Chapter 5

Assessment of Project Effects on Natural Community Conservation Plan Communities and Conservation Measures

This chapter describes the extent, function, and species associated with each NCCP community and fish group that could be affected by the Restoration Project (Table 1-4). In addition, this chapter describes effects of the project on each NCCP community and identifies conservation measures that will be implemented to avoid, minimize, and compensate for each adverse effect. Conservation measures were derived from the EIS/EIR mitigation measures (Jones & Stokes 2003a), the Fish and Wildlife Coordination Act Report (U.S. Fish and Wildlife Service 2003), and the Multi-Species Conservation Strategy conservation measures (CALFED Bay-Delta Program 2000c). Except where noted below, methods used to assess effects on each NCCP community are described in Chapter 3. This chapter also describes the expected outcome of implementing the project and conservation measures and how CALFED has contributed to the conservation of each NCCP community.

Anadromous Fish Species

The MSCS evaluates two fish groups—anadromous and estuarine species. The fish group associated with the Restoration Project is anadromous fish species. The fish species and NCCP habitat types included in the anadromous fish species MSCS fish group are listed in Table 5-1.

Table 5-1. Anadromous Fish Group Species and Associated NCCP Habitats

Included Species	NCCP Habitat Types
Sacramento River winter-run Chinook salmon Central Valley fall-/late fall–run Chinook salmon Central Valley spring-run Chinook salmon Central Valley steelhead Central California Coast steelhead green sturgeon	tidal perennial aquatic valley riverine aquatic montane riverine aquatic lacustrine saline emergent tidal freshwater emergent

The anadromous fish species evaluated in this ASIP include the Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, Central Valley fall-/late fall–run Chinook salmon, and Central Valley steelhead. The NCCP community associated with these species that is present in the Battle Creek project area is montane riverine aquatic. The MSCS conservation goal for the anadromous fish species fish group is to substantially increase the extent and quality of anadromous fish populations and habitat.

For the purposes of this ASIP, the anadromous fish species fish group is essentially the fish species addressed in Chapter 4. The reader is referred to this chapter for a discussion on the assessment methodology, effects, and conservation measures related to fish species. A discussion of the assessment methodology, effects, and conservation measures related to montane riverine aquatic habitat is provided below.

Montane Riverine Aquatic

The MSCS defines montane riverine aquatic habitat as follows:

> Montane riverine aquatic habitat includes the water column of flowing streams and rivers above an elevation of approximately 300 feet. This includes associated SRA, pool, riffle, run, and unvegetated channel substrate (including seasonally exposed channel bed) habitat features, and sloughs, backwaters, and overflow channels hydrologically connected to stream and river channels. Montane riverine aquatic habitat includes portions of the ERP riparian and riverine aquatic habitat (CALFED Bay-Delta Program 2000c).

For the purposes of this ASIP, the montane riverine aquatic habitat includes perennial drainages identified within the project area, including North Fork and South Fork Battle Creek, as well as perennial drainages within the project area that are hydrologically connected to Battle Creek, including Ripley Creek and Soap Creek. This habitat type supports the following species covered in this ASIP under the Programmatic BOs and NCCP Determination: osprey, western pond turtle, Central Valley steelhead, Sacramento River winter-run Chinook salmon, Central Valley spring-run chinook salmon, and Central Valley fall-/late fall–run Chinook salmon. Foothill yellow-legged frog is an MSCS evaluated species that is known to occur in the Battle Creek project area and could be adversely affected by the project but is not covered under the Programmatic BOs and NCCP Determination (CALFED Bay-Delta Program 2000c, Jones & Stokes 2003a). For a discussion of which species were included in, or excluded from, this ASIP, please see the section in Chapter 1 entitled Species Analyzed in This ASIP.

Current Status in the Project Area

The Battle Creek watershed is in the Cascade Range Foothill physiographic region (Hickman 1993). The Cascade region's geology is derived from the volcanic formations created by Mount Lassen and its predecessor volcanoes. The volcanic formations produce a type of hydrology that is unusual for the Central Valley, characterized by abundant cold water from spring flows and relatively high dry-season base flows.

Battle Creek is a tributary to the upper Sacramento River and is one of the only watersheds of significant size remaining in the Cascade region that has habitat types similar to the habitat types in which the now scarce runs of spring- and winter-run Chinook salmon evolved (U.S. Fish and Wildlife Service 1995). Prior to the hydroelectric development in Battle Creek watershed more than a century ago, prime habitat for Chinook salmon and steelhead extended from the confluence with the Sacramento River upstream to natural barrier waterfalls on North Fork and South Fork Battle Creek.

Battle Creek is a high-gradient, headwater stream with an elevation change in excess of 5,000 ft over 50 miles. The montane riverine aquatic habitat is supported by flows through remote, deep-shaded canyons and riparian corridors with little development near its banks. The Battle Creek channel is characterized by alternating pools and riffles. Boulders, ledges, and turbulence provide diversity to the channel form. Substrate size ranges from sand to boulder with predominantly gravel and cobble throughout the system. Concentration and types of gravel deposits are directly correlated to stream gradient. Sediment mobility studies imply that gravel in Battle Creek moves with enough frequency to keep it clean of fine sediment and loose enough to support spawning by Chinook salmon and steelhead (U.S. Department of the Interior, Bureau of Reclamation 2001).

A primary factor affecting the area of montane riverine aquatic habitat in Battle Creek is streamflow. Battle Creek flow consists of rainfall and snowmelt from the western slope of the Cascade Mountain Range, complemented by the year-round flow of natural springs. High flow increases the habitat area, including channel edge and floodplain inundation. Deeper inundation provides more overhead cover and greater channel depth. Change in flow can greatly increase or decrease the available lateral area that is inundated, particularly in riffles and shallow glides.

Diversion for power generation has substantially reduced streamflow in all the reaches of Battle Creek downstream of Keswick Diversion Dam on the North Fork and South Diversion Dam on the South Fork. Although minimum flows are maintained, reduced streamflow has substantially decreased stream area. Tributary streams, in particular Soap, Ripley, and Baldwin Creeks, have been similarly affected. The existing FERC license–required minimum flow of 0 cfs minimizes existing montane riverine aquatic habitat in these streams.

Streamflow also affects water temperature in montane riverine aquatic habitat. Water temperature is determined primarily by weather, channel form and dimension, shade, and flow. Diversion of flow, including spring water accretions, from Battle Creek substantially raises water temperature, especially from March through October. Flow diversion and subsequent warming substantially reduce cool habitat area in Battle Creek (Kier Associates 1999). Transbasin water diversions from North Fork Battle Creek to the South Fork tend to warm North Fork Battle Creek and cool South Fork Battle Creek.

In the steep, high-elevation stream reaches, natural features in the channel, such as boulders and logs, affect continuity of montane riverine aquatic habitat, consequently affecting passage of steelhead and Chinook salmon. Streamflow affects habitat continuity. Natural events, such as floods, can alter physical characteristics of montane riverine aquatic habitat, including depth of pools, height of drops and cascades, water velocity, slope of the streambed, and the length of the slope.

Nine diversion dams have modified montane riverine aquatic habitat, blocking the channel of Battle Creek and its tributaries in several locations and affecting streamflow. The North Battle Creek Feeder, Eagle Canyon, Wildcat, Coleman, Inskip, South, Soap Creek Feeder, Lower Ripley Creek Feeder, and Asbury Diversion Dams disrupt habitat continuity and potentially block movement of steelhead and Chinook salmon to approximately 55 miles of upstream habitat. Existing fish ladders at Eagle Canyon, Wildcat, and Coleman Diversion Dams are considered ineffective under most flow conditions (California Department of Water Resources 1997, 1998). During average or wet water years, fish ladders at North Battle Creek Feeder, Eagle Canyon, Wildcat, Inskip, and Coleman Diversion Dams could be ineffective for 3 to 8 months because flow exceeds the maximum effective capacity of the ladders by a factor of 10 or more. Fish ladders at Eagle Canyon and Coleman Diversion Dams were intentionally closed to fish passage under the 1998 Interim Agreement.

The Coleman National Fish Hatchery operates a barrier weir to collect fall-run Chinook salmon broodstock for hatchery production. The Coleman National Fish Hatchery also operates a fish ladder located approximately 5.5 miles upstream of Battle Creek's confluence with the Sacramento River (U.S. Fish and Wildlife Service 2001a). When the fish ladder is closed, the barrier weir extends across the full width of Battle Creek.

Effects of the Restoration Project

Increased Sedimentation of North Fork and South Fork Battle Creek

Vegetation would be removed and the soil would be graded in order to construct staging areas and new access roads and to expand existing roads in the project area. Construction and demolition activities adjacent to or in the flowing waters

of Battle Creek and its tributaries would disturb soils and the streambed, potentially leading to erosion and input of fine sediment. The input of fine sediment would increase turbidity and sedimentation of gravel substrates. Deposition of fine sediment would fill interstitial spaces between gravel and cobble substrates, inhibiting the flow of oxygen-rich water. Duration of effects could be short term or could continue over several years, depending on the extent and duration of fine sediment input and on flow conditions that mobilize and transport fine sediment through the stream ecosystem.

Increased sedimentation of North Fork and South Fork Battle Creek resulting from construction activities would be avoided or minimized with implementation of the environmental commitments described in Chapter 2 and mitigation measure EFISH2 from the Restoration Project EIS/EIR described in Chapter 4 of this report. Temporary effects of mobilized fine sediment would be fully mitigated by habitat restoration efforts provided through implementing the Restoration Project.

Release of Currently Stored Fine Sediment to the Stream Channel

Removal of Wildcat, Coleman, and South Diversion Dams would release currently stored fine sediment to the stream channel, which would increase turbidity and sedimentation of gravel substrates. The volume and type of sediment stored behind the dams varies, with 30,000 yd^3 at South Diversion Dam and 28,000 yd^3 at Coleman Diversion Dam. Wildcat Diversion Dam is relatively small, and its removal would not release substantial sediment. Removal of diversion dams on Ripley and Soap Creeks would also release fine sediment, but the dams are small and would not release substantial sediment. Removal of the dams potentially increases the input of fine sediment to the stream channel.

