams and would not involve construction of the Inskip Powerhouse bypass facility. Compared to the Proposed Action, the Three Dam Removal Alternative would avoid the loss of riparian habitat associated with ceasing flows in South Canal but would involve the loss of riparian habitat associated with ceasing flows in Wildcat and Eagle Canyon Canals. The Three Dam Removal Alternative would not provide the additional biological benefits associated with increasing bat habitat from dewatering the South Canal. The Three Dam Removal Alternative would result in the loss of slightly less riparian habitat (approximately 6 acres) compared to the Proposed Action (approximately 7 acres). Additionally, the Three Dam Removal Alternative would result in the loss of approximately 11.6 acres of waters of the United States compared to 12.1 acres under the Proposed Action[5].

Similar to the Six Dam Removal Alternative, this alternative would not require the mitigation proposed under the Proposed Action at the Jeffcoat site because the Eagle Diversion Dam would be removed and flows in Eagle Canyon Canal would cease.

[5] The acreage calculations of the affected riparian and wetland habitats will be updated for the Final EIS/EIR.

Hydrology

The Three Dam Removal Alternative would realize the potential benefits of minimized flow fluctuations during canal and powerhouse outages that would be provided by connectors at South and Inskip Powerhouses and in the stream channel below Wildcat, Eagle Canyon, and Coleman Diversion Dams. The absence of an absolute connector and bypass facility at Inskip Powerhouse, however, could result in benefits less than those realized by minimum instream flow requirements and water temperature fluctuations under the Proposed Action. The minimum flow requirements (i.e., AFRP minimum flow requirements) below the diversion dams would be higher than the instream flows for the No Action Alternative (i.e., FERC minimum flow requirements) but would be generally less than the instream flows recommended under the Proposed Action (i.e., MOU minimum flow requirements).

Water Quality

Both the Three Dam Removal Alternative and the Proposed Action would have short-term construction-related sedimentation and erosion impacts, which would be mitigated to less-than-significant levels. The Three Dam Removal Alternative, however, would generally have slightly less relative impact to water quality because of less construction and dam removal activity under this alternative.

Groundwater

The Three Dam Removal Alternative and the Proposed Action would result in similar impacts on groundwater, although impacts would occur only at the facilities proposed to be improved under the Three Dam Removal Alternative.

Land Use

The Three Dam Removal Alternative and the Proposed Action would result in similar impacts on land use, although impacts would occur only at the facilities proposed to be improved under this alternative.

Geology and Soils

The and the Proposed Action would result in similar impacts on geology and soils, although impacts would occur only at the facilities proposed to be improved under the Three Dam Removal Alternative.

Aesthetics and Visual Resources

The Three Dam Removal Alternative and the Proposed Action would result in similar impacts on aesthetics and visual resources, except that the Three Dam Removal Alternative would also result in an additional significant and unavoidable impact from construction of armoring or revetment within the South Fork Battle Creek channel for the open tailrace connector between the South Powerhouse and the Inskip Canal.

Transportation

The Three Dam Removal Alternative and the Proposed Action would result in similar impacts on transportation, although impacts would occur only at the facilities proposed to be improved under the Three Dam Removal Alternative.

Noise

The Three Dam Removal Alternative and the Proposed Action would result in similar impacts on noise, although impacts would occur only at the facilities proposed to be improved under the Three Dam Removal Alternative.

Air Quality

The Three Dam Removal Alternative and the Proposed Action would result in similar impacts on air quality, although impacts would occur only at the facilities proposed to be improved under the Three Dam Removal Alternative.

Public Health and Safety

The Three Dam Removal Alternative and the Proposed Action would result in similar impacts on public health and safety, although impacts would occur only at the facilities proposed to be improved under the Three Dam Removal Alternative.

Public Services and Utilities

The Three Dam Removal Alternative and the Proposed Action would result in similar impacts on public services and utilities, although impacts would occur only at the facilities proposed to be improved under the Three Dam Removal Alternative.

