Chapter 4

Revisions to Chapter 4, "Affected Environment and Environmental Consequences"

Chapter 4 of this document (the Draft SEIS/REIR) is being revised in response to public comments received on the Draft EIS/EIR (Jones & Stokes 2003). The majority 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.

4.1 Fish

As a result of public comments received on the Draft EIS/EIR, a new significant impact will be incorporated into Section 4.1, Fish, of the Final EIS/EIR. This new impact describes how the Restoration Project could potentially increase the risk of spreading virulent fish diseases to California waters that have natural fish populations that do not currently carry such diseases. Specifically, implementing the Restoration Project will restore Chinook salmon and steelhead to Battle Creek, and the fish may be carriers of the infectious hematopoietic necrosis (IHN) virus. The restoration of larger populations of anadromous fish to Battle Creek also could transfer the IHN virus to the water in Battle Creek. PG&E canals divert water from Battle Creek to various powerhouses as part of the Hydroelectric Project. Battle Creek water infected with the IHN virus may seep into the groundwater as it passes through two PG&E canals, Eagle Canyon Canal and Inskip Canal. These waters may be hydrologically connected with springs that two Mount Lassen Trout Farm (MLTF) facilities—the Jeffcoat site, which includes Jeffcoat East, Jeffcoat West, and the Jeffcoat nursery, and Willow Springs—use as their water supply. The MLTF fish (farmed rainbow trout) would be at greater risk of receiving the IHN virus as anadromous fish populations in Battle Creek increase. If MLTF continued to distribute their fish to various lakes and rivers throughout California, the fish could spread the disease to habitats where it does not already exist and potentially affect the fish populations using these habitats. (For more information on project-related concerns associated with MLTF, see the Foreword to this report.) Reclamation and the State Water Board are soliciting comments on this new impact, which is presented below as it is proposed to be included in the Final EIS/EIR.

Environmental Consequences

Impact Assessment

Five Dam Removal Alternative (Proposed Action)

Long-Term and Ongoing Effects

Impact 4.1-8. Significant—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.
The following impact analysis is based on direction received from DFG (Rectenwald pers. comm.). Naturally spawning Chinook salmon and steelhead are known to carry virulent diseases that can have serious adverse effects on other anadromous and non-anadromous fish communities (USFWS 1997a). Annual production records from the Coleman National Fish Hatchery reveal that disease outbreaks, particularly the IHN virus, occurred almost annually prior to the installation of the ozonation plant for the hatchery (Hamelberg pers. comm.; Foot 1996; Sverdrup & Parcel 1986, 1989). One can infer from these records that the IHN virus has subsisted in the Battle Creek watershed since at least the early 1940s.

Implementation of the Restoration Project would result in increased numbers of anadromous fish in Battle Creek. Because naturally spawning Chinook salmon and steelhead are known to carry the IHN virus, it is anticipated that a greater incidence of the naturally occurring disease could occur in Battle Creek. An increased threat of the IHN virus could potentially affect commercial fishery operations in the system, including the privately owned MLTF facilities and the state-owned Darrah Springs State Fish Hatchery.

As part of the Hydroelectric Project, PG&E canals divert water from Battle Creek to various project powerhouses. Currently, Battle Creek water seeps into the shallow groundwater as it passes through two unlined PG&E canals—Eagle Canyon Canal and Inskip Canal. Groundwater that may become contaminated with these viruses resurfaces as natural springs that two MLTF facilities—the Jeffcoat site and Willow Springs—use as their main water supply. The canal seepage potentially transports waterborne pathogens from Battle Creek into the spring-fed water supplies of these MLTF facilities (Pert pers. comm.). Resident rainbow trout above the MLTF intake have commingled in the past with wild anadromous fish and would continue to commingle under existing conditions (i.e., No Action Alternative); therefore, the resident rainbow trout are potential carriers of diseases carried by anadromous fish that are a possible threat to MLTF rainbow trout. Because under existing conditions (No Action Alternative) anadromous salmonids and resident rainbow trout would continue to be present in surface water that is cross-connected with MLTF's water, there is some baseline disease risk.

MLTF is the only private fish hatchery in the state of California that has wild anadromous fish migrating above its water intake, and the only rainbow trout hatchery in the state that could transmit waterborne diseases from its water source to other waters in the state of California (Cox pers. comm. 2004b). When MLTF registered its facilities with DFG in the 1970s to farm rainbow trout, neither MLTF nor DFG were aware of the hydrologic connection between Battle Creek and MLTF's source springs. According to DFG, they would not register a facility that had any known hydrologic connection to waters carrying anadromous fish (Cox pers. comm. 2004b). Given the information presented above, implementing the Restoration Project could increase the incidence of pathogens in PG&E's canals diverting Battle Creek water because it would increase the abundance and upstream distribution of Chinook salmon and steelhead in Battle Creek. As a result, the possibility of pathogens entering the MLTF aquaculture facilities by means of canal water that has seeped into the groundwater and to MLTF's water source would also increase under the Five Dam Removal Alternative, thereby increasing the risk of a serious disease affecting fish communities in other watersheds.

In addition to the potential effects resulting from increased risk of infection at MLTF, DFG has indicated that once the Restoration Project has been implemented, there is also an increased potential for naturally spawning steelhead to migrate up Baldwin Creek and pass over Asbury Diversion Dam. This is because Baldwin Creek would provide habitat to a larger steelhead population, as would Battle Creek, from where fish may stray. While no formal study has been performed, DFG fish passage engineers have visited Asbury Diversion Dam and concluded that passage is possible during high flow events and sediment-pass-through activities. DFG stream restoration biologists have inspected the falls at the mouth of Baldwin Creek and determined passage of steelhead is possible at high flows.

Similar to MLTF, Darrah Springs State Fish Hatchery plants fish in waters throughout the state of California, especially in northern California. Should the Darrah Springs State Fish Hatchery receive a disease conveyed to them by anadromous fish passing above Asbury Diversion Dam at high flows, and it is not detectable in the hatchery fish at the time they are transported off site, the disease could be conveyed to other fish communities where the hatchery stocking occurs. A disease outbreak at Darrah Springs State Fish Hatchery could potentially result in the closure of this facility if harmful pathogens were to become established in the springs associated with the hatchery. Some pathogens such as those associated with whirling disease would be impossible to completely eradicate and would likely result in permanent closure of the facility.

The effects of waterborne diseases can be particularly serious for fish that reside in waters where such diseases do not occur and, therefore, do not have as much immunity to the disease. DFG considers the increased risk of waterborne diseases carried by anadromous fish potentially infecting MLTF and Darrah Springs facilities a serious impact because fish from these facilities are stocked in water bodies throughout northern California that currently do not carry these diseases. The State of California has several regulatory planning processes

intended to protect fish communities from the spread of diseases categorized as serious or catastrophic. Some of the diseases known to occur in Battle Creek, such as the IHN virus and others, are categorized as serious and catastrophic under Fish and Game Code regulations (Fish and Game Code Section 15505 and Title 14 Fish and Game Commission Regulations Sections 245 8[c] [2] and [3]).

According to DFG, measures available for managing the spread of serious or catastrophic diseases to other watersheds include: preventing the exposure of cultured fish that are moved around the state to causative agents of such diseases; restricting under permit stocking with cultured fish; and, when infected or diseased cultured fish are discovered, restricting their movement, quarantining, or destroying them as appropriate (Fish and Game Code Section 15000 *et. seq*.). DFG's fish pathology laboratory implements plans to protect fish communities from the spread of disease consistent with their authority and within the realm of their limited budget.

In reviewing the Restoration Project's effect on MLTF and Darrah Springs State Fish Hatchery and the potential of these facilities to receive and transport diseased fish, DFG does not expect to be able to implement the measures necessary to manage the spread of serious or catastrophic diseases to other watersheds to reduce this significant impact to less-than-significant levels for the following reasons (Cox pers. comm. 2004a; Rectenwald pers. comm.).

- An annual aquaculture facility inspection, conducted as described in the American Fisheries Society Bluebook under the discussion on methods for viral inspection (American Fisheries Society 2004), may not be sufficient to detect the IHN virus in an asymptomatic salmonid population with a low incidence of infection. Detection of the IHN virus improves as the quantity of virus increases in a given tissue sample. Samples from diseased animals therefore will have the highest detection rate.
- Beyond the adequacy of diagnostic tests, authority and funds to inspect all private licensed aquaculture facilities in the state of California regularly are limited. Currently, the DFG pathology laboratory would not inspect MLTF unless a new disease threat is discovered and an ensuing investigation identifies MLTF as a possible source. Such an inspection cannot restrict the spread of disease if it is done after the disease has spread. The potential source of a disease listed as serious or catastrophic can be inspected by DFG with the consent of the licensed aquaculturist or under an inspection warrant issued pursuant to Fish and Game Code Section 15501. Time delays associated with contested inspections can compromise the ability to locate disease sources. By comparison, the Darrah Springs Fish Hatchery has more consistent and frequent monitoring for anadromous fish diseases because it is a state-owned and -operated facility.
- A permit system is in effect to limit the movement of privately cultured fish throughout the state; however, there are significant exceptions that do not require a permit to stock or move fish. No permits are required to move live fish between two registered trout aquaculturists (Fish and Game Code Section 15200). Permits also are not required to stock trout in lakes and

reservoirs that are privately owned or publicly owned with a cooperative agreement between DFG and the lake operator, because they are specifically exempt (Code of California Regulations Title 14 238.5 [c]). Additionally, no stocking permits are required in waters west of Highway 49 in the state of California.

Therefore, the impact of increased risk of a serious or catastrophic fish disease spreading from Battle Creek to fish communities throughout the state of California through stocking with MLTF or Darrah Springs hatchery fish is considered significant. Implementing the following mitigation measures will successfully address the risk of transferring catastrophic fish diseases throughout California.

Mitigation Measures for Impact 4.1-8. To reduce the impact of increased risk of a serious or catastrophic fish disease from spreading from Battle Creek to fish communities throughout the state of California, mitigation measures will be implemented near the MLTF Jeffcoat site, near the MLTF Willow Springs facilities, and at Asbury Diversion Dam near Darrah Springs State Fish Hatchery. Mitigation measures for each facility are described below.

Jeffcoat Aquaculture Facilities

Canal water from Eagle Canyon Canal will be diverted into a new watertight pipeline (e.g., high-density polyethylene with heat-welded joints) at a point along the canal that is sufficiently far enough upstream of the spring area to prevent canal water from mixing with the spring water. The long-term risk of waterborne pathogen contamination of MLTF aquaculture facilities is minimal because the pipe would be sealed and buried. The new pipeline will be constructed and operational before the risk of transmitting disease has significantly increased as a result of completing the proposed fish passage facilities at Eagle Canyon Diversion Dam.

Four different pipeline alignments are proposed at the Jeffcoat site (see Figure F-11 in Appendix F of this Draft SEIS/REIR). The four different alignments include:

- Alternative A—Cross-Country Alignment,
- Alternative B—Modified Cross-Country Alignment,
- Alternative C—Eagle Canyon Canal Alignment, and
- Alternative D—Modified Eagle Canyon Canal Alignment.

Each alignment is described below.

Alternative A, Cross-Country Alignment—The Alternative A pipeline alignment will follow a new “cross-country” alignment downslope of the present canal (see Figure F-11 in Appendix F of this Draft SEIS/REIR for an approximation of this alignment). This alignment is approximately 4,500 feet long, and the construction corridor will be approximately 80 feet wide along the length of this alignment. The first leg of the pipeline alignment extends from the

Eagle Canyon Canal flume across open rangeland that crosses an existing drainage. As the route continues southwest, it parallels an access road through the Jeffcoat West facility. This route would avoid all spring sources associated with the Jeffcoat East facility (located east and uphill of Eagle Canyon Canal) and most of the spring sources for the Jeffcoat West facility (located west and downhill of Eagle Canyon Canal). The pipe alignment continues on a route close to the access road through the Jeffcoat West facility and discharges back into Eagle Canyon Canal at a point downstream of the spring area. This final segment of the pipeline from the Jeffcoat West facility to its terminus approximately 150 feet upstream of Manton Road is anticipated to follow the proposed alignment. However, it is possible that the pipeline could follow any alignment within the greater area shown in Figure F-11 of Appendix F of this Draft SEIS/REIR. During construction, all attempts will be made to avoid or minimize the potential impacts on wildlife habitat, cultural resources, and waters of the United States.

Under the Alternative A alignment, a concrete diversion structure will be constructed to plug the canal and direct water into the new pipeline. Eagle Canyon Canal will remain open along the portion of the canal that will be replaced by the new pipeline (approximately 4,900 feet between the new pipeline's point of diversion and discharge back into the canal). This will allow spring flows and overland runoff from rain and snowmelt to continue to be captured and conveyed to the Hydroelectric Project facilities, in accordance with PG&E water rights. PG&E maintains three spillway structures along this reach of the canal, which will remain in place and operable. Operating these spillways does not pose a risk to the MLTF facilities because the water in the canal will not contain contaminated water from Battle Creek.

Alternative B, Modified Cross-Country Alignment—The Alternative B pipeline alignment is similar to the Alternative A alignment; however, Alternative B could vary between the starting point of Alignment A and a point 1,100 feet downstream of the end of the flume (see Figure F-11 in Appendix F of this Draft SEIS/REIR for an approximation of this alignment). From its beginning, the pipeline travels due west until it meets the cross-country alignment described above for Alternative A. Similar to the Alternative A alignment, the Alternative B route travels southwest, parallels an access road through the Jeffcoat West facility, and discharges back into Eagle Canyon Canal at a point downstream of the spring area, approximately 150 feet upstream of Manton Road. The full length of the Alternative B alignment as depicted in Figure F-11 in Appendix F of this document is approximately 3,900 feet. However, the exact length of the pipeline could vary depending on which alignment is chosen within the areas described above. Regardless of which alignment is selected, all attempts will be made to minimize the potential impacts on wildlife habitat, cultural resources, and waters of the United States. The construction corridor will be approximately 80 feet wide along the length of this alignment.

As with the Alternative A pipeline alignment, Eagle Canyon Canal will remain open along the portion of the canal that will be replaced by the new pipeline

(approximately 3,800 feet between the new pipeline's point of diversion and discharge back into the canal). This will allow spring flows and overland runoff from rain and snowmelt to continue to be captured and conveyed to the Hydroelectric Project facilities, in accordance with PG&E water rights. PG&E maintains three spillway structures along this reach of the canal, which will remain in place and operable. Operating these spillways does not pose a risk to the MLTF facilities because the water in the canal will not contain contaminated water from Battle Creek.

Alternative C, Eagle Canyon Canal Alignment—Under the Alternative C pipeline alignment, a concrete diversion structure will be constructed to plug the canal and direct water into the new pipeline. The pipe route will follow the canal alignment and may be placed within or below the canal prism, or adjacent to or below the canal bank, in either a partially exposed or unexposed configuration, depending on PG&E and landowner requirements. Eagle Canyon Canal will remain open between the diversion structure and the terminal structure (see Figure F-11 of Appendix F in this Draft SEIS/REIR for an approximation of this alignment). This will allow spring flows and overland runoff from rain and snowmelt to continue to be captured and conveyed to the Hydroelectric Project facilities, in accordance with PG&E water rights. This alignment is approximately 4,900 feet long. The construction corridor will be approximately 45 feet wide along the length of this alignment. PG&E maintains three spillway structures along this reach of the canal, which will remain in place and operable. Operating these spillways does not pose a risk to the MLTF facilities because the water in the canal will not contain contaminated water from Battle Creek.

Alternative D, Modified Eagle Canyon Canal Alignment—Under the Alternative D pipeline alignment, a concrete diversion structure will be constructed to plug the canal and direct water into the new pipeline. The pipe route will follow the canal alignment and may be placed within or below the canal prism; or adjacent to or below the canal bank, in either a partially exposed or unexposed configuration, depending on PG&E and landowner requirements (see Figure F-11 in Appendix F of this Draft SEIS/REIR for an approximation of this alignment). Eagle Canyon Canal will remain open between the diversion structure and the terminal structure. This will allow spring flows and overland runoff from rain and snowmelt to continue to be captured and conveyed to the Hydroelectric Project facilities, in accordance with PG&E water rights. This alignment is approximately 3,800 feet long. The construction corridor will be approximately 45 feet wide along the length of this alignment. PG&E maintains three spillway structures along this reach of the canal, which will remain in place and operable. Operating these spillways does not pose a risk to the MLTF facilities because the water in the canal will not contain contaminated water from Battle Creek.

Willow Springs Aquaculture Facility

The Willow Springs aquaculture facility is located on private property. MLTF has a long-term lease agreement with the landowner to own and operate this facility on the property. Diverting water from Inskip Canal into a watertight pipeline, similar to the mitigation proposed for the Eagle Canyon Canal, is not a

feasible mitigation measure for the Willow Springs trout farm. The owner-operator of the MLTF has indicated that a substantial amount of the spring water used by MLTF to operate its Willow Springs facility is received by water leaking from Inskip Canal into the groundwater. Investigations are underway to determine whether a hydrologic connection exists among the Eagle Canyon Canal, Inskip Canal, Inskip Tunnel, and the springs supplying the water to the MLTF Willow Springs facility. Obstructing this leakage would reduce MLTF spring water to a degree that would interfere with the trout farming operation. Because a structural solution is not possible to eliminate the hydrologic connection between Inskip Canal and the MLTF Willow Springs facility, the feasibility of four mitigation options are currently being investigated. These options include:

- Option A, install a disinfection facility;
- Option B, relocate Willow Springs to raise trout at an equivalent off-site facility;
- Option C, modify MLTF's operations at the Willow Springs facility; and
- Option D, acquisition of Willow Springs.

Each mitigation option is described below.

Option A, Install a Disinfection Facility—The Willow Springs trout farm receives its water from Willow Springs, a natural spring source approximately 3,000 feet southeast of the facility. Water from the spring source is conveyed to the Willow Springs facility through an existing 24-inch-diameter metal pipeline approximately 4,000 feet long. As the pipeline approaches the trout farm, it travels under Manton Road and resurfaces on the west side of the road, then travels another 700 feet to the rearing ponds. The pipe terminates at a 4-foot-high concrete catch basin, where sands are allowed to settle out of the water. A pipe attached to the upper part of the catch basin sends water about 50 feet to the rearing ponds.

The new disinfection facility will be located east (upstream) of the catch basin. A new pipeline will divert water from the existing Willow Springs pipeline to a new settling basin. From this basin the water will be piped to the disinfection facility. The disinfection equipment will be housed in new buildings (up to six buildings approximately 30 feet by 60 feet in size). These buildings will be located immediately east (upstream) of the catch basin and trout-rearing ponds in the northern section of the Willow Springs property. Water from the new pipeline will enter the disinfection buildings, where the water will then pass through pressurized sand beds to filter and clean the water before passing through an ultraviolet disinfection process using ultraviolet bulbs. The water must be 99% clear or sediment-free before passing through the ultraviolet light; otherwise the disinfection process does not work properly. Once the disinfection process is complete, the water is piped to the trout-rearing ponds. After passing through the ponds, the water is discharged through an existing point of discharge into a nearby canal. Wastewater from the sand beds will be conveyed to the west end of the trout-rearing ponds through a new pipeline where it will be combined with

the water discharged from the ponds into the nearby canal. The disinfection process requires a significant amount of power. As a result, new power lines may need to be installed to power the facility. For the new equipment buildings, site grading will be required to allow construction of the concrete slab foundation pads. Trenches will be excavated for installing the new buried pipelines. The construction area covers an area approximately 400 feet by 260 feet at the new building site and includes the permanent features for the disinfection facility and the temporary staging area for construction (see Figure F-12 in Appendix F of this Draft SEIS/REIR). An additional area approximately 30 feet wide will be required to install the 500-foot-long wastewater line parallel to the trout-rearing ponds. A diesel-powered engine generator set will provide backup power in the event of power outages. The system will include an automatic power transfer and fuel storage tank for 24 hours of operation.

Option B, Relocate Willow Springs to raise trout at an equivalent off-site facility—Under this mitigation option, the Willow Springs operations will be relocated to an equivalent off-site facility to raise rainbow trout where the water source is not hydrologically connected to waters that support anadromous fish. Relocation of Willow Springs and consideration of the leasehold interest (the existing lease between MLTF and the landowner) will take place in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (PL 91-646, PL 100-17, PL 102-240 and PL 105-117). This act covers any acquisition, valuation of leasehold and business interests, and relocation benefits to the business. The existing infrastructure at Willow Springs would be dismantled and disposed of through the General Services Administration pursuant to the Federal Management Regulations. The land that was used by the Willow Springs trout farm would return to ranchland for cattle grazing.

The location for an off-site facility has not been determined; however, the facility could be located somewhere in the Battle Creek watershed or elsewhere in northern California. The off-site facility could involve the modification of an existing aquaculture facility or the construction of a new facility. Regardless, the off-site facility would require enough land to contain the number of raceways, water supply pipelines, discharge pipelines, and settling ponds for effluent treatment used for fish production at Willow Springs. The property size necessary to meet these needs would vary, depending on the density of trout that could be held in the raceways as determined by the characteristics of the water supply (i.e., the warmer the water temperature and the lower the oxygen content in the water, the less density of fish in the raceway). Willow Springs likely would require approximately 10 to 15 acres to produce an equivalent number of rainbow trout per year (Overton pers. comm.).

The quality of water used by the Willow Springs off-site facility should be adequate to grow young trout to a catchable-sized fish. These water quality specifications are different from those specifications required of a hatchery producing earlier life stages of fish. Recommended water quality would be equal to the water quality objectives established for coldwater fish production in the Central Valley Regional Water Quality Control Board Basin Plan for the Central

Valley. Additionally, according to DFG's "Trout and Salmon Culture," Fish Bulletin 164 (Leitriz and Lewis 1980), water used for aquaculture should meet the water quality parameters listed below.

- Dissolved oxygen—10 to 11 ppm (best for trout); 7 ppm (lowest preferred safe level for trout)
- pH—within the range of 6.7 to 8.2
- Temperature—a moderate and even temperature between 45°F and 60°F, depending on the objectives of the installation

Option C, Modify MLTF's operations at their Willow Springs facility— Under this mitigation option, MLTF will permanently modify its current operations at Willow Springs, specifically to ensure that trout would no longer be raised for the purpose of stocking in waters of the state. Operational changes could result in one of two options:

- Option C-1, DFG will modify MLTF's permit to allow for on-site recreational fishing (i.e., catch-and-release) of farm-raised rainbow trout at Willow Springs and restrict off-site distribution of these trout.
- Option C-2, DFG will modify MLTF's permit to raise at Willow Springs an equivalent production of coldwater game fish that are more resistant to diseases carried by anadromous fish.

Modifying Willow Springs' operations could trigger the need for a business valuation appraisal in accordance with state and federal laws. A "before and after" appraisal would be performed to determine the loss in value of the business resulting from the loss of income to Willow Springs' business following modification of its operations.

Operational changes proposed by Option C-1 would not require substantial modification of Willow Springs' existing infrastructure because the trout farm would continue to raise rainbow trout; however, the property would need to be modified to meet the needs of its new customers. To provide on-site recreational fishing, MLTF would need to construct a fishing pond, approximately 4 acres in size, at its Willow Springs facility to accommodate anglers. The aesthetics of the Willow Springs facility may also need to be improved to provide an aesthetically pleasing fishing experience for its customers.