The release of fine sediment to the stream channel stored behind Coleman and South Diversion Dams would be minimized with excavation of a pilot channel in the sediments behind the dams, as described in the project description for these sites presented in Chapter 2 of this report. The pilot channel would extend from the dam upstream about 200 feet to facilitate sediment flushing and to ensure that fish passage is adequate. The pilot channel would have a bottom width of approximately 8 feet and side slopes of approximately 3:1. The bottom slope of the channel would range from 8:1 to 10:1. Material excavated for the pilot channel would be spread in the high flow channel in the vicinity of the dam.

Adverse effects of dam removal would also be minimized with implementation of mitigation measure EFISH3 from the Restoration Project EIS/EIR described in Chapter 4 of this report.

Removal of Five Dams and Construction of More-Reliable, Effective Fish Ladders

The removal of five dams and the construction of more-reliable, effective fish ladders would restore and reestablish continuity within the montane riverine aquatic habitat. Removal of Wildcat, Coleman, Soap Creek Feeder, Lower Ripley Creek Feeder, and South Diversion Dams would restore the natural stream channel. Construction of improved fish ladders on North Battle Creek Feeder, Eagle Canyon, and Inskip Diversion Dams would provide significantly greater habitat continuity, facilitating upstream passage of steelhead and Chinook salmon relative to passage conditions provided under baseline conditions.

Increased Minimum Instream Flow Requirements

The Restoration Project will increase the minimum instream flow requirements in multiple reaches of Battle Creek (i.e., MOU minimum flow requirements). The increased flow will increase montane riverine aquatic habitat area and reestablish more natural water temperature conditions. The total habitat area will be several times greater than the current area. In addition, higher instream flows would improve continuity of montane riverine aquatic habitat, facilitating passage of Chinook salmon and steelhead over natural barriers.

The removal of diversion dams on Soap and Ripley Creeks and the substantial increase in minimum flow (i.e., greater than zero) would increase montane riverine aquatic habitat in those streams. Baldwin Creek extends ¾ mile from Battle Creek to Asbury Dam. Flow released from Asbury Dam is contributed by Darrah Creek, a major cold spring–fed tributary. Flow below Asbury Dam in Baldwin Creek would increase habitat area and quality.

The higher flows will substantially cool water temperature at most locations, especially during the warmer months, reestablishing more natural conditions to the montane riverine aquatic habitat in Battle Creek. The additional flow in North Fork Battle Creek cools water temperature from the North Fork Battle Creek Feeder Dam to the mouth and downstream into the mainstem of Battle Creek.

On South Fork Battle Creek, the higher minimum instream flow cools water temperature at most locations. The higher minimum instream flows, in combination with construction of connectors that will convey North Fork Battle Creek water directly into existing canals, will restore the natural water temperature gradient within montane riverine aquatic habitat in South Fork Battle Creek.

Under baseline conditions, cool springs are diverted into canals that convey flow from Eagle Canyon Diversion Dam and Soap Creek Feeder Diversion Dam. At Eagle Canyon Diversion Dam, the spring flow is approximately 12 cfs, and the temperature of the spring flow is near 52°F year-round. Under the Restoration

Project, the spring flow would discharge to North Fork Battle Creek, restoring the natural condition and cooling North Fork Battle Creek flow during the warmer months.

Soap Creek inflow to South Fork Battle Creek would also increase under the Restoration Project. Flow in Soap Creek originates from Bluff Springs. Under baseline conditions, flow in Soap Creek is diverted and does not contribute to cooling of South Fork Battle Creek. The reestablishment of spring flow discharge to South Fork Battle Creek would restore the natural condition within the montane riverine aquatic habitat and would cool streamflow during the warmer months.

As noted above, cessation of the discharge of North Fork Battle Creek water into the South Fork Battle Creek at Inskip and Coleman Diversion Dams will reestablish the gradient of warm to cool water temperatures from downstream to upstream. Connectors will convey powerhouse discharge and spillage during outages directly to canals. Short-term variation in flow and water temperature that occur under baseline conditions would be avoided, reestablishing temporal and spatial continuity of flow and temperature conditions within the montane riverine aquatic habitat in South Fork Battle Creek.

ASIP Conservation Measures

The purpose of the Restoration Project is to substantially increase the extent and quality of the montane riverine aquatic habitat in Battle Creek. The applicable programmatic conservation measures set forth in the MSCS for montane riverine aquatic habitat are satisfied by implementing the Restoration Project and the environmental commitments described in Chapter (CALFED Bay-Delta Program 2000c). Specifically, one objective for the Restoration Project is to "establish instream flow releases that restore self-sustaining populations of Chinook salmon and steelhead." In addition, all construction-related activities will occur during the times of the year that are least detrimental to the environment, e.g., instream work will be conducted during periods of low streamflow (May-October). No additional conservation measures are necessary.

Expected Outcomes

Implementation of the Restoration Project, consistent with the ASIP goals, would substantially increase the ecological functions of Battle Creek. The Restoration Project would restore conditions supporting adult and juvenile anadromous fish migration, spawning, and rearing in approximately 42 miles of habitat in Battle Creek, and an additional 6 miles in its tributaries, which would considerably increase the functions and values of montane riverine aquatic habitat in Battle Creek.

CALFED Contribution to Species and Habitat Conservation

Implementation of the Restoration Project is designed to substantially increase the extent and quality of montane riverine aquatic habitat. In addition to this beneficial activity, the overall contribution of the CALFED program will benefit this NCCP community. Table I-1 in Appendix I lists the projects that are being implemented, or will be implemented in the near future, that substantially increase the extent and quality of montane riverine aquatic habitat.

Appendix J of this document identifies ecosystem restoration milestones described in the Programmatic BOs and NCCP Determination that will benefit montane riverine aquatic habitats. These milestones are required to be achieved in the first 7 years of CALFED implementation, as a condition of the Programmatic BOs and NCCP Determination.

Nontidal Freshwater Permanent Emergent Habitat

The MSCS defines nontidal freshwater permanent emergent habitat as follows:

> Nontidal freshwater permanent emergent habitat includes permanent (natural and managed) wetlands, including meadows, dominated by wetland plant species that are not tolerant of saline or brackish conditions. Nontidal freshwater permanent emergent habitat includes all or portions of the ERP fresh emergent wetland (nontidal) and nontidal perennial aquatic habitat to be restored within nontidal freshwater permanent emergent wetlands (CALFED Bay-Delta Program 2000c).

The nontidal freshwater permanent emergent NCCP community is identified in the Restoration Project area as two subtypes: emergent wetland and emergent scrub wetland. These habitat types support the western pond turtle, which is covered in this ASIP under the Programmatic NCCP Determination. No additional MSCS evaluated species that are associated with this NCCP community are known to occur in the Battle Creek project area (CALFED Bay-Delta Program 2000c, Jones & Stokes 2003a). For a discussion of which species were included in, or excluded from, this ASIP, please see the Chapter 1 section entitled Species Analyzed in This ASIP.

Table 5-2 lists the number of acres of emergent wetland habitat potentially affected by implementation of the Restoration Project.

Table 5-2. Acres of Emergent Wetland Habitat Potentially Affected at Each Restoration Project Site

Project Site	Emergent Wetland
Coleman Diversion Dam/Inskip Powerhouse	0.06
Inskip Diversion Dam/South Powerhouse	0.02
Total Acres	**0.08**

Current Status in the Project Area

Emergent Wetland

Approximately 3 acres of emergent wetlands were delineated on the Restoration Project sites (Jones & Stokes 2003b, 2004). Emergent wetlands are characterized by erect, rooted, herbaceous plants that are adapted to living in water (Cowardin et al. 1979). Perennial plants present for most of the growing season in most years usually dominate these wetlands. Dominant species include narrow-leaved cattail, rush, Parish's spike-rush, monkeyflower, and Himalayan blackberry.

Representative waterbirds that forage and rest in emergent wetlands and associated open-water habitats in the Sierra Nevada foothills include pied-billed grebe, great blue heron, and great egret. Various ducks, including wood duck, green-winged teal, mallard, cinnamon teal, gadwall, American widgeon, and ring-necked duck, frequent emergent wetlands, where they are joined by American coot, killdeer, black-necked stilt, greater yellowlegs, and common snipe. Typical amphibians and reptiles in these habitats are California newt, foothill yellow-legged frog, northwestern pond turtle, and garter snakes. Large mammals such as black-tailed deer may frequent emergent wetlands and use them as sources of drinking water.

Emergent Scrub Wetland

Approximately 2 acres of emergent scrub wetlands were delineated on the Restoration Project sites (Jones & Stokes 2003b, 2004). Emergent scrub wetlands are characterized by the same erect, rooted, herbaceous hydrophytes described above for emergent wetlands. In addition, these wetlands are dominated by broad-leaved, deciduous, hydrophytic trees and shrubs, usually less than 20 feet tall, such as willows and white alder. These wetlands may represent a successional stage leading to forested wetlands, or they may be relatively stable communities. Representative wildlife species are similar to those species described above for emergent wetlands.

Effects of the Restoration Project

Construction activities associated with the Restoration Project would result in the temporary disturbance of approximately 0.1 acre of emergent and emergent scrub wetlands at the Coleman Diversion Dam/Inskip Powerhouse and Inskip Diversion Dam/South Powerhouse project sites. Emergent wetlands at Coleman Diversion Dam/Inskip Powerhouse and Inskip Diversion Dam/South Powerhouse are located near construction access roads. Use of the access roads would result in temporary, construction-related effects on these nontidal freshwater permanent emergent communities.

