3.3 Biological Environment

The biological study area generally comprises the project construction footprint and an area outside the project footprint to accommodate construction activities and staging where needed. The approximately 772-acre biological study area also includes areas outside of this general construction footprint in order to analyze indirect impacts on listed species. These additional areas include known occurrences of special-status plants within 250 feet of the construction footprint, seasonal wetlands that provide habitat for listed shrimp species within 250 feet of the construction footprint, elderberry shrubs within 100 feet of the construction footprint, California red-legged frog (*Rana aurora draytonii*) (CRLF) aquatic and upland habitat, and CRLF Critical Habitat within one mile. Where seasonal wetlands extend beyond the 250-foot boundary, the entire wetland is included in the biological study area.

Potential biological resources associated with the proposed project were identified through agency coordination, a review of existing information, and field surveys. Field surveys included botanical surveys (May 2004, May 2005, August 2007, December 2008, and April 2009); wetland delineations (April, May, and June 2004; June and August 2007; August 2008) and verification (January 2009); reconnaissance-level surveys and CRLF site assessment (July and October 2007); fisheries habitat assessment (July 2007); valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) (VELB) surveys (July 2007); vernal pool fairy and tadpole shrimp habitat assessments (July 2007 and February 2009); Callippe silverspot butterfly habitat survey (Monk & Associates 2004c); a fish passage assessment (September 2006, August 2007); salt-marsh harvest mouse site assessment (August 2007); and tree surveys (November and December 2007). The analysis presented in this chapter is based on the technical reports (listed below) that documented the above studies.

- *Interstate 80/Interstate 680/State Route 12 Interchange Natural Environmental Study* (2010).
- *Site Assessment for California Red-legged Frog for the Interstate 80/Interstate 680/State Route 12 Interchange Project*, submitted to the U.S. Fish and Wildlife Service (USFWS) on March 3, 2009, for review (2009).
- *Preliminary Delineation of Waters of the United States for the Interstate 80/Interstate 680/State Route 12 Interchange Project*; field verified in January 2009, final verification on July 9, 2009.
- *Interstate 80/Interstate 680/State Route 12 Project Biological Assessment for Contra Costa Goldfields, Callippe Silverspot Butterfly, Vernal Pool Fairy and Tadpole Shrimps, California Red-Legged Frog, and Valley Elderberry Longhorn Beetle* (in prep).
- *I-80/I-680/SR 12 Interchange Project Fish Passage Assessment for Green Valley, Ledgewood, and Suisun Creeks, Solano County, California* (2010).

3.3.1 Natural Communities

This section of the document discusses natural communities of concern. The focus of this section is on biological communities, not individual plant or animal species. This section also includes information on wildlife corridors and habitat fragmentation. Wildlife corridors are areas of habitat used by wildlife for seasonal or daily migration. Habitat fragmentation involves the potential for dividing sensitive habitat and thereby lessening its biological value.

Habitat areas that have been designated as critical habitat under the Federal Endangered Species Act are discussed in Section 3.3.5, "Threatened and Endangered Species." Also see Section 3.3.2, "Wetlands and Other Waters."

The study area supports nine natural communities of special concern: riparian woodland, blue oak woodland, live oak woodland, valley oak woodland, perennial marsh, perennial drainage, seasonal drainage, alkali seasonal marsh, and seasonal wetland (Volume 2, Figure 3.3-1). In the discussions of riparian woodland and oak woodlands below, the sheet numbers shown in parentheses indicate the sheet numbers in Volume 2, Figures 3.3-2a, 3.3-2b, 3.3-2c, and/or 3.3-2d. All biological resource figures are bound separately in Volume 2 of this document. Affected acreage is tabulated for each natural community under each alternative in Table 3.3.1-1.

Only riparian woodland and oak woodlands (blue oak woodland, live oak woodland, and valley oak woodland) are discussed in this section. The wetland communities and drainages are discussed in Section 3.3.2, "Wetlands and Other Waters." Other parts of the study area support upland scrub, other woodland, eucalyptus grove, orchard, vineyard, nonnative annual grassland, ruderal, row crops, landscaped, and a small area of open water in an artificial pond.

3.3.1.1 Riparian Woodland

Regulatory Setting

Riparian communities are considered sensitive locally, regionally, and statewide because of their habitat value and decline in extent. The Solano County Water Agency (SCWA) administrative draft habitat conservation plan (HCP) concludes that the riparian corridor along Suisun Valley Creek is important because it provides connectivity between the West Hills and Suisun Marsh (Solano County Water Agency 2009). The California Department of Fish and Game (CDFG) has adopted a no-net-loss policy for riparian habitat values, and the streambed alteration agreement (SAA) would include mitigation requirements for a loss of riparian vegetation. The USFWS mitigation policy identifies California's riparian habitats in Resource Category 2, for which no net loss of existing habitat value is recommended (46 FR 7644).

Table 3.3.1-1. Summary of Impacts on Sensitive Communities by Project Alternative

Impact Type	Sensitive Natural Communities (acres)											
	Riparian Wood-land	Blue Oak Wood-land	Valley Oak Wood-land	Live Oak Wood-land	Perennial Drainage	Jurisdictional Seasonal Drainage[b]	Nonjurisdictional Seasonal Drainage	Jurisdict-tional Perennial Marsh[a]	Nonjurisdictional Perennial Marsh	Jurisdic-tional Alkali Seasonal Marsh	Jurisdic-tional Seasonal Wetland	Non-Jurisdic-tional Seasonal Wetland
Alternative B												
Temporary	0.34	0.52	<0.01	4.12	0.30	0.85	0	5.25	0.01	0.28[c]	1.64[c]	0.01[c]
Permanent	1.28	0	0.47	6.37	0.59	1.78	<0.01	5.09	0.03	1.75	8.19	0
Total Alternative B Impacts	**1.62**	**0.52**	**0.47**	**10.49**	**0.89**	**2.63**	**<0.01**	**10.34**	**0.04**	**2.03**	**9.83**	**0.01**
Alternative B, Phase 1												
Temporary	0.02	0.52	0.01	0	0.17	0.14	0	1.97	0.01	0	0	0
Permanent	0.12	0	0.46	0	0.06	0.81	0	0.39	0.03	0	1.84	0
Total Alternative B, Phase 1 Impacts	**0.14**	**0.52**	**0.47**	**0**	**0.23**	**0.95**	**0**	**2.36**	**0.04**	**0**	**1.84**	**0**
Alternative C												
Temporary	0.41	0.14	0.05	3.14	0.45	0.56	0	2.44	0	0.13[c]	1.07[c]	0
Permanent	1.12	4.22	0.54	12.85	0.66	2.05	<0.01	5.73	0	1.03	8.30	0.78
Total Alternative C Impacts	**1.53**	**4.36**	**0.59**	**15.99**	**1.11**	**2.61**	**<0.01**	**8.17**	**0**	**1.16**	**9.37**	**0.78**
Alternative C, Phase 1												
Temporary	0.06	0	0	2.03	0.05	0.08	0.01	1.41	0	0	0.01[c]	0
Permanent	1.09	0	0.44	13.19	0.08	1.89	<0.01	0.41	0	0.07	3.89	0.77
Total Alternative C, Phase 1 Impacts	**1.15**	**0**	**0.44**	**15.22**	**0.13**	**1.97**	**0.01**	**1.82**	**0**	**0.07**	**3.90**	**0.77**

[a] Perennial marsh acreages include areas mapped as perennial wetland drainage in the delineation.

[b] Non-jurisdictional seasonal drainage impacts are provided in Section 3.3.2.5, but are not included in this table. No compensatory mitigation is required for the impacts on non-jurisdictional seasonal drainages, as discussed in Section 3.3.2.5.

[c] Temporary impacts on jurisdictional and non-jurisdictional seasonal wetland will be avoided and minimized through use of barrier fencing, worker training, and biological monitoring during construction.

Affected Environment

Riparian woodland occurs along the drainages in the study area listed here and illustrated in Figures 3.3-2a through 3.3-2d in Volume 2.

- Jameson Canyon Creek (OW-8) (Sheets 7, 9, and 14) south of SR 12W and on the east side of I-680, and its tributary south of I-80 (OW-8c) (Sheet 7).
- Two roadside ditches south of I-80 along Cordelia Road west of I-680 (W-26 and W-41) (Sheets 7–8).
- Green Valley Creek (W-45) (Sheet 17).
- Suisun Creek at I-80 (OW-56) (Sheet 22).
- Ledgewood Creek at SR 12E (W-90) (Sheet 32).

Tree species that characterize riparian woodland in the study area include valley oak, coast live oak, willows, white alder, California buckeye, California bay, Fremont's cottonwood, and box elder. Riparian woodland also supports elderberry shrubs in three locations: along Green Valley Creek north of I-80, adjacent to the east side of Dan Wilson Creek, and along the north and south sides of SR 12W in the vicinity of Jameson Canyon Creek. Herbaceous groundcover consists of nonnative grasses, sedge species, mugwort, and Bermuda grass, and shrubs include Himalayan blackberry, California wild rose, poison-oak, and California wild grape.

Riparian woodland habitat provides wildlife movement corridors up- and downstream for fish, amphibians, reptiles, birds, and mammals on a seasonal basis. However, its biological value is reduced because of fragmentation by roads and nearby development.

Affected acreage in riparian woodland is tabulated for each alternative in Table 3.3.1-1.

Environmental Consequences

Loss or Disturbance of Riparian Woodland Resulting from Construction

Construction of Alternative B would result in a permanent loss of approximately 1.28 acres of riparian woodland along the following drainages within the project footprint (Volume 2, Figure 3.3-2a).

- Jameson Canyon Creek (OW-8) and the tributary of Jameson Canyon Creek (OW-8c) south of I-80 for widening of I-80 for the I-80/I-680/SR 12W interchange.
- Two roadside ditches (W-26 and W-41) south of I-80 along Cordelia Road west of I-680 for the I-80/I-680/SR 12W interchange (Sheets 7–8).
- The north side of Suisun Creek (OW-56) for the widening of I-80 (Sheet 22).
- Ledgewood Creek (W-90) for widening of SR 12E (Sheet 32).

Construction of Alternative B, Phase 1 would result in a permanent loss of approximately 0.12 acre of riparian woodland. These impacts would occur along Ledgewood Creek south of SR 12E within the project footprint (Volume 2, Figure 3.3-2b, Sheet 32).

Under Alternative C, construction of the proposed project would result in a permanent loss of approximately 1.12 acres of riparian woodland along the following drainages within the project footprint (Volume 2, Figure 3.3-2c).

- Jameson Canyon Creek (OW-8) and the tributary to Jameson Canyon Creek south of I-80 (OW-8c) for widening of I-80 for the I-80/I-680/SR 12W interchange (Sheet 7).
- Jameson Canyon Creek west of I-680 for realignment of I-680 to SR 12W (Sheets 9 and 14).
- One roadside ditch south of I-80 along Cordelia Road west of I-680 (W-26) for the I-80/I-680/SR 12W interchange (Sheet 8).
- The north side of Suisun Creek (OW-56) for widening of I-80 (Sheet 22).
- Ledgewood Creek (OW-90) for widening of SR 12E (Sheet 32).

Construction of Alternative C, Phase 1 would result in a permanent loss of approximately 1.09 acre of riparian woodland along the following drainages within the project footprint (Volume 2, Figure 3.3-2d).

- Jameson Canyon Creek west of I-680 (OW-8) and one of its tributaries (OW-8c) for the realignment of I-680 to SR 12W (Sheets 9 and 14).
- Roadside ditches south of I-80 along Cordelia Road west of I-680 (W-26 and W-41) for the I-80/I-680/SR 12W interchange (Sheet 8).
- Ledgewood Creek (OW-90) for the widening on SR 12E (Sheet 32).

The permanent impact area would include riparian trees, as well as woody understory plants such as young trees, coyote brush, Himalayan blackberry, and possibly elderberry, adjacent to the south side of the study area at Suisun Creek and along the north and south sides of SR 12W in the vicinity of Jameson Canyon Creek.

Approximately 0.34 acre of riparian woodland vegetation would be temporarily disturbed during construction of Alternative B in the areas listed above for permanent impacts. Under Alternative B, Phase 1, approximately 0.02 acre of riparian woodland vegetation would be temporarily disturbed during construction at the areas listed above for permanent impacts. Under Alternative C, approximately 0.41 acre of riparian woodland vegetation would be temporarily disturbed during construction at the areas listed above for permanent impacts. Under Alternative C, Phase 1, approximately 0.06 acre of riparian woodland vegetation would be temporarily disturbed during construction at the areas listed above for permanent impacts. This impact would include the probable removal of additional trees and understory vegetation to provide equipment access to the drainages.

Indirect impacts on riparian woodland vegetation could occur from adjacent construction activity. Riparian vegetation is adjacent to the construction area and would not be removed for construction, but it could sustain damage from equipment.

Implementation of avoidance, minimization, and/or mitigation measures to install construction barrier fencing, to conduct environmental awareness training, and for biological monitoring will

protect trees during construction and avoid indirect impacts. Implementation of compensation measures would mitigate loss of riparian habitat.

State and federal agencies require avoidance, minimization, and compensatory mitigation for the loss of riparian habitat. The loss or disturbance of riparian woodland vegetation is considered adverse because it provides a variety of important ecological functions and values.

Under the No-Build Alternative, there would be no temporary or permanent impacts on riparian woodland.

Avoidance, Minimization, and/or Mitigation Measures

Place Environmentally Sensitive Area Fencing around All Sensitive Biological Resources in and near the Construction Area

Orange construction barrier fencing will be installed to identify environmentally sensitive areas (ESAs). A qualified biologist will identify sensitive biological resources adjacent to the construction area before the final design plans are prepared so that the areas to be fenced can be included in the plans. The area that generally would be required for construction, including staging and access, is shown in Figure 3.3-1 in Volume 2 (Biological Study Area Boundary). Portions of this area that are to be avoided during construction will be fenced off to avoid disturbance. Sensitive biological resources that occur adjacent to the construction area include sensitive natural communities; native trees to be retained; special-status wildlife habitats for VELB, CRLF, and western pond turtle (*Actinemys marmorata*); and nests of special-status birds.

Temporary fences around the ESAs will be installed as one of the first orders of work in accordance with the Department's specifications. Before construction, the construction contractor will work with the project engineer and a resource specialist to identify the locations for the barrier fencing and will place stakes around the sensitive resource sites to indicate these locations. The protected areas will be designated as ESAs and identified clearly on the construction plans. The fencing will be installed before construction activities are initiated, maintained throughout the construction period, and be removed after completion of construction.

Conduct Environmental Awareness Training for Construction Employees

A USFWS-approved biologist will be retained to develop and conduct environmental awareness training for construction employees on the importance of on-site biological resources, including sensitive natural communities; native trees to be retained; special-status wildlife habitats for VELB, CRLF, and western pond turtles; nests of special-status birds; and avoidance of invasive plant introduction and spread. The environmental awareness program will be provided to all construction personnel to brief them on the life history of special-status species in or adjacent to the project area, the need to avoid adverse effects on sensitive biological resources, any terms and conditions required by state and federal agencies, and the penalties for not complying with biological mitigation requirements. If new construction personnel are added to the project, the contractor's superintendent will ensure that the personnel receive the mandatory training before starting work. An environmental awareness handout, describing and illustrating sensitive

resources that will be avoided during project construction and identifying all relevant permit conditions, will be provided to each person.

Retain a Biological Monitor to Conduct Visits during Construction in Sensitive Habitats

A qualified biologist will be retained to conduct construction monitoring in and adjacent to all sensitive habitats when construction is taking place near sensitive habitat areas. Construction monitoring frequency will range from daily to weekly depending on the biological resource. The monitor, as part of the overall monitoring duties, will inspect the fencing along the creek and drainages in the construction area that support riparian vegetation, surrounding native trees and woodlands, and special-status wildlife habitats. The biological monitor will assist the construction crew as needed to comply with all project implementation restrictions and guidelines. The biological monitor also will be responsible for ensuring that the contractor maintains the staked and flagged perimeters of the construction area and staging areas adjacent to sensitive biological resources and stopping work if necessary.

Avoid and Minimize Potential Disturbance of Riparian Communities

Potential disturbance of riparian communities will be avoided and minimized by implementing the following measures.

- The potential for long-term loss of riparian vegetation will be minimized by trimming vegetation rather than removing entire shrubs. Shrubs that need to be trimmed will be cut at least one foot above ground level to leave the root systems intact and allow for more rapid regeneration. Cutting will be limited to the minimum area necessary within the construction zone. To protect nesting birds, the project proponent will not allow pruning or removal of woody riparian vegetation between February 15 and August 31 without preconstruction surveys.
- A certified arborist will be retained to oversee any necessary pruning of riparian trees.
- The areas that undergo vegetative pruning will be inspected immediately before construction, immediately after construction, and one year after construction to determine the amount of existing species cover, cover that has been removed, and cover that resprouts. If, after one year, these areas have not resprouted sufficiently to return to the pre-project level, the project proponent will replant the areas with the same species (native species) to reestablish the vegetation cover.

Compensate for Temporary and Permanent Loss of Riparian Vegetation

Temporary construction-related loss of riparian vegetation will be compensated for by replanting the temporarily disturbed areas with the same native species. Replanting will occur immediately after completion of the construction activities and no later than October 15 to minimize erosion, creek sedimentation, and adverse effects on fish.

Permanent loss of riparian vegetation will be compensated for at a ratio to be determined in cooperation with the CDFG. Potential mitigation areas are available at Solano Community College; the Solano Land Trust's Lynch Canyon Open Space, which is northwest of I-80 in

American Canyon; and the King Ranch Open Space, which is west of I-680 in the American Canyon area (according to Sue Wickham, project coordinator at the Solano Land Trust, in a phone conversation with Lisa Webber of ICF Jones & Stokes on March 12, 2008, and an e-mail to the same recipient on October 13, 2008). Compensation may be combined with project impacts on CRLF riparian habitat.

The temporary and permanent losses of riparian vegetation will be compensated for through the preparation of a mitigation planting plan, including a species list and number of each species, planting locations, and maintenance requirements. Plantings will consist of cuttings taken from local plants, or plants grown from local material.

Planted species will be based on those removed from the project area and will include valley oak, interior live oak, willows, white alder, California buckeye, California bay, and Himalayan blackberry. Native understory species, such as sedge species, mugwort, California wild rose, poison-oak, California wild grape, or other suitable species, will be planted. Plantings will be monitored annually for three years or as required in the project permits.

If 75% of the plants survive at the end of the monitoring period, the revegetation will be considered successful. If the survival criterion is not met at the end of the monitoring period, planting and monitoring will be repeated after mortality causes have been identified and corrected.

3.3.1.2 Oak Woodlands

Regulatory Setting

Local and state agencies recognize oak woodlands as sensitive natural communities. The Resources Chapter of the draft Solano County General Plan (2008) includes policies to protect oak woodlands and heritage trees, encourage the planting of native tree species, and develop an ordinance to protect oak woodlands and heritage oak trees. The CDFG recognizes oak woodland types that include valley oak as rare natural communities of high priority for inventory in the California Natural Diversity Database (CNDDB) (California Department of Fish and Game 2003). The California State Board of Forestry and Fire Protection oak conservation policy supports a statewide program of research and education known as the Integrated Hardwood Range Management Program. The State Wildlife Conservation Board enacted the Oak Woodlands Conservation Act of 2001 to recognize the importance of oak woodlands and provide financial support for oak woodland conservation activities. State agencies protect blue oak and valley oak woodlands under Senate Concurrent Resolution (SCR) 17; however, impacts on live oak woodland also have to be addressed under CEQA. The CDFG recommends avoidance, minimization, and compensatory mitigation for the loss of native oak trees and oak woodland habitat. The loss or disturbance of oak woodland vegetation is considered adverse because this vegetation is declining and provides important wildlife habitat and other ecological functions and values.

The City of Fairfield Tree Conservation ordinance (FCC 25.36) also protects native trees that may occur in oak woodlands, including native oaks (*Quercus* spp.), bay laurel (*Umbellularia californica*), madrone (*Arbutus menziesi*), and California buckeye (*Aesculus californica*). This ordinance protects native trees located inside the City Limit Line on public property or on private

property developed or landscaped with City approval, but not those located within the Caltrans right-of-way. Because all the oak woodlands in the study area are located either outside the City Limit Line or inside of the Caltrans right-of-way, no native trees in these woodlands are protected under the City ordinance.

Individual native trees in the study area that do not occur in or adjacent to riparian and oak woodland communities are discussed in Section 3.3.7, "Native Trees."

Affected Environment

The study area supports three types of oak woodland: blue oak woodland, valley oak woodland, and interior live oak woodland. Because oak woodlands are regulated as a general type rather than as separate community types, and the woodland types are often intergraded, the same mitigation would be required for impacts on all three community types.

The locations of each oak woodland type in the study area are listed here illustrated in Figures 3.3-2a through 3.3-2d in Volume 2.

- Blue oak woodland occurs only in one location in the study area: on the hill south of I-80 and west of the I-80 westbound truck scale (Sheet 21). This community is dominated by blue oak with a nonnative grassland understory and scattered poison-oak shrubs.
- Several patches of valley oak woodland occur in the study area. One area occurs at the northeast quadrant of the Green Valley Road/Business Center Drive intersection (Sheet 17). A small area of valley oak woodland is located in the I-80 on-ramp loop at the I-80/I-680 interchange (Sheets 17–18). Valley oak woodland is also at the south side of I-80 near the eastbound truck scales (Sheet 21). This community is dominated by valley oak trees, although the overstory also contains coast live oak and blue oak. The understory is open and grassy with blue wildrye and poison-oak.
- Live oak woodland occurs in the study area along the north and south sides of SR 12W (Sheets 3–5 and 7–8) and west of the I-80 eastbound truck scales (Sheet 21). This community type is dominated by interior live oak with elderberry and poison-oak shrubs and an understory of nonnative annual grasses, creeping wildrye, and purple needlegrass.

Affected acreage in oak woodland is tabulated for each alternative in Table 3.3.1-1.

Environmental Consequences

Permanent Loss and Temporary Disturbance of Oak Woodlands

Construction of Alternative B would result in a permanent loss of approximately 0.47 acre of valley oak and 6.37 acres of live oak woodland types within the following parts of the project area (Volume 2, Figure 3.3-2a):

- Valley oak woodland in the area between Dan Wilson Creek and the former eastbound truck scale location proposed for widening of I-80.
- Live oak woodland in the area proposed for the realignment of Red Top Road, the Red Top Road on- and off-ramps to SR 12W, and the SR 12W westbound on-ramp from WB I-80.

Temporary impacts occurring in the areas adjacent to the construction area for Alternative B could affect up to 0.52 acre of blue oak woodland, less than 0.01 acre of valley oak woodland, and up to 4.12 acres of live oak woodland. Shading of live oak woodland vegetation could occur in the area of the SR 12W connector ramps, which would be elevated. The effects of shading could include loss of vegetation over time in the area adjacent to the project footprint. No permanent impacts on blue oak woodland would occur within the Alternative B footprint.

Construction of Alternative B, Phase 1 would result in no permanent loss of no blue oak woodland, but a loss of approximately 0.46 acre of valley oak woodland in the area between Dan Wilson Creek and the former eastbound truck scale location proposed for widening of I-80 (Volume 2, Figure 3.3-2b). Temporary impacts in the area adjacent to the construction area could affect up to 0.52 acre of blue oak woodland and 0.01 acre of valley oak woodland. No permanent or temporary impacts on live oak woodland would occur within the Alternative B, Phase 1 footprint.

Construction of Alternative C would result in a permanent loss of approximately 4.22 acres of blue oak woodland on the hillside west of the former eastbound truck scales, and 0.54 acre of valley oak woodland and 12.85 acres of live oak woodland types within the same general parts of the project area as described for Alternative B (Volume 2, Figure 3.3-2c). Temporary impacts in the area adjacent to the construction area could affect up to 0.14 acre of blue oak woodland, 0.05 acre of valley oak woodland, and 3.14 acres of live oak woodland.

Construction of Alternative C, Phase 1 would result in a permanent loss of approximately 0.44 acre of valley oak woodland and 13.19 acres of live oak woodland along SR 12W and in the area between Dan Wilson Creek and the former eastbound truck scale location proposed for widening of I-80 (Volume 2, Figure 3.3-2d). Approximately 2.03 acres of live oak woodland could be temporarily affected, but no temporary effects on valley oak woodland would occur. No permanent or temporary impacts on blue oak woodland would occur within the Alternative C, Phase 1 footprint.

Under both build alternatives, indirect impacts on oak woodland vegetation outside the temporary impact zone could result from adjacent construction activity and damage from equipment. Construction could cause indirect impacts on trees in the oak woodland due to long-term damage through excessive pruning before construction begins.

Avoidance, Minimization, and/or Mitigation Measures

CDFG would recommend avoidance, minimization, and compensatory mitigation for the loss of native oak trees and oak woodland habitat. The loss or disturbance of oak woodland vegetation is considered significant because it provides important wildlife habitat and other ecological functions and values. Implementation of the measure below and measures to avoid and minimize disturbance and compensate for loss of riparian areas described in Section 3.3.1.1 would address

the loss and disturbance of riparian habitat. Implementation of measures designed to protect sensitive natural communities described in Section 3.3.1.1 will protect adjacent vegetation during construction and minimize indirect impacts.

Compensate for temporary and permanent loss of oak woodland vegetation.

Temporary construction-related loss of oak woodland habitat will be compensated for by replanting the temporarily disturbed area with the native species removed, including blue oak, valley oak, and interior live oak. Replanting will occur in fall so that less frequent irrigation and maintenance will initially be necessary.

The permanent loss of oak woodland vegetation will be compensated for at a minimum ratio of 1:1 (1 acre restored or created for every one acre permanently affected). This ratio will be confirmed through coordination with state agencies as part of the permitting process for the proposed project. Potential mitigation areas are available at the Solano Land Trust's Lynch Canyon Open Space, which is northwest of I-80 in American Canyon, and the King Ranch Open Space, which is west of I-680 in the American Canyon area (Wickham pers. comm.). A mitigation planting plan will be developed that includes a species list and number of each, planting locations, and maintenance requirements. Plantings will consist of cuttings taken from local plants, or plants grown from local material obtained within the American Canyon watershed. Planted species will be based on those removed from the project area and will include valley and interior live oak, as well as suitable native understory species such as blue wildrye, creeping wildrye, and purple needlegrass. Plantings will be monitored annually for three years, or as required in the project permits. A minimum of 75% of the plantings will have survived at the end of the monitoring period for mitigation to be considered successful. If the survival criterion is not met at the end of the monitoring period, planting and monitoring will be repeated until the survival criterion is met.

3.3.2 Wetlands and Other Waters

The information presented here is taken from the *Preliminary Delineation of Waters of the United Stated for the Interstate 80/Interstate 680/State Route 12 Interchange Project* and the *Interstate 80/Interstate 680/State Route 12 Interchange Project Natural Environment Study*. The wetland delineation was submitted to the U.S. Army Corps of Engineers (USACE) in August 2008. A field verification of the preliminary delineation was conducted with Andrea Meier of the USACE San Francisco District on January 7, 2009, and final verification of the revised map occurred on July 9, 2009. This section addresses waters of the United States, which are under the jurisdiction of the USACE, as well as wetland and drainage features that are outside USACE jurisdiction (nonjurisdictional features) and are regulated only as waters of the state. Impacts on nonjurisdictional features are also discussed per CEQA requirements in Chapter 4. Jurisdictional wetlands and other waters (waters of the United States) in the study area include perennial drainages (American Canyon Creek, parts of Green Valley Creek, parts of Dan Wilson Creek, Suisun Creek, and parts of Ledgewood Creek); seasonal drainages (Jameson Canyon Creek and unnamed drainages); perennial wetland drainages (parts of Green Valley Creek, parts of Dan Wilson Creek, parts of Ledgewood Creek, and unnamed drainages); perennial marshes; alkali seasonal marshes; and seasonal wetlands. Non-jurisdictional features (waters of the state) in the

study area include seasonal drainages (irrigation and roadside ditches) and seasonal wetlands. In the discussions below, the sheet numbers shown in parentheses indicate the sheet numbers in Figures 3.3-2a, 3.3-2b, 3.3-2c, and 3.3-2d in Volume 2.

Documentation of this, and other, consultation with the USACE is presented in Appendix H and discussed in Chapter 5.

Regulatory Setting

Wetlands and other waters are protected under a number of laws and regulations. At the federal level, the Clean Water Act (33 U.S.C. 1344) is the primary law regulating wetlands and waters. The Clean Water Act regulates the discharge of dredged or fill material into waters of the United States, including wetlands. Waters of the United States include navigable waters, interstate waters, territorial seas and other waters that may be used in interstate or foreign commerce. To classify wetlands for the purposes of the Clean Water Act, a three-parameter approach is used that includes the presence of hydrophytic (water-loving) vegetation, wetland hydrology, and hydric soils (soils subject to saturation/inundation). All three parameters must be present, under normal circumstances, for an area to be designated as a jurisdictional wetland under the Clean Water Act.

Section 404 of the Clean Water Act establishes a regulatory program that provides that no discharge of dredged or fill material can be permitted if a practicable alternative exists that is less damaging to the aquatic environment or if the nation's waters would be significantly degraded. The Section 404 permit program is run by the U.S. Army Corps of Engineers (USACE) with oversight by the Environmental Protection Agency (EPA).

The Department, FHWA, the Army Corps of Engineers, the U.S. Environmental Protection Agency, and U.S. Fish and Wildlife Service entered into a memorandum of understanding (MOU) to integrate NEPA and the Clean Water Act for EIS projects that have five or more acres of permanent impacts on Waters of the United States. Under this MOU, the signatory agencies agree to coordinate at three checkpoints: 1) purpose and need, 2) identification of range of alternatives, and 3) preliminary determination of the least environmentally damaging practicable alternative (LEDPA) and conceptual mitigation plan. The goal of the MOU process is allow the USACE to more efficiently adopt the EIS for their Section 404 permit action.

The Executive Order for the Protection of Wetlands (E.O. 11990) also regulates the activities of federal agencies with regard to wetlands. Essentially, this executive order states that a federal agency, such as the Federal Highway Administration, cannot undertake or provide assistance for new construction located in wetlands unless the head of the agency finds: 1) that there is no practicable alternative to the construction and 2) the proposed project includes all practicable measures to minimize harm.

At the state level, wetlands and waters are regulated primarily by the CDFG and the Regional Water Quality Control Boards (RWQCB). In certain circumstances, the Coastal Commission (or Bay Conservation and Development Commission) may also be involved. Sections 1600–1607 of the California Fish and Game Code (CFGC) require any agency that proposes a project that will substantially divert or obstruct the natural flow of or substantially change the bed or bank of a river, stream, or lake to notify the CDFG before beginning construction. If the CDFG determines

that the project may substantially and adversely affect fish or wildlife resources, a Lake or Streambed Alteration Agreement will be required. CDFG jurisdictional limits are usually defined by the tops of the stream or lake banks, or the outer edge of riparian vegetation, whichever is wider. Wetlands under jurisdiction of the USACE may or may not be included in the area covered by a Streambed Alteration Agreement obtained from the CDFG.

The RWQCB were established under the Porter-Cologne Water Quality Control Act to oversee water quality. The RWQCB issues water quality certifications in compliance with Section 401 of the Clean Water Act. Please see the Water Quality section for additional details. Wetlands and drainages that are not under USACE jurisdiction but have beneficial uses are considered waters of the State and are regulated by the RWQCB. The RWQCB also issues waste discharge requirements (WDRs) for loss of waters of the State.

3.3.2.1 Perennial Drainage

Affected Environment

The drainage numbers used in this discussion correspond to the numbers used in the delineation of waters of the United States. However, there are drainage features that were not labeled on the delineation maps because they were in areas that had been delineated for other projects. These drainages are labeled in Figures 3.3-2a through 3.3-2d in Volume 2 for the purpose of discussion in this document. Perennial drainages that are densely vegetated are discussed separately from the unvegetated perennial drainages in this section. See the "Perennial Marsh" section below for descriptions of vegetated perennial drainages.

The following unvegetated drainages in the study area are perennial and carry flow year-round or nearly year-round.

- The downstream reach of American Canyon Creek (OW-23) (Sheet 12).
- Dan Wilson Creek (OW-53) (Sheet 21).
- Suisun Creek (OW-56) (Sheet 22).
- Culverted parts of Ledgewood Creek (OW-90) (Sheet 32) and its tributary (OW-90a) (Sheets 30-31).

Functions and values of perennial drainages in the study area include flood conveyance and providing food and habitat for fish and wildlife species.

Drainages that connect to the Suisun Marsh sloughs and tributaries of these drainages are considered waters of the United States, subject to regulation under CWA Section 404. Both permanent and temporary placement of material in these areas, including cofferdams and bridge supports, would be considered placement of fill within waters of the United States. This activity would require Section 404 authorization from the USACE and CWA Section 401 water quality certification from the RWQCB.

Affected acreage in perennial drainage is tabulated for each alternative in Table 3.3.1-1.

Environmental Consequences

Construction of the project alternatives would involve the installation of culverts and placement of fill for road widening and bridge construction, resulting in direct disturbance of jurisdictional drainages. Impact acreages are based on the final USACE-verified delineation.

Loss or Disturbance of Perennial Drainage Resulting from Construction

Construction of both of the build alternatives would result in permanent and temporary losses of perennial drainage within the project area as summarized in Tables 3.3.2-1 through 3.3.2-4 and Figures 3.3-2a through 3.3-2d in Volume 2.

Under Alternative B, permanent impacts on perennial drainages would include construction associated with removal and replacement of the bridges over Dan Wilson Creek (OW-53) (Sheet 21) and Suisun Creek (OW 56) (Sheet 22) and replacement of culverts on American Canyon Creek (OW-23) (Sheet 12), a tributary of Ledgewood Creek (OW-90a) (Sheet 31), and Ledgewood Creek (OW-90) (Sheet 32) (Volume 2, Figure 3.3-2a). Construction would result in a total area of fill of 3.52 acres (Table 3.3.2-1).

Table 3.3.2-1**. Direct Impacts on Drainages in the Study Area under Alternative B**[a]

Drainage Type	Area of Permanent Fill (acres)	Area of Temporary Fill (acres)	Total Area of Fill (Permanent + Temporary) (acres)
Waters of the State (Nonjurisdictional)			
Seasonal (constructed)	<0.01	0	<0.01
Waters of the U.S. (Jurisdictional)			
Perennial	0.59	0.30	0.89
Seasonal	1.78	0.85	2.63
Total direct impacts	**2.37**	**1.15**	**3.52**

[a] In this table, the acreages for waters of the State (nonjurisdictional) include only those drainages that are not also waters of the U.S. Because all drainages that are waters of the U.S. (jurisdictional) are also considered waters of the State, the total acreage for waters of the State would include both the nonjurisdictional and jurisdictional acreages. Under Alternative B, Phase 1, permanent impacts on perennial drainages would include construction associated with removal and replacement of the bridges over Dan Wilson Creek (OW-53) (Sheet 21) and Ledgewood Creek (OW-90) (Sheet 32) and with replacement of culverts on American Canyon Creek (OW-23) (Sheet 12) and Ledgewood Creek (Sheet 32) (Volume 2, Figure 3.3-2b). Construction of Alternative B, Phase 1 would result in a total area of fill of 1.18 acres, the lowest of the first fundable phase of the alternatives.

Table 3.3.2-2**. Direct Impacts on Drainages in the Study Area under Alternative B, Phase 1**[a]

Drainage Type	Area of Permanent Fill (acres)	Area of Temporary Fill (acres)	Total Area of Fill (Permanent + Temporary) (acres)
Waters of the State (Nonjurisdictional)			
None	N/A	N/A	N/A
Waters of the US (Jurisdictional)			
Perennial	0.06	0.17	0.23
Seasonal	0.81	0.14	0.95
Total direct impacts	**0.87**	**0.31**	**1.18**

[a] Because all drainages that are waters of the U.S. (jurisdictional) are also considered waters of the State, the acreages for waters of the U.S. in this table also represent acreages of waters of the State. Under Alternative C, permanent and temporary impacts on perennial drainages would be in the same areas as described for Alternative B, though the total area of fill would be slightly higher, and is the highest of the build alternatives (Table 3.3.2-3).

Table 3.3.2-3. Direct Impacts on Drainages in the Study Area under Alternative C [a]

Drainage Type	Area of Permanent Fill (acres)	Area of Temporary Fill (acres)	Total Area of Fill (permanent + temporary) (acres)
Waters of the State (Nonjurisdictional)			
Seasonal (constructed)	<0.01	0	<0.01
Waters of the US (Jurisdictional)			
Perennial	0.66	0.45	1.11
Seasonal	2.05	0.56	2.61
Total direct impacts	**2.71**	**1.01**	**3.72**

[a] In this table, the acreages for waters of the State (nonjurisdictional) include only those drainages that are not also waters of the U.S. Because all drainages that are waters of the U.S. (jurisdictional) are also considered waters of the State, the total acreage for waters of the State would include both the nonjurisdictional and jurisdictional acreages. Construction of Alternative C, Phase 1 would result in permanent loss of perennial drainage (summarized in Table 3.3.2-4), for replacement of culverts on American Canyon Creek (OW-23) (Sheet 12) and the widening of SR 12E over the tributary of Ledgewood Creek (OW-90a) (Sheet 31). Approximately 0.05 acre of the Ledgewood Creek tributary would also be temporarily affected.

Table 3.3.2-4**. Direct Impacts on Jurisdictional Drainages in the Study Area under Alternative C, Phase 1 [a]**

Drainage Type	Area of Permanent Fill (acres)	Area of Temporary Fill (acres)	Total Area of Fill (Permanent + Temporary) (acres)
Waters of the State (Nonjurisdictional)			
Seasonal	<0.01	0.01	0.01
Waters of the US (Jurisdictional)			
Perennial	0.08	0.05	0.13
Seasonal	1.89	0.08	1.97
Total direct impacts	**1.97**	**0.14**	**2.11**

[a] In this table, the acreages for waters of the State (nonjurisdictional) include only those drainages that are not also waters of the U.S. Because all drainages that are waters of the U.S. (jurisdictional) are also considered waters of the State, the total acreage for waters of the State would include both the nonjurisdictional and jurisdictional acreages. Under the No-Build Alternative, there would be no impacts on perennial drainage.

Although the bridges over Dan Wilson Creek and Suisun Creek are clear spans, and no piers would be placed below the ordinary high water mark (OHWM), and existing piers and supports would be removed from the creekbed. The removal may result in the need for placing fill and recontouring the bed, which would be a direct permanent impact. This analysis assumes that the bridge abutments at Dan Wilson Creek and Suisun Creek would be constructed above the OHWM and would not result in permanent fill. The SR 12E bridges carrying on- and off-ramps over Ledgewood Creek would each include a single pier wall within the OHWM of the creek, which would be permanent fill. Replacement of the culvert on I-680 at American Canyon Creek with a longer culvert and replacement of the culvert under SR 12E at Ledgewood Creek would be permanent fill. For bridge construction, cofferdams installed during construction would be considered a temporary impact.

Additional indirect impacts caused by sedimentation or modification of hydrology could occur in portions of perennial drainages that lie outside the project footprint.

Avoidance, Minimization, and/or Mitigation Measures

Implementation of avoidance, minimization, and/or mitigation measures in Section 3.3.1.1 (installation of construction barrier fencing, environmental awareness training, and biological

monitoring) and the measures listed below to protect water quality, prevent erosion, and restore and compensate for drainage habitat would address the impacts on perennial drainages for all build alternatives.

Protect Water Quality and Prevent Erosion and Sedimentation into Drainages and Wetlands

Features to be protected include American Canyon, Green Valley, Suisun, Dan Wilson, and Ledgewood Creeks; unnamed drainages; and wetlands in and adjacent to the project area. The following BMPs will be implemented before and during construction.

- All earthwork or foundation activities involving creeks, culverts, and bridges will occur in the dry season (generally between June 1 and October 15).
- Equipment used in and around drainages and wetlands will be in good working order and free of dripping or leaking engine fluids. All vehicle maintenance, staging, and materials storage will be performed at least 300 feet from all drainages and wetlands. Any necessary equipment washing will be carried out where the water cannot flow into drainages or wetlands.
- Any surplus concrete rubble, asphalt, or other rubble from construction will be taken to an appropriate landfill.
- An erosion control plan will be prepared and implemented for the proposed project. It will include the following provisions and protocols:
  - Discharge from dewatering operations, if needed, and runoff from disturbed areas will be made to conform to the water quality requirements of the waste discharge permit issued by the RWQCB.
  - Material stockpiles will be located in non-traffic areas only. Side slopes will not be steeper than 2:1. All stockpile areas will be surrounded by a filter fabric fence and interceptor dike.
  - Temporary erosion control measures, such as sandbagged silt fences, will be applied throughout construction of the proposed project and will be removed after the working area is stabilized or as directed by the engineer. The SWPPP for the proposed project will detail the applications and type of measures and the allowable exposure of unprotected soils.
  - Soil exposure will be minimized through use of temporary BMPs, groundcover, and stabilization measures. Exposed dust-producing surfaces will be sprinkled daily, if necessary, until wet; this measure will be controlled to avoid producing runoff. Paved streets will be swept daily following construction activities.
  - The contractor will conduct periodic maintenance of erosion and sediment control measures.
  - An appropriate seed mix of native species will be planted on disturbed areas upon completion of construction.