Under Option C-2, MLTF would raise an equivalent production of coldwater game fish at Willow Springs that are more resistant to disease carried by anadromous fish (e.g., the IHN virus). Brown trout, which could be raised at the Willow Springs trout farm, are known to be the least susceptible to this anadromous fish disease of all coldwater game species (Cox pers. comm.). Raising coldwater game fish other than rainbow trout would not require substantial modification of Willow Springs' existing infrastructure because the existing facilities would continue to be used to raise coldwater game fish for stocking in other waters in the state.

Option D, Acquisition of Willow Springs—This mitigation option will involve the acquisition of the Willow Springs' aquaculture business. Acquiring the Willow Springs business and consideration of the leasehold interest (the existing lease between MLTF and the landowner) will take place in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (PL 91-646, PL 100-17, PL 102-240 and PL 105-117). This Act covers any acquisition, valuation of leasehold and business interests, and relocation benefits to the business. Under this mitigation option, the existing infrastructure at Willow Springs would be dismantled and disposed of through the General Services Administration pursuant to the Federal Management Regulations. The land that was used by the Willow Springs trout farm would return to ranchland for cattle grazing.

Asbury Diversion Dam

In addition to implementing the structural changes described in Chapter 3 for Asbury Diversion Dam, construction of a fish barrier downstream of the dam may also be necessary to prevent anadromous fish from passing above the dam and conveying diseases to Darrah Springs State Fish Hatchery during the times when fish are present and at flows that facilitate their passage over Asbury Diversion Dam (including high flows and normal floodflows).

The most cost-effective and reliable disease-prevention remedy will be used to prevent the spread of virulent fish diseases above Asbury Diversion Dam and protect Darrah Springs State Fish Hatchery and fish communities in the waters of the state where hatchery fish may be stocked. Assuming that fish passage is possible, two options have been identified to prevent fish from migrating up Baldwin Creek and passing over Asbury Diversion Dam. These options include:

- Option A, constructing an appropriate fish barrier at Asbury Diversion Dam by structural or operational modification; or
- Option B, modifying an existing waterfall located farther downstream of Asbury Diversion Dam to prevent fish passage.

Each mitigation option is described below. Please note that three different alternatives are presented for Option A.

Option A-1, Structural and Operational Modifications at Asbury Diversion Dam (Velocity Barrier)—To prevent fish from defeating the Asbury Diversion Dam during low- and high-water conditions, a new gunited sloped section will be installed immediately below the dam. The gunited section will run the full width of the dam and extend approximately 30 feet downstream. The gunited section will begin at the existing dam crest elevation on the downstream face of the dam and gradually slope to the stream channel. Existing flashboard stanchions will be used to support flashboard installation at the top of the dam. Flashboards will be placed to provide for multiple instream-flow release points such that instream flows will be dispersed along the downstream face of the sloped section of the dam. Approximately 2,400 square feet of gunite is planned to cover this section. In addition, the low-level outlet gate will be operated infrequently in order to move trapped sediments downstream of Asbury Diversion Dam. To prevent fish

from moving through the low-level outlet gate, a culvert pipe 3 feet in diameter and approximately 75 feet long will be installed to contain the discharge of the low-level outlet gate and protrude through the gunited section of the dam. This will provide a high velocity stream of water for a sufficient distance that fish are not expected to be able to traverse upstream of the dam. Additionally, new concrete walls may be required on the abutments to prevent fish passage during large flood events.

Option A-2, Structural and Operational Modifications at Asbury Diversion Dam (Dam Crest, Outlet Works, and Downstream Channel)—Modifications will be implemented at the existing dam crest and outlet works. In addition, the downstream channel will be filled in. These modifications are described as follows.

- **Dam Crest.** The existing dam crest will be modified by the installation of a steel plate cap with a 2-foot overhang to prevent fish passage over the crest. Installation of the steel plate cap will require the construction of a temporary upstream cofferdam and excavation of reservoir sediments at the upstream face of the dam. New concrete walls may be required on the abutments to prevent fish passage during large flood events. The steel plate cap will include new steel supports for flashboards. The total area affected will be approximately 4,000 square feet.
- **Outlet Works.** The existing outlet works pipe will be extended between 75 and 100 feet downstream (requiring the construction of concrete saddle supports), or otherwise modified to prevent fish passage upstream through the pipe during sediment-pass-through operations. The total area affected will be approximately 2,000 square feet.
- **Downstream Channel**. Two existing scour holes near the downstream toe of the dam will be backfilled with grouted riprap to eliminate potential jump pools below the dam crest. The total area affected will be approximately 1,000 square feet.

Option A-3, Structural and Operational Modifications at Asbury Diversion Dam (Concrete Cap and Apron)—In order to minimize the risk of fish passing over Asbury Diversion Dam, DFG recommends adding a 6-inch- to 8-inch-high concrete cap to the existing structure. The cap will be flush with the upstream side of the dam and will extend to the downstream-most walkway support posts. The weir cap will be constructed with a 2% minimum slope, and will extend across the entire face of the dam except for the area adjacent to the sediment-pass-through control structure. A concrete, or shotcrete, apron will be constructed at the base of the dam extending approximately 12 feet downstream. The top surface of the apron will be horizontal from the dam to the end of the walkway footings, and will be sloped downstream for the remaining 8 to 10 feet at a 5% grade. The apron will extend across the face of the dam, including the area adjacent to the sediment-pass-through-gate control structure and the approximate 10-foot pass through gate. Together, the cap and the apron should prevent fish from jumping over the dam, with the cap serving as a jump barrier and the apron eliminating jump pools below the dam.

In order to minimize the risk of fish passing through the 36-inch culvert pipe during sediment-pass-through operations, the pipe will be extended approximately 75 to 100 feet downstream. The pipe will be constructed of a suitable material (e.g., reinforced concrete, steel, or high density polyethylene), will be properly supported, and will not have any internal corrugations. The pipe will be placed at the steepest angle that the channel geometry allows. Because supercritical flow is expected in the extended pipe, the pipe will serve as a velocity barrier to upstream passage. The 10-foot gate will be discontinued in favor of the 36-inch culvert pipe and periodic dredging of material from behind the dam.

Option B, Waterfall Barrier Modification—A waterfall is located on private property downstream of Asbury Diversion Dam. Presently, the waterfall appears to function as a temporary barrier such that fish are blocked at low flows but can ascend at higher flows via a side channel that bypasses the main waterfall. Modifying the channel at the waterfall so that it functions as a fish barrier will require property-owner agreements. The feasibility study would address private property issues associated with modifying the existing waterfall downstream of the dam.

Impacts Associated with Mitigation Measures for Impact 4.1-8. According to the State CEQA Guidelines, an EIR requires a discussion of the environmental effects of mitigation measure implementation (§15126.4[a]). Reclamation's NEPA Handbook also requires that the effects of mitigation measures be analyzed (Bureau of Reclamation 2000). The following sections identify impacts associated with the Jeffcoat, Willow Springs, and Asbury Diversion Dam mitigation options.

Jeffcoat Aquaculture Facilities

The Mitigation Measure for Impact 4.1-8 at the Jeffcoat site (including alternative alignments A through D) would cause additional environmental impacts that were not disclosed in the Draft EIS/EIR (Jones & Stokes 2003). These new impacts are described in the appropriate sections in Chapter 4 of this Draft SEIS/REIR and include the following:

- Section 4.2, Botanical, Wetland, and Wildlife Resources.
  - **Impact 4.2-5. Significant—Potential disturbance to valley elderberry longhorn beetle habitat.** Construction of the Eagle Canyon pipeline may disturb potential valley elderberry longhorn beetle habitat, which has been identified at nine locations within 100 feet of the proposed pipeline alignments and staging area. This impact is similar to Impact 4.2-5 in the Draft EIS/EIR. The mitigation measure identified for Impact 4.2-5 in the Draft EIS/EIR will be implemented to reduce this impact to a less-than-significant level; however, additional elderberry shrub and native plant compensation will be required (see page 4-27 of this Draft SEIS/REIR).

- **Impact 4.2-6. Significant—Potential disturbance to California red-legged frogs and their habitat.** Construction of the Eagle Canyon pipeline may directly affect potential California red-legged frog habitat, which has been identified at various locations along the proposed pipeline alignments. The mitigation measure identified for Impact 4.2-6 will be implemented to reduce this impact to a less-than-significant level (see page 4-30 of this Draft SEIS/REIR).
- **Impact 4.2-11. Significant—Potential disturbance to nesting California black rails in emergent wetland.** Construction of the Eagle Canyon pipeline may disturb nesting California black rails, which could potentially occur in an emergent wetland located upslope of Eagle Canyon Canal. The wetland is located near a possible construction area for the proposed pipeline. The mitigation measure identified for Impact 4.2-11 will be implemented to reduce this impact to a less-than-significant level (see page 4-31 of this Draft SEIS/REIR).
- **Impact 4.2-13. Less than Significant—Potential loss of woody riparian vegetation along PG&E canals.** The mitigation measure proposed for the Jeffcoat site could cause the potential loss of woody riparian vegetation along the Eagle Canyon Canal because of the cessation of flows in the canal; however, natural springs found throughout this area provide significantly more water to support woody riparian vegetation along Eagle Canyon Canal than does canal seepage. Additionally, the overall impacts on the riparian community downstream are expected to be beneficial because of increases in streamflows. This impact is considered less than significant.
- **Impact 4.2-15. Less than Significant—Potential disturbance of annual grassland habitat.** Construction of Eagle Canyon pipeline near the Jeffcoat site may cause disturbance of annual grassland vegetation. As part of the Restoration Project, Reclamation and/or the construction contractor will implement best management practices (BMPs) and environmental commitments before and during construction, and restore annual grassland habitat at a 1:1 ratio. With the implementation of these actions, this impact is considered less than significant. No mitigation is required (see page 4-32 of this Draft SEIS/REIR).

- Section 4.8, Aesthetics and Visual Resources.
  - **Impact 4.8-5. Less than Significant—Temporarily reduced scenic resources along the Eagle Canyon Canal as a result of construction of Eagle Canyon pipeline.** Construction of the Eagle Canyon pipeline would require staging areas and access road improvements at some locations near these facilities, and the installation of an underground pipeline to replace a portion of Eagle Canyon Canal. Any reduction in scenic quality is considered less than significant (see page 4-44 of this Draft SEIS/REIR).

- Section 4.15, Cultural Resources
  - **Impact 4.15-4. Significant—Potential impact on cultural resources at the Jeffcoat aquaculture facility**. Nine cultural resources sites have been identified at the Jeffcoat aquaculture facility. Construction of the pipeline will disturb these sites, depending on which alignment is chosen. Studies are ongoing to determine the status of these sites, and this information will be presented in the Final EIS/EIR. Any effect on a significant cultural resource is considered to be significant. The mitigation measure identified for Impact 4.15-4 will be implemented to reduce this impact to a less-than-significant level (see page 4-48 of this Draft SEIS/REIR).

Additional environmental impacts associated with the implementation of the Mitigation Measure for Impact 4.1-8 at the Jeffcoat site are similar to impacts already disclosed in the Draft EIS/EIR (Jones & Stokes 2003). These impacts have been updated to include the effects of implementing the Jeffcoat site Mitigation Measure for Impact 4.1-8 and are listed in Table 4.1-11.

As discussed above, Alternatives A through D would result in generally the same environmental impacts; however, there are some differences among the alternatives. For example, compared with Alternatives C and D, Alternatives A and B would potentially affect the greatest number of elderberry shrubs and would also have a greater potential to fragment yellow-breasted chat habitat. In addition, Alternatives A and B both intersect California red-legged frog habitat. In comparison, implementing Alternatives C or D would have a greater effect on the permanent loss of woody riparian habitat from constructing the pipeline within Eagle Canyon Canal.

Willow Springs Aquaculture Facility

The Mitigation Measure for Impact 4.1-8 at the Willow Springs facility would cause additional environmental impacts that were not disclosed in the Draft EIS/EIR (Jones & Stokes 2003). New impacts associated with mitigation Option A (installation of a disinfection facility) are described in the appropriate sections in Chapter 4 of this Draft SEIS/REIR and include the following:

- Section 4.2, Botanical, Wetland, and Wildlife Resources.
  - **Impact 4.2-6. Significant—Potential disturbance to California red-legged frogs and their habitat.** Construction of the Willow Springs disinfection facility could affect potential California red-legged frog habitat, which has been identified in the northwestern corner of the project site. The mitigation measure identified for Impact 4.2-6 will be implemented to reduce this impact to a less-than-significant level (see page 4-30 of this Draft SEIS/REIR).
  - **Impact 4.2-11. Significant—Potential disturbance to nesting California black rails in emergent wetland.** Construction of the Willow Springs disinfection facility may disturb nesting California black rails, which could potentially occur in an emergent wetland in the northwestern corner of the project site. The mitigation measure

identified for Impact 4.2-11 will be implemented to reduce this impact to a less-than-significant level (see page 4-31 of this Draft SEIS/REIR).

- **Impact 4.2-15. Less than Significant—Potential disturbance of annual grassland habitat.** Construction of the disinfection facility at the Willow Springs facility may cause disturbance of annual grassland vegetation. As part of the Restoration Project, Reclamation and/or the construction contractor will implement BMPs and environmental commitments before and during construction, and restore annual grassland habitat at a 1:1 ratio. With the implementation of these actions, this impact is considered less than significant. No mitigation is required (see page 4-32 of this Draft SEIS/REIR).

Additional environmental impacts associated with implementing Option A of the Mitigation Measure for Impact 4.1-8 at the Willow Springs facility are similar to impacts already disclosed in the Draft EIS/EIR. These impacts have been updated to include the effects of implementing the Willow Springs mitigation measure options for Impact 4.1-8 and are listed in Table 4.1-12.

Impacts associated with mitigation Option B (i.e., relocating Willow Springs to raise rainbow trout at an equivalent off-site facility) would depend on whether the off-site facility would include the modification or expansion of an existing aquaculture facility or a new facility would need to be constructed off site. Constructing an equivalent off-site facility in the Battle Creek watershed or elsewhere in northern California could potentially result in significant temporary and permanent impacts. Construction-related impacts may include disturbance or loss of special-status species or their habitats; disturbance or loss of waters of the United States; accelerated water and wind erosion; increased traffic volumes on local roadways; exposure of noise-sensitive land uses to construction noise; construction-related air emissions in excess of allowable thresholds; exposure of construction workers to hazardous or toxic materials; and increased demands on fire, police, and emergency medical services attributable to construction activities. Modifying or expanding an existing aquaculture facility would result in similar but fewer impacts compared to the construction of a new facility. Long-term operational impacts associated with the off-site aquaculture facility may include impacts on water quality, depending on the quality of effluent treated from the raceways and settling ponds.

Removing the existing Willow Springs infrastructure from its current location would also result in temporary construction-related impacts associated with the removal of these facilities. Removal activities could potentially include impacts associated with accelerated water and wind erosion; increased traffic volumes on local roadways to remove materials; exposure of noise-sensitive land uses to on-site removal activities; construction-related air emissions in excess of allowable thresholds; and exposure of construction workers to hazardous or toxic materials.

Under mitigation Option B, land use impacts associated with changing the land that MLTF's Willow Springs facility is currently leasing back to ranchland would be less than significant because the land would remain in agricultural production. The land is currently used by MLTF for aquaculture, which is a form

Table 4.1-11. Summary of Impacts Associated with the Proposed Construction of the Eagle Canyon Pipeline near the Jeffcoat Mitigation Site Already Disclosed in the Draft EIS/EIR

Impact as Presented in the Draft EIS/EIR[a]	Description of Impact for the Draft SEIS/REIR	Location in the Draft EIS/EIR (page number)
SECTION 4.1—FISH		
None.		
SECTION 4.2—BOTANICAL, WETLAND, AND WILDLIFE RESOURCES		
Impact 4.2-1. Significant—Potential disturbance or loss of 7.2 acres woody riparian vegetation and associated wildlife habitat.	Construction of the Eagle Canyon pipeline would involve clearing woody riparian vegetation associated with wildlife habitat. This impact is similar to Impact 4.2-1 described in the Draft EIS/EIR. The mitigation measures identified for Impact 4.2-1 will be implemented to reduce this impact to a less-than-significant level.	4.2-24—4.2-27
Impact 4.2-2. Significant—Potential introduction of noxious weeds or spread of existing noxious weeds.	Construction of the Eagle Canyon pipeline has the potential to introduce or spread noxious weeds. This impact is similar to Impact 4.2-2 described in the Draft EIS/EIR. The mitigation measures identified for Impact 4.2-2 will be implemented to reduce this impact to a less-than-significant level.	4.2-27 to 4.2-28
Impact 4.2-3. Significant—Potential loss or disturbance of 41.27 acres of waters of the United States (including wetlands).	Wetlands and waters of the United States are located within the construction area for the Eagle Canyon pipeline, resulting in potential loss or disturbance of waters of the United States (including wetlands). This impact is similar to Impact 4.2-3 described in the Draft EIS/EIR. The mitigation measures identified for Impact 4.2-3 will be implemented to reduce this impact to a less-than-significant level.	4.2-28 to 4.2-30
Impact 4.2-4. Significant—Potential loss or disturbance of common upland woodland and forest communities and associated wildlife habitat.	Construction of the Eagle Canyon pipeline could potentially result in loss or disturbance of common upland woodland and forest communities and associated wildlife habitat, specifically blue oak woodland and live oak woodland. This impact is similar to Impact 4.2-4 described in the Draft EIS/EIR. The mitigation measures identified for Impact 4.2-4 will be implemented to reduce this impact to a less-than-significant level.	4.2-30 to 4.2-32

Table 4.1-11. Continued

Impact as Presented in the Draft EIS/EIR[a]	Description of Impact for the Draft SEIS/REIR	Location in the Draft EIS/EIR (page number)
Impact 4.2-7. Significant—Potential disturbance of foothill yellow-legged frogs and their habitat.	Construction of the Eagle Canyon pipeline could potentially affect foothill yellow-legged frog habitat near the Jeffcoat site. This impact is similar to Impact 4.2-6 in the Draft EIS/EIR. The mitigation measure identified for Impact 4.2-6 will be implemented to reduce this impact to a less-than-significant level.	4.2-34 to 4.2-35
Impact 4.2-8. Significant—Potential disturbance of northwestern pond turtles and their habitat.	Construction of the Eagle Canyon pipeline could affect northwestern pond turtle habitat near the Jeffcoat Site. This impact is similar to Impact 4.2-7 described in the Draft EIS/EIR. The mitigation measure identified for Impact 4.2-7 will be implemented to reduce this impact to a less-than-significant level.	4.2-35 to 4.2-36
Impact 4.2-9. Significant—Potential disturbance of breeding habitat for yellow-breasted chat and little willow flycatcher.	Construction of the Eagle Canyon pipeline could remove or damage riparian vegetation that provides nesting and foraging habitat for the little willow flycatcher and the yellow-breasted chat. Construction activities may also stress adults of these species and affect their reproductive success or survivorship or cause the adults to abandon their nests. This impact is similar to Impact 4.2-8 described in the Draft EIS/EIR. The mitigation measure identified for Impact 4.2-8 will be implemented to reduce this impact to a less-than-significant level.	4.2-36 to 4.2-37
Impact 4.2-10. Significant—Potential disturbance to nesting raptors.	Construction of the Eagle Canyon pipeline may directly remove or damage riparian vegetation that provides nesting and foraging habitat for raptors, especially the Cooper's hawk. Construction activities may also stress the adults of these species and affect their reproductive success or survivorship or cause the adults to abandon their nests. This impact is similar to Impact 4.2-9 described in the Draft EIS/EIR. The mitigation measure identified for Impact 4.2-9 will be implemented to reduce this impact to a less-than-significant level.	4.2-37 to 4.2-38

Table 4.1-11. Continued

Impact as Presented in the Draft EIS/EIR[a]	Description of Impact for the Draft SEIS/REIR	Location in the Draft EIS/EIR (page number)
SECTION 4.3—HYDROLOGY		
None.		
SECTION 4.4—WATER QUALITY		
None.		
SECTION 4.5—GROUNDWATER		
None.		
SECTION 4.6—LAND USE		
None.		
SECTION 4.7—GEOLOGY AND SOILS		
Impact 4.7-1. Significant—Potential accelerated water and wind erosion from construction activities.	Construction of the Eagle Canyon pipeline will require vegetation and ground disturbance. This disturbance would include excavation, backfilling, and bypass pipeline. This impact is similar to Impact 4.7-1 described in the Draft EIS/EIR. The mitigation measure identified for Impact 4.7-1 will be implemented to reduce this impact to a less-than-significant level.	4.7-11 to 4.7-13
SECTION 4.8—AESTHETICS		
None.		

Table 4.1-11. Continued

Impact as Presented in the Draft EIS/EIR[a]	Description of Impact for the Draft SEIS/REIR	Location in the Draft EIS/EIR (page number)
SECTION 4.9—TRANSPORTATION		
Impact 4.9-1. Less than Significant—Construction and removal activities at the Restoration Project sites would result in increased traffic volumes on state, county, and private roadways.	Construction of the Eagle Canyon pipeline would result in increased traffic levels on state, county, and private roads used to transport construction workers, equipment, and materials to and from the site. The impact of increased traffic volumes on state, county, and private roads would be less than significant as a result of improvements being installed as part of the project and compliance with *Reclamation Safety and Health Standards*.	4.9-18—4.9-20
Impact 4.9-2. Less than Significant—Construction traffic could damage county and private roadways.	Reclamation contractors will be required not to exceed legal load limits for the county roads accessing the sites. Postconstruction repairs to private roads would be coordinated with landowners to ensure that the roads would be left in a condition equal to or better than the existing, preconstruction condition. The impact of construction on county and private roads is considered to be less-than-significant.	4.9-20
Impact 4.9-3. Less than Significant—Construction traffic or activities could delay emergency vehicle response times.	It may be necessary for emergency response vehicles to access the construction site along private roads. It is not, however, expected that construction traffic would substantially delay emergency vehicle response times. Emergency vehicles would likely be needed to respond to an incident at a site when workers are on site and not during morning and afternoon traffic times, when traffic is heaviest. The impact of construction traffic and activities on emergency vehicle response times is considered to be less than significant.	4.9-21

Table 4.1-11. Continued

Impact as Presented in the Draft EIS/EIR[a]	Description of Impact for the Draft SEIS/REIR	Location in the Draft EIS/EIR (page number)
SECTION 4.10—NOISE		
Impact 4.10-2. Significant—Exposure of noise-sensitive land uses to noise from on-site construction activities.	Large equipment would be used during construction of the Eagle Canyon pipeline. The MLTF Jeffcoat site employees and the residence located in the vicinity of the pipeline alignment are the only noise-sensitive land uses that would be exposed to noise from on-site construction activity. This impact is similar to Impact 4.10-2 described in the Draft EIS/EIR. The mitigation measure identified for Impact 4.10-2 will be implemented to reduce this impact to a less-than-significant level.	4.9 to 4.10-10
SECTION 4.11—AIR QUALITY		
Impact 4.11-1. Significant—Construction-related emissions in excess of allowable thresholds.	Construction of the Eagle Canyon pipeline could result in a temporary increase in an undetermined amount of construction-related emissions. This impact is similar to Impact 4.11-1 described in the Draft EIS/EIR. The mitigation measures identified for Impact 4.11-1 will be implemented to reduce this impact to a less-than-significant level.	4.11-8 to 4.11-9
SECTION 4.12—PUBLIC HEALTH AND SAFETY		
Impact 4.12-1. Significant—Construction workers could be exposed to hazardous or toxic materials disturbed during construction, modification, or removal activities at the Restoration Project sites.	Hazardous materials, such as petroleum-based products, solvents, and lubricants, may be encountered during construction of the Eagle Canyon pipeline. Construction workers could come into contact with these hazardous materials. Workers could also be exposed to similar hazardous materials brought on site for use during construction. This impact is similar to Impact 4.12-1 described in the Draft EIS/EIR. The mitigation measures identified for Impact 4.12-1 will be implemented to reduce this impact to a less-than-significant level.	4.12-7—4.12-8

Table 4.1-11. Continued

Impact as Presented in the Draft EIS/EIR[a]	Description of Impact for the Draft SEIS/REIR	Location in the Draft EIS/EIR (page number)
Impact 4.12-2. Significant—The public could be exposed to hazardous or toxic materials associated with or disturbed during construction, modification, or removal activities at the Restoration Project sites; public access to construction areas could also increase the potential for exposure to hazardous materials.	Construction of the Eagle Canyon pipeline could result in an increased risk to the public associated with equipment use, exposure to potentially hazardous materials during construction, and other hazards, including open trenches. This impact is similar to Impact 4.12-2 described in the Draft EIS/EIR. The mitigation measures identified for Impact 4.12-2 will be implemented to reduce this impact to a less-than-significant level.	4.12-8 to 4.12-9
Impact 4.12-3. Significant—Increased vehicle traffic along private access roads during construction activities could endanger residents and domestic animals.	Increased traffic associated with construction of the Eagle Canyon pipeline would increase hazards to people and domestic animals that live along access roads. Hazards to people and domestic animals would increase especially during peak morning and evening hours when work crews typically arrive and leave from the project sites. This impact is similar to Impact 4.12-3 described in the Draft EIS/EIR. The mitigation measures identified for Impact 4.12-3 will be implemented to reduce this impact to a less-than-significant level.	4.12-9 to 4.12-10
SECTION 4.13—PUBLIC SERVICES AND UTILITIES		
Impact 4.13-1. Significant—Proposed activities at the Restoration Project sites may increase demands on fire, police, and emergency medical services.	Construction of the Eagle Canyon pipeline has the potential to result in temporary increased demands on fire protection, police protection, and emergency medical services that may be needed in the area. The proposed construction would result in temporary traffic and workers in the general area of the site. This impact is similar to Impact 4.13-1 described in the Draft EIS/EIR. The mitigation measure identified for Impact 4.13-1 will be implemented to reduce this impact to a less-than-significant level.	4.13-7—4.13-8
SECTION 4.14—RECREATION		
None.		

