

Executive Summary

Introduction

The U.S. Department of the Interior, Bureau of Reclamation (Reclamation) and the California State Water Resources Control Board (SWRCB) are proposing the Battle Creek Salmon and Steelhead Restoration Project (Restoration Project). The proposed Restoration Project presents an opportunity to reestablish approximately 42 miles of prime salmon and steelhead habitat on Battle Creek, plus an additional 6 miles of habitat on its tributaries (Figure ES-1). The Restoration Project would be accomplished primarily through the modification of the Battle Creek Hydroelectric Project (Federal Energy Regulatory Commission [FERC] Project No. 1121) (Hydroelectric Project) facilities and operations, including instream flow releases. Any proposed changes to the Hydroelectric Project would trigger the need for Pacific Gas and Electric Company (PG&E)¹ to seek a license amendment from FERC.

Because of the federal and state actions associated with the Restoration Project, compliance with both the National Environmental Policy Act (NEPA) (42 USC 4321-4347) and the California Environmental Quality Act (CEQA) (Public Resources Code [PRC] 21000 *et seq.*) is required. This joint Environmental Impact Statement/Environmental Impact Report (EIS/EIR) has been prepared to fulfill the requirements of both NEPA and CEQA. Because the Restoration Project is an action directed within the CALFED Bay-Delta Programmatic EIS/EIR (CALFED Bay-Delta Program 2000a), environmental review of this EIS/EIR will tier from that document. The Restoration Project is also directed by several actions needed to implement the CALFED Ecosystem Restoration Program (ERP).

The purpose of this EIS/EIR is to disclose the impacts associated with the Restoration Project Proposed Action alternative and other project alternatives to reach a decision on the alternative to be implemented.

Reclamation, the lead federal agency, is responsible for ensuring overall NEPA compliance, while FERC, a cooperating federal agency, is responsible for ensuring that proposed changes to the Hydroelectric Project comply with NEPA prior to issuing a license amendment for the Hydroelectric Project. Because the FERC license requires Clean Water Act (CWA) (33 USC 1251 *et seq.*)

¹ Pacific Gas & Electric Company (PG&E) is the owner and licensee of the Battle Creek Hydroelectric Project (FERC Project No. 1121) at the time of publication of this document.

Section 401 water quality certification from the SWRCB, the SWRCB is the state lead agency responsible for ensuring CEQA compliance.

Battle Creek Significance

In recent decades, California has experienced a statewide decline in its salmon and steelhead populations, particularly wild stocks. The decline has been attributed to multiple causes, most notably the development of federal, state, municipal, and private water projects to meet growing societal demands. In the Sacramento River drainage, large projects that provide domestic water supplies, irrigation, flood control, and power generation have in some cases irretrievably blocked anadromous fish access to natal streams. Actions to offset permanent stream habitat loss, such as establishing hatchery facilities, have maintained adequate stocks of some species. However, these actions have not been able to mitigate fully the loss of habitat used by species such as winter-run chinook salmon, spring-run chinook salmon, and steelhead that evolved life strategies to make use of the headwaters of major river systems in the Central Valley where natural barriers were absent.

The continuing decline in numbers of several species of chinook salmon and steelhead has resulted in their listing under the federal Endangered Species Act (ESA) and the California Endangered Species Act (CESA) as threatened or endangered. Before the species' listing, resource agencies and interest groups were aware of the declines and had initiated efforts aimed at arresting the decline and rebuilding these populations to levels above thresholds of concern set by ESA and CESA. While a number of those efforts broadly address the issues, specific actions significant to the restoration of Battle Creek include the Upper Sacramento River Fisheries and Riparian Habitat Management Plan, the Central Valley Project Improvement Act (CVPIA), and the ERP of the CALFED Bay-Delta Accord.

A common strategy to arrest the decline of the various anadromous salmonid stocks has been to recognize that some habitat has been permanently lost and to focus on finding other suitable habitat that is, or could be, accessible to these species and that could be restored to offset the permanent losses. In pursuit of that strategy, the use of partnerships among governmental agencies, stakeholders, and the private sector is viewed as the most efficacious and timely means to identify these restoration opportunities and share the costs necessary to bring them to fruition. This approach has led to the identification of Battle Creek as an extraordinary opportunity and initiated a partnership to effect a comprehensive restoration project for the watershed.

When compared to other upper Sacramento River tributaries, Battle Creek offers an extraordinary restoration opportunity because of its geology, hydrology, habitat suitability for several anadromous species, historical water allocation, and land uses compatible with a restored stream environment. The geology of the Battle Creek watershed, located at the southern end of the Cascades, is primarily volcanic in nature. This type of terrain provides deeply incised, shaded, cool stream corridors. Its ruggedness limits the extent of human activities that typically occur around more readily accessible streams. While substantial quantities of water have been diverted for hydroelectric production since the early 1900s, other activities that could have potentially detrimental impacts on the stream and surrounding riparian environment have been effectively precluded by the nature of the terrain.

Perhaps the most important feature of Battle Creek supporting its potential for restoration is its hydrology, which results from the volcanic nature of the drainage. Seasonal precipitation does not rapidly run off the watershed as with streams situated farther south in the Sierra Nevada. Instead, a large portion of the annual water charge percolates through the underlying volcanic strata and emerges throughout the watercourse as cold springs that ensure a relatively high and stable base flow throughout the year. The naturally regulated stable base flow and cold water temperature offer drought resistance not found elsewhere in the present range of anadromous fish and ensure that the watershed can provide refugia for species when they may become distressed in other watersheds more vulnerable to drought conditions. These hydrologic and geologic attributes of Battle Creek are representative of streams permanently blocked by water development projects. In terms of a restoration opportunity, Battle Creek offers the natural habitat conditions conducive to the recovery of species no longer able to access all of their ancestral streams.

Other factors that contribute to the unique Battle Creek restoration opportunity include:

- Because of the lack of large on-stream storage reservoirs, creek geomorphic processes have not substantially been affected.
- Habitat suitable to support naturally occurring anadromous salmonid species exists in the watershed and will improve with the Restoration Project.
- Private ownership of lands bordering Battle Creek discourages potential human impacts on recovered species.

Development of a Memorandum of Understanding

The compatibility of continuing existing land uses and the limited impact of the Hydroelectric Project have facilitated the formation of partnerships supportive of restoration activities throughout the watershed. In particular, the formal partnership among federal and state agencies and PG&E to modify and reoperate the Hydroelectric Project is the key element in the restoration of stream reaches. The collaboration among these partners and the other stakeholders has been the

hallmark in the development of the widely supported Restoration Project involving the hydroelectric facilities.

In early 1999, this cooperative effort led to the signing of an Agreement in Principle by Reclamation, National Marine Fisheries Service (NOAA Fisheries), U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Game (DFG), and PG&E to pursue a restoration project for Battle Creek. In mid-1999, the parties signed a detailed, formal Memorandum of Understanding (MOU) (included in Appendix A of this document) in conformance with the Agreement in Principle, allowing the release of \$28 million in CALFED funding for the agencies' responsibilities in the partnership.² Since the signing of the MOU in 1999, public costs have increased by more than a factor of two. Reclamation has recently submitted an amended CALFED proposal for the Research Project in the amount of \$62 million. Such a substantial commitment is based on the expectation that this Restoration Project will result in significantly greater benefits than one could achieve in a normal FERC licensing amendment process initiated solely by the owner of the project.

The MOU called for contributions from PG&E in the form of forgone energy generation, pursuit of an amendment to the Hydroelectric Project's FERC license, transfers of certain water rights to DFG, and a variety of other requirements. Flow determinations for the Restoration Project used in the MOU were initially developed by the Battle Creek Working Group (BCWG) Biological Technical Team. Decisions were made on dam removal options based on limitations that minimum instream flow releases posed to the power potential of the diversion. The MOU also provided for the partial funding of adaptive management through a separate third-party funding agreement for an additional \$3 million. The plan discussed in the MOU is the Proposed Action alternative, which is being evaluated along with other Action Alternatives in this EIS/EIR.

Social Context

The Restoration Project has been supported in the community and is consistent and compatible with other related restoration initiatives in the watershed. The BCWG has served as a catalyst to explore various actions to carry forth the Restoration Project. The Battle Creek Watershed Conservancy supports the Restoration Project, pending the appropriate consideration and resolution of other watershed actions, notably the operation of Coleman National Fish Hatchery. Coordination of Restoration Project measures with broader local watershed management initiatives and those of a basinwide nature would ensure that

² At the time of the signing of the 1999 MOU the cost of the agencies' responsibilities was \$28 million dollars; that amount is now estimated to be \$62 million. Additional CALFED funding is being sought. If additional funds are not made available for physical implementation of the Restoration Project, Restoration intends to suspend work on the Restoration Project until the necessary additional funding is made available.

restoration of the anadromous fishery in Battle Creek is maintained and would contribute significantly to population recovery goals.