Restore Temporarily Disturbed Drainage Habitat and Compensate for Permanent Loss of Drainage Habitat

Portions of the drainages temporarily disturbed by cofferdam construction will be restored to original grade and preconstruction conditions following construction, and no permanent impacts will result.

The permanent fill of other waters of the United States in drainages will be compensated for at a minimum ratio of 1:1 (one acre restored or created for every one acre permanently affected). The actual compensation ratios will be determined through coordination with the RWQCB and the USACE as part of the permitting process. Permanent loss of perennial and seasonal drainage will be compensated for by implementing one or a combination of the following options.

- Purchase credits for created riparian stream channel at a locally approved mitigation bank. Written evidence will be provided to the resource agencies that compensation has been established through the purchase of mitigation credits.
- Compensate out of kind for loss of drainages by implementing compensatory mitigation for riparian woodland impacts described in the measure to compensate for temporary and permanent loss of riparian vegetation in Section 3.3.1.1. The acreage restored to compensate for loss of drainages will be added to the acreage restored for loss of riparian habitat.

3.3.2.2 Seasonal Drainage

Affected Environment

Seasonal drainages in the study area primarily carry water after storm events and during the wet season. This category includes both natural seasonal drainages and constructed seasonal drainages, both of which provide habitat for wildlife. Some natural and constructed seasonal drainages in the study area are considered jurisdictional by the USACE and are subject to regulation under CWA Section 404. Drainages that are not under USACE jurisdiction but have beneficial uses would be considered waters of the State that would be regulated by the RWQCB, which would issue WDRs for loss of drainage area.

Natural Seasonal Drainage

Natural seasonal drainages in the study area are listed here illustrated in Figures 3.3-2a through 3.3-2d in Volume 2.

- Jameson Canyon Creek and its tributaries (OW-8, OW-8a, OW-8b, OW-8c, OW-8d, and OW-8e) (Sheets 3, 4, 5, 7, 9, and 14).
- Drainages north of SR 12W (OW-149 and OW-161) (Sheet 5).
- Erosional drainages north of I-80 and Red Top Road (OW-1a and OW-2b) (Sheets 2 and 3).
- Erosional drainages west of I-680 (OW-150 and OW-151) (Sheet 13).

Functions of natural seasonal drainages in the study area include flood conveyance during and after storm events. Most natural seasonal drainages in the study area ultimately drain to Cordelia or Peytonia Sloughs, which in turn drain to Suisun Bay and are considered jurisdictional by the USACE. These features are subject to USACE regulation under CWA Section 404 and are

considered sensitive natural communities. Some natural seasonal drainages in the study area are not subject to USACE jurisdiction, because they have no connection to the tidal sloughs that drain to Suisun Bay. However, these natural drainages are considered sensitive natural communities and would be considered waters of the state regulated by the RWQCB.

Constructed Seasonal Drainages

Constructed seasonal drainages occur throughout the study area and include ditches excavated in upland areas along roadsides, railroads, and agricultural fields or around developments. Some ditches are concrete lined. Roadside and irrigation ditches that were constructed in uplands and do not connect to a natural stream are not subject to USACE jurisdiction and are not considered sensitive natural communities.

Environmental Consequences

Construction of the project alternatives would involve the installation of culverts and placement of fill for road widening and bridge construction, resulting in direct disturbance of jurisdictional and nonjurisdictional seasonal drainages. Impact acreages are based on the final USACE-verified delineation.

Loss or Disturbance of Nonjurisdictional Seasonal Drainages

Construction of the full build alternatives would involve the installation of culverts and placement of fill for road widening, resulting in direct disturbance of nonjurisdictional constructed seasonal drainages. Under Alternative B, Alternative C, and Alternative C, Phase 1, less than 0.01 acre of nonjurisdictional irrigation ditch would be placed in a culvert for construction. Alternative B, Phase 1 would not affect nonjurisdictional seasonal drainages.

Loss or Disturbance of Jurisdictional Seasonal Drainages Resulting from Construction

Temporary impacts on jurisdictional seasonal drainages under both build alternatives would occur during project construction activities for equipment access and placement of cofferdams and falsework.

Alternative B

Construction of Alternative B would result in a permanent loss and a temporary loss of jurisdictional seasonal drainage within the project area (summarized in Table 3.3.2-1 and Volume 2, Figures 3.3-1 and 3.3-2a). These impact acreages are based on the final USACE-verified delineation.

Permanent impacts on jurisdictional seasonal drainages would occur in the areas listed below.

- Replacement and lengthening of culverts in Jameson Canyon Creek (OW-8) (Sheets 7, 9, and 14); its tributaries (OW-8b, OW-8d, OW-8e) (Sheets 3, 4, and 5); and unnamed drainages (OW-13, OW-15, OW-86, OW-149, OW-160) (Sheets 3, 4, and 5) for the realignment of Red Top Road and construction of on- and off-ramps for SR 12W.
- Grading and culverting of unnamed drainages for the extension of Red Top Road north of SR 12W (OW-145, OW-153, and OW-161) (Sheets 5 and 6).

- Replacement and lengthening of culverts in unnamed jurisdictional seasonal drainages throughout the project area for road widening on I-80 (OW-1a, OW-2, OW-2a, OW-2b, OW-8, OW-57, OW-87, OW-88, OW-93, OW-139, and OW-141) (Sheets 1, 2, 3, 7, 19, 20, 21, and 23); I-680 (OW-8, OW-43, OW-44, OW-103c, OW-104, OW-150, and OW-151) (Sheets 10, 11, 13, 15, and 16); and SR 12E (OW-90b, OW-110, and OW-119) (Sheets 25, 32, 33, and 34).
- Improvements to the I-80/I-680 interchange (OW-45a, OW-45d, OW-45e, OW-61a, and OW-61) (Sheets 8, 16, 17, and 18).

Alternative B, Phase 1

Construction of Alternative B, Phase 1 would result in a permanent loss and a temporary loss of jurisdictional seasonal drainage within the project area (summarized in Table 3.3.2-2 and Volume 2, Figure 3.3-2b). These impact acreages are based on the final USACE-verified delineation.

Permanent impacts on jurisdictional seasonal drainages would occur in the following areas.

- Replacement and lengthening of culverts in unnamed jurisdictional seasonal drainages throughout the project area for road widening on I-80 (OW-57, OW-87, OW-88, OW-93, OW-139, and OW-141) (Sheets 19, 20, and 21); I-680 (OW-8, OW-43, OW-44, OW-104, OW-150, and OW-151) (Sheets 13, 14, 15, and 16); and SR 12E (OW-90b) (Sheet 32);
- Improvements to the I-80/I-680 interchange (OW-45a, 45d, OW-45e, OW-61a, and OW-61) (Sheets 16, 17, and 18).

Alternative C

Construction of Alternative C would result in a permanent loss of and a temporary loss of jurisdictional seasonal drainage within the project area (summarized in Table 3.3.2-3 and Volume 2, Figure 3.3-2c). These impact acreages are based on the final USACE-verified delineation.

Permanent impacts on jurisdictional seasonal drainages would occur in the following areas.

- Replacement and lengthening of culverts in Jameson Canyon Creek tributaries (OW-8b, OW-8d, and OW-8e) (Sheets 3, 4, and 5); and unnamed drainages (OW-13, OW-15, OW-86, OW-149, and OW-160) (Sheets 3, 4, and 5) for realignment of Red Top Road and construction of on- and off-ramps for SR 12W.
- Grading and culverting of unnamed drainages within the extension of Red Top Road north of SR 12W (OW-145, OW-153, and OW-161) (Sheets 5 and 6).
- Replacement and lengthening of culverts in unnamed jurisdictional seasonal drainages throughout the project area for road widening on I-80 (OW-1a, OW-2, OW-2a, OW-2b, OW-8, OW-57, OW-87, OW-88, OW-93, and OW-139) (Sheets 1, 2, 3, 7, 19, 20, 21, and 23); I-680 (OW-8, OW-19, OW-103c, OW-150, and OW-151) (Sheets 11 and 13); and SR 12E (OW-110, OW-90b, and OW-119) (Sheets 25, 32, 33, and 34).
- Improvements to the I-80/I-680 interchange (OW-8, OW-45a, OW-61a, and OW-61) (Sheets 8, 9, 14, 16, and 17).

Alternative C, Phase 1

Construction of Alternative C, Phase 1 would result in a permanent loss and a temporary loss of jurisdictional seasonal drainage within the project area (Table 3.3.2-4 and Volume 2, Figure 3.3-2d). These impact acreages are based on the final USACE-verified delineation.

Permanent impacts on jurisdictional seasonal drainages would occur in the following areas.

- Replacement and lengthening of culverts in Jameson Canyon Creek (OW-8); its tributaries (OW-8a, OW-8b, OW-8d, and OW-8e) (Sheets 3, 4, and 5); and unnamed drainages (OW-13, OW-15, OW-86, OW-149, and OW-160) (Sheets 3, 4, and 5) for the realignment of Red Top Road and construction of on- and off-ramps for SR 12W.
- Grading and culverting of unnamed drainages within the extension of Red Top Road north of SR 12W (OW-145, OW-153, and OW-161) (Sheets 5 and 6).
- Replacement and lengthening of culverts in unnamed jurisdictional seasonal drainages throughout the project area for road widening on I-80 (OW-1, OW-1a, OW-2, OW-2a, and OW-8) (Sheets 1, 2, 3, and 7); I-680 (OW-19, OW-150, and OW-151) (Sheet 13); and SR 12E (OW-119) (Sheet 33).
- Improvements to the I-80/I-680 interchange (OW-8, OW-45a, OW-61a, and OW-61) (Sheets 8, 9, 14, 16, and 17).
- Widening of I-80 east of the interchange (OW-87) (Sheet 19).

No-Build Alternative

Under the No-Build Alternative, there would be no impacts on seasonal drainage.

Avoidance, Minimization, and/or Mitigation Measures

Implementation of avoidance, minimization, and/or mitigation measures (in Section 3.3.1.1) to install construction barrier fencing, to conduct environmental awareness training, and for biological monitoring, and measures to protect water quality, to prevent erosion, and to restore and compensate for drainage habitat (in Section 3.3.2.1) would address the impacts on jurisdictional seasonal drainages for all build alternatives.

3.3.2.3 Perennial Marsh

Affected Environment

Perennial marsh includes areas mapped in the delineation of waters of the United States as perennial wetland drainages, as well as areas mapped as perennial marsh. Perennial marsh occurs within study area drainages in the following areas (Volume 2, Figures 3.3-2a through 3.3-2d).

- An unnamed drainage adjacent to the east side of Ramsey Road, the frontage road east of I-680 (W-103c-1) (Sheet 11).
- Green Valley Creek and an unnamed tributary (W-45 and W-45g) (Sheets 17 and 18).
- Dan Wilson Creek upstream of I-80 (W-53) (Sheet 21).
- The downstream reach of Ledgewood Creek that crosses SR 12E (W-90), and an unnamed constructed tributary to Ledgewood Creek (W-90a) (Sheets 30, 31, and 32).

- An unnamed drainage south of SR 12E (W-175) (Sheet 33).

Green Valley Creek has a cement-lined bed and bank under the I-80 bridge but also has sediment deposits built up in portions of the creekbed. These sediment "islands" support some emergent vegetation, including willow and cattail, which is transient and can be scoured during high flows. The unnamed drainage, Dan Wilson Creek, and Ledgewood Creek have natural beds and banks, although Ledgewood Creek and the unnamed constructed tributary are culverted under SR 12E. In Ledgewood Creek and the tributary, the open water and emergent vegetation habitats are considered to function as a single ecological unit.

The four drainages listed above support freshwater marsh vegetation but are mentioned separately from either the perennial marsh or drainage types because they have characteristics and functions of both types. Dominant plant species observed in perennial wetland drainages include narrow-leaved cattail, bulrush, Himalayan blackberry, watercress, water-milfoil, and Goodding's willow. Water is present year-round, or nearly year-round, in these areas. Wetland functions of perennial wetland drainages in the study area include flood conveyance and wildlife habitat because of the presence of generally dense wetland vegetation.

Perennial marsh wetlands that are outside of drainages occur in the following parts of the study area (Volume 2, Figures 3.3-2a through 3.3-2d).

- A pond north of SR 12W (W-150) (Sheet 5).
- A drainage basin between Rodriquez High School and Lopes Road (W-149) (Sheet 13).
- A pond north of Cordelia Road (W-105) (Sheets 15 and 16).
- In a mitigation area east of Green Valley Creek (W-45e-1) (Sheet 18).
- Surrounding a water treatment plant at the east end of SR 12E (W-136 and W-137) (Sheet 35).
- In the Webster Street off-ramp loop on SR 12E (W-155) (Sheet 35).
- South of SR 12E at the eastern end of the study area (W-142) (Sheets 33, 34, and 35).

Dominant plant species observed in perennial marsh wetlands include those found in the perennial wetland drainages, as well as California blackberry, Harding grass, curly dock, and soft rush. This community type is inundated or saturated year-round. Perennial marsh at the east end of SR 12E is brackish.

Wetland functions of perennial marsh in the study area include flood storage, groundwater discharge due to high water tables, sediment control (in the case of marsh that directly abuts a drainage), and wildlife habitat associated with the presence of generally dense wetland vegetation.

Perennial wetland drainages that connect to the Suisun Marsh sloughs and tributaries of these drainages are considered waters of the United States, subject to regulation under CWA Section 404. Placement of material in these areas, including cofferdams, would be considered placement of fill within waters of the United States. This activity would require Section 404 authorization

from the USACE and CWA Section 401 water quality certification from the RWQCB. An SAA from the CDFG would be required for construction activity within perennial wetland drainages and their floodplains. No creeks in the study area are regulated by the State Lands Commission, and construction would not require a land lease amendment (Jones pers. comm.). Perennial marshes that are not under USACE jurisdiction but have beneficial uses would be considered waters of the State that would be regulated by the RWQCB, which would issue WDRs for loss of wetlands.

Environmental Consequences

Construction of the project alternatives would involve the installation of culverts and placement of fill for road widening and bridge construction, resulting in direct disturbance of jurisdictional perennial marsh wetlands. Impact acreages are based on the final USACE-verified delineation. Affected acreage in this community is tabulated for each alternative in Table 3.3.1-1.

Loss or Disturbance of Nonjurisdictional Perennial Marsh

Under Alternative B and Alternative B, Phase 1, approximately 0.03 acre of nonjurisdictional perennial marsh in an isolated wetland (W-105 [Volume 2, Figures 3.3-2a and 3.3-2b, Sheets 15 and 16]) would be permanently affected and approximately 0.01 acre of the same wetland would be temporarily affected by construction for the widening of I-680.

No nonjurisdictional perennial marsh would be affected under Alternative C or Alternative C, Phase 1.

Loss or Disturbance of Jurisdictional Perennial Marsh Resulting from Construction

Construction of both of the build alternative would involve installation of culverts and placement of fill for road widening, resulting in direct disturbance of jurisdictional perennial marsh, including perennial wetland drainages and marsh habitat that occurs outside of drainages. Additional indirect impacts caused by sedimentation or modification of hydrology could occur in portions of perennial wetland drainages that lie outside the project footprint.

Alternative B

Construction of Alternative B would result in a permanent loss of approximately 5.09 acres of jurisdictional perennial marsh. Perennial marsh would be filled in the following features within the project footprint (Volume 2, Figure 3.3-2a).

- An unnamed drainage adjacent to the east side of Ramsey Road, the frontage road east of I-680 (W-103c-1), due to a lengthened culvert for the widening of I-680 (Sheet 11).
- One unnamed tributary of Green Valley Creek (W-45g) for the off-ramp from northbound I-680 to eastbound I-80 and Green Valley Road (Sheet 18).
- The perennial marsh mitigation area east of Green Valley Creek (W-45e-1) for a new off-ramp from westbound I-80 to Green Valley Road (Sheet 18).
- The downstream reach of Ledgewood Creek (W-90) that crosses SR 12E and an unnamed constructed tributary of Ledgewood Creek (W-90a) for widening of the culvert under SR 12E by ten feet on both sides (Sheets 30, 31, and 32).

- Two brackish perennial marshes south of SR 12E at the eastern end of the study area (W-142, W-175) for widening of SR 12E and construction of access to Main Street in Suisun City (Sheets 33, 34, and 35).

Under Alternative B, a total of 5.25 acres of temporary impacts would occur in jurisdictional perennial marsh, including areas adjacent to the permanent impacts listed above as well as in Green Valley Creek (W-45) (Sheet 17) and Dan Wilson Creek upstream of I-80 (W-53a) (Sheet 21) for installation of cofferdams during construction of clear-span bridges within the I-80/I-680 interchange.

Alternative B, Phase 1

Construction of Alternative B, Phase 1 would result in a permanent loss of approximately 0.39 acre of jurisdictional perennial marsh. Perennial marsh would be filled in the following features within the project footprint (Volume 2, Figure 3.3-2b).

- One unnamed tributary of Green Valley Creek (W-45g) for the off-ramp from northbound I-680 to eastbound I-80 and Green Valley Road (Sheet 18).
- The perennial marsh mitigation area east of Green Valley Creek (W-45e-1) for a new off-ramp from westbound I-80 to Green Valley Road (Sheet 18).
- The downstream reach of Ledgewood Creek (W-90) that crosses SR 12E and an unnamed constructed tributary of Ledgewood Creek (W-90a) for widening of the culvert under SR 12E (Sheets 30, 31, and 32).

Under Alternative B, Phase 1, a total of 1.97 acres of temporary impacts would occur in jurisdictional perennial marsh, including areas adjacent to the permanent impacts listed above, as well as in Green Valley Creek (W-45) (Sheet 17) and Dan Wilson Creek (W-53a) (Sheet 21) for installation of cofferdams during construction of clear-span bridges within the I-80/ I-680 interchange.

Alternative C

Construction of Alternative C would result in a permanent loss of approximately 5.73 acres of jurisdictional perennial marsh. Perennial marsh would be filled in the following features within the project footprint (Volume 2, Figure 3.3-2c).

- A drainage basin between Rodriquez High School and Lopes Road (W-149) for improvements to I-680 (Sheet 13).
- A small area of marsh in an unnamed drainage adjacent to the east side of Ramsey Road, the frontage road east of I-680 (W-103 and W-103c-1), for a lengthened culvert for widening of I-680 (Sheet 11).
- The downstream reach of Ledgewood Creek (W-90) that crosses SR 12E and an unnamed constructed tributary of Ledgewood Creek (W-90a) for widening of the culvert under SR 12E on both sides (Sheets 30, 31, and 32).
- An unnamed drainage (W-175) south of SR 12E, a feature in the Webster Street off-ramp loop on SR 12E (W-155), and a feature south of SR 12E at the eastern end of the study area

(W-142) for widening of SR 12E and construction of access to Main Street in Suisun City (Sheets 33, 34, and 35).

Under Alternative C, a total of 2.44 acres of temporary impacts would occur in jurisdictional perennial marsh, including areas adjacent to the permanent impact areas listed above, as well as in Green Valley Creek (W-45) (Sheets 17 and 18) and Dan Wilson Creek upstream of I-80 (W-53a) (Sheet 21) for installation of cofferdams during construction of clear-span bridges associated with the I-80/I-680 interchange.

Alternative C, Phase 1

Construction of Alternative C, Phase 1 would result in a permanent loss of approximately 0.41 acres of jurisdictional perennial marsh. Perennial marsh would be filled in the following features within the project footprint (Volume 2, Figure 3.3-2d).

- A drainage basin between Rodriquez High School and Lopes Road (W-149) for improvements to I-680 (Sheet 13).
- The downstream reach of Ledgewood Creek (W-90) that crosses SR 12E and an unnamed constructed tributary of Ledgewood Creek (W-90a) for widening of the culvert under SR 12E on the south side (Sheets 31 and 32).

A total of 1.41 acres of temporary impacts would occur in jurisdictional perennial marsh, including areas adjacent to the permanent impact areas listed above, as well as in Green Valley Creek (W-45) (Sheets 17 and 18), for installation of cofferdams during construction of clear-span bridges associated with the I-80/I-680 interchange.

No-Build Alternative

Under the No-Build Alternative, no construction activities would occur, and no impacts on perennial marshes would occur.

Avoidance, Minimization, and/or Mitigation Measures

Implementation of avoidance, minimization, and/or mitigation measures (in Section 3.3.1.1) to install construction barrier fencing, to conduct environmental awareness training, and for biological monitoring; measures (in Section 3.3.2.1) to protect water quality, to prevent erosion, and to restore and compensate for drainage habitat; and the measures listed below would address the impacts on perennial marsh under all build alternatives.

Restore Temporarily Disturbed Perennial Marsh

Portions of perennial marsh temporarily disturbed by cofferdam construction will be restored to original grade and preconstruction conditions following construction. Any temporarily disturbed marsh vegetation in the channel is anticipated to regenerate.

Compensate for Permanent Loss of Wetlands

In compliance with the CWA Section 404 permit and WDRs, the permanent loss (fill) of wetlands, including perennial marsh, alkali seasonal marsh, and seasonal wetland, will be compensated for and measures will be taken to ensure no net loss of habitat functions. Loss of

wetlands will be compensated for at a minimum ratio of 1:1 (one acre of mitigation for every one acre filled). The actual compensation ratios will be determined through coordination with the RWQCB and the USACE as part of the permitting process. Compensation may be a combination of mitigation bank credits and restoration/creation of habitat. Permanent loss of wetland habitat will be compensated for by implementing one or a combination of the following options.

- Purchase credits for the affected wetland type (perennial marsh, alkali seasonal marsh, or seasonal wetland) at a locally approved mitigation bank. Written evidence will be provided to the resource agencies that compensation has been established through the purchase of mitigation credits.
- Develop and ensure implementation of a wetland restoration plan that involves creating or enhancing the affected wetland type (perennial marsh, alkali seasonal marsh, or seasonal wetland) on the project site. Potential restoration sites will be evaluated to determine whether this is a feasible option. If it is determined that onsite 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. The plan will also include a species list and number of each species, planting locations, and maintenance requirements. Plantings will be similar to those removed from the project area and will consist of cuttings taken from local plants, or plants grown from local material obtained within the Suisun Bay watershed. Plantings will be monitored annually for three years or as required in the project permits. If 75% of the plants survive at the end of the monitoring period, the revegetation will be considered successful. If the survival criterion is not met at the end of the monitoring period, planting and monitoring will be repeated after mortality causes have been identified and corrected. Mitigation sites will be protected in perpetuity in a conservation easement.

3.3.2.4 Alkali Seasonal Marsh

Affected Environment

Alkali seasonal marsh was mapped only in the area south of SR 12E at the eastern end of the study area (Figures 3.3-2a through 3.3-2d, Sheet 33 in Volume 2). This area is surrounded by seasonal wetland and nonnative annual grassland. Alkali seasonal marsh is seasonally inundated or saturated and is distinguished from seasonal wetland habitat by the presence of saline soils and salt-tolerant species, including curved sicklegrass, alkali weed, alkali heath and, in low areas, pickleweed.

Local, state, and federal agencies recognize alkali seasonal marshes as sensitive natural communities. Alkali seasonal marsh wetlands in the study area are considered waters of the United States, subject to regulation under CWA Section 404. Placement of material in these areas, including cofferdams, would be considered placement of fill within waters of the United States. This activity would require Section 404 authorization from the USACE and CWA Section 401 water quality certification from the RWQCB.

Environmental Consequences

Construction of the project alternatives would involve the installation of culverts and placement of fill for road widening and bridge construction, resulting in direct disturbance of jurisdictional

alkali seasonal marsh wetlands. Impact acreages are based on the final USACE-verified delineation. Affected acreage in this community is tabulated for each alternative in Table 3.3.1-1.

Loss or Disturbance of Alkali Seasonal Marsh Resulting from Construction

Construction of Alternative B, Alternative C, and Alternative C, Phase 1 would involve placement of fill, resulting in direct disturbance of jurisdictional alkali seasonal marsh. These impact acreages are based on the final USACE-verified delineation. No alkali seasonal marsh occurs in the Alternative B, Phase 1 study area, and no impacts on this habitat would result from construction of Alternative B, Phase 1.

Construction of Alternative B would result in a permanent loss of approximately 1.75 acres of alkali seasonal marsh. Alkali seasonal marsh would be filled for the new SR 12E off-ramp, extension of Meyer Lane between Beck and Pennsylvania Avenues, and widening of Pennsylvania Avenue south of SR 12E (W-163, W-164, W-166, and W-168) (Volume 2, Figure 3.3-2a, Sheet 33). Under Alternative B, 0.28 acre of alkali seasonal marsh lies within the temporary impact area, but implementation of avoidance and minimization measures below will avoid temporary impacts.

Construction of Alternative C would result in a permanent loss of approximately 1.03 acres of alkali seasonal marsh. Alkali seasonal marsh would be filled for construction of the Pennsylvania Avenue interchange (W-163, W-164, and W-166) and widening of Pennsylvania Avenue south of SR 12E (W-168) (Volume 2, Figure 3.3-2c, Sheet 33). Under Alternative C, 1.07 acre of alkali seasonal marsh lies within the temporary impact area, but implementation of avoidance and minimization measures below will avoid temporary impacts

Construction of Alternative C, Phase 1 would result in a permanent loss of approximately 0.07 acre of alkali seasonal marsh. Alkali seasonal marsh would be filled for construction of the Pennsylvania Avenue interchange (W-163 and W-164) (Volume 2, Figure 3.3-2d, Sheet 33).

Temporary impacts could potentially occur in portions of alkali seasonal marsh wetlands that lie outside the project footprint under Alternatives B, C, and C, Phase 1. However, implementation of avoidance, minimization, and/or mitigation measures to install construction barrier fencing, to conduct environmental awareness training, and for biological monitoring in Section 3.3.1.1 would avoid and minimize temporary impacts on alkali seasonal marsh.

Under the No-Build Alternative, no construction activities would occur, and no impacts on alkali seasonal marshes would occur.

Avoidance, Minimization, and/or Mitigation Measures

Implementation of avoidance, minimization, and/or mitigation measures to protect water quality and prevent erosion and sedimentation and to restore and compensate for drainage habitat in Section 3.3.2.1, and measures to compensate for permanent loss of wetlands in Section 3.3.2.3 would address the permanent impacts on alkali seasonal wetland under all build alternatives.

3.3.2.5 Seasonal Wetland

Affected Environment

The numbers used to refer to seasonal wetlands in this discussion are the numbers used in the delineation of waters of the United States conducted in the study area. However, there are wetland features that were not labeled on the delineation maps, because they were in areas that had been delineated for other projects. These wetlands are labeled on Figures 3.3-2a through 3.3-2d in Volume 2 for the purpose of discussion in this document.

Numerous seasonal wetlands were mapped in the study area; they are mostly in or adjacent to areas disturbed by development and agriculture. Many seasonal wetlands in the study area are near roadways and receive runoff from the roads. The vegetation in these wetlands is correspondingly degraded, often dominated by nonnative annual grasses and nonnative forbs. Dominant species observed in this wetland type typically include Italian ryegrass, Mediterranean barley, Harding grass, rabbits-foot grass, creeping wildrye, creeping spikerush, curly dock, iris-leaved rush, toad rush, prickly ox-tongue, birds-foot trefoil, and alkali mallow.

This habitat type also includes features south of SR 12E and west of Pennsylvania Avenue that were more specifically identified as “seasonally saturated annual grassland” in the wetland delineation conducted for another project in that area (Huffman-Broadway Group 2007). These areas are dominated by Italian ryegrass, Mediterranean barley, alkali weed, and alkali heath. Some seasonal wetlands located south of SR 12E support special-status vernal pool species. These wetlands were not categorized separately from the other seasonal wetlands, but they do provide higher quality habitat and support more native species.

Wetland functions of seasonal wetlands in the study area include flood storage, groundwater recharge, wildlife habitat, and—in the case of wetlands that support more native species—rare and endangered species habitat.

Some of the seasonal wetlands in the study area are considered jurisdictional by the USACE and subject to regulation under CWA Section 404; some are isolated features. Placement of material in these areas would be considered placement of fill in waters of the United States. This activity would require Section 404 authorization from the USACE and CWA Section 401 water quality certification from the RWQCB. Wetlands that are not under USACE jurisdiction but have beneficial uses would be considered waters of the State that would be regulated by the RWQCB, which would issue WDRs for loss of wetlands. Regardless of USACE or state jurisdiction, however, local, state, and federal agencies recognize seasonal wetlands as sensitive natural communities.

Environmental Consequences

Construction of the project alternatives would involve the installation of culverts and placement of fill for road widening and bridge construction, resulting in direct disturbance of jurisdictional and nonjurisdictional seasonal wetlands. Affected acreages in jurisdictional and nonjurisdictional seasonal wetlands are tabulated for each alternative in Table 3.3.1-1.

Loss or Disturbance of Nonjurisdictional Seasonal Wetland

Construction of Alternative B or Alternative B, Phase 1 would not have any permanent effect on nonjurisdictional seasonal wetlands. Construction of Alternative C would result in a permanent loss of approximately 0.78 acre of nonjurisdictional seasonal wetland as a result of project construction for improvements to the I-80/I-680 interchange (W-20 and W-147) (Volume 2, Figure 3-3-2c, Sheets 9, 12, and 14). Alternative C, Phase 1 would result in a permanent loss of approximately 0.77 acre of nonjurisdictional seasonal wetland for improvements to the I-80/I-680 interchange (W-147) (Volume 2, Figure 3-3-2d, Sheets 9 and 14). Additional temporary impacts during project construction and indirect impacts caused by sedimentation or modification of hydrology could occur in seasonal wetlands that lie outside the project footprint.

Loss or Disturbance of Jurisdictional Seasonal Wetland Resulting from Construction

Under both of the build alternatives, temporary impacts during project construction and indirect impacts caused by sedimentation or modification of hydrology could occur in portions of seasonal wetlands that lie outside the project footprint. However, implementation of avoidance, minimization, and/or mitigation measures to install construction barrier fencing, to conduct environmental awareness training, and for biological monitoring in Section 3.3.1.1 would avoid and minimize temporary impacts on seasonal wetland.

Alternative B

Construction of Alternative B would involve placement of fill, resulting in a permanent loss of approximately 8.19 acres of jurisdictional seasonal wetland (Table 3.3.1-1 and Volume 2, Figure 3.3-2a). These impact acreages are based on the final USACE-verified delineation. Direct permanent impacts on parts or all of seasonal wetlands would occur in the following areas because of project construction.

- The realignment area to be graded for Red Top Road north of SR 12W (W-187 and W-189) (Sheets 5 and 6).
- Widening of SR 12W and construction of westbound on- and off-ramps for SR 12W (W-13, W-14, W-15, W-148, W-149, W-149a, W-156, W-159, W-194, and W-195) (Sheets 4, 5, and 6).
- Widening of the SR 12W/I-80 interchange (W-60 and W-62) (Sheets 7 and 8).
- Improvements to the SR 12W/I-680 interchange (W-28, W-29, W-30, W-42, W-63, W-64, W-143, W-144, W-145, and W-146) (Sheet 8).
- Improvements to the I-80/I-680 interchange (W-45a-1, W-45a-2, W-45-1, W-45-2, W-61, W-80, W-81, W-86, W-109, and W-191) (Sheets 17 and 18).
- Widening of I-80 east of the interchange (W-192 and W-193) (Sheet 21).
- Construction of the Meyer Lane extension between Beck and Pennsylvania Avenues (W-131 and W-132) (Sheet 32).

- The overcrossing and local road improvements at Pennsylvania Avenue and SR 12E (W-121, W-122, W-123, W-127, W-128, W-130, W-162, W-165, W-167, W-169, W-170, W-173, and W-174) (Sheets 32, 33, and 34).

Under Alternative B, 1.64 acres of jurisdictional seasonal wetland lies within the temporary impact area, but implementation of avoidance and minimization measures below will avoid temporary impacts.

Alternative B, Phase 1

Construction of Alternative B, Phase 1 would involve placement of fill, resulting in a permanent loss of approximately 1.84 acres of jurisdictional seasonal wetland (Table 3.3.1-1 and Volume 2, Figure 3.3-2b). These impact acreages are based on the final USACE-verified delineation. Direct permanent impacts would occur in parts or all of seasonal wetlands W-45-1, W-45a-2, W-45-2, W-61, W-63, W-80, W-81, W-86, W-109, and W-191 (Sheets 8, 17, and 18) for improvements to the interchange.

Alternative C

Construction of Alternative C would involve placement of fill, resulting in a permanent loss of approximately 8.30 acres of jurisdictional seasonal wetland (Table 3.3.1-1 and Volume 2, Figure 3.3-2c). These impact acreages are based on the final USACE-verified delineation. Direct permanent impacts on parts or all of seasonal wetlands would occur in the following areas as a result of project construction.

- The realignment area to be graded for Red Top Road north of SR 12W (W-184, W-187, and W-189) (Sheets 5 and 6).
- Widening of SR 12W and construction of westbound on- and off-ramps for SR 12W (W-13, W-14, W-15, W-148, W-149, W-149a, W-156, W-159, W-194, and W-195) (Sheets 4 and 5).
- Widening of the SR 12W/I-80 interchange (W-60 and W-62) (Sheets 7 and 8).
- Improvements to the SR 12W/I-680 interchange (W-28, W-29, W-30, W-42, W-63, W-64, W-143, W-145, and W-146) (Sheet 8).
- Improvements to the I-80/I-680 interchange (W-20, W-45a-1, W-45a-2, W-45-1, W-45-2, W-61, W-80, W-86, W-109, W-145, and W-191) (Sheets 9, 12, 13, 14, 17, and 18).
- The interchange at and widening of Pennsylvania Avenue (W-120, W-123, W-127, W-130, W-152, W-162, W-165, W-167, W-169, W-170, W-171, W-172, W-173, and W-174) (Sheets 32, 33, 34, and 35).

Under Alternative C, 1.07 acres of jurisdictional seasonal wetland lies within the temporary impact area, but implementation of avoidance and minimization measures below will avoid temporary impacts.

Alternative C, Phase 1

Construction of Alternative C, Phase 1 would result in direct disturbance of jurisdictional and nonjurisdictional seasonal wetlands.

Construction of Alternative C, Phase 1 would involve placement of fill, resulting in a permanent loss of approximately 3.89 acres of jurisdictional seasonal wetland (Table 3.3.1-1 and Volume 2, Figure 3.3-2d). These impact acreages are based on the final USACE-verified delineation. Direct permanent impacts on parts or all of seasonal wetlands would occur in the following areas because of project construction.

- The realignment area to be graded for Red Top Road north of SR 12W (W-184, W-187, and W-189) (Sheets 5 and 6).
- Widening of SR 12W and construction of westbound on- and off-ramps for SR 12W (W-13, W-14, W-15, W-148, W-149, W-149a, W-159, W-194, and W-195) (Sheets 4 and 5).
- Improvements to the SR 12W/I-680 interchange (W-28, W-29, W-30, W-42, W-60, W-62, W-63, W-64, W-143, and W-146) (Sheets 7 and 8).
- Improvements to the I-80/I-680 interchange (W-20, W-45a-1, W-45a-2, W-45-1, W-45-2, W-60, W-61, W-62, W-109, W-144, W-145, and W-191) (Sheets 9, 12, 13, 14, 17, and 18).
- Widening of SR 12E (W-162) (Sheets 32 and 33).

Under Alternative C, Phase 1, 0.01 acre of jurisdictional seasonal wetland lies within the temporary impact area, but implementation of avoidance and minimization measures below will avoid temporary impacts.

No-Build Alternative

Under the No-Build Alternative, no construction activities would occur, and no impacts on seasonal wetlands would occur.

Avoidance, Minimization, and/or Mitigation Measures

Implementation of avoidance, minimization, and/or mitigation measures to protect water quality and prevent erosion and sedimentation and to restore and compensate for drainage habitat in Section 3.3.2.1, and measures to compensate for permanent loss of wetlands in Section 3.3.2.3, would address the permanent impacts on seasonal wetlands under all build alternatives.

3.3.3 Plant Species

Regulatory Setting

The U.S. Fish and Wildlife Service (USFWS) and the CDFG share regulatory responsibility for the protection of special-status plant species. *Special-status* species are selected for protection because they are rare and/or subject to population and habitat declines. Special status is a general term for species that are afforded varying levels of regulatory protection. The highest level of protection is given to threatened and endangered species; these are species that are formally listed or proposed for listing as endangered or threatened under the Federal Endangered Species Act (FESA) and/or the California Endangered Species Act (CESA). Please see Section 3.3.4, "Threatened and Endangered Species" in this document for detailed information regarding these species.

This section of the document discusses all the other special-status plant species, including CDFG fully protected species and species of special concern, USFWS candidate species, and California Native Plant Society (CNPS) rare and endangered plants.

Table 3.3.3-1. Summary of Sensitive Plant Species and Native Tree Impacts by Project Alternative

	(number of plants, unless otherwise stated)						
	Alkali Milk-Vetch	**Pappose Tarplant**	**Contra Costa Gold-fields**	**Gold-fields Critical Habitat (acres)**	**Stream-side Daisy**	**Saline Clover**	**Native Trees[a] (# of trees)**
Alternative B							
Temporary	0	0	0	14.02	0	0	0
Permanent	0	185	30	55.91	0	35	13
Total	**0**	**185**	**30**	**69.93**	**0**	**35**	**13**
Alternative B, Phase 1							
Temporary	0	0	0	1.18	0	0	0
Permanent	0	0	0	7.27	0	0	6
Total	**0**	**0**	**0**	**8.45**	**0**	**0**	**6**
Alternative C							
Temporary	0	0	0	8.55	0	0	0
Permanent	0	200	30	39.59	0	65	14
Total	0	200	30	48.14	0	65	14
Alternative C, Phase 1							
Temporary	0	0	0	0.70	0	0	0
Permanent	0	2	0	5.41	0	0	4
Total	**0**	**2**	**0**	**6.11**	**0**	**0**	**4**

[a] Includes only native trees mapped outside of riparian woodland and oak woodland habitats.

The regulatory requirements for FESA can be found at United States Code 16 (USC), Section 1531, et seq. See also 50 CFR Part 402. The regulatory requirements for CESA can be found at California Fish and Game Code, Section 2050, et seq. Department projects are also subject to the Native Plant Protection Act, found at Fish and Game Code, Section 1900–1913, and the California Environmental Quality Act, Public Resources Code, Sections 2100–21177.

Botanical surveys of the study area were conducted in April and May 2004, April and May 2005, August 2007, and April 2009. Botanical surveys for the Gentry-Suisun project included a portion of the study area south of SR 12E and were conducted in spring 2000 and 2002; summer 2000; and April 6, 7, 8, 11, 12, 13, and 15, 2005. Five sensitive plant species (Table 3.3.3-1 located at the end of this section) were found in the study area during these surveys: alkali milk-vetch, pappose tarplant, Contra Costa goldfields, streamside daisy, and saline clover. Contra Costa goldfields are discussed in Section 3.3.5, Threatened and Endangered Species. The remaining species are discussed below.

Table 3.3.3-1 summarizes impacts on special-status plant species and native trees. Impacts on Contra Costa goldfields are discussed in Section 3.3.5.1, and impacts on native trees are discussed in Section 3.3.7.

3.3.3.1 Alkali Milk-Vetch

Alkali milk-vetch (*Astragalus tener* var. *tener*) is an annual herb in the pea family (Fabaceae) that blooms between March and June. Alkali milk-vetch occurs in alkaline vernal pools and annual grasslands with adobe clay (heavy clay) soils at elevations below 200 feet. Alkali milk-vetch has no federal or state listing status, but it is on CNPS List 1B.2 (rare, threatened, or endangered in California and elsewhere; fairly endangered in California with 20%–80% of occurrences threatened). The primary threats to this species are development; competition from nonnative plants; habitat destruction, especially agricultural conversion; and possibly trampling. (California Native Plant Society 2009.)