Table 4.1-11. Continued

Impact as Presented in the Draft EIS/EIR[a]	Description of Impact for the Draft SEIS/REIR	Location in the Draft EIS/EIR (page number)
SECTION 4.15—CULTURAL		
None.		
SECTION 4.16—OTHER NEPA ANALYSES		
None.		
SECTION 4.17—OTHER REQUIRED ANALYSES		
None.		

[a] Source: Jones & Stokes 2003.

Notes:

EIS/EIR = environmental impact statement/environmental impact report.

MLTF = Mount Lassen Trout Farm.

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

Table 4.1-12. Summary of Impacts Associated with the Proposed Construction of a Disinfection Facility for the Willow Springs Mitigation Site Already Disclosed in the Draft EIS/EIR

Impact (similar to that presented in the Draft EIS/EIR[a])	Description of Impact	Location in the Draft EIS/EIR (page number)
SECTION 4.1—FISH		
None.		
SECTION 4.2—BOTANICAL, WETLAND, AND WILDLIFE RESOURCES		
Impact 4.2-1. Significant—Potential disturbance or loss of 7.2 acres of woody riparian vegetation and associated wildlife habitat.	Construction of a new disinfection facility at Willow Springs may involve clearing woody riparian vegetation associated with wildlife habitat. This impact is similar to Impact 4.2-1 described in the Draft EIS/EIR. The mitigation measures identified for Impact 4.2-1 will be implemented to reduce this impact to a less-than-significant level.	4.2-24—4.2-27
Impact 4.2-2. Significant—Potential introduction of noxious weeds or spread of existing noxious weeds.	Construction of a new disinfection facility at Willow Springs has the potential to introduce or spread noxious weeds. This impact is similar to Impact 4.2-2 described in the Draft EIS/EIR. The mitigation measures identified for Impact 4.2-2 will be implemented to reduce this impact to a less-than-significant level.	4.2-27 to 4.2-28
Impact 4.2-3. Significant—Potential loss or disturbance of 41.27 acres of waters of the United States (including wetlands).	Wetlands and waters of the United States are located within the construction area for a new disinfection facility at Willow Springs, resulting in potential loss or disturbance of waters of the United States (including wetlands). This impact is similar to Impact 4.2-3 described in the Draft EIS/EIR. The mitigation measures identified for Impact 4.2-3 will be implemented to reduce this impact to a less-than-significant level.	4.2-28 to 4.2-30
Impact 4.2-4. Significant—Potential loss or disturbance of common upland woodland and forest communities and associated wildlife habitat.	Construction of a new disinfection facility at Willow Springs could potentially result in loss or disturbance of common upland woodland and forest communities and associated wildlife habitat, specifically blue oak woodland/savanna habitat. This impact is similar to Impact 4.2-4 described in the Draft EIS/EIR. The mitigation measures identified for Impact 4.2-4 will be implemented to reduce this impact to a less-than-significant level.	4.2-30 to 4.2-32

Table 4.1-12. Continued

Impact (similar to that presented in the Draft EIS/EIR[a])	Description of Impact	Location in the Draft EIS/EIR (page number)
Impact 4.2-7. Significant—Potential disturbance of foothill yellow-legged frogs and their habitat.	Construction of a new disinfection facility at Willow Springs could potentially affect foothill yellow-legged frog habitat near the Willow Springs trout-rearing ponds. This impact is similar to Impact 4.2-6 in the Draft EIS/EIR. The mitigation measure identified for Impact 4.2-6 will be implemented to reduce this impact to a less-than-significant level.	4.2-34 to 4.2-35
Impact 4.2-8. Significant—Potential disturbance of northwestern pond turtles and their habitat.	Construction of a new disinfection facility at Willow Springs could affect northwestern pond turtle habitat near the Willow Springs trout-rearing ponds. This impact is similar to Impact 4.2-7 described in the Draft EIS/EIR. The mitigation measure identified for Impact 4.2-7 will be implemented to reduce this impact to a less-than-significant level (see page 4.2-54 of the Draft EIS/EIR).	4.2-35 to 4.2-36
Impact 4.2-9. Significant—Potential disturbance of breeding habitat for yellow-breasted chat and little willow flycatcher.	Construction of a new disinfection facility at Willow Springs could remove or damage riparian vegetation that provides nesting and foraging habitat for the little willow flycatcher and the yellow-breasted chat. Construction activities may also stress adults of these species and affect their reproductive success or survivorship or cause the adults to abandon their nests. This impact is similar to Impact 4.2-8 described in the Draft EIS/EIR. The mitigation measure identified for Impact 4.2-8 will be implemented to reduce this impact to a less-than-significant level.	4.2-36 to 4.2-37
Impact 4.2-10. Significant—Potential disturbance to nesting raptors.	Construction of a new disinfection facility at Willow Springs may directly remove or damage riparian vegetation that provides nesting and foraging habitat for raptors, especially the Cooper's hawk. Construction activities may also stress the adults of these species and affect their reproductive success or survivorship or cause the adults to abandon their nests. This impact is similar to Impact 4.2-9 described in the Draft EIS/EIR. The mitigation measure identified for Impact 4.2-9 will be implemented to reduce this impact to a less-than-significant level.	4.2-37 to 4.2-38

Table 4.1-12. Continued

Impact (similar to that presented in the Draft EIS/EIR[a])	Description of Impact	Location in the Draft EIS/EIR (page number)
SECTION 4.3—HYDROLOGY		
None.		
SECTION 4.4—WATER QUALITY		
None.		
SECTION 4.5—GROUNDWATER		
None.		
SECTION 4.6—LAND USE		
None.		
SECTION 4.7—GEOLOGY AND SOILS		
Impact 4.7-1. Significant—Potential accelerated water and wind erosion from construction activities.	Construction of the new disinfection facility at Willow Springs would require vegetation removal and ground disturbance. This disturbance would involve clearing, grading, blading, and related activities. These construction activities would expose soils to erosion. This impact is similar to Impact 4.7-1 described in the Draft EIS/EIR. The mitigation measure identified for Impact 4.7-1 will be implemented to reduce this impact to a less-than-significant level.	4.7-11 to 4.7-13
SECTION 4.8—AESTHETICS		
None.		

Table 4.1-12. Continued

Impact (similar to that presented in the Draft EIS/EIR[a])	Description of Impact	Location in the Draft EIS/EIR (page number)
SECTION 4.9—TRANSPORTATION		
Impact 4.9-1. Less than Significant—Construction and removal activities at the Restoration Project sites would result in increased traffic volumes on state, county, and private roadways.	Construction of the new disinfection facility at Willow Springs would result in increased traffic levels on state, county, and private roads used to transport construction workers, equipment, and materials to the site. Construction workers and equipment would travel along a several state, county, and private roads to access the construction site. It is not expected that increased traffic on state highways would result in significant impacts on traffic volumes. The impact of increased traffic volumes on county and private roads would be less than significant as a result of improvements being installed as part of the project and compliance with *Reclamation Safety and Health Standards*.	4.9-18 to 4.9-20
Impact 4.9-2. Less than Significant—Construction traffic could damage county and private roadways.	The Bureau of Reclamation contractors will be required not to exceed legal load limits for the county roads accessing the site. Other measures will help avoid damage from occurring. The impact of construction traffic on county and private roads is considered to be less than significant.	4.9-20
Impact 4.9-3. Less than Significant—Construction traffic or activities could delay emergency vehicle response times.	It may be necessary for emergency response vehicles to access the construction site along private roads. It is not, however, expected that construction traffic would substantially delay emergency vehicle response times. Emergency vehicles would likely be needed to respond to an incident at the Willow Springs construction site when workers are on site and not during morning and afternoon commute times, when traffic is heaviest. The impact of construction traffic and activities on emergency vehicle response times is considered to be less than significant.	4.9-21

Table 4.1-12. Continued

Impact (similar to that presented in the Draft EIS/EIR[a])	Description of Impact	Location in the Draft EIS/EIR (page number)
SECTION 4.10—NOISE		
Impact 4.10-2. Significant—Exposure of noise-sensitive land uses to noise from on-site construction activities.	Large equipment would be used during construction of the Willow Springs disinfection facility. The MLTF Willow Springs employees and the residence located to the west of the trout farm are the only noise-sensitive land uses that would be exposed to noise from on-site construction activity. This impact is similar to Impact 4.10-2 described in the Draft EIS/EIR. The mitigation measure identified for Impact 4.10-2 will be implemented to reduce this impact to a less-than-significant level.	4.10-9 to 4.10-10
SECTION 4.11—AIR QUALITY		
Impact 4.11-1. Significant—Construction-related emissions in excess of allowable thresholds.	Construction of the new disinfection facility at Willow Springs could result in a temporary increase in an undetermined amount of construction-related emissions. This impact is similar to Impact 4.11-1 described in the Draft EIS/EIR. The mitigation measures identified for Impact 4.11-1 will be implemented to reduce this impact to a less-than-significant level.	4.11-8 to 4.11-9
SECTION 4.12—PUBLIC HEALTH AND SAFETY		
Impact 4.12-1. Significant—Construction workers could be exposed to hazardous or toxic materials disturbed during construction, modification, or removal activities at the Restoration Project sites.	Hazardous materials, such as petroleum-based products, solvents, and lubricants, may be encountered during construction of the new disinfection facility at Willow Springs. Construction workers could come in contact with these hazardous materials. Workers could also be exposed to similar hazardous materials brought on site for use during the construction, modification, or removal of Restoration Project facilities. This impact is similar to Impact 4.12-1 described in the Draft EIS/EIR. The mitigation measures identified for Impact 4.12-1 will be implemented to reduce this impact to a less-than-significant level.	4.12-7—4.12-8

Table 4.1-12. Continued

Impact (similar to that presented in the Draft EIS/EIR[a])	Description of Impact	Location in the Draft EIS/EIR (page number)
Impact 4.12-2. Significant—The public could be exposed to hazardous or toxic materials associated with or disturbed during construction, modification, or removal activities at the Restoration Project sites; public access to construction areas could also increase the potential for exposure to hazardous materials.	Construction of the new disinfection facility could result in an increased risk to the public associated with equipment use, exposure to potentially hazardous materials during construction, and other hazards, including open trenches. Although the construction activities are located in a remote location, it is possible that the increased traffic and activity at Willow Springs and along access roads could also increase public curiosity and draw them to the construction site. This impact is similar to Impact 4.12-2 described in the Draft EIS/EIR. The mitigation measures identified for Impact 4.12-2 will be implemented to reduce this impact to a less-than-significant level.	4.12-8—4.12-9
Impact 4.12-3. Significant—Increased vehicle traffic along private access roads during construction activities could endanger residents and domestic animals.	Increased traffic associated with construction of the new disinfection facility at Willow Springs would increase hazards to people and domestic animals that live along access roads. Hazards to people and domestic animals would increase especially during peak morning and evening commuting hours when work crews typically arrive at and leave the construction site. This impact is similar to Impact 4.12-3 described in the Draft EIS/EIR. The mitigation measures identified for Impact 4.12-3 will be implemented to reduce this impact to a less-than-significant level.	4.12-9—4.12-10
SECTION 4.13—PUBLIC SERVICES AND UTILITIES		
Impact 4.13-1. Significant—Proposed activities at the Restoration Project sites may increase demands on fire, police, and emergency medical services.	Construction of the new disinfection facility at Willow Springs has the potential to result in temporary increased demands on fire protection, police protection, and emergency medical services that may be needed in the area. Construction activities would result in additional traffic and workers in the Willow Springs area. This impact is similar to Impact 4.13-1 described in the Draft EIS/EIR. The mitigation measure identified for Impact 4.13-1 will be implemented to reduce this impact to a less-than-significant level.	4.13-7 to 4.13-8

Table 4.1-12. Continued

Impact (similar to that presented in the Draft EIS/EIR[a])	Description of Impact	Location in the Draft EIS/EIR (page number)
SECTION 4.14—RECREATION		
None.		
SECTION 4.15—CULTURAL		
None.		
SECTION 4.16—OTHER NEPA ANALYSES		
None.		
SECTION 4.17—OTHER REQUIRED ANALYSES		
None.		

[a] Source: Jones & Stokes 2003.

Notes:

EIS/EIR = environmental impact statement/environmental impact report.

MLTF = Mount Lassen Trout Farm.

Table 4.1-13. Summary of Impacts Associated with the Proposed Construction of a Fish Passage Barrier at and Downstream of Asbury Diversion Dam Already Disclosed in the Draft EIS/EIR

Impact (similar to that presented in the Draft EIS/EIR[a])	Description of Impact	Location in the Draft EIS/EIR (page number)
SECTION 4.1—FISH		
None.		
SECTION 4.2—BOTANICAL, WETLAND, AND WILDLIFE RESOURCES		
Impact 4.2-1. Significant—Potential disturbance or loss of 7.2 acres of woody riparian vegetation and associated wildlife habitat.	Construction of a new disinfection facility at Willow Springs may involve clearing woody riparian vegetation associated with wildlife habitat. This impact is similar to Impact 4.2-1 described in the Draft EIS/EIR. The mitigation measures identified for Impact 4.2-1 will be implemented to reduce this impact to a less-than-significant level.	4.2-24—4.2-27
Impact 4.2-2. Significant—Potential introduction of noxious weeds or spread of existing noxious weeds.	Construction of a new disinfection facility at Willow Springs has the potential to introduce or spread noxious weeds. This impact is similar to Impact 4.2-2 described in the Draft EIS/EIR. The mitigation measures identified for Impact 4.2-2 will be implemented to reduce this impact to a less-than-significant level.	4.2-27 to 4.2-28
Impact 4.2-3. Significant—Potential loss or disturbance of 41.27 acres of waters of the United States (including wetlands).	Wetlands and waters of the United States are located within the construction area for a new disinfection facility at Willow Springs, resulting in potential loss or disturbance of waters of the United States (including wetlands). This impact is similar to Impact 4.2-3 described in the Draft EIS/EIR. The mitigation measures identified for Impact 4.2-3 will be implemented to reduce this impact to a less-than-significant level.	4.2-28 to 4.2-30
Impact 4.2-4. Significant—Potential loss or disturbance of common upland woodland and forest communities and associated wildlife habitat.	Construction of a new disinfection facility at Willow Springs could potentially result in loss or disturbance of common upland woodland and forest communities and associated wildlife habitat, specifically blue oak woodland/savanna habitat. This impact is similar to Impact 4.2-4 described in the Draft EIS/EIR. The mitigation measures identified for Impact 4.2-4 will be implemented to reduce this impact to a less-than-significant level.	4.2-30 to 4.2-32

Table 4.1-13. Continued

Impact (similar to that presented in the Draft EIS/EIR[a])	Description of Impact	Location in the Draft EIS/EIR (page number)
Impact 4.2-7. Significant—Potential disturbance of foothill yellow-legged frogs and their habitat.	Construction of a new disinfection facility at Willow Springs could potentially affect foothill yellow-legged frog habitat near the Willow Springs trout-rearing ponds. This impact is similar to Impact 4.2-6 in the Draft EIS/EIR. The mitigation measure identified for Impact 4.2-6 will be implemented to reduce this impact to a less-than-significant level.	4.2-34 to 4.2-35
Impact 4.2-8. Significant—Potential disturbance of northwestern pond turtles and their habitat.	Construction of a new disinfection facility at Willow Springs could affect northwestern pond turtle habitat near the Willow Springs trout-rearing ponds. This impact is similar to Impact 4.2-7 described in the Draft EIS/EIR. The mitigation measure identified for Impact 4.2-7 will be implemented to reduce this impact to a less-than-significant level (see page 4.2-54 of the Draft EIS/EIR).	4.2-35 to 4.2-36
Impact 4.2-9. Significant—Potential disturbance of breeding habitat for yellow-breasted chat and little willow flycatcher.	Construction of a new disinfection facility at Willow Springs could remove or damage riparian vegetation that provides nesting and foraging habitat for the little willow flycatcher and the yellow-breasted chat. Construction activities may also stress adults of these species and affect their reproductive success or survivorship or cause the adults to abandon their nests. This impact is similar to Impact 4.2-8 described in the Draft EIS/EIR. The mitigation measure identified for Impact 4.2-8 will be implemented to reduce this impact to a less-than-significant level.	4.2-36 to 4.2-37
Impact 4.2-10. Significant—Potential disturbance to nesting raptors.	Construction of a new disinfection facility at Willow Springs may directly remove or damage riparian vegetation that provides nesting and foraging habitat for raptors, especially the Cooper's hawk. Construction activities may also stress the adults of these species and affect their reproductive success or survivorship or cause the adults to abandon their nests. This impact is similar to Impact 4.2-9 described in the Draft EIS/EIR. The mitigation measure identified for Impact 4.2-9 will be implemented to reduce this impact to a less-than-significant level.	4.2-37 to 4.2-38

Table 4.1-13. Continued

Impact (similar to that presented in the Draft EIS/EIR[a])	Description of Impact	Location in the Draft EIS/EIR (page number)
SECTION 4.3—HYDROLOGY		
None.		
SECTION 4.4—WATER QUALITY		
None.		
SECTION 4.5—GROUNDWATER		
None.		
SECTION 4.6—LAND USE		
None.		
SECTION 4.7—GEOLOGY AND SOILS		
Impact 4.7-1. Significant—Potential accelerated water and wind erosion from construction activities.	Construction of the new disinfection facility at Willow Springs would require vegetation removal and ground disturbance. This disturbance would involve clearing, grading, blading, and related activities. These construction activities would expose soils to erosion. This impact is similar to Impact 4.7-1 described in the Draft EIS/EIR. The mitigation measure identified for Impact 4.7-1 will be implemented to reduce this impact to a less-than-significant level.	4.7-11 to 4.7-13
SECTION 4.8—AESTHETICS		
None.		

Table 4.1-13. Continued

Impact (similar to that presented in the Draft EIS/EIR[a])	Description of Impact	Location in the Draft EIS/EIR (page number)
SECTION 4.9—TRANSPORTATION		
Impact 4.9-1. Less than Significant—Construction and removal activities at the Restoration Project sites would result in increased traffic volumes on state, county, and private roadways.	Construction of the new disinfection facility at Willow Springs would result in increased traffic levels on state, county, and private roads used to transport construction workers, equipment, and materials to the site. Construction workers and equipment would travel along a several state, county, and private roads to access the construction site. It is not expected that increased traffic on state highways would result in significant impacts on traffic volumes. The impact of increased traffic volumes on county and private roads would be less than significant as a result of improvements being installed as part of the project and compliance with *Reclamation Safety and Health Standards*.	4.9-18 to 4.9-20
Impact 4.9-2. Less than Significant—Construction traffic could damage county and private roadways.	The Bureau of Reclamation contractors will be required not to exceed legal load limits for the county roads accessing the site. Other measures will help avoid damage from occurring. The impact of construction traffic on county and private roads is considered to be less than significant.	4.9-20
Impact 4.9-3. Less than Significant—Construction traffic or activities could delay emergency vehicle response times.	It may be necessary for emergency response vehicles to access the construction site along private roads. It is not, however, expected that construction traffic would substantially delay emergency vehicle response times. Emergency vehicles would likely be needed to respond to an incident at the Willow Springs construction site when workers are on site and not during morning and afternoon commute times, when traffic is heaviest. The impact of construction traffic and activities on emergency vehicle response times is considered to be less than significant.	4.9-21

Table 4.1-13. Continued

Impact (similar to that presented in the Draft EIS/EIR[a])	Description of Impact	Location in the Draft EIS/EIR (page number)
SECTION 4.10—NOISE		
Impact 4.10-2. Significant—Exposure of noise-sensitive land uses to noise from on-site construction activities.	Large equipment would be used during construction of the Willow Springs disinfection facility. The MLTF Willow Springs employees and the residence located to the west of the trout farm are the only noise-sensitive land uses that would be exposed to noise from on-site construction activity. This impact is similar to Impact 4.10-2 described in the Draft EIS/EIR. The mitigation measure identified for Impact 4.10-2 will be implemented to reduce this impact to a less-than-significant level.	4.10-9 to 4.10-10
SECTION 4.11—AIR QUALITY		
Impact 4.11-1. Significant—Construction-related emissions in excess of allowable thresholds.	Construction of the new disinfection facility at Willow Springs could result in a temporary increase in an undetermined amount of construction-related emissions. This impact is similar to Impact 4.11-1 described in the Draft EIS/EIR. The mitigation measures identified for Impact 4.11-1 will be implemented to reduce this impact to a less-than-significant level.	4.11-8 to 4.11-9
SECTION 4.12—PUBLIC HEALTH AND SAFETY		
Impact 4.12-1. Significant—Construction workers could be exposed to hazardous or toxic materials disturbed during construction, modification, or removal activities at the Restoration Project sites.	Hazardous materials, such as petroleum-based products, solvents, and lubricants, may be encountered during construction of the new disinfection facility at Willow Springs. Construction workers could come into contact with these hazardous materials. Workers could also be exposed to similar hazardous materials brought on site for use during the construction, modification, or removal of Restoration Project facilities. This impact is similar to Impact 4.12-1 described in the Draft EIS/EIR. The mitigation measures identified for Impact 4.12-1 will be implemented to reduce this impact to a less-than-significant level.	4.12-7—4.12-8

Table 4.1-13. Continued

Impact (similar to that presented in the Draft EIS/EIR[a])	Description of Impact	Location in the Draft EIS/EIR (page number)
Impact 4.12-2. Significant—The public could be exposed to hazardous or toxic materials associated with or disturbed during construction, modification, or removal activities at the Restoration Project sites; public access to construction areas could also increase the potential for exposure to hazardous materials.	Construction of the new disinfection facility could result in an increased risk to the public associated with equipment use, exposure to potentially hazardous materials during construction, and other hazards, including open trenches. Although the construction activities are located in a remote location, it is possible that the increased traffic and activity at Willow Springs and along access roads could also increase public curiosity and draw them to the construction site. This impact is similar to Impact 4.12-2 described in the Draft EIS/EIR. The mitigation measures identified for Impact 4.12-2 will be implemented to reduce this impact to a less-than-significant level.	4.12-8—4.12-9
Impact 4.12-3. Significant—Increased vehicle traffic along private access roads during construction activities could endanger residents and domestic animals.	Increased traffic associated with construction of the new disinfection facility at Willow Springs would increase hazards to people and domestic animals that live along access roads. Hazards to people and domestic animals would increase especially during peak morning and evening commuting hours when work crews typically arrive and leave from the construction site. This impact is similar to Impact 4.12-3 described in the Draft EIS/EIR. The mitigation measures identified for Impact 4.12-3 will be implemented to reduce this impact to a less-than-significant level.	4.12-9—4.12-10
SECTION 4.13—PUBLIC SERVICES AND UTILITIES		
Impact 4.13-1. Significant—Proposed activities at the Restoration Project sites may increase demands on fire, police, and emergency medical services.	Construction of the new disinfection facility at Willow Springs has the potential to result in temporary increased demands on fire protection, police protection, and emergency medical services that may be needed in the area. Construction activities would result in additional traffic and workers in the Willow Springs area. This impact is similar to Impact 4.13-1 described in the Draft EIS/EIR. The mitigation measure identified for Impact 4.13-1 will be implemented to reduce this impact to a less-than-significant level.	4.13-7 to 4.13-8

Table 4.1-13. Continued

Impact (similar to that presented in the Draft EIS/EIR[a])	Description of Impact	Location in the Draft EIS/EIR (page number)
SECTION 4.14—RECREATION		
None.		
SECTION 4.15—CULTURAL		
None.		
SECTION 4.16—OTHER NEPA ANALYSES		
None.		
SECTION 4.17—OTHER REQUIRED ANALYSES		
None.		

