

# CALIFORNIA HIGH-SPEED TRAIN

Project Environmental Impact Report /  
Environmental Impact Statement

DRAFT

## Biological Resources and Wetlands Technical Report

Merced to Fresno Section  
Project EIR/EIS

August 2011





**DRAFT**  
TECHNICAL REPORT

Merced to Fresno Section  
**Biological Resources and Wetlands**

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# Contents

<b>1.0</b>	<b>Introduction.....</b>	<b>1-1</b>
<b>2.0</b>	<b>Project Description .....</b>	<b>2-1</b>
2.1	No Project Alternative .....	2-1
2.2	High-Speed Train Alternatives.....	2-1
2.2.1	UPRR/SR 99 Alternative.....	2-1
2.2.2	BNSF Alternative.....	2-5
2.2.3	Hybrid Alternative .....	2-7
2.2.4	Heavy Maintenance Facility Alternatives.....	2-8
<b>3.0</b>	<b>Study Methods.....</b>	<b>3-1</b>
3.1	Regulatory Requirements .....	3-1
3.1.1	Laws, Regulations, and Orders.....	3-1
3.2	Definitions .....	3-7
3.2.1	Special-Status Species.....	3-7
3.2.2	Jurisdictional Waters .....	3-8
3.2.3	Special-Status Plant Communities.....	3-10
3.3	Prefield Investigation Methods.....	3-11
3.3.1	Regional Area.....	3-11
3.3.2	Study Areas .....	3-11
3.3.3	Jurisdictional Waters .....	3-13
3.3.4	Special-Status Plant Communities and Special-Status Plants .....	3-14
3.3.5	Special-Status Wildlife.....	3-14
3.3.6	Reconnaissance-Level Field Survey Methods .....	3-15
3.3.7	Special-Status Plant Community and Special-Status Species Habitat Assessments.....	3-17
3.3.8	Special-Status Wildlife Species Occurrence Potential .....	3-20
3.4	Wetland Delineations .....	3-21
3.4.1	Field Methods.....	3-21
3.5	Special-Status Plant Survey Methods.....	3-23
3.6	Methods for Evaluating Impacts.....	3-23
3.6.1	Methods for Evaluating Impacts Under NEPA .....	3-23
3.6.2	CEQA Significance Criteria .....	3-24
<b>4.0</b>	<b>Results: Environmental Setting.....</b>	<b>4-1</b>
4.1	Existing Physical and Biological Conditions.....	4-1
4.1.1	Physical Conditions .....	4-1
4.1.2	Biological Conditions .....	4-2
4.2	Habitats of Concern, Mitigation Banks, and Special-Status Species.....	4-38
4.2.1	Habitats of Concern .....	4-38
4.2.2	Special-Status Species.....	4-61
<b>5.0</b>	<b>Results: Biological Resources, Impacts, and Mitigation .....</b>	<b>5-1</b>
5.1	Jurisdictional Waters.....	5-1
5.1.1	Wetlands .....	5-1
5.1.2	Other Waters .....	5-1
5.2	Special-Status Species .....	5-8
5.2.1	Special-Status Plant Species .....	5-8
5.2.2	Special-Status Wildlife.....	5-22
5.3	Environmental Consequences .....	5-46
5.3.1	Overview .....	5-46
5.3.2	No Project Alternative .....	5-47
5.3.3	High-Speed Train Alternatives.....	5-48
5.4	Mitigation Measures.....	5-119
5.4.1	Common Mitigation Measures For Biological Resources .....	5-120
5.4.2	Construction-Period Mitigation Measures.....	5-123

5.4.3	Project Mitigation Measures .....	5-137
5.5	NEPA Impacts Summary .....	5-144
5.6	CEQA Significance Conclusions .....	5-145
<b>6.0</b>	<b>Permits and Technical Studies for Special Laws or Conditions .....</b>	<b>6-1</b>
6.1	Federal/State Endangered Species Act Consultation Summary .....	6-1
6.2	Federal Fisheries and Essential Fish Habitat Consultation Summary.....	6-1
6.3	Jurisdictional Waters Coordination Summary .....	6-2
<b>7.0</b>	<b>References .....</b>	<b>7-1</b>
<b>8.0</b>	<b>Preparer Qualifications.....</b>	<b>8-1</b>

**Appendices**

- A USFWS Official Species List
- B CNDDDB Report
- C-1 Regional Special-Status Plant Species with Potential to Occur
- C-2 Regional Special-Status Wildlife Species with Potential to Occur
- D Special-Status Plant and Wildlife Species Potentially Affected by the HST Alternatives
- E Watercourse Crossings within Eastman Lake-Bear Creek ECA and Modeled Wildlife Corridor – All Alternatives
- F Distance Between Crossings Along Track within Eastman Lake-Bear Creek ECA and Modeled Wildlife Corridor – All Alternatives

**List of Tables**

3-1 Local and Regional Laws and Regulations..... 3-5

4-1 Approximate Relationships of Vegetation Classifications Systems..... 4-2

4-2 Natural Watercourses in the Wetland Resource Study Area .....4-25

4-3 Constructed Watercourses in the Wetland Resource Study Area .....4-29

4-4 Plant Species Observed in the Habitat Study Area .....4-31

4-5 Wildlife Species Observed in the Habitat Study Area.....4-35

4-6 Sensitive Biological Communities Occurring in the Habitat Study Area .....4-39

5-1 Terrestrial Communities Potentially Affected during the Construction Period of the UPRR/SR 99 Alternative (acres <sup>a</sup>).....5-50

5-2 Aquatic Communities Potentially Affected during the Construction Period of the UPRR/SR 99 Alternative (acres <sup>a</sup>).....5-51

5-3 Terrestrial Communities Potentially Affected during the Construction Period of the BNSF Alternative (acres <sup>a</sup>).....5-52

5-4 Aquatic Communities Potentially Affected during the Construction Period of the BNSF Alternative (acres <sup>a</sup>).....5-53

5-5 Terrestrial Communities Potentially Affected during the Construction Period of the Hybrid Alternative (acres <sup>a</sup>).....5-54

5-6 Aquatic Communities Potentially Affected during the Construction Period of the Hybrid Alternative (acres <sup>a</sup>).....5-55

5-7 Terrestrial Communities Potentially Affected during the Construction Period of the HMF Alternatives (acres <sup>a</sup>).....5-56

5-8 Aquatic Communities Potentially Affected during the Construction Period of the HMF Alternatives (acres <sup>a</sup>).....5-57

5-9 Special-Status Wildlife Species Potentially Affected during the Construction Period of the HMF Alternatives <sup>a</sup>.....5-67

5-10 Critical Habitat Potentially Affected during the Construction Period of the BNSF Alternative (acres <sup>a</sup>).....5-70

5-11 Habitats of Concern Potentially Affected during the Construction Period of the HMF Alternatives <sup>a</sup>.....5-73

5-12 Wildlife Movement Corridors Potentially Affected during the Construction Period of the HMF Alternatives .....5-85

5-13 Terrestrial Communities Potentially Affected during the Project Period of the UPRR/SR 99 Alternative (acres <sup>a</sup>) .....5-88

5-14 Aquatic Communities Potentially Affected during the Project Period of the UPRR/SR 99 Alternative (acres <sup>a</sup>) .....5-88

5-15 Terrestrial Communities Potentially Affected during the Project Period of the BNSF Alternative (acres <sup>a</sup>).....5-90

5-16 Aquatic Communities Potentially Affected during the Project Period of the BNSF Alternative (acres <sup>a</sup>).....5-91

5-17 Terrestrial Communities Potentially Affected during the Project Period of the Hybrid Alternative (acres <sup>a</sup>).....5-92

5-18 Aquatic Communities Potentially Affected during the Project Period of the Hybrid Alternative (acres <sup>a</sup>).....5-93

5-19 Terrestrial Communities Potentially Affected during the Project Period of the HMF Alternatives (acres <sup>a</sup>).....5-95

5-20 Aquatic Communities Potentially Affected during the Project Period of the HMF Alternatives (acres <sup>a</sup>).....5-95

5-21 Special-Status Wildlife Species Potentially Affected during the Project Period of the HMF Alternatives <sup>a</sup>.....5-105

5-22 Critical Habitat Potentially Affected during the Project Period of the BNSF Alternative (acres <sup>a</sup>).....5-108

5-23 Habitats of Concern Potentially Affected during the Project Period of the HMF Alternatives <sup>a</sup>.....5-111

5-24 Wildlife Movement Corridors Potentially Affected during the Project Period of the  
HMF Alternatives ..... 5-116

5-25 Summary of Significant Biological Resource Impacts and Mitigation Measures ..... 5-145



**List of Figures**

1-1	HST System in California.....	1-2
2-1	Merced to Fresno Section HST Alternatives.....	2-2
2-2a and b	Ave 24 Wye and Chowchilla Design Options.....	2-4
3-1	Regional Area .....	3-12
4-1	Observed Habitats within Habitat Study Area – Sheet 1 of 13.....	4-4
4-2	Observed Habitats within Habitat Study Area – Sheet 2 of 13.....	4-5
4-3	Observed Habitats within Habitat Study Area – Sheet 3 of 13.....	4-6
4-4	Observed Habitats within Habitat Study Area – Sheet 4 of 13.....	4-7
4-5	Observed Habitats within Habitat Study Area – Sheet 5 of 13.....	4-8
4-6	Observed Habitats within Habitat Study Area – Sheet 6 of 13.....	4-9
4-7	Observed Habitats within Habitat Study Area – Sheet 7 of 13.....	4-10
4-8	Observed Habitats within Habitat Study Area – Sheet 8 of 13.....	4-11
4-9	Observed Habitats within Habitat Study Area – Sheet 9 of 13.....	4-12
4-10	Observed Habitats within Habitat Study Area – Sheet 10 of 13.....	4-13
4-11	Observed Habitats within Habitat Study Area – Sheet 11 of 13.....	4-14
4-12	Observed Habitats within Habitat Study Area – Sheet 12 of 13.....	4-15
4-13	Observed Habitats within Habitat Study Area – Sheet 13 of 13.....	4-16
4-14	Regional Habitats of Concern .....	4-40
4-15	Special-Status Plants in the Merced Vicinity .....	4-41
4-16	Special-Status Plants in the Le Grand Vicinity.....	4-42
4-17	Special-Status Plants South of Chowchilla.....	4-43
4-18	Special-Status Plants in the Madera Vicinity.....	4-44
4-19	Special-Status Plants in Fresno County.....	4-45
4-20	Special-Status Plant in the Fresno Vicinity.....	4-46
4-21	Special-Status Animals in the Merced Vicinity.....	4-47
4-22	Special-Status Animals in the Le Grand Vicinity .....	4-48
4-23	Special-Status Animals South of Chowchilla .....	4-49
4-24	Special-Status Animals in the Madera Vicinity.....	4-50
4-25	Special-Status Animals in Fresno County .....	4-51
4-26	Special-Status Animals in the Fresno Vicinity.....	4-52
4-27	ECAs in the Vicinity of the Merced to Fresno Section Study Area.....	4-60
4-28	Wildlife Corridors in the Merced to Fresno Section.....	4-62
4-29	Wildlife Corridors (North of Chowchilla).....	4-63
4-30	Wildlife Corridors (South of Chowchilla).....	4-64
4-31	Wildlife Corridors (Madera Area).....	4-65
5-1	Aquatic Habitat for California Tiger Salamander within 1.5 Miles of the HST Alternatives .....	5-28
5-2	Watercourse Crossings within Eastman Lake- Bear Creek ECA and Modeled Wildlife Corridors – All Alternatives .....	5-74
5-3	Watercourse Crossings within Eastman Lake-Bear Creek ECA and Modeled Wildlife Corridors – All Alternatives .....	5-75
5-4	Watercourse Crossings within Eastman Lake-Bear Creek ECA and Modeled Wildlife Corridors – All Alternatives .....	5-76
5-5	Watercourse Crossings within Eastman Lake-Bear Creek ECA and Modeled Wildlife Corridors – All Alternatives .....	5-77
5-6	Watercourse Crossings within Eastman Lake-Bear Creek ECA and Modeled Wildlife Corridors – All Alternatives .....	5-78
5-7	Watercourse Crossings within Eastman Lake-Bear Creek ECA and Modeled Wildlife Corridors – All Alternatives .....	5-79
5-8	Watercourse Crossings within Eastman Lake-Bear Creek ECA and Modeled Wildlife Corridors – All Alternatives .....	5-80
5-9	Watercourse Crossings within Eastman Lake-Bear Creek ECA and Modeled Wildlife Corridors – All Alternatives .....	5-81

5-10 Watercourse Crossings within Eastman Lake-Bear Creek ECA and Modeled Wildlife  
Corridors – All Alternatives .....5-82

## List of Abbreviated Terms

AB	Assembly Bill
Authority	California High Speed Rail Authority
BA	Biological Assessment
Bay Area	San Francisco Bay Area
BCC	Birds of Conservation Concern
BGEPA	Bald and Golden Eagle Protection Act
BIOS	Biogeographic Information and Observation System
BMP	Best Management Practices
BNSF	Burlington Northern Santa Fe
BO	Biological Opinion
BRMP	Biological Resources Management Plan
CBOC	California Burrowing Owl Consortium
CCR	California Code of Regulations
CDFG	California Department of Fish and Game
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFGC	California Fish and Game Code
CFR	Code of Federal Regulations
CNDDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CWA	Clean Water Act
CWHR	California Wildlife Habitat Relationships
CZMA	Coastal Zone Management Act
dBA	decibels on an A-weighted scale
ECA	Essential Connectivity Area
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ESRP	Endangered Species Recovery Program
F	Fahrenheit
FP	fully protected species
FR	Federal Register

FRA	Federal Railroad Administration
GEA	Grassland Ecological Area
GIS	Geographic Information System
GPS	Global Positioning System
GVGSP	Great Valley Grasslands State Park
HCP	Habitat Conservation Plan
HMF	heavy maintenance facility
HMMP	habitat mitigation and monitoring plan
HST	High-Speed Train
HU	hydrological unit
ITP	Incidental Take Permit
JD	Jurisdictional Determination
MBTA	Migratory Bird Treaty Act
MCV	Manual of California Vegetation
MMRP	Mitigation Monitoring and Reporting Program
mph	miles per hour
NCCP	Natural Communities Conservation Plan
NEPA	National Environmental Policy Act
NHD	National Hydrography Dataset
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRDC	Natural Resources Defense Council
NWI	National Wetland Inventory
OHWM	ordinary high water mark
PEMC	Palustrine Emergent Seasonally Flooded
PEMF	Palustrine Emergent Semi-Permanently Flood Wetlands
PG&E	Pacific Gas and Electric Company
quad	quadrangle
Reclamation	U.S. Bureau of Reclamation
RMP	Runoff Management Plan
ROWD	Report of Waste Discharge
RPWs	relatively permanent waters

RRP	restoration and revegetation plan
RTP	regional transportation plan
RWQCB	Regional Water Quality Control Board
SEL	sound exposure level
SJRRP	San Joaquin River Restoration Program
SR	state route
SSC	species of special concern
Statewide Program EIR/EIS	<i>Final Program EIR/EIS for the Proposed California High-Speed Train System EIR/EIS</i>
Survey Plan	Central Valley Biological Resources and Wetlands Survey Plan
SWRCB	State Water Resources Control Board
TNWs	traditional navigable waters
UPRR	Union Pacific Railroad
USACE	United States Army Corps of Engineers
U.S.C.	U.S. Code
USFWS	United States Fish and Wildlife Service
USGS	United States Geologic Survey
WDR	Waste Discharge Requirements
WEAP	Worker Environmental Awareness Program
WRAPP	wetland and riparian area protection policy
WRCC	Western Regional Climate Center



## 1.0 Introduction

The California High-Speed Train (HST) System, as shown in Figure 1-1, is planned to provide intercity, high-speed service on more than 800 miles of tracks throughout California, connecting the major population centers of Sacramento, the San Francisco Bay Area, the Central Valley, Los Angeles, the Inland Empire, Orange County, and San Diego. The HST System is envisioned as a state-of-the-art, electrically powered, high-speed, steel-wheel-on-steel-rail technology, which will include contemporary safety, signaling, and automated train-control systems. The trains will be capable of operating at speeds of up to 220 miles per hour (mph) over a fully grade-separated, dedicated track alignment.

Two phases of the California HST System are planned. Phase 1 will connect San Francisco to Los Angeles via the Pacheco Pass and the Central Valley. An expected express trip time between San Francisco and Los Angeles is mandated to be 2 hours and 40 minutes or less. Phase 2 will connect the Central Valley to the state's capital, Sacramento, and will extend the system from Los Angeles to San Diego.