The Restoration Project EIS/EIR includes the following mitigation measures to avoid, minimize, and compensate for the potential effects on emergent and emergent scrub wetlands:

- **ENFPE1. Avoid and Minimize Disturbance of Emergent and Emergent Scrub Wetlands.**[1] Reclamation and/or the construction contractor will avoid and minimize impacts on emergent and emergent scrub wetlands by implementing the environmental commitments listed in Chapter 2, mitigation measure EFISH2 described in Chapter 4, and the following measures.
- Redesign or modify the project to avoid direct and indirect effects on wetlands and streams, if feasible.
- Avoid construction activities in saturated or ponded wetlands and streams during the wet season (spring and winter) to the maximum extent possible. Where such activities are unavoidable, protective practices, such as use of padding or vehicles with balloon tires, will be employed.
- Where determined necessary by resource specialists, use geotextile cushions and other materials (e.g., timber pads, prefabricated equipment pads, geotextile fabric) in saturated conditions to minimize damage to the substrate and vegetation.
- Restrict instream construction within the ordinary high water mark to the low-flow period of April through October.
- Complete all activities promptly to minimize their duration and resultant effects.
- Obtain approval of Reclamation for all staging areas for the Restoration Project.
- Prohibit, to the extent possible, equipment access or staging in and near wetlands and other waters of the United States located along existing access roads. To the extent possible, confine access to existing roads.

[1] Mitigation measure ENFPE1 is included in "Mitigation Measures for Impact 4.2-3" in the draft EIS/EIR (Jones & Stokes 2003a).

- Ensure that resource monitors and contract compliance inspectors routinely inspect protected areas to confirm that protective measures are in place and effective.
- Keep all protective measures in place until all construction activities have been completed near the resource and remove them immediately following construction and reclamation activities.

ENFPE2. Compensate for the Loss of Emergent and Emergent Scrub Wetlands.[2] Reclamation will compensate for permanent impacts on emergent and emergent scrub wetlands to ensure no net loss of habitat functions and values. Compensation will be provided at a minimum ratio of 2:1 (2 acres restored or created for every 1 acre affected). The Restoration Project could be partially or fully self-mitigating for project-related effects on wetland habitat; however, if wetland vegetation does not develop naturally, thus not offering the opportunity to offset mitigation requirements, additional mitigation requirements may need to be met. Compensation for permanent effects on emergent and emergent scrub wetlands will depend on Section 404 Clean Water Act requirements enforced by the Corps. Potential measures may include a combination of on-site restoration/creation, off-site restoration, mitigation credits, and habitat credits from a CALFED–funded conservation easement (CALFED Bay-Delta Program 2000c). Compensation options are presented below.

1. Develop a wetland restoration plan that involves creating or enhancing wetland habitat on site or within the Battle Creek watershed. Potential creation and enhancement sites will be evaluated by Reclamation to determine whether this option is feasible. If Reclamation determines that on-site or off-site restoration is possible, a restoration plan will be developed that describes where and when restoration will occur and who will be responsible for developing, implementing, and monitoring the restoration plan. When this option is selected, restoration will be conducted within the Battle Creek watershed.

or

2. Contribute funds, equal to the amount needed to purchase mitigation bank credits, to restore wetlands and other waters in the Battle Creek watershed or other nearby lands that are publicly managed and will be protected in perpetuity. Reclamation will coordinate with appropriate individuals to determine whether there is potential to create, restore, or enhance waters of the United States in the Battle Creek watershed.

or

3. Purchase mitigation bank credits at an agency-approved bank in the region.

[2] Mitigation measure ENFPE2 is similar to the measure included in "Mitigation Measures for Impact 4.2-3" in the draft EIS/EIR (Jones & Stokes 2003a). The mitigation measure for Impact 4.2-3 will be revised in the final EIS/EIR to include mitigation measure ENFPE2 as presented in this ASIP.

or

4. Use habitat credits at the Burton Ranch property, a CALFED–funded conservation easement managed by The Nature Conservancy and located on the mainstem Battle Creek (for more information, see the habitat compensation approach presented in Appendix F of this document). If this option is selected, additional surveying of the easement will be necessary to determine whether suitable habitat exists to meet mitigation requirements for emergent and emergent scrub wetlands. Monitoring and reporting of the conservation easement will be conducted by The Nature Conservancy as part of their commitment to stewardship of this easement.

ASIP Conservation Measures

ASIP conservation measures for nontidal freshwater permanent emergent habitat are discussed below.

ANFPE1. Implement EIS/EIR Mitigation Measure ENFPE1. This conservation measure implements the EIS/EIR mitigation measure ENFPE1 (described above) and tiers from the following MSCS programmatic conservation measures for nontidal freshwater permanent emergent habitat (CALFED Bay-Delta Program 2000c):

- Avoid or minimize disturbance to existing habitat; and
- Minimize effects of construction-related runoff into nearby wetlands through use of siltation control barriers, detention basins, or other appropriate methods.

ANFPE2. Implement EIS/EIR Mitigation Measure ENFPE2. This conservation measure implements the EIS/EIR mitigation measure ENFPE2 (described above) and tiers from the following MSCS programmatic conservation measure for nontidal freshwater permanent emergent habitat (CALFED Bay-Delta Program 2000c):

- Before implementing actions that could result in the loss or degradation of habitat, restore or enhance 1–3 acres of additional in-kind habitat for every acre of existing habitat affected by restoration near where impacts would occur.

Implementation of conservation measures ANFPE1 and ANFPE2 will fully mitigate effects of the Restoration Project on nontidal freshwater permanent emergent habitat, and no additional conservation measures are required.

Expected Outcomes

Implementation of the ASIP conservation measures ANFPE1 and ANFPE2 achieves the ASIP goal of avoidance, minimization, and compensation for adverse effects of Restoration Project actions on nontidal freshwater permanent emergent communities. Implementation of these conservation measures will help ensure that the existing functions and values of nontidal freshwater permanent emergent habitat in the project area are maintained.

CALFED Contribution to Species and Habitat Conservation

The Restoration Project is not designed to benefit specifically nontidal freshwater permanent emergent habitat, but will fully mitigate effects of project implementation on this NCCP community. Implementation of other CALFED program actions, however, will contribute to the increased extent and quality of nontidal freshwater permanent emergent habitat. Table I-1 in Appendix I lists the projects that are being implemented, or will be implemented in the near future, that substantially increase the extent and quality of nontidal freshwater permanent emergent habitat.

Appendix J of this document identifies ecosystem restoration milestones described in the Programmatic BOs and NCCP Determination that will benefit nontidal freshwater permanent emergent habitats. These milestones are required to be achieved in the first 7 years of CALFED implementation, as a condition of the Programmatic BOs and NCCP Determination.

Natural Seasonal Wetland

The MSCS defines natural seasonal wetland habitat as:

> Natural seasonal wetland habitat includes vernal pools and other nonmanaged seasonal wetlands with natural hydrologic conditions that are dominated by herbaceous vegetation and that annually pond surface water or maintain saturated soils at the ground surface for enough of the year to support facultative or obligate wetland plant species. Alkaline and saline seasonal wetlands that were not historically part of a tidal regime are included in natural seasonal wetlands. Natural seasonal wetland habitat includes ERP vernal pool habitat (CALFED Bay-Delta Program 2000c).

The natural seasonal wetland NCCP community is identified in the Restoration Project area as two subtypes: seasonal wetland and groundwater seep. These habitat types do not support any MSCS evaluated species that are known to occur in the Battle Creek project area (CALFED Bay-Delta Program 2000c, Jones & Stokes 2003a). For a discussion of which species were included in, or excluded

from, this ASIP, please see the Chapter 1 section entitled Species Analyzed in This ASIP.

Table 5-3 lists the number of acres of each habitat type potentially affected by implementation of the Restoration Project.

Table 5-3. Acres of Seasonal Wetland and Groundwater Seep Wetland Habitat Potentially Affected at Each Restoration Project Site

Project Site	Seasonal Wetland	Groundwater Seep
Eagle Canyon Diversion Dam	–	0.28
Inskip Diversion Dam/South Powerhouse	0.60	–
Total Acres	**0.60**	**0.28**

Current Status in the Project Area

Seasonal Wetland

Approximately 1 acre of seasonal wetland was delineated on the Inskip Diversion Dam/South Powerhouse project site (Jones & Stokes 2003b, 2004). Seasonal wetlands are characterized by short-duration ponding sufficient to support hydrophytic plant species. These areas differ from vernal pools in various respects but are distinguished from them by the lack of vernal pool plant species. Seasonal wetlands in the Restoration Project area are dominated by Italian ryegrass, curly dock, cocklebur, annual hairgrass, Mediterranean barley, long-beaked hawkbit, hyssop loosestrife, toad rush, and occasional vernal pool species such as coyote thistle, Fremont's goldfields, woolly marbles, and water starwort. Seasonal wetlands can attract the same wetland-dependent birds and other wildlife that frequent emergent wetlands, as described above.

Groundwater Seep Wetland

Approximately 0.3 acres of groundwater seep wetlands were delineated on the Eagle Canyon Diversion Dam project site (Jones & Stokes 2003b, 2004). Groundwater seep wetlands are dominated by annual or perennial hydrophytes. The substrate is usually saturated to the surface for extended periods, especially early in the growing season, but saturation can be absent by the end of the season in most years. Dominant plant species include watercress, monkeyflower, various sedges, and liverworts. Representative wildlife species are similar to those species described above for other wetland habitats.

Effects of the Restoration Project

Construction activities associated with the Restoration Project would result in the temporary disturbance or permanent loss of approximately 0.6 acre of seasonal wetland and a temporary disturbance of approximately 0.3 acre of groundwater seep wetland. Seasonal wetlands would be temporarily and permanently affected by construction of a new access road from South Powerhouse to Inskip Diversion Dam and construction of a new fish ladder downstream of the dam. The groundwater seep is located along the south canyon wall at Eagle Canyon Diversion Dam. The seep would be temporarily affected by improvements proposed to the footpath leading down to North Fork Battle Creek.