[a] Source: Jones & Stokes 2003.

Notes:

EIS/EIR = environmental impact statement/environmental impact report.

MLTF = Mount Lassen Trout Farm.

of agriculture according to the Food and Agricultural Code (Section 23.5). Once Willow Springs is relocated and its infrastructure is removed, the land would return to ranchland or cattle grazing, which is another form of agriculture.

Impacts associated with mitigation Option C-1 (i.e., modifying MLTF's permit to allow on-site recreational fishing of farm-raised trout) would primarily be related to the construction of a new fishing pond and aesthetic improvements at the Willow Springs project site. Modification to Willow Springs' existing infrastructure would be minimal because the facilities would continue to be used to raise rainbow trout. Construction of the on-site fishing pond could result in significant temporary or permanent impacts, including disturbance or loss of special-status species and their habitats; disturbance or loss of waters of the United States; accelerated water and wind erosion; increased traffic volumes on local roadways; exposure of noise-sensitive land uses to construction noise; and construction-related air emissions in excess of allowable thresholds. As long as MLTF uses native plants and nontoxic materials to improve the visual appearance of the Willow Springs facility, impacts associated with visual improvements would be considered less than significant. MLTF's Willow Springs facility may also experience a socioeconomic effect (i.e., loss in revenue) as a result of changing its business from raising rainbow trout for stocking in other waters in the state to raising trout for on-site recreational purposes only.

Impacts associated with mitigation Option C-2 (i.e., modifying MLTF's permit to raise an equivalent production of coldwater game fish) would result in few impacts on the physical environment because the Willow Springs facility would use its existing infrastructure to raise coldwater game fish (e.g., brown trout) for stocking in other waters in the state, which would be similar to its current operations of raising rainbow trout. Although brown trout is known to be less susceptible to anadromous fish diseases (such as the IHN virus) than rainbow trout, brown trout could be a host species for other serious fish diseases such as bacterial kidney disease, which is classified as a serious disease in DFG's regulations (Title 14, Section 245 [c][2]). Additionally, MLTF's Willow Springs facility may experience a socioeconomic effect (i.e., loss in revenue) as a result of shifting production from rainbow trout to a species such as brown trout attributable to marketability and production differences.

Impacts associated with mitigation Option D would include primarily land use impacts. Impacts associated with changing the land that MLTF's Willow Springs facility is currently leasing back to ranchland would be less than significant because the land would remain in agricultural production. The land is currently used by MLTF for aquaculture, which is a form of agriculture according to the Food and Agricultural Code (Section 23.5). Once Willow Springs is bought out and its infrastructure is removed, the land would return to ranchland or cattle grazing, which is another form of agriculture.

Asbury Diversion Dam

The Mitigation Measure for Impact 4.1-8 at Asbury Diversion Dam would cause an additional environmental impact that was not disclosed in the Draft EIS/EIR

(Jones & Stokes 2003). This new impacts is described in the appropriate sections in Chapter 4 of this Draft SEIS/REIR and includes the following:

- Section 4.2, Botanical, Wetland, and Wildlife Resources.
  - **Impact 4.2-6. Significant—Potential disturbance of California red-legged frogs and their habitat.** The mitigation measure(s) identified for Impact 4.2-6 will be implemented to reduce this impact to a less-than-significant level.

Additional environmental impacts associated with the implementation of the Mitigation Measure for Impact 4.1-8 at Asbury Diversion Dam are similar to impacts already disclosed in the Draft EIS/EIR. These impacts have been updated to include the effects of implementing the Willow Springs mitigation measure options for Impact 4.1-8 and are listed in Table 4.1-13.

No Dam Removal Alternative

Impact 4.1-27. Significant—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. According to DFG, the impact of 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 is considered significant. This impact is the same as Impact 4.1-8 described above for the Five Dam Removal Alternative. Reclamation will implement the Mitigation Measures for Impact 4.1-8 (including mitigation at Jeffcoat, Willow Springs, and Asbury Diversion Dam described on pages 4-5 through 4-12 of this Draft SEIS/REIR) to reduce this impact to a less-than-significant level. The impacts associated with implementing these mitigation measures are the same as described under Impact 4.1-8 and listed in Table 4.1-11 for the Jeffcoat site, Table 4.1-12 for Willow Springs, and Table 4.1-13 for Asbury Diversion Dam.

Six Dam Removal Alternative

Long-Term and Ongoing Effects

Impact 4.1-45. Significant—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. According to DFG, the impact of 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 Hatchery fish is considered significant. This impact is similar to Impact 4.1-8 described above for the Five Dam Removal Alternative; however, under the Six Dam Removal Alternative, Eagle Canyon Canal would

be decommissioned and, therefore, would no longer contribute to the risk of fish pathogen transfer to the Jeffcoat facilities. Water would, however, continue to be diverted along Inskip Canal and could potentially transfer fish pathogens to the Willow Springs facility. Anadromous fish could also potentially pass over Asbury Diversion Dam and transfer fish pathogens to the Darrah Springs State Fish Hatchery. To reduce this significant impact to a less-than-significant level, Reclamation will implement one of the mitigation options described for the Willow Springs facility and for Asbury Diversion Dam for Impact 4.1-8 under the Five Dam Removal Alternative. The impacts associated with implementing these mitigation measures are the same as described under Impact 4.1-8 and listed in Table 4.1-12 for the Willow Springs facility and in Table 4.1-13 for Asbury Diversion Dam.

Three Dam Removal Alternative

Long-Term and Ongoing Effects

Impact 4.1-65. Significant—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. According to DFG, the impact of 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 is considered significant. This impact is the same as Impact 4.1-45 described above for the Six Dam Removal Alternative, and similar to Impact 4.1-8 described above for the Five Dam Removal Alternative. To reduce this significant impact to a less-than-significant level, Reclamation will implement one of the mitigation options described for the Willow Springs facility and for Asbury Diversion Dam for Impact 4.1-8 under the Five Dam Removal Alternative. The impacts associated with implementing these mitigation measures are the same as described under Impact 4.1-8 and listed in Table 4.1-12 for the Willow Springs facility and in Table 4.1-13 for Asbury Diversion Dam.

4.2 Botanical, Wetland, and Wildlife Resources

New significant impacts associated with the mitigation measures described for MLTF's Jeffcoat and Willow Springs facilities (see Mitigation Measures for Impact 4.1-8 in Section 4.1, Fish, on page 4-5 of this document) have been identified for biological resources and will be incorporated into Section 4.2, Botanical, Wetland, and Wildlife Resources, of the Final EIS/EIR. New impacts are associated with the construction of the proposed Eagle Canyon pipeline near the Jeffcoat mitigation site, and implementation of mitigation options for the Willow Springs mitigation site (including construction of a new disinfection facility, relocation to an off-site facility, or modification of MLTF operations at Willow Springs). Impacts described below are also associated with construction activities proposed at the Asbury Diversion Dam project site because proposed activities for this site have changed (see Chapter 3 of this Draft SEIS/REIR) since release of the Draft EIS/EIR (Jones & Stokes 2003).

The Jeffcoat and Willow Springs mitigation sites were not included in the original project area for the Restoration Project as described in the Draft EIS/EIR (Jones & Stokes 2003). The revised project description for the Asbury Diversion Dam project site also includes some areas that were not assessed in the Draft EIS/EIR (Jones & Stokes 2003). As a result, all three project sites were surveyed between June and November 2004 for sensitive plant communities, waters of the United States, and potential special-status wildlife habitat. During these subsequent surveys, valley elderberry longhorn beetle habitat was found to exist near the Jeffcoat mitigation site, potential California black rail habitat was found to exist near the Jeffcoat and Willow Springs mitigation sites, and potential California red-legged frog habitat was found to exist in the vicinity of all three project sites.

The California black rail, for which habitat was not previously identified at the Battle Creek project sites, is listed as a threatened species under the CESA and is fully protected under DFG code. Additionally, the California red-legged frog, which is federally listed as threatened and is a state species of special concern, had also not been previously identified at the Battle Creek project sites. In addition to describing impacts associated with construction activities at the Asbury Diversion Dam project site and the Jeffcoat and Willow Springs mitigation sites, new text has also been added to Section 4.2 describing the species and potential habitat for California red-legged frog and California black rail (see Affected Environment below).

Reclamation and the State Water Board are soliciting comments on this new information, which is presented below as it is proposed to be included in the Final EIS/EIR. Impacts associated with construction of the proposed Eagle Canyon pipeline are not addressed under the Six Dam and the Three Dam Removal Alternatives because Eagle Canyon Diversion Dam would be removed under these alternatives and, as a result, the Eagle Canyon pipeline would not need to be constructed.

Botanical and Wetland Study Methods

For this Draft SEIS/REIR, Jones & Stokes wetland ecologists surveyed the Jeffcoat and Willow Springs mitigation sites for plant communities, wetland features, and waters of the United States. As identified under Impact 4.1-8 in Section 4.1, Fish, these areas included the construction area proposed for the Eagle Canyon pipeline near MLTF's Jeffcoat facilities and the construction area proposed for mitigation near the MLTF's Willow Springs facility. The Asbury Diversion Dam project site was also resurveyed for plant communities, wetland features, and other waters of the United States. The study areas for Asbury Diversion Dam, Jeffcoat, and Willow Springs are shown on Figures L-10, L-11, and L-12, and Figures M-10, M-11, and M-12 in Appendices L and M, respectively. Survey dates for plant community characterization and wetland delineations are presented in Table 4.2-1. Study methods for each are described below.

Table 4.2-1. Plant Community Characterization and Wetland Delineation Survey Dates

Restoration Project Site	Survey Dates	Survey Purpose
Asbury Diversion Dam	October 14, 2004	Plant community characterization and wetland delineation
MLTF Jeffcoat Mitigation Site	June 18, 2004	Plant community characterization and wetland delineation
	August 31, 2004	Plant community characterization and wetland delineation
	September 22–24, 2004	Plant community characterization and wetland delineation
MLTF Willow Springs Mitigation Site	October 12–14, 2004	Plant community characterization and wetland delineation

Special-Status Plant Surveys

No special-status plant surveys were performed at the Asbury Diversion Dam project site or at the Jeffcoat or Willow Springs mitigation sites for this Draft SEIS/REIR. Special-status plant surveys will be conducted in spring 2005 to determine the presence of special-status plants at Asbury Diversion Dam, Jeffcoat, and Willow Springs. These surveys will follow the methods described in Section 4.2 of the Draft EIS/EIR (Jones & Stokes 2003). Special-status plants documented or identified as potentially occurring in the Restoration Project area during the 2000 surveys are listed in Table 4.2-6 in the Draft EIS/EIR (Jones & Stokes 2003). This table will be updated and renumbered Table 4.2-2 for the Final EIS/EIR.

Plant Community Characterization and Mapping

Survey and mapping methods used to identify plant communities at the Asbury Diversion Dam project site and the Jeffcoat, and Willow Springs mitigation sites follow the methods described in the Draft EIS/EIR (Jones & Stokes 2003). Plant communities at each of the new sites were mapped in the field on aerial photographs (at a scale of 1 inch equaling approximately 200 feet). Descriptions and names of plant communities follow the community-type classification established for the Draft EIS/EIR. No additional plant communities were identified at Asbury Diversion Dam, Jeffcoat, and Willow Springs.

Noxious Weed Surveys

No noxious weed surveys were performed at the Asbury Diversion Dam project site and the Jeffcoat and Willow Springs mitigation sites for this Draft SEIS/REIR. Noxious weed surveys will be conducted in spring 2005 concurrently with the special-status plant surveys.

Wetland Delineation

Wetland delineation survey methods performed at the Asbury Diversion Dam project site and the Jeffcoat and Willow Springs mitigation sites are similar to those described in the Draft EIS/EIR (Jones & Stokes 2003). A detailed description of the wetland delineation methods performed at these sites will be presented in the *Revised Preliminary Delineation of Waters of the United States for the Battle Creek Salmon and Steelhead Restoration Project in Shasta and Tehama Counties, California*, which is currently in preparation by Jones & Stokes and will be submitted to the U.S. Army Corps of Engineers in early 2005.

Wildlife Resource Study Methods

For this Draft SEIS/REIR, Jones & Stokes wildlife biologists surveyed the Jeffcoat and Willow Springs mitigation sites for wildlife resources, including special-status wildlife and wildlife habitat. As identified under Impact 4.1-8 in Section 4.1, Fish, these areas included the construction area proposed for the Eagle Canyon pipeline near MLTF's Jeffcoat facilities and the construction area proposed for mitigation near the MLTF's Willow Springs facility. . The Asbury Diversion Dam project site was also surveyed for wildlife resources. The study areas for Asbury Diversion Dam, Jeffcoat, and Willow Springs are shown on Figures L-10, L-11, and L-12, respectively, in Appendix L. Survey dates for wildlife resources are presented in Table 4.2-3. Study methods for special-status wildlife and wildlife habitat are described below.

Table 4.2-3. Wildlife Survey Dates

Restoration Project Site	Survey Dates	Survey Purpose
Asbury Diversion Dam	April 20 and June 13, 2000	Special-status wildlife habitat assessment
	November 3, 2004	Special-status wildlife habitat assessment (California red-legged frog)
MLTF Jeffcoat Mitigation Site	June 18, 2004	Special-status wildlife habitat assessment
	August 31, 2004	Special-status wildlife habitat assessment (valley elderberry longhorn beetle, California red-legged frog, and California black rail)
MLTF Willow Springs Mitigation Site	September 30–October 1, 2004	Special-status wildlife habitat assessment (valley elderberry longhorn beetle, California black rail)
	November 3 and 15, 2004	Special-status wildlife habitat assessment (California red-legged frog)

Special-Status Wildlife Surveys

Jones & Stokes wildlife biologists performed protocol-level special-status habitat surveys for California red-legged frog at the Asbury Diversion Dam project site and the Jeffcoat and Willow Springs mitigation sites, as described below and noted in Table 4.2-3 above. Surveys for potential valley elderberry longhorn beetle habitat were conducted at Jeffcoat and Willow Springs. Potential valley elderberry longhorn beetle habitat was documented only at the Jeffcoat mitigation site. A Jones & Stokes wildlife biologist and a DFG biologist conducted reconnaissance-level special-status bird surveys at the Willow Springs and Jeffcoat mitigation sites. The surveys were not yet performed to meet USFWS protocols; however, all species and special-status species habitat that were identified during the surveys were noted and are described in this Draft SEIS/REIR. Threatened, endangered, candidate, and other special-status wildlife documented or identified as potentially occurring at Asbury Diversion Dam, Jeffcoat, and Willow Springs are presented in Table 4.2-4.

Valley Elderberry Longhorn Beetle

Valley elderberry longhorn beetle survey methods similar to those described in the Draft EIS/EIR (Jones & Stokes 2003) were used.

California Red-Legged Frog

A Jones & Stokes wildlife biologist examined aerial photographs of the Asbury Diversion Dam project site and the Jeffcoat and Willow Springs mitigation sites;

a topographic-based map of the Jeffcoat project site; and the Shingletown and Tuscan Buttes NE 7.5-minute U.S. Geological Survey topographic quadrangles. The purpose of this examination was to identify potential habitat (i.e., streams, springs, and ponds) for California red-legged frogs at each project site and within 1 mile (1.6 km) of the sites. The biologist conducted a site visit to assess the suitability of habitat at each site to support breeding, provide refuge, and provide dispersal corridors for California red-legged frogs. Every site assessment was based on habitat requirements described in USFWS's 1997 *Guidance on Site Assessment and Field Surveys for California Red-Legged Frogs* (USFWS 1997b). Determinations of suitability of habitat for California red-legged frogs were based on characteristics of the aquatic habitat, presence of fish, topography of the area, and vegetation present.

California Black Rail

California black rail habitat at the Jeffcoat and Willow Springs mitigation sites was identified using criteria published in Tecklin (1999) and Aigner et al. (1995) as well as the biologists' personal experience with occupied black rail habitat in the western foothills of the Sierra Nevada.

Affected Environment

Plant Communities and Associated Wildlife Habitats

Table 4.2-5 summarizes the plant communities and associated wildlife habitats observed at the Asbury Diversion Dam project site and the Jeffcoat and Willow Springs mitigation sites. Tables 4.2-6 through 4.2-9 summarize the total acreage of sensitive and common plant communities located at each site for each alternative. Plant communities documented at Asbury Diversion Dam, Jeffcoat, and Willow Springs are shown on Figures L-10, L-11, and L-12, respectively, in Appendix L of this Draft SEIS/REIR. Waters of the United States documented at the three project sites are shown in Figures M-10, M-11, and M-12 in Appendix M of this Draft SEIS/REIR. Descriptions of each plant community identified in the Restoration Project area are provided in the Draft EIS/EIR (Jones & Stokes 2003).

Special-Status Wildlife

Table 4.2-4 summarizes threatened, endangered, candidate, and other special-status wildlife documented or identified as potentially occurring at the Asbury Diversion Dam project site and the Jeffcoat and Willow Springs mitigation sites. Potential special-status wildlife habitat documented at Asbury Diversion Dam, Jeffcoat, and Willow Springs is shown on Figures L-10, L-11, and L-12, respectively, in Appendix L of this Draft SEIS/REIR. California red-legged frog and California black rail are described below. A detailed account for each

Table 4.2-4. Threatened, Endangered, Candidate, and Other Special-Status Wildlife Documented or Identified as Potentially Occurring at Asbury Diversion Dam, Jeffcoat East and West, and Willow Springs Sites

Common Name/ Scientific Name	Legal Status[1]		Distribution	Habitat Association	Occurrence in the Restoration Project Area
	Federal	State			
Insects					
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	FT, FS	–	Streamside habitats below 3,000 feet throughout the Central Valley	Riparian and oak savanna habitats with elderberry shrubs; Elderberry shrub is the host plant for the beetle	Suitable habitat was identified at Jeffcoat East and West
Amphibians					
California red-legged frog *Rana aurora draytoni*	FT	SSC	Along the coast and coastal mountain ranges of California from Marin County to San Diego County and in the Sierra Nevada from Tehama County to Fresno County	Permanent and semipermanent aquatic habitats, such as creeks and coldwater ponds, with emergent and submergent vegetation; may estivate in rodent burrows or cracks during dry periods	Suitable habitat was identified at Willow Springs, Jeffcoat East and West, and Asbury Dam
Foothill yellow-legged frog *Rana boylii*	SC, FS	SSC	In the Klamath, Cascade, north Coast, south Coast, Transverse, and Sierra Nevada Ranges up to approximately 6,000 feet elevation	Creeks or rivers in woodlands or forests with rock and gravel substrate and low overhanging vegetation along the edge; usually found near riffles with rocks and sunny banks nearby	Suitable habitat was identified at Willow Springs, Jeffcoat East and West, and Asbury Dam
Reptiles					
Northwestern pond turtle *Clemmys marmorata marmorata*	SC, FS	SSC	From the Oregon border of Del Norte and Siskiyou Counties, south along the coast to San Francisco Bay, inland through the Sacramento Valley, and on the western slope of the Sierra Nevada	Ponds, marshes, rivers, streams, and irrigation canals with muddy or rocky bottoms and with watercress, cattails, water lilies, or other aquatic vegetation in woodlands, grasslands, and open forests	Suitable habitat was identified at Willow Springs, Jeffcoat East and West, and Asbury Dam

Table 4.2-4. Continued

Common Name/ Scientific Name	Legal Status[1]		Distribution	Habitat Association	Occurrence in the Restoration Project Area
	Federal	State			
Birds					
Bald eagle *Haliaeetus leucocephalus*	FT	SE, FP	Nests in Siskiyou, Modoc, Trinity, Shasta, Lassen, Plumas, Butte, Tehama, Lake, and Mendocino Counties, in the Lake Tahoe Basin and in the northern Sacramento Valley; reintroduced into central coast; winter range includes the rest of California, except the southeastern deserts, and very high altitudes in the Sierra Nevada	In western North America, nests and roosts in coniferous forests within one mile of a lake, reservoir, stream, or the ocean	Suitable foraging habitat was identified at Willow Springs, and Jeffcoat East and West
California black rail *Laterallus jamaicensis*	SC	ST	Breeds locally in the western foothills of the northern Sierra Nevada, tidal marshes in San Pablo Bay area, Tomales Bay, Moro Bay, Tijuana Slough Estuary, the Sacramento River Delta, and the Lower Colorado River.	Found primarily in shallow freshwater and tidal wetlands dominated by bulrush, sedge, or salicornia.	Suitable habitat identified at Willow Springs and Jeffcoat East and West
California yellow warbler *Dendroica petechia brewsteri*	–	SSC	Nests in all of California except the Central Valley, the Mojave Desert region, and high altitudes in the Sierra Nevada; winters along the Colorado River and in parts of Imperial and Riverside Counties	Nests in riparian areas dominated by willows, cottonwoods, sycamores, or alders or in mature chaparral; may also use oaks, conifers, and urban areas near streamcourses	Suitable habitat was identified at Willow Springs, Jeffcoat East and West, and Asbury Dam
Cooper's hawk[2] *Accipiter cooperii*	–	SSC	Throughout California except high altitudes in the Sierra Nevada; winters in the Central Valley, southeastern desert regions, and plains east of the Cascade Range	Nests in a wide variety of habitat types, from riparian woodlands and digger pine-oak woodlands through mixed conifer forests	Suitable habitat was identified at Willow Springs, Jeffcoat East and West, and Asbury Dam
Golden eagle *Aquila chrysaetos*	–	SSC, FP	Resident in the foothills and mountains throughout California; uncommon nonbreeding visitor to lowlands such as the Central Valley	Nests on cliffs and escarpments or in tall trees overlooking open country; forages in annual grasslands, chaparral, and oak woodlands with plentiful medium- and large-sized mammals	Suitable foraging habitat was identified at Willow Springs, and Jeffcoat East and West

