

3.7 Biological Resources and Wetlands

3.7.1 Introduction

This section describes the regulatory setting and the affected environment for biological resources, the potential impacts on these resources that would result from implementing the project, and the measures that would reduce impacts on these resources. The term "biological resources" includes plant and wildlife species, terrestrial and aquatic habitats (including jurisdictional waters), and habitats of concern (including special-status plant communities, critical habitat, core recovery areas, mitigation banks/reserves, and wildlife corridors). This section summarizes detailed information in the *Merced to Fresno Section Biological Resources and Wetlands Technical Report* (Authority and FRA 2012a). Additional information regarding biological resources is included in the following sections:

- Section 3.4, Noise and Vibration, discusses noise and vibration that would occur in the project vicinity from the operation of the project. Potential impacts on wildlife due to project-related noise and vibration are based on information provided in the *High-Speed Ground Transportation Noise and Vibration Impact Assessment Manual* (FRA 2005).
- Section 3.8, Hydrology and Water Resources, discusses existing surface water hydrology, water quality, groundwater, and floodplains, and identifies potential impacts on these resources for each alternative.
- Section 3.14, Agricultural Resources, discusses the range of impacts on agricultural lands that may overlap with the biological conditions discussed and evaluated in this section.
- Section 3.18, Regional Growth, includes a discussion of growth-inducing impacts.
- Section 3.19, Cumulative Impacts, describes cumulative impacts of this and other past, present, and reasonably foreseeable future projects.

The Program EIR/EIS documents concluded the project would have a significant impact on biological resources and committed to mitigation strategies and design practices to reduce effects.

3.7.1.1 Key Definitions

Key definitions of special-status species, special-status plant communities, and jurisdictional waters are provided below. Each of these resources is further defined in the *Merced to Fresno Section Biological Resources and Wetlands Technical Report* (Authority and FRA 2012a).

Special-Status Species: Special-status species are plants and animals that are legally protected under the federal Endangered Species Act of 1973 (federal ESA), the California Endangered Species Act (CESA), the California Native Plant Protection Act, and/or other regulations, such as those species that meet the definitions of rare, threatened, or endangered under CEQA Guidelines Sections 15380 and 15125.

Special-Status Plant Communities: Special-status plant communities are determined to be significant and/or represent rare vegetation types (California Natural Diversity Database [CNDDDB] 2003) or that are of limited distribution statewide or within a county or region. These communities are often vulnerable to the environmental effects of projects (California Department of Fish and Game [CDFG] 2003).

The CNDDDB contains plant communities and special-status species (both plant and animal) classified as special-status under the federal ESA and CESA. A list of special-status plant communities in California is maintained by CDFG in its *Vegetation Classification and Mapping Program: List of California Terrestrial Natural Communities Recognized by the California Natural Diversity Database* (CDFG 2003).

Jurisdictional Waters: Wetlands and other waters in the project vicinity, including waters of the U.S., waters of the state, and state streambeds and lakes, are regulated by the federal government (U.S. Army

Corps of Engineers [USACE] and the State of California (SWRCB, CDFG). When considering wetlands and other waters, these features are collectively termed jurisdictional waters. Wetlands and other waters as delineated during the jurisdictional delineation (see the *Merced to Fresno Section Wetlands Delineation Report*, Authority and FRA 2012b), are assumed to fall under the jurisdiction of the USACE, SWRCB, and CDFG for purposes of this discussion. Confirmation of these waters as jurisdictional by the USACE, SWRCB, and CDFG will be conducted when the regulatory permitting process is conducted. Definitions of the categories that are included in the jurisdictional waters are presented below:

- **Wetlands:** According to the USACE *Wetlands Delineation Manual* (USACE 1987) and the recently published Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0) (USACE 2008), three criteria must be satisfied to classify an area as a jurisdictional wetland: (1) a predominance of plant life that is adapted to life in wet conditions (hydrophytic vegetation), (2) soils that saturate, flood, or pond long enough during the growing season to develop anaerobic conditions in the upper part (hydric soils), and (3) permanent or periodic inundation or soils saturation, at least seasonally (wetland hydrology).
- **Waters of the U.S.:** The federal Clean Water Act (CWA) defines waters of the U.S. as follows: (1) All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide; (2) All interstate waters including interstate wetlands; (3) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce; (4) all impoundments of waters otherwise defined as waters of the U.S.; (5) tributaries to the foregoing types of waters; and (6) wetlands adjacent to the foregoing waters. (33 CFR 328.3[a]).
- **Waters of the State:** Waters of the state are broadly defined by the Porter-Cologne Water Quality Control Act (§ 1305(e)). Under this definition, isolated wetlands that may not be subject to regulations under federal law are considered waters of the state. However, the State Water Resources Control Board (SWRCB) has not yet adopted a wetland definition. On October 6, 2009, the Technical Advisory Team for the Wetland and Riparian Area Protection Policy (WRAPP) presented a definition to the SWRCB as follows: An area is a wetland if, under normal circumstances, it (1) is saturated by ground water or inundated by shallow surface water for a duration sufficient to cause anaerobic conditions within the upper substrate; (2) exhibits hydric substrate conditions indicative of such hydrology; and (3) either lacks vegetation or the vegetation is dominated by hydrophytes (San Francisco Estuary Institute 2009).
- **State Lakes and Streambeds:** According to the CDFG, lake or streambed alteration is defined as any action(s) that would obstruct the natural flow of, or substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake, or deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake.

3.7.2 Laws, Regulations, and Orders

The following lists a summary of federal, state, and local laws, regulations, and agency jurisdiction and management guidance that were considered in the evaluation of potential impacts on biological resources. Table 3.7-1 lists federal laws and regulations and Table 3.7-2 lists state laws and regulations. For full definitions refer to the *Merced to Fresno Section Biological Resources and Wetlands Technical Report* (Authority and FRA 2012a).

3.7.2.1 Federal

Table 3.7-1
 Federal Laws and Regulations

Policy Title	Summary
Federal Endangered Species Act of 1973 (42.U.S.C. 4321 et seq.)	<p>The federal ESA and subsequent amendments provide guidance for conserving federally listed species and the ecosystems upon which they depend.</p> <p><u>Section 9 (Prohibited Acts)</u>: Section 9 of the federal ESA and its implementing regulations prohibit the “take” of any fish or wildlife species listed under the federal ESA as endangered or threatened, unless otherwise authorized by federal regulations. “Take” includes the destruction of a listed species’ habitat. Section 9 also prohibits a number of specified activities with respect to endangered and threatened plants.</p> <p><u>Section 7 (Interagency Consultation and Biological Assessments)</u>: Section 7 of the federal ESA requires federal agencies to consult with the U.S. Fish and Wildlife Service (USFWS) or the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS), as appropriate, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of threatened or endangered fish, wildlife, or plant species or result in the destruction or adverse modification of designated critical habitat for any such species.</p> <p><u>Section 10 (Permitting and Conservation Plans)</u>: Section 10 of the federal ESA provides a process by which nonfederal entities may obtain an Incidental Take Permit from the USFWS or NMFS for otherwise lawful activities that might incidentally result in “take” of endangered or threatened species, subject to specific conditions.</p>
Magnuson-Stevens Fishery Conservation and Management Act (U.S.C. Section 1801 et seq.)	<p>The Pacific Fishery Management Council has designated portions of the San Joaquin River as essential fish habitat (EFH) to protect and enhance habitat for coastal marine fish and macroinvertebrate species that support commercial fisheries such as Pacific salmon.</p> <p>The amended Magnuson-Stevens Fishery Conservation and Management Act, also known as the Sustainable Fisheries Act (Public Law 104-297), requires that all federal agencies consult with NMFS on activities or proposed activities authorized, funded, or undertaken by that agency that may adversely affect EFH of commercially managed marine and anadromous fish species.</p>
Clean Water Act	<p>The CWA serves as the primary federal law protecting the quality of the nation’s surface waters, including wetlands.</p> <p><u>Section 401</u>: Under the CWA Section 401, applicants for a federal license or permit to conduct activities that may result in the discharge of a pollutant into waters of the U.S. must obtain certification from the state in which the discharge would originate or from the interstate water pollution control agency with jurisdiction over affected waters.</p> <p><u>Section 402</u>: Under the CWA Section 402, all point source discharges, including but not limited to construction-related stormwater discharges to surface waters, are regulated through the National Pollutant Discharge Elimination System (NPDES) program, which requires an NPDES permit for discharge.</p> <p><u>Section 404</u>: Under the CWA Section 404, the USACE and EPA regulate the discharge of dredged and fill materials into the waters of the U.S. Project sponsors must obtain a permit from USACE for discharges of dredged or fill materials into jurisdictional waters of the U.S.</p>
Rivers and Harbors Act of 1899	<p><u>Section 10</u> of the Rivers and Harbors Act of 1899 requires authorization from the USACE for the construction of any structure in or over any navigable waters of the U.S.</p>

Policy Title	Summary
U.S. Fish and Wildlife Coordination Act (16 U.S.C. Sections 661 to 667e et seq.)	The U.S. Fish and Wildlife Coordination Act applies to any federal project where any body of water is impounded, diverted, deepened, or otherwise modified. Project proponents are required to consult with USFWS and the appropriate state wildlife agency.
Migratory Bird Treaty Act (16 U.S.C. Sections 703 to 712)	The Migratory Bird Treaty Act (MBTA) protects selected species of birds that cross international boundaries (i.e., species that occur in more than one country at some point during their life cycle). The law prohibits the take of such species, including the removal of nests, eggs, and feathers.
Bald and Golden Eagle Protection Act (16 U.S.C. Sections 668 to 668d, 54 Statute 250)	The Bald and Golden Eagle Protection Act prohibits the destruction of bald and golden eagles and their occupied and unoccupied nests.
Protection of Wetlands (Executive Order 11990)	Executive Order 11990 aims to avoid direct or indirect new construction in wetlands when a practicable alternative is available. If wetland impacts cannot be avoided, all practicable measures to minimize harm must be included.
Protection of Migratory Bird Populations (Executive Order 13186)	Executive Order 13186 directs each federal agency taking actions that have or may have adverse impact on migratory bird populations to work with USFWS to develop a memorandum of understanding that will promote the conservation of migratory bird populations.
Invasive Species (Executive Order 13112)	Executive Order 13112 requires federal agencies to work cooperatively to prevent and control the introduction and spread of invasive plants and animals.

3.7.2.2 State

Table 3.7-2
 State Laws and Regulations

Policy Title	Summary
California Endangered Species Act (Sections 2050 to 2085)	CESA mandates that state agencies not approve a project that would jeopardize the continued existence of species if reasonable and prudent alternatives are available that would avoid a jeopardy finding. CESA also prohibits the take of any fish, wildlife, or plant species listed as endangered or threatened, or designated as candidates for listing, under CESA. Similar to the federal ESA, CESA contains a procedure for CDFG to issue an incidental take permit authorizing the take of listed and candidate species incidental to an otherwise lawful activity, subject to specified conditions.
California Fish and Game Code (CFG)	<p><u>Sections 3511, 4700, 5050, 5515 (Fully Protected Species):</u> The CFGC designates 37 fully protected species and prohibits the take or possession at any time of such species, with certain limited exceptions.</p> <p>Sections 3503 and 3503.5 (Nesting Bird Protections): Sections 3503 and 3503.5 of the CFGC states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, including raptors, except as otherwise provided by code or any regulation made pursuant thereto.</p> <p>Section 1600 et seq. (Lake and Streambed Alteration): Section 1600 et seq. of the CFGC requires notifying the CDFG prior to any project activity undertaken in or near a river, stream, or lake that flows at least intermittently through a bed or channel.</p>

Policy Title	Summary
California Native Plant Protection Act (Sections 1900 to 1913)	The California Native Plant Protection Act (NPPA) requires all state agencies to use their authority to carry out programs to conserve endangered and rare native plants. The NPPA gives the CDFG the power to designate native plants as "endangered" or "rare" and prohibits the take of such plants, with certain exceptions.
Porter-Cologne Water Quality Control Act	Section 13260(a) of the Porter-Cologne Water Quality Control Act (contained in the California Water Code) requires any person discharging waste or proposing to discharge waste, other than to a community sewer system, within any region that could affect the quality of the waters of the state to file a Report of Waste Discharge (ROWD). The SWRCB is responsible for the implementation of the act.

3.7.2.3 Regional and Local

Local and regional municipal plans pertaining to the preservation and protection of biological resources are addressed in the various general plans for Merced, Madera, and Fresno counties, as well as the cities of Atwater, Merced, Chowchilla, and Fresno. These plans address such issues as habitat, protection of wildlife, oak woodland conservation, and wetlands and riparian communities. Special attention is paid to the San Joaquin corridor and resource functions. The *Merced to Fresno Section Biological Resources and Wetland Technical Report* (Authority and FRA 2012a) provides more detail on the plans that were identified and considered in the preparation of this analysis.

3.7.2.4 Habitat Conservation Plans in the Project Vicinity

A Habitat Conservation Plan (HCP) is a document that must accompany an incidental take permit request under Section 10 of the federal ESA. The Pacific Gas and Electric Company San Joaquin Valley Operations and Management HCP (PG&E 2006) is the only approved HCP in the project vicinity.

3.7.3 Methods for Evaluating Impacts

3.7.3.1 Study Areas

The Merced to Fresno Section study area described in Chapter 2, Alternatives, encompasses the entire potential area of disturbance associated with the construction footprint, including the proposed HST right-of-way and associated facilities (traction power substations, switching and paralleling stations, wye junctions, and areas associated with modifying or relocating roadways for those facilities – including overcrossings and interchanges), heavy maintenance facility (HMF) sites, and construction areas (including laydown, storage, and similar areas [see detailed description in Chapter 2]).

To address regulatory requirements effectively, type of habitat or species, or type of potential effect, the *California High-Speed Train Central Valley Biological Resources and Wetlands Survey Plan* (Authority and FRA 2010) established three biological resources study areas for the following types of resources:

- Habitat Study Area** – Construction footprint plus a 1,000-foot-radius buffer around project elements (review of aerial photos only between 250 feet and 1,000 feet) to evaluate direct and indirect impacts on habitats and special-status wildlife species that use these habitats. Habitat assessments, including field observations and aerial photograph interpretation, were conducted within the habitat study area. The habitat study area was evaluated for the presence or absence of potentially suitable habitat for those resources identified from the regional area database queries. The habitat study area is the largest of three study areas and encompasses the wetland and special-status plant species study areas defined below.
- Wetland Study Area** – Construction footprint plus a 250-foot-radius buffer around project elements to evaluate direct and indirect impacts on wetlands and special-status wildlife using vernal pools and

other seasonal wetlands. Direct impacts on wetlands are within the 100-foot construction footprint, and indirect impacts are within the 250-foot-radius buffer around project elements. Jurisdictional delineations were conducted within the wetland study area.

- **Special-Status Plant Species Study Area** – Construction footprint to evaluate indirect impacts plus a 100-foot-radius buffer around project elements to evaluate indirect impacts on special-status plant species. Focused special-status plant surveys were conducted within the special-status plant species study area.
- The *Merced to Fresno Section Biological Resources and Wetland Technical Report* (Authority and FRA 2012a) provides more detail on biological resources study areas.

3.7.3.2 Literature Review

Biological resources potentially occurring in the study areas were identified through queries of existing databases and agency information. The sources used are described below. Further detail can be found in the *Merced to Fresno Section Biological Resources and Wetlands Technical Report* (Authority and FRA 2012a).

Special-Status Plant Communities and Special-Status Plant Species

Special-status plant communities and special-status plants potentially occurring in the habitat study area were identified through a query of existing databases and agency information. The following sources were used:

- USFWS official list of federal candidate, proposed, threatened, and endangered plant species having the potential to occur in the 45-quad (i.e., U.S. Geological Survey [USGS] topographic quadrangle] search area (USFWS 2011).
- CNDDDB RareFind 3 database list of special-status plant species prepared through a two-fold inquiry of the CNDDDB via a standard quad search using the RareFind program and a geographic information system (GIS) mapping exercise to include all sensitive natural communities and special-status species occurrences reported in the regional area (CNDDDB 2003).
- The California Native Plant Society (CNPS) Online Inventory of Rare and Endangered Plants of California list of CNPS special-status plant species that may occur in the regional area (CNPS 2011).

Special-Status Wildlife

To develop a list of special-status wildlife with potential to occur in the habitat study area, existing special-status wildlife species databases and agency information sources were reviewed. Database queries included all reported occurrences of special-status wildlife within the regional area. The following data were generated:

- USFWS official list of federal candidate, proposed, threatened, and endangered wildlife species from the 45-quad search area (USFWS 2010).
- CNDDDB RareFind 3 database list of special-status wildlife species that was prepared through a two-fold inquiry of the CNDDDB via a standard combined quad search using the RareFind program and a GIS mapping exercise of all occurrences in a 10-mile radius of the proposed alignment centerlines to include all special-status wildlife species occurrences reported in the regional area (CNDDDB 2003).
- California Wildlife Habitat Relationships (CWHR) Information System GIS data of special-status wildlife species whose known geographic ranges occur within a 10-mile radius of the Merced to Fresno Section (CDFG 2011).
- USFWS Birds of Conservation Concern (BCC) for Region 8 (California and Nevada) were included on a list of special-status species considered for evaluation (USFWS 2008).

- To identify special-status fish species that could potentially occur in the habitat study area, the following source documents were consulted: Moyle (2002), Stillwater Sciences (2003), CDFG (2007), U.S. Bureau of Reclamation (Reclamation) (2009), CalFish (2009), NMFS (2009), and McBain and Trush (2002). These documents were used to identify known barriers to the upstream and downstream migrations of anadromous species. These source documents were consulted in addition to the state and federal species databases described above.
- An analysis of available GIS data was conducted to identify regional watercourses that could potentially support special-status fish and thus warranted further assessment. To identify watercourses, a fisheries biologist reviewed the Merced to Fresno alignments overlaid on aerial photography and the National Hydrography Dataset (NHD) (1:24,000 scale; USGS 2006).
- To identify important wildlife movement corridors, habitat and linkage corridor data were reviewed from the following sources: San Joaquin Valley Endangered Species Recovery Program (ESRP) (ESRP 2009 and USFWS 1998), Missing Linkages: Restoring Connectivity to the California Landscape (Penrod et al. 2001), CDFG Biogeographic Information and Observation System (BIOS) (Huber 2007, ESRP 1999), and the California Essential Connectivity Project (Spencer et al. 2010).

Jurisdictional Waters

The following resources were reviewed prior to field investigations to obtain information on jurisdictional water features that may occur in the wetland study area:

- USGS 7.5-minute topographic quads.
- National Wetlands Inventory (NWI) maps (USFWS 2009).
- NHD (BIOS 2009).
- Central Valley vernal pool habitat dataset (BIOS 2009).
- Color aerial photographs at a scale of 1:2,400 from February and March, 2007 (Mapcon Mapping, Ltd., 2007).
- Mapped soil units (Natural Resources Conservation Service [NRCS] 2008).
- Aerial photographs from 1976, 1987, 1998–1999, 2007, and 2009.

Aerial Imagery Mapping Methods

Most of the jurisdictional waters identified in the wetland study area were delineated based on high resolution aerial photographs (Mapcon Mapping, Ltd. 2007). Due to access limitations, this methodology was approved by the USACE regulatory staff as an acceptable method of completing the wetland delineation (see Section 6.3, Jurisdictional Waters Coordination Summary). Potential waters and wetland features that were visible on printed aerial imagery within the wetland study area were identified and digitized using GIS technology.

Aerial imagery (Mapcon Mapping, Ltd. 2007 and Google Earth 2010) was used to identify wetlands and other waters of the U.S. present in the study area. Wetlands and other waters of the U.S. were initially identified based on landscape signatures viewable on imagery overlaid with an NWI and Central Valley Vernal Pool Habitat dataset (BIOS 2009). Two aerial imagery sources (Mapcon Mapping, Ltd. 2007 and Google Earth 2010) were used to identify landscape signatures of palustrine wetlands and other waters of the U.S. early and late in the growing season. Mapcon Mapping, Ltd. aerial imagery was collected (flown) early in the growing season (February and March; 30 cm aerial photography, Mapcon Mapping, Ltd. 2007) and prepared in September. Google Earth imagery (2010) was dated from June and September 2009 and 2010 (late growing season).

3.7.3.3 Field Surveys

Reconnaissance-level Surveys

The potential for project impacts on biological resources depends largely on the presence of suitable habitat in and adjacent to areas that would be affected by the project. Reconnaissance-level field surveys involved preliminary data gathering for the purpose of recognizing and identifying resources that warrant additional or more focused surveys (e.g., for special-status plants, as described below). Project biologists conducted these reconnaissance-level field surveys to determine the presence or absence of jurisdictional waters and biological resources, and to document the location of any biological resources through habitat characterization and mapping. All habitat characterization and mapping was done from publically accessible roads along or near the HST alternatives. The results of these surveys provided background for the focused jurisdictional waters and special-status plant surveys, when biologists accessed properties along the HST alternatives following the methods defined for jurisdictional waters (Authority and FRA 2012b) and plants (Authority and FRA 2011).

Reconnaissance-level mapping was conducted for the survey areas beginning in 2009 and intermittently through June 2011. The following provides brief descriptions of verification surveys conducted in support of mapping activities:

- Preliminary evaluations of several watercourses were conducted between March 30 and April 2, 2009; between April 28 and April 30, 2009; and between April 24 and April 29, 2010. These evaluations were conducted to determine general hydrologic patterns in portions of the habitat study area that overlapped with preliminary alignment study areas; however, field observations made during these evaluations are relevant to aquatic habitat associated with the current alignment as discussed in this section.
- Terrestrial habitat surveys of the UPRR/SR 99 Alternative north-south alignment and the downtown Merced and Fresno stations were conducted from November 16 through 20, 2009. The primary objective of the November 2009 field surveys was to characterize and map the land use and habitat types within the habitat study area.
- Jurisdictional waters field surveys of the Merced to Fresno corridor were conducted from December 7 through 10, 2009. The objective of the December surveys was to characterize and map each of the proposed alignment crossing locations of rivers, creeks, and sloughs (referred to in this section as "natural watercourses").
- Terrestrial habitat surveys on May 6 and 7, 2010. The primary objective of these surveys was to map habitat within areas of the UPRR and BNSF alternatives that had shifted subsequent to previous mapping and to map habitat in the BNSF alternative habitat study area, the Ave 24 Wye, and the HMF sites.
- Terrestrial habitat surveys were conducted on May 24 through May 26, 2010. The primary objective of these surveys was to map habitat within areas of the UPRR and BNSF alternatives that had shifted subsequent to previous mapping and to map habitat in the BNSF alternative habitat study area, the Ave 24 Wye, and the HMF sites. Focused surveys for special-status plants, as discussed in the *Merced to Fresno Section Special-Status Plants Survey Report* (Authority and FRA 2011), were also conducted.
- Terrestrial habitat surveys were conducted on July 14 through July 16, 2010. The primary objective of these surveys was to map habitat within areas of the HST alternatives that had shifted subsequent to previous mapping and to resolve questions related to earlier field mapping.
- Terrestrial habitat surveys were conducted on December 21 through December 23, 2010. The primary objective of these surveys was to map habitat within areas of the HST alternatives that had shifted subsequent to previous mapping and to resolve questions related to earlier field mapping.

- Terrestrial habitat surveys were conducted on January 10 through January 12, 2011. The primary objective of these surveys was to map habitat within areas of the HST alternatives that had shifted subsequent to previous mapping and to resolve questions related to earlier field mapping.
- Terrestrial habitat surveys were conducted on January 29 through February 2, 2011. The primary objective of these surveys was to map habitat within areas of the HST alternatives that had shifted subsequent to previous mapping and to resolve questions related to earlier field mapping.
- Terrestrial habitat surveys were conducted on April 18 through April 22, 2011. The primary objective of these surveys was to map habitat within areas of the HST alternatives that had shifted subsequent to previous mapping and to resolve questions related to earlier field mapping.

Following each reconnaissance-level survey, field verified habitat data were noted on aerial photographs and were digitized into the project GIS database.

Special-Status Plant Species

Field surveys for special-status plants were conducted during the early growing season (March to April) in accordance with the *CNPS Botanical Survey Guidelines* (CNPS 2001), the *Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants* (USFWS 2000), *Guidelines for Assessing the Effects of Proposed Projects on Rare, Threatened, and Endangered Plants and Natural Communities* (CDFG 2000), and *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFG 2009). In addition, where applicable, surveys for the two federally listed species, San Joaquin woolly-threads (*Monopolias congdonii*) and California jewelflower (*Caulanthus californicus*), complied with supplemental guidance provided in *General Rare Plant Survey Guidelines* and the *Supplemental Survey Methods* (ESRP 2002). A more detailed survey methodology is discussed in the *Merced to Fresno Section Special-Status Plant Survey Report* (Authority and FRA 2011).

Habitat types identified during the reconnaissance-level field assessments were compared against the known habitat requirements for each special-status plant species with potential to occur in the regional area. The potential for a particular special-status species to occur within the special-status plant species study area was then assessed and ranked as either no potential, future potential, unlikely potential, low potential, moderate potential, or high potential.

Plant Communities, Including Special-Status Plant Communities

Interpretation of aerial imagery determined plant community and land cover types in inaccessible areas. The reconnaissance-level field surveys and mapping process is detailed in the *Merced to Fresno Section Biological Resources and Wetlands Technical Report* (Authority and FRA 2012a). Terrestrial plant communities and land cover types within the habitat study area were mapped using 1:4800 scale aerial photographs. All terrestrial plant community and cover type characterization and mapping was done from publicly accessible roads along or near the proposed HST alternatives. Habitat types, including natural communities of special concern, were noted and delineated on aerial photographs of the study area. Data collected using aerial photographs during terrestrial and aquatic field surveys were then digitized and incorporated into a GIS application for analysis. The *Merced to Fresno Section Special-Status Plant Survey Report* (Authority and FRA 2011) includes a complete discussion of methods for these studies.

Fish Species

Aquatic habitat surveys were conducted between March 30 and April 2, 2009, and between April 28 and April 30, 2009. Aquatic habitat surveys were conducted at proposed HST drainage crossing (natural and constructed watercourses) locations to characterize potential fish habitat in historically natural watercourses in the habitat study area. For locations where crossings were inaccessible, observations were made from the nearest accessible point(s) up- and/or downstream. Fish were assumed potentially present if field observations indicated sufficient hydrology, including any evidence of surface flow during the recent wet seasons. No fish sampling was performed.

Special-Status Wildlife Species Habitat Surveys

To identify potentially suitable wildlife habitat for special-status wildlife species, key habitat constituents mapped during the reconnaissance-level field surveys included topography and the presence or absence of vegetative cover, foraging habitat, and migration barriers (i.e., canals and roadways). Focused surveys were not conducted. All special-status wildlife species are presumed as present within the construction footprint for purposes of the impact analysis. Wildlife surveys were not conducted; suitable habitat is presumed occupied for terrestrial and aquatic communities.

Jurisdictional Delineations

Jurisdictional delineations were conducted, consistent with USACE protocol, during the summer 2010 and winter 2011 for which land owners had granted access. The *Merced to Fresno Section Wetlands Delineation Report* (Authority and FRA 2012b) includes a complete discussion of the methods for the wetland delineation study.

Rivers, creeks, sloughs, and other aquatic features in the wetland study area were characterized and mapped using 1:4800 scale aerial photographs. Where possible, these surveys were conducted by walking the portion of the aquatic feature occurring within the wetland study area. Data, recorded at each aquatic feature, included information on channel characteristics and vegetation as well as adjacent riparian habitat.

Wildlife Movement Corridors

Wildlife species (including, mammals such as San Joaquin kit fox [*Vulpes macrotis mutica*]) have the potential to use wildlife movement corridors within the habitat study area. Drainage corridors and Essential Connectivity Areas (ECAs) identified in the literature review (Spencer et al. 2010) were evaluated in the field (where access was permitted) to determine their utility as movement corridors for wildlife. The literature review was conducted to help establish the reported movement corridors for mammal species and assessed corridor quality at a landscape level. This evaluation was augmented, as feasible, by identifying additional areas such as creeks and other drainages in the habitat study area that may be used by wildlife as movement corridors.

3.7.3.4 Methods for Evaluating Impacts

The fundamental method for evaluating impacts included a process for qualifying or quantifying the direct and indirect impacts and comparing those findings against the severity of the impact and/or a specific threshold. For example, during the habitat assessment process, plant communities (i.e., terrestrial and aquatic habitats) were mapped within the habitat study area (refer to Section 3.7.3.1, Study Area, for a discussion of the various biological resources study areas). The plant community and cover type mapping units were then overlaid on construction footprint maps using GIS applications. Acreages were then calculated and presented in tabular form for evaluation purposes in Section 3.7.5, Environmental Consequences.

A similar GIS-related process was used for evaluating impacts on special-status species, although these impacts were based on the potential for occurrence in suitable habitat. Special-status species and their potential for occurrence are described in Appendix 3.7-A. Appendix 3.7-B provides figures that illustrate the impact methodology used for evaluating impacts on special-status species. Appendix 3.7-B also provides a range of potential impacts in acres on special-status species based on the specific affinity each species has to plant communities and land cover types identified within the study area. For wildlife movement, existing and accessible drainage corridor crossings (i.e., bridges and culverts) of SR 99 and the BNSF rights-of-way were assessed with respect to their relative function to facilitate wildlife movement through the landscape.

In this manner, the information presented can be quantified as appropriate and a comparative evaluation can be made. Qualitative discussions are provided for indirect impacts such as noise, motion, and startle,



and any potential hydrologic issues such as erosion and sedimentation. For these indirect impacts, the severity is evaluated without having specific numeric or quantitative data.

The affected environment established for biological resources was based on a combination of methods including field investigations and aerial photo mapping interpretation. Field reconnaissance surveys were conducted in all areas where access was granted. Access was emphasized in the riparian corridors that bisect much of the agricultural and pasture lands throughout the study areas. During special-status plant surveys in March 2011, 18% of all acres (3.2% of all identified parcels) within the special-status plant species study area were visited. Subsequent special-status plant surveys in April and May 2011 accessed 21% of all acres (3.3% of all identified parcels) within the special-status plant species study area. All areas were analyzed based on the methods described in this section. The *Merced to Fresno Section Biological Resources and Wetland Technical Report* (Authority and FRA 2012a) includes a complete discussion of methods for these studies.

The result of the literature review, aerial imagery mapping, and reconnaissance-level field surveys provided data that were evaluated with the construction footprint. Due to the right-of-entry limitations, suitable habitat for species was assumed to be occupied. The degree of impact was determined based on the magnitude of affected habitat (i.e., acres) and the regulatory status of the resource. The degree of impact was analyzed with the NEPA effects definitions and the CEQA thresholds in defining the severity and significance of impact. These definitions and thresholds are presented below.

3.7.3.5 Methods for Evaluating Effects Under NEPA

Pursuant to NEPA regulations (40 CFR 1500–1508), project effects are evaluated based on the criteria of context and intensity. Context means the affected environment in which a proposed project occurs. Intensity refers to the severity of the effect, which is examined in terms of the type, quality, and sensitivity of the resource involved, location and extent of the effect, duration of the effect (short- or long-term), and other considerations. Beneficial effects are identified and described. When there is no measurable effect, impact is found not to occur. The intensity of adverse effects is the degree or magnitude of a potential adverse effect, described as negligible, moderate, or substantial. Context and intensity are considered together when determining whether an impact is significant under NEPA. The characterization includes physical and biological resources of the project area, the immediate vicinity, and region. This characterization enables the effect to be addressed in relation to the presence and distribution of these physical and biological resources at varying distances from areas of potential disturbance. In addition to describing the environmental context in which a resource is located, a description of the regulatory setting also characterizes the context in which the resources are managed.

For biological resources and wetlands, the terms negligible, moderate, and substantial are defined as follows:

- Impacts with *negligible* intensity related to biological resources are defined as a slight change from existing biological conditions resulting in little or no regional effects and minor effects within seasonal shifts in populations, biotic communities, and wildlife movement patterns.
- Impacts with *moderate* intensity are defined as incremental regional effects and measurable loss of terrestrial/aquatic plant communities, jurisdictional waters/wetlands, special-status species, or removal of lands known to accommodate wildlife movement.
- Impacts with *substantial* intensity are influential regional effects and loss of lands or species that would have local or regional detrimental effects on terrestrial/aquatic plant communities, jurisdictional waters/wetlands, special-status species, or wildlife movement.

3.7.3.6 CEQA Significance Criteria

For the purposes of this project, the following thresholds are used to define a significant impact on biological resources. These thresholds are based on issues identified in Appendix G of the CEQA Guidelines. The project would result in a significant impact on biological resources if it would:

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFG or USFWS.
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the CDFG or USFWS.
- Have a substantial adverse effect on federally protected wetlands, as defined by CWA Section 404 (including habitats types identified in the California Rapid Assessment Method (CRAM) such as vernal pool and coastal and valley freshwater marsh) through direct removal, filling, hydrological interruption, indirect or cumulative effects, or other means.
- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.
- Conflict with the provisions of an adopted habitat conservation plan (HCP), Natural Communities Conservation Plan (NCCP), or other approved local, regional, state, or federal habitat conservation plans.

Mandatory findings of significance within Section 15065 of the CEQA guidelines require the lead agency to determine whether a project may have a significant effect on the environment where substantial evidence indicates that negative impacts may occur to biological resources. The negative conditions are defined as: (1) the project has the potential to substantially degrade the quality of the environment, reduce habitat of wildlife species, cause wildlife populations to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce or restrict the range of a listed species; (2) the project has the potential to achieve short-term environmental goals to the disadvantage of long-term environmental goals; and (3) the project has environmental effects that are individually limited but cumulatively considerable.

Under CEQA's mandatory findings of significance, the project would result in a significant impact if it would:

- Substantially reduce the habitat of a fish or wildlife species.
- Cause a fish or wildlife population to drop below self-sustaining levels.
- Threaten to eliminate a plant or animal community.
- Substantially reduce the number or restrict the range of an endangered, rare, or threatened species.

General indicators of significance, based on guidelines or criteria in NEPA, CEQA, CWA, CESA, federal ESA, CFGC, and regulatory guidance from FRA include:

- Potential modification or destruction of habitat, movement/migration corridors, or breeding, feeding, and sheltering areas for endangered, threatened, rare, or other special-status species.
- Potential measurable degradation of protected habitats, sensitive vegetation communities, wetlands.
- Potential loss of a substantial number of any species that could affect the abundance or diversity of that species beyond the level of normal variability.
- Potential indirect impacts, both temporary and permanent, from excessive noise eliciting a negative response and avoidance behavior.

3.7.4 Affected Environment

This section summarizes the existing biological resources within the habitat study area, which include, regional setting, biological communities (terrestrial and aquatic), special-status species, habitats of concern (special-status plant communities, jurisdictional waters, critical habitat, essential fish habitat (EFH), core areas for recovery of federally listed species, mitigation banks, CDFG lands, HCP areas), and wildlife movement/migration corridors. More details are provided in the *Merced to Fresno Section Biological Resources and Wetlands Technical Report* (Authority and FRA 2012a).

3.7.4.1 Regional Setting

Historically, the Central Valley was characterized by California prairie, marshlands, valley oak savanna, and extensive riparian woodlands (Hickman 1993). Today, more than 80% of the land is covered by farms and ranches (Natural Resources Conservation Service [NRCS] 2006). Large areas of northern hardpan vernal pool habitat occur east of SR 99 and along the Eastman Lake – Bear Creek ECA, which extends in an east-to-west direction crossing SR 99 between Merced and Chowchilla (Spencer et al. 2010). Camp Pashayan (within the San Joaquin River Ecological Reserve), which is located just east of the Union Pacific Rail Road (UPRR) Bridge on the south side of the San Joaquin River in Fresno, is a CDFG-owned property designated as an Ecological Reserve. Developed areas within or near the habitat study area include Merced, Chowchilla, Madera, Fresno, and Le Grand. Special-status plant communities are uncommon within the habitat study area and are limited to uncultivated areas supporting coastal and valley freshwater marsh, and narrow bands of riparian habitat along rivers, creeks, and sloughs.

Seven special-status plant communities and other natural communities described within the CNDDDB are reported to occur in the region: Great Valley mixed riparian forest, northern hardpan vernal pool, northern claypan vernal pool, valley sacaton grassland, valley sink scrub, sycamore alluvial woodland, coastal and valley freshwater marsh (CNDDDB 2003).

Hydrologic features (rivers, creeks, canals, etc.) in the region generally flow to the west and southwest, with a greater density of features occurring at the northern end of the project near Merced. Large hydrologic features south of the City of Madera include Cottonwood Creek and the San Joaquin River.

3.7.4.2 Plant Communities and Land Cover Types

General Habitat Conditions – Terrestrial

The categories of terrestrial plant communities and land cover types that occur in the habitat study area are discussed below. The plant communities and land cover types identified in the habitat study area include agricultural lands, developed areas, and natural and seminatural areas.

The following descriptions of plant communities and land cover types are based on *A Guide to Wildlife Habitats of California* (Mayer and Laudenslayer 1988). In addition, descriptions of plant communities discussed within the natural and seminatural area section provide the equivalent of the *Manual of California Vegetation* (Sawyer et al. 2009) and *Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland 1986) classification systems, where applicable.

Agricultural Lands

Agricultural areas are characterized by various types of cover, including high-value crops (i.e., orchards, vineyards), fallow fields, row crops, field crops, dairies, pastures, inactive agriculture, and rural residential areas (most of the pastureland in the habitat study area is associated with rural residential areas). Field and row crops, such as alfalfa (*Medicago sativa*), provide foraging habitat for raptors, particularly Swainson's hawks (*Buteo swainsonii*). Fallow fields and inactive farmland may provide nesting habitat for several wildlife species including northern harrier (*Circus cyaneus*) and western burrowing owl (*Athene cunicularia*). These and other agricultural lands may provide foraging or dispersal habitat for loggerhead shrike (*Lanius ludovicianus*), white-tailed kite (*Elanus leucurus*), and American badger (*Taxidea taxus*).

Developed Areas

Developed areas are characterized by various types of cover, including barren, commercial/industrial, urban, and transportation corridors. These areas generally include landscaped areas, yards, and various outbuildings and provide low-quality resources for wildlife. However, certain species, such as the American peregrine falcon (*Falco peregrinus anatum*) and western mastiff bat (*Eumops perotis*) have adapted to developed areas and may use these areas for nesting or roosting habitat.

Natural and Seminal Areas

The terms natural and seminal areas are used within this section to distinguish the land uses and plant communities described in the subsequent sections where current human influences substantially influence the plant composition and structure. While the natural and seminal plant communities have been altered to some extent by past and present human activities, the composition and structure of these communities is generally not actively managed or controlled. A distinction is also made between those habitats that are largely characterized by native plants and those in which the dominant plants comprise introduced species.

Natural and seminal areas are characterized by various types of cover, including California annual grassland, Great Valley mixed riparian forest, other riparian, eucalyptus woodlands, and ruderal vegetation.

California Annual Grassland

California annual grassland within the habitat study area is best classified as annual brome grassland (Sawyer et al. 2009) and nonnative grassland (Holland 1986). California annual grassland in the habitat study area is characterized by nonnative annual grasses such as ripgut brome (*Bromus diandrus*), soft chess (*Bromus hordeaceus*), smooth barley (*Hordeum murinum*), medusahead (*Taeniatherum caput-medusae*), and wild oat (*Avena barbata*). Common nonnative herbaceous species include yellow star thistle (*Centaurea melitensis*), Italian thistle (*Carduus pycnocephalus*), prickly lettuce (*Lactuca serriola*), mustards (*Brassica* spp.), and wild radish (*Raphanus sativa*). Many native annual and perennial herbaceous species may also be present within this plant community, but these species were not evident or readily identifiable during the reconnaissance-level field surveys. Vernal pools and other seasonal wetlands observed in the habitat study area are typically associated with California annual grassland as both occur on clay soils. Vernal pools and other seasonal wetlands are discussed below under *General Habitat Conditions – Aquatic*.

Riparian Communities

Riparian communities within the habitat study area include Great Valley mixed riparian forest, Central Coast arroyo willow riparian forest, Great Valley riparian scrub, and Great Valley oak riparian forest as defined by Holland (1986). Riparian communities are generally located on the banks of natural waterways including streams, sloughs, and rivers and, in some cases, constructed watercourses. Riparian plant communities consist of overstory species that are facultative wetland species (having a 67% to 99% estimated probability of occurring in wetlands); however, soils, hydrology, and/or understory vegetation are not representative of wetland plant communities. Riparian plant communities can be found throughout the habitat study area. Riparian areas form transition zones between terrestrial and aquatic ecosystems, and provide essential habitat for a large variety of terrestrial and aquatic wildlife species.

Great Valley Mixed Riparian Forest

Great Valley mixed riparian forest, as defined by Holland (1986), most closely resembles the *Juglans hindsii* (Hind's black walnut) and seminal woodland stands described by Sawyer et al. (2009).

Other Riparian

Other riparian communities include Valley oak woodland, Valley and Foothill riparian, willow riparian forest and woodland, cottonwood willow riparian, and black walnut riparian. More details are provided in

Table 4-1 of the *Merced to Fresno Section Biological Resources and Wetlands Technical Report* (Authority and FRA 2012a).

Eucalyptus Woodlands

Eucalyptus woodlands (*Eucalyptus globulus* and *E. camaldulensis*) are seminatural woodland stands or groves characterized by open to relatively dense stands of eucalyptus trees. Eucalyptus woodlands are dominated by exotic, nonnative species, but they provide suitable nesting habitat for special-status bird species such as Swainson's hawk.

Ruderal Vegetation

Vegetation that occurs in areas where the natural vegetation has been removed or significantly degraded by past or current human activity is referred to as ruderal. Ruderal vegetation is generally composed of nonnative, seasonal species. This type of vegetation is often associated with vacant lots, roadsides, and other highly disturbed areas. Vegetation in these areas is highly variable but often includes a mix of nonnative annual grasses such as ripgut brome, soft chess, wild oat, Italian ryegrass (*Lolium multiflorum*), smooth barley, and weedy forbs such as bur clover (*Medicago polymorpha*), redstem filaree (*Erodium cicutarium*), yellow star thistle, Italian thistle, milk thistle (*Silybum marianum*), Russian thistle (*Salsola tragus*), and many others. Because of the highly variable nature of ruderal habitats, this plant community was not classified according to Sawyer et al. (2009), Holland (1986), or Mayer and Laudenslayer (1988).

General Habitat Conditions – Aquatic

This section describes the aquatic plant communities and land cover types mapped in the habitat study area. Aquatic plant communities and land cover types are broadly classified following *A Hydrogeomorphic Wetland Classification System* (USACE 1993) and the *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979). The aquatic plant communities and land cover types identified in the habitat study area include vernal pools, other seasonal wetlands, coastal and valley freshwater marsh, and open water. Of the aquatic plant communities and land cover types identified in the habitat study area, the following fall under the jurisdiction of the USACE, SWRCB, and CDFG: vernal pools, other seasonal wetlands, Fremont cottonwood forested wetland, coastal and valley freshwater marsh, natural watercourses, and constructed watercourses.

Vernal Pools

Vernal pools are a type of seasonal wetland characterized by a low, amphibious, herbaceous community dominated by annual herbs and grasses. Vernal pools are isolated, unstable ecosystems that respond markedly to precipitation received in winter and the drying up of water in summer. These pools are associated with certain types of soils. Hardpan soil layers frequently form in the horizons of clay soils, leading to the formation of vernal pools with clay soils. California annual grassland can occur on similar types of soils, but are not exclusively found associated with vernal pools. Once formed, these vernal pools have specific flora and fauna associated with their seasonal water cycle. The standing water that forms in vernal pools is ideal breeding habitat for several special-status species such as vernal pool fairy shrimp, Conservancy fairy shrimp, vernal pool tadpole shrimp (*Lepidurus packardii*), California tiger salamander (*Ambystoma californiense*), and western spadefoot toad (*Spea hammondi*). This plant community type is a CDFG special-status plant community and is a subclass of depressional wetlands which are considered palustrine emergent seasonally flooded (PEMC) wetlands (Cowardin et al. 1979).

Common plant species observed in vernal pools include woolly marbles (*Psilocarphus brevissimus*), popcorn flower (*Plagiobothrys* spp.), water pigmy-stonecrop (*Crassula aquatica*), annual hairgrass (*Deschampsia danthonioides*), purslane speedwell (*Veronica peregrina*), and toad rush (*Juncus bufonius*). Shallow vernal pools are often characterized by an abundance of nonnative grasses and forbs such as Mediterranean barley (*Hordeum marinum*) and hyssop-loosestrife (*Lythrum hyssopifolium*), but these areas also typically contain relatively high cover of native vernal pool plants such as coyote thistle (*Eryngium* spp.). Deeper parts of vernal pools are often characterized by creeping spikerush (*Eleocharis macrostachya*).

Other Seasonal Wetlands

Seasonal wetlands are a broader class of wetland characterized by seasonal inundation. The primary distinctions between vernal pools and other seasonal wetlands are the characteristic native flora, the general lack of nonnative plant species, and the association with landscapes that are characterized by mound and inter-mound topography and some form of restrictive layer that result in a seasonally perched water table. Seasonal wetlands support a variety of both native and nonnative wetland plant species and may occur in a variety of landforms where there is seasonal saturation or inundation. In the study area, seasonal wetlands may be considered somewhat degraded based on nonnative plant community assemblage and land management modifications (cultivation, grading, etc.) that may reduce flood storage potential.

Coastal and Valley Freshwater Marsh

Coastal and valley freshwater marsh is classified as several different alliances (uniform group of plant associations sharing one or more dominant species) by Sawyer et al. (2009) including the *Typha* (*T. angustifolia*, *T. domingensis*, *T. latifolia*) alliance (cattail marshes), *Schoenoplectus acutus* alliance (hardstem bulrush marsh), and *Schoenoplectus californicus* alliance (California bulrush marsh). It is classified as freshwater emergent wetland as described in *A Guide to the Wildlife Habitats of California* (Mayer and Laudenslayer 1988). Coastal and valley freshwater marsh is characterized by erect, rooted herbaceous hydrophytes (water-adapted plants). All emergent wetlands are flooded frequently so that the roots of vegetation are saturated or submerged in water. Vegetation is generally about 6 feet tall and may vary from small clumps of vegetation to large areas. Coastal and valley freshwater marsh in the habitat study area is generally associated with rivers, streams, sloughs, and irrigation drainages. This community is characterized by bulrush and hardstem bulrush marsh and cattail marsh alliances, including broadleaf cattail (*T. latifolia*), hardstem bulrush (*S. acutus*), and California bulrush (*S. californicus*). This plant type is a CDFG special-status plant community. Coastal and valley freshwater marsh is a nontidal, flooded, depressionnal wetland type and is considered a palustrine emergent semi-permanently flooded (PEMF) wetland (Cowardin et al. 1979).

Fremont Cottonwood Forested Wetland

Fremont cottonwood forested wetlands occur on soils intermittently or seasonally flooded or saturated by freshwater systems. Frequently, these communities are found along riparian corridors, floodplains subject to high-intensity flooding, or on low-gradient depositions along rivers and streams. These communities are described as typically containing an overstory dominated by Fremont cottonwood or mixed with other tree species including box elder (*Acer negundo*), Oregon ash (*Fraxinus latifolia*), California walnut (*Juglans californica*), or California sycamore (*Platanus racemosa*). The shrub layer within this community type is typically dominated by willow species (*Salix* spp.) and California wild grape (*Vitis californica*). The understory of Fremont cottonwood forested wetland may support emergent perennial vegetation such as cattails, sedges, and rushes. Freshwater forested wetlands are nontidal, flooded, depressionnal wetlands, and are categorized by Cowardin et al. (1979) as palustrine forested (PFO) wetlands. The *Populus fremontii* Forest Alliance, Fremont cottonwood forested wetlands are described by Sawyer et al. (2009) and are similar to the Great Valley cottonwood riparian forest described by Holland (1986).

Other Waters

Other waters include perennial rivers and creeks, intermittent watercourses, and intermittent to ephemeral sloughs and creeks (watercourses). Two categories of watercourses occur within the wetland study area, natural and constructed.

Natural Watercourses

Natural waters with perennial flow include the San Joaquin River and Bear Creek. The majority of the natural waters in the wetland study area have intermittent or ephemeral flow regimes either because of their small watershed size or because they have been impounded or diverted upstream into other watercourses for agricultural purposes. Natural watercourses in the wetland study area have been

influenced by the anthropogenic stressors affecting streams elsewhere in the Central Valley, such as agricultural land conversions of floodplains, associated water diversions, and exotic fish and invertebrate introductions (McBain & Trush, Inc. 2002).

Constructed Watercourses and Basins

Constructed watercourses include irrigation canals and drainage ditches; constructed basins include retention basins, stock ponds, and agricultural tail water ponds. The constructed watercourses have the potential to support emergent vegetation, as well as ruderal wetland species. A number of constructed watercourses convey water diverted from or discharged into natural watercourses as described above. Constructed watercourses potentially support special-status species such as Sanford's arrowhead (*Sagittaria sanfordii*) and western pond turtle (*Actinemys marmorata*), but these watercourses usually do not provide native fishes with the aquatic habitat necessary to survive and grow, and are typically dominated by predatory or competitive nonnative fishes. Constructed watercourses are routinely maintained by removing vegetation (e.g., by clearing or spraying), which greatly limits their potential as aquatic habitat. Section 3.8, Hydrology and Water Resources, discusses constructed watercourses in further detail. Constructed basins on average do not retain perennial water sources. They have the potential to support special-status species that rely on ephemeral inundation cycles such as vernal pool branchiopods and California tiger salamanders.

Many new watercourses have been constructed as a result of agricultural supply and drainage. These constructed watercourses are new features that were not available to fish historically. These features generally have limited access for fish from natural watercourses due to a variety of structures to control flows, elevations, or drainage. In addition, many of the constructed watercourses have ephemeral or intermittent hydrology, flowing only during periods of agricultural demand or drainage. For these reasons, special-status fish were presumed to potentially occur only in historically natural watercourses, not in the constructed watercourses.

Open Waters

This habitat type is characterized by shallow depressions such as incidental scrapes, tire ruts, and artificial hardpans that have an ephemeral hydroperiod. The features are typically bare or sparsely vegetated; adventive native and nonnative species are associated with both vernal and upland habitats. Inundation is not of a sufficient duration to produce hydric soils and/or defined wetland vegetation under normal hydrological cycles. Therefore, these features are not identified as wetlands. Inundation may nevertheless be of sufficient duration to provide marginal breeding habitat for special-status vernal pool species, such as vernal pool branchiopods and western spadefoot toad.

3.7.4.3 Native Fauna Assemblage

Although this section focuses primarily on special-status wildlife species, other native fauna also occur in the study area. Native, indigenous wildlife occur in natural communities as well as some of the culturally disturbed landscapes that dominate the area. Native fauna observed during reconnaissance surveys are discussed within the *Merced to Fresno Section Biological Resources and Wetlands Technical Report* (Authority and FRA 2012a). Sixty species of regularly observed wildlife were recorded, including western toad (*Anaxyrus boreas*), western fence lizard (*Sceloporus occidentalis*), red-tailed hawk (*Buteo jamaicensis*), mallard (*Anas platyrhynchos*), Canada goose (*Branta canadensis*), turkey vulture (*Cathartes aura*), snowy egret (*Egretta thula*), killdeer (*Charadrius vociferus*), western kingbird (*Tyrannus verticalis*), brush rabbit (*Sylvilagus bachmani*), and coyote (*Canis latrans*).

3.7.4.4 Special-Status Species

There are 36 special-status plant species and 56 special-status wildlife species, cited by the CNDDDB and CNPS, reported to occur in the region (CNDDDB 2003, CNPS 2011). CDFG has jurisdiction over 9 plant species through CESA (8 endangered, 1 rare) and 7 wildlife species (5 threatened, 2 endangered). The USFWS has jurisdiction over 9 plant species through the ESA (4 threatened, 5 endangered) and 10 wildlife species (6 threatened, 4 endangered). All special-status species with a conservation designation are identified in Tables 3.7-3 and 3.7-4. A list was compiled of the special-status plant species with

potential to occur in the region based on CNDDDB and CNPS occurrence data, and the potential for a particular special-status plant and wildlife species to occur was assessed based on the presence or absence of suitable habitat identified in the habitat study area. Each special-status species was ranked as having no potential, unlikely potential, low potential, moderate potential, or high potential to occur in the habitat study area. Special-status species and their potential for occurrence are described in Appendix 3.7-A, Attachments 1 and 2.

Table 3.7-3
 Special-Status Plant Species Reported to Occur in the Region

<i>Scientific Name</i>	Common Name	Federal Status ^a	State Status ^b	CNPS ^c
Alismataceae				
<i>Sagittaria sanfordii</i>	Sanford's arrowhead	--	--	List 1B.2
Apiaceae				
<i>Eryngium racemosum</i>	Delta button celery	--	E	List 1B.1
<i>Eryngium spinosepalum</i>	spiny-sepaed button-celery	--	--	List 1B.2
Asteraceae				
<i>Calycadenia hooveri</i>	Hoover's calycadenia	--	--	List 1B.3
<i>Lasthenia glabrata</i> ssp. <i>coulteri</i>	Coulter's goldfields	--	--	List 1B.1
<i>Pseudobahia bahiifolia</i>	Hartweg's golden sunburst	E	E	List 1B.1
<i>Trichocoronis wrightii</i> var. <i>wrightii</i>	Wright's trichocoronis	--	--	List 2.1
Brassicaceae				
<i>Lepidium latipes</i> var. <i>heckardii</i>	Heckard's pepper-grass	--	--	List 1B.2
<i>Tropidocarpum capparideum</i>	caper-fruited tropidocarpum	--	--	List 1B.1
Campanulaceae				
<i>Downingia pusilla</i>	dwarf downingia	--	--	List 2.2
Chenopodiaceae				
<i>Atriplex cordulata</i>	Heartscale	--	--	List 1B.2
<i>Atriplex depressa</i>	Brittlescale	--	--	List 1B.2
<i>Atriplex joaquiniana</i>	San Joaquin spearscale	--	--	List 1B.2
<i>Atriplex minuscule</i>	lesser saltscale	--	--	List 1B.1
<i>Atriplex persistens</i>	vernal pool smallscale	--	--	List 1B.2
<i>Atriplex subtilis</i>	subtle orache	--	--	List 1B.2
<i>Atriplex vallicola</i>	Lost Hills crownscale	--	--	List 1B.2
Euphorbiaceae				
<i>Chamaesyce hooveri</i>	Hoover's spurge *Critical Habitat*	T	--	List 1B.2

<i>Scientific Name</i>	Common Name	Federal Status ^a	State Status ^b	CNPS ^c
Fabaceae				
<i>Astragalus tener</i> var. <i>tener</i>	alkali milk-vetch	--	--	List 1B.2
Hydrophyllaceae				
<i>Phacelia ciliata</i> var. <i>opaca</i>	Merced phacelia	--	--	List 1B.2
Malvaceae				
<i>Sidalcea keckii</i>	Keck's checkerbloom *Critical Habitat*	E	--	List 1B.1
Onagraceae				
<i>Clarkia rostrata</i>	beaked clarkia	--	--	List 1B.3
Poaceae				
<i>Agrostis hendersonii</i>	Henderson's bent grass	--	--	List 3.2
<i>Imperata brevifolia</i>	California satintail	--	--	List 2.1
<i>Neostapfia colusana</i>	Colusa grass *Critical Habitat*	T	E	List 1B.1
<i>Orcuttia inaequalis</i>	San Joaquin Valley Orcutt grass *Critical Habitat*	T	E	List 1B.1
<i>Orcuttia pilosa</i>	hairy Orcutt grass *Critical Habitat*	E	E	List 1B.1
<i>Tuctoria greenei</i>	Greene's tuctoria *Critical Habitat*	E	R	List 1B.1
Polemoniaceae				
<i>Navarretia myersii</i> ssp. <i>Myersii</i>	pincushion navarretia	--	--	List 1B.1
<i>Navarretia nigelliformis</i> ssp. <i>radians</i>	shining navarretia	--	--	List 1B.2
<i>Navarretia prostrata</i>	prostrate vernal pool navarretia	--	--	List 1B.1
Ranunculaceae				
<i>Delphinium recurvatum</i>	recurved larkspur	--	--	List 1B.2
<i>Myosurus minimus</i> ssp. <i>Apus</i>	little mousetail	--	--	List 3.1
<i>Castilleja campestris</i> ssp. <i>Succulenta</i>	succulent owl's-clover *Critical Habitat*	T	E	List 1B.2
<i>Cordylanthus palmatus</i>	palmate-bracted bird's-beak	E	E	List 1B.1
<i>Gratiola heterosepala</i>	Boggs Lake hedge-hyssop	--	E	List 1B.2
Notes: -- = No status designation. * * notes critical habitat ^a Federal status: E (Endangered) = Listed as endangered under the federal ESA. T (Threatened) = Listed as threatened under the federal ESA. ^b State status: E (Endangered) = Listed as endangered under the CESA. T (Threatened) = Listed as threatened under the CESA.				

<i>Scientific Name</i>	Common Name	Federal Status ^a	State Status ^b	CNPS ^c
R (Rare) = Listed as rare under the NPPA. ^c CNPS: LIST 1A = Presumed extinct in California. LIST 1B = Rare, threatened, or endangered in California and elsewhere. LIST 2 = Rare, threatened, or endangered in California, but more common elsewhere. LIST 3 = More information about this plant (Review List). .1 = Seriously endangered in California; .2 = Fairly endangered in California; .3 = Not very endangered in California ^d Source: CDFG 2003, CNPS 2011, USFWS (2011).				

Table 3.7-4
 Special-Status Wildlife Species Reported to Occur in the Region

<i>Scientific Name</i>	Common Name	Federal Status ^a	State Status ^b
Invertebrates			
<i>Branchinecta conservatio</i>	Conservancy fairy shrimp	E	--
<i>Branchinecta lynchi</i>	vernal pool fairy shrimp	T	--
<i>Lepidurus packardi</i>	vernal pool tadpole shrimp	E	--
<i>Desmocerus californicus dimorphus</i>	valley elderberry longhorn beetle	T	--
Fish			
<i>Lampetra hubbsi</i>	Kern brook lamprey	--	SSC
<i>Oncorhynchus mykiss</i>	Central Valley steelhead	T	SSC
<i>Oncorhynchus tshawytscha</i>	Central Valley spring-run Chinook salmon	T ^c	T
<i>Oncorhynchus tshawytscha</i>	Chinook salmon - Central Valley fall / late fall-run ESU (evolutionary significant unit)	--	SSC
<i>Mylopharodon conocephalus</i>	Hardhead	--	SSC
<i>Lavinia symmetricus symmetricus</i> ssp. 1	San Joaquin roach	--	SSC
Amphibians			
<i>Ambystoma californiense</i>	California tiger salamander	T	T/SSC
<i>Spea hammondi</i>	western spadefoot toad	--	SSC
Reptiles			
<i>Actinemys marmorata</i>	western pond turtle	--	SSC

<i>Scientific Name</i>	Common Name	Federal Status ^a	State Status ^b
Birds			
Anseriformes			
<i>Dendrocygna bicolor</i>	fulvous whistling-duck	--	SSC
<i>Aythya americana</i>	Redhead	--	SSC
Pelecaniformes			
<i>Pelecanus erythrorhynchos</i>	American white pelican	--	SSC
Ciconiiformes			
<i>Ixobrychus exilis</i>	least bittern	--	SSC
Falconiformes			
<i>Elanus leucurus</i>	white-tailed kite	--	FP
<i>Haliaeetus leucocephalus</i>	bald eagle	BGEPA	E/FP
<i>Circus cyaneus</i>	northern harrier	--	SSC
<i>Buteo swainsoni</i>	Swainson's hawk	--	T
<i>Aquila chrysaetos</i>	golden eagle	BGEPA	FP
<i>Falco peregrinus anatum</i>	American peregrine falcon	BCC	--
Gruiformes			
<i>Grus canadensis canadensis</i>	lesser sandhill crane	--	SSC
<i>Grus canadensis tabida</i>	greater sandhill crane	--	T/FP
Charadriiformes			
<i>Charadrius alexandrinus</i>	snowy plover	T	SSC
<i>Charadrius montanus</i>	mountain plover	PT/BCC	SSC
<i>Numenius phaeopus</i>	whimbrel	BCC	--
<i>Numenius americanus</i>	long-billed curlew	BCC	--
<i>Limosa fedoa</i>	marbled godwit	BCC	--
<i>Calidris canutus</i>	red knot	BCC	--
<i>Limnodromus griseus</i>	short-billed dowitcher	BCC	--
<i>Chlidonias niger</i>	black tern	--	SSC
Strigiformes			
<i>Athene cunicularia</i>	burrowing owl	BCC	SSC
<i>Asio otus</i>	long-eared owl	--	SSC
<i>Asio flammeus</i>	short-eared owl	--	SSC
Apodiformes			
<i>Calypte costae</i>	Costa's hummingbird	BCC	--

<i>Scientific Name</i>	Common Name	Federal Status ^a	State Status ^b
Passeriformes			
<i>Lanius ludovicianus</i>	loggerhead shrike	BCC	SSC
<i>Pica nuttalli</i>	yellow-billed magpie	BCC	--
<i>Progne subis</i>	purple martin	--	SSC
<i>Dendroica petechia brewsteri</i>	yellow warbler	--	SSC
<i>Icteria virens</i>	yellow-breasted chat	--	SSC
<i>Pipilo maculatus</i>	spotted towhee	BCC	--
<i>Pooecetes gramineus affinis</i>	Oregon vesper sparrow	--	SSC
<i>Vireo bellii pusillus</i>	least Bell's vireo	E/BCC	E
<i>Ammodramus savannarum</i>	grasshopper sparrow	--	SSC
<i>Melospiza melodia</i>	song sparrow ("Modesto" population)	--	SSC
<i>Agelaius tricolor</i>	tricolored blackbird	BCC	SSC
<i>Xanthocephalus xanthocephalus</i>	yellow-headed blackbird	--	SSC
<i>Carduelis lawrencei</i>	Lawrence's goldfinch	BCC	--
Mammals			
<i>Lasiurus blossevillii</i>	western red bat	--	SSC
<i>Antrozous pallidus</i>	pallid bat	--	SSC
<i>Eumops perotis californicus</i>	western mastiff bat	--	SSC
<i>Vulpes macrotis mutica</i>	San Joaquin kit fox	E	T
<i>Taxidea taxus</i>	American badger	--	SSC
Notes: -- = No status designation. ^a Federal status: PT (Proposed Threatened) = Federally proposed for listing as Threatened under federal ESA. E (Endangered) = Listed as endangered under federal ESA. T (Threatened) = Listed as threatened under the federal ESA. BCC = Birds of Conservation Concern. BGEPA = Bald and Golden Eagle Protection Act of 1999. ^b State status: E (Endangered) = Listed as endangered under the CESA. T (Threatened) = Listed as threatened under the CESA. FP (Fully Protected) = Classified as fully protected by CDFG. SSC (California Species of Special Concern) = Listed as a Species of Special Concern by CDFG. ^c Central Valley spring-run Chinook salmon are being reintroduced into the San Joaquin River as part of the San Joaquin River Restoration Program and are designated as an experimental population under Section 10(j) of the ESA. Source: CDFG (2003), USFWS (2011), USFWS (2005), USFWS (1998), (USFWS 2008), PRBO Conservation Service (2005).			