The Restoration Project EIS/EIR includes the following mitigation measures to avoid, minimize, and compensate for the potential effects on seasonal wetlands and groundwater seep wetlands:

- **ENSWE1. Avoid and Minimize Disturbance of Seasonal Wetlands and Groundwater Seep Wetlands.**[3] Reclamation and/or the construction contractor will avoid and minimize impacts on seasonal wetlands and groundwater seep wetlands by implementing the environmental commitments listed in Chapter 2, Mitigation Measure EFISH2 described in Chapter 4, and the following measures.
- Redesign or modify the project to avoid direct and indirect effects on wetlands and streams, if feasible.
- Avoid construction activities in saturated or ponded wetlands and streams during the wet season (spring and winter) to the maximum extent possible. Where such activities are unavoidable, protective practices, such as use of padding or vehicles with balloon tires, will be employed.
- Where determined necessary by resource specialists, use geotextile cushions and other materials (e.g., timber pads, prefabricated equipment pads, geotextile fabric) in saturated conditions to minimize damage to the substrate and vegetation.
- Restrict in-stream construction within the ordinary high water mark to the low-flow period of April through October.
- Complete all activities promptly to minimize their duration and resultant effects.
- Obtain approval of Reclamation for all staging areas for the Restoration Project.
- Prohibit, to the extent possible, equipment access or staging in and near wetlands and other waters of the United States located along existing access roads. To the extent possible, confine access to existing roads.

[3] Mitigation measure ENSWE1 is included in "Mitigation Measures for Impact 4.2-3" in the draft EIS/EIR (Jones & Stokes 2003a).

- Ensure that resource monitors and contract compliance inspectors routinely inspect protected areas to confirm that protective measures are in place and effective.
- Keep all protective measures in place until all construction activities have been completed near the resource and remove them immediately following construction and reclamation activities.

ENSWE2. Compensate for the Loss of Seasonal Wetlands and Groundwater Seep Wetlands.[4] Reclamation will compensate for permanent impacts on seasonal wetlands and groundwater seep wetlands to ensure no net loss of habitat functions and values. Compensation will be provided at a minimum ratio of 2:1 (2 acres restored or created for every 1 acre disturbed) for seasonal wetlands and groundwater seeps (CALFED Bay-Delta Program 2000c). The Restoration Project could be partially or fully self-mitigating for project-related effects on wetland habitat; however, if wetland vegetation does not develop naturally, thus not offering the opportunity to offset mitigation requirements, additional mitigation requirements may need to be met. Compensation for permanent effects on emergent and emergent scrub wetlands will depend on Section 404 Clean Water Act requirements enforced by the Corps. Potential compensation measures may be a combination of on-site restoration/creation, off-site restoration, mitigation credits, and habitat credits from a CALFED–funded conservation easement (CALFED Bay-Delta Program 2000c). Compensation options are presented below.

1. Develop a wetland restoration plan that involves creating or enhancing wetland habitat on site or within the Battle Creek watershed. Potential creation and enhancement sites will be evaluated by Reclamation to determine whether this option is feasible. If Reclamation determines that on-site or off-site restoration is possible, a restoration plan will be developed that describes where and when restoration will occur and who will be responsible for developing, implementing, and monitoring the restoration plan. When this option is selected, restoration will be conducted within the Battle Creek watershed.

or

2. Contribute funds, equal to the amount needed to purchase mitigation bank credits, to restore wetlands and other waters in the Battle Creek watershed or other nearby lands that are publicly managed and will be protected in perpetuity. Reclamation will coordinate with appropriate individuals to determine whether there is a potential to create, restore, or enhance waters of the United States in the Battle Creek watershed.

or

[4] Mitigation measure ENSWE2 is similar to the measure included in "Mitigation Measures for Impact 4.2-3" in the draft EIS/EIR (Jones & Stokes 2003a). The mitigation measure for Impact 4.2-3 will be revised in the final EIS/EIR to include mitigation measure ENSWE2 as presented in this ASIP.

3. Purchase mitigation bank credits at an agency-approved bank in the region.

or

4. Use habitat credits at the Burton Ranch property, a CALFED–funded conservation easement managed by The Nature Conservancy and located on the mainstem Battle Creek (for more information, see the habitat compensation approach presented in Appendix F of this document). If this option is selected, additional surveying of the easement will be necessary to determine whether suitable habitat exists to meet mitigation requirements for seasonal wetlands and groundwater seep wetlands. Monitoring and reporting of the conservation easement will be conducted by The Nature Conservancy as part of their commitment to stewardship of this easement.

ASIP Conservation Measures

ASIP conservation measures for natural seasonal wetland habitat are discussed below.

ANSWE1. Implement EIS/EIR Mitigation Measure ENSWE1. This conservation measure implements the EIS/EIR mitigation measure ENSWE1 (described above) and tiers from the following MSCS programmatic conservation measures for natural seasonal wetland habitat (CALFED Bay-Delta Program 2000c):

- Avoid or minimize disturbance to existing natural seasonal wetland habitat; and
- Minimize effects of construction-related runoff into nearby wetlands through use of siltation control barriers, detention basins, or other appropriate methods.

ANSWE2. Implement EIS/EIR Mitigation Measure ENSWE2. This conservation measure implements the EIS/EIR mitigation measure ENSWE2 (described above) and tiers from the following MSCS programmatic conservation measure for natural seasonal wetland habitat (CALFED Bay-Delta Program 2000c):

- Restore or enhance 2–5 acres of additional in-kind habitat for every acre of affected natural seasonal wetland habitat. This compensation should be implemented before the impact occurs and near the impact location.

Implementation of conservation measures ANSWE1 and ANSWE2 will fully mitigate effects of the Restoration Project on natural seasonal wetland habitat, and no additional conservation measures are required.

Expected Outcomes

Implementation of the ASIP conservation measures ANSWE1 and ANSWE2 achieves the ASIP goal of avoidance, minimization, and compensation for adverse effects of Restoration Project actions on natural seasonal wetland communities. Implementation of these conservation measures will help ensure that the existing functions and values of natural seasonal wetland habitat in the project area are maintained.

CALFED Contribution to Species and Habitat Conservation

The Restoration Project is not designed to benefit specifically natural seasonal wetland habitat, but will fully mitigate effects of project implementation on this NCCP community. Implementation of other CALFED program actions, however, will contribute to the protection, enhancement, and restoration of natural seasonal wetland habitat. Table I-1 in Appendix I lists the projects that are being implemented, or will be implemented in the near future, that will protect, enhance, and restore natural seasonal wetland habitat.

Appendix J of this document identifies ecosystem restoration milestones described in the Programmatic BOs and NCCP Determination that will benefit natural seasonal wetland habitats. These milestones are required to be achieved in the first 7 years of CALFED implementation, as a condition of the Programmatic BOs and NCCP Determination.

Montane Riparian

The MSCS defines montane riparian as follows:

> Montane riparian habitat includes all successional stages of woody vegetation, such as willow, black cottonwood, white alder, birch, and dogwood, within the active floodplains of moderate-to-high-gradient reaches of streams and rivers generally above an elevation of 300 feet. Montane riparian habitat includes portions of the ERP riparian and riverine aquatic habitat (CALFED Bay-Delta Program 2000c).

The montane riparian NCCP community is identified in the Restoration Project area as one subtype: riparian forest and scrub. This habitat type supports the following species covered in this ASIP under the Programmatic BOs and NCCP Determination: osprey, yellow-breasted chat, and valley elderberry longhorn beetle. Foothill yellow legged frog is an MSCS evaluated species that is known to occur in the Battle Creek project area and could be adversely affected by the project, but is not covered under the Programmatic BOs and NCCP Determination (CALFED Bay-Delta Program 2000c, Jones & Stokes 2003a).

For a discussion of which species were included in, or excluded from, this ASIP, please see the Chapter 1 section entitled Species Analyzed in This ASIP.

Current Status in the Project Area

Riparian forest and scrub communities occur along perennial drainages in the Restoration Project area, including North Fork and South Fork Battle Creek, Ripley Creek, and Soap Creek; along several unnamed drainages; and in several emergent wetlands. Riparian forest and scrub habitat dominates areas along channels in most creeks and forms a mosaic with riparian forest or live oak woodland.

In areas with broader floodplains, riparian trees such as valley oak and western sycamore tend to dominate the overstory. Patches of Himalayan blackberry, scattered willows, and California wild grape usually compose the understory in these areas.

In canyons with perennial streams (such as North Fork Battle Creek), several species are common in addition to the species listed above. Overstory species include California bay, white alder, big-leaf maple, fig, white mulberry, Douglas-fir, Pacific yew, and Oregon ash. Understory shrubs include poison-oak, western spicebush, dogwood, and several species of willow.

In the Restoration Project area, riparian communities are generally dominated by hydrophytic vegetation and hydrologic conditions, but lack hydric soil indicators. These riparian communities do not meet the Corps's definition of wetlands for purposes of the Clean Water Act because they do not have all three indicators. Riparian communities that occur within the ordinary high-water mark of Battle Creek and other drainages would be considered other waters of the United States, subject to regulation by the Corps under Section 404 of the Clean Water Act (33 USC 1251–1376).

Riparian forest and scrub habitats are among the most important wildlife habitats in the Restoration Project area. These habitats attract a high diversity of resident and neotropical migratory birds; species observed during field visits included belted kingfisher, downy woodpecker, black phoebe, warbling vireo, orange-crowned warbler, bushtit, western scrub-jay, Bewick's wren, house wren, American robin, yellow-breasted chat, western tanager, black-headed grosbeak, lazuli bunting, spotted towhee, and song sparrow. Important seed-eating species included house finch and lesser goldfinch.

Other representative wildlife species in riparian habitats of the Restoration Project area include most mammals, amphibians, and reptiles that are attracted by a source of flowing water. Riparian corridors are important deer migratory habitat. Bats may forage for insects over riparian areas in the canyons and roost in trees. The number of bat species using the Restoration Project area was not determined during the field surveys. Although not confirmed during field surveys, spotted bat, western red bat, fringed myotis, long-eared myotis, small-

footed myotis, long-legged myotis, Yuma myotis, pallid bat, and Townsend's big-eared bat potentially occur, and all are considered species of concern by USFWS.