Alkali milk-vetch is known from the southern Sacramento Valley, northern San Joaquin Valley, and east San Francisco Bay Area. It is currently recorded in the CNDDB at 67 locations in Alameda, Contra Costa, Merced, Monterey, Napa, San Benito, San Francisco, San Joaquin, Santa Clara, Solano, Sonoma, Stanislaus, and Yolo Counties. Of this total, 24 occurrences are in Solano County. One of these is recorded in the study area south of SR 12E, and another is approximately 0.5 mile south of this location. (California Natural Diversity Database 2010.)

Affected Environment

Four populations of alkali milk-vetch occur in seasonal wetland habitat approximately 250 to 350 feet south of the study area, but outside the project construction areas, along SR 12E, between Ledgewood Creek and Pennsylvania Avenue (Volume 2, Figure 3.3-2a, Sheets 32–33). Based on surveys in 2000–2002 and 2005, these occurrences varied from one to 20 plants (Vollmar Consulting 2005). Although the occurrences were not found in 2009, the habitat remains suitable and the plants are assumed to be extant. Below average rainfall and varied temperature patterns in 2009 may have affected germination and growth of annual species such as alkali milk-vetch.

Environmental Consequences

Potential direct and indirect effects on Alkali Milk-Vetch

Alkali milk-vetch plants are outside the temporary and permanent impact areas for all build alternatives. With implementation of measures designed to protect sensitive natural communities and to protect water quality and prevent erosion and sedimentation in drainages and wetlands described in Sections 3.3.2.1, none of the build alternatives would result in indirect effects on seasonal wetlands that support alkali milk-vetch. However, the project alternatives would not be constructed in the area of the alkali milk-vetch occurrences for many years, and updated surveys for the species will be needed to document the extent and number of plants at that time to ensure that the species has not established within the project footprint. If the species is found within the proposed construction area, compensation for loss of plants would be based on the preconstruction data obtained from the updated surveys.

Avoidance, Minimization, and/or Mitigation Measures

Implementation of mitigation measures to conduct preconstruction surveys and to compensate for loss of special-status plants described below would address impacts to alkali milk-vetch.

Conduct Preconstruction Surveys for Special-status Plants

As a prerequisite to developing compensatory mitigation, a qualified botanist will be retained to conduct botanical surveys of the portion of the study area to be affected within one year prior to construction of each construction phase of the project. A list of special-status species with potential to occur in the study area will be compiled based on contemporary CNDDB and CNPS Inventory data. Surveys will be conducted during the blooming period for these special-status plants. Surveys will be conducted consistent with CNPS guidelines for botanical surveys (California Native Plant Society 2001).

If any special-status plants are identified during the surveys, the botanist will photograph and map locations of the plants, document the location and extent of the special-status plant population on a CNDDB Survey Form, and submit the completed Survey Form to the CNDDB. The amount of compensatory mitigation required will be based on the results of these surveys.

Compensate for Loss of Special-status Plants

Permanent loss (areas directly affected in the project area) of occupied special-status plant habitat for alkali milk-vetch, pappose tarplant, streamside daisy, or saline clover will be compensated for through preservation at a ratio of 3:1 (3 acres preserved for each one acre of occupied habitat removed during construction). The area to be preserved will include either private property or City of Fairfield property located within a high-value vernal pool conservation area identified in the Solano Multispecies HCP (Solano County Water Agency 2009). Suitable habitat for special-status plant species affected by project construction will be purchased, preserved, and managed in perpetuity. Detailed information will be provided to the agencies on the location and quality of the preservation area, the feasibility of protecting and managing the area in perpetuity, and the responsible parties involved. Other pertinent information will also be provided, to be determined through future coordination with the resource agencies.

3.3.3.2 Pappose Tarplant

Pappose tarplant (*Centromadia parryi* ssp. *parryi*) is an annual herb in the sunflower family (Asteraceae) that blooms between May and November. Pappose tarplant is found in meadows and seeps, salt marsh, and mesic annual grassland, often on alkaline soils at elevations below 1,400 feet. Pappose tarplant has no federal or state listing status, but it is on CNPS List 1B.2 (rare, threatened, or endangered in California and elsewhere; fairly endangered in California, with 20–80% of occurrences threatened). The primary threats to the species have been development and habitat disturbance. (California Native Plant Society 2009.)

Pappose tarplant is known historically from central California in the Sacramento Valley and San Joaquin Valley. It is currently recorded in the CNDDB at 23 occurrences in Butte, Glenn, Lake, Napa, San Mateo, Solano, and Sonoma Counties. Of this total, 13 occurrences are recorded in Solano County. One of these 13 occurrences is recorded in the study area south of SR 12E, and another is approximately 0.25 mile south of this location. One additional occurrence is generally mapped south of the I-80/I-680 interchange. (California Natural Diversity Database 2010.)

Affected Environment

A total of 43 occurrences of pappose tarplant (approximately 7,000 plants) were found during the August 2007 and April 2009 botanical surveys of the study area (Volume 2, Figure 3.3-2a, Sheets 32–33). Points shown in Figure 3.3-2a represent stands of between one and 6,000 plants. This species was observed primarily in seasonal wetlands (W-118, W-134 W-135, W-162, W-163, W-165, W-166, and W-172), but three occurrences are in areas of nonnative annual grassland near these seasonal wetlands.

There are six occurrences (approximately 185 plants) of pappose tarplant in the proposed construction area for Alternative B, seven occurrences (approximately 200 plants) for Alternative C, and one stand (two plants) for Alternative C, Phase 1. None occur within 250 feet of the Alternative B, Phase 1 construction area.

All but one of these occurrences are south of SR 12E and east of Ledgewood Creek; one is north of SR 12E approximately 200 feet east of Ledgewood Creek. Additional occurrences were observed in the study area but outside the temporary and permanent impact areas. Five occurrences are within 250 feet of the temporary impact boundary for Alternative B, 33 occurrences are within the temporary impact boundary for Alternative C, and two occurrences are within the temporary impact boundary for Alternative C, Phase 1.

Environmental Consequences

Loss or Disturbance of Pappose Tarplant

Based on the 2007 and 2009 survey results, approximately 185 pappose tarplants would be removed within the Alternative B footprint south of SR 12E for construction of the Meyer Lane extension, widening of SR 12E, and construction of the frontage road south of SR 12E and west of Pennsylvania Avenue (Volume 2, Figure 3.3-2a, Sheets 32–33). Indirect effects on the 33 stands of pappose tarplant outside the Alternative B construction area but within 250 feet of the temporary impact area could result from adjacent construction activity. These plants would not be removed for construction, but they could be indirectly affected by earthmoving activities and changes in hydrology.

Pappose tarplants are outside the temporary and permanent impact areas for Alternative B, Phase 1.

Within the Alternative C footprint, approximately 200 pappose tarplant plants would be removed south of SR 12E for widening of SR 12E and construction of the interchange at Pennsylvania Avenue (Volume 2, Figure 3.3-2c, Sheet 33). Indirect effects on the five stands of pappose tarplant outside the construction area but within 250 feet of the temporary impact area could occur from adjacent construction activity.

Within the Alternative C, Phase 1 footprint, two pappose tarplant plants would be removed south of SR 12E for construction of the Meyer Lane extension, widening of SR 12E, and the frontage road south of SR 12E and west of Pennsylvania Avenue (Volume 2, Figure 3.3-2d, Sheets 32–33). Indirect effects on the two stands of pappose tarplant (approximately 300 plants) outside the

construction area but within 250 feet of the temporary impact area could result from adjacent construction activity.

Because pappose tarplant is not a state- or federally listed species, authorization under FESA or CESA would not be required for removal of the plants. However, CDFG would recommend avoidance, minimization, and compensatory mitigation for the loss of a CNPS List 1B.2 species. The loss or disturbance of pappose tarplant is considered significant because this species is identified by CNPS as rare or endangered in California.

Avoidance, Minimization, and/or Mitigation Measures

Implementation of measures designed to protect sensitive natural communities and to protect water quality and prevent erosion and sedimentation in drainages and wetlands described in Section 3.3.2.1 would protect pappose tarplant and wetland habitat from indirect impacts. Implementation of mitigation measures to conduct preconstruction surveys and to compensate for loss of special-status plants described in Section 3.3.3.1 this would address impacts to pappose tarplant.

3.3.3.3 Streamside Daisy

Streamside daisy (*Erigeron biolettii*) is a perennial herb in the sunflower family (Asteraceae). This species blooms between June and October and occurs in rocky, mesic areas, including woodlands below 2,300 feet. Streamside daisy has no state or federal listing status but is on CNPS List 3 (plants about which more information is needed to determine their status). The CNDDB does not currently include any records for streamside daisy, but the CNPS Inventory records the species in Humboldt, Mendocino, Marin, Napa, Solano, and Sonoma Counties (California Native Plant Society 2009; California Natural Diversity Database 2010).

Affected Environment

Streamside daisy was observed in August 2007 at one location outside the study area within approximately 100 feet of the study area boundary, in the area north of the westbound I-80 truck scales (Volume 2, Figure 3.3-2a, Sheet 21). This site is a rocky hill vegetated by valley oak woodland, and fewer than 20 plants were observed. Since the time of the survey, the vegetation has been removed and the hill has been graded for another project. The population of streamside daisy on the hill is extirpated, because the hill has been removed.

Environmental Consequences

Potential Direct and Indirect Effects on Streamside Daisy

Streamside daisy plants near the study area have been removed. However, the project alternatives would not be constructed in this area for several years, and updated surveys for the species will be needed to document of the presence of any streamside daisy plants at that time to ensure that the species has not established within the project footprint. If the species is found within the proposed construction area, compensation for loss of plants would be based on the preconstruction data obtained from the updated surveys.

Avoidance, Minimization, and/or Mitigation Measures

Implementation of mitigation measures to conduct preconstruction surveys and to compensate for loss of special-status plants described in Section 3.3.3.1 would address effects to streamside daisy.

3.3.3.4 Saline Clover

Saline clover (*Trifolium depauperatum* var. *hydrophilum*) is an annual herb in the pea family (Fabaceae). This species blooms between April and June and grows in mesic, alkaline areas, including annual grasslands and vernal pools at elevations below 1,000 feet. Saline clover has no federal or state listing status, but it is on CNPS List 1B.2 (rare, threatened, or endangered in California and elsewhere; fairly endangered in California with 20–80% of occurrences threatened). Saline clover is threatened by development. The CNDDB currently lists 20 records of saline clover occurrences in Alameda, Monterey, Napa, San Benito, San Luis Obispo, San Mateo, Santa Clara, Santa Cruz, Solano, and Sonoma Counties. Of this total, two occurrences are recorded in Solano County. (California Natural Diversity Database 2010.)

Affected Environment

Based on surveys in 2000–2002 and 2005, a total of 12 occurrences of saline clover were found in seasonal wetland habitat south of SR 12E and east of Ledgewood Creek (Volume 2, Figure 3.3-2a, Sheets 32–33). These occurrences varied from one to 100 plants and were located outside the project construction area (Vollmar Consulting 2005). No occurrences were found within the proposed construction area, but eight occurrences were within 250 feet of the temporary impact boundary for the project. Based on surveys in 2000–2002 and 2005, these occurrences varied from one to 100 plants (Vollmar Consulting 2005). In April 2009, five additional occurrences of saline clover were observed north of the previously observed locations, and all five occur within the project construction area for Alternative B and Alternative C. The five occurrences varied from one to ten plants each.

Environmental Consequences

Direct and Indirect Effects on Saline Clover

Five occurrences of saline clover totaling 35 plants in an approximately 0.2-acre area are within the permanent impact area for Alternative B (Volume 2, Figure 3.3-2a, Sheet 33), based on the 2009 surveys. These plants would be removed within the project footprint south of SR 12E for widening of SR 12E and construction of the interchange at Pennsylvania Avenue. An additional two occurrences are within the temporary impact area. Indirect effects on the four stands of saline clover outside the construction area but within 250 feet of the temporary impact area could result from adjacent construction activity. These plants would not be removed for construction, but they could be indirectly affected by earthmoving activity and changes in hydrology.

Six occurrences of saline clover totaling 65 plants in two 0.1-acre locations are within the permanent impact area for Alternative C (Volume 2, Figure 3.3-2c, Sheet 33), based on the 2005 and 2009 surveys. These plants would be removed within the project footprint south of SR 12E for widening of SR 12E and construction of the interchange at Pennsylvania Avenue. Indirect effects on the four stands of saline clover could result from adjacent construction activity.

Saline clover plants are outside the temporary and permanent impact areas for Alternative B, Phase 1 and Alternative C, Phase 1.

Because saline clover is not a state- or federally listed species, authorization under FESA or CESA would not be required for removal of the plants. However, CDFG would recommend avoidance, minimization, and compensatory mitigation for the loss of a CNPS List 1B.2 species. The loss or disturbance of saline clover is considered significant because the species is identified by CNPS as rare or endangered in California.

Avoidance, Minimization, and/or Mitigation Measures

Implementation of measures designed to protect sensitive natural communities and to protect water quality and prevent erosion and sedimentation in drainages and wetlands described in Section 3.3.2.1 will avoid indirect effects on saline clover. With implementation of mitigation measures to conduct preconstruction surveys and to compensate for loss of special-status plants described in Section 3.3.3.1 would address impacts to saline clover.

3.3.4 Animal Species

Regulatory Setting

Many state and federal laws regulate impacts on wildlife. The U.S. Fish and Wildlife Service (USFWS), the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA's NMFS) and the CDFG are responsible for implementing these laws. This section discusses potential impacts and permit requirements associated with wildlife not listed or proposed for listing under the state or federal Endangered Species Act. Species listed or proposed for listing as threatened or endangered are discussed in Section 3.3.5, "Threatened and Endangered Species." All other special-status animal species are discussed here, including CDFG fully protected species and species of special concern, and USFWS or NOAA's NMFS candidate species.

Federal laws and regulations pertaining to wildlife include the following:

- National Environmental Policy Act.
- Migratory Bird Treaty Act.
- Fish and Wildlife Coordination Act.

State laws and regulations pertaining to wildlife include the following:

- California Environmental Quality Act.
- Sections 1600–1603 of the California Fish and Game Code.
- Sections 4150 and 4152 of the California Fish and Game Code.

Based on the CNDDB search results and the USFWS list for the project region, 29 special–status wildlife species and ten special-status fish species were determined to have the potential to occur in the project region (Table 3.3.4-1 located at the end of this section). After completion of field surveys and review of species distribution and habitat requirements data, the biologists

determined that 12 of the 29 wildlife species and six of the ten fish species would not occur in the study area because the area lacks suitable habitat for the species or is outside the species' known range. An explanation for the absence of each of these species from the study area is provided in the table.

Three of the 17 special-status wildlife species that could occur in the study area (burrowing owl, northern harrier, and western pond turtle) have been observed in the study area. Suitable habitat for eight additional special-status wildlife species—three birds and five bat species—was found in the study area during field surveys; accordingly, these species as well as migratory birds, raptors, and swallows have the potential to occur in the study area and may be affected by construction activities. The other six special-status wildlife species are threatened or endangered species discussed in Section 3.3.5. Impacts on these species are summarized in Table 3.3.4-2.

Four special-status fish species—central California coast steelhead, river lamprey, Sacramento splittail, and fall-run/late-fall-run Chinook salmon—have potential to occur in the study area based on the presence of suitable habitat. Central California coast steelhead is a threatened species and is discussed in Section 3.3.5.

3.3.4.1 Western Pond Turtle

Western pond turtle (*Actinemys marmorata*) is designated a state species of special concern. Western pond turtle occurs from Baja California to the lower Columbia River in Oregon and Washington (Jennings et al. 1992).

Western pond turtles are thoroughly aquatic, preferring the quiet waters of ponds, reservoirs, and sluggish streams (Stebbins 1985). The species occurs in a wide range of both permanent and intermittent aquatic environments (Jennings et al. 1992). Western pond turtles spend considerable time basking on rocks, logs, emergent vegetation, mud or sand banks, or human-generated debris. They move up to 1,300 feet or more to upland areas adjacent to watercourses to deposit eggs and to overwinter (Jennings and Hayes 1994). Western pond turtles spend time in upland habitats during the spring and summer, frequently moving between aquatic and upland habitats (Rathbun et al. 2002). Western pond turtles typically become active in March and return to overwintering sites by October or November (Jennings et al. 1992).

Affected Environment

Western pond turtles were observed in the two ponds (Mangels pond and perennial marsh W-150) north of SR 12W (Solano Transportation Authority 2007) (Volume 2, Figure 3.3-2a, Sheet 5). One of those ponds (W-150 on the north side of SR 12W) is within the Alternative B, Alternative C, and Alternative C, Phase 1 study areas. In addition, there is suitable upland habitat around the two ponds, some of which is within the study area.

A western pond turtle was observed in Ledgewood Creek at I-80 (approximately one mile upstream of the study area for Alternatives B and C) in April and September 2008 during construction monitoring surveys for the I-80 HOV project. In addition to Mangels pond and W-150, the following locations in the study area provide potential aquatic habitat for western pond turtles. The following locations can be found in Volume 2, Figure 3.3-2a.

Table 3.3.4-2. Summary of Special-Status Wildlife and Fish Species Potential Presence and/or Impacts by Project Alternative

Impact Type	Callippe Butterfly Habitat Present	Vernal Pool Fairy and Tadpole Shrimp Habitat (acres)	VELB (number of shrubs)	CRLF Aquatic Habitat (acres)	CRLF Upland Habitat (acres)[a]	CRLF Critical Habitat	Western Pond Turtle Potential Presence	Swainson's Hawk Foraging Habitat (compensation) acreage[b]	Nesting Birds[c]	Special-Status Bats	Central California Coast Steelhead	Central Valley Fall/Late Fall–Run Chinook Salmon	Sacramento Splittail	River Lamprey
Alternative B														
Indirect		1.71	1											
Direct	Yes	1.33	11	Temp: 2.20 Perm: 1.25	Temp: 36.40 Perm: 105.89	Temp: 2.94 Perm: 16.47	Yes	Perm: 447.42 (366.50)	Yes	Yes	Yes	Yes	Yes	Yes
Alternative B, Phase 1														
Indirect		0.04	0											
Direct	No	0.20	1	Temp: 1.44 Perm: 0.16	Temp: 1.52 Perm: 54.70	No	Yes	Perm: 56.51(50.86)	Yes	Yes	Yes	Yel s	Yes	Yes
Alternative C														
Indirect		1.10	1											
Direct	Yes	1.51	10	Temp: 0.36 Perm: 1.56	Temp: 30.99 Perm: 126.57	Temp: 1.51 Perm: 21.50	Yes	Perm: 230.92 (181.79)	Yes	Yes	Yes	Yes	Yes	Yes
Alternative C, Phase 1														
Indirect		0.26	0											
Direct	Yes	1.45	10	Temp: 0.17 Perm: 2.41	Temp: 6.38Per m: 144.90	Temp: 0.48 Perm: 22.54	Yes	Perm: 183.10 (145.72)	Yes	Yes	Yes	Yes	No	Yes

a Upland habitat for CRLF includes riparian woodland, live oak woodland, blue oak woodland, valley oak woodland, other woodland, upland scrub, seasonal wetland, alkali seasonal marsh, non-native annual grassland, and ruderal vegetation communities.

b See Chapter 4 and under each alternative for a description of compensation for Swainson's hawk foraging habitat based on its distance from a known nest. DFG uses a 1:1 ratio for compensation within 1 mile of a nest and a 0.75:1 ratio for compensation within 1-5 miles of a nest. Temporary losses of foraging habitat were not included in the effects chapter because the habitat will return to baseline following construction.

c Includes special-status birds such as burrowing owl and northern harrier as well as resident and migratory species.

.Two locations on Ledgewood Creek at SR 12E (Sheet 32).

- Suisun Creek (Sheet 22).
- Dan Wilson Creek (Sheet 21).
- Green Valley Creek (Sheets 17 and 18).
- American Canyon Creek (Sheet 12).
- Four locations on Jameson Canyon Creek (Sheets 3, 7, and 9).

Except for W-150 north of SR 12W, upland habitat in the study area is in heavily disturbed areas along I-80, I-680, and SR 12E. If turtles nest or overwinter in these locations, they would do so in the narrow strip of riparian habitat between the aquatic habitat and urban development, agricultural crops, and roads.

Environmental Consequences

Because suitable aquatic habitat for western pond turtles is present within the study area, pond turtles could be affected by the project alternatives. Western pond turtles are very sensitive to disturbances and quickly retreat into the water when threatened. If pond turtles are present in the creek channel or along the creek bank during the construction period, they could be injured or killed during construction.

Potential Loss or Disturbance of Western Pond Turtles Resulting from Construction

Alternative B and Alternative C include Mangels pond, W-150, and upland habitat north of SR 12W, one location on Jameson Canyon Creek, crossings in Green Valley Creek, Dan Wilson Creek, Suisun Creek, and Ledgewood Creek and one location on Jameson Canyon Creek. Alternative B, Phase 1 would include construction in the vicinity of Green Valley Creek, Dan Wilson Creek, and Ledgewood Creek, which provide potential aquatic habitat. Western pond turtles could be directly affected during construction activities in creeks and in upland habitat around ponds and adjacent to creeks.

Alternative B, Phase 1 includes construction associated with removal and replacement of the bridges over Dan Wilson Creek and Ledgewood Creek and with replacement of culverts on American Canyon Creek and Ledgewood Creek. Western pond turtles could be directly affected during construction in creeks and in upland habitat around the creeks.

Alternative C, Phase 1 includes culverts or crossings over Green Valley Creek, and four locations on Jameson Canyon Creek—at Red Top Road, upstream from Red Top Road, I-80, and upstream from I-680. Although the areal extent of effects would be less than those described for Alternatives B and C, all project effects on western pond turtle would be the same as those described for Alternative B.

Under the No-Build Alternative, no construction activities would occur and there would be no adverse effects on western pond turtle.

Avoidance, Minimization, and/or Mitigation Measures

See avoidance, minimization and/or mitigation measures described in Section 3.3.1.1 and 3.3.2.1, as well as the measure below.

Conduct Preconstruction Surveys for Western Pond Turtle

A qualified biologist will conduct preconstruction surveys for western pond turtle in conjunction with surveys for CRLF (see Section 3.3.5.5, "Conduct Preconstruction Surveys for California Red-Legged Frog") immediately preceding construction activities in the creeks and near ponds, and will move turtles to a safe location.

3.3.4.2 White-Tailed Kite

White-tailed kite (*Elanus leucurus*) is a fully protected species under CFGC 3511. The species has a restricted distribution in the United States, occurring only in California and western Oregon and along the Texas coast (American Ornithologists' Union 1983). The species is fairly common in California's Central Valley lowlands. White-tailed kites nest in riparian and oak woodlands and forage in nearby grasslands, pastures, agricultural fields, and wetlands. White-tailed kites use nearby treetops for perching and nesting sites. Voles and mice are common prey species.

Affected Environment

No white-tailed kite nest sites are known from the study area, but the CNDDB (2010) lists one record along Suisun Creek approximately 0.5 mile south of I-80. Riparian habitat in and adjacent to the study area provides potential nesting habitat for white-tailed kites. Kites could also nest in riparian and oak woodlands north of SR 12W. However, it is unlikely that white-tailed kites would nest in the study area because of its proximity to I-80/I-680/SR 12. Annual grasslands in the study area are located along I-80/I-680/SR 12 and within developed portions of Fairfield. These areas are not typically used by white-tailed kites for foraging. Higher quality foraging habitat (open agricultural fields) occurs in portions of the study area that would not be affected by the proposed project.

Environmental Consequences

Although there is a low likelihood that white-tailed kites would nest adjacent to I-80/I-680/SR 12, tree removal or noise associated with construction activities could result in the disturbance of nesting white-tailed kites if active nests are present in or near the construction area. These disturbances could cause nest abandonment and death of young or loss of reproductive potential at active nests in or near the study area. Such disturbance would violate CFGC Sections 3503.5 and 3511 and the MBTA.

Potential Disturbance of Nesting White-Tailed Kites Resulting from Construction

Both build alternatives would result in a permanent loss and temporary disturbance of riparian woodland in the study area, which provides potential nesting habitat for white-tailed kites.

Under the No-Build Alternative, no construction activities would occur and there would be no adverse effects on white-tailed kites.

Avoidance, Minimization, and/or Mitigation Measures

Implementation of avoidance, minimization and/or mitigation measures in Section 3.3.1.1 and the measure below will ensure that the proposed project will not result in an adverse effect on white-tailed kites, their eggs, or young.

Conduct Preconstruction Nesting Bird and Raptor Surveys and Establish a No-Disturbance Buffer, if Necessary

To avoid and minimize effects on nesting migratory birds, one or more of the following surveys and restrictions will be implemented.

- Tree and shrub removal will occur during the nonbreeding season for most migratory birds and raptors (generally between September 1 and February 15).
- If construction activities, including tree and shrub removal, are scheduled to occur during the breeding season for migratory birds and raptors (generally between February 15 and September 1), a qualified wildlife biologist (with knowledge of the species to be surveyed) will be retained to conduct nesting migratory bird and raptor surveys before the start of construction. A set of three nesting surveys should be conducted within a 2-week period just prior to initiation of construction activities (including tree removal) between February 15 and September 1. If no active nests are detected during these surveys, tree removal can proceed.
- If surveys indicate that migratory bird or raptor nests are present in the survey area, a no-disturbance buffer will be established around the site to avoid disturbance or destruction of the nest site until after the breeding season or until after a qualified wildlife biologist determines that the young have fledged (usually late June to mid-July). The extent of these buffers will be determined by the biologist (in coordination with the CDFG) and will depend on the level of noise or construction disturbance, the line of sight between the nest and the disturbance, ambient levels of noise and other disturbances, and other topographical or artificial barriers. These factors will be analyzed to make an appropriate decision on buffer distances. Suitable buffer distances may vary between species.

3.3.4.3 Western Burrowing Owl

Western burrowing owl (*Athene cunicularia*) is designated as a state species of special concern. Western burrowing owl is found throughout much of California in annual and perennial grassland, desert, and arid scrubland. It also can be found in vacant lots in residential areas, railroad ballast, dirt roads, and canal levees. The presence of burrows is the most critical requirement for western burrowing owl habitat; the species uses burrows excavated by ground squirrels and badgers, as well as artificial burrows, such as cement culverts, debris piles, or openings under roads. Its breeding season extends from March through August, peaking in April and May.

Affected Environment

Several (ten-plus) occurrences of burrowing owl have been reported within a ten-mile radius of the study area (California Natural Diversity Database 2010). Burrowing owls were observed near Alternative B, Alternative C, and Alternative C, Phase 1 project limits north of SR 12W, in November 2003 and March 2004 (Solano Transportation Authority 2007). Annual grassland,

edges of agricultural ditches and farm roads, and fallow fields in the project area provide suitable foraging and nesting habitat for burrowing owls. Minimal loss of foraging habitat for western burrowing owls would occur because most of the construction would occur in existing roadbeds and rights-of-way.

Environmental Consequences

If western burrowing owls are nesting in or within 250 feet of the construction right-of-way, grading and excavation activities could result in the removal of an occupied breeding or wintering burrow site and loss of adults, young, or eggs. These disturbances could cause nest abandonment and death of young or loss of reproductive potential at active nests in or near the study area. Such disturbance would violate CFGC Sections 3503.5 and 3511 and the MBTA.

Potential Disturbance of Burrowing Owls and Permanent Loss of Habitat Resulting from Construction

Both build alternatives and Alternative C, Phase 1 would result in a permanent loss and temporary disturbance of annual grassland that provides potential nesting habitat for western burrowing owl in and adjacent to the study area north of SR 12W. Both build alternatives could result in disturbances to burrowing owls that might be present in areas of annual grassland, edges of agricultural ditches and farm roads, and fallow fields in the study area.

Under the No-Build Alternative, no construction activities would occur and there would be no adverse effects on burrowing owls.

Avoidance, Minimization, and/or Mitigation Measures

Implementation of avoidance, minimization and/or mitigation measures in Section 3.3.1.1 and measures listed below will ensure that there will be no adverse effects on burrowing owl burrows, eggs, or young.

Conduct Preconstruction Surveys for Active Burrowing Owl Burrows and Implement the California Department of Fish and Game Guidelines for Burrowing Owl Mitigation, if Necessary

CDFG (1994) recommends that preconstruction surveys be conducted in suitable habitat (except paved areas) in a project study area and in a 250-foot-wide buffer zone around the construction site to locate active burrowing owl burrows. This would apply to habitat north of SR 12W that provides the most suitable habitat for breeding burrowing owls. A qualified biologist will be retained to conduct preconstruction surveys for active burrows according to the CDFG guidelines. The surveys will include a nesting season survey and a wintering season survey (wintering season is the season immediately preceding construction).

If no burrowing owls are detected, no further mitigation is required. If active burrowing owl burrows are detected, the following measures will be implemented.

- Occupied burrows will not be disturbed during the nesting season (February 1–August 31).
- When destruction of occupied burrows is unavoidable outside the nesting season (September 1–January 31), unsuitable burrows will be enhanced (enlarged or cleared of debris) or new

burrows created (installing artificial burrows) at a ratio of 2:1 on protected lands approved by the CDFG. Newly created burrows will conform to guidelines established by the CDFG.

- If owls must be moved away from the project construction area, passive relocation techniques (e.g., installing one-way doors at burrow entrances) will be used instead of trapping. At least one week will be necessary to accomplish passive relocation and allow owls to acclimate to alternate burrows.
- If avoidance is the preferred method of dealing with potential impacts, no disturbance will occur within 160 feet of occupied burrows during the nonbreeding season (September 1 to January 31) or within 250 feet during the breeding season. Avoidance also requires that at least 6.5 acres of foraging habitat (based on an approximately 300-foot foraging radius around an occupied burrow) be permanently preserved for each pair of breeding burrowing owls or single unpaired resident bird. The configuration of the protected site will be submitted to the CDFG for approval.

Compensate for Loss of Burrowing Owl Nesting Habitat

If active burrowing owl burrows are found and the owls must be relocated, the loss of foraging and burrow habitat in the project construction area will be offset by acquiring and permanently protecting a minimum of 6.5 acres of foraging habitat per occupied burrow, ideally in the project construction area. The protected lands should be located adjacent to the occupied burrowing owl habitat in the project construction area or at another occupied site near the project construction area. The location of the protected lands will be determined in coordination with the CDFG. If on-site compensation is not feasible, the Department will purchase credits at an approved mitigation bank. It may be possible to compensate for burrowing owl habitat in conjunction with compensation for loss of Swainson's hawk habitat (Section 3.3.5.6).

3.3.4.4 Northern Harrier

Northern harrier (*Circus cyaneus*) is a state species of special concern. The breeding range includes most of the Central Valley, the Delta, Suisun Marsh, and portions of San Francisco Bay. Northern harriers use tall grasses and forbs in wetlands and field borders for cover (Zeiner et al. 1990). They roost on the ground in shrubby vegetation, often near a marsh edge. The species' breeding season is between April and late August, with peak activity in June and July. Northern harriers feed mainly on voles, other small mammals, birds, small reptiles, crustaceans, and insects.

Affected Environment

Northern harriers are not known to nest in the study area (California Natural Diversity Database 2010) but are known to nest in Solano County. In 2004, a northern harrier was observed foraging over grassland habitat north of SR 12W (Solano Transportation Authority 2007). The tall annual grassland north of SR 12W in the project area provides suitable foraging and nesting habitat for northern harriers (Volume 2, Figure 3.3-2a, Sheets 5 and 6).

Environmental Consequences

There is potential for northern harriers to nest in the undisturbed annual grassland habitat north of SR 12W. In addition to direct mortality during the breeding season from construction

activities, noise associated with construction activities could result in the disturbance of nesting northern harriers if active nests are present in or near the construction area. These disturbances could cause nest abandonment and death of young or loss of reproductive potential at active nests located in or near the study area. Such disturbance would violate CFGC Sections 3503.5 and 3511 and the MBTA.

Potential Disturbance of Nesting Northern Harriers Resulting from Construction

Under Alternative B, Alternative C, and Alternative C, Phase 1, nesting northern harriers could be disturbed during construction in annual grassland habitat north of SR 12W. There is no suitable nesting habitat for northern harrier within the project area for Alternative B, Phase 1 and therefore there would be no effects to nesting habitat under this alternative.

Under the No-Build Alternative, no construction activities would occur and there would be no adverse effects on northern harriers.

Avoidance, Minimization, and/or Mitigation Measures

Implementation of the avoidance, minimization, and /or mitigation measure listed below will ensure that there will be no adverse effects on northern harrier nests, eggs, or young.

Conduct Preconstruction Nesting Surveys for Northern Harrier in the Annual Grassland Habitat North of SR 12W

To avoid and minimize impacts on nesting northern harriers, one or more of the following surveys and restrictions will be implemented.

- Ground disturbance for all construction activities will occur during the non-breeding season for northern harriers (generally between August 16 and March 15).

  Or:

  If construction activities, including grubbing and excavation, are scheduled to occur during the breeding season for northern harriers (generally between March 16 and August 15), a qualified wildlife biologist (with knowledge of the species to be surveyed) will be retained to conduct nesting surveys before the start of construction. The nesting surveys should be conducted within one week before initiation of construction activities (including grubbing) between March 16 and August 15.

  If no active nests are detected during these surveys, no additional mitigation is required.

- If surveys indicate that northern harrier nests are present in the survey area, a no-disturbance buffer will be established around the site to avoid disturbance or destruction of the nest site until after the breeding season or until after a qualified wildlife biologist determines that the young have fledged (usually late June to mid-July). The extent of these buffers will be determined by the biologist (in coordination with the CDFG) and will depend on the level of noise or construction disturbance, line-of-sight between the nest and the disturbance, ambient levels of noise and other disturbances, and other topographical or artificial barriers. These factors will be analyzed to make an appropriate decision on buffer distances.

3.3.4.5 Loggerhead Shrike

Loggerhead shrike (*Lanius ludovicianus*) is a state species of special concern. It is a common year-round resident throughout the lowlands and foothills of California. Loggerhead shrikes prefer open habitats with shrubs, fences, utility line poles, or other perches. They tend to avoid urbanized areas but frequent open croplands. Nests are usually hidden in densely foliaged shrubs or trees. The breeding season is March through August.

Affected Environment

No loggerhead shrikes were observed in the study area during the field surveys; however, loggerhead shrikes are known to nest in Solano County, and trees and shrubs in the study area provide suitable nesting habitat for the species.

Environmental Consequences

If loggerhead shrikes are nesting in or adjacent to the construction right-of-way, grading and excavation activities could result in the removal of an occupied breeding site and loss of adults, young, or eggs. These disturbances could cause nest abandonment and death of young or loss of reproductive potential at active nests in or near the study area. Such disturbance would violate CFGC Sections 3503.5 and 3511 and the MBTA.

Potential Disturbance of Nesting Loggerhead Shrikes Resulting from Construction

Under both build alternatives, nesting loggerhead shrikes could be disturbed during construction throughout the study area.

Under the No-Build Alternative, no construction activities would occur and there would be no adverse effects on loggerhead shrikes.

Avoidance, Minimization, and/or Mitigation Measures

Implementation of avoidance, minimization, and/or mitigation measures in Section 3.3.1.1 and the measure to conduct preconstruction surveys for nesting birds and raptors in Section 3.3.4.2 will ensure that there will be no adverse effects on loggerhead shrike nests, eggs, or young.

3.3.4.6 Tricolored Blackbird

Tricolored blackbird (*Agelaius tricolor*) is a state species of special concern. It is a resident in the Central Valley from Butte County south to Kern County. Nests are usually in dense colonies in emergent marsh vegetation, such as tules and cattails, or upland sites with blackberries, nettles, thistles, and grain fields. Habitat must be large enough to support 50 pairs.

Affected Environment

No tricolored blackbirds were observed in the study area during the field surveys; however, tricolored blackbirds are known to nest in Solano County, and marshes and shrubs in the study area provide suitable nesting habitat for the species.

Environmental Consequences

Implementation of either build alternative could affect nesting tricolored blackbirds if construction activities remove or otherwise disturb occupied nests during the breeding season. Construction activities during the breeding season that result in death of young or loss of reproductive potential would violate CFGC Sections 3503 and 3503.5 and the MBTA.

Potential Disturbance of Nesting Tricolored Blackbirds Resulting from Construction

Implementation of either build alternative could affect nesting tricolored blackbirds, if construction activities remove or otherwise disturb occupied nests during the breeding season. Under the No-Build Alternative, no construction activities would occur and there would be no adverse effects on tricolored blackbirds.

Avoidance, Minimization, and/or Mitigation Measures

Implementation of measures in Section 3.3.1.1 and the measure to conduct preconstruction surveys for nesting birds and raptors in Section 3.3.4.2 will ensure that project construction will not result in adverse effects on tricolored blackbird nests, eggs, or young.

3.3.4.7 Migratory Birds and Raptors

Several migratory birds and raptors could nest in and adjacent to the study area. The breeding season for most birds is generally February 15 through August 31. The occupied nests and eggs of these birds are protected by federal and state laws, including the MBTA and CFGC Sections 3503 and 3503.5.

Affected Environment

A number of nesting birds have been observed in the study area during preconstruction surveys for the I-80 HOV construction project. In 2008 and 2009, biological monitors observed a nesting mockingbird, Anna's hummingbird, cliff swallow, northern rough-winged swallow, wrentit, bushtit, California spotted towhee, white-throated swifts, and black phoebes. Potential nesting habitat for other migratory birds and raptors occurs in riparian habitat, trees, oak woodlands, and shrubs in the Alternative B study area.

Environmental Consequences

Implementation of both of the build alternatives could affect nesting birds, including raptors, if construction activities remove or otherwise disturb occupied nests during the breeding season. Construction activities during the breeding season that result in death of young or loss of reproductive potential would violate CFGC Sections 3503 and 3503.5 and the MBTA.

Potential Disturbance of Nesting Migratory Birds and Raptors Resulting from Construction

Implementation of the build alternatives could affect nesting migratory birds and raptors if construction activities remove or otherwise disturb occupied nests during the breeding season. Under the No-Build Alternative, no construction activities would occur and there would be no adverse effects on migratory birds or raptors.

Avoidance, Minimization, and/or Mitigation Measures

Implementation of avoidance, minimization, and/or mitigation measures in Section 3.3.1.1 and the measure to conduct preconstruction surveys for nesting birds and raptors in Section 3.3.4.2 will avoid adverse effects on nesting migratory birds and raptors.

3.3.4.8 Swallows

Swallows are not considered sensitive wildlife species. However, their occupied nests and eggs are protected by both federal and state laws, including the MBTA. Cliff and barn swallows are two swallow species that frequently build mud nests on the undersides of artificial structures, such as bridges. The two species winter in South America and arrive back in California to breed in February. Nesting generally occurs from March to August, and migration south occurs in September and October (Zeiner et al. 1990).

Affected Environment

Empty and remnant swallow nests were observed on the undersides of the bridge decks and ledges within the study area. At Green Valley and Suisun Creeks, no nests or nest remnants were observed in 2008 or 2009 during monitoring surveys for the I-80 HOV project, but approximately three cliff swallow nests were removed from the eastbound lanes on Green Valley Creek in 2007. During the 2008 monitoring surveys, the on-ramp from I-680 to EB I-80 (just south of the EB I-80 lanes) that spans Green Valley Creek had approximately 30 remnant cliff swallow nests, and the Central Way bridge (the southernmost of the four bridges) had an active cliff swallow colony of approximately 50 nests.

Environmental Consequences

Construction activities associated with bridge construction for both build alternatives could result in the direct loss of active swallow nests. Loss of a nest could in turn result in the death of adults, young, or eggs. This would violate CFGC Section 3503 and the MBTA.

Potential Disturbance to Nesting Swallows Resulting from Construction

Construction activities associated with bridge construction under both build alternatives could result in the direct loss of active swallow nests.

Under the No-Build Alternative, no construction activities would occur and there would be no adverse effects on nesting swallows.

Avoidance, Minimization, and/or Mitigation Measures

Implementation of the measure below to prevent swallows from nesting adjacent to new bridge construction will ensure that this alternative will not result in an adverse effect on swallow nests, eggs, or young.

Prevent Swallows from Nesting Adjacent to New Bridge Construction

To avoid adverse effects on nesting swallows and other bridge-nesting migratory birds that are protected under the MBTA and CFGC, the following measures will be implemented.