3.7.4.5 Habitats of Concern

Habitats of concern evaluated in the habitat study area include special-status plant communities, jurisdictional waters, critical habitat, EFH, core areas for recovery of federally listed species, mitigation banks and reserves, CDFG lands, HCP areas, and wildlife movement corridors. Habitats of concern in the habitat study area receive special protection by federal, state, and local regulations. These habitats of concern, discussed below, are depicted on Figures 3.7-1 through 3.7-5.

Special-Status Plant Communities

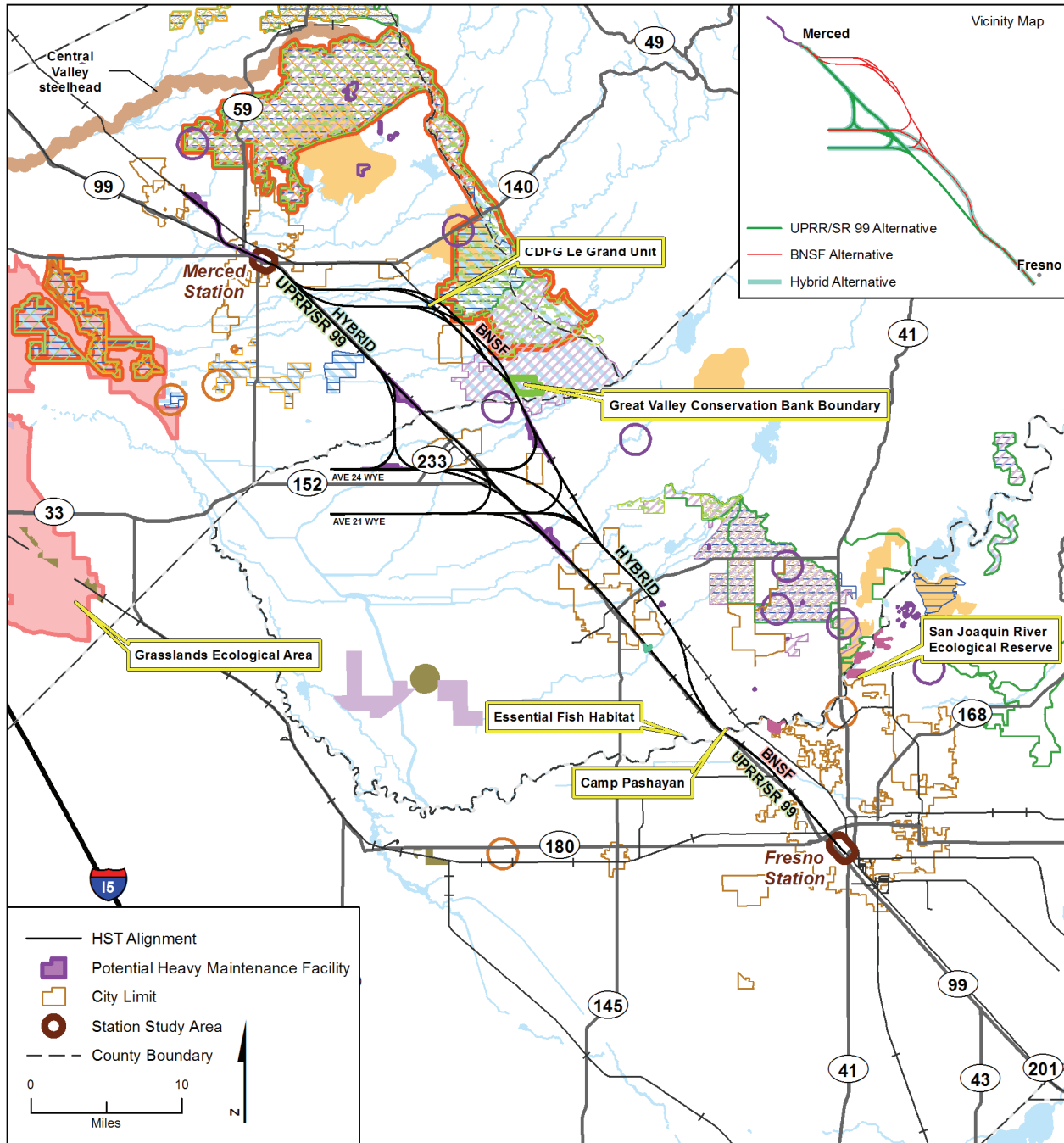
Special-status plant communities on the List of California Terrestrial Natural Communities Recognized by the CNDDDB (CDFG 2003) and identified as potentially occurring in the habitat study area based on CNDDDB (2003) search results include Great Valley mixed riparian forest, coastal and valley freshwater marsh, northern claypan vernal pools, northern hardpan vernal pools, sycamore alluvial woodland, valley sacaton grassland, and valley sink scrub (CDFG 2003). All of these plant communities have been identified as high priority on the List of California Terrestrial Natural Communities Recognized by the CNDDDB (CDFG 2003).

Jurisdictional Waters

Jurisdictional waters, including watercourses as described above, are afforded protection under federal and state laws by the USACE, CDFG, and SWRCB. Jurisdictional waters are generally considered an important resource for various plant and wildlife species and are discussed in Sections 3.7.4.5 and 3.7.4.6. These sections discuss jurisdictional waters in relation to regulatory permitting requirements concerning temporary and permanent impacts during ground-disturbing activities. Refer to the *Merced to Fresno Section Wetlands Delineation Report* (Authority and FRA 2012b) for figures of jurisdictional waters within the wetland study area.

Waters, including waters of the U.S., waters of the state, and state streambeds and lakes, considered jurisdictional are described in Section 3.7.1.1, Key Definitions. Permitting and compliance related to the CWA and Section 1600 of the CFGC are discussed in Section 3.7.7. The regulatory permitting process under the CWA and Section 1600 of the CFGC may also trigger the need for compliance with the federal ESA, CESA, Section 402 of the CWA, MBTA, and Section 106 of the National Historic Preservation Act.

Jurisdictional waters identified as potentially supporting special-status fishes are discussed in the *Merced to Fresno Section Biological Resources and Wetlands Technical Report* (Authority and FRA 2012a). Wetlands (as defined by the USACE) occur in varying densities throughout all HST alternatives. Vernal pools (jurisdictional only through USFWS and/or CDFG) are concentrated between Duck Slough and the Chowchilla River along the BNSF Mission Ave and Mariposa Way design options (Figures 3.7-1 through 3.7-5). Vernal pool habitat is present primarily along the BNSF Alternative; however, vernal pool habitat does occur within other HST alternatives in small quantities (see Tables 3.7-7, 3.7-9, and 3.7-11 in Section 3.7.5).



Source: U.S Fish & Wildlife Service, ESRP 2009, CNDDDB 2010, Conservation Land Group, 2010, Wildlands, Inc., 2010, Caltrans. MF_EIS_BIO_05 Jun 02, 2011

Critical Habitat

- Hoover's spurge
- San Joaquin Valley Orcutt grass
- hairy Orcutt grass
- succulent owl's-clover
- Greene's tuctoria
- Conservancy fairy shrimp
- vernal pool fairy shrimp
- vernal pool tadpole shrimp
- Colusa grass

- Central Valley steelhead
- California tiger salamander

Caltrans Observed Data

- vernal pool

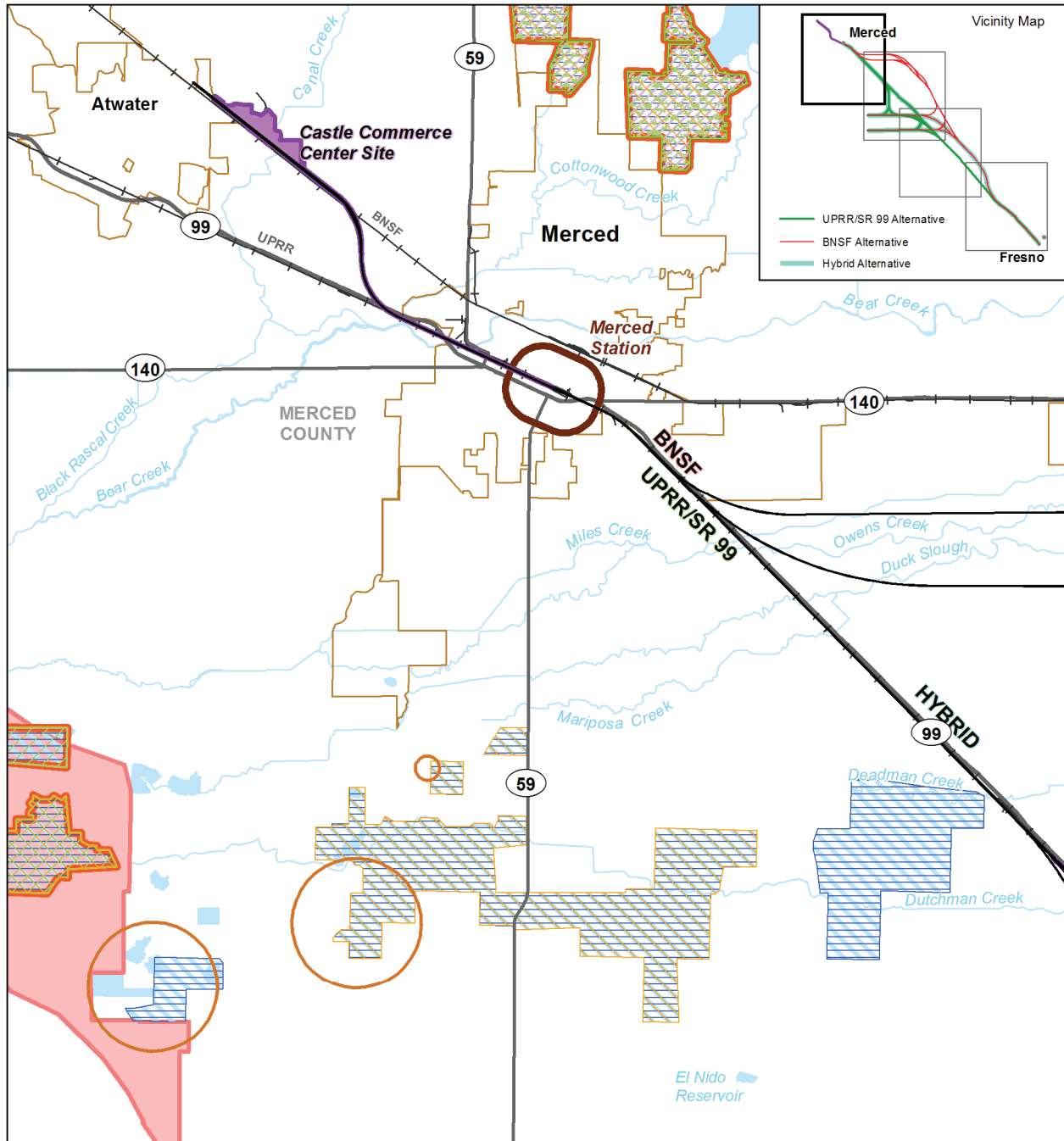
Mitigation Banks/Reserves

- San Joaquin River Ecological Reserve
- CDFG Le Grand Unit
- Great Valley Conservation Bank Boundary
- Grasslands Ecological Area

Special-Status Plant Communities

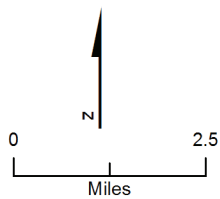
- Northern Claypan Vernal Pool
- Northern Hardpan Vernal Pool
- Valley Sacaton Grassland
- Valley Sink Scrub

Figure 3.7-1
 Habitats of Concern



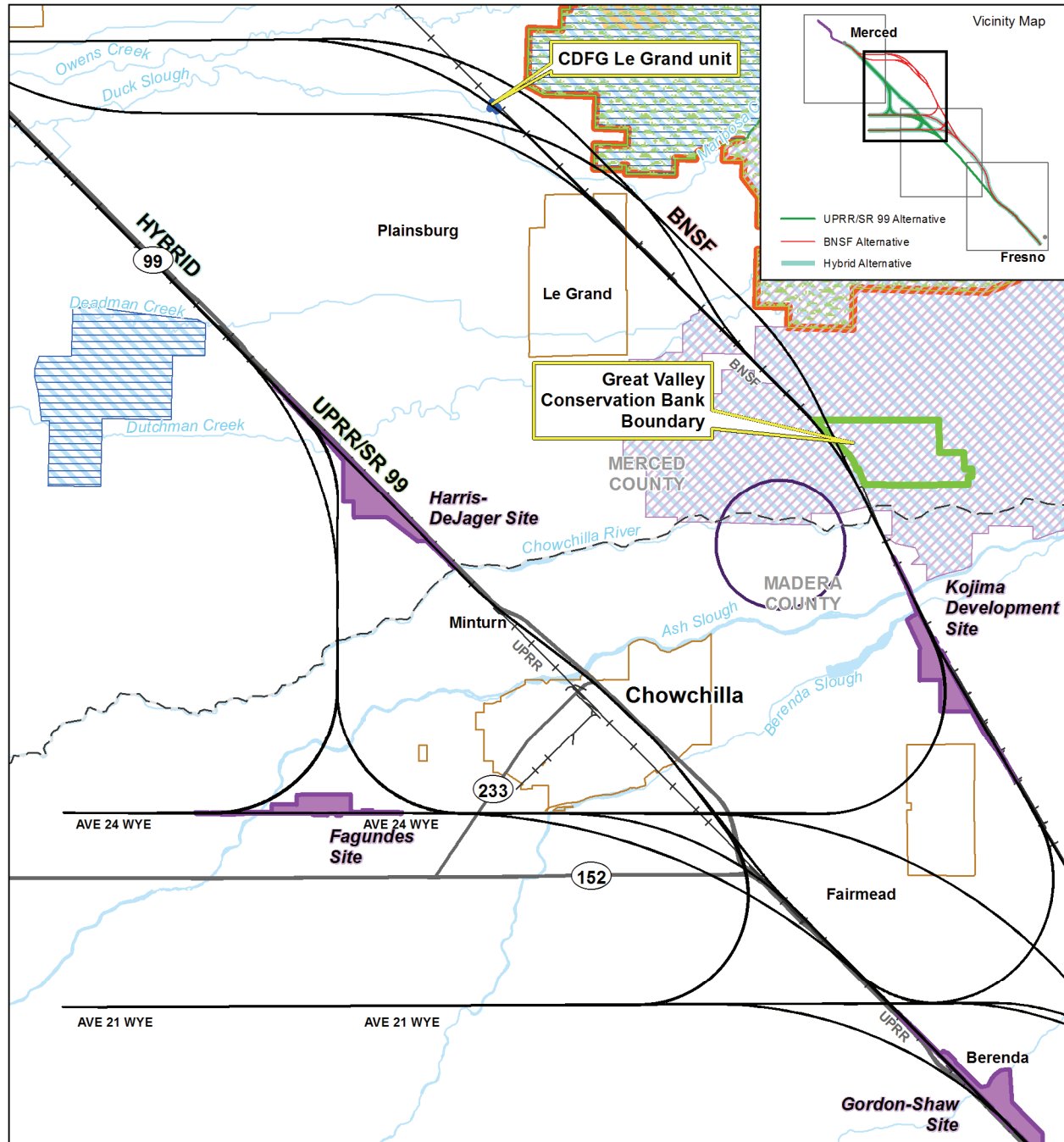
Source: U.S Fish & Wildlife Service, ESRP 2009, CNDDB 2010, Conservation Land Group, 2010, Wildlands, Inc., 2010, Caltrans.

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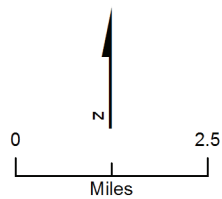


- | | | |
|--|--|--|
| <p>Critical Habitat</p> <ul style="list-style-type: none"> Hoover's spurge San Joaquin Valley Orcutt grass hairy Orcutt grass succulent owl's-clover Greene's tuctoria Colusa grass Conservancy fairy shrimp vernal pool fairy shrimp vernal pool tadpole shrimp Central Valley steelhead California tiger salamander | <p>Caltrans Observed Data</p> <ul style="list-style-type: none"> vernal pool <p>Mitigation Banks/Reserves</p> <ul style="list-style-type: none"> San Joaquin River Ecological Reserve CDFG Le Grand Unit Great Valley Conservation Bank Boundary Grasslands Ecological Area <p>Special-Status Plant Communities</p> <ul style="list-style-type: none"> Northern Claypan Vernal Pool Northern Hardpan Vernal Pool Valley Sacaton Grassland Valley Sink Scrub | <ul style="list-style-type: none"> HST Alignment Potential Heavy Maintenance Facility Station Study Area City Limit County Boundary Railroad |
|--|--|--|

Figure 3.7-2
 Habitats of Concern
 (Merced Area)

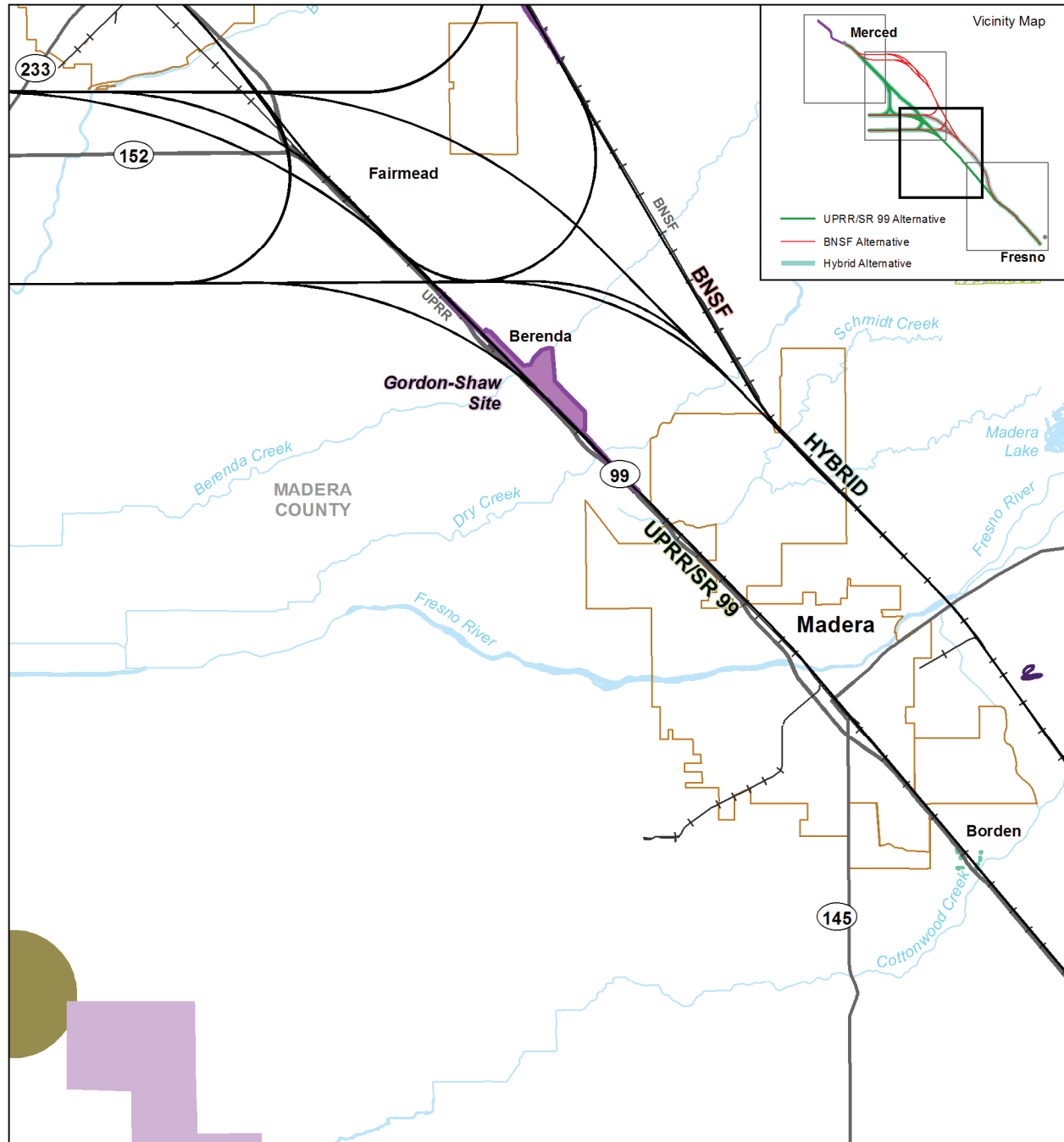


Source: U.S Fish & Wildlife Service, ESRP 2009, CNDDB 2010, Conservation Land Group, 2010, Wildlands, Inc., 2010, Caltrans. MF_EIS_BIO_26-29_b Jun 02, 2011

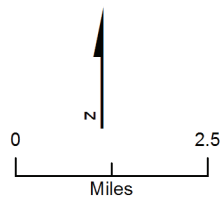


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|--|--|--|
| <p>Critical Habitat</p> <ul style="list-style-type: none"> Hoover's spurge San Joaquin Valley Orcutt grass hairy Orcutt grass succulent owl's-clover Greene's tuctoria Colusa grass Conservancy fairy shrimp vernal pool fairy shrimp vernal pool tadpole shrimp Central Valley steelhead California tiger salamander | <p>Caltrans Observed Data</p> <ul style="list-style-type: none"> vernal pool <p>Mitigation Banks/Reserves</p> <ul style="list-style-type: none"> San Joaquin River Ecological Reserve CDFG Le Grand Unit Great Valley Conservation Bank Boundary Grasslands Ecological Area <p>Special-Status Plant Communities</p> <ul style="list-style-type: none"> Northern Claypan Vernal Pool Northern Hardpan Vernal Pool Valley Sacaton Grassland Valley Sink Scrub | <ul style="list-style-type: none"> HST Alignment Potential Heavy Maintenance Facility Station Study Area City Limit County Boundary Railroad |
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Figure 3.7-3
 Habitats of Concern
 (Chowchilla Area)

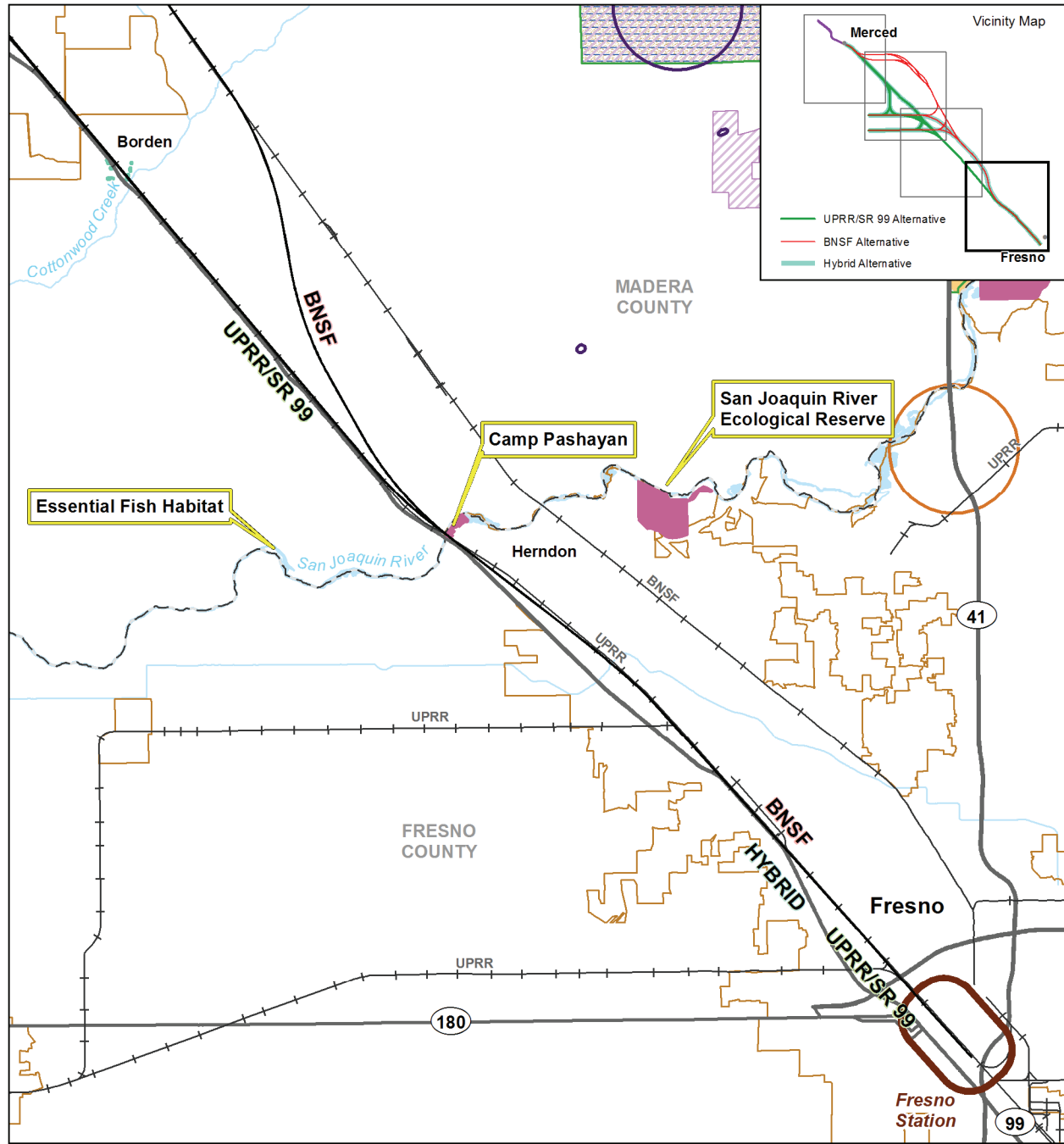


Source: U.S Fish & Wildlife Service, ESRP 2009, CNDDB 2010, Conservation Land Group, 2010, Wildlands, Inc., 2010, Caltrans. MF_EIS_BIO_26-29_c Jun 02, 2011



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|--|--|--|
| <p>Critical Habitat</p> <ul style="list-style-type: none"> Hoover's spurge San Joaquin Valley Orcutt grass hairy Orcutt grass succulent owl's-clover Greene's tuctoria Colusa grass Conservancy fairy shrimp vernal pool fairy shrimp vernal pool tadpole shrimp Central Valley steelhead California tiger salamander | <p>Caltrans Observed Data</p> <ul style="list-style-type: none"> vernal pool <p>Mitigation Banks/Reserves</p> <ul style="list-style-type: none"> San Joaquin River Ecological Reserve CDFG Le Grand Unit Great Valley Conservation Bank Boundary Grasslands Ecological Area <p>Special-Status Plant Communities</p> <ul style="list-style-type: none"> Northern Claypan Vernal Pool Northern Hardpan Vernal Pool Valley Sacaton Grassland Valley Sink Scrub | <ul style="list-style-type: none"> HST Alignment Potential Heavy Maintenance Facility Station Study Area City Limit County Boundary Railroad |
|--|--|--|

Figure 3.7-4
 Habitats of Concern
 (Madera Area)



Source: U.S Fish & Wildlife Service, ESRP 2009, CNDDB 2010, Conservation Land Group, 2010, Wildlands, Inc., 2010, Caltrans. MF_EIS_BIO_26-29_d Jun 02, 2011

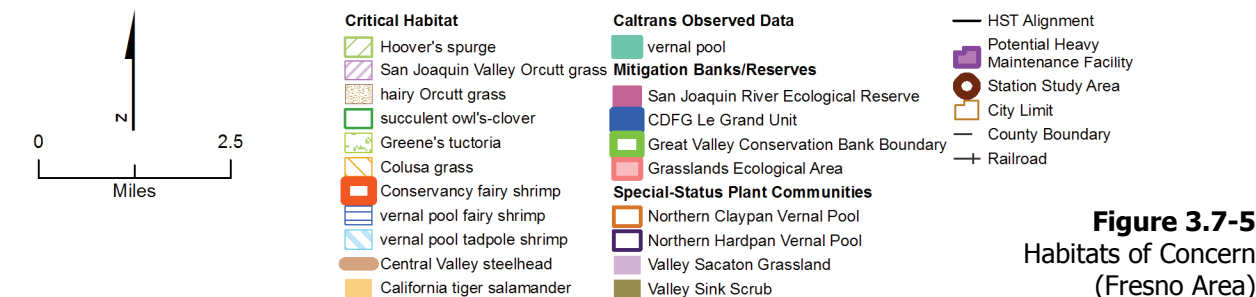


Figure 3.7-5
 Habitats of Concern
 (Fresno Area)

Critical Habitat

Critical habitat as defined by the federal ESA includes designated areas that provide federally listed species with suitable habitat and which have the geographical locations and physical features essential to the conservation of a particular species. The federal ESA defines conservation as "all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to [the federal ESA] are no longer necessary" (16 U.S.C. § 1532(3)). Critical habitat is present in the habitat study area for the following special-status species:

- Vernal pool tadpole shrimp (*Lepidurus packardii*).
- Vernal pool fairy shrimp (*Branchinecta lynchi*).
- Conservancy fairy shrimp (*Branchinecta conservatio*).
- Succulent owl's-clover (*Castilleja campestris* ssp. *succulenta*).
- San Joaquin Valley Orcutt grass (*Orcuttia inaequalis*).
- Greene's tuctoria (*Tuctoria greenei*).

Essential Fish Habitat

EFH is defined as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." Waters include aquatic areas and their associated physical, chemical, and biological properties. *Substrate* includes sediment underlying the waters. *Necessary* means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem. Spawning, breeding, feeding, or growth to maturity covers all habitat types used by a species throughout its life cycle. The Magnuson-Stevens Fishery Conservation and Management Act, as amended, requires all federal agencies to consult with NMFS on all actions, or proposed actions, permitted, funded, or undertaken by the federal agency, that may adversely affect EFH. Adversely affect means any impact which reduces the quality and/or quantity of EFH. Adverse effects may include direct (e.g., contamination; physical disruption), indirect (e.g., loss of prey), or site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (NOAA 2009).

NMFS has designated most water bodies that were historically accessible to Chinook salmon (*Oncorhynchus tshawytscha*) as EFH. This designation includes the Middle San Joaquin-Lower Chowchilla hydrologic unit (HU 18040001; Pacific Fisheries Management Council 2003). The Merced to Fresno Section HST Project occurs in this hydrologic unit. Within the Merced to Fresno Section, EFH has been designated for Chinook salmon within the San Joaquin River up to the boundary of HU 18040001 at Friant Dam (FR 73:60987-60994).

Though EFH has been designated within the noted hydrologic unit on the Middle San Joaquin River, surface water is only intermittently present in the Middle San Joaquin River since completion of the Central Valley Project in the late 1940s and early 1950s. The approximately 25-mile-long reach of the river between the Gravelly Ford gauging station and Mendota Pool is commonly without surface water due to diversions and infiltration losses, and conveys surface water only as a result of flood flow releases from Friant Dam. Since 1992, CDFG has erected a diversion barrier at the Merced River confluence with the Middle San Joaquin River from mid-September to mid-December to stop salmonids from moving up the river above this location (CH2M HILL 2003, 2005). Fish habitat above the Merced River confluence, while potentially suitable for Chinook salmon and Central Valley Steelhead, is currently negatively impacted by habitat degradation, altered flows, and this managed fish barrier.

As a result of the San Joaquin River Restoration Program (SJRRP) Settlement (NRDC 2005) and Public Law 111-11, NMFS, USFWS, and Reclamation have implemented the SJRRP (Reclamation 2009) with implementation support from the California Department of Water Resources (DWR) and CDFG. The SJRRP is a comprehensive long-term effort to restore flows to the San Joaquin River from Friant Dam to the confluence of the Merced River and restore a self-sustaining Chinook salmon fishery in the river while reducing or avoiding adverse water supply impacts from restoration flows. Interim flow releases for water years 2010 through 2012 have been completed for the purpose of data collection and will continue to be

implemented until final flows are scheduled for late 2012. Spring-run Chinook salmon are scheduled to be reintroduced to the San Joaquin River no later than December 2012 (Reclamation et al. 2010).

Areas for Recovery of Federally Listed Species

Two recovery plans address federally protected species with the potential to occur in the region: *Recovery Plan for Upland Species of the San Joaquin Valley, California* (USFWS 1998) and *Draft Recovery Plan for Vernal Pool Ecosystems for California and Southern Oregon* (USFWS 2004).

For the San Joaquin kit fox (*Vulpes macrotis mutica*), linking the undeveloped area surrounding Sandy Mush Road with the population of kit foxes on natural lands east of Merced is listed in the *Recovery Plan for Upland Species of the San Joaquin Valley, California* (USFWS 1998) as a recovery action. Core areas for San Joaquin kit fox are not discussed further in this section because the wildlife movement corridors, which encompass the same areas, are discussed in detail in Section 3.7.4.6.

Since the *Recovery Plan for Upland Species of the San Joaquin Valley, California* was written, the Endangered Species Recovery Program has stated that populations of Fresno kangaroo rat are not known to occur (*Dipodomys mitratooides exilis*) within their historical geographic range in Merced, Madera, and Fresno counties (ESRP 2006). Chenopod scrub communities, which are considered suitable habitat for the Fresno kangaroo rat, do not occur in the habitat study area or the project vicinity. Therefore, the Fresno kangaroo rat is unlikely to occur in the habitat study area and is not further addressed in this section.

Mitigation Banks/Reserves

Mitigation banks and reserves are large blocks of land that are preserved, restored, and enhanced for the purpose of providing mitigation for projects that result in takes of special-status species, wetlands, or important biological communities. The following mitigation banks and reserves are established or proposed in the habitat study area:

- The Great Valley Conservation Bank covers a portion of the BNSF Alternative, and is located southeast of Le Grand near Santa Fe Ave and Marguerite Roads (Figure 3.7-1). This 1,067-acre bank site includes existing vernal pools, other seasonal wetlands, and California annual grassland within critical habitat for San Joaquin Valley Orcutt grass and vernal pool tadpole shrimp. Special-status species that are found on either or both habitats include California tiger salamander, vernal pool tadpole shrimp, vernal pool fairy shrimp, western spadefoot toad, western burrowing owl, and San Joaquin kit fox. The mitigation bank is currently active and approved by the USFWS (CH2M HILL 2010a, b).
- Camp Pashayan is a 31-acre property located just east of the UPRR bridge on the south side of the San Joaquin River in Fresno, within each of the HST alternatives (Figure 3.7-1). This property was acquired by the California Wildlife Conservation Board through a donation from the Boy Scouts of America, which continues to use constructed facilities on the property. Camp Pashayan is one of the properties that is part of the San Joaquin River Ecological Reserve. There are a number of properties that comprise the ecological reserve and all are within the San Joaquin River Parkway. The parkway consists of the ecological reserve properties owned by the CDFG, easements, and properties owned and operated by the San Joaquin River Parkway and Conservation Trust or the City of Fresno. Camp Pashayan is owned and operated jointly by the CDFG and the Trust; it is protected under Title 14 of the California Code of Regulations. Sensitive species such as Sanford's arrowhead, valley elderberry longhorn beetle, white-tailed kite, and loggerhead shrike are reported to occur on the property. Riparian habitat along the San Joaquin River is adjacent to the property.

CDFG Le Grand Unit

CDFG has ownership of a 4.9-acre parcel near Le Grand. The purpose of CDFG ownership is to provide wetland conservation opportunities (Sloan 2010). It is near Mariposa Creek, is low-lying and may contain the proper hydrology for enhancement of wetland habitat values. It is not officially designated at this

time (Sloan 2010) and is not further discussed as a specific CDFG-designated property but is still a biological resource with potential for mitigation/compensation opportunities.

Habitat Conservation Plans (HCP)

As stated earlier, an HCP must accompany an incidental take permit under Section 10 of the federal ESA. One approved HCP is administered in the project vicinity. The Merced to Fresno Section is located within the planning area of the Pacific Gas and Electric Company (PG&E) San Joaquin Valley Operations and Management HCP (PG&E 2006). This HCP is an operations and maintenance plan, which only applies to PG&E facilities. The HCP covers incidental take of special-status plants and animals resulting from the operation of existing facilities, maintenance activities (e.g., repairing and replacing existing facilities, existing structures, access roads, emergency repair, vegetation management, and fire breaks), and minor construction. The covered activities do not include any facilities outside the plan area or new construction actions unrelated to maintenance, repair, and operation of existing transmission or distribution lines or pipelines. The HCP is not applicable to work performed by a third party, such as the Authority (Dedon 2012). Therefore, the HCP does not apply to this project and is not further discussed in this section. The construction for the HST power line upgrades would occur in the HCP area. The Authority would secure its own permits for construction activities.

3.7.4.6 Wildlife Movement Corridors

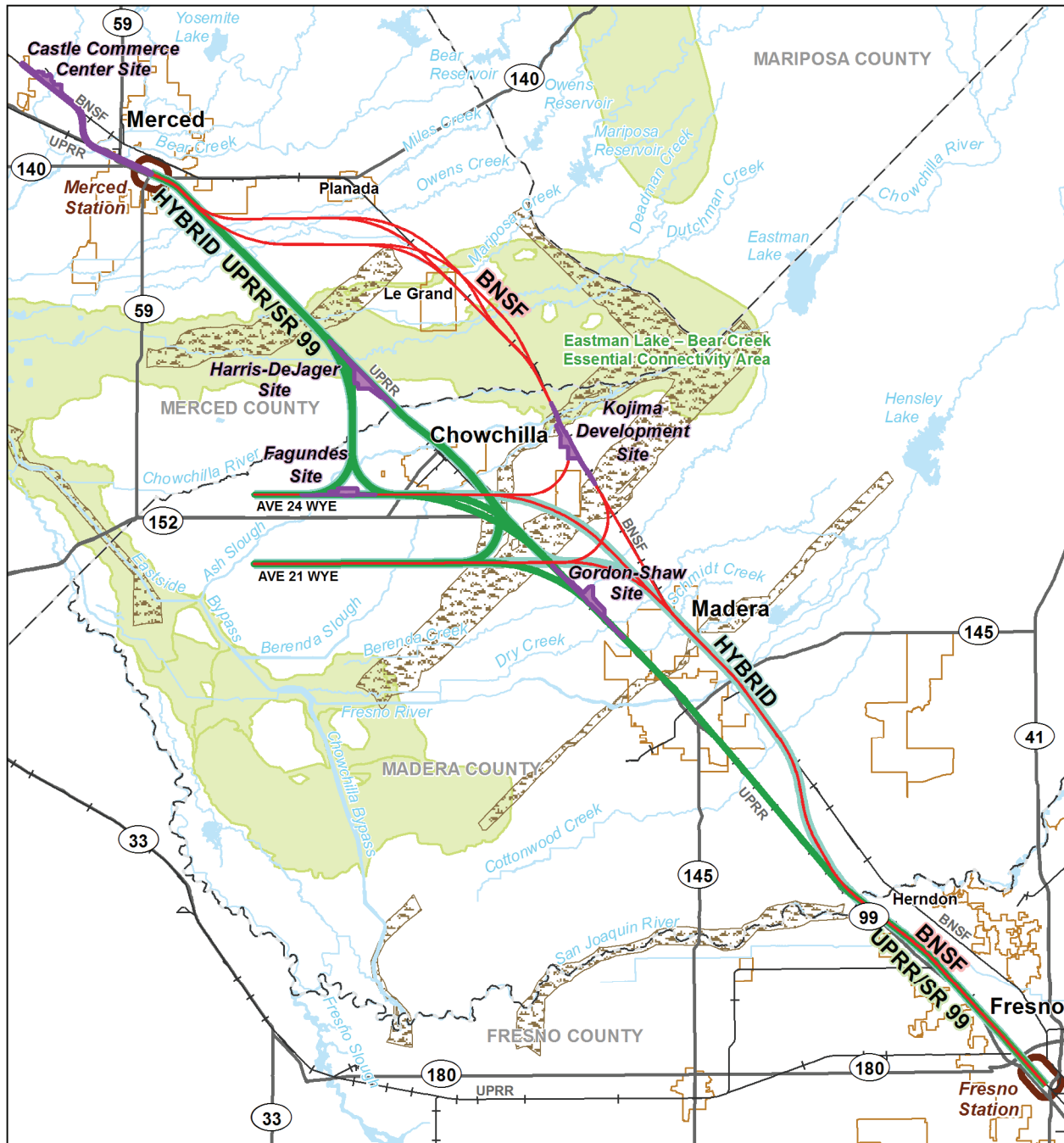
Wildlife linkages are planning areas that, among other services, provide broad connections for wildlife movement between two or more habitat areas. One documented essential habitat connectivity area and one migratory bird flyway exist in the Merced to Fresno Section HST corridor (Figure 3.7-6).

The Sandy Mush Road linkage is one such area where connectivity and linkages between isolated habitat on the San Joaquin Valley floor and natural lands in the surrounding foothills should be promoted (ESRP 1999, USFWS 1998). As discussed in the *Core Areas for Recovery of Federally Listed Species* section above, linking the natural areas in the Sandy Mush Road area with the San Joaquin kit fox population east of SR 99 is listed as a recovery action by the USFWS in the *Recovery Plan for Upland Species of the San Joaquin Valley* (USFWS 1998). Lost hills saltbush (*Atriplex vallicola*) and blunt-nosed leopard lizard are also identified as target species associated with the Sandy Mush Road linkage, while lesser saltscale (*Atriplex minuscula*) and palmate-bracted bird's beak (*Cordylanthus palmatus*) are identified as other federally listed species with recovery actions associated with this linkage. The Sandy Mush Road linkage in the Recovery Plan was modeled by the ESRP (1999). In 2008, this linkage was subsumed by the designation of the Madera-Merced Linkage (Linkage 18) near Deadman Creek and Dutchman Creek close to Sandy Mush Road and Le Grand, and was ranked as a high priority "choke-point" and "missing link" by Penrod et al. (2001). It is reportedly severely threatened, with only moderate conservation potential, reflecting existing functional impairments due to development.

Among other actions, the California Missing Linkages Project process identified, mapped, and characterized landscape linkages, choke-points, and missing links within the California landscape that provided, or could provide, some level of function for wildlife movement and genetic dispersal.

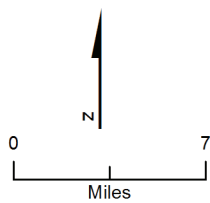
Penrod et al. (2001) defined these linkage terms as follows:

- **Landscape Linkages:** Large regional connections between habitat blocks ("core areas") meant to facilitate animal movements and other essential flows between different sections of the landscape.
- **Choke-Point:** A narrow, impacted, or otherwise tenuous habitat linkage connecting two more habitat blocks ("core areas").
- **Missing Link:** A highly impacted area currently providing limited to no connectivity function (due to intervening development, roadways, etc.), but based on location one that is critical to restore connectivity function.



Source: Spencer et al. (2010), Huber (2007).

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- UPRR/SR 99 Alternative
- BNSF Alternative
- Hybrid Alternative
- Station Study Area
- Potential Heavy Maintenance Facility
- City Limit
- County Boundary
- Railroad
- Essential Connectivity Area
- Modeled Wildlife Corridors

Figure 3.7-6
 Wildlife Corridors

In general, features identified that facilitated wildlife movement within linkages included riparian corridors or waterways, contiguous or semi-contiguous habitat patches, and culvert/bridge underpasses. Conversely, features that correlated with impeding wildlife movement included roads/highways, developed/urbanization, gaps in habitat patches, agriculture/ranching, dams/diversions, and logging.

The Essential Connectivity Project was commissioned by the California Department of Transportation (Caltrans) and CDFG in response to Assembly Bill 2785 that required CDFG to investigate, study, and identify those areas in the state that are most essential as wildlife corridors and habitat linkages (A.B. 2785 2008).

The Essential Connectivity Project identified areas that are important for ecological connectivity between large, relatively natural habitat blocks that support native biodiversity (Spencer et al. 2010). The Eastman Lake – Bear Creek ECA, as shown in Figure 3.7-6, is based primarily on the concept of ecological integrity, rather than the needs of particular species. This ECA, as is the case with other ECAs shown by Spencer et al. (2010), is intended to inform land use planning efforts, and is intended to be replaced at a future date with a more detailed linkage design based on the needs of particular species and ecological processes. These ECAs delineate lands that are likely important to wildlife movement between large, mostly natural areas at the statewide scale based on available data and assumptions provided in the California Essential Habitat Connectivity Project Report (Spencer et al. 2010).

As noted by Spencer et al. (2010), land use within the California Central Valley ecoregion (Sacramento Valley, San Joaquin Valley, and Sacramento-San Joaquin Delta regions) has largely been converted to agriculture and urban landcovers. As such, remaining habitat blocks are small in size and spatially fragmented relative to other ecoregions in the state. Fifty-four ECAs were identified within this ecoregion, with seven ECAs located in the vicinity of the Merced to Fresno Section study area. These seven proximal ECAs are:

1. Flat Top Mountain – Hunter Valley Mountain ECA.
2. Eastman Lake – Bear Creek ECA.
3. Ash Slough – Merced National Wildlife Refuge ECA.
4. Lone Willow – Ash Slough ECA.
5. Fresno River – Lone Willow ECA.
6. Gravelly Ford Canal – Lone Willow ECA.
7. Gravelly Ford Canal – Fresno River ECA.

Of these, only the Eastman Lake – Bear Creek ECA is intersected by the Merced to Fresno Section. The Eastman Lake – Bear Creek ECA occurs in association with the corridors of Deadman Creek and Dutchman Creek, from their headwaters in the Sierra Nevada Range east of Planada and Le Grand, westward to their confluence points with the Eastside Bypass. The Eastman Lake – Bear Creek ECA also largely follows the spatial arrangement of the Madera-Merced Linkage reported by Penrod et al. (2001), along Sandy Mush Road. To date, there has been no focused management plan developed for the Eastman Lake – Bear Creek ECA.

Spencer et al. (2010) concluded that because the Central Valley provides few connectivity opportunities at modeled ECA sites relative to other ecoregions, "... remaining riparian corridors play a critical role in helping connect remaining natural areas in the Great Central Valley, a function that can and should be greatly enhanced by riparian and riverine restoration projects."

Additional wildlife corridors that are potentially present within and near the Eastman Lake – Bear Creek ECA occur near Berenda Slough and the Fresno River channels. These wildlife corridors are intersected by the Merced to Fresno Section. These corridors were modeled for CDFG by the Information Center for the Environment, University of California, Davis, in GIS through evaluation of current land cover and management, road density, urban area density, natural area density, waterway density, and other elements (Huber 2007).

Watercourse Crossings within Wildlife Movement Corridors

Within the Eastman Lake – Bear Creek ECA, the BNSF Alternative intersects approximately 6 miles of the ECA and, depending on design option, would cross 5 to 9 watercourses. All of these watercourses crossed by the BNSF alternative are natural watercourses. In contrast, the UPRR/SR 99 and Hybrid Alternatives each intersect approximately 3.6 to 4.1 miles of the noted ECA, and would cross 0 to 2 watercourses depending on the design option. Both of these watercourses crossed by the UPRR/SR 99 and Hybrid Alternatives are natural watercourses.

Within other modeled wildlife corridors that are present near the Berenda Slough and the Fresno River channels, the BNSF Alternative intersects approximately 3.6 to 9.1 miles of the corridor and, depending on design option, would cross 4 to 8 watercourses. All of these watercourses crossed by the BNSF Alternative are constructed watercourses, such as canals. In contrast, the UPRR/SR 99 and Hybrid Alternatives each intersect approximately 3.6 to 7.75 miles of the corridor, and would cross 0 to 8 watercourses depending on the design option. All of these watercourses crossed by the UPRR/SR 99 and Hybrid Alternatives are constructed watercourses.

3.7.4.7 Plant Communities and Land Cover Types – By Alternative

This section discusses plant communities, by alternative. The majority of the discussion below addresses locations of aquatic or riparian communities since they represent the majority of native plant communities.

UPRR/SR 99 Alternative

North-South Alignment

Vernal pools, other seasonal wetlands, and open waters are present within and adjacent to California annual grassland along the UPRR/SR 99 Alternative's north-south alignment (includes the East Chowchilla design option) southwest of SR 99 between South Arboleda Drive and South Athlone Road south of Deadman Creek. Great Valley mixed riparian forest and other riparian vegetation is present along Deadman Creek, Chowchilla River, Ash Slough, Berenda Slough, Berenda Creek, Fresno River, Dry Creek, Cottonwood Creek, and the San Joaquin River. Coastal and valley freshwater marsh occurs along the fringes several of these rivers, creeks, and sloughs and is considered seasonal (emergent).

The Eastman Lake-Bear Creek ECA (alternatively called the Sandy Mush Road Linkage by USFWS [1998]) and the Madera-Merced Linkage (Linkage 18) by Penrod et al. (2001), has been documented as a wildlife corridor. Linking the natural areas in the Sandy Mush Road area with the San Joaquin kit fox population east of SR 99 has been recommended as a recovery action by the USFWS (1998).

Two jurisdictional water features are found along the UPRR/SR 99 Alternative. One is north of Duck Slough and is mapped by the NWI (USFWS 2009) and Holland (1986) as palustrine scrub-shrub and emergent wetlands on the NWI maps. The other is a scattered group of vernal pools and other seasonal wetlands south of Deadman Creek. The habitat study area crosses numerous natural watercourses, including perennial rivers, intermittent or ephemeral streams, and named and constructed watercourses features within the UPRR/SR 99 Alternative (see Section 3.8, Hydrology and Water Resources). The habitat study area crosses Camp Pashayan, within the San Joaquin River Ecological Reserve.

West Chowchilla Design Option

The habitat study area within the West Chowchilla design option is composed primarily of agricultural habitats and associated constructed watercourses including the Chowchilla River Bypass and Bethel Canal. The West Chowchilla design option crosses Ash Slough and associated riparian vegetation.

Fresno HST Station Alternatives

The Mariposa Street Station and Kern Street Station alternatives would each be located within developed areas within the city limits of Fresno. These station alternative areas do not contain substantial native plant communities and land cover types.

Ave 24 Wye

The habitat study area within the Ave 24 Wye is primarily located within agricultural lands and encompasses associated constructed watercourses within the Chowchilla Irrigation District (see Section 3.8, Hydrology and Water Resources). The habitat study area within the Ave 24 Wye also crosses the Chowchilla River, Ash Slough, and Berenda Slough. Great Valley mixed riparian forest and other riparian vegetation are present along crossings at Chowchilla River, Ash Slough, and Berenda Slough.

Ave 21 Wye

The habitat study area within Ave 21 Wye is primarily located within agricultural lands and encompasses associated constructed watercourses in the Madera Irrigation District. The habitat study area within Ave 21 Wye crosses Berenda Slough and Berenda Creek. Great Valley mixed riparian forest is present at crossings along Berenda Slough and Berenda Creek.

BNSF Alternative

Habitat along the BNSF Alternative is primarily associated with agricultural lands. Riverine habitat with associated riparian corridors and wetlands is common. Developed areas are limited to the town of Le Grand and isolated rural commercial developments. Ruderal areas are common along the BNSF railway and adjacent roadways. California annual grasslands, vernal pools, and other seasonal wetlands are concentrated in existing and proposed mitigation banks.

North-South Alignment

Vernal pools and other seasonal wetlands are present along the habitat study area within and adjacent to California annual grassland between South Ipsen Avenue and Avenue 26. Great Valley mixed riparian forest and other riparian vegetation are present along Mariposa, Deadman, and Dutchman creeks. Critical habitat for vernal pool tadpole shrimp and San Joaquin Valley Orcutt grass occurs in the habitat study area within the BNSF north-south alignment between Deadman Creek and Chowchilla River. Vernal pools and other seasonal wetlands created by the BNSF railroad and located in the BNSF right-of-way occur throughout the habitat study area. Several natural and constructed watercourses are crossed by the habitat study area within the BNSF north-south alignment.

Le Grand Design Options

The Le Grand design options are located within agricultural lands that are primarily composed of orchards, field crops, and row crops. Vernal pool complexes are located within and adjacent to California annual grassland. The Le Grand design options cross Owens Creek, Duck Slough, and Mariposa Creek as well as many constructed watercourses. Critical habitat also occurs for vernal pool tadpole shrimp, vernal pool fairy shrimp, Conservancy fairy shrimp, and succulent owl's clover. The Le Grand design options cross the Great Valley Conservation Bank.

Fresno HST Station Alternatives

The Mariposa Street Station and Kern Street Station alternative locations are each within developed areas within the city limits of Fresno. These station alternative locations do not contain substantial native plant communities and land cover types.

Ave 24 Wye

The habitat study area within the Ave 24 Wye is primarily located within agricultural lands and encompasses associated constructed watercourses. The Ave 24 Wye crosses Ash Slough, Berenda Creek, and Dry Creek. Great Valley mixed riparian forest is also present along the crossing at Ash Slough.

Ave 21 Wye

The habitat study area within the Ave 21 Wye is primarily located within agricultural lands and encompasses associated constructed watercourses including the Main Ashe, Eastman Lateral, Berenda, Califa, and Califa Lateral A canals. The Ave 21 Wye crosses Berenda Creek and Dry Creek.

Hybrid Alternative

North-South Alignment

Vernal pools and other seasonal wetlands are present within and adjacent to California annual grassland along the Hybrid Alternative southwest of SR 99 between South Arboleda Drive and South Athlone Road south of Deadman Creek and near the BNSF railway between Dry Creek and Cottonwood Creek. Great Valley mixed riparian forest and other riparian vegetation is present along Deadman Creek, Chowchilla River, Ash Slough, Berenda Slough, Berenda Creek, Fresno River, Dry Creek, and Cottonwood Creek. Coastal and valley freshwater marsh occurs along the fringes of several of these rivers, creeks, and sloughs.

Ave 24 Wye

The habitat study area within the Ave 24 Wye is primarily located within agricultural lands and encompasses associated constructed watercourses within the Chowchilla Irrigation District (see Section 3.8, Hydrology and Water Resources). The habitat study area within the Ave 24 Wye also crosses the Chowchilla River, Ash Slough, and Berenda Slough. Great Valley mixed riparian forest and other riparian vegetation are present along crossings at Chowchilla River, Ash Slough, and Berenda Slough.

Ave 21 Wye

The habitat study area within the Ave 21 Wye is primarily located within agricultural lands and encompasses associated constructed watercourses including the Main Ashe, Eastman Lateral, Berenda, Califa, and Califa Lateral A canals. The Ave 21 Wye crosses Berenda Creek and Dry Creek.

Heavy Maintenance Facility Alternatives

The habitat study area surrounding the Castle Commerce Center HMF site includes primarily developed areas and agricultural lands. This HMF site spans the Main Ashe Lateral Canal as well as Canal Creek, Black Rascal Creek, Bear Creek, and associated Great Valley mixed riparian forest.

The habitat study area surrounding the Harris-DeJager HMF site comprises agricultural lands and associated constructed watercourses. It is adjacent to but south of an area of Great Valley mixed riparian forest along Deadman Creek.

The habitat study area surrounding the Fagundes HMF site includes primarily agricultural lands and contains several constructed watercourses. This HMF site is adjacent to but east of an area of Great Valley mixed riparian forest along Ash Slough.

The habitat study area surrounding the Gordon-Shaw HMF site includes primarily agricultural lands. This HMF site is adjacent to but south of an area of Great Valley mixed riparian forest along Berenda Creek and does not contain any natural or constructed watercourses.

The habitat study area surrounding the Kojima Development HMF site is adjacent to but south of an area of Great Valley mixed riparian forest along Berenda Slough and does not contain any natural or

constructed watercourses. However, vernal pools, other seasonal wetlands, and California annual grasslands are present.

3.7.4.8 Special-Status Species – By Alternative

Only special-status species with moderate or high potential to occur are discussed in this section. Appendix 3.7-A, Attachments 1 and 2 list the special-status plant and wildlife species, respectively, with moderate or high potential to occur. Locations of these species along the HST alignment are discussed in this section and shown on Figure 3.7-7. A detailed discussion of all special-status species considered is provided in the *Merced to Fresno Section Biological Resources and Wetlands Technical Report* (Authority and FRA 2012a).

The UPRR/SR 99, BNSF, and Hybrid alternatives span a wide variety of habitat types between the proposed Merced to Fresno Section HST alignment. With the exception of coastal and valley freshwater marsh that has not been identified along the UPRR/SR 99 Alternative or Hybrid Alternative, habitat types are common among all HST alternatives in differing quantities and qualities. For this reason, the species listed in Appendix 3.7-A, Attachments 1 and 2, have the potential to occur within each HST alternative. Relative to the HST alternatives, the HMF sites are restricted to specific geographic areas and habitat within each site is more homogeneous. Therefore, habitat types are not common among the HMF sites, and potentially suitable habitat for certain species is present in some HMF sites but not others. The similarities and differences between alternative alignments and HMF sites with respect to potential habitat for the special-status species listed in Appendix 3.7-A, Attachments 1 and 2, are discussed below.

UPRR/SR 99 Alternative

Habitat along the UPRR/SR 99 Alternative primarily comprises developed areas and agricultural lands. Ruderal vegetation and eucalyptus woodlands are prevalent within the UPRR and SR 99 rights-of-way. Riverine habitat with associated riparian corridors and wetlands is common, and isolated vernal pools and other seasonal wetlands occur infrequently. The riparian areas along the alignment include: Deadman Creek, Chowchilla River, Ash Slough, Berenda Slough and Creek, Fresno River, Dry Creek, Cottonwood Creek, and the San Joaquin River. The habitat study areas include portions of the established Eastman Lake-Bear Creek ECA.