Ecological Restoration Considerations

With partnerships coalescing, stakeholders pursued an evaluation of habitat needs in Battle Creek to restore the anadromous fishery through various forums. This evaluation focused on minimum instream flow requirements, management of those instream flows, upstream and downstream fish passage, restoration of stream function to mimic the natural hydrography in its undeveloped state, and adaptive management to monitor and refine restoration actions.

Power Production Considerations

To minimize the loss of clean, renewable power production from the Hydroelectric Project, careful consideration has been given to power production issues while meeting habitat needs. Key among these are instream flow requirements, maintaining existing system operating flexibility, designing new highly reliable facilities, ensuring that operating and maintenance requirements are reasonable, and achieving regulatory certainty to the extent feasible in light of the sensitivity of the anadromous species inhabiting the watershed.

Enhanced Benefits

The Restoration Project includes a number of other measures (beyond the physical issues discussed above) that would enhance and ensure environmental benefits. Among these are:

- transferring water rights at removed diversion dams to DFG,
- supporting the dedication of those rights for instream use,
- creating a Water Acquisition Fund to facilitate additional instream flows should the adaptive management process determine that it would be appropriate, and
- using funds from a third party to create an Adaptive Management Fund to accommodate modifications to hydroelectric production facilities or the acquisition of additional water for increased instream flow determined by the Adaptive Management Plan protocols. A total of \$6 million is funded for adaptive management through scheduled use of funds derived from a third party and the CALFED water acquisition program.

Purpose and Need

The purpose of the Restoration Project is to restore approximately 42 miles of habitat in Battle Creek and an additional 6 miles of habitat in its tributaries while minimizing the loss of clean and renewable energy produced by the Hydroelectric Project.

The Restoration Project will be accomplished through the modification of Hydroelectric Project facilities and operations, including instream flow releases. Habitat restoration would enable safe passage for naturally produced salmonids and would facilitate their growth and recovery in the Sacramento River and its tributaries. These salmonids include Central Valley spring-run chinook salmon, state- and federally listed as threatened; Sacramento River winter-run chinook salmon, state- and federally listed as endangered; and Central Valley steelhead, federally listed as threatened.

The timely restoration of a drought-resistant, spring-fed system like Battle Creek is especially important to species such as winter-run and spring-run chinook and steelhead, which are dependant on cool water stream habitats. Winter-run chinook is actually obligated to habitats like Battle Creek that have reaches kept constantly cool year-round by springs. Historically, winter-run Chinook salmon populations occurred in the creek, but at present, the only significant population of winter-run chinook occurs in the main stem of the Sacramento River below Shasta Dam (Yoshiyama et. al. 1998). This section is kept cool by releases from the deepest portion of the reservoir. However, periods of extended drought exhaust this cold water reserve, leaving the fish susceptible to reproductive failure. The current population is at risk of total reproductive failure due to lethal water temperatures at least 2 years out of every 100 and partial reproductive failure 1 year out of every 10 (U.S. Bureau of Reclamation 1991). Because it is inevitable that serious drought conditions will again affect Shasta Lake, it is necessary to have drought resistant refugia available in the upper Sacramento River system for populations sensitive to drought conditions like winter-run and spring-run chinook.

The Restoration Project facilitates a timely restoration of the stream compared with waiting until 2026 for the expiration of the existing FERC license of the Battle Creek Hydroelectric project. One of the most valuable aspects of hydropower is that it is renewable through annual snowmelt and rainfall. Hydropower's fuel, water, is replenished with precipitation. Unlike fossil fuel technologies, hydropower's fuel is reused because it is not consumed in the production of electricity. Hydropower produces no greenhouse gases or other air pollutants. The use of hydropower makes it possible to avoid the additional burning of natural gas or other fossil fuels, which in turn avoids the release of the following air emissions: carbon dioxide, nitrogen oxide, carbon monoxide, and the production of ozone or smog.

Project Objectives

Specific project objectives were developed to expand on the purposes of the Restoration Project and to help develop project alternatives. A variety of alternatives are described in this document that propose various combinations of steps to be taken to improve fish habitat/passage (e.g., dam removal, flow increases). The project objectives are consistent with recovery plans for listed anadromous fish species. The alternatives evaluated in this EIS/EIR are consistent with the following specific objectives:

- restore self-sustaining populations of chinook salmon and steelhead by restoring their habitat in the Battle Creek watershed and access to it through a voluntary partnership with state and federal agencies, third-party donor(s), and PG&E;
- establish instream flow releases that restore self-sustaining populations of chinook salmon and steelhead;
- remove selected dams at key locations in the watershed where the hydroelectric values were marginal because of increased instream flow;
- dedicate water diversion rights for instream purposes at dam removal sites;
- construct tailrace connectors and install fail-safe fish screens and fish ladders to provide increased certainty about restoration components;
- restore stream function by structural improvements in the transbasin diversion to provide a stable habitat and guard against false attraction of anadromous fish away from their migratory destinations;
- avoid Restoration Project impacts on species of wildlife and native plants and their habitats to the extent practicable, minimize impacts that are unavoidable, and restore or compensate for impacts;
- minimize loss of clean and renewable energy produced by the Battle Creek Hydroelectric Project;
- implement restoration activities in a timely manner;
- develop and implement a long-term adaptive management plan with dedicated funding sources to ensure the continued success of restoration efforts; and
- avoid impacts on other established water users/third parties.

The Restoration Project is a proactive, cooperative undertaking among the state and federal agencies, PG&E, and private organizations to help restore the anadromous fishery in the Sacramento River watershed, where funding and restoration potential are uniquely promising.

Proposed Action and Alternatives

The Restoration Project consists of the portion of the Hydroelectric Project below the natural fish barriers (Figure ES-2). The upper project limit on North Fork Battle Creek is the absolute natural fish barrier above North Battle Creek Feeder Diversion Dam, 14 miles upstream of the confluence. The upper project limit on South Fork Battle Creek is the natural fish barrier above South Diversion Dam. The lower project limit is 9 miles upstream of the confluence of Battle Creek and the Sacramento River at a location just below the confluence of Coleman Powerhouse tailrace channel and the mainstem of Battle Creek.

Restoration efforts would occur at Hydroelectric Project sites along North Fork and South Fork Battle Creek and their tributaries, including North Battle Creek Feeder, Eagle Canyon, Wildcat, Coleman, Lower Ripley Creek Feeder, Inskip, Soap Creek Feeder, and South Diversion Dams; the Eagle Canyon, Wildcat, Inskip, and South Canals; and the Inskip and South Powerhouses. A means to access each project site (i.e., an existing or new access road or trail) would be needed during and after construction. Complete descriptions of each Restoration Project alternative are provided in Chapter 3 of this EIS/EIR.

The Restoration Project provides the following modifications to the Hydroelectric Project that would achieve the restoration of ecological processes important to anadromous fish:

- adjustments to Hydroelectric Project operations, including allowing cold spring water to reach natural stream channels, decreasing the amount of water diverted from streams, and decreasing the rate and manner in which water is withdrawn from the stream and returned to the canals and powerhouses following outages;
- modification of facilities such as fish ladders, fish screens and bypass facilities, diversion dams, and canals and powerhouse discharge facilities; and
- changes in the approach used to manage the Hydroelectric Project to balance hydroelectric energy production with habitat needs, using ecosystem-based management that protects and enhances fish and wildlife resources and other environmental values using adaptive management, reliable facilities, and water rights transfers, among other strategies.

The Restoration Project intends to restore the ecological processes that would allow the recovery of steelhead and chinook salmon populations in Battle Creek and minimize the loss of clean and renewable electricity through modifications to the Hydroelectric Project.

Restoration Project Alternatives were evaluated and selected for further analysis in this EIS/EIR by a multidisciplinary team of agencies and stakeholders, as noted above. The four Action Alternatives represent a reasonable range of

alternatives that meet the purpose and need and objectives of the Restoration Project, are feasible, and avoid significant environmental impacts.

No Action Alternative

The No Action Alternative is required by NEPA (42 USC 4321–4347) and used as a baseline against which the Action Alternatives are compared. The No Action Alternative represents conditions under a “no salmon or steelhead restoration project” or “future without salmon and steelhead restoration project” alternative. The No Action Alternative is defined by the existing FERC license conditions for the Hydroelectric Project and other existing environmental and resource conditions. Instream flow releases under the No Action Alternative are the license-required continuous minimum flows of 3 cfs below dams in North Fork Battle Creek and 5 cfs below dams in South Fork Battle Creek. Existing fish ladders would be operated according to the conditions set forth in the Hydroelectric Project’s FERC license. Fish screening of the existing diversion canals is assumed not to be included in the No Action Alternative. PG&E would continue to maintain license-required stream gages, documentation, and operations criteria consistent with the license requirements. PG&E also would continue to be responsible for all costs associated with this alternative.