- If bridge construction will take place during the breeding season (generally between February 15 and August 31), a qualified wildlife biologist will be retained to inspect all bridges during the swallows' non-breeding season (August 16 through February 14). If nests are found and are abandoned, they may be removed. To avoid damaging active nests adjacent to new bridge construction, nests must be removed before the breeding season begins (February 15).
- After nests are removed, the undersides of the bridges will be covered with 0.5- to 0.75-inch mesh net or poultry wire. All net installation will occur before February 15. The netting will be anchored so that swallows cannot attach their nests to the bridge through gaps in the net.
- An option to netting is to daily remove any newly constructed nests until the start of construction.
- If netting of the bridges does not occur by February 15 and swallows colonize the bridge, modifications to this structure should not begin before August 31 of that year or until a qualified biologist has determined that the young have fledged and all nest use has been completed.

If appropriate steps are taken to prevent swallows from constructing new nests, work can proceed at any time of the year.

3.3.4.9 Roosting Bats

Two species of special concern and three Working Bat Group priority bat species have potential to occur in the study area: pallid bat (*Antrozous pallidus*), western red bat (*Lasiurus blossevillii*), long-eared myotis (*Myotis evotis*), fringed myotis (*Myotis thysanodes*), and Yuma myotis (*Myotis yumanensis*). Both pallid bats and Yuma myotis use bridges over perennial waterways or in or near open agricultural or grassland areas. Western red bats could occur in riparian woodland and orchards. All five bat species use trees for roosting. These areas provide abundant roosts as well as a source of insects, the primary food source for bats.

Affected Environment

At the time of the 2007, 2008, and 2009 field surveys, no evidence of bat presence (guano, urine staining, odor, or vocalizations) was observed on portions of the undersides of the existing bridges over creeks in the study area. However, the undersides of the bridge decks contained expansion joints that could provide roosting sites for bats. This habitat would not support a maternal roost but could support a small number of day- or night-roosting bats. In addition to bridges, trees throughout the study area provide suitable roost sites.

Environmental Consequences

Potential bat roosting areas occur in portions of the existing bridges and more mature trees in riparian woodland on Dan Wilson, American Canyon, Jameson Canyon, Green Valley, Suisun, and Ledgewood Creeks that could be directly disturbed during new bridge construction. No bridge roosting habitat would be permanently removed. Noise disturbances associated with new bridge construction and pile driving could disturb day-roosting bats if they are present in the bridge during construction. However, these disturbances would be temporary and would not result in the death of a large number of bats. Both build alternatives could remove bat roosting habitat in trees, with the potential to adversely affect roosting bats.

Potential Disturbance to Roosting Bats Resulting from Construction

Both build alternatives have the potential to disturb roosting bats. Noise disturbances during bridge construction would be temporary, and no avoidance, minimization, or mitigation measures are recommended. Tree-roosting bats could be adversely affected under all build alternatives by the removal of mature trees in the construction area. Under the No-Build Alternative, no construction activities would occur and there would be no adverse effects on roosting bats.

Avoidance, Minimization, and/or Mitigation Measures

Implementation of the measure below to conduct preconstruction surveys for bats will ensure that there are no adverse effects on roosting bats.

Conduct Preconstruction Surveys for Roosting Bats in Mature Trees

The following measure will be incorporated in the project construction conditions to minimize direct impacts on roosting bats.

- Avoid disturbances to mature oak and cottonwood species. These tree species have the highest potential for bat roosts. If tree removal is unavoidable, these trees should be surveyed with a bat detector to determine bat occupancy. If roosting bats are present, consultation with the CDFG is necessary to assess options for avoiding impacts on the bats. Avoidance could include determining a no-disturbance buffer around trees with maternal bat roosts, the appropriate timing of removal of roost trees, the feasibility of installing exclusion devices at roosts, and providing alternative roost sites (i.e., bat houses).

3.3.4.10 River Lamprey

Affected Environment

River lamprey (*Lampetra ayresi*), a state species of special concern, could occur in the study area in any of the drainages, although the occurrence of river lamprey has not been explicitly documented. The study area falls within the species' distribution and environmental conditions generally support their habitat requirements. While it appears that the creeks in the study area do not support spawning or rearing habitat for river lamprey, these creek segments at a minimum support migration habitat for both adult and juvenile river lamprey. Juvenile lampreys (ammocoetes) rear in the silt and sand of backwater areas. None of the creeks in the study area have backwater habitat in the immediate vicinity of the impact areas: Green Valley and Ledgewood Creeks have concrete-lined channels and Suisun Creek has high-velocity water and gravel in the construction area. This is unsuitable rearing habitat for ammocoetes.

Environmental Consequences

Potential Effects on River Lamprey Resulting from Construction

Construction of either build alternative could affect water quality, substrate conditions, channel morphology, water temperature, and river lamprey movement in streams that provide habitat for river lamprey. In addition, all build alternatives could result in disturbance and direct injury to

river lamprey. Alternatives B and C include construction of crossings over Green Valley, Suisun, and Ledgewood Creeks. Alternative B would additionally include construction of a second, new bridge over Ledgewood Creek. The fundable first phases of the alternatives would not include construction of crossings over Suisun Creek, and would have potential impacts only on Green Valley and Ledgewood Creeks. Under the No-Build Alternative, no construction activities would occur, and no impacts on river lamprey or its habitat would occur.

Water Quality

The assessment of water quality addresses the effects of both sediment and contaminants on river lamprey and their habitat. Activities associated with bridge removal and reconstruction, highway improvements, and revegetation could increase erosional processes, thereby increasing sedimentation and turbidity in downstream waterways. Excessive sediment deposited in or near stream channels can degrade aquatic habitats. Increased turbidity can increase fish mortality; reduce feeding opportunities for fish, including rearing lamprey; and cause fish to avoid important habitat. Contaminants include toxic substances such as metals, petroleum products, pesticides, fertilizers, sewage, and uncharacteristically high sediment loading. Construction materials such as concrete, sealants, oil, and paint could adversely affect water quality if accidental spills occurred during project construction. Increased pollutant concentrations could limit fish production, abundance, and distribution by direct mortality of fish or their prey.

Implementation of the measure to prepare and implement a SWPPP in Section 3.2.3 and avoidance, minimization, and/or mitigation measures listed below that would prevent contaminants from entering streams and restrict the construction time frame for in-water work would address this impact.

Habitat and Channel Morphology

Construction activities associated with the project alternatives that would affect fish habitat include stream dewatering, removal of existing bridge structures, placement of new bridge abutments, and activities related to revegetation. Bridge replacement and bank stabilization activities would require removal of vegetation, resulting in temporary loss of vegetative cover and reducing fish habitat complexity. Construction activities, such as heavy equipment use, could also change the channel morphology by damaging or compacting the streambed substrate.

Riparian vegetation, including shaded riverine aquatic (SRA) cover, is an essential component of fish habitat. Undercut banks and overhead SRA cover, such as canopy cover and overhanging vegetation, provide fish with protection from predators, maintain shade necessary to reduce thermal input, and provide nutrients to the stream in the form of fallen leaves and insects. Riparian vegetation is also important in maintaining undercut banks and controlling streambank erosion, thereby contributing to instream structural diversity. Bridge construction would remove vegetation and SRA cover. However, the amount of vegetation removal is relatively minor, and revegetation would mitigate any long-term adverse effects related to its removal.

Construction activities in the streambeds could also change channel morphology and cause migration habitat to be degraded. However, the channels would be restored to preproject conditions based on fish passage assessments for Suisun, Green Valley, and Ledgewood Creeks , and no permanent changes to channel morphology are expected.

Implementation of measures listed below to minimize impacts on creek channels would avoid or minimize the potential for adverse effects.

Water Temperature

As a result of the lack of specific information regarding the habitat requirements of river lamprey, especially the ammocoete (juvenile lamprey) rearing stage, it is unknown whether existing water temperatures in the study area are suitable for ammocoete rearing. Water temperature is an important variable that determines the suitability of fish habitat for growth, reproduction, survival, and migration.

Water temperature is controlled primarily by flow, weather, stream width, stream depth, and shading of the stream surface. The proposed project would affect shade provided by riparian vegetation, however the amount of shade that would be affected by vegetation removal is relatively minor. Revegetation that is proposed in disturbed areas, combined with the shading provided by the bridge extension, is expected to maintain existing shade conditions in the study area.

Based on an evaluation conducted during the field visit, the proposed project would affect a relatively minimal amount of SRA cover and would not affect the low-flow channel geometry that could affect residence time, depth, or area of water exposed to solar radiation. From the perspective of water temperature, the temporary reduction in stream shading from removal of SRA cover vegetation would not result in any measurable increase in water temperature. Furthermore, the loss of shade would be offset over time by the increased shading provided by the new bridges at Suisun and Ledgewood Creeks and the replacement and reestablishment of riparian vegetation in the affected areas. Implementation of the proposed project is not expected to affect creek shading and water temperature, therefore the project would not adversely affect river lamprey or its habitat.

Implementation of measures listed below to minimize impacts on creek channels would further ensure that river lamprey or river lamprey habitat is not adversely affected as a result of construction.

Interference with Movement

Construction activities associated with the project alternatives would require temporary redirection of the flow of water through the use of cofferdams and pipelines. These devices could block the migration of adult and juvenile river lamprey. However, construction activities would be avoided during the primary migration time of river lamprey (i.e., fall, winter, and spring). Furthermore, maintenance of fish passage conditions through the construction site during stream dewatering activities would further reduce the potential for impacts on fish movement. The pipeline would be checked every few hours (or more often, if necessary) to clear debris buildup that may occur during construction. Therefore, temporary stream diversions associated with construction are not likely to adversely affect migrating river lamprey.

Implementation of measures listed below to restrict the timing of in-water work and to maintain a migration corridor in the study area creek channels would minimize or avoid any adverse effects on fish movement.

Disturbance and Direct Injury

Noise, vibrations, artificial light, and other physical disturbances can harass fish, disrupt or delay normal activities, and cause injury or mortality. The potential magnitude of effects depends on a number of factors, including the type and intensity of the disturbance, proximity of the action to the water body, timing of actions relative to the occurrence of sensitive life stages, and frequency and duration of activities. For most activities, the effects on fish would be limited to avoidance behavior in response to movements, noises, and shadows caused by construction personnel and equipment operating in or adjacent to the water body. However, survival may be altered if disturbance causes fish to leave protective habitat (increasing exposure to predators) or is of sufficient duration and magnitude to affect growth and spawning success. Injury and mortality may result from direct and indirect contact with humans and machinery, sound pressure, and physiological stress.

Physical disturbance and injury are most likely to occur during in-water work. Project actions that involve in-water work include removing and disturbing aquatic vegetation, removing sediment and debris from the stream channel, and removing the current bridge structures. Project actions that cause no direct harm but may temporarily disturb fish include movement of construction equipment and personnel, lighting, removal and disturbance of riparian vegetation, and grading and construction of access roads and staging areas adjacent to the stream.

Short-term noise disturbance caused by pile driving would occur during construction. Pile driving and blasting can generate intense sound pressure that can injure or kill fish. The effects on fish can range from avoidance to direct mortality, depending on the species, life stage, and intensity of the pressure waves. Factors that influence the intensity of pressure waves include the proximity to the source, the maximum force generated, the rate at which the maximum force is generated, and characteristics of the medium (i.e., water and substrate) through which the waves travel. It is unknown how lamprey react to pile driving, but it is expected ammocoetes would move out of the disturbed area.

During in-channel construction activities, some harassment or delay of migrating adults or juveniles may occur because of noise, artificial light, and other disturbances. However, these disturbances are not expected to be of sufficient extent, duration, or intensity to affect survival, growth, or spawning success.

Implementation of the measures listed below to restrict the timing of in-water work, to provide alternate migration corridors through creek channels, and to minimize noise impacts would ensure that this is not an adverse effect.

Potential Effects on River Lamprey Associated with Operations

Water Quality

Both build alternatives will result in increased impervious surfaces. The fundable first phases of the alternatives have smaller footprints than the full build alternatives and, therefore, would result in lesser impacts. The Green Valley Creek crossing under Alternative C is slightly smaller than that of Alternative B and, therefore, Alternative C would result in a lesser effect. Under the No-Build Alternative, no additional impervious surfaces would be constructed and therefore there would be no potential effect on water quality from operations.

The increase in new impervious surfaces combined with runoff from petroleum products and other contaminants from automobiles potentially would result in an increase of contaminated runoff. The potential for impacts would likely be greatest during the initial winter storm event, or "first flush," when pollutant constituents would be concentrated.

Although the creeks in the study area are believed to have no spawning or rearing habitat for river lamprey, pollutants entering the creeks could adversely affect migration of river lamprey.

Most of the discharges from the proposed project would occur in winter and spring, when dilution would greatly limit the amount of nutrient and pollutant constituent loading in the creeks. However, this effect on river lamprey is considered potentially adverse because of the potential for direct effects associated with the "first flush."

Implementation of the measure to prepare and implement a SWPPP in Section 3.2.3 and measures listed below to prevent contaminants from entering the stream channel would minimize this effect.

Avoidance, Minimization, and/or Mitigation Measures

Prevent Contaminants and Hazardous Materials from Entering the Stream Channel

A SWPPP will be implemented as part of the NPDES Construction General Permit and General Construction Activity Storm Water Permit to minimize the potential for sediment input to the aquatic system. A toxic materials control and spill response plan will be developed and implemented to regulate the use of hazardous materials, such as the petroleum-based products used as fuel and lubricants for equipment and other potentially toxic materials associated with project construction. In addition, the following measures will be implemented.

- Falsework will be installed to keep bridge debris and construction and maintenance materials from falling into streams during demolition, construction, and substantial maintenance activities.
- When concrete is poured to construct bridge footings or other infrastructure in areas of flowing water, work must be conducted to prevent contact of wet concrete with water (e.g., within a cofferdam).

Restrict In-Water Work to Avoid Special-Status Fish Spawning Seasons

In-channel construction, including riverbank and channel-bed construction below the OHWM, will be limited to the summer low-precipitation period (June 1–October 15) to reduce the likelihood of adverse effects on rearing juvenile salmonids and on adult fish spawning and migration, unless otherwise approved by appropriate resource agencies.

Minimize Impacts on Creek Channels

The following measures will be implemented to decrease impacts on the creek channel and habitat. Please also see the avoidance and minimization efforts in Section 3.3.2.1 "Perennial Drainage."

- The duration and extent of in-water activities will be limited to the maximum extent practicable.
- The minimum amount of wood, sediment, gravel, and other natural debris will be removed to maintain and protect bridge function, ensure suitable fish passage conditions, and minimize disturbance of the streambed.
- Immediately upon completion of in-channel work, temporary fills (as needed), cofferdams, and other in-channel structures will be removed in a manner that minimizes disturbance to downstream flows and water quality.
- Streamflow through the widened portion of the bridges must meet the velocity, depth, and other passage criteria for salmonids as described by NOAA's NMFS and the CDFG—or as developed in cooperation with NOAA's NMFS and the CDFG—to accommodate site-specific conditions.
- All creek channels will be returned to pre-project conditions.

Provide Alternate Migration Corridor through Creek Channels

In-water construction activities will provide a migratory route through the creek channel by installing cofferdams in all creeks around the new footing excavations. Pipelines may be installed at Green Valley and Suisun Creeks to ensure fish passage through the project areas.

The pipeline in Green Valley and Suisun Creeks will be a corrugated steel pipe, approximately 24 to 36 inches in diameter, allowing passage of various sizes of fish. The pipe will span the width of the bridge plus ten feet on either side. It will be laid down in the channel so that all water passes through the pipeline, and it will be removed as soon as possible after construction. If flows exceed the capacity of the steel pipe, an additional or larger-diameter pipe will be installed to convey the increased flow. Subject to the sufficiency of ambient conditions in upstream and downstream stream reaches unaffected by project construction, adequate fish passage conditions will be sustained by maintaining contiguous flows, avoiding the creation of vertical drops in excess of six inches, and maintaining suitable water velocities (i.e., eight feet per second or less) and water depths (minimum of one foot).

Cofferdams will affect no more of the stream channel than is necessary to support completion of the construction activity. Flow will be diverted the minimum distance necessary to isolate the construction area. Water will be released downstream at an appropriate rate to maintain downstream flows at all times.

Retain a Fish Biologist During Instream Construction

Because special-status fish might be present and subject to potential injury or mortality from construction activities, a qualified biologist will conduct preconstruction surveys of the project area to determine whether such species are present or likely to be present near the project site. When special-status fish are present and could be affected by construction activities, the project biologist will identify appropriate methods to capture, handle, exclude, and relocate those individuals. All fish exclusion and salvage activities will adhere to accepted NMFS and CDFG protocols.

Minimize Noise Impacts on Special-Status Fish Species

Potential injury and mortality associated with pile driving will be avoided or minimized by implementing the following measures.

- Vibratory hammers will be used whenever feasible.
- The smallest pile driver and minimum force necessary will be used to complete the work.

3.3.4.11 Fall- /Late Fall–Run Chinook Salmon

Affected Environment

The Central Valley fall- /late fall–run evolutionarily significant unit (ESU) of Chinook salmon (*Oncorhynchus tshawytscha*) is a federal species of special concern and a commercial species. Only fall-run Chinook salmon are likely to occur in the study area streams (late fall–run Chinook salmon spawn and rear primarily in the Sacramento River drainage). Fall-run Chinook salmon have been documented as occurring upstream of the study area (National Marine Fisheries Service 2006). For example, redds (nests) have been observed upstream of I-80 near Mangels Boulevard in Green Valley Creek; in Suisun Creek the upper limit of the Chinook salmon run extends to the Napa/Sonoma County line, more than six miles upstream of I-80. Chinook salmon have also been observed in Ledgewood Creek upstream of I-80. There is a potential spawning gravel patch in Suisun Creek about 20 feet downstream of the existing bridge. Spawning habitat is not supported in Green Valley and Ledgewood Creeks in the study area; however, both creeks support migration habitat for fall-run Chinook salmon. It is unlikely that Chinook salmon occur in Dan Wilson, American Canyon, or Jameson Canyon Creeks because these drainages are relatively small and dry and do not appear to support habitat conditions necessary for migration and spawning of fall-run Chinook salmon.

Fall-run Chinook salmon, a commercially valuable species, is managed under the Magnuson-Stevens Fishery Conservation and Management Act. This act requires that all federal agencies consult with NOAA's NMFS on all proposed projects that may adversely affect Essential Fish Habitat (EFH). EFH is the aquatic habitat (water and substrate) necessary for fish to spawn, breed, feed, or grow to maturity (National Marine Fisheries Service 1998) that will allow a level of production needed to support a long-term, sustainable commercial fishery and contribute to a healthy ecosystem. Because Chinook salmon is managed by NMFS and the species occurs in the study area streams, these streams are considered EFH for Chinook salmon.

Environmental Consequences

Potential Effects on Chinook Salmon Resulting from Construction

Construction of either build alternative could affect water quality, channel morphology, water temperature, and Chinook salmon movement in streams that provide habitat for Chinook salmon. In addition, both build alternatives could result in disturbance and direct injury to Chinook salmon. Alternatives B and C include construction of crossings over Green Valley, Suisun, and Ledgewood Creeks. Alternative B would additionally include construction of a second, new bridge over Ledgewood Creek. The fundable first phases of the alternatives would not include construction of crossings over Suisun Creek, and would have potential impacts only on Green

Valley and Ledgewood Creeks. Under the No-Build Alternative, no construction activities would occur, and no impacts on Chinook salmon or its habitat would occur.

Water Quality

As described above in Section 3.3.4.10, the temporary effects of construction on water quality include increased sedimentation and turbidity and possible release of contaminants into Green Valley, Suisun, and Ledgewood Creeks from construction activities and equipment. These water quality effects could increase Chinook salmon mortality; reduce feeding opportunities, including for rearing juveniles; and cause Chinook salmon to avoid important habitat. Increased pollutant concentrations could limit Chinook salmon production, abundance, and distribution by direct mortality of eggs, fry, and juveniles or by reducing availability of prey for juvenile Chinook salmon.

Implementation of the measure to prepare and implement a SWPPP in Section 3.2.3 and measures listed in Section 3.3.4.10 to prevent contaminants from entering streams and to restrict in-water work to avoid spawning seasons would address this effect.

Habitat and Channel Morphology

As described above in Section 3.3.4.10, project construction activities would affect fish habitat (e.g., through vegetation removal) and could also change channel morphology by disturbing the streambed substrate. However, revegetation would mitigate the minor loss of vegetation and SRA cover, and the channels would be restored to pre-project conditions based on fish passage assessments for Suisun, Green Valley, and Ledgewood Creeks. No permanent changes to channel morphology are expected.

Implementation of the measure in Section 3.3.4.10 to minimize impacts on creek channels would address this impact.

Water Temperature

Under existing conditions, habitat for juvenile Chinook salmon rearing in the study area is marginal to unsuitable. Water temperature is an important variable that determines the suitability of fish habitat for growth, reproduction, survival, and migration. This is especially true for Chinook salmon, which have relatively narrow temperature requirements for carrying out their life history. Any increase in water temperatures could further reduce the suitability of habitat in the study area for Chinook salmon.

As described above in Section 3.3.4.10, the project alternatives would have a minor effect on SRA cover. Revegetation proposed in disturbed areas, combined with the shading provided by the bridge extension, would be expected to offset shade loss and result in maintaining existing water temperatures in the study area. Therefore, the project alternatives would not adversely affect growth, reproduction, survival, or migration of Chinook salmon with respect to water temperature.

Implementation of the measure in Section 3.3.4.10 to minimize impacts on creek channels would ensure that there would be no adverse water temperature effects.

Interference with Movement

As described above in Section 3.3.4.10, construction activities associated with the project alternatives would require the use of cofferdams and pipelines, which could interfere with the migration of adult and juvenile Chinook salmon. However, the timing of construction activities and maintenance of fish passage through the construction site during stream dewatering activities would reduce the potential for impacts on fish movement. Therefore, temporary stream diversions associated with construction are not likely to adversely affect juvenile Chinook salmon.

Implementation of the measures listed in Section 3.3.4.10 to restrict the timing of in-water work and to maintain a migration corridor in the study area creek channels would minimize or avoid any adverse effects on fish movement.

Disturbance to Potential Spawning Habitat

A potential spawning gravel bed was observed in Suisun Creek approximately 20 feet downstream of the existing bridge, which is proposed for removal and reconstruction. It is anticipated that the gravel bed would not be disturbed by the project alternatives. All construction equipment would access the construction site from the existing bridge and road. If the gravel cannot be avoided, it would be temporarily removed and replaced to preconstruction conditions using, to the extent practicable, gravel removed from the site. No spawning habitat was observed on Ledgewood Creek or Green Valley Creek in the project area (the channel bottom at these two locations is concrete lined).

Alternatives B and C both include construction on Suisun Creek and therefore could disturb potential spawning habitat for Chinook salmon. Because no construction is proposed on Suisun Creek under the fundable first phase of either alternative or under the No-Build Alternative, there would be no effect on spawning habitat under these alternatives.

Implementation of measures listed below to avoid potential spawning habitat and measures in 3.3.4.10 to minimize impacts on creek channels would address this impact.

Disturbance and Direct Injury

As described above in Section 3.3.4.10, noise, vibrations, artificial light, and other physical disturbances can harass fish, disrupt or delay normal activities, and cause injury or mortality. Under Alternative B, short-term noise disturbance caused by pile driving would occur within Ledgewood Creek.

Potential direct effects of pile-driving activities include increased noise and turbidity. Researchers have suggested that salmonids can hear pile-driving noise approximately 2,000 feet from the source (Feist et al. 1992). Feist et al. (1992) observed that pile driving altered the distribution and behavior of juvenile pink and chum salmon. The potential impact on salmonids from pile-driving activities depends on the distance separating the noise-generating activity from fish and the duration of these activities. Evidence suggests that, although pile-driving noise may affect the distribution and behavior of juvenile pink and chum salmon, no significant changes occurred in their overall abundance (Feist et al. 1992).

Implementation of measures in Section 3.3.4.10 to restrict in-water work to avoid spawning seasons and to minimize noise impacts on fish would address this impact.

Potential Water Quality Effects on Chinook Salmon Associated with Operations

Water Quality

As described above in Section 3.3.4.10, both build alternatives except the No-Build Alternative would result in increased impervious surfaces and potential for contaminated runoff. The potential increase in contaminated runoff entering the creeks could adversely affect Chinook salmon that use the creeks for migration, spawning, and rearing. Pollutants could also cause mortality to, and reduced growth of, the egg, larval, and juvenile life stages of Chinook salmon.

Implementation of the measure in Section 3.2.3 to prepare and implement a SWPPP and measures listed in Section 3.3.4.10 to prevent contaminants from entering the stream channel would address this impact.

Potential Interference with Movement

Current conditions in Ledgewood Creek under SR 12E are such that fish movement could be impeded by low water levels. Shallow water in the existing notched box culvert may create unfavorable passage conditions for adults. Results from modeling conducted for the fish passage assessment indicate that the proposed extension of the culvert under SR 12E would exacerbate existing shallow water conditions during the migration season and would worsen fish passage conditions relative to current conditions. Bridge widening would occur under both build alternatives. Implementation of measures discussed below to address shallow water depths by improving the channel downstream of the culvert would improve postproject fish passage conditions at Ledgewood Creek.

Under the No-Build Alternative, no construction would take place and the current conditions would remain. The impediment to fish movement would remain and no measures to improve conditions would be implemented.

Avoidance, Minimization, and/or Mitigation Measures

Avoid Potential Fish Spawning Habitat

In-water construction activities will avoid disturbance of the spawning gravel bed immediately downstream of the existing bridge on Suisun Creek. If the gravel cannot be avoided, the gravel will be removed temporarily and replaced to preconstruction conditions, using—to the extent practicable—gravel removed from the site. If imported gravel is used, only washed river rock ranging in size from 0.25- to 4.0-inches will be used (i.e., angular rock or unwashed gravel will not be used).

Implement Culvert Retrofit at the SR 12E Crossing on Ledgewood Creek

Because the proposed culvert design would maintain the existing culvert dimensions (width and slope) and exacerbate existing shallow water depths at low flows, it is recommended that the culvert invert be modified to concentrate low flows to increase water depths when flows are low

(i.e., less than 20 cfs). Several potential alternatives to address anticipated shallow water depths are described below.

- **Low-Flow Walls.** Low-flow walls running parallel to the long axis of the culvert and straddling the low-point of the culvert mid-line could be installed to help confine the width of low flows and increase water depths. The walls could be configured at the inlet such that it directs and concentrates low flows to the mid-line of the culvert between the walls and be constructed of concrete, steel, or untreated wood (e.g., redwood). Steel and untreated wood would need to be anchored using recessed bolts glued (epoxy) into holes drilled into the culvert bottom. It should be noted that wood and steel are subject to decomposition over time, and therefore, would potentially require greater maintenance than concrete. The height of the walls and the distance separating the left and right walls would be determined based on hydraulic analyses to achieve minimum water depths of one foot. It is further recommended that once the dimensions of the low-flow walls are determined, a hydraulic analysis be performed to confirm that the low-flow walls do not compromise the culvert's ability to safely pass flows with a 1% exceedance.
- **Offset (Washington) Baffles.** As an alternative to or in conjunction with low-flow walls, offset (Washington) baffles can be utilized to further increase minimum water depths while providing resting habitat for migrating fish. As described above for low-flow walls, offset baffles could be constructed out of concrete, steel, or untreated wood with steel and untreated wood being subject to decomposition and therefore greater maintenance than concrete. Several different offset baffle configurations used in combination with or without low-flow walls are possible; the precise configuration would be determined based on hydraulic analyses and subject to evaluations to determine effects on safely passing flows with a 1% exceedance. While offset baffles have the added benefit of creating resting habitat for fish (especially during higher flows), they also have greater potential to trap debris which can render them impassable in extreme circumstances.

3.3.4.12 Sacramento Splittail

Affected Environment

Sacramento splittail (*Pogonichthys macrolepidotus*), a state species of special concern, is present in Suisun Marsh and its associated sloughs, including Peytonia Slough (Schroeter et al. 2006). Due to the connection of Ledgewood Creek with Peytonia Slough downstream of the project area, water quality impacts could affect Sacramento splittail occurring in Peytonia Slough.

Environmental Consequences

Potential Water Quality Effects on Sacramento Splittail Resulting from Construction

Both build alternatives have the potential to affect water quality in Ledgewood Creek. Alternative B could have a greater effect than the other alternatives because it includes construction of a second, new bridge to the south. Under Alternative C and the fundable first phase of both alternatives, only the existing culvert would be widened. Under the No-Build Alternative, no construction activities would occur, and no impacts on Sacramento splittail or its habitat would occur.

As described above in Section 3.3.4.10, the temporary effects of construction on water quality include increased sedimentation and turbidity and possible release of contaminants into Ledgewood Creek from construction equipment. These water quality effects could increase Sacramento splittail mortality; reduce feeding opportunities, including those for rearing splittail; and cause splittail to avoid important habitat. Increased pollutant concentrations could limit Sacramento splittail reproduction, abundance, and distribution by direct mortality of splittail or their prey.

Implementation of the measure to prepare and implement a SWPPP in Section 3.2.3 and avoidance, minimization, and/or mitigation measures in Section 3.3.4.10 to prevent contaminants from entering streams would address this impact.

Potential Water Quality Effects on Sacramento Splittail Associated with Operations

As described above in Section 3.3.4.10, water quality effects could result from construction of new bridges and increased impervious surfaces at Ledgewood Creek. Pollutants entering Ledgewood Creek and carried downstream could cause mortality to and reduced growth of the egg, larval, and juvenile life stages of Sacramento splittail. As mentioned above, implementation of the measure to prepare and implement a SWPPP in Section 3.2.3 and measures listed in Section 3.3.4.10 to prevent contaminants from entering the stream channel would minimize this effect.

Avoidance, Minimization, and/or Mitigation Measures

See the measure to prepare and implement a SWPPP in Section 3.2.3 and measures to prevent contaminants from entering streams in avoidance, minimization, and/or mitigation measures in Section 3.3.4.10.

3.3.5 Threatened and Endangered Species

This section addresses species listed or eligible for listing as threatened or endangered. Tables 3.3.3-1 and 3.3.4-1 list the threatened and endangered plant and animal species, respectively, with potential to occur in the study area. The USFWS list of federally listed species for the study area is provided in Appendix F.

Based on early coordination with USFWS it was determined that there is potential for a "may affect" determination for the following federally listed species:

- Contra Costa goldfields (*Lasthenia conjugens*),
- Callippe silverspot butterfly (*Speyeria callippe callippe*),
- Vernal pool fairy shrimp (*Branchinecta lynchi*),
- Vernal pool tadpole shrimp (*Lepidurus packardi*),
- Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*),
- California red-legged frog (*Rana aurora draytonii*), and

- Central California coast steelhead (*Oncorhynchus mykiss*).

Caltrans has made a "no effect" determination for the remaining 27 federally species listed below based on the absence of suitable habitat or because the project is outside of the species range.

- Conservancy fairy shrimp (*Branchineta conservatio*)
- Delta green ground beetle (*Elaphrus viridis*)
- Myrtle's silverspot butterfly (*Speyeria zerene myrtleae*)
- California freshwater shrimp (*Syncaris pacifca*)
- Green sturgeon (*Acipenser medirostris*)
- Tidewater goby (*Eucyclogobius newberyi*)
- Delta smelt (*Hypomesus transpacificus*)
- Coho salmon (*Oncorhynchus kisutch*)
- Central Valley spring-run Chinook salmon (*Oncorhynchus tshawytscha*)
- California tiger salamander (*Ambystoma californiense*)
- Alameda whipsnake (Masticophis lateralis euryxanthus)
- Giant garter snake (*Thamnophis gigas*)
- Western snowy plover (*Charadrius alexanderinus nivosus*)
- California brown pelican (*Pelecanus occidentalis californicus*)
- California clapper rail (*Rallus longirostris obsoletus*)
- California least tern (*Sternula antillarum browni*)
- Northern spotted owl (*Strix occidentalis caurina*)
- Salt marsh harvest mouse (*Reithrodontomys raviventris*)
- Baker's stickyseed (*Blennosperma bakeri*)
- Tiburon paintbrush (*Castilleja affinis ssp. neglecta*)
- Suisun thistle (*Cirsium hydrophilum var. hydrophilum*)
- Soft bird's-beak (*Cordylanthus mollis ssp. mollis*)
- Colusa grass (*Neostapfia colusana*)
- Antioch Dunes evening –primrose (*Oenothera deltoides* ssp. *howellii*)
- San Joaquin Valley Orcutt grass (*Orcuttia inaequalis*)
- Keck's checker-mallow (*Sidalcea keckii*)
- Solano grass (*Tuctoria mucronata*)

One state listed species known to occur in the study area, the Swainson's hawk (*Buteo Swainsoni*), is also included in this section. However, the proposed project would not result in take of a state-listed species including Swainson's hawk or California tiger salamander. We confirmed with Melissa Escaron, Staff Environmental Scientist with CDFG that the recently state listed California tiger salamander was not in the action area (Escaron pers. comm.). Therefore, no California Endangered Species Act (CESA) coordination is required.

One additional species with the potential to occur within the study area, salt-marsh harvest mouse (*Reithrodontomys raviventris*), was determined to be not present within the study area. Dr. Phil Leitner conducted a habitat assessment for salt-marsh harvest mouse (federally listed as endangered and a fully protected species) on August 31, 2007. The primary survey area was south of SR 12E between Ledgewood Creek and Suisun City. To assess the condition of adjoining habitat, he also inspected the area north of SR 12E that is within the project footprint, and areas to the south as far as Cordelia Road. Dr. Leitner concluded, in a letter sent to Stephanie Myers of ICF Jones & Stokes on September 2, 2007, that there is no suitable salt-marsh harvest mouse habitat within the project footprint. The area did support this species more than 20 years ago, but land use changes appear to have significantly reduced and degraded the pickleweed habitat. The small patches of pickleweed that remain do not have the structure and density required by salt-marsh harvest mouse.

Impacts on habitat for each sensitive wildlife species and fish are tabulated for each project alternative in Table 3.3.4-2.

During preparation of this document, ICF coordinated with the following federal and state agencies.

March 20, 2008: Ms. Myers contacted USFWS biologist Peter Johnsen to initiate coordination concerning the potential for effects on federally listed species in the project vicinity. Mr. Johnsen requested a project description and stated that he would be our contact for Section 7 coordination and consultation. Ms. Myers emailed him a copy of the project description on March 25, 2008.

November 19, 2009: Ms. Webber, Ms. Myers, and Ms. Ashkar from ICF met with Caltrans biologist, Mr. Hashemi and USFWS biologist John Cleckler to review the interchange project, discuss our approach to analysis for the BA, and discuss listed species issues including but not limited to CRLF, its critical habitat, and callippe silverspot butterfly.

March 26, 2010. ICF obtained a species list from the USFWS website of all federally proposed and listed endangered and threatened species and critical habitat that could occur in the vicinity of the proposed project (Appendix F).

June 28, 2010. Meeting between Caltrans, STA, ICF and FWS to discuss BA species effects and conservation measures.

November 2009 through July 30, 2010: Numerous email exchanges between ICF, Caltrans, and USFWS biologists.

Regulatory Setting

The primary federal law protecting threatened and endangered species is the Federal Endangered Species Act (FESA): 16 United States Code (USC), Section 1531, et seq. See also 50 CFR Part 402. This act and subsequent amendments provide for the conservation of endangered and threatened species and the ecosystems upon which they depend. Under Section 7 of this act, federal agencies, such as the Federal Highway Administration, are required to consult with the USFWS and NOAA's NMFS to ensure that they are not undertaking, funding, permitting, or authorizing actions likely to jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat. Critical habitat is defined as geographic locations critical to the existence of a threatened or endangered species. The outcome of consultation under Section 7 is a Biological Opinion or an incidental take permit. Section 3 of FESA defines take as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect or any attempt at such conduct."

California has enacted a similar law at the state level, the California Endangered Species Act (CESA), California Fish and Game Code, Section 2050, et seq. CESA emphasizes early consultation to avoid potential impacts on rare, endangered, and threatened species and to develop appropriate planning to offset project-caused losses of listed species populations and their essential habitats. The CDFG is the agency responsible for implementing CESA. Section 2081 of the Fish and Game Code prohibits "take" of any species determined to be an endangered species or a threatened species. Take is defined in Section 86 of the Fish and Game Code as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." CESA allows for take incidental to otherwise lawful development projects; for these actions an incidental take permit is issued by the CDFG. For projects requiring a Biological Opinion under Section 7 of the FESA, the CDFG may also authorize impacts on CESA species by issuing a Consistency Determination under Section 2080.1 of the Fish and Game Code.

Magnuson-Stevens Fishery Conservation and Management Act

The federal Magnuson-Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act of 1996 (Public Law 94-265), protects essential fish habitat (EFH), which is the aquatic habitat (water and substrate) that is necessary for fish to spawn, breed, feed, or grow to maturity (Pacific Fishery Management Council 1999) and that will allow a level of production needed to support a long-term, sustainable commercial fishery and contribute to a healthy ecosystem.

The Magnuson-Stevens Act establishes the following requirements.

- Federal agencies undertaking, permitting, or funding activity that may adversely affect EFH are required to consult with NOAA's NMFS.
- NOAA's NMFS must provide conservation recommendations for any federal or state activity that may adversely affect EFH.
- Federal agencies, within 30 days of receiving conservation recommendations from NOAA's NMFS, must provide a detailed response in writing to NOAA's NMFS regarding the conservation recommendations (the response shall include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on EFH, or reasons for not following the recommendations).

3.3.5.1 Contra Costa Goldfields

Contra Costa goldfields (*Lasthenia conjugens*) is an annual herb in the sunflower family (Asteraceae). It can bloom from March to June but is usually at its peak bloom in the project region in late April and early May. Contra Costa goldfields inhabits neutral to alkaline or saline vernal pools and adjacent seasonally moist grassy areas at elevations below 1,500 feet. It is dependent on continuous, high soil-moisture content and appears to occupy deep pools that dry out later in the growing season, rather than very shallow, "flashy" pools (Ornduff 1966; Rajakaruna 2003). Saturated, low-salinity soils appear to provide optimum conditions for germination and growth of Contra Costa goldfields (Collinge et al. 2003). Contra Costa goldfields requires insect pollinators for reproduction. Ground-nesting solitary bees (Andrenidae) that nest in the uplands around vernal pools are important pollinators of the goldfields genus (Thorp and Leong 1998).

Contra Costa goldfields was federally listed as endangered on July 18, 1997 (62 FR 33029–33038).The USFWS designated final critical habitat for Contra Costa goldfields on February 10, 2006 (71 FR 7217–7266). The designation of critical habitat requires federal agencies to consult with the USFWS regarding any action that could destroy or adversely modify critical habitat. This species is included in the 2005 recovery plan for vernal pool species (U.S. Fish and Wildlife Service 2005).

Contra Costa goldfields has no state listing status, but it is on CNPS List 1B.1 (rare, threatened, or endangered in California and elsewhere; seriously endangered in California—more than 80% of occurrences threatened/high degree and immediacy of threat). The primary threats to the species have been historical habitat loss, commercial and residential development, grazing, and competition from invasive nonnative plants (California Native Plant Society 2009).

Contra Costa goldfields is known historically from coastal valleys in central California (from Mendocino to Santa Barbara County) and from the western edge of the Sacramento Valley, north of Suisun Marsh. The CNDDB lists 32 occurrences in Alameda, Contra Costa, Marin, Mendocino, Monterey, Napa, and Solano Counties (California Natural Diversity Database 2010). The largest known concentration of Contra Costa goldfields is in Solano County in the City of Fairfield. Of the 32 total recorded occurrences, 12 are recorded in Solano County.

Affected Environment

Based on the 2005 surveys (Vollmar Consulting 2005), two stands of Contra Costa goldfields (29 plants) occur within seasonal wetland W-165 in the Alternative B footprint south of SR 12E on the west side of Pennsylvania Avenue as illustrated in Volume 2, Figure 3.3-2a (Sheet 33). The total area occupied by the plants in these three stands was less than 0.01 acre. Thirteen additional stands (Sheets 33 and 35) with a total of 420 plants, based on the 2005 survey results (Vollmar Consulting 2005), were mapped within several hundred feet of the Alternative B project area. Nine of the stands are within 250 feet of the project area; these supported 190 plants in 2005 (Vollmar Consulting 2005).

Four stands of Contra Costa goldfields occur within seasonal wetlands (W-165, W-171, and W-174) in the project footprint for Alternative C south of SR 12E, on the west and east sides of Pennsylvania Avenue as illustrated in Volume 2, Figure 3.3-2c (Sheet 33). Based on the 2005

surveys (Vollmar Consulting 2005), the two stands in W-165 west of Pennsylvania Avenue comprised a total of 29 plants, and the stands in W-171 and W-174 east of Pennsylvania Avenue each comprised a single plant. The total area occupied by the plants in these four stands was less than 0.01 acre. Eleven additional stands (Sheets 33 and 35) with a total of approximately 420 plants, based on the 2005 survey results (Vollmar Consulting 2005), were mapped within several hundred feet of the Alternative C project area. One of the stands, less than 100 feet from the project area, contained one plant in 2005 (Vollmar Consulting 2005). Three of the stands (totaling 116 plants) were within 250 feet of the temporary impact area.