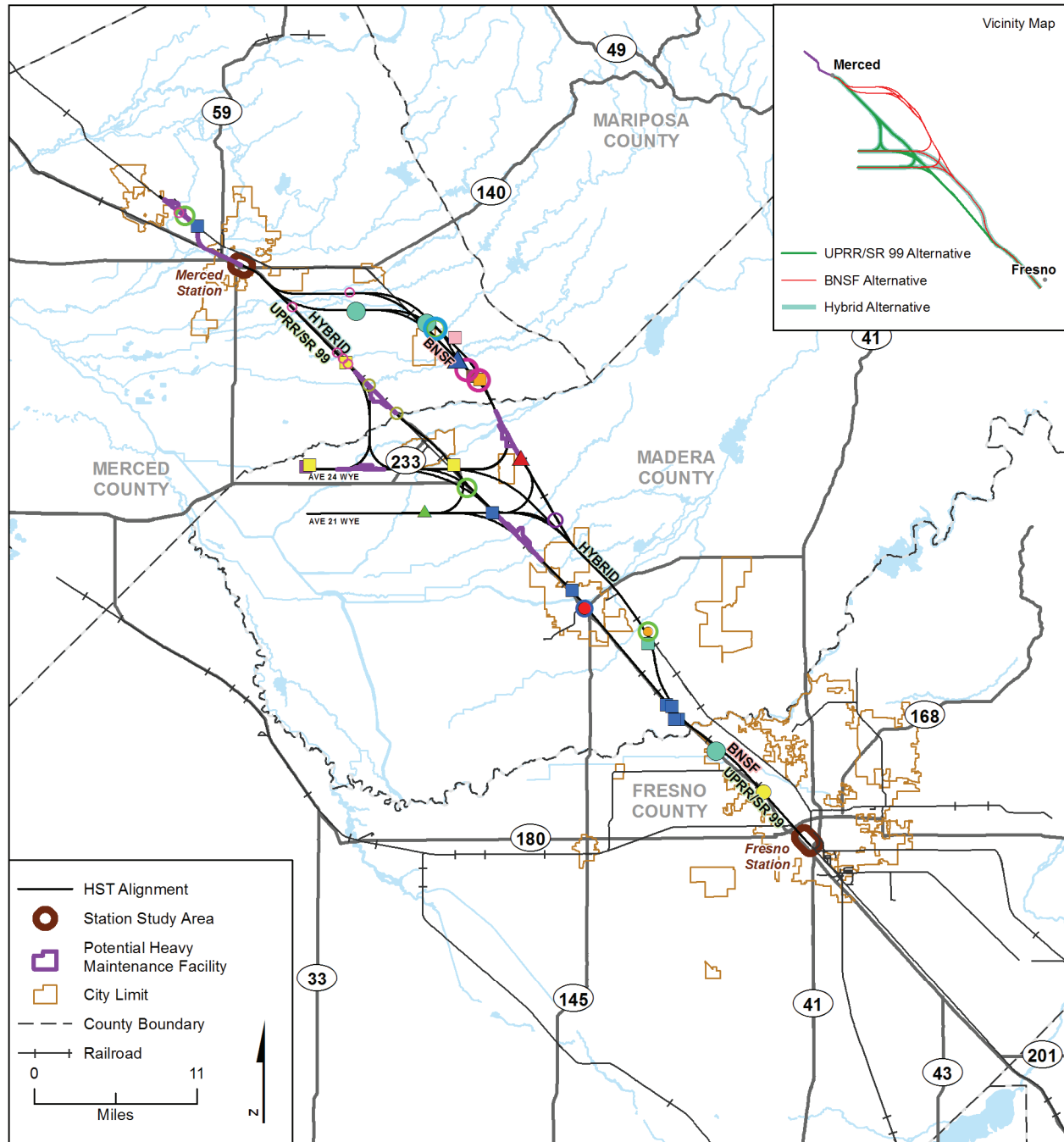
Each of these habitat types provides potentially suitable habitat for one or more special-status plant and wildlife species listed in Appendix 3.7-A, Attachments 1 and 2; however, the prevalence and extent of converted natural and seminatural lands have resulted in special-status species habitat of low quality overall along the UPRR/SR 99 Alternative.

BNSF Alternative

The natural and seminatural grassland communities provide high-quality habitat for a number of special-status species. The prevalence of relatively undisturbed vernal pools and other seasonal wetlands in these grasslands provides potentially suitable habitat for several of the plant and animal species listed in Appendix 3.7-A, Attachments 1 and 2.

The Mission Ave and Mariposa Way design options occur primarily within agricultural lands. Agricultural lands provide suitable habitat for special-status bird and bat species. The Mission Ave and Mariposa Way design options cross Miles and Mariposa creeks, respectively, which provide riverine, riparian, and wetland habitats for numerous special-status plant and wildlife species. The East Le Grand portion of the design options crosses areas of California annual grasslands, vernal pools, and other seasonal wetlands that provide habitat for several listed species.

Although the same special-status wildlife and plant species have the potential to occur along the BNSF Alternative as along the UPRR/SR 99 Alternative, the greater extent and relatively higher quality of California annual grassland and vernal pool habitat associated with the BNSF Alternative results in a higher likelihood that special-status species dependent on these habitat types would occur.



Source: CDFG, CNDDDB (2011)

MF_EIS_BIO_13 Jun 02, 2011

- | Observed Special-Status Species | | CNDDDB Reported Special-Status Species | |
|---------------------------------|-----------------------------|--|---------------------------------|
| Wildlife | | Wildlife | |
| California tiger salamander | California linderiella | Yuma myotis | moestan blister beetle |
| bald eagle | California tiger salamander | moestan blister beetle | moestan blister beetle |
| loggerhead shrike | Fresno kangaroo rat | vernal pool fairy shrimp | vernal pool fairy shrimp |
| northern harrier | San Joaquin kit fox | vernal pool tadpole shrimp | vernal pool tadpole shrimp |
| golden eagle | Swainson's hawk | western spadefoot | western spadefoot |
| yellow-headed blackbird | | Plant | |
| Plant | | heartscale | heartscale |
| Sanford's arrowhead | | lesser saltscale | lesser saltscale |
| | | succulent owl's-clover | succulent owl's-clover |
| | | San Joaquin Valley Orcutt grass | San Joaquin Valley Orcutt grass |

Figure 3.7-7
Threatened and Endangered
Species Observed and
Reported

Hybrid Alternative

Habitat along the Hybrid Alternative is primarily composed of developed areas and agricultural lands. Ruderal vegetation and eucalyptus woodlands are also prevalent. Riverine habitat with associated riparian corridors and wetlands are common. Isolated vernal pools and other seasonal wetlands occur infrequently. The riparian areas along the alignment include: Deadman Creek, Chowchilla River, Ash Slough, Berenda Slough, Berenda Creek, Fresno River, Dry Creek, Cottonwood Creek, and the San Joaquin River.

The habitat study area includes portions of the Eastman Lake-Bear Creek ECA. Each of these areas provides suitable habitat for one or more special-status plant and wildlife species listed in Appendix 3.7-A, Attachments 1 and 2; however, the prevalence and extent of converted natural and seminatural lands have resulted in special-status species habitat of low quality overall.

The same special-status wildlife and plant species have the potential to occur along the Hybrid Alternative as for the other two alternatives. However, the lower extent and quality of California annual grasslands, vernal pools, and other seasonal wetlands relative to those within the BNSF Alternative results in a lower likelihood that special-status species dependent on these habitat types would occur along the Hybrid Alternative.

Heavy Maintenance Facility Alternatives

This section summarizes the habitat types present within each HMF site. These include the Castle Commerce Center, Harris-DeJager, Fagundes, Gordon-Shaw, and Kojima Development sites.

The Castle Commerce Center HMF site includes primarily ruderal, agricultural, and riparian habitats. Constructed basins and natural watercourses associated with Black Rascal Creek and Bear Creek are also present. This HMF site provides potentially suitable habitat for all species listed in Appendix 3.7-A, Attachments 1 and 2, except for the following: Hartweg's golden sunburst, caper-fruited tropidocarpum, subtle orache, Merced phacelia, Conservancy fairy shrimp, vernal pool fairy shrimp, vernal pool tadpole shrimp, California tiger salamander, and western spadefoot toad.

The Harris-DeJager HMF site includes primarily agricultural lands with small areas of developed areas. Natural watercourses and riparian habitat associated with Deadman Creek are also present. This HMF site provides potentially suitable habitat for only the following plant species listed in Appendix 3.7-A, Attachment 1: Sanford's arrowhead, Delta button-celery, Coulter's goldfields, Wright's trichocoronis, Keck's checkerbloom, and beaked clarkia. This HMF site does not provide potentially suitable habitat for the following wildlife species listed in Appendix 3.7-A, Attachment 2: Conservancy fairy shrimp, vernal pool fairy shrimp, vernal pool tadpole shrimp, valley elderberry longhorn beetle, hardhead, Chinook salmon, California tiger salamander, western spadefoot toad, least bittern, western yellow-billed cuckoo, snowy plover, least Bell's vireo, yellow warbler, yellow-breasted chat, and song sparrow ("Modesto" population).

The Fagundes HMF site includes primarily agricultural lands with small areas of developed areas. Natural watercourses and riparian habitat associated with Ash Slough are also present. This HMF site provides potentially suitable habitat for the following plant species listed in Appendix 3.7-A, Attachment 1: Sanford's arrowhead, Delta button-celery, Coulter's goldfields, Wright's trichocoronis, Keck's checkerbloom, beaked clarkia, and California satintail. This HMF site does not provide potentially suitable habitat for the following wildlife species listed in Appendix 3.7-A, Attachment 2: Conservancy fairy shrimp, vernal pool fairy shrimp, vernal pool tadpole shrimp, hardhead, Chinook salmon, California tiger salamander, western spadefoot toad, least bittern, snowy plover, and song sparrow ("Modesto" population).

The Gordon-Shaw HMF site includes primarily agricultural lands with small developed areas and ruderal vegetation. Natural watercourses and riparian habitat associated with Berenda Creek are also present. This HMF site provides suitable habitat for all plant species and wildlife species listed in Appendix 3.7-A, Attachments 1 and 2, except for the following: Conservancy fairy shrimp, vernal pool fairy shrimp, vernal

pool tadpole shrimp, hardhead, Chinook salmon, California tiger salamander, western spadefoot toad, black tern, and song sparrow ("Modesto" population).

The Kojima Development HMF site includes primarily agricultural lands and California annual grassland, constructed basins and ruderal vegetation. Natural watercourses and riparian habitat associated with Berenda Slough and Ash Slough, including vernal pools and other seasonal wetlands, are also present. This HMF site is the only proposed HMF site with vernal pools and other seasonal wetlands. The site provides potentially suitable habitat for all species listed in Appendix 3.7-A, Attachments 1 and 2, except hardhead, Chinook salmon, and song sparrow ("Modesto" population).

3.7.4.9 Habitats of Concern – By Alternative

Habitats of concern evaluated in the project vicinity include special-status plant communities, jurisdictional waters, critical habitat, core areas for recovery of federally listed species, and mitigation banks and reserves. Figures 3.7-1 through 3.7-5 depict the location of regional habitats of concern.

UPRR/SR 99 Alternative

North-South Alignment

Special-Status Plant Communities: Vernal pools and other seasonal wetlands are present along the UPRR/SR 99 Alternative's north-south alignment (including the East Chowchilla design option) southwest of SR 99 between South Arboleda Drive and South Athlone Road within and adjacent to California annual grassland south of Deadman Creek. Great Valley mixed riparian forest and other riparian habitat is present along Deadman Creek, Chowchilla River, Ash Slough, Berenda Slough, Berenda Creek, Fresno River, Dry Creek, Cottonwood Creek, and the San Joaquin River. Coastal and valley freshwater marsh is also present along rivers, creeks, and sloughs.

Jurisdictional Waters: The habitat study area crosses numerous natural and constructed watercourses, including perennial rivers, intermittent streams, and ephemeral streams. Vernal pools, other seasonal wetlands, and coastal and valley freshwater marshes have also been identified within the UPRR/SR 99 north-south alignment (see Section 3.8, Hydrology and Water Resources).

Critical Habitat: Critical habitat does not occur within the habitat study area.

Essential Fish Habitat: The UPRR/SR 99 Alternative is elevated where it crosses the San Joaquin River, which contains EFH for Chinook salmon within and adjacent to the HST System footprint. Final bridge design plans are not currently available, but may require placing piling within the San Joaquin River. EFH for Chinook salmon has been identified where the UPRR/SR 99 north-south alignment crosses the San Joaquin River.

Mitigation Banks/Reserves: The habitat study area crosses Camp Pashayan (within the San Joaquin River Ecological Reserve) within the UPRR/SR 99 Alternative north-south alignment.

West Chowchilla Design Option

The West Chowchilla design option contains vernal pools and other seasonal wetlands as well as natural and constructed watercourses. Similar to the UPRR/SR 99 north-south alignment, the West Chowchilla design option crosses several natural watercourses, including perennial rivers, intermittent or ephemeral streams, and named and unnamed constructed watercourses.

Fresno HST Station Alternatives

The Mariposa Street Station and Kern Street Station alternatives would each be located within developed areas within the city limits of Fresno. These locations do not contain substantial native plant communities and land cover types.

Ave 24 Wye

The habitat study area is primarily located in agricultural habitats and encompasses associated constructed watercourses within the Chowchilla Irrigation District (see Section 3.8, Hydrology and Water Resources). The habitat study area crosses the Chowchilla River, Ash Slough, Berenda Slough, and Berenda Creek. Great Valley mixed riparian forest and other riparian communities are present along crossings at Chowchilla River, Ash Slough, and Berenda Slough.

Ave 21 Wye

The habitat study area is primarily located in agricultural lands and encompasses several constructed watercourses. The habitat study area crosses Berenda Slough and Berenda Creek. Great Valley mixed riparian forest is present at crossings along Berenda Slough and Berenda Creek.

BNSF Alternative

North-South Alignment

Special-Status Plant Communities: Vernal pools and other seasonal wetlands are present along the habitat study area within and adjacent to California annual grassland between South Ipsen Avenue and Avenue 26. Great Valley mixed riparian forest and other riparian communities are present along Mariposa, Deadman, and Dutchman creeks. Vernal pools and other seasonal wetlands created by the BNSF railroad and located in the BNSF right-of-way also occur throughout the habitat study area.

Jurisdictional Waters: The habitat study area crosses vernal pools and other seasonal wetlands as well as several natural watercourses, including perennial rivers, intermittent or ephemeral streams, and named and unnamed constructed watercourses.

Critical Habitat: Critical habitat occurs for San Joaquin Valley Orcutt grass (Unit 2) and vernal pool tadpole shrimp (Unit 15). These habitat areas occur between Deadman Creek and the Chowchilla River, mostly east of Le Grand.

Essential Fish Habitat: The BNSF Alternative is elevated where it crosses the San Joaquin River, which contains EFH for Chinook salmon within and adjacent to the HST System footprint. Final bridge design plans are not currently available, but may require placing piling within the San Joaquin River. EFH for Chinook salmon has been identified where the BNSF Alternative north-south alignment crosses the San Joaquin River.

Mitigation Banks/Reserves: Within the habitat study area, BNSF Alternative north-south alignment crosses the Great Valley Conservation Bank and Camp Pashayan (within the San Joaquin River Ecological Reserve).

Le Grand Design Options

The Le Grand design options contain vernal pools, other seasonal wetlands, coastal and valley freshwater marshes, and natural and constructed watercourses. The Le Grand design options include the same critical habitats as listed for the BNSF north-south alignment. Similar to the BNSF north-south alignment, the Le Grand design options cross several natural watercourses, including perennial rivers, intermittent or ephemeral streams, and named and unnamed constructed watercourses. Critical habitat occurs for vernal pool tadpole shrimp, vernal pool fairy shrimp, Conservancy fairy shrimp, San Joaquin Valley Orcutt grass, Greene's tuctoria, and succulent owl's-clover within the Le Grand and East of Le Grand design options.

Fresno HST Station Alternatives

The Mariposa Street Station and Kern Street Station alternatives will each be located within developed areas within the city limits of Fresno. These station alternative locations do not contain substantial native plant communities and land cover types.

Ave 24 Wye

The habitat study area for the Ave 24 Wye crosses several intermittent or ephemeral streams, including natural and constructed watercourses.

Ave 21 Wye

The habitat study area for the Ave 21 Wye crosses several intermittent or ephemeral streams, including natural and constructed watercourses.

Hybrid Alternative

North-South Alignment

The habitat study area for the Hybrid Alternative includes similar features as discussed under both the UPRR/SR 99 Alternative and the BNSF Alternative.

Special-Status Plant Communities: Vernal pools and other seasonal wetlands, as well as coastal and valley freshwater marsh, are located within the Hybrid Alternative's footprint.

Jurisdictional Waters: The habitat study area crosses vernal pools and other seasonal wetlands as well as several natural watercourses, including perennial rivers, intermittent or ephemeral streams, and named and unnamed constructed watercourses.

Critical Habitat: The Hybrid Alternative does not contain critical habitat within the study area.

Essential Fish Habitat: The Hybrid Alternative is elevated where it crosses the San Joaquin River, which contains EFH for Chinook salmon within and adjacent to the HST System footprint. Final bridge design plans are not currently available, but may require placing piling within the San Joaquin River. EFH for Chinook salmon has been identified where the Hybrid Alternative crosses the San Joaquin River.

Mitigation Banks/Reserves: The habitat study area crosses Camp Pashayan which is located within the San Joaquin River Ecological Reserve, within the Hybrid Alternative's footprint.

Ave 24 Wye

The habitat study area is primarily located in agricultural habitats and encompasses associated constructed watercourses within the Chowchilla Irrigation District (see Section 3.8, Hydrology and Water Resources). The habitat study area crosses the Chowchilla River, Ash Slough, Berenda Slough, and Berenda Creek. Great Valley mixed riparian forest and other riparian communities are present along crossings at Chowchilla River, Ash Slough, and Berenda Slough.

Ave 21 Wye

The habitat study area for the Ave 21 Wye crosses several intermittent or ephemeral streams, including natural and constructed watercourses.

Heavy Maintenance Facility Alternatives

Castle Commerce Center HMF

Special-Status Plant Communities: The habitat study area surrounding Castle Commerce Center HMF site includes primarily developed areas, and agricultural lands. The facility spans the Main Ashe Lateral Canal as well as Canal Creek, Black Rascal Creek, Bear Creek, and associated Great Valley mixed riparian forest.

Jurisdictional Waters: Constructed watercourses and natural watercourses occur within the habitat study area.



Critical Habitat: Critical habitat does not occur within the habitat study area.

Essential Fish Habitat: EFH does not occur within the habitat study area.

Mitigation Banks/Reserves: Mitigation banks and reserves do not occur within the habitat study area.

Harris-DeJager HMF

Special-Status Plant Communities: The habitat study area surrounding Harris-DeJager HMF site comprises agricultural lands. It is adjacent to and south of an area of Great Valley mixed riparian forest along Deadman Creek.

Jurisdictional Waters: Natural watercourses occur within the habitat study area.

Critical Habitat: Critical habitat does not occur within the habitat study area.

Essential Fish Habitat: EFH does not occur within the habitat study area.

Mitigation Banks/Reserves: Mitigation banks and reserves do not occur within the habitat study area.

Fagundes HMF

Special-Status Plant Communities: The habitat study area surrounding the Fagundes HMF site comprises primarily agricultural habitat. This HMF site is adjacent to and east of an area of Great Valley mixed riparian forest along Ash Slough.

Jurisdictional Waters: Constructed and natural watercourses occur within the habitat study area.

Critical Habitat: Critical habitat does not occur within the habitat study area.

Essential Fish Habitat: EFH does not occur within the habitat study area.

Mitigation Banks/Reserves: Mitigation banks and reserves do not occur within the habitat study area.

Gordon-Shaw HMF

Special-Status Plant Communities: The habitat study area surrounding Gordon-Shaw HMF site comprises primarily agricultural lands. This HMF site is adjacent to and south of an area of Great Valley mixed riparian forest along Berenda Creek.

Jurisdictional Waters: Natural watercourses occur within the habitat study area.

Critical Habitat: Critical habitat does not occur within the habitat study area.

Essential Fish Habitat: EFH does not occur within the habitat study area.

Mitigation Banks/Reserves: Mitigation banks and reserves do not occur within the habitat study area.

Kojima Development HMF

Special-status Plant Communities: The habitat study area includes vernal pools and other seasonal wetlands.

Jurisdictional Waters: Natural watercourses, vernal pools, and other seasonal wetlands occur within the habitat study area.

Critical Habitat: Critical habitat does not occur within the habitat study area.

Essential Fish Habitat: EFH does not occur within the habitat study area.



Mitigation Banks/Reserves: Mitigation banks and reserves do not occur within the habitat study area.

3.7.4.10 Wildlife Movement Corridors – By Alternative

A discussion of the watercourse crossings within the Eastman Lake – Bear Creek ECA and within the modeled wildlife corridors by alternative is provided below. Figure 3.7-6 illustrates the watercourse crossings within the Eastman Lake – Bear Creek ECA and within modeled wildlife corridors with all alternatives, including all design options. Specifically, Figure 3.7-6 includes a series of diagrams including an overview followed by select focused illustrations generally following a north to south orientation.

Tables D-1 through D-6 provided in Appendix D of the *Merced to Fresno Section Biological Resources and Wetlands Technical Report* (Authority and FRA 2012a) summarize the type and number of watercourse crossings within the noted ECA and modeled wildlife corridors by alternative. These tables also provide the vertical design and design approach at each watercourse crossing and the riparian corridor value and adjacent land use of the watercourse crossing.

It should be noted that the Eastman Lake – Bear Creek ECA and modeled wildlife corridors overlap at Deadman Creek and Berenda Slough. Accordingly, the tables for the ECA include watercourse crossings within the entire ECA, whereas the tables for the modeled wildlife corridors focus on all crossings outside the ECA within the modeled wildlife corridors limits to avoid duplication of watercourse crossing information.

In addition, these tables provide a wildlife crossing value (i.e., Low, Moderate, High) for each watercourse crossing. These crossing values were assessed qualitatively based on the apparent openness factor which will be reflected in the design treatment (such as multi-span bridge, single-span bridge, or culvert) as well as the landscape cover leading to the crossing (such as the riparian canopy, scrub/shrub component or intermittent shrub cover that provides hiding places, escape cover, or prey opportunities depending on the species).

Adjacent land uses were also considered in making the crossing value determination. For example, adjacent land uses may provide either a buffer or a constraint/impediment depending on the landscape cover, frequency of maintenance activities, and the intensity of indirect effects on animal movement (such as noise, motion, startle, or harassment). Crossing values are described as follows:

- All HST crossings of watercourses that are elevated or at-grade with a multi-span bridge structure will potentially have a high crossing value due to the openness factor and the likelihood of a free-ranging mammal to approach and move through the crossing.
- HST crossings of watercourses that are elevated or at-grade with a single-span bridge will potentially have a moderate to high crossing value, depending on the riparian value combined with the openness factor. The riparian values and the openness factor play an important role in determining the crossing value of the single-span bridge due to the combination of the more limited opening size and the cover value. For example, single-span bridges with little or no riparian habitat and cover will be given a moderate crossing value as it will provide some cover and connectivity, whereas a single-span bridge with well-developed riparian habitat will provide more cover and connectivity and will therefore be given a high crossing value.
- Adjacent land uses such as rural residential or urban may provide a substantive impediment and deterrent due to noise, startle, motion and miscellaneous disturbances that can distract or impair movement. These land uses adjacent to otherwise moderate to high value crossings may elicit a negative/avoidance behavior, which will lower the crossing value.
- As the crossing size becomes more limited such as with culverts, the riparian values and the adjacent land use may extend a greater influence on wildlife movement. Culverts are generally smaller with less of an openness factor and are more manufactured which may elicit a more cautious behavior for animal movement. These crossings are considered of lower value due to the openness factor and manufactured landscape.



- Constructed watercourses with bridges or culverts have an opportunity for wildlife movement, although of lower value due to the manufactured nature of the crossing and likelihood of less riparian values.

The ECA includes a mosaic of landscapes, dominated by agriculture, farms, rural pastures and select riparian corridors. The landscape includes various impediments such as roads and fencing as well as the UPRR and SR 99. The modeled wildlife corridor area landscape also includes this mosaic and is further restricted due to more extensive alteration of the landscape and fewer riparian crossings as evident by the number of culverts used in the design.

It is important to recognize that although there are impediments in the ECA, the hydraulic crossing locations are strategically located with the riparian corridors where there is some landscape cover that provides movement opportunities and can act as a funnel and linkage between foraging, breeding and denning areas. In this manner, the crossings for the HST are located in the most desirable locations within a somewhat constrained designated wildlife movement area. The riparian corridors in some cases also provide some topographic relief and coupled with the shrub/scrub layer and canopy, provide hiding places for wildlife with the active portions of the floodplain.

The distance between the crossings is shown in Appendix D of the *Merced to Fresno Section Biological Resources and Wetlands Technical Report* (Authority and FRA 2012a). The distance between crossings on the HST is important as concentrated crossing locations may prove valuable as an attractant and would provide more cover/opportunity in a focused area. Wildlife movement opportunities for drainage features would vary in quality among all HST alternatives. Both the number of crossings and their proximity to each other are important.

UPRR/SR 99 Alternative

North-South Alignment

The UPRR/SR 99 Alternative crosses the Eastman Lake – Bear Creek ECA near Mariposa Creek and Dutchman Creek north of the Harris-DeJager HMF site. The North-South alignment integrates the East Chowchilla design option. The Eastman Lake – Bear Creek ECA, formerly referred to as the Madera-Merced Linkage (Linkage 18 in Penrod et al. [2001]) and as the Sandy Mush Road corridor by ESRP (1999) and USFWS (1998), has been documented as a wildlife linkage. Linking the natural areas in the Sandy Mush Road area with the San Joaquin kit fox population east of SR 99 has been recommended as a recovery action by the USFWS (USFWS 1998).

In addition, the UPRR/SR 99 Alternative crosses other modeled wildlife corridors to the south potentially used by wildlife to move between habitat areas.

West Chowchilla Design Option

The portion of the West Chowchilla design option with the Ave 24 Wye habitat study area near SR 99 does not intersect the Eastman Lake – Bear Creek ECA or other modeled wildlife corridors potentially used by wildlife to move between habitat areas.

Fresno HST Station Alternatives

Within the habitat study area, the Fresno HST Station alternatives would not cross or intersect the Eastman Lake – Bear Creek ECA or other wildlife corridors potentially used by wildlife to move between habitat areas.

Ave 24 Wye

The Ave 24 Wye near SR 99 intersects a portion of the Eastman Lake-Bear Creek ECA to the north. However, the Ave 24 Wye habitat study area near SR 99 does not intersect with any other modeled wildlife corridors.

Ave 21 Wye

The Ave 21 Wye does not intersect the Eastman Lake – Bear Creek ECA or other modeled wildlife corridors.

BNSF Alternative

North-South Alignment

The BNSF Alternative crosses the Eastman Lake – Bear Creek ECA north of the Chowchilla River. In addition, the BNSF Alternative crosses other modeled wildlife corridors near the Berenda Slough and the Fresno River channels east of the Gordon-Shaw HMF site.

Le Grand Design Options

The Mariposa Way and Mission Ave east of Le Grand design options intersect the Eastman Lake – Bear Creek ECA near Mariposa Creek and Dutchman Creek. However, the Mariposa Way and Mission Ave East of Le Grand design options do not intersect with any other modeled wildlife corridors.

Fresno HST Station Alternatives

The Fresno HST station alternatives would not cross or intersect the Eastman Lake – Bear Creek ECA or other wildlife corridors potentially used by wildlife to move between habitat areas.

Ave 24 Wye

The Ave 24 Wye does not cross the Eastman Lake – Bear Creek ECA or other wildlife corridors potentially used by wildlife to move between habitat areas.

Ave 21 Wye

The Ave 21 Wye does not cross the Eastman Lake – Bear Creek ECA or other wildlife corridors potentially used by wildlife to move between habitat areas.

The Hybrid Alternative habitat study area crosses the Eastman Lake-Bear Creek ECA near Mariposa Creek and Dutchman Creek.

Heavy Maintenance Facilities Alternatives

The Harris-DeJager HMF site habitat study area is located largely within the Eastman Lake-Bear Creek ECA. The northern portion of the Kojima Development HMF site is within the Eastman Lake-Bear Creek ECA. The Castle Commerce Center, Fagundes, or Gordon-Shaw HMF sites do not cross or intersect the Eastman Lake-Bear Creek ECA.

3.7.5 Environmental Consequences

3.7.5.1 Overview

Under the No Project Alternative, existing development trends affecting biological resources are expected to continue and potentially further degrade some natural systems because development, such as new residential communities and transportation infrastructure, would convert undeveloped habitat to other uses. In addition, the developments would degrade remaining habitat through pollution, noise, and dust, and would threaten species with mortality from vehicle strikes and habitat fragmentation.

Construction of the HST alternatives and the HMF sites would affect biological resources, including plant communities and land cover types, special-status species, habitats of concern (including critical habitat), and wildlife movement corridors. The intensity of the effect from constructing the BNSF Alternative would have a moderate effect on critical habitat, while the other two HST alternatives would have no effect. The

intensity of the effect from construction of the Harris-DeJager site would have a negligible effect on the Eastman Lake-Bear Creek ECA, while the other four HMF sites would have no effect.

Project period impacts of the UPRR/SR 99, BNSF, and Hybrid alternatives would have adverse effects of moderate to substantial intensity on special-status plant communities and jurisdictional waters. All HMF sites would have adverse effects of moderate intensity on these same resources.

Project period impacts of the UPRR/SR 99, BNSF, and Hybrid alternatives would have adverse effects of moderate intensity on both special-status plants and special-status wildlife. The HMF sites may potentially have an effect of moderate intensity on special-status plants and wildlife because of the presence of suitable habitat.

The UPRR/SR 99 Alternative, BNSF Alternative, and the Hybrid Alternative would have adverse effects of moderate intensity on wildlife movement corridors, specifically within the Eastman Lake-Bear Creek ECA. The HST project incorporates permeable features, such as elevated rail, wildlife-dedicated crossing structures, road overcrossings over HST track, hydraulic crossings, and cross culverts into the project design. The Harris-DeJager HMF site would result in an effect with negligible intensity on the Eastman Lake – Bear Creek ECA. The Castle Commerce Center, Fagundes, Gordon-Shaw, and Kojima Development HMF sites would have no effect or an effect with negligible intensity on wildlife movement.

Construction of any of the HST or HMF alternatives would require permitting for adverse effects to jurisdictional waters under the federal CWA (Section 401 and 404), State Fish and Game Code (Streambed Alteration Agreement/Section 1600), CESA (2081 Incidental Take Permit), and federal ESA (Section 7). Under Section 7, the proposed project would require consultation with both NMFS for anadromous fishes and their habitats for the San Joaquin River crossing, and the USFWS for other federally listed species and their habitats. The Authority would prepare and issue a Resolution of Necessity and submit it to the Public Works Board as part of the right-of-way process.

3.7.5.2 No Project Alternative

Under the No Project Alternative, existing development trends affecting biological resources are expected to continue and potentially further degrade some natural systems. Expanded development in the region would continue to result in habitat loss, mortality from vehicle strikes, habitat degradation from pollution, noise and dust impacts on species and habitats, creation of barriers to wildlife movement, habitat fragmentation, and other indirect effects. These impacts will vary in intensity over time. Conservation planning and existing regulatory programs, such as the CWA and conservation programs (e.g., establishment of conservation easements and mitigation banks), are mechanisms for maintaining a degree of natural heritage, but some continual erosion of natural resources may be expected. Effects that are expected to continue to occur are as follows.

- Changes in crop production and rotation would continue to improve or degrade habitat conditions for species that forage or nest on farmland.
- Transportation agencies would implement programmed and funded improvements to the intercity transportation system through 2035 (see Section 3.2, Transportation). Needs would be satisfied by the existing and future statewide intercity transportation system based on programmed and funded improvements to the intercity transportation system through 2035 (see Section 3.2, Transportation). In some cases, widening existing corridors or constructing new improvements could result in additional impacts on biological resources. Each of these improvement projects would be subject to environmental impact analysis, evaluating the impacts of habitat loss, habitat degradation, and mortality (or “take”) of special-status species. Impacts on biological resources and jurisdictional waters would be mitigated as part of those projects, including avoidance of mortality during construction, minimization of impacts during construction and operation, restoration of disturbed sites, and preservation of compensatory habitat.
- Development pressure would continue in Merced, Madera, and Fresno counties (see Section 3.13, Station Planning, Land Use, and Development and Section 3.18, Regional Growth). Low-density

development on the urban fringe would likely continue and potentially result in the loss of habitat in these currently undeveloped areas, including high-value habitat such as wetlands and riparian areas. Current and future conservation easements on properties near urban boundaries would protect some areas. Impacts on biological resources and jurisdictional waters would be avoided, reduced, and, in accordance with permit requirements for the development projects, would be mitigated, including preservation of compensatory habitat and restoration of disturbed sites.

For example, some local projects that are in various stages of planning include the Mercy Medical Center in Merced, expanding the Jaxon Enterprise aggregate mining operation, University of Merced, and the Gateway Village Master Planned Community. These are examples of projects that would continue to have some impact on the wildlife, vernal pools, other seasonal wetlands, native vegetation, oak woodland, and nonnative grassland biological resources in the local areas between Fresno and Merced that contribute to impacts on wildlife, vernal pools, other seasonal wetlands, native vegetation, oak woodland, and nonnative grassland in the region.

In addition, the historical trend of converting native plant communities to agricultural production has compromised the biological complexity of the region. While the No Project Alternative does not propose changes that would directly contribute to the addition of the built environment, the loss of native plant communities would likely continue with the No Project Alternative. Foreseeable projects that are planned, committed, or are otherwise part of a general plan or specific plan would continue the trend of converting open spaces with native plant communities to more urban uses.

3.7.5.3 High-Speed Train Alternatives

This section describes the potential effects on biological resources for the HST alternatives. Mitigation measures for effects and impacts on biological resources are listed in Section 3.7.7. Most impacts associated with construction activities would result in temporary impacts, whereas activities during the project period would result in permanent impacts on biological resources. This section evaluates direct and indirect impacts that would result from both construction and operation of each HST alternative on biological resources. Biological resources are described below in four categories: (1) plant communities and land cover types, (2) special-status species, (3) habitats of concern, and (4) wildlife movement corridors.

Construction Period Impacts – Common Biological Resource Impacts

Sensitive biological resources occurring adjacent to the disturbance limits of the construction footprint are expected to incur direct and indirect impacts resulting from construction activities. These direct and indirect impacts from ground-disturbing activities would be common among all HST alternatives.

For temporary impacts during construction, some portions of the construction limits and activities would result in direct temporary losses of plant communities and land cover types and/or indirect effects, such as noise, motion, startle, and dust generation that would influence wildlife use of affected area(s). Since the construction activities are expected to be temporary and the area of impact for some portions of the construction limits may be restored to its original contour with some landscaping, the effect under NEPA would have moderate intensity in most cases. At any given location, construction could take more than one season. Due to the length of this schedule, temporary loss of plant communities and wildlife habitat, and the potential for wildlife avoidance, many of these impacts would be significant under CEQA.

Plant Communities and Land Cover Types

Developed areas and agricultural lands, ruderal vegetation, and eucalyptus woodlands are generally not productive habitat for most special-status species because they do not provide optimal living conditions most species require within their preferred natural setting. Agricultural lands have been cleared of native plant communities for intensive biomass production. As such, they are not emphasized as distinct biological resources. These open areas can provide suitable foraging habitat for wildlife species such as Swainson's hawk, burrowing owl, and kit fox. Agricultural habitat provides poor habitat for special-status plants due to frequent disturbance; however, isolated patches of disturbance adapted special-status

species have low potential for occurrence on field peripheries or undisturbed fragments. Where focused surveys were not conducted, suitable habitat for each species is presumed occupied for purposes of the impacts analysis. It is also important to recognize that although suitable habitat has been presumed occupied for terrestrial and aquatic communities, the habitat quality and location within the landscape may not be conducive to specific species requirements and there could be substantive areas/acres that are not occupied.

The following section emphasizes impacts related to Great Valley mixed riparian forest and other riparian habitat since they are also special-status plant communities. Vernal pools are also described briefly. Impacts associated with aquatic habitats are discussed under *Special-Status Plant Communities* and *Jurisdictional Waters*.

As noted above, nonnative trees also exist within the urban areas and represent a component of the urban forest as recognized in the *City of Merced Vision 2015 General Plan* (see Table 3.7-1, Local and Regional Laws and Regulations), which encourages the preservation of these open spaces. The preservation of the urban forest is a policy and includes a goal to preserve of urban forests. The direct removal of urban trees conflicts with this goal within the City of Merced.

Direct Impacts During Construction

Plant communities and land cover types that are assumed to be impacted directly during construction activities include vernal pools, other seasonal wetlands, and Great Valley mixed riparian forest and other riparian communities and land cover types. The following discussion of direct impacts during construction is focused on these native plant communities that occur within the construction footprint:

- *Vernal Pools and Other Seasonal Wetlands:* During the construction period, vernal pools and other seasonal wetlands that lie completely within the 100-foot permanent construction footprint within at-grade areas would be permanently and directly impacted by the Project. It is acknowledged that for the at-grade sections of the Project, the areas/resources outside the tracks that are not permanently underlain by fill in most cases are still permanently removed or physically altered. During the construction period, vernal pools and other seasonal wetlands that lie completely or partially within the 60-foot wide fill embankment within elevated segments would be directly and permanently impacted by the project. Pools or portions of pools within the remaining construction footprint (i.e., additional 20 feet on either side) of an elevated segment would be subjected to site preparation activities to support the elevated structure. There would be no permanent placement of fill within these outer portions of the construction footprint area within raised segments of the alignment.
- *Great Valley Mixed Riparian Forest and other riparian communities and land cover types:* Direct impacts on Great Valley mixed riparian forest and other riparian communities and land cover types would occur through removal of vegetation during construction activities within and adjacent to the construction footprint. Direct impacts would also occur from vehicular and construction-related traffic in the area disturbing the vegetation (i.e., trampling and crushing). Vegetation requiring removal solely to accommodate construction operations (temporary access roads, laydown areas, etc.) would be restored after construction activities are completed.

Indirect Impacts During Construction

Plant communities and land cover types that are assumed to be impacted indirectly during construction activities include vernal pools, other seasonal wetlands, and Great Valley mixed riparian forest and other riparian communities and land cover types. The following discussion of indirect impacts during construction is focused on these native plant communities that occur within the construction footprint:

- *Vernal Pools and Other Seasonal Wetlands:* Vernal pools and other seasonal wetlands that lie completely or partially within the 250-foot-radius buffer (i.e., indirect impact area) around project elements are expected to be indirectly and permanently impacted by construction activities. The vernal pools and other seasonal wetlands within the 250-foot-radius buffer may be potentially, indirectly impacted within the construction and project period by hydrological changes within the watershed. Indirect permanent impacts can be anticipated for the pools receiving flow from the



location of the construction footprint. Drilling, excavating or other activities that occur within the construction footprint would potentially alter surface and subsurface water flow within the watershed (hardpans, volume, flow direction, etc.) and increase sedimentation/pollution from the construction footprint.

- *Great Valley Mixed Riparian Forest and other riparian communities and land cover types:* Indirect impacts on Great Valley mixed riparian forest and other riparian communities would include: erosion, siltation, and drainage runoff; soil and water contamination from construction equipment leaks; construction-related dust that affects plants by reducing their photosynthetic capability (especially during flowering periods); invasion by exotic species; and an increased risk of fire (e.g., construction equipment use and smoking by construction workers) in adjacent open spaces.

UPRR/SR 99 Alternative

The UPRR/SR 99 Alternative footprint contains the following plant communities and land cover types: developed areas, agricultural lands, ruderal vegetation, California annual grassland, Great Valley mixed riparian forest, other riparian, vernal pools, other seasonal wetlands, Fremont cottonwood forested wetland, coastal and valley freshwater marsh, and natural and constructed watercourses. Direct construction period acreage numbers for terrestrial and aquatic communities potentially affected during the construction period of the UPRR/SR 99 Alternative can be found in Tables 3.7-5 and 3.7-6. Great Valley mixed riparian forest and other riparian habitat is considered a sensitive natural community due to its relative scarcity and importance in sustaining biological resources; as such, this habitat is regulated by the CDFG, USFWS, and USACE. Any impacts that result in reduction of riparian habitat values would have moderate intensity under NEPA and be significant under CEQA. As described in Section 3.7.4, some of these communities are special-status and are regulated or require mitigation because of their habitat value (e.g., Great Valley mixed riparian forest).

Because construction of the UPRR/SR 99 Alternative has the potential to adversely affect riparian habitat, other sensitive natural communities, and federally protected wetlands for reasons identified above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Table 3.7-5
 Terrestrial Communities Potentially Affected
 during the Construction Period of the UPRR/SR 99 Alternative (acres ^a)

UPRR/SR 99 Alternative	Developed Areas	Agricultural Lands	Ruderal Vegetation	California Annual Grassland	Great Valley Mixed Riparian Forest	Other Riparian	Eucalyptus Woodlands
Impacts by Project Combination							
West Chowchilla Design Option & Ave 24 Wye	106.57	316.22	41.88	3.69	3.54	0.73	--
East Chowchilla Design Option & Ave 24 Wye	117.20	367.69	44.18	3.69	4.58	0.76	0.01
East Chowchilla Design Option & Ave 21 Wye	123.19	319.74	48.62	3.93	4.31	0.43	0.21
Fresno Station Alternatives							
Mariposa Street Station	25.85	--	7.65	--	--	--	--
Kern Street Station	3.53	--	0.08	--	--	--	--
Total Range of Impacts ^b	110.10 to 149.04	316.22 to 367.69	41.96 to 56.27	3.69 to 3.93	3.54 to 4.58	0.43 to 0.76	0 to 0.21
All impacts were calculated based on the construction footprint design.							
^a All decimal values are presented to the hundredths place. Totals from 0.005 to 0.009 are therefore rounded to 0.01. Totals below 0.004 acre are therefore rounded to zero (0).							
^b Total range of impacts includes the least amount of habitat affected by the HST alternative to the most impact by the HST alternative.							
Source: Authority and FRA (2012a).							

Table 3.7-6
 Aquatic Communities Potentially Affected
 during the Construction Period of the UPRR/SR 99 Alternative (acres ^a)

UPRR/SR 99 Alternative	Vernal Pools ^b	Other Seasonal Wetlands ^b	Fremont Cottonwood Forested Wetlands	Coastal and Valley Freshwater Marsh	Natural Watercourses	Constructed Basins	Constructed Watercourses	Open waters ^b
Impacts by Project Combination								
West Chowchilla Design Option & Ave 24 Wye	NA	NA	2.01	--	6.00	1.19	3.04	NA
East Chowchilla Design Option & Ave 24 Wye	NA	NA	2.05	--	6.36	1.64	3.69	NA
East Chowchilla Design Option & Ave 21 Wye	NA	NA	2.06	--	6.20	1.12	3.87	NA
Fresno Station Alternatives								
Mariposa Street Station	NA	NA	--	--	--	--	--	NA
Kern Street Station	NA	NA	--	--	--	--	--	NA
Total Range of Impacts ^c	NA	NA	2.01 to 2.06	--	6.00 to 6.36	1.12 to 1.64	3.04 to 3.87	NA

All impacts were calculated based on the construction footprint design.

^a All decimal values are presented to the hundredths place. Totals from 0.005 to 0.009 are therefore rounded to 0.01. Totals below 0.004 acre are therefore rounded to zero (0).

^b Direct temporary impacts do not apply to vernal pools, seasonal wetlands, and open waters because of the difficulty in their restoration and return to pre-existing conditions. Any vernal pool, seasonal wetland, and open water feature that provides potentially suitable habitat for federally listed species located wholly or partially within the construction footprint is therefore considered to be directly affected. In addition, if any portion of a vernal pool, seasonal wetland, and open water feature is located within 250 feet of the project footprint, the entire feature is considered to be indirectly and permanently affected, even where a portion of the wetland feature extends beyond 250 feet from the project footprint.

^c Total range of impacts includes the least amount of habitat affected by the HST alternative to the most impact by the HST alternative.

The sum of Vernal Pools, Other Seasonal Wetlands, Fremont Cottonwood Forested Wetland, Coastal and Valley Freshwater Marsh, Natural Watercourses, Constructed Basins, and Constructed Watercourses represents potential impacts on jurisdictional waters.

Source: Authority and FRA (2012a).

BNSF Alternative

The BNSF Alternative footprint contains the following plant communities and land cover types: developed areas, agricultural lands, ruderal vegetation, California annual grassland, Great Valley mixed riparian forest, other riparian habitat, eucalyptus woodlands, vernal pools, other seasonal wetlands, coastal and valley freshwater marsh, and natural and constructed watercourses. Direct construction period acreage numbers for terrestrial and aquatic communities potentially affected during the construction period of the BNSF Alternative can be found in Tables 3.7-7 and 3.7-8. As described above, some of these communities are special-status and are regulated or require mitigation because of their habitat value (e.g., Great Valley mixed riparian forest). Great Valley mixed riparian forest and other riparian habitat is considered a sensitive natural community due to their relative scarcity and importance in sustaining biological

resources; as such, this habitat is regulated by the CDFG, USFWS, and USACE. Any impacts that result in reduction of riparian habitat values would have moderate intensity under NEPA and would be significant under CEQA.

Because construction of the BNSF Alternative has the potential to adversely affect riparian habitat, other sensitive natural communities, and federally protected wetlands for reasons identified above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Table 3.7-7
 Terrestrial Communities Potentially Affected
 during the Construction Period of the BNSF Alternative (acres ^a)

BNSF Alternative	Developed Areas	Agricultural Lands	Ruderal Vegetation	California Annual Grassland	Great Valley Mixed Riparian Forest	Other Riparian	Eucalyptus Woodlands
Impacts by Project Combination							
BNSF north - south alignment with Ave 24 Wye	92.77	287.25	32.85	3.68	2.09	0.34	0.06
BNSF north - south alignment Ave with 21 Wye	67.56	154.96	41.54	4.96	1.65	0.50	0.02
Le Grand Design Options							
Mission Ave	12.83	54.08	3.57	16.48	0.10	--	--
Mission Ave East of Le Grand	10.43	66.04	6.56	16.47	0.23	--	0.55
Mariposa Way	17.43	60.78	20.36	20.16	0.61	0.38	--
Mariposa Way East of Le Grand	8.37	69.07	3.04	26.48	0.81	0.38	0.14
Fresno Station Alternatives							
Mariposa Street Station	25.85	--	7.65	--	--	--	--
Kern Street Station	3.53	--	0.08	--	--	--	--
Impact of Components Combined ^b							
BNSF Alternative, Ave 24 Wye	104.67 to 136.05	341.33 to 356.32	35.97 to 60.86	20.15 to 30.16	2.19 to 2.90	0.34 to 0.72	0.06 to 0.61
BNSF Alternative, Ave 21 Wye	79.46 to 110.84	209.04 to 224.03	44.66 to 69.55	21.43 to 31.44	1.75 to 2.46	0.50 to 0.88	0.02 to 0.57
Total Range of Impact ^b	79.46 to 136.05	209.04 to 356.32	35.97 to 69.55	20.15 to 31.44	1.75 to 2.90	0.34 to 0.88	0.02 to 0.61

All impacts were calculated based on the construction footprint design.

^a All decimal values are presented to the hundredths place. Totals from 0.005 to 0.009 are therefore rounded to 0.01. Totals below 0.004 acre are therefore rounded to zero (0).

^b Total range of impacts includes the least amount of habitat affected by the HST alternative to the most impact by the HST alternative.

Source: Authority and FRA (2012a).

Table 3.7-8
 Aquatic Communities Potentially Affected
 during the Construction Period of the BNSF Alternative (acres ^a)

BNSF Alternative	Vernal Pools ^b	Other Seasonal Wetlands ^b	Fremont Cottonwood Forested Wetlands	Coastal and Valley Freshwater Marsh	Natural Watercourses	Constructed Basins	Constructed Watercourses	Open waters ^b
Impacts by Project Combination								
BNSF north - south alignment with Ave 24 Wye	NA	NA	--	0.03	5.22	0.65	1.32	NA
BNSF north - south alignment Ave with 21 Wye	NA	NA	--	0.04	4.72	0.16	0.46	NA
Le Grand Design Options								
Mission Ave	NA	NA	0.06	--	0.21	0.13	0.71	NA
Mission Ave East of Le Grand	NA	NA	0.27	--	0.23	0.13	0.87	NA
Mariposa Way	NA	NA	0.28	--	0.64	0.03	0.47	NA
Mariposa Way East of Le Grand	NA	NA	0.32	--	0.87	--	0.48	NA
Fresno Station Alternatives								
Mariposa Street Station	NA	NA	--	--	--	--	--	NA
Kern Street Station	NA	NA	--	--	--	--	--	NA
Impact of Components Combined ^c								
BNSF Alternative, Ave 24	NA	NA	0.06 to 0.32	0.03	5.43 to 6.09	0.65 to 0.78	1.79 to 2.19	NA
BNSF Alternative, Ave 21	NA	NA	0.06 to 0.32	0.04	4.93 to 5.59	0.16 to 0.29	0.93 to 1.33	NA
Total Range of Impact^c	NA	NA	0.06 to 0.32	0.03 to 0.04	4.93 to 6.09	0.16 to 0.78	0.93 to 2.19	NA

All impacts were calculated based on the construction footprint design.

^a All decimal values are presented to the hundredths place. Totals from 0.005 to 0.009 are therefore rounded to 0.01. Totals below 0.004 acre are therefore rounded to zero (0).

^b Direct temporary impacts do not apply to vernal pools, seasonal wetlands, and open waters because of the difficulty in their restoration and return to pre-existing conditions. Any vernal pool, seasonal wetland, and open water feature that provides potentially suitable habitat for federally listed species located wholly or partially within the construction footprint is therefore considered to be directly affected. In addition, if any portion of a vernal pool, seasonal wetland, and open water feature is located within 250 feet of the project footprint, the entire feature is considered to be indirectly and permanently affected, even where a portion of the wetland feature extends beyond 250 feet from the project footprint.

BNSF Alternative	Vernal Pools ^b	Other Seasonal Wetlands ^b	Fremont Cottonwood Forested Wetlands	Coastal and Valley Freshwater Marsh	Natural Watercourses	Constructed Basins	Constructed Watercourses	Open waters ^b
<p>^c Total range of impacts includes the least amount of habitat affected by the HST alternative to the most impact by the HST alternative.</p> <p>The sum of Vernal Pools, Other Seasonal Wetlands, Fremont Cottonwood Forested Wetland, Coastal and Valley Freshwater Marsh, Natural Watercourses, Constructed Basins, and Constructed Watercourses represents potential impacts on jurisdictional waters.</p> <p>Source: Authority and FRA (2012a).</p>								

Hybrid Alternative

The footprint for the Hybrid Alternative contains the following plant communities and land cover types: developed areas, agricultural lands, ruderal vegetation, California annual grassland, Great Valley mixed riparian forest, other riparian habitat, eucalyptus woods, vernal pools, other seasonal wetlands, Fremont cottonwood forested wetland, coastal and valley freshwater marsh, and natural and constructed watercourses. Direct construction period acreage numbers for terrestrial and aquatic communities potentially affected during the construction period of the Hybrid Alternative can be found in Tables 3.7-9 and 3.7-10. As described above, some of these communities are special-status and are regulated or require mitigation because of their habitat value (e.g., Great Valley mixed riparian forest). Great Valley mixed riparian forest and other riparian habitat is considered a sensitive natural community due to its relative scarcity and importance in sustaining biological resources; as such, this habitat is regulated by the CDFG, USFWS, and USACE. Any substantive impacts that result in reduction of riparian habitat values would have moderate intensity under NEPA and would be significant under CEQA.

Because construction of the Hybrid Alternative has the potential to adversely affect riparian habitat, other sensitive natural communities, and federally protected wetlands for reasons identified above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Table 3.7-9
 Terrestrial Communities Potentially Affected
 during the Construction Period of the Hybrid Alternative (acres ^a)

Hybrid Alternative	Developed Areas	Agricultural Lands	Ruderal Vegetation	California Annual Grassland	Great Valley Mixed Riparian Forest	Other Riparian	Eucalyptus Woodlands
Impacts by Project Combination							
Hybrid Alignment with Ave 24 Wye	81.95	312.78	28.32	3.69	3.62	0.52	--
Hybrid Alignment with Ave 21 Wye	98.96	285.06	37.85	3.93	4.07	0.23	0.21
Fresno Station Alternatives							
Mariposa Street Station	25.85	--	7.65	--	--	--	--
Kern Street Station	3.53	--	0.08	--	--	--	--
Total Range of Impacts ^b	85.48 to 124.81	285.06 to 312.78	28.40 to 45.50	3.69 to 3.93	3.62 to 4.07	0.23 to 0.52	0 to 0.21
All impacts were calculated based on the construction footprint design. ^a All decimal values are presented to the hundredths place. Totals from 0.005 to 0.009 are therefore rounded to 0.01. Totals below 0.004 acre are therefore rounded to zero (0). ^b Total range of impacts includes the least amount of habitat affected by the HST alternative to the most impact by the HST alternative. Source: Authority and FRA (2012a).							

Table 3.7-10
 Aquatic Communities Potentially Affected
 during the Construction Period of the Hybrid Alternative (acres ^a)

Hybrid Alternative	Vernal Pools ^b	Other Seasonal Wetlands ^b	Fremont Cottonwood Forested Wetlands	Coastal and Valley Freshwater Marsh	Natural Watercourses	Constructed Basins	Constructed Watercourses	Open waters ^b
Impacts by Project Combination								
Hybrid North-South Alignment with Ave 24 Wye	NA	NA	1.50	--	5.92	1.10	2.81	NA
Hybrid North-South Alignment with Ave 21 Wye	NA	NA	1.64	--	5.93	0.47	3.78	NA
Fresno Station Alternatives								
Mariposa Street Station	NA	NA	--	--	--	--	--	NA
Kern Street Station	NA	NA	--	--	--	--	--	NA
Total Range of Impacts ^c	NA	NA	1.50 to 1.64	--	5.92 to 5.93	0.47 to 1.10	2.81 to 3.78	NA

All impacts were calculated based on the construction footprint design.

^a All decimal values are presented to the hundredths place. Totals from 0.005 to 0.009 are therefore rounded to 0.01. Totals below 0.004 acre are therefore rounded to zero (0).

^b Direct temporary impacts do not apply to vernal pools, seasonal wetlands, and open waters because of the difficulty in their restoration and return to pre-existing conditions. Any vernal pool, seasonal wetland, and open water feature that provides potentially suitable habitat for federally listed species located wholly or partially within the construction footprint is therefore considered to be directly affected. In addition, if any portion of a vernal pool, seasonal wetland, and open water feature is located within 250 feet of the project footprint, the entire feature is considered to be indirectly and permanently affected, even where a portion of the wetland feature extends beyond 250 feet from the project footprint.

^c Total range of impacts includes the least amount of habitat affected by the HST alternative to the most impact by the HST alternative.

The sum of Vernal Pools, Other Seasonal Wetlands, Fremont Cottonwood Forested Wetland, Coastal and Valley Freshwater Marsh, Natural Watercourses, Constructed Basins, and Constructed Watercourses represents potential impacts on jurisdictional waters.

Source: Authority and FRA (2012a).

Heavy Maintenance Facility Alternatives

Direct temporary acreage numbers for terrestrial and aquatic communities potentially affected during the construction period of all HMF alternatives can be found in Tables 3.7-11 and 3.7-12.

Castle Commerce Center HMF: The Castle Commerce Center HMF site contains the following plant communities and land cover types: developed areas, agricultural lands, ruderal vegetation, Great Valley mixed riparian forest, other riparian habitat, eucalyptus woodlands, Fremont cottonwood forested wetland, and natural and constructed watercourses. Great Valley mixed riparian forest and other riparian habitat is considered a sensitive natural community due to its relative scarcity and importance in sustaining biological resources; as such, this habitat is regulated by the CDFG, USFWS, and USACE. Any substantive impacts that result in reduction of riparian habitat values would have moderate intensity under NEPA and would be significant under CEQA.

Table 3.7-11
 Terrestrial Communities Potentially Affected
 during the Construction Period of the HMF Alternatives (acres ^a)

HMF Alternatives	Developed Areas	Agricultural Lands	Ruderal Vegetation	California Annual Grassland	Great Valley Mixed Riparian Forest	Other Riparian	Eucalyptus Woodlands
Castle Commerce Center	28.92	5.98	8.26	--	0.07	0.46	0.44
Harris-DeJager	--	0.28	0.66	--	--	--	--
Fagundes	0.85	3.70	--	--	--	--	--
Gordon -Shaw	--	0.40	--	--	--	--	--
Kojima Development	--	18.96	0.54	0.35	0.17	--	--

All impacts were calculated based on the construction footprint design.
^a All decimal values are presented to the hundredths place. Totals from 0.005 to 0.009 are therefore rounded to 0.01. Totals below 0.004 acre are therefore rounded to zero (0).
 Source: Authority and FRA (2012a).

Table 3.7-12
 Aquatic Communities Potentially Affected
 during the Construction Period of the HMF Alternatives (acres ^a)

HMF Alternatives	Vernal Pools	Other Seasonal Wetlands	Fremont Cottonwood Forested Wetlands	Coastal and Valley Freshwater Marsh	Natural Watercourses	Constructed Basins	Constructed Watercourses	Open waters
Castle Commerce Center	NA	NA	0.08	--	0.17	0.20	0.02	NA
Harris-DeJager	NA	NA	--	--	--	--	--	NA
Fagundes	NA	NA	--	--	--	--	0.05	NA
Gordon-Shaw	NA	NA	--	--	0.14	--	--	NA
Kojima Development	NA	NA	--	0.19	0.18	--	--	NA

All impacts were calculated based on the construction footprint design.
^a All decimal values are presented to the hundredths place. Totals from 0.005 to 0.009 are therefore rounded to 0.01. Totals below 0.004 acre are therefore rounded to zero (0).
 The sum of Vernal Pools, Other Seasonal Wetlands, Fremont Cottonwood Forested Wetland, Coastal and Valley Freshwater Marsh, Natural Watercourses, Constructed Basins, and Constructed Watercourses represents potential impacts on jurisdictional waters.
 Source: Authority and FRA(2012a).

Because construction of the Castle Commerce Center HMF has the potential to adversely affect riparian habitat and other sensitive natural communities for reasons identified above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Harris-DeJager HMF: The Harris-DeJager HMF site does not contain riparian habitat, other sensitive natural communities, or federally protected wetlands. Because there is no riparian habitat, other sensitive natural communities, or federally protected wetlands within the Harris-DeJager HMF, there would be no effect under NEPA and no impact under CEQA.

Fagundes HMF: The Fagundes HMF does not contain riparian habitat, other sensitive natural communities, or federally protected wetlands. Because there is no riparian habitat, other sensitive natural communities, or federally protected wetlands within the Fagundes HMF, there would be no effect under NEPA and no impact under CEQA.

Gordon-Shaw HMF: The Gordon-Shaw HMF site contains agricultural lands, coastal and valley freshwater marsh and natural watercourses.

Because construction of the Gordon-Shaw HMF has the potential to adversely affect federally protected wetlands for reasons described below in the *Special-Status Plant Communities* and *Jurisdictional Waters* subsection, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Kojima Development HMF: The Kojima Development HMF site contains the following plant communities and land cover types: agricultural lands, ruderal vegetation, California annual grassland, Great Valley mixed riparian forest, vernal pools, other seasonal wetlands, coastal and valley freshwater marsh and natural watercourses. Great Valley mixed riparian forest and other riparian habitat is considered a sensitive natural community due to its relative scarcity and importance in sustaining biological resources; as such, this habitat is regulated by the CDFG, USFWS, and USACE. The impacts that result in reduction of riparian habitat values would have moderate intensity under NEPA and would be significant under CEQA.

Because construction of the Kojima Development HMF has the potential to adversely affect riparian habitat, other sensitive natural communities, and federally protected wetlands for reasons identified above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Special-Status Plant Species

Thirty-six special-status plant species were determined to have the potential to occur across all HST alternatives. Appendix 3.7-A, Attachments 1 and 2, lists these species and discusses their potential for occurrence within each HST alternative. Where property access was granted, focused special-status plant surveys were conducted. Where property access was not granted, the determinations of effects to special-status plants reflect the liberal approach that if suitable habitat was determined to be present, then the special-status plant species associated with that habitat were also assumed to be present.

Direct Impacts During Construction

Direct impacts on special-status plant species may occur as a result of construction crews removing vegetation within and adjacent to the construction footprint, and from construction vehicles and personnel in the area disturbing the vegetation (i.e., trampling and crushing). Appendix 3.7-B provides a range of potential impacts in acres to special-status plant species based on the specific affinity each species has to plant communities and land cover types, identified within the study area. Vegetation removed to accommodate construction operations (access, laydown area, etc.) would be restored after construction activities are completed. Mitigation measures are discussed in Section 3.7.7.