Since 1995, Reclamation has maintained interim flow agreements³ with PG&E to maintain higher minimum instream flows until such time as a long-term restoration project can be implemented on Battle Creek. Terms of these agreements include increasing instream releases at Eagle Canyon and Coleman Diversion Dams to 30 cfs, suspending diversions at Wildcat Diversion Dam, and blocking downstream entrances to the fish passage facilities at Eagle Canyon and Coleman Diversion Dams. A major portion of the increased release at the Eagle Canyon site would be accomplished by bypassing the Eagle Canyon Springs collection facilities that discharge to the Eagle Canyon Canal. The interim flow agreements represent a short-term set of resource conditions that are not guaranteed to continue and are not conditions of the existing FERC license. Therefore, resource conditions established under the interim flow agreements are not included as part of the No Action Alternative. The resource conditions include reopening fish ladders now closed at Eagle Canyon and Coleman Diversion Dams under the interim agreement conditions. Wildcat Canal would be rewatered to convey water from North Fork Battle Creek to Coleman Canal, and minimum instream flow releases from the diversion dams would be returned to FERC license conditions.

³ The interim agreements between PG&E and Reclamation are discussed in greater detail in Chapter 6, “Related Projects” of this EIS/EIR.

Five Dam Removal Alternative – Proposed Action

The Five Dam Removal Alternative is the Proposed Action that modifies both facilities and operations to provide water management consistent with the descriptions in the MOU (see Appendix A). Table ES-1 lists the individual components of the Five Dam Removal Alternative.

Table ES-1. Five Dam Removal Alternative Components

Site Name	Component
North Battle Creek Feeder Diversion Dam	55-cfs fish screen Fish ladder
Eagle Canyon Diversion Dam	70-cfs fish screen Fish ladder
Wildcat Diversion Dam	Dam and appurtenant facilities removed
South Diversion Dam	Dam and appurtenant facilities removed
Soap Creek Feeder Diversion Dam	Dam and appurtenant facilities removed
Inskip Diversion Dam and South Powerhouse	220-cfs fish screen Fish ladder Construction of South Powerhouse and Inskip Canal connector (tunnel)
Lower Ripley Creek Feeder Diversion Dam	Dam and appurtenant facilities removed
Coleman Diversion Dam and Inskip Powerhouse	Dam removed Construction of Inskip Powerhouse and Coleman Canal connector Inskip Powerhouse bypass replaced
Asbury Diversion Dam	Reoperate Stream gaging station installed Minimum instream flow set for Baldwin Creek

Under the Five Dam Removal Alternative, Wildcat, South, Soap Creek Feeder, Lower Ripley Creek Feeder, and Coleman Diversion Dams would be removed. In addition, fish screens and fish ladders would be installed at North Battle Creek Feeder, Eagle Canyon, and Inskip Diversion Dams. In addition, tailrace connectors would be installed to convey water directly from the Inskip and South Powerhouses to downstream canals to meet several fishery restoration goals. A penstock bypass facility would be replaced at the Inskip Powerhouse, as well. Springs at Eagle Canyon, Soap Creek/Bluff, Lower Ripley, and Darrah springs areas would release to adjacent stream sections under this alternative.

The new tailrace connectors directing water from Inskip and South Powerhouses to downstream canals would maintain stable stream habitat, which would improve the ability of spawning fish to return to the streams where they were hatched. Water leaving the South Powerhouse would be conveyed through a new connector (a free-flow tunnel) and outlet works to the Inskip Canal. Water leaving the Inskip Powerhouse would be conveyed through a new connector (a full-flow buried pipe) and outlet works to the Coleman Canal. The current bypass facilities at both the South and Inskip Powerhouses do not prevent the mixing of North Fork and South Fork Battle Creek waters. The South Powerhouse bypass would be integrated with the new tailrace connector to prevent the mixing of these waters. The Inskip Powerhouse bypass would be replaced with a new pipeline and chute system that would prevent the mixing of these waters and ensure full-flow delivery of water to the Coleman Canal.

Construction Schedule

Construction of the Proposed Action is anticipated to begin in early 2004 and end by fall 2006. The construction schedule for each project site follows:

- North Battle Creek Feeder Diversion Dam—Begin construction in spring 2005 and end by summer 2006.
- Eagle Canyon Diversion Dam—Begin construction in spring 2005 and end by summer 2006.
- Wildcat Diversion Dam—Begin construction in summer 2005 and end by spring 2006.
- South Diversion Dam—Complete construction during fall 2005
- Soap Creek Feeder—Complete construction during summer 2005
- Inskip Diversion Dam/South Powerhouse—Begin construction in spring 2004 and end by fall 2006
- Lower Ripley Creek Feeder Diversion Dam—Complete construction during summer 2005
- Coleman Diversion Dam/Inskip Powerhouse—Begin construction in spring 2004 and end by spring 2006

Adaptive Management Plan

Adaptive management is an integral component of the Five Dam Removal Alternative. Adaptive management is a process that (1) uses monitoring and research to identify and define problems, (2) examines various alternative strategies and actions for meeting measurable biological goals and objectives, and (3) if necessary, makes timely adjustments to strategies and actions based on best scientific and commercial information available.

The primary reason for using an adaptive management process is to allow changes to restoration strategies or actions that may be needed to achieve the long-term goals and/or biological objectives and to ensure the likelihood of the survival and recovery of naturally spawning chinook salmon and steelhead. Under adaptive management, restoration activities would be monitored and analyzed to determine whether they are producing the desired results (i.e., properly functioning habitats).

As implementation proceeds, results would be monitored and assessed. If the anticipated goals and objectives are not being achieved, adjustments in the restoration strategy or actions would be considered through the draft *Battle Creek Salmon and Steelhead Restoration Project Adaptive Management Plan* (Adaptive Management Plan) (Kier Associates 2001), which has been developed consistent with relevant CALFED guidelines (Chapter 3 in CALFED 1999a) and the MOU (Appendix A). The Water Acquisition Fund and Adaptive Management Fund, which are elements of adaptive management, would provide funding for potential changes to Restoration Project actions that result from the application of the Adaptive Management Plan.

Facility Monitoring Plan

A detailed facility monitoring plan, prepared by PG&E in consultation with the other parties to the MOU, will be submitted to FERC as part of the license amendment application for the Five Dam Removal Alternative. The monitoring plan delineates a program related to the Proposed Action's components that expands on typical FERC license monitoring requirements. PG&E would perform and assume the costs for the following facility monitoring:

- Verifying compliance with the FERC license at the various outlet and spillway works for North Battle Creek Feeder, Eagle Canyon, Inskip, and Asbury (Baldwin Creek) Diversion Dams by operating properly calibrated remote-sensing devices that continuously measure and record total flow and the fluctuation of stage immediately below each dam during all operations.
- Identifying debris problems at the fish ladders at North Battle Creek Feeder, Eagle Canyon, and Inskip Diversion Dams by operating properly calibrated remote-sensing devices that continuously monitor water surface elevations at the tops and bottoms of the ladders. In addition, PG&E would continuously operate a calibrated automated fish counter or an underwater video camera to document fish movement through the ladder during the first 3 years of operation or as otherwise agreed upon by the parties to the MOU.
- Identifying instances of plugging at the fish screens at North Battle Creek Feeder, Eagle Canyon, and Inskip Diversion Dams by operating properly calibrated remote-sensing devices that continuously monitor water surface elevation differences on the inlet and outlet sides of the screens. If the monitoring reports a critical malfunction on the screen, the fail-safe feature would shut down the inlet to the canal until the situation has been remedied.

PG&E will perform all the necessary maintenance and replacement on the fish screens, fish ladders, and stream gages as indicated by the monitoring, once Reclamation has released these structures for operation.

Water Rights

PG&E's water diversion rights associated with all dams removed in this alternative would be transferred to DFG. For example, when the rights for the Soap Creek diversion are transferred, all rights and obligations associated with that diversion would be transferred, including but not limited to, PG&E's Bluff Springs rights and obligations, which are subject to an agreement regarding senior water rights for Hazen Ditch (Bluff Springs-Hazen Ditch Water Users Agreement, dated May 31, 1988). PG&E would execute the necessary documents to transfer these water diversion rights when it receives the associated portions of the funding specified in the MOU. DFG agrees that the transferred water rights would not be used to increase prescribed instream flow releases above the amounts specified in the MOU or developed pursuant to the Adaptive Management Plan. It further agrees that the rights would not be used adversely against remaining Hydroelectric Project upstream or downstream diversions until the FERC license is abandoned, at which time the limitation regarding transferred water rights would no longer apply.