Table 4.2-4. Continued

Common Name/ Scientific Name	Legal Status[1]		Distribution	Habitat Association	Occurrence in the Restoration Project Area
	Federal	State			
Little willow flycatcher *Empidonax traillii brewsteri*	SC, FS	SE	Summers along the western Sierra Nevada from El Dorado to Madera County, in the Cascade and northern Sierra Nevada in Trinity, Shasta, Tehama, Butte, and Plumas Counties, and along the eastern Sierra Nevada from Lassen to Inyo County	Riparian areas and large wet meadows with abundant willows; usually found in riparian habitats during migration	Suitable breeding habitat was identified at Jeffcoat East and West
Loggerhead shrike *Lanius ludovicianus*	SC	SSC	Resident and winter visitor in lowlands and foothills throughout California; rare on coastal slope north of Mendocino County, occurring only in winter	Prefers open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches	No records from DFG's CNDDB; Suitable habitat was identified at Willow Springs, and Jeffcoat East and West
Long-eared owl *Asio otus*	–	SSC	Permanent resident east of the Cascade Range from Placer County north to the Oregon border, east of the Sierra Nevada from Alpine County to Inyo County; scattered breeding populations along the coast and in southeastern California; winters throughout the Central Valley and southeastern California	Nests in abandoned crow, hawk, or magpie nests, usually in dense riparian stands of willows, cottonwoods, live oaks, or conifers	No records from DFG's CNDDB; Suitable habitat was identified at Willow Springs, Jeffcoat East and West, and Asbury Dam
Osprey[2] *Pandion haliaetus*	–	SSC	Nests along the north coast from Marin County to Del Norte County, east through the Klamath and Cascade Ranges, and in the upper Sacramento Valley; important inland breeding populations at Shasta Lake, Eagle Lake, and Lake Almanor and small numbers elsewhere south through the Sierra Nevada; winters along the coast from San Mateo County to San Diego County	Nests in snags, trees, or utility poles near the ocean, large lakes, or rivers with abundant fish populations	Suitable habitat was identified at Willow Springs, Jeffcoat East and West, and Asbury Dam

Table 4.2-4. Continued

Common Name/ Scientific Name	Legal Status[1]		Distribution	Habitat Association	Occurrence in the Restoration Project Area
	Federal	State			
Vaux's swift *Chaetura vauxi*	–	SSC	Coastal belt from Del Norte County south to Santa Cruz County and in mid-elevation forests of the Sierra Nevada and Cascade Range	Nests in hollow, burned-out tree trunks in large conifers	No records from DFG's CNDDB; Suitable foraging habitat was identified at Willow Springs, Jeffcoat East and West, and Asbury Dam
White-tailed kite *Elanus leucurus*	–	FP	Lowland areas west of the Sierra Nevada from the head of the Sacramento Valley south, including coastal valleys and foothills, to western San Diego County	Low foothills or valley areas with valley or live oaks, riparian areas, and marshes near open grasslands	No records from DFG's CNDDB; Suitable habitat was identified at Willow Springs, Jeffcoat East and West, and Asbury Dam
Yellow-breasted chat *Icteria virens*	–	SSC	Nests locally in coastal mountains and Sierra Nevada foothills, east of the Cascades in northern California, along the Colorado River, and very locally inland in southern California	Nests in dense riparian habitats dominated by willows, alders, Oregon ash, tall weeds, blackberry vines, and grapevines	Occupied habitat was found at Jeffcoat East and West and at Asbury Dam; suitable habitat was identified at Willow Springs
Mammals					
American badger *Taxidae taxus*	–	–	Statewide except for the northwestern corner in Del Norte County and parts of Humboldt and Siskiyou Counties	Typically found in open areas with scattered shrubs and trees; also found in open forests, particularly ponderosa pine	No records from DFG's CNDDB; Suitable habitat was identified at Willow Springs, Jeffcoat East and West, and Asbury Dam
Fringed myotis *Myotis thysanodes*	SC	–	Throughout California except the southeastern deserts and the Central Valley	Found in a wide variety of habitats from low desert scrub to high-elevation coniferous forests; day and night roosts in caves, mines, trees, buildings, and rock crevices	No records from DFG's CNDDB; Suitable foraging habitat was identified at Willow Springs, Jeffcoat East and West, and Asbury Dam

Table 4.2-4. Continued

Common Name/ Scientific Name	Legal Status[1]		Distribution	Habitat Association	Occurrence in the Restoration Project Area
	Federal	State			
Long-eared myotis *Myotis evotis*	SC	–	Throughout California except the southeastern deserts and the Central Valley	Occurs primarily in high-elevation coniferous forests, but also found in mixed hardwood/conifer, high desert, and humid coastal conifer habitats	No records from DFG's CNDDB; Suitable foraging habitat was identified at Willow Springs, Jeffcoat East and West, and Asbury Dam
Long-legged myotis *Myotis volans*	SC	–	Mountains throughout California, including ranges in the Mojave Desert	Most common in woodlands and forests above 4,000 feet, but occurs from sea level to 11,000 feet	No records from DFG's CNDDB; Suitable foraging habitat was identified at Willow Springs, Jeffcoat East and West, and Asbury Dam
Pallid bat *Antrozous pallidus*	–	SSC	Throughout California, primarily at lower elevations and mid-elevations	Occurs in a variety of habitats from desert to coniferous forest; most closely associated with oak, yellow pine, redwood, and giant sequoia habitats in northern California; relies heavily on trees for roosts	No records from DFG's CNDDB; Suitable foraging habitat was identified at Willow Springs, Jeffcoat East and West, and Asbury Dam
Ringtail *Basariscus astutas*	–	FP	Little information on distribution and abundance; apparently occurs throughout the state except for the southern Central Valley and the Modoc Plateau	Occurs primarily in riparian habitats, but also known to occur in most forest and shrub habitats from lower elevations to mid-elevations	No records from DFG's CNDDB; Suitable habitat was identified at Willow Springs, Jeffcoat East and West, and Asbury Dam
Small-footed myotis *Myotis ciliolabrum*	SC	–	South Coast, Transverse, and Peninsular Ranges; Sierra Nevada; and the Great Basin	Open stands in forests and woodlands, as well as shrublands and desert scrub; uses caves, crevices, trees, and abandoned buildings	No records from DFG's CNDDB; Suitable foraging habitat was identified at Willow Springs, Jeffcoat East and West, and Asbury Dam

Table 4.2-4. Continued

Common Name/ Scientific Name	Legal Status[1]		Distribution	Habitat Association	Occurrence in the Restoration Project Area
	Federal	State			
Townsend's big-eared bat *Plecotus townsendii*	SC	SSC	Throughout California, from low desert to mid-elevation montane habitats	Roosts in caves, tunnels, mines, and dark attics of abandoned buildings; buildings must offer cavelike spaces to be suitable; highly sensitive to disturbance at roost sites	No records from DFG's CNDDB; Suitable foraging habitat was identified at Willow Springs, Jeffcoat East and West, and Asbury Dam
Yuma myotis *Myotis yumanensis*	SC	–	Common and widespread throughout most of California except the Colorado and Mojave Deserts	Found in a wide variety of habitats from sea level to 11,000 feet, but uncommon above 8,000 feet; optimal habitat is open forests and woodlands near water bodies	No records from DFG's CNDDB; Suitable foraging habitat was identified at Willow Springs, Jeffcoat East and West, and Asbury Dam

DFG = California Department of Fish and Game

CNDDB = California Natural Diversity Database

[1] Status Explanations:

Federal:

FE = listed as endangered under the federal Endangered Species Act (ESA).

FT = listed as threatened under ESA.

FS = U.S. Forest Service sensitive species (Region).

SC = species of concern; species for which existing information indicates it may warrant listing but for which substantial biological information to support a proposed rule is lacking.

– = no listing.

State:

SE = listed as endangered under the California Endangered Species Act (CESA).

ST = listed as threatened under CESA.

FP = fully protected under the California Fish and Game Code.

SSC = species of special concern in California.

– = no listing.

[2] This species is not considered to be a state species of special concern in the draft list of *Bird Species of Special Concern in California* (California Department of Fish and Game and Point Reyes Bird Observatory 2003). This list is currently under review by DFG and the Point Reyes Bird Observatory Advisory Committee.

Table 4.2-5. Plant Communities and Associated Wildlife Habitats Observed at the Restoration Project Sites[1]

Restoration Project Site	Annual Grassland	Blue Oak Woodland/Savanna	Live Oak Woodland	Emergent Wetland	Emergent Scrub Wetland	Seasonal Wetland
Asbury Diversion Dam	✓		✓			
Jeffcoat Mitigation Site	✓	✓	✓	✓	✓	✓
Willow Springs Mitigation Site	✓	✓		✓	✓	✓

Note: This table does not include plant communities and associated wildlife habitats observed along existing access roads.

Table 4.2-6. Biological Communities and Waters of the United States Potentially Affected by the Five Dam Removal Alternative

	Biological Communities (acres)						Waters of the United States (acres)					
Restoration Project Site	Annual Grassland	Blue Oak Woodland/ Savanna	Grey Pine/ Oak Woodland	Live Oak Woodland	Mixed Chaparral	Riparian Forest/ Riparian Scrub	Emergent Wetland	Emergent Scrub Wetland	Seasonal Wetland	Perennial Drainage[a]	Seasonal Drainage	Groundwater Seep
Asbury Diversion Dam	1.71	—	—	2.43	—	—	—	—	—	1.28	—	—
Jeffcoat Mitigation Site[b]	4.35	14.12	—	0.75	—	—	0.15	1.65	0.55	0.68[c]	—	—
Willow Springs Mitigation Site[d]	3.51	—	—	—	—	—	0.14	0.31	—	—	—	—
Total Acres Documented in the Draft EIS/EIR[e]	11.2	49.6	3.4	25.9	3.4	7.2	0.0	0.0	0.6	4.48	0.29	0.28
Total Acres Affected	**20.8**	**63.7**	**3.4**	**29.1**	**3.4**	**7.2**	**0.29**	**1.96**	**1.2**	**6.44**	**0.29**	**0.28**

[a] The designation *Perennial Drainage* includes riparian scrub and riparian forest communities that are located within the ordinary high water mark of the stream.

[b] Because the Jeffcoat mitigation site includes four different pipeline alignment alternatives, the acreage value presented in this table represents the most conservative estimate of biological communities and waters of the United States potentially affected by construction activities.

[c] Refers to Eagle Canyon Canal

[d] Affected habitat at the Willow Springs mitigation site only refers to the disinfection facility (Mitigation Option A). Affected habitat associated with the three additional mitigation options considered for Willow Springs will be provided once more information has become available.

[e] Since release of the Draft EIS/EIR for public review in July 2003, construction plans and specifications for the Restoration Project have been better defined. As a result, the acres of habitat potentially affected by the Restoration Project will be updated in the Final EIS/EIR.

Table 4.2-7. Biological Communities and Waters of the United States Potentially Affected by the No Dam Removal Alternative

	Biological Communities (acres)						Waters of the United States (acres)					
Restoration Project Site	Annual Grassland	Blue Oak Woodland/ Savanna	Grey Pine/ Oak Woodland	Live Oak Woodland	Mixed Chaparral	Riparian Forest/ Riparian Scrub	Emergent Wetland	Emergent Scrub Wetland	Seasonal Wetland	Perennial Drainage[a]	Seasonal Drainage	Groundwater Seep
Asbury Diversion Dam	1.71	—	—	2.43	—	—	—	—	—	1.28	—	—
Jeffcoat Mitigation Site[b]	4.35	14.12	—	0.75	—	—	0.15	1.65	0.55	0.68[c]	—	—
Willow Springs Mitigation Site[d]	3.51	—	—	—	—	—	0.14	0.31	—	—	—	—
Total Acres Documented in the Draft EIS/EIR[e]	10.9	22.3	1.7	14.6	2.1	4.1	0.1	0.0	0.6	10.3	0.1	0.5
Total Acres Affected	**20.5**	**36.4**	**1.7**	**17.8**	**2.1**	**4.1**	**0.4**	**1.96**	**1.2**	**12.3**	**0.1**	**0.5**

[a] The designation *Perennial Drainage* includes riparian scrub and riparian forest communities that are located within the ordinary high water mark of the stream.

[b] Because the Jeffcoat mitigation site includes four different pipeline alignment alternatives, the acreage value presented in this table represents the most conservative estimate of biological communities and waters of the United States potentially affected by construction activities.

[c] Refers to Eagle Canyon Canal

[d] Affected habitat at the Willow Springs mitigation site only refers to the disinfection facility (Mitigation Option A). Affected habitat associated with the three additional mitigation options considered for Willow Springs will be provided once more information has become available.

[e] Since release of the Draft EIS/EIR for public review in July 2003, construction plans and specifications for the Restoration Project have been better defined. As a result, the acres of habitat potentially affected by the Restoration Project will be updated in the Final EIS/EIR.

Table 4.2-8. Biological Communities and Waters of the United States Potentially Affected by the Six Dam Removal Alternative

	Biological Communities (acres)						Waters of the United States (acres)					
Restoration Project Site	Annual Grassland	Blue Oak Woodland/ Savanna	Grey Pine/ Oak Woodland	Live Oak Woodland	Mixed Chaparral	Riparian Forest/ Riparian Scrub	Emergent Wetland	Emergent Scrub Wetland	Seasonal Wetland	Perennial Drainage[a]	Seasonal Drainage	Groundwater Seep
Asbury Diversion Dam	1.71	—	—	2.43	—	—	—	—	—	1.28	—	—
Jeffcoat Mitigation Site[b]	—	—	—	—	—	—	—	—	—	—	—	—
Willow Springs Mitigation Site[c]	3.51	—	—	—	—	—	0.14	0.31	—	—	—	—
Total Acres Documented in the Draft EIS/EIR[d]	11.2	49.6	3.4	25.9	3.4	7.2	0.1	0.0	0.6	10.7	0.2	0.5
Total Acres Affected	**16.4**	**49.6**	**3.4**	**28.3**	**3.4**	**7.2**	**0.14**	**0.31**	**0.6**	**12.0**	**0.2**	**0.5**

[a] The designation *Perennial Drainage* includes riparian scrub and riparian forest communities that are located within the ordinary high water mark of the stream.

[b] Because the Jeffcoat mitigation site includes four different pipeline alignment alternatives, the acreage value presented in this table represents the most conservative estimate of biological communities and waters of the United States potentially affected by construction activities.

[d] Affected habitat at the Willow Springs mitigation site only refers to the disinfection facility (Mitigation Option A). Affected habitat associated with the three additional mitigation options considered for Willow Springs will be provided once more information has become available.

[d] Since release of the Draft EIS/EIR for public review in July 2003, construction plans and specifications for the Restoration Project have been better defined. As a result, the acres of habitat potentially affected by the Restoration Project will be updated in the Final EIS/EIR.

Table 4.2-9. Biological Communities and Waters of the United States Potentially Affected by the Three Dam Removal Alternative

	Biological Communities (acres)						Waters of the United States (acres)					
Restoration Project Site	Annual Grassland	Blue Oak Woodland/ Savanna	Grey Pine/ Oak Woodland	Live Oak Woodland	Mixed Chaparral	Riparian Forest/ Riparian Scrub	Emergent Wetland	Emergent Scrub Wetland	Seasonal Wetland	Perennial Drainage[a]	Seasonal Drainage	Groundwater Seep
Asbury Diversion Dam	1.71	—	—	2.43	—	—	—	—	—	1.28	—	—
Jeffcoat Mitigation Site[b]	—	—	—	—	—	—	—	—	—	—	—	—
Willow Springs Mitigation Site[c]	3.51	—	—	—	—	—	0.14	0.31	—	—	—	—
Total Acres Documented in the Draft EIS/EIR[d]	11.1	24.8	3.4	14.6	3.4	6.0	0.1	0.0	0.6	10.3	0.1	0.5
Total Acres Affected	**16.3**	**24.8**	**3.4**	**17.0**	**3.4**	**6.0**	**0.2**	**0.3**	**0.6**	**11.6**	**0.1**	**0.5**

[a] The designation *Perennial Drainage* includes riparian scrub and riparian forest communities that are located within the ordinary high water mark of the stream.

[b] Because the Jeffcoat mitigation site includes four different pipeline alignment alternatives, the acreage value presented in this table represents the most conservative estimate of biological communities and waters of the United States potentially affected by construction activities.

[d] Affected habitat at the Willow Springs mitigation site only refers to the disinfection facility (Mitigation Option A). Affected habitat associated with the three additional mitigation options considered for Willow Springs will be provided once more information has become available.

[d] Since release of the Draft EIS/EIR for public review in July 2003, construction plans and specifications for the Restoration Project have been better defined. As a result, the acres of habitat potentially affected by the Restoration Project will be updated in the Final EIS/EIR.

species is presented in Appendix O of this Draft SEIS/REIR. Descriptions of other wildlife species identified in the Restoration Project area, including valley elderberry longhorn beetle, are provided in the Draft EIS/EIR (Jones & Stokes 2003).

California Red-Legged Frog

California red-legged frog is federally listed as threatened and is designated as a California species of special concern. California red-legged frog is a relatively large frog (1¾–5¼ inches) with red on the lower abdomen and underside of the hind legs (Stebbins 2003). California red-legged frog occurs at isolated locations in the Sierra Nevada and North Coast, and northern Transverse Ranges. It is relatively common in the San Francisco Bay area and along the central coast and is still present in Baja California, Mexico (USFWS 2002). California red-legged frogs use a variety of habitat types, including various aquatic systems, riparian, and upland habitats (USFWS 2002); however, they may complete their entire life cycle in a pond or other aquatic site that is suitable for all life stages (66 FR 14626). The decline of California red-legged frog is attributable to a variety of factors including commercial harvesting, exotic aquatic predators, and habitat alterations (Jennings and Hayes 1994).

There are no records of sightings of California red-legged frogs within a 5-mile (8-km) radius of the project sites. The closest record for a California red-legged frog is approximately 48 miles (77 km) southwest of the project sites in Tehama County (CNDDB 2004). One adult frog was observed at this location in 1986.

Potential California red-legged frog habitat at the Asbury Pump Station and Diversion Dam site consists of Baldwin Creek (see Figure L-10 in Appendix L of this Draft SEIS/REIR). A large ponded area immediately upstream of the Asbury Diversion Dam and portions of Baldwin Creek downstream of the dam provide suitable breeding habitat for California red-legged frogs. Suitable refuge and dispersal habitat is also present in Baldwin Creek, downstream of the dam. Baldwin Creek upstream of the ponded area does not provide suitable habitat for California red-legged frogs because of the unsuitable substrate, and lack of pooled areas and emergent vegetation.

Several areas provide suitable breeding and refuge habitat for California red-legged frog at the Jeffcoat site, including two ponds, two forebays, and Juniper Gulch (see Figure L-11 in Appendix L of this Draft SEIS/REIR). An unnamed creek at the southwest end of the site may provide suitable refuge and dispersal habitat for California red-legged frogs. Eagle Canyon Canal does not provide suitable breeding, refuge, or dispersal habitat because of the steep banks and moderately swift flow of the water.

A pond and an unnamed creek at the Willow Springs site provide suitable habitat for California red-legged frog. The pond is located northwest of the trout farm access road and appears to provide suitable breeding and refuge habitat for California red-legged frog (see Figure L-12 in Appendix L of this Draft

SEIS/REIR). An unnamed creek flows from the fish-rearing facility in the northwestern corner of the project site. Although the creek provides suitable dispersal and refuge habitat for California red-legged frogs, the lack of deeper pooled areas probably precludes its use as breeding habitat.

California Black Rail

California black rail is listed as threatened under the California Endangered Species Act (CESA) (California Fish and Game Code §§2050–2068) and is currently fully protected under the California Fish and Game Code Section 3511. This species is a very secretive, small rail that is restricted to emergent marshes/wetlands, and is almost exclusively found by its distinct vocalizations. In California, black rails are found in a few scattered freshwater marshes in the western foothills of the Sierra Nevada (Tecklin 1999; Aigner et al. 1995) and in freshwater and tidal marshes in Tomales Bay, the Sacramento–San Joaquin Delta region, San Francisco Bay, Morro Bay, Tijuana Slough Estuary, and along the Lower Colorado River (Eddleman et al. 1994; Evens et al. 1991).

No records of this species exist in Tehama or Shasta Counties, but California black rails have been found in nearby Butte County (Tecklin pers. comm.). No protocol-level surveys have been performed for this species in the upper foothills of Tehama County, so undiscovered populations could potentially exist in the Restoration Project area. California black rails potentially occur in an emergent wetland located upslope of Eagle Canyon Canal near a possible work area for the proposed Eagle Canyon pipeline bypass; however, the likelihood of this occurrence is currently unknown (see Figure L-11 in Appendix L of this Draft SEIS/REIR). The emergent wetland is not located where excavation or dewatering the canal would cause direct disturbance. The habitat is dominated by sedge and is upslope from the canal where it is dependent on a natural spring as its source of water. This emergent wetland would not be affected by dewatering Eagle Canyon Canal.

Biologists from Jones & Stokes and Reclamation surveyed the emergent wetland habitat near Eagle Canyon Canal on June 18, 2004. Biologists from Jones & Stokes, Reclamation, and DFG surveyed the same area again on August 31, 2004. Tape playback was used on both occasions. The latter survey was conducted at dawn, which is the optimal time for black rail surveys. No rails were detected during the first survey; however, three Virginia rails (*Rallus limicola*) were detected during the second survey. The presence of Virginia rails indicates high-quality habitat for rails.

Potential rail habitat was also identified at the Willow Springs mitigation site (see Figure L-12 in Appendix L of this Draft SEIS/REIR). As indicated on Figure L-12, three areas have been identified as suitable emergent wetland habitat dominated by cattails and bulrush. Two of these areas are located in portions of a larger wetland complex, and the third includes the edges along the MLTF raceways or trout-rearing ponds. All three areas were passively surveyed (i.e.,

tape playback was not used) on October 1, 2004, by biologists from Jones & Stokes and DFG. At least one Virginia rail was identified during this survey.

Environmental Consequences

Impact Assessment

Five Dam Removal Alternative (Proposed Action)

Impact 4.2-5. Significant—Potential disturbance to valley elderberry longhorn beetle habitat. Construction of the Eagle Canyon pipeline (see Mitigation Measures for Impact 4.1-8 in Section 4.1, Fish, on page 4-5 of this document) may disturb valley elderberry longhorn beetle habitat near the MLTF Jeffcoat facilities. Nine elderberry shrubs that are capable of providing habitat for valley elderberry longhorn beetle are located within 100 feet of the proposed Eagle Canyon pipeline alignments and staging area near the Jeffcoat facilities (see Figure L-11 in Appendix L of this Draft SEIS/REIR). Elderberry survey results are presented in Table 4.2-10. No elderberry shrubs were identified in the vicinity of the Asbury Diversion Dam site or the proposed Willow Springs disinfection facility.