The California HST System will be planned, designed, constructed, and operated under the direction of the California High-Speed Rail Authority (Authority), a state governing board formed in 1996. The Authority's statutory mandate is to develop a high-speed rail system that is coordinated with the state's existing transportation network, which includes intercity rail and bus lines, regional commuter rail lines, urban rail and bus transit lines, highways, and airports.

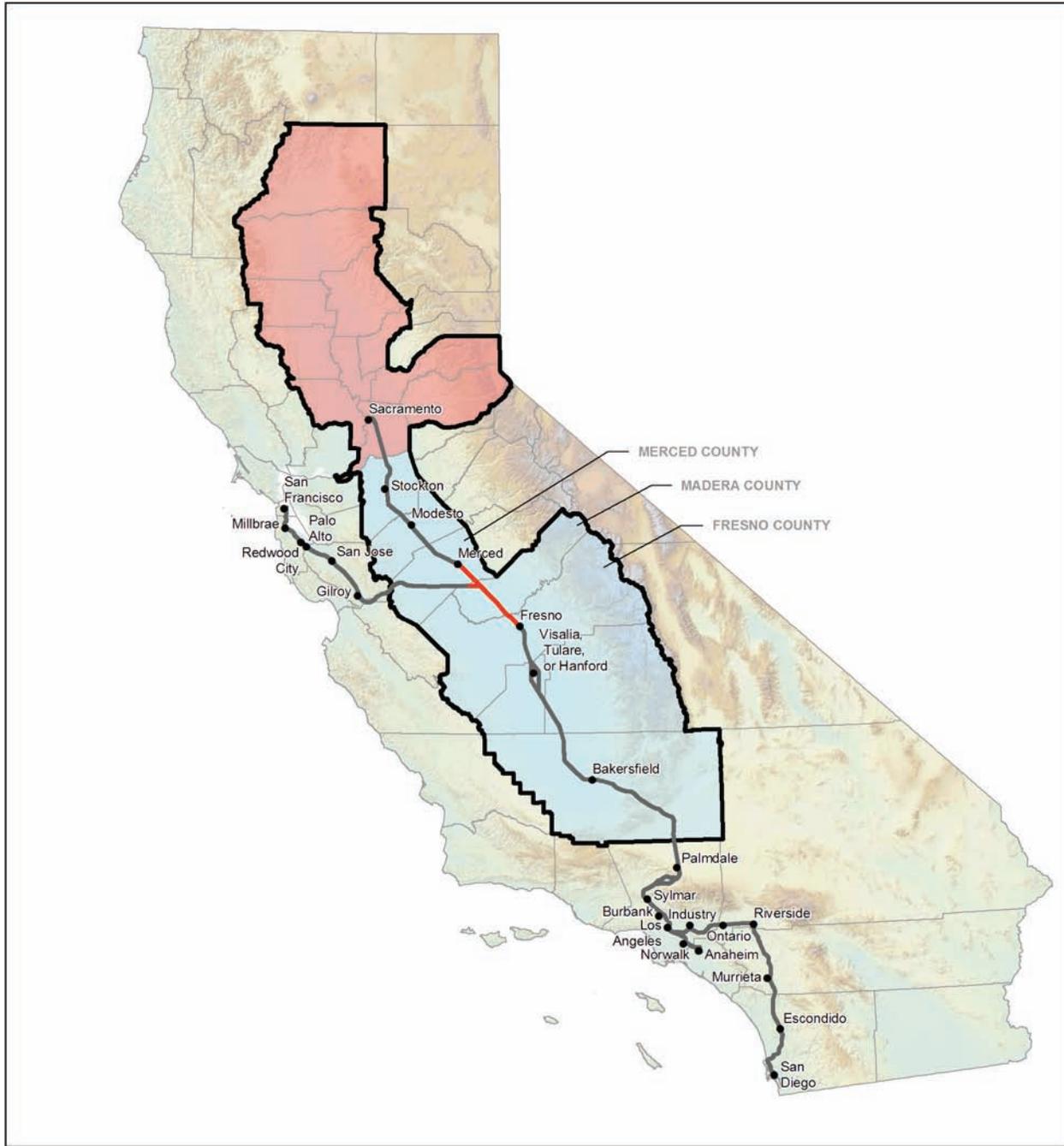
### Definition of HST System

The system that includes the HST tracks, structures, stations, traction powered substations, and maintenance facilities and train vehicles able to travel up to 220 mph.

The Merced to Fresno HST Section is a critical Phase 1 link connecting the Bay Area HST sections to the Fresno to Bakersfield, Bakersfield to Palmdale, and Palmdale to Los Angeles HST sections. The Merced to Fresno Section alternatives originated in two program EIR/EIS documents. The Authority and the Federal Railroad Administration (FRA) prepared the 2005 *Final Program EIR/EIS for the Proposed California High-Speed Train System EIR/EIS* (Statewide Program EIR/EIS) and the 2008 *Bay Area to Central Valley HST Final Program EIR/EIS* (Bay Area to Central Valley Program EIR/EIS) to evaluate the ability of an HST System to meet the existing and future capacity demands on California's intercity transportation system and to identify a preferred alignment for the San Francisco Bay Area (Bay Area to Central Valley sections of the HST System, respectively).

Commitments for surveys, analyses, and mitigation made in the programmatic EIR/EIS documents from 2005 and 2008 are listed below:

- Field surveys to determine the extent and type of general and sensitive biological resources, including focused surveys following resource agency protocols for special-status species.
- Mapping of plant communities and sensitive biological resources within and adjacent to the proposed HST System right-of-way/impact footprint to address direct and indirect impacts on biological resources.
- Study of wildlife movement/migration corridors to identify locally significant corridors and to provide data to assist in the design of bridges and wildlife crossings at crucial travel route points.



MF\_EIS\_Sect01\_02 Oct 20, 2010

**Figure 1-1**  
 HST System in California

- Delineation of waters and wetlands to determine the extent of United States Army Corps of Engineers (USACE), Regional Water Quality Control Board (RWQCB) and California Department of Fish and Game (CDFG) jurisdiction, and consultation with these agencies regarding appropriate mitigation.
- Consultation with the U.S. Fish and Wildlife Service (USFWS), as needed, for potential impacts on federally listed plant and wildlife species, including the preparation of a Biological Assessment (BA) and Biological Opinion (BO).
- Consultation with CDFG regarding potential impacts on state-listed plant and wildlife species and appropriate mitigation for such impacts.
- Assessment of Habitat Conservation Plans (HCPs) in the area and the applicability of project compliance.
- Development of a mitigation monitoring plan for environmental compliance during construction.
- Application for necessary permits (USACE Nationwide Permit or Section 404, USFWS BO, CDFG consistency determination with USFWS BO, 1600 Streambed Alteration Agreement, and RWQCB Section 401).

This Biological Resources and Wetlands Technical Report discusses the survey methodologies and results of biological studies conducted on the Merced to Fresno Section of the Authority's HST System. This report is organized as follows:

- Section 1 introduces the Biological Resources and Wetlands Technical Report and provides the background of the planning process.
- Section 2 provides a description of the Merced to Fresno Section of the California HST System.
- Section 3 describes study methodologies including prefield investigation methods and field survey methods. Regulatory requirements and definitions pertinent to methodology are included in this section.
- Section 4 describes the environmental setting for the Merced to Fresno Section as defined through the prefield investigations and reconnaissance-level surveys, including a description of the existing biological and physical conditions, regional habitats of concern, and special-status species known to occur in the region.
- Section 5 presents the results of field surveys conducted for wetland delineations, plant habitat assessments, and wildlife habitat assessments; discusses the potential impacts of the project on plant communities and land cover types, wetlands, special-status plant species, special-status wildlife species, habitats of concern, and wildlife movement corridors; and proposes mitigation measures.
- Section 6 presents a discussion of the permits and technical studies that may be required for special laws or conditions.
- Section 7 provides a list of the references cited in the Biological Resources and Wetlands Technical Report.
- Section 8 summarizes the qualifications of the authors of this technical report.



## 2.0 Project Description

The purpose of the Merced to Fresno Section of the HST project is to implement the California HST System between Merced and Fresno, providing the public with electric-powered high-speed rail service that provides predictable and consistent travel times between major urban centers and connectivity to airports, mass transit systems, and the highway network in the south San Joaquin Valley, and to connect the northern and southern portions of the HST System. The approximately 65-mile-long corridor between Merced and Fresno is an essential part of the statewide HST System. The Merced to Fresno Section is the location where the HST would intersect and connect with the Bay Area and Sacramento branches of the HST System; it would provide a potential location for the heavy maintenance facility (HMF) where the HSTs would be assembled and maintained, as well as a test track for the trains; it would also provide Merced and Fresno access to a new transportation mode and would contribute to increased mobility throughout California.

### 2.1 No Project Alternative

The No Project Alternative refers to the projected growth planned for the region through the 2035 time horizon without the HST project and serves as a basis of comparison for environmental analysis of the HST build alternatives. The No Project Alternative includes planned improvements to the highway, aviation, conventional passenger rail, and freight rail systems in the Merced to Fresno project area. There are many environmental impacts that would result under the No Project Alternative.

### 2.2 High-Speed Train Alternatives

As shown in Figure 2-1, there are three HST alignment alternatives proposed for the Merced to Fresno Section of the HST System: the UPRR/SR 99 Alternative, which would primarily parallel the UPRR railway; the BNSF Alternative, which would parallel the BNSF railway for a portion of the distance between Merced and Fresno; and the Hybrid Alternative, which combines features of the UPRR/SR 99 and BNSF alternatives. In addition, there is an HST station proposed for both the City of Merced and the City of Fresno, there is a wye connection (see text box on page 2-3) west to the Bay Area, and there are five potential sites for a proposed HMF.

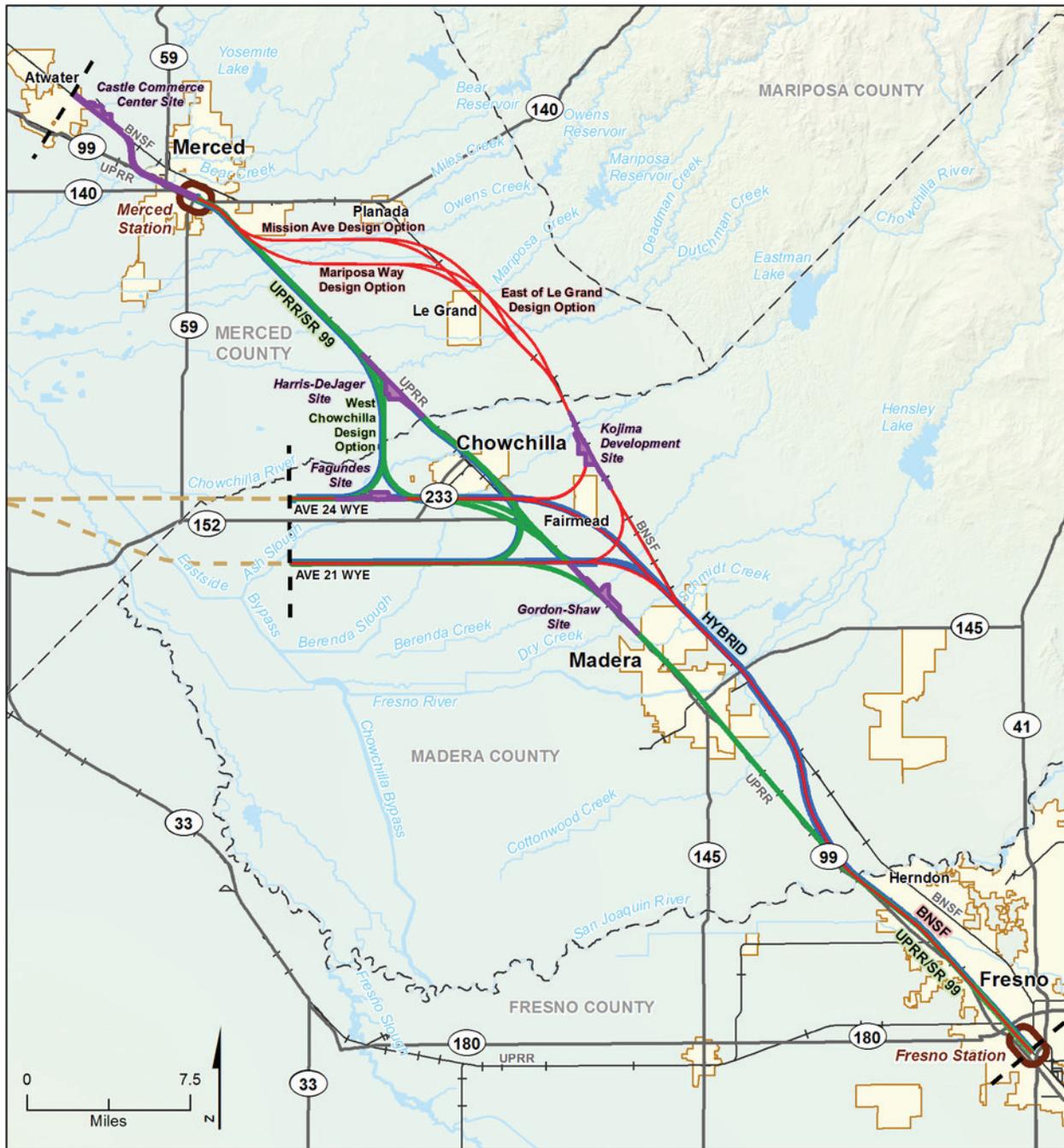
#### 2.2.1 UPRR/SR 99 Alternative

This section describes the UPRR/SR 99 Alternative, including the Chowchilla design options, wyes, and HST stations.

##### 2.2.1.1 North-South Alignment

The north-south alignment of the UPRR/SR 99 Alternative would begin at the HST station in Downtown Merced, located on the west side of the UPRR right-of-way. South of the station and leaving Downtown Merced, the alternative would be at-grade and cross under SR 99. Approaching the City of Chowchilla, the UPRR/SR 99 Alternative has two design options: the East Chowchilla design option, which would pass Chowchilla on the east side of town, and the West Chowchilla design option, which would pass Chowchilla 3 to 4 miles west of the city before turning back to rejoin the UPRR/SR 99 transportation corridor. These design options would take the following routes:

- **East Chowchilla design option:** This design option would transition from the west side of the UPRR/SR 99 corridor to an elevated structure as it crosses the UPRR railway and N Chowchilla Boulevard just north of Avenue 27, continuing on an elevated structure away from the UPRR corridor along the west side of and parallel to SR 99 to cross Berenda Slough. Toward the south side of Chowchilla, this design option would cross over SR 99 north of the SR 99/SR 152 interchange near Avenue 23½ south of Chowchilla. Continuing south on the east side of SR 99 and the UPRR corridor,



MF\_EIS\_PD\_26 Jun 09, 2011

- |                        |                                      |                    |
|------------------------|--------------------------------------|--------------------|
| BNSF Alternative       | Connection to Other Section          | City Limit         |
| UPRR/SR 99 Alternative | Station Study Area                   | County Boundary    |
| Hybrid Alternative     | Potential Heavy Maintenance Facility | Railroad           |
| Project Limit          |                                      | State / US Highway |

**Figure 2-1**  
 Merced to Fresno Section  
 HST Alternatives

- this design option would remain elevated for 7.1 miles through the communities of Fairmead and Berenda until reaching the Dry Creek Crossing. The East Chowchilla design option connects to the HST sections to the west via either the Ave 24 or Ave 21 wyes (described below).
- **West Chowchilla design option:** This design option would travel due south from Sandy Mush Road north of Chowchilla, following the west side of Road 11¾. The alignment would turn southeast toward the UPRR/SR 99 corridor south of Chowchilla. The West Chowchilla design option would cross over the UPRR and SR 99 east of the Fairmead city limits to again parallel the UPRR/SR 99 corridor. The West Chowchilla design option would result in a net decrease of approximately 13 miles of track for the HST System compared to the East Chowchilla design option and would remain outside the limits of the City of Chowchilla. The West Chowchilla design option connects to the HST sections to the west via the Ave 24 Wye, but not the Ave 21 Wye.

The UPRR/SR 99 Alternative would continue toward Madera along the east side of the UPRR south of Dry Creek and remain on an elevated profile for 8.9 miles through Madera. After crossing over Cottonwood Creek and Avenue 12, the HST alignment would transition to an at-grade profile and continue to be at-grade until north of the San Joaquin River. After the alternative crosses the San Joaquin River, it would rise over the UPRR railway on an elevated guideway, supported by straddle bents, before crossing over the existing Herndon Avenue and again descending into an at-grade profile and continuing west of and parallel to the UPRR right-of-way. After elevating to cross the UPRR railway on the southern bank of the San Joaquin River, south of Herndon Avenue, the alternative would transition from an elevated to an at-grade profile. Traveling south from Golden State Boulevard at-grade, the alternative would cross under the reconstructed Ashlan Avenue and Clinton Avenue overhead structures. Advancing south from Clinton Avenue between Clinton Avenue and Belmont Avenue, the HST guideway would run at-grade adjacent to the western boundary of the UPRR right-of-way and then enter the HST station in Downtown Fresno. The HST guideway would descend in a retained-cut to pass under the San Joaquin Valley Railroad spur line and SR 180, transition back to at-grade before Stanislaus Street, and continue to be at-grade into the station. As part of a station design option, Tulare Street would become either an overpass or undercrossing at the station.