Under this alternative, PG&E agrees that it will not use its riparian rights tied to lands associated with components of this alternative to decrease prescribed instream flow releases below the amounts specified in this alternative or developed pursuant to the Adaptive Management Plan. PG&E agrees that any deed transferring such riparian land or rights will contain this restriction.

PG&E and DFG would jointly file a petition with the SWRCB pursuant to Section 1707 of the California Water Code to dedicate to instream uses the water diversion rights associated with all removed dams in this alternative.

Water Acquisition Fund

An important component of this alternative is the Water Acquisition Fund. Its purpose is to establish a ready source of money that may be needed for any future purchases of additional instream flow releases in Battle Creek. These releases may be recommended under the Adaptive Management Plan during the 10-year period following the initiation of prescribed instream flow releases. The fund shall be used solely to purchase additional environmentally beneficial instream flow releases.

The Water Acquisition Fund account would be funded with federal funds administered by the resource agencies, following consultation with appropriate interested parties. Reclamation would commit \$3 million to an account or subaccount for the Water Acquisition Fund.

Protocols would be developed by the adaptive management technical team to identify environmentally beneficial flow changes for anadromous fish under the Adaptive Management Plan. If the adaptive management technical team or the adaptive management policy team cannot reach a consensus regarding flow changes, the resource agencies (collectively) and PG&E would each choose a person, and together those two persons would choose a single third party to act as mediator. If consensus through mediation still were not achieved, the resource agencies and PG&E would reserve their rights to petition FERC to resolve the subject action. The resource agencies and PG&E would assume their respective costs for any FERC process.

Adaptive Management Fund

The Adaptive Management Fund would implement actions developed under the Adaptive Management Plan. The purpose of the Adaptive Management Fund is to provide a readily available source of money to be used for possible future changes in the Restoration Project. The fund shall be used only for Restoration Project purposes directly associated with the Hydroelectric Project, including compensation for prescribed instream flow release increases after the Water Acquisition Fund has been exhausted or terminated. The Adaptive Management Fund shall not be used to fund monitoring or construction cost overruns.

The Adaptive Management Fund, in the amount of \$3 million, will be made available to PG&E and the resource agencies by a third-party donor to fund those actions developed pursuant to the Adaptive Management Plan. The third-party donor shall deposit that amount in an interest-bearing account pursuant to a separate agreement to be developed jointly by the resource agencies, PG&E, and the third-party donor. These three parties jointly will develop account disbursement instructions.

The three parties agree that (1) interest on the funds in the Adaptive Management Fund will accrue to the account and shall be applied to changes in the Restoration Project adopted pursuant to the Adaptive Management protocols and (2) all uncommitted funds in the Adaptive Management Fund will revert to the third-party donor at the end of the current term of the license for the Hydroelectric Project. USFWS shall request disbursements from the Adaptive Management Fund in writing, based on identified protocols.

Protocols to designate environmentally beneficial adaptive management actions to be funded from the Adaptive Management Fund pursuant to the Adaptive Management Plan are detailed in the plan.

The protocols for funding prescribed instream flow increases will be the same as for the Water Acquisition Fund described in Section 9.2 A 3 of the MOU (Appendix A). The protocols for funding facility modifications will also be the same as that described in Section 9.2 A 3, with two exceptions: (1) no interim action will be implemented prior to any required FERC approval of a license amendment or other necessary action by FERC, and (2) for all actions resolved

by FERC in which PG&E is in the minority opinion (opposing a proposed action expenditure), the Adaptive Management Fund will contribute 60% of any resulting facility modification cost; if PG&E is in the majority opinion (in support of a proposed action expenditure), the Adaptive Management Fund will contribute 100% of any resulting facility modifications.

No Dam Removal Alternative

The No Dam Removal Alternative would provide new fish screens and fish ladders at North Battle Creek Feeder, Eagle Canyon, Wildcat, South, Inskip, and Coleman Diversion Dams. The final facility configurations and instream flows for this alternative were derived from the Anadromous Fish Restoration Program (AFRP) (U.S. Fish and Wildlife Service 2001d) and were developed specifically for the restoration of Battle Creek fall- and late-fall-run chinook salmon and steelhead, but not specifically for Battle Creek winter-run chinook salmon. Table ES-2 summarizes the components of the No Dam Removal Alternative.

Table ES-2. No Dam Removal Alternative Components

Site Name	Component
North Battle Creek Feeder Diversion Dam	55-cfs fish screen Fish ladder
Eagle Canyon Diversion Dam	70-cfs fish screen Fish ladder
Wildcat Diversion Dam	20-cfs fish screen Fish ladder
South Diversion Dam	90-cfs fish screen Fish ladder
Inskip Diversion Dam	220-cfs fish screen Fish ladder
Coleman Diversion Dam	340-cfs fish screen Fish ladder
Instream Flows	Minimum instream flows below selected dams would be increased

Under this alternative, facility improvements would occur at North Battle Creek Feeder, Eagle Canyon, Wildcat, South, Inskip and Coleman Diversion Dams. No modifications would be made to Lower Ripley Creek Feeder, Soap Creek Feeder, or Asbury Pump Diversion Dam facilities, and no diversion dams would be removed. No powerhouse tailrace connectors or penstock bypass facilities would be constructed, which prevent mixing of North and South Fork Battle Creek flows. Springs at Eagle Canyon, Soap Creek/Bluff, Lower Ripley, and Darrah springs area would not release to adjacent stream sections under this alternative.

This alternative will also include elements of adaptive management consistent with the overarching principles of adaptive management set forth by the CALFED Science Program. This alternative does not include an adaptive management fund, facilities monitoring and maintenance plan, dedicated water rights, or a water acquisition fund as established in the Five Dam Removal Alternative.

Six Dam Removal Alternative

The Six Dam Removal Alternative would include the facility changes shown in Table ES-3.

Table ES-3. Six Dam Removal Alternative Components

Site Name	Component
North Battle Creek Feeder Diversion Dam	55-cfs fish screen Fish ladder
Eagle Canyon Diversion Dam	Dam and appurtenant facilities removed
Wildcat Diversion Dam	Dam and appurtenant facilities removed
South Diversion Dam	Dam and appurtenant facilities removed
Inskip Diversion Dam and South Powerhouse	220-cfs fish screen
	Fish ladder
	Construction of South Powerhouse and Inskip Canal connector (tunnel)
Coleman Diversion Dam and Inskip Powerhouse	Dam removed
	Construction of Inskip Powerhouse and Coleman Canal connector
	Inskip Powerhouse bypass replaced
Lower Ripley Creek Feeder Diversion Dam	Dam and appurtenant facilities removed
Soap Creek Feeder Diversion Dam	Dam and appurtenant facilities removed
Asbury Diversion Dam	Reoperate
	Stream gaging station installed
	Minimum instream flow set for Baldwin Creek

The major physical difference between this alternative and the Five Dam Removal Alternative is that this alternative includes the removal of Eagle Canyon Diversion Dam and its appurtenant facilities. New tailrace connectors at South and Inskip Powerhouses, and a new bypass facility at the Coleman Diversion Dam/Inskip Powerhouse site would be constructed similar to that described for the Five Dam Removal Alternative to prevent the mixing of North

Fork and South Fork Battle Creek flows. Springs at Eagle Canyon, Soap Creek/Bluff, Lower Ripley, and Darrah springs area would release to adjacent stream sections under this alternative. Minimum instream flow requirements are consistent with the 1999 MOU (Appendix A). This alternative will also include elements of adaptive management consistent with the overarching principles of adaptive management set forth by the CALFED Science Program. This alternative does not include, facility monitoring and maintenance plan, dedicated water rights, water acquisition fund, or an adaptive management fund, as established in the Five Dam Removal Alternative.

Three Dam Removal Alternative

The Three Dam Removal Alternative would include the facility changes shown in Table ES-4.