Recreation

The Three Dam Removal Alternative and the Proposed Action would result in similar impacts on recreation, although impacts would occur only at the facilities proposed to be improved under the Three Dam Removal Alternative.

Cultural Resource

The Three Dam Removal Alternative would have slightly greater impacts on historic dams on Battle Creek than the Proposed Action because Eagle Canyon Diversion Dam would be removed, in addition to Wildcat and Coleman Diversion Dams.

Other NEPA Analyses

Power Generation and Economics

The Three Dam Removal Alternative would result in a reduction of hydropower produced by the Hydroelectric Project of approximately 31%, whereas the Proposed Action would result in a reduction of approximately 30%[6].

The Three Dam Removal Alternative would also require the replacement of lost hydropower. The likely renewable resource to replace lost hydropower would be wind power. Environmental impacts typically associated with wind power production include impacts to biological resources (particularly raptors), aesthetics and visual resources, and noise. Compared to existing conditions, the Three Dam Removal Alternative would require replacing slightly less energy (approximately 71,000 MWh annually) than the Proposed Action (approximately 69,000 MWh annually). Therefore, although the indirect effects of securing replacement energy would be similar to the Proposed Action, it is likely that the magnitude of these effects would be less under the Three Dam Removal Alternative.

Socioeconomics

Although the mitigation measure at the Jeffcoat site would not be needed because of the closure of Eagle Canyon Canal, the Three Dam Removal Alternative would nevertheless result in a socioeconomic effect on MLTF because of the risk to their fish marketing program from the potential spread of catastrophic anadromous fish diseases to the Willow Springs facility. Otherwise, the

[6] The information on power generation and economics as presented in Table 4.16-9 will be updated for the Final EIS/EIR.

socioeconomic effects associated with the Three Dam Removal Alternative and the Proposed Action are similar.

Environmentally Preferred Alternative

According to Reclamation's NEPA Handbook, the alternative or alternatives considered to be environmentally preferred should be specified in an EIS. The *environmentally preferred alternative* under NEPA is defined as "the alternative that will promote the national environmental policy as expressed in NEPA's Section 101." Ordinarily, the environmentally preferred alternative refers to the alternative that causes the least damage to the physical environment; it also refers to the alternative that best protects, preserves, and enhances historic, cultural, and natural resources. It is implicit in NEPA that the environmentally preferred alternative is a reasonable and feasible alternative.

Section 15126.6(e) of the State CEQA Guidelines also requires the state lead agency (State Water Board) to identify the environmentally superior alternative. If the No Action Alternative is also the environmentally superior alternative, the EIR will also identify an environmentally superior alternative from among the other alternatives.

In this EIS/EIR for the Restoration Project, the environmentally superior alternative is referred to as the *environmentally preferred* alternative (NEPA terminology).

In addition to the No Action Alternative, four alternatives are considered for the Restoration Project: the Five Dam Removal Alternative (the Proposed Action), No Dam Removal Alternative, Six Dam Removal Alternative, and the Three Dam Removal Alternative. Table 7-2 presents those environmental impacts that are different among the alternatives. Impacts that are shared by all alternatives are not listed in this table.

Based on the comparison presented in Table 7-2, both the Five Dam Removal (Proposed Action) and Six Dam Removal Alternatives would result in the greatest number of beneficial effects among all the alternatives. The Five Dam and Six Dam Removal Alternatives would have more benefits to fish, amphibians, and riparian species than the other alternatives. In addition, decommissioning South Canal under the Five Dam Removal and Six Dam Removal Alternatives would provide potential habitat in the canal tunnels for special-status bat species. Improvements under both alternatives would substantially improve the reliability and effectiveness of upstream and downstream fish passage. In addition, powerhouse tailrace connectors are proposed under the Five Dam Removal and Six Dam Removal Alternatives. These connectors would prevent North Fork Battle Creek water from mixing

with South Fork Battle Creek water, which would prevent false attraction of anadromous fish to South Fork Battle Creek.