**2.2.1.2 Wye Design Options**

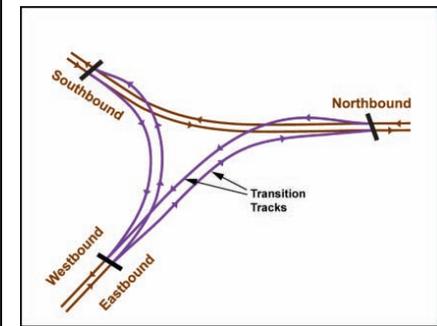
The following text describes the wye connection from the San Jose to Merced Section to the Merced to Fresno Section. There are two variations of the Ave 24 Wye for the UPRR/SR 99 Alternative because of the West Chowchilla design option. The Ave 21 Wye does not connect to the West Chowchilla design option and therefore does not have a variation.

**Ave 24 Wye**

The Ave 24 Wye design option would travel along the south side of eastbound Avenue 24 toward the UPRR/SR 99 Alternative and would begin diverging onto two sets of tracks west of Road 11 and west of the City of Chowchilla. Under the East Chowchilla design option, the northbound set of tracks would travel northeast across Road 12, joining the UPRR/SR 99 north-south alignment on the west side of the UPRR right-of-way just north of Sandy Mush Road. Under the West Chowchilla design option, the northbound set of tracks would travel northeast across Road 12 and would join the UPRR/SR 99 north-south alignment just south of Avenue 26. The southbound HST guideway would continue east along Avenue 24, turning south near SR 233 southeast of Chowchilla, crossing SR 99 and the UPRR railway to connect to the UPRR/SR 99 Alternative north-south alignment on the east side of the UPRR near Avenue 21½. Under the West Chowchilla design option, the southbound tracks

**What is a “Wye”?**

The word “wye” refers to the “Y”-like formation that is created where train tracks branch off the mainline to continue in different directions. The transition to a wye requires splitting two tracks into four tracks that cross over one another before the wye “legs” can diverge in opposite directions to allow bidirectional travel. For the Merced to Fresno Section of the HST System, the two tracks traveling east-west from the San Jose to Merced Section must become four tracks—a set of two tracks branching to the north and a set of two tracks branching to the south.



would turn south near Road 16 south of Chowchilla, crossing SR 99 and the UPRR to connect to the UPRR/SR 99 north-south alignment on the east side of the UPRR adjacent to the city limits of Fairmead.

Figure 2-2a shows the wye alignment for the East Chowchilla design option and Figure 2-2b shows the alignment for the West Chowchilla design option. Together, the figures illustrate the difference in the wye triangle formation for each design option connection. The north-south alignment of the West Chowchilla design option between Merced and Fresno diverges along Avenue 24 onto Road 12, on the north branch of the wye, allowing the HST alternative to avoid traveling through Chowchilla and to avoid constraining the city within the wye triangle.

**Ave 21 Wye**

The Ave 21 Wye would travel along the north side of Avenue 21. Just west of Road 16, the HST tracks would diverge north and south to connect to the UPRR/SR 99 Alternative, with the north leg of the wye joining the north-south alignment at Avenue 23½ and the south leg at Avenue 19½.

**2.2.1.3 HST Stations**

The Downtown Merced and Downtown Fresno station areas would each occupy several blocks, to include station plazas, drop-offs, a multimodal transit center, and parking structures. The areas would include the station platform and associated building and access structure, as well as lengths of platform tracks to accommodate local and express service at the stations. As currently proposed, both the Downtown Merced and Downtown Fresno stations would be at-grade, including all trackway and platforms, passenger services and concessions, and back-of-house functions.

**Downtown Merced Station**

The Downtown Merced Station would be between Martin Luther King Jr. Way to the northwest and G Street to the southeast. The station would be accessible from both sides of the UPRR, but the primary station house would front 16th Street. The major access points from SR 99 include V Street, R Street, Martin Luther King Jr. Way, and G Street. Primary access to the parking facility would be from West 15th Street and West 14th Street, just one block east of SR 99. The closest access to the parking facility from the SR 99 freeway would be R Street, which has a full interchange with the freeway. The site proposal includes a parking structure that would have the potential for up to 6 levels with a capacity of approximately 2,250 cars and an approximate height of 50 feet.

**Downtown Fresno Station Alternatives**

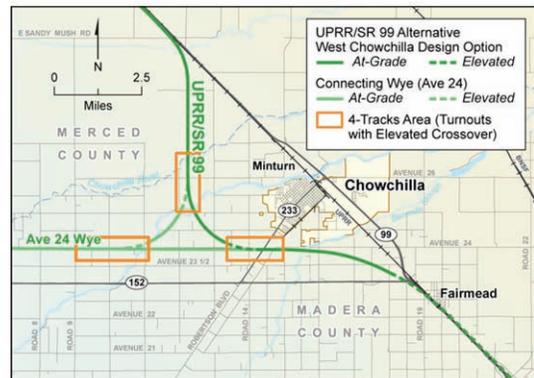
There are two station alternatives under consideration in Fresno: the Mariposa Street Station Alternative and the Kern Street Station Alternative.

**Mariposa Street Station Alternative**

The Mariposa Street Station Alternative is located in Downtown Fresno, less than 0.5 mile east of SR 99. The station would be centered on Mariposa Street and bordered by Fresno Street on the north, Tulare



(a) Ave 24 Wye with the East Chowchilla Design Option



(b) Ave 24 Wye with the West Chowchilla Design Option

**Figure 2-2a and b**  
 Ave 24 Wye and Chowchilla Design Options

Street on the south, H Street on the east, and G Street on the west. The station building would be approximately 75,000 square feet, with a maximum height of approximately 60 feet. The two-level station would be at-grade, with passenger access provided both east and west of the HST guideway and the UPRR tracks, which would run parallel with one another adjacent to the station. Entrances would be located at both G and H Streets. The eastern entrance would be at the intersection of H Street and Mariposa Street, with platform access provided via the pedestrian overcrossing. The main western entrance would be located at G Street and Mariposa Street.

The majority of station facilities would be located east of the UPRR tracks. The station and associated facilities would occupy approximately 18.5 acres, including 13 acres dedicated to the station, bus transit center, surface parking lots, and kiss-and-ride accommodations. A new intermodal facility would be included in the station footprint on the parcel bordered by Fresno Street to the north, Mariposa Street to the south, Broadway Street to the east, and H Street to the west. The site proposal includes the potential for up to 3 parking structures occupying a total of 5.5 acres. Two of the three potential parking structures would each sit on 2 acres, and each would have a capacity of approximately 1,500 cars. The third parking structure would have a slightly smaller footprint (1.5 acres), with 5 levels and a capacity of approximately 1,100 cars. Surface parking lots would provide approximately 300 additional parking spaces.

### Kern Street Station Alternative

The Kern Street Station Alternative for the HST station would also be in Downtown Fresno and would be centered on Kern Street between Tulare Street and Inyo Street. This station would include the same components and acreage as the Mariposa Street Station Alternative, but the station would not encroach on the historic Southern Pacific Railroad depot just north of Tulare Street and would not require relocation of existing Greyhound facilities. Two of the 3 potential parking structures would each sit on 2 acres and each would have a capacity of approximately 1,500 cars. The third structure would have a slightly smaller footprint (1.5 acres) and a capacity of approximately 1,100 cars. Like the Mariposa Street Station Alternative, the majority of station facilities under the Kern Street Station Alternative would be east of the HST tracks.

## 2.2.2 BNSF Alternative

This section describes the BNSF Alternative, including the Le Grand design options and wyes. It does not include a discussion of the HST stations, because the station descriptions are identical for each of the three HST alignment alternatives.

### 2.2.2.1 North-South Alignment

The north-south alignment of the BNSF Alternative would begin at the proposed Downtown Merced Station. This alternative would remain at-grade through Merced and would cross under SR 99 at the south end of the city. Just south of the interchange at SR 99 and E Childs Avenue, the BNSF Alternative would cross over SR 99 and UPRR as it begins to curve to the east, crossing over the E Mission Avenue interchange. It would then travel east to the vicinity of Le Grand, where it would turn south and travel adjacent to the BNSF tracks.

To minimize impacts on the natural environment and the community of Le Grand, the project design includes four design options:

- **Mission Ave design option:** This design option would turn east to travel along the north side of Mission Avenue at Le Grand and then would elevate through Le Grand adjacent to and along the west side of the BNSF corridor.
- **Mission Ave East of Le Grand design option:** This design option would vary from the Mission Ave design option by traveling approximately 1 mile farther east before turning southeast to cross Santa Fe Avenue and the BNSF tracks south of Mission Avenue. The HST alignment would parallel the BNSF for a half-mile to the east, avoiding the urban limits of Le Grand. This design option would

cross Santa Fe Avenue and the BNSF railroad again approximately one-half mile north of Marguerite Road and would continue adjacent to the west side of the BNSF corridor.

- **Mariposa Way design option:** This design option would travel 1 mile farther than the Mission Ave design option before crossing SR 99 near Vassar Road and turning east toward Le Grand along the south side of Mariposa Way. East of Simonson Road, the HST alignment would turn to the southeast. Just prior to Savana Road in Le Grand, the HST alignment would transition from at-grade to elevated to pass through Le Grand on a 1.7-mile-long guideway adjacent to and along the west side of the BNSF corridor.
- **Mariposa Way East of Le Grand design option:** This design option would vary from the Mariposa Way design option by traveling approximately 1 mile farther east before turning southeast to cross Santa Fe Avenue and the BNSF tracks less than one-half mile south of Mariposa Way. The HST alignment would parallel the BNSF to the east of the railway for a half-mile, avoiding the urban limits of Le Grand. This design option would cross Santa Fe Avenue and the BNSF again approximately a half-mile north of Marguerite Road and would continue adjacent to the west side of the BNSF corridor.

Continuing southeast along the west side of BNSF, the BNSF Alternative would begin to curve just before Plainsburg Road through a predominantly rural and agricultural area. One mile south of Le Grand, the HST alignment would cross Deadman and Dutchman creeks. The alignment would deviate from the BNSF corridor just southeast of S White Rock Road, where it would remain at-grade for another 7 miles, except at the bridge crossings, and would continue on the west side of the BNSF corridor through the community of Sharon. The HST alignment would continue at-grade through the community of Kismet until crossing at Dry Creek. The BNSF Alternative would then continue at-grade through agricultural areas along the west side of the BNSF corridor through the community of Madera Acres north of the City of Madera. South of Avenue 15 east of Madera, the alignment would transition toward the UPRR corridor, following the east side of the UPRR corridor near Avenue 9 south of Madera, then continuing along nearly the same route as the UPRR/SR 99 Alternative over the San Joaquin River to enter the community of Herndon. After crossing the San Joaquin River, the alignment would be the same as for the UPRR/SR 99 Alternative.

#### 2.2.2.2 Wye Design Options

The Ave 24 Wye and the Ave 21 Wye would be the same as described for the UPRR/SR 99 Alternative (East Chowchilla design option), except as noted below.

##### **Ave 24 Wye**

As with the UPRR/SR 99 Alternative, the Ave 24 Wye would follow along the south side of Avenue 24 and would begin diverging into two sets of tracks (i.e., four tracks) beginning west of Road 17. Two tracks would travel north near Road 20½, where they would join the north-south alignment of the BNSF Alternative on the west side of the BNSF corridor near Avenue 26½. The two southbound tracks would join the BNSF Alternative on the west side of the BNSF corridor south of Avenue 21.

##### **Ave 21 Wye**

As with the UPRR/SR 99 Alternative, the Ave 21 Wye would travel along the north side of Avenue 21. Two tracks would diverge, turning north and south to connect to the north-south alignment of the BNSF Alternative just west of Road 21. The north leg of the wye would join the north-south alignment just south of Avenue 24 and the south leg would join the north-south alignment just east of Frontage Road/Road 26 north of the community of Madera Acres.

### 2.2.3 Hybrid Alternative

This section describes the Hybrid Alternative, which generally follows the alignment of the UPRR/SR 99 Alternative in the north and the BNSF Alternative in the south. It does not include a discussion of the HST stations because the station descriptions are identical for each of the three HST alternatives.

#### 2.2.3.1 North-South Alignment

From north to south, generally, the Hybrid Alternative would follow the UPRR/SR 99 alignment with either the West Chowchilla design option with the Ave 24 Wye or the East Chowchilla design option with the Ave 21 Wye. Approaching the Chowchilla city limits, the Hybrid Alternative would follow one of two options:

- In conjunction with the Ave 24 Wye, the HST alignment would veer due south from Sandy Mush Road along a curve and would continue at-grade for 4 miles parallel to and on the west side of Road 11¾. The Hybrid Alternative would then curve to a corridor on the south side of Avenue 24 and would travel parallel for the next 4.3 miles. Along this curve, the southbound HST track would become an elevated structure for approximately 9,000 feet to cross over the Ave 24 Wye connection tracks and Ash Slough, while the northbound HST track would remain at-grade. Continuing east on the south side of Avenue 24, the HST alignment would become identical to the Ave 24 Wye connection for the BNSF Alternative and would follow the alignment of the BNSF Alternative until Madera.
- In conjunction with the Ave 21 Wye connection, the HST alignment would transition from the west side of UPRR and SR 99 to an elevated structure as it crosses the UPRR and N Chowchilla Boulevard just north of Avenue 27, continuing on an elevated structure along the west side of and parallel to SR 99 away from the UPRR corridor while it crosses Berenda Slough. Toward the south side of Chowchilla, the alignment (with the Ave 21 Wye) would cross over SR 99 north of the SR 99/SR 152 interchange near Avenue 23½ south of Chowchilla. It would continue to follow along the east side of SR 99 until reaching Avenue 21, where it would curve east and run parallel to Avenue 21, briefly. The alignment would then follow a path similar to the Ave 21 Wye connection for the BNSF Alternative, but with a tighter 220 mph curve. The alternative would then follow the BNSF Alternative alignment until Madera.

Through Madera and until reaching the San Joaquin River, the Hybrid Alternative is the same as the BNSF Alternative. Once crossing the San Joaquin River, the alignment of the Hybrid Alternative becomes the same as for the UPRR/SR 99 Alternative.

#### 2.2.3.2 Wye Design Options

The wye connections for the Hybrid Alternative follow Avenue 24 and Avenue 21, similar to those of the UPRR/SR 99 and BNSF alternatives.

##### Ave 24 Wye

The Ave 24 Wye is the same as the combination of the UPRR/SR 99 Alternative with the West Chowchilla design option, and the Ave 24 Wye for the BNSF Alternative.

##### Ave 21 Wye

The Ave 21 Wye is similar to the combination of the UPRR/SR 99 Alternative with the Ave 21 Wye on the northbound leg and the BNSF Alternative with the Ave 21 Wye on the southbound leg. However, the south leg under the Hybrid Alternative would follow a tighter, 220 mph curve than the BNSF Alternative, which follows a 250 mph curve.

## 2.2.4 Heavy Maintenance Facility Alternatives

The Authority is studying five HMF sites (see Figure 2-1) within the Merced to Fresno Section, one of which may be selected.

- **Castle Commerce Center HMF site** – A 370-acre site located 6 miles northwest of Merced, at the former Castle Air Force Base in northern unincorporated Merced County. It is adjacent to and on the east side of the BNSF mainline, 1.75 miles south of the UPRR mainline, off of Santa Fe Drive and Shuttle Road, 2.75 miles from the existing SR 99 interchange. The Castle Commerce Center HMF would be accessible by all HST alternatives.
- **Harris-DeJager HMF site** – A 401-acre site located north of Chowchilla adjacent to and on the west side of the UPRR corridor, along S Vista Road and near the SR 99 interchange under construction. The Harris-DeJager HMF would be accessible by the UPRR/SR 99 and Hybrid alternatives if coming from the Ave 21 Wye and the UPRR/SR 99 Alternative with the East Chowchilla design option and the Ave 24 Wye.
- **Fagundes HMF site** – A 231-acre site, located 3 miles southwest of Chowchilla on the north side of SR 152, between Road 11 and Road 12. This HMF would be accessible by all HST alternatives with the Ave 24 Wye.
- **Gordon-Shaw HMF site** – A 364-acre site adjacent to and on the east side of the UPRR corridor, extending from north of Berenda Boulevard to Avenue 19. The Gordon-Shaw HMF would be accessible from the UPRR/SR 99 Alternative.
- **Kojima Development HMF site** – A 392-acre site on the west side of the BNSF corridor east of Chowchilla, located along Santa Fe Drive and Robertson Boulevard (Avenue 26). The Kojima Development HMF would be accessible by the BNSF Alternative with the Ave 21 Wye.