Table ES-4. Three Dam Removal Alternative Components

Site Name	Component
North Battle Creek Feeder Diversion Dam	55-cfs fish screen Fish ladder
Eagle Canyon Diversion Dam	Dam and appurtenant facilities removed
Wildcat Diversion Dam	Dam and appurtenant facilities removed
South Diversion Dam	90-cfs fish screen Fish ladder
Inskip Diversion Dam and South Powerhouse	220-cfs fish screen Fish ladder Construction of South Powerhouse and Inskip Canal connector (flow separator channel)
Coleman Diversion Dam and Inskip Powerhouse	Dam removed Construction of Inskip Powerhouse and Coleman Canal connector Inskip Powerhouse Bypass replacement
Asbury Diversion Dam	Reoperate Stream gaging station installed Minimum instream flow set for Baldwin Creek

The major physical differences between this alternative and the Five Dam Removal Alternative is the removal of Eagle Canyon Diversion Dam and its appurtenant facilities; the retention of South, Lower Ripley Creek Feeder, and Soap Creek Feeder Diversion Dams and their appurtenant facilities; the addition of a fish screen and ladder facility at South Diversion Dam; and elimination of the penstock bypass facility at Inskip Powerhouse. New tailrace connectors at

South and Inskip Powerhouses, and a new bypass facility at the Coleman Diversion Dam/Inskip Powerhouse site would be constructed similar to that described for the Five Dam Removal Alternative to prevent the mixing of North Fork and South Fork Battle Creek flows. Springs at Eagle Canyon and Darrah springs area would release to adjacent stream sections under this alternative. Minimum instream flow requirements are consistent with AFRP requirements for Battle Creek. This alternative will also include elements of adaptive management consistent with the overarching principles of adaptive management set forth by the CALFED Science Program. This alternative also does not include facility monitoring and maintenance plan, dedicated water rights, water acquisition fund, or an adaptive management fund, as described for the Five Dam Removal Alternative.

Summary of Impacts

A list of impacts associated with each alternative is provided in Table 7-1, which is presented in Chapter 7, “Summary” of this EIS/EIR.

No Action Alternative

Implementation of the No Action Alternative would not result in new environmental impacts in the Restoration Project study area. This alternative assumes that hydroelectric facilities, including fish ladders, would be operated in accordance with FERC regulations and the existing minimum flows. The existing project operations under the No Action Alternative would continue to limit the recovery of anadromous species in Battle Creek as identified in the Purpose and Need. Beneficial effects on fish habitat and populations would not occur under this alternative and construction-related impacts on fish, terrestrial biological resources, wetlands and historic resources associated with Restoration Project alternatives would not occur in the Battle Creek watershed. Implementing the No Action Alternative would reduce the need to upgrade access roads to hydroelectric facilities and would avoid visual resource effects of the Restoration Project between South Powerhouse and Inskip Diversion Dam. No impacts on land use, recreation, local traffic or transportation systems, noise, or air quality would result under this alternative.

Five Dam Removal Alternative—Proposed Action

Implementation of the Proposed Action would result in substantial increases in spawning and rearing habitat and production of fry and juvenile life stages for chinook salmon and steelhead. For most life stages of steelhead, spring-run chinook salmon, winter-run chinook salmon, and late-fall-run chinook salmon, capacity and production indices for the Proposed Action are several times greater than the corresponding indices for the No Action Alternative (Section 4.1,

“Fish,” in this EIS/EIR). The higher indices indicate the potential for a substantial increase in the number of fry and juvenile fish potentially supported by the higher minimum flow requirements and cooler water temperature conditions.

Additional benefits would result from improvements in fish passage from dam removal and more effective fish ladders and intake screens on remaining dams and diversions. The Proposed Action would also eliminate discharge of North Fork Battle Creek water to South Fork Battle Creek and reduce the number of Hydroelectric Project facilities in the stream channel. The restored hydrologic function would facilitate passage of adult and juvenile anadromous fish and reestablish the natural continuity of habitat use.

Construction of Proposed Action improvements could result in some short-term impacts to habitat and fish survival that would be mitigated with standard construction period mitigation measures.

The Proposed Action would also provide substantial benefits to amphibian habitat by reducing adverse effects of flow fluctuations and by increasing minimum instream flows. Significant construction-related impacts to riparian and wetland habitat would result from Proposed Action improvements that could be reduced by avoiding habitat during construction and replacing temporarily removed habitat onsite. Potential habitat disturbances to a number of special-status wildlife species, including valley elderberry longhorn beetle, foothill yellow legged frog, northwestern pond turtle, yellow-breasted chat, nesting raptors, and bats, are considered significant. These significant impacts would be reduced to less-than-significant levels by identifying habitat, avoiding occupied habitat areas during construction, and implementing appropriate mitigation measures to minimize impacts when occupied habitat cannot be avoided.

Construction and operation of the Proposed Action associated with South Powerhouse and Inskip Diversion Dam improvements would result in a significant and unavoidable aesthetic impact on the Oasis Springs Lodge. Mitigation measures are recommended to partially reduce the aesthetic effect on these facilities. Similarly, recreational use and public access to Battle Creek in the vicinity of construction zones could be affected during the construction period. Mitigation measures are recommended to reduce construction period effects on recreation resources.

Temporary construction nuisances for transportation, noise, and air quality that are considered significant impacts could result at various construction sites during the construction period. Construction area noise-reducing measures and best management practices for emissions controls are recommended to reduce these impacts to a less-than-significant level. Potential impacts related to construction area safety have been identified that would be reduced to a less-than-significant level by standard construction area safety precautions.

The Wildcat, Eagle Canyon, Coleman, and Inskip Diversion Dams are considered to be historic properties under Section 106 and historical resources for

the purposes of CEQA. Under the Proposed Action, Wildcat and Coleman Diversion Dams would be removed, and Eagle Canyon and Inskip Diversion Dams would be modified by installing fish screens and fish ladders. The removal and modifications proposed for these historic properties are considered significant impacts. Reclamation has consulted with the State Historic Preservation Officer (SHPO) with respect to the removal and modification of these facilities, and a memorandum of agreement between Reclamation and SHPO identifies appropriate measures to implement for these impacts.

Implementation of the Proposed Action would not substantially effect the costs of hydroelectric power generation. The increased annual total and going-forward cost of Hydroelectric Project power, with the cost-sharing agreement, would still be less than the annual power benefits, demonstrating that the Hydroelectric Project would continue to be a low-cost source of electricity. See Section 4.16, "Other NEPA Analyses," for additional information on power generation and economics.

No Dam Removal Alternative

Implementation of the No Dam Removal Alternative would result in substantial increases in spawning and rearing habitat and production of fry and juvenile life stages for chinook salmon and steelhead. Fish production would be less than identified for the Proposed Action. For most life stages of steelhead, spring-run chinook salmon, winter-run chinook salmon, and late fall-run chinook salmon, capacity and production indices for the No Dam Removal Alternative are several times greater than the corresponding indices for the No Action Alternative (Section 4.1, "Fish," in this EIS/EIR). The higher indices indicate the potential for a substantial increase in the number of fry and juvenile fish potentially supported by the higher minimum flow requirements and cooler water temperature conditions.

Additional benefits would result from improvements in fish passage from more effective fish ladders and new intake screens at all of the existing diversion structures. Although the No Dam Removal Alternative would provide substantial benefits relative to the No Action Alternative, the level of benefits would be less than those realized under the Proposed Action (i.e., Five Dam Removal Alternative). The lower benefits could occur in response to:

- lower minimum flow requirements (i.e., AFRP minimum flow requirements under the No Dam Removal Alternative versus MOU minimum flow requirements under the Proposed Action);
- potential impedance of passage associated with movement of adult and juvenile steelhead and chinook salmon over the dams (i.e., all dams and diversions remain in place); and
- maintenance of unnatural continuity associated with mixing of North Fork Battle Creek flow with South Fork Battle Creek flow that may affect

attraction of adult chinook salmon and an increased potential for adverse warm water temperatures during facility outages.

Some short-term impacts to habitat and fish survival could result from construction of fish ladders and diversion screens, similar to those identified for the Proposed Action. These impacts would be mitigated with standard construction period mitigation measures.

The No Dam Removal Alternative would also provide benefits to amphibian habitat by increasing minimum instream flows. Significant construction-related impacts on riparian and wetland habitat would result from this alternative that could be reduced by avoiding habitat during construction and replacing temporarily removed habitat on site. Potential habitat disturbances to a number of special-status wildlife species, including valley elderberry longhorn beetle, foothill yellow legged frog, northwestern pond turtle, yellow-breasted chat, nesting raptors, and bats are similar to those identified for the Proposed Action and are considered significant. These significant impacts would be reduced to less-than-significant levels by identifying habitat, avoiding occupied habitat areas during construction, and implementing appropriate mitigation measures to minimize impacts when occupied habitat cannot be avoided.