No Contra Costa goldfields have been found within the Alternative B, Phase 1 or Alternative C, Phase 1 study areas.

Because Contra Costa goldfields is an annual plant, the numbers of plants that grow in an area can vary widely from year to year, depending on rainfall, disturbance regime, and other factors that affect seed germination and plant survival (U.S. Fish and Wildlife Service 2005). Although the stands of Contra Costa goldfields were not found in April 2009, the habitat remains suitable and the plants are assumed to be extant. Below average rainfall and varied temperature patterns in 2008/2009 may have affected germination and growth of this species for spring 2009. For the purposes of this analysis, the extent of occupied habitat and numbers of plants are based on the 2005 data.

The area immediately south of SR 12E between Beck Avenue and Pennsylvania Avenue includes the northern edge of Vernal Pool Critical Habitat Unit 5B, which is designated for Contra Costa goldfields (71 FR 7217–7266).

Environmental Consequences

Loss or Disturbance of Contra Costa Goldfields Resulting from Construction

Impacts on Contra Costa goldfields could occur under either full build alternative. Although special-status plant species were found during the botanical surveys of the Alternative B, Phase 1 and Alternative C, Phase 1 study areas, none occur within the temporary or permanent impact area.

Based on the 2005 and 2009 survey results, approximately 30 Contra Costa goldfields plants in a total area of less than 0.01 acre would be removed within the Alternative B and Alternative C footprints. Under Alternative B, this would occur south of SR 12E for construction of the Meyer Lane extension, the frontage road south of SR 12E and west of Pennsylvania Avenue, and widening of Pennsylvania Avenue south of SR 12E (Volume 2, Figure 3.3-2a, Sheets 32–33). Under Alternative C, impacts would occur south of SR 12E on either side of Pennsylvania Avenue for construction of the Pennsylvania Avenue interchange (Volume 2, Figure 3.3-2c, Sheet 33).

A total of 55.91 acres of critical habitat for Contra Costa goldfields would be permanently removed and approximately 14.02 acres of critical habitat would be temporarily disturbed with implementation of Alternative B.

Alternative B, Phase 1 would not directly affect Contra Costa goldfield plants, but 7.27 acre of its critical habitat would be permanently removed and 1.18 acre would be temporarily affected.

A total of 39.59 acres of Contra Costa goldfields critical habitat would be permanently removed in the Alternative C project area and approximately 8.55 acres of critical habitat would be temporarily affected by construction of Alternative C.

Alternative C, Phase 1 would not directly affect Contra Costa goldfield plants, but 5.41 acre of its critical habitat would be permanently removed and 0.70 acre would be temporarily affected.

Implementation of the measures to compensate for the loss of Contra Costa goldfields would reduce the severity of this effect.

Indirect effects from adjacent construction activity for Alternatives B and C could affect the eight stands of Contra Costa goldfields outside the construction area but within 250 feet of the temporary impact area. These plants would not be removed for construction but could be indirectly affected by changes in hydrology and siltation from earthmoving activities.

Implementation of measures to install construction barriers, to conduct environmental awareness training and to conduct biological monitoring discussed in Section 3.3.1.1 and the measure to protect water quality and prevent erosion and sedimentation discussed in Section 3.3.2.1 would protect Contra Costa goldfields and wetland habitat, avoiding this potential effect.

Because Contra Costa goldfields is a federally listed species, consultation under FESA would be required for removal of the plants. Loss or disturbance of Contra Costa goldfields and its critical habitat would be considered an adverse effect. The federal lead agency must ensure that its activities do not adversely modify critical habitat to the point that it will no longer aid in the species' recovery. Improvements to SR 12E that are not included in a fundable first phase of an alternative would not be constructed until funding is available, which is not expected until after 2035. The proposed Gentry-Suisun development project includes this same area; therefore, if the Gentry-Suisun project is constructed before the I-80/I-680/SR 12 project, the Contra Costa goldfield plants in the area will have been removed.

Under the No-Build Alternative, no construction activities would occur, and no effects on Contra Costa goldfields or its habitat would occur.

Avoidance, Minimization, and/or Mitigation Measures

See measures to install construction barriers, to conduct environmental awareness training and to conduct biological monitoring discussed in Section 3.3.1.1 and the measure to protect water quality and prevent erosion and sedimentation discussed in Section 3.3.2.1.

Compensate for the Loss of Contra Costa Goldfields

A plan to compensate for the permanent loss of Contra Costa goldfields will be developed and implemented. The Contra Costa goldfields compensation plan will include mitigation for impacts on seasonal wetlands, because the primary constituent elements of critical habitat for the goldfields are associated with seasonal wetlands/vernal pool habitat. The total compensation area

required will be based on vernal pool mitigation requirements for Category 1 conservation zones of moderate and high quality, as outlined in the administrative draft SCWA HCP (Solano County Water Agency 2009).

The Contra Costa goldfields compensation plan will be developed through extensive and well-documented coordination between the Department, resource agency specialists, and conservation groups. Based on the current draft SCWA HCP (2009), compensation for permanent loss (areas directly affected in the project area) of Contra Costa goldfields will consist of restoration of Contra Costa goldfields habitat by transplantation of Contra Costa goldfields onto suitable habitat sites on private property. Restoration will occur at a minimum 4:1 ratio (four acres of vernal pool habitat restored for each one acre of occupied habitat area removed). Suitable restoration habitat will be within pools that lack Contra Costa goldfields. The habitat will either be within the same population area that the seed is taken from or will be a minimum of 0.5 mile from extant Contra Costa goldfields populations in another area.

A qualified restoration ecologist will work with resource agency specialists and knowledgeable individuals to identify a transplantation area and ensure that the area can be managed and protected in perpetuity. Transplanting the Contra Costa goldfields plants will entail the activities listed below.

- Identifying suitable transplant sites within Vernal Pool Critical Habitat Unit 5B that either do not support the goldfields or support a sparse cover of goldfields.
- Moving the plant material and seed bank to the transplant sites.
- Monitoring the transplant sites to document recruitment and survival rates.

The restoration ecologist will develop a detailed transplanting and monitoring plan. The following general steps will be involved in the transplanting and monitoring efforts, as appropriate.

- Conduct a site analysis to document the biotic and physical requirements of the Contra Costa goldfield plants that will be affected by the proposed action. This task will include an evaluation of the plant populations to gather the following information: soil type, soil salinity, plant species associations, aspect, level of disturbance, and surrounding upland vegetation cover and soil type.
- Identify and evaluate sites that may be suitable for transplanting the Contra Costa goldfields. Preferred sites will include pools with neutral soils; saturated conditions through at least mid-spring; and solitary bee nesting habitat, such as mounds and uplands with friable soils. The information identified in the previous bullet item will be gathered for the transplant sites.
- Prepare the transplant sites by excavating the topsoil, roughening the subsoil, presoaking the subsoil, and removing weeds from the surrounding area.
- Excavate the topsoil from the area containing the Contra Costa goldfields that would be directly affected by the proposed action. The topsoil will be excavated with the seed bank and any roots in place (depth of excavation will be determined after further research on the species and site conditions). This excavation will occur after the plants have flowered and set seed (generally by June or July). The excavation will be done by hand or with a truck-

mounted tree spade. The type of equipment chosen will depend on the depth and diameter of excavation required. The topsoil will be placed on the transplant site immediately after excavation. This activity will be conducted or monitored by a botanist to ensure that the appropriate amount of topsoil is removed and placed in the appropriate location. Special project specifications will be developed for removing and relocating soils containing Contra Costa goldfields. A post-transplantation report will be prepared, documenting the measures used to relocate the populations and where they were relocated.

- Protect the transplanted Contra Costa goldfields by installing temporary exclusion fencing with signs around the transplant sites. The purpose of this temporary fencing will be to prevent animals and humans from entering and disturbing the transplant sites during the establishment phase. The fencing will remain in place during the monitoring period or longer, if it appears that the populations could be significantly disturbed by grazing or human encroachment. Grazing might be necessary in and around the transplant area over the long term to prevent overgrowth and encroachment by other species.
- Conduct periodic maintenance visits to ensure that the transplant sites are undisturbed and the fencing is in place. Maintenance activities may consist of manual weeding, supplemental watering, and mending of fences.
- Monitor the transplanted populations to document survival and recruitment rates over a period established in consultation with the resource agencies and vernal pool community experts. The populations will be monitored annually during the flowering period to document success rates and identify remedial actions. The detailed transplanting and monitoring plan will provide specific monitoring protocols and documentation procedures. A copy of the annual monitoring reports and the final monitoring report, with maps of the transplant sites, will be provided to the USFWS and public agencies for their review.

3.3.5.2 Callippe Silverspot Butterfly

Callippe silverspot butterfly was listed as an endangered species in 1997 (FR 62:64306). It has no state status but fits the CEQA definition of a rare species. Callippe silverspot is endemic to the San Francisco Bay Area. Additional populations occur in the Sky Valley–Lake Herman area of southern Solano County; at Sears Point in Sonoma County; and in the area between Dublin, Pleasanton, and Sunol in Alameda County.

Callippe silverspot occurs in grasslands where its sole larval foodplant (Johnny jump-up, or violet [*Viola pedunculata* (Violaceae)]) grows. Callippe silverspot occurs in hilly terrain with a mixture of topographic relief. Adults tend to congregate on prominent hilltops, a behavior known as *hilltopping*, where they search for potential mates. The flight season is usually from about mid-May through early July but may vary depending on seasonal weather conditions. Because of the length of the flight season, adults visit several different flowers to obtain nectar—as the plants flower during different periods of the flight season. When available, favored nectar plants include mints, especially *Monardella*; thistles, such as *Silybum* and *Cirsium;* and buckeyes (*Aesculus*). Flowers of other species may also be visited, depending on their availability at a particular location. Areas where the larval and adult food plants grow do not always coincide with areas where mate location and other behaviors occur. Once the larvae metamorphose, adult butterflies may travel up to several miles to find suitable nectar plants. (Arnold 1981).

Affected Environment

Two populations of Johnny jump-ups, the larval host plant, were identified in the grasslands near the west end of the realignment for Red Top Road north of SR 12W (Volume 2, Figure 3.3-2a, Sheets 5 and 6). During surveys conducted in 2004 (Monk & Associates 2004c), two distinct populations were identified—one of which is within the Alternative B and Alternative C study area. The second population is approximately 300 feet north of the study area.

Environmental Consequences

Potential Loss or Disturbance of Callippe Silverspot Butterfly Resulting from Construction

Alternative B, Alternative C, and Alternative C, Phase 1 all have the potential to destroy or disturb callippe silverspot butterfly or its habitat.

Under Alternative B, Phase 1, no construction is proposed in the vicinity of Red Top Road and SR 12W, therefore there would be no potential for effects.

Avoidance, Minimization, and/or Mitigation Measures

Implementation of the avoidance and minimization measure provided below would reduce the severity of this potential effect.

Avoid and Minimize Potential Direct and Indirect Disturbance of Populations of Callippe Silverspot Butterflies

A qualified biologist will be retained to conduct presence-absence surveys for callippe silverspot butterflies. Surveys will be conducted in the grassland habitat north of SR 12W. Presence-absence surveys consist of a search for larval host plants, larval surveys, followed by adult flight surveys.

Surveys consist of looking for the host larval plant, Johnny jump-ups , during its blooming period (early January through April); and if plants are found then searching for larvae prior to the adult flight season. Larval surveys consist of laying down cover boards and looking for signs of larval feeding damage on the Johnny jump-ups. The number of survey visits for larvae will depend the extent of the plant populations.

Adults usually start flying in mid May which is when the biologist will start weekly surveys until the end of the adult flight season, typically 8-10 adult surveys at approximately weekly intervals (weather permitting). Surveys will also be conducted at the nearby control sites, where butterflies are known to have occurred in the recent past. Because of the lengthy survey period it may be necessary to conduct the surveys the year before construction starts. If butterflies are found, preconstruction surveys for Johnny jump-ups will be conducted the year of construction and populations of Johnny jump-ups found outside of the construction work area will be fenced and flagged to ensure complete avoidance during construction.

3.3.5.3 Vernal Pool Fairy Shrimp/Vernal Pool Tadpole Shrimp

Vernal pool fairy shrimp is listed as threatened under FESA (59 FR 48136). Vernal pool fairy shrimp occurs in the Central Valley from Tehama to Madera Counties and in the eastern margin of the central and southern Coast Ranges from San Benito to Ventura Counties. A disjunct population occurs in Riverside County (Eng et al. 1990). Most known locations are in the Sacramento and San Joaquin Valleys and along the eastern margin of the central Coast Ranges (Eng et al. 1990).

Vernal pool tadpole shrimp is listed as endangered under FESA (59 FR 48136). Vernal pool tadpole shrimp occurs in the Central Valley from Shasta County in the north to Merced County in the south, and a disjunct population occurs in western Alameda County (Rogers 2001).

Vernal pool fairy shrimp and vernal pool tadpole shrimp (listed branchiopods) are restricted to seasonal wetland habitats (e.g., vernal pools and wet swales) in California that provide the necessary environmental conditions. These species produce cysts (eggs) that lie dormant in the soil over summer and hatch when pools fill during the winter rainy season. To complete their life cycle, vernal pool fairy shrimp and vernal pool tadpole shrimp require an annual cycle of inundation during cold and wet winter months, when the water temperature is cool and oxygen concentration is high, contrasted by dry soil conditions during the summer months (Helm 1998; Eriksen and Belk 1999).

Vernal pool fairy shrimp and vernal pool tadpole shrimp are not known to occur in shallow seasonal wetlands that lack a defined basin and do not provide a water column of sufficient depth (>1 inch) and duration (three to four weeks), because such conditions are necessary for reproduction. Similarly, these species do not occur in wetlands that remain wet or damp throughout most of the year (such as seasonal marsh and perennial wetlands) or permanent bodies of water (such as riverine and marine habitats) because these conditions do not allow egg cysts to properly dry and cure (59 FR 48136–48153).

Affected Environment

There are ten records of vernal pool fairy shrimp occurrence reported within ten miles of the study area and 23 records reported from Solano County. Vernal pool tadpole shrimp has been reported to occur in 17 locations within ten miles of the project area and in 30 locations within Solano County (California Natural Diversity Database 2010). The greatest density of occurrence records for these species is reported from south of the project area, near Jepson Prairie. The study area does not occur within designated critical habitat for vernal pool fairy shrimp (71 FR 7117). Vernal Pool Critical Habitat Units 12A and 12B are located in Napa County, approximately six miles west of the study area.

Alternative B

There are 31 suitable habitat features for vernal pool fairy shrimp or vernal pool tadpole shrimp within 250 feet of the Alternative B construction area (i.e., within the study area for vernal pool crustaceans).

Suitable habitat was observed in the areas listed below and illustrated in Figure 3.3-2a in Volume 2.

- Along the north and south sides of SR 12W west of I-80 (Sheets 4–6).
- In disturbed areas on the north side of I-80 (Sheets 11 and 14).
- Along Ramsey Road west of I-680 (Sheets 11 and 14).
- Along the north side of SR 12E between Beck and Pennsylvania Avenues (Sheets 32–34).
- On the south side of SR 12E between Webster Street and Ledgewood Creek (Sheet 32).

Suitable habitat features observed during the habitat assessment were primarily seasonal wetlands. Many of the habitat features occur in disturbed areas that are subject to plowing, disking, stormwater runoff, and other human influences that greatly reduce the ecologic value these habitats provide for listed shrimp species.

Alternative B, Phase 1

Four suitable habitat features for vernal pool fairy shrimp or vernal pool tadpole shrimp are located within 250 feet of the Alternative B, Phase 1 construction area.

Suitable habitat was observed in two locations in the Alternative B, Phase 1 study area as illustrated in Figure 3.3-2b in Volume 2.

- In disturbed areas on the north side of I-80 (Sheets 8 and 17).
- Along the north side of SR 12E between Beck and Pennsylvania Avenues (Sheet 32).

Alternative C

There are 28 suitable habitat features for vernal pool fairy shrimp or vernal pool tadpole shrimp located within 250 feet of the Alternative C project construction area.

During the July 27, 2007, habitat assessment, suitable habitat was indentified in the project areas listed below and illustrated in Figure 3.3-2c in Volume 2.

- Along both the north and south sides of SR 12W west of I-80 (Sheets 4–6).
- In disturbed areas on the north side of I-80 (Sheets 8 and 17).
- Along Ramsey Road west of I-680 (Sheet 11).
- Along the north side of SR 12E between Beck and Pennsylvania Avenues (Sheets 32–34).
- On the south side of SR 12E between Webster Street and the railroad tracks on the edge of Suisun City (Sheet 35).

Alternative C, Phase 1

Nineteen suitable habitat features for vernal pool fairy shrimp or vernal pool tadpole shrimp are located within 250 feet of the project construction area for Alternative C, Phase 1.

Suitable habitat was observed in the project areas listed below and illustrated in Figure 3.3-2d in Volume 2.

- Along the north and south sides of SR 12W west of I-80 (Sheets 4–6).

- In disturbed areas on the north side of I-80. (Sheets 8 and 17).

Environmental Consequences

Potential Loss or Disturbance of Vernal Pool Fairy Shrimp/Vernal Pool Tadpole Shrimp Resulting from Construction

Both build alternatives would result in temporary and permanent impacts on vernal pool fairy shrimp or vernal pool tadpole shrimp. See the discussions below for more specific information

The USFWS generally considers all habitats for listed shrimp species that are located within 250 feet of ground disturbance to be indirectly affected unless suitable habitat is separated from construction activities by a road or other suitable barrier. The acreages below are based on this assumption. Project construction would directly affect suitable seasonal wetlands through excavation and road construction. Indirect impacts on suitable seasonal wetlands that could result from project activities include altered hydrology, soil compaction, introduction of urban stormwater runoff, and increased human activity.

Under the No-Build Alternative, no construction activities would occur, and no effects on vernal pool fairy shrimp or vernal pool tadpole shrimp or their habitat would occur.

Alternative B

Alternative B would directly affect 13 suitable habitat features (all pools within the construction footprint) totaling 1.33 acres of habitat for vernal pool fairy shrimp or vernal pool tadpole shrimp (Table 3.3.5-1 and Volume 2, Figure 3.3-2a). In addition, Alternative B could indirectly affect 18 suitable habitat features (all pools within 250 feet of the construction footprint) totaling 1.71 acres of habitat for these species.

Table 3.3.5-1. Direct and Indirect Impacts on Vernal Pool Fairy and Tadpole Shrimp in the Study Area under Alternative B

Pool Identification Number	Direct Impact	Indirect Impact
W-13 (Sheet 5)	0.28	
W-14 (Sheet 4)	0.08	
W-15 (Sheet 5)	0.19	
W-25 (Sheet 14)	0.21	
W-35 (Sheet 11)		0.01
W-36 (Sheet 11)		0.01
W-37 (Sheet 11)		0.21
W-38 (Sheet 11)		0.08
W-39 (Sheet 11)		0.14
W-45a-2 (Sheet 17)	0.16	
W-45-3 (Sheet 17)	0.02	
W-63 (Sheet 8)	0.02	
W-118 (Sheet 32)		0.04
W-121 (Sheet 34)	0.06	
W-128 (Sheet 33)	0.02	
W-133 (Sheet 32)		0.06
W-134 (Sheet 32)		0.09
W-135 (Sheet 32)		0.28
W-143 (Sheet 4)	0.09	

Pool Identification Number	Direct Impact	Indirect Impact
W-149 (Sheet 5)	0.16	
W-151 (Sheet 6)		0.04
W-154 (Sheet 35)		0.14
W-177 (Sheet 5)		0.07
W-182 (Sheet 6)		0.01
W-183 (Sheet 6)		0.37
W-184 (Sheet 6)		0.06
W-185 (Sheet 6)		0.05
W-186 (Sheet 6)		0.01
W-187 (Sheet 6)	0.01	
W-188 (Sheet 6)		0.04
W-189 (Sheet 6)	0.03	
Total impact (acres)	**1.33**	**1.71**
Total combined impact (acres)	**3.04**	

Alternative B, Phase 1

Alternative B, Phase 1 would directly affect three suitable habitat features encompassing 0.20 acre of habitat for vernal pool fairy shrimp or vernal pool tadpole shrimp. In addition, Alternative B, Phase 1 could indirectly affect one suitable habitat feature encompassing 0.04 acre of habitat for these species (Table 3.3.5-2 and Volume 2, Figure 3.3-2b).

Table 3.3.5-2. Direct and Indirect Impacts on Vernal Pool Fairy and Tadpole Shrimp under Alternative B, Phase 1

Pool Identification Number	Direct Impact	Indirect Impact
W-45a-2 (Sheet 17)	0.16	
W-45-3 (Sheet 17)	0.02	
W-63 (Sheet 8)	0.02	
W-118 (Sheet 32)		0.04
Total impact (acres)	**0.20**	**0.04**
Total combined impact (acres)	**0.24**	

Alternative C

Project construction would directly affect suitable seasonal wetlands through excavation and road construction. Alternative C would directly affect 13 suitable habitat features totaling 1.51 acres of habitat for vernal pool fairy shrimp or vernal pool tadpole shrimp. In addition, Alternative C could indirectly affect 15 suitable habitat features totaling 1.10 acres of habitat for these species (Table 3.3.5-3 and Volume 2, Figure 3.3-2c).

Table 3.3.5-3. Direct and Indirect Impacts on Vernal Pool Fairy and Tadpole Shrimp under Alternative C

Pool Identification Number	Direct Impact	Indirect Impact
W-13 (Sheet 5)	0.28	
W-14 (Sheet 4)	0.08	
W-15 (Sheet 5)	0.19	
W-25 (Sheet 14)		0.21
W-35 (Sheet 11)		0.01
W-36 (Sheet 11)		0.01
W-37 (Sheet 11)		0.21
W-38 (Sheet 11)		0.08
W-39 (Sheet 11)		0.14
W-45a-2 (Sheet 17)	0.16	

Pool Identification Number	Direct Impact	Indirect Impact
W-45-3 (Sheet 17)		0.02
W-63 (Sheet 8)	0.02	
W-118 (Sheet 32)		0.04
W-121 (Sheet 34)	0.06	
W-128 (Sheet 33)	0.02	
W-143 (Sheet 4)	0.09	
W-149 (Sheet 5)	0.16	
W-151 (Sheet 6)	0.04	
W-154 (Sheet 36)		0.14
W-177 (Sheet 5)		0.07
W-182 (Sheet 6)		0.01
W-183 (Sheet 6)	0.37	
W-184 (Sheet 6)		0.06
W-185 (Sheet 6)		0.05
W-186 (Sheet 6)		0.01
W-187 (Sheet 6)	.01	
W-188 (Sheet 6)		0.04
W-189 (Sheet 6)	0.03	
Total impact (acres)	**1.51**	**1.10**
Total combined impact (acres)	**2.61**	

Alternative C, Phase 1

Alternative C, Phase 1 would directly affect 12 suitable habitat features totaling 1.45 acres of habitat for vernal pool fairy shrimp or vernal pool tadpole shrimp (Table 3.3.5-4 and Volume 2, Figure 3.3-2d). The direct impact acreage for Alternative C, Phase 1 includes construction of a bike trail north of SR 12W that is not part of the full build alternative, and the bike trail would cross one wetland not directly affected by the full build alternative (W-183) and indirectly affect another wetland (W-184). In addition, Alternative C, Phase 1 could indirectly affect seven suitable habitat features totaling 0.26 acre of habitat for these species.

Table 3.3.5-4. Direct and Indirect Impacts on Vernal Pool Fairy and Tadpole Shrimp under Alternative C, Phase 1

Pool Identification Number	Direct Impact	Indirect Impact
W-13 (Sheet 5)	0.28	
W-14 (Sheet 4)	0.08	
W-15 (Sheet 5)	0.19	
W-45a-2 (Sheet 17)	0.16	
W-45-3 (Sheet 17)	0.02	
W-63 (Sheet 8)	0.02	
W-128 (Sheet 33)		0.02
W-143 (Sheet 4)	0.09	
W-149 (Sheet 5)	0.16	
W-151 (Sheet 6)	0.04	
W-177 (Sheet 5)		0.07
W-182 (Sheet 6)		0.01
W-183 (Sheet 6)	0.37	
W-184 (Sheet 6)		0.06
W-185 (Sheet 6)		0.05
W-186 (Sheet 6)		0.01

Pool Identification Number	Direct Impact	Indirect Impact
W-187 (Sheet 6)	0.01	
W-188 (Sheet 6)		0.04
W-189 (Sheet 6)	0.03	
Total impact (acres)	**1.45**	**0.26**
Total combined impact	**1.71**	

Avoidance, Minimization, and/or Mitigation Measures

See avoidance, minimization and/or mitigation measure to protect water quality and prevent erosion and sedimentation in Section 3.2.2.1 and the measures below.

Avoid and Minimize Potential Indirect Disturbance of Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp Habitat

To the extent possible, potential indirect disturbance of vernal pool fairy shrimp and vernal pool tadpole shrimp habitat will be avoided and minimized by implementing the following measures.

- The on-site biological monitor will be present during all ground-disturbing activities occurring within 250 feet of suitable habitat to ensure that habitat is avoided, will have the authority to stop all construction activities that may result in the destruction of habitat, and will immediately report any unauthorized impacts to the USFWS.
- Construction activities occurring within 250 feet of suitable habitat will be conducted between June 1 and October 15.
- Activities that are inconsistent with the maintenance of suitability of avoided habitat and associated watershed, including alteration of topography, dumping, burning, burying of garbage or fill materials, construction of access roads, killing or removal of existing native vegetation, placement of stormwater drains, and use of pesticides or other toxic chemicals, will be prohibited.

Compensate for Loss of Direct and Indirect Impacts on Vernal Pool Fairy Shrimp or Vernal Pool Tadpole Shrimp Habitat

Loss of all suitable habitat for vernal pool fairy shrimp or vernal pool tadpole shrimp that occurs within 250 feet of the project area will be compensated for. Direct effects on habitat for vernal pool fairy and tadpole shrimp will be compensated for at a ratio of 3:1 because the effect is permanent. Temporary or indirect effects will be compensated for at a minimum ratio of 1.1:1.

However, actual compensation ratios will be determined through consultation with the USFWS. Compensation will be implemented through purchase of mitigation credits at a USFWS-approved bank. It may be possible to compensate for some or all of the impacts on fairy shrimp habitat through implementation of the mitigation measure to compensate for permanent loss of wetlands (in Section 3.3.2.3).

3.3.5.4 Valley Elderberry Longhorn Beetle (VELB)

VELB is federally listed as a threatened species (45 FR 52803). This species was first described in 1921 from specimens collected in Sacramento (U.S. Fish and Wildlife Service 1984). The

species' range extends throughout the associated foothills of the Central Valley in California, from Kern County in the south to Shasta County in the north (Jones & Stokes Associates 1985, 1986, 1987).

VELB is closely associated with elderberry, the host plant for beetle larvae. Elderberry is considered a typical riparian shrub (Roberts et al. 1977; Katibah et al. 1984; Warner 1984) in California. Blue elderberry is a hardy shrub that successfully grows in a variety of riparian habitat types. In a study of Sacramento Valley riparian vegetation, Conard et al. (1977) found that elderberry grows mainly at an intermediate elevation in the floodplain, in association with box elder and buttonbush. Where a source of water exists, elderberry shrubs grow in nonriparian habitats. However, most VELB occurrences are known from elderberry shrubs in or adjacent to riparian communities.

Affected Environment

Information on all elderberry shrubs in the study area is provided below in Table 3.3.5-5. The table also notes which alternative would affect each shrub.

Twenty-two shrubs were identified in the study area. Locations of all the shrubs are shown in Figure 3.3-2a, 2b, 2c, 2d - Sheets 7, 17, 18, and 21 in Volume 2. Shrubs 1–15 were located during field surveys in 2007. Shrubs 16–22 were located on the east side of Dan Wilson Creek during field surveys in 2004 conducted for the City of Fairfield Corporate Commons EIR (RBF Consulting 2005). No exit holes (which would indicate the presence of VELB) were observed in any elderberry stem measuring 1.0 inch or more in diameter at ground level within the project area.

In 2004, the seven elderberry shrubs (shrubs 16-22) adjacent to Dan Wilson Creek appeared to have been cut back to the ground in the preceding couple of years, as evidenced by the large amount of new growth that appeared to be growing from existing parent material, as well as the presence of large remnants of cut elderberry stems. Although only a few of the living elderberry stems on the seven shrubs measured at least one inch in diameter at the time of the 2004 field surveys, these shrubs appeared to be growing rapidly, and a number of additional stems are likely to have attained a diameter of one inch or more by the end of the 2010 growing season and in subsequent growing seasons.

Table 3.3.5-5. Summary of Stem Counts for All Elderberry Shrubs In the Study Area

Shrub	Presence of Exit Holes?	Riparian Habitat?	Number of Stems (by Diameter)			Comments
			One to Three Inches	Three to Five Inches	More than Five Inches	
1	No	Yes	3	4	1	South side of SR 12, northwest of I-80; clump with very old stems
2	Yes	Yes	2	1	1	North side of SR 12, northwest of I-80
3	Yes, old hole	Yes	0	0	1	North side of SR 12W, northwest of I-80; very large tree
4	No	Yes	3	1	1	North side of SR 12W, northwest of I-80; one shrub with several stems
5	No	Yes	2	1	2	North side of SR 12W, northwest of I-80
6	No	Yes	0	1	1	North side of SR 12W, northwest of I-80; small tree

Shrub	Presence of Exit Holes?	Riparian Habitat?	Number of Stems (by Diameter)			Comments
			One to Three Inches	Three to Five Inches	More than Five Inches	
7	No	Yes	2	0	1	South side of SR 12W, near a homeless encampment; small tree
8	No	Yes	0	0	3	South side of SR 12W
9	No	Yes	0	4	2	South side of SR 12W; clump is three meters in diameter
10	No	Yes	0	2	1	South side of SR 12W
11	No	Yes	3	2	2	North side of I-80 along frontage road; short shrub on roadside
12	No	Yes	15	0	0	North side of I-80 along frontage road; ~100 stems that are less than one inch
13	No	Yes	2	1	4	On Green Valley Road; large shrub in urban area, evidence of pruning
14	No	Yes	2	1	2	On Green Valley Road
15	No	Yes	2	0	0	On Green Valley Road
16	No	Yes	4	0	0	Numerous smaller stems that are almost one inch
17	No	Yes	1	0	0	New growth, with stems almost one inch
18	No	Yes	0	0	0	Abundant new growth from this year, and many stems may be 1 inch by end of growing season
19	No	Yes	0	0	0	Abundant new growth from this year, and many stems may be 1 inch by end of growing season
20	No	Yes	2	0	0	One large clump of stems and another smaller clump very close; many stems are almost one inch
21	No	Yes	1	0	0	Large shrub with numerous smaller stems that are almost one inch
22	No	Yes	0	0	0	Small shrub farther upland from other shrubs; stems are very small and appear to be growing slowly
Overall total			**44**	**18**	**22**	

Alternative B

Under Alternative B, 12 elderberry shrubs were identified in the following three locations. The number and size of stems present on each shrub and riparian habitat associations for each shrub are listed in Table 3.3.5-5 and illustrated in Figure 3.3-2a in Volume 2.

- Along Green Valley Creek north of I-80 (Sheet17 and 18).
- Adjacent to the east side of Dan Wilson Creek (Sheet 21).
- Along the north and south sides of SR 12W in the vicinity of Jameson Canyon Creek in the project area (Sheet 7).

Alternative B, Phase 1

In the project area for Alternative B, Phase 1, one elderberry shrub was identified in one location along Green Valley Creek north of I-80 (Volume 2, Figure 3.3-2b, Sheet 18).

Alternative C

In the Alternative C study area, 11 elderberry shrubs were identified in three locations, as illustrated in Figure 3.3-2c in Volume 2.

- Along Green Valley Creek north of I-80 (Sheet 17).
- Adjacent to the east side of Dan Wilson Creek (Sheet 21).

- Along the north and south sides of SR 12W in the vicinity of Jameson Canyon (Sheet 7).

Alternative C, Phase 1

Ten elderberry shrubs were identified in one location.

- Along the north and south sides of SR 12W in the vicinity of Jameson Canyon Creek in the project area (Volume 2, Figure 3.3-2d, Sheet 7).

Environmental Consequences

Potential Loss of VELB Habitat Resulting from Construction

Both build alternatives would directly affect (by removal or transplanting) VELB habitat (elderberry shrubs) although Alternative B, Phase 1 would only indirectly affect elderberry shrubs.

Possible indirect effects on VELB potentially occurring within 100 feet of the construction work area include increases in dust accumulation on shrubs from ground-disturbing activities and removal of associated woodland species. Tree and shrub removal activities within the study area would be minimized and would involve only the removal of trees and shrubs necessary to construct the proposed project; however, ground-disturbing activities occurring within 100 feet of an elderberry shrub could cause an accumulation of dust on elderberry shrubs, altering VELB habitat. Although implementation of the build alternatives would not change the hydrology of the existing habitat, excavation and grading in the vicinity of an elderberry shrub could damage the root system, resulting in death of the shrub.

Construction activities associated with Alternative B would directly affect 11 elderberry shrubs, as listed in Table 3.3.5-6. Shrub 16 is more than 20 feet but less than 100 feet from proposed construction activities for Alternative B, and could be indirectly affected by construction.

Table 3.3.5-6. Summary of Elderberry Shrub Effects under Alternative B

Shrub	Presence of Exit Holes?	Riparian Habitat?	Number of Stems (by Diameter)			Effect on Shrub (None, Direct, or Indirect)
			One to Three Inches	Three to Five Inches	More than Five Inches	
1	No	Yes	3	4	1	Direct
2	Yes	Yes	2	1	1	Direct
3	Yes, old hole	Yes	0	0	1	Direct
4	No	Yes	3	1	1	Direct
5	No	Yes	2	1	2	Direct
6	No	Yes	0	1	1	Direct
7	No	Yes	2	0	1	Direct
8	No	Yes	0	0	3	Direct
9	No	Yes	0	4	2	Direct
10	No	Yes	0	2	1	Direct
11	No	Yes	3	2	2	Direct
16	No	Yes	4	0	0	Indirect

Shrub	Presence of Exit Holes?	Riparian Habitat?	Number of Stems (by Diameter)			Effect on Shrub (None, Direct, or Indirect)
			One to Three Inches	Three to Five Inches	More than Five Inches	
No effect			25	2	6	
Indirect total			4	0	0	
Direct total			15	16	16	
Overall total			**44**	**18**	**22**	

Alternative B, Phase 1 would directly affect one shrub during construction, as listed in Table 3.3.5-7. Alternative B, Phase 1 would not indirectly affect any shrubs.

Table 3.3.5-7. Summary of Elderberry Shrub Effects under Alternative B, Phase 1

Shrub	Presence of Exit Holes?	Riparian Habitat?	Number of Stems (by Diameter)			Effect on Shrub (None, Direct, or Indirect)
			One to Three Inches	Three to Five Inches	More than Five Inches	
11	No	Yes	3	2	2	Direct
Indirect totals			0	0	0	
Direct totals			3	2	2	
Overall totals			**3**	**2**	**2**	

Alternative C would directly affect ten shrubs, as listed in Table 3.3.5-8. Shrub 16 is more than 20 feet and less than 100 feet from, proposed construction activities for Alternative C, and could be indirectly affected by construction.

Table 3.3.5-8. Summary of Elderberry Shrub Effects under Alternative C

Shrub	Presence of Exit Holes?	Riparian Habitat?	Number of Stems (by Diameter)			Effect on Shrub (None, Direct, or Indirect)
			One to Three Inches	Three to Five Inches	More than Five Inches	
1	No	Yes	3	4	1	Direct
2	Yes	Yes	2	1	1	Direct
3	Yes, old hole	Yes	0	0	1	Direct
4	No	Yes	3	1	1	Direct
5	No	Yes	2	1	2	Direct
6	No	Yes	0	1	1	Direct
7	No	Yes	2	0	1	Direct
8	No	Yes	0	0	3	Direct
9	No	Yes	0	4	2	Direct
10	No	Yes	0	2	1	Direct
16	No	Yes	4	0	0	Indirect
No effects			28	4	8	
Indirect totals			4	0	0	
Direct totals			12	14	14	
Overall totals			**44**	**18**	**22**	

Alternative C, Phase 1 would directly affect shrubs 1–10 during construction, as listed in Table 3.3.5-9. Shrub 11 is within 100 feet of construction but is separated by a road from construction activities and would not be affected.

Table 3.3.5-9. Summary of Elderberry Shrub Effects under Alternative C, Phase 1

Shrub	Presence of Exit Holes?	Riparian Habitat?	Number of Stems (by Diameter)			Effect on Shrub (None, Direct, or Indirect)
			One to Three Inches	Three to Five Inches	More than Five Inches	
1	No	Yes	3	4	1	Direct
2	Yes	Yes	2	1	1	Direct
3	Yes, old hole	Yes	0	0	1	Direct
4	No	Yes	3	1	1	Direct
5	No	Yes	2	1	2	Direct
6	No	Yes	0	1	1	Direct
7	No	Yes	2	0	1	Direct
8	No	Yes	0	0	3	Direct
9	No	Yes	0	4	2	Direct
10	No	Yes	0	2	1	Direct
Indirect total			0	0	0	
Direct total			12	14	14	
Overall total			**12**	**14**	**14**	

Under the No-Build Alternative, no construction activities would occur, and no impacts on VELB or its habitat would occur.

Avoidance, Minimization, and/or Mitigation Measures

See avoidance, minimization and/or mitigation measures in Section 3.3.1.1 and measures below. For the compensation measure below, minimization ratio tables are provided specific to each build alternative.

Establish a Minimum 20-Foot-Wide Buffer around All Elderberry Shrubs Where Feasible

Before any ground-disturbing activity, a minimum 4-foot-tall temporary, plastic mesh–type construction fence (Tensor Polygrid or equivalent) will be installed at least 20 feet from the driplines of elderberry shrubs that will be retained in the study area (shrub 16). This fencing is intended to prevent encroachment by construction vehicles and personnel, and to prevent inadvertent trimming of elderberry shrubs and associated riparian vegetation. The exact location of the fencing will be determined by a qualified biologist, with the goal of protecting habitat for VELB.

The fencing will be strung tightly on posts set at a maximum interval of ten feet. The fencing will be installed in a way that prevents equipment from enlarging the work area beyond the delineated work area. The fencing will be checked and maintained weekly until all construction is completed. This buffer zone will be marked by a sign stating, “This is habitat of the valley elderberry longhorn beetle, a threatened species, and must not be disturbed. This species is protected by the Endangered Species Act of 1973, as amended. Violators are subject to prosecution, fines, and imprisonment.”

No construction activity, including grading, will be allowed until this condition is satisfied. No grading, clearing, storage of equipment or machinery, or other disturbance or activity may occur

until a representative of the Department has inspected and approved all temporary construction fencing. The fencing and a note reflecting this condition will be shown on the construction plans.

Implement Dust Control Measures

Dust control measures will be implemented for all ground-disturbing activities in the project area. These measures may include application of water to graded and disturbed areas that are unvegetated. To avoid attracting Argentine ants, at no time will water be sprayed within the driplines of elderberry shrubs.

Compensate for Direct Effects on Valley Elderberry Longhorn Beetle Habitat

Direct effects on VELB will be compensated for through a combination of replacement plantings and transplantation. Compensation for impacts on VELB will include replacement plantings of elderberry seedlings or cuttings and associated native plantings in a USFWS-approved conservation area, at a ratio between 1:1 and 8:1 (ratio of new plantings to affected stems), depending on the diameter of the stem at ground level, the presence or absence of exit holes, and whether the shrub is located in riparian habitat (Table 3.3.5-10).

Table 3.3.5-10. USFWS-Approved Compensation Ratios for VELB Habitat

Location	Stems (diameter in inches at ground level)	Exit Holes?	Elderberry Seedling Ratio	Associated Native Plant Ratio[a]
Nonriparian	1–3	No: Yes:	1:1 2:1	1:1 2:1
Nonriparian	3–5	No: Yes:	2:1 4:1	1:1 2:1
Nonriparian	≥5	No: Yes:	3:1 6:1	1:1 2:1
Riparian	1–3	No: Yes:	2:1 4:1	1:1 2:1
Riparian	3–5	No: Yes:	3:1 6:1	1:1 2:1
Riparian	>5	No: Yes:	4:1 8:1	1:1 2:1

[a] Ratio of native trees/plants to each elderberry seedling.