## 3.0 Study Methods

The surveys conducted for the Merced to Fresno Section, the San Jose to Merced Section, and the Fresno to Bakersfield Section of the California HST Program are intended to follow similar methodologies in evaluating potential impacts on biological resources and wetlands. These methods are described in detail in the *Central Valley Biological Resources and Wetlands Survey Plan* (Survey Plan) (Authority and FRA 2010) and are summarized in this section. Discussions of the regulatory requirements and definitions that provide the basis for the wetlands and biological resource surveys are provided in Sections 3.1 and 3.2. Discussions of the prefield investigation and field survey methods are provided in Sections 3.3 and 3.4.

### 3.1 Regulatory Requirements

The following federal, state, and local laws, regulations, and agency jurisdiction and management guidance apply to biological resources and wetlands. The jurisdictional applications vary; however, various requirements and mitigation actions arise or are a result of the implementation of the HST project.

#### 3.1.1 Laws, Regulations, and Orders

The following federal, state, and local laws, regulations, and agency jurisdiction and management guidance were considered in the evaluation of potential impacts on biological resources.

##### 3.1.1.1 Federal

#### **Endangered Species Act of 1973 [16 U.S.C. Sections 1531 to 1543]**

The federal Endangered Species Act (federal ESA) and subsequent amendments provide guidance for the conservation of federally listed species and the habitat upon which they depend.

#### ***Prohibited Acts [Section 9]***

Section 9 of the federal ESA prohibits the “take” of any fish or wildlife species listed under the federal ESA as threatened or endangered, unless otherwise authorized by federal regulations. “Take” means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Under two processes, Section 7 and Section 10, take can be allowed for activities when they are incidental to an otherwise legal activity.

#### ***Interagency Consultation and Biological Assessments [Section 7]***

Section 7 of the federal ESA provides a means for authorizing take of threatened or endangered species by federal agencies and applies to actions that are conducted, permitted, or funded by a federal agency. Section 7 requires federal agencies to consult with the USFWS or National Marine Fisheries Service (NMFS), as appropriate, so that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of threatened or endangered species or result in the destruction or adverse modification of critical habitat for these species. If a proposed project “may affect” a listed species or destroy or modify critical habitat, the lead agency is required to prepare a BA evaluating the nature and severity of the potential effect.

#### ***Habitat Conservation Plans [Section 10]***

Section 10 of the federal ESA requires obtaining an Incidental Take Permit (ITP) from the USFWS, for nonfederal activities that might incidentally harm (or “take”) endangered or threatened wildlife. In order to obtain a permit, an HCP must be developed and designed to offset any harmful effects the proposed activity might have on the species.

**Magnuson-Stevens Fishery Conservation and Management Act [16 U.S.C. Section 1801 et seq.]**

The Magnuson-Stevens Fishery Conservation and Management Act requires all federal agencies to consult with NMFS on all actions or proposed actions (permitted, funded, or undertaken by the agency) that may adversely affect fish habitats, and requires cooperation among NMFS, the councils, fishing participants, and federal and state agencies to protect, conserve, and enhance essential fish habitat. It is defined as those waters and substrates necessary to fish for spawning, breeding, feeding, and growth to maturity.

**Clean Water Act**

The Clean Water Act (CWA) serves as the primary federal law protecting the quality of the nation's surface waters, including wetlands.

***Section 401***

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, if appropriate, from the interstate water pollution control agency with jurisdiction over affected waters at the point where the discharge would originate. Therefore, all projects that have a federal component and may affect state water quality (including projects that require federal agency approval, such as issuance of a Section 404 permit) must also comply with Section 401.

***Section 402***

Under the CWA Section 402, construction-related stormwater discharges to surface waters are regulated through the National Pollutant Discharge Elimination System (NPDES) program, administered by the EPA. In California, the State Water Resources Control Board (SWRCB) is authorized by the EPA to oversee the NPDES program through the RWQCB (see Porter-Cologne Water Quality Control Act below). The project is under the jurisdiction of the Central Valley RWQCB.

***Section 404***

Section 404 of the CWA serves as the primary federal law protecting the quality of the nation's surface waters, including wetlands. Under Section 404, the USACE and the EPA regulate the discharge of dredged and fill materials into the waters of the U.S. These waters are primarily defined as navigable waterways or water features (including wetlands) that have a significant nexus to navigable waters. Project sponsors must obtain authorization from USACE for all discharges of dredged or fill materials into waters of the U.S. before proceeding with a proposed activity. Section 404 permits may only be issued for a least environmentally damaging practicable alternative. Compliance with CWA Section 404 requires compliance with several other environmental laws and regulations. The USACE cannot issue an individual permit, nationwide permit, or verify the use of a general permit until the requirements of NEPA, federal ESA, the Coastal Zone Management Act (CZMA), and the National Historic Preservation Act (NHPA) have been met. Additionally, no permit can be issued or verified until a water quality certification, or waiver of certification, has been issued pursuant to CWA Section 401.

**Rivers and Harbors Act of 1899, Section 10**

Section 10 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. Tidal waterways within the Sacramento/San Joaquin drainage basin are considered navigable waters. The law applies to any dredging, excavation, filling, or other modification of a navigable water of the U.S., as well as to all structures, including bank protection (e.g., riprap) and mooring structures, such as those in a marina. Structures or work outside the limits defined for navigable waters of the U.S. requires a Section 10 permit if the structure or work affects the course, location, or condition of the water body.

### **Fish and Wildlife Coordination Act [16 U.S.C. Sections 661 to 667e et seq.]**

The 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 migratory birds and their parts (including eggs, nests, and feathers). The MBTA prohibits killing, possessing, or trading in migratory birds, except in accordance with regulations prescribed by the Secretary of the Interior. Projects that are likely to result in the taking of birds protected under the MBTA would require the issuance of take permits from the USFWS. Activities that would require such a permit would include, but not be limited to, 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 (BGEPA) 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 support of new construction in wetlands when a practicable alternative is available. If wetland effects 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 would promote the conservation of migratory bird populations. This includes avoiding and minimizing adverse impacts on migratory bird resources when conducting agency actions; restoring and enhancing migratory bird habitats; and preventing or abating the pollution or detrimental alteration of the environment for the benefit of migratory birds.

### **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.

#### **3.1.1.2 State**

### **California Fish and Game Code**

### **California Endangered Species Act [Sections 2050 to 2085]**

The California Endangered Species Act (CESA) establishes the policy of the state to conserve, protect, restore, and enhance threatened or endangered species and their habitats, by protecting "all native species of fishes, amphibians, reptiles, birds, mammals, invertebrates, and plants, and their habitats, threatened with extinction and those experiencing a significant decline which, if not halted, will lead to a threatened or endangered designation." It mandates that state agencies do not approve a project that would jeopardize the continued existence of these species if reasonable and prudent alternatives are available that would avoid a jeopardy finding. There are no state agency consultation procedures under CESA. For projects that would affect species that are federally and state-listed, compliance with the federal ESA satisfies CESA if CDFG determines that the federal incidental take authorization is consistent with CESA under Section 2080.1. For projects that would result in take of a species that is state-listed only, the project sponsor must apply for a take permit in accordance with Section 2081(b).

***Fully Protected Species [Sections 3511, 4700, 5050, 5515]***

Four sections of the California Fish and Game Code (CFG) list 37 fully protected (FP) species (CFG Sections 3511, 4700, 5050, and 5515, and prohibits take or possession “at any time” of the species listed, with few exceptions; states that “no provision of this code or any other law shall be construed to authorize the issuance of permits or licenses to ‘take’ the species;” and states that no previously issued permits or licenses for take of the species “shall have any force or effect” for authorizing take or possession.

***Bird Nesting Protections [Sections 3503 and 3503.5]***

These sections state that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto. To avoid violation of the take provisions, it is generally required that project-related disturbance at active nesting territories be reduced or eliminated during the nesting cycle.

***Lake and Streambed Alteration [Section 1600 et seq.]***

This section requires notifying the CDFG prior to any project activity that would substantially divert or obstruct the natural flow of any river, stream, or lake; 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. This includes ephemeral streams, desert washes, and watercourses with a subsurface flow. It may also apply to work undertaken within the floodplain of a body of water.

***California Native Plant Protection Act [Sections 1900 to 1913]***

The California Native Plant Protection Act requires all state agencies to use their authority to carry out programs to conserve endangered and rare native plants. It prohibits importation, take, and sale of native plants determined to be endangered or rare. CESA expands upon NPPA and enhances legal protection for plants, but NPPA remains part of the CDFG. Since rare plants are not included in CESA, NPPA is deferred to for protection of plants with these designations.

***Natural Communities Conservation Planning Act [Sections 2800 to 2835]***

The Natural Communities Conservation Planning Act was enacted to encourage broad-based planning to provide for effective protection and conservation of the state’s wildlife resources while continuing to allow appropriate development and growth. Natural Community Conservation Plans (NCCP) may be implemented, which identify measures necessary to conserve and manage natural biological diversity within the planning area, while allowing compatible and appropriate economic development, growth, and other human uses.

**Porter-Cologne Water Quality 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 discharge of dredged or fill material may constitute a discharge of waste that could affect the quality of waters of the State.

Historically, California relied on its authority under Section 401 of the CWA to regulate discharges of dredged or fill material to California waters. That section requires an applicant to obtain “water quality certification” from the SWRCB through its RWQCBs to comply with state water quality standards before certain federal licenses or permits may be issued. The permits subject to Section 401 include permits for the discharge of dredged or fill materials (CWA Section 404 permits) issued by the USACE.



The SWRCB issued Water Quality Order No. 2004-004-DWQ, which addresses general waste discharge requirements (WDRs) for discharges of dredged or fill material to waters deemed by the USACE to be outside its jurisdiction and therefore not subject to Section 404 of the CWA. In general, these are waters found to be “isolated.” If a discharge does not qualify for general WDRs, an ROWD must be filed using a 401 Certification Application.

**3.1.1.3 Regional and Local**

Table 3-1 summarizes local and regional laws and regulations that were identified and considered in preparation of this analysis.

**Table 3-1**  
 Local and Regional Laws and Regulations

Policy Title	Summary
<b>Merced County</b>	
Merced County 2000 General Plan, Open Space and Conservation Element (County of Merced 1990)	This Open Space and Conservation Element ensures the following: <ul style="list-style-type: none"> <li>a) Habitats that support rare, endangered, and threatened species are not substantially degraded (Goal 1).</li> <li>b) Local, state, and federally-managed lands are recognized (Objective 1.B).</li> <li>c) Soil, water, mineral, energy, historical, and air resources are properly managed (Goal 2).</li> <li>d) Open space is provided for recreation, aesthetics, and protection from hazards (Goal 3).</li> </ul> The Merced County General Plan is in the process of being updated.
<b>Madera County</b>	
1995 Madera County General Plan, Open Space and Conservation Element (County of Madera 1995)	This element involves coordinating with federal, state, and regional programs, protecting special wildlife needs, and supporting other General Plan policies related to open space protection. The County has also adopted voluntary water quality, grazing land, and oak woodland conservation management guidelines that address nonpoint-source water pollution on grazing land and oak woodlands in the region.
1995 Madera County General Plan, Wetlands and Riparian Areas (County of Madera 1995)	Goal 5.D protects wetland communities and related riparian areas throughout Madera County as valuable resources.
1995 Madera County General Plan, Fish and Wildlife Habitat (County of Madera 1995)	Goal 5.E protects, restores, and enhances habitats that support fish and wildlife species so as to maintain populations at viable levels.
1995 Madera County General Plan, Vegetation (County of Madera 1995)	Goal 5.F preserves and protects the valuable vegetation resources of Madera County.

Policy Title	Summary
<b>Fresno County</b>	
Fresno County General Plan, Policy G-12 through G-13 (County of Fresno 2000)	Policies G-12 through G-13 direct the County to provide for long-term preservation, enhancement, and enjoyment of plant, wildlife, and aquatic habitat resources in the Fresno area by protecting, improving, and restoring these resources and also direct the County to maintain and restore, where feasible, the ecological values of the San Joaquin River corridor (County of Fresno 2000). The County would implement these goals by supporting state, federal, and local programs and regulations regarding special-status species, as well as designating open space and using appropriate zoning, setbacks, and conservation easements to preserve areas identified as having sensitive or critical habitat for special-status species.
Fresno County General Plan, Wetland and Riparian Areas (County of Fresno 2000)	Goal OS-D conserves the function and values of wetland communities and related riparian areas throughout Fresno County while allowing compatible uses where appropriate. Protection of these resource functions positively affects aesthetics, water quality, floodplain management, ecological function, and recreation/tourism.
Fresno County General Plan, Fish and Wildlife Habitat (County of Fresno 2000)	Goal OS-E helps to protect, restore, and enhance habitats in Fresno County that support fish and wildlife species so that populations are maintained at viable levels.
Fresno County General Plan, Vegetation (County of Fresno 2000)	Goal OS-F preserves and protects the valuable vegetation resources of Fresno County.
<b>City of Atwater</b>	
2000 General Plan, Open Space and Conservation Element (City of Atwater 2000)	<p>Goal CO-5 minimizes impacts of future and current development on sensitive species, critical habitats, and wildlife.</p> <p>Goal CO-6 minimizes impacts of development on wildlife and wildlife habitat, particularly special-status species.</p> <p>The City encourages habitat enhancement and the preservation of corridors between natural habitat areas to allow for the movement of wildlife and to prevent the creation of "biological islands."</p>
<b>City of Merced</b>	
Vision 2015 General Plan, Open Space, Conservation, & Recreation Goals, Policies, and Actions (City of Merced 1997)	<p>Goal Area OS-1 provides open space for the preservation of natural resources:</p> <ul style="list-style-type: none"> <li>• Maintenance of Merced's biological resources</li> <li>• A high-quality, expanding urban forest</li> <li>• Preservation of scenic corridors and resources</li> <li>• Improvement and enhancement of water quality</li> </ul>
<b>City of Chowchilla</b>	
Draft 2040 General Plan, Open Space and Conservation Element, Biological Resources Section (City of Chowchilla 2009)	Objective OS-13 encourages the provision of open space areas throughout the Planning Area through the preservation and enhancement of natural features or the joint use of other public facilities and/or rights-of-ways.

Policy Title	Summary
<b>City of Fresno</b>	
2025 General Plan, Resource Conservation Element (City of Fresno 2002)	<p>Objective G-12 provides for long-term preservation, enhancement, and enjoyment of plant, wildlife, and aquatic habitat resources in the Fresno area by protecting, improving, and restoring these resources.</p> <p>Objective G-14 supports the San Joaquin River Conservancy in its efforts to develop a river parkway that strikes an appropriate balance between facilitating recreational pursuits; protecting water resources; meeting economic and development needs through sand and gravel production; and long-term preservation, enhancement, and public enjoyment of the river's unique and irreplaceable plant, wildlife, and aquatic resources.</p> <p>The policies to meet these objectives focus on obtaining areas of land for preservation and conservation of sensitive wildlife, plants, and wetland habitats in the city and around the San Joaquin River.</p>

**3.1.1.4 Habitat Conservation Plans in the Project Vicinity**

An HCP is a document that must accompany an ITP under Section 10 of the federal ESA. One approved HCP is administered in the project vicinity. The Merced to Fresno Section is within the permit area of the Pacific Gas and Electric Company (PG&E) San Joaquin Valley Operations and Management HCP (Pacific Gas and Electric 2006). The HCP only applies to PG&E projects, not other public or private applicants such as the Authority. Conflicts with HCPs or other conservation plans are not discussed further since no HCPs apply to the HST alternatives.

**3.2 Definitions**

The definitions of special-status species, jurisdictional waters, and sensitive natural communities are provided in the following subsections.

**3.2.1 Special-Status Species**

Special-status species are plants and wildlife that are legally protected under the federal ESA, CESA, and/or other regulations, as well as species considered rare by the scientific community because of documented or perceived decline or limitation of population size or geographical extent. Special-status species include:

- Species listed or proposed for listing as threatened or endangered under the federal ESA (50 Code of Federal Regulations [CFR] 17.12 [listed plants]); 50 CFR 17.11 [listed animals]; various notices in the Federal Register [FR] [proposed species]).
- Species that are candidates for possible future listing as threatened or endangered under the federal ESA (73 FR 75176, December 10, 2008).
- Species listed or proposed for listing by the state of California as threatened or endangered under CESA (14 California CCR 670.5).
- USFWS Birds of Conservation Concern (BCC) for Region 8 (USFWS 2008).
- Species that meet the definitions of rare or endangered under CEQA (California Environmental Quality Act [CEQA Guidelines Section 15380 and 151250).
- Plants presumed by the California Native Plant Society (CNPS) to be "extinct in California" (Lists 1A, CNPS 2009).