Mitigation Measure for Impact 4.2-5. This impact is similar to Impact 4.2-5 described in the Draft EIS/EIR (Jones & Stokes 2003). The impact described in this Draft SEIS/REIR for the Jeffcoat mitigation site is considered significant because construction activities would remove one or more elderberry shrubs that provide potential habitat for valley elderberry longhorn beetle, federally listed as threatened, located in the vicinity of the proposed Eagle Canyon pipeline alignment. Implementing the mitigation measures would follow standard USFWS (1999) guidelines through Section 7 consultation with USFWS, as described for Impact 4.2-5 in the Draft EIS/EIR (Jones & Stokes 2003). This would reduce the impact to a less-than-significant level; however, elderberry shrub and native plant compensation described in this mitigation measure would need to be increased. Table 4.2-11 presents compensation ratios as recommended by the USFWS conservation guidelines for valley elderberry longhorn beetle (USFWS 1999). Table 4.2-12 lists valley elderberry longhorn beetle compensation measures for shrubs 24 through 32, which were identified in the vicinity of the proposed Eagle Canyon pipeline near the Jeffcoat mitigation site. Because the selected design for the Eagle Canyon pipeline at the Jeffcoat mitigation site is not known, elderberry shrubs originally identified as being affected may not be once the design is finalized. Additional shrubs may also be affected, depending on the final design of the mitigation site. The amount of compensation for impacts on valley elderberry longhorn beetle habitat will not be determined until the project design is finalized. This information will be presented in the Final EIS/EIR.

Table 4.2-10. Elderberry Shrub Survey Results at the Jeffcoat Mitigation Site, June 18, 2004 and August 31, 2004

Shrub Number	Site Location	Riparian or Upland	Stems 1–3 inches	Stems 3–5 inches	Stems >5 inches	Exit Holes Present
24 [a]	Jeffcoat	Riparian	0	0	0	No
25	Jeffcoat	Riparian	5	2	0	No
26	Jeffcoat	Riparian	3	0	0	No
27	Jeffcoat	Riparian	3	0	0	No
28	Jeffcoat	Riparian	9	0	1	No
29	Jeffcoat	Riparian	1	0	0	No
30	Jeffcoat	Riparian	4	0	0	No
31	Jeffcoat	Riparian	4	0	0	No
32	Jeffcoat	Riparian	0	0	1	No
33[b]	Jeffcoat	Riparian	—	—	—	—
34[b]	Jeffcoat	Riparian	—	—	—	—

[a] ~60 stems < 1 inch.

[b] Additional data for shrub #33 and shrub #34 will be provided in the Final EIS/EIR.

Table 4.2-11. Compensation Ratios Based on USFWS Conservation Guidelines for Valley Elderberry Longhorn Beetle

Location	Stems (maximum diameter at ground level)	Exit Holes? (No/Yes)	Elderberry Seedling Ratio	Associated Native Plant Ratio
Nonriparian	Stems 1–3"	No:	1:1	1:1
		Yes:	2:1	2:1
Nonriparian	Stems 3–5"	No:	2:1	1:1
		Yes:	4:1	2:1
Nonriparian	Stems >5"	No:	3:1	1:1
		Yes:	6:1	2:1
Riparian	Stems 1–3"	No:	2:1	1:1
		Yes:	4:1	2:1
Riparian	Stems 3–5"	No:	3:1	1:1
		Yes:	6:1	2:1
Riparian	Stems >5"	No:	4:1	1:1
		Yes:	8:1	2:1

Table 4.2-12. Valley Elderberry Longhorn Beetle Compensation for Shrubs 24 through 32[a]

Stem Size (inches)	Number of Stems	Exit Holes?	Riparian?	Elderberry Compensation Ratio	Elderberry Compensation (number of seedlings)	Native Plant Compensation Ratio[b]	Native Plant Compensation (number of seedlings)
1–3	29	No	Yes	2:1	58	1:1	58
3–5	2	No	Yes	3:1	6	1:1	6
>5	2	No	Yes	4:1	8	1:1	8
Total Compensation:					**72**		**72**

[a] Final compensation for valley elderberry longhorn beetle habitat loss will be presented in the Final EIS/EIR.

[b] The Native Plant Compensation Ratio is based on the Elderberry Compensation number.

Impact 4.2-6. Significant—Potential disturbance to California red-legged frogs and their habitat.

Structural and operational modifications at the Asbury Diversion Dam may directly affect suitable aquatic and upland habitat for California red-legged frog. Structural modifications to the dam and immediately downstream of the dam could temporarily disturb suitable breeding habitat for California red-legged frog. These structural modifications would not remove or reduce the large ponded area adjacent to the dam. Construction of the access trail and other construction activities would disturb upland habitat for California red-legged frog. As described in the project description, allowing sediment to pass through during high-flow events would continue. If California red-legged frogs occur in this area, they could be disturbed or killed during these events.

Construction of the Eagle Canyon pipeline (see Mitigation Measures for Impact 4.1-8 in Section 4.1, Fish, on page 4-5 of this Draft SEIS/REIR) may disturb suitable aquatic and upland habitat for California red-legged frog in the Jeffcoat mitigation site. Construction of the Eagle Canyon pipeline may directly affect suitable breeding, refuge, and dispersal habitat if the Alternative A or Alternative B pipeline alignments are implemented. Construction may also disturb upland habitat (areas within 300 feet of suitable habitat) for California red-legged frogs when any of the pipeline alternatives are implemented.

Construction of the disinfection facility at Willow Springs is not expected to directly affect breeding, refuge, or dispersal habitat for California red-legged frog because the facility would be constructed in the northeast portion of the project site and away from suitable habitat. Construction access via the dirt road through the facility would occur in upland habitat for California red-legged frog. Although the location of the staging area has not been identified, it is likely to be located in the northeast section of the project site and would not affect aquatic or upland habitat. It is possible that water quality in the unnamed creek downstream of the fish rearing facility could be reduced during operation of the disinfection

facility. The reduced water quality could affect California red-legged frogs or their habitat upon project completion.

In addition to implementing the Restoration Project's environmental commitments before and during project construction, Reclamation will implement the following mitigation measure to reduce construction-related impacts on California red-legged frog to a less-than-significant level.

Mitigation Measure for Impact 4.2-6. Because CRLF habitat was found at Jeffcoat, Willow Springs, and Asbury Diversion Dam, it will be necessary to conduct surveys for presence of CRLF using USFWS protocol before construction begins. If CRLF are found, Reclamation will need to re-initiate consultation with USFWS and acquire an amended biological opinion to address this species before construction can begin.

In addition to completing protocol-level surveys, Reclamation will implement the following measures at the Asbury Diversion Dam, Jeffcoat, and Willow Springs sites to avoid and minimize impacts on California red-legged frog and its habitat:

1. Prior to the initial site investigation and subsequent ground-disturbing activities, a qualified biologist will instruct all project personnel in worker awareness training, including recognition of California red-legged frogs and their habitat.
2. A qualified biologist will conduct preconstruction surveys in the project area no earlier than 2 days before ground-disturbing activities.
3. No activities will occur after October 15 or the onset of the rainy season, whichever occurs first, until May 1 except for during periods following 72 hours without precipitation. Activities can resume only after site inspection by a qualified biologist. The rainy season is defined as "a frontal system that results in depositing 0.25 inch or more of precipitation in one event."
4. Vehicles traveling to and from the project site will be confined to existing roadways to minimize disturbance of habitat.
5. Prior to moving a backhoe in the project area, a qualified biologist will make sure the route is clear of California red-legged frogs.
6. If a California red-legged frog is encountered during excavations, or any project activities, activities will cease until the frog is removed and relocated by a USFWS–approved biologist. Any incidental take will be reported to the USFWS immediately by telephone at 916/414-6600.
7. If suitable wetland habitat is disturbed or removed, the project proponent will restore the suitable habitat back to its original value by covering bare areas with mulch and revegetating all cleared areas with wetland species that are currently found in the project area.

Impact 4.2-11. Significant—Potential disturbance to nesting California black rails in emergent wetland.
Construction of the Eagle Canyon pipeline (see Mitigation Measures for Impact 4.1-8 in Section 4.1, Fish, on page 4-5 of this document) may disturb nesting California black rails near the MLTF Jeffcoat East facility. Construction disturbances could affect reproductive success and the survival of young, and/or result in the abandonment of nests in the emergent wetland habitat. Construction of the Eagle Canyon pipeline would not directly affect the emergent wetland, because the wetland is on the opposite side of the Eagle Canyon Canal from where construction activities would take place (see Figure L-11 in Appendix L of this Draft SEIS/REIR). However, noise from construction activities may disrupt the rails' nesting activities, foraging patterns, and communication with and protection of their young.

Construction of the Willow Springs disinfection facility may disturb nesting California black rails near the trout-rearing ponds. Construction activities could affect reproductive success and the survival of young, and/or result in the abandonment of nests in the emergent wetland habitat. Construction of the disinfection facility would not directly affect the emergent wetland. However, noise from construction activities may disrupt the rails' nesting activities, foraging patterns, and communication with and protection of their young.

The California black rail is a rare breeding species in a few scattered locations in the western foothills of the northern Sierra Nevada. Its population throughout much of California has declined because of degradation and loss of habitat. For these reasons, potential impacts resulting from disturbance of individuals or nests are considered significant. If surveys confirm the presence of black rails, measures should be implemented to avoid direct disturbance from noise or dust before September 15 when young are dependent upon parents.

In addition to implementing the Restoration Project's environmental commitments before and during project construction, Reclamation will implement the following mitigation measure to reduce construction-related impacts on California black rail to a less-than-significant level.

Mitigation Measure for Impact 4.2-11. Before beginning construction, a qualified biologist will conduct a tape-playback survey according to DFG-recommended protocol to determine presence of California black rails in the emergent wetland habitat near Eagle Canyon Canal and the Willow Springs trout farm facility. Construction activities will be restricted seasonally to avoid disturbance during the rails' breeding and nesting season from March 1 to September 15. If three protocol-level preconstruction surveys conducted once per month from June through August do not detect black rails during this survey season, the seasonal restrictions will be lifted for the remainder of the breeding season during the year when the surveys took place.

Impact 4.2-13. Less than Significant—Potential loss of woody riparian vegetation along PG&E canals.

The Restoration Project could cause the loss of scattered woody riparian trees and shrubs along two PG&E canals, the South Canal and the Wildcat Canal, as a result of cessation of flows. Canal leakage has supported the establishment of these riparian species in scattered locations along the canals. This impact is considered less than significant because the scattered riparian trees and shrubs along the canals provide minimal habitat functions and values for wildlife species.

In addition, the mitigation measure proposed for the Jeffcoat site could cause the potential loss of woody riparian vegetation along a portion of the Eagle Canyon Canal attributable to the cessation of flows in the canal. Once construction of the Eagle Canyon pipeline is complete, water that would normally travel up to approximately 5,000 feet in Eagle Canyon Canal would be diverted to the new pipeline. To some extent, canal leakage has provided an additional water source that may have helped to support the woody riparian vegetation located along Eagle Canyon Canal. This impact is considered less than significant because the natural springs found throughout this area provide significantly more water to support the riparian vegetation than the does canal leakage. It is likely that the loss of woody riparian vegetation as a result of the cessation of flows in Eagle Canyon Canal would be minimal.

Impact 4.2-15. Less than Significant—Potential disturbance of annual grassland habitat.

Construction impacts at the Asbury Diversion Dam, Jeffcoat, and Willow Springs sites may cause disturbance of annual grassland vegetation. Reclamation and/or the construction contractor will implement BMPs and the environmental commitments described in Chapter 3 of the Draft EIS/EIR (Jones & Stokes 2003) to avoid or minimize temporary effects on grassland. Where grassland habitat loss is temporary, compensation will include full restoration of the affected habitat (USFWS 2003). The compensation for permanent loss of grassland habitat will be provided at a minimum ratio of 1:1 (1 acre restored or enhanced for every 1 acre affected) (USFWS 2003). Compensation will be provided through a combination of on-site restoration and use of habitat credits from a CBDA–funded conservation easement located in the project area. With these BMPs and environmental commitments implemented, impacts on annual grassland habitat will be less than significant.

No Dam Removal Alternative

Impact 4.2-24. Significant—Potential disturbance to valley elderberry longhorn beetle habitat.

Construction of the Eagle Canyon pipeline (see Mitigation Measures for Impact 4.1-8 in Section 4.1, Fish, on page 4-5 of this document) may disturb valley elderberry longhorn beetle habitat near the MLTF Jeffcoat facilities. This impact is the same as Impact 4.2-5 described above for the Five Dam Removal

Alternative. Implementing the Mitigation Measure for Impact 4.2-5 described above would reduce this impact to a less-than-significant level.

Impact 4.2-25. Significant—Potential disturbance to California red-legged frogs and their habitat.
Modifications to Asbury Diversion Dam, construction of the Eagle Canyon pipeline, and installation of the Willow Springs disinfection facility may affect potential California red-legged frog habitat in the vicinity of Asbury Diversion Dam, the Jeffcoat facilities, and the Willow Springs facilities. This impact is the same as Impact 4.2-6 described above for the Five Dam Removal Alternative. Implementing the Mitigation Measure for Impact 4.2-6 described above would reduce this impact to a less-than-significant level.

Impact 4.2-30. Significant—Potential disturbance to California black rails in emergent wetland.
Construction of the Eagle Canyon pipeline and the Willow Springs disinfection facility (see Mitigation Measures for Impact 4.1-8 in Section 4.1, Fish, on page 4-5 of this document) may disturb nesting California black rails near the MLTF Jeffcoat East and Willow Springs facilities. This impact is the same as Impact 4.2-11 described above for the Five Dam Removal Alternative. In addition to implementing the Restoration Project's environmental commitments before and during project construction, implementing the Mitigation Measure for Impact 4.2-11 described above under the Five Dam Removal Alternative would reduce this impact to a less-than-significant level.

Impact 4.2-32. Less than Significant—Potential loss of woody riparian vegetation along PG&E canals.
Construction of the Eagle Canyon pipeline proposed at the Jeffcoat facilities could cause the potential loss of woody riparian vegetation along Eagle Canyon Canal because of the cessation of flows in the canal. This impact is the same as Impact 4.2-13 described above under the Five Dam Removal Alternative.

Impact 4.2-34. Less than Significant—Potential disturbance of annual grassland habitat.
Construction activities at the Asbury Diversion Dam, Jeffcoat, and Willow Springs mitigation sites would result in temporary disturbance and minimal permanent loss of annual grassland habitat. This impact is the same as Impact 4.2-15 described above under the Five Dam Removal Alternative and is considered less than significant.

Six Dam Removal Alternative

Impact 4.2-42. Significant—Potential disturbance to California red-legged frogs and their habitat.
Modifications to Asbury Diversion Dam and installation of the Willow Springs disinfection facility may affect potential California red-legged frog habitat in the vicinity of Asbury Diversion Dam and the Willow Springs facility, respectively. This impact is similar to Impact 4.2-6 described above for the Five Dam

Removal Alternative. Implementing the Mitigation Measure for Impact 4.2-6 described above would reduce this impact to a less-than-significant level.

Impact 4.2-47. Significant—Potential disturbance to nesting California black rails in emergent wetland.

Construction of the Willow Springs disinfection facility (see Mitigation Measures for Impact 4.1-8 in Section 4.1, Fish, on page 4-5 of this document) may disturb California black rails potentially nesting in an emergent wetland near the Willow Springs facility. Construction activities could affect reproductive success and the survival of young, and/or result in the abandonment of nests in the emergent wetland habitat. Construction of the disinfection facility would not directly affect the emergent wetland; however, noise from construction activities may disrupt the rails' nesting activities, foraging patterns, and communication with and protection of their young. In addition to implementing the Restoration Project's environmental commitments before and during project construction, implementing the Mitigation Measure for Impact 4.2-11 described above under the Five Dam Removal Alternative would reduce this impact to a less-than-significant level.

Impact 4.2-49. Less than Significant—Possible loss of woody riparian vegetation along PG&E canals.

Implementation of the Six Dam Removal Alternative could cause the loss of scattered woody riparian trees and shrubs along PG&E canals. Similar to the Five Dam Removal Alternative, the South Canal and the Wildcat Canal would be closed as a result of cessation of flows from removal of the corresponding diversion dams. In addition, the Eagle Canyon Diversion Dam would be removed and flows would be restored to the original Battle Creek channel. This impact is similar to Impact 4.2-13 described for the Five Dam Removal Alternative and is considered less than significant.

Impact 4.2-51. Less than Significant—Potential disturbance of annual grassland habitat.

Construction at the Asbury Diversion Dam and installation of the Willow Springs disinfection facility would result in temporary disturbance and minimal permanent loss of annual grassland habitat. This impact is similar to Impact 4.2-15 described above under the Five Dam Removal Alternative and is considered less than significant.

Three Dam Removal Alternative

Impact 4.2-61. Significant—Potential disturbance to California red-legged frogs and their habitat.

Modifications to Asbury Diversion Dam and installation of the Willow Springs disinfection facility may affect potential California red-legged frog habitat in the vicinity of Asbury Diversion Dam and the Willow Springs facility, respectively. This impact is similar to Impact 4.2-6 described above for the Five Dam Removal Alternative. Implementing the Mitigation Measure for Impact 4.2-6 described above would reduce this impact to a less-than-significant level.

Impact 4.2-66. Significant—Potential disturbance to nesting California black rails in emergent wetland.
Construction of the Willow Springs disinfection facility (see Mitigation Measures for Impact 4.1-8 in Section 4.1, Fish, on page 4-5 of this document) may disturb California black rails potentially nesting in an emergent wetland near the Willow Springs facility. This impact is the same as Impact 4.2-47 described above under the Six Dam Removal Alternative, and similar to Impact 4.2-11 described above under the Five Dam Removal Alternative. In addition to implementing the Restoration Project's environmental commitments before and during project construction, implementing the Mitigation Measure for Impact 4.2-11 described above under the Five Dam Removal Alternative would reduce this impact to a less-than-significant level.

Impact 4.2-68. Less than Significant—Possible loss of woody riparian vegetation along PG&E canals.
Under the Three Dam Removal Alternative, the Wildcat, South, and Eagle Canyon Diversion Dams would be removed and flows from these canals would be restored to the original channels along Battle Creek. This impact is similar to Impact 4.2-13 described under the Five Dam Removal Alternative and is considered less than significant.

Impact 4.2-70. Less than Significant—Potential disturbance of annual grassland habitat.
Construction at the Asbury Diversion Dam and installation of the Willow Springs disinfection facility would result in temporary disturbance and minimal permanent loss of annual grassland habitat. This impact is similar to Impact 4.2-15 described above under the Five Dam Removal Alternative and is considered less than significant.

4.4 Water Quality

As a result of public comments received on the Draft EIS/EIR, a new criterion will be included in Section 4.4, Water Quality. The new criterion identifies an impact as significant if implementation of the Restoration Project would result in a deterioration of the biological integrity of surface waters.

Additionally, as a result of public comments received on the Draft EIS/EIR, two new significant impacts will be incorporated into Section 4.4, Water Quality, of the Final EIS/EIR. These new impacts describe how the Restoration Project could adversely affect the beneficial use of water used by MLTF and potentially increase the risk of the IHN virus in other waters in California by increasing the numbers of Chinook salmon and steelhead in Battle Creek. As described under Impact 4.1-8 in Section 4.1, Fish, Battle Creek is hydrologically connected to MLTF's water supply at two locations and could potentially contaminate water used by MLTF and transfer the IHN virus to MLTF–farmed fish. MLTF fish, which are distributed to lakes and rivers throughout the state of California, could transfer the virus to other California waters and thereby affect the biological integrity of those waters.

Reclamation and the State Water Board are soliciting comments on the new criterion and new impacts, which are presented below as they are proposed to be included in the Final EIS/EIR.

Environmental Consequences

Impact Significance Criteria

Water quality constituents that could be affected by the Restoration Project were selected for analysis. The water quality objectives for each constituent as described in the Basin Plan (CVRWQCB 1998) and examples of implementation of similar projects (e.g., Saeltzer Dam Fish Passage and Flow Protection Project) were used to determine whether an impact was significant. For this analysis, impacts were considered significant if implementation of the Restoration Project would result in any of the following:

1. Turbidity increase in Battle Creek over background levels as measured in nephelometric turbidity units (NTUs) by more than the numerical objectives contained in the Basin Plan:

   According to the Basin Plan (CVRWQCB 1998), an appropriate averaging period may be applied, provided that beneficial uses will be fully protected. The basin plan includes numeric turbidity limits, and exemptions to those limits will be considered when a dredging operation (such as excavation of sediment from behind dams) can cause an increase in turbidity. In those cases, an allowable zone of dilution within which turbidity in excess of the

limits may be tolerated will be defined for the operation prescribed in a discharge permit. The dilution zone will be prescribed on a case-by-case basis. For example, similar projects in the upper Sacramento River basin have had a monitoring requirement that, during in-water working periods, a turbidity increase of 15 NTUs over background turbidity is allowed up to 500 feet downstream of the work site, using a 12-hour averaging interval to determine compliance.

2. Increased suspended material concentrations in Battle Creek that may leave deposits on the stream bottom that cause nuisance or adversely affect beneficial uses.
3. Increase of more than 5ºF above the natural receiving water temperature.
4. Deterioration of the biological integrity of surface waters.
5. A release of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, and aquatic life.

For this analysis, the impacts resulting from Restoration Project activities were considered beneficial if they would improve water quality management in Battle Creek to better attain Basin Plan objectives, specifically coldwater habitat for spawning and rearing of fish.

Impact Assessment

Five Dam Removal Alternative (Proposed Action)

Impact 4.4-3. Significant—Potential reduction in beneficial uses of waters used at Mount Lassen Trout Farm and Darrah Springs State Fish Hatchery.

As discussed under Impact 4.1-8 in Section 4.1, Fish (see page 4-2 of this Draft SEIS/REIR), the Restoration Project would restore habitat in Battle Creek for Chinook salmon and steelhead, which in turn would result in increased numbers of anadromous fish in the Battle Creek system. Wild anadromous fish, such as Chinook salmon and steelhead, are known to be carriers of the IHN virus, as well as several other serious viruses common to anadromous fish. Annual production records from the Coleman National Fish Hatchery reveal that disease outbreaks, particularly of the IHN virus, occurred almost annually prior to the installation of the ozonation plant at the hatchery (Hamelberg pers. comm.). One can infer from these records that the IHN virus has subsisted in the Battle Creek watershed since at least the early 1940s. As a result of increasing populations of anadromous fish, the Restoration Project would greatly increase the probability that the viruses could be transferred to Battle Creek water.

As part of the Hydroelectric Project, PG&E canals divert water from Battle Creek to various powerhouses. Currently, Battle Creek water seeps into the shallow groundwater as it passes through two unlined PG&E canals—Eagle Canyon Canal and Inskip Canal. Groundwater that may become contaminated with these viruses resurfaces as natural springs that two MLTF facilities—the

Jeffcoat mitigation site (which includes Jeffcoat East, Jeffcoat West, and the Jeffcoat nursery) and Willow Springs—use as their main water supply. The risk of MLTF fish (farmed rainbow trout) being exposed to these viruses, including the IHN virus, would increase as wild anadromous fish populations in Battle Creek increase. The potential transfer of these viruses from Battle Creek waters into the waters used by MLTF could affect the main beneficial use of the MLTF waters, aquaculture.