Vernal pools and other seasonal wetlands support special-status plant species, including those listed by the USFWS as threatened or endangered under the federal ESA. Vernal pools that lie completely within the construction footprint, and those that lie partially within the construction footprint and partially within the wetland study area, are considered to be directly and permanently impacted.

Indirect Impacts During Construction

Indirect impacts on special-status plant species would potentially include: erosion, siltation, and runoff into natural and constructed watercourses; soil and water contamination from construction equipment leaks; construction-related dust affecting plants by reducing their photosynthetic capability (especially during flowering periods); and an increased risk of fire (e.g., construction equipment use and smoking by construction workers) in adjacent open spaces. Because of the reasons listed below, indirect impacts would have moderate intensity under NEPA and would be significant under CEQA.

Vernal pools that lie completely within the wetland study area, and those that lie partially within the wetland study area and partially within the habitat study area, are considered to be indirectly and permanently impacted.

UPRR/SR 99 Alternative

All suitable habitats for special-status plants are assumed to be occupied by populations of special-status plants. Special-status plant populations are regulated by both CDFG and USFWS. The loss of habitat could impair the survival of self-sustaining populations. Consequently, the impact of the potential loss of habitat would have moderate intensity under NEPA and would be significant under CEQA.

Because construction of the UPRR/SR 99 Alternative has the potential to result in the temporary loss of or damage to all 36 special-status plant species and their habitats for reasons identified above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

BNSF Alternative

All suitable habitats for special-status plants are assumed to be occupied by populations of special-status plants. Special-status plant populations are regulated by both CDFG and USFWS. The loss of habitat could impair the survival of self-sustaining populations. Consequently, the impact of the potential loss of habitat would have moderate intensity under NEPA and would be significant under CEQA.

Because construction of the BNSF Alternative has the potential to result in the temporary loss of or damage to all 36 special-status plant species and their habitats for reasons identified above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Hybrid Alternative

All suitable habitats for special-status plants are assumed to be occupied by populations of special-status plants. Special-status plant populations are regulated by both CDFG and USFWS. The loss of habitat could impair the survival of self-sustaining populations. Consequently, the impact of the potential loss of habitat would have moderate intensity under NEPA and would be significant under CEQA.

Because construction of the Hybrid Alternative has the potential to result in the temporary loss of or damage to all 36 special-status plant species and their habitats for reasons identified above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Heavy Maintenance Facility Alternatives

Castle Commerce Center HMF: All suitable habitats for special-status plants are assumed to be occupied by populations of special-status plants. Special-status plant populations are regulated by both CDFG and USFWS. The loss of habitat could impair the survival of self-sustaining populations. Consequently, the impact of the potential loss of habitat would have moderate intensity under NEPA and would be significant under CEQA.

Because construction of the Castle Commerce Center HMF has the potential to result in the loss of or damage to 31 special-status plant species and their habitats for reasons identified above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Habitat known to support the other five special-status plant species (Hartweg's golden sunburst, caper-fruited tropidocarpum, subtle orache, Merced phacelia, and palmate-bracted bird's-beak) is not present

within the Castle Commerce Center HMF. Therefore, these five special-status plant species and their habitats would not be affected by this HMF alternative.

Harris-DeJager HMF: All suitable habitats for special-status plants are assumed to be occupied by populations of special-status plants. Special-status plant populations are regulated by both CDFG and USFWS. The loss of habitat could impair the survival of self-sustaining populations. Consequently, the impact of the potential loss of habitat would have moderate intensity under NEPA and would be significant under CEQA.

Because construction of the Harris-DeJager HMF has the potential to result in the loss of or damage to four special-status plant species (Coulter's goldfields, Wright's trichocoronis, Keck's checkerbloom, and beaked clarkia) and their habitats for reasons identified above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Habitat known to support the other 32 special-status plant species is not present within the Harris-DeJager HMF site. Therefore, these 32 special-status plant species would not be affected by this HMF alternative.

Fagundes HMF: All suitable habitats for special-status plants are assumed to be occupied by populations of special-status plants. Special-status plant populations are regulated by both CDFG and USFWS. The loss of habitat could impair the survival of self-sustaining populations. Consequently, the impact of the potential loss of habitat would have moderate intensity under NEPA and would be significant under CEQA.

Because construction of the Fagundes HMF has the potential to result in the loss of or damage to six special-status plant species (Sanford's arrowhead, Coulter's goldfields, Wright's trichocoronis, Keck's checkerbloom, beaked clarkia, and California satintail) and their habitats for reasons identified above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Habitat known to support the other 30 special-status plant species is not present within the Fagundes HMF. Therefore, these 30 other special-status plant species and their habitats would not be affected by this HMF alternative.

Gordon-Shaw HMF: All suitable habitats for special-status plants are assumed to be occupied by populations of special-status plants. Special-status plant populations are regulated by both CDFG and USFWS. The loss of habitat could impair the survival of self-sustaining populations. Consequently, the impact of the potential loss of habitat would have moderate intensity under NEPA and would be significant under CEQA.

Because construction of the Gordon-Shaw HMF has the potential to result in the loss of or damage to all 36 special-status plant species and their habitats for reasons identified above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Kojima Development HMF: All suitable habitats for special-status plants are assumed to be occupied by populations of special-status plants. Special-status plant populations are regulated by both CDFG and USFWS. The loss of habitat could impair the survival of self-sustaining populations. Consequently, the impact of the potential loss of habitat would have moderate intensity under NEPA and would be significant under CEQA.

Because construction of the Kojima Development HMF has the potential to result in the loss of or damage to all 36 special-status plant species and their habitats for reasons identified above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Native Wildlife

The temporary and permanent impacts on non-designated wildlife resources (i.e., those not protected under state or federal law) would be similar to those affecting special-status wildlife species. Construction impacts would occur due to site preparation activities and the removal and/or clearing of native and

nonnative plant communities. Direct impacts on wildlife populations would include the physical loss of suitable habitat, mortality of individuals, and population fragmentation from site clearing, grubbing, grading, and road construction. Direct impacts would result from both permanent (long-term) and temporary (short-term) activities. They would include habitat degradation, fragmentation, or modification. Potential indirect or long-term impacts would include water quality impacts, noise impacts, population fragmentation, and habitat degradation. Indirect impacts on wildlife would include the displacement of individuals, habitat modification, as well as increased rates of competition and mortality. Each build alternative has the potential to fragment populations of amphibians, reptiles, and small- to medium-sized mammals, reducing population heterogeneity and dispersal opportunities.

Construction of an alternative would affect reptiles and amphibians by removing breeding sites and upland foraging habitat(s). Plant communities and other cover types of value to amphibian and reptile communities include vernal pools, other seasonal wetlands, Great Valley mixed riparian forest, other riparian and adjacent ruderal vegetation, and California annual grassland.

Removal of plant communities and other cover types would affect foraging and breeding opportunities for passerines, shorebirds, waterfowl, and raptors. Declines of California raptors are directly related to declines in upland and riparian habitats (Shuford and Gardali 2008). Vernal pools and other seasonal wetlands are important foraging habitats for migrating waterfowl such as Northern shoveler (*Anas clypeata*) and shorebirds such as lesser yellowlegs (*Tringa flavipes*).

Both migratory and resident birds would be affected by the removal of plant communities and land cover types found within the construction footprint. Direct impacts on birds would consist of mortality and the alteration of both daily and seasonal movement patterns.

The removal of plant communities and other land cover types would affect small- to medium-size mammals by eliminating food sources and breeding sites and altering daily movement patterns. Loss of habitat would cause the displacement and mortality of individual small- to medium-size mammals. Construction would traverse a number of riparian corridors that are pivotal in facilitating local and regional wildlife movement patterns.

Potential effects on aquatic organisms such as fish, mollusks, crustaceans, and amphibians include direct mortality, sedimentation and siltation, increased turbidity, and the removal of riparian habitat. Potential effects on terrestrial organisms such as mammals, birds, reptiles, and insects include direct mortality, modification or removal of habitat, and the fragmentation of formerly contiguous habitat. Mitigation designed for special-status species specified in the EIR/EIS would also benefit non-protected species.

Special-Status Wildlife Species

Special-status plant communities and land cover types located in the construction footprint have the potential to support a variety of special-status wildlife species. Construction activities have the potential to disturb the life cycles of these special-status species. The following section discusses impacts, direct and indirect, to special-status wildlife species resulting from construction activities.

The presence of and potential for special-status wildlife species to occur in a particular habitat is linked to the physical characteristics of the landscape. For instance, amphibians require standing water to complete their life cycle. However, terrestrial species may be linked to aquatic resources for a limited time during their breeding season and may spend significant amounts of time away from aquatic resources. No focused surveys were conducted for special-status wildlife species. Suitable habitat for each species was presumed occupied for purposes of the impacts analysis. It is also important to recognize that although suitable habitat has been presumed occupied for terrestrial and aquatic communities, the habitat quality and location within the landscape may not be conducive to specific species requirements and there could be substantive areas/acres that are not occupied (see Section 3.7.3). Appendix 3.7-B provides a range of potential impacts in acres to special-status wildlife species based on the specific affinity each species has to plant communities and land cover types, identified within the study area. Incidental wildlife observations during field activities were noted and included in

the *Merced to Fresno Section Biological Resources and Wetlands Technical Report* (Authority and FRA 2012a).

Direct Impacts During Construction

Vernal pools and other seasonal wetlands support special-status wildlife species, including those listed or proposed for listing by the USFWS as threatened or endangered under the federal ESA. Vernal pools that that lie completely within the construction footprint, and those that lie partially within the construction footprint and partially within the wetland study area, are considered to be directly and permanently impacted.

Invertebrates: Direct impacts during construction on vernal pool branchiopods (Conservancy fairy shrimp, vernal pool tadpole shrimp, and vernal pool fairy shrimp) would include changes in the retention/ infiltration of runoff, disturbance of the hardpan, and potential increase in siltation and turbidity from grading, vehicle traffic, contaminants, and other related ground-disturbing activities. Construction impacts can alter the watershed of specific vernal pools and other seasonal wetlands, which in turn would alter seasonal inundation conditions. Valley elderberry longhorn beetles can be directly affected through the damage or removal of Mexican elderberry host plants. Removal of young Mexican elderberry shrubs would reduce the long-term habitat of the valley elderberry longhorn beetle by inhibiting recruitment of young Mexican elderberry shrubs into the canopy.

Aestivation

Species such as amphibians and reptiles "aestivate" during periods of high heat or drought. Essentially, they become dormant or sleep, slowing their body processes down to escape the stressful conditions.

Amphibians: Direct impacts on amphibian species (including California tiger salamander and western spadefoot toad) are similar to those described for vernal pool branchiopods. The removal of California annual grassland adjacent to vernal pools and other seasonal wetlands could directly affect the foraging and aestivation of these special-status amphibians.

Reptiles: Direct impacts on reptiles (including western pond turtle) during construction would be the same as for invertebrates and amphibians.

Fish: Direct impacts on special-status fish (including Kern brook lamprey, Central Valley steelhead, Central Valley spring-run Chinook salmon [fall/late fall-run evolutionary significant unit (ESU)], hardhead, and San Joaquin roach) consist of physical disturbance, interruptions to fish passage, sedimentation, turbidity, altered water temperatures, oxygen depletion, and exposure to contaminants. Overhanging vegetation, undercut banks, logs, and other streamside features provide cover for fish. These types of cover and in-stream habitats would be disturbed by clearing and the installation of cofferdams during construction, resulting in decreased shading, increased water temperatures, and displacement of fish. However, streamside clearing would be localized. Two approaches to bridge crossing design are presented in Section 3.7.6. Construction would require work activities to be conducted below the ordinary high water mark.

Birds (includes native birds covered under MBTA): Thirty-seven special-status bird species listed in Appendix 3.7-A, Attachment 2, have been identified as having a moderate or higher potential to occur within the project vicinity. Burrowing owls and other raptors extensively use agricultural lands, vineyard, and pasture land cover types, and are discussed in detail below.

Construction activities (e.g., grubbing, grading, excavation, and driving off-road) could remove or disturb potential nesting habitat for migratory birds. If construction occurs during the breeding season (February 1 to September 1), active nests could also be disturbed, potentially causing the loss of eggs or developing young. While construction activities would not substantially reduce habitat available for these species, restrict their range, or cause their regional populations to drop below self-sustaining levels, the direct or indirect loss of nests through physical removal, nest abandonment, or reproductive suppression of these regionally rare species would constitute an impact with moderate intensity under NEPA and a significant impact under CEQA.

- **Burrowing Owls:** Burrowing owls extensively use open landscapes with suitable artificial or natural burrows. Suitable habitat exists along the majority of the right-of-way. Vibration from construction equipment along with increased vehicular traffic could collapse inhabited burrows. Rodent control programs can directly poison owls as well as reduce the long-term availability of burrows.
- **Other Raptors:** Raptors nest in exposed sites within riparian habitat, roadside trees, windbreaks, oak woodlands, and power lines. Several species were identified within the survey area, including Swainson's hawks. Construction disturbance within the February 1 to September 1 breeding season could result in the loss of fertile eggs or nestlings through nest abandonment. Direct impacts on raptors also include the loss of breeding and foraging habitat, as well as a decline in prey due to rodent control programs.

Mammals: Construction activities described above also have the potential to affect special-status mammals, including San Joaquin kit fox, special-status bats, and American badger.

- **Western mastiff bat, western red bat, and pallid bat:** Increased lighting after sunset would disrupt foraging activities by special-status bat species, causing them to leave an area that has prolonged disturbance. Nocturnal insects are drawn by lighting, which in turn attracts foraging bats. Special-status bats that are attracted to lighted construction areas would have higher potential mortality through disorientation and impacts with construction equipment. Direct impacts on bats would include mortality of individuals during construction and temporary disturbances from noise, dust, and ultrasonic vibrations from construction equipment.
- **San Joaquin kit fox:** Impacts on San Joaquin kit foxes would occur since this species has the potential to actively use the construction footprint and adjacent areas. Kit fox are highly variable in their behavior in the vicinity of rural areas, urban areas and generally within active construction zones. Some fox would avoid lights, motion, noise, and other startle activities that elicit a negative response and avoidance of the area; however, there are instances where kit fox may use the construction footprint as behavior is highly variable.
- **American badger:** Direct impacts on American badgers would occur from construction equipment crushing burrows as well as vehicle strikes on access roads. Temporary impacts on American badgers would occur from noise, dust, and motion disturbance.

Indirect Impacts During Construction

Vernal pools that lie completely within the wetland study area, and those that lie partially within the wetland study area and partially within the habitat study area, are considered to be indirectly and permanently impacted.

Invertebrates: Indirect impacts would result from the upslope disturbance and stockpiling of soils contributing to the transportation of sediment loads to adjacent special-status plant communities. Changes in the contour of the landscape would cause changes in the hydrological cycles of vernal pools and other seasonal wetlands. Chemical spills from construction equipment (e.g., fuel, transmission fluid, lubricating oil, and motor oil) could contaminate the water column, resulting in mortality or reduced reproductive success of vernal pool branchiopods. Indirect impacts on vernal pool branchiopods may also include the shading of pools by structures and the inadvertent introduction of nonnative invasive (noxious) weeds such as yellow star thistle (*Centaureum solstitialis*). For valley elderberry longhorn beetle, indirect impacts during construction could include the accumulation of fugitive dust on Mexican elderberry host plants, potentially weakening their vigor. In addition, changes to local runoff could have some negative effects on the health and vigor of these plants.

Amphibians/Reptiles/Fish: Indirect construction impacts for vernal pool branchiopods are applicable to amphibians, reptiles, and fish.

Birds (includes all migratory birds covered under MBTA): Indirect impacts would occur when breeding birds temporarily or permanently leave their nesting territories to avoid disturbance from construction

activities. Repeated exposure to disturbance can reduce reproductive success and increase mortality through the exposure of nests to predators and the elements. Indirect impacts could result from construction vehicles traveling along the access road and repeatedly disturbing breeding birds

- Burrowing Owls: Indirect impacts would occur from the loss of habitat due to nonnative plant species, such as yellow star thistle, colonizing the area and a disruption of breeding activity by repeated disturbance from construction vehicles traveling along access roads.
- Raptors: Indirect impacts during construction on raptors would be the same as for all avian species.
- Mammals: Construction activities have the potential to affect special-status mammals, including San Joaquin kit fox, special-status bats, and American badger.
- Western mastiff bat, western red bat, and pallid bat: Indirect impacts would potentially occur from the removal of nursery roosts, including trees, buildings, etc. outside of the breeding season.
- San Joaquin kit fox: Indirect impacts would be the same as for other mammals.
- American badger: Indirect impacts would potentially include alteration of soils, such as compaction. Removal of ground dwelling prey species, such as ground squirrels, would affect food availability for badgers.

UPRR/SR 99 Alternative

Invertebrates: The UPRR/SR 99 Alternative contains a relatively small amount of vernal pools and other seasonal wetlands, including California annual grassland with soils suitable for vernal pools and other seasonal wetlands. Vernal pools and other seasonal wetlands provide habitat for Conservancy fairy shrimp, vernal pool fairy shrimp, and vernal tadpole fairy shrimp. Special-status invertebrates are regulated by the USFWS; the loss of suitable habitat could impair the survival of self-sustaining populations. The potential loss of suitable vernal habitat would result in the elimination of vernal pool invertebrate populations. Consequently, the impact of the potential loss of suitable habitat for vernal pool invertebrate would have moderate intensity under NEPA and would be significant under CEQA.

Because construction of the UPRR/SR 99 Alternative has the potential to result in the loss of suitable habitat for vernal pool invertebrates, the impact would have moderate intensity under NEPA and would be significant under CEQA.

The UPRR/SR 99 Alternative also contains populations of Mexican elderberry shrubs, specifically along the San Joaquin River area. Mexican elderberry shrubs with stem diameters of 2 to 8 inches are the larval host plant for the valley elderberry longhorn beetle. All habitats with elderberry shrubs are assumed to be occupied by the valley elderberry longhorn beetle. Populations of the valley elderberry longhorn beetle are regulated by USFWS; the loss of elderberry shrubs could impair the survival of self-sustaining populations. Consequently, the potential impact on suitable habitat for valley elderberry longhorn beetles would have moderate intensity under NEPA and would be significant under CEQA.

Because construction of the UPRR/SR 99 Alternative has the potential to result in the loss of suitable Mexican elderberry shrubs for the valley elderberry longhorn beetle and also generate airborne particulate deposition which would potentially affect this special-status insect temporarily, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Fish: The UPRR/SR 99 Alternative contains aquatic habitats (primarily along the San Joaquin River) known to support Kern brook lamprey, Central Valley steelhead, hardhead, and San Joaquin roach. Additionally, an experimental population of spring run Chinook salmon is being reintroduced in the San Joaquin River from the Friant Dam to the Merced River confluence as part of the San Joaquin River Restoration Program. Potential project impacts (i.e., indirect from runoff/water-quality related) could hinder the re-establishment of special-status fish along the San Joaquin River. The potential impacts are being considered during the project design. With the incorporation of best management practices (BMPs) coupled with the placement of piers at the San Joaquin River crossing, substantive impacts on special-

status fish and EFH are not expected during construction; impacts would therefore have negligible intensity under NEPA and would be less than significant under CEQA. Two approaches to bridge crossing design are presented in Section 3.7.6.

Amphibians: The UPRR/SR 99 Alternative contains suitable breeding and upland habitat for California tiger salamanders and western spadefoot toads. All suitable vernal pool and other seasonal wetland habitat with associated upland areas are assumed to be occupied by California tiger salamanders and western spadefoot toads. Populations of these special-status amphibians are regulated by both CDFG and USFWS; the loss of suitable breeding and upland habitat could impair the survival of self-sustaining populations. The potential impact on suitable habitat for California tiger salamanders and western spadefoot toads would have moderate intensity under NEPA and would be significant under CEQA.

Because construction of the UPRR/SR 99 Alternative would affect the plant communities and land cover types used by these special-status amphibians both directly and indirectly as described above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Reptiles: The UPRR/SR 99 Alternative contains suitable habitat for populations of western pond turtles. All suitable aquatic habitats are assumed to be occupied by western pond turtles. Populations of these special-status reptiles are regulated by CDFG; the loss of suitable habitat could impair the survival of self-sustaining populations. The potential impact on suitable habitat for western pond turtles would have moderate intensity under NEPA and would be significant under CEQA.

Because construction of the UPRR/SR 99 Alternative would affect the western pond turtle both directly and indirectly as described above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Birds (includes all native birds covered under MBTA): The UPRR/SR 99 Alternative contains a wide range of habitats known to support a diversity of birds. All suitable habitat is assumed to be occupied by special-status bird species. Populations of special-status birds are regulated by both CDFG and USFWS; the loss of suitable habitat could impair the survival of self-sustaining populations. The potential impact on suitable habitat for special-status birds would have moderate intensity under NEPA and would be significant under CEQA.

Because construction of the UPRR/SR 99 Alternative would affect these special-status birds both directly and indirectly as described above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Mammals: The UPRR/SR 99 Alternative contains California annual grassland and agricultural lands known to support American badger (California annual grassland only), San Joaquin kit fox, and special-status bats (also known to occur within trees and rocky outcrops). All suitable habitats are assumed to be occupied by special-status mammals. Populations of mammals are regulated by both the CDFG and USFWS; the loss of suitable habitat could impair the survival of self-sustaining populations. The potential impact on suitable habitat would have moderate intensity under NEPA and would be significant under CEQA.

Because construction of the UPRR/SR 99 Alternative would affect these special-status mammals both directly and indirectly as described above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

BNSF Alternative

Invertebrates: The BNSF Alternative contains a relatively small amount of vernal pools and other seasonal wetlands, including California annual grassland with soils suitable for vernal pools and other seasonal wetlands. Vernal pools and other seasonal wetlands provide habitat for Conservancy fairy shrimp, vernal pool fairy shrimp, and vernal tadpole fairy shrimp. Special-status invertebrates are regulated by the USFWS; the loss of suitable habitat could impair the survival of self-sustaining populations. The potential loss of suitable vernal habitat would result in the elimination of vernal pool invertebrate populations.

Consequently, the impact of the potential loss of suitable habitat for vernal pool invertebrate would have moderate intensity under NEPA and would be significant under CEQA.

Because construction of the BNSF Alternative has the potential to result in the loss of suitable habitat for vernal pool invertebrates, the impact would have moderate intensity under NEPA and would be significant under CEQA.

The BNSF Alternative also contains populations of Mexican elderberry shrubs, specifically along the San Joaquin River area. All habitats with elderberry shrubs are assumed to be occupied by the valley elderberry longhorn beetle. Populations of the valley elderberry longhorn beetle are regulated by USFWS; the loss of elderberry shrubs could impair the survival of self-sustaining populations. Consequently, the potential impact on suitable habitat for valley elderberry longhorn beetles would have moderate intensity under NEPA and would be significant under CEQA.

Because construction of the BNSF Alternative has the potential to result in the loss of suitable Mexican elderberry shrubs for the valley elderberry longhorn beetle and also generate airborne particulate deposition which would potentially affect this special-status insect temporarily, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Fish: The BNSF Alternative contains aquatic habitats (primarily along the San Joaquin River) known to support Kern brook lamprey, Central Valley steelhead, hardhead, and San Joaquin roach. Additionally, an experimental population of spring run Chinook salmon is being reintroduced within the San Joaquin River from the Friant Dam to the Merced River confluence as part of the San Joaquin River Restoration Program. Potential project impacts (i.e., indirect from runoff/water-quality related) could hinder the re-establishment of special-status fish along the San Joaquin River. The potential impacts are being considered during the project design. With the incorporation of BMPs coupled with the placement of piers at the San Joaquin River crossing, substantive impacts on EFH are not expected during construction. Impacts would therefore have negligible intensity under NEPA and would be less than significant under CEQA. Two approaches to bridge crossing design are presented in Section 3.7.6.

Amphibians: The BNSF Alternative contains suitable breeding and upland habitat for California tiger salamanders and western spadefoot toads. All suitable vernal pool and other seasonal wetland habitat with associated upland areas are assumed to be occupied by California tiger salamanders and western spadefoot toads. Populations of these special-status amphibians are regulated by both CDFG and USFWS; the loss of suitable breeding and upland habitat could impair the survival of self-sustaining populations. The potential impact on suitable habitat for California tiger salamanders and western spadefoot toads would have moderate intensity under NEPA and would be significant under CEQA.

Because construction of the BNSF Alternative would affect the plant communities and land cover types used by these special-status amphibians both directly and indirectly as described above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Reptiles: The BNSF Alternative contains suitable habitat for populations of western pond turtles. All suitable aquatic habitats are assumed to be occupied by western pond turtles. Populations of these special-status reptiles are regulated by CDFG; the loss of suitable habitat could impair the survival of self-sustaining populations. The potential impact on suitable habitat for western pond turtles would have moderate intensity under NEPA and would be significant under CEQA.

Because construction of the BNSF Alternative would affect the western pond turtle both directly and indirectly as described above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Birds (includes all native birds covered under MBTA): The BNSF Alternative contains a wide range of habitats known to support a diversity of birds. All suitable habitat is assumed to be occupied by special-status bird species. Populations of special-status birds are regulated by both CDFG and USFWS; the loss of suitable habitat could impair the survival of self-sustaining populations. The potential impact on

suitable habitat for special-status birds would have moderate intensity under NEPA and would be significant under CEQA.

Because construction of the BNSF Alternative would affect these special-status birds both directly and indirectly as described above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Mammals: The BNSF Alternative contains California annual grassland and agricultural lands known to support American badger (California annual grassland only), San Joaquin kit fox, and special-status bats (also known to occur within trees and rocky outcrops). All suitable habitats are assumed to be occupied by special-status mammals. Populations of mammals are regulated by both the CDFG and USFWS; the loss of suitable habitat could impair the survival of self-sustaining populations. The potential impact on suitable habitat would have moderate intensity under NEPA and would be significant under CEQA.

Because construction of the BNSF Alternative would affect these special-status mammals both directly and indirectly as described above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Hybrid Alternative

Invertebrates: The Hybrid Alternative contains a relatively small amount of vernal pools and other seasonal wetlands, including California annual grassland with soils suitable for vernal pools and other seasonal wetlands. Vernal pools and other seasonal wetlands provide habitat for Conservancy fairy shrimp, vernal pool fairy shrimp, and vernal tadpole fairy shrimp. Special-status invertebrates are regulated by the USFWS; the loss of suitable habitat could impair the survival of self-sustaining populations. The potential loss of suitable vernal habitat would result in the elimination of vernal pool invertebrate populations. Consequently, the impact on the potential loss of suitable habitat for vernal pool invertebrate would have moderate intensity under NEPA and would be significant under CEQA.

Because construction of the Hybrid Alternative has the potential to result in the loss of suitable habitat for vernal pool invertebrates, the impact would have moderate intensity under NEPA and would be significant under CEQA.

The Hybrid Alternative also contains populations of Mexican elderberry shrubs, specifically along the San Joaquin River area. All habitats with elderberry shrubs are assumed to be occupied by the valley elderberry longhorn beetle. Populations of the valley elderberry longhorn beetle are regulated by USFWS; the loss of elderberry shrubs could impair the survival of self-sustaining populations. Consequently, the potential impact on suitable habitat for valley elderberry longhorn beetles would have moderate intensity under NEPA and would be significant under CEQA.

Because construction of the Hybrid Alternative has the potential to result in the loss of suitable Mexican elderberry shrubs for the valley elderberry longhorn beetle and also generate airborne particulate deposition which would potentially affect this special-status insect temporarily, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Fish: The Hybrid Alternative contains aquatic habitats (primarily along the San Joaquin River) known to support Kern brook lamprey, Central Valley steelhead, hardhead, and San Joaquin roach. Additionally, an experimental population of spring run Chinook salmon is being reintroduced within the San Joaquin River from the Friant Dam to the Merced River confluence as part of the San Joaquin River Restoration Program. Potential project impacts (i.e., indirect from runoff/water-quality related) could hinder the re-establishment of special-status fish along the San Joaquin River. The potential impacts are being considered during the project design. With the incorporation of BMPs coupled with the placement of piers at the San Joaquin River crossing, substantive impacts on special-status fish and EFH are not expected during construction. Impacts would therefore have negligible intensity under NEPA and would be less than significant under CEQA. Two approaches to bridge crossing design are presented in Section 3.7.6.

Amphibians: The Hybrid Alternative contains suitable breeding and upland habitat for California tiger salamanders and western spadefoot toads. All suitable vernal pool and other seasonal wetland habitat with associated upland areas are assumed to be occupied by California tiger salamanders and western spadefoot toads. Populations of these special-status amphibians are regulated by both CDFG and USFWS; the loss of suitable breeding and upland habitat could impair the survival of self-sustaining populations. The potential impact on suitable habitat for California tiger salamanders and western spadefoot toads would have moderate intensity under NEPA and would be significant under CEQA.

Because construction of the Hybrid Alternative would affect the plant communities and land cover types used by these special-status amphibians both directly and indirectly as described above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Reptiles: The Hybrid Alternative contains suitable habitat for populations of western pond turtles. All suitable aquatic habitats are assumed to be occupied by western pond turtles. Populations of these special-status reptiles are regulated by CDFG; the loss of suitable habitat could impair the survival of self-sustaining populations. The potential impact on suitable habitat for western pond turtles would have moderate intensity under NEPA and would be significant under CEQA.

Because construction of the Hybrid Alternative would affect the western pond turtle both directly and indirectly as described above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Birds (includes all native birds covered under MBTA): The Hybrid Alternative contains a wide range of habitats known to support a diversity of birds. All suitable habitat is assumed to be occupied by special-status bird species. Populations of special-status birds are regulated by both CDFG and USFWS; the loss of suitable habitat could impair the survival of self-sustaining populations. The potential impact on suitable habitat for special-status birds would have moderate intensity under NEPA and would be significant under CEQA.

Because construction of the Hybrid Alternative would affect these special-status birds both directly and indirectly as described above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Mammals: The Hybrid Alternative contains California annual grassland and agricultural lands known to support American badger (California annual grassland only), San Joaquin kit fox, and special-status bats (also known to occur within trees and rocky outcrops). All suitable habitats are assumed to be occupied by special-status mammals. Populations of mammals are regulated by both the CDFG and USFWS; the loss of suitable habitat could impair the survival of self-sustaining populations. The potential impact on suitable habitat would have moderate intensity under NEPA and would be significant under CEQA.

Because construction of the Hybrid Alternative would affect these special-status mammals both directly and indirectly as described above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Heavy Maintenance Facility Alternatives

The conclusions presented in Table 3.7-13 are based on the potential presence of terrestrial and aquatic communities and the corresponding potential for special-status wildlife species. All communities with corresponding acreages assume presence. Without detailed survey results, the moderate effect/significant impact level of intensity was met.

Table 3.7-13
 Special-Status Wildlife Species Potentially Affected during the Construction Period of the
 HMF Alternatives

HMF Alternatives	Vernal Pool Branchiopods	Valley Elderberry Longhorn Beetle	Fish	Amphibians	Reptiles	Birds	Mammals	Bats
Castle Commerce Center	NE/NI	ME/SI	ME/SI	NE/NI	ME/SI	ME/SI	ME/SI	ME/SI
Harris-DeJager	NE/NI	NE/NI	NE/NI	NE/NI	ME/SI	ME/SI	ME/SI	ME/SI
Fagundes	NE/NI	ME/SI	NE/NI	NE/NI	ME/SI	ME/SI	ME/SI	ME/SI
Gordon-Shaw	NE/NI	ME/SI	ME/SI	ME/SI	ME/SI	ME/SI	ME/SI	ME/SI
Kojima Development	ME/SI	ME/SI	ME/SI	ME/SI	ME/SI	ME/SI	ME/SI	ME/SI

CEQA/NEPA Significance Conclusion:
 No Effect/No Impact = NE/NI.
 Negligible Effect/Less Than Significant Impact = NE/LI (Conclusion not applicable above).
 Moderate Effect/Significant Impact = ME/SI.
 Substantial Effect/Significant Impact = SE/SI (Conclusion not applicable above).

Habitats of Concern

As described in Section 3.7.4, habitats of concern occur within the various study areas and include special-status plant communities, such as Great Valley mixed riparian forest, coastal and valley freshwater marshes, vernal pools, and other seasonal wetlands. The HST alternatives were selected over time to avoid sensitive biological resources and/or to provide project design features such as elevated sections to minimize direct effects while accommodating operation requirements.

Direct Impacts During Construction

Construction activities within and adjacent to the construction footprint would have direct impacts on habitats of concern. These impacts would include crews removing vegetation and construction vehicles and personnel in the area disturbing the vegetation (i.e., trampling and crushing). With respect to vegetation removal, it should be noted that vegetation within the HST right-of-way would be permanently removed; however, adjacent vegetation requiring removal to accommodate construction operations (i.e., access and laydown area) may be restored after construction activities are completed.

Vernal pools and other seasonal wetlands are considered habitats of concern. Vernal pools that that lie completely within the construction footprint, and those that lie partially within the construction footprint and partially within the wetland study area, are considered to be directly and permanently impacted.

Indirect Impacts During Construction

Construction-related indirect impacts on habitats of concern would include: erosion, siltation, and runoff into natural and constructed watercourses; soil and water contamination from construction equipment leaks; construction-related dust reducing photosynthetic capability (especially during flowering periods); and an increased risk of fire (e.g., construction equipment use and smoking by construction workers) in adjacent open spaces. Wildlife use of adjacent habitats would also be subjected to noise, dust, and motion and startle disturbances.

Vernal pools that lie completely within the wetland study area, and those that lie partially within the wetland study area and partially within the habitat study area, are considered to be indirectly and permanently impacted.

UPRR/SR 99 Alternative

Special-Status Plant Communities: Vernal pools, other seasonal wetlands, Fremont cottonwood forested wetlands, and Great Valley mixed riparian forest are present within and adjacent to the construction footprint. Special-status plant communities and federally protected wetlands are considered sensitive natural communities due to their relative scarcity and importance in sustaining biological resources and are also regulated by the CDFG, USFWS, and USACE. Any substantive impacts that result in reduction of riparian habitat values and federally protected wetlands may be considered to be impacts with either moderate or substantial intensity under NEPA and significant under CEQA.

Because construction of the UPRR/SR 99 Alternative has the potential to result in the loss or disturbance of these special-status plant communities (excluding coastal and valley freshwater marsh) for reasons identified above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Jurisdictional Waters: Natural and constructed watercourses and vernal pools and other seasonal wetlands are present within and adjacent to the construction footprint. Jurisdictional waters are considered sensitive natural communities due to their relative scarcity and importance in sustaining biological resources and are also regulated by USACE. Any substantive impacts that result in the reduction of jurisdictional waters would have moderate to substantial intensity under NEPA and be significant under CEQA.

Because construction of the UPRR/SR 99 Alternative has the potential to result in direct and indirect impacts on jurisdictional waters as described above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Critical Habitat: Critical habitat does not occur within the habitat study area. Because the UPRR/SR 99 Alternative does not contain critical habitat, there would be no effect under NEPA and no impact under CEQA.

Mitigation Banks/Reserves: A portion of Camp Pashayan (within the San Joaquin River Ecological Reserve) is within and adjacent to the construction footprint of the UPRR/SR 99 Alternative. Impacts on Camp Pashayan would have moderate intensity under NEPA and would be significant under CEQA.

Because construction of the UPRR/SR 99 Alternative would result in direct and indirect impacts on Camp Pashayan as described above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Essential Fish Habitat: The UPRR/SR 99 Alternative is elevated where it crosses the San Joaquin River, which contains EFH for Chinook salmon within and adjacent to the construction footprint. Two approaches to bridge crossing design are presented in Section 3.7.6. EFH and the associated special-status fish are being restored with the San Joaquin River from the Friant Dam to the Merced River confluence. Potential project impacts (i.e., indirect from runoff/water-quality related) could hinder the re-establishment of special-status fish along the San Joaquin River. Potential impacts are being considered during project design. With the incorporation of BMPs coupled with the placement of piers at the San Joaquin River crossing, substantive impacts on special-status fish and EFH are not expected during construction. Impacts would therefore have negligible intensity under NEPA and would be less than significant under CEQA.

BNSF Alternative

Special-Status Plant Communities: Vernal pools, other seasonal wetlands, coastal and valley freshwater marshes, and Great Valley mixed riparian forest are present within and adjacent to the construction footprint. Special-status plant communities and federally protected wetlands are considered sensitive

natural communities due to their relative scarcity and importance in sustaining biological resources and are also regulated by the CDFG, USFWS, and USACE. Any substantive impacts that result in the reduction of riparian habitat values and federally protected wetlands would be impacts with moderate to substantial intensity under NEPA and would be significant under CEQA. The moderate intensity relates to the relatively low number of acres located within the construction footprint.

Because construction of the BNSF Alternative has the potential to result in the loss or disturbance of these special-status plant communities for the reasons identified above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Jurisdictional Waters: Natural and constructed watercourses, vernal pools, other seasonal wetlands, and coastal and valley freshwater marsh are present within and adjacent to the construction footprint. Jurisdictional waters are considered sensitive natural communities due to their relative scarcity and importance in sustaining biological resources and are also regulated by USACE. Any substantive impacts that result in the reduction of jurisdictional waters would be considered impacts with moderate to substantial intensity under NEPA and would be significant under CEQA.

Because construction of the BNSF Alternative has the potential to result in direct and indirect impacts on jurisdictional waters as described above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Critical Habitat: The BNSF Alternative contains critical habitat for Conservancy fairy shrimp, vernal pool tadpole shrimp, vernal pool fairy shrimp, Greene's tuctoria, succulent owl's clover, and San Joaquin Orcutt grass near the town of Le Grand. Critical habitat is a federal requirement in identifying key areas for endangered species recovery. Consequently, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Table 3.7-14 summarizes the critical habitat potentially affected directly by the BNSF Alternative during the construction period. Because construction of the BNSF Alternative has the potential to result in direct and indirect impacts on critical habitat as described above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Table 3.7-14
 Critical Habitat Potentially Affected
 during the Construction Period of the BNSF Alternative (acres ^a)

HST Alternative	San Joaquin Valley Orcutt grass (Unit 2)	Greene's tuctoria (Unit 7)	Succulent owl's- clover (Unit 3B)	Conservancy fairy shrimp (Unit 6)	Vernal pool fairy shrimp (Unit 22)	Vernal pool tadpole shrimp (Unit 15)
Impacts by Project Combination						
BNSF north - south alignment with Ave 24 Wye	--	--	--	--	--	--
BNSF north - south alignment with Ave 21Wye	--	--	--	--	--	--
Le Grand Design Options						
Mission Ave	37.14	--	--	--	--	37.14
Mission Ave East of Le Grand	37.58	--	--	--	--	37.58
Mariposa Way	45.67	--	--	--	--	45.67
Mariposa Way East of Le Grand	51.88	--	--	--	--	51.88
Design Options to Fresno Station						
Mariposa Street Station	--	--	--	--	--	--
Kern Street Station	--	--	--	--	--	--
Impacts of Components Combined^b						
BNSF Alternative, Ave 24 Wye	37.14 to 51.88	--	--	--	--	37.14 to 51.88
BNSF Alternative, Ave 21 Wye	37.14 to 51.88	--	--	--	--	37.14 to 51.88
Total Range of Impacts for the BNSF Alternative^b	37.14 to 51.88	--	--	--	--	37.14 to 51.88
Notes: No critical habitat is present along the wyes and Fresno Station design options. All impacts were calculated based on the construction footprint design. ^a All decimal values are presented to the hundredth place. Totals from 0.005 to 0.009 are therefore rounded to 0.01. Totals below 0.004 acre are therefore rounded to zero (0). ^b Total range of impacts includes the least amount of habitat affected by the HST alternatives to the most impact by the HST alternatives. Source: Authority and FRA (2012a).						

Mitigation Banks/Reserves: The BNSF Alternative, near the town of Le Grand, contains portions of the Great Valley Conservation Bank within and adjacent to the BNSF Alternative construction footprint. These portions of the Great Valley Conservation Bank contain critical habitat for San Joaquin Valley Orcutt grass and vernal pool tadpole shrimp. In addition, the BNSF Alternative contains a portion of Camp Pashayan (within the San Joaquin River Ecological Reserve) along the San Joaquin River. The Great Valley Conservation Bank is mitigation property that is part of a regional planning process to compensate for the loss of biological resources in the Central Valley. The impacts from project activities have the potential to reduce some of the biological values of the property to function and affect conservation bank values. The potential impacts on conservation properties would have moderate intensity under NEPA and would be significant under CEQA.

Because construction of the BNSF Alternative would result in direct and indirect impacts on the Great Valley Conservation Bank as described above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

A portion of Camp Pashayan (within the San Joaquin River Ecological Reserve) is within and adjacent to the construction footprint of the UPRR/SR 99 Alternative. Impacts on Camp Pashayan would have moderate intensity under NEPA and would be significant under CEQA.

Because construction of the UPRR/SR 99 Alternative would result in direct and indirect impacts on Camp Pashayan as described above, the impacts would have moderate intensity under NEPA and would be significant under CEQA.

Essential Fish Habitat: The BNSF Alternative is elevated where it crosses the San Joaquin River, which contains EFH for Chinook salmon within and adjacent to the construction footprint. Two approaches to bridge crossing design are presented in Section 3.7.6. EFH and the associated special-status fish are being restored with the San Joaquin River from the Friant Dam to the Merced River confluence. Potential project impacts (i.e., indirect from runoff/water-quality related) could hinder the re-establishment of special-status fish along the San Joaquin River. Potential impacts are being considered during project design. With the incorporation of BMPs coupled with the placement of piers at the San Joaquin River crossing, substantive impacts on special-status fish and EFH are not expected during construction. Impacts would therefore have negligible intensity under NEPA and would be less than significant under CEQA.

Hybrid Alternative

Special-Status Plant Communities: Vernal pools, other seasonal wetlands, and Great Valley mixed riparian forest are present within and adjacent to the construction footprint. Special-status plant communities and federally protected wetlands are considered sensitive natural communities due to their relative scarcity and importance in sustaining biological resources and are also regulated by the CDFG, USFWS, and USACE. Any substantive impacts that result in the reduction of riparian habitat values and federally protected wetlands would have moderate to substantial intensity under NEPA and be significant under CEQA.

Because construction of the Hybrid Alternative has the potential to result in the loss or disturbance of these special-status plant communities for reasons identified above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Jurisdictional Waters: Natural and constructed watercourses, vernal pools, and other seasonal wetlands are present within and adjacent to the construction footprint. Jurisdictional waters are considered sensitive natural communities due to their relative scarcity and importance in sustaining biological resources and are also regulated by USACE. Any substantive impacts that result in the reduction of jurisdictional waters would be impacts with moderate to substantial intensity under NEPA and would be significant under CEQA.

Because construction of the Hybrid Alternative has the potential to result in direct and indirect impacts on jurisdictional waters as described above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Critical Habitat: Critical habitat does not occur within the habitat study area. Because the Hybrid Alternative does not contain critical habitat, there would be no effect under NEPA and no impact under CEQA.

Mitigation Banks/Reserves: A portion of Camp Pashayan (within the San Joaquin River Ecological Reserve) is within and adjacent to the construction footprint of the Hybrid Alternative. Impacts on Camp Pashayan would have moderate intensity under NEPA and would be significant under CEQA.

Because construction of the Hybrid Alternative would result in direct and indirect impacts on Camp Pashayan as described above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Essential Fish Habitat: The UPRR/SR 99 Alternative is elevated where it crosses the San Joaquin River, which contains EFH for Chinook salmon within and adjacent to the construction footprint. Two approaches to bridge crossing design are presented in Section 3.7.6. EFH and the associated special-status fish are being restored with the San Joaquin River from the Friant Dam to the Merced River confluence. Potential project impacts (i.e., indirect from runoff/water-quality related) could hinder the re-establishment of special-status fish along the San Joaquin River. Potential impacts are being considered during project design. With the incorporation of BMPs coupled with the placement of piers at the San Joaquin River crossing, substantive impacts on special-status fish and EFH are not expected during construction. Impacts would therefore have negligible intensity under NEPA and would be less than significant under CEQA.

Heavy Maintenance Facility Alternatives

Habitats of concern potentially affected by the HMF sites are addressed in Table 3.7-15. This table lists the presence or absence of habitats of concern within each HMF construction footprint and the potential for construction-related impacts to occur. The conclusions presented in Table 3.7-15 are based on the occurrence of special-status plant communities, jurisdictional waters, critical habitat, mitigation banks/reserves, and EFH. Impacts on resources found within the construction footprint would have moderate intensity under NEPA and would be significant under CEQA for any acreage, as they are regulated by CDFG, USFWS, or USACE.

Table 3.7-15
 Habitats of Concern Potentially Affected
 during the Construction Period of the HMF Alternatives^a

HMF Alternatives	Special-Status Plant Communities	Jurisdictional Waters	Critical Habitat	Mitigation Banks/Reserves	Essential Fish Habitat
Castle Commerce Center	ME/SI (Great Valley Mixed Riparian Forest)	ME/SI (Natural Watercourses and Fremont Cottonwood Forested Wetlands)	NE/NI	NE/NI	NE/NI
Harris-DeJager	NE/NI	NE/NI	NE/NI	NE/NI	NE/NI
Fagundes	NE/NI	NE/NI	NE/NI	NE/NI	NE/NI
Gordon-Shaw	ME/SI (Coastal and Valley Freshwater Marsh)	ME/SI (Natural Watercourses and Coastal and Valley Freshwater Marsh)	NE/NI	NE/NI	NE/NI
Kojima Development	ME/SI (Great Valley Mixed Riparian Forest, Coastal and Valley Freshwater Marsh and Vernal Pools)	ME/SI (Natural Watercourses, Coastal and Valley Freshwater Marsh and Vernal Pools)	NE/NI	NE/NI	NE/NI

^a CEQA/NEPA Significance Conclusion:
 NE/NI = No Effect/No Impact.
 NE/LI = Negligible Effect/Less Than Significant Impact (Conclusion not applicable above).
 ME/SI = Moderate Effect/Significant Impact.
 SE/SI = Substantial Effect/Significant Impact (Conclusion not applicable above).

Wildlife Movement Corridors

As described in Section 3.7.4.5 and shown on Figure 3.7-6, the Eastman Lake – Bear Creek ECA and other modeled wildlife corridors are located within the HST alternative construction footprints. This section evaluates direct and indirect impacts on this ECA and other modeled wildlife corridors that would result from construction of each of the HST alternatives. The HST System has incorporated permeability features within the project design as a component of the project description. These permeability features allow wildlife access opportunities between the landscape on both sides of the facility. These permeability features include elevated rail structures, wildlife-dedicated crossing structures, roadway overpasses, and cross culverts that, coupled with the viability of the hydraulic crossings, maintain permeability. Fencing of the at-grade alignment would avoid the potential for collisions along the UPRR/SR99, BNSF and Hybrid Alternatives. The impact analysis considers these engineering design features within the context of the biological resource impacts regarding wildlife movement.

Direct Impacts During Construction

Temporary impacts, including site preparation, fencing, and other grading and infrastructure placement, during construction activities could affect the ability of San Joaquin kit fox and other free-ranging animals to move freely within the Eastman Lake – Bear Creek ECA and other modeled wildlife corridors.

Indirect Impacts During Construction

Construction of the project would result in concentrated heavy vehicle and equipment use. Construction-related activities occurring at or in the vicinity of wildlife movement corridors, such as the Eastman Lake –

Bear Creek ECA, may result in indirect disruption of wildlife movement through lighting, noise, motion, and startle effects. Construction activities would also potentially affect wildlife in adjacent habitats by interfering with movement patterns or by causing wildlife to temporarily avoid areas adjacent to the construction areas.

UPRR/SR 99 Alternative

Construction of the UPRR/SR 99 Alternative would occur within portions of the Eastman Lake – Bear Creek ECA and other modeled wildlife corridors near the Berenda Slough and the Fresno River channels. It has the potential to result in the above-mentioned direct and indirect impacts.

As described in Section 3.7.4, the *Recovery Plan for Upland Species of the San Joaquin Valley* (USFWS 1998) identifies San Joaquin kit fox as a key species of concern for the Eastman Lake – Bear Creek ECA (Sandy Mush Road wildlife linkage). Construction activities within the Eastman Lake – Bear Creek ECA may further impede the movement of the San Joaquin kit fox.

Although construction of the UPRR/SR 99 Alternative has the potential to interfere with the movement of wildlife species within the Eastman Lake – Bear Creek ECA and other modeled wildlife corridors, the impact is not long term and the construction phasing is anticipated to allow some dispersal over the construction period. For the reasons identified above, the impact would have negligible intensity under NEPA and would not be significant under CEQA.

BNSF Alternative

Construction of the BNSF Alternative would occur within the Eastman Lake – Bear Creek ECA and within other modeled wildlife corridors near the Berenda Slough and the Fresno River channels, and has the potential to result in the above-mentioned direct and indirect impacts.

As described above, the *Recovery Plan for Upland Species of the San Joaquin Valley* (USFWS 1998) identifies San Joaquin kit fox as a key species of concern for the Eastman Lake – Bear Creek ECA (Sandy Mush Road wildlife linkage). Construction activities within the Eastman Lake – Bear Creek ECA may further impede the movement of the San Joaquin kit fox.

Although construction of the BNSF Alternative has the potential to interfere with the movement of wildlife species within the Eastman Lake – Bear Creek ECA and other modeled wildlife corridors, the impact is not long term and the construction phasing is anticipated to allow some dispersal over the construction period. For the reasons identified above, the impact would have negligible intensity under NEPA and would not be significant under CEQA.

Hybrid Alternative

Construction of the Hybrid Alternative would occur within portions of the Eastman Lake – Bear Creek ECA and within other modeled wildlife corridors near the Berenda Slough and the Fresno River channels and has the potential to result in the above-mentioned direct and indirect impacts.

As described above, the *Recovery Plan for Upland Species of the San Joaquin Valley* (USFWS 1998) identifies San Joaquin kit fox as a key species of concern for the Eastman Lake – Bear Creek ECA (Sandy Mush Road wildlife linkage). Construction activities within the Eastman Lake – Bear Creek ECA may further impede the movement of the San Joaquin kit fox.

Although construction of the Hybrid Alternative has the potential to interfere with the movement of wildlife species within the Eastman Lake – Bear Creek ECA and other modeled wildlife corridors, the impact is not long term and the construction phasing is anticipated to allow some dispersal over the construction period. For the reasons identified above, the impact would have negligible intensity under NEPA and would not be significant under CEQA.

Heavy Maintenance Facility Alternatives

Wildlife movement corridors potentially affected by the HMF sites are addressed in Table 3.7-16. This table lists the presence or absence of wildlife movement corridors within each HMF construction footprint

and the potential for construction-related impacts to occur. Although the Harris-DeJager HMF overlays an estimated 30% of the ECA, the impact of construction is not long term and construction phasing is anticipated to retain dispersal opportunities. The impact would have negligible intensity under NEPA and be less than significant under CEQA.

Table 3.7-16
 Wildlife Movement Corridors Potentially Affected
 during the Construction Period of the HMF Alternatives

HMF Alternatives	Wildlife Movement Corridor NEPA/CEQA Significance Conclusion ^a
Castle Commerce Center	NE/NI
Harris-DeJager	NE/LI (Near Dutchman Creek)
Fagundes	NE/NI
Gordon-Shaw	NE/NI
Kojima Development	NE/LI (Ash and Berenda Slough riparian corridors)
^a NEPA/CEQA Significance Conclusion: NE/NI= No Effect/No Impact. NE/LI = Negligible Effect/Less Than Significant Impact. ME/SI = Moderate Effect/Significant Impact (conclusion not applicable above). SE/SI = Substantial Effect/Significant Impact.	

Project Period Impacts – Common Biological Resource Impacts

Sensitive biological resources occurring adjacent to and within the construction footprint are expected to incur direct and indirect impacts from project operation. These direct and indirect impacts would be common through all HST alternatives. The following sections discuss how the HST alternatives would affect these sensitive biological resources.

Plant Communities and Land Cover Types

Developed areas, agricultural lands, ruderal vegetation, and eucalyptus woodlands are not productive habitat for most special-status species because they do not provide the living conditions most species require within their preferred natural setting. These landscapes are generally void of the conditions required to support suitable habitat for special-status species. Consequently, these plant communities and land cover types are not further addressed in this section. The following section only discusses impacts related to Great Valley mixed riparian forest and other riparian habitat. Impacts associated with aquatic habitats are discussed under *Special-Status Plant Communities and Jurisdictional Waters*.

Within the construction easement, both native and nonnative species of trees would be lost. The majority of the native trees affected are associated with trees occurring in the riparian corridors such as those found in the Great Valley mixed riparian forest and other riparian habitat, because much of the uplands have already been converted to agriculture or have been disturbed.

As noted in the paragraph above, nonnative trees also exist within the urban areas and represent a component of the urban forest as recognized in the *City of Merced Vision 2015 General Plan* (see Table 3.7-1, Local and Regional Laws and Regulations). This plan encourages the preservation of these open spaces. Preserving the urban forest is a policy of the plan that includes a goal to preserve of urban forests. The direct removal of urban trees conflicts with this goal within the City of Merced.

Direct Impacts During the Project Period

Plant communities and land cover types that are assumed to be impacted directly during project period activities include vernal pools, other seasonal wetlands, and Great Valley mixed riparian forest and other riparian communities and land cover types. The following discussion of direct impacts during the project period is focused on these native plant communities that occur within the construction footprint:

- *Vernal pools and Other Seasonal Wetlands:* During the project period, these areas are anticipated to be directly disturbed after construction for maintenance and the introduction of other hardscape, fencing and landscape features. The resource values that exist would be permanently removed during site preparation and continue to be during the life of the Project.
- *Great Valley Mixed Riparian Forest and other riparian communities and land cover types:* Direct impacts on Great Valley mixed riparian forest and other riparian communities and land cover types would result from the permanent removal of vegetation from within the HST system footprint. In addition, these habitats would be affected by increased pedestrian access/activity in the area, which would trample or crush native vegetation; exposure to accidental spills including contaminants/pollutants; and an increased risk of fire in adjacent open spaces due to increased human activity. Vehicle or foot traffic associated with ongoing operation and maintenance activities (e.g., routine inspection and maintenance of the HST right-of-way) would also trample or crush native vegetation. The discussion related to special-status plant communities for terrestrial and aquatic habitat types are discussed more thoroughly under *Habitats of Concern*. Project period impacts include the permanent removal of areas of Great Valley mixed riparian forest and other riparian habitat during site preparation activities. Each of the HST alternatives converts substantial acreages of Great Valley mixed riparian forest and other riparian habitat. Since the effects of the impacts are permanent in nature, the effect determination is substantial for each HST alternative. The conversion of these plant communities would influence the distribution of biological resources adjacent to and along the HST alternatives. The substantial effect determination recognizes the adverse effect that loss of acreage would have on these plant communities and the subsequent impacts on sensitive biological resources that depend on these plant communities.

Indirect Impacts During the Project Period

Plant communities and land cover types that are assumed to be impacted indirectly, during project period activities are vernal pools, other seasonal wetlands, and Great Valley mixed riparian forest and other riparian communities and land cover types, and other project period environmental effects. The following discussion of indirect impacts during the project period is focused on native plant communities that occur within the construction footprint:

- *Vernal Pools and Other Seasonal Wetlands:* Indirectly impacted vernal pools and other seasonal wetlands that lie within the 250-foot-radius buffer (i.e., indirect impact area) around project elements are expected to be impacted through the project period. The vernal pools and other seasonal wetlands within the 250-foot-radius buffer may be potentially indirectly impacted project period by hydrological changes within the watershed. Indirect permanent impacts can be anticipated for the pools receiving flow from the location of the construction footprint. Drilling, excavating, or other activities that occur within the construction footprint would continue to potentially alter surface and subsurface water flow within the watershed (hardpans, volume, flow direction, etc.) and increase sedimentation/pollution from the construction footprint.
- *Great Valley Mixed Riparian Forest and other riparian communities and land cover types:* Indirect impacts on Great Valley mixed riparian forest and other riparian communities and land cover types are anticipated to include: increased erosion, sedimentation, siltation, and runoff due to alterations in topography and hydrology that could affect aquatic habitats in nearby water features; wind erosion effects (including from unvegetated rights-of-way and passing high-speed trains); an increased risk of fire in adjacent open spaces due to increased human activity; and the introduction of noxious plant species from increased human activity/disturbance.

- *Other project period environmental effects:* The adjacent areas along the HST alternatives contain primarily disturbed habitats such as California annual grassland and agricultural lands. However, in those adjacent areas, human disturbances could enhance the germination and proliferation of nonnative plant species. Invasive plant species are of particular concern in that they usually germinate before native plants in the fall and, with rapid growth rates, quickly out-compete native plant species. If not controlled, these species may encroach into other adjacent, natural open space areas and diminish the quality of existing special-status plant communities. Impacts attributed to the colonization of noxious plant species could include a gradual decrease in natural biodiversity and an alteration of hydrological conditions through nitrogen fixation (as with Spanish broom [*Spartium junceum*]), or a draining of the water table (as in giant reed [*Arundo donax*]).

UPRR/SR 99 Alternative

The UPRR/SR 99 Alternative footprint contains the following plant communities and land cover types: developed areas, agricultural lands, ruderal vegetation, California annual grassland, Great Valley mixed riparian forest, other riparian, vernal pools, other seasonal wetlands, Fremont cottonwood forested wetland, coastal and valley freshwater marsh, and natural and constructed watercourses. Great Valley mixed riparian forest and other riparian habitat is considered a sensitive natural community due to its relative scarcity and importance in sustaining biological resources; as such, this habitat is regulated by the CDFG, USFWS, and USACE. Any substantive impacts that result in the reduction of riparian habitat values would be impacts with moderate to substantial intensity under NEPA and would be significant under CEQA. As described in Section 3.7.4, some of these communities are special-status and are regulated or require mitigation because of their habitat value (e.g., Great Valley mixed riparian forest).

Direct permanent and indirect permanent acreage numbers for terrestrial and aquatic communities potentially affected during the project period of the UPRR/SR 99 Alternative can be found in Tables 3.7-17 and 3.7-18. Because implementation of the UPRR/SR 99 Alternative has the potential to adversely affect riparian habitat, other sensitive natural communities, and federally protected wetlands for the reasons identified above, the impact would have moderate to substantial intensity under NEPA and would be significant under CEQA.

BNSF Alternative

The BNSF Alternative footprint contains the following plant communities and land cover types: developed areas, agricultural lands, ruderal vegetation, California annual grassland, Great Valley mixed riparian forest, other riparian habitat, eucalyptus woodlands, vernal pools, other seasonal wetlands, coastal and valley freshwater marsh, and natural and constructed watercourses. As described above, some of these communities are special-status and are regulated or require mitigation because of their habitat value (e.g., Great Valley mixed riparian forest). Great Valley mixed riparian forest and other riparian habitat is considered a sensitive natural community due to their relative scarcity and importance in sustaining biological resources; as such, this habitat is regulated by the CDFG, USFWS, and USACE. Any substantive impacts that result in reduction of riparian habitat values would be considered impacts with moderate to substantial intensity under NEPA and would be significant under CEQA.

Table 3.7-17
 Terrestrial Communities Potentially Affected (Direct/Indirect ^a)
 during the Project Period of the UPRR/SR 99 Alternative (acres ^b)

UPRR/SR 99 Alternative	Developed Areas	Agricultural Lands	Ruderal Vegetation	California Annual Grassland	Great Valley Mixed Riparian Forest	Other Riparian	Eucalyptus Woodlands
Impacts by Project Combination							
West Chowchilla Design Option & Ave 24 Wye	615.54	1,122.09	101.39	11.91	8.68/30.75	5.21/18.57	--
East Chowchilla Design Option & Ave 24 Wye	610.31	1,087.65	102.71	11.70	5.72/23.41	4.99/20.85	--
East Chowchilla Design Option & Ave 21 Wye	651.10	1,171.32	121.51	12.66	3.06/13.95	1.48/7.82	0.42
Fresno HST Station Design Options							
Mariposa Street Station	38.23	--	12.40	--	--/--	--/--	--
Kern Street Station	54.89	--	18.16	--	--/--	--/--	--
Total Range of Impacts ^c	648.54 to 705.99	1,087.65 to 1,171.32	113.79 to 139.67	11.70 to 12.66	3.06 to 8.68/13.95 to 30.75	1.48 to 5.21/7.82 to 20.85	0 to 0.42
All impacts were calculated based on the construction footprint design.							
^a Direct/Indirect acreages are provided for riparian and aquatic communities due to higher functions and values and corresponding sensitivity to indirect effects.							
^b All decimal values are presented to the hundredths place. Totals from 0.005 to 0.009 are therefore rounded to 0.01. Totals below 0.004 acre are therefore rounded to zero (0).							
^c Total range of impacts includes the least amount of habitat affected by the HST alternative to the most impact by the HST alternative.							
Source: Authority and FRA (2012a).							