The Five Dam Removal (Proposed Action) and Six Dam Removal Alternatives would also result in similar environmental impacts. However, one difference between the two alternatives is that the Five Dam Removal Alternative would include environmental impacts associated with the mitigation that is proposed for the MLTF Jeffcoat site. Implementing mitigation at the Jeffcoat site would result in additional significant impacts associated with the potential disturbance to or the loss of habitat for special-status species, including valley elderberry longhorn beetle, California red-legged frog, foothill yellow-legged frog, northwester pond turtle, and California black rail. Additionally, mitigation at Jeffcoat would affect waters of the United States and sensitive plant communities and associated wildlife habitats (e.g., riparian forest and scrub plant community). Impacts associated with erosion, noise, air quality, and general public health and safely may also occur as a result of implementing the mitigation proposed for the Jeffcoat site. As described in this document, measures will be implemented to mitigate these significant impacts.

With respect to cultural resources, Eagle Canyon Diversion Dam, which was determined to be eligible for inclusion in the National Register of Historic Places (NRHP) in the Draft EIS/EIR (Jones & Stokes 2003), would be removed under the Six Dam Removal Alternative; however, the dam would not be removed under the Five Dam Removal Alternative. Conversely, mitigation activities proposed at the Jeffcoat site under the Five Dam Removal Alternative could potentially disturb historic-era cultural resources and archeological sites, if these sites are found to be eligible and cannot be avoided.

Both the Five Dam Removal Alternative and the Six Dam Removal Alternative would also require replacing lost hydropower with a renewable resource. The likely renewable resource to replace lost hydropower would be wind power. Environmental impacts typically associated with wind power production include impacts to biological resources (particularly raptors), aesthetics and visual resources, and noise (see Power Generation and Economics in Section 4.16, Other NEPA Analyses). Because more hydropower is lost under the Six Dam Removal Alternative compared to the Five Dam Removal Alternative (Table 4.16-9), environmental impacts associated with replacement power under the Six Dam Removal Alternative would also be of greater magnitude than under the Five Dam Removal Alternative. However, these impacts are difficult to quantify because not enough information is known about where the windfarm would be located, how the wind turbines would be designed, and how long the wind turbines would be in operation.

In relation to power generation, the annual power benefits associated with the Five Dam Removal Alternative would be greater than the increased annual total and going-forward cost of Hydroelectric Project power (Section 4.16, Other NEPA Analyses in the Draft EIS/EIR [Jones & Stokes 2003]). The No Dam

Removal, Six Dam Removal, and Three Dam Removal Alternatives would have greater project costs and fewer power generation benefits.

In summary, the Six Dam Removal Alternative and the Five Dam Removal Alternative are nearly equal because they both have the most environmental benefits and a similar number of impacts compared to the other Action Alternatives. The main difference between the Five Dam Removal and Six Dam Removal Alternatives is that the Five Dam Removal Alternative would result in additional significant impacts to the physical environment associated with the Jeffcoat mitigation site. Although the Six Dam Removal Alternative would result in indirect environmental impacts associated with replacement power at a greater magnitude compared to the Five Dam Removal Alternative, the magnitude of difference between the two alternatives is difficult to quantify. For these reasons, the Six Dam Removal Alternative is identified as the environmentally preferred alternative.

Under NEPA, the federal lead agency is not obligated to select the environmentally preferred alternative as the Proposed Action but must identify it in the Record of Decision and should, if possible, identify it in the final EIS. Similarly, CEQA does not require the state lead agency to select the environmentally superior alternative as the Proposed Action in its EIR, as long as the significant impacts of the proposed project are otherwise avoided or mitigated without implementation of the environmentally superior alternative. No significant impacts associated with the Five Dam Removal Alternative (i.e., the Proposed Action) would in fact be avoided by implementation of the Six Dam Removal Alternative.