Effects of the Restoration Project

Potential Disturbance or Loss of Montane Riparian Vegetation and Associated Wildlife Habitat

The Restoration Project would have primarily temporary effects on approximately 7 acres of montane riparian habitat. These temporary disturbances would be associated with the construction of temporary staging areas, improvements to access roads and footpaths, removal of dams and appurtenant facilities, and construction of fish facilities and associated structures. All areas temporarily disturbed by construction would be restored to their preproject conditions as described in the project description for the Restoration Project (Chapter 2).

Minimal permanent removal of habitat would occur as a result of implementing the Restoration Project. Permanent effects would be associated with the construction of a closure wall and installation of riprap stone protection at the Coleman Diversion Dam/Inskip Powerhouse site and with the construction of a new access road at the Inskip Diversion Dam/South Powerhouse site.

Table 5-4 lists the number of acres of montane riparian habitat at each project site potentially affected by implementation of the Restoration Project (Jones & Stokes 2003a).

Table 5-4. Acres of Montane Riparian Habitat Potentially Affected at Each Restoration Project Site

Project Site	Acreage of Potentially Affected Montane Riparian Habitat
North Battle Creek Feeder Diversion Dam	0.39
Eagle Canyon Diversion Dam	1.29
Wildcat Diversion Dam	0.73
Wildcat Canal	1.85
Coleman Diversion Dam/Inskip Powerhouse	1.18
Lower Ripley Creek Feeder	1.18
Inskip Diversion Dam/South Powerhouse	0.05
South Battle Creek/South Diversion Dam	0.40
Total Acres	**7.07**

The actual acreage of riparian forest that is removed or disturbed during Restoration Project activities will be determined as part of the environmental compensation measures. The habitat removal will be assessed and measured by a qualified plant ecologist after construction activities are complete at each site. The number of acres affected will be used to determine the exact acreage of compensatory mitigation and will be described in the Implementation Plan.

Riparian forest provides important shelter, foraging, and roosting habitat for a variety of wildlife species, including bats, and nesting habitat for raptors and migratory birds. Substantial statewide declines of riparian communities in recent years have increased concerns about dependent plant and wildlife species, leading state and federal agencies to adopt policies to arrest further loss. Riparian vegetation serves a variety of functions, such as providing bank stabilization, erosion control, and wildlife habitat. For these reasons, DFG has adopted a no-net-loss policy for riparian habitat value. USFWS mitigation policy identifies California's riparian habitats as Resource Category 2, for which no net loss of existing inkind habitat value is recommended (46 FR 7644, January 23, 1981).

The Restoration Project EIS/EIR includes the following mitigation measures to avoid, minimize, and compensate for the potential effects on riparian forest and scrub habitat:

> **EMORI1. Avoid and Minimize Removal and Disturbance of Riparian Habitat.**[5] Reclamation and/or the construction contractor will avoid and minimize impacts on montane riparian habitat by implementing the environmental commitments listed in Chapter 2, mitigation measure EFISH2 described in Chapter 4, and the following measures.
>
> Reclamation and/or the construction contractor will ensure that the unnecessary removal or disturbance of riparian habitat adjacent to the construction area will be avoided by installing orange construction barrier fencing (and sedimentation fencing in some cases) between the construction site and the riparian/creek area. Removal of woody riparian vegetation will be avoided by creating a work exclusion zone (buffer) around woody riparian vegetation near the construction zone, educating construction crews about the importance of avoiding sensitive habitat, and monitoring construction to ensure avoidance. The exclusion zone will be demarcated by orange construction fencing placed 20 feet beyond the dripline of the vegetation. The work exclusion zone will be delineated and marked as explained under the environmental commitments described in Chapter 2. The fencing will be installed before construction activities begin and will be maintained throughout the construction period.

[5] Mitigation measure EMORI1 is included in "Mitigation Measures for Impact 4.2-1" in the draft EIS/EIR (Jones & Stokes 2003a).

EMORI2. Avoid Long-Term Impacts on Woody Riparian Vegetation and Associated Habitat.[6] Reclamation and/or the construction contractor will avoid long-term impacts on woody riparian vegetation by trimming trees and shrubs rather than removing entire woody plants. Where possible, shrubs and trees should be cut at least 1 foot above ground level to leave the root systems intact and allow more rapid regeneration following construction. To avoid the take of eggs or nestlings of migratory birds and avoid violating the MBTA, riparian vegetation should be removed during the nonbreeding season (October–February) before construction begins. If such timing is not feasible, riparian vegetation should not be removed until it can be demonstrated that it is not supporting nesting birds.

EMORI3. Compensate for the Loss of Woody Riparian Habitat.[7] Reclamation will compensate for temporary and permanent impacts on woody riparian habitat to ensure no net loss of habitat functions and values. Where woody riparian habitat loss is temporary, compensation will include full restoration of the affected habitat as well as on-site or off-site restoration at a ratio of 2:1 (2 acres restored or enhanced for every 1 acre affected) (U.S. Fish and Wildlife Service 2003). The compensation for permanent loss of woody riparian habitat will be provided at a minimum ratio of 3:1 (3 acres restored or enhanced for every 1 acre affected) and may be a combination of on-site restoration/creation and use of habitat credits from a CALFED–funded conservation easement located within the project area.

For on-site restoration of riparian habitat, Reclamation will develop a Riparian Restoration Plan through coordination with NOAA Fisheries, USFWS, DFG, and the Corps and described in detail as part of the Battle Creek Implementation Plan (see the environmental commitments described in Chapter 2). Reclamation will retain a qualified ecologist to prepare the Riparian Restoration Plan to compensate for the removal of riparian vegetation along Battle Creek. This measure will apply to trees and shrubs that are removed entirely (including root systems) for construction of the Restoration Project. Enhancement of riparian habitat could be accomplished along Battle Creek through the removal of invasive species and replacement with native riparian species. The feasibility of removing nonnative species and replanting native species will be evaluated as part of the Riparian Restoration Plan. The Riparian Restoration Plan will include design specifications, an implementation plan, maintenance requirements, and a monitoring program for onsite restoration.

[6] Mitigation measure EMORI2 is included in "Mitigation Measures for Impact 4.2-1" in the draft EIS/EIR (Jones & Stokes 2003a).

[7] Mitigation measure EMORI3 is similar to the measure included in "Mitigation Measures for Impact 4.2-1" in the draft EIS/EIR (Jones & Stokes 2003a). The mitigation measure for Impact 4.2-1 will be revised in the final EIS/EIR to include mitigation measure EMORI3 as presented in this ASIP.

Monitoring of on-site riparian restoration efforts will be conducted for a 10-year period, or until the performance standards have been met without human intervention for 3 years, to document the degree to which success criteria are achieved and to identify remedial actions that may be needed (U.S. Fish and Wildlife Service 2003). Annual monitoring reports will be submitted to the appropriate resource agencies. The reports will summarize the data collected during monitoring periods and describe how the habitats are progressing in terms of the success criteria (to be determined as part of the restoration plan). Success criteria will be determined through coordination with the resource agencies. A brief letter report summarizing the results of monitoring and recommending additional needed actions will be submitted to the appropriate resource agencies.

Off-site restoration of riparian habitat will be implemented by using habitat credits at the Burton Ranch property, a CALFED–funded conservation easement managed by The Nature Conservancy and located on the mainstem of Battle Creek (for more information, see the habitat compensation approach presented in Appendix F of this document). Monitoring and reporting for the conservation easement will be conducted by The Nature Conservancy as part of their commitment to stewardship of this easement.

The Battle Creek Adaptive Management Plan proposes a draft riparian monitoring program to document project-related benefits to riparian habitats hypothesized to result from increased minimum streamflow. Riparian enhancement expected from increased minimum instream flows may provide additional riparian compensation benefits, which could make the Restoration Project partially or fully self-mitigating. For more information on the riparian monitoring plan, see the Adaptive Management Plan (Appendix C).

Possible Loss of Montane Riparian Habitat along the South and Wildcat Canals from Cessation of Flows

The Restoration Project could cause the loss of scattered woody riparian trees and shrubs along 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. Dewatering the canals is not a net adverse effect because the scattered riparian trees and shrubs along the canals provide minimal habitat functions and values for wildlife species. Additionally, as part of the Restoration Project, the South and Wildcat Diversion Dams would be removed. As a result, flow that was diverted to South and Wildcat Canals would be restored to the original Battle Creek river channel because drainages that are currently bisected by the canals would also be restored to their natural pre-canal drainage patterns. The overall effects on the riparian community downstream are expected to be beneficial because of increased streamflows in Battle Creek.

ASIP Conservation Measures

ASIP conservation measures for montane riparian habitat are discussed below.

AMORI1. Implement EIS/EIR Mitigation Measures EMORI1 and EMORI2. These conservation measures implement the EIS/EIR mitigation measures EMORI1 and EMORI2 (described above) and tier from the following MSCS programmatic conservation measure for montane riparian habitat (CALFED Bay-Delta Program 2000c):

- Avoid or minimize disturbance to existing habitat.

AMORI2. Implement EIS/EIR Mitigation Measure EMORI3. This conservation measure implements the EIS/EIR mitigation measure EMORI3 (described above) and tiers from the following MSCS programmatic conservation measure for montane riparian habitat (CALFED Bay-Delta Program 2000c):

- Restore or enhance 2 to 5 acres of additional in-kind habitat for every acre of affected habitat near where impacts would occur before implementing actions that could result in the loss or degradation of habitat.

Implementation of conservation measures AMORI1 and AMORI2 will fully mitigate effects of the Restoration Project on montane riparian habitat and no additional conservation measures are required.

Expected Outcomes

Implementation of the ASIP conservation measures AMORI1 and AMORI2 achieves the ASIP goal of avoidance, minimization, and compensation for adverse effects of Restoration Project actions on montane riparian communities. Implementation of these conservation measures will help ensure that the existing functions and values of montane riparian habitat in the project area are maintained.