DFG has indicated that implementation of the Restoration Project, in addition to potentially affecting MLTF's water source, would increase potential for naturally spawning steelhead to migrate up Baldwin Creek, pass over Asbury Diversion Dam, and infect Darrah Springs State Fish Hatchery, which is located immediately upstream of the dam. Following implementation of the Restoration Project, Baldwin Creek would provide habitat for a larger steelhead population, as would Battle Creek from where fish may stray. While no formal study has been performed, DFG fish-passage engineers have visited Asbury Diversion Dam and concluded that passage is possible during high-flow events and sediment–pass-through activities. DFG stream restoration biologists have inspected the falls at the mouth of Baldwin Creek and determined passage of steelhead is possible at high flows. Similar to the situation at MLTF, the potential transfer of serious fish diseases from Battle Creek waters into the waters used by the Darrah Springs State Fish Hatchery could affect the main beneficial use of their waters, aquaculture.

Aquaculture is recognized in the CVRWQCB's Basin Plan as a beneficial use of water, although not identified as a specific beneficial use of the Battle Creek water used at MLTF facilities (CVRWQCB 1998). Aquaculture is a designated beneficial use of waters:

> …for aquaculture or mariculture operations, including, but not limited to, propagation, cultivation, maintenance, or harvesting of aquatic plants and animals for human consumption or bait purposes (Central Valley Regional Water Quality Control Board 1998).

As explained above, water currently seeps from PG&E's canals and enters the groundwater that makes up a portion of the water issuing at the springs used by MLTF in its aquaculture activities. Additionally, anadromous fish from Battle Creek could migrate up Baldwin Creek, pass over Asbury Diversion Dam, and infect waters used by Darrah Springs State Fish Hatchery. Therefore, the Restoration Project could reasonably affect the quality of water used by MLTF and Darrah Springs State Fish Hatchery by increasing the probability of introducing viruses (e.g., IHN) carried by wild anadromous fish in Battle Creek. This unique circumstance would be considered a significant water quality impact.

Reclamation will implement the mitigation measures described for Impact 4.1-8 in Section 4.1, Fish (see page 4-2 of this Draft SEIS/REIR), for the Jeffcoat, Willow Springs, and Asbury Diversion Dam sites to reduce this impact to a less-than-significant level. These mitigation measures would ensure that water used by MLTF and Darrah Springs State Fish Hatchery would not come from a source

that could be infected with viruses carried by anadromous fish, including the IHN virus, by restoring populations of wild anadromous fish in Battle Creek to a larger size. This would ensure that MLTF and Darrah Springs State Fish Hatchery fish are not infected with these viruses and that their beneficial use of the water (aquaculture) is not impaired.

Impact 4.4-4. Significant—Potential reduction in beneficial uses of California waters from the distribution of infected Mount Lassen Trout Farm and Darrah Springs State Fish Hatchery fish.

As discussed under Impact 4.1-8 in Section 4.1, Fish (see page 4-2 of this Draft SEIS/REIR) and under Impact 4.4-3 above, the Restoration Project would restore habitat in Battle Creek for Chinook salmon and steelhead, which in turn would result in increased numbers of anadromous fish in the Battle Creek system and increase the risk that serious fish diseases carried by anadromous fish could be transferred to Battle Creek water.

As discussed earlier, two PG&E canals (Eagle Canyon Canal and Inskip Canal), which divert water from Battle Creek to various powerhouses, are hydrologically connected to the natural springs used by two MLTF facilities—Jeffcoat and Willow Springs. These springs are the main water supply for these facilities. Similarly, as anadromous fish in Battle Creek increase, the likelihood for steelhead to migrate up Baldwin Creek, pass over Asbury Diversion Dam, and infect the Darrah Springs State Fish Hatchery also increases.

The risk of MLTF fish (farmed rainbow trout) and Darrah Springs State Fish Hatchery fish being exposed to these viruses, including the IHN virus, would increase as anadromous fish populations in Battle Creek increase. If infected fish from MLTF or Darrah Springs State Fish Hatchery were distributed to various lakes and rivers throughout California, the viruses could be spread to aquatic habitats where the disease does not presently exist and could affect the biological integrity of those waters.

A protected beneficial use of California surface waters is cold freshwater habitat, which includes “uses of water that support cold water ecosystems including but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife including invertebrates.” (CVRWQCB 1998.) Waters that support high quality aquatic habitats suitable for reproduction and early development of fish are also a protected beneficial use of surface waters (CVRWQCB 1998). The Restoration Project could adversely affect these beneficial uses by increasing the probability of introducing viruses and diseases transferred by anadromous fish, including the IHN virus, through the distribution of infected MLTF fish and Darrah Springs State Fish Hatchery fish to waters that are currently IHN–free, and would therefore adversely affect the beneficial uses of those waters. This potential impact would be considered a significant water quality impact.

To reduce this impact to a less-than-significant level, Reclamation will implement the mitigation measures described for Impact 4.1-8 in Section 4.1, Fish (see page 4-2 of this Draft SEIS/REIR) for the Jeffcoat, Willow Springs, and Asbury Diversion Dam sites. These mitigation measures would ensure that water

used by MLTF and Darrah Springs State Fish Hatchery would not come from a source that could be infected with viruses carried by anadromous fish. This would also ensure that MLTF fish and Darrah Springs State Fish Hatchery fish are not infected with these viruses and that the distribution of their propagated fish would not be a cause of the spread of these diseases to other waters in the state of California.

No Dam Removal Alternative

Impact 4.4-10. Significant—Potential reduction in beneficial uses of waters used at Mount Lassen Trout Farm and Darrah Springs State Fish Hatchery.

This impact is the same as Impact 4.4-3 described above for the Five Dam Removal Alternative. To reduce this impact to a less-than-significant level, Reclamation will implement the mitigation measures described for Impact 4.1-8 in Section 4.1, Fish (see page 4-5 of this Draft SEIS/REIR) for the Jeffcoat, Willow Springs, and Asbury Diversion Dam sites.

Impact 4.4-11. Significant—Potential reduction in beneficial uses of California waters from the distribution of infected Mount Lassen Trout Farm and Darrah Springs State Fish Hatchery fish.

This impact is the same as Impact 4.4-4 described above for the Five Dam Removal Alternative. To reduce this impact to a less-than-significant level, Reclamation will implement the mitigation measures described for Impact 4.1-8 in Section 4.1, Fish (see page 4-5 of this Draft SEIS/REIR) for the Jeffcoat, Willow Springs, and Asbury Diversion Dam sites.

Six Dam Removal Alternative

Impact 4.4-14. Significant—Potential reduction in beneficial uses of waters used at Mount Lassen Trout Farm and Darrah Springs State Fish Hatchery.

This impact is similar to Impact 4.4-3 described above for the Five Dam Removal Alternative, although under the Six Dam Removal Alternative, Eagle Canyon Canal would be decommissioned and, therefore, would no longer contribute to the risk of fish-pathogen transfer to the Jeffcoat trout farms. However, water would continue to be diverted along Inskip Canal and could potentially transfer fish pathogens to the Willow Springs facility. Similarly, anadromous fish could potentially migrate up Baldwin Creek, pass over Asbury Diversion Dam, and infect waters used by Darrah Springs State Fish Hatchery. To reduce this significant impact to a less-than-significant level, Reclamation will implement one of the mitigation options described under Impact 4.1-8 in Section 4.1, Fish (see page 4-5 of this Draft SEIS/REIR) for the Willow Springs facility and Asbury Diversion Dam.

Impact 4.4-15. Significant—Potential reduction in beneficial uses of California waters from the distribution of infected Mount Lassen Trout Farm and Darrah Springs State Fish Hatchery fish.
This impact is similar to Impact 4.4-4 described above for the Five Dam Removal Alternative, although under the Six Dam Removal Alternative, Eagle Canyon Canal would be decommissioned and, therefore, would no longer contribute to the risk of fish-pathogen transfer to the Jeffcoat trout farms. However, water would continue to be diverted along Inskip Canal and could potentially transfer fish pathogens to the Willow Springs facility. Similarly, anadromous fish could potentially migrate up Baldwin Creek, pass over Asbury Diversion Dam, and infect waters used by Darrah Springs State Fish Hatchery. To reduce this significant impact to a less-than-significant level, Reclamation will implement one of the mitigation options described under Impact 4.1-8 in Section 4.1, Fish (see page 4-5 of this Draft SEIS/REIR) for the Willow Springs facility and Asbury Diversion Dam.

Three Dam Removal Alternative

Impact 4.4-21. Significant—Potential reduction in beneficial uses of waters used at Mount Lassen Trout Farm and Darrah Springs State Fish Hatchery.
This impact is the same as Impact 4.4-14 described above for the Six Dam Removal Alternative. To reduce this significant impact to a less-than-significant level, Reclamation will implement one of the mitigation options described under Impact 4.1-8 in Section 4.1, Fish (see page 4-5 of this Draft SEIS/REIR) for the Willow Springs facility and Asbury Diversion Dam.

Impact 4.4-22. Significant—Potential reduction in beneficial uses of California waters from the distribution of infected Mount Lassen Trout Farm and Darrah Springs State Fish Hatchery fish.
This impact is the same as Impact 4.4-15 described above for the Six Dam Removal Alternative. To reduce this significant impact to a less-than-significant level, Reclamation will implement one of the mitigation options described under Impact 4.1-8 in Section 4.1, Fish (see page 4-5 of this Draft SEIS/REIR) for the Willow Springs facility and Asbury Diversion Dam.

4.6 Land Use

As a result of public comments received on the Draft EIS/EIR, additional information has been added to Section 4.6, Land Use, of the Final EIS/EIR. Many comment letters requested that the EIS/EIR address potential land use impacts on MLTF operations based on the understanding that aquaculture is a form of agriculture, as defined by California Food and Agricultural Code Section 23.5. In response to this request, MLTF impacts associated with land use were analyzed; however, the analysis concluded that there is no impact on land use. A short discussion of this topic has been added to the setting section (Affected Environment) of Section 4.6, Land Use. Reclamation and the State Water Board are soliciting comments on this new affected environment discussion, which is presented below as it is proposed to be included in the Final EIS/EIR.

Affected Environment

County Land Uses

Agriculture

According to the Food and Agricultural Code (Section 23.5), agriculture also encompasses aquaculture. Aquaculture includes the propagation, cultivation, maintenance, and harvesting of fish (Fish and Game Code Section 17). MLTF is an aquacultural business that operates nine facilities in the vicinity of the project area. Two of its facilities (Willow Springs and the Jeffcoat site, which includes Jeffcoat East, Jeffcoat West, and Jeffcoat nursery) may be directly affected by implementation of the Restoration Project.

MLTF is an aquaculture facility that leases agricultural land from a local landowner in Tehama County. Although aquaculture is considered by DFG as an agricultural use, and MLTF has expressed concern that it could be economically affected by the Restoration Project, the project itself would not convert agricultural land to another use. Therefore, land use impacts on the agricultural land leased by MLTF are not considered further in this section. Please see Sections 4.1, Fish; 4.4, Water Quality; and 4.16, Socioeconomics, for further discussion of project-related effects related to MLTF aquaculture facilities.

4.8 Aesthetics

As a result of public comments received on the Draft EIS/EIR, two new impacts will be incorporated into Section 4.8, Aesthetics, of the Final EIS/EIR.

The first new impact addresses visual impacts associated with closing PG&E canals and is considered to be less than significant.

A second new impact addresses visual impacts associated with construction of the Eagle Canyon pipeline, which is identified as a Mitigation Measure for Impact 4.1-8 in Section 4.1, Fish (see page 4-5 of this Draft SEIS/REIR). *As described below, this new aesthetic impact is considered to be less than significant. This impact is not addressed under the Six Dam and Three Dam Removal Alternatives because Eagle Canyon Diversion Dam would be removed and, as a result, the Eagle Canyon pipeline would not need to be constructed.*

Reclamation and the State Water Board are soliciting comments on both new impacts, which are presented below as they are proposed to be included in the Final EIS/EIR.

Environmental Consequences

Impact Assessment

Five Dam Removal Alternative (Proposed Action)

Impact 4.8-4. Less than Significant—Potential reduction in scenic resources visible from canals caused by closure of PG&E canals. The closure of Wildcat and South Canals would result in the loss of some riparian vegetation in scattered areas along the length of each canal. In addition, a portion of Eagle Canyon Canal could also be closed as part of a proposed mitigation measure. The loss of this vegetation, which includes large cottonwood trees along some portions of PG&E canals, could potentially affect the scenic quality of the canals as viewed by the adjacent landowners. While this impact could be considered important to the private property owners, currently no public viewing areas of these canals exist and the impact is localized. A limited number of people would be exposed to this visual change based on the rural character of the canals. In addition, PG&E periodically conducts maintenance activities involving clearance and removal of vegetation to protect the integrity of the canals. It is expected that other types of vegetation, including both native and nonnative forbs and grasses, would colonize the sites. Some native tree and shrub species also may colonize the sites in place of vegetation that had previously been supported by canal water. For these reasons, this impact is considered to be less than significant.

Impact 4.8-5. Less than Significant—Temporarily reduced scenic resources along the Eagle Canyon Canal as a result of construction of Eagle Canyon pipeline.
The mitigation measure for the Jeffcoat trout farms, as described for Impact 4.1-8 in Section 4.1, Fish (see page 4-5 of this Draft SEIS/REIR), would require the installation of a new underground or partially exposed pipeline to replace a portion of Eagle Canyon Canal. Additionally, this measure would require the construction of a temporary staging area and access road improvements at some locations near these facilities. Any reduction in scenic quality (i.e., the temporary loss of rangeland) resulting from these activities would be less than significant because it would not be visible from any public viewing areas such as public roads, scenic vista points, recreational facilities, or communities, as the Eagle Canyon Canal is located on private property. While this impact could be considered important to the private property owners, no public viewing areas of Eagle Canyon Canal exist and the impact is localized. A limited number of people would be exposed to this change based on the rural character of this site. In addition, construction impacts would be only temporary, and any impacts on the construction area would be restored following completion of the Restoration Project. For these reasons, this impact is considered to be less than significant.

No Dam Removal Alternative

Impact 4.8-9. Less than Significant—Potential reduction in scenic resources visible from canals caused by closure of PG&E canals.
A portion of Eagle Canyon Canal would be closed as part of the proposed mitigation measure at MLTF's Jeffcoat facility. The loss of this vegetation could potentially affect the scenic quality of the canals as viewed by the adjacent landowners. While this impact could be considered important to the private property owners, currently no public viewing areas of these canals exist and the impact is localized. A limited number of people would be exposed to this visual change based on the rural character of the canal. In addition, PG&E periodically conducts maintenance activities involving clearance and removal of vegetation to protect the integrity of the canals. It is expected that other types of vegetation, including both native and nonnative forbs and grasses, would colonize the sites. Some native tree and shrub species also may colonize the sites in place of vegetation that previously had been supported by canal water. For these reasons, this impact is considered to be less than significant.

Impact 4.8-10. Less than Significant—Temporarily reduced scenic resources along the Eagle Canyon Canal as a result of construction of Eagle Canyon pipeline.
This impact is the same as Impact 4.8-5 described above for the Five Dam Removal Alternative. As with Impact 4.8-5, the visual impact associated with the construction of the Eagle Canyon pipeline would remain less than significant because of the limited number of people that would be exposed to the temporary changes occurring at this site.

Six Dam Removal Alternative

Impact 4.8-14. Less than Significant—Potential reduction in scenic resources visible from canals caused by closure of PG&E canals. This impact is the same as Impact 4.8-4 described above for the Five Dam Removal Alternative except that the entire length of the Eagle Canyon Canal would be closed as a result of decommissioning the Eagle Canyon Diversion Dam. As with Impact 4.8-4, the visual impact associated with the closure of Wildcat, South, and Eagle Canyon Canals would remain less than significant because of the limited number of people that would be exposed to the changes occurring along both canals.

Three Dam Removal Alternative

Impact 4.8-19. Less than Significant—Potential reduction in scenic resources visible from canals caused by closure of PG&E canals. This impact is the same as Impact 4.8-4 described above for the Five Dam Removal Alternative except that the entire length of the Eagle Canyon Canal would be closed as a result of decommissioning the Eagle Canyon Diversion Dam. As with Impact 4.8-4, the visual impact associated with the closure of Wildcat, South, and Eagle Canyon Canals would remain less than significant because of the limited number of people that would be exposed to the changes occurring along both canals.

4.15 Cultural Resources

New potentially significant impacts associated with the mitigation measure described for MLTF's Jeffcoat facility (see Mitigation Measures for Impact 4.1-8 in Section 4.1, Fish, on page 4-5 of this document) have been identified for cultural resources and will be incorporated into Section 4.15, Cultural Resources, of the Final EIS/EIR. New impacts are associated with the construction of a new pipeline (i.e., Eagle Canyon pipeline) near the Jeffcoat trout farms.

The Jeffcoat and Willow Springs project sites were not included in the original project area for the Restoration Project as described in the Draft EIS/EIR (Jones & Stokes 2003). For this reason, Reclamation's archaeologists performed an archeological inventory at each site in October 2004. Results of this inventory are described below. Reclamation and the State Water Board are soliciting comments on this new information, which is presented below as it is proposed to be included in the Final EIS/EIR. The environmental impacts of this mitigation measure are analyzed qualitatively, at a lesser level of detail than project-action impacts, as authorized by the State CEQA Guidelines (14 CCR 15126.4[a][1][D]).

Methodology

Reclamation archeologists conducted field examinations at MLTF's Jeffcoat and Willow Springs facilities and at Asbury Diversion Dam to determine whether any cultural resources are present in proposed areas of potential effect (APEs). Systematic transects were walked at each location, corresponding to proposed APEs for disinfection facilities and ancillary activities.

Documentation of the results of this cultural resources inventory is in preparation. The cultural resources section from the Draft EIS/EIR (Jones & Stokes 2003) is included here by reference.

Affected Environment

No cultural resources were found at Willow Springs and at Asbury Diversion Dam; however, nine cultural resources were identified as a result of the inventory of MLTF's Jeffcoat facilities (an area of approximately 50 acres was surveyed). A large area was examined because the proposed route for the Eagle Canyon pipeline and equipment staging area had not been determined at the time the inventory took place. Ground cover during the survey was dense in portions of the APEs and exact boundaries of archeological sites were not completely determined.

Archeological sites exhibiting a preponderance of flaked-stone artifacts account for seven of the identified cultural resources. Flaked-stone artifacts observed include a debitage (a by-product of tool production) and an arrowhead. One site contains a bedrock milling feature.

Two historic-era cultural resources were identified as well: Eagle Canyon Canal, which conveys water from Eagle Canyon Diversion Dam to the Inskip Powerhouse, and a low rock wall or fence stretching over 150 linear feet.

Additional fieldwork is necessary to determine whether identified cultural resources meet the criteria for consideration as historic properties pursuant to 36 CFR 800.4(c). Because of limited ground surface visibility at the time of Reclamation's archeological survey and the then–poorly defined APE, qualified archeologists will survey the final route of proposed conveyance structures. Furthermore, qualified archeologists will undertake detailed site recordation and test excavation to determine the character of the sites and whether they meet the criteria of a historic property.

Reclamation will make the determination of eligibility for identified cultural resources and seek concurrence from the State Historic Preservation Officer (SHPO). Additional requirements of 36 CFR 800 will be completed before any ground disturbance is authorized, including inquiring of local federally recognized Indian tribes whether resources of religious or cultural significance exist in the APE. If any cultural resources are determined to be historic properties, a memorandum of agreement (MOA) will be developed to guide mitigation measures in the case that the undertaking would result in adverse effects on historic properties.

The Eagle Canyon Diversion Dam was determined eligible for inclusion in the National Register of Historic Places (NRHP) as part of the Draft EIS/EIR (Jones & Stokes 2003). The Eagle Canyon Canal appears to have been determined ineligible, although the NRHP status of this canal will be resolved in consultation with the SHPO and other consulting parties.

Environmental Consequences

Impact Assessment

Five Dam Removal Alternative (Proposed Action)

Impact 4.15-4. Significant—Potential impact on cultural resources at the Jeffcoat aquaculture facility.
Nine cultural resources have been identified at the Jeffcoat aquaculture facility. Construction of the pipeline will disturb these resources, depending on which alignment is chosen. Studies are ongoing to determine the status of these sites, and this information will be presented in the Final EIS/EIR. Any effect on a significant cultural resource is considered to be a significant environmental

impact. Implementation of the following mitigation measure would reduce this impact to a less-than-significant level.

Mitigation Measure for Impact 4.15-4. To comply with Section 106, Reclamation will consult with the SHPO, the Advisory Council on Historic Preservation, and any other consulting parties in the Section 106 review process. An MOA will be developed among 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.

No Dam Removal Alternative

Impact 4.15-7. Significant—Potential impact on cultural resources at the Jeffcoat aquaculture facility.

Nine cultural resources have been identified at the Jeffcoat aquaculture facility. Construction of the pipeline will disturb these sites, depending on which alignment is chosen. Studies are ongoing to determine the status of these sites, and this information will be presented in the Final EIS/EIR. Any effect on a significant cultural resource is considered to be a significant environmental impact. Implementation of the mitigation measure for Impact 4.15-4 would reduce this impact to a less-than-significant level.

4.16 Other NEPA Analyses

As a result of public comments received on the Draft EIS/EIR, the introduction to Section 4.16, Other NEPA Analyses, has been modified. Additionally, a discussion on the indirect effects associated with the loss of hydropower has been added to the section entitled "Power Generation and Economics." This discussion describes indirect environmental impacts that could potentially result from replacing hydroelectric power that would be lost as a result of implementing the Restoration Project.

In addition, under the section entitled "Socioeconomics," the socioeconomic effect on MLTF has been revised, and a new socioeconomic effect on Oasis Springs Lodge has been added. The socioeconomic effect on MLTF has been modified to refer to the new impact and mitigation measures presented for Impact 4.1-8 in Section 4.1, Fish. A new socioeconomic effect on Oasis Springs Lodge has been identified to address potential loss in employment revenue during construction at the South Powerhouse/Inskip Diversion Dam project site.

Although the changes described above are not substantial, Reclamation and the State Water Board are soliciting comments on the introduction to Section 4.16 and on both socioeconomic effects, which are presented below as they are proposed to be included in the Final EIS/EIR.

Introduction

This section includes a discussion of several topics that are required for analysis under NEPA but not required for analysis under CEQA and, therefore, do not require any findings of significance. These topics include Power Generation and Economics, Socioeconomics, Environmental Justice, and Indian Trust Assets. Under NEPA, an EIS must address economic and social effects if they are interrelated with the natural or physical environmental effects of a project. Under CEQA, economic and social changes resulting from a project are not treated as significant effects on the environment and are not required to be included in an EIR unless these changes would lead, either directly or indirectly, to a physical effect on the environment.

Power Generation and Economics

Environmental Consequences

Summary of Effects

Indirect Environmental Effects Associated with the Loss of Hydropower and Renewable Replacement Power

Implementation of the Restoration Project would result in a reduction in hydroelectric power produced by the Battle Creek Hydroelectric Project and would also decrease the dependable capacity[1] of the Hydroelectric Project. Table 4.16-9 summarizes the reductions in power generation that would be associated with the implementation of each action alternative.

Table 4.16-9. Average Annual Energy, Dependable Capacity, Power Benefits, and Total Cost of Project Power for the Hydroelectric Project

Alternative	Average Annual Energy (MWh)	Dependable Capacity (MW)	Annual Power Benefits (2003 dollars)	Annual Total Cost of Hydroelectric Project Power (2003 dollars)
No Action Alternative	230,890	13.5	$11,798,000	$7,111,000
Five Dam Removal Alternative	162,170	7.4	$8,287,000	$7,863,000*
No Dam Removal Alternative	190,560	9.1	$9,738,000	$16,798,000
Six Dam Removal Alternative	137,050	6.3	$7,003,000	$16,218,000
Three Dam Removal Alternative	159,570	7.4	$8,154,000	$15,967,000

Notes:
MW = megawatts.
MWh = megawatt hours.
* With cost-sharing agreement of the MOU.