- Plants considered by the CNPS to be “rare, threatened, or endangered in California” (Lists 1B and 2, CNPS 2009).
- Plants listed by CNPS as plants about which more information is needed to determine their status (List 3, CNPS 2009), which may be included as special-status species on the basis of local significance or recent biological information.
- Plant species considered a locally significant species (i.e., a species that is not rare from a statewide perspective, but is rare or uncommon in a local context such as within a county or region).
- Plant species listed as rare under the California Native Plant Protection Act (CFGF 1900 et seq.).
- Wildlife species of special concern (SSC) to the CDFG (California Natural Diversity Database [CNDDDB] 2003a).
- Wildlife that are FP in California (CFGF Sections 3511 [birds], 4700 [mammals], 5050 [amphibians and reptiles], and 5515 [fish]) (CNDDDB 2003b).

### 3.2.2 Jurisdictional Waters

Wetlands and other waters in the project vicinity, including waters of the U.S. and waters of the State and state streambeds, are regulated by the federal government and the state of California. Waters of the U.S. are defined by federal regulations promulgated by the USACE. Waters of the State are not clearly defined; however, the SWRCB is currently developing a wetland definition as part of a wetland and riparian area protection policy (WRAPP). Waters also include drainages and associated areas regulated by CDFG. Wetlands and other waters as delineated during the jurisdictional delineation (see the *Merced to Fresno Section Wetlands Delineation Report* [Authority and FRA 2011a]), are assumed to fall under the jurisdiction of the USACE, RWQCB, and CDFG for purposes of this discussion. Confirmation of these waters as jurisdictional by the USACE, RWQCB, and CDFG would be conducted when the regulatory permitting process is conducted. Further definitions are presented below.

#### 3.2.2.1 Federal Definitions

The CWA defines waters of the U.S. as follows:

- 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;
- All interstate waters including interstate wetlands; and
- 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 (33 CFR 328.3[a]).

The CWA defines wetlands as a subset of waters of the U.S. Wetlands are those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas (33 CFR 328.3[b]; 40 CFR 230.3[t]).

The definition of waters of the U.S. has been revised based on subsequent rulings by the U.S. Supreme Court. These rulings have concluded that isolated waters and some headwaters are not waters of the U.S. The USACE and the EPA (USACE and EPA 2007) have developed specific criteria for determining whether features are waters of the U.S. based on these Court rulings, as described below.

### **Solid Waste Agency of Northern Cook County v. United States Army Corps of Engineers**

On January 9, 2001, the U.S. Supreme Court issued a decision in *Solid Waste Agency of Northern Cook County v. USACE*. The case involved the filling of hydrologically isolated wetland that had formed in an abandoned sand and gravel pit. In the 5 to 4 decision, the Court held that the USACE had exceeded its statutory authority by asserting jurisdiction of an isolated wetland based solely on the use of the wetland by migratory birds. The USACE had previously regulated isolated wetlands using the "Migratory Bird Rule" established in 1986. The Court defined isolated waters as any body of water that is nonnavigable, intrastate, and lacking any significant nexus to navigable bodies of water (Pooley 2002).

Isolated, interstate wetlands (i.e., wetlands that are not hydrologically connected with other jurisdictional wetlands or nonwetland waters of the U.S.) are generally considered nonjurisdictional under the federal CWA.

### **Rapanos v. United States and Carabell v. Army Corps of Engineers**

Two cases recently brought before the U.S. Supreme Court, *Rapanos v. United States* (No. 04 1034) and *Carabell v. Army Corps of Engineers* (No. 04-1384), challenged USACE interpretation of waters of the U.S. (USACE and EPA 2007). The USACE had interpreted CWA 33 U.S. Code (U.S.C.) 1362(7) to regulate wetland areas that are separated from a tributary of a navigable water by a narrow, constructed berm, where evidence of an occasional hydrologic connection existed between the wetland and the tributary. Also, the case questioned Congress's authority under the Commerce Clause to apply the CWA to the wetlands at issue.

On June 19, 2006, the Court held 5 to 4 in favor of tightening the definition of "waters of the U.S." According to the opinion, a water or wetland constitutes "navigable waters" under the CWA if it possesses a "significant nexus" to waters that are currently navigable or could feasibly be made navigable.

The USACE and the EPA issued a joint memorandum on June 5, 2007, issuing new guidelines for establishing whether or not wetlands or other waters of the U.S. fall within USACE jurisdiction (USACE and EPA 2007). Under these guidelines, the agencies assert jurisdiction over traditional navigable waters (TNWs), wetlands adjacent to TNWs, nonnavigable tributaries to TNWs that are relatively permanent waters (RPWs), and wetlands that abut RPWs. The agencies may take jurisdiction over nonnavigable tributaries that are not RPWs, wetlands that are adjacent to non-RPWs, and wetlands adjacent to but not directly abutting a relatively permanent, nonnavigable tributary. The agencies will generally not assert jurisdiction over swales, erosional features, or ditches excavated wholly in and draining only uplands and that do not carry a relatively permanent flow of water.

#### **3.2.2.2 State Definitions**

##### **State Water Resources Control Board**

The SWRCB takes jurisdiction of all waters of the State, including, as a subset, all waters of the U.S. under Section 401 of the federal CWA. 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 waters of the State. However, the SWRCB has not yet adopted a wetland definition. As required by State Water Board Resolution No. 2008-0026, a wetland definition will be developed as part of the WRAPP. On October 6, 2009, the Technical Advisory Team for the WRAPP presented a definition to the SWRCB that "would reliably define the diverse array of California wetlands based on the USACE wetland delineation methods to the extent feasible." The proposed definition is 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).

Although some RWQCBs have adopted a wetland definition in their basin plans, the Central Valley RWQCB, which has jurisdiction over all the drainage basins potentially affected by the project, has not adopted a wetland definition within its basin plans. Therefore the definition in the USACE manual was followed in conducting the wetland delineation.

### **CDFG Streams and Lakes**

The CDFG is responsible for conserving, protecting, and managing California's fish, wildlife, and native plant resources. To meet this responsibility, the CFGC (Section 1602) requires an entity to notify CDFG of any proposed activity that may substantially modify a river, stream, or lake.

The notification requirement applies to any work undertaken in or near a river, stream, or lake that flows at least intermittently through a bed or channel and includes ephemeral streams, desert washes, and watercourses with a subsurface flow. It may also apply to work undertaken within the floodplain of a body of water.

The CDFG has not released an official definition of lake or streambed and therefore the extent of the area regulated under Section 1602 remains undefined. However, CDFG jurisdiction generally includes the streambed and bank, together with the adjacent floodplain and riparian vegetation.

### **3.2.3 Special-Status Plant Communities**

Special-status plant communities are plant communities that are determined to be significant and/or represent rare vegetation types (CDFG 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 (CDFG 2009a). Both special-status plant communities and other natural communities are tracked by the CNDDDB and may or may not contain individual plants or animals classified as special-status species. The identification of plant communities by their rarity and threat level is an important component of vegetation classification and conservation. While wetland and riparian communities are afforded protection separately under federal and/or state regulations, other special-status plant communities are not protected by specific regulations. However, lead and trustee agencies may request that impacts on all special-status plant communities, regardless of other federal and/or state regulations, be addressed in environmental documents. Local agencies may also have policies requiring avoidance of rare community types.

The list of special-status plant communities in California is currently maintained by CDFG in its Vegetation Classification and Mapping Program List of California Terrestrial Natural Communities Recognized by the CNDDDB (CDFG 2003). Both the CNPS Botanical Survey Guidelines and the CDFG's Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities (CNPS 2001; CNDDDB 2003d) specify that the CNDDDB's List of California Terrestrial Natural Communities (CDFG 2003) is to be used as a guide to the names and status of special-status plant communities. These communities are described based on a vegetation classification system developed by Sawyer and Keeler-Wolf, the most current of which is published in the Manual of California Vegetation (MCV), Second Edition (Sawyer et al. 2009).

The List of California Terrestrial Natural Communities is based on the Vegetation Alliances (generic vegetation units) and Vegetation Associations (specific vegetation units) used in the first edition of the MCV (Sawyer and Keeler-Wolf 1995). The List of California Terrestrial Natural Communities, published in 2003, was intended as an interim reference pending the release of the second edition of the MCV (CDFG 2003).

With the publication of the second edition of the MCV in 2009 (Sawyer et al. 2009), CDFG prepared an updated List of Vegetation Alliances (CDFG 2009b) with associated "Global" or "State" rarity rankings using NatureServe standard heritage program methodology (Faber-Langendoen et al. 2009) rather than the asterisks (\*) used to denote special vegetation types in the List of California Terrestrial Natural Communities. Rankings are numbered 1 through 5 using NatureServe's standard heritage program

methodology (Faber-Langendoen et al. 2009). If an alliance is marked with a G1 through a G3 code, this means that all of the associations within it will also be considered of high inventory priority. In addition to vegetation alliances, the list also includes identification of special stands, which are specific patches of vegetation that may be rare. CDFG is expected to publish an accepted list of vegetation associations together with revised rarity rankings in the near future.

CNPS Botanical Survey Guidelines also specify that the CNDDDB's List of California Terrestrial Natural Communities is to be used as a guide to the names and status of sensitive natural communities.

### 3.3 Prefield Investigation Methods

Prior to performing field surveys, study areas for special-status species habitat and jurisdictional waters were established and existing background information was reviewed to develop survey plans for jurisdictional waters, special-status plant communities, and special-status plant and wildlife species.

#### 3.3.1 Regional Area

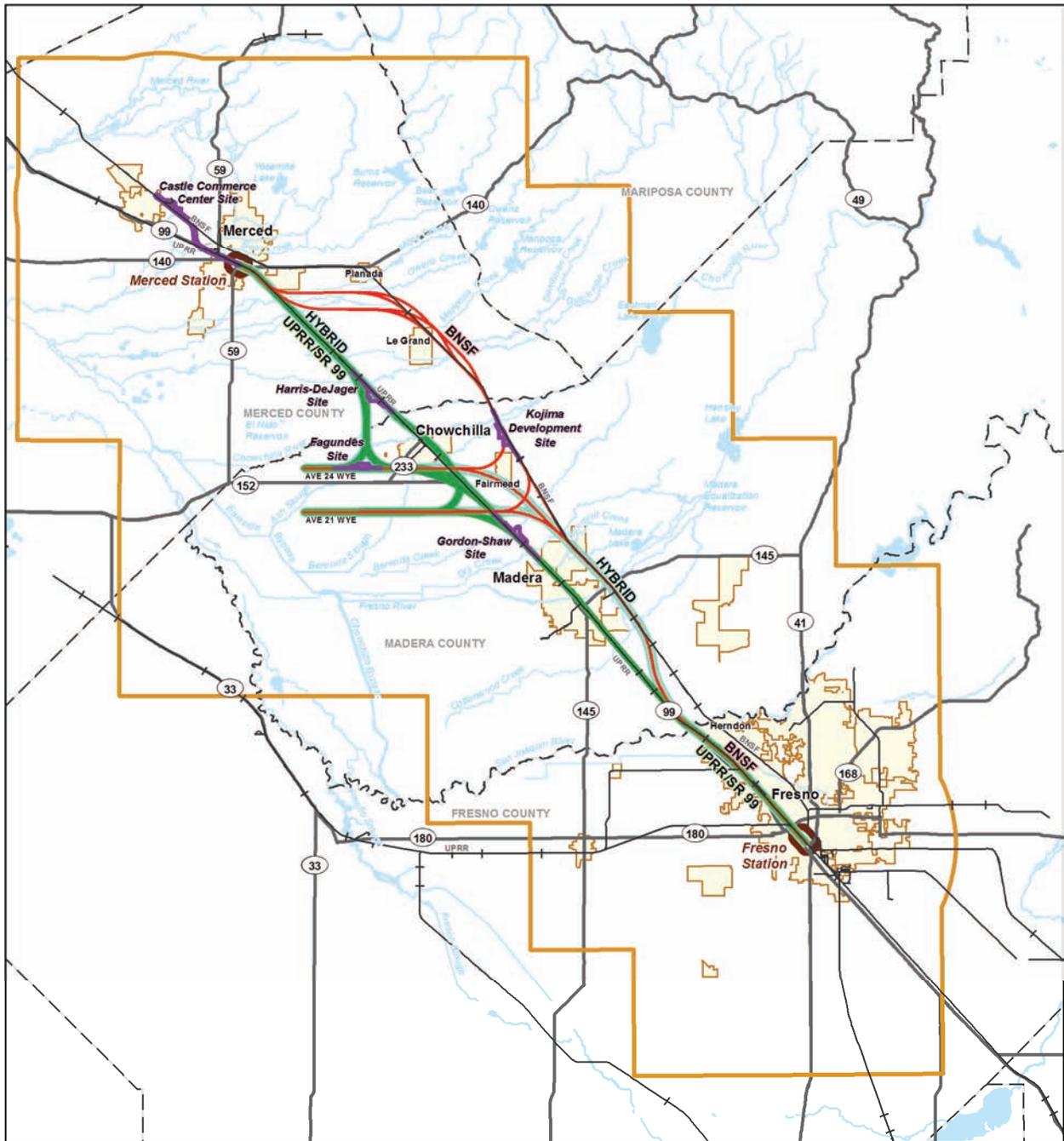
The regional area includes a broad, approximately 2,688-square-mile (69,618,880-acre) area of the San Joaquin Valley centered on the proposed HST alternatives that consider the potential presence, connection, and movement of biological resources within and between suitable habitat within the region. Starting the analysis with this regional focus allowed for a conservative approach to distinguish among those habitats, species, and resources that have the potential to be affected by the proposed activities from those that do not. The results of regional area prefield evaluations were considered in determining which resources to evaluate through field studies for the potential to be affected by the project.

In this report, the regional area primarily refers to an area described by 45 United States Geologic Survey (USGS) 7.5-minute quadrangles (quads) including the 15 quads that overlap with the HST alternatives and the 30 adjacent quads. USFWS, CNDDDB, and CNPS database queries for prefield investigations included the following 45 quads: Arena, Atwater, Berenda, Biola, Bliss Ranch, Bonita Ranch, Caruthers, Chowchilla, Clovis, Conjeo, Cressey, Daulton, El Nido, Firebaugh NE, Fresno North, Fresno South, Friant, Gravelly Ford, Gregg, Haystack Mountain, Herndon, Illinois Hill, Indian Gulch, Kearney Park, Kerman, Kismet, Lanes Bridge, Le Grand, Little Table Mountain, Madera, Malaga, Merced, Owens Reservoir, Oxalis, Plainsburg, Planada, Poso Farm, Raisin, Raymond, Raynor Creek, Sandy Mush, Santa Rita Bridge, Turner Ranch, Winton, and Yosemite Lake.

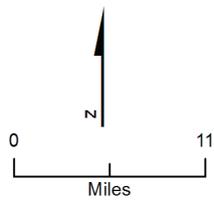
In order to generate a regular polygon for querying certain spatial databases, such as the CNDDDB RareFind 3 Geographic Information System (GIS) data, the area within 10 miles of the alignment centerline was used instead of the 45 quad area. Small areas of the Turlock Lake, Turlock, Stevinson, and Delta Ranch quads are within this 10-mile area but are beyond the 45-quad area described above; therefore, these four quads were not included in quad based database queries. The regional area is illustrated on Figure 3-1.

#### 3.3.2 Study Areas

To address regulatory requirements effectively, type of habitat or species, or type of potential effect, several study areas were established to evaluate biological resources. The geographic extent and method of biological resource evaluation differ in each of these areas.



MF\_TR\_BIO\_08 Jul 06, 2011



- UPRR/SR 99 Alternative
- BNSF Alternative
- Hybrid Alternative
- Station Study Area
- Potential Heavy Maintenance Facility
- City Limit
- - - County Boundary
- +— Railroad
- Regional Area

**Figure 3-1**  
 Regional Area

This discussion includes three study areas: habitat study area, wetland resource study area, and special-status plant study area. This technical report refers to each study area separately as it pertains to these defined areas of investigation. The study areas include the construction footprint for the HST facilities (i.e., tracks, wyes, stations, and HMFs) and the areas for related infrastructure changes required to accommodate the HST alternatives (such as roadway and interchange modifications, utility relocation, and addition of power substations). Furthermore, the study areas include entire or partial parcels that are too small to continue current operations (e.g., agriculture) that the Authority might purchase. These areas could be used during construction.