Construction and operation of this alternative associated with the Inskip Diversion Dam fish ladder and diversion improvements would result in a significant and unavoidable aesthetic impact on the Oasis Springs Lodge. Impacts would be slightly less than under the Proposed Action because no powerhouse tailrace connector is proposed under this alternative. Mitigation measures are recommended to partially reduce the aesthetic effect of these facilities. Recreational use and public access to Battle Creek in the vicinity of construction zones could be affected in a manner similar to the Proposed Action during the construction period. Mitigation measures are recommended to reduce construction period effects on recreation resources.

Temporary construction nuisances for transportation, noise, and air quality and potential construction site safety impacts would be similar to those identified for the Proposed Action and would be reduced to a less-than-significant levels by implementing mitigation measures similar to those recommended for the Proposed Action.

The Wildcat, Eagle Canyon, Coleman, and Inskip Diversion Dams are considered to be historic properties under Section 106, and historical resources for the purposes of CEQA. Under the No Dam Removal Alternative, Wildcat, Eagle Canyon, Inskip, and Coleman Diversion Dams would be modified by installing fish screens and fish ladders. The modifications proposed for these historic properties are considered significant impacts. Reclamation has consulted with the SHPO with respect to the modification of these facilities, and a memorandum of agreement between Reclamation and SHPO identifies appropriate measure to implement for these impacts.

Implementation of the No Dam Removal Alternative would create an adverse effect on the cost of hydroelectric power generation. The increased annual going-forward cost of Hydroelectric Project power be more than the annual power benefits, demonstrating that the Hydroelectric Project would not be a source of low-cost electricity. In addition, the increased annual total cost of Hydroelectric Project power would be more than annual power benefits (i.e., PG&E would not recover all of its past capital investments).

Six Dam Removal Alternative

Implementation of the Six Dam Removal Alternative would result in substantial increases in spawning and rearing habitat and production of fry and juvenile life stages for chinook salmon and steelhead. For most life stages of steelhead, spring-run chinook salmon, winter-run chinook salmon, and late-fall-run chinook salmon, capacity and production indices for the Six Dam Removal Alternative are several times greater than the corresponding indices for the No Action Alternative (Section 4.1, "Fish," in this EIS/EIR). The higher indices indicate the potential for a substantial increase in the number of fry and juvenile fish potentially supported by the higher minimum flow requirements and cooler water temperature conditions.

Additional benefits would result from improvements in fish passage from dam removal and more effective fish ladders and new intake screens on remaining dams and diversions. The Six Dam Removal Alternative would also eliminate discharge of North Fork Battle Creek water to South Fork Battle Creek and reduce the number of Hydroelectric Project facilities in the stream channel. The restored hydrologic function would facilitate passage of adult and juvenile anadromous fishes and reestablish the natural continuity of habitat use. These beneficial effects would be similar to those described for the Proposed Action. The most important difference under this alternative would be removal of Eagle Canyon Diversion Dam.

Facility removal and improvements under this alternative could result in some short-term impacts on habitat and fish survival during construction, similar to those identified for the Proposed Action. These impacts would be mitigated with standard construction period mitigation measures.

The Six Dam Removal Alternative would also provide benefits to amphibian habitat by reducing adverse effects of flow fluctuations and by increasing minimum instream flows in a manner similar to the Proposed Action. Significant construction-related impacts on riparian and wetland habitat that would result from this alternative could be reduced by avoiding habitat during construction and replacing temporarily removed habitat on site. Potential habitat disturbances to a number of special-status wildlife species, including valley elderberry longhorn beetle, foothill yellow legged frog, northwestern pond turtle, yellow-breasted chat, nesting raptors, and bats are similar to those identified for the Proposed Action and are considered significant. These significant impacts would be reduced to less-than-significant levels by identifying habitat, avoiding

occupied habitat areas during construction, and implementing appropriate mitigation measures to minimize impacts when occupied habitat cannot be avoided.

Construction and operation of this alternative associated with the South Powerhouse and Inskip Diversion Dam improvements would result in a significant and unavoidable aesthetic impact on the Oasis Springs Lodge in the same manner as the Proposed Action. Similarly, recreational use and public access to Battle Creek in the vicinity of construction zones could be affected during the construction period. Mitigation measures are recommended to reduce construction period effects on recreation resources.

Temporary construction nuisances for transportation, noise, and air quality, and potential construction site safety impacts would be similar to those identified for the Proposed Action and would be reduced to a less-than-significant level by implementing mitigation measures similar to those recommended for the Proposed Action.

The Wildcat, Eagle Canyon, Coleman, and Inskip Diversion Dams are considered to be historic properties under Section 106, and historical resources for the purposes of CEQA. Under the Six Dam Removal Alternative, Wildcat, Eagle Canyon, and Coleman Diversion Dams would be removed, and Inskip Diversion Dam would be modified by installing fish screens and fish ladders. The removal and modifications proposed for these historic properties are considered significant impacts. Reclamation has consulted with the SHPO with respect to the removal and modification of these facilities, and a memorandum of agreement between Reclamation and SHPO identifies appropriate measure to implement for these impacts.

Implementation of the Six Dam Removal Alternative would create an adverse effect on the cost of hydroelectric power generation. The increased annual going-forward cost of Hydroelectric Project power be significantly more than the annual power benefits, demonstrating that the Hydroelectric Project would not be a source of low-cost electricity. In addition, the increased annual total cost of Hydroelectric Project power would be more than annual power benefits (i.e., PG&E would not recover all of its past capital investments).

Three Dam Removal Alternative

Implementation of the Three Dam Removal Alternative would result in substantial increases in spawning and rearing habitat and production of fry and juvenile life stages for chinook salmon and steelhead. For most life stages of steelhead, spring-run chinook salmon, winter-run chinook salmon, and late-fall-run chinook salmon, capacity and production indices for the Three Dam Removal Alternative are several times greater than the corresponding indices for the No Action Alternative (Section 4.1, "Fish," in this EIS/EIR). The higher indices indicate the potential for a substantial increase in the number of fry and juvenile

fish potentially supported by the higher minimum flow requirements and cooler water temperature conditions.

Additional benefits would result from improvements in fish passage from dam removal and more effective fish ladders and new intake screens on remaining dams and diversions. The Three Dam Removal Alternative would also eliminate discharge of North Fork Battle Creek water to South Fork Battle Creek and reduce the number of Hydroelectric Project facilities in the stream channel. The restored hydrologic function would facilitate passage of adult and juvenile anadromous fishes and reestablish the natural continuity of habitat use. Although the Three Dam Removal Alternative would provide substantial benefits relative to the No Action Alternative, the level of benefits would be less than those realized under the Proposed Action (i.e., Five Dam Removal Alternative). The lower benefits could occur in response to:

- lower minimum flow requirements (i.e., AFRP minimum flow requirements under the Three Dam Removal Alternative versus MOU minimum flow requirements under the Proposed Action);
- potential impedance of passage associated with movement of adult and juvenile steelhead and chinook salmon over the dams (i.e., fewer dams and diversions are removed); and
- an increased potential for temporary exposure of chinook salmon and steelhead to variable flow and water temperature conditions during outages at Inskip Powerhouse.

Facility removal and improvements under this alternative could result in some short-term impacts on habitat and fish survival during construction, similar to those identified for the Proposed Action. These impacts would be mitigated with standard construction period mitigation measures.

The Three Dam Removal Alternative would also provide substantial benefits to amphibian habitat by reducing adverse effects of flow fluctuations and by increasing minimum instream flows in a manner similar to the Proposed Action. Significant construction-related impacts on riparian and wetland habitat would result from this alternative that could be reduced by avoiding habitat during construction and replacing temporarily removed habitat on site. Potential habitat disturbances to a number of special-status wildlife species, including valley elderberry longhorn beetle, foothill yellow legged frog, northwestern pond turtle, yellow-breasted chat, nesting raptors, and bats are similar to those identified for the Proposed Action and are considered significant. These significant impacts would be reduced to less-than-significant levels by identifying habitat, avoiding occupied habitat areas during construction, and implementing appropriate mitigation measures to minimize impacts when occupied habitat cannot be avoided.

Construction and operation of this alternative associated with the South Powerhouse and Inskip Diversion Dam improvements would result in a significant and unavoidable aesthetic impact on the Oasis Springs Lodge in the

same manner as the Proposed Action. Similarly, recreational use and public access to Battle Creek in the vicinity of construction zones could be affected during the construction period. Mitigation measures are recommended to reduce construction period effects on recreation resources.

Temporary construction nuisances for transportation, noise, and air quality, and potential construction site safety impacts would be similar to those identified for the Proposed Action and would be reduced to a less-than-significant level by implementing mitigation measures similar to those recommended for the Proposed Action.