Before construction begins, all elderberry shrubs that are directly affected will be transplanted to a conservation area according to USFWS-approved procedures outlined in the VELB Guidelines (U.S. Fish and Wildlife Service 1999). Some of the shrubs may be too large to transplant or their removal would destabilize creek banks; accordingly, additional compensation may be required. Elderberry seedlings or cuttings and associated native plant species will be planted in a USFWS-approved conservation area. A map and written details identifying the conservation area will be provided to the USFWS before initiation of the mitigation program in order to obtain USFWS approval that the conservation area is acceptable. Elderberry shrubs will be transplanted only during the plant's dormant phase (November through the first two weeks of February). A qualified biological monitor will remain on site while the shrubs are being transplanted. Evidence of VELB occurrence in the conservation area, the condition of the elderberry shrubs in the conservation area, and the general condition of the conservation area itself will be monitored and reported to the USFWS over a period of ten consecutive years, or for seven years over a 15-year period from the date of transplanting. As specified in the VELB Guidelines, the report will

include information on timing and rate of irrigation, growth rates, and survival rates and mortality. To meet the success criteria specified in the VELB Guidelines, a minimum survival rate of 60% of the original number of elderberry replacement plantings and associated native plants must be maintained throughout the monitoring period.

Alternative B

The minimum numbers of elderberry cuttings or seedlings and native plants required to compensate for effects under Alternative B are provided in Table 3.3.5-11.

Table 3.3.5-11. Affected Elderberry Plant Minimization Ratios Based on Location, Stem Diameter, and Presence of Exit Holes under Alternative B

Location	Stems	Holes	Number of Stems	Elderberry Ratios (multiply number of stems by)	Elderberry Planting	Associated Native Planting	Native Ratios
Non-riparian	≥ 1 inch and ≤ 3 inches	No	0	1	0	0	1
		Yes	0	2	0	0	2
Non-riparian	> 3 inches and < 5 inches	No	0	2	0	0	1
		Yes	0	4	0	0	2
Non-riparian	≥ 5 inches	No	0	3	0	0	1
		Yes	0	6	0	0	2
Riparian	≥ 1 inch and ≤ 3 inches	No	13	2	26	26	1
		Yes	2	4	8	16	2
Riparian	> 3 inches and < 5 inches	No	15	3	45	45	1
		Yes	1	6	6	12	2
Riparian	≥ 5 inches	No	14	4	56	56	1
		Yes	2	8	16	32	2
Totals			**47**		**157**	**187**	
Total acres needed for compensation				**1.42**			

Alternative B, Phase 1

The minimum numbers of elderberry cuttings or seedlings and native plants required to compensate for proposed project effects are provided in Table 3.3.5-12.

Table 3.3.5-12. Affected Elderberry Plant Minimization Ratios Based on Location, Stem Diameter, and Presence of Exit Holes under Alternative B, Phase 1

Location	Stems	Holes	Number of Stems	Elderberry Ratios (multiply number of stems by)	Elderberry Planting	Associated Native Planting	Native Ratios
Non-riparian	1–3	No	0	1	0	0	1
		Yes	0	2	0	0	2
Non-riparian	3–5	No	0	2	0	0	1
		Yes	0	4	0	0	2
Non-riparian	>5	No	0	3	0	0	1
		Yes	0	6	0	0	2
Riparian	1–3	No	3	2	6	6	1
		Yes	0	4	0	0	2
Riparian	3–5	No	2	3	6	6	1
		Yes	0	6	0	0	2
Riparian	>5	No	2	4	8	8	1
		Yes	0	8	0	0	2
Totals			**7**		**20**	**20**	
Total acres needed for compensation				**0.17**			

Alternative C

The minimum numbers of elderberry cuttings or seedlings and native plants required to compensate for proposed project effects under Alternative C are shown in Table 3.3.5-13.

Table 3.3.5-13. Affected Elderberry Plant Minimization Ratios Based on Location, Stem Diameter, and Presence of Exit Holes under Alternative C

Location	Stems (diameter in inches at ground level)	Holes	Number of Stems	Elderberry Ratios (multiply number of stems by)	Elderberry Planting	Associated Native Planting	Native Ratios
Non-riparian	1–3	No	0	1	0	0	1
		Yes	0	2	0	0	2
Non-riparian	3–5	No	0	2	0	0	1
		Yes	0	4	0	0	2
Non-riparian	>5	No	0	3	0	0	1
		Yes	0	6	0	0	2
Riparian	1–3	No	10	2	20	20	1
		Yes	2	4	8	16	2
Riparian	3–5	No	13	3	39	39	1
		Yes	1	6	6	12	2
Riparian	>5	No	12	4	48	48	1
		Yes	2	8	16	32	2
Totals			**40**		**137**	**167**	
Total acres needed for compensation				**1.26**			

Alternative C, Phase 1

The minimum numbers of elderberry cuttings or seedlings and native plants required to compensate for effects under Alternative C, Phase 1 are provided in Table 3.3.5-14.

Table 3.3.5-14. Affected Elderberry Plant Minimization Ratios Based on Location, Stem Diameter, and Presence of Exit Holes under Alternative C, Phase 1

Location	Stems	Holes	Number of Stems	Elderberry Ratios (multiply number of stems by)	Elderberry Planting	Associated Native Planting	Native Ratios
Non-riparian	1–3	No	0	1	0	0	1
		Yes	0	2	0	0	2
Non-riparian	3–5	No	0	2	0	0	1
		Yes	0	4	0	0	2
Non-riparian	>5	No	0	3	0	0	1
		Yes	0	6	0	0	2
Riparian	1–3	No	10	2	20	20	1
		Yes	2	4	8	16	2
Riparian	3–5	No	13	3	39	39	1
		Yes	1	6	6	12	2
Riparian	>5	No	12	4	48	48	1
		Yes	2	8	16	32	2
Totals			**40**		**137**	**167**	
Total acres needed for compensation				**1.26**			

3.3.5.5 California Red-Legged Frog

CRLF is listed as threatened under FESA and is a state species of special concern. Historically, CRLF was common from Redding to Baja California, including the Sierra Nevada and Coast Ranges. Its current range is much reduced, and most remaining populations are found in central California along the coast, from Marin to Ventura Counties.

CRLFs breed in lowland and foothill streams and wetlands, including livestock ponds (Jennings and Hayes 1994). They may also be found in upland habitats near breeding areas and along intermittent drainages connecting wetlands. Adults may take refuge during dry periods in rodent holes or leaf litter in riparian habitats. Although CRLFs typically remain near streams or ponds, studies in Santa Cruz suggest that they are capable of moving one mile or more in upland habitat or through ephemeral drainages (Bulger 1999).

The CNDDB lists 15 records for CRLF within a 5-mile radius of the project area (California Natural Diversity Database 2010). The nearest records are on the Mangels property associated with a pond and intermittent drainage. The remaining 13 records are from one to five miles south and west of the project area (Volume 2, Figure 3.3-3).

The USFWS published a final rule to revise critical habitat for CRLF on March 17, 2010 (75 FR 12816). The designation of critical habitat requires federal agencies to consult with the USFWS regarding any action that could destroy or adversely modify critical habitat.

Affected Environment

ICF conducted a CRLF site assessment in 2007 within the study area and within 1 mile of the study area. The biologists assessed habitat suitability in 17 sites within the study area and in one creek and 14 ponds within 1 mile of the study area (Figure 3 from *Site Assessment for California*

Red-legged Frog for the Interstate 80/Interstate 680/State Route 12 Interchange Project, submitted to the U.S. Fish and Wildlife Service (USFWS) on March 3, 2009, for review (2009). No CRLFs were observed within or adjacent to the study area during the site assessment surveys. USFWS biologist John Cleckler (email, July 2, 2010) reviewed the 2009 site assessment and stated that the Service considers all undeveloped habitat north of I-80 as potential CRLF habitat.

Monk & Associates (2003a, 2003b; 2004a, 2004b) also conducted site assessments and protocol-level surveys in several locations within the current study area including in ponds, seasonal wetlands, and seasonal drainages on the Mangels property north of SR 12W and in Jameson Canyon Creek, Dan Wilson Creek, and Suisun Creek. They found CRLF adults and tadpoles in the pond (just north of W-150) and in an intermittent drainage (OW-161, which includes W-177 and W-178 on the Mangels property) (Volume 2, Figure 3.3-4a, Sheet 5).

Upland habitat was defined as suitable if it was within one mile of aquatic habitat and there were no substantial barriers to CRLF movement including heavily traveled roads, development, and railroads. Suitable upland habitat includes all alkali seasonal marsh, woodlands, annual grassland, riparian woodland, upland scrub, and seasonal wetlands that were too shallow and ephemeral to provide aquatic habitat.

Alternative B

Suitable aquatic habitat for CRLF occurs in the following locations of the Alternative B study area (Volume 2, Figure 3.3-4a).

- The perennial marsh mitigation area east of Green Valley Creek (W-45e-1) (Sheets 17 and 18)
- Perennial marsh (W-150) (Sheet 5)
- Jameson Canyon Creek (OW-8) and its tributaries (OW-8a, OW-8b, OW-8d) (Sheets 4, 7)
- The unnamed drainage north of SR 12W (OW-161) (Sheet 5)
- Green Valley Creek (W-45)(Sheets 17, 18)
- Dan Wilson Creek (W-53 and OW-53) (Sheet 21)
- Suisun Creek (OW-56) (Sheet 22)

The portion of the study area in the realignment for Red Top Road north of SR 12W is within critical habitat for CRLF.

Alternative B, Phase 1

There are five locations for CRLF aquatic habitat under Alternative B, Phase 1: Green Valley Creek (W-45), an adjacent perennial marsh (W-45e-1), and Jameson Canyon Creek (OW-8), and Dan Wilson Creek (W-53 and OW-53), (Volume 2, Figure 3.3-4b, Sheets 7, 17, 18, and 21).

There is no critical habitat for CRLF in the footprint of this alternative.

Alternative C

Suitable habitat under Alternative C is the same as that described above for Alternative B

Alternative C, Phase 1

Suitable aquatic habitat for CRLF occurs in the following locations of the Alternative C, Phase 1 study area (Volume 2, Figure 3.3-4d).

- A perennial marsh north of SR 12W (W-150) (Sheet 5).
- A seasonal drainage west of SR 12-W (OW-8d) (Sheet 3).
- A seasonal drainage (OW-161) (Sheet 5).
- Green Valley Creek (Sheets 17 and 18).

The portion of the study area in the realignment for Red Top Road north of SR 12W is within critical habitat for CRLF.

Environmental Consequences

Potential Loss of CRLF and its Habitat Resulting from Construction

Both build alternatives could result in temporary and permanent effects to CRLF and its habitat from construction. In addition, both build alternatives are likely to adversely affect CRLF critical habitat.

Construction activities associated with road construction and bridge widening in potential CRLF habitat in the project area could result in indirect effects on water quality downstream from the construction work area. Increased sedimentation could reduce the suitability of CRLF habitat downstream of the construction area by filling in pools and smothering eggs. Accidental spills of toxic fluids also could result in the subsequent mortality of CRLFs if these substances flow downstream from the construction area and CRLFs are present. Under Alternative B, Alternative C, and Alternative C, Phase 1, construction of the project would fill in a portion of a drainage (OW-161) that is upstream from CRLF occurrences (W-177 and W-178) (Volume 2, Figures 3.3-4a, Sheet 5; 3.3-4c, Sheet 5; and 3.3-4d, Sheet 5). In addition, the road extension will reduce migration opportunities between critical habitat that encompasses the Mangels pond (where CRLF adults and tadpoles have been observed) and W-150 and currently contiguous critical habitat to the north, potentially resulting in substantial mortality to dispersing CRLFs. The federal lead agency must ensure that its activities do not adversely modify critical habitat to the point that it will no longer aid in the species' recovery.

Under the No-Build Alternative, no construction activities would occur, and no impacts on CRLF or its habitat would occur.

Alternative B

Construction of Alternative B would result in both temporary disturbance and permanent loss of both aquatic and upland habitat for CRLF in the following locations within the project footprint (Volume 2, Figure 3.3-4a).

- The perennial marsh mitigation area east of Green Valley Creek (W-45e-1) (Sheets 17 and 18), for a new off-ramp from westbound I-80 to Green Valley Road.
- Perennial marsh (W-150) (Sheet 5) for road widening on SR 12W.

- Replacement and lengthening of culverts in Jameson Canyon Creek (OW-8) (Sheet 7) and its tributaries (OW-8a, OW-8b) (Sheets 3 and 4) for the realignment of Red Top Road and construction of on- and off-ramps for SR 12W.
- Widening of SR 12W and construction of westbound on- and off-ramps for SR 12W (OW-8d) (Sheets 3 and 4).
- Grading and culverting of the unnamed drainage within the extension of Red Top Road north of SR 12W (OW-161) (Sheet 5).
- Green Valley Creek for the Green Valley Creek bridge (W-45) (Sheets 17 and 18).
- Removal and replacement of the bridge over Dan Wilson Creek (W-53 and OW-53) (Sheet 21)).
- Suisun Creek for the widening of I-80 (OW-56) (Sheet 22).

Construction within the potential CRLF sites identified above would result in the temporary disturbance of 2.20 acres and the permanent loss of 1.25 acres of potential CRLF aquatic habitat. Additionally, Alternative B would result in the loss of 105.89 acres and temporary disturbance of 36.40 acres of upland habitat within one mile of suitable aquatic habitat. Most of this habitat occurs within a highly disturbed area along I-80/I-680/SR 12W and SR 12E.

Construction in the portion of the study area in the extension of Red Top Road north of SR 12W is within critical habitat for CRLF (Volume 2, Figure 3.3-4a, Sheets 4–7). Approximately 16.47 acres of critical habitat would be permanently affected and 2.94 acres would be temporarily affected by construction. In addition, the new road would reduce migration opportunities and increase mortality for CRLF for the approximately 65 acres of critical habitat surrounding Mangels pond. There will be an undercrossing paralleling the creek to allow cattle access. Although this undercrossing will provide a movement corridor, because CRLFs do not travel in straightline movements, there could still be substantial mortality from the new road. CRLFs could be directly affected by construction activities occurring in or adjacent to all of the locations described above. If CRLFs are present within the construction work area, they could be inadvertently killed or wounded by construction vehicles, construction personnel, and accidental spill of toxic fluids (e.g., gasoline and other petroleum-based products). If CRLFs must be captured and relocated outside the construction work area, they could be exposed to increased risks of disease, predation, and competition that could result in increased mortality.

Alternative B, Phase 1

Construction of Alternative B, Phase 1 would affect CRLF aquatic habitat in the three locations described above in the affected environment (Volume 2, Figure 3.3-4b).

Potential upland habitat occurs within one mile of the aquatic habitat (Volume 2, Figure 3.3-4b, all sheets). Construction within the potential CRLF site identified above would result in the temporary disturbance of 1.45 acres and the permanent loss of 0.16 acre of potential CRLF aquatic habitat. Additionally, Alternative B, Phase 1 would result in the loss of 54.70 acres and temporary disturbance of 1.52 acres of upland habitat. This habitat occurs within a highly disturbed area along I-80/I-680/SR 12W and SR 12E.

Construction effects under Alternative B, Phase 1 would be similar to those described for Alternative B.

Alternative C

Construction of Alternative C would result in temporary disturbance and permanent loss of both aquatic and upland habitat for CRLF in the following locations within the project footprint (Volume 2, Figure 3.3-4c).

- Perennial marsh (W-150) (Sheet 5) for road widening on SR 12W.
- Replacement and lengthening of culverts in Jameson Canyon Creek (OW-8) (Sheet 7) and its tributaries (OW-8a, OW-8b) (Sheets 3 and 4) for the realignment of Red Top Road and construction of on- and off-ramps for SR 12W.
- Widening of SR 12W and construction of westbound on- and off-ramps for SR 12W (W-8d) (Sheets 3 and 4).
- Grading and culverting of the unnamed drainage for the extension of Red Top Road north of SR 12W (OW-161) (Sheet 5).
- Green Valley Creek for the Green Valley Creek bridge (W-45) (Sheets 17 and 18).
- Removal and replacement of the bridge over Dan Wilson Creek (W-53 and OW-53) (Sheet 21).
- Suisun Creek for the widening of I-80 (OW-56) (Sheet 22).
- The perennial marsh mitigation area east of Green Valley Creek (W-45e-1) (Sheets 17 and 18) for a new off-ramp from westbound I-80 to Green Valley Road.

Construction in the potential CRLF sites identified above would result in the temporary disturbance of 0.36 acre and the permanent loss of 1.56 acres of potential CRLF aquatic habitat. Additionally, Alternative C would result in the loss of 126.57 acres and temporary disturbance of 30.99 acres of upland habitat for CRLF.

Construction on the extension of Red Top Road north of SR 12W would temporarily affect 1.51 acres and permanently affect 21.50 acres of critical habitat. In addition, approximately 65 acres of critical habitat would be isolated from critical habitat to the north of the road extension.

Construction effects under Alternative C would be similar to those described for Alternative B.

Alternative C, Phase 1

Construction of Alternative C, Phase 1 would result in project effects of CRLF habitat in the following locations within the project footprint (Volume 2, Figure 3.3-4d).

- Grading and culverting of the unnamed drainage for the extension of Red Top Road north of SR 12W (OW-161) (Sheet 5).
- Replacement and lengthening of culverts in Jameson Canyon Creek (OW-8) (Sheet 7) and its tributaries (OW-8a, OW-8b, W-8d) (Sheets 3 and 4) for the realignment of Red Top Road and construction of on- and off-ramps for SR 12W.

- Green Valley Creek (W-45) for the Green Valley Creek bridge (Sheets 17 and 18).

Construction in the potential CRLF habitat identified above would result in the temporary disturbance of 0.17 acre s and the permanent loss of 2.41 acre of potential CRLF aquatic habitat. Additionally, Alternative C, Phase 1 would result in the loss of 144.90 acres and temporary disturbance of 6.38 acres of upland habitat. Most of this habitat occurs within a highly disturbed area along I-80/I-680/SR 12W and SR 12E.

Construction on the extension of Red Top Road north of SR 12W would temporarily affect 0.48 acres and permanently affect 22.54 acres of critical habitat. In addition, approximately 65 acres of critical habitat would be isolated from critical habitat to the north of the road extension.

Construction effects under Alternative C, Phase 1 would be similar to those described for Alternative B.

Avoidance, Minimization, and/or Mitigation Measures

See avoidance, minimization, and/or mitigation measures in Section 3.3.1.1. Implementation of the USFWS standardized avoidance and minimization efforts for CRLF, construction BMPs, and the compensatory mitigation identified below would reduce effects on CRLF and potential habitat that could occur in the vicinity of the aquatic and upland habitat locations identified in the study area.

Conduct Preconstruction Surveys for California Red-Legged Frog

A preconstruction survey will be conducted immediately preceding any construction activity that occurs in CRLF habitat or any activity that may result in take of the species. A USFWS-approved biologist will carefully search all obvious potential hiding spots for CRLF, such as large downed woody debris, the perimeter of pond or wetland habitats, and the riparian corridors associated with streams and drainages. Any CRLFs found will be captured and held for the minimum amount of time necessary to release them in suitable habitat outside the study area. Suitable release sites will be identified by a qualified biologist approved by the USFWS before the start of construction activities.

Monitor Construction Occurring near Potential California Red-Legged Frog Habitat

A USFWS-approved biologist will monitor all ground-disturbing construction activity near potential CRLF habitat. After ground-disturbing activities are complete, the USFWS-approved biologist will train an individual to act as the on-site construction monitor. Both the USFWS-approved biologist and the construction monitor will have the authority to stop or redirect project activities to ensure protection of resources and compliance with all environmental permits and conditions of the project. If the USFWS-approved biologist or construction monitor has requested that work stop because of take of any listed species, the USFWS and the CDFG will be notified within one working day by email or telephone. The USFWS-approved biologist and construction monitor will complete a daily log summarizing activities and environmental compliance.

- If a CRLF is encountered during construction work, activities will cease until the frog is removed and relocated by a USFWS-approved biologist.
- Any person capturing or handling CRLF will be a qualified biologist approved by the USFWS. A qualified biologist means any person who has completed at least four years of university training in wildlife biology or a related science, or has demonstrated field experience in the identification and life history of CRLF. Resumes of all biologists proposed to capture or handle CRLF will be submitted to the USFWS for approval no later than 30 days before the start of construction.
- If necessary, nets or bare hands may be used to capture red-legged frogs. The USFWS-approved biologist will not use soaps, oils, creams, lotions, repellents, or solvents of any sort on their hands within two hours before and during periods in which they are capturing and relocating CRLFs. To avoid transferring disease or pathogens between aquatic habitats during the course of surveys or handling of CRLF, the USFWS-approved biologist will follow the Declining Amphibian Populations Task Force's Code of Practice. The USFWS-approved biologist will limit the duration of handling and captivity of CRLF. While in captivity, CRLF will be kept in a cool, moist, aerated environment, such as a bucket containing a damp sponge. Containers used for holding or transporting adults of this species will not contain any standing water.
- All construction areas will be flagged, and all activity will be confined to these areas.
- Because dusk and dawn are often the times when CRLFs are most actively foraging and dispersing, all construction activities should cease 30 minutes before sunset and should not begin before 30 minutes prior to sunrise.
- A representative will be appointed to be the contact source for any employee or contractor who might inadvertently kill or injure a CRLF, or who finds a dead, injured, or entrapped individual. The representative will be identified during the environmental awareness training and employee education program described in Section 3.3.1.1. The representative's name and telephone number will be provided to the USFWS before the initiation of ground-disturbing activities.
- Tightly woven fiber netting or similar material will be used for erosion control or other purposes at the project site to ensure that CRLF are not trapped. This limitation will be communicated to the contractor through use of special provisions included in the bid solicitation package. Coconut coir matting is an acceptable erosion control material. No plastic monofilament matting will be used for erosion control.
- A litter control program will be instituted at the entire project site. All workers will ensure that food scraps, paper wrappers, food containers, cans, bottles, and other trash from the study area are deposited in covered or closed trash containers. The trash containers will be removed from the study area at the end of each working day.
- After construction is complete, temporarily disturbed areas within the study area will be restored to pre-project conditions or enhanced to compensate for the removal of riparian vegetation.

- Requests for bids will include these avoidance and minimization efforts where applicable. Contractors involved in the project will be educated and informed about the requirements of applicable permits obtained for the project, including a BO.

Compensate for Loss and Disturbance of California Red-Legged Frog Habitat

Permanent loss and temporary disturbance of aquatic and upland habitat and critical habitat for CRLF in the study area will be compensated for by enhancement of an area of suitable acreage or by contribution to a mitigation bank for CRLF.

3.3.5.6 Swainson's Hawk

Swainson's hawk is listed as threatened under CESA and is protected under the MBTA and CFGC Section 3503.5. The MBTA and CFGC Section 3503.5 prohibit take of migratory birds, nests, and young. In the Central Valley, this species typically nests in oak or cottonwood trees in or near riparian habitats, in oak groves, in roadside trees, and in solitary trees. Swainson's hawks prefer nesting sites that provide sweeping views of nearby foraging grounds (grasslands, irrigated pasture, alfalfa, hay, and row and grain crops). Swainson's hawks are migratory, wintering from Mexico to Argentina and breeding in California and elsewhere in the western United States. They generally arrive in the Central Valley in mid-March and begin courtship and nest construction immediately after arrival at the breeding sites. The young fledge in early July, and most Swainson's hawks leave their breeding territories by late August or early September.

Affected Environment

There is one Swainson's hawk nest site in the study area, approximately 0.5 mile southeast of the I-80/680 interchange (California Natural Diversity Database 2010). Large trees, suitable for nesting Swainson's hawks, are present in oak and riparian woodlands, and eucalyptus trees in the study area. However, it is unlikely that Swainson's hawks would nest in the study area because of the area's proximity to I-80, I-680, and SR 12W and 12E. Foraging habitat (row crops, ruderal, and nonnative annual grasslands) occurs in portions of the study area that would be affected by the proposed project.

Environmental Consequences

Potential Loss of Swainson's Hawk Nesting and Foraging Habitat Resulting from Construction

Both build alternatives would result in permanent and temporary effects to Swainson's hawk nesting habitat and permanent effects to foraging habitat. Temporary effects on foraging habitat are not considered because the habitat will return to baseline conditions once construction is complete.

Although there is a low likelihood that Swainson's hawks would nest adjacent to I-80/I-680/SR 12, tree removal or noise associated with construction activities could result in the disturbance of nesting Swainson's hawks if active nests are present in or near the construction area. These disturbances could cause nest abandonment and death of young or loss of reproductive potential at active nests located in or near the study area. Any of the build alternatives could result in a

substantial adverse effect, through loss of eggs or young, on a species listed as threatened under CESA.

Alternative B

Alternative B would result in a permanent loss of approximately 19.34 acres and temporary disturbance of 6.84 acre of potential nesting habitat including riparian woodland, eucalyptus, live oak woodland, other woodland, and valley oak woodland in and adjacent to the study area, which provides potential nesting habitat for Swainson's hawks.

Alternative B would result in a permanent loss of approximately 447.42 acres of foraging habitat that occurs in the study area: 123.70 acres within one mile of a known nest and 323.72 acres within one to five miles of a nest.

Alternative B, Phase 1

Alternative B, Phase 1 would result in a permanent loss of approximately 6.21 acre and temporary disturbance of 0.58 acre of potential nesting habitat for Swainson's hawks.

Alternative B, Phase 1 would result in a permanent loss of approximately 56.51 acres of foraging habitat that occur in portions of the study area: 33.90acres within one mile of a nest and 22.61 acres within one to five miles.

Alternative C

Alternative C would result in a permanent loss of approximately 27.49 acres and temporary disturbance of 6.62 acre of potential nesting habitat.

Alternative C would result in a permanent loss of approximately 230.92 acres of foraging habitat that occurs in the study area: 34.62 acres within one mile of a known nest, 196.06 acres within one to five miles of a nest, and 0.24 acre within five to ten miles of a known nest.

Alternative C, Phase 1

Alternative C, Phase 1 would result in a permanent loss of approximately 17.85 acre and temporary disturbance of 3.10 acre of potential nesting habitat.

Alternative C, Phase 1 would result in a permanent loss of approximately 183.10 acres of foraging habitat that occur in portions of the study area: 33.59 acres within one mile of a nest and 149.51 acres within one to five miles.

Loss of a substantial amount of foraging habitat within ten miles of a known Swainson's hawk nest is considered to be an adverse effect. This adverse effect can be offset through the acquisition of conservation lands that will preserve significant amounts of suitable foraging habitat for the species and the management and monitoring of these lands for Swainson's hawk habitat values.

Under the No-Build Alternative, no construction activities would occur, and no effects on Swainson's hawk would occur.

Avoidance, Minimization, and/or Mitigation Measures

Implementation of avoidance, minimization measures in Section 3.3.1.1, the measure to conduct preconstruction nesting bird and raptor surveys in Section 3.3.4.2, and the measure listed below would reduce adverse effects on nesting Swainson's hawks.

Compensate for Loss of Swainson's Hawk Foraging Habitat

The CDFG requires that loss of foraging habitat for the species be replaced at different ratios depending on the habitat's distance from a known nest. Loss of foraging habitat within a 1-mile radius is to be compensated for at a ratio of 1:1, loss of habitat within one to five miles at a 0.75:1 ratio, and loss of habitat within five to ten miles at a ratio of 0.5:1 (California Department of Fish and Game 1994; Melissa Escaron, Staff Environmental Scientist at the California Department of Fish and Game, in December 29, 2008, e-mail to Stephanie Myers of ICF Jones & Stokes). Credits will be purchased at an approved mitigation bank.

3.3.5.7 Central California Coast Steelhead

Affected Environment

Review of available literature and data sources of species occurrence indicates that central California coast steelhead were both historically and recently present in several streams in the project area. A recent comprehensive review of existing steelhead occurrence within San Francisco Bay Estuary can be found in Leidy et al. (2005), which is the basis for some of the species occurrence information presented below. Hanson Environmental (2002) was also reviewed for information on Suisun Creek. On January 18, 2006, NMFS provided a list of threatened, endangered, and special-status fish species potentially found in the project area which included central California coast steelhead (Appendix F).

Dan Wilson Creek near the I-80 bridge has a modified channel bed and bank. Under the I-80 bridge, the channel bottom has natural substrates composed primarily of mud/silt. At the time of the survey (August 8, 2007), the channel was choked with cattails, and riparian and SRA cover vegetation was observed to be largely absent—with the exception of approximately 15 linear feet of SRA cover vegetation on the east bank downstream of the I-80 bridge. Stream flow was visually estimated to be 0.1 cfs or less. No suitable habitat for steelhead was observed in Dan Wilson Creek in the vicinity of the I-80 bridge crossing. The relatively small size and low elevation of the watershed, combined with the general lack of riparian vegetation, extensive emergent vegetative growth in the channel, and low stream flow, further suggest that this stream in the vicinity of the I-80 stream crossing does not support steelhead migration, spawning, and rearing habitat.

American Canyon Creek near the I-680 and Ramsey Road bridges also has a modified channel bed and bank. Overall, the channel is moderately incised and numerous cattails line the channel bottom. In the vicinity of the I-680 and Ramsey Road bridges, riparian and SRA cover vegetation is absent. Stream flow is conveyed under the I-680 and Ramsey Road bridges through concrete box culverts; presently, mud substrates line the bottom of both culverts. A concrete apron on the downstream side of the box culvert is perched above the adjacent, downstream channel bed, creating a vertical drop of approximately 0.75 foot. At the time of the survey (August 8, 2007), stream flows were visually estimated to be less than 0.1 cfs. A large beaver

dam was observed at the upstream end of the frontage road west of I-680 and was determined to be a barrier to fish passage at the observed stream flow conditions. No suitable habitat for steelhead was observed in American Canyon Creek in the vicinity of the I-680 bridge crossing. The relatively small size and low elevation of the watershed, combined with the general lack of riparian vegetation, extensive emergent vegetative growth in the channel, and low stream flow, further suggest that this stream in the vicinity of the I-680 stream crossing does not support suitable conditions for steelhead. Surveys conducted in 1981, 1997, and 2002 did not find any steelhead in American Canyon Creek (Leidy et al. 2005).

To the north of American Canyon Creek, Jameson Canyon Creek flows west to east and drains the adjacent watershed north of American Canyon. This creek channel is moderately incised with a high terrace floodplain and exhibits evidence of past disturbance, including channel straightening and levee construction. Substrate in the creek is predominantly sand, and gravel is present at isolated locations or in combination with sand. A stand of riparian vegetation consisting primarily of mature willows is present along both banks, creating a 50- to 75-foot-wide riparian corridor. Stream flow is conveyed under I-680 in box culverts. At the time of the survey (August 8, 2007), the creek was dry throughout the entire study area, which extends from immediately downstream of I-680 to near SR 12 upstream of the I-80 crossing. For the same reasons as those discussed for American Canyon Creek, habitat conditions in Jameson Canyon Creek in the vicinity of the I-680 stream crossing likely do not support steelhead.

Green Valley Creek flows north to south and drains the watershed area north of Cordelia. Green Valley Creek at the I-80 crossing has a concrete-lined bed and bank throughout the study area. The concrete-lined channel contains a low flow channel with concrete weirs every 20 feet for the entire length of the channel to facilitate fish passage. At the time of the surveys (July 5 and August 8, 2007), sediment deposits were observed over much of the length of channel under the I-80 bridges. Very little riparian vegetation occurs in the study area and is limited to vegetation that is growing in sediments deposited on the engineered channel. Leidy et al. (2005) indicated that steelhead were collected from Green Valley Creek from the 1950s to the present. Unpublished sampling data indicated that steelhead were collected about one mile upstream from I-80 in January 1997 (Leidy et al. 2005). Although data documenting specific occurrences of steelhead are lacking, Leidy et al. (2005) suggests that this creek's connection to the Suisun Marsh and its close proximity to the Suisun Creek drainage provides habitat opportunities for migratory steelhead. A fish passage assessment was conducted on the current channel configurations in Green Valley, Ledgewood, and Suisun Creeks, the results of which were compared to postproject conditions. This assessment concluded that, under existing conditions at low flows, the passage criteria related to minimum water depth for adult Chinook salmon and steelhead are not currently being met at the Green Valley Creek stream crossing because excessive sediments deposited in the constructed (i.e., concrete-lined) low-flow channel cause the water to spread out and become too shallow.

Suisun Creek flows north to south and drains the largest watershed area of any of the creeks in the study area. Although levees top the banks of Suisun Creek upstream and downstream of the I-80 crossing, riparian vegetation is dense in the study area up to the bridge. The Suisun Creek channel at the I-80 crossing is an earthen channel and consists of abutments on each bank of the creek. Two pier columns supporting the I-80 bridge spans intercept the channel at the interface between the creek and each bank. Historical evidence dating back as far as 1940 indicates that

steelhead were present throughout the Suisun Creek watershed. Following the construction of Gordon Valley Dam (Lake Curry) in 1926 and subsequent water developments, steelhead populations in the watershed declined. Although the distribution and abundance of steelhead throughout Suisun Creek and its tributaries may have fluctuated over the years, recent surveys found that both adult and juvenile steelhead are still present in this system. An adult steelhead (26.5 inches) was found approximately 0.25 mile downstream of the Wooden Valley Creek confluence in March 2001, while two other adult steelhead (20.9–25.2 inches) were observed in June and early July 2001 approximately six and 11 miles downstream of Lake Curry (Leidy et al. 2005); these locations are well upstream of the I-80 stream crossing. This same survey also noted the occurrence of juvenile steelhead (6.3–6.7 inches) downstream from the dam.

Historical evidence from 1965 (Leidy et al. 2005) suggested that Wooden Valley Creek, a tributary of Suisun Creek, contained the highest concentration of steelhead in the watershed. Surveys of Wooden Valley Creek conducted in 2002 indicated that juvenile steelhead were present at both headwater and various other survey locations along the creek (Leidy et al. 2005), suggesting the possibility of an existing steelhead population. Additionally, NOAA's NMFS believes that Suisun and Wooden Valley Creeks currently support a steelhead population and that sufficient migration, spawning, and rearing habitat exist (50 FR 52504, September 2, 2005). Hanson Environmental (2002) performed a more detailed analysis of steelhead habitat quality in Suisun Creek. The study surveyed approximately 95% of the stream from Cordelia Road to Lake Curry during summer low-flow period. Results of this study indicate that significant habitat constraints are present; these include migration barriers, limited spawning gravel availability, high summer water temperatures, and low habitat diversity. The study concluded that Suisun Creek was unlikely to consistently support self-sustaining steelhead populations. Instead, habitat would be best available during wet years when winter flows were high enough to allow upstream passage for adults and summer stream temperatures remained cool enough to support juvenile rearing. During dry years, summer rearing habitat would be constrained to upstream areas immediately below the reservoir, where temperatures would most likely remain suitable to support salmonids.

Ledgewood Creek at the SR 12E crossing is highly modified. Levees line both banks of the channel, and the channel has a trapezoidal cross section. Riparian and SRA cover vegetation is limited to areas downstream of the SR 12E bridge; no riparian or SRA cover vegetation is present in the immediate vicinity upstream of the bridge. SRA cover vegetation included six linear feet of willow on the west bank, and 15 linear feet of weeping willow and four feet of dying weeping willow along the east bank. Stream flow is conveyed through concrete-lined box culverts under the five-span bridge. At low flows, stream flow is conveyed through the second box culvert from the east bank. The concrete invert in this box culvert is notched and forms a V-shaped channel, which maximizes water depths at low flows. At the time of the survey (August 8, 2007), stream flow was measured at 0.67 cfs with a maximum depth of 0.4 foot. Based on the results of a fish passage assessment conducted as part of this proposed project, excessively shallow water depths in the box culvert under SR 12E create an impediment to migrating steelhead in Ledgewood Creek. Although specific data of steelhead occurrence in Ledgewood Creek are lacking, its connection to the Suisun Marsh and close proximity to Suisun Creek suggest that steelhead are potentially present in Ledgewood Creek.

The field survey and literature review results indicate that steelhead occur in Green Valley, Ledgewood, and Suisun Creeks. The effects discussion is limited to these creeks because they support special-status fish species in the project area.

Environmental Consequences

Potential Effects on Steelhead Resulting from Construction

Construction of either build alternative could affect water quality, fish habitat, channel morphology, water temperature, steelhead movement, and steelhead spawning habitat in streams containing steelhead. In addition, both build alternatives could result in disturbance and direct injury of steelhead. Alternatives B and C include construction of crossings over Green Valley, Suisun, and Ledgewood Creeks. Alternative B would additionally include construction of a second, new bridge over Ledgewood Creek. The fundable first phases of the alternatives would not include construction of crossings over Suisun Creek and would have potential impacts only on Green Valley and Ledgewood Creeks. Under the No-Build Alternative, no construction activities would occur, and no impacts on steelhead or its habitat would occur.

Water Quality

As described above in Section 3.3.4.10, the temporary effects of construction on water quality include increased sedimentation and turbidity and possible release of contaminants into Green Valley, Suisun, and Ledgewood Creeks from construction equipment. These water quality effects could increase steelhead mortality; reduce feeding opportunities, including those for rearing steelhead; and cause steelhead to avoid important habitat. Increased pollutant concentrations could limit steelhead reproduction, abundance, and distribution by direct mortality of steelhead or their prey. Steelhead in the study area require relatively clean, cold, well-oxygenated water for successful growth, reproduction, and survival and are not well adapted for survival in degraded aquatic habitats.

Implementation of the measure to prepare and implement a SWPPP in Section 3.2.3 and measures to prevent contaminants from entering streams and to restrict in-water work to avoid the migration and spawning seasons in Section 3.3.4.10 would address this impact.

Habitat and Channel Morphology

As described above in Section 3.3.4.10, project construction activities would affect fish habitat and could also change the channel morphology by disturbing the streambed substrate. However, revegetation would mitigate the loss of vegetation and SRA cover, and the channels would be restored to pre-project conditions based on fish passage assessments for Suisun, Green Valley, and Ledgewood Creeks. No permanent changes to channel morphology are expected.

Implementation of the measure in Section 3.3.4.10 to minimize impacts on creek channels would address this impact.

Water Temperature

Under existing conditions, habitat for juvenile steelhead rearing in the study area is likely marginal to unsuitable during summer (Hanson Environmental 2002). Water temperature is an important variable that determines the suitability of fish habitat for growth, reproduction,

survival, and migration. This is especially true for steelhead, which have relatively narrow temperature requirements for carrying out their life history. Any increase in water temperatures could further reduce the suitability of habitat for steelhead in the study area.

As described above in Section 3.3.4.10, the proposed project would have a minor effect on SRA cover. Revegetation of the disturbed areas, combined with the shading provided by the bridge extension, would be expected to maintain existing water temperatures in the study area, and the project would not adversely affect water temperature.

Implementation of the measure in Section 3.3.4.10 to minimize impacts on creek channels would ensure that there would be no adverse water temperature effects.

Interference with Movement

As described above in Section 3.3.4.10, construction activities associated with the project alternatives would require the use of cofferdams and pipelines, which could block the migration of adult and juvenile steelhead. However, the timing of construction activities to avoid the primary migration time of adult and juvenile steelhead and maintenance of fish passage through the construction site during stream dewatering activities would reduce the potential for impacts on fish movement. Therefore, temporary stream diversions associated with construction are not likely to adversely affect the migration of adult and juvenile steelhead.

Based on the fish passage assessment, modification of the bridge structures at Green Valley and Suisun Creeks along I-80 would not create new fish passage barriers or reduce existing fish passage conditions. The proposed modification of the bridge structure at Ledgewood Creek along SR-12 would exacerbate existing fish passage constraints associated with shallow water depths.

Implementation of measures in Section 3.3.4.10 to minimize impacts on creek channels and to maintain a migration corridor through creek channels would address this impact.

Disturbance to Potential Spawning Habitat

As described above in Section 3.3.4.11, a potential spawning gravel bed was observed in Suisun Creek approximately 20 feet downstream of the existing bridge, which is proposed for removal and reconstruction under Alternatives B and C. It is anticipated that the gravel bed would not be disturbed by the proposed project. All construction equipment would access the construction site from the existing bridge and road. If the gravel cannot be avoided, it would be temporarily removed and replaced to preconstruction conditions—using, to the extent practicable, gravel removed from the site.

Because no construction is proposed on Suisun Creek under the fundable first phase of either alternative or under the No-Build Alternative, there would be no effect on spawning habitat under these alternatives.