### 3.3.2.1 Habitat Study Area

The habitat study area was established as a 1,000-foot-radius buffer around the construction footprint. This area is divided into a core survey area and an auxiliary survey area. The core survey area includes the construction footprint plus a 250-foot-radius buffer around project elements, while the auxiliary survey area includes the area from the edge of the core area laterally an additional 750 feet.

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 the three study areas and encompasses the wetland resource and special-status plant study areas discussed below.

### 3.3.2.2 Wetland Resource Study Area

The wetland resource study area was established as 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 were evaluated within the 100-foot-radius construction footprint and indirect impacts were evaluated within the 250-foot-radius buffer around project elements. Jurisdictional delineations were conducted within the wetland resource study area.

### 3.3.2.3 Special-Status Plant Study Area

The special-status plant study area includes the construction footprint plus a 100-foot-radius buffer around project elements. Focused special-status plant surveys were conducted within the special-status plant study area.

## 3.3.3 Jurisdictional Waters

When considering wetlands and other jurisdictional waters, these features are collectively termed jurisdictional waters. Jurisdictional waters as delineated during the jurisdictional delineation (see *Merced to Fresno Section Wetlands Delineation Report* [Authority and FRA 2011a]), are assumed to fall under the jurisdiction of the USACE, RWQCB, and CDFG for purposes of this discussion. Confirmation of these waters as jurisdictional by the USACE, RWQCB, and CDFG will be conducted when the regulatory permitting process is conducted.

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

- USGS 7.5-minute topographic quads.
- National Wetland Inventory (NWI) maps (USFWS 2009a).
- National Hydrography Dataset (NHD) (Biogeographic Information and Observation System [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.

### 3.3.4 Special-Status Plant Communities and Special-Status Plants

- 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 Sacramento Field Office web site provided an official list of federal candidate, proposed, threatened, and endangered plant species having the potential to occur in the 45-quad search area. The lists were generated on September 28 and October 5, 2009 (USFWS 2009b), June 17, 2010 (USFWS 2010a), and March 15, 2011 (USFWS 2011). The official USFWS species list for the 45-quad regional area is provided in Appendix A.
- CNDDDB RareFind 3 database provided a 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 GIS mapping exercise to include all sensitive natural communities and special-status species occurrences reported in the regional area (CDFG 2003). This two-fold inquiry was performed so that all sensitive natural communities and special-status plant species with the potential to occur in the alignment were captured in the query. Lists of special-status plant species that have documented occurrences in the regional area were generated on October 1, 2009 (CNDDDB 2003a), June 17, 2010 (CNDDDB 2003b), October 25, 2010 (CNDDDB 2003c), and March 15, 2011 (CNDDDB 2003d). Appendix B provides the lists of CNDDDB-reported sensitive natural communities and special-status species.
- CNPS's Online Inventory of Rare and Endangered Plants of California provided a list of CNPS special-status plant species that may occur in the regional area. These lists were generated for the 45-quad search area on October 1, 2009 (CNPS 2009), June 17, 2010 (CNPS 2010), and March 15, 2011 (CNPS 2011).

### 3.3.5 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 Sacramento Field Office Web Site provided an official list of federal candidate, proposed, threatened, and endangered wildlife species from the 45-quad regional area. The lists were generated on September 28 and October 5, 2009 (USFWS 2009b) and on June 17, 2010 (USFWS 2010a). The official USFWS species list for the 45-quad regional area is provided in Appendix A.
- CNDDDB RareFind 3 database provided a 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 (CDFG 2003). Lists of special-status wildlife species that have documented occurrences in the 45-quad search area were generated on October 1, 2009 (CNDDDB 2003a), June 17, 2010 (CNDDDB 2003b), October 25, 2010 (CNDDDB 2003c), and March 24, 2011 (CNDDDB 2003e). The list of CNDDDB-reported sensitive natural communities and special-status species is provided in Appendix B.
- California Wildlife Habitat Relationships (CWHR) Information System provided 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). These species range data were used to augment data acquired from

the CNDDDB, as discussed above, to identify additional special-status wildlife species with a known geographic range within the regional area but for whom no occurrence data have been reported in the CNDDDB.

- Following a meeting with regulatory agencies on November 5, 2009, USFWSBCC for Region 8 (California and Nevada) were included on the 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) et al. (2009), CalFish (2009), and NMFS (2009), and McBain and Trush (2002). These documents were used to identify known barriers to upstream and downstream migration 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 NHD (1:24,000 scale; USGS 2006). In general, watercourses were identified as potentially supporting special-status fishes if they were named "river", "creek", or "slough" in the NHD and available maps and/or they exhibited natural fluvial characteristics based on aerial photographs. These historically natural watercourses were targeted for further assessment and field characterization given their potential to provide habitat either currently or in the future based on foreseeable changes in water release programs (i.e., restoration activities associated with the San Joaquin River [Stillwater Sciences 2003, Reclamation et al. 2009]).
- 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 1998a), Missing Linkages: Restoring Connectivity to the California Landscape (Penrod et al. 2001), CDFG BIOS (Huber 2007, ESRP 1999), and the California Essential Connectivity Project (Spencer et al. 2010).
- Though the impact analysis within this section focuses on special-status wildlife species, it is anticipated that impacts on native fauna would occur within the project footprint. The temporary and permanent impacts on non-protected wildlife resources would be analogous to those for special-status wildlife. Construction impacts would occur because of site preparation activities and the removal and/or clearing of native and non-native plant communities. Direct impacts on wildlife populations would be the physical loss of suitable habitat, mortality of individuals, and population fragmentation from site clearing, grubbing, grading, and road construction. Direct impacts would include both permanent (long-term) and temporary (short-term) activities. They might also 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 displacement of individuals, habitat modification, and increased rates of competition and mortality. Each build alternative would have the potential to fragment populations of amphibians, reptiles, and small- to medium-sized mammals, which would reduce population heterogeneity and dispersal opportunities. The impacts on special-status wildlife species would help ameliorate the impacts on the native fauna assemblages. The methodology for assessing special-status wildlife species is discussed below.

### 3.3.6 Reconnaissance-Level Field Survey Methods

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 involve preliminary data gathering for the purpose of recognizing and identifying resources that warrant additional or more focused surveys. Reconnaissance-level field surveys were conducted 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 were done from publically accessible roads along or near the HST alternatives. The results of these surveys were used to provide 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 2011a) and plants (Authority and FRA 2011b).

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

- CH2M HILL fisheries biologist Craig Williams and CH2M HILL hydrologist Jeremy Thomas conducted preliminary evaluations of several watercourses during relatively dry periods between March 30 and April 2, 2009; Craig Williams and CH2M HILL biologist Michael Clary conducted evaluations between April 28 and April 30, 2009; and Craig Williams and CH2M HILL fisheries biologist Niel Nikirk conducted evaluations 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 report.
- CH2M HILL biologists Michael Clary and Corinna Lu conducted terrestrial habitat surveys of the UPRR/SR 99 Alternative north-south alignment and the downtown Merced and Fresno stations from November 16 through 20, 2009. Surveys for portions of the Ave 24 Wye were conducted by CH2M HILL biologists Russell Huddleston and Danielle Tannourji. Temperatures during the November 2009 surveys ranged from 30 to 70°F with light winds and light precipitation on November 20. 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.
- CH2M HILL biologists Russell Huddleston, Michael Clary, and Craig Williams conducted jurisdictional waters field surveys of the Merced-to-Fresno Corridor from December 7 through 10, 2009. Temperatures ranged from approximately 27 to 50°F with occasional light winds, moderate precipitation on December 7, and locally heavy morning fog on December 8. The objective of the December survey was to characterize and map each of the proposed alignment crossing locations of rivers, creeks, and sloughs (referred to in this report as “natural watercourses”).
- CH2M HILL biologist Michael Clary conducted terrestrial habitat surveys on May 6 and 7, 2010. Temperatures ranged from approximately 36 to 79°F with light winds. 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.
- CH2M HILL biologists Michael Clary, Judy Ferguson, and Dave Fornander conducted terrestrial habitat surveys on May 24 through May 26, 2010. Temperatures ranged from approximately 40 to 76°F with moderate winds. 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 2011b), were also conducted at this time.
- CH2M HILL biologist Michael Clary conducted terrestrial habitat surveys on July 14 through July 16, 2010. Temperatures ranged from approximately 40 to 76°F with moderate winds. 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.
- CH2M HILL biologist Michael Clary conducted terrestrial habitat surveys on December 21 through December 23, 2010. Temperatures ranged from approximately 46 to 58°F with moderate rain. 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.

- CH2M HILL biologist Michael Clary conducted terrestrial habitat surveys on January 10 through January 12, 2011. Temperatures ranged from approximately 38 to 60°F with slight precipitation. 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.
- CH2M HILL biologist Michael Clary conducted terrestrial habitat surveys on January 29 through February 2, 2011. Temperatures ranged from approximately 36 to 58°F with slight precipitation. 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.
- CH2M HILL biologist Michael Clary conducted terrestrial habitat surveys on April 18 through April 22, 2011. Temperatures ranged from approximately 49 to 76°F. 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 were digitized into the project GIS database.

### 3.3.7 Special-Status Plant Community and Special-Status Species Habitat Assessments

Reconnaissance-level field surveys for the Merced to Fresno Section were standardized with the San Jose to Merced and Fresno to Bakersfield sections so that all sections followed consistent methods. The standardized vegetation community habitat mapping methods are described in the *High-Speed Train Central Valley Biological Resources and Wetlands Survey Plan*, prepared by URS Corporation, CH2M HILL, and ICF Jones and Stokes (2010).

Special-status plant community and special-status species assessments consisted of field surveys to identify and map special-status plant communities, including jurisdictional waters, and potential special-status plant and wildlife habitat, including both terrestrial and aquatic habitats.

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 1996), and the *Guidelines for Assessing the Effects of Proposed Projects on Rare, Threatened, and Endangered Plants and Natural Communities* (CDFG 2009d). In addition, where applicable, surveys for the two federally listed species, San Joaquin woolly-threads (*Monopolies congdonii*) and California jewelflower (*Caulanthus californicus*), complied with supplemental guidance provided in *General Rare Plant Survey Guidelines* and the *Supplemental Survey Methods* (ESRP 2002).

Communities and habitat were mapped using the plant and wildlife habitat descriptions presented in *A Guide to Wildlife Habitats of California* (CDFG 1988), which are used in the California Wildlife Habitat Information System (CDFG 2009c). Field maps of the habitat study area were created at a scale of 1:4800. The habitat study area was overlaid onto aerial photographs with major roads, geographic features, and other notable landmarks to help orient survey teams and provide a reference for estimating the location of plant and wildlife habitats, special-status resources, and wildlife movement corridors.

Assessments of the habitat study area were conducted on properties where access had been granted and, to the extent possible, from publicly accessible roadways where property access had not been granted. In areas where the habitat study area was not accessible or visible from the roadway, biologists used other available resources, including aerial photography, to assess natural communities. In these instances, high-resolution aerial imagery signatures that were continuous between the study area and an

accessible roadway were presumed to be consistent. Imagery signatures that were not continuous with an accessible roadway were presumed to match similar nearby signatures.

Sensitive natural communities including riparian boundaries and potential jurisdictional waters were identified and mapped on aerial photographs during the assessments. After field work was completed, hand-drawn locations of plant and wildlife habitats and observations of special-status species, their key habitat elements, any identified wildlife movement corridors, or special plant and wildlife notes were digitized, and Global Positioning System (GPS)-collected data were downloaded and imported into the GIS database. Hydrologic connectivity of both the constructed and natural drainage features was evaluated using a combination of aerial photographs and USGS 7.5-minute topographic quad maps.

Where possible, jurisdictional waters habitat assessments were conducted by walking portions of drainage channels within the habitat study area. Field data characterizing adjacent riparian vegetation and channel characteristics were collected at each crossing location. Riparian vegetation characterization noted dominant and subdominant vegetation per vegetative strata within the channel and along the edges of the channel for each crossing location. Channel characterization included channel type and dimensions, substrate, and apparent flow regime (perennial, intermittent, ephemeral). The width and depth of ordinary high-water flows were determined based on field observations of indicators such as shelving, destruction of terrestrial vegetation, scour, presence of litter and debris, and water staining among others included in the USACE Regulatory Guidance Letter No. 05-5 (USACE 2005). In many areas, access was limited or not possible, and natural drainage features were evaluated instead from the nearest public road or other accessible location upstream and/or downstream of the habitat study area. Because aquatic habitat is also mapped in the wetland delineation report, preliminary mapped features from that study were used to calculate aquatic habitat areas.

The plant and wildlife habitat assessment consisted of the following activities:

- Mapped and verified wildlife habitats based on vegetation communities identified in the California Gap Analysis Project (University of California-Santa Barbara 2002).
- Reviewed and made initial identifications of potential wetlands and waters of the U.S., waters of the state, and state streambeds.
- Mapped sensitive natural communities and habitats that may be suitable for special-status plant and wildlife species.
- Confirmed, identified, and described known or previously unreported suitable plant and wildlife habitats.
- Mapped special-status plant and wildlife habitat elements as identified in the prefield investigation.
- Identified and mapped locations of observed special-status plant and wildlife species.

All observed wildlife species (regardless of listing status) were identified to the species level and recorded according to nomenclature found in *A Complete List of Amphibian, Reptile, Bird and Mammals Species in California* (CDFG 2008). For portions of the habitat study area where designated critical habitat units were identified, the presence of primary constituent elements (physical and biological landscape elements necessary for species survival and reproduction) were noted.

### 3.3.7.1 Sensitive Natural Communities

Both the List of California Terrestrial Natural Communities Recognized by the CNDDDB (CDFG 2003) and the List of Vegetation Alliances (CDFG 2009b) were used to identify sensitive natural communities within the habitat study area. Based on the two lists, communities within the habitat study area were considered sensitive or high inventory priority if they were designated with asterisks on the List of California Terrestrial Natural Communities Recognized by the CNDDDB (CDFG 2003) and/or if they are ranked with a G1 through G3 on the List of Vegetation Alliances (i.e., considered vulnerable, imperiled, or critically

imperiled throughout their range). Additionally, any jurisdictional waters and riparian communities subject to federal and state regulations are considered sensitive natural communities within this report.

### 3.3.7.2 Special-Status Plant Habitat

To identify potential habitat for the 36 special-status plant species identified in the regional area, key habitat constituents were mapped during the reconnaissance-level field surveys including natural and seminatural habitats, sensitive natural communities, and other terrestrial habitats with potential to provide suitable special-status plant habitat.

### 3.3.7.3 Invertebrate Habitat

The prefield investigation identified several special-status invertebrate species with a potential to occur in the habitat study area, including aquatic branchiopods (crustaceans in the taxonomic class *Branchiopoda*) associated with vernal pools (a type of seasonally inundated wetland) and one terrestrial insect, valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), that uses a species of shrub for larval habitat.

To refine potentially suitable wildlife habitat for special-status vernal pool branchiopods, key habitat constituents were mapped or recorded during the reconnaissance-level field surveys. Where vernal pool habitat was accessible, soil conditions (such as wetland indicators), topography, and other indicators (such as plant composition) were noted to help determine how long aquatic features retain water throughout the season. Key habitat for the valley elderberry longhorn beetle is the larval host plant Mexican elderberry (*Sambucus* spp.); focused surveys for elderberry plants would be conducted during the special-status plant surveys. Protocol-level surveys for this species were not conducted.

### 3.3.7.4 Fish Habitat

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. At each crossing, habitat features were recorded for one or two representative channel reaches after walking the entire length of channel bound by the habitat study area. For locations where crossings were inaccessible, observations were made from the nearest accessible point(s) upstream and/or downstream. Key channel and habitat features observed included apparent hydrology (i.e., perennial, intermittent, ephemeral), bankfull<sup>1</sup> width, bankfull depth, substrates (e.g., silt, sand, gravel, cobble), and presence of large woody debris. Fish were assumed potentially present if field observations indicated sufficient at least ephemeral hydrology, including any evidence of surface flow during recent wet seasons. No fish sampling was performed.

Watercourses were determined to provide potential habitat for special-status aquatic species if they met one or more of the following criteria:

- Are perennial.
- Meet use attainability analysis standards.
- Are identified as Critical Habitat by NMFS or the USFWS for species of concern.
- Have appropriate riparian cover, substrate, temperature, and passage/connectivity required to support special-status fish species.

### 3.3.7.5 Amphibian and Reptile Habitat

To identify potentially suitable wildlife habitat for special-status amphibian and reptile species, key habitat constituents mapped during the reconnaissance-level field surveys included potential breeding pools (e.g., stock ponds, vernal pools and other seasonal wetlands, streams, and canals), creek/stream/river

<sup>1</sup> As cited in Simon and Castro (2003), bankfull discharge is the maximum discharge that can be contained within the channel without overtopping the banks and is generally accepted to represent the flow that occurs, on average, every 1 to 2.3 years.

substrates, refugia habitat (e.g., small mammal burrows), soil conditions (e.g., sandy soils, moist substrates, and alkali soils), vegetation communities (e.g., bush seepweed – iodine bush scrub), topography, watershed boundaries, foraging habitat, and prey base.