Table 3.7-18
 Aquatic Communities Potentially Affected (Direct/Indirect ^a)
 during the Project Period of the UPRR/SR 99 Alternative (acres ^b)

UPRR/SR 99 Alternative	Vernal Pools	Other Seasonal Wetlands	Fremont Cottonwood Forested Wetlands	Coastal and Valley Freshwater Marsh	Natural Watercourses	Constructed Basins	Constructed Watercourses	Open waters
Impacts by Project Combination								
West Chowchilla Design Option & Ave 24 Wye	1.05/ 1.18	1.08/ 0.29	3.89/ 3.75	--/--	7.76/ 32.53	7.81/ 27.45	14.58/ 22.90	1.30/ 3.48
East Chowchilla Design Option & Ave 24 Wye	0.87/ 1.62	1.08/ 0.29	4.11/ 4.65	--/--	6.08/ 31.10	6.70/ 22.98	12.06/ 17.62	1.64/ 3.75
East Chowchilla Design Option & Ave 21 Wye	1.44/ 2.64	1.08/ 0.34	3.94/ 3.75	--/--	3.76/ 24.40	4.80/ 25.52	18.38/ 20.46	1.65/ 3.89
Fresno HST Station Design Options								
Mariposa Street Station	--/--	--/--	--/--	--/--	--/--	--	--/--	--/--
Kern Street Station	--/--	--/--	--/--	--/--	--/--	--	--/--	--/--
Total Range of Impacts ^c	0.87 to 1.44/ 1.18 to 2.64	1.08/ 0.29 to 0.34	3.89 to 4.11/ 3.75 to 4.65	--	3.76 to 7.76/ 24.40 to 32.53	4.80 to 7.81/ 22.98 to 27.45	12.06 to 18.38/ 17.62 to 22.90	1.30 to 1.65/ 3.48 to 3.89
All impacts were calculated based on the construction footprint design.								
^a Direct/Indirect acreages are provided for riparian and aquatic communities due to higher functions and values and corresponding sensitivity to indirect effects.								
^b All decimal values are presented to the hundredths place. Totals from 0.005 to 0.009 are therefore rounded to 0.01. Totals below 0.004 acre are therefore rounded to zero (0).								
^c Total range of impacts includes the least amount of habitat affected by the HST alternative to the most impact by the HST alternative.								
The sum of Vernal Pools, Other Seasonal Wetlands, Fremont Cottonwood Forested Wetland, Coastal and Valley Freshwater Marsh, Natural Watercourses, Constructed Basins, and Constructed Watercourses represents potential impacts on jurisdictional waters.								
Source: Authority and FRA (2012a).								

Direct and indirect acreage numbers for terrestrial and aquatic communities potentially affected during the project period of the BNSF Alternative can be found in Tables 3.7-19 and 3.7-20. Because implementation of the BNSF Alternative has the potential to adversely affect riparian habitat, other sensitive natural communities, and federally protected wetlands for reasons identified above, the impact would have moderate to substantial intensity under NEPA and would be significant under CEQA.

Table 3.7-19
 Terrestrial Communities Potentially Affected (Direct/Indirect ^{a)}
 during the Project Period of the BNSF Alternative (acres ^{b)})

BNSF Alternative	Developed Areas	Agricultural Lands	Ruderal Vegetation	California Annual Grassland	Great Valley Mixed Riparian Forest	Other Riparian	Eucalyptus Woodlands
Impacts by Project Combination							
BNSF north - south alignment with Ave 24 Wye	609.74	1,206.26	128.13	52.21	4.13/15.46	2.79/8.27	0.08
BNSF north - south alignment Ave with 21 Wye	598.46	1,121.32	118.62	42.83	1.64/7.68	2.05/8.82	0.10
Le Grand Design Options							
Mission Ave	67.27	255.58	50.96	64.48	0.87/4.34	0.07/0.45	--
Mission Ave East of Le Grand	38.42	296.94	17.69	53.42	0.78/4.69	0.07/0.45	0.48
Mariposa Way	45.43	258.23	11.72	68.51	2.08/12.81	0.44/3.15	--
Mariposa Way East of Le Grand	33.11	312.19	6.54	32.87	3.42/12.68	0.44/3.15	0.69
Fresno Station Alternatives							
Mariposa Street Station	38.23	--	12.40	--	--/--	--/--	--
Kern Street Station	54.89	--	18.16	--	--/--	--/--	--
Impact of Components Combined^c							
BNSF Alternative, Ave 24	681.08 to 731.90	1,461.84 to 1,518.45	147.07 to 197.25	85.08 to 120.72	4.91 to 7.55/19.80 to 28.27	2.86 to 3.23/8.72 to 11.42	0.08 to 0.77
BNSF Alternative, Ave 21	669.80 to 720.62	1,376.90 to 1,433.51	137.56 to 187.74	75.70 to 111.34	2.42 to 5.06/12.02 to 20.49	2.12 to 2.49/9.27 to 11.97	0.10 to 0.79
Total Range of Impact^c	669.80 to 731.90	1,376.90 to 1,518.45	137.56 to 197.25	75.70 to 120.72	2.42 to 7.55/12.02 to 28.27	2.12 to 3.23/8.72 to 11.97	0.08 to 0.79
All impacts were calculated based on the construction footprint design.							
^a Direct/Indirect acreages are provided for riparian and aquatic communities due to higher functions and values and corresponding sensitivity to indirect effects.							
^b All decimal values are presented to the hundredths place. Totals from 0.005 to 0.009 are therefore rounded to 0.01. Totals below 0.004 acre are therefore rounded to zero (0).							
^c Total range of impacts includes the least amount of habitat affected by the HST alternative to the most impact by the HST alternative.							
Source: Authority and FRA (2012a),							

Table 3.7-20
Aquatic Communities Potentially Affected (Direct/Indirect ^a)
during the Project Period of the BNSF Alternative (acres ^b)

BNSF Alternative	Vernal Pools	Other Seasonal Wetlands	Fremont Cottonwood Forested Wetlands	Coastal and Valley Freshwater Marsh	Natural Watercourses	Constructed Basins	Constructed Watercourses	Open waters
Impacts by Project Combination								
BNSF north - south alignment with Ave 24 Wye	4.93/ 11.59	1.54/ 2.04	0.10/ 0.13	0.38/ 1.50	5.28/2 0.49	6.60/2 3.02	9.57/ 15.90	2.07/ 3.34
BNSF north - south alignment Ave with 21 Wye	4.88/13.39	1.54/ 2.17	0.10/ 0.13	0.28/ 1.53	4.42/2 0.67	6.45/ 20.71	9.06/ 18.45	1.86/ 3.28
Le Grand Design Options								
Mission Ave	11.53/ 22.15	0.10/ 0.11	0.27/2.05	0.02/0.52	1.61/ 4.82	0.40/ 5.79	4.76/5.41	0.70/ 0.11
Mission Ave East of Le Grand	11.23/ 28.91	0.08/0.28	1.43/3.10	--/--	1.85/5. 23	0.34/5. 15	5.21/7.00	0.63/ 0.09
Mariposa Way	10.81/ 24.88	0.10/ 0.11	0.71/8.67	0.02/0.02	1.25/1 0.90	0.08/ 0.18	1.53/3.67	0.68/ 0.01
Mariposa Way East of Le Grand	7.02/27.98	--/0.17	1.68/9.19	0.02/0.02	2.26/1 0.37	0.54/ 2.22	1.32/5.37	--/--
Fresno Station Alternatives								
Mariposa Street Station	--/--	--/--	--/--	--/--	--/--	--	--/--	--/--
Kern Street Station	--/--	--/--	--/--	--/--	--/--	--	--/--	--/--
Impact of Components Combined ^c								
BNSF Alternative, Ave 24	11.95 to 16.46/ 33.74 to 40.50	1.54 to 1.64/ 2.15 to 2.32	0.37 to 1.78/2.18 to 9.32	0.38 to 0.40/1.50 to 2.02	6.53 to 7.54/2 5.31 to 31.39	6.68 to 7.14/ 23.20 to 28.81	10.89 to 14.78/ 19.57 to 22.90	2.07 to 2.77/ 3.34 to 3.45
BNSF Alternative, Ave 21	11.90 to 16.41/ 35.54 to 42.30	1.54 to 1.64/ 2.28 to 2.45	0.37 to 1.78/2.18 to 9.32	0.28 to 0.30/1.53 to 2.05	5.67 to 6.68/2 5.49 to 31.57	6.53 to 6.99/ 20.89 to 26.50	10.38 to 14.27/ 22.12 to 25.45	1.86 to 2.56/ 3.28 to 3.39
Total Range of Impact ^c	11.90 to 16.46/ 33.74 to 42.30	1.54 to 1.64/ 2.15 to 2.45	0.37 to 1.78/ 2.18 to 9.32	0.28 to 0.40/ 1.50 to 2.05	5.67 to 7.54/ 25.31 to 31.57	6.53 to 7.14/ 20.89 to 28.81	10.38 to 14.78/ 19.57 to 25.45	1.86 to 2.77/ 3.28 to 3.45
All impacts were calculated based on the construction footprint design.								
^a Direct/Indirect acreages are provided for riparian and aquatic communities due to higher functions and values and corresponding sensitivity to indirect effects.								

BNSF Alternative	Vernal Pools	Other Seasonal Wetlands	Fremont Cottonwood Forested Wetlands	Coastal and Valley Freshwater Marsh	Natural Watercourses	Constructed Basins	Constructed Watercourses	Open waters
<p>^b All decimal values are presented to the hundredths place. Totals from 0.005 to 0.009 are therefore rounded to 0.01. Totals below 0.004 acre are therefore rounded to zero (0).</p> <p>^c Total range of impacts includes the least amount of habitat affected by the HST alternative to the most impact by the HST alternative.</p> <p>The sum of Vernal Pools, Other Seasonal Wetlands, Fremont Cottonwood Forested Wetland, Coastal and Valley Freshwater Marsh, Natural Watercourses, Constructed Basins, and Constructed Watercourses represents potential impacts on jurisdictional waters.</p> <p>Source: Authority and FRA (2012a).</p>								

Hybrid Alternative

The Hybrid Alternative footprint is composed of the following plant communities and land cover types: developed areas, agricultural lands, ruderal vegetation, California annual grassland, Great Valley mixed riparian forest, other riparian habitat, eucalyptus woods, vernal pools, other seasonal wetlands, Fremont cottonwood forested wetland, coastal and valley freshwater marsh, and natural and constructed watercourses. As described above, some of these communities are special-status and are regulated or require mitigation because of their habitat value (e.g., Great Valley mixed riparian forest). Great Valley mixed riparian forest and other riparian habitat is considered a sensitive natural community due to its relative scarcity and importance in sustaining biological resources; as such, this habitat is regulated by the CDFG, USFWS, and USACE. Any substantive impacts that result in reduction of riparian habitat values would be considered impacts with moderate to substantial intensity under NEPA and would be significant under CEQA.

Direct permanent and indirect permanent acreage numbers for terrestrial and aquatic communities potentially affected during the project period of the Hybrid Alternative can be found in Tables 3.7-21 and 3.7-22. Because implementation of the Hybrid Alternative has the potential to adversely affect riparian habitat, other sensitive natural communities, and federally protected wetlands for reasons identified above, the impact would have moderate to substantial intensity under NEPA and would be significant under CEQA.

Table 3.7-21
 Terrestrial Communities Potentially Affected (Direct/Indirect ^a)
 during the Project Period of the Hybrid Alternative (acres ^b)

Hybrid Alternative	Developed Areas	Agricultural Lands	Ruderal Vegetation	California Annual Grassland	Great Valley Mixed Riparian Forest	Other Riparian	Eucalyptus Woodlands
Impacts by Project Combination							
Hybrid North-South Alignment Ave 24 Wye	605.26	1,426.88	96.04	46.18	6.60/ 28.32	4.74/ 18.22	0.08
Hybrid North-South Alignment Ave 21 Wye	617.30	1,288.00	110.78	46.81	2.87/ 14.35	1.40/ 6.89	0.50
Fresno Station Alternatives							
Mariposa Street Station	38.23	--	12.40	--	--/--	--/--	--
Kern Street Station	54.89	--	18.16	--	--/--	--/--	--
Total Range of Impacts^c	643.49 to 672.19	1,288.00 to 1,426.88	108.44 to 128.94	46.18 to 46.81	2.87 to 6.60/ 14.35 to 28.32	1.40 to 4.74/ 6.89 to 18.22	0.08 to 0.50
All impacts were calculated based on the construction footprint design.							
^a Direct/Indirect acreages are provided for riparian and aquatic communities due to higher functions and values and corresponding sensitivity to indirect effects.							
^b All decimal values are presented to the hundredths place. Totals from 0.005 to 0.009 are therefore rounded to 0.01. Totals below 0.004 acre are therefore rounded to zero (0).							
^c Total range of impacts includes the least amount of habitat affected by the HST alternative to the most impact by the HST alternative.							
Source: Authority and FRA (2012a).							

Table 3.7-22

Aquatic Communities Potentially Affected (Direct/Indirect ^a)
 during the Project Period of the Hybrid Alternative (acres ^b)

Hybrid Alternative	Vernal Pools	Other Seasonal Wetlands	Fremont Cottonwood Forested Wetlands	Coastal and Valley Freshwater Marsh	Natural Watercourses	Constructed Basins	Constructed Watercourses	Open waters
Impacts by Project Combination								
Hybrid North-South Alignment Ave 24 Wye	2.85/ 7.52	0.93/ 1.93	3.64/ 3.37	--/--	6.70/ 30.63	5.98/ 24.25	16.13/ 25.87	1.49/ 3.52
Hybrid North-South Alignment Ave 21 Wye	1.87/ 10.62	0.85/ 2.01	3.59/ 3.08	0.04/0.2 2	3.73/ 22.86	3.97/ 20.84	18.83/ 20.55	1.64/ 3.97
Fresno Station Alternatives								
Mariposa Street Station	--/--	--/--	--/--	--/--	--/--	--	--/--	--/--
Kern Street Station	--/--	--/--	--/--	--/--	--/--	--	--/--	--/--
Total Range of Impacts ^c	1.87 to 2.85/7.52 to 10.62	0.85 to 0.93/1.93 to 2.01	3.59 to 3.64/3.08 to 3.37	0 to 0.04/0 to 0.22	3.73 to 6.70/22.86 to 30.63	3.97 to 5.98/20.84 to 24.25	16.13 to 18.83/20.55 to 25.87	1.49 to 1.64/3.52 to 3.97
All impacts were calculated based on the construction footprint design.								
^a Direct/Indirect acreages are provided for riparian and aquatic communities due to higher functions and values and corresponding sensitivity to indirect effects.								
^b All decimal values are presented to the hundredths place. Totals from 0.005 to 0.009 are therefore rounded to 0.01. Totals below 0.004 acre are therefore rounded to zero (0).								
^c Total range of impacts includes the least amount of habitat affected by the HST alternative to the most impact by the HST alternative.								
The sum of Vernal Pools, Other Seasonal Wetlands, Fremont Cottonwood Forested Wetland, Coastal and Valley Freshwater Marsh, Natural Watercourses, Constructed Basins, and Constructed Watercourses represents potential impacts on jurisdictional waters.								
Source: Authority and FRA (2012a).								

Heavy Maintenance Facility Alternatives

Direct permanent and indirect permanent acreage numbers for terrestrial and aquatic communities potentially affected during the project period of all HMF alternatives can be found in Tables 3.7-23 and 3.7-24.

Castle Commerce Center HMF: The Castle Commerce Center HMF footprint contains the following plant communities and land cover types: developed areas, agricultural lands, ruderal vegetation, Great Valley mixed riparian forest, other riparian habitat, eucalyptus woodlands, vernal pools, other seasonal wetlands, Fremont cottonwood forested wetland, and natural and constructed watercourses. The Castle Commerce HMF spans the Main Ashe Lateral Canal as well as Canal Creek, Black Rascal Creek, Bear Creek, including associated Great Valley mixed riparian forest. Great Valley mixed riparian forest and other riparian habitat is considered a sensitive natural community due to its relative scarcity and importance in sustaining biological resources; as such, this habitat is regulated by the CDFG, USFWS, and USACE. Any substantive impacts that result in reduction of riparian habitat values would be considered an impact with moderate to substantial intensity under NEPA and would be significant under CEQA.

Table 3.7-23
 Terrestrial Communities Potentially Affected
 during the Project Period of the HMF Alternatives (acres ^a)

HMF Alternatives	Developed Areas	Agricultural Lands	Ruderal Vegetation	California Annual Grassland	Great Valley Mixed Riparian Forest	Other Riparian	Eucalyptus Woodlands
Castle Commerce Center	105.93	172.10	27.10	--	0.24/ 0.59	0.80/ 1.18	0.23
Harris-DeJager	6.34	387.53	3.34	--	--/--	0.44/--	--
Fagundes	9.27	214.58	0.02	--	0.48/ 0.16	0.47/ 0.17	--
Gordon -Shaw	15.57	344.68	16.11	--	--/--	1.05/ 0.31	--
Kojima Development	2.22	288.12	2.30	77.05	1.28/ 1.71	--/--	--

All impacts were calculated based on the construction footprint design.

^a All decimal values are presented to the hundredths place. Totals from 0.005 to 0.009 are therefore rounded to 0.01. Totals below 0.004 acre are therefore rounded to zero (0).

Source: Authority and FRA (2012a)

Table 3.7-24
 Aquatic Communities Potentially Affected
 during the Project Period of the HMF Alternatives (acres ^a)

HMF Alternatives	Vernal Pools	Other Seasonal Wetlands	Fremont Cottonwood Forested Wetlands	Coastal and Valley Freshwater Marsh	Natural Watercourses	Constructed Basins	Constructed Watercourses	Open waters
Castle Commerce Center	0.20/ 0.04	0.20/0.79	0.43/0.77	--/--	2.01/ 7.26	0.81/3 .34	5.50/ 1.74	--/0.57
Harris-DeJager	--/--	--/--	0.44/--	--/--	0.19/ -	--/--	0.91/- -	0.42/--
Fagundes	--/--	--/--	--/--	--/--	0.49/ 0.12	0.28/0 .89	0.87/ 0.03	--/--
Gordon-Shaw	--/--	--/0.34	0.12/0.27	0.06/0.1 0	2.56/ 0.83	--/--	0.31/ 0.07	0.12/1.64
Kojima Development	0.76/ 0.51	0.59 /--	--/--	0.50/2.0 1	1.10/ 5.54	0.84/--	0.28/ 0.06	--/0.32

All impacts were calculated based on the construction footprint design.

^a All decimal values are presented to the hundredths place. Totals from 0.005 to 0.009 are therefore rounded to 0.01. Totals below 0.004 acre are therefore rounded to zero (0).
 The sum of Vernal Pools, Other Seasonal Wetlands, Fremont Cottonwood Forested Wetland, Coastal and Valley Freshwater Marsh, Natural Watercourses, Constructed Basins, and Constructed Watercourses represents potential impacts on jurisdictional waters.

Source: Authority and FRA (2012)a.

Because implementation of the Castle Commerce Center HMF has the potential to adversely affect riparian habitat, other sensitive natural communities, and federally protected wetlands for reasons identified above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

It should be noted that California annual grassland and coastal and valley freshwater marsh do not occur within the Castle Commerce Center HMF footprint. No effect or impact would occur to these terrestrial and aquatic communities.

Harris-DeJager HMF: The Harris-DeJager HMF footprint contains the following plant communities and land cover types: developed areas, agricultural lands, ruderal vegetation, other riparian habitat, Fremont cottonwood forested wetland, natural and constructed watercourses, and open waters.

Because implementation of the Harris-DeJager HMF has the potential to adversely affect riparian habitat, other sensitive natural communities, and federally protected wetlands for reasons identified above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

It should be noted that California annual grassland, Great Valley mixed riparian forest, eucalyptus woodlands, vernal pools, other seasonal wetlands, and coastal and valley freshwater marsh do not occur within the Harris-DeJager HMF footprint. No effect or impact would occur to these terrestrial and aquatic communities.

Fagundes HMF: The Fagundes HMF footprint contains the following plant communities and land cover types: developed areas, agricultural lands, ruderal vegetation, Great Valley mixed riparian forest, other riparian habitat, and natural and constructed watercourses. Great Valley mixed riparian forest and other riparian habitat is considered a sensitive natural community due to its relative scarcity and importance in sustaining biological resources; as such, this habitat is regulated by the CDFG, USFWS, and USACE. Any substantive impacts that result in the reduction of riparian habitat values would be an impact with moderate to substantial intensity under NEPA and would be significant under CEQA.

Because implementation of the Fagundes HMF has the potential to adversely affect riparian habitat and other sensitive natural communities for reasons identified above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

It should be noted that California annual grasslands, eucalyptus woodlands, vernal pools, other seasonal wetlands, Fremont cottonwood forested wetland, coastal and valley freshwater marshes, and open waters do not occur within the Fagundes HMF footprint. No effect or impact would occur to these terrestrial and aquatic communities.

Gordon-Shaw HMF: The Gordon-Shaw HMF footprint contains the following plant communities and land cover types: developed areas, agricultural lands, ruderal vegetation, other riparian habitat, Fremont cottonwood forested wetland, coastal and valley freshwater marsh, natural and constructed watercourses, and open waters.

Because implementation of the Gordon-Shaw HMF has the potential to adversely affect riparian habitat, other sensitive natural communities, and federally protected wetlands for reasons identified above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

It should be noted that California annual grassland, Great Valley mixed riparian forest, eucalyptus woodlands, vernal pools, and other seasonal wetlands do not occur within the Gordon-Shaw HMF footprint. No effect or impact would occur to these terrestrial and aquatic communities.

Kojima Development HMF: The Kojima Development HMF site contains the following plant communities and land cover types: developed areas, agricultural lands, ruderal vegetation, California annual grassland, Great Valley mixed riparian forest, vernal pools, other seasonal wetlands, coastal and valley freshwater marsh, and natural and constructed watercourses. Great Valley mixed riparian forest is considered a sensitive natural community due to its relative scarcity and importance in sustaining biological resources; as such, this habitat is regulated by the CDFG, USFWS, and USACE. Any substantive impacts that result in reduction of riparian habitat values are considered to have moderate to substantial intensity under NEPA and to be significant under CEQA.

Because implementation of the Kojima Development HMF has the potential to adversely affect riparian habitat, other sensitive natural communities, and federally protected wetlands for reasons identified above, the impact would have moderate intensity under NEPA and would be significant under CEQA. The Kojima Development HMF is the only HMF to result in direct impacts on vernal pools and other seasonal wetlands.

It should be noted that other riparian habitat, eucalyptus woodlands, Fremont cottonwood forested wetlands, and open waters do not occur within the Kojima Development HMF footprint. No effect or impact would occur on these terrestrial and aquatic communities.

Special-Status Plant Species

Direct Impacts During the Project Period

Direct impacts on special-status plant species would result from the permanent removal of vegetation from within the HST system footprint. In addition, special-status plants would be affected by increased pedestrian access/activity in the area, which would trample or crush them; and exposure to accidental spills including contaminants/pollutants. During ongoing operation and maintenance activities (e.g.,

routine inspection and maintenance of the HST right-of-way) vehicle or foot traffic would also trample or crush the native vegetation.

Direct impacts include the permanent removal of special-status plant communities and land cover types that provide habitat for a number of special-status plants. Based upon the habitat requirements of special-status plants, an estimated 36 species have a moderate to high potential to occur within the HST alternatives. Many areas within the study areas and the corresponding limits of disturbance were not made available for pedestrian field surveys. Therefore, inaccessible areas with potentially suitable habitat present are considered occupied by special-status plant species. For these reasons, all of the HST alternatives have various amounts of suitable habitat for special-status species. Appendix 3.7-B provides a range of potential impacts in acres to special-status plant species based on the specific affinity each species has to plant communities and land cover types, identified within the study area. Depending on the amount of affected habitat, the projected effect may be considered moderate to substantial or moderate. Effects identified as having moderate intensity under NEPA are considered significant under CEQA.

Indirect Impacts During the Project Period

Indirect impacts on special-status plant species are anticipated to include: increased erosion, sedimentation, siltation from runoff, and hydrology that could affect adjacent aquatic habitats; wind erosion effects (including from unvegetated rights-of-way and passing high-speed trains); an increased risk of fire in adjacent open spaces due to increased human activity; and the introduction of noxious plant species (nonnative, detrimental species) from increased human activity. Indirect impacts would be less during the project period of the HST as project design features would be in place to direct water flow.

UPRR/SR 99 Alternative

All suitable habitats for special-status plants are assumed to be occupied by populations of special-status plants. Special-status plant populations are regulated by both CDFG and USFWS. The loss of habitat could impair the survival of self-sustaining populations. Consequently, the impact of the potential loss of habitat would have moderate intensity under NEPA and would be significant under CEQA.

Implementation of the UPRR/SR 99 Alternative would result in direct and indirect impacts on all 36 special-status plant species as described above. However, most impacts would occur to the following species based on a comparison of acres affected per species: Hoover's calycadenia, Keck's checkerbloom, beaked clarkia, recurved larkspur, and heartscale. It should be noted that Hoover's calycadenia could be substantially more affected than any other special-status plant since permanent removal of suitable habitat is anticipated for this species.

Because implementation of the UPRR/SR 99 Alternative has the potential to result in the loss of or damage to all 36 special-status plant species and their habitats for reasons identified above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

BNSF Alternative

All suitable habitats for special-status plants are assumed to be occupied by populations of special-status plants. Special-status plant populations are regulated by both CDFG and USFWS. The loss of habitat could impair the survival of self-sustaining populations. Consequently, the impact of the potential loss of habitat would have moderate intensity under NEPA and would be significant under CEQA.

Implementation of the UPRR/SR 99 Alternative would result in direct and indirect impacts on all 36 special-status plant species as described above. However, most impacts would occur to the following species based on a comparison of acres affected per species: Hoover's calycadenia, Keck's checkerbloom, beaked clarkia, recurved larkspur, heartscale, spiny-sealed button-celery, caper-fruited tropidocarpum, brittlescale, San Joaquin spearscale, lesser saltscale, vernal pool smallscale, subtle orache, Lost Hills crownscale, Hoover's spurge, alkali milk-vetch, shining navarretia, Hartweg's golden sunburst, Merced phacelia, palmate-bracted bird's-beak, and prostrate vernal pool navarretia. It should be noted that

Hoover's calycadenia could be substantially more affected than any other special-status plant since permanent removal of suitable habitat is anticipated for this species.

Because implementation of the BNSF Alternative has the potential to result in the loss of or damage to all 36 special-status plant species and their habitats for reasons identified above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Hybrid Alternative

All suitable habitats for special-status plants are assumed to be occupied by populations of special-status plants. Special-status plant populations are regulated by both CDFG and USFWS. The loss of habitat could impair the survival of self-sustaining populations. Consequently, the impact of the potential loss of habitat would have moderate intensity under NEPA and would be significant under CEQA.

Implementation of the Hybrid Alternative would result in direct and indirect impacts on all 36 special-status plant species as described above. However, most impacts would occur to the following species based on a comparison of acres affected per species: Hoover's calycadenia, Keck's checkerbloom, beaked clarkia, recurved larkspur, and heartscale. It should be noted that Hoover's calycadenia could be substantially more affected than any other special-status plant since permanent removal of suitable habitat is anticipated for this species.

Because implementation of the Hybrid Alternative has the potential to result in the loss of or damage to all 36 special-status plant species and their habitats for reasons identified above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Heavy Maintenance Facility Alternatives

Castle Commerce Center HMF: All suitable habitats for special-status plants are assumed to be occupied by populations of special-status plants. Special-status plant populations are regulated by both CDFG and USFWS. The loss of habitat could impair the survival of self-sustaining populations. Consequently, the impact of the potential loss of habitat would have moderate intensity under NEPA and would be significant under CEQA.

Implementation of the Castle Commerce Center HMF would result in direct and indirect impacts on 27 special-status plant species as described above. Because implementation of the Castle Commerce Center HMF has the potential to result in the loss of or damage to 27 special-status plant species and their habitats for reasons identified above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Habitat known to support the other nine special-status plant species (Sanford's arrowhead, Hartweg's golden sunburst, Heckard's pepper-grass, caper-fruited tropidocarpum, heartscale, subtle orache, Merced phacelia, beaked clarkia, palmate-bracted bird's-beak) is not present within the Castle Commerce Center HMF. Therefore, these nine special-status plant species and their habitats would not be affected by this HMF alternative.

Harris-DeJager and Fagundes HMFs: All suitable habitats for special-status plants are assumed to be occupied by populations of special-status plants. Special-status plant populations are regulated by both CDFG and USFWS. The loss of habitat could impair the survival of self-sustaining populations. Consequently, the impact of the potential loss of habitat would have moderate intensity under NEPA and would be significant under CEQA.

Implementation of the Harris-DeJager and Fagundes HMFs would result in direct and indirect impacts on 26 special-status plant species as described above. Because implementation of the Harris-DeJager and Fagundes HMFs have the potential to result in the loss of or damage to 26 special-status plant species and their habitats for reasons identified above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Habitat known to support the other 10 special-status plant species (Hoover's calycadenia, Hartweg's golden sunburst, Heckard's pepper-grass, caper-fruited tropidocarpum, heartscale, subtle orache, Merced phacelia, beaked clarkia, recurved larkspur, and palmate-bracted bird's-beak) is not present within the Harris-DeJager and Fagundes HMFs. Therefore, these 10 special-status plant species and their habitats would not be affected by these HMFs.

Gordon-Shaw HMF: All suitable habitats for special-status plants are assumed to be occupied by populations of special-status plants. Special-status plant populations are regulated by both CDFG and USFWS. The loss of habitat could impair the survival of self-sustaining populations. Consequently, the impact of the potential loss of habitat would have moderate intensity under NEPA and would be significant under CEQA.

Implementation of the Gordon-Shaw HMF would result in direct and indirect impacts on 34 special-status plant species as described above. Because implementation of the Gordon-Shaw HMF has the potential to result in the loss of or damage to 34 special-status plant species and their habitats for reasons identified above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Habitat known to support the other two special-status plant species (beaked clarkia and palmate-bracted bird's-beak) is not present within the Gordon-Shaw HMF. Therefore, these two special-status plant species and their habitats would not be affected by this HMF.

Kojima Development HMF: All suitable habitats for special-status plants are assumed to be occupied by populations of special-status plants. Special-status plant populations are regulated by both CDFG and USFWS. The loss of habitat could impair the survival of self-sustaining populations. Consequently, the impact of the potential loss of habitat would have moderate intensity under NEPA and would be significant under CEQA.

Implementation of the Kojima Development HMF would result in direct and indirect impacts on 35 special-status plant species as described above. Because implementation of the Kojima Development HMF has the potential to result in the loss of or damage to 35 special-status plant species and their habitats for reasons identified above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Habitat known to support the other special-status plant species (California satintail) is not present within the Kojima Development HMF. Therefore, this special-status plant species and its habitat would not be affected by this HMF.

Special-Status Wildlife Species

The following section discusses impacts, direct and indirect, resulting from operation activities to special-status wildlife species.

Based on specific habitat requirements, several special-status invertebrates and vertebrates are likely to occur. As previously discussed in the methodology section, significant portions of the survey zone within the construction footprint and the corresponding limits of disturbance were not made available for field surveys. Areas not reached during field surveys are considered potentially occupied by special-status wildlife species. Appendix 3.7-B provides a range of potential impacts in acres to special-status wildlife species based on the specific affinity each species has to plant communities and land cover types, identified within the study area. Consequently, if appropriate habitat is present, all of the HST alternatives would result in either a moderate or substantial effect depending on the quantity of habitat and scarcity of the species. Sufficient vernal pool habitat exists to support special-status fairy shrimp within each of the HST alternatives; however, the BNSF Alternative has more suitable vernal pool habitat than the UPRR/SR 99 Alternative or the Hybrid Alternative, and the corresponding magnitude of the potential effect is therefore greater.

Direct Impacts During the Project Period

Direct impacts relative to all special-status wildlife species include the permanent conversion of occupied habitat and the loss of individual special-status wildlife species within the limits of disturbance.

Invertebrates: Direct impacts would include mortality from incidental trampling or crushing caused by increased human activity, and exposure to accidental spills including contaminants/pollutants. Direct impacts would also include the permanent conversion of occupied habitat.

Amphibians and Reptiles: Direct impacts during operation would include some impacts similar to those described for invertebrates, such as incidental trampling or crushing, exposure to accidental spills including contaminants/pollutants, changes in micro/local hydrology, and displacement due to habitat modification. Direct impacts would also include the permanent conversion of occupied habitat.

Fish: Direct impacts during operation would be similar to those described for invertebrates and amphibians. Final bridge design plans are not currently available, but may require placing piling within the San Joaquin River, permanently converting a small amount of occupied habitat. However, the HST alternatives would be elevated where each crosses the river. Two approaches to bridge crossing design are presented in Section 3.7.6. The HST crossing would be designed for anticipated increases in river flows resulting from the implementation of the SJRRP. The design minimizes any appreciable changes in scour, sediment transport and deposition, or other hydrofluvial processes that could adversely alter salmonid habitat.

Birds: Thirty-seven special-status bird species listed in Appendix 3.7-A, Attachment 2, have been identified as having a moderate or higher potential to occur within the project vicinity. The following discussion relates to these species as described in Section 3.7.4. Direct impacts would also result from avian collisions with HSTs.

Project period activities (e.g., mowing, weed control, and driving off-road) could result in the removal or disturbance of areas that provide potential nesting habitat for a diverse population of birds. Operations and maintenance activities conducted in areas of nesting habitat during the breeding season (generally between February 1 and September 1) could disturb nesting birds. This disturbance could cause nest abandonment and subsequent loss of eggs or developing young at active nests in or near the area of activity. Increased noise levels, mortality due to HST strikes, and human presence may accelerate local shifts in populations as could additional pressures on the landscape from colonization by nonnative plant species.

Burrowing Owls: Direct impacts on burrowing owls as a result of operation activities include the permanent conversion of occupied habitat and the potential for local nest/burrow abandonment. Increased noise levels and human presence may accelerate local shifts in populations and any additional pressures on the landscape from colonization by nonnative plant species.

Raptors: Direct impacts on raptors could include disruption of breeding activity due to increased noise, mortality due to HST strikes, and human presence associated with HST operations and the loss of habitat due to tree clearing. Incidental project period impacts from the disruption of breeding activity or the flushing of adult or fledging birds through the use of the new or improved access and spur roads.

Direct impacts on potential raptor foraging habitat include the permanent conversion of habitat due to site preparation activities.

Mammals: Direct impacts during operation would be primarily related to habitat conversion. In addition, increased noise levels and human presence may accelerate local shifts in populations. In addition to the loss of habitat, some free-ranging mammals may avoid the area and be funneled along the HST corridor until locating a dispersion corridor.

Indirect Impacts During the Project Period

Invertebrates: Any change in local hydrology and vernal pools and other seasonal wetlands could cause a change in habitat conditions for vernal pool branchiopods. Indirect impacts may result from grading and stockpiling soils upslope of the pools, leading to sediment transfer into the water column. Depending on drainage BMPs, some changes to local hydrology could cause scour and changes to local hydrologic profiles. Chemical spills from fuel, transmission fluid, lubricating oil, and motor oil leaks could contaminate the water column, resulting in mortality or reduced reproductive success of special-status vernal pool branchiopods. Valley elderberry longhorn beetles can be directly affected through the damage or removal of Mexican elderberry host plants. Removal of young Mexican elderberry shrubs would reduce the long-term habitat of the valley elderberry longhorn beetle by inhibiting recruitment of young Mexican elderberry shrubs into the canopy.

Amphibians: Impacts on amphibians would be dependent on the effectiveness of BMPs used in potentially affected drainages to mitigate changes to water velocity. Chemical spills from fuel, transmission fluid, lubricating oil, and motor oil leaks have the potential to contaminate the water column, resulting in direct mortality or reduced reproductive success.

Reptiles: Indirect impacts during the project period are expected to be similar to those for amphibians except that reptiles are not as sensitive to impacts that occur in aquatic systems. Reptiles would potentially be affected by changes in the local landscape from invasive species and local terrestrial as well as aquatic spills of fuel, transmission fluid, lubricating oil, and motor oil leaks.

Fish: Indirect impacts during the project period on water quality would be similar to those described for invertebrates. Depending on drainage BMPs, some changes to local hydrology could cause scour and changes to local hydrologic profiles. Chemical spills from fuel, transmission fluid, lubricating oil, and motor oil leaks could also contaminate water, resulting in mortality or reduced reproductive success of special-status fish.

Birds: Indirect impacts could occur from use of access roads by maintenance vehicles. These activities could disrupt nesting birds, potentially leading to nest failure or abandonment. Indirect impacts would include some avoidance behavior by some species in response to increased noise, lighting, and startle and motion disturbances during HST operation and maintenance activities.

Burrowing Owls: Indirect impacts during the project period would be similar to those identified as common to all bird species.

Raptors: Indirect impacts during the project period would be similar to those identified as common to all bird species.

Mammals: Indirect impacts during the project period would include any additional pressures on the landscape from colonization by nonnative plant species. This change in plant species would further reduce adjacent habitat values. Local noise and motion disturbance effects resulting from HST operation may cause some avoidance behavior.

UPRR/SR 99 Alternative

Invertebrates: The UPRR/SR 99 Alternative contains a relatively small amount of vernal pools and other seasonal wetlands, including California annual grassland with soils suitable for vernal pools and other seasonal wetlands. Vernal pools and other seasonal wetlands provide habitat for Conservancy fairy shrimp, vernal pool fairy shrimp, and vernal tadpole fairy shrimp. Special-status invertebrates are regulated by the USFWS; the loss of suitable habitat could impair the survival of self-sustaining populations. The potential loss of suitable vernal habitat would result in the elimination of vernal pool invertebrate populations. Consequently, the impact that would result in the potential loss of suitable habitat for vernal pool invertebrate would have moderate intensity under NEPA and would be significant under CEQA.

Because implementation of the UPRR/SR 99 Alternative has the potential to result in the loss of suitable habitat for vernal pool invertebrates, the impact would have moderate intensity under NEPA and would be significant under CEQA.

The UPRR/SR 99 Alternative also contains populations of Mexican elderberry shrubs, specifically along the San Joaquin River area. All habitats with elderberry shrubs are assumed to be occupied by the valley elderberry longhorn beetle. Populations of the valley elderberry longhorn beetle are regulated by USFWS; the loss of elderberry shrubs could impair the survival of self-sustaining populations. Consequently, the potential impact on suitable habitat for valley elderberry longhorn beetles would have moderate intensity under NEPA and would be significant under CEQA.

Because implementation of the UPRR/SR 99 Alternative has the potential to result in the loss of suitable Mexican elderberry shrubs for the valley elderberry longhorn beetle, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Fish: The UPRR/SR 99 Alternative contains aquatic habitats (primarily along the San Joaquin River) known to support Kern brook lamprey, Central Valley steelhead, Central Valley spring-run Chinook salmon, hardhead, and San Joaquin roach. Fish habitat is being restored with the San Joaquin River from the Friant Dam to the Merced River confluence. Potential impacts during the project period are not expected to adversely affect the re-establishment of special-status fish along the San Joaquin River. The potential impacts are being considered during the project design (i.e., final bridge design and piling locations). Impacts on fish habitat, including EFH, are anticipated to be avoided after construction is complete. Two approaches to bridge crossing design are presented in Section 3.7.6. The HST crossing would be designed for anticipated increases in river flows resulting from the implementation of the SJRRP. Design options avoid or minimize any appreciable changes in scour, sediment transport and deposition, or other hydrofluvial processes that could adversely alter salmonid habitat.

Because implementation of the UPRR/SR 99 Alternative would not directly or indirectly affect these special-status fish as described above, the impact would have negligible intensity under NEPA and would be less than significant under CEQA.

Amphibians: The UPRR/SR 99 Alternative contains suitable breeding and upland habitat for California tiger salamanders and western spadefoot toads. All suitable vernal pool and other seasonal wetland habitat with associated upland areas are assumed to be occupied by California tiger salamanders and western spadefoot toads. Populations of these special-status amphibians are regulated by both CDFG and USFWS; the loss of suitable breeding and upland habitat could impair the survival of self-sustaining populations. The potential impact on suitable habitat for California tiger salamanders and western spadefoot toads would have moderate intensity under NEPA and would be significant under CEQA.

Because implementation of the UPRR/SR 99 Alternative would directly and indirectly affect the plant communities and land cover types used by these special-status amphibians as described above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Reptiles: The UPRR/SR 99 Alternative contains suitable habitat for populations of western pond turtles. All suitable aquatic habitats are assumed to be occupied by western pond turtles. Populations of these special-status reptiles are regulated by CDFG; the loss of suitable habitat could impair the survival of self-sustaining populations. The potential impact on suitable habitat for western pond turtles would have moderate intensity under NEPA and would be significant under CEQA.

Because implementation of the UPRR/SR 99 Alternative would directly and indirectly affect the western pond turtle as described above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Birds (includes all native birds covered under MBTA): The UPRR/SR 99 Alternative contains a wide range of habitats known to support 37 special-status bird species. All suitable habitat is assumed to be occupied by special-status bird species. Populations of special-status birds are regulated by both CDFG and USFWS; the loss of suitable habitat could impair the survival of self-sustaining populations. The potential



impact on suitable habitat for special-status birds would have moderate intensity under NEPA and would be significant under CEQA.

Because implementation of the UPRR/SR 99 Alternative would directly and indirectly affect these special-status birds as described above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Mammals: The UPRR/SR 99 Alternative contains California annual grassland and agricultural lands known to support American badger (California annual grassland only), San Joaquin kit fox, and special-status bats (also known to occur within trees and rocky outcrops). All suitable habitats are assumed to be occupied by special-status mammals. Populations of mammals are regulated by both the CDFG and USFWS; the loss of suitable habitat could impair the survival of self-sustaining populations. The potential impact on suitable habitat would have moderate intensity under NEPA and would be significant under CEQA.

Because implementation of the UPRR/SR 99 Alternative would directly and indirectly affect these special-status mammals as described above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

BNSF Alternative

Invertebrates: The BNSF Alternative contains a higher amount of vernal pools and other seasonal wetlands than the UPRR/SR 99 Alternative and Hybrid Alternative and California annual grassland with soils suitable for vernal pools and other seasonal wetlands. Vernal pools and other seasonal wetlands provide habitat for Conservancy fairy shrimp, vernal pool fairy shrimp, and vernal tadpole fairy shrimp. Special-status invertebrates are regulated by the USFWS; the loss of suitable habitat could impair the survival of self-sustaining populations. The potential loss of suitable vernal habitat would result in the elimination of vernal pool invertebrate populations. Consequently, the impact of the potential loss of suitable habitat for vernal pool invertebrate would have moderate intensity under NEPA and would be significant under CEQA.

Because implementation of the BNSF Alternative has the potential to result in the loss of suitable habitat for vernal pool invertebrates, the impact would have moderate intensity under NEPA and would be significant under CEQA.

The BNSF Alternative also contains populations of Mexican elderberry shrubs, specifically along the San Joaquin River area. All habitats with elderberry shrubs are assumed to be occupied by the valley elderberry longhorn beetle. Populations of the valley elderberry longhorn beetle are regulated by USFWS; the loss of elderberry shrubs could impair the survival of self-sustaining populations. Consequently, the potential impact on suitable habitat for valley elderberry longhorn beetles would have moderate intensity under NEPA and would be significant under CEQA.

Because implementation of the BNSF Alternative has the potential to result in the loss of suitable Mexican elderberry shrubs for the valley elderberry longhorn beetle, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Fish: The BNSF Alternative contains aquatic habitats (primarily along the San Joaquin River) known to support Kern brook lamprey, Central Valley steelhead, Central Valley spring-run Chinook salmon, hardhead, and San Joaquin roach. Fish habitat is being restored with the San Joaquin River from the Friant Dam to the Merced River confluence. Potential impacts during the project period are not expected to adversely affect re-establishment of special-status fish along the San Joaquin River. The potential impacts are being considered during the project design (i.e., final bridge design and piling locations). Impacts on fish habitat, including EFH, are anticipated to be avoided after construction is complete. Two approaches to bridge crossing design are presented in Section 3.7.6. The HST crossing would be designed for anticipated increases in river flows resulting from the implementation of the SJRRP. Design options avoid or minimize any appreciable changes in scour, sediment transport and deposition, or other hydrofluvial processes that could adversely alter salmonid habitat.

Because implementation of the BNSF Alternative would not directly or indirectly affect these special-status fish as described above, the impact would have negligible intensity under NEPA and would be less than significant under CEQA.

Amphibians: The BNSF Alternative contains suitable breeding and upland habitat for California tiger salamanders and western spadefoot toads. All suitable vernal pool and other seasonal wetland habitat with associated upland areas are assumed to be occupied by California tiger salamanders and western spadefoot toads. Populations of these special-status amphibians are regulated by both CDFG and USFWS; the loss of suitable breeding and upland habitat could impair the survival of self-sustaining populations. The potential impact on suitable habitat for California tiger salamanders and western spadefoot toads would have moderate intensity under NEPA and would be significant under CEQA.

Because implementation of the BNSF Alternative would directly and indirectly affect the plant communities and land cover types used by these special-status amphibians as described above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Reptiles: The BNSF Alternative contains suitable habitat for populations of western pond turtles. All suitable aquatic habitats are assumed to be occupied by western pond turtles. Populations of these special-status reptiles are regulated by CDFG; the loss of suitable habitat could impair the survival of self-sustaining populations. The potential impact on suitable habitat for western pond turtles would have moderate intensity under NEPA and would be significant under CEQA.

Because implementation of the BNSF Alternative would directly and indirectly affect the western pond turtle as described above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Birds (includes all migratory birds covered under MBTA): The BNSF Alternative contains a wide range of habitats known to support 37 special-status bird species. All suitable habitat is assumed to be occupied by special-status bird species. Populations of special-status birds are regulated by both CDFG and USFWS; the loss of suitable habitat could impair the survival of self-sustaining populations. The potential impact on suitable habitat for special-status birds would have moderate intensity under NEPA and would be significant under CEQA.

Because implementation of the BNSF Alternative would directly and indirectly affect these special-status birds as described above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Mammals: The BNSF Alternative contains California annual grassland and agricultural lands known to support American badger (California annual grassland only), San Joaquin kit fox, and special-status bats (also known to occur within trees and rocky outcrops). All suitable habitats are assumed to be occupied by special-status mammals. Populations of mammals are regulated by both the CDFG and USFWS; the loss of suitable habitat could impair the survival of self-sustaining populations. The potential impact on suitable habitat would have moderate intensity under NEPA and would be significant under CEQA.

Because implementation of the BNSF Alternative would directly and indirectly affect these special-status mammals as described above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Hybrid Alternative

Invertebrates: The Hybrid Alternative contains a relatively small amount of vernal pools and other seasonal wetlands, including California annual grassland with soils suitable for vernal pools and other seasonal wetlands. Vernal pools and other seasonal wetlands provide habitat for Conservancy fairy shrimp, vernal pool fairy shrimp, and vernal tadpole fairy shrimp. Special-status invertebrates are regulated by the USFWS; the loss of suitable habitat could impair the survival of self-sustaining populations. The potential loss of suitable vernal habitat would result in the elimination of vernal pool

invertebrate populations. Consequently, the impact of the potential loss of suitable habitat for vernal pool invertebrate would have moderate intensity under NEPA and would be significant under CEQA.

Because implementation of the Hybrid Alternative has the potential to result in the loss of suitable habitat for vernal pool invertebrates, the impact would have moderate intensity under NEPA and would be significant under CEQA.

The Hybrid Alternative also contains populations of Mexican elderberry shrubs, specifically along the San Joaquin River area. All habitats with elderberry shrubs are assumed to be occupied by the valley elderberry longhorn beetle. Populations of the valley elderberry longhorn beetle are regulated by USFWS; the loss of elderberry shrubs could impair the survival of self-sustaining populations. Consequently, the potential impact on suitable habitat for valley elderberry longhorn beetles would have moderate intensity under NEPA and would be significant under CEQA.

Because implementation of the Hybrid Alternative has the potential to result in the loss of suitable Mexican elderberry shrubs for the valley elderberry longhorn beetle, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Fish: The Hybrid Alternative contains aquatic habitats (primarily along the San Joaquin River) known to support Kern brook lamprey, Central Valley steelhead, Central Valley spring-run Chinook salmon, hardhead, and San Joaquin roach. Fish habitat is being restored with the San Joaquin River from the Friant Dam to the Merced River confluence. Potential impacts during the project period are not expected to adversely affect the re-establishment of special-status fish along the San Joaquin River. The potential impacts are being considered during the project design (i.e., final bridge design and piling locations). Impacts on fish habitat, including EFH, are anticipated to be avoided after construction is complete. Two approaches to bridge crossing design are presented in Section 3.7.6. The HST crossing would be designed for anticipated increases in river flows resulting from the implementation of the SJRRP. Design options avoid or minimize any appreciable changes in scour, sediment transport and deposition, or other hydrofluvial processes that could adversely alter salmonid habitat.

Because implementation of the Hybrid Alternative would not directly or indirectly affect these special-status fish as described above, the impact would have negligible intensity under NEPA and be less than significant under CEQA.

Amphibians: The Hybrid Alternative contains suitable breeding and upland habitat for California tiger salamanders and western spadefoot toads. All suitable vernal pool and other seasonal wetland habitat with associated upland areas are assumed to be occupied by California tiger salamanders and western spadefoot toads. Populations of these special-status amphibians are regulated by both CDFG and USFWS; the loss of suitable breeding and upland habitat could impair the survival of self-sustaining populations. The potential impact on suitable habitat for California tiger salamanders and western spadefoot toads would have moderate intensity under NEPA and would be significant under CEQA.

Because implementation of the Hybrid Alternative would directly and indirectly affect the plant communities and land cover types used by these special-status amphibians as described above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Reptiles: The Hybrid Alternative contains suitable habitat for populations of western pond turtles. All suitable aquatic habitats are assumed to be occupied by western pond turtles. Populations of these special-status reptiles are regulated by CDFG; the loss of suitable habitat could impair the survival of self-sustaining populations. The potential impact on suitable habitat for western pond turtles would have moderate intensity under NEPA and would be significant under CEQA.

Because implementation of the Hybrid Alternative would directly and indirectly affect the western pond turtle as described above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Birds (includes all native birds covered under MBTA): The Hybrid Alternative contains a wide range of habitats known to support 37 special-status bird species. All suitable habitat is assumed to be occupied by special-status bird species. Populations of special-status birds are regulated by both CDFG and USFWS; the loss of suitable habitat could impair the survival of self-sustaining populations. The potential impact on suitable habitat for special-status birds would have moderate intensity under NEPA and would be significant under CEQA.

Because implementation of the Hybrid Alternative would directly and indirectly affect these special-status birds as described above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Mammals: The Hybrid Alternative contains California annual grassland and agricultural lands known to support American badger (California annual grassland only), San Joaquin kit fox, and special-status bats (also known to occur within trees and rocky outcrops). All suitable habitats are assumed to be occupied by special-status mammals. Populations of mammals are regulated by both the CDFG and USFWS; the loss of suitable habitat could impair the survival of self-sustaining populations. The potential impact would have moderate intensity under NEPA and would be significant under CEQA.

Because implementation of the Hybrid Alternative would directly and indirectly affect these special-status mammals as described above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Heavy Maintenance Facility Alternatives

Special-status wildlife species potentially affected by the HMF sites are addressed in Table 3.7-25. This table lists the presence or absence of the species within each HMF footprint and the potential for project-related impacts on each species. The conclusions presented in Table 3.7-25 are based on the potential presence of terrestrial and aquatic communities and the corresponding potential for special-status wildlife species. All communities with corresponding acreages assume presence.

Table 3.7-25

Special-Status Wildlife Species Potentially Affected during the Project Period of the HMF Alternatives ^a

HMF Alternatives	Vernal Pool Branchiopods	Valley Elderberry Longhorn Beetle	Fish	Amphibians	Reptiles	Birds*	Mammals	Bats
Castle Commerce Center	ME/SI	ME/SI	ME/SI	NE/NI	ME/SI	ME/SI	ME/SI	ME/SI
Harris-DeJager	NE/NI	ME/SI	ME/SI	NE/NI	ME/SI	ME/SI	ME/SI	ME/SI
Fagundes	NE/NI	ME/SI	ME/SI	NE/NI	ME/SI	ME/SI	ME/SI	ME/SI
Gordon-Shaw	NE/NI	ME/SI	ME/SI	NE/NI	ME/SI	ME/SI	ME/SI	ME/SI
Kojima Development	ME/SI	ME/SI	ME/SI	ME/SI	ME/SI	ME/SI	ME/SI	ME/SI

a NEPA/CEQA Significance Conclusion:
 NE/NI= No Effect/No Impact.
 NE/LI = Negligible Effect/Less Than Significant Impact (Conclusion not applicable above).
 ME/SI = Moderate Effect/Significant Impact.
 SE/SI = Substantial Effect/Significant Impact (Conclusion not applicable above).
 *includes all migratory birds covered under the MBTA.

Habitats of Concern

This section evaluates direct and indirect operation-related impacts on habitats of concern that would result from operation of the HST alternatives. Refer to Tables 3.7-23 and 3.7-24, which list the amount of terrestrial and aquatic habitats (in acres), respectively, that would potentially be affected by the HST alternatives and design options.

The amount of habitat converted during operation activities varies among the HST alternatives. If habitats of concern are present, all of the HST alternatives would result in either a moderate or substantial effect depending on the quantity of the regulated habitat (e.g., jurisdictional waters). The moderate or substantial effect finding is based primarily on the relative acreages. All of the HST alternatives include substantive riparian or aquatic habitat impacts.

Direct Impacts During the Project Period

Direct impacts include the permanent conversion of special-status plant communities, jurisdictional waters, critical habitat, mitigation banks, and fish habitat.

Project period direct impacts on habitats of concern would be similar to those discussed for plant communities and land cover types. These would include the permanent removal of vegetation from within the HST System footprint, and the disturbance (i.e., trampling or crushing) of plants due to increased human activity. During ongoing maintenance activities (e.g., routine inspection and maintenance of the HST right-of-way), vehicle or foot traffic would also trample or crush native vegetation.

Indirect Impacts During the Project Period

Operation-related indirect impacts on habitats of concern would be similar to those discussed for plant communities and land cover types. These would include: increased erosion, sedimentation, siltation, and runoff due to alterations in topography and hydrology that could affect aquatic habitats in nearby water features; wind erosion effects (including from unvegetated rights-of-way and passing high-speed trains); an increased risk of fire in adjacent open spaces due to increased human activity; and the introduction of noxious plant species from increased human activity. In addition, noise exposure during HST operations would affect local wildlife as well as incidental effects from motion and startle disturbances.

UPRR/SR 99 Alternative

Special-Status Plant Communities: Vernal pools, other seasonal wetlands, and Great Valley mixed riparian forest are present within the footprint of the UPRR/SR 99 Alternative. Special-status plant communities and federally protected wetlands are considered sensitive natural communities due to their relative scarcity and importance in sustaining biological resources and are also regulated by the CDFG, USFWS, and USACE. Any substantive impacts that result in reduction of riparian habitat values and federally protected wetlands would be considered impacts with moderate to substantial intensity under NEPA and would be significant under CEQA.

Because implementation of the UPRR/SR 99 Alternative has the potential to result in the loss or disturbance of these two special-status plant communities for reasons identified above, the impact would have moderate to substantial intensity under NEPA and would be significant under CEQA.

Jurisdictional Waters: Natural and constructed watercourses, Fremont cottonwood forested wetlands, coastal and valley freshwater marsh, vernal pools, and other seasonal wetlands are present within the footprint of the UPRR/SR 99 Alternative. Jurisdictional waters are considered sensitive natural communities due to their relative scarcity and importance in sustaining biological resources and are also regulated by USACE. Any substantive impacts that result in reduction of jurisdictional waters would have moderate to substantial intensity under NEPA and would be significant under CEQA.

Because implementation of the UPRR/SR 99 Alternative has the potential to result in direct and indirect impacts on jurisdictional waters as described above, the impact would have moderate to substantial intensity under NEPA and would be significant under CEQA.

Critical Habitat: Critical habitat does not occur within the construction footprint. Because the UPRR/SR 99 Alternative does not contain critical habitat, there would be no effect under NEPA and no impact under CEQA.

Mitigation Banks/Reserves: A portion of Camp Pashayan (within the San Joaquin River Ecological Reserve) is within the footprint of the UPRR/SR 99 Alternative. Impacts on Camp Pashayan would be considered moderate under NEPA and significant under CEQA.

Because implementation of the UPRR/SR 99 Alternative would result in direct and indirect impacts on Camp Pashayan as described above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Essential Fish Habitat: The UPRR/SR 99 Alternative is elevated where it crosses the San Joaquin River, which contains EFH for Chinook salmon within and adjacent to the HST System footprint. Because the design options avoid or minimize any appreciable changes in scour, sediment transport and deposition, or other hydrofluvial processes that could adversely alter salmonid habitat, the intensity of the impact would be negligible under NEPA and less than significant under CEQA.

BNSF Alternative

Special-Status Plant Communities: Vernal pools, other seasonal wetlands, coastal and valley freshwater marshes, and Great Valley mixed riparian forest are present within the footprint of the BNSF Alternative. Special-status plant communities and federally protected wetlands are considered sensitive natural communities due to their relative scarcity and importance in sustaining biological resources and are also regulated by the CDFG, USFWS, and USACE. Any substantive impacts that result in reduction of riparian habitat values and federally protected wetlands would have moderate to substantial intensity under NEPA and would be significant under CEQA.

Because implementation of the BNSF Alternative has the potential to result in the loss or disturbance of these three special-status plant communities for reasons identified above, the impact would have moderate to substantial intensity under NEPA and would be significant under CEQA.

Jurisdictional Waters: Natural and constructed watercourses, vernal pools, other seasonal wetlands, and coastal and valley freshwater marshes are present within the surrounding area of the BNSF Alternative. Jurisdictional waters are considered sensitive natural communities due to their relative scarcity and importance in sustaining biological resources and are also regulated by USACE. Any substantive impacts that result in reduction of jurisdictional waters would have moderate to substantial intensity under NEPA and would be significant under CEQA.

Because implementation of the BNSF Alternative has the potential to result in direct and indirect impacts on jurisdictional waters as described above, the impact would have moderate to substantial intensity under NEPA and would be significant under CEQA.

Critical Habitat: The BNSF Alternative contains critical habitat for Conservancy fairy shrimp, vernal pool tadpole shrimp, vernal pool fairy shrimp, Greene's tuctoria, succulent owl's clover, and San Joaquin Orcutt grass near the town of Le Grand. Critical habitat is a federal requirement in identifying key areas for endangered species recovery. Consequently, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Because implementation of the BNSF Alternative has the potential to result in direct and indirect impacts on critical habitat as described above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Mitigation Banks/Reserves: The BNSF Alternative, near the town of Le Grand, contains portions of the Great Valley Conservation Bank within and adjacent to the BNSF Alternative footprint. These portions of the Great Valley Conservation Bank contain critical habitat for San Joaquin Valley Orcutt grass and vernal pool tadpole shrimp. In addition, the BNSF Alternative traverses a portion of Camp Pashayan (within the

San Joaquin River Ecological Reserve) along the San Joaquin River. The Great Valley Conservation Bank is mitigation property that is part of a regional planning process to compensate for the loss of biological resources in the Central Valley. The impacts from project activities have the potential to reduce the biological values on the property and affect overall values as a conservation bank. The potential impacts on conservation properties would have moderate intensity under NEPA and would be significant under CEQA.

Because implementation of the BNSF Alternative would result in direct and indirect impacts on the Great Valley Conservation Bank and Camp Pashayan as described above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Essential Fish Habitat: The BNSF Alternative would be elevated where it crosses the San Joaquin River, which contains EFH for Chinook salmon within and adjacent to the HST construction footprint. Because the design options would avoid or minimize any appreciable changes in scour, sediment transport and deposition, or other hydrofluvial processes that could adversely alter salmonid habitat, the intensity of the impact would be negligible under NEPA and less than significant under CEQA.

Table 3.7-26 summarizes the critical habitat potentially affected directly by the BNSF Alternative during the project period.