PG&E's Hydroelectric Project powerhouses are considered "renewable" small hydroelectric facilities per the California Public Utilities Commission (CPUC). Under this definition, the Hydroelectric Project falls within the framework of the Renewable Portfolio Standards (RPS), which were adopted by the state of California in 2002 and require that an electrical corporation must increase its total procurement of eligible renewable energy resources by at least an additional 1% of retail sales per year so that 20% of its retail sales are procured from eligible energy resources no later than December 31, 2017.

[1] Dependable capacity is the load-carrying ability of a hydroelectric plant under adverse hydrologic conditions for a specified time interval and period of a particular electric system load. The Hydroelectric Project dependable capacity is based on the Hydroelectric Project's load-carrying ability during the critical hydrologic period (e.g., 1977) coincident with the Licensee's peak electric system load. Currently, the peak system load in California occurs during summer heat storms, typically in July or August.

Because the Hydroelectric Project is an eligible renewable energy resource pursuant to the State's RPS mandate, replacement energy must come from another eligible renewable energy resource. The RPS program does not specify the type of resource that could replace reductions in dependable capacity. Development of the details associated with RPS implementation are ongoing, including the development of a competitive public bidding process for new eligible renewable energy resources. The results of this bidding process are not yet publicly available.

In order to replace the reduced power production and dependable capacity output of the Hydroelectric Project, other types of electrical energy production facilities may need to be constructed. Some sources of replacement energy could include solar-powered facilities or fossil-fueled turbines; however, a likely source of replacement renewable energy for the Hydroelectric Project would be wind power. The generation of electricity from wind energy has an advantage over other conventional methods of generating electricity (e.g., coal, oil, natural gas) because wind energy is a renewable and non-depletable resource, generates nearly no air pollution, and uses no water. However, wind power would require a much larger capacity to deliver a similar amount of energy because wind facilities deliver limited energy to the grid.

Implementation of the Restoration Project would result in the delivery of energy to the grid with an average capacity factor of about 50%. Per the California Energy Commission, wind facilities operate at about 20%[2]. Other estimates show wind facilities operate at about 35%. Therefore, the installed capacity of a wind facility would have to be about 1.5 to 2.5 times larger for wind than the average lost capacity from the Battle Creek Hydroelectric Project to provide an equivalent amount of renewable energy.

In the state of California, 95% of the wind turbines are contained in three main areas (California Energy Commission 2002). Other areas have been identified as suitable for wind-energy development, but these areas represent a minor wind-energy presence. The three major wind resource areas in California are the Altamont Pass Wind Resource Area (APWRA), Tehachapi Pass Wind Resource Area (TPWRA), and the San Gorgonio Pass Wind Resource Area (SGPWRA). In 1995, these three areas produced approximately 30% of the world's wind power according to the California Energy Commission.

Based on the information presented in Table 4.16-9, approximately 17% to 41% of the power produced by the Hydroelectric Project would be lost upon implementing the Restoration Project action alternatives. A majority of the lost hydroelectric power production would likely be replaced by wind power produced at a new facility. Because no wind farms are currently proposed for construction, it would be speculative to quantify environmental impacts. However, the environmental impacts associated with the operation of wind power facilities may include impacts on botanical, wetland, and wildlife

[2] California Energy Commission Renewable Energy Programs and Rebates presentation made at the Southern California Renewable Energy Expo, August 2–3, 2003.

resources; aesthetics and visual resources; and noise, depending on the size and location of the facility. While other environmental resources may be affected by wind farm development, the impacts on these resource areas are generally considered to be relatively minor and accordingly are not discussed further in this analysis.

Botanical, Wetland, and Wildlife Resources. In order to take advantage of wind patterns and address other constraints associated with selecting an optimal location, wind farms typically occupy large tracts of land. Although the physical footprint of a wind farm is generally limited to a relatively small area (e.g., turbines and their pads, access roads, and power collection systems), wind farms could still result in significant impacts on biological resources, primarily sensitive natural communities and special-status species, that could range from near zero to very high depending on the particular site.

When wind farms are in operation, biological impacts occur when raptors are killed as a result of striking turbine blades; however, this issue is also highly variable depending on the location of the wind farm and the turbine's size and height. For example, the APWRA is widely known to have a high mortality rate for raptor species because it is located in a major raptor migration corridor (see studies by Thelander and Rugge 2000a and 2000b; Anderson et al. 1996, 2000; and Orloff and Flannery 1996). By comparison, raptor mortality rate at the TPWRA is significantly lower. The magnitude of impacts on biological resources could also vary depending on whether a new wind farm would need to be constructed, where the wind farm would be located, how the wind turbines are designed, and how long the wind turbines are in operation.

Aesthetics and Visual Resources. In order to maximize wind exposure, wind turbines are often located at higher elevations in areas that also tend to be open and unobstructed, which means that wind farms are often easily seen and highly visible in a public viewshed (National Wind Energy Coordinating Committee 2002). As new technologies are developed and wind turbines are designed to produce more power, the turbines have evolved to be lighter and more efficient, but also larger, making them even more visible. As a result, construction of a new wind farm could cause substantial visual changes in a landscape. The analysis of aesthetic and visual impacts depends greatly on site-specific information, including the number and type of individuals to be affected and the duration of their exposure to a visual change. Most wind farms permitted today use computer modeling and rendering techniques to assist in siting individual wind turbines, and efforts are made to avoid sensitive viewsheds and to accommodate public concerns.

Implementing the Restoration Project (i.e., the Five Dam Removal Alternative) would require replacing approximately 69,000 megawatt hours (MWh) of energy annually. If an existing wind farm is used as the source to replace lost hydroelectric power, no new visual impacts would occur; however, as mentioned above, it is likely that a new wind farm would need to be constructed. Therefore, potential visual impacts could occur depending on where the new farm is located.

Noise. Wind farms generate both audible and low-frequency sound waves. The public often raises concerns related to noise generation during the planning phase of a wind-energy project. Whether the noise generated by a wind farm is considered objectionable varies with its magnitude, the surrounding noise level, and the sensitivity of noise receptors. In general, wind turbines today produce less audible noise than in the past because of better streamlining, soundproofing of the generator and gears, and increased efficiency of the blades. Compared to other types of industrial facilities, wind farms are relatively quiet (National Wind Energy Coordinating Committee 2002).

For most new wind-energy projects, a noise analysis is completed to document the existing background noise and to analyze the effect of the particular turbine proposed for use. In addition, wind farms are typically located in areas where wind speed is higher than average and the background noise of the wind masks noise produced by operating wind turbines. The most common method used to address potential noise issues is to simply implement a setback, or minimum distance, between the wind turbines and the nearest residence or receptor that is sufficient to reduce the sound level to a regulatory threshold. These regulatory thresholds are typically set by a county or another approving agency.

If an existing wind farm were used as a source of replacement power, no new noise impacts would occur; however, as mentioned above, it is likely that a new wind farm would be constructed. Therefore, noise impacts could occur depending on the location of the farm, background noise, and the location and number of sensitive receptors.

Comparison of Alternatives. Implementing the No Action Alternative would not result in a loss of hydroelectric power produced by the Battle Creek Hydroelectric Project and, therefore, would not result in any indirect environmental impacts from securing replacement energy. Implementing any of the action alternatives would require the replacement of lost hydropower. The amount of annual energy lost by implementing the Restoration Project compared to existing conditions is approximately 69,000 MWh; 40,000 MWh; 94,000 MWh; and 71,000 MWh for the Five Dam, No Dam, Six Dam, and Three Dam Removal Alternatives, respectively (see Table 4.16-9). Therefore, although the indirect environmental impacts of securing replacement energy would be similar among the Action Alternatives, , the No Dam Removal Alternative would have a lesser magnitude of effects, and the Six Dam and Three Dam Removal Alternatives would have a greater magnitude of effects, than the Proposed Action (Five Dam Removal Alternative).

Socioeconomics

Affected Environment

Local Setting

Local Business

Trout Farm Operations. MLTF is a private aquaculture venture that raises and sells rainbow trout primarily for stocking private, fee-fishing lakes. In the past, MLTF sold live rainbow trout eggs; however, it no longer serves this market. MLTF operates 12 flow-through trout culture facilities, nine of which may be affected by the Restoration Project. Six facilities are located in the Battle Creek watershed, and three are in the Paynes Creek watershed, approximately 5–7 air miles south of South Fork Battle Creek.

MLTF leases land at freshwater spring sites from local landowners and has a substantial investment in hatcheries, rearing pens, and water treatment equipment. The rent that local landowners receive from MLTF is, in some cases, a substantial portion of their annual incomes. MLTF employs 20 full-time workers and some seasonal part-time workers.

Private Fishing Lodge Operations. Oasis Springs Lodge is a private fishing lodge that offers recreational fly-fishing along the south bank of South Fork Battle Creek directly across from PG&E's South Powerhouse and Inskip Diversion Dam. Oasis Springs Lodge provides full service accommodation for up to 22 guests, including lodging and meals, to both fishing and non-fishing guests. Trespass rights are sold by the lodge that allow overnight guests to fish reaches of Battle Creek otherwise inaccessible to the fishing public because of streamside private property access restrictions. Oasis Springs Lodge allows catch-and-release fly-fishing from 15 pools that spread over 6 miles of Battle Creek. The lodge also provides its guests with the opportunity to catch large rainbow trout from a coldwater pool in Battle Creek. These trout are commercially planted by Oasis Springs Lodge under a stocking permit provided by DFG (Berry pers. comm.).

The season for fishing at Oasis Springs Lodge begins the last Saturday in April and ends November 15. Although fishing is the primary attraction, guests of the lodge can also participate in trap shooting, game hunting, tennis, swimming, and relaxation. Through the lodge, guests can also hire fishing and hunting guides, take short courses on fly-fishing techniques, and rent equipment for fishing and shooting. Oasis Springs Lodge possibly employs two full-time caretakers and four to six part-time seasonal employees. In addition, the lodge offers guided fishing and hunting trips, contracted out to independent local guides.

Environmental Consequences

Five Dam Removal Alternative (Proposed Action)

Effect 4.16-5—Potential socioeconomic risk to Mount Lassen Trout Farm fish-marketing program. As described in Section 4.1, Fish (see page 4-2 of this Draft SEIS/REIR), increasing the habitat available to anadromous fish in the Battle Creek watershed could increase the potential of IHN virus to spread to MLTF's Jeffcoat and Willow Springs fish-rearing facilities.

Naturally spawning salmon and steelhead in Battle Creek are known to carry virulent diseases that can have serious effects on fish communities (USFWS 1997a). Increasing the abundance of Chinook salmon and steelhead in Battle Creek potentially increases the occurrence of these diseases in water that is diverted from South Fork and North Fork Battle Creek via PG&E canals. The number of adult steelhead and Chinook salmon spawning in Battle Creek may increase to several thousand adults under the Five Dam Removal Alternative, at least an order of magnitude greater than existing abundance. The potential for MLTF's aquaculture-reared rainbow trout (or other salmonid species) to be exposed to anadromous fish diseases is positively correlated with the number of anadromous salmonids entering Battle Creek above the intakes to Eagle Canyon and Inskip Canals. Battle Creek water conveyed in both canals leaks into the shallow groundwater, which then resurfaces at the spring-fed water sources serving MLTF's Jeffcoat and Willow Springs facilities. Once exposed to pathogens such as the IHN virus, MLTF's cultured fish would be unmarketable because DFG codes and regulations prohibit the stocking of diseased fish or fish carrying serious pathogens. The economic consequences of MLTF's trout being exposed to anadromous fish diseases are serious for MLTF.

In the event that MLTF's Jeffcoat and Willow Springs facilities were to become infected with the IHN virus, fish production most likely would cease. The effect on employment and income is difficult to estimate because it is not known whether MLTF would continue operation of its other fish-rearing facilities in the Battle Creek watershed. However, in the event that MLTF completely ceased operation, it is estimated that up to 20 fulltime and some seasonal part-time employees would lose their jobs with an estimated combined annual income of $800,000 (Remy, Thomas, and Moose pers. comm.). Some secondary economic effects also may occur because MLTF would no longer purchase supplies needed for operation of the fish-rearing facilities from local or regional suppliers and would no longer pay lease payments to local landowners where facilities are located.

The jobs lost in the event MLTF ceases its operations represent less than 1% of the 23,620 persons employed in Tehama County in 2000. However, ceasing operations would adversely affect MLTF and would result in the loss of an important employment source to the local economy. The mitigation measure described for the Jeffcoat and Willow Springs mitigation sites in Impact 4.1-8 under Section 4.1, Fish (see page 4-5 in this Draft SEIS/REIR) would address this socioeconomic effect.

Effect 4.16-6. Potential construction-related loss in revenues at Oasis Springs Lodge. Oasis Springs Lodge advertises its access to fishing along several miles of South Fork Battle Creek, as well as its relative isolation and seclusion. Proposed construction activities would occur in visual and audible proximity of lodge facilities, which include lodging, dining, and patio amenities. Construction would interfere with the marketable qualities of the lodge, primarily its aesthetic feel of isolation and seclusion.

The extent to which construction would adversely affect the business enterprise in the short term is not entirely certain; however, should project construction result in shutting down lodge operations for the duration of construction activity (approximately 3 years), it is estimated that two full-time and up to four part-time/seasonal employees could lose their jobs. Based on information provided by fly-fishing outfitters knowledgeable about California lodging facilities like Oasis Springs Lodge, it is estimated that the loss of these jobs would represent an estimated combined annual income of $160,000. In addition, the demand for services provided by local fishing and hunting guides to the lodge guests would be lost for this period. Guide services are likely provided by independent subcontractors; however, this analysis does not provide a quantitative estimate on loss of business for guide contracting because losses in annual income related to guide contracting is highly dependent upon guest demand for guide services, and this estimation of income loss is rather speculative, although it is not believed to be substantial.

In addition to the direct economic effects of the temporary closure of Oasis Springs Lodge, secondary economic effects may occur. If Oasis Springs Lodge were to close temporarily, the lodge would no longer purchase the supplies necessary to operate the lodge, including food, cleaning materials, and fly-fishing and hunting-related supplies.

In summary, if Oasis Springs Lodge were to close temporarily, the jobs lost by this closure would represent less than 0.1% of the 23,620 persons employed in Tehama County in 2000. However, ceasing operations would adversely affect Oasis Springs Lodge and would result in the temporary loss of an employment source to the local economy.

To reduce construction-related loss of revenue to the Oasis Springs Lodge, Oasis Springs Lodge will be notified as soon as possible and prior to construction activities of the anticipated start date, duration, and type of construction activities.

Effect 4.16-7. Potential long-term loss in revenues at Oasis Springs Lodge. An advertised saleable quality of the fishing and lodging experience at Oasis Springs Lodge is the opportunity to catch large, trophy-sized rainbow trout. These trout are commercially planted by the lodge under a stocking permit provided by DFG. The stocking permit stipulates that the permitted stocking program will terminate when anadromous fish passage facilities are constructed, or by 2006 (if not renewed for a designated period of time), whichever arrives sooner (Berry pers. comm.). Under the Five Dam Removal Alternative, Coleman

Diversion Dam would be removed and a fish screen and fish ladder would be constructed at Inskip Diversion Dam to allow anadromous fish to migrate up Battle Creek past Oasis Springs Lodge. If the Five Dam Removal Alternative, or one of the other action alternatives, is not implemented, PG&E's license with FERC would still require that PG&E's Hydroelectric Project facilities downstream of natural fish barriers be modified to allow fish passage. As a policy, DFG prohibits planting of hatchery fish in waters that support anadromous fish. It is anticipated that upon completion of the anadromous fish passage facilities at Inskip Diversion Dam, whether this is completed under the Restoration Project or under PG&E's current license with FERC, the lodge would no longer be permitted to plant large-sized rainbow trout.

DFG often measures the quality of the fishing experience, or angler satisfaction, through indicators such as catch rate (the number of fish caught per hour) and fish size (length and weight). An increase in both indicators corresponds to an increase in angler satisfaction. In large part, it can be assumed that Oasis Springs Lodge is a successful business based on how guests gage their satisfaction as measured by these indicators of catch rate and fish size. It can further be assumed that paying guests who fish are generally satisfied with the opportunity to catch planted trophy-sized trout, fish that are generally considered very large and easier to catch compared to their smaller and more selective native counterparts, and therefore, planted trout result in a higher catch rate of greater average size. Consequently, the lodge's stocking program likely correlates with high angler satisfaction. However, the population of wild trout in Battle Creek will likely increase as a result of implementing the Restoration Project and may provide an equal, if not superior angling experience.

Future prohibition on stocking likely would adversely affect satisfaction of guests who fish; however, this effect would occur regardless of whether the Restoration Project is implemented or PG&E upgrades its facilities to allow fish passage, as would be required by FERC if the Restoration Project is not implemented. It is possible that native trout would replace the experience offered through the stocking program. Some of northern California's most popular fishing destinations rely on native trout populations (e.g., the Upper Sacramento River above and below Shasta Lake, Fall River, and Hat Creek). Additionally, the absence of stocking farmed trout would not prevent guests from enjoying all other amenities offered by the lodge, nor would it exclude guests from fishing for native trout in Battle Creek. Because of these uncertainties, the extent or degree of decline in satisfaction cannot be accurately predicted; however, compared to the current baseline condition of stocking farmed trout, a decline in angler satisfaction mitght be expected, although possibly not substantial enough to adversely affect business at the lodge. No measures are necessary.

No Dam Removal Alternative

Effect 4.16-10. Potential socioeconomic risk to Mount Lassen Trout Farm fish-marketing program. This effect is the same as Effect 4.16-5 described above for the Five Dam Removal Alternative. As stated under the Five Dam Removal Alternative, if MLTF's farmed trout become infected with a serious waterborne disease such as the IHN virus, the Jeffcoat and Willow Springs facilities may be forced to stop farming trout. Ceasing MLTF's operations could result in the loss of an important employment source to the local economy. The mitigation measure described for Jeffcoat and for Willow Springs in Impact 4.1-8 under Section 4.1, Fish (see page 4-5 in this Draft SEIS/REIR) would address this socioeconomic effect.

Effect 4.16-11. Potential construction-related loss in revenues at Oasis Springs Lodge. This effect is the same as Effect 4.16-6 described above for the Five Dam Removal Alternative. As stated under the Five Dam Removal Alternative, if construction activities were to result in the Oasis Springs Lodge temporarily closing, the closure could result in the temporary loss of an employment source to the local economy. To reduce construction-related loss in revenue to the Oasis Springs Lodge, Reclamation will notify the Oasis Springs Lodge as soon as possible and prior to construction activities of the anticipated start date, duration, and type of construction activities. The project proponent will consult with the lodge operators to determine whether any other measures may be necessary to further reduce socioeconomic effects associated with construction-related activities near Oasis Springs Lodge.

Effect 4.16-12. Potential long-term loss in revenues at Oasis Springs Lodge. This effect is the same as Effect 4.16-7 described above for the Five Dam Removal Alternative. As stated under the Five Dam Removal Alternative, future prohibition on stocking of large-sized trout at Oasis Springs Lodge would likely affect angling guest satisfaction. Although a decline in angling guest satisfaction would be expected, an absence of stocked trout would not preclude guests from fishing for native trout and enjoying other amenities provided by the lodge. The expected decline in satisfaction may not be substantial enough to adversely affect business at the lodge.

Six Dam Removal Alternative

Effect 4.16-15. Potential socioeconomic risk to Mount Lassen Trout Farm fish-marketing program. This effect is similar to Effect 4.16-5 described above for the Five Dam Removal Alternative; however, under the Six Dam Removal Alternative, Eagle Canyon Canal would be decommissioned and, therefore, would no longer contribute to the risk of fish pathogen transfer to the Jeffcoat trout farms. Water would, however, continue to be diverted along Inskip Canal and could potentially transfer fish pathogens to the Willow Springs facility.

As stated under the Five Dam Removal Alternative, if MLTF's farmed trout become infected with a serious waterborne disease such as the IHN virus, the Willow Springs facility may be forced to stop farming trout. Ceasing MLTF's operations could result in the loss of an important employment source to the local economy. The mitigation measure described for Willow Springs in Impact 4.1-8 under Section 4.1, Fish (see page 4-5 in this Draft SEIS/REIR) would address this socioeconomic effect.

Effect 4.16-16. Potential construction-related loss in revenues at Oasis Springs Lodge. This effect is the same as Effect 4.16-6 described above for the Five Dam Removal Alternative. As stated under the Five Dam Removal Alternative, if construction activities were to result in the Oasis Springs Lodge temporarily closing, the closure could result in the temporary loss of an employment source to the local economy. To reduce construction-related loss in revenue to the Oasis Springs Lodge, Reclamation will notify the Oasis Springs Lodge as soon as possible and prior to construction activities of the anticipated start date, duration, and type of construction activities. Reclamation will consult with the lodge operators to determine whether any other measures may be necessary to further reduce socioeconomic effects associated with construction-related activities near Oasis Springs Lodge.

Effect 4.16-17. Potential long-term loss in revenues at Oasis Springs Lodge. This effect is the same as Effect 4.16-7 described above for the Five Dam Removal Alternative. As stated under the Five Dam Removal Alternative, future prohibition on stocking of large trout at Oasis Springs Lodge would likely affect angling guest satisfaction. Although a decline in angling guest satisfaction would be expected, an absence of stocked trout would not preclude guests from fishing for native trout and enjoying other amenities provided by the lodge. The expected decline in satisfaction may not be substantial enough to adversely affect business at the lodge.

Three Dam Removal Alternative

Effect 4.16-20. Potential socioeconomic risk to Mount Lassen Trout Farm fish-marketing program. This effect is similar to Effect 4.16-5 described above for the Five Dam Removal Alternative and the same as Effect 4.16-13 described above for the Six Dam Removal Alternative. As stated under the Five Dam Removal Alternative, if MLTF's farmed trout become infected with a serious waterborne disease such as the IHN virus, the Willow Springs facility may be forced to stop farming trout. Ceasing MLTF's operations could result in the loss of an important employment source to the local economy. The mitigation measure described for Willow Springs in Impact 4.1-8 under Section 4.1, Fish (see page 4-5 in this Draft SEIS/REIR) would address this socioeconomic effect.

Effect 4.16-21. Potential construction-related loss in revenues at Oasis Springs Lodge. This effect is the same as Effect 4.16-6 described above for the Five Dam Removal Alternative. As stated under the Five Dam Removal Alternative, if construction activities were to result in the Oasis Springs Lodge temporarily closing, the closure could result in the temporary loss of an employment source to the local economy. To reduce construction-related loss in revenue to the Oasis Springs Lodge, Reclamation will notify the Oasis Springs Lodge as soon as possible and prior to construction activities of the anticipated start date, duration, and type of construction activities. Reclamation will consult with the lodge operators to determine whether any other measures may be necessary to further reduce socioeconomic effects associated with construction-related activities near Oasis Springs Lodge.

Effect 4.16-22. Potential long-term loss in revenues at Oasis Springs Lodge. This effect is the same as Effect 4.16-7 described above for the Five Dam Removal Alternative. As stated under the Five Dam Removal Alternative, future prohibition on stocking of large trout at Oasis Springs Lodge would likely affect angling guest satisfaction. Although a decline in angling guest satisfaction would be expected, an absence of stocked trout would not preclude guests from fishing for native trout and enjoying other amenities provided by the lodge. The expected decline in satisfaction may not be substantial enough to adversely affect business at the lodge.