CALFED Contribution to Species and Habitat Conservation

The Restoration Project is not designed to benefit specifically montane riparian habitat, but will fully mitigate effects of project implementation on this NCCP community. Implementation of other CALFED program actions, however, will contribute to the increased extent and quality of montane riparian habitat. Table I-1 in Appendix I lists the projects that are being implemented, or will be

implemented in the near future, that substantially increase the extent and quality of montane riparian habitat.

Appendix J of this document identifies ecosystem restoration milestones described in the Programmatic BOs and NCCP Determination that will benefit montane riparian habitats. These milestones are required to be achieved in the first 7 years of CALFED implementation, as a condition of the Programmatic BOs and NCCP Determination.

Upland Scrub

The MSCS defines upland scrub habitat as follows:

> Upland scrub habitat includes habitat areas dominated by shrubs characteristic of coastal scrub, chaparral, and saltbush scrub communities. Upland scrub is not included in the ERP (CALFED Bay-Delta Program 2000c).

The upland scrub NCCP community is identified in the Restoration Project area as one subtype: mixed chaparral. This habitat type supports Cooper's hawk, which is covered in this ASIP under the Programmatic NCCP Determination. Golden eagle is an MSCS evaluated species that is known to occur in the Battle Creek project area and could be adversely affected by the project, but is not covered under the Programmatic BOs and NCCP Determination (CALFED Bay-Delta Program 2000c, Jones & Stokes 2003a). For a discussion of which species were included in, or excluded from, this ASIP, please see the Chapter 1 section entitled Species Analyzed in This ASIP.

Current Status in the Project Area

Mixed chaparral is common throughout the Restoration Project area but is typically found on north-facing slopes in canyons and in openings of other community types after fires have removed overstory trees. This community is dominated by broad-leaved shrubs with small, hard leaves, typically 10–16 feet tall, forming a dense overstory. Common shrubs include buckbrush, big manzanita, green-leaved manzanita, birch-leaved mountain-mahogany, coffeeberry, poison-oak, California yerba santa, and California buckeye. Overstory trees are typically absent except in the transition zone between community types, where scattered canyon live oaks and interior live oaks are present.

Bird species observed in chaparral habitats of the Restoration Project area included mountain quail, California quail, mourning dove, Anna's hummingbird, western scrub-jay, oak titmouse, bushtit, Bewick's wren, blue-gray gnatcatcher, wrentit, California thrasher, spotted towhee, California towhee, rufous-crowned sparrow, lesser goldfinch, fox sparrow, golden-crowned sparrow, white-crowned sparrow, dark-eyed junco, hermit thrush, western tanager, black-headed

grosbeak, orange-crowned warbler, and lazuli bunting. The latter two species are common nesters in chaparral habitats.

Representative reptiles and mammals in mixed chaparral habitats include western fence lizard, western skink, gopher snake, common kingsnake, western rattlesnake, mule deer, coyote, and gray fox.

Effects of the Restoration Project

Implementation of the Restoration Project would result in temporary effects on upland scrub habitat. Restoration Project activities that would affect this habitat would be minimal and temporary. These activities would be associated with construction of temporary staging areas, maintenance of and improvements to existing access roads and footpaths, and the removal of Wildcat Pipeline. All areas temporarily disturbed by construction would be restored to their preproject conditions as described in the project description for the Restoration Project (Chapter 2). Table 5-5 lists the number of acres of upland scrub habitat at each project site potentially affected by implementation of the Restoration Project (Jones & Stokes 2003a).

Table 5-5. Acres of Upland Scrub Habitat Potentially Affected at Each Restoration Project Site

Project Site	Acreage of Potentially Affected Upland Scrub Habitat
North Battle Creek Feeder Diversion Dam	1.45
Eagle Canyon Diversion Dam	0.37
Wildcat Canal	1.25
South Battle Creek/South Diversion Dam	0.19
Total Acres	**3.26**

The Restoration Project EIS/EIR includes the following mitigation measure to avoid, minimize, and compensate for the potential effects on upland scrub habitat:

> **EUPSC1. Compensate for Effects on Upland Scrub Habitat.[8]** Reclamation and/or the construction contractor will implement BMPs and the environmental commitments described in Chapter 2 to avoid or minimize temporary effects on upland scrub. Where upland scrub habitat loss is temporary, compensation will be provided at a minimum ratio of 2:1 (2 acres compensated for every 1 acre affected). The

[8] Mitigation measure EUPSC1 is not included in the draft EIS/EIR (Jones & Stokes 2003a); however, this mitigation measure will be included in the final EIS/EIR.

compensation for permanent loss of upland scrub habitat will be provided at a minimum ratio of 3:1 (3 acres compensated for every 1 acre affected) (U.S. Fish and Wildlife Service 2003). Compensation will be provided through a combination of on-site restoration and use of habitat credits from a CALFED–funded conservation easement located within the project area (for more information, see the habitat compensation approach presented in Appendix F of this document). No additional mitigation is required.

ASIP Conservation Measures

The ASIP conservation measure for upland scrub habitat is discussed below.

AUPSC1. Implement EIS/EIR Mitigation Measure EUPSC1. This conservation measure implements the EIS/EIR mitigation measure EUPSC1 (described above) and tiers from the following MSCS programmatic conservation measure for upland scrub habitat (CALFED Bay-Delta Program 2000c):

- Before implementing actions that could result in the loss or degradation of habitat, restore or enhance 2–5 acres of additional in-kind habitat for every acre of existing habitat occupied by evaluated species affected by the actions, within the current range of affected species and near where impacts would occur.

Implementation of conservation measure AUPSC1 will fully mitigate effects of the Restoration Project on upland scrub habitat, and no additional conservation measures are required.

Expected Outcomes

Implementation of the ASIP conservation measure AUPSC1 achieves the ASIP goal of avoidance, minimization, and compensation for adverse effects of Restoration Project actions on upland scrub communities. Implementation of this conservation measure will help ensure that the existing functions and values of upland scrub habitat in the project area are maintained.

CALFED Contribution to Species and Habitat Conservation

The Restoration Project is not designed to benefit specifically upland scrub habitat but will fully mitigate effects of project implementation on this NCCP community. Implementation of other CALFED program actions will also ensure

avoidance, minimization, and compensation for loss of upland scrub habitat where evaluated species are affected.

Grassland

The MSCS defines grassland habitat as follows:

> Grassland habitat includes upland vegetation communities dominated by introduced and native annual and perennial grasses and forbs, including nonirrigated and irrigated pasturelands. Grassland habitat includes all the ERP perennial grassland habitat and the much more extensive annual grassland vegetation that is not addressed in the ERP (CALFED Bay-Delta Program 2000c).

The grassland NCCP community is identified in the Restoration Project area as one subtype: annual grassland. This habitat type supports the northwestern pond turtle, which is covered in this ASIP under the Programmatic NCCP Determination. Golden eagle is an MSCS evaluated species that is known to occur in the Battle Creek project area and could be adversely affected by the project, but is not covered under the Programmatic BOs and NCCP Determination (CALFED Bay-Delta Program 2000c, Jones & Stokes 2003a).For a discussion of which species were included in, or excluded from, this ASIP, please see the Chapter 1 section entitled Species Analyzed in This ASIP.

Current Status in the Project Area

Annual grassland is the most common plant community in the Restoration Project area. It occupies understory and open areas in the gray pine/oak woodland and blue oak woodland/savanna communities. Annual grassland is dominated by mostly nonnative annual grass species, including soft chess, red brome, ripgut brome, medusahead, annual fescues, silver hairgrass, wild oat, lesser quaking-grass, and Italian ryegrass. Common native herbaceous species include tidy-tips, goldfields, yellowcarpet, popcornflowers, lowland shooting star, saxifrage, erect plantain, dwarf stonecrop, Fitch's spikeweed, filago, tarweeds, q-tips, marigold navarretia, downy navarretia, vetch, cowbag clover, tomcat clover, and white-tipped clover. Native perennial species include some of those mentioned in the description of blue oak woodland/savanna. Nonnative weedy species include filarees, star-thistle, and prickly lettuce.

Raptors that were observed foraging in grasslands of the Restoration Project area during the spring and summer included golden eagle, red-tailed hawk, American kestrel, and barn owl. Western kingbird and loggerhead shrike were seen perching on fence posts and searching for prey in grassland habitats. Ground-foraging birds observed included American crow, horned lark, American pipit, vesper sparrow, lark sparrow, savannah sparrow, western meadowlark, Brewer's blackbird, brown-headed cowbird, and house finch. Several species of swallows

foraged over the grasslands for flying insects. Special-status raptor species that probably winter in grasslands of the Restoration Project area include white-tailed kite, northern harrier, ferruginous hawk, rough-legged hawk, golden eagle, prairie falcon, and merlin. However, because no winter surveys were performed, none of these species, except golden eagle, were observed in the Restoration Project area.

Representative reptiles and mammals of annual grasslands include gopher snake, western rattlesnake (mostly near rock outcrops), garter snakes, racer, western fence lizard, coyote, mule deer, and California ground squirrel.

Effects of the Restoration Project

Implementation of the Restoration Project would result in temporary disturbance and minimal permanent loss on common annual grassland. Restoration Project activities that could temporarily affect this habitat include construction of temporary staging areas, maintenance of and improvements to existing access roads and footpaths, removal of dams and appurtenant facilities, construction of fish facilities, replacement of an existing aboveground pipeline with a new underground pipeline at the Coleman Diversion Dam/Inskip Powerhouse site, and the abandonment of Wildcat Canal. All areas temporarily disturbed by construction would be restored to their preproject conditions as described in the project description for the Restoration Project (Chapter 2).

Minimal permanent removal of habitat would occur as a result of implementing the Restoration Project. Permanent effects would be associated with widening and paving the existing intersection of Manton Road and a dirt access road at the Coleman Diversion Dam/Inskip Powerhouse site and the construction of a new gravel access road at the Inskip Diversion Dam/South Powerhouse site. Table 5-6 lists the number of acres of annual grassland habitat at each project site potentially affected by implementation of the Restoration Project (Jones & Stokes 2003a).