Table 3.7-26
 Critical Habitat Potentially Affected
 during the Project Period of the BNSF Alternative (acres ^a)

HST Alternative	San Joaquin Valley Orcutt grass (Unit 2)	Greene's tuctoria (Unit 7)	Succulent owl's- clover (Unit 3B)	Conservancy fairy shrimp (Unit 6)	Vernal pool fairy shrimp (Unit 22)	Vernal pool tadpole shrimp (Unit 15)
Impacts by Project Combination						
BNSF north - south alignment with Ave 24 Wye	0.03	--	--	--	--	0.03
BNSF north - south alignment with Ave 21Wye	0.03	--	--	--	--	0.03
Le Grand Design Options						
Mission Ave	89.77	--	--	--	--	89.77
Mission Ave East of Le Grand	71.24	10.48	10.48	10.48	10.48	81.72
Mariposa Way	85.72	--	--	--	--	85.72
Mariposa Way East of Le Grand	60.05	4.76	4.76	4.76	4.76	64.82
Design Options to Fresno Station						
Mariposa Street Station	--	--	--	--	--	--
Kern Street Station	--	--	--	--	--	--
Impacts of Components Combined^b						
BNSF Alternative, Ave 24 Wye	60.08 to 89.80	0 to 10.48	0 to 10.48	0 to 10.48	0 to 10.48	64.85 to 89.80
BNSF Alternative, Ave 21 Wye	60.08 to 89.80	0 to 10.48	0 to 10.48	0 to 10.48	0 to 10.48	64.85 to 89.80
Total Range of Impacts for the BNSF Alternative^b	60.08 to 89.80	0 to 10.48	0 to 10.48	0 to 10.48	0 to 10.48	64.85 to 89.80
Notes: No critical habitat is present along the Fresno Station design options.						
All impacts were calculated based on the construction footprint design.						
^a All decimal values are presented to the hundredths place. Totals from 0.005 to 0.009 are therefore rounded to 0.01. Totals below 0.004 acre are therefore rounded to zero (0).						
^b Total range of impacts includes the least amount of habitat affected by the HST alternatives to the most impact by the HST alternatives.						
Source: Authority and FRA (2012a).						

Hybrid Alternative

Special-Status Plant Communities: Vernal pools, other seasonal wetlands, and Great Valley mixed riparian forest are present within the area surrounding the Hybrid Alternative. Special-status plant communities and federally protected wetlands are considered sensitive natural communities due to their relative scarcity and importance in sustaining biological resources and are also regulated by the CDFG, USFWS, and USACE. Any substantive impacts that result in reduction of riparian habitat values and federally protected wetlands would have moderate to substantial intensity under NEPA and would be significant under CEQA.

Because implementation of the Hybrid Alternative has the potential to result in the loss or disturbance of these two special-status plant communities for reasons identified above, the impact would have moderate to substantial intensity under NEPA and would be significant under CEQA.

Jurisdictional Waters: Natural and constructed watercourses, Fremont cottonwood forested wetlands, coastal and valley freshwater marsh, vernal pools, and other seasonal wetlands are present within the Hybrid Alternative footprint. Jurisdictional waters are considered sensitive natural communities due to their relative scarcity and importance in sustaining biological resources and are also regulated by the USACE. Any substantive impacts that result in reduction of jurisdictional waters would have moderate to substantial intensity under NEPA and would be significant under CEQA.

Because implementation of the Hybrid Alternative has the potential to result in direct and indirect impacts on jurisdictional waters as described above, the impact would have moderate to substantial intensity under NEPA and would be significant under CEQA.

Critical Habitat: Critical habitat does not occur within the construction footprint. Because the Hybrid Alternative does not contain critical habitat, there would be no effect under NEPA and no impact under CEQA.

Mitigation Banks/Reserves: A portion of Camp Pashayan (within the San Joaquin River Ecological Reserve) is within and adjacent to the construction footprint of the Hybrid Alternative. Impacts on Camp Pashayan would have moderate intensity under NEPA and would be significant under CEQA.

Because construction of the Hybrid Alternative would result in direct and indirect impacts on Camp Pashayan as described above, the impact would have moderate intensity under NEPA and would be significant under CEQA.

Essential Fish Habitat: The Hybrid Alternative would be elevated where it crosses the San Joaquin River, which contains EFH for Chinook salmon within and adjacent to the HST construction footprint. Because the design options would avoid or minimize any appreciable changes in scour, sediment transport and deposition, or other hydrofluvial processes that could adversely alter salmonid habitat, the intensity of the impact would be negligible under NEPA and less than significant under CEQA.

Heavy Maintenance Facility Alternatives

Habitats of concern potentially affected by the HMF sites are addressed in Table 3.7-27. This table lists the presence or absence of special-status species within each HMF footprint as well as the potential for project-related impacts on species. The conclusions presented in Table 3.7-27 are based on the occurrence of special-status plant communities, jurisdictional waters, critical habitat, mitigation banks/reserves, and fish habitat. Impacts on acreages of natural resources within the construction footprint would have moderate under NEPA and would be significant under CEQA as they are regulated by CDFG, USFWS, or USACE.

Table 3.7-27
 Habitats of Concern Potentially Affected during the Project Period of the HMF Alternatives ^a

HMF Alternatives	Special-Status Plant Communities	Jurisdictional Waters	Critical Habitat	Mitigation Banks/Reserves	Essential Fish Habitat
Castle Commerce Center	ME/SI (Great Valley Mixed Riparian Forest and Vernal Pools)	ME/SI (Natural Watercourses, Fremont Cottonwood Forested Wetlands and Vernal Pools)	NE/NI	NE/NI	NE/NI
Harris-DeJager	NE/NI	ME/SI (Natural Watercourses and Fremont Cottonwood Forested Wetlands)	NE/NI	NE/NI	NE/NI
Fagundes	ME/SI (Great Valley Mixed Riparian Forest)	ME/SI (Natural Watercourses)	NE/NI	NE/NI	NE/NI
Gordon-Shaw	ME/SI (Coastal and Valley Freshwater Marsh)	ME/SI (Natural Watercourses, Fremont Cottonwood Forested Wetlands and Coastal and Valley Freshwater Marsh)	NE/NI	NE/NI	NE/NI
Kojima Development	ME/SI (Great Valley Mixed Riparian Forest, Coastal and Valley Freshwater Marsh and Vernal Pools)	ME/SI (Natural Watercourses, Coastal and Valley Freshwater Marsh and Vernal Pools)	NE/NI	NE/NI	NE/NI

^a NEPA/CEQA Significance Conclusion:

NE/NI = No Effect/No Impact.

NE/LI = Negligible Effect/Less Than Significant Impact (Conclusion not applicable above).

ME/SI = Moderate Effect/Significant Impact.

SE/SI = Substantial Effect/Significant Impact (Conclusion not applicable above).

Wildlife Movement Corridors

Direct Impacts During the Project Period

Elevated track sections are a fundamental project design feature. The elevated track provides the permeability as there is no fencing or other barrier effect on local wildlife movement. Sections of the HST alternatives include elevated tracks, which would allow for unimpeded wildlife movement. For at-grade segments, the project incorporates wildlife-dedicated crossings (see Section 3.7.6). The final size and frequency of the wildlife-dedicated crossings will be determined in coordination with the USFWS and CDFG under their respective permitting processes that require that effects to movement by listed species are avoided or minimized to the extent feasible.

The area near Deadman and Dutchman Creeks have been identified as a high-priority choke-point and missing link and is severely threatened due to development and obstructions. Existing linear facilities, including the SR 99 highway, the existing BNSF and UPRR railroad alignments, roadways and canals, and urban and certain agricultural land uses (e.g., vineyards) impede wildlife movement for free-ranging mammals (e.g., coyote, badger, San Joaquin kit fox, raccoon, skunk). As a result, the ability of wildlife species to move freely across the Central Valley is impaired. Natural dispersal corridors such as waterways have also become increasingly constrained due to adjacent land use conversion and infrastructure.

Fenced, at-grade track of the UPRR/SR 99, BNSF, and Hybrid alternatives with wildlife-dedicated and other crossings (e.g., culverts, road crossings over the HST track) would cross the 4- to 6-mile-wide ECA and modeled wildlife corridors. Modeled wildlife corridors occur within portions of the ECA and occur at several locations outside the ECA along the HST alignments. Crossing features incorporated into the project design would allow wildlife to move between the landscape on both sides of the facility. Designated wildlife crossings would be installed more frequently along track crossing the ECA and would occur less frequently along areas with little existing potential for wildlife movement because of existing infrastructure or land uses (e.g., orchards).

Because these design features accommodate wildlife movement that are subject to USFWS and CDFG approval, the HST project during the project period would result in an effect with negligible intensity under NEPA and in a less than significant impact under CEQA.

Indirect Impacts During the Project Period

Implementation of the project would require ongoing HST operation and maintenance activities (e.g., routine inspection and maintenance of the HST right-of-way). These activities occurring at or in the vicinity of wildlife movement corridors may result in indirect disruption of wildlife movement through lighting, noise, motion, and startle effects.

Some indirect disturbance of the habitats associated with a wildlife corridor may ultimately preclude the use of that corridor by wildlife species. In addition, habitat shifts (toward nonnative and/or disturbed type communities) that may occur over time (through indirect effects) can render wildlife corridors unusable for many species, as those that are substantially degraded may no longer provide food, cover, or ease of travel for many species.

As discussed in Section 3.4, Noise and Vibration, FRA has established noise levels that address impacts on wildlife (mammals and birds) and domestic animals (livestock and poultry). Noise exposure limits for each have been established at a sound exposure level (SEL) of 100 dBA from passing trains. The SEL is a receiver's cumulative noise exposure from an event and is used herein as a guideline or threshold to consider in assessing effects on wildlife and domestic animals. The focus of this discussion is on native wildlife within the natural, indigenous plant communities and habitats adjacent and parallel to the HST alternatives. The 100-dBA SEL is forecast to occur an estimated 100 feet from the trackway centerline for at-grade crossings. Elevated sections on structures would be much less; an estimated 15 feet from the centerline of the track. No intervening structures were assumed and maximum speeds of 220 mph were modeled. For purposes of this evaluation, noise exposure on adjacent wildlife habitat approaching or exceeding the 100-dBA SEL threshold are considered to elicit a negative response from mammals and birds and result in an adverse effect. It is expected that the 100-dBA SEL occurs consistently throughout and applies equally among the alternatives.

For noise exposure, the 100-dBA SEL would be exceeded for an estimated 50 feet outside the at-grade crossings on both sides. It would likely be contained within the typical cross-section and built environments for the elevated structures (assumed 60-foot height) and presence of a safety barrier on the edge of the guideways above the top of the rail. All areas that are at-grade and include substantive wildlife habitat, primarily the Eastman Lake – Bear Creek ECA and riparian corridors, are expected to experience noise exposure that exceed the 100-dBA SEL threshold and would potentially elicit a startle, avoidance or negative behavior. Additional details are provided in Section 3.4, Noise and Vibration.

UPRR/SR 99 Alternative

The HST project includes elevated track and incorporates wildlife-dedicated crossings and other features (e.g., stream crossings, road overcrossings over the HST tracks, and cross culverts) that facilitate wildlife movement. Stream, creek, or river crossings include spans or bridges that retain riparian corridors for wildlife movement. Stream crossings along the UPRR/SR99 Alternative are described below.

Within the Eastman Lake – Bear Creek ECA, the UPRR/SR 99 Alternative intersects approximately 3.6 to 4.1 miles of the noted ECA, and would cross two to four watercourses depending on the design option. Specifically, the East Chowchilla and West Chowchilla design options with Ave 24 Wye would cross four watercourses, whereas the East Chowchilla design option with Ave 21 Wye would cross two watercourses. Most of the watercourses crossed by the UPRR/SR 99 Alternative within the ECA are natural watercourses, including Deadman and Dutchman creeks. However, within other modeled wildlife corridors that are present near the Berenda Slough and the Fresno River channels, the UPRR/SR 99 Alternative intersects approximately 5.25 to 7.75 miles of the other modeled wildlife corridors, and would cross zero to five watercourses depending on the design option. All of the watercourses crossed by the UPRR/SR 99 Alternative within the other modeled wildlife corridors are constructed watercourses, such as canals. A summary of the watercourse crossings within the ECA and within the other modeled wildlife corridors by the UPRR/SR 99 Alternative is provided in Table D-1 and Table D-2 in Appendix D in the *Merced to Fresno Section Biological Resources and Wetlands Technical Report* (Authority and FRA 2012a).

All UPRR/SR 99 design options, with the exception of the West Chowchilla design option with Ave 24 Wye, include both elevated and at-grade crossings within the ECA and within other modeled wildlife corridors. All crossings include both the mainline of the tracks as well as other permanent project features that cross the watercourse at other locations.

Many of the crossings intersected by the UPRR/SR 99 Alternative include single-span or multi-span bridges at natural watercourses, such as Deadman and Dutchman creeks. All bridge crossings for all design options have limited/scattered riparian habitat. However, some of the crossings, especially within the other modeled wildlife corridors, include cross culverts. All design options provide free-ranging mammals with opportunities to disperse across the ECA and the modeled wildlife corridors. The UPRR/SR 99 Alternative has integrated permeable features to convey wildlife dispersal and supplement the hydraulic crossings.

The West Chowchilla design option with Ave 24 Wye includes at-grade crossings within the ECA. The West Chowchilla design option with Ave 24 Wye includes two multi-span bridges along Ash Slough, which may facilitate wildlife movement more effectively based on the more expansive opening.

The UPRR/SR 99 West Chowchilla design option with Ave 24 Wye crosses Deadman Creek one time along the mainline, and only crosses Dutchman Creek once along the mainline and once along an access road. The East Chowchilla design option with Ave 24 Wye crosses Deadman Creek one time along the mainline, and crosses Dutchman Creek three times (mainline twice and access road once). The UPRR/SR 99 East Chowchilla design option with Ave 21 Wye crosses Deadman Creek just once and Dutchman Creek once with no other access road crossing inside the ECA. The Ave 21 Wye also includes a longer portion of elevated track on the south end of the ECA and is retained as elevated track for several miles. This design option also includes five canal/culverts at-grade, although these are very low value crossings.

In addition, the UPRR/SR 99 Alternative would expose wildlife to noise levels that could exceed 100-dBA SEL for at-grade watercourse crossings within the Eastman Lake – Bear Creek ECA and within the other modeled wildlife corridors. The 100-dBA SEL criterion would be exceeded, but for only a short distance (i.e., traversed) within immediate proximity to the at-grade watercourse crossings. Refer to Section 3.4, Noise and Vibration, for more information concerning noise exposure impacts on wildlife and mitigation measures (such as sound barriers).

Overall, the UPRR/SR 99 Alternative would provide permeable features within the project design and, coupled with the hydraulic crossings, maintain a degree of connectivity. Therefore, the impact on wildlife

movement from implementing the UPRR/SR 99 Alternative would have negligible intensity under NEPA and would be less than significant under CEQA.

In addition, the UPRR/SR 99 Alternative would expose wildlife to noise levels that could exceed 100 dBA SEL for at-grade watercourse crossings within the Eastman Lake – Bear Creek ECA and within the other modeled wildlife corridors. The 100-dBA SEL criterion would be exceeded, but for only a short distance (i.e., traversed) within immediate proximity to the at-grade watercourse crossings. Refer to Section 3.4, Noise and Vibration, for more information concerning noise exposure impacts to wildlife and mitigation measures (such as sound barriers).

BNSF Alternative

Within the Eastman Lake – Bear Creek ECA, the BNSF Alternative intersects approximately 6 miles of the ECA and, depending on design option, would cross five to nine watercourses. All of the watercourses crossed by the BNSF Alternative within the ECA are natural watercourses, such as Deadman Creek, Dutchman Creek, Mariposa Creek, the Chowchilla River, Ash Slough, and Berenda Slough. However, within other modeled wildlife corridors that are present near the Berenda Slough and the Fresno River channels, the BNSF Alternative intersects 3.6 to 9.1 miles of the corridor and, depending on design option, would cross four to eight watercourses. All of these watercourses crossed by the BNSF Alternative within the other modeled wildlife corridors are constructed watercourses, such as canals. A summary of the watercourse crossings within the ECA and within the other modeled wildlife corridors by the BNSF Alternative is provided in Table D-3 and Table D-4 in Appendix D in the *Merced to Fresno Section Biological Resources and Wetlands Technical Report* (Authority and FRA 2012a).

Project design features that facilitate wildlife movement are as described for the UPRR/SR99 Alternative. All BNSF design options within the ECA, with the exception of the Mission Ave design option with Ave 24 Wye and Ave 21 Wye, include both elevated and at-grade crossings. In addition, all BNSF design options within the modeled wildlife corridors include both elevated and at-grade crossings. All crossings include both the mainline of the tracks as well as other permanent project features that cross the watercourse at other locations. All of the hydraulic crossings within the ECA include single-span or multi-span bridges at natural watercourses, such as Deadman Creek, Dutchman Creek, Mariposa Creek, the Chowchilla River, Ash Slough, and Berenda Slough. Most of the bridge crossings contain limited/scattered riparian habitat, where only three bridges contain well-developed riparian habitat. However, all the hydraulic crossings within the modeled wildlife corridors are constructed watercourses that include culverts and have no riparian habitat. All design options provide free-ranging mammals with opportunities to disperse across the ECA and the modeled wildlife corridors.

The Mission Ave design option with Ave 24 Wye and Ave 21 Wye has five multi-span bridges, with only one at-grade crossing within the ECA. However, the Mission Ave design option with Ave 24 Wye and Ave 21 Wye includes five multi-span bridges (one along Deadman Creek, one along Dutchman Creek, one along Chowchilla River, one along Ash Slough, and one along Berenda Slough) which may facilitate wildlife movement most effectively based on the more expansive opening. With the exception of the bridge crossing at Dutchman Creek, most of the bridge crossings contain limited/scattered to well-developed riparian habitat. This design option with Ave 24 and Ave 21 wyes, when integrating hydraulic crossings with permeable design features, provides free-ranging mammals with opportunities to disperse across the ECA.

The design option that offers the largest number of multi-span bridge crossings within the ECA is the Mariposa Way East of Le Grand design option with Ave 24 Wye and Ave 21 Wye. This design option includes seven multi-span bridges (one along Deadman Creek, three along unnamed streams, one along Chowchilla River, one along Ash Slough, and one along Berenda Slough). However, the three multi-span bridge crossings along unnamed streams contain no riparian habitat, whereas the remaining four multi-span bridges contain limited/scattered to well-developed riparian habitat. This design option with Ave 24 and Ave 21 wyes, when integrating hydraulic crossings with other design features that facilitate wildlife movement, provides free-ranging mammals with opportunities to disperse across the ECA.

Within the other modeled wildlife corridors, all of the elevated and at-grade crossings are associated with canals which include a culvert, with the exception of three multi-span bridges. The crossings at the multi-span bridges are elevated; however, the multi-span bridges each cross over a canal that does not have riparian habitat.

The BNSF Alternative has the most crossings of all of the alternatives along the watercourses. The Mission Ave East of Le Grand with both Wye options has the fewest crossings and would likely have less conflict with wildlife movement compared to the other design options. No culverts or bridges are provided in the other modeled wildlife corridor limits.

The BNSF Alternative would expose wildlife to noise levels that could exceed 100 dBA SEL for at-grade watercourse crossings within the Eastman Lake – Bear Creek ECA and within the other modeled wildlife corridors. The 100-dBA SEL criterion would be exceeded, but for only a short distance (i.e., traversed) within immediate proximity to the at-grade watercourse crossings. Refer to Section 3.4, Noise and Vibration, for more information concerning noise exposure impacts on wildlife and mitigation measures (such as sound barriers).

Overall, BNSF Alternative project design would provide wildlife crossing features and maintain habitat connectivity. Therefore, the impact on wildlife movement resulting from implementation of the BNSF Alternative would have negligible intensity under NEPA and would be less than significant under CEQA.

Hybrid Alternative

Within the Eastman Lake – Bear Creek ECA, the Hybrid Alternative intersects approximately 3.6 to 4.1 miles of the noted ECA, and would cross two to three watercourses depending on the design option. All of the watercourses crossed by the Hybrid Alternative within the ECA are natural watercourses (including Deadman and Dutchman creeks). Within other modeled wildlife corridors that are present near the Berenda Slough and the Fresno River channels, the Hybrid Alternative intersects approximately 3.6 to 5.3 miles of the other modeled wildlife corridors, and would cross two to eight watercourses depending on the design option. All of the crossings within the modeled wildlife corridors are constructed watercourses which include a culvert. A summary of the watercourse crossings within the ECA and within the other modeled wildlife corridors by the Hybrid Alternative is provided in Table D-5 and Table D-6 in Appendix D in the *Merced to Fresno Section Biological Resources and Wetlands Technical Report* (Authority and FRA 2012a).

The Hybrid Alternative includes the same project design features that facilitate wildlife movement as the UPRR/SR99 Alternative. All Hybrid design options, with the exception of the Hybrid Alternative with Ave 24 Wye within the ECA, include both elevated and at-grade crossings. All hydraulic crossings include both the mainline of the tracks as well as other permanent project features that cross the watercourse at other locations. In addition, all of the hydraulic crossings within the ECA include single-span or multi-span bridges at natural watercourses that contain limited/scattered riparian habitat.

The Hybrid Alternative with Ave 24 Wye within the ECA includes only at-grade crossings. However, this alternative with Ave 24 Wye includes two multi-span bridges along Dutchman Creek and one single-span bridge along Deadman Creek within the ECA. These bridges may facilitate wildlife movement most effectively based on the more expansive opening. The multi-span bridges and single-span bridge within the ECA have limited/scattered riparian habitat. This alternative with Ave 24 Wye, when integrating hydraulic crossings with wildlife-dedicated crossing design features, provides free-ranging mammals with opportunities to disperse across the ECA.

The Hybrid Alternative with Ave 21 Wye within the ECA includes both at-grade and elevated crossings, where two of the crossings include single-span bridges (an elevated single-span bridge across Dutchman Creek, and an at-grade single-span bridge across Deadman Creek). Both single-span bridges have limited/scattered riparian habitat. The Ave 21 Wye also includes a longer portion of elevated track on the south end of the ECA and is retained as elevated track for several miles to the south. This alternative

with Ave 21 Wye, when integrating hydraulic crossings with permeable design features, provides free-ranging mammals with opportunities to disperse across the ECA.

Within the other modeled wildlife corridors, all of the elevated and at-grade crossings are associated with canals which include a culvert.

The Hybrid Alternative with the Ave 21 Wye includes a long elevated structure within and south of the ECA and is retained as elevated track for several miles to the south. It crosses only once at the Deadman Creek and Dutchman Creek locations. With the Ave 24 Wye, the Hybrid Alternative would have three crossings, including two at Dutchman Creek. Regardless, both have permeable design features that facilitate wildlife movement.

The Hybrid Alternative would expose wildlife to noise levels that could exceed 100 dBA SEL for at-grade watercourse crossings within the Eastman Lake – Bear Creek ECA and within the other modeled wildlife corridors. The 100-dBA SEL criterion would be exceeded, but for only a short distance (i.e., traversed) within immediate proximity to the at-grade watercourse crossings. Refer to Section 3.4, Noise and Vibration, for more information concerning noise exposure impacts on wildlife and mitigation measures (such as sound barriers).

Overall, the Hybrid Alternative with Ave 24 Wye and Ave 21 Wye would include design features that maintain habitat connectivity. Therefore, the impact on wildlife movement from the Hybrid Alternative would have negligible intensity under NEPA and would be less than significant under CEQA.

Wildlife crossing information for the HST alternatives is summarized in Table 3.7-28.

Table 3.7-28

Summary of Hydraulic Wildlife Crossings within ECA and Modeled Wildlife Corridors by Alternative

Alternative, Design Option, and Wye Combination	Greatest Linear Distance Across ECA	Total Crossings within ECA			Greatest Linear Distance Across Modeled Wildlife Corridor	Total Crossings within Modeled Wildlife Corridor		
		High	Moderate	Low		High	Moderate	Low
UPRR/SR 99 Alternative								
West Chowchilla with Ave 24 Wye	3.6	2	1	1	5.25	0	0	1
East Chowchilla with Ave 24 Wye	4.1	2	2	0	5.25	0	0	0
East Chowchilla with Ave 21 Wye	4.1	0	2	0	7.75	0	0	5
Total	3.6-4.1	0-2	1-2	0-1	5.25-7.75	0	0	0-5
BNSF Alternative								
Mission Avenue with Ave 24 Wye	6.8	5	2	0	3.6	0	0	4
Mission Avenue East of Le Grand with Ave 24 Wye	6.4	5	0	0	3.6	0	0	4
Mariposa Way with Ave 24	6.8	5	2	0	3.6	0	0	4

Alternative, Design Option, and Wye Combination	Greatest Linear Distance Across ECA	Total Crossings within ECA			Greatest Linear Distance Across Modeled Wildlife Corridor	Total Crossings within Modeled Wildlife Corridor		
		High	Moderate	Low		High	Moderate	Low
Wye								
Mariposa Way East of Le Grand with Ave 24 Wye	6.1	8	1	0	3.6	0	0	4
Mission Avenue with Ave 21 Wye	6.8	5	2	0	9.1	0	0	8
Mission Avenue East of Le Grand with Ave 21 Wye	6.4	5	0	0	9.1	0	0	8
Mariposa Way with Ave 21 Wye	6.8	5	2	0	9.1	0	0	8
Mariposa Way East of Le Grand with Ave 21 Wye	6.1	8	1	0	9.1	0	0	8
Total	6.1-6.8	5-8	0-2	0	3.6-9.1	0	0	4-8
Hybrid Alternative								
Hybrid Alternative with Ave 24 Wye	3.6	2	1	0	3.6	0	0	2
Hybrid Alternative with Ave 21 Wye	4.1	1	1	0	5.3	0	0	8
Total	3.6-4.1	1-2	1	0	3.6-5.3	0	0	2-8

Heavy Maintenance Facility Alternatives

Wildlife movement corridors potentially affected by the HMF sites are addressed in Table 3.7-29. This table lists the presence or absence of wildlife movement corridors within each HMF footprint and the potential for project-related impacts. The Harris-DeJager HMF is located partially within the ECA, but comprises a relatively small percentage and is not expected to create a substantial barrier. Overall, the HST project provides permeability features within project design and, coupled with the hydraulic crossings, maintains connectivity. The impact on wildlife movement from the HMF alternatives is characterized below.

Table 3.7-29
 Wildlife Movement Corridors Potentially Affected
 during the Project Period of the HMF Alternatives

HMF Alternatives	Wildlife Movement Corridors NEPA/CEQA Significance Conclusion ^a
Castle Commerce Center	NE/NI
Harris-DeJager	NE/LI
Fagundes	NE/NI
Gordon-Shaw	NE/NI
Kojima Development	NE/LI (Ash and Berenda Slough riparian corridors)
^a NEPA/CEQA Significance Conclusion: NE/NI = Negligible Effect/No Impact NE/LI = Negligible Effect/Less Than Significant Impact ME/SI = Moderate Effect/Significant Impact SE/SI = Substantial Effect/Significant Impact (conclusion not applicable above)	

3.7.6 Project Design Features

The Authority and FRA have considered avoidance and minimization measures consistent with commitments in the Program EIR/EIS Documents. The Merced to Fresno Section includes project design features such as those that minimize effects from crossing the San Joaquin River, effectively manage and reduce runoff and discharges, and facilitate wildlife movement.

3.7.6.1 Project Design Options for the San Joaquin River

A program-level environmental document on the SJRRP has been prepared (*Draft Program EIS/EIR for the San Joaquin River Restoration Program* [Reclamation and DWR 2011]). The location of the project crossing is in Reach 1, which has been identified as the reach where spawning may occur. During an initial coordination meeting with Reclamation and the DWR on June 6, 2011, it was determined that the project design would not conflict with the SJRRP; however, this will be further evaluated as part of the permitting process, including ESA Section 7 consultation with NMFS. The Authority would continue to coordinate with the SJRRP.

Since the release of the Merced to Fresno Section Draft EIR/EIS, additional coordination has occurred under Section 7 of the Federal Endangered Species Act with the USFWS and NMFS for the preparation and submittal of the Biological Assessments (BAs). This coordination, particularly with NMFS, has resulted in two project design options for the crossing of the San Joaquin River.

- One design option for the river crossing utilizes a continuation (as on upland areas) of the spacing of the columns of the elevated structure as it approaches the river crossing within the inundated river channel. The proposed configuration or span arrangement utilizes piers/foundations at a spacing of 110 feet and results in the placement of 3 piers within the wetted perimeter of the typical low flow channel of the river. Construction would require work in the river channel for placement of the piers.
- A second design option has a configuration that uses a combination of the typical precast segmental construction up to the north bank of the river with a two-span (320- to 160-foot) steel truss superstructure spanning the main portion of the low flow channel. This second design minimizes the need to enter the wetted perimeter of the low-flow river channel. Construction would require temporary work in the river channel, including for placement of temporary piers.

As required, the construction of foundations within the edge of the active waterway will use construction methods such as the installation of sheet pile cofferdams to isolate the activity from the water column to minimize the potential for adverse effects on anadromous fish within the construction footprint. In addition, for the installation of both temporary and permanent steel casings for cast-in-drilled-hole pile construction, sheet piling for cofferdams, and pipe or H-piling for falsework, vibratory pile hammers will be used to minimize underwater acoustic impacts.

The number of foundation elements is directly related to the span arrangement necessary to meet the requirements for bridge hydraulics. Since the future crossing would be located upstream of the two existing bridge structures that carry SR 99 and the UPRR, the hydraulic effect of the placement of new piers within the river corridor on downstream structures and the geomorphology of the channel will be considered during the design of the final configuration of the structure. The HST crossing would be designed with the planned increase in river flows and would not conflict with the goals of the restoration flows.

Regardless of the design option, the HST crossing will be designed with due consideration for the anticipated increases in river flows resulting from the implementation of the SJRRP and to minimize any appreciable changes in scour, sediment transport and deposition, or changes in geomorphic processes that could alter habitat conditions in a manner that will impede the reestablishment of these species. The Authority, in partnership with the design-build team, will design and conduct a hydraulics/hydrology analysis with appropriate modeling tools and incorporate site-specific data, including the needed geotechnical investigations, to establish the design requirements, including sizing and siting of features, as well as construction techniques that are compatible with habitat conditions that support salmonid utilization of the San Joaquin River within the area impacted by the proposed HST crossing.

The design will be evaluated in consultation with NMFS, CDFG, Reclamation, and the USACE.

3.7.6.2 Project Design Features for Stormwater Management and Treatment

During the detailed design phase, the design-build team will evaluate each receiving stormwater system's capacity to accommodate project runoff. As necessary, this phase will include the following:

- Design onsite stormwater management measures, such as detention or selected upgrades to the receiving system, to provide adequate capacity.
- Design and construct onsite stormwater management facilities to capture runoff and provide treatment prior to discharge for pollutant-generating surfaces, including station parking areas, access roads, new road over- and underpasses, reconstructed interchanges, and new or relocated roads and highways.
- Consider the use of constructed wetland systems, biofiltration and bioretention systems, wet ponds, organic mulch layers, planting soil beds, and vegetated systems (biofilters) such as vegetated swales and grass filter strips.

- Use portions of the HMF site for on site infiltration of runoff, if feasible, or for stormwater detention if not. Incorporate vegetated setbacks from streams.

3.7.6.3 Project Design Features for Flood Protection

Design of the project will allow the HST to remain operational during flood events and will minimize increases in 100-year flood elevations, including the following:

- In Special Flood Hazard Areas (SFHA), raise the track at least 4 feet above the 100-year flood elevation.
- Minimize development within the floodplain as appropriate. Avoid placement of facilities in the floodplain (e.g., at the Castle Commerce Center HMF site and the Gordon-Shaw HMF) or raise the ground with fill above the base-flood elevation.

Crossing design will maintain a floodwater surface elevation of no greater than 0.1 foot above current levels (zero rise within designated floodways). The following design considerations will minimize the effects of pier placement in the floodways:

- Design site crossings to be as nearly perpendicular to the channel as feasible to minimize bridge length.
- Orient piers to be parallel to the expected high water flow direction to minimize flow disturbance.
- Elevate bridge crossings at least 3 feet above the high water surface elevation to provide adequate clearance for floating debris or as required by local agencies. (The Central Valley Flood Protection Board requires that the bottom members [soffit] of a proposed bridge be at least 3 feet above the calculated water surface elevation for the design flood. The required clearance may be reduced to 2 feet on minor streams at sites where significant amounts of stream debris are unlikely.)
- Conduct engineering analyses of channel scour depths at each crossing to evaluate the necessary embedment depth for bridge piers. Implement scour-control measures to reduce erosion potential.
- Use quarry stone, cobblestone, or their equivalent for erosion control along rivers and streams, complemented with native riparian plantings or other natural stabilization alternatives that will restore and maintain a natural riparian corridor, where feasible.
- Place bedding materials under stone protection at locations where the underlying soils require stabilization resulting from streamflow velocity.

3.7.6.4 Construction Stormwater Pollution Prevention Plan

The SWRCB Construction General Permit (2009-0009 DWQ) (SWRCB 2009) establishes three erosion risk levels that are based on site erosion and receiving-water risk factors. A preliminary analysis indicates that most of the project will fall under Erosion Risk Level 1, the lowest risk level. The portion of the project vicinity draining to the San Joaquin River will fall under Erosion Risk Level 2. Erosion Risk Level 2 measures also will be carried out anywhere in the project vicinity where construction activities are conducted within or immediately adjacent to sensitive environmental areas such as streams, wetlands, and vernal pools.

The Construction General Permit requires preparation and implementation of a Stormwater Pollution Prevention Plan (SWPPP), which will identify BMPs to minimize potential short-term increases in sediment transport caused by construction, including erosion control requirements, stormwater management, and channel dewatering for affected stream crossings. These BMPs could include measures to provide permeable surfaces where feasible and to retain and treat stormwater on site. Other BMPs include strategies to manage the overall amount and quality of stormwater runoff. Typical BMPs include:

- Practices to minimize the contact of construction materials, equipment, and maintenance supplies with stormwater.
- Limiting fueling and other activities using hazardous materials to areas distant from surface water, providing drip pans under equipment, and daily checks for vehicle condition.
- Practices to reduce erosion of exposed soil, including soil stabilization, watering for dust control, perimeter silt fences, placement of rice straw bales, and sediment basins.
- Practices to maintain water quality including silt fences, stabilized construction entrances, grass buffer strips, ponding areas, organic mulch layers, inlet protection, and Baker tanks and sediment traps to settle sediment.
- Practices to capture and provide proper offsite disposal of concrete washwater, including isolation of runoff from fresh concrete during curing to prevent it from reaching the local drainage system, and possible treatment with dry ice or other acceptable means to reduce the alkaline character of the runoff (high pH) that typically results from new concrete.
- Development of a spill prevention and emergency response plan to manage potential fuel or other spills.
- Use of diversion ditches to intercept offsite surface runoff.
- Where feasible, avoidance of areas that may have substantial erosion risk, including areas with erosive soils and steep slopes.
- Where feasible, limiting construction to dry periods when flows in water bodies are low or absent.

3.7.6.5 Central Valley Regional Water Quality Board, Order No. 5-00-175, Waste Discharge Requirements General Order for Dewatering and Other Low Threat Discharges to Surface Waters

This order is a permit that covers construction dewatering discharges and some other listed discharges that do not contain significant quantities of pollutants, and that either: (1) are 4 months or less in duration, or (2) have an average dry-weather discharge that does not exceed 0.25 million gallons per day.

3.7.6.6 Maintain Pre-Project Hydrology

Avoid increasing existing peak stormwater flows from the project site. This will be accomplished by emphasizing onsite retention of stormwater runoff using measures such as flow dispersion, infiltration, and evaporation, supplemented by detention, where required. Additional flow control measures could be implemented where local regulations or drainage requirements dictate.

3.7.6.7 Industrial Stormwater Pollution Prevention Plan

The stormwater general permit (97-03-DWQ) (SWRCB 2000) requires the preparation of an SWPPP and a monitoring plan for industrial facilities, including vehicle maintenance facilities associated with transportation operations. The permit includes performance standards for pollution control.

3.7.6.8 Air Quality Fugitive Dust Control

Fugitive dust control measures are administered through Rule 8011. According to Rule 8011, the San Joaquin Valley Air Pollution Control District (SJVAPCD) requires the implementation of control measures for fugitive dust emission sources. These measures are not considered mitigation measures because they are required by law.

3.7.6.9 Wildlife-dedicated Crossings

Crossing structures dedicated to facilitating wildlife movement will be included in the design, as discussed in Chapter 2, Alternatives.

3.7.7 Mitigation Measures

The mitigation measures in this section identify avoidance, minimization, and compensation measures to minimize potential impacts and effects on biological resources by the HST alternatives and HMF sites. Many of these mitigation measures have multiple benefits that avoid, protect, or compensate for the impacts and effects on various biological resources.

Section 3.7.2 presents the regulatory programs that apply to the HST alternatives. Table 3.7-1 addresses federal requirements and Table 3.7-2 addresses state requirements. The primary agreements and regulatory requirements include the ESA (Section 7), CESA (Section 2081), CWA (Section 404, 401), and State Fish and Game Code (Section 1600).

Mitigation measures presented below were refined in some cases as a result of the coordination with federal, state, and local agencies. Representative agencies involved in early coordination include the USFWS, NMFS, USACE, CDFG, and SWRCB. This coordination effort includes consideration for the type, timing, and location of mitigation measures, including consideration for early implementation as feasible.

The mitigation measures and the conditions that will be specified per the regulatory permitting requirements will result in continued input from the USFWS, USACE, EPA, CDFG, and SWRCB review and approval. These actions, coupled with the project design features, provide further mitigating circumstances that address each of the biological resources.

The goal of these actions is to avoid, minimize, repair, mitigate, or compensate for biological resources impacts. Each of the biological resources measures may be characterized as having one or more of these qualities or act as a reporting requirement and/or assign monitoring/reporting responsibilities. Specific performance standards that apply to special-status plants, special-status wildlife, special-status plant communities, or jurisdictional waters are generally addressed in the Bio-MM#58 as part of the Habitat Mitigation and Monitoring Plan (HMMP). These are habitat-based performance standards that include consideration for the establishment of a species or habitat. Since species are nested within habitats, the performance standards are primarily based on vegetation, substrate, and hydrology conditions. The performance standards for the establishment of any temporary or permanent impacts on these resources are recognized in those resource categories, but are more specifically covered in the specific performance standards/guidelines shown in Bio-MM#58.

The habitat creation, restoration and/or revegetation ratios presented here are based upon and ultimately depend on the type of impact (i.e., permanent or temporary), scarcity of the resource, and performance anticipated. In regards to special-status species, the avoidance, minimization, and compensation measures are specific to special-status species' known geographic ranges and their suitable habitats.

The following roles and definitions represent the lead biology positions responsible for monitoring, reporting, and implementing the mitigation measures and associated terms and conditions. Other support roles may include restoration ecologists, landscape architects, and special-status species experts.

- **Project Biologist:** The Project Biologist will represent the construction management team, report directly to the construction management team, and will be responsible for reporting and overseeing the biological resources mitigation measures presented in the Final California HST Merced to Fresno

Section EIR/EIS. The Project Biologist will also be responsible for confirming that the terms and conditions in USFWS, USACE, SWRCB, and CDFG permits are outlined in the Mitigation Monitoring and Reporting Program (MMRP). The Project Biologist will report to the overall construction management team Mitigation Manager, interact with the designated Resident Engineer, and work to provide quality assurance on the implementation of the biological resources mitigation program as performed by the Contractor and the designated Contractor's Biologist. It is anticipated that the Project Biologist will have specialized support from other biological monitors and will work with the Mitigation Manager during deployment of the monitors and their respective responsibilities.

- **Mitigation Manager:** The Mitigation Manager is responsible for overseeing the implementation and compliance of all project-related mitigation measures and will support the construction management team. The Project Biologist will report to the Mitigation Manager to verify compliance with biological resource mitigation measures.
- **Contractor's Biologist:** The Contractor's Biologist is responsible for implementing mitigation measures in compliance with the terms and conditions outlined in the MMRP and USFWS, USACE, SWRCB, and CDFG permits. The Contractor's Biologist will work to implement mitigation reflected within the construction drawings and specifications. The Contractor's Biologist will keep the Project Biologist informed of the progress, planning, implementation, and activities conducted in support of the biological resources mitigation program.
- **Project Biological Monitor:** The Project Biological Monitor will be approved by and report directly to the Project Biologist. The Project Biological Monitor will be onsite during all ground-disturbing activities that have the potential to affect biological resources and will be the principal agent(s) in the direct implementation of the MMRP and compliance assurance. The Project Biological Monitor is responsible for Worker Environmental Awareness Program (WEAP) training, general surveys, compliance monitoring, and reporting. The Project Biological Monitor will act on behalf of the Project Biologist.

These mitigation measures are based on mitigation strategies from the Programmatic EIR/EIS documents, which have been refined and adapted for this proposed project. These mitigation measures will be incorporated into the MMRP and grouped by construction and project periods. Construction-period mitigation measures include all temporary impacts and effects associated with ground-disturbing activities. Project-period mitigation measures include all permanent impacts and effects associated with ground-disturbing activities, as well as impacts and effects from HST operation and maintenance activities.

3.7.7.1 Mitigation Measures for Biological Resources

The following mitigation measures will be implemented, as applicable, during the construction period and project period to avoid and or minimize impacts and effects on biological resources. In addition, resource-specific mitigation measures could be implemented to directly or indirectly avoid or minimize the impacts and effects to the specific biological resource (e.g., special-status species, habitats of concern, and wildlife movement corridors). Many of the mitigation measures apply throughout the biological resources program covering multiple species and habitats.

Bio-MM#1: Designate Project Biologist(s), Contractor's Biologist(s), and Project Biological Monitor(s). During contract procurement and for construction management and Contractor selection and prior to ground-disturbing activities, the Authority or its designee will designate a Project Biologist(s), a Contractor's Biologist(s), and a Project Biological Monitor(s) responsible for conducting biological monitoring, overseeing regulatory compliance requirements, and monitoring restoration activities associated with ground-disturbing activities in accordance with the adopted mitigation measures and applicable laws.

The Project Biologist's duties include reviewing design documents and construction schedules and determining which Project Biological Monitor(s), depending on type of biological issues, need(s) to report

to the construction site each day. The Project Biologist informs the Biological Monitors as to which mitigation measures should be documented each day and of any special issues that arise during meetings with the construction management team and/or the Contractor's team.

The Contractor's Biologist is responsible for the timely implementation of the biological mitigation measures as outlined in the MMRP and construction documents and pertinent resource agency permits.

The Project Biological Monitor's duties include monitoring construction crew activities, as needed, to document compliance with applicable mitigation measures and permit conditions.

Bio-MM#2: Regulatory Agency Access. If requested, before, during, or upon completion of ground-disturbing activities, the Contractor will allow access by the USFWS, USACE, SWRCB, and CDFG staff to the construction site. Due to safety concerns, all visitors will check in with the Resident Engineer prior to accessing the construction site. The final product will be a memorandum prepared by the Project Biologist within 1 day documenting agency access and issues raised during the field meeting and submitted to the Mitigation Manager. Any non-compliance issues will be reported to the Authority or its designee.

Bio-MM#3: Prepare and Implement a Worker Environmental Awareness Program. Prior to ground-disturbing activities, the Mitigation Manager or designee will prepare and implement a WEAP for construction crews. WEAP training materials will include the following: discussion of the federal ESA, CESA, BGEPA, and the MBTA; consequences and penalties for violation or noncompliance with these laws and regulations and project permits; identification and value of special-status plants, special-status wildlife, jurisdictional waters, and special-status plant communities; hazardous substance spill prevention and containment measures; the contact person in the event of the discovery of a dead or injured wildlife species; and review of mitigation measures. In the WEAP, the Mitigation Manager will detail construction timing in relation to habitat and species' life stage requirements and discuss project maps, showing areas of planned minimization and avoidance measures.

A fact sheet conveying this information will be prepared by the Mitigation Manager for distribution to the construction crews and to other individuals who enter the construction footprint. Upon completion of the WEAP training, construction crews will sign a form stating that they attended the training and understand and will comply with the information presented. Construction crews will be informed during the WEAP training that, to the extent possible, travel within the marked project site will be restricted to established roadbeds. Established roadbeds include all pre-existing and project-constructed unimproved, as well as improved roads.

Bio-MM#4: Prepare and Implement a Weed Control Plan. Prior to ground-disturbing activities, the Contractor will prepare and implement a Weed Control Plan to minimize or avoid the spread of weeds during ground-disturbing activities. The Weed Control Plan will address the following:

- Schedule for conducting noxious weed surveys to be conducted in coordination with the Biological Resources Management Plan (BRMP)(Bio-MM#5).
- Success criteria for noxious and invasive weed control as established by a qualified biologist. The success criteria will be linked to the HMMP for compensatory mitigation sites, and the standards for onsite work during construction will limit invasive species to less than 5% and non-native herbaceous species to less than 25%. If these success criteria have not been met by the end of the BRMP monitoring and implementation period, monitoring and control efforts will continue and remedial actions will be identified and implemented until success criteria are met. Based on monitoring results, additional or revised measures may be needed to ensure the introduction and spread of noxious weeds is not promoted by the construction and operation of the HST.
- Provisions to ensure that the development of the Weed Control Plan will be coordinated with development of the Restoration and Revegetation Plan (RRP)(Bio-MM#6) so that the RRP incorporates measures to reduce the spread and establishment of noxious weeds and incorporates percent cover of noxious weeds into revegetation performance standards.

- Identify weed control treatments including permitted herbicides, and manual and mechanical methods for application. Restrict herbicide application from use in environmentally sensitive areas (ESAs).
- Determine timing of the weed control treatment for each plant species.
- Identify fire prevention measures.

The Contractor will implement the Weed Control Plan during the construction period and require that maintenance crews follow the guidelines in the Weed Control Plan during the project period. The Authority or its designee will appoint the responsible party during the operations period. A monthly memorandum will be prepared by the Project Biologist to document the progress of the plan and its implementation.

Bio-MM#5: Prepare and Implement a Biological Resources Management Plan. During final design, and prior to construction, the Project Biologist will prepare the Biological Resources Management Plan (BRMP) and assemble the biological resources mitigation measures. In the BRMP, the Project Biologist will include terms and conditions from applicable permits and agreements and make provisions for monitoring assignments, scheduling, and responsibility. The BRMP will also include habitat replacement and revegetation protection during ground-disturbing activities, performance (growth) standards, maintenance criteria, and monitoring requirements for temporary and permanent native plant community impacts. The BRMP will form the parameters for the biology mitigation measures from the EIR/EIS, including terms and conditions as applicable from the USFWS, USACE, SWRCB, and CDFG permits. The BRMP will be prepared for all phases of project implementation but may be exclusively prepared for each construction package.

The goal of the BRMP is to assist the Project Biologist with an organized reporting tool to ensure the mitigation measures and terms and conditions are implemented in a timely manner and are reported on. These include all avoidance, minimization, repair, mitigation, and compensatory actions stated in the mitigation measures or terms and conditions from the permits referenced above. These measures and conditions are tracked through final design, implementation, and post-construction phases. Specific performance standards are habitat-based and are related to success of onsite or offsite repair of temporary impacts, or more permanent impacts that are compensated at an offsite location. Habitat-based mitigation applies to compensatory mitigation or permittee-responsible mitigation for impacts on special-status plants, special-status wildlife, special-status plant communities, or jurisdictional waters and are generally addressed in the Bio-MM#58 as part of the HMMP. Performance standards are targets for determining the effectiveness of the mitigation and assessing the need for adaptive management (e.g., mitigation design or maintenance revisions). Success criteria are formal criteria that must be met after a specific timeframe to meet regulatory requirements of the permitting agencies. These are habitat-based performance standards that include consideration for the establishment of a species or habitat. Since species are nested within habitats, the performance standards are primarily based on vegetation, substrate, and hydrology conditions. The performance standards for the establishment of any temporary or permanent impacts on these resources are recognized in those resource categories, but are more specifically covered in the specific performance standards/guidelines shown in Bio-MM#58. The overarching goal is to neutralize the impacts with respect to species and habitat impacted.

The BRMP will help the long-term perpetuation of biological resources within the temporarily disturbed areas, as well as protect adjacent targeted habitats. The BRMP will contain but not be limited to the following information:

- a. Specific measures for the protection of special-status species.
- b. Identification (on construction plans) of the locations and quantity of habitats to be avoided or removed, including locations where habitats are to be restored.
- c. Procedures for vegetation analyses of temporarily impacted habitats to approximate their relative composition, as well as procedures for site preparation, irrigation, planting, and maintenance. This



information may be used to determine the requirements of the revegetation areas for both onsite temporary impacts and offsite compensatory sites.

- d. Sources of plant materials and methods of propagation.
- e. Specific parameters for determining the amount of replacement habitat for temporary disturbance areas identified consistent with mitigation ratios and permit conditions.
- f. Specification of parameters for maintenance and monitoring of re-established habitats, including weed control measures, frequency of field checks, and monitoring reports for temporary disturbance areas.
- g. Specification of performance standards for the re-established plant communities within the construction limits.
- h. Remedial measures, such as a form of adaptive management, to be taken if performance standards are not met.
- i. Methodologies and requirements for monitoring the restoration/replacement efforts, which will be a combination of qualitative and quantitative data consistent with mitigation measures and permit conditions.
- j. Measures to preserve topsoil and control erosion.
- k. Design of protective fencing around ESAs and ERAs and the construction staging areas.
- l. Specification of location and quantities of gallinaceous guzzlers (catch basin/artificial watering structures) if needed; specification of monitoring of water levels in guzzlers.
- m. Location of trees to be protected as wildlife habitat (roosting sites) and locations for planting replacement trees.
- n. Specification of the purpose, type, frequency, and extent of chemical use for insect and disease control operations as part of vegetative maintenance within sensitive habitat areas.
- o. Specific construction monitoring programs for habitats of concern and special-status species, as needed.
- p. Specific measures for the protection of vernal pool habitat and riparian areas. These measures may include but are not limited to: erosion and siltation control measures, protective fencing guidelines, dust control measures, grading techniques, construction area limits, and biological monitoring requirements.
- q. Provisions for biological monitoring during ground-disturbing activities to confirm compliance and success of protective measures. The monitoring procedures will: (1) identify specific locations of wildlife habitat and sensitive species to be monitored, (2) identify the frequency of monitoring and the monitoring methodology (for each habitat and sensitive species to be monitored), (3) list required qualifications of biological monitor(s), and (4) identify reporting requirements.

Bio-MM#6: Prepare and Implement a Restoration and Revegetation Plan. During final design, the Contractor's Biologist will prepare a restoration and revegetation plan (RRP) for upland communities and verified by the Project Biologist. This is a complement for site restoration in addition to the temporary effects for riparian plant communities (Bio-MM#15) and for jurisdictional waters (Bio-MM#44). In the RRP, address impacts on habitat subject to temporary ground disturbances that will require decompaction or regrading, if appropriate. The standards for onsite work during construction will limit invasive species to less than 5% and nonnative herbaceous species to less than 25% unless otherwise called out in the final approved seed mix. The Project Biologist will approve the seed mix.



During ground-disturbing activities, the Contractor will implement the RRP in temporarily disturbed areas. The Project Biologist will prepare and submit compliance reports to document implementation. The RRP compliance reports will be prepared and submitted to the Mitigation Manager.

Bio-MM#7: Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field). Prior to ground-disturbing activities, to the extent practicable, the Project Biologist will verify that environmentally sensitive areas (ESAs) and environmentally restricted areas (ERAs) are delineated as appropriate. ESAs are areas within the construction zones containing suitable habitat for special-status species and habitats of concern that may allow construction activities, but have restrictions based on the presence of special-status species or habitats of concern at the time of construction. ERAs are areas outside the construction footprint that must be protected in-place during all construction activities.

Prior to ground-disturbing activities, the Contractor's Biologist will include all ESAs and ERAs on final construction plans (including grading and landscape plans). Prepare, review and approve the map of all ESAs and ERAs on the design drawings and work to update the map as necessary.

Prior to ground-disturbing activities, the Contractor will mark ESAs and ERAs with high visibility temporary fencing to prevent encroachment of construction personnel and equipment onto sensitive areas. Designate the two categories, ESA and ERA, differently in the field (e.g., different colored flagging/fencing). Use sub-meter accurate GPS equipment to delineate all ESAs and ERAs. Remove ESA and ERA fencing when construction is complete or the resource has been cleared according to agency permit conditions in the MMRP and construction drawings and specifications. The Project Biologist will submit memoranda regarding the field delineation of all ESAs/ERAs to the Mitigation Manager. These areas will receive ongoing monitoring during site preparation and construction activities.

Bio-MM#8: Equipment Staging Areas. Prior to ground-disturbing activities, the Contractor will locate staging areas for construction equipment outside sensitive biological resources including habitat for special-status species, habitats of concern (e.g., wetlands, waters of the U.S., riparian communities), and wildlife movement corridors, to the maximum extent possible. The Project Biologist will submit memoranda to the Mitigation Manager documenting compliance.

Bio-MM#9: Mono-Filament Netting. During ground-disturbing activities, the Project Biologist will verify that plastic mono-filament netting (erosion-control matting) or similar material is not used in erosion control materials; substitutes include coconut hair matting or tackified hydroseeding compounds. The Project Biologist will submit memoranda to the Mitigation Manager documenting compliance monthly, or as appropriate, through the life of the project construction.

Bio-MM#10: Vehicle Traffic. During ground-disturbing activities, the Contractor will restrict project-related vehicle traffic, within the construction area, to established roads, construction areas, and other designated areas. Establish vehicle traffic locations disturbed by previous activities to prevent further adverse effects. Observe a 20 mph speed limit for construction areas with potential special-status species habitat. Clearly flag and mark access routes and prohibit off-road traffic. The Project Biologist will submit a memorandum to the Mitigation Manager documenting compliance on a weekly basis.

Bio-MM#11: Entrapment Prevention. The Contractor's biologist will cover all excavated, steep-sided holes or trenches, more than 8 inches deep, at the close of each working day with plywood or similar materials, or provide a minimum of one escape ramp per 10 feet of trenching constructed of earth fill. The Contractor's Biologist will thoroughly inspect such holes or trenches for trapped animals before leaving the construction site each day.

The Contractor's Biologist will screen all culverts, or similar enclosed structures, with a diameter of 4 inches or greater to prevent use by wildlife. The Contractor's Biologist will ensure that cleared and stored material at the construction site for common and special-status wildlife species before the material is subsequently used or moved. The Project Biologist will submit a memorandum to the Mitigation Manager documenting compliance on a weekly basis.

Bio-MM#12: Work Stoppage. During ground-disturbing activities, the Project Biologist or Biological Monitor will halt work in the event that a special-status wildlife species gains access to the construction footprint. This work stoppage will be coordinated with the resident engineer and/or the Authority or its designee. The work stoppage will occur within the area where the potential construction activity could affect the species; other work may continue. This will be determined prior to direction given to the Contractor. At this direction, the Contractor will suspend ground-disturbing activities in the immediate construction area that could reasonably result in a "take" of special-status wildlife species. The Contractor will continue the suspension until the individual leaves voluntarily, is relocated to a release area using USFWS- and/or CDFG-approved handling techniques and relocation methods, or as required by USFWS or CDFG. The Project Biologist will submit a memorandum to the Mitigation Manager documenting compliance within 1 day of the work stoppage and subsequent action.

Bio-MM#13: 'Take' Notification and Reporting. The Contractor's Biologist in coordination with the Project Biologist and Mitigation Manager will notify the USFWS and/or CDFG immediately in the case of an accidental death or injury to a federal or state listed species during project-related activities. The Authority or its designee will be notified prior to the notification to the agencies. The Project Biologist will submit a memorandum to the Mitigation Manager documenting compliance.

Bio-MM#14: Post-Construction Compliance Reports. After each construction period is completed, the Project Biologist will submit post-construction compliance reports consistent with the appropriate agency (e.g., USFWS, NMFS, and CDFG) protocols, including compliance with resource agency permits (i.e., Section 7 of the federal ESA, Section 2081 of CESA and Section 401 and 404 of FCWA and 1600 of Fish and Game Code). The Project Biologist will submit a memorandum to the Mitigation Manager documenting compliance. The frequency of the memorandum compilation and submission will be consistent with regulatory compliance permits.

3.7.7.2 Construction-Period Mitigation Measures

Plant Communities and Cover Types

Bio-MM#15: Restore Temporary Riparian Impacts. During post-construction, the Contractor's Biologist will revegetate all disturbed riparian areas using appropriate plants and seed mixes. The Project Biologist will monitor restoration activities consistent with provisions in the HMMP as described in Bio-MM#58. Performance standards for riparian communities are generally described in Bio-MM#58. It is important to recognize that Bio-MM#58 includes standards that apply to several resource areas (e.g., jurisdictional waters, riparian habitat, California tiger salamander habitat). The Project Biologist will submit a memorandum to the Mitigation Manager documenting compliance and other reporting requirements in the 1600 Streambed Alteration Agreement.

See Bio-MM#6.

Bio-MM#16: Mitigation and Monitoring of Protected Trees. Protected trees are those that are identified within local planning jurisdiction documents/ordinances that have policies toward protection. Prior to, during, and post-construction, the Contractor's Biologist will implement the following methods to preserve and/or mitigate impacts on protected trees:

- (1) The Contractor will conduct pre-construction surveys to evaluate the condition of all ornamental and native trees found within urban areas directly and indirectly affected by the proposed project.
- (2) The Contractor will transplant all directly affected trees that are in good condition to a suitable site outside the construction footprint.
- (3) The Contractor will fence trees which may be indirectly affected by construction activities 5 feet from their driplines to form exclusion zones.
- (4) The Contractor will prepare a monitoring and maintenance program to monitor transplanted trees for re-establishment of root systems.



The Project Biologist will submit a memorandum to document compliance to the Mitigation Manager on a monthly basis as needed pending construction progress.

Special-Status Species

Plants

Bio-MM#17: Conduct Pre-Construction Surveys for Special-Status Plant Species. The Project Biologist will conduct pre-construction surveys for special-status plant species in suitable habitat areas, subject to ground-disturbing activities. The surveys will be conducted in the appropriate season prior to ground-disturbing activities for salvage and relocation activities. The Project Biologist will use the results of the Special-Status Plants Survey Report (prepared as part of the Biological Resources Technical Report), including mapping of locations of special-status plant species, to determine focused locations for the pre-construction surveys, as appropriate. The Project Biologist will work with the Contractor's Biologist to mark and avoid locations of all special-status plant species observed where feasible or incorporate the species into the relocation/compensation program defined in Bio-MM#50: Compensate for Impacts on Special-Status Plant Species.

Prior to ground-disturbing activities, the Contractor will protect any populations of special-status plant species identified during the surveys within 100 feet of the construction footprint as ERAs. As appropriate, the Contractor's Biologist will update the special-status or habitats of concern mapping within the construction limits, based upon resource agency permits.

The Contractor's Biologist will determine the locations of special-status plant species on construction drawings and identified as ESAs within the construction footprint. Plant populations within 100 feet of the construction limits will be fenced as ERAs by the Contractor's Biologist. Terms and conditions from Section 7 and Section 2081 agreements will be incorporated as appropriate. The Project Biologist will provide verification and report through memorandum to the Mitigation Manager.

Bio-MM#18: Prepare and Implement Plan for Salvage, Relocation, and/or Propagation of Special-Status Plant Species. The Contractor's Biologist will prepare a plan prior to ground-disturbing activities to address monitoring, salvage, relocation, and propagation of special-status plant species. The plan will be submitted to the Project Biologist for concurrence. The relocation or propagation of plants and seed will be performed at a suitable mitigation site, as appropriate per species. Documentation will include provisions that address the techniques, location, and procedures required for the successful establishment of the plant populations. The plan will include provisions for performance that address survivability requirements, maintenance, monitoring, implementation, and the annual reporting requirements. Permit conditions issued by the appropriate resource agencies (e.g., USFWS, CDFG) will guide the development of the plan and performance standards. The Project Biologist will submit a memorandum to the Mitigation Manager documenting compliance.

Other measures that potentially apply to special-status plants include:

- Bio-MM#4: Prepare and Implement a Weed Control Plan.
- Bio-MM#5: Prepare and Implement a Biological Resources Management Plan.
- Bio-MM#6: Prepare and Implement a Restoration and Revegetation Plan.
- Bio-MM#7: Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field).
- Bio-MM#8: Equipment Staging Areas.
- Bio-MM#10: Vehicle Traffic.
- Bio-MM#14: Post-Construction Compliance Reports.