### **3.3.7.6 Bird Habitat**

Biologists recorded observations of special-status bird species, evaluated potential nest sites for raptors protected under the MBTA (16 USC 703-712) and CFGC (CFGC 3503.5), and maintained a list of all observed migratory bird species. Bird species were identified based on direct observation, call, song, or diagnostic signs including nest type (size) and pellets. To identify potentially suitable habitat for special-status and migratory bird species, key habitat constituents were mapped during the reconnaissance-level field surveys. These habitat constituents included nesting and roosting habitat (e.g., mature trees, bridges, power lines, and burrows), topography, the presence or absence of vegetative cover, vegetation communities, foraging habitat, and prey base. Diagnostic signs such as fresh whitewash, pellets, castings, feathers, and nests were also recorded and mapped.

### **3.3.7.7 Mammal Habitat**

To identify potentially suitable wildlife habitat for special-status mammal 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). Diagnostic signs of special-status wildlife species such as fresh tracks, scat, and skeletal remains (of target special-status species or prey species) were also recorded and mapped, as feasible.

### **3.3.7.8 Wildlife Movement Corridors**

Free-ranging wildlife species (specifically, mammals such as San Joaquin kit fox, coyote, raccoon, striped skunk, etc.) 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 and supplemented with incidental field observations (where access was permitted) to determine their utility as movement corridors for wildlife on both a local and a regional population level. This literature review identified areas such as creeks and other drainages in the habitat study area that wildlife may use as movement corridors.

## **3.3.8 Special-Status Wildlife Species Occurrence Potential**

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

### **3.3.8.1 No Potential**

Special-status species with no potential to occur include those with no current or historic range in the habitat study area, and with no habitat present in the habitat study area. Several special-status fish species, (e.g., delta smelt; see Appendix C-1, C-2), were identified within the regional area but were determined not to have potential to occur within the habitat study area. Species determined to have no potential to occur or that are unlikely to occur in the study area are addressed in Appendix C-1, C-2 but are not discussed further in this report. Definitions for potential are provided below. Species with future, low, moderate or high potential to occur in the habitat study area are discussed in Section 5.

### **3.3.8.2 Future Potential**

Several special-status fish species that currently have no potential to occur may have a low to moderate potential to occur following the San Joaquin River Restoration Program, which is anticipated to be

completed before construction of the Merced to Fresno HST Section Project. These species are considered to have a future potential to occur in the habitat study area.

### 3.3.8.3 Unlikely Potential

Special-status species with an unlikely potential to occur in the habitat study area include those reported to have a current or historic range in the regional area, but either a) have no potentially suitable habitat identified within the habitat study area; b) are presumed to be extirpated from the habitat study area; or, c) have a current range that is well documented not to include the habitat study area.

### 3.3.8.4 Low Potential

Special-status species with low potential to occur include those with either a) a potential current range and low or marginal quality (i.e., disturbed, fragmented, or otherwise degraded) habitat identified in the habitat study area; or b) a potential historic (but not current) range and habitat of any quality within the habitat study area.

### 3.3.8.5 Moderate Potential

Special-status species with moderate potential to occur include those with potential current range and moderate quality habitat in the habitat study area.

### 3.3.8.6 High Potential

Special-status species with high potential to occur include those reported as presumed extant, observed, or otherwise expected (i.e., professional opinion or other documentation) to occur in the habitat study area.

## 3.4 Wetland Delineations

Wetlands and waters of the U.S. were delineated using a combination of field surveys and aerial imagery mapping. Wetland types were classified according to *A Hydrogeomorphic Wetland Classification for Wetlands* (USACE 1993) and the *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979). Information from the wetland delineation will be used to obtain a Preliminary Jurisdictional Determination (JD) from USACE. A preliminary JD is "preliminary" in the sense that a recipient of a preliminary JD can later request and obtain an approved JD from the USACE if that becomes necessary or appropriate during the permit process or during the administrative appeal process (USACE 2008a). A permittee can identify impacts, compensatory mitigation requirements, and other resource protection measures with a preliminary JD, because the USACE will treat all waters and wetlands that would be affected in any way by the permitted activity on the site as if they are jurisdictional waters of the U.S. (USACE 2008a).

### 3.4.1 Field Methods

Wetland delineation field surveys were conducted on four occasions in April and May 2010 and in January and February 2011, generally between 7 a.m. and 5 p.m. Field delineations were conducted on parcels of land where access had been granted to the wetland resource study area. Surveys only included those parcels where suitable habitat was present. Developed parcels and urban areas were not included in the survey. The wetland delineation was completed following guidance provided in the *Corps of Engineers Wetlands Delineation Manual* (USACE 1987) and *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (USACE 2008b).

The following provides brief descriptions of staff and field conditions:

- CH2M HILL biologists Russell Huddleston, Michael Clary, Deborah Waller, and Gretchen Herron conducted wetland and waters field surveys on April 26 through 29, 2010. Temperatures ranged from

approximately 44 to 86°F with occasional light winds and trace precipitation on April 28. Terrestrial habitat surveys for the majority of the BNSF alternative were also completed at this time.

- CH2M HILL biologists Deborah Waller and Russell Huddleston conducted additional wetlands and waters field surveys on May 24 through May 26, 2010. Temperatures ranged from approximately 60 to 88°F with no precipitation.
- CH2M HILL biologists Gretchen Herron, Morgan King, Steve Long, Victor Leighton, Yolanda Molette, and Michael Clary conducted wetlands and waters field surveys from February 7 through 10, 2011.
- CH2M HILL biologists Gretchen Herron, Morgan King, Steve Long, Victor Leighton, Yolanda Molette, and Michael Clary conducted wetlands and waters field surveys from January 25 through January 28, 2011.

The primary objective of these surveys was to characterize and delineate wetlands and waters on accessible parcels.

### **Aerial Imagery Mapping Methods**

Most of the jurisdictional waters identified in the wetland resource 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 resource study area were identified and digitized using GIS technology.

Aerial imagery (Mapcon Mapping, Ltd. 2007 and Google Earth 2010) was used to identify wetland and other waters of the U.S. present in the study area. Wetland 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; 30cm 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).

The Mapcon Mapping, Ltd. 2007 imagery dataset was selected for project use based on adequate project area coverage, higher quality resolution, and imagery collection during the wet season (February and March). Wet season imagery is preferred in identifying the maximum extent of wetlands and waters signatures on the landscape. Precipitation preceding February fly dates (2007) was 51% of normal. However, the imagery reviewed from other vintages was not considered to contain better representation of wetland signatures because those images were collected during the drier portions of the growing season, contained lower quality resolution, or had insufficient coverage of the project area. Aerial imagery sources reviewed prior to selection of the 2007 imagery (Mapcon Mapping, Ltd.) include:

- 2007 50cm aerial photography – Collected in June and July of 2007.
- 2009 1m aerial photography – Collected in June of 2009.
- 2009 30cm aerial photography – Collected from March to June of 2009.

### 3.5 Special-Status Plant Survey Methods

This section provides a summary of methods used to survey for special-status plants. A more detailed survey methodology is discussed in the *Special-Status Plants Survey Report Merced to Fresno Section* (Authority and FRA 2011b). Special-status plant surveys were conducted in late March, late April, and late May 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 1996), and the *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFG 2009a).

Botanical surveys were floristic in nature, meaning that all observed plants species regardless of listing status were identified to the level necessary to determine whether they were a special-status species. Species were identified and recorded according to nomenclature found in the *Jepson Manual: Higher Plants of California* (Hickman 1993). Surveys were timed after reviewing reference sites and weather trends to conduct plant surveys within the appropriate phenological (blooming) period(s).

The *Special-Status Plants Survey Report Merced to Fresno Section* (Authority and FRA 2011b) includes a complete discussion of methods for these studies.

### 3.6 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. The plant community and cover type mapping units were then overlaid on construction footprint maps using geographic information system (GIS) applications.

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. 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 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 study area.

#### 3.6.1 Methods for Evaluating Impacts 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 consideration of context. Beneficial effects are identified and described. When there is no measurable effect, impact is found not to occur. Intensity of adverse effects is summarized as the degree or magnitude of a potential adverse effect where the adverse effect is thus determined to be

negligible, moderate, or substantial. It is possible that a significant adverse effect may still exist when on balance the impact is negligible or even beneficial. For biological resources and wetlands, the terms are defined as follows:

*Negligible* impacts 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. *Moderate* impacts are defined as incremental regional effects and measurable adverse loss to terrestrial/aquatic plant communities, jurisdictional waters/wetlands, special-status species, or wildlife movement. *Substantial* impacts are influential regional effects and relatively high intensity loss to terrestrial/aquatic plant communities, jurisdictional waters/wetlands, special-status species or wildlife movement.

### 3.6.2 CEQA Significance Criteria

According to CEQA Guidelines, Appendix G, 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, but not limited to, vernal pool, coastal and valley freshwater marsh, etc.) through direct removal, filling, hydrological interruption, 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 HCP, Natural Communities Conservation Plan (NCCP), or other approved local, regional, or state habitat conservation plans.

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 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 from excessive noise eliciting a negative response and avoidance behavior.

## 4.0 Results: Environmental Setting

This section includes the physical and biological conditions identified during prefield investigations and reconnaissance-level surveys in the wetland resource study area, as well as habitats of concern and special-status plant and animal species known to have suitable habitat within the regional area.

### 4.1 Existing Physical and Biological Conditions

The existing physical and biological conditions pertinent to the biological resources and jurisdictional waters analysis include geology, ecoregion, climate, terrestrial and aquatic habitats, wetlands and waters, and plants and wildlife observed during the field surveys.

This section includes the physical and biological conditions identified during prefield investigations and field surveys, including habitats of concern and special-status plant and animal species with potential to occur in the regional area.

#### 4.1.1 Physical Conditions

##### 4.1.1.1 Geomorphic Province and Ecological Subregion

The proposed Merced to Fresno HST Project is located within the Great Valley Geomorphic Province and Ecological Subregion. Portions of the project within the Great Valley Ecological Subregion occur in three ecological subsections: Manteca-Merced Alluvium, Hardpan Terraces, and the Granitic Alluvial Fans and Terraces (Miles and Goudey 1998).

The Manteca-Merced Alluvium ecological subsection occurs on the alluvial fans of streams that travel from the Sierra Nevada Mountains to the San Joaquin River. The alluvium deposits are predominantly derived from the erosion of granitic rock from the southern Sierra Nevada region (Miles and Goudey 1998).

The Hardpan Terraces ecological subsection is characterized by very gently to gently sloping terraces that are interspersed with alluvial fans along streams that transport sediments from the Sierra Nevada region to the Sacramento and San Joaquin rivers. This subsection contains mostly Pleistocene alluvium derived from volcanic, granitic, sedimentary, and metamorphic rock sources (Miles and Goudey 1998).

The Granitic Alluvial Fans and Terraces ecological subsection includes the alluvial fans and terraces on the eastern side of San Joaquin Valley. The fans and terraces in this area were derived predominantly from granitic alluvium originating in the southern Sierra Nevada (Miles and Goudey 1998).

##### 4.1.1.2 Climate

The Mediterranean climate typical of the regional area consists of cool, wet winters and hot, dry summers. Mean annual temperatures range from a low of 36°F in December to a high of 98°F in July (Western Regional Climate Center [WRCC] 2009). The growing season (defined as a 50% probability of temperatures at or above 32°F) ranges from 261 days (March 3 to November 19) for Merced to 300 days (February 5 to December 1) for Fresno (NRCS 2002). Average annual precipitation is approximately 12.5 inches in the northern part of the habitat study area near Merced and approximately 11.0 inches to the south, near Fresno (WRCC 2009). Eighty percent of the annual rainfall occurs between November and March.

Elevation above mean sea level in the habitat study area ranges from 160 feet near downtown Merced to 300 feet north of downtown Fresno. The topography throughout the habitat study area is generally flat with slopes ranging from 0% to 2%. Drainage generally flows to the west and southwest.

### 4.1.2 Biological Conditions

Historically, the Central Valley was characterized by California prairie, marshlands, valley oak (*Quercus lobata*) savanna, and extensive riparian woodlands (Hickman 1993). Today, more than 80% of the land is covered by farms and ranches (NRCS 2006). Urban areas within or near the habitat study area include the communities of Atwater, Merced, Le Grand, Chowchilla, Madera, and Fresno. Based on habitat assessment data, natural vegetation communities are uncommon within the habitat study area and are limited to uncultivated areas supporting California annual grassland and narrow bands of riparian and emergent wetland habitat along the rivers, creeks, and sloughs. Certain areas of terrestrial California annual grassland also support vernal pool aquatic habitat.

Biological conditions discussed in this section are derived from observations conducted within the habitat study area during reconnaissance-level habitat mapping surveys. Acreages of terrestrial and aquatic habitat in the habitat study area are provided in Section 5.

#### 4.1.2.1 Terrestrial Habitats and Land Uses

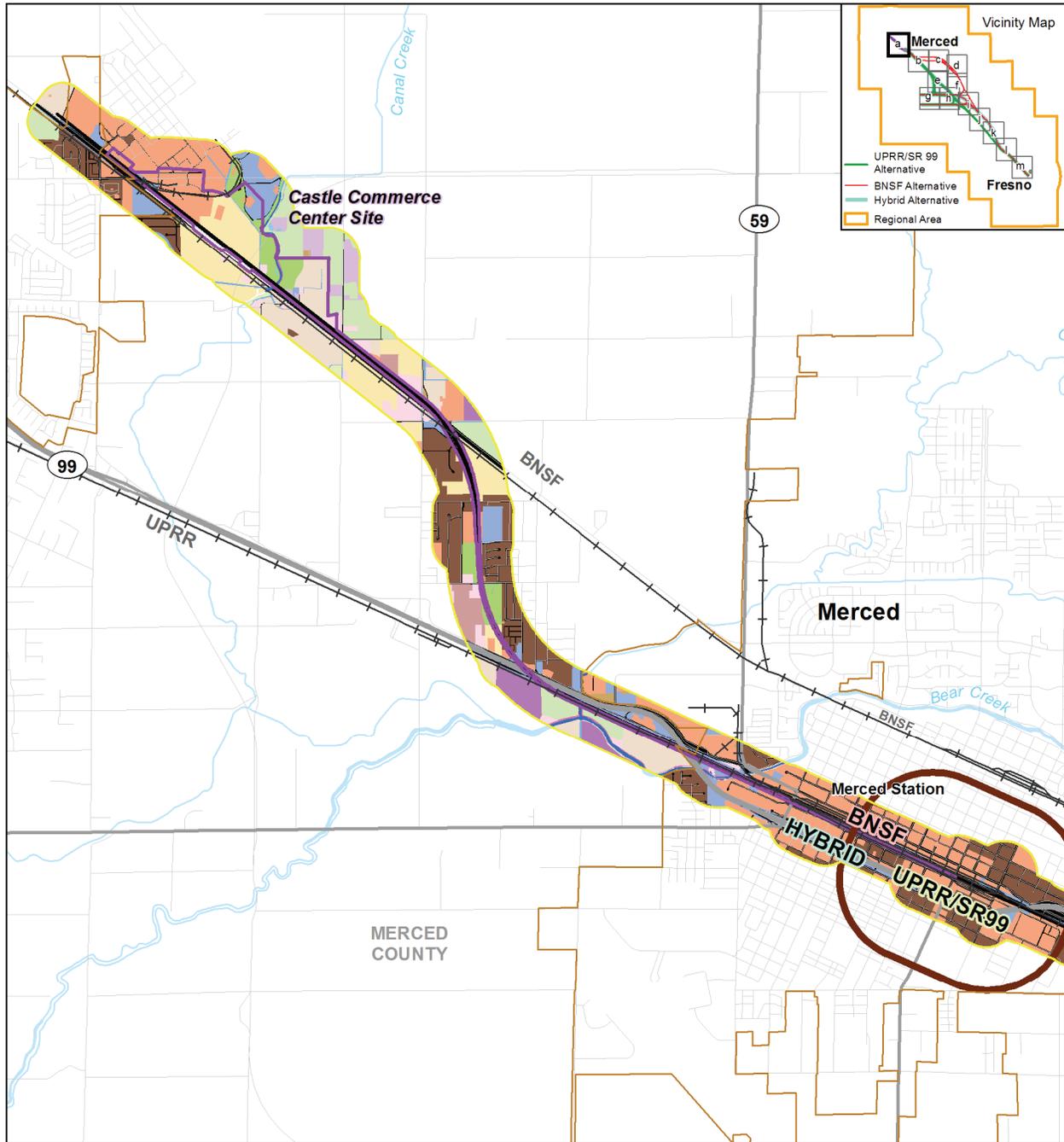
This section discusses the eight types of agricultural lands, five types of developed lands, and five types of natural and seminatural terrestrial habitats mapped in the habitat study area. Due to the level of disturbance observed in all areas of the habitat study area, terrestrial areas do not provide pristine high-quality habitat for special-status species; however, areas of potentially suitable habitat exist that are of a relatively higher quality than other areas. For the purposes of this report, potentially suitable habitat is therefore described as either moderate quality or low quality.