Implementation of measures listed in Section 3.3.4.10 to minimize impacts on creek channels and in Section 3.3.4.11 to avoid spawning habitat would address this impact.

Disturbance and Direct Injury

As described above in Section 3.3.4.10, noise, vibrations, artificial light, and other physical disturbances can harass fish, disrupt or delay normal activities, and cause injury or mortality. Under Alternative B, short-term noise disturbance caused by pile driving would occur within Ledgewood Creek. Potential direct effects of pile-driving activities include increased noise and turbidity. Researchers have suggested that salmonids can hear pile-driving noise approximately 2,000 feet from the source (Feist et al. 1992). Feist et al. (1992) observed that pile driving altered the distribution and behavior of juvenile pink and chum salmon. The potential impact on salmonids from pile-driving activities depends on the distance separating the noise-generating activity from fish and the duration of these activities. Evidence suggests that, although pile-driving noise may affect the distribution and behavior of juvenile pink and chum salmon, no significant changes occurred in their overall abundance (Feist et al. 1992).

Implementation of measures in Section 3.3.4.10 to restrict in-water activities to avoid spawning season and to minimize noise impacts on fish would address this impact.

Potential Effects on Steelhead Resulting from Operations

Water Quality

As described above in Section 3.3.4.10, all build alternatives would result in increased impervious surfaces and contaminated runoff. The potential increase in contaminated runoff entering the creeks could adversely affect steelhead that use the creeks for migration, spawning, and rearing. Pollutants could also cause mortality to and reduced growth of the egg, larval, and juvenile life stages of steelhead.

Implementation of the measure in Section 3.2.3 to prepare and implement a SWPPP and measures listed in Section 3.3.4.10 to prevent contaminants from entering the stream channel would address this impact.

Potential Interference with Movement

As described above in Section 3.3.4.11, the proposed extension of the culvert under SR 12E would exacerbate existing shallow water conditions at Ledgewood Creek during the migration season and would worsen fish passage conditions relative to current conditions. Bridge widening would occur under both build alternatives. Implementation of 'Implement culvert retrofit at the SR12E crossing on Ledgewood Creek' in Section 3.3.4.11 to address shallow water depths would improve fish passage conditions at Ledgewood Creek.

In summary, effects to central California coast steelhead could occur from construction and operation. Construction effects will be temporary and include change in water quality, habitat and channel morphology, and water temperature, interference with movement, disturbance of potential spawning habitat, and disturbance and direct injury. These temporary effects will occur during construction when steelhead are not in the study area. Operational effects which are permanent include a degradation in water quality and potential interference with movement on Ledgewood Creek. Implementation of measures to address water quality and fish passage will reduce the severity of this effect.

Avoidance, Minimization, and/or Mitigation Measures

See avoidance, minimization, and/or mitigation measures in Sections 3.3.4.10 and 3.3.4.11 to prevent contaminants from entering streams, restrict in-water work to avoid spawning season, minimize impacts on creek channels, maintain a migration corridor through creek channels, minimize noise impacts on fish, avoid spawning habitat, and retrofit the culvert at the SR 12E crossing over Ledgewood Creek.

3.3.6 Invasive Species

Regulatory Setting

On February 3, 1999, President Clinton signed Executive Order 13112 requiring federal agencies to combat the introduction or spread of invasive species in the United States. The order defines invasive species as "any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem whose introduction does or is likely to cause economic or environmental harm or harm to human health." Federal Highway Administration guidance issued August 10, 1999, directs the use of the state's noxious weed list to define the invasive plants that must be considered as part of the NEPA analysis for a proposed project.

More recently, FHWA has required use of the National Invasive Species Council's (NSIC's) invasive species databases (National Invasive Species Council 2009). The NSIC databases include both the CDFA noxious weed list (California Department of Food and Agriculture 2007) and the Cal-IPC Invasive Plant Inventory list (Cal-IPC 2007). Accordingly, the CDFA and Cal-IPC lists were used for the analysis of invasive species in the study area.

Affected Environment

Table 3.3.6-1 identifies the invasive plant species located in the study area. These species occur in areas mapped as annual grassland, landscaped, riparian woodland, drainage, and seasonal wetland. The infestation of the study area by these species is limited, occurring primarily on isolated patches of ruderal vegetation on the edges of roadways or scattered in the annual grassland.

Table 3.3.6-1. Invasive Plant Species Identified in the Study Area

Species	CDFA	Cal-IPC
Giant reed (*Arundo donax*)	B	High
Slender wild oat (*Avena barbata*)	–	Moderate
Wild oat (*Avena fatua*)	–	Moderate
Mediterranean linseed (*Bellardia trixago*)	–	Limited
Black mustard (*Brassica nigra*)	–	Moderate
Common mustard (*Brassica rapa*)	–	Limited
Rattlesnake grass (*Briza maxima*)	–	Limited
Ripgut brome (*Bromus diandrus*)	–	Moderate
Soft chess (*Bromus hordeaceus*)	–	Limited
Red brome (*Bromus madritensis* ssp. *rubens*)	–	High
Italian thistle (*Carduus pycnocephalus*)	C	Moderate
Iceplant (*Carpobrotus edulis*)	–	High
Purple star-thistle (*Centaurea calcitrapa*)	B	Moderate
Yellow star-thistle (*Centaurea solstitialis*)	C	High
Bull thistle (*Cirsium vulgare*)	C	Moderate
Poison hemlock (*Conium maculatum*)	–	Moderate
Bindweed (*Convolvulus arvensis*)	C	–
Pampas grass (*Cortaderia jubata*)	B	High
Silverleaf cotoneaster (*Cotoneaster pannosus*)	–	Moderate
Brass buttons (*Cotula coronopifolia*)	–	Limited
Artichoke thistle (*Cynara cardunculus*)	B	Moderate
Bermuda grass (*Cynodon dactylon*)	C	Moderate
Orchard grass (*Dactylis glomerata*)	–	Limited
Fuller's teasel (*Dipsacus sativus*)	–	Moderate
Red-stemmed filaree (*Erodium cicutarium*)	–	Limited
Fig (*Ficus carica*)	–	Moderate
Fennel (*Foeniculum vulgare*)	–	High
Mediterranean barley (*Hordeum marinum* var. *gussoneanum*)	–	Moderate
Hare barley (*Hordeum murinum* ssp. *leporinum*)	–	Moderate
Klamathweed (*Hypericum perforatum*)	C	Moderate
Smooth cat's ear (*Hypochaeris glabra*)	–	Limited
Broad-leaved pepper-grass (*Lepidium latifolium*)	B	High
Italian ryegrass (*Lolium multiflorum*)	–	High
Water primrose (*Ludwigia peploides*)	–	High
Hyssop loosestrife (*Lythrum hyssopifolium*)	–	Moderate
Alkali mallow (*Malvella leprosa*)	C	–
White horehound (*Marrubium vulgare*)	–	Limited
Bur-clover (*Medicago polymorpha*)	–	Limited
Pennyroyal (*Mentha pulegium*)	–	Moderate
Olive (*Olea europaea*)	–	Limited
Harding grass (*Phalaris aquatica)*	–	Moderate
Bristly ox-tongue (*Picris echioides*)	–	Limited
Smilo grass (*Piptatherum millaceum*)	–	Limited
Narrow-leaved plantain (*Plantago lanceolata*)	–	Limited
Rabbit-foot grass (*Polypogon monspeliensis*)	–	Limited
Firethorn (*Pyracantha angustifolia*)	–	Limited
Wild radish (*Raphanus sativus*)	–	Limited
Black locust (*Robinia pseudoacacia*)	–	Limited
Himalayan blackberry (*Rubus discolor*)	–	High
Sheep sorrel (*Rumex acetosella*)	–	Moderate

Species	CDFA	Cal-IPC
Curly dock (*Rumex crispus*)	–	Limited
Russian thistle (*Salsola tragus*)	C	Limited
Milk thistle (*Silybum marinum*)	–	Limited
Charlock (*Sinapis arvensis*)	–	Limited
Spanish broom (*Spartium junceum*)	–	High
Medusahead (*Taeniatherum caput-medusae*)	C	High
Saltcedar (*Tamarix ramosissima*)	B	High
Hedgeparsley (*Torilis arvensis*)	–	Moderate
Puncture vine (*Tribulus terrestris*)	C	–
Rose clover (*Trifolium hirtum*)	–	Moderate
Bigleaf periwinkle (*Vinca major*)	–	Moderate
Foxtail fescue (*Vulpia myuros*)	–	Moderate

Notes: The California Department of Agriculture (CDFA) and California Invasive Plant Council (Cal-IPC) lists assign ratings that reflect the CDFA and Cal-IPC views of the statewide importance of the pest, likelihood that eradication or control efforts would be successful, and present distribution of the pest in the state. These ratings are guidelines that indicate the most appropriate action to take against a pest under general circumstances. The Cal-IPC species list is more inclusive than the CDFA list; however, FHWA requires adherence to Executive Order 13112, which requires the use of only the CDFA list. The CDFA categories indicated in the table are defined as follows:

- **B:** Eradication, containment, control or other holding action at the discretion of the county agricultural commissioner.
- **C:** State-endorsed holding action and eradication only when found in a nursery; action to retard spread outside nurseries at the discretion of the county agricultural commissioner.

The Cal-IPC categories indicated in the table are defined as follows:

- **High:** Species with severe ecological impacts, high rates of dispersal and establishment, and usually widely distributed.
- **Moderate:** Species with substantial and apparent ecological impacts, moderate to high rates of dispersal, establishment dependent on disturbance, and limited to widespread distribution.
- **Limited:** Species with minor ecological impacts, low to moderate rates of invasion, limited distribution, and locally persistent and problematic.

Environmental Consequences

Potential Introduction and Spread of Invasive Plant Species Resulting from Construction

Invasive weed species in the study area are present along roadsides, which are routinely disturbed by shoulder maintenance and vegetation management activities. The proposed project would create additional disturbed area for a temporary period, but it would not substantially increase the area subject to repeated disturbance because the new road shoulders would replace existing road shoulders. Therefore, the project alternatives are not anticipated to increase or decrease the area currently occupied by invasive weeds or the potential for spreading invasive weed species.

Implementation of the measure to conduct environmental awareness training provided in Section 3.3.1.1 and the measure below would address this impact.

Under the No-Build Alternative, no construction activities would occur, and no effects associated with the spread of invasive species would occur.

Avoidance, Minimization, and/or Mitigation Measures

Avoid the Introduction and Spread of Invasive Plants

To avoid the introduction of new invasive plants and the spread of invasive plants previously documented in the study area, the following measures will be implemented during construction.

- Surface disturbance within the construction work area will be minimized to the greatest extent possible.
- All disturbed areas will be seeded with certified weed-free native mixes and mulched with certified weed-free mulch (rice straw may be used in upland areas).
- Native, noninvasive species will be used in erosion control plantings to stabilize site conditions and prevent invasive species from colonizing.

3.3.7 Native Trees

Regulatory Setting

The City of Fairfield Tree Conservation ordinance (FCC 25.36) protects native trees, including native oaks, bay laurel, madrone, and California buckeye, that are greater than six inches in diameter at breast height (dbh). This ordinance protects native trees located inside the City Limit Line on public property or on private property developed or landscaped with City approval, but not those located within the Caltrans right-of-way. Solano County has no specific tree protection requirements outside of hillsides and visually sensitive areas.

Most native trees in the study area occur in or adjacent to riparian and oak woodland communities. These trees are still considered sensitive resources because they occur in natural communities of special concern and were discussed above in Sections 3.3.1.1 and 3.3.1.2.

Affected Environment

Mature native trees (dbh of six inches or more) that are not located within riparian or oak woodland were individually mapped in the study area. The sheet and tree numbers shown in parentheses below correspond to Figures 3.3-2a, 3.3-2b, 3.3-2c, and/or 3.3-2d in Volume 2. Information for each tree is listed in Appendix G. Individually mapped native trees occur at the following locations in and adjacent to the study area.

- Along Jameson Canyon Creek near the industrial area west of I-680 (three coast live oaks) (Trees 1–3 on Sheets 9 and 14).
- Near the I-80 EB on-ramp from NB I-680 (one coast live oak and three valley oaks) (Trees 4–7 on Sheets 16 and 17).
- The intersection of Green Valley Road and Business Center Drive (17 coast live oaks and two valley oaks) (Trees 8–24 on Sheet 17).

Native trees outside the City Limit Line and outside the Caltrans right-of-way occur at the following locations in the study area.

- Red Top Road extension (six interior live oaks) (Trees 100–105 on Sheets 2-3).
- South of SR 12W (seven coast live oaks) (Trees 27–33 on Sheet4).
- Between Dan Wilson Creek and the previous site of the I-80 eastbound Cordelia truck scales (one interior live oak, one valley oak, and an undetermined number in the area replanted after construction of the new eastbound truck scales) (Trees 34 and 35 on Sheets 21 and 22).

Environmental Consequences

Native trees are not protected under any applicable federal statute. Impacts on native trees are discussed as CEQA impacts in Chapter 4.

3.3.8 Suisun Marsh Secondary Management Area

Regulatory Setting

Pursuant to the Nejedly-Bagley-Z'berg Suisun Marsh Preservation Act of 1974, the San Francisco Bay Conservation and Development Commission (BCDC) and the CDFG prepared the Suisun Marsh Protection Plan. In 1977, the Suisun Marsh Preservation Act was enacted to incorporate the findings and policies contained in the plan into state law. The Suisun Marsh Preservation Act established two management areas within the marsh. The Primary Management Area includes tidal marshes, seasonal marshes, managed wetlands, and lowland grasslands. The Secondary Management Area is the adjacent upland grasslands and cultivated lands that serve as a buffer between the Primary Management Area and developed land. As required by the Suisun Marsh Protection Act, Solano County prepared the Suisun Marsh Local Protection Program (SMLPP), which includes policies, programs, and regulations to preserve and enhance wildlife habitat in the Suisun Marsh and retain adjacent upland areas in uses compatible with protection of the marsh. Solano County regulates uses in the Secondary Management Area through Marsh Development Permits to ensure that proposed uses are consistent with the SMLPP.

Affected Environment

The study area east of I-680 between the Gold Hill Road overpass and just south of Jameson Canyon Creek is within the Suisun Marsh Secondary Management Area. The location is shown in Figures 3.3-2a through 2d, Sheets 10–14 in Volume 2.

This part of the study area is primarily nonnative annual grassland, with stands of eucalyptus trees, several seasonal wetlands, seasonal drainages, and ruderal vegetation adjacent to I-680.

Environmental Consequences

The Suisun Marsh Secondary Management Area is not protected under any applicable federal statute. Effects on this resource are discussed per CEQA requirements in Chapter 4.

Table 3.3.3-1. Sensitive Plant Species with the Potential to Occur in the I-80/I-680/SR 12 Project Region

Common Name *Scientific Name*	Legal Status[a] Federal/State/ CNPS	Geographic Distribution	Habitat Requirements	Blooming Period	Habitat Present in Study Area?	Rationale
Ferris' milk-vetch *Astragalus tener* var. *ferrisiae*	–/–/1B.1	Historical range included the Central Valley from Butte to Alameda County but currently only occurs in Butte, Glenn, Colusa, and Yolo Counties.	Seasonally wet areas in meadows and seeps, subalkaline flats in valley and foothill grassland; 16-245 feet	April–May	Yes	Suitable vegetation communities, soils, and hydrologic conditions are present in nonnative annual grasslands on alkali soils the study area, but study area is outside current known range and the species was not observed during blooming-period surveys.
Alkali milk-vetch *Astragalus tener* var. *tener*	–/–/1B.2	Merced, Solano, and Yolo Counties. Historically more widespread.	Grassy flats and vernal pool margins on alkali soils below 200 feet.	March–June	Yes	**Species is present in the study area.** Suitable vegetation communities and soils are present, and the species was observed in the area south of SR 12E between Ledgewood Creek and Pennsylvania Avenue.
Heartscale *Atriplex cordulata*	–/–/1B.2	Western Central Valley and valleys of adjacent foothills.	Alkali grassland, alkali meadow, and alkali scrub below 650 feet.	April–October	Yes	Suitable vegetation communities and soils are present in nonnative annual grasslands on alkali soils the study area, but the species was not observed during blooming-period surveys.
Brittlescale *Atriplex depressa*	–/–/1B.2	Western Central Valley and valleys of adjacent foothills on west side of Central Valley.	Alkali grassland, alkali meadow, alkali scrub, chenopod scrub, playas, and valley and foothill grasslands on alkaline or clay soils below 650 feet	May–October	Yes	Suitable vegetation communities and soils are present in nonnative annual grasslands on alkali and clay soils the study area, but the species was not observed during blooming-period surveys.
San Joaquin spearscale *Atriplex joaquiniana*	–/–/1B.2	West edge of Central Valley from Glenn County to Tulare County.	Alkali grassland, alkali meadow, alkali scrub, and saltbush scrub below 1,000 feet.	April–October	Yes	Suitable vegetation communities and soils are present in nonnative annual grasslands on alkali soils the study area, but the species was not observed during blooming-period surveys.

Common Name *Scientific Name*	Legal Status[a] Federal/State/ CNPS	Geographic Distribution	Habitat Requirements	Blooming Period	Habitat Present in Study Area?	Rationale
Vernal pool smallscale *Atriplex persistens*	–/–/1B.2	Central Valley, from Glenn to Tulare County.	Dry beds of vernal pools on alkaline soils; 33-380 feet.	July–October	Yes	Suitable vernal pool habitat is present in the study area south of SR 12E, but species was not observed during blooming-period surveys.
Big-scale balsamroot *Balsamorhiza macrolepis* var. *macrolepis*	–/–/1B.2	Scattered occurrences in Coast Ranges and Sierra Nevada foothills.	Chaparral, cismontane woodland, valley and foothill grassland, sometimes on serpentine soils, at 300–4,600 feet.	March–June	Yes	Suitable habitat is present in oak woodlands and nonnative annual grasslands in the study area, but species was not observed during blooming-period surveys.
Sonoma sunshine *Blennosperma bakeri*	E/E/1B.1	Endemic to Sonoma County.	Vernal pools, mesic valley and foothill grassland; 33-360 feet.	March–May	No	Suitable habitat is present in nonnative annual grasslands and seasonal wetlands in the study area, but species occurs only in Sonoma County and was not observed during blooming-period surveys.
Big tarplant *Blepharizonia plumosa*	–/–/1B.1	San Francisco Bay area, with occurrences in Alameda, Contra Costa, San Joaquin[b], Stanislaus, and Solano Counties.	Valley and foothill grassland; 100-1,650 feet.	July–October	Yes	Suitable habitat is present in nonnative annual grasslands in the study area, but species was not observed during blooming-period surveys.
Narrow-anthered California brodiaea *Brodiaea californica* var. *leptandra*	–/–/1B.2	Lake, Napa, and Sonoma Counties.	Broadleaved upland forest, chaparral, and lower montane coniferous forest at 300 to 3,000 feet.	May–July	No	No suitable vegetation communities are present in the study area.
Mt. Diablo fairy-lantern *Calochortus pulchellus*	–/–/1B.2	Alameda, Contra Costa, and Solano Counties.	Cismontane woodland and chaparral, 100-2,750 feet.	April–June	Yes	Suitable habitat is present in undisturbed oak woodlands in the study area, but species was not observed during blooming-period surveys.
Tiburon Indian paintbrush *Castilleja affinis* ssp. *neglecta*	E/T/1B.2	San Francisco Bay Area. Marin, Napa, and Santa Clara Counties.	Serpentine grasslands, 200-1,300 feet.	April–June	No	No suitable vegetation communities or soils are present in the study area.

Common Name *Scientific Name*	Legal Status[a] Federal/State/ CNPS	Geographic Distribution	Habitat Requirements	Blooming Period	Habitat Present in Study Area?	Rationale
Holly-leaved ceanothus *Ceanothus purpureus*	–/–/1B.2	Inner north Coast Ranges. Napa and Solano Counties.	Chaparral on volcanic, rocky substrate, 400-2,100 feet.	February–April	No	No suitable vegetation communities or soils are present in the study area.
Congdon's tarplant *Centromadia [Hemizonia] parryi* ssp. *congdonii*	–/–/1B.2	East San Francisco Bay Area, Salinas Valley, Los Osos Valley.	Annual grassland, on lower slopes, flats, and swales, sometimes on alkaline or saline soils; below 750 feet.	June-November	Yes	Suitable habitat is present in nonnative annual grasslands in the study area, but species was not observed during blooming-period surveys.
Pappose tarplant *Centromadia [Hemizonia] parryi* ssp. *parryi*	–/–/1B.2	Butte, Colusa, Glenn, Lake, Napa, San Mateo, Solano, and Sonoma Counties.	Coastal prairie, meadows and seeps, coastal salt marshes and swamps, alkaline soils in vernally mesic valley and foothill grassland; 6-1,400 feet.	May–November	Yes	**Species is present in the study area.** Suitable vegetation communities and soils are present, and the species was observed in the area north and south of SR 12E, between Beck Avenue and Pennsylvania Avenue.
Bolander's water-hemlock *Cicuta maculata* var. *bolanderi*	–/–/2.1	Southern Sacramento Valley, Central Coast, South Coast.	Coastal, freshwater, or brackish marshes and swamps; below 660 feet.	July–September	Yes	Suitable habitat is present in perennial marsh in the study area, but species was not observed during blooming-period surveys.
Suisun thistle *Cirsium hydrophilum* var. *hydrophilum*	E/–/1B.1	Suisun Marsh. Solano County.	Salt marsh, 0-3 feet.	July–September	No	No suitable vegetation communities are present in the study area.
Hispid bird's-beak *Cordylanthus mollis* ssp. *hispidus*	–/–/1B.1	Central Valley. Alameda, Kern, Merced, Placer, and Solano Counties.	Meadow, grassland, and playa on alkaline soils below 500 feet.	June–September	Yes	Suitable habitat is present in nonnative annual grasslands in the study area, but species was not observed during blooming-period surveys.
Soft bird's-beak *Cordylanthus mollis* ssp. *mollis*	E/R/1B.2	San Francisco Bay region and Suisun Marsh. Contra Costa, Marin,[b] Napa, Solano, Sacramento,[b] and Sonoma[b] Counties.	Tidal salt marsh, 0-10 feet.	July–September	No	No suitable vegetation communities or hydrologic conditions are present in the study area.

Common Name *Scientific Name*	Legal Status[a] Federal/State/ CNPS	Geographic Distribution	Habitat Requirements	Blooming Period	Habitat Present in Study Area?	Rationale
Subalpine cryptantha *Cryptantha crymophila*	–/–/1B.3	Alpine, Mono, and Tuolumne Counties.	Subalpine coniferous forest on volcanic, rocky substrates; 8,500-10,500 feet.	July–August	No	No suitable vegetation communities are present in the study area. Species is included in the Allendale quadrangle in the CNPS database (2010), but this is a high-elevation species unlikely to occur in the valley or Bay Area.
Recurved larkspur *Delphinium recurvatum*	–/–/1B.2	San Joaquin Valley and central valley of the south Coast Ranges. Contra Costa County to Kern County.	Subalkaline soils in annual grassland, saltbush scrub, cismontane woodland, and vernal pools at 100–2,000 feet.	March–May	Yes	Suitable habitat is present in nonnative annual grasslands and oak woodlands in the study area, but species was not observed during blooming-period surveys.
Western leatherwood *Dirca occidentalis*	–/–/1B.2	San Francisco Bay region, Alameda, Contra Costa, Marin, Santa Clara, San Mateo, and Sonoma Counties.	Moist areas in broadleaved upland forest, closed-cone coniferous forest, chaparral, cismontane woodland, North Coast coniferous forest, riparian forest, riparian woodland; 165-1,300 feet.	January–April	No	Potentially suitable habitat is present in riparian woodland in the study area, but study area is below known elevation range and species was not observed during blooming-period surveys.
Dwarf downingia *Downingia pusilla*	–/–/2.2	Central Valley.	Vernal pools and valley and foothill grasslands; 3-1,500 feet.	March–May	Yes	Potentially suitable habitat is present in nonnative annual grasslands and seasonal wetlands in the study area, but species was not observed during blooming-period surveys.
Streamside daisy *Erigeron biolettii*	–/–/3	North Coast, from Humboldt County to Marin County, Solano County.	Moist, rocky areas in broadleaved upland forest, cismontane woodland, North Coast coniferous forest, and ledges along rivers; 100-3,600 feet.	June–October	Yes	**Species was present in the study area, but has been subsequently removed.** Suitable vegetation communities and soils are present, and the species was observed in the area north of I-80 and east of Dan Wilson Creek. This area has been graded for construction of a development project.
Greene's narrow-leaved daisy *Erigeron greenei*	–/–/1B.2	Lake, Napa, and Sonoma Counties.	On serpentinite or volcanic soils in chaparral; 260–950 feet.	May–September	No	No suitable plant communities or soils (serpentinite or volcanic) are present in the study area.

Common Name *Scientific Name*	Legal Status[a] Federal/State/ CNPS	Geographic Distribution	Habitat Requirements	Blooming Period	Habitat Present in Study Area?	Rationale
Tiburon buckwheat *Eriogonum luteolum* var. *caninum*	–/–/1B.1	Central inner north Coast Range, northern Central coast, and northern San Francisco Bay area: Alameda, Colusa, Lake, Marin, Napa, Santa Clara, San Mateo, Solano, and Sonoma[b] Counties.	On serpentinite in chaparral, coastal prairie, valley and foothill grassland; 0-2,300 feet.	June–September	No	No suitable soils (serpentinite) are present in the study area.
Mt. Diablo buckwheat *Eriogonum truncatum*	–/–/1B.1	Historically known from Alameda, Contra Costa, and Solano counties; recently rediscovered on Mt. Diablo.	Coarse, sandy soils in chaparral, coastal scrub, valley and foothill grassland; elevation 10-1,150 feet.	April–September	No	CNDDB includes an historic record from 1888 near Suisun City, but no suitable undisturbed nonnative annual grassland or coarse, sandy soils are present in the study area.
Fragrant fritillary *Fritillaria liliacea*	–/–/1B.2	Coast Ranges from Marin County to San Benito County.	Adobe soils of interior foothills, coastal prairie, coastal scrub, annual grassland, often on serpentinite; 10-1,345 feet.	February–April	Yes	Suitable habitat is present in nonnative annual grasslands in the study area, and heavy clay soils may occur in the study area, but species was not observed during blooming-period surveys.
Adobe lily *Fritillaria pluriflora*	–/–/1B.2	Northern Sierra Nevada foothills, inner Coast Ranges foothills, and Sacramento Valley. Butte, Colusa, Glenn, Lake, Napa, Plumas, Solano, Tehama, and Yolo Counties.	Chaparral, cismontane woodland, valley and foothill grassland, often on adobe soils; 200-2,300 feet.	February–April	Yes	Suitable habitat is present in nonnative annual grasslands in the study area, and heavy clay soils may occur in the study area, but species was not observed during blooming-period surveys.
Woolly-headed gilia *Gilia capitata* ssp. *tomentosa*	–/–/1B.1	Coastal California: Sonoma and Marin Counties.	Coastal bluff scrub; 50-510 feet.	May–July	No	No suitable vegetation communities are present in the study area.
Boggs Lake hedge-hyssop *Gratiola heterosepala*	–/E/1B.2	Inner north Coast Ranges, Central Sierra Nevada foothills, Sacramento Valley and Modoc Plateau: Fresno, Lake, Lassen, Madera, Merced, Modoc, Placer, Sacramento, Shasta, Siskiyou, San Joaquin, Solano, and Tehama Counties; also Oregon.	Clay soils in areas of shallow water, lake margins and vernal pool margins, 330-7,800 feet.	April–August	Yes	Potentially suitable habitat is present in seasonal wetlands in the study area, but species generally occurs in large vernal pools, which do not occur in the study area. Species was not observed during blooming-period surveys.

Common Name *Scientific Name*	Legal Status[a] Federal/State/ CNPS	Geographic Distribution	Habitat Requirements	Blooming Period	Habitat Present in Study Area?	Rationale
Diablo helianthella *Helianthella castanea*	–/–/1B.2	San Francisco Bay area: Alameda, Contra Costa, Marin[b], San Francisco[b], and San Mateo Counties; also reported from San Diego County.	At chaparral/oak woodland ecotone, often in partial shade, on rocky soils, also coastal scrub, riparian woodland, grassland; 200-4,300 feet.	March–June	Yes	Marginally suitable habitat is present in riparian woodland in the study area, but species is not known from Solano County. Species was not observed during blooming-period surveys.
Pale yellow hayfield tarplant *Hemizonia congesta* ssp. *congesta*	–/–/1B.2	Coastal California: Mendocino, Sonoma and Marin Counties.	Coastal scrub, valley and foothill grassland, often in fallow fields; 82-1,500 feet.	April–October	Yes	Suitable habitat is present in nonnative annual grasslands and fallow row crop fields in the study area, but species was not observed during blooming-period surveys.
Brewer's western flax *Hesperolinon breweri*	–/–/1B.2	Southern north inner Coast Ranges, northeast San Francisco Bay region, and Mt. Diablo. Contra Costa, Napa, and Solano Counties.	Serpentine slopes in chaparral and grasslands at 100–2,000 feet.	May–July	No	No suitable soils (serpentine) are present in the study area.
Napa western flax *Hesperolinon serpentinum*	–/–/1B.1	Alameda, Lake, Napa, and Stanislaus Counties.	Chaparral on serpentinite; 164-2,600 feet.	May–July	No	No suitable vegetation communities or soils (serpentinite) are present in the study area.
Santa Cruz tarplant *Holocarpha macradenia*	T/E/1B.1	Coastal slope of the Santa Cruz Mountains, Monterey and Santa Cruz Counties.	Coastal terrace grasslands, coastal scrub, often on light sandy to sandy clay soils, 30- 720 feet.	June–October	No	No suitable vegetation communities or soils (sandy or sandy clay) are present in the study area.
Carquinez goldenbush *Isocoma arguta*	–/–/1B.1	Deltaic Sacramento Valley and Suisun Slough. Contra Costa and Solano Counties.	Annual grassland on alkaline soils and flats generally below 70 feet.	August–December	Yes	Suitable habitat is present in nonnative annual grasslands in the study area, but species was not observed during blooming-period surveys.
Northern California black walnut *Juglans hindsii*	–/–/1B.1	Last two native stands in Napa and Contra Costa Counties; historically more widespread through southern north inner Coast Range, southern Sacramento Valley, northern San Joaquin Valley, and San Francisco Bay region.	Riparian forest, riparian woodland, 0-1,450 feet.	April–May	Yes	No native stands present in study area.

Common Name *Scientific Name*	Legal Status[a] Federal/State/ CNPS	Geographic Distribution	Habitat Requirements	Blooming Period	Habitat Present in Study Area?	Rationale
Contra Costa goldfields *Lasthenia conjugens*	E/–/1B.1	Napa and Solano Counties.	Alkaline or saline vernal pools and swales, below 1,550 feet.	March–June	Yes	**Species is present in the study area.** Suitable vegetation communities and soils are present, and the species was observed in the area south of SR 12E, west and east of Pennsylvania Avenue.
Delta tule pea *Lathyrus jepsonii* var. *jepsonii*	–/–/1B.2	Central Valley and San Francisco Bay region. Alameda, Contra Costa, Fresno, Marin, Napa, Sacramento, San Benito, Santa Clara, San Joaquin, and Solano Counties.	Coastal and estuarine marshes below 1,000 feet.	May–September	No	No suitable vegetation communities are present in the study area.
Legenere *Legenere limosa*	–/–/1B.1	Central Valley.	Vernal pools.	April–June	Yes	Potentially suitable habitat is present in seasonal wetlands in the study area, but species was not observed during blooming-period surveys.
Heckard's pepper-grass *Lepidium latipes* var. *heckardii*	–/–/1B.2	Southern Sacramento Valley, Glenn, Solano, and Yolo Counties.	On margins of alkali scalds in annual grassland; below 656 feet.	March–May	No	No suitable soil conditions (alkali scalds) present in annual grasslands in the study area.
Jepson's leptosiphon *Leptosiphon jepsonii*	–/–/1B.2	Lake, Napa, and Sonoma Counties.	Chaparral and cismontane woodland, typically in volcanic soils, 320–1,640 feet.	March–May	No	No suitable soils (volcanic) are present in the study area.
Woolly-headed lessingia *Lessingia hololeuca*	–/–/3	Southern north Coast Ranges, southern Sacramento Valley, northern San Francisco Bay region, Alameda, Monterey, Marin, Napa, Santa Clara, San Mateo, Solano, Sonoma, and Yolo Counties.	Clay or serpentinite soils of coastal scrub, lower montane coniferous forest, valley and foothill grassland; 49-1,000 feet.	June–October	Yes	Suitable habitat is present in nonnative annual grasslands on clay soils in the study area, but species was not observed during blooming-period surveys.
Mason's lilaeopsis *Lilaeopsis masonii*	–/R/1B.1	Southern Sacramento Valley, Sacramento River–San Joaquin River Delta, and northeast San Francisco Bay Area. Alameda, Contra Costa, Marin,[b] Napa, Sacramento, San Joaquin, and Solano Counties.	Freshwater or brackish marsh, in tidal zone, generally at sea level.	April–November	No	No suitable hydrologic conditions (tidal areas) are present in the study area.

Common Name *Scientific Name*	Legal Status[a] Federal/State/ CNPS	Geographic Distribution	Habitat Requirements	Blooming Period	Habitat Present in Study Area?	Rationale
Sebastopol meadowfoam *Limnanthes vinculans*	E/E/1B.1	Napa? and Sonoma Counties.	Vernal pools, vernally mesic grasslands and wet meadows; 50-1,000 feet.	April–May	Yes	Potentially suitable habitat is present in seasonal wetlands in the study area, but species was not observed during blooming-period surveys.
Delta mudwort *Limosella subulata*	–/–/2.1	Deltiac Central Valley: Contra Costa, Sacramento, San Joaquin, and Solano Counties; Oregon.	Muddy or sandy intertidal flats and marshes, streambanks in riparian scrub generally at sea level; 0-10 feet.	May–August	No	No suitable hydrologic conditions (tidal areas) are present in the study area.
Mt. Diablo cottonweed *Micropus amphibolus*	–/–/3.2	Coast Ranges from Lake County to Santa Barbara County.	Rocky sites in broadleafed upland forest, mixed evergreen forest, oak woodland, chaparral, Valley and foothill grasslands; 150-2,700 feet.	March–May	No	No suitable soils are present in the study area, and study area is outside known range.
Robust monardella *Monardella villosa* ssp. *globosa*	–/–/1B.2	North Coast Ranges and Eastern San Francisco Bay Area: Alameda, Contra Costa, Humboldt, Lake, Mendocino, Napa, Santa Clara, Santa Cruz, San Mateo, and Sonoma Counties.	Grassy openings in oak woodland and chaparral, coastal scrub and grassland, 330-3,000 feet	June–July	No	Study area is below known elevational range for species. Not observed during blooming-period surveys.
Little mousetail *Myosurus minimus* ssp. *apus*	–/–/3.1	Central Valley and South Coast from Butte County south to San Diego County; Baja California, Oregon.	Valley and foothill grassland, alkaline vernal pools at 66-2,100 feet.	March–June	Yes	Suitable vegetation communities and soils are present in seasonal wetlands on alkali soils the study area, but the species was not observed during blooming-period surveys.
Baker's navarretia *Navarretia leucocephala* ssp. *bakeri*	–/–/1B.1	Inner North Coast Range, western Sacramento Valley: Colusa, Glenn, Lake, Mendocino, Marin, Napa, Solano, Sonoma, Tehama, and Yolo Counties.	Vernal pools and swales in woodland, lower montane coniferous forest, mesic meadows, and grassland; generally below 5,740 feet.	May–July	Yes	Potentially suitable habitat is present in seasonal wetlands in the study area, but species was not observed during blooming-period surveys.

Common Name *Scientific Name*	Legal Status[a] Federal/State/ CNPS	Geographic Distribution	Habitat Requirements	Blooming Period	Habitat Present in Study Area?	Rationale
Colusa grass *Neostapfia colusana*	T/E/1B.1	Central Valley. Colusa,[b] Glenn,[b] Merced, Solano, Stanislaus, and Yolo Counties.	Adobe soils of vernal pools generally below 660 feet.	May–September	Yes	Potentially suitable habitat is present in seasonal wetlands in the study area, and heavy clay soils may occur in the study area, but species was not observed during blooming-period surveys.
Antioch Dunes evening-primrose *Oenothera deltoides* ssp. *howellii*	E/E/1B.1	Northeast San Francisco Bay region, known from 3 native occurrences; Contra Costa and Sacramento Counties.	Inland dunes generally below 100 feet.	March–September	No	No suitable vegetation communities or soils are present in the study area.
San Joaquin Valley orcutt grass *Orcuttia inaequalis*	T/E/1B.1	Scattered locations along east edge of the San Joaquin Valley and adjacent foothills, from Stanislaus County to Tulare County.	Vernal pools, 30-2,500 feet.	April–September	Yes	Potentially suitable habitat is present in nonnative annual grasslands in the study area, but species was not observed during blooming-period surveys.
Bearded popcorn-flower *Plagiobothrys hystriculus*	–/–/1B.1	Endemic to Solano[b] County. Last recorded in 1892 (California Natural Diversity Database 2005); rediscovered in 2005.	Mesic grasslands and vernal pools, 30-165 feet.	April–May	Yes	Potentially suitable habitat is present in seasonal wetlands in the study area, but species was not observed during blooming-period surveys.
Marin knotweed *Polygonum marinense*	–/–/3.1	Coastal Marin, Marin, Napa, Solano, and Sonoma Counties.	Coastal salt marsh, brackish marsh; 0-30 feet.	April–October	Yes	Suitable marsh habitat is present on south side of SR 12E, but not observed during blooming-period surveys.
Slender-leaved pondweed *Potamogeton filiformis*	–/–/2.2	Scattered locations in California: Contra Costa, El Dorado, Lassen, Merced, Mono, Modoc, Mariposa, Placer, Santa Clara*, and Sierra Counties; Arizona, Nevada, Oregon, Washington.	Freshwater marsh, shallow emergent wetlands and freshwater lakes, drainage channels; 980-7,050 feet.	May–July	Yes	Potentially suitable habitat is present in perennial marshes in the study area, but study area is below the known elevation range and the species was not observed during blooming-period surveys.
California beaked-rush *Rhynchospora californica*	–/–/1B.1	Scattered occurrences in northern California. Butte, Mariposa, Marin, and Sonoma Counties.	Freshwater marshes and seeps, bogs and fens, and lower montane coniferous forest, 131-3,310 feet.	May–July	Yes	Potentially suitable habitat is present in perennial marshes in the study area, but species was not observed during blooming-period surveys.

Common Name *Scientific Name*	Legal Status[a] Federal/State/ CNPS	Geographic Distribution	Habitat Requirements	Blooming Period	Habitat Present in Study Area?	Rationale
Rayless ragwort *Senecio aphanactis*	–/–/2.2	Scattered locations in central western and southwestern California, from Alameda County to San Diego County.	Oak woodland, coastal scrub, open sandy or rocky areas, on alkaline soils; 50-2,600 feet.	January–April	Yes	Suitable habitat is present in undisturbed oak woodlands in the study area, but species was not observed during blooming-period surveys.
Napa checkerbloom *Sidalcea hickmanii* ssp. *napensis*	–/–/1B.1	Napa county	Rhyolitic soils in chaparral; 1,360-2,000 feet.	April-June	No	No suitable vegetation communities or soils are present in the study area, and study area is below the known elevation range.
Marin checkerbloom *Sidalcea hickmanii* ssp. *viridis*	–/–/1B.3	Sonoma County to San Mateo County.	Openings in chaparral on volcanic or serpentinite substrates, 165-1,410 feet.	May–June	No	No suitable vegetation communities or soils are present in the study area.
Keck's checkerbloom *Sidalcea keckii*	E/–/1B.1	Fresno and Tulare Counties.	Serpentine clay soils in cismontane woodland, valley and foothill grassland; 400-1,400 feet.	April-May	No	No suitable soils are present in the study area, and study area is below the known elevation range.
Suisun marsh aster *Symphyotrichum lentum* [*Aster lentus*]	–/–/1B.2	Sacramento River–San Joaquin River Delta, Suisun Marsh, and Suisun Bay. Contra Costa, Napa, Sacramento, San Joaquin, and Solano Counties.	Tidal brackish and freshwater marsh below 500 feet.	May–November	No	No suitable hydrologic conditions (tidal areas) are present in the study area.
Napa bluecurls *Trichostema ruygtii*	–/–/1B.2	Lake and Napa Counties.	Cismontane woodland, lower montane coniferous forest, valley and foothill grassland, vernal pools; 100-200 feet.	June-October	Yes	Potentially suitable habitat is present in nonnative annual grasslands and seasonal wetlands in the study area, but species was not observed during blooming-period surveys.
Showy Indian clover *Trifolium amoenum*	E/–/1B.1	Coast Range foothills in the San Francisco Bay region, currently known from Marin County.	Low elevation grasslands, including swales and disturbed areas, sometimes on serpentinite soils; 13-1,360 feet.	April–June	Yes	Potentially suitable habitat is present in nonnative annual grasslands in the study area, but species was not observed during blooming-period surveys.