The Wildcat, Eagle Canyon, Coleman, and Inskip Diversion Dams are considered to be historic properties under Section 106, and historical resources for the purposes of CEQA. Under the Three Dam Removal Alternative, Wildcat, Eagle Canyon, and Coleman Diversion Dams would be removed, and Inskip Diversion Dam would be modified by installing fish screens and fish ladders. The removal and modifications proposed for these historic properties are considered significant impacts. Reclamation has consulted with SHPO with respect to the removal and modification of these facilities, and a memorandum of agreement between Reclamation and SHPO identifies appropriate measure to implement for these impacts.

Implementation of the Three Dam Removal Alternative would create an adverse effect on the cost of hydroelectric power generation. The increased annual going-forward cost of Hydroelectric Project power be significantly more than the annual power benefits, demonstrating that the Hydroelectric Project would not be a source of low-cost electricity. In addition, the increased annual total cost of Hydroelectric Project power would be more than annual power benefits (i.e., PG&E would not recover all of its past capital investments).

Key Issues and Areas of Potential Controversy

The key issues and areas for potential controversy in implementing the Restoration Project include the compatibility of the Proposed Action and the other alternatives with ongoing and planned operations at the Coleman National Fish Hatchery, especially with respect to fish restoration upstream of the hatchery. Other key issues include the focus of the adaptive management process being used for Battle Creek fish restoration, the level of community involvement, long-term impacts on land use as they relate to potential restrictions associated with ESA and CESA compliance, and potential effects on trout farming.

Environmentally Preferred/Superior Alternative

According to Reclamation's NEPA Handbook, the alternative, or alternatives, considered to be environmentally preferred should be specified in an EIS. The *environmentally preferred alternative* under NEPA is defined as "the alternative

that will promote the national environmental policy as expressed in NEPA's Section 101." Ordinarily, this means the alternative that causes the least damage to the biological and physical environment; it also means the alternative that best protects, preserves, and enhances historic, cultural, and natural resources. It is implicit in NEPA that the environmentally preferred alternative is a reasonable and feasible alternative. Reclamation is not obliged to select the environmentally preferred alternative but must identify it in the Record of Decision and should, if possible, identify it in the final EIS.

Section 15126.6(e) of the state CEQA Guidelines also requires the state lead agency (SWRCB) to identify the environmentally superior alternative. If the No Action Alternative is also the environmentally superior alternative, the EIR will also identify an environmentally superior alternative from among the other alternatives. For the purposes of this EIS/EIR, the environmentally superior alternative will be referred to as the environmentally preferred alternative, as referred to under NEPA.

On the basis of the analyses of the potential environmental impacts, the Proposed Action, the Five Dam Removal Alternative, has been determined to be the environmentally preferred alternative. The Five Dam Removal Alternative would have more benefits to fish than the other alternatives. In addition, decommissioning the South Canal under the Five Dam Removal Alternative would provide additional habitat for amphibians and potential habitat for special-status bat species. Improvements under this alternative would substantially improve the reliability and effectiveness of upstream and downstream fish passage. In addition, powerhouse tailrace connectors are proposed that prevent the discharge of North Fork Battle Creek water to South Fork Battle Creek and the mixing of flow sources, which would prevent false attraction of anadromous fish to South Fork Battle Creek.

In relation to power generation, the annual power benefits associated with the Five Dam Removal Alternative would be greater than the increased annual total and going-forward cost of Hydroelectric Project power (see Section 4.16, "Other NEPA Analyses"). The No Dam Removal, Six Dam Removal, and Three Dam Removal Alternatives would have greater project costs and fewer power generation benefits.

Indian Trust Assets

Indian trust assets are legal interests in assets held in trust by the Federal government for Indian tribes or individuals. The trust relationship usually stems from a treaty, executive order, or act of Congress. Assets are anything that holds monetary value, and can be real property, physical assets, or intangible property rights. Examples of trust assets are lands, minerals, hunting and fishing rights, and water rights. Indian rancherias, reservations, and public domain allotments are frequently placed in trust status.

Reclamation's Indian trust asset policy states that Reclamation will carry out its activities in a manner that protects Indian trust assets and avoids adverse impacts when possible. When Reclamation cannot avoid adverse impacts, it will provide appropriate mitigation or compensation.

A search of the geographical information system coverage for California Indian reservations and public domain allotments failed to show any tribal or Indian lands in the vicinity of the Restoration Project area (U.S. Bureau of Reclamation and U.S. Fish and Wildlife Service 1999). Given the absence of Indian lands within or near the Restoration Project area, there will be no impacts on Indian trust assets from the Restoration Project.

Environmental Justice

Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," requires each federal agency to identify and address disproportionately high and adverse human health or environmental effects of their actions on minorities and low-income populations and communities. It requires federal agencies to adopt strategies to address environmental justice concerns within the context of agency operations.

The California Government Code (Section 65040.12) defines environmental justice as "The fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations and policies." This statute obligates the SWRCB as state lead agency for CEQA to do the following:

- Conduct all programs, policies, and activities in a manner that ensures the fair treatment of people of all races, cultures, and income levels, including minority populations and low-income populations of the State.
- Promote enforcement of all health and environmental statutes within its jurisdiction in a manner that ensures the fair treatment of all Californians, irrespective of race, culture, and income.
- Ensure greater public participation from environmental justice stakeholders in the development, adoption, and implementation of environmental regulations and policies.
- Identify among people of different socioeconomic classifications any differential patterns of consumption of natural resources.

The dams to be removed and the fish screens, ladders, and related water conveyance facilities to be improved as part of the Restoration Project are located on lands managed for grazing, fisheries restoration, and hydropower generation. Construction, operation, and maintenance activities associated with the Restoration Project are not expected to result in substantial changes to, or conflict with, existing land uses or result in substantial change in the socioeconomic characteristics of the study area. The Restoration Project could benefit

employment and income in the study area by enhancing the anadromous fishery. Conversely, the Restoration Project could adversely affect employment and income in the study area by reducing or eliminating production from the Mount Lassen Trout Farm, a privately owned fish hatchery with some operations located within the study area.

The Restoration Project study area does not have a high minority or low-income population. Most workers commute outside the study area to their places of employment, and income levels are similar to county averages. Construction, operation, and maintenance of the Restoration Project would not result in a disproportionate effect on a minority and/or low-income communities. In addition, the lead agencies have engaged stakeholders for input at all levels of the project decision-making process to ensure early, accessible, and meaningful participation. By their participation in ongoing local watershed efforts, the agencies have included stakeholders in the decision-making process and have explored opportunities to address environmental justice within current statutory and regulatory structure (refer to Chapter 4, Section 4.16, for additional analysis).

Public and Agency Involvement Process

Public involvement is a vital and required component of the NEPA and CEQA processes. Scoping is a process to gather input from the public, including their issues and concerns and, together with technical input and agency considerations, to define the significant issues to be addressed in the environmental document. NEPA regulations (40 CFR 1500 *et seq.*) define *scoping* as “an early and open process for determining the scope of issues to be addressed, and for identifying the significant issues related to the proposed action.” The CEQA guidelines (Title 14 CCR §§15000 *et seq.*) require scoping meetings under limited circumstances and encourages scoping activities.

Reclamation placed a Notice of Intent to prepare an EIS/EIR and notice of a public scoping meeting in the *Federal Register* on January 12, 2000. A brief description of the proposed Restoration Project, a request for written comments, and details on the public scoping meeting were included in the notice.

A joint federal and state public scoping meeting was held on January 31, 2000, at the Manton School Gymnasium in Manton, California. During this meeting, the public was presented with an overview of the Restoration Project, including the purpose and need for the project, a project description, and the current project alternatives. In addition, written and oral comments were received from the public at this meeting.

The SWRCB issued a Notice of Preparation of a draft EIS/EIR for the Restoration Project on April 12, 2000. The notice was circulated through the State Clearinghouse for agency review and comment on April 13, 2000.