Wildlife

Invertebrates

Vernal Pool Branchiopods

Prior to final design and during the permitting process, the Contractor will comply with CESA and federal ESA. The Project Biologist will document compliance with the mitigation measures specific to vernal pool branchiopods, including the results of sampling, seasonal work restrictions and protective measures. These activities will be documented daily during the specific season for sampling, work restrictions, and protective measures when construction takes place.

Bio-MM#19: Conduct Pre-Construction Sampling and Assessment for Vernal Pool Fauna. Prior to ground-disturbing activities, the Project Biologist will conduct pre-construction, non-protocol surveys in seasonally inundated habitats (seasonal wetland, noninundated wetlands) within the construction footprint. The Project Biologist will conduct general aquatic surveys at a suitable interval after the first significant storm event of the rainy season (October 15 to June 1), as feasible prior to ground-disturbing activities. The sampling is an assessment of the hydrological, biological and ecological conditions of each seasonal wetland and open waters. This assessment will determine the quality and suitability of seasonal wetlands for special-status species (e.g., vernal pool branchiopods, western spadefoot toads, and California tiger salamanders) and later assist in determining which materials (e.g., soils, viable plant seeds, vernal pool cysts) may be collected. The sampling is an assessment that will be useful in understanding the species present and will help guide the implementation of performance standards to be consistent with Bio-MM#21: Implement and Monitor Vernal Pool Protection, for vernal pool special-status species (e.g., vernal pool branchiopods, western spadefoot toads, and California tiger salamanders). The Project Biologist will submit a report within 1 month of completing the field work and submit to the Mitigation Manager and Authority or its designee. The report will provide the documentation and the results of the sampling, including the results of the data collected and compared with the performance standards.

Bio-MM#20: Seasonal Vernal Pool Work Restriction. For seasonal avoidance of special-status vernal pool branchiopods and vernal pool-dependent species (e.g., California tiger salamander), the Contractor will not work within 250 feet of aquatic habitats suitable for these species (e.g., vernal pools and other seasonal wetlands) from October 15 to June 1 (corresponding to the rainy season), or as determined through informal or formal consultation with the USFWS or USACE. Ground-disturbing activities may begin once the habitat is no longer inundated for the season. If any work remains to be completed after October 15, exclusion fencing and erosion control measures will be placed at the vernal pools and other seasonal wetlands by the Contractor's Biologist. The fencing will act as a buffer between ground-disturbing activities and the vernal pools and other seasonal wetlands as determined through consultations with USFWS/USACE. The Project Biologist will document compliance through a memorandum to the Mitigation Manager during the establishment of the fencing activities.

Bio-MM#21: Implement and Monitor Vernal Pool Protection. If temporary impacts can be avoided, the vernal pool(s) will be protected by erecting exclusion fencing. The Contractor's Biologist, under the supervision of the Project Biologist, will erect and maintain the exclusion fencing. For temporary impacts on vernal pools and other seasonal wetlands that cannot be avoided, the Contractor's Biologist will apply geotextile fabric and a layer of gravel over the affected vernal pool(s) prior to ground-disturbing activities to protect the contours in cases where the area may be excluded from the permanent construction footprint. The Contractor will implement this measure within temporary impact areas within the construction footprint. Resource agency consultations with the USFWS/USACE will occur as needed and based on permit conditions.

- If temporary impacts occur over a full wet-dry season cycle and the vernal pool(s) cannot be avoided, the vernal pool(s) will be protected by erecting exclusion fencing by the Contractor's Biologist.

- If temporary impacts occur within the dry season (approximately June 1 to October 15) and the vernal pool(s) cannot be fenced, geotextile fabric and rinsed gravel should be placed within and cover the vernal pool(s) to minimize damage to the soils. The Contractor's Biologist in coordination with the Project Biologist will collect a representative sampling of soils from the vernal pool(s) prior to initiating ground-disturbing activities within vernal pools. The representative soil sample(s) will contain viable plant seeds and vernal pool branchiopod cysts to be preserved from the vernal pool(s). These samples may be incorporated into other vernal pools, as applicable, with USFWS and/or CDFG consultation. If temporary impacts take more than two full wet-dry season cycles, the above-described soil storage and/or offsite mitigation will be implemented.

Other measures that potentially apply to vernal pools and other seasonal wetlands include:

- Bio-MM#3: Prepare and Implement a Worker Environmental Awareness Program.
- Bio-MM#4: Prepare and Implement a Weed Control Plan.
- Bio-MM#5: Prepare and Implement a Biological Resources Management Plan.
- Bio-MM#7: Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field).
- Bio-MM#6: Prepare and Implement a Restoration and Revegetation Plan.
- Bio-MM#8: Equipment Staging Areas.
- Bio-MM#10: Vehicle Traffic.
- Bio-MM#12: Work Stoppage.
- Bio-MM#14: Post-Construction Compliance Reports.
- Bio-MM#44: Restore Temporary Impact on Jurisdictional Waters.
- Bio-MM#45: Monitor Construction Activities within Jurisdictional Waters.

Valley Elderberry Longhorn Beetle

Bio-MM#22: Implement Conservation Guidelines During the Construction Period for Valley Elderberry Longhorn Beetle. Prior to and during ground-disturbing activities, the Contractor will implement the avoidance and minimization measures detailed in the *Conservation Guidelines for the Valley Elderberry Longhorn Beetle* (USFWS 1999a). These measures include establishing and maintaining appropriate buffer areas around elderberry plants, surveying for beetle boreholes in affected shrubs, restricting the use of chemicals that might harm beetles, and mowing. After ground-disturbing activities are completed, restore any damage to buffer areas containing elderberry shrubs according to specifications within the *Conservation Guidelines for the Valley Elderberry Longhorn Beetle* (USFWS 1999a).

In areas where encroachment on the 100-foot buffer has been approved by the USFWS, the Contractor will provide a minimum setback of at least 20 feet from the dripline of each Mexican elderberry plant. In buffer areas, ground-disturbing activities should be minimized, and any damaged area should be restored by the Contractor following construction.

The Contractor will erect signage every 50 feet along the edge of the avoidance area with the following information: "This area is habitat of the valley elderberry longhorn beetle, a federally threatened species, and must not be disturbed. This species is protected by the federal ESA of 1973, as amended. Violators are subject to prosecution, fines, and imprisonment." The signs should be clearly readable from a distance of 20 feet, and must be maintained by the Contractor for the duration of ground-disturbing activities.

To prevent encroachment, these buffer areas must continue to be protected per USFWS protocol (after ground-disturbing activities) from adverse effects of the project (USFWS 1999a) during the construction phase. The Contractor will include protective measures such as fencing, signage, weeding, and trash removal to enforce the protection of the valley elderberry longhorn beetle and its associated habitat. The Project Biologist will submit a memorandum to the Mitigation Manager documenting compliance on a weekly basis or at other appropriate intervals.

Other measures that potentially apply to valley elderberry longhorn beetle include:

- Bio-MM#3: Prepare and Implement a Worker Environmental Awareness Program.
- Bio-MM#4: Prepare and Implement a Weed Control Plan.
- Bio-MM#5: Prepare and Implement a Biological Resources Management Plan.
- Bio-MM#6: Prepare and Implement a Restoration and Revegetation Plan.
- Bio-MM#7: Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field).
- Bio-MM#8: Equipment Staging Areas.
- Bio-MM#10: Vehicle Traffic.
- Bio-MM#11: Entrapment Prevention.
- Bio-MM#12: Work Stoppage.
- Bio-MM#13: 'Take' Notification and Reporting.
- Bio-MM#14: Post-Construction Compliance Reports.

Amphibians

California Tiger Salamander

Bio-MM#23: Translocation of California Tiger Salamanders. Prior to ground-disturbing activities, the Project Biologist or designee will conduct a pre-construction survey and relocate any California tiger salamanders from within the construction footprint in accordance with the *Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander* (USFWS 2003). The relocation will occur for any individuals within the construction footprint per coordination with the USFWS. The Project Biologist will conduct pit trapping. The Contractor's Biologist will work in coordination with the Project Biologist when installing amphibian exclusion fencing specified in Bio-MM#24. The Project Biologist will submit a memorandum to the Mitigation Manager documenting compliance on a weekly basis or at other appropriate intervals.

Bio-MM#24: Erect Amphibian Exclusion Fencing. The Contractor's Biologist will install exclusion barriers (i.e., silt fences) to influence the movement of California tiger salamander, including other amphibian species, within impacted areas. The barriers can be used to exclude California tiger salamander, and other amphibian species, from ground-disturbing areas and to guide breeding adults toward pre-identified mitigation ponds. Exclusion fencing will be maintained by the Contractor throughout the California tiger salamander's entire active period (November to April) or until all ground-disturbing activities are completed, whichever occurs first. Exclusion fencing must be trenched into the soil at least 4 inches in depth with the soil compacted against both sides of the fence for its entire length to prevent amphibians from passing under the fence. Barriers must be inspected by the Contractor's Biologist at least twice weekly on non-consecutive days and after any significant rain event (defined as a 0.75 inch downpour or 1.5 inches of rain in any 24-hour period). Barriers will be installed by the Contractor with

turn-arounds at any access openings needed in the fencing, to redirect amphibians away from openings. The Project Biologist will submit a memorandum to the Mitigation Manager documenting compliance.

Other measures that potentially apply to California tiger salamander include:

- Bio-MM#3: Prepare and Implement a Worker Environmental Awareness Program.
- Bio-MM#4: Prepare and Implement a Weed Control Plan.
- Bio-MM#5: Prepare and Implement a Biological Resources Management Plan.
- Bio-MM#6: Prepare and Implement a Restoration and Revegetation Plan.
- Bio-MM#7: Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field).
- Bio-MM#8: Equipment Staging Areas.
- Bio-MM#9: Mono-Filament Netting.
- Bio-MM#10: Vehicle Traffic.
- Bio-MM#11: Entrapment Prevention.
- Bio-MM#12: Work Stoppage.
- Bio-MM#13: 'Take' Notification and Reporting.
- Bio-MM#14: Post-Construction Compliance Reports.
- Bio-MM#19: Conduct Pre-Construction Sampling and Assessment for Vernal Pool Fauna.
- Bio-MM#20: Seasonal Vernal Pool Work Restriction.
- Bio-MM#21: Implement and Monitor Vernal Pool Protection.

Western Spadefoot Toad

Bio-MM#25: Conduct Emergence and Larval Surveys for Western Spadefoot Toad. The Project Biologist or designee (qualified herpetologist) will conduct pre-construction emergence and larval surveys for western spadefoot toad during the fall and winter rainy season. Emergence surveys will be conducted within the appropriate time period(s) after precipitation events as evaluated by a qualified herpetologist and will be partially in tandem with California tiger salamander surveys. Potential breeding depressions, including vernal pools, will be surveyed for western spadefoot toad larvae concurrently with special-status vernal pool branchiopod and California tiger salamander pre-construction surveys. Adults found within the construction footprint during emergence surveys will be relocated to an appropriate area adjacent to another pool suitable for breeding. Pre-construction surveys will help identify the proper implementation of mitigation measures, identify state and federal permit requirements, and inform the accurate implementation of mitigation requirements. The Project Biologist will submit a memorandum to the Mitigation Manager documenting compliance after surveys are complete.

Other measures that potentially apply to western spadefoot toad include:

- Bio-MM#3: Prepare and Implement a Worker Environmental Awareness Program.
- Bio-MM#4: Prepare and Implement a Weed Control Plan.
- Bio-MM#5: Prepare and Implement a Biological Resources Management Plan.



- Bio-MM#6: Prepare and Implement a Restoration and Revegetation Plan.
- Bio-MM#7: Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field).
- Bio-MM#8: Equipment Staging Areas.
- Bio-MM#9: Mono-Filament Netting.
- Bio-MM#10: Vehicle Traffic.
- Bio-MM#11: Entrapment Prevention.
- Bio-MM#12: Work Stoppage.
- Bio-MM#19: Conduct Pre-Construction Sampling and Assessment for Vernal Pool Fauna.
- Bio-MM#20: Seasonal Vernal Pool Work Restriction.
- Bio-MM#21: Implement and Monitor Vernal Pool Protection.
- Bio-MM#24: Erect Amphibian Exclusion Fencing.

Reptiles

Western Pond Turtle

Bio-MM#26: Conduct Western Pond Turtle Pre-Construction Surveys and Relocation. Prior to ground-disturbing activities, conduct pre-construction surveys for western pond turtles to determine the presence or absence of western pond turtles within the construction footprint. If western pond turtles are found within the construction footprint, conduct daily clearance surveys prior to the initiation of any construction activities.

If a western pond turtle nest will be affected by ground-disturbing activities, relocate the eggs according to relocation protocol coordinated with CDFG for all life stages of western pond turtles. Relocate hatchling and adult turtles outside of the construction footprint in suitable habitat. The Project Biologist will submit a memorandum to the Mitigation Manager documenting compliance.

Bio-MM#27: Conduct Western Pond Turtle Monitoring. During ground-disturbing activities, the Project Biologist will observe all construction activities within habitat that supports populations of western pond turtles. If ESAs are deemed necessary, the Project Biologist will conduct a clearance survey for western pond turtles prior to the time the fence is installed. If necessary, conduct daily clearance surveys prior to construction. The Project Biologist will submit a memorandum to the Mitigation Manager documenting compliance.

Bio-MM#28: Implement Western Pond Turtle Avoidance and Relocation. Prior to ground-disturbing activities, if a western pond turtle nesting area is present and will be affected by ground-disturbing activities as determined by the Project Biologist, the Contractor will avoid western pond turtle nesting areas. If avoidance is not feasible, as determined by the Authority or its designee, the Project Biologist will coordinate with CDFG to identify where to relocate western pond turtles. The Project Biologist will coordinate specific trapping and relocation protocols with CDFG for adults, hatchlings, and eggs prior to ground-disturbing activities. The Contractor will not move eggs or hatchlings without prior coordination with the Project Biologist and concurrence from CDFG. The Project Biologist will submit a memorandum to the Mitigation Manager documenting compliance on a weekly basis or as determined appropriate pending construction progress.

Other measures that potentially apply to western pond turtles include the following:

- Bio-MM#3: Prepare and Implement a Worker Environmental Awareness Program.

- Bio-MM#5: Prepare and Implement a Biological Resources Management Plan.
- Bio-MM#6: Prepare and Implement a Restoration and Revegetation Plan.
- Bio-MM#7: Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field).
- Bio-MM#8: Equipment Staging Areas.
- Bio-MM#10: Vehicle Traffic.
- Bio-MM#12: Work Stoppage.
- Bio-MM#13: 'Take' Notification and Reporting.
- Bio-MM#14: Post-Construction Compliance Reports.
- Bio-MM#15: Restore Temporary Riparian Impacts.
- Bio-MM#44: Restore Temporary Impacts on Jurisdictional Waters.
- Bio-MM#45: Monitor Construction Activities within Jurisdictional Waters.

Fish

- Bio-MM#3: Prepare and Implement a Worker Environmental Awareness Program.
- Bio-MM#5: Prepare and Implement a Biological Resources Management Plan.
- Bio-MM#7: Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field).
- Bio-MM#8: Equipment Staging Areas.
- Bio-MM#10: Vehicle Traffic.
- Bio-MM#14: Post-Construction Compliance Reports.

Birds

Birds included in the following mitigation measures are those protected under the MBTA and/or listed as a Species of Special Concern (SSC) by CDFG.

Bio-MM#29: Conduct Pre-Construction Surveys and Monitoring for Raptors. Prior to ground-disturbing activities, the Project Biologist or designee will conduct pre-construction surveys for nesting raptors if construction and habitat removal activities are scheduled to occur during the breeding season (February 1 to August 15). The Project Biologist or designee will conduct surveys in areas within 300 feet of the construction footprint. Modify the required survey dates based on local conditions. If breeding raptors with active nests are found, establish a 300-foot buffer around the nest and phase construction activities within the buffer(s) until the young have fledged from the nest or the nest is abandoned. Approve construction activities within the buffer area, pending site conditions that will not jeopardize the nest.

The Project biologist will conduct pre-construction surveys for bald and golden eagle nests within ¼ mile of the construction footprint. If nesting bald or golden eagles are identified, the Contractor's Biologist in coordination with the Project Biologist will establish a 1,000-foot buffer area. The Project Biologist or designee will adjust the 1,000-foot buffer as needed to reflect existing conditions including ambient noise, topography, and disturbance with the approval of the USFWS or CDFG, as appropriate. The Project Biologist or designee will conduct regular monitoring of the nest to determine success/failure and to confirm that project activities are not conducted within the buffer(s) until the nesting cycle is complete or



the nest fails. The Project Biologist or designee will document the results of the surveys and the ongoing monitoring, and provide a copy of the monitoring reports for impact areas to the respective agencies. The Project Biologist or designee will approve ground-disturbing activities within the buffer area, pending site conditions that will not jeopardize the nest. The Project Biologist will submit a memorandum to the Mitigation Manager documenting compliance.

Bio-MM#30: Conduct Pre-Construction Surveys and Delineate Active Nest Exclusion Areas for Other Breeding Birds.

In the event active bird nests are encountered during the pre-construction survey, the Project Biologist or designee will determine the nest avoidance buffer zones as appropriate. The Project Biologist or designee will coordinate with the Contractor's Biologist to establish the suitable buffers consistent with the intent of the MBTA and as determined by the Project Biologist. The Project Biologist or designee will delineate nest avoidance buffers established for ground nesting birds in a manner that does not create predatory bird perch points in close proximity (150 feet) to the active nest site. The Project Biological Monitor will monitor active bird nests weekly or more frequently pending status of nest and status of fledgling development. The Contractor's Biologist will maintain the nest avoidance buffer zone until nestlings have fledged or the nest is abandoned. The Project Biologist will submit a memorandum to the Mitigation Manager documenting compliance.

Bio-MM#31: Raptor Protection on Power Lines. During final design, the Contractor will verify that the catenary system and masts are designed to be raptor-safe, in accordance with the *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006* (Avian Power Line Interaction Committee 2006). The Project Biologist will check the final design drawings and submit a memorandum to the Mitigation Manager documenting compliance.

Other measures that potentially apply to raptors and breeding birds include the following:

- Bio-MM#3: Prepare and Implement a Worker Environmental Awareness Program.
- Bio-MM#5: Prepare and Implement a Biological Resources Management Plan.
- Bio-MM#7: Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field).
- Bio-MM#8: Equipment Staging Areas.
- Bio-MM#10: Vehicle Traffic.
- Bio-MM#12: Work Stoppage.
- Bio-MM#13: 'Take' Notification and Reporting.
- Bio-MM#14: Post-Construction Compliance Reports.

Swainson's Hawks

Bio-MM#32: Conduct Pre-Construction Surveys for Swainson's Hawks. The Project Biologist or designee will conduct pre-construction surveys for Swainson's hawks during the nesting season (March 1 through September 15) within the construction footprint and within a 0.5-mile buffer. The Project Biologist or designee will conduct the pre-construction nest surveys at least 30 days prior to ground-disturbing activities and phase with project construction. The pre-construction surveys will determine the status (i.e., active, inactive) of the nest and then will be used to set up nest avoidance strategies (Bio-MM#33). The Project Biologist will submit a memorandum to the Mitigation Manager documenting compliance with the measure.

Bio-MM#33: Swainson's Hawk Nest Avoidance. If active Swainson's hawk nests (defined as a nest used one or more times in the last 5 years) are found within 0.5 mile of the construction footprint during the nesting season (March 1 to September 15), the Contractor's Biologist will implement buffers

restricting construction activities, following CDFG's *Staff Report Regarding Mitigation for Impacts to Swainson's Hawks (Buteo swainsoni) in the Central Valley of California* (CDFG 1994). Adjustments to the buffer(s) will require prior approval by CDFG as coordinated by the Project Biologist. The buffers and nest condition will then be monitored (see Bio-MM#34). The Project Biologist will submit a memorandum to the Mitigation Manager documenting compliance on a weekly basis.

Bio-MM#34: Monitor Removal of Nest Trees for Swainson's Hawks. Prior to ground-disturbing activities, the Project Biologist or designee will monitor nest trees for Swainson's hawks in the construction footprint that are not removed. If a nest tree for a Swainson's hawk must be removed, the Contractor will obtain a Management Authorization (including conditions to offset the loss of the nest tree) from the CDFG, as described in CDFG's *Staff Reporting Regarding Mitigation for Impacts to Swainson's Hawks (Buteo swainsoni) in the Central Valley of California* (CDFG 1994). The Management Authorization will specify the tree removal period, generally between October 1 and February 1. If ground-disturbing activities or other project-related activities may cause nest abandonment by a Swainson's hawk or forced fledging within the specified buffer area, monitoring of the nest site (funded by the Authority) by the Project Biologist will be required to determine if the nest is abandoned. The Project Biologist will submit a memorandum to the Mitigation Manager documenting compliance on a weekly basis during the appropriate season. Other measures that potentially apply to Swainson's hawk include the following:

- Bio-MM#3: Prepare and Implement a Worker Environmental Awareness Program.
- Bio-MM#5: Prepare and Implement a Biological Resources Management Plan.
- Bio-MM#7: Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field).
- Bio-MM#8: Equipment Staging Areas.
- Bio-MM#10: Vehicle Traffic.
- Bio-MM#12: Work Stoppage.
- Bio-MM#13: 'Take' Notification and Reporting.
- Bio-MM#14: Post-Construction Compliance Reports.

Burrowing Owls

Bio-MM#35: Conduct Pre-Construction Surveys for Burrowing Owls. Prior to ground-disturbing activities, the Project Biologist or designee will conduct pre-construction surveys in accordance with CDFG's *Staff Report on Burrowing Owl Mitigation* (CDFG 1995). The Project Biologist or designee will conduct these surveys at appropriate timeframes within suitable habitat located in the construction footprint and a 500-foot buffer. Results of the surveys will be used to inform Bio-MM#36. The Project Biologist will submit a memorandum to the Mitigation Manager documenting compliance on a weekly basis.

Bio-MM#36: Burrowing Owl Avoidance and Minimization. Implement burrowing owl avoidance and minimization measures following CDFG's *Staff Report on Burrowing Owl Mitigation* (CDFG 1995).

- The Contractor will not disturb occupied burrowing owl burrows during the nesting season (February 1 through August 31) unless it is verified that either the birds have not begun egg-laying and incubation, or that juveniles from the occupied burrows are foraging independently and are capable of independent survival as determined by the Project Biologist or designee. Eviction outside the nesting season may be permitted pending evaluation of eviction plans and receipt of formal written approval from the CDFG authorizing the eviction.

- Unless otherwise authorized by CDFG, the Contractor's Biologist will establish a 250-foot buffer (as an environmentally sensitive area) between the construction work area and nesting burrowing owls during the nesting season. The Contractor will maintain this protected area until August 31 or a time set at CDFG's discretion and based upon monitoring evidence, until the young owls are foraging independently.
- Unless otherwise authorized by CDFG, the Contractor's Biologist will establish a 160-foot buffer (as an environmentally sensitive area) between the construction work area and occupied burrows during the non-breeding season (September 1 through January 31). The Contractor will maintain this protected area until January 31 or at CDFG's discretion and based upon monitoring evidence, until the young owls are foraging independently.

If burrowing owls must be moved away from the construction footprint, the Contractor's Biologist will undertake the passive relocation measures in accordance with CDFG's (1995) guidelines. The Project Biologist will submit a memorandum to the Mitigation Manager documenting compliance on a weekly basis.

Other measures that potentially apply to burrowing owls include the following:

- Bio-MM#3: Prepare and Implement a Worker Environmental Awareness Program.
- Bio-MM#5: Prepare and Implement a Biological Resources Management Plan.
- Bio-MM#7: Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field).
- Bio-MM#8: Equipment Staging Areas.
- Bio-MM#10: Vehicle Traffic.
- Bio-MM#11: Entrapment Prevention.
- Bio-MM#12: Work Stoppage.
- Bio-MM#13: 'Take' Notification and Reporting.
- Bio-MM#14: Post-Construction Compliance Reports.

Mammals

Special-Status Bats

Bio-MM#37: Conduct Pre-Construction Surveys for Special-Status Bat Species. Prior to any ground-disturbing activities, the Project Biological Monitor or designee will conduct a visual and acoustic pre-construction survey for roosting bats. Include a minimum of one day and one evening in the visual pre-construction survey. The Project Biologist, in coordination with the Mitigation Manager, will contact CDFG if any hibernation roosts or active nurseries are identified within the construction footprint, as appropriate. The Project Biologist will submit a memorandum to the Mitigation Manager documenting compliance.

Bio-MM#38: Bat Avoidance and Relocation. During ground-disturbing activities, the Contractor will avoid active hibernation roosts. If avoidance of the hibernation roost is not feasible, the Contractor's Biologist will prepare a relocation plan and coordinate the construction of an alternative bat roost with CDFG. The Contractor will implement the Bat Roost Relocation Plan prior to the commencement of construction activities.

Remove roosts with approval from CDFG before hibernation begins (October 31), or after young are flying (July 31), using exclusion and deterrence techniques described in Bio-MM#39 below. The timeline

to remove vacated roosts is between August 1 and October 31. All effort to avoid disturbance to maternity roosts will be made during construction activities. The Project Biologist will submit a memorandum to the Mitigation Manager documenting compliance.

Bio-MM#39: Bat Exclusion and Deterrence. During ground-disturbing activities, if non-breeding or non-hibernating individuals or groups of bats are found within the construction footprint, the bats will be safely excluded by either opening the roosting area to change lighting and airflow conditions, or by installing one-way doors, or other appropriate methods specified by CDFG. The Contractor will leave the roost undisturbed by project-related activities for a minimum of one week after implementing exclusion and/or eviction activities. The Contractor will not implement exclusion measures to evict bats from established maternity roosts or occupied hibernation roosts. The Project Biologist will submit a memorandum to the Mitigation Manager documenting compliance.

Other measures that potentially apply to bats include the following:

- Bio-MM#3: Prepare and Implement a Worker Environmental Awareness Program.
- Bio-MM#5: Prepare and Implement a Biological Resources Management Plan.
- Bio-MM#7: Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field).
- Bio-MM#8: Equipment Staging Areas.
- Bio-MM#10: Vehicle Traffic.
- Bio-MM#11: Entrapment Prevention.
- Bio-MM#12: Work Stoppage.
- Bio-MM#13: 'Take' Notification and Reporting.
- Bio-MM#14: Post-Construction Compliance Reports.

American Badger

Bio-MM#40: Conduct Pre-Construction Surveys for American Badger. Prior to ground-disturbing activities, the Project Biologist or designee will conduct pre-construction surveys for American badger den sites within suitable habitats in the construction footprint. The Project Biologist will conduct these surveys no more than 30 days before the start of ground-disturbing activities and phase with project build out. The Project Biologist will submit a memorandum to the Mitigation Manager documenting compliance.

Bio-MM#41: American Badger Avoidance. The Contractor's Biologist will establish a 50-foot buffer around occupied American badger dens. The Contractor will establish a 200-foot buffer around badger maternity dens through the pup-rearing season (February 15 through July 1). Adjustments to the buffer(s) will require prior approval by CDFG as coordinated by the Project Biologist. The Project Biologist will submit a memorandum to the Mitigation Manager documenting compliance.

Other measures that potentially apply to the American badger include the following:

- Bio-MM#3: Prepare and Implement a Worker Environmental Awareness Program.
- Bio-MM#5: Prepare and Implement a Biological Resources Management Plan.
- Bio-MM#7: Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field).
- Bio-MM#8: Equipment Staging Areas.

- Bio-MM#10: Vehicle Traffic.
- Bio-MM#11: Entrapment Prevention.
- Bio-MM#12: Work Stoppage.

San Joaquin Kit Fox

Bio-MM#42: Conduct Pre-Construction Surveys for San Joaquin Kit Fox. The USFWS' *Standardized Recommendations for Protection of the San Joaquin Kit Fox Prior to or During Ground Disturbance* (USFWS 1999b) will be implemented as follows for construction related impacts.

Prior to the start of ground-disturbing activities, the Project Biologist or designee will conduct pre-construction surveys in accordance with the USFWS' *San Joaquin Kit Fox Survey Protocol for the Northern Range* (USFWS 1999c). The Project Biologist will submit a memorandum to the Mitigation Manager documenting compliance.

Bio-MM#43: Minimize Impacts on San Joaquin Kit Fox. The Contractor's Biologist will Implement USFWS' *Standard Measures for Protection of the San Joaquin Kit Fox Prior to or During Ground Disturbance* (USFWS 1999b) to minimize ground disturbance-related impacts on this species. The Project Biologist will submit a memorandum to the Mitigation Manager documenting compliance.

Other measures that potentially apply to the San Joaquin kit fox include the following:

- Bio-MM#3: Prepare and Implement a Worker Environmental Awareness Program.
- Bio-MM#5: Prepare and Implement a Biological Resources Management Plan.
- Bio-MM#7: Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field).
- Bio-MM#8: Equipment Staging Areas.
- Bio-MM#10: Vehicle Traffic.
- Bio-MM#11: Entrapment Prevention.
- Bio-MM#12: Work Stoppage.
- Bio-MM#13: 'Take' Notification and Reporting.
- Bio-MM#14: Post-Construction Compliance Reports.

Habitats of Concern

Special-Status Plant Communities

The following measures potentially apply to special-status plant communities:

- Bio-MM#3: Prepare and Implement a Worker Environmental Awareness Program.
- Bio-MM#4: Prepare and Implement a Weed Control Plan.
- Bio-MM#5: Prepare and Implement a Biological Resources Management Plan.
- Bio-MM#6: Prepare and Implement a Restoration and Revegetation Plan.
- Bio-MM#7: Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field).

- Bio-MM#8: Equipment Staging Areas.
- Bio-MM#10: Vehicle Traffic.
- Bio-MM#15: Restore Temporary Riparian Impacts.

Jurisdictional Waters

Bio-MM#44: Restore Temporary Impacts on Jurisdictional Waters. During or post-construction, the Contractor will restore disturbed jurisdictional waters using stockpiled and segregated soils. The Contractor's Biologist will conduct revegetation using appropriate plants and seed mixes, and conduct maintenance monitoring consistent with the provisions in the HMMP (Bio-MM#58). The Project Biologist will document compliance with memorandum submitted to the Mitigation Manager.

Bio-MM#45: Monitor Construction Activities within Jurisdictional Waters. During ground-disturbing activities, the Project Biological Monitor will conduct monitoring within jurisdictional waters, including monitoring of the installation of protective devices (silt fencing, sandbags, fencing, etc.), installation and/or removal of creek crossing fill, construction of access roads, vegetation removal, and other associated construction activities. The Project Biological Monitor will conduct biological monitoring to document adherence to habitat avoidance and minimization measures addressed in the project mitigation measures and as listed in the USFWS, CDFG, SWRCB, and USACE permits conditions. The Project Biological Monitor will report and document compliance consistent with requirements in the permitting documents, including frequency and timing and submittals.

Other measures that potentially apply to jurisdictional waters include the following:

- Bio-MM#3: Prepare and Implement a Worker Environmental Awareness Program.
- Bio-MM#4: Prepare and Implement a Weed Control Plan.
- Bio-MM#5: Prepare and Implement a Biological Resources Management Plan.
- Bio-MM#6: Prepare and Implement a Restoration and Revegetation Plan.
- Bio-MM#7: Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field).
- Bio-MM#8: Equipment Staging Areas.
- Bio-MM#10: Vehicle Traffic.
- Bio-MM#15: Restore Temporary Riparian Impacts.
- Bio-MM#19: Conduct Pre-Construction Sampling and Assessment for Vernal Pool Fauna.
- Bio-MM#20: Seasonal Vernal Pool Work Restriction.
- Bio-MM#21: Implement and Monitor Vernal Pool Protection.

Critical Habitat

HST impacts associated with threatened and endangered species, including critical habitat, occupied habitat, and suitable habitat for special-status species is addressed through the coordination process, outlined under Section 7 of the federal ESA. After a Biological Assessment has been accepted, the USFWS will render a Biological Opinion. The Authority or its designee will coordinate with the USFWS related to threatened and endangered species, including critical habitat, occupied habitat and suitable habitat for special-status species.

The individual mitigation measures addressed for special-status species are anticipated to result in compliance with appropriate mitigation for Conservancy fairy shrimp, vernal pool tadpole shrimp, vernal pool fairy shrimp, and San Joaquin Orcutt grass critical habitat.

The following measures potentially apply to critical habitat:

- Bio-MM#2: Regulatory Agency Access.
- Bio-MM#3: Prepare and Implement a Worker Environmental Awareness Program.
- Bio-MM#4: Prepare and Implement a Weed Control Plan.
- Bio-MM#5: Prepare and Implement a Biological Resources Management Plan.
- Bio-MM#7: Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field).
- Bio-MM#8: Equipment Staging Areas.
- Bio-MM#10: Vehicle Traffic.
- Bio-MM#11: Entrapment Prevention.
- Bio-MM#12: Work Stoppage.
- Bio-MM#13: 'Take' Notification and Reporting.
- Bio-MM#14: Post-Construction Compliance Reports.
- Bio-MM#15: Restore Temporary Riparian Impacts.
- Bio-MM#17: Conduct Pre-construction Surveys for Special-Status Plant Species.
- Bio-MM#18: Prepare and Implement Plan for Salvage, Relocation, and/or Propagation of Special-Status Plant Species.
- Bio-MM#19: Conduct Pre-Construction Sampling and Assessment for Vernal Pool Fauna.
- Bio-MM#20: Seasonal Vernal Pool Work Restriction.
- Bio-MM#21: Implement and Monitor Vernal Pool Protection.

Essential Fish Habitat

The following measures potentially apply to EFH (within the San Joaquin River):

- Bio-MM#3: Prepare and Implement a Worker Environmental Awareness Program.
- Bio-MM#5: Prepare and Implement a Biological Resources Management Plan.
- Bio-MM#6: Prepare and Implement a Restoration and Revegetation Plan.
- Bio-MM#7: Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field).
- Bio-MM#8: Equipment Staging Areas.
- Bio-MM#10: Vehicle Traffic.
- Bio-MM#14: Post-Construction Compliance Reports.

- Bio-MM#15: Restore Temporary Riparian Impacts.

Core Areas for Recovery of Federally Listed Species

Mitigation for impacts on core areas for San Joaquin kit fox are not discussed further in this section because the Eastman Lake-Bear Creek ECA, which encompasses the same areas, is discussed in detail under Wildlife Movement Corridors.

Mitigation Banks/Reserves

Camp Pashayan (within the San Joaquin River Ecological Reserve)

Several mitigation measures listed above apply to Camp Pashayan. Mitigation for Camp Pashayan is also addressed in Section 3.15, Parks, Recreation, and Open Space.

- Bio-MM#15: Restore Temporary Riparian Impacts;
- Bio-MM#17: Conduct Pre-Construction Surveys for Special-Status Plant Species;
- Bio-MM#18: Prepare and Implement Plan for Salvage, Relocation, and/or Propagation of Special-Status Plant Species;
- Bio-MM#19: Conduct Pre-Construction Sampling and Assessment for Vernal Pool Fauna;
- Bio-MM#20: Seasonal Vernal Pool Work Restriction;
- Bio-MM#21: Implement and Monitor Vernal Pool Protection;
- Bio-MM#44: Restore Temporary Impacts on Jurisdictional Waters.
- Bio-MM#45: Monitor Construction Activities within Jurisdictional Waters;

Great Valley Conservation Bank

The resources present in the Great Valley Conservation Bank include vernal pools, other seasonal wetlands, vernal pool species, and special-status plants and wildlife local to the area. Mitigation resulting from the BNSF Alternative will therefore involve many of the mitigation measures that address these resources, including the following:

- Bio-MM#3: Prepare and Implement a Worker Environmental Awareness Program.
- Bio-MM#5: Prepare and Implement a Biological Resources Management Plan.
- Bio-MM#6: Prepare and Implement a Restoration and Revegetation Plan.
- Bio-MM#7: Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field).
- Bio-MM#8: Equipment Staging Areas.
- Bio-MM#10: Vehicle Traffic.
- Bio-MM#15: Restore Temporary Riparian Impacts.
- Bio-MM#17: Conduct Pre-Construction Surveys for Special-Status Plant Species.
- Bio-MM#18: Prepare and Implement Plan for Salvage, Relocation, and/or Propagation of Special-Status Plant Species.
- Bio-MM#19: Conduct Pre-Construction Sampling and Assessment for Vernal Pool Fauna.
- Bio-MM#20: Seasonal Vernal Pool Work Restriction.
- Bio-MM#21: Implement and Monitor Vernal Pool Protection.
- Bio-MM#44: Restore Temporary Impacts on Jurisdictional Waters.

Bio-MM#46: Wildlife Corridor Undercrossing (Implementation). During construction of the alignment, the Contractor will install designated wildlife undercrossing(s) at the designated locations shown on the construction drawings. To the extent feasible, water crossing structures (those serving either constructed or natural watercourses) should be designed to also accommodate wildlife passage. The Project Biologist will check implementation of the undercrossing to determine consistency with the construction drawings and to confirm that installation is consistent and incorporates applicable conditions from resource agency permits (e.g., 2081, Section 7). The Project Biologist will prepare a memorandum documenting compliance and submit to the Mitigation Manager.

Bio-MM#47: Install Wildlife Fencing. Prior to operation of the HST, the Contractor's Biologist will install free-ranging mammal-proof fencing along portions of the proposed project consistent with final design. The Project Biologist will verify that the installation is consistent with the designated terms and conditions in the applicable permits. The Project Biologist will prepare and submit a memorandum to the Mitigation Manager documenting compliance.

Bio-MM#48: Construction in Wildlife Movement Corridors. Before ground-disturbing activities, the Contractor's Biologist will submit a construction avoidance and minimization plan for the Eastman Lake-Bear Creek ECA to the Project Biologist for concurrence. During ground-disturbing activities, the Contractor will keep the Eastman Lake-Bear Creek ECA riparian corridors (including Deadman and Dutchman creeks) free of all equipment, storage materials, construction materials, and any significant potential impediments. The Contractor will minimize ground-disturbing activities within the Eastman Lake-Bear Creek ECA riparian corridors (Deadman and Dutchman creeks) during nighttime hours to the extent practicable. In addition, keep nighttime illumination (e.g., for security) from spilling into the ECA or shield nighttime lighting to avoid illumination spilling into the ECA. Inspections will verify compliance and the Project Biologist will report through an appropriate memorandum to the Mitigation Manager.

Other measures that potentially apply to wildlife movement corridors include the following:

- Bio-MM#3: Prepare and Implement a Worker Environmental Awareness Program.
- Bio-MM#4: Prepare and Implement a Weed Control Plan.
- Bio-MM#5: Prepare and Implement a Biological Resources Management Plan.
- Bio-MM#6: Prepare and Implement a Restoration and Revegetation Plan.
- Bio-MM#7: Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field).
- Bio-MM#8: Equipment Staging Areas.
- Bio-MM#10: Vehicle Traffic.
- Bio-MM#11: Entrapment Prevention.
- Bio-MM#15: Restore Temporary Riparian Impacts.
- Bio-MM#44: Restore Temporary Impacts on Jurisdictional Waters.
- N &V-MM#1: Construction Noise Mitigation Measures.

3.7.7.3 Project Mitigation Measures

Plant Communities and Land Cover Types

Bio-MM#49: Compensate for Permanent Riparian Impacts. The Authority will compensate for permanent impacts on Great Valley mixed riparian forest and other riparian habitats, determined in consultation with the appropriate agencies (e.g., CDFG), by restoring nearby areas to suitable habitat

through permittee-responsible mitigation and/or by purchasing credits in a mitigation bank. Other relevant regulatory permits addressing riparian impacts include the CDFG 1600 Streambed Alteration Agreement, the USACE Section 404 Permit, and the SWRCB 401 Permit. The HMMP will provide the planning details as referenced in Bio-MM#58. Bio-MM#58 provides documentation and reporting requirements.

Compensation will be based on the following ratios (acres of mitigation to acres of impact):

- Great Valley Mixed Riparian Forest: 2:1
- Other Riparian: 2:1

Other measures that potentially apply to riparian plant communities include the following:

- Bio-MM#4: Prepare and Implement a Weed Control Plan.
- Bio-MM#57: Conduct Delineation of Jurisdictional Waters and State Streambeds.
- Bio-MM#58: Prepare and Implement a Habitat Mitigation and Monitoring Plan.
- Bio-MM#59: Compensate for Permanent Impacts on Jurisdictional Waters.

Special-Status Species

Plants

Bio-MM#50: Compensate for Impacts on Special-Status Plant Species. Prior to Final Design and during the permitting process, the Authority will comply with CESA and the federal ESA by implementing the following measures:

Purchase credits from an existing mitigation bank or conduct a special-status plant re-establishment program within the same watershed or in proximity to the impact area at a 1:1 ratio. The success of the special status plant species program is related to the success of the vernal pools. Restored areas must be similar in species composition and ecosystem function to the reference habitat to be considered completed and successful at the end of the monitoring period. In general, this means that data collected on restored or enhanced pools must fall within the range of data obtained from reference pools. General performance standards and guidelines are presented in Bio-MM#58.

Mitigate the impacts on special-status plants in accordance with the USFWS Biological Opinion and/or CDFG 2081(b).

The Project Biologist will submit a memorandum to the Mitigation Manager documenting compliance. Other measures that potentially apply to special-status plant species include the following:

- Bio-MM#4: Prepare and Implement a Weed Control Plan.
- Bio-MM#14: Post-Construction Compliance Reports.
- Bio-MM#51: Implement Conservation Guidelines During the Project Period for Valley Elderberry Longhorn Beetle.
- Bio-MM#57: Conduct Delineation of Jurisdictional Waters and State Streambeds.
- Bio-MM#58: Prepare and Implement a Habitat Mitigation and Monitoring Plan.
- Bio-MM#59: Compensate for Permanent Impacts on Jurisdictional Waters.
- Bio-MM#61: Wildlife Corridor Artificial Dens.



Wildlife

Invertebrates

Vernal Pool Branchiopods

The Authority or its designee will mitigate direct and indirect impacts, including temporary and permanent, on vernal pool branchiopod habitat through compensation determined in consultation with the USFWS and CDFG. Vernal pool branchiopods are addressed for the project-period mitigation measures under jurisdictional waters (refer to Bio-MM#57, 58, 59) to re-establish vernal pool branchiopod habitat values. Performance standards for vernal pool branchiopod habitat are generally described in Bio-MM#58. It is important to recognize that Bio-MM#58 includes standards that apply to several resource areas (e.g., jurisdictional waters, riparian habitat, California tiger salamander habitat). Compensatory mitigation for vernal pool branchiopods will incorporate appropriate terms and conditions from CESA and federal ESA requirements.

Valley Elderberry Longhorn Beetle

Bio-MM#51: Implement Conservation Guidelines During the Project Period for Valley Elderberry Longhorn Beetle. The Authority or its designee will conduct compensatory mitigation for the valley elderberry longhorn beetle, including transplantation and replacement of elderberry shrubs, and maintenance for replacement shrubs, following the USFWS' *Conservation Guidelines for the Valley Elderberry Longhorn Beetle* (USFWS 1999a). Performance standards for valley elderberry longhorn beetle habitat are generally described in Bio-MM#58. It is important to recognize that Bio-MM#58 includes standards that apply to several resource areas (e.g., jurisdictional waters, riparian habitat, California tiger salamander habitat). The Project Biologist will submit a memorandum to the Mitigation Manager documenting compliance.

Other measures that potentially apply to valley elderberry longhorn beetle include the following:

- Bio-MM#4: Prepare and Implement a Weed Control Plan.
- Bio-MM#14: Post-Construction Compliance Reports.

Amphibians

California Tiger Salamander

Bio-MM#52: Compensate for Impacts on California Tiger Salamander. The Authority or its designee will determine compensatory mitigation for the temporary and permanent loss of suitable upland and aquatic breeding habitat through agency consultation with the USFWS and CDFG. Performance standards for California tiger salamander habitat are generally described in Bio-MM#58. It is important to recognize that Bio-MM#58 includes standards that apply to several resource areas (e.g., jurisdictional waters, riparian habitat, California tiger salamander habitat). Compensatory mitigation could include one of the following:

- Purchase of credits from an agency-approved mitigation bank.
- Fee-title-acquisition of natural resource regulatory agency-approved property.
- Purchase or establishment of a conservation easement with an endowment for long-term management of the property-specific conservation values.
- In-lieu fee contribution determined through negotiation and consultation with the various natural resource regulatory agencies.
- Implementation of USFWS Biological Opinion and/or CDFG 2081(b).
- The Project Biologist will submit a memorandum documenting compliance to the Mitigation Manager.

The following measures potentially apply to California tiger salamander:

- Bio-MM#4: Prepare and Implement a Weed Control Plan.
- Bio-MM#57: Conduct Delineation of Jurisdictional Waters and State Streambeds.
- Bio-MM#58: Prepare and Implement a Habitat Mitigation and Monitoring Plan.
- Bio-MM#59: Compensate for Permanent Impacts on Jurisdictional Waters.

Reptiles

Western Pond Turtle

Bio-MM#53: Implement Western Pond Turtle Mitigation Measures. The Authority or its designee will mitigate the impacts on western pond turtle in accordance with the USFWS Biological Opinion and/or CDFG 2081(b). The Project Biologist will submit a memorandum documenting compliance to the Mitigation Manager.

The following measures potentially apply to western pond turtle:

- Bio-MM#4: Prepare and Implement a Weed Control Plan.
- Bio-MM#49: Compensate for Permanent Riparian Impacts.
- Bio-MM#57: Conduct Delineation of Jurisdictional Waters and State Streambeds.
- Bio-MM#58: Prepare and Implement a Habitat Mitigation and Monitoring Plan.
- Bio-MM#59: Compensate for Permanent Impacts on Jurisdictional Waters.

Fish

The following measures potentially apply to fish:

- Bio-MM#4: Prepare and Implement a Weed Control Plan.
- Bio-MM#49: Compensate for Permanent Riparian Impacts.
- Bio-MM#57: Conduct Delineation of Jurisdictional Waters and State Streambeds.
- Bio-MM#58: Prepare and Implement a Habitat Mitigation and Monitoring Plan.
- Bio-MM#59: Compensate for Permanent Impacts on Jurisdictional Waters.

Birds

Birds included in the following mitigation measure are those protected under the MBTA and/or listed as SSC by CDFG.

- Bio-MM#4: Prepare and Implement a Weed Control Plan.
- Bio-MM#49: Compensate for Permanent Riparian Impacts.
- Bio-MM#57: Conduct Delineation of Jurisdictional Waters and State Streambeds.
- Bio-MM#58: Prepare and Implement a Habitat Mitigation and Monitoring Plan.
- Bio-MM#59: Compensate for Permanent Impacts on Jurisdictional Waters.
- Bio-MM#63: Compensate for Impacts on Protected Trees.



Raptors

Swainson's Hawks

Bio-MM#54: Compensate for Loss of Swainson's Hawk Foraging Habitat. To compensate for the loss of Swainson's hawk foraging habitat, the Authority or its designee will provide compensatory mitigation that follows the ratios recommended by CDFG's (1994) Staff Report Regarding Mitigation for Impacts on Swainson's hawks in the Central Valley. The Project Biologist will submit a memorandum documenting compliance to the Mitigation Manager. The ratios are based on the distance from the construction footprint to the closest active nest site (which for this species is defined as a nest used one or more times in the last 5 years), as follows:

- Compensate where impacts on foraging habitat occur within 1 mile of an active nest tree, at a 1:1 ratio on agricultural lands or other suitable foraging habitat; or at a 0.5:1 ratio where habitat can be managed for prey production.
- Compensate where impacts on foraging habitat occur within 5 miles, but more than 1 mile from an active nest tree, at a 0.75:1 ratio.
- Compensate where impacts on foraging habitat occur within 10 miles, but more than 5 miles from an active nest tree, at a 0.5:1 ratio.
- Mitigate the impacts on special-status plants in accordance with the USFWS Biological Opinion and/or CDFG 2081(b).

Other measures that potentially apply to Swainson's hawk include the following:

- Bio-MM#4: Prepare and Implement a Weed Control Plan.
- Bio-MM#49: Compensate for Permanent Riparian Impacts.
- Bio-MM#57: Conduct Delineation of Jurisdictional Waters and State Streambeds.
- Bio-MM#58: Prepare and Implement a Habitat Mitigation and Monitoring Plan.
- Bio-MM#59: Compensate for Permanent Impacts on Jurisdictional Waters.
- Bio-MM#63: Compensate for Impacts on Protected Trees.

Burrowing Owls

Bio-MM#55: Compensate for Loss of Burrowing Owl Foraging and Breeding Habitat. The Authority or its designee will provide base compensatory mitigation for the temporary and permanent loss of foraging and breeding habitat on the number of western burrowing owl pairs or individuals affected. Compensation will be at a 6.5:1 ratio (acres of habitat: number of pairs or individuals). Mitigate each occupied burrow destroyed by enlarging or enhancing existing unsuitable burrows at a 2:1 ratio based on CDFG's (1995) *Staff Report on Burrowing Owl Mitigation*. The Project Biologist will submit a memorandum to the Mitigation Manager documenting compliance.

Mammals

Special-Status Bats

The following measures potentially apply to special-status bats:

- Bio-MM#4: Prepare and Implement a Weed Control Plan.
- Bio-MM#14: Post-Construction Compliance Reports.
- Bio-MM#49: Compensate for Permanent Riparian Impacts.

- Bio-MM#57: Conduct Delineation of Jurisdictional Waters and State Streambeds.
- Bio-MM#58: Prepare and Implement a Habitat Mitigation and Monitoring Plan.
- Bio-MM#59: Compensate for Permanent Impacts on Jurisdictional Waters.
- Bio-MM#61: Wildlife Corridor Artificial Dens.

American Badger

The following measures potentially apply to American badgers:

- Bio-MM#4: Prepare and Implement a Weed Control Plan.
- Bio-MM#14: Post-Construction Compliance Reports.
- Bio-MM#57: Conduct Delineation of Jurisdictional Waters and State Streambeds.
- Bio-MM#58: Prepare and Implement a Habitat Mitigation and Monitoring Plan.
- Bio-MM#59: Compensate for Permanent Impacts on Jurisdictional Waters.
- Bio-MM#61: Wildlife Corridor Artificial Dens.

San Joaquin Kit Fox

Bio-MM#56: Compensate for Destruction of Natal Dens. The Authority or its designee will mitigate the destruction of kit fox natal dens by the purchase of suitable, approved habitat (USFWS and CDFG). Replace habitat at a minimum of 1:1 acre of habitat in order to provide additional protection and habitat in a location consistent with the recovery of the species. Mitigate the impacts on San Joaquin kit fox in accordance with the USFWS Biological Opinion and/or CDFG 2081(b). The Project Biologist will submit a memorandum to the Mitigation Manager documenting compliance.

Other measures that potentially apply to San Joaquin Kit Fox include the following:

- Bio-MM#4: Prepare and Implement a Weed Control Plan.
- Bio-MM#57: Conduct Delineation of Jurisdictional Waters and State Streambeds.
- Bio-MM#58: Prepare and Implement a Habitat Mitigation and Monitoring Plan.
- Bio-MM#59: Compensate for Permanent Impacts on Jurisdictional Waters.
- Bio-MM#61: Wildlife Corridor Artificial Dens.
- Bio-MM#62: Monitoring and Reporting of Wildlife Corridor Undercrossings.

Habitats of Concern

Jurisdictional Waters

Bio-MM#57: Conduct Delineation of Jurisdictional Waters and State Streambeds. The Authority or its designee, prior to final design, will conduct a jurisdictional delineation, documenting jurisdictional waters and state streambeds consistent with USACE, SWRCB, and CDFG guidance. As part of the delineation, determine the functions and values of the jurisdictional waters using accepted methods such as the CRAM so that the functions and values have been replaced and that no net loss of jurisdictional waters and state streambed values occurs. Develop habitat replacement guidelines to identify and quantify habitats that are to be removed and identify the locations for restoring or relocating habitats. The Project Biologist will submit a memorandum to the Mitigation Manager documenting compliance.

Bio-MM#58: Prepare and Implement a Habitat Mitigation and Monitoring Plan. As part of the USFWS, USACE, SWRCB, and CDFG permit applications and prior to ground-disturbing activities, the Authority or its designee will prepare an HMMP to mitigate for temporary and permanent impacts on jurisdictional waters and state streambeds. The HMMP will detail performance standards, including percent cover of native species, survivability, canopy cover requirements, wildlife utilization, the acreage basis, restoration ratios, and the combination of onsite and/or offsite mitigation. Preference shall be given to conduct the mitigation within the same watershed where the impact occurs. The Authority or its designee will conduct work with the USACE, SWRCB, and CDFG to develop appropriate avoidance, minimization, mitigation, and monitoring measures to be incorporated into the HMMP. The intent of the



HMMP is to mitigate for the lost functions and values of impacts on jurisdictional waters and state streambeds consistent with resource agency requirements and conditions presented in Sections 404 and 401 of the CWA and Section 1600 of the CFGC. It is also anticipated that since listed species such as California tiger salamander, colusa grass, and vernal pool branchiopods are nested within these habitats, the HMMP will also serve to mitigate for listed species through Section 7 of ESA and CESA 2081. The Project Biologist will submit a memorandum to the Mitigation Manager documenting compliance. In the HMMP, the applicant or its designee shall incorporate the following standard requirements consistent with USACE, SWRCB, and CDFG guidelines:

- Description of the project impact/site.
- Goal(s) (i.e., functions and values) of the compensatory mitigation project.
- Description of the proposed compensatory mitigation site.
- Implementation plan for the proposed compensatory mitigation site.
- Maintenance activities during the monitoring period.
- Monitoring plan for the compensatory mitigation site.
- Completion of compensatory mitigation.
- Contingency measures.

Additionally, the following will be included at a minimum for the implementation plan:

- Site analysis for appropriate soils and hydrology.
- Site preparation specifications based on site analysis, including but not limited to grading and weeding.
- Soil and plant material salvage from impact areas, as appropriate to the timing of impact and restoration as well as the location of restoration sites.
- Specifications for plant and seed material appropriate to the locality of the mitigation site.
- Specifications for site maintenance to establish the habitats, including but not limited to weeding and temporary irrigation.

Habitat restoration, enhancement, and/or establishment activities will be conducted on some of the compensatory (i.e., selected permittee-responsible) mitigation sites to achieve the mitigation goals. A detailed design of the mitigation habitats will be created in coordination with the permitting agencies and be described in the HMMP. It is recognized that several HMMPs will be developed consistent with the selected mitigation sites and the resources mitigated at each. The primary engineering and construction contractors will ensure, through coordination with the Project Biologist, that construction is implemented in a manner that minimizes disturbance of such areas to the extent feasible. Temporary fencing will be used during construction to avoid sensitive biological resources that are adjacent to construction areas and can be avoided.

Performance standards are targets for determining the effectiveness of the mitigation and assessing the need for adaptive management (e.g., mitigation design or maintenance revisions). Success criteria are formal criteria that must be met after a specific timeframe to meet regulatory requirements of the permitting agencies. Where applicable, replacement planting/seeding will be implemented if monitoring demonstrates that performance goals or success criteria are not met during a particular monitoring interval.

The criteria for measuring performance will be used to determine whether the habitat improvement is trending toward sustainability (i.e., reduced human intervention) and to assess the need for adaptive management. These criteria must be met for the habitat improvement to be declared successful, both during a particular monitoring year and at the end of the establishment period. These performance criteria will be developed in consultation with the permitting agencies. The criteria include:

- Percent survival of planted trees (65–85%).

- Percent survival of transplanted trees (60–85%).
- Percent relative canopy cover (5–35%).
- Percent cover of invasive species (<1%).
- Percent cover of nonnative herbaceous plants (<10–25%).
- Percent absolute cover of native species (>50–80%).
- Percent relative cover of native species (>50%).
- Percent total cover of plant species (20–75%).
- Percent relative cover of wetland indicator species (75–90%).
- Water level within +/-6 inches (or other measurement) of design.
- Species composition and community diversity, relative to reference sites, and/or as described in the guidelines issued by permitting agencies (e.g., USFWS conservation guidelines for valley elderberry longhorn beetle).

Performance goals and success criteria will be provided for each of the years of monitoring and will be specific to habitat types at each permittee-responsible mitigation site. The monitoring schedule will be detailed in the site-specific HMMPs. To be deemed successful, the site may be required to meet the success criteria only in selected years. However, if success criteria are not met in specific years, remedial measures, including regrading, adjustment to modify the hydrological regime, and/or replacement planting or seeding, must be implemented and that year's monitoring must be repeated the following year until the success criteria are met. The success criteria specified must be reached without human intervention (e.g., irrigation, replacement plantings) aside from maintenance practices described in the site-specific HMMPs for maintenance during the establishment period.

Where the HST alignment affects an existing mitigation bank, the Authority or its designee will modify the mitigation ratio to meet the vernal pool mitigation requirement. The Authority or its designee will relocate the affected portion of the mitigation bank or compensate the landowner in accordance with the Uniform Relocation and Real Property Policy Act of 1970, as amended.

The Project Biologist will oversee the implementation of all HMMP elements and monitor consistent with the prescribed maintenance and performance monitoring requirements.

The Project Biologist will prepare annual monitoring reports for 5 years (or less if success criteria are met as described earlier) and/or other documentation prescribed in the resource agency permits. In addition, the Project Biologist will document compliance and submit to the Mitigation Manager.

Bio-MM#59: Compensate for Permanent Impacts on Jurisdictional Waters. The Authority or its designee will mitigate permanent wetland impacts through compensation determined in consultation with the USACE, SWRCB, USFWS, and CDFG, in order to be consistent with the HMMP (Bio-MM#58).

Regulatory compliance for jurisdictional waters includes relevant terms and conditions from the USACE 404 Permit, SWRCB 401 Permit, and CDFG 1600 Streambed Alteration Agreement. The Project Biologist will submit a memorandum to the Mitigation Manager documenting compliance. Performance standards for jurisdictional waters are generally described in Bio-MM#58. It is important to recognize that Bio-MM#58 includes standards that apply to several resource areas (e.g., jurisdictional waters, riparian habitat, California tiger salamander habitat).

Compensation could include one of the following:

- Purchase of credits from an agency-approved mitigation bank.

- Fee-title-acquisition of natural resource agency-related property.
- Purchase or establishment of a conservation easement with an endowment for long-term management of the property-specific conservation values.
- In-lieu fee contribution determined through negotiation and consultation with the various natural resource regulatory agencies.

Base compensation for permanent impacts on the following ratios (acres of mitigation to acres of impact), pending agency confirmation:

- Vernal pools and other seasonal wetlands: 2:1 Preservation and 1:1 Creation.
- Coastal and Valley Freshwater Marsh: 1:1.
- Other Wetlands: Between 1.1:1 and 1.5:1 (1:1 onsite and 0.1 to 0.5:1 offsite), based on function and values lost.
- Ratios determined in consultation with the appropriate agencies.

The Authority will mitigate impacts on jurisdictional waters by replacing, creating, restoring, or preserving the identified resource at the ratios presented below or other ratio that compensates for functions and values lost. The Authority or its designee will consider modifying the vernal pool mitigation ratio in the final permits based on site-specific conditions and the specific life history requirements of vernal pool branchiopods, California tiger salamanders, and Western spadefoot toads.

Where the HST Alternative affects an existing mitigation bank, the Authority or its designee will modify the mitigation ratio to meet the vernal pool mitigation requirement. Relocate the affected portion of the mitigation bank or provide compensation to the holder of the conservation easement, in accordance with the *Uniform Relocation and Real Property Policy Act of 1970*, as amended.

Through the HMMP reporting program and the applicable terms and conditions from the USACE 404 Permit, SWRCB 401 Permit, and the CDFG 1600 Streambed Alteration Agreement, the Project Biologist will document compliance and submit to the Mitigation Manager.

Critical Habitat

HST impacts associated with threatened and endangered species, including critical habitat, occupied habitat, and suitable habitat for special-status species is addressed through the coordination process, outlined under Section 7 of the federal ESA. After a Biological Assessment has been accepted, the USFWS will render a Biological Opinion. Coordinate with the USFWS related to threatened and endangered species, including critical habitat, occupied habitat and suitable habitat for special-status species.

Essential Fish Habitat

Construction-period mitigation measures address impacts associated with EFH. There will be no impacts related to project-period impacts.

Core Areas for Recovery of Federally Listed Species

Impacts on core areas for San Joaquin kit fox are not discussed further in this section because the Eastman Lake-Bear Creek ECA, which encompasses the same areas, is discussed in detail under Wildlife Movement Corridors.