Common Name *Scientific Name*	Legal Status[a] Federal/State/ CNPS	Geographic Distribution	Habitat Requirements	Blooming Period	Habitat Present in Study Area?	Rationale
Saline clover *Trifolium depauperatum* var. *hydrophilum*	–/–/1B.2	Alameda, Monterey, Napa, San Benito, Santa Clara, San Luis Obispo, San Mateo, Solano, and Sonoma Counties.	Salt marsh, mesic alkaline areas in grasslands, vernal pools; 0-1,000 feet.	April–June	Yes	**Species is present in the study area.** Suitable vegetation communities and soils are present, and the species was observed in the area south of SR 12E, west and east of Pennsylvania Avenue.
Greene's tuctoria *Tuctoria greenei*	E/R/1B.1	Scattered distribution along eastern Central Valley and foothills from Shasta County to Tulare County.	Dry vernal pools at 100-3,510 feet.	May–September	Yes	Potentially suitable habitat is present in seasonal wetlands in the study area, but species was not observed during blooming-period surveys.
Oval-leaved viburnum *Viburnum ellipticum*	–/–/2.3	Northwest California, San Francisco Bay Area, and north and central Sierra Nevada foothills. Contra Costa, Fresno, El Dorado, Glenn, Humboldt, Mendocino, Napa, Shasta, and Sonoma Counties, as well as Oregon and Washington.	Chaparral, cismontane woodland, and lower montane coniferous forest; 705-4,600 feet.	May–June	No	No suitable habitat in the study area, and study area is below elevational range for the species.

Sources: California Natural Diversity Database (CNDDB) 2010; CNPS 2010; Huffman-Broadway Group, Inc. 2007; Jones & Stokes study area surveys 2004 and 2007.

[a] Status explanations:

– = no listing.

Federal

E = listed as endangered under the federal Endangered Species Act.

T = listed as threatened under the federal Endangered Species Act.

State

E = listed as endangered under the California Endangered Species Act.

T = listed as threatened under the California Endangered Species Act.

R = listed as rare under the California Native Plant Protection Act; this category is no longer used for newly listed plants, but some plants previously listed as rare retain this designation.

California Native Plant Society

1B = List 1B species: rare, threatened, or endangered in California and elsewhere.

2 = List 2 species: rare, threatened, or endangered in California but more common elsewhere.

3 = List 3 species: plants about which more information is needed to determine their status.

CNPS Code Extensions:

.1 = seriously endangered in California (over 80% of occurrences threatened / high degree and immediacy of threat)

.2 = fairly endangered in California (20- 80% of occurrences threatened)

.3 = not very endangered in California (<20% of occurrences threatened or not current threats known)

[b] Known populations believed extirpated from that county.

Table 3.3.4-1. Special-Status Wildlife and Fish Species with the Potential to Occur in the I-80/I-680/SR-12 Project Region

Common Name, *Scientific Name*	Legal Status[a]		Geographic Distribution	Habitat Requirements	Habitat Present in Study Area?	Comments
	Federal	State				
Invertebrates						
Conservancy fairy shrimp *Branchinecta conservatio*	E	–	Disjunct occurrences in Solano, Merced, Tehama, Ventura, Butte, and Glenn Counties.	Large deep vernal pools in annual grasslands.	Absent	Suitable habitat (large, deep vernal pools) is not present in or near the study area.
Vernal pool fairy shrimp *Branchinecta lynchi*	T	–	Central Valley and central and south Coast Ranges from Tehama County to Santa Barbara County. Isolated populations also in Riverside County.	Common in vernal pools. Also found in sandstone rock outcrop pools.	Present	Suitable habitat (vernal pools) is present in or near the study area.
Vernal pool tadpole shrimp *Lepidurus packardi*	E	–	Shasta County to Merced County.	Vernal pools and ephemeral stock ponds.	Present	Suitable habitat (vernal pools) is present in or near the study area.
Delta green ground beetle *Elaphrus viridus*	T	–	Restricted to Olcott Lake and other vernal pools at Jepson Prairie Preserve in central Solano County.	Sparsely vegetated edges of vernal lakes and pools, occurring up to 250 feetfrom pools.	Absent	Outside known range of the species. Closest record occurs approximately 13 miles east of the study area at Jepson Prairie Preserve.
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	T	–	Streamside habitats below 915 meters (3,000 feet) above sea level throughout the Central Valley.	Riparian and oak savanna habitats with elderberry shrubs and streamside habitats below 915 meters (3,000 feet) above sea level. Elderberries are the host plant.	Present	Twenty-two elderberry shrubs are present in the study area.
Callippe silverspot butterfly *Speyeria callippe callippe*	E	–	San Bruno Mountains, San Mateo County, and a single location in Alameda County.	Open hillsides where wild pansy (*Viola pedunculata*) grows. Larvae feed on Johnny jump-up plants, whereas adults feed on native mints and non-native thistles.	Present	Two distinct populations of Johnny jump-up plants were located in the study area during March 2004 floristic surveys (Monk & Associates 2004).

Common Name, *Scientific Name*	Legal Status[a]		Geographic Distribution	Habitat Requirements	Habitat Present in Study Area?	Comments
	Federal	State				
Amphibians						
California red-legged frog *Rana aurora draytonii*	T	SSC	Along the coast and coastal mountain ranges of California from Marin County to San Diego County and in the Sierra Nevada from Tehama County to Fresno County.	Permanent and semi-permanent aquatic habitats, such as creeks and coldwater ponds, with emergent and submergent vegetation. May aestivate in rodent burrows or cracks during dry periods.	Present	Perennial and seasonal drainages and ponds and adjacent habitat in the study area provide potential aquatic and upland habitat. Species found in Mangels pond and a nearby intermittent drainage (North Connector EIR 2007).
California tiger salamander *Ambystoma californiense*	T	T	Central Valley, including Sierra Nevada foothills, up to approximately 305 meters (1,000 feet) above sea level and coastal region from Butte County to northeastern San Luis Obispo County	Valley floor grasslands or low (below 1,500 feetabove sea level) foothill elevations where lowland aquatic sites like large vernal pools, playa pools, sag ponds, and stock ponds are available for breeding. Upland habitat consists of small mammal burrows within approximately 2,200 feetof breeding habitat.	Absent	The study area is outside the range of the California tiger salamander (Escaron and Cleckler pers. comms.)
Reptiles						
Giant garter snake *Thamnophis gigas*	T	T	Central Valley from the vicinity of Burrel in Fresno County to near Chico in Butte County. Extirpated from areas south of Fresno.	Sloughs, canals, low-gradient streams, and freshwater marshes where there is a prey base of small fish and amphibians. Also irrigation ditches and rice fields. Requires grassy banks and emergent vegetation for basking and areas of high ground protected from flooding during winter.	Absent	Study area is on the edge of the species' range. No suitable habitat (perennial marsh and slough) that is hydrologically connected to GGS populations is present in the study area.

Common Name, *Scientific Name*	Legal Status[a]		Geographic Distribution	Habitat Requirements	Habitat Present in Study Area?	Comments
	Federal	State				
Western pond turtle *Actinemys marmorata*	–	SSC	Occurs from the Oregon border of Del Norte and Siskiyou Counties along the coast to San Francisco Bay, inland through the Sacramento Valley, and on the western slope of the Sierra Nevada.	Ponds, marshes, rivers, streams, and irrigation canals with muddy or rocky bottoms and with watercress, cattails, water lilies, or other aquatic vegetation in woodlands, grasslands, and open forests.	Present	Suitable aquatic habitat is present within the study area. The species is present within the Dan Wilson Creek/Green Valley Creek watershed (Solano County Water Agency 2005). Western pond turtles have been observed in a pond north of SR 12W (CNDDB 2008) and in Ledgewood Creek during a swallow nest survey in March 2008 for the I-80 HOV project (Ref).
Birds						
Northern harrier *Circus cyaneus*	–	SSC	Throughout lowland California. Has been recorded in fall at high elevations.	Grasslands, meadows, marshes, and seasonal and agricultural wetlands.	Present	Suitable nesting and foraging habitat is present in the study area. A northern harrier was observed in grassland habitat north of SR 12W (North Connector EIR 2007).
White-tailed kite *Elanus leucurus*	–	FP	Lowland areas west of Sierra Nevada from the head of the Sacramento Valley south, including coastal valleys and foothills, to western San Diego County at the Mexico border.	Low foothills or valley areas with valley or live oaks, riparian areas, and marshes near open grasslands for foraging.	Present	Riparian habitat along the perennial and seasonal drainages provides potential nesting habitat in the study area.
Swainson's hawk *Buteo swainsoni*	–	T	Lower Sacramento and San Joaquin Valleys, Klamath Basin, and Butte Valley. Highest nesting densities occur near Davis and Woodland, Yolo County.	Nests in oaks or cottonwoods in or near riparian habitats. Forages in grasslands, irrigated pastures, and grain fields.	Present	Riparian habitat throughout the study area provides potential nesting habitat. Annual grassland, row crops, and ruderal vegetation provides suitable foraging habitat.

Common Name, *Scientific Name*	Legal Status[a]		Geographic Distribution	Habitat Requirements	Habitat Present in Study Area?	Comments
	Federal	State				
Western burrowing owl *Athene cunicularia hypugea*	–	SSC	Lowlands throughout California, including the Central Valley, northeastern plateau, southeastern deserts, and coastal areas. Rare along south coast.	Level, open, dry, heavily grazed or low-stature grassland or desert vegetation with available burrows. Also occurs along ag ditches and abandoned lots.	Present	Suitable nesting habitat is present in the study area. Burrowing owls were observed in grassland habitat north of SR 12W (North Connector EIR 2007).
Loggerhead shrike *Lanius ludovicianus*	–	SSC	Resident and winter visitor in lowlands and foothills throughout California. Rare on coastal slope north of Mendocino County, occurring only in winter.	Prefers open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches.	Present	Suitable nesting habitat is present in the study area.
California clapper rail *Rallus longirostris oboletus*	E	FP	Marshes around San Francisco Bay and east through the Sacramento River–San Joaquin River Delta to Suisun Marsh.	Restricted to salt marshes and tidal sloughs. Usually associated with heavy growth of pickleweed. Feeds on mollusks removed from the mud in sloughs.	Absent	No suitable habitat (marsh and slough) is present in the study area.
California black rail *Laterallus jamaicensis coturniculus*	_	T, FP	Known from the San Francisco Bay area and the delta of the Sacramento and San Joaquin rivers south along the coast to northern Baja California and in Yuba County.	Inhabits saltwater, brackish, and freshwater marshes.	Absent	No suitable habitat is present in the study area.
California least tern *Sterna antillarum*	E	E	Nests on beaches along San Francisco Bay and along the southern California coast from southern San Luis Obispo County to San Diego County.	Nests on sandy, upper ocean beaches, and occasionally uses mudflats. Forages on adjacent surf line, estuaries, or the open ocean.	Absent	No suitable habitat (sandy beaches and mudflats) is present in the study area.
Western Snowy plover *Charadrius alexandrines nivosus*	T	SSC	Population defined as those birds that nest adjacent to or near tidal waters, including all nests along the mainland coast, peninsulas, offshore islands, and adjacent bays and estuaries. Twenty breeding sites are known in California from Del Norte to Diego County.	Coastal beaches above the normal high tide limit in flat, open areas with sandy or saline substrates; vegetation and driftwood are usually sparse or absent	Absent	No suitable habitat (sandy beaches) present in the study area.

Common Name, *Scientific Name*	Legal Status[a]		Geographic Distribution	Habitat Requirements	Habitat Present in Study Area?	Comments
	Federal	State				
Saltmarsh common yellowthroat *Geothlypis trichas sinuosa*	–	SSC	The breeding range of salt marsh common yellowthroat as described by Grinnell and Miller (1944) is bounded by Tomales Bay on the north, Carquinez Strait on the east, and Santa Cruz County on the south.	In California, yellowthroats are found in freshwater marshes, coastal swales, swampy riparian thickets, brackish marshes, salt marshes, and the edges of disturbed weed fields and grasslands that border soggy habitats (Shuford 1993).	Absent	No suitable habitat is present in the study area.
Suisun song sparrow *Melospiza melodia maxillaris*	–	SSC	The Suisun song sparrow is a distinct subspecies completely endemic to Suisun Bay.	Intermixed stands of bulrush, cattail, and other emergent vegetation provide ideal habitat.	Absent	No suitable habitat is present in the study area.
Tricolored blackbird *Agelaius tricolor*	–	SSC	Permanent resident in the Central Valley from Butte County to Kern County. Breeds at scattered coastal locations from Marin County south to San Diego County; and at scattered locations in Lake, Sonoma, and Solano Counties. Rare nester in Siskiyou, Modoc, and Lassen Counties	Nests in dense colonies in emergent marsh vegetation, such as tules and cattails, or upland sites with blackberries, nettles, thistles, and grainfields. Habitat must be large enough to support 50 pairs. Probably requires water at or near the nesting colony	Present	Suitable nesting habitat is present in the study area.
Mammals						
Suisun shrew *Sorex ornatus sinuosus*	–	SSC	Found in the tidal marshes of the northern shores of San Pablo and Suisun bays, as far east as Grizzly Island, and as far west as Sonoma Creek and Tubbís Island. Also observed near Petaluma and north of San Rafael.	Occupies tidal marshes that provide dense cover, abundant food (primarily invertebrates), suitable nesting sites, and fairly continuous ground moisture.	Absent	No suitable saltmarsh habitat occurs on site.
Salt marsh harvest mouse *Reithrodontomys raviventris*	E	E, FP	Vicinity of San Francisco, San Pablo, and Suisun Bays and the Sacramento River–San Joaquin River Delta.	Salt marshes with a dense plant cover of pickleweed and fat hen. Adjacent to an upland site.	Absent	No suitable habitat (saltmarsh) is present in the study area based on survey by Phil Leitner (Appendix C
Pallid bat *Antrozous pallidus*	–	SSC	Throughout California.	Day roosts include rock outcrops, mines, caves, hollow trees, buildings and bridges. Recent research suggests high reliance on tree roosts.	Present	Bridges and trees in study area provide potential roosting sites.

Common Name, *Scientific Name*	Legal Status[a]		Geographic Distribution	Habitat Requirements	Habitat Present in Study Area?	Comments
	Federal	State				
Western red bat *Lasiurus blossevillii*	–	SSC	Scattered throughout much of California at lower elevations	Found primarily in riparian and wooded habitats. Occurs at least seasonally in urban areas. Day roosts in trees within the foliage. Found in fruit orchards and sycamore riparian habitats in the central valley	Present	Suitable roosting habitat in riparian woodlands and orchards.
Long-eared bat *Myotis evotis*		WBWG: Medium priority	Found throughout California.	Day roosts in hollow trees under exfoliating bark, and crevices in rock outcrops. Found roosting under bark of small black oaks in northern California.	Present	Suitable roosting habitat occurs in trees.
Fringed myotis bat *Myotis thysanodes*		WBWG: High priority	Found throughout most of California.	Roosts in colonies in caves, cliffs and attics of old buildings. Will also use trees as day roosts.	Present	Suitable roosting habitat occurs in trees. .
Yuma myotis *Myotis yumanensis*	–	WBWG:Low-medium priority	Considered common and widespread in northern California up to 5,000 feet above sea level. Colonies known from Marin and San Francisco Counties.	Found in desert scrub, pinyon-juniper woodlands, and other open woodlands and forests. Open water is a key habitat element for this species. Roosts colonially in a variety of natural and artificial sites, including caves, mines, buildings, bridges, and trees.	Present	Bridges and trees in study area provide potential roosting sites.
Fish						
Delta smelt *Hypomesus transpacificus*	T	T	Sacramento River–San Joaquin River Delta	Euryhaline estuary channels.	Absent	Ledgewood Creek in the project area connects to Peytonia Slough which does not support delta smelt (Schroeter 2005).

Common Name, *Scientific Name*	Legal Status[a]		Geographic Distribution	Habitat Requirements	Habitat Present in Study Area?	Comments
	Federal	State				
Central California coast steelhead distinct population segment (DPS) *Oncorhynchus mykiss*	T	–	Coastal streams from Russian River to Aptos Creek; tributaries to San Francisco, San Pablo, and Suisun Bays; Suisun Marsh; and coastal marine waters off California.	Coldwater anadromous streams.	Present	The project is located in inland freshwater stream habitats draining to Suisun Marsh. Species occurrence documented in Suisun, Green Valley and Ledgewood Creeks. Study area is not included in critical habitat.
Central Valley steelhead DPS *Oncorhynchus mykiss*	T	–	Sacramento River and tributary Central Valley rivers	Occurs in well-oxygenated, cool, riverine habitat with water temperatures from 7.8 to 18°C (Moyle 2002). Habitat types are riffles, runs, and pools.	Absent	Outside of species range.
Central California coast coho *Oncorhynchus kisutch*	E	E	Includes naturally spawned populations from Punta Gorda in northern California south to and including the San Lorenzo River in central California, as well as populations in tributaries to San Francisco Bay, excluding the Sacramento-San Joaquin River system	Occur in coastal streams with water temperatures < 15°C. Need cool, clear water with instream cover. Spawn in tributaries to large rivers or streams directly connected to the ocean (Moyle 2002).	Absent	Outside of species range.
Sacramento River winter-run Chinook salmon *Oncorhynchus tshawytscha*	E	E	Mainstem Sacramento River below Keswick Dam (Moyle 2002)	Occurs in well-oxygenated, cool, riverine habitat with water temperatures from 8.0 to 12.5°C. Habitat types are riffles, runs, and pools. (Moyle 2002.)	Absent	Outside of species range.
Central Valley spring-run Chinook salmon *Oncorhynchus tshawytscha*	T	T	Upper Sacramento River and Feather River	Have the same general habitat requirements as winter-run Chinook salmon. Coldwater pools are needed for holding adults (Moyle 2002).	Absent	Outside of species range.

Common Name, *Scientific Name*	Legal Status[a]		Geographic Distribution	Habitat Requirements	Habitat Present in Study Area?	Comments
	Federal	State				
River lamprey *Lampetra ayresi*	–	SSC	Exact range unknown, but includes coastal streams from Alaska to San Francisco Bay. In California, within lower Sacramento and San Joaquin Rivers, Napa River, Sonoma Creek, Alameda Creek, Salmon Creek, Russian River tributaries, and tributaries to San Francisco Bay.	Habitat requirements poorly understood, but include anadromous streams with gravel riffle for spawning and soft-bottomed areas for rearing.	Present	The project is located in inland freshwater anadromous stream habitats draining within the range of the species.
Sacramento splittail *Pogonichthys macrolepidotus*	–	SSC	Largely confined to Sacramento River–San Joaquin River Delta, Napa River, Petaluma River, Sacramento River, and Suisun Marsh.	Shallow-water, low-salinity habitats throughout slow areas of rivers and sloughs; areas of flooded vegetation for spawning and rearing.	Present	Ledgewood Creek in the project area connects to Peytonia Slough which supports splittail (Schroeter et al 2005).
Green sturgeon *Acipenser medirostris*	T	SSC	In marine waters of the Pacific Ocean from the Bering Sea to Ensenada, Mexico. In rivers from British Columbia south to the Sacramento River, primarily in the Klamath/Trinity and Sacramento Rivers.	Primarily marine, using large anadromous freshwater rivers and associated estuaries for spawning and rearing.	Absent	The project area does not include large rivers and is not within the primary range of the species.
Central Valley fall/late fall–run Chinook salmon *Oncorhynchus tshawytscha*	SC	–	Sacramento and San Joaquin Rivers and their tributaries, as well as some tributaries to San Francisco Bay.	Lower-elevation coldwater anadromous streams.	Present	The project is located in inland freshwater anadromous stream habitats draining to Suisun Marsh, designated essential fish habitat. Species occurrence documented in Suisun, Green Valley and Ledgewood Creeks.

[a] Status explanations:
– = no listing.

Federal
E = listed as endangered under the federal Endangered Species Act.
T = listed as threatened under the federal Endangered Species Act.
SC = species of concern; species for which existing information indicates it may warrant listing but for which substantial biological information to support a proposed rule is lacking.
P = officially proposed (in the Federal Register) for listing as endangered or threatened.
C = candidate to become a proposed species.

State

E	=	listed as endangered under the California Endangered Species Act.
T	=	listed as threatened under the California Endangered Species Act.
FP	=	fully protected under the California Fish and Game Code.
C	=	formally designated as a candidate for threatened or endangered status; extending its legal protection for 1 year (until February 2010).
SSC	=	species of special concern in California.
WBWG	=	Western Bat Working Group (http://www.wbwg.org/spp_matrix.html)

High priority	=	species are imperiled or at high risk of imperilment
Moderate priority	=	This designation indicates a level of concern that should warrant closer evaluation, more research, and conservation actions of both the species and possible threats. A lack of meaningful information is a major obstacle in adequately assessing these species' status and should be considered a threat
Low priority	=	While there may be localized concerns, the overall status of the species is believed to be secure.

3.4 Relationship between Local Short-Term Uses of the Human Environment and the Maintenance of Long-Term Productivity

Implementation of either of the project alternatives (and their fundable first phases) will result in attainment of short-term and long-term transportation, safety, and economic objectives at the expense of some long-term social, aesthetic, biological, noise, parkland, and other land use impacts. Implementation of Alternative B or Alternative C would further address the objectives as well as long-term inspection and enforcement objectives with the construction of the improved westbound truck scales facility. The attainment of these objectives (long-term productivity) comes at the expense of some short-term costs that would be incurred during construction and some long-term term losses of valuable uses of the environment. These long-term losses include impacts on biological resources, agricultural and community land uses, air quality, and noise.

3.4.1 Build Alternatives

The build alternatives would have similar impacts. Because of the magnitude of the proposed project, the fundable first phase of the alternatives would have similar impacts and the full build alternatives would have similar impacts.

Alternative B, Phase 1 and Alternative C, Phase 1

The fundable first phase of the alternatives would have similar impacts.

- **Short-term losses would include**: economic losses experienced by businesses that relocate; construction impacts such as noise, traffic detours or delays; access inconveniences; temporary disturbance to biological resources; visual impacts during construction.
- **Short-term benefits would include:** increase in jobs and revenue due to construction.
- **Long-term losses would include:** permanent loss of plant and wildlife resources; loss of agricultural land; noise increase; displaced businesses and a displaced residence; use of construction materials and energy; possible decreased air quality or increase in greenhouse gas emissions.
- **Long-term gains would include:** improvement of transportation network in the vicinity; reduction of congestion on local roads and highways.

Alternative B and Alternative C

These alternatives would have similar impacts.

- **Short-term losses would include:** economic losses experienced by businesses that relocate; construction impacts such as noise, traffic detours or delays; access inconveniences; temporary disturbance to biological resources; visual impacts during construction.
- **Short-term benefits would include:** increase in jobs and revenue due to construction.

- **Long-term losses would include:** permanent loss of plant and wildlife resources; loss of agricultural land; noise increase; displaced businesses and a displaced residence; use of construction materials and energy; possible decreased air quality or increase in greenhouse gas emissions.
- **Long-term gains would include:** improved truck weight and safety inspection and enforcement system; improvement of transportation network in the vicinity; reduction of congestion on local roads and highways; encouragement of use of HOV lanes.

3.4.2 No-Build Alternative

This alternative would not result in any of the gains or losses listed under the above alternatives. It would not address the issues of worsening traffic and truck congestion, increasingly unreliable freight transport, or worsening traffic safety.

3.5 Irreversible and Irretrievable Commitments of Resources

Irretrievable commitments of resources would occur as a result of implementing any of the proposed project alternatives because all of the project alternatives involve a commitment of natural, physical, human, and fiscal resources. Land converted from its present uses to a transportation facility is considered an irreversible commitment. However, if a greater need arises for use of the land or if the highway facility is no longer needed, the land can be converted to another use. At present, there is no reason to believe such a conversion would ever be necessary or desirable.

Considerable amounts of fossil fuels, labor, and highway construction materials such as cement, aggregate, and bituminous material would be expended in the construction of any of the alternatives. Additional building materials would be used in the construction of the westbound truck scales facility under both Alternative B and C. Additionally, extensive expenditure of labor and natural resources (e.g., woodlands, wetlands, and other natural habitat) are used in the production of construction and building materials. These materials are typically not retrievable. However, they are generally not in short supply and their use would not have an adverse effect on continued availability of these resources. Any construction would also require a substantial one-time expenditure of both state and federal funds, which are not retrievable. In addition to the costs of construction and right-of-way, costs for roadway maintenance, including pavement maintenance and resurfacing, roadside, litter/sweeping, signs and markers, electrical and storm maintenance would be incurred. However, savings in energy use, travel time, and a reduction of accidents would offset these costs.

The commitment of these resources is based on the concept that the residents in the immediate area, region, and state, as well as commuters would benefit from the improved quality of the transportation system. In the case of the ultimate alternatives, the safety of the nation would benefit from the improved security and enforcement at the new westbound truck scales facility. These benefits would consist of improved accessibility, functioning, safety, and homeland security, which are expected to outweigh the commitment of these resources.

3.6 Cumulative Impacts

3.6.1 Regulatory Setting

Cumulative impacts are those that result from past, present, and reasonably foreseeable future actions, combined with the potential impacts of the proposed project. A cumulative effect assessment looks at the collective impacts posed by individual land use plans and projects. Cumulative impacts can result from individually minor, but collectively substantial impacts taking place over a period of time.

Cumulative impacts on resources in the project area may result from residential, commercial, industrial, and highway development, as well as from agricultural development and the conversion to more intensive types of agricultural cultivation. These land use activities can degrade habitat and species diversity through consequences such as displacement and fragmentation of habitats and populations, alteration of hydrology, contamination, erosion, sedimentation, disruption of migration corridors, changes in water quality, and the introduction or promotion of predators. They also can contribute to potential community impacts identified for the project, such as changes in community character, traffic patterns, housing availability, and employment.

CEQA Guidelines, Section 15130, describes when a cumulative impact analysis is warranted and what elements are necessary for an adequate discussion of cumulative impacts. The definition of cumulative impacts, under CEQA, can be found in Section 15355 of the CEQA Guidelines. A definition of cumulative impacts, under NEPA, can be found in 40 CFR, Section 1508.7 of the CEQ Regulations.

3.6.2 Approach to Cumulative Impact Analysis

The cumulative analysis for the proposed project takes into consideration the other ongoing projects in the same geographic area as the proposed project, as well as planned land uses and transportation and circulation projections identified in city and county general plan and policy documents.

The existing and proposed transportation projects listed below in order of anticipated completion have been included in this analysis because they either are close to the project area or could affect regional resources. This information represents the most up-to-date information available as of the date of publication of this document.

- **North Connector Project:** The North Connector Project would construct a parallel route to the north of I-80 between Abernathy Road at I-80 on the east and SR 12 at Red Top Road on the west. This project would provide increased east/west capacity and provide an alternative to I-80 for local traffic. Construction of the first phase of the North Connector Project started in summer 2009, with completion anticipated by December 2010.

- **Interstate 80 High-Occupancy Vehicle Lanes Project:** Eastbound and westbound high-occupancy vehicle (HOV) lanes have been constructed along an approximately 8.5-mile-long segment of I-80 from the Red Top Road interchange in Solano County to approximately 0.5 mile east of the Air Base Parkway interchange in Fairfield. This project (EA-04-0A5304) increases the overall carrying capacity of I-80 in the project area and facilitates the already high demand for ridesharing on I-80. Construction of this project was completed in late 2009.
- **Jepson Parkway:** This project would provide a route for local Vacaville-Fairfield traffic to bypass I-80 in Fairfield and instead enter Fairfield from the east on Air Base Parkway or from the south on State Route 12. The project would include widening of existing roads, and could include construction of new roadway through an existing area of grassland and wetlands.
- **2010 State Highway Operation and Protection Program (SHOPP) Projects:** These projects include two collision reduction projects scheduled for construction in program year 2010/11 and one mobility project scheduled for construction in program year 2012/2013. One collision reduction project is to construct a concrete barrier on I-80 in Vallejo between the Redwood Street on-ramp and the Route 37 connector. The other collision reduction project is to widen the shoulder on SR 12 near Rio Vista between Azevedo Road and Liberty Island Road. The mobility project includes lengthening an on-ramp and widening a bridge on I-80 in Vacaville, from west of the Alamo Creek Bridge to the Alamo west-bound on-ramp.
- **I-80 Eastbound Cordelia Truck Scales Relocation Project:** The I-80 Eastbound Cordelia Truck Scales Relocation Project (EA-04-0A5350) would include the construction of a larger, more efficient truck scales facility on eastbound I-80, approximately 2,500 feet east of the existing facility. The project would also include the construction of on- and off-ramps to both I-80 and eastbound SR 12E. The environmental document for the project was approved in fall 2009. Construction is expected to begin in 2011and be completed in 2013.
- **Jameson Canyon (SR 12) Widening from I-80 to SR 29:** This project would provide a continuous four-lane expressway between I-80 and SR 29. The project is currently in the final design phase and construction is planned to begin in late 2011, with completion in 2013.
- **I-80 Express Lanes Projects:** Two projects are planned as part the construction of the I-80 express lanes. The I-80 Express Lanes (HOV Conversion) Project would convert the existing HOV lanes between Red Top Road and Airbase Parkway Project to express lanes. The I-80 Express Lanes (New Lanes) Project would construct new express lanes between Airbase Parkway and I-505. These improvements are in the early planning phase. No construction date has been determined.
- **I-80 Improvements through Fairfield:** Several projects are planned between SR 12W and Air Base Parkway. They include the removal of existing hook ramps at Auto Mall Parkway and construction of westbound auxiliary lanes on I-80 between Green Valley Road and SR 12W, Waterman Boulevard and Travis Boulevard, and West Texas Street and Abernathy Road. These improvements are in the early planning phases. No construction date has been determined.
- **Transit Improvements:** To support increased transit ridership and expanded bus routes in the county, the *I-80/I-680/I-780 Transit Corridor Study* identifies numerous potential locations for park-and-ride lots in these major corridors, four of which could be located in the

project area: Red Top Road at I-80, a surface lot at Abernathy Road between I-80 and SR 12 or an expanded parking structure at the Fairfield Multimodal Transportation Center, and Gold Hill Road at I-680. These potential lots are expected to be constructed between 2010 and 2015.

Additionally, local non-transportation projects currently planned and underway in the general project area are provided in Tables 3.1.1-1 and 3.1.1-2. These projects represent development covered in county and city planning documents and approved under building permits. The cumulative analysis for the individual resource areas are based on analysis of different geographic boundaries or resource study areas. The resource study area and pertinent projects are identified under each resource area.

3.6.3 Assessment of Cumulative Impacts

The project alternatives would not contribute to a cumulative impact in the following resource areas because the resources are in generally good health and the project alternatives would result in either beneficial impacts, no impacts, or minor impacts that would be fully mitigated (to a less than significant level) and the alternatives' contribution to the cumulative impact would not be considerable.

- Land Use
- Growth
- Community Impacts
- Utilities and Emergency Services
- Visual and Aesthetic Resources
- Cultural Resources
- Hydrology and Floodplain
- Water Quality and Stormwater Runoff
- Geology/Soils/Seismic/Topography
- Paleontology
- Hazardous Waste/Materials
- Air Quality
- Noise
- Energy
- Biological Resources (Plant Species and Animal Species)

3.6.3.1 Human Environment

Farmlands

Farmland resources are most commonly managed at the County and Statewide level. For the proposed project the study area for cumulative farmlands effects is Solano County. As discussed in Chapter 3.1.3, Solano County had a total of 360,562 acres of land under cultivation in 2006. Of this total, 139,536 acres were designated as Prime Farmland, 7,164 acres were designated as Farmland of Statewide Importance, 11,036 acres were designated as Unique Farmland, and 202,826 acres were used for grazing purposes (California Department of Conservation 2006). Between 1984 and 2006, 40,537 acres (1,843 acres per year) of agricultural land was converted to non-agricultural uses in Solano County. This conversion included 23,221 acres of Important Farmland at a rate of 1,056 acres per year. Approximately half of the converted acreage, or 12,689 acres, was considered Prime Farmland (California Department of Conservation 2006). During this same period, about 13,000 acres inside the cities' (Fairfield and Suisun City) spheres of influence were converted to non-agricultural uses. This trend has caused local and regional governments to implement measures to preserve farmland (see discussion in Section 3.1.3, County of Solano).

As discussed in Section 3.1.3, the project alternatives would result in the conversion of farmlands to non-farm uses. Alternative B would convert roughly 140 acres of agricultural land to roadway, while Alternative B, Phase 1 would not affect agricultural land. Alternative C would convert roughly 122 acres of agricultural land, while Alternative C, Phase 1 would convert roughly 77 acres of agricultural land.

The direct impact of the project alternatives is not considered adverse, as measured by its LESA score (see discussion at page 3.1.3-8).

The project alternatives in combination with other ongoing and reasonably foreseeable projects in the study area (see discussion under 3.6.2 above and Tables 3.1.1-1 and 3.1.1-2) would contribute to additional conversion of farmland to non-farm uses. The amount of farmland conversion could cause a cumulatively adverse effect. However, farmland conversion in the County of Solano is governed by the County General Plan which has strong policies and guidelines for the protection and mitigation of impacts to farmland including the following implementation measure:

"AG.I-1: Create and adopt a farmland conversion mitigation program and ordinance."

Implementation of this measure will limit the cumulative impact on farmlands on a county wide basis. The project alternatives would also be required to mitigate farmland impacts (see discussion at page 3.1.3-9).

Given the strong policies of the Solano County General Plan to limit and mitigate impacts to farmlands and the project alternatives would also include mitigation that would preserve additional farmland within the County, the long-term health of the resource would be preserved and maintained and therefore no cumulative effect to farmlands would occur.

Traffic and Transportation/Pedestrian and Bicycle Facilities

The resource study area for cumulative traffic and transportation impacts is the same as that used for the traffic analysis. Projects that would contribute to potential cumulative impacts include all the transportation projects listed in section 3.6.2 and development projects included in local planning documents. These impacts are analyzed in Section 3.1.6 for each alternative in 2035. Because the project alternatives, to varying degrees, would result in net beneficial effects on traffic and transportation, they would not contribute to a cumulative impact on traffic and transportation.

The resource study area for cumulative impact to pedestrian and bicycle facilities includes those facilities within the project area and the local planning areas. Projects that may contribute to a potential cumulative impact would include the development projects in Section 3.1.1 and the transportation projects listed in Section 3.6.2. Pedestrian and bicycle facilities in the area are accounted for in local planning documents. Effects to bicycle and pedestrian facilities during construction of the project would be temporary. Project design will ensure that existing facilities can be maintained or replaced and that planned facilities can be provided. The proposed project would not contribute to a cumulative impact on pedestrian and bicycle facilities.

3.6.3.2 Biological Environment

Natural Communities

Implementation of the project alternatives would directly impact riparian woodlands and native trees, and in combination with other local and regional projects, would contribute to the cumulative loss of riparian woodland and native trees in the project vicinity. Historic loss of riparian vegetation and native trees in Solano County has occurred from conversion of riparian and native tree habitat for agriculture and development. Although riparian vegetation and native trees remains along some of the major streams in the county and in isolated areas, including Suisun Creek, these riparian corridors are substantially narrower than historically because of development. The project alternatives would contribute incrementally to cumulative impacts on riparian woodland and native trees in Solano County by directly impacting less than two acres of riparian habitat. Other existing and reasonably foreseeable projects within the county, such as Fairfield Corporate Commons, Green Valley Corporate Park, and other business and residential projects in the area, have the potential to contribute to the cumulative loss of riparian habitat (Table 3-6.1).

Avoidance, minimization, and/or mitigation measures identified in Section 3.3.1.1 to avoid and minimize disturbance and to compensate for loss of riparian vegetation and native trees that would be impacted by the project alternatives would reduce this impact. However, to fully address the cumulative impact to the resource other agencies such as Solano County, City of Fairfield and Suisun City would need to require and implement similar mitigation to protect and restore riparian woodlands impacted by other existing and reasonably foreseeable projects in the study area.

Wetlands and Other Waters

Implementation of the proposed project, in combination with other local and regional projects, without mitigation, would contribute to the cumulative loss of wetlands and drainages that are waters of the United States within the Suisun Bay hydrologic unit (HUC 18050001). Most

drainages that historically occurred in the rivers in the Solano County have been modified over the last century or more to improve water transport, flood protection, and agricultural development (Solano County Water Agency 2009). Wetlands and drainages have been filled for development and agricultural improvements, including features that are waters of the United States.

California now has approximately 2.9 million acres of wetlands, which is approximately 10% of the wetland area that was present two hundred years ago. Around the San Francisco Estuary, almost 200,000 acres of tidal marshes existed historically, much of which were large marshes of 50,000 acres or more in Suisun, North Bay, and South Bay. Approximately half of the grasslands above the tidal marshes were seasonally moist. By the 1950s, there were only about 50,000 acres of tidal marshes in the entire estuary, about 25% of the historical amount. Loss has continued more slowly since then. Currently, less than 1% of the non-saline historic wetlands and about 15% of the historic salt marsh in the San Francisco Estuary remain due to direct conversion of wetlands to other land uses and changes in watershed land use that indirectly result in wetland loss. Since the mid-1800s, moist grasslands in the Estuary have declined from about 60,000 acres to about 7,000 acres, and moist grassland/vernal pool habitat has declined from about 24,000 acres to about 15,000 acres, as a result of farming and urban uses.

In the eastern part of Suisun Marsh, wetlands were first diked in 1865 to be used for livestock grazing, and by the early 1900s, these areas were also farmed to produce various crops. Natural marsh ponds in the western portion of the marsh were established as duck clubs in the 1870s and 1880s. Today, Suisun Marsh is the largest contiguous protected area in the San Francisco Estuary, and includes a primary management area (89,000 acres of wetlands, channels, and bays) and a secondary management area (22,500 acres of adjacent uplands). (California Natural Resources Agency 2009; Goals Project 1999.)

Direct loss of waters of the United States in drainages and wetlands would be caused by the proposed project, and indirect effects on waters of the United States due to sedimentation could also occur. Additional projects proposed within the hydrologic unit, such as Fairfield Corporate Commons, Green Valley Corporate Park, and other business and residential projects in the area, have the potential to cause cumulative direct and indirect impacts on wetlands and drainages. Direct impacts can result from the placement of fill within a wetland or drainage. Indirect impacts can be caused by the accumulation of sediment in wetlands and drainages resulting from adjacent disturbances. Both direct and indirect impacts have the potential to add to the cumulative loss of wetland and drainage habitat.

The project alternatives would result in the direct and indirect loss of up to 22 acres of wetland habitat and 3.7 acres of drainage habitat. However, the proposed project, as well as all other existing and reasonably foreseeable projects in the project area, are required by Section 404 of the Clean Water Act, to result in no net loss of wetlands. Indirect impacts would be minimized through avoidance and minimization measures and BMPs also required under Section 404 permit conditions. The no net loss requirement under Section 404 of the Clean Water Act is implemented by the U.S. Army Corps of Engineers through their Section 404 permitting process. As such the cumulative impacts of the proposed project in combination with other existing and reasonably foreseeable projects on wetland resources would be reduced to a less than significant

level through implementation and compliance with the no net loss requirements under Section 404 of the Clean Water Act.

3.6.3.3 Threatened and Endangered Species

Eight threatened or endangered species occur or have the potential to occur within the project area. These species include:

- Contra Costa goldfields
- Callippe silverspot butterfly
- Vernal pool fairy shrimp
- Vernal pool tadpole shrimp
- Valley elderberry longhorn beetle
- California red-legged frog
- Swainson's hawk
- Central California coastal steelhead

Project alternatives would result in both direct and indirect impacts to these species. Avoidance, minimization and/or mitigation measures have been identified in Chapter 3.3. In addition, consultation under Section 7 of the Endangered Species Act and issuance of a Biological Opinion will be required prior to project approval. It is anticipated that avoidance, minimization and/or mitigation measures identified in Chapter 3.3 for these species, along with consultation under Section 7 will result in reducing and/or mitigating project impacts so that no long term impact to the health or stability of these species, or cumulative impact, would occur from project implementation.