Table 5-6. Acres of Grassland Habitat Potentially Affected at Each Restoration Project Site

Project Site	Acreages of Potentially Affected Grassland Habitat
North Battle Creek Feeder Diversion Dam	1.79
Wildcat Canal	0.20
Coleman Diversion Dam/Inskip Powerhouse	4.64
Inskip Diversion Dam/South Powerhouse	4.52
South Canal	0.06
Total Acres	**11.21**

The Restoration Project EIS/EIR includes the following mitigation measure to avoid, minimize, and compensate for the potential effects on grassland habitat:

> **EGRAS1. Compensate for Effects on Grassland Habitat.[9]** Reclamation and/or the construction contractor will implement BMPs and the environmental commitments described in Chapter 2 to avoid or minimize temporary effects on grassland. Where grassland habitat loss is temporary, compensation will include full restoration of the affected habitat (U.S. Fish and Wildlife Service 2003). The compensation for permanent loss of grassland habitat will be provided at a minimum ratio of 1:1 (1 acre compensated for every 1 acre affected) (U.S. Fish and Wildlife Service 2003). Compensation will be provided through a combination of on-site restoration and use of habitat credits from a CALFED–funded conservation easement located within the project area (for more information, see the habitat compensation approach presented in Appendix F of this document). No additional mitigation is required.

ASIP Conservation Measures

The ASIP conservation measure for grassland habitat is discussed below.

> **AGRAS1. Implement EIS/EIR Mitigation Measure EGRAS1.** This conservation measure implements the EIS/EIR mitigation measure EGRAS1 (described above) and tiers from the following MSCS programmatic conservation measure for grassland habitat (CALFED Bay-Delta Program 2000c):
>
> - Before implementing actions that could result in the loss or degradation of habitats occupied by evaluated species, restore or enhance 1–3 acres of grassland within the current range of affected species, and near where impacts would occur.

Implementation of conservation measure AGRAS1 will fully mitigate effects of the Restoration Project on grassland habitat, and no additional conservation measures are required.

Expected Outcomes

Implementation of the ASIP conservation measure AGRAS1 achieves the ASIP goal of avoidance, minimization, and compensation for adverse effects of Restoration Project actions on grassland communities. Implementation of this conservation measure will help ensure that the existing functions and values of grassland habitat in the project area are maintained.

[9] Mitigation measure EGRAS1 is not included in the draft EIS/EIR (Jones & Stokes 2003a); however, this mitigation measures will be included in the final EIS/EIR.

CALFED Contribution to Species and Habitat Conservation

The Restoration Project is not designed to benefit specifically grassland habitat but will fully mitigate effects of project implementation on this NCCP community. Implementation of other CALFED program actions will also ensure avoidance, minimization, and compensation for loss of grassland habitat where evaluated species are affected (e.g., golden eagle).

Valley/Foothill Woodland and Forest

The MSCS defines valley/foothill woodland and forest habitat as follows:

> Valley/foothill woodland and forest habitat includes nonriparian forest, woodland, and savanna of valleys and foothills. These vegetation communities are commonly dominated by valley oak, blue oak, interior live oak, coast live oak, and foothill pine. Valley/foothill woodland and forest habitat is not included in the ERP (CALFED Bay-Delta Program 2000c).

The valley/foothill woodland and forest NCCP community is identified in the Restoration Project area as four subtypes: live oak woodland, blue oak woodland/savanna, gray pine/oak woodland, and westside ponderosa pine. These habitat types are known to support the osprey, bald eagle, Cooper's hawk, and northwestern pond turtle, which are covered in this ASIP and under the Programmatic BOs and NCCP Determination. No additional MSCS evaluated species that are associated with this NCCP community are known to occur in the Battle Creek project area (CALFED Bay-Delta Program 2000c, Jones & Stokes 2003a). For a discussion of which species were included in, or excluded from, this ASIP, please see the Chapter 1 section entitled Species Analyzed in This ASIP.

Current Status in the Project Area

Live Oak Woodland

Live oak woodland is common in the Restoration Project area, typically occurring in canyons and valley bottoms near streams. This plant community forms a mosaic in the transition zones between gray pine/oak woodland and chaparral on north-facing slopes. Live oak woodland is dominated by a mixture of canyon live oak and interior live oak, usually forming a dense overstory. Other trees such as California bay, buckeye, and black oak are usually present but are a minor component of the overstory. The understory typically is poorly developed or absent in areas with dense overstory, but poison-oak, pipevine, California melic grass, Pacific sanicle, and sword fern are common in open areas.

Representative nesting raptors of live oak woodland habitats observed in the Restoration Project area included red-tailed hawk, American kestrel, barn owl, great horned owl, western screech owl, and northern pygmy-owl. Other species observed included California quail, mourning dove, spotted towhee, California towhee, lark sparrow, dark-eyed junco, Anna's hummingbird, acorn woodpecker, Nuttall's woodpecker, northern flicker, white-breasted nuthatch, Pacific-slope flycatcher, Hammond's flycatcher, ash-throated flycatcher, house wren, blue-gray gnatcatcher, orange-crowned warbler, black-throated gray warbler, Bullock's oriole, lazuli bunting, Hutton's vireo, western scrub-jay, oak titmouse, bushtit, Bewick's wren, western bluebird, American robin, California thrasher, brown-headed cowbird, house finch, lesser goldfinch, white-crowned sparrow, and golden-crowned sparrow.

Representative reptiles and mammals in live oak woodlands include western skink, northern alligator lizard, common kingsnake, gopher snake, western rattlesnake, deer mouse, western gray squirrel, striped skunk, ringtail, raccoon, bobcat, and mule deer.

Blue Oak Woodland/Savanna

Blue oak woodland/savanna in the Restoration Project area is located on sites with relatively thin, rocky soils. The community intergrades with gray pine/oak woodland at higher elevations and is replaced by annual grassland in thinner soils and at lower elevations.

Blue oak woodland/savanna is characterized by a relatively open canopy of trees dominated almost entirely by blue oaks. Shrubs are mostly lacking, but scattered individuals or occasional aggregations of mixed chaparral species may be present. Herbaceous species commonly found in the openings include blue dicks, grass nuts, soaproot, western buttercup, sanicle, manroot, bedstraws, puttyroot, and miner's lettuce. Most annual species are the same as those listed above for the annual grassland plant community.

Representative raptors observed in the Restoration Project area included red-tailed hawk, American kestrel, barn owl, great horned owl, and western screech owl. Other species observed included California quail, mourning dove, greater roadrunner, acorn woodpecker, Nuttall's woodpecker, northern flicker, white-breasted nuthatch, ash-throated flycatcher, blue-gray gnatcatcher, orange-crowned warbler, Bullock's oriole, Hutton's vireo, western scrub-jay, oak titmouse, bushtit, Bewick's wren, western bluebird, lark sparrow, brown-headed cowbird, California towhee, house finch, lesser goldfinch, white-crowned sparrow, and golden-crowned sparrow.

Representative reptiles and mammals in blue oak woodland/savanna include western fence lizard, gopher snake, California ground squirrel, coyote, striped skunk, and mule deer.

Gray Pine/Oak Woodland

Gray pine/oak woodland is common in the Restoration Project area where it transitions into Westside ponderosa pine forest at higher elevations and into blue oak woodland and annual grassland at lower elevations. Mixed chaparral occurs in inclusions and forms the shrubby understory in places.

A varying mixture of blue oak and gray pine dominates gray pine/oak woodland. At higher elevations, scattered black oak, big-leaf maple, and California bay are also present. Associated shrub and sub-shrub species include many that are common to mixed chaparral, such as toyon, manzanita, coffeeberry, redberry, California buckeye, redbud, buckbrush, mountain-mahogany, poison-oak, lemonadeberry, bedstraws, and live oak. Herbaceous species are mostly lacking where the shrub layer is best developed. In open areas, herbaceous species include many that are common to the adjacent blue oak woodland/ savanna and annual grassland plant communities.

Representative wildlife species include the species representative of live oak woodland habitats (see above).

Westside Ponderosa Pine

Westside ponderosa pine forest occupies the upper elevations along access roads to the southern end of the Restoration Project area. Westside ponderosa pine forest also mixes with gray pine/oak woodland and mixed chaparral at lower elevations. Inclusions of Douglas-fir forest also occur at higher elevations adjacent to westside ponderosa pine forest.

A relatively dense-to-open canopy of ponderosa pine with scattered incense cedar, black oak, and canyon live oak dominates westside ponderosa pine forest. Also present at lower elevations are occasional California bay and gray pine. Shrub and sub-shrub species include mountain lilac, manzanita, and live oak. At lower elevations, coffeeberry, redbud, blackberry, and poison-oak are found. Common herbaceous species include wild iris, snub pea, Indian-pink, aster, goldenrod, bracken fern, and woodland strawberry. Grasses include mountain brome, orchard grass, needlegrass, hedgehog dogtail, nitgrass, and annual fescues. Other species common to the annual grassland reach their higher elevation limits here.

Representative raptors observed in the Restoration Project area included red-tailed hawk, sharp-shinned hawk during migration, western screech owl, great horned owl, and northern pygmy-owl. Other species observed included band-tailed pigeon, red-breasted sapsucker, hairy woodpecker, northern flicker, pileated woodpecker (expected to occur but not observed), red-breasted nuthatch, white-breasted nuthatch, olive-sided flycatcher, western wood-pewee, Pacific-slope flycatcher, Cassin's vireo, warbling vireo, Nashville warbler, black-throated gray warbler, hermit warbler, Wilson's warbler, western tanager, black-

headed grosbeak, lazuli bunting, chipping sparrow, Hutton's vireo, Steller's jay, western scrub-jay, oak titmouse, bushtit, brown creeper, winter wren, golden-crowned kinglet, American robin, spotted towhee, dark-eyed junco, mountain quail, brown-headed cowbird, purple finch, pine siskin, lesser goldfinch, and violet green swallows. Pileated woodpecker was not observed but is expected to occur.