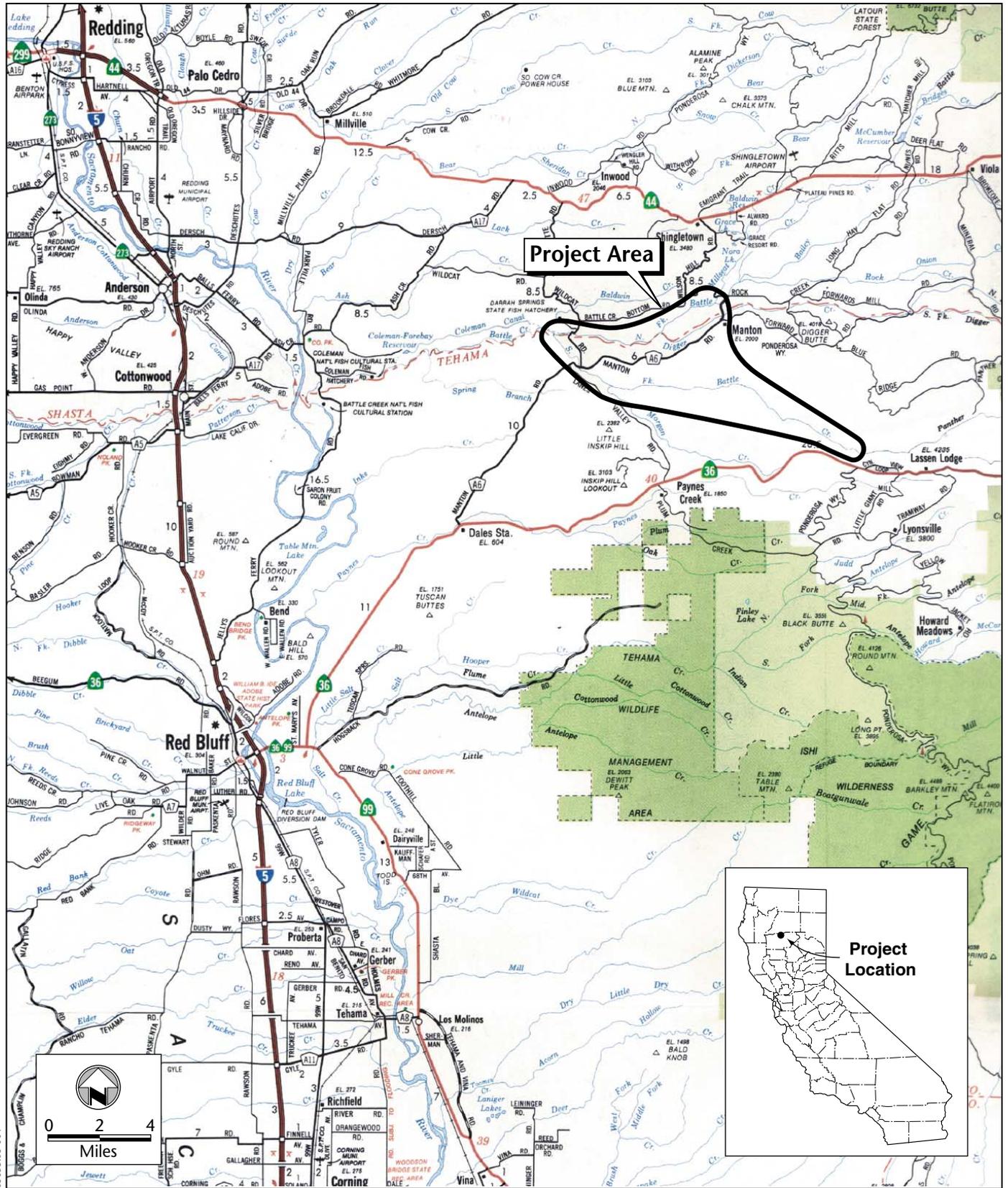
The Scoping Report⁴ provides an overview of the Restoration Project; describes the environmental compliance process associated with the Restoration Project, including the role of public scoping; discusses the public scoping meeting; describes Restoration Project alternatives; and contains comments received throughout the scoping process.

In addition to the public scoping process, public participation has been encouraged and has occurred at Restoration Project meetings. The public input received at Restoration Project meetings, including the BCWG, Environmental and Design Technical Team, and Project Management Team meetings, has been used throughout the development of the EIS/EIR.

The release of the draft EIS/EIR is another opportunity for the public to provide input on the analysis of the environmental effects of the proposed project and the other alternatives examined in the EIS/EIR. Responses to the comments received during the review of the draft document will be included in the final EIS/EIR.

Preparation of the Restoration Project documents, draft EIS/EIR, adaptive management plan, and FERC license agreement has also involved active participation by coordinated teams of federal and state agency staff and other stakeholders. Members of the teams included Reclamation, USFWS, NOAA Fisheries, FERC, DFG, SWRCB, California Department of Water Resources, PG&E, BCWG, Battle Creek Watershed Conservancy, Friends of the River, and others. Most of the teams met monthly; meetings were open to the public. The meetings were announced on Reclamation's web page for the Restoration Project (U.S. Bureau of Reclamation n.d.). In addition, email notices of meetings were distributed to the team participants. Anyone could request to be included on the email list.

⁴ The Scoping Report is available on Reclamation's web site at <http://www.mp.usbr.gov/regional/battlecreek>.



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Figure ES-1
Location of the Battle Creek Salmon and Steelhead Restoration Project

Battle Creek Salmon and Steelhead Restoration Project
Project Area Limits

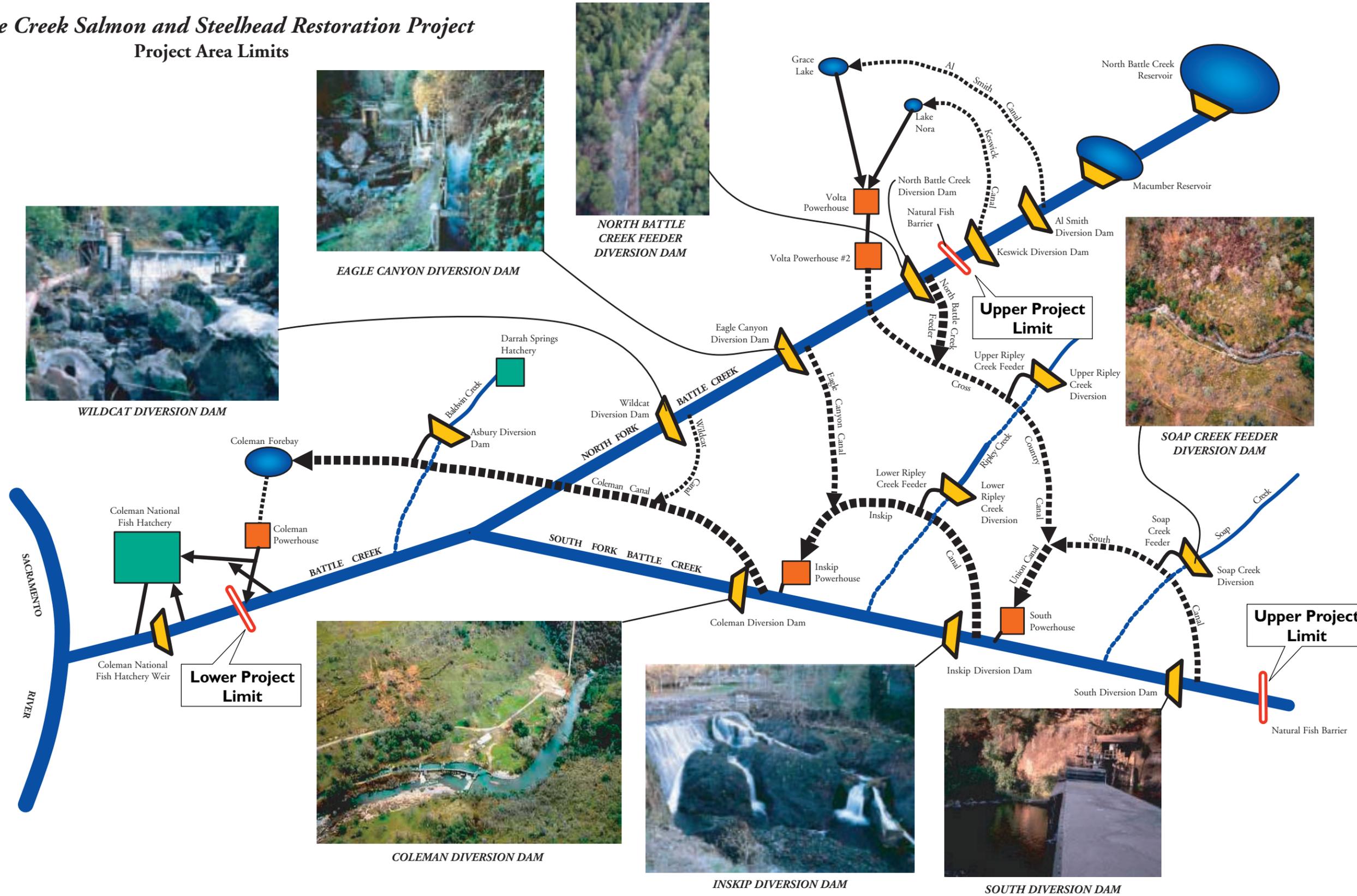


Figure ES-2
Restoration Project Facilities and Limits