Mitigation Banks/Reserves

Camp Pashayan (within the San Joaquin River Ecological Reserve)

Mitigation for Camp Pashayan (within the San Joaquin River Ecological Reserve) is addressed in Section 3.15, Parks, Recreation, and Open Space. The following measures will apply:

- PK-MM#1: Compensate for Staging in Park Property for Construction.
- PK-MM#4: Acquire Park Property.

Great Valley Conservation Bank

The resources present with the Great Valley Conservation Bank include vernal pools, other seasonal wetlands, vernal pool species, and special-status plants and wildlife local to the area. Mitigation resulting from the BNSF Alternative will, therefore, likely include many of the mitigation measures that address these resources, depending on specific resources impacted, including the following:

- Bio-MM#49: Compensate for Permanent Riparian Impacts.
- Bio-MM#50: Compensate for Impacts on Special-Status Plant Species.
- Bio-MM#57: Conduct Delineation of Jurisdictional Waters and State Streambeds.
- Bio-MM#58: Prepare and Implement a Habitat Mitigation and Monitoring Plan.
- Bio-MM#59: Compensate for Permanent Impacts on Jurisdictional Waters.

Bio-MM#60: Offsite Habitat Restoration, Enhancement, and Preservation.

Prior to site preparation at the mitigation site, the Authority or its designee will consider the offsite habitat restoration, enhancement, or preservation program, and identify short-term temporary and/or long-term permanent effects on the natural landscape. A determination will be made on any effects from the physical alteration of the site to onsite biological resources, including plant communities, land cover types, and the distribution of special-status plants and wildlife.

Appropriate seasonal restrictions (e.g., breeding season) may be applicable if appropriate habitats exist onsite. Activities resulting in the physical alteration of the site include grading/modifications to onsite topography, stockpiling, storage of equipment, installation of temporary irrigation, removal of invasive species, and drainage feature treatments. In general, the long-term improvements to habitat functions and values will offset temporary effects during restoration, enhancement, or preservation activities.

The offsite habitat restoration, enhancement, and preservation program will be designed, implemented, and monitored consistent with the terms and conditions of the USACE Section 404 Permit, CDFG 1600 Streambed Alteration Agreement, and CESA and federal ESA as they apply to their jurisdiction and resources onsite. Potential effects on site-specific hydrology and the downstream resources will be evaluated as a result of implementation of the restoration-related activity. Site-specific BMPs and an SWPPP will be implemented as appropriate.

The Authority or its designee will report on compliance with permitting requirements. The Project Biologist will be responsible for the monitoring and tracking of the program and will prepare a memorandum of compliance and submit to the Mitigation Manager.

Other measures that potentially apply to offsite habitat restoration, enhancement, and preservation include the following:

- Bio-MM#3: Prepare and Implement a Worker Environmental Awareness Program.
- Bio-MM#4: Prepare and Implement a Weed Control Plan.
- Bio-MM#5: Prepare and Implement a Biological Resources Management Plan.
- Bio-MM#6: Prepare and Implement a Restoration and Revegetation Plan.

- Bio-MM#7: Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field).
- Bio-MM#8: Equipment Staging Areas.
- Bio-MM#10: Vehicle Traffic.
- Bio-MM#15: Restore Temporary Riparian Impacts.
- Bio-MM#19: Conduct Pre-Construction Sampling and Assessment for Vernal Pool Fauna.
- Bio-MM#20: Seasonal Vernal Pool Work Restriction.
- Bio-MM#21: Implement and Monitor Vernal Pool Protection.

Wildlife Movement Corridors

Bio-MM#61: Wildlife Corridor Artificial Dens. To prevent predation by larger predators (e.g., coyotes, bobcats, red foxes, and dogs) at wildlife undercrossings, the Contractor's Biologist will install artificial escape tunnels at wildlife-dedicated crossing structure, as needed, to provide escape cover for wildlife (e.g., San Joaquin kit foxes). The Project Biologist will submit a memorandum to the Mitigation Manager documenting compliance.

Bio-MM#62: Monitoring and Reporting of Wildlife Corridor Undercrossings. Prior to final design, the Authority or its designee will prepare the Wildlife Corridor Monitoring Program which will document wildlife usage of the undercrossing(s). The Authority or its designee will monitor and report the wildlife usage of the designated undercrossings during operation of the project consistent with the methods identified in the Wildlife Corridor Monitoring Program.

Other measures that potentially apply to wildlife movement corridors include the following:

- Bio-MM#4: Prepare and Implement a Weed Control Plan.
- N & V-MM#3: Implement Proposed California High-Speed Train Project Noise and Vibration Mitigation Guidelines.

Protected Trees

Bio-MM#63: Compensate for Impacts on Protected Trees. The Contractor will compensate for impacts, including removal or trimming of native protected trees and landscape or ornamental trees, according to the various city and county policies, ordinances, and regulations through one of the following:

- The Contractor will transplant all directly affected protected trees that are judged by the arborist to be in good condition to a suitable site outside the zone of impact.
- The Contractor will replace all directly affected protected trees at onsite or offsite locations, based on the number of protected trees removed, at a ratio to be determined through consultation with the various city and county governmental agencies, but not to exceed 3:1 for native trees or 1:1 for landscape or ornamental trees.
- The Authority will contribute to a city or county tree-planting fund within the jurisdiction of a regulatory agency.
- The Project Biologist will submit a memorandum to the Mitigation Manager documenting compliance.

The comprehensive list of mitigation measures presented in this section is the result of coordination with federal, state, and local agencies including the USFWS, USACE, EPA, CDFG, and SWRCB. Since these agencies are tasked with conserving, protecting, and enhancing biological resources, their input and

validation confirms the proposed measures as effective. Additionally, the majority of these measures include monitoring and tracking by approved biologists to verify progress and effectiveness. In the event that conditions are not effective, the mitigation measures include provisions for modifications to meet the mitigation objectives.

3.7.8 NEPA Impacts Summary

This section summarizes impacts identified in Section 3.7.5, Environmental Consequences, and evaluates whether they are significant according to the CEQ Regulation 1508.27.

Under the No Project Alternative, existing development trends affecting biological resources are expected to continue and potentially further degrade some natural systems. Development of the region would continue to result in habitat loss for special-status plant and wildlife species, mortality from vehicle strikes, habitat degradation from pollution, noise and dust impacts on species and habitats, creation of barriers to wildlife movement, habitat fragmentation, and other indirect effects. These impacts will vary in intensity over time. Conservation planning and regulatory controls are a mechanism for maintaining a degree of natural heritage, but some continual erosion of natural resources may be expected.

Effect on Special-Status Plant Communities and Special-status Plant Species

UPRR/SR 99, BNSF, and Hybrid Alternatives

Much of the natural vegetation communities in the project area and vicinity have been highly disturbed by historical and ongoing land management practices such as agriculture, flood control protection, and urban and commercial development. The affected environment for plant communities is highly altered from its natural state and its ability to support viable populations of special-status plant species is diminished. In this context, the remaining habitats that contain special-status plants are important because of their relative scarcity. Compounding this scarcity is the finding that much of the remaining habitat is of marginal quality, further diminishing the habitat values for the associated special-status species. Special-status plant communities include riparian communities.

The intensity of the effect on special-status plant communities, specifically riparian communities, from constructing the UPRR/SR99, BNSF, and Hybrid alternatives is moderate. The moderate intensity is based on an incremental regional effect and a measurable loss of riparian communities that occurs as a result of construction of the HST. Because construction has the potential to adversely affect riparian plant communities, the impact would have moderate intensity under NEPA.

The intensity of construction-period impacts would be moderate for special-status riparian plant communities. With the implementation of mitigation measures, the impact is considered negligible as resource values would be restored in a relatively short period after the end of construction-related disturbance. The construction period impacts on riparian habitat would be less than significant under NEPA.

Project period impacts would have adverse effects of moderate to substantial intensity on special-status riparian plant communities. The impact is considered moderate to substantial as there is an anticipated incremental regional effect, measurable loss, and an anticipated temporal loss.

The incorporation of the mitigation measures and the compensatory mitigation program, in addition to the requirements of the CWA and 1600 Streambed Alteration Agreement, as administered by the USACE and CDFG, provides additional assurances that biological resources such as special-status riparian plant communities are mitigated. Consequently, the project period impacts on riparian habitat would be less than significant under NEPA.

HMF Alternatives

The HMF sites have an effect of moderate intensity on special-status plant communities because of their occurrence with the construction footprint. The incorporation of the mitigation measures and the regulatory agency requirements provides additional assurances that biological resources such as special-

status riparian plant communities are mitigated. Consequently, the HMF impacts on riparian habitat would be less than significant under NEPA.

UPRR/SR 99, BNSF, and Hybrid Alternatives

Construction period impacts would result in effects of moderate intensity under NEPA for special-status plant species as a result of the construction of the HST. The impact is considered moderate because the project may result in an incremental regional effect and measureable adverse loss of populations.

Compliance with state and federal regulatory agencies permits will be required in addition to mitigation measures specified within this EIR/EIS. Minimization and mitigation measures for special-status plant species, and compliance with the Section 7 Biological Opinion and the 2081.1 Incidental Take Permit, provide assurances that mitigation is integrated. The moderate intensity impacts during the construction period on special-status plant species are expected to be mitigated to a less than significant impact under NEPA as a result.

Project period impacts would result in effects of moderate intensity for special-status plant species populations. The impact is considered moderate because the project may result in an incremental regional effect and measureable adverse loss of populations.

As stated for the construction period impacts, compliance with state and federal regulatory agencies permits will be required in addition to mitigation measures specified within this EIR/EIS. Minimization and mitigation measures for special-status plant species will be synchronized between the Section 7 Biological Opinion. Therefore, impacts during the project period on special-status plant species are expected to be mitigated to a less than significant impact under NEPA.

HMF Alternatives

The HMF sites have an effect of moderate intensity on special-status plants because of the presence of suitable habitat. However, the mitigation measures in combination with regulatory requirements would mitigate effects during the construction period and the project period to less than significant under NEPA.

Effect on Jurisdictional Waters and Wetlands

UPRR/SR 99, BNSF, and Hybrid Alternatives

Historical and ongoing land use practices have filled or otherwise significantly altered jurisdictional waters and wetlands within the immediate project area, local vicinity, and throughout much of the surrounding Central Valley. The existing environment for jurisdictional waters and wetlands is now highly altered from its natural state. This alteration results in an environmental context where the remaining wetland features are important because of their relative scarcity. However, it is also important to recognize that many of the remaining wetland features are degraded and consequently lower quality.

Construction period impacts would have moderate effects on jurisdictional waters and wetlands, including vernal pools. The impact is considered moderate because the project may result in an incremental regional effect and measurable adverse loss of populations. In addition, jurisdictional waters and wetlands consist of sensitive natural communities and are federally protected under the CWA. However, with the implementation of the mitigation measures, including avoidance and minimization and compensatory mitigation and compliance with the CWA and regulatory agency permit conditions, the impacts would be less than significant under NEPA.

The construction of the UPRR/SR 99, BNSF, and Hybrid alternatives during the project period would have an effect on jurisdictional waters and wetlands of moderate to substantial intensity. Impacts would be considered significant under NEPA because of the value of these habitats in this region, the removal of jurisdictional waters, and the importance of adhering to the policies implementing the CWA. Project period impacts for all alternatives would have moderate to substantial intensity because of the permanent removal or fill of jurisdictional waters and wetlands. With the implementation of measures to compensate for the effects on jurisdictional waters and wetlands, adverse effects on these resources are mitigated. State and federal minimization and mitigation requirements under the CWA and the 1600 Streambed



Alteration Agreement are further assurances to minimize impacts on jurisdictional waters. With the implementation of mitigation measures and regulatory requirements, the impact on jurisdictional waters would be less than significant under NEPA.

The implementation of the mitigation measures, the compensatory mitigation program, and the requirements of the CWA and 1600 Streambed Alteration Agreement, as administered by USACE and CDFG, provides additional assurances that biological resources such as jurisdictional waters and wetlands are mitigated. Therefore, the project period impacts on jurisdictional waters and wetlands are expected to be mitigated to less than significant under NEPA.

HMF Alternatives

The HMF sites have an effect with moderate intensity on jurisdictional waters and wetlands because of the presence of wetlands at all proposed HMF sites. However, with the adherence to the CWA and 1600 Streambed Alteration Agreement and the implementation of mitigation measures that are identified to offset measureable losses of jurisdictional waters and wetlands from project activities, impacts during the construction period and the project period would be less than significant under NEPA.

Effect on Special-Status Wildlife

UPRR/SR 99, BNSF, and Hybrid Alternatives

Habitats for special-status wildlife have been highly disturbed by historical ongoing land use management practices, including agriculture, flood control, and development. The environment is now in a highly altered state with varying levels of disturbance continuously occurring. This results in a context where the remaining suitable habitat for special-status wildlife species is important because of its relative scarcity. In addition, the remaining populations of special-status wildlife are also of increased importance because of their relative scarcity.

The construction of the UPRR/SR 99, BNSF, and Hybrid alternatives would have an effect of moderate intensity on select special-status wildlife and wildlife habitats. For example, construction-period impacts on vernal pool branchiopods would have a moderate intensity because of the anticipated incremental reduction of local populations. However, with implementation of the mitigation measures coupled with the requirements to comply with the Section 7 Biological Opinion and the 2081.1 Incidental Take Permit, impacts would be mitigated. Therefore, impacts during the construction period on special-status wildlife and wildlife habitats are expected to be mitigated to less than significant under NEPA.

The project period would have an impact of moderate intensity on select special-status wildlife and wildlife habitat. The impact is considered moderate because the project may result in an incremental regional effect and measureable adverse loss of populations. However, with the implementation of the mitigation measures coupled with the requirements to comply with the Section 7 Biological Opinion and the 2081.1 Incidental Take Permit, impacts would be mitigated. Therefore, impacts during the project period on special-status wildlife and wildlife habitats are expected to be mitigated to less than significant under NEPA.

HMF Alternatives

The HMF sites potentially have an effect with moderate intensity on special-status wildlife species and wildlife habitats. However, with the implementation of the mitigation measures coupled with the requirements to comply with the Section 7 Biological Opinion and the 2081 Incidental Take Permit, impacts during the project period on special-status wildlife and wildlife habitats are expected to be mitigated to less than significant under NEPA.

Effect on Wildlife Movement

UPRR/SR 99, BNSF, and Hybrid Alternatives

Existing linear facilities, including the SR 99 highway, the existing BNSF and UPRR railroad alignments, roadways and canals, and urban and certain agricultural land uses (e.g., vineyards), impede wildlife movement for free-ranging mammals (e.g., coyote, badger, San Joaquin kit fox, raccoon, skunk). As a

result, the ability of wildlife species to move freely across the Central Valley is impaired. Natural dispersal corridors such as waterways have also become increasingly constrained because of adjacent land use conversion and infrastructure.

Fenced, at-grade track of the UPRR/SR 99, BNSF, and Hybrid alternatives would cross the 4- to 6-mile-wide ECA and modeled wildlife corridors, potentially impeding wildlife movement. Modeled wildlife corridors occur within portions of the ECA and at several locations outside the ECA along the HST alignments. The UPRR/SR 99, BNSF, and Hybrid alternatives will incorporate permeability features within the project design. These permeability features allow wildlife access opportunities between the landscape on both sides of the facility. These permeability features include elevated sections of track, wildlife-dedicated crossings, hydraulic crossings, road overcrossings over the HST tracks, and cross culverts for flood protection, and are suitable to facilitate wildlife movement. Built-in design features and project fencing sustain permeability that reduces potential for collisions and mortality along the UPRR/SR 99, BNSF, and Hybrid alternatives. Designated wildlife crossings would be installed more frequently along track crossing the ECA and would occur less frequently along areas with little potential for wildlife movement (e.g., orchards). The impact analysis considers these engineering design features within the context of the biological resources impacts regarding wildlife movement.

The construction period effects of the UPRR/SR 99, BNSF, and Hybrid alternatives have the potential to interfere with the movement of wildlife species in the ECA and other modeled wildlife corridor. These effects would be of moderate intensity. It is also important to recognize that the impact is not long term and the construction phasing is anticipated to allow some continued dispersal over the construction period. For these reasons, coupled with the implementation of the mitigation measures, and compliance with the Section 7 Biological Opinion and the 2081.1 Incidental Take Permit, impacts during the construction project period to wildlife movement are expected to be mitigated to less than significant under NEPA.

For the project period, effects would be of moderate intensity. As described above the, the UPRR/SR 99, BNSF, and Hybrid alternatives have incorporated permeability features within the project design as a component of the project description. These permeability features allow wildlife access opportunities between the landscape on both sides of the facility. The design features, including wildlife-dedicated crossings, accommodate permeability and dispersal within the HST corridor. During the project period, wildlife movement is addressed within the design features and the mitigation measures, and is also addressed as part of compliance with the Section 7 Biological Opinion and the 2081.1 Incidental Take Permit. With these features, measures, and permitting requirements, the HST impacts are expected to be less than significant under NEPA.

HMF Alternatives

Effects on wildlife movement from the Harris DeJager HMF Alternative would be of moderate intensity. Because of the permeability features described, the incremental overlap of the Harris-DeJager HMF site with the ECA will not contribute substantially to movement opportunities, resulting in a less than significant impact under NEPA. The other HMF sites would have no effect or an effect with negligible intensity on wildlife movement.

Effect on Critical Habitat

As stated previously for special-status plants and wildlife, habitats within the Central Valley have been highly disturbed by historical and ongoing land use management practices, including agriculture, flood control, and development. The environment is now in a highly altered state with varying levels of disturbance continuously occurring. In this context, the remaining suitable habitat for special-status species and their corresponding critical habitat is important because of its relative scarcity.

The USFWS has designated critical habitat for several federally listed plant and wildlife species in the Central Valley because of the historical impacts on native habitat for plants and wildlife. These designated areas are vital to the preservation and recovery of federally listed plant and wildlife species.

Critical habitat is impacted only by the BNSF Alternative. The UPRR/SR 99 and Hybrid alternatives would not affect critical habitat and therefore would have no effect under NEPA.

Construction period impacts on designated critical habitat that provides suitable habitat for select listed species would be of moderate intensity. The impact is considered moderate because the project may result in an incremental regional effect and measureable adverse loss of populations. However, the BNSF impact The BNSF Alternative would affect critical habitat during both the construction and project periods, and would be considered significant under NEPA. on critical habitat is addressed through consultation with the USFWS under Section 7 of the federal ESA. The individual mitigation measures addressed for species with critical habitat (including Conservancy fairy shrimp, vernal pool tadpole shrimp, vernal pool fairy shrimp, San Joaquin Orcutt grass, Greene's tuctoria, and succulent owl's clover), as well as the coordination effort and compliance with Section 7, would be expected to result in less than significant impact under NEPA.

The project period impacts on designated critical habitat are considered moderate because the project may result in an incremental regional effect and measureable adverse loss of populations. The BNSF Alternative impact on critical habitat is addressed through consultation with the USFWS under Section 7 of the federal ESA. Project period individual mitigation measures addressed for species with critical habitat (including Conservancy fairy shrimp, vernal pool tadpole shrimp, vernal pool fairy shrimp, San Joaquin Orcutt grass, Greene's tuctoria, and succulent owl's clover), as well as the coordination effort and compliance with Section 7, would be expected to result in less than significant impact under NEPA.

The UPRR/SR 99 and Hybrid alternatives would not affect critical habitat and therefore would have no effect under NEPA. None of the HMF sites would affect critical habitat.

Effect on Essential Fish Habitat

Fish habitat within the Central Valley has been substantially altered or degraded from past and current water diversion projects, stream channelization, and other habitat modifications. However, EFH occurs at the San Joaquin River. NMFS has designated EFH to protect the remaining habitat for listed fish species for this river.

Construction-period impacts on EFH would have negligible intensity with the construction-related BMPs, project design features, and construction phasing implemented during the construction period.

Project-period impacts on EFH would have negligible intensity, because of the permanent project design features that avoid/minimize impacts on the river. The localized effects would not diminish the EFH at this crossing and therefore would not be considered significant under NEPA.

The HMFs would not impact EFH.

Effect on Mitigation Banks/Reserves

Great Valley Conservation Bank

The BNSF Alternative affects a portion of the Great Valley Conservation Bank, located southeast of Le Grand near Santa Fe Ave and Marguerite roads. This 1,067-acre bank site includes existing vernal pools, other seasonal wetlands, and California annual grassland within critical habitat for San Joaquin Valley Orcutt grass and vernal pool tadpole shrimp. Special-status species that are found on either or both habitats include California tiger salamander, vernal pool tadpole shrimp, vernal pool fairy shrimp, western spadefoot toad, western burrowing owl, and San Joaquin kit fox. The mitigation bank is currently active and approved by the USFWS.

The Great Valley Conservation Bank is specifically set aside to mitigate effects on biological resources by other activities within its designated service area. The Great Valley Conservation Bank has designated conservation credits for San Joaquin kit fox, upland habitat for California tiger salamander, vernal pool tadpole shrimp, vernal pool fairy shrimp, and vernal pool preservation.

The construction footprint of the BNSF Alternative would affect a portion of the Great Valley Conservation Bank. The portion of the bank impacted by the BNSF Alternative contains critical habitat for San Joaquin Valley Orcutt grass and vernal pool tadpole shrimp. The impacts from project activities have the potential to reduce some of the biological functions and values of the property.

Because construction of the BNSF Alternative would result in impacts on the Great Valley Conservation Bank as described above, the construction period and project impacts would have moderate intensity impacts under NEPA as they may be subject to a regional effect and measureable adverse loss of populations.

Biological resources in the Great Valley Conservation Bank will be subject to the same regulatory permitting requirements administered by the state and federal agencies for riparian habitat, special-status species, and jurisdictional waters and wetlands. As a result, the EIR/EIS mitigation measures coupled with the permit conditions and the minimization and mitigation measures in the EIR/EIS will provide assurances that biological resources will be mitigated in the Great Valley Conservation Bank and that combined impacts would be less than significant under NEPA for both the construction and project periods.

The HMFs would not impact the Great Valley Conservation Bank.

Camp Pashayan

Camp Pashayan is a 31-acre property just east of the UPRR bridge on the south side of the San Joaquin River in Fresno and would be affected equally under each of the HST alternatives. This property was acquired by the California Wildlife Conservation Board through a donation from the Boy Scouts of America, which continues to use constructed facilities on the property. Camp Pashayan is protected under Title 14 of the California Code of Regulations and is one of several properties that are part of the San Joaquin River Ecological Reserve within the San Joaquin River Parkway. Sensitive species such as Sanford's arrowhead, valley elderberry longhorn beetle, white-tailed kite, and loggerhead shrike are reported to occur on the property. Riparian habitat along the San Joaquin River is adjacent to and on the property. The HST corridor would cross Camp Pashayan near its southern boundary. The HST tracks are located just northeast of existing the UPRR and SR 99.

Construction period impacts on Camp Pashayan biological resources would have moderate intensity effects under NEPA. Since the construction limits would potentially impact some of the species and habitat present and contribute to an incremental regional and measureable loss. However, these impacts would become less than significant under NEPA with the incorporation of BMPs, project design features at the river, and the avoidance and minimization measures presented in the EIR/EIS.

Project period impacts on biological resources in Camp Pashayan would have a moderate intensity effect under NEPA. However, similar to construction period impacts, they will be subject to the same regulatory permitting requirements administered by the state and federal agencies for riparian habitat, special-status species, and jurisdictional waters and wetlands. As a result, the EIR/EIS mitigation measures coupled with the permit minimization and mitigation requirements will provide assurances that biological resources will be mitigated in Camp Pashayan during the project period and that combined impacts would be less than significant under NEPA.

The HMFs would not affect Camp Pashayan.

3.7.9 CEQA Significance Conclusions

Table 3.7-30 provides a summary of impacts-associated mitigation measures and the level of significance after mitigation. Mitigation fundamental to reducing an impact is summarized; other measures that support the mitigation effect are listed by number.

Table 3.7-30
 Summary of Significant Biological Resource Impacts and Mitigation Measures

Impact	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
COMMON MITIGATION MEASURES			
The following mitigation measures effectively mitigate multiple resources and are common to overlapping impacts (e.g., special-status wildlife and wildlife movement corridors). Common mitigation measures apply to many of the construction period and project period impact categories.	N/A	Bio-MM#1: Designate Project Biologist(s), Contractor’s Biologist(s), and Project Biological Monitor(s); Bio-MM#2: Regulatory Agency Access; Bio-MM#3: Prepare and Implement a Worker Environmental Awareness Program; Bio-MM#4: Prepare and Implement a Weed Control Plan; Bio-MM#5: Prepare and Implement a Biological Resources Management Plan; Bio-MM#6: Prepare and Implement a Restoration and Revegetation Plan; Bio-MM#7: Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field); Bio-MM#8: Equipment Staging Areas; Bio-MM#9: Mono-Filament Netting; Bio-MM#10: Vehicle Traffic; Bio-MM#11: Entrapment Prevention; Bio-MM#12: Work Stoppage; Bio-MM#13: ‘Take’ Notification and Reporting; Bio-MM#14: Post-Construction Compliance Reports.	N/A
CONSTRUCTION-PERIOD MITIGATION MEASURES			
Plant Communities and Land Cover Types			
Bio#1: Construction of the HST alternatives would introduce noxious weeds.	Significant	Bio-MM#4: Prepare and Implement a Weed Control Plan; Bio-MM#5: Prepare and Implement a Biological Resources Management Plan.	Less than Significant
Bio#2: Construction of the HST alternatives would disturb Great Valley mixed riparian forest and other riparian habitat.	Significant	Bio-MM#4: Prepare and Implement a Weed Control Plan; Bio-MM#5: Prepare and Implement a Biological Resources Management Plan; Bio-MM#6: Prepare and Implement a Restoration and Revegetation Plan; Bio-MM#7: Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field); Bio-MM#8: Equipment Staging Areas; Bio-MM#10: Vehicle Traffic; Bio-MM#15: Restore Temporary Riparian Impacts;	Less than Significant
Special-Status Plants			
Bio#3: Construction of the HST alternatives would	Significant	Bio-MM#3: Prepare and Implement a Worker Environmental Awareness Program;	Less than Significant

Impact	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
<p>disturb suitable habitat that has potential to support special-status plant species.</p>		<p>Bio-MM#4: Prepare and Implement a Weed Control Plan; Bio-MM#5: Prepare and Implement a Biological Resources Management Plan; Bio-MM#6: Prepare and Implement a Restoration and Revegetation Plan; Bio-MM#7: Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field); Bio-MM#8: Equipment Staging Areas; Bio-MM#10: Vehicle Traffic; Bio-MM#14: Post-Construction Compliance Reports; Bio-MM#17: Conduct Pre-Construction Surveys for Special-Status Plant Species; Bio-MM#18: Prepare and Implement Plan for Salvage, Relocation, and/or Propagation of Special-Status Plant Species;</p>	
Special-Status Wildlife – Invertebrates			
<p>Bio#4: Construction of the HST alternatives would disturb suitable habitat that has potential to support vernal pool branchiopods</p>	<p>Significant</p>	<p>Bio-MM#3: Prepare and Implement a Worker Environmental Awareness Program; Bio-MM#4: Prepare and Implement a Weed Control Plan; Bio-MM#5: Prepare and Implement a Biological Resources Management Plan; Bio-MM#6: Prepare and Implement a Restoration and Revegetation Plan; Bio-MM#7: Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field); Bio-MM#8: Equipment Staging Areas; Bio-MM#10: Vehicle Traffic; Bio-MM#12: Work Stoppage; Bio-MM#14: Post-Construction Compliance Reports; Bio-MM#19: Conduct Pre-Construction Sampling and Assessment for Vernal Pool Fauna; Bio-MM#20: Seasonal Vernal Pool Work Restriction; Bio-MM#21: Implement and Monitor Vernal Pool Protection; Bio-MM#44: Restore Temporary Impacts on Jurisdictional Waters; Bio-MM#45: Monitor Construction Activities within Jurisdictional Waters;</p>	<p>Less than Significant</p>
<p>Bio#5: Construction of the HST alternatives would disturb suitable habitat that has potential to support the valley elderberry longhorn</p>	<p>Significant</p>	<p>Bio-MM#3: Prepare and Implement a Worker Environmental Awareness Program; Bio-MM#4: Prepare and Implement a Weed Control Plan;</p>	<p>Less than Significant</p>

Impact	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
beetle.		<p>Bio-MM#5: Prepare and Implement a Biological Resources Management Plan; Bio-MM#6: Prepare and Implement a Restoration and Revegetation Plan; Bio-MM#7: Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field); Bio-MM#8: Equipment Staging Areas; Bio-MM#10: Vehicle Traffic; Bio-MM#11: Entrapment Prevention; Bio-MM#12: Work Stoppage; Bio-MM#13: 'Take' Notification and Reporting; Bio-MM#14: Post-Construction Compliance Reports; Bio-MM#22: Implement Conservation Guidelines During the Construction Period for Valley Elderberry Longhorn Beetle;</p>	
Special-Status Wildlife-Amphibians			
<p>Bio#6: Construction of the HST alternatives would disturb California tiger salamander habitat.</p>	Significant	<p>Bio-MM#3: Prepare and Implement a Worker Environmental Awareness Program; Bio-MM#4: Prepare and Implement a Weed Control Plan; Bio-MM#5: Prepare and Implement a Biological Resources Management Plan; Bio-MM#6: Prepare and Implement a Restoration and Revegetation Plan; Bio-MM#7: Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field); Bio-MM#8: Equipment Staging Areas; Bio-MM#9: Mono-Filament Netting; Bio-MM#10: Vehicle Traffic; Bio-MM#11: Entrapment Prevention; Bio-MM#12: Work Stoppage; Bio-MM#13: 'Take' Notification and Reporting; Bio-MM#14: Post-Construction Compliance Reports; Bio-MM#15: Restore Temporary Riparian Impacts; Bio-MM#19: Conduct Pre-Construction Sampling and Assessment for Vernal Pool Fauna; Bio-MM#20: Seasonal Vernal Pool Work Restriction; Bio-MM#21: Implement and Monitor Vernal Pool Protection; Bio-MM#23: Translocation of California Tiger Salamanders; Bio-MM#24: Erect Amphibian Exclusion Fencing; Bio-MM#44: Restore Temporary Impacts</p>	Less than Significant

Impact	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
		on Jurisdictional Waters; Bio-MM#45: Monitor Construction Activities within Jurisdictional Waters;	
Bio#7: Construction of the HST alternatives would disturb western spadefoot toad habitat.	Significant	Bio-MM#3: Prepare and Implement a Worker Environmental Awareness Program; Bio-MM#4: Prepare and Implement a Weed Control Plan; Bio-MM#5: Prepare and Implement a Biological Resources Management Plan; Bio-MM#6: Prepare and Implement a Restoration and Revegetation Plan; Bio-MM#7: Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field); Bio-MM#8: Equipment Staging Areas; Bio-MM#9: Mono-Filament Netting; Bio-MM#10: Vehicle Traffic; Bio-MM#12: Work Stoppage; Bio-MM#13: 'Take' Notification and Reporting; Bio-MM#14: Post-Construction Compliance Reports; Bio-MM#15: Restore Temporary Riparian Impacts; Bio-MM#19: Conduct Pre-Construction Sampling and Assessment for Vernal Pool Fauna; Bio-MM#20: Seasonal Vernal Pool Work Restriction; Bio-MM#21: Implement and Monitor Vernal Pool Protection; Bio-MM#24: Erect Amphibian Exclusion Fencing; Bio-MM#25: Conduct Emergence and Larval Surveys for Western Spadefoot Toad; Bio-MM#44: Restore Temporary Impacts on Jurisdictional Waters; Bio-MM#45: Monitor Construction Activities within Jurisdictional Waters;	Less than Significant
Special-Status Wildlife – Reptiles			
Bio#8: Construction of the HST alternatives would disturb habitat that supports the western pond turtle.	Significant	Bio-MM#3: Prepare and Implement a Worker Environmental Awareness Program; Bio-MM#5: Prepare and Implement a Biological Resources Management Plan; Bio-MM#6: Prepare and Implement a Restoration and Revegetation Plan; Bio-MM#7: Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field); Bio-MM#8: Equipment Staging Areas;	Less than Significant



Impact	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
		<p>Bio-MM#10: Vehicle Traffic; Bio-MM#12: Work Stoppage; Bio-MM#13: 'Take' Notification and Reporting; Bio-MM#14: Post-Construction Compliance Reports; Bio-MM#15: Restore Temporary Riparian Impacts; Bio-MM#26: Conduct Western Pond Turtle Pre-Construction Surveys and Relocation; Bio-MM#27: Conduct Western Pond Turtle Monitoring; Bio-MM#28: Implement Western Pond Turtle Avoidance and Relocation; Bio-MM#44: Restore Temporary Impacts on Jurisdictional Waters; Bio-MM#45: Monitor Construction Activities within Jurisdictional Waters; Bio-MM#53: Implement Western Pond Turtle Mitigation Measures.</p>	
Special-Status Wildlife – Fish			
<p>Bio#9: Construction of the HST alternatives would disturb special-status fish due to potential for turbidity, sediment deposition, and noise exposure.</p>	Significant	<p>Bio-MM#3: Prepare and Implement a Worker Environmental Awareness Program; Bio-MM#5: Prepare and Implement a Biological Resources Management Plan; Bio-MM#7: Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field); Bio-MM#8: Equipment Staging Areas; Bio-MM#10: Vehicle Traffic; Bio-MM#12: Work Stoppage; Bio-MM#14: Post-Construction Compliance Reports; Bio-MM#15: Restore Temporary Riparian Impacts; Bio-MM#44: Restore Temporary Impacts on Jurisdictional Waters; Bio-MM#45: Monitor Construction Activities within Jurisdictional Waters;</p>	Less than Significant
Special-Status Wildlife-Birds and Raptors			
<p>Bio#10: Construction of the HST alternatives would disturb nesting Swainson's hawk.</p>	Significant	<p>Bio-MM#3: Prepare and Implement a Worker Environmental Awareness Program; Bio-MM#5: Prepare and Implement a Biological Resources Management Plan; Bio-MM#7: Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field); Bio-MM#8: Equipment Staging Areas; Bio-MM#10: Vehicle Traffic; Bio-MM#12: Work Stoppage;</p>	Less than Significant

Impact	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
		<p>Bio-MM#13: 'Take' Notification and Reporting; Bio-MM#14: Post-Construction Compliance Reports; Bio-MM#29: Conduct Pre-Construction Surveys and Monitoring for Raptors; Bio-MM#31: Raptor Protection on Power Lines; Bio-MM#32: Conduct Pre-Construction Surveys for Swainson's Hawks; Bio-MM#33: Swainson's Hawk Nest Avoidance; Bio-MM#34: Monitor Removal of Nest Trees for Swainson's Hawk.</p>	
<p>Bio#11: Construction of the HST alternatives would disturb breeding birds, including raptors.</p>	<p>Significant</p>	<p>Bio-MM#3: Prepare and Implement a Worker Environmental Awareness Program; Bio-MM#5: Prepare and Implement a Biological Resources Management Plan; Bio-MM#7: Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field); Bio-MM#8: Equipment Staging Areas; Bio-MM#10: Vehicle Traffic; Bio-MM#12: Work Stoppage; Bio-MM#13: 'Take' Notification and Reporting; Bio-MM#14: Post-Construction Compliance Reports; Bio-MM#29: Conduct Pre-Construction Surveys and Monitoring for Raptors; Bio-MM#30: Delineate Active Nest Exclusion Areas for Other Breeding Birds; Bio-MM#31: Raptor Protection on Power Lines.</p>	<p>Less than Significant</p>
<p>Bio#12: Construction of the HST alternatives would disturb or cause the loss of burrowing owls and their habitat.</p>	<p>Significant</p>	<p>Bio-MM#3: Prepare and Implement a Worker Environmental Awareness Program; Bio-MM#5: Prepare and Implement a Biological Resources Management Plan; Bio-MM#7: Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field); Bio-MM#8: Equipment Staging Areas; Bio-MM#10: Vehicle Traffic; Bio-MM#13: 'Take' Notification and Reporting; Bio-MM#14: Post-Construction Compliance Reports; Bio-MM#35: Conduct Pre-Construction Surveys for Burrowing Owls; Bio-MM#36: Burrowing Owl Avoidance and Minimization.</p>	<p>Less than Significant</p>
<p>Special-Status Wildlife – Mammals</p>			
<p>Bio#13: Construction of the</p>	<p>Significant</p>	<p>Bio-MM#3: Prepare and Implement a</p>	<p>Less than</p>



Impact	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
<p>HST alternatives would disturb breeding or nonbreeding bats.</p>		<p>Worker Environmental Awareness Program; Bio-MM#5: Prepare and Implement a Biological Resources Management Plan; Bio-MM#7: Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field); Bio-MM#8: Equipment Staging Areas; Bio-MM#10: Vehicle Traffic; Bio-MM#12: Work Stoppage; Bio-MM#13: 'Take' Notification and Reporting; Bio-MM#14: Post-Construction Compliance Reports; Bio-MM#37: Conduct Pre-Construction Surveys for Special-Status Bat Species; Bio-MM#38: Bat Avoidance and Relocation; Bio-MM#39: Bat Exclusion and Deterrence.</p>	<p>Significant</p>
<p>Bio#14: Construction of the HST alternatives would disturb American badger dens.</p>	<p>Significant</p>	<p>Bio-MM#3: Prepare and Implement a Worker Environmental Awareness Program; Bio-MM#6: Prepare and Implement a Restoration and Revegetation Plan; Bio-MM#5: Prepare and Implement a Biological Resources Management Plan; Bio-MM#7: Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field); Bio-MM#8: Equipment Staging Areas; Bio-MM#10: Vehicle Traffic; Bio-MM#11: Entrapment Prevention; Bio-MM#12: Work Stoppage; Bio-MM#40: Conduct Pre-Construction Surveys for American Badger; Bio-MM#41: American Badger Avoidance; Bio-MM#44: Restore Temporary Impacts on Jurisdictional Waters; Bio-MM#45: Monitor Construction Activities within Jurisdictional Waters.</p>	<p>Less than Significant</p>

Impact	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
<p>Bio#15: Construction of the HST alternatives would disturb San Joaquin kit fox dens.</p>	<p>Significant</p>	<p>Bio-MM#3: Prepare and Implement a Worker Environmental Awareness Program; Bio-MM#5: Prepare and Implement a Biological Resources Management Plan; Bio-MM#7: Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field); Bio-MM#8: Equipment Staging Areas; Bio-MM#10: Vehicle Traffic; Bio-MM#11: Entrapment Prevention; Bio-MM#12: Work Stoppage; Bio-MM#13: 'Take' Notification and Reporting; Bio-MM#14: Post-Construction Compliance Reports; Bio-MM#42: Conduct Pre-Construction Surveys for San Joaquin Kit Fox; Bio-MM#43: Minimize Impacts on San Joaquin Kit Fox; Bio-MM#44: Restore Temporary Impacts on Jurisdictional Waters; Bio-MM#45: Monitor Construction Activities within Jurisdictional Waters.</p>	<p>Less than Significant</p>
Habitats of Concern			
Special-Status Plant Communities			
<p>Bio#16: Construction of the HST alternatives would temporarily convert special-status plant communities (e.g., Great Valley mixed riparian forest, coastal and valley freshwater marsh, vernal pools).</p>	<p>Significant</p>	<p>Bio-MM#4: Prepare and Implement a Weed Control Plan; Bio-MM#5: Prepare and Implement a Biological Resources Management Plan; Bio-MM#6: Prepare and Implement a Restoration and Revegetation Plan; Bio-MM#7: Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field); Bio-MM#8: Equipment Staging Areas; Bio-MM#10: Vehicle Traffic; Bio-MM#15: Restore Temporary Riparian Impacts; Bio-MM#16: Mitigation and Monitoring of Protected Trees; Bio-MM#19: Conduct Pre-Construction Sampling and Assessment for Vernal Pool Fauna; Bio-MM#20: Seasonal Vernal Pool Work Restriction; Bio-MM#21: Implement and Monitor Vernal Pool Protection; Bio-MM#44: Restore Temporary Impacts on Jurisdictional Waters; Bio-MM#45: Monitor Construction Activities within Jurisdictional Waters</p>	<p>Less than Significant</p>



Impact	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
Jurisdictional Waters			
<p>Bio#17: Construction of the HST alternatives would have indirect impacts on jurisdictional waters.</p>	<p>Significant</p>	<p>Bio-MM#3: Prepare and Implement a Worker Environmental Awareness Program; Bio-MM#4: Prepare and Implement a Weed Control Plan; Bio-MM#5: Prepare and Implement a Biological Resources Management Plan; Bio-MM#6: Prepare and Implement a Restoration and Revegetation Plan; Bio-MM#7: Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field); Bio-MM#8: Equipment Staging Areas; Bio-MM#10: Vehicle Traffic; Bio-MM#15: Restore Temporary Riparian Impacts; Bio-MM#19: Conduct Pre-Construction Sampling and Assessment for Vernal Pool Fauna; Bio-MM#20: Seasonal Vernal Pool Work Restriction; Bio-MM#21: Implement and Monitor Vernal Pool Protection; Bio-MM#44: Restore Temporary Impacts on Jurisdictional Waters; Bio-MM#45: Monitor Construction Activities within Jurisdictional Waters</p>	<p>Less than Significant</p>
Critical Habitat			
<p>Bio#18: Construction of the HST alternatives would disturb critical habitat.</p>	<p>Significant</p>	<p>HST impacts associated with threatened and endangered species, including critical habitat, occupied habitat, and suitable habitat for special-status species is addressed through the coordination process, outlined under Section 7 of the federal ESA. After a Biological Assessment has been accepted, the USFWS will render a Biological Opinion.</p> <p>The individual mitigation measures addressed for special-status species are anticipated to result in compliance with appropriate mitigation for Conservancy fairy shrimp, vernal pool tadpole shrimp, vernal pool fairy shrimp, San Joaquin Orcutt grass, Greene's tuctoria, and succulent owl's clover critical habitat.</p> <p>Bio-MM#3: Prepare and Implement a Worker Environmental Awareness Program; Bio-MM#4: Prepare and Implement a Weed Control Plan; Bio-MM#5: Prepare and Implement a Biological Resources Management Plan; Bio-MM#6: Prepare and Implement a</p>	<p>Less than Significant</p>

Impact	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
		Restoration and Revegetation Plan; Bio-MM#7: Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field); Bio-MM#8: Equipment Staging Areas; Bio-MM#10: Vehicle Traffic; Bio-MM#14: Post-Construction Compliance Reports; Bio-MM#15: Restore Temporary Riparian Impacts; Bio-MM#17: Conduct Pre-Construction Surveys for Special-Status Plant Species; Bio-MM#18: Prepare and Implement Plan for Salvage, Relocation, and/or Propagation of Special-Status Plant Species; Bio-MM#19: Conduct Pre-Construction Sampling and Assessment for Vernal Pool Fauna; Bio-MM#20: Seasonal Vernal Pool Work Restriction; Bio-MM#21: Implement and Monitor Vernal Pool Protection; Bio-MM#44: Restore Temporary Impacts on Jurisdictional Waters; Bio-MM#45: Monitor Construction Activities within Jurisdictional Waters	
Essential Fish Habitat			
Bio#19: Construction of the HST alternatives would disturb Essential Fish Habitat.	Significant	Bio-MM#3: Prepare and Implement a Worker Environmental Awareness Program; Bio-MM#5: Prepare and Implement a Biological Resources Management Plan; Bio-MM#6: Prepare and Implement a Restoration and Revegetation Plan; Bio-MM#7: Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field); Bio-MM#8: Equipment Staging Areas; Bio-MM#10: Vehicle Traffic; Bio-MM#14: Post-Construction Compliance Reports; Bio-MM#15: Restore Temporary Riparian Impacts; Bio-MM#44: Restore Temporary Impacts on Jurisdictional Waters; Bio-MM#45: Monitor Construction Activities within Jurisdictional Waters	Less than Significant
Mitigation Banks/Reserves			
Bio#20: Construction of the BNSF Alternative would disturb portions of the Great Valley Conservation Bank.	Significant	Bio-MM#3: Prepare and Implement a Worker Environmental Awareness Program; Bio-MM#5: Prepare and Implement a Biological Resources Management Plan; Bio-MM#6: Prepare and Implement a	Less than Significant



Impact	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
		Restoration and Revegetation Plan; Bio-MM#7: Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field); Bio-MM#8: Equipment Staging Areas; Bio-MM#10: Vehicle Traffic; Bio-MM#15: Restore Temporary Riparian Impacts; Bio-MM#17: Conduct Pre-Construction Surveys for Special-Status Plant Species; Bio-MM#18: Prepare and Implement Plan for Salvage, Relocation, and/or Propagation of Special-Status Plant Species; Bio-MM#19: Conduct Pre-Construction Sampling and Assessment for Vernal Pool Fauna; Bio-MM#20: Seasonal Vernal Pool Work Restriction; Bio-MM#21: Implement and Monitor Vernal Pool Protection; Bio-MM#44: Restore Temporary Impacts on Jurisdictional Waters; Bio-MM#45: Monitor Construction Activities within Jurisdictional Waters;	
Bio#21: Construction of the HST alternatives would disturb Camp Pashayan (San Joaquin River Ecological Reserve).	Significant	Bio-MM#15: Restore Temporary Riparian Impacts; Bio-MM#17: Conduct Pre-Construction Surveys for Special-Status Plant Species; Bio-MM#18: Prepare and Implement Plan for Salvage, Relocation, and/or Propagation of Special-Status Plant Species; Bio-MM#19: Conduct Pre-Construction Sampling and Assessment for Vernal Pool Fauna; Bio-MM#20: Seasonal Vernal Pool Work Restriction; Bio-MM#21: Implement and Monitor Vernal Pool Protection; Bio-MM#44: Restore Temporary Impacts on Jurisdictional Waters. Bio-MM#45: Monitor Construction Activities within Jurisdictional Waters; PK-MM#4 Acquire Property for Camp Pashayan.	Less than Significant
PROJECT MITIGATION MEASURES			
Plant Communities and Land Cover Types			
Bio#22: Project period impacts from the HST alternatives would permanently convert Great Valley mixed riparian forest and other riparian habitat	Significant	Bio-MM#4: Prepare and Implement a Weed Control Plan; Bio-MM#14: Post-Construction Compliance Reports; Bio-MM#49: Compensate for Permanent Riparian Impacts; Bio-MM#57: Conduct Delineation of	Less than Significant

Impact	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
(Coastal and Valley Freshwater Marsh and vernal pools addressed in Bio#16).		Jurisdictional Waters and State Streambeds; Bio-MM#58: Prepare and Implement a Habitat Mitigation and Monitoring Plan; Bio-MM#59: Compensate for Permanent Impacts on Jurisdictional Waters (addresses riparian habitat); Bio-MM#60: Offsite Habitat Restoration, Enhancement, and Preservation.	
Special-Status Plant Species			
Bio#23: Project period impacts from the HST alternatives would permanently convert suitable habitat that has potential to support special-status plant species.	Significant	Bio-MM#4: Prepare and Implement a Weed Control Plan; Bio-MM#14: Post-Construction Compliance Reports; Bio-MM#50: Compensate for Impacts on Special-Status Plant Species; Bio-MM#51: Implement Conservation Guidelines During the Project Period for Valley Elderberry Longhorn Beetle; Bio-MM#57: Conduct Delineation of Jurisdictional Waters and State Streambeds; Bio-MM#58: Prepare and Implement a Habitat Mitigation and Monitoring Plan; Bio-MM#59: Compensate for Permanent Impacts on Jurisdictional Waters; Bio-MM#60: Off-Site Habitat Restoration, Enhancement, and Preservation.	Less than Significant
Special-Status Wildlife – Invertebrates			
Bio#24: Project period impacts from the HST alternatives would permanently convert suitable habitat that has the potential to support vernal pool branchiopods.	Significant	Bio-MM#4: Prepare and Implement a Weed Control Plan; Bio-MM#14: Post-Construction Compliance Reports; Bio-MM#57: Conduct Delineation of Jurisdictional Waters and State Streambeds; Bio-MM#58: Prepare and Implement a Habitat Mitigation and Monitoring Plan; Bio-MM#59: Compensate for Permanent Impacts on Jurisdictional Waters; Bio-MM#60: Off-Site Habitat Restoration, Enhancement, and Preservation.	Less than Significant
Bio#25: Project period impacts from the HST alternatives would permanently convert suitable habitat that has the potential to support valley elderberry longhorn beetle.	Significant	Bio-MM#4: Prepare and Implement a Weed Control Plan; Bio-MM#14: Post-Construction Compliance Reports; Bio-MM#51: Implement Conservation Guidelines During the Project Period for Valley Elderberry Longhorn Beetle; Bio-MM#60: Off-Site Habitat Restoration, Enhancement, and Preservation.	Less than Significant

Impact	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
Special-Status Wildlife – Amphibians			
<p>Bio#26: Project period impacts from the HST alternatives would permanently convert suitable habitat that has the potential to support California tiger salamander.</p>	Significant	<p>Bio-MM#4: Prepare and Implement a Weed Control Plan; Bio-MM#14: Post-Construction Compliance Reports; Bio-MM#52: Compensate for Impacts on California Tiger Salamander; Bio-MM#57: Conduct Delineation of Jurisdictional Waters and State Streambeds; Bio-MM#58: Prepare and Implement a Habitat Mitigation and Monitoring Plan; Bio-MM#59: Compensate for Permanent Impacts on Jurisdictional Waters; Bio-MM#60: Off-Site Habitat Restoration, Enhancement, and Preservation.</p>	Less than Significant
<p>Bio#27: Project period impacts from the HST alternatives would permanently convert suitable habitat that has the potential to support western spadefoot toad.</p>	Significant	<p>Bio-MM#4: Prepare and Implement a Weed Control Plan; Bio-MM#14: Post-Construction Compliance Reports; Bio-MM#25: Conduct Emergence and Larval Surveys for Western Spadefoot Toad; Bio-MM#52: Compensate for Impacts on California Tiger Salamander; Bio-MM#57: Conduct Delineation of Jurisdictional Waters and State Streambeds; Bio-MM#58: Prepare and Implement a Habitat Mitigation and Monitoring Plan; Bio-MM#59: Compensate for Permanent Impacts on Jurisdictional Waters; Bio-MM#60: Off-Site Habitat Restoration, Enhancement, and Preservation.</p>	Less than Significant
Special-Status Wildlife – Reptiles			
<p>Bio#28: Project period impacts from the HST alternatives would permanently convert suitable habitat that has the potential to support western pond turtle.</p>	Significant	<p>Bio-MM#4: Prepare and Implement a Weed Control Plan; Bio-MM#14: Post-Construction Compliance Reports; Bio-MM#49: Compensate for Permanent Riparian Impacts; Bio-MM#53: Implement Western Pond Turtle Mitigation Measures; Bio-MM#57: Conduct Delineation of Jurisdictional Waters and State Streambeds; Bio-MM#58: Prepare and Implement a Habitat Mitigation and Monitoring Plan; Bio-MM#59: Compensate for Permanent Impacts on Jurisdictional Waters; Bio-MM#60: Off-Site Habitat Restoration, Enhancement, and Preservation.</p>	Less than Significant

Impact	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
Special-Status Wildlife – Fish			
<p>Bio#29: Project period impacts from the HST alternatives would permanently convert suitable habitat that has the potential to support special-status fish.</p>	Significant	<p>Bio-MM#4: Prepare and Implement a Weed Control Plan; Bio-MM#14: Post-Construction Compliance Reports; Bio-MM#49: Compensate for Permanent Riparian Impacts; Bio-MM#57: Conduct Delineation of Jurisdictional Waters and State Streambeds; Bio-MM#58: Prepare and Implement a Habitat Mitigation and Monitoring Plan; Bio-MM#59: Compensate for Permanent Impacts on Jurisdictional Waters; Bio-MM#60: Off-Site Habitat Restoration, Enhancement and Preservation.</p>	Less than Significant
Special-Status Wildlife – Birds and Raptors			
<p>Bio#30: Project period impacts from the HST alternatives would permanently convert suitable habitat that has the potential to support nesting Swainson’s hawk.</p>	Significant	<p>Bio-MM#4: Prepare and Implement a Weed Control Plan; Bio-MM#14: Post-Construction Compliance Reports; Bio-MM#49: Compensate for Permanent Riparian Impacts; Bio-MM#54: Compensate for Loss of Swainson’s Hawk Foraging Habitat; Bio-MM#57: Conduct Delineation of Jurisdictional Waters and State Streambeds; Bio-MM#58: Prepare and Implement a Habitat Mitigation and Monitoring Plan; Bio-MM#59: Compensate for Permanent Impacts on Jurisdictional Waters; Bio-MM#60: Off-Site Habitat Restoration, Enhancement, and Preservation; Bio-MM#63: Compensate for Impacts on Protected Trees.</p>	Less than Significant
<p>Bio#31: Project period impacts from the HST alternatives would permanently convert suitable habitat that has the potential to support burrowing owls.</p>	Significant	<p>Bio-MM#14: Post-Construction Compliance Reports; Bio-MM#55: Compensate for Loss of Burrowing Owl Foraging and Breeding Habitat.</p>	Less than Significant
<p>Bio#32: Project period impacts from the HST alternatives would permanently convert suitable habitat that has the potential to support breeding birds, including raptors and burrowing owls.</p>	Significant	<p>Bio-MM#4: Prepare and Implement a Weed Control Plan; Bio-MM#14: Post-Construction Compliance Reports; Bio-MM#49: Compensate for Permanent Riparian Impacts; Bio-MM#54: Compensate for Loss of Swainson’s Hawk Foraging Habitat; Bio-MM#55: Compensate for Loss of Burrowing Owl Foraging and Breeding Habitat. Bio-MM#57: Conduct Delineation of</p>	Less than Significant

Impact	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
		Jurisdictional Waters and State Streambeds; Bio-MM#58: Prepare and Implement a Habitat Mitigation and Monitoring Plan; Bio-MM#59: Compensate for Permanent Impacts on Jurisdictional Waters; Bio-MM#60: Off-Site Habitat Restoration, Enhancement, and Preservation; Bio-MM#63: Compensate for Impacts on Protected Trees.	
Special-Status Wildlife – Mammals			
Bio#33: Project period impacts from the HST alternatives would permanently convert suitable habitat that has the potential to support special-status bats.	Significant	Bio-MM#4: Prepare and Implement a Weed Control Plan; Bio-MM#14: Post-Construction Compliance Reports; Bio-MM#49: Compensate for Permanent Riparian Impacts; Bio-MM#57: Conduct Delineation of Jurisdictional Waters and State Streambeds; Bio-MM#58: Prepare and Implement a Habitat Mitigation and Monitoring Plan; Bio-MM#59: Compensate for Permanent Impacts on Jurisdictional Waters; Bio-MM#60: Off-Site Habitat Restoration, Enhancement and Preservation.	Less than Significant
Bio#34: Project period impacts from the HST alternatives would permanently convert suitable habitat that has the potential to support American badger dens.	Significant	Bio-MM#4: Prepare and Implement a Weed Control Plan; Bio-MM#14: Post-Construction Compliance Reports; Bio-MM#46: Wildlife Corridor Undercrossing (Implementation); Bio-MM#47: Install Wildlife Fencing; Bio-MM#48: Construction in Wildlife Movement Corridors; Bio-MM#57: Conduct Delineation of Jurisdictional Waters and State Streambeds; Bio-MM#58: Prepare and Implement a Habitat Mitigation and Monitoring Plan; Bio-MM#59: Compensate for Permanent Impacts on Jurisdictional Waters; Bio-MM#60: Off-Site Habitat Restoration, Enhancement, and Preservation; Bio-MM#61: Wildlife Corridor Artificial Dens; Bio-MM#62: Monitoring and Reporting of Wildlife Corridor Undercrossings; N & V-MM#3: Implement Proposed California High-Speed Train Project Noise and Vibration Mitigation Guidelines.	Less than Significant
Bio#35: Project period impacts from the HST alternatives would permanently convert suitable	Significant	Bio-MM#4: Prepare and Implement a Weed Control Plan; Bio-MM#14: Post-Construction Compliance Reports;	Less than Significant



Impact	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
<p>habitat that has the potential to support San Joaquin kit fox dens.</p>		<p>Bio-MM#56: Compensate for Destruction of Natal Dens; Bio-MM#57: Conduct Delineation of Jurisdictional Waters and State Streambeds; Bio-MM#58: Prepare and Implement a Habitat Mitigation and Monitoring Plan; Bio-MM#59: Compensate for Permanent Impacts on Jurisdictional Waters; Bio-MM#46: Wildlife Corridor Undercrossing (Implementation); Bio-MM#47: Install Wildlife Fencing; Bio-MM#48: Construction in Wildlife Movement Corridors; Bio-MM#60: Off-Site Habitat Restoration, Enhancement, and Preservation; Bio-MM#61: Wildlife Corridor Artificial Dens; Bio-MM#62: Monitoring and Reporting of Wildlife Corridor Undercrossings; N & V-MM#3: Implement Proposed California High-Speed Train Project Noise and Vibration Mitigation Guidelines.</p>	
Habitats of Concern			
Special-Status Plant Communities			
<p>Bio#36: Project period impacts from the HST alternatives would permanently convert special-status plant communities (Great Valley Mixed Riparian and other riparian addressed in Bio#22).</p>	Significant	<p>Bio-MM#4: Prepare and Implement a Weed Control Plan; Bio-MM#14: Post-Construction Compliance Reports; Bio-MM#49: Compensate for Permanent Riparian Impacts; Bio-MM#51: Implement Conservation Guidelines During the Project Period for Valley Elderberry Longhorn Beetle; Bio-MM#57: Conduct Delineation of Jurisdictional Waters and State Streambeds; Bio-MM#58: Prepare and Implement a Habitat Mitigation and Monitoring Plan; Bio-MM#59: Compensate for Permanent Impacts on Jurisdictional Waters; Bio-MM#60: Off-Site Habitat Restoration, Enhancement, and Preservation.</p>	Less than Significant
Jurisdictional Waters			
<p>Bio#37: Project period impacts from the HST alternatives would permanently convert jurisdictional waters.</p>	Significant	<p>Bio-MM#4: Prepare and Implement a Weed Control Plan; Bio-MM#14: Post-Construction Compliance Reports; Bio-MM#49: Compensate for Permanent Riparian Impacts; Bio-MM#57: Conduct Delineation of Jurisdictional Waters and State Streambeds; Bio-MM#58: Prepare and Implement a</p>	Less than Significant



Impact	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
Habitat Mitigation and Monitoring Plan; Bio-MM#59: Compensate for Permanent Impacts on Jurisdictional Waters; Bio-MM#60: Off-Site Habitat Restoration, Enhancement, and Preservation.			
Critical Habitat			
Bio#38: Project period impacts from the HST alternatives would include critical habitat for vernal pool species.	Significant	Bio-MM#4: Prepare and Implement a Weed Control Plan; Bio-MM#14: Post-Construction Compliance Reports; Bio-MM#49: Compensate for Permanent Riparian Impacts; Bio-MM#50: Compensate for Impacts on Special-Status Plant Species; Bio-MM#57: Conduct Delineation of Jurisdictional Waters and State Streambeds; Bio-MM#58: Prepare and Implement a Habitat Mitigation and Monitoring Plan; Bio-MM#59: Compensate for Permanent Impacts on Jurisdictional Waters; Bio-MM#60: Off-Site Habitat Restoration, Enhancement, and Preservation.	Less than Significant
Essential Fish Habitat			
Bio#39: Project period impacts from the HST alternatives would require construction in Essential Fish Habitat.	Significant	Construction period mitigation measures address impacts associated with EFH. There would be no impacts related to project period impacts. Bio-MM#14: Post-Construction Compliance Reports.	Less than Significant
Mitigation Banks/Reserves			
Bio#40: All of the HST alternatives would affect Camp Pashayan (within the San Joaquin River Ecological Reserve).	Significant	PK-MM#1: Compensate for Staging in Park Property for Construction; PK-MM#2: Acquire Park Property.	Less than Significant

Impact	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
<p>Bio#41: Project period impacts from the BNSF Alternative would affect portions of the Great Valley Conservation Bank.</p>	<p>Significant</p>	<p>Bio-MM#14: Post-Construction Compliance Reports; Bio-MM#49: Compensate for Permanent Riparian Impacts; Bio-MM#50: Compensate for Impacts on Special-Status Plant Species; Bio-MM#57: Conduct Delineation of Jurisdictional Waters and State Streambeds; Bio-MM#58: Prepare and Implement a Habitat Mitigation and Monitoring Plan; Bio-MM#59: Compensate for Permanent Impacts on Jurisdictional Waters; Bio-MM#60: Offsite Habitat Restoration, Enhancement, and Preservation. PK-MM#1: Compensate for Staging in Park Property for Construction; PK-MM#2: Acquire Park Property.</p>	<p>Less than Significant</p>