Representative amphibians, reptiles, and mammals of ponderosa pine forests include California slender salamander, ring-necked snake, common kingsnake, deer mouse, western gray squirrel, striped skunk, mule deer, raccoon, bobcat, and mountain lion.

Effects of the Restoration Project

The Restoration Project could result in the loss or disturbance of valley/foothill woodland and forest habitat, including gray pine/oak, blue oak, and/or live oak woodland, and westside ponderosa forest. The most substantial effects on woodland and forest habitat would occur along the South Canal and the Coleman Diversion Dam/Inskip Powerhouse sites. Along the South Canal, approximately 36 acres of woodland would be removed or disturbed during construction activities associated with decommissioning and dewatering the canal. Construction activities would include installing bat gates on all tunnels, removing flumes and other metalwork, and filling in some dirt portions of the canal. Approximately 20 acres of woodland and forest habitat would be removed or disturbed during construction activities at the Coleman Diversion Dam/Inskip Powerhouse site.

Temporary effects at the site result from construction of temporary access roads and staging areas, improvements to existing access roads and staging areas, construction of an Eagle Canyon Canal temporary bypass, and replacement of an aboveground pipeline with a new underground pipeline. All areas temporarily disturbed by construction would be restored to their preproject conditions as described in the project description for the Restoration Project (Chapter 2).

Some permanent removal of habitat would occur as a result of implementing the Restoration Project. Permanent effects would be associated mainly with widening the chute corridor from 85 to 120 feet and constructing a closure wall and installing riprap stone protection at the Coleman Diversion Dam/Inskip Powerhouse site and the constructing a new 10-foot-wide paved access road at the North Battle Creek Feeder Diversion Dam site. Table 5-7 lists the number of acres of valley/foothill woodland and forest habitat at each project site potentially affected by implementation of the Restoration Project (Jones & Stokes 2003a).

Table 5-7. Acres of Valley/Foothill Woodland and Forest Habitat Potentially Affected at Each Restoration Project Site

Project Site	Acreages of Potentially Affected Valley/Foothill Woodland and Forest Habitat
North Battle Creek Feeder Diversion Dam	1.48
Eagle Canyon Diversion Dam	2.36
Wildcat Canal	4.19
Wildcat Diversion Dam	0.20
Coleman Diversion Dam/Inskip Powerhouse	19.72
Inskip Diversion Dam/South Powerhouse	11.06
South Canal	35.91
Soap Creek Feeder	0.197
South Battle Creek/South Diversion Dam	3.72
Total Acres	**78.84**

Most woodland communities in the project area contain native oaks that could be removed during construction of temporary staging areas, improvements to access roads and footpaths, removal of dams and appurtenant facilities, and construction of fish facilities and associated structures. These activities could result in short-term or long-term effects on the oak woodlands and other common plant communities in the Restoration Project area. An additional assessment of effects will be performed by a plant ecologist after construction activities are complete. This postconstruction assessment will be used to quantify unanticipated effects on the plant communities.

Oak woodland provides important foraging habitat for several species of wildlife, including mammals, birds, and reptiles. A variety of raptors use oak woodland habitat for nesting. The removal of these woodland habitats could result in the substantial loss or degradation of a plant community and associated wildlife habitat and the disruption of natural wildlife movement corridors.

In addition to implementing the environmental commitments described in Chapter 2, the Restoration Project EIS/EIR includes the following mitigation measures to avoid, minimize, and compensate for the potential effects on valley/foothill woodland and forest habitat:

EVFWF1. Minimize Removal and Disturbance of Woodland Habitat.[10] Reclamation and/or the construction contractor will avoid and minimize impacts on valley/foothill woodland and forest habitat by

[10] Mitigation measure EVFWF1 is included in "Mitigation Measures for Impact 4.2-4" in the draft EIS/EIR (Jones & Stokes 2003a).

implementing the environmental commitments listed in Chapter 2 and the following measures.

- Retain an arborist to identify the species and numbers of native trees that will be removed or indirectly affected within the construction zone.
- Protect oaks that will not to be removed but that are within 61 meters (200 feet) of the grading activity by fencing them 1.5 meters (5 feet) beyond the dripline and root zone (as determined by a certified arborist). This fence, intended to prevent activities that result in soil compaction beneath the canopy or over the root zone, will be maintained until all construction activities are complete. No grading, trenching, or movement of construction equipment will be allowed within fenced areas. Protection for oak trees on slopes will include installation of silt fences. A silt fence will be installed at the upslope base of the protective fence to prevent any soil from drifting down over the root zone.

EVFWF2. Compensate for the Loss of Oak Woodland Habitat.[11] Reclamation will compensate for temporary and permanent impacts on oak woodland habitat to ensure no net loss of habitat functions and values. Where oak woodland habitat is temporary, compensation will include full restoration of the affected habitat as well as on-site or off-site restoration at a minimum ratio of 2:1 (2 acres compensated for every 1 acre affected). The compensation for permanent loss of oak woodland habitat will be provided at a minimum ratio of 5:1 (5 acres compensated for every 1 acre affected). Reclamation will develop and implement an oak planting plan for on-site compensation for the temporary loss of oak woodland habitat. Off-site compensation will use habitat credits from a CALFED–funded conservation easement located within the project area.

The oak planting plan, developed for on-site restoration of oak woodland habitat, will include the following measures.

- The oak planting plan will specify collecting acorns from the local region and planting the acorns on site based on the diameter at breast height of the removed trees. The oak planting plan will also develop success criteria and monitor the restored habitat for 10 to 15 years to until the success criteria are met (U.S. Fish and Wildlife Service 2003). In addition, the plan will contain adaptive management measures to ensure that the desired goals are achieved.
- Plantings will be monitored annually by a qualified biologist for 10 to 15 years after construction is complete and until the success

[11] Mitigation measure EVFWF2 is similar to the measure included in "Mitigation Measures for Impact 4.2-4" in the draft EIS/EIR (Jones & Stokes 2003a). The mitigation measure for Impact 4.2-4 will be revised in the final EIS/EIR to include mitigation measure EVFWF2 as presented in this ASIP.

criteria are met. The monitoring methods will be described in the Implementation Plan. Results of the monitoring will be submitted to the appropriate agencies. Success will be achieved if there is a minimum survival rate, specified by USFWS, by the end of the fifth year and a stable viable population for the duration of the monitoring period. If the performance standards are not met, remedial measures, such as replanting, will be implemented. During monitoring, the following information will be evaluated: average tree height, percent of tree cover, tree density, percent of woody shrub cover, seedling recruitment, and invasion by nonnative species. During the revegetation process, tree survival will be maximized by using deer screens or other maintenance measures as recommended by a certified arborist.

- Areas that have vegetative pruning and tree removal will be inspected immediately before construction begins, following construction, and 1 year after construction to determine the amount of existing vegetative cover, cover that is removed, and cover that resprouts. If these areas have not resprouted sufficiently to return the cover to the level of cover existing prior to project construction, these areas will be replanted with the same species to reestablish the cover to the preproject condition.

Off-site restoration of oak woodland habitat will be implemented by using habitat credits at the Burton Ranch property, a CALFED-funded conservation easement managed by The Nature Conservancy and located on the mainstem of Battle Creek (for more information, see the habitat compensation approach presented in Appendix F of this document). Monitoring and reporting for the conservation easement will be conducted by The Nature Conservancy as part of their commitment to stewardship of this easement.

ASIP Conservation Measures

ASIP conservation measures for valley/foothill woodland and forest habitat are discussed below.

AVFWF1. Implement EIS/EIR Mitigation Measure EVFWF1. This conservation measure implements the EIS/EIR mitigation measure EVFWF1 (described above) and tiers from the following MSCS programmatic conservation measure for valley/foothill woodland and forest habitat (CALFED Bay-Delta Program 2000c):

- Avoid or minimize disturbance to existing habitat.

AVFWF2. Implement EIS/EIR Mitigation Measure EVFWF2. This conservation measure implements the EIS/EIR mitigation measure EVFWF2 (described above) and tiers from the following MSCS

programmatic conservation measure for valley/foothill woodland and forest habitat (CALFED Bay-Delta Program 2000c):

- Restore or enhance 2–5 acres of additional in-kind habitat for every acre of existing habitat adversely affected by the actions near where impacts would be incurred.

Implementation of conservation measures AVFWF1 and AVFWF2 will fully mitigate effects of the Restoration Project on valley/foothill woodland and forest habitat, and no additional conservation measures are required.

Expected Outcomes

Implementation of the ASIP conservation measures AVFWF1 and AVFWF2 achieves the ASIP goal of avoidance, minimization, and compensation for adverse effects of Restoration Project actions on valley/foothill woodland and forest communities. Implementation of these conservation measures will help ensure that the existing functions and values of valley/foothill woodland and forest habitat in the project area are maintained.

CALFED Contribution to Species and Habitat Conservation

The Restoration Project is not designed to benefit specifically valley/foothill woodland and forest habitat but will fully mitigate effects of project implementation on this NCCP community. Implementation of other CALFED program actions will also ensure avoidance, minimization, and compensation for loss of woodland and forest habitat. Table I-1 in Appendix I lists the CALFED projects that are being implemented, or will be implemented in the near future, that will fully mitigate project-related effects on valley/foothill woodland and forest habitat.

The programmatic BOs and NCCP Determination do not present any ecosystem restoration milestones specifically targeted at restoration of valley/foothill woodland and forest habitats. However, several milestones targeted at other habitat types and processes (such as natural floodplains, stream meander, and riparian riverine aquatic habitats) also call for restoration of woodland communities. Ecosystem restoration milestones that have woodland restoration components include milestone numbers 5, 12, 13, 14, 38, 54, 59, 60, 62, 63, 64, 87, 88, 89, 90, 94, and 95 (see Appendix J of this document for more information related to each milestone).