Plant communities and land cover types observed within the habitat study area are illustrated in Figures 4-1 through 4-13 for the Merced, Chowchilla, Madera, and Fresno vicinities, respectively, as indicated in the upper right corner map inset on each figure. The following descriptions of agricultural lands, and developed areas, are based on *A Guide to Wildlife Habitats of California* (Mayer and Laudenslayer 1988). Table 4-1 provides equivalent descriptions of natural and seminatural habitat types from other classification systems including the *Manual of California Vegetation* (Sawyer et al. 2009), *Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland 1986), and *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979).

**Table 4-1**  
 Approximate Relationships of Vegetation Classifications Systems

Terminology for Plant Community Used in this Report	Preliminary Descriptions of the Terrestrial Natural Communities of California (Holland 1986)	Classification of Wetlands and Deepwater Habitats of the United States (Cowardin et al. 1979)	Manual of California Vegetation (Sawyer et al. 2009)	Guide to Wildlife Habitats of California (Mayer and Laudenslayer 1988)
California Annual Grassland	Nonnative Grassland (42200)	No corresponding vegetation type provided.	Amsinckia ( <i>menziesii</i> , <i>tessellata</i> ) Alliance	Annual Grassland
Coastal and Valley Freshwater Marsh	Coastal and Valley Freshwater Marsh (52410)	Palustrine Emergent Wetland	<i>Schoenoplectus californicus</i> Herbaceous Alliance	Fresh Emergent Wetland (FEW)
Eucalyptus Woodlands	No corresponding vegetation type provided.	No corresponding vegetation type provided.	Eucalyptus ( <i>globulus</i> , <i>camaldulensis</i> ) Seminatural Woodland Stands	Eucalyptus (EUC)

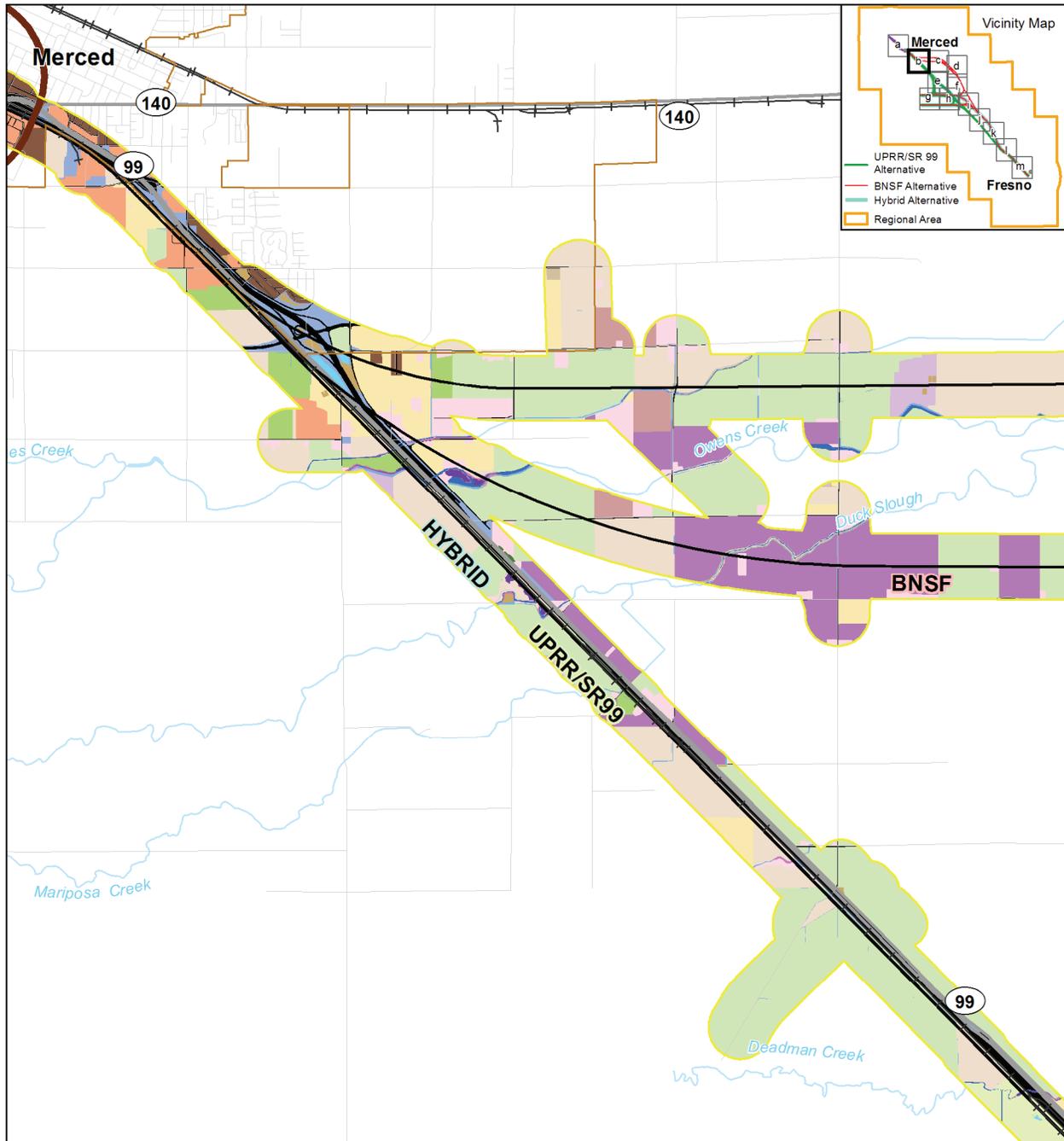
Terminology for Plant Community Used in this Report	Preliminary Descriptions of the Terrestrial Natural Communities of California (Holland 1986)	Classification of Wetlands and Deepwater Habitats of the United States (Cowardin et al. 1979)	Manual of California Vegetation (Sawyer et al. 2009)	Guide to Wildlife Habitats of California (Mayer and Laudenslayer 1988)
Fremont Cottonwood Forested Wetland	Great Valley Cottonwood Riparian Forest	Palustrine Forested Wetland (in part)	<i>Populus fremontii</i> Forest Alliance	No corresponding vegetation type provided.
Great Valley Mixed Riparian Forest	Great Valley Mixed Riparian Forest (61420)	Palustrine Forested Wetland (in part)	<i>Populus fremontii</i> Forest Alliance	Valley Foothill Riparian
Constructed Watercourses	No corresponding vegetation type provided.	No corresponding vegetation type provided.	No corresponding vegetation type provided.	No corresponding vegetation type provided.
Natural Watercourses	No corresponding vegetation type provided.	Riverine	No corresponding vegetation type provided.	Riverine (RIV)
Other Riparian	Central Coast Arroyo Willow Riparian Forest (61230); Great Valley Willow Scrub (63000); Great Valley oak riparian forest (61430)	Palustrine Forested Wetland (in part)	<i>Salix lasiolepis</i> Shrubland Alliance; <i>Rubus armeniacus</i> Seminatural shrubland stands; <i>Quercus lobata</i> Woodland alliance	Fresh Emergent Wetland; Valley Foothill Riparian; Valley Oak Woodland
Ruderal Vegetation	No corresponding vegetation type provided.	No corresponding vegetation type provided.	No corresponding vegetation type provided.	No corresponding vegetation type provided.
Inundated Nonwetlands	No corresponding vegetation type provided.	No corresponding vegetation type provided.	No corresponding vegetation type provided.	No corresponding vegetation type provided.



MF\_TR\_BIO\_31\_a Jul 06, 2011

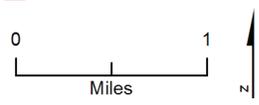


**Figure 4-1**  
 Observed Habitats within Habitat Study Area – Sheet 1 of 13

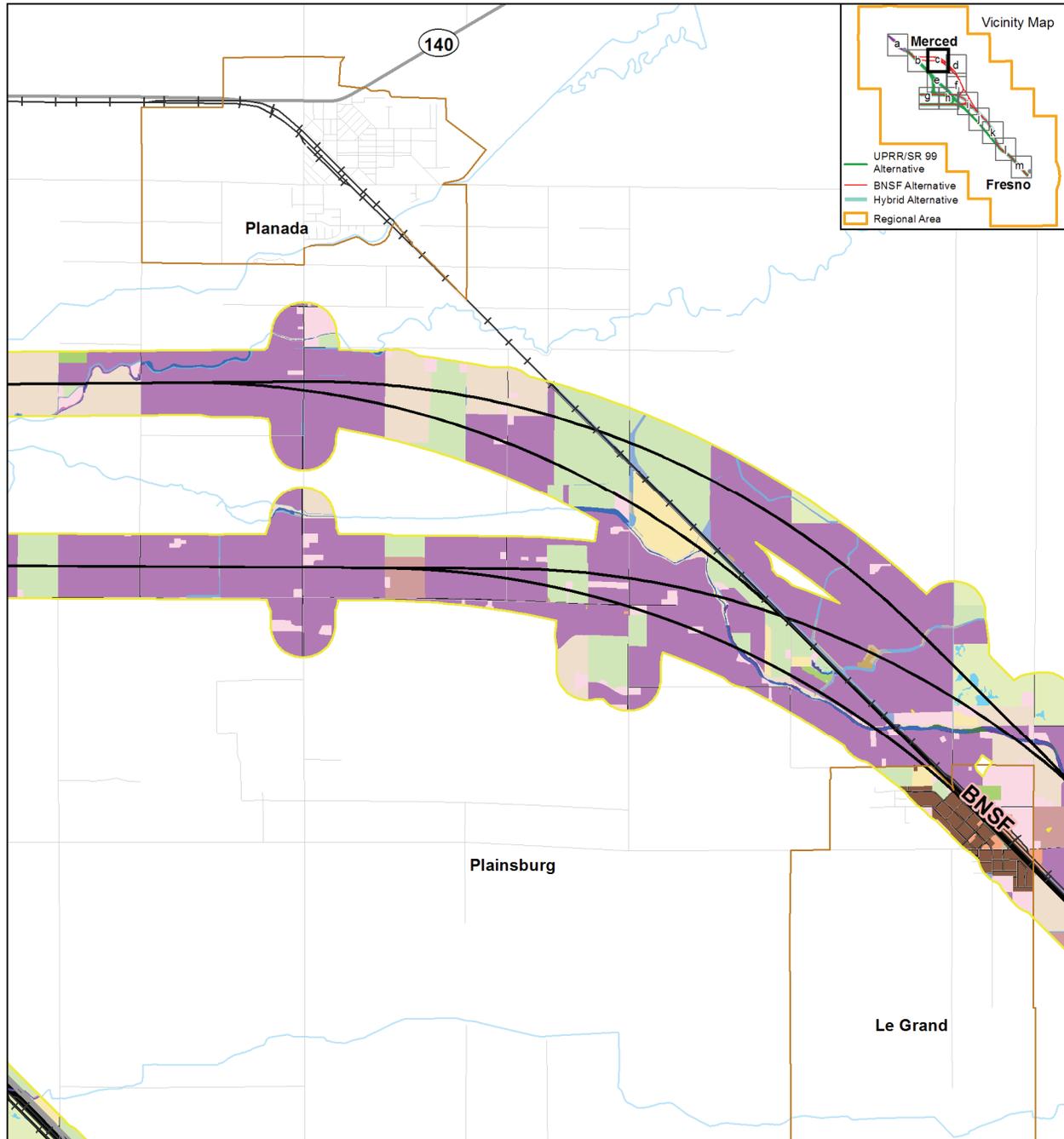


MF\_TR\_BIO\_31\_b Jul 06, 2011

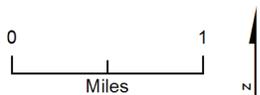
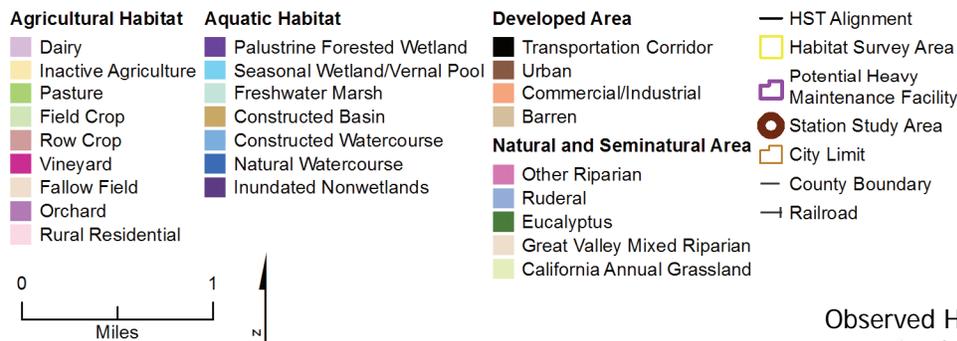
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|---|---|---|--|
| <p><b>Agricultural Habitat</b></p> <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: #d9ead3; border: 1px solid #000; margin-right: 5px;"></span> Dairy</li> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: #fff2cc; border: 1px solid #000; margin-right: 5px;"></span> Inactive Agriculture</li> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: #d9ead3; border: 1px solid #000; margin-right: 5px;"></span> Pasture</li> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: #c6e0b4; border: 1px solid #000; margin-right: 5px;"></span> Field Crop</li> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: #f4cccc; border: 1px solid #000; margin-right: 5px;"></span> Row Crop</li> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: #f4cccc; border: 1px solid #000; margin-right: 5px;"></span> Vineyard</li> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: #fff2cc; border: 1px solid #000; margin-right: 5px;"></span> Fallow Field</li> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: #d9ead3; border: 1px solid #000; margin-right: 5px;"></span> Orchard</li> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: #f4cccc; border: 1px solid #000; margin-right: 5px;"></span> Rural Residential</li> </ul> | <p><b>Aquatic Habitat</b></p> <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: #4f81bd; border: 1px solid #000; margin-right: 5px;"></span> Palustrine Forested Wetland</li> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: #4f81bd; border: 1px solid #000; margin-right: 5px;"></span> Seasonal Wetland/Vernal Pool</li> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: #4f81bd; border: 1px solid #000; margin-right: 5px;"></span> Freshwater Marsh</li> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: #4f81bd; border: 1px solid #000; margin-right: 5px;"></span> Constructed Basin</li> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: #4f81bd; border: 1px solid #000; margin-right: 5px;"></span> Constructed Watercourse</li> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: #4f81bd; border: 1px solid #000; margin-right: 5px;"></span> Natural Watercourse</li> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: #4f81bd; border: 1px solid #000; margin-right: 5px;"></span> Inundated Nonwetlands</li> </ul> | <p><b>Developed Area</b></p> <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: #808080; border: 1px solid #000; margin-right: 5px;"></span> Transportation Corridor</li> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: #808080; border: 1px solid #000; margin-right: 5px;"></span> Urban</li> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: #808080; border: 1px solid #000; margin-right: 5px;"></span> Commercial/Industrial</li> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: #808080; border: 1px solid #000; margin-right: 5px;"></span> Barren</li> </ul> <p><b>Natural and Seminatural Area</b></p> <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: #4f81bd; border: 1px solid #000; margin-right: 5px;"></span> Other Riparian</li> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: #4f81bd; border: 1px solid #000; margin-right: 5px;"></span> Ruderal</li> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: #4f81bd; border: 1px solid #000; margin-right: 5px;"></span> Eucalyptus</li> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: #4f81bd; border: 1px solid #000; margin-right: 5px;"></span> Great Valley Mixed Riparian</li> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: #4f81bd; border: 1px solid #000; margin-right: 5px;"></span> California Annual Grassland</li> </ul> | <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 10px; height: 10px; border-bottom: 1px solid black; margin-right: 5px;"></span> HST Alignment</li> <li><span style="display: inline-block; width: 10px; height: 10px; border: 1px solid yellow; margin-right: 5px;"></span> Habitat Survey Area</li> <li><span style="display: inline-block; width: 10px; height: 10px; border: 1px dashed purple; margin-right: 5px;"></span> Potential Heavy Maintenance Facility</li> <li><span style="display: inline-block; 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|---|---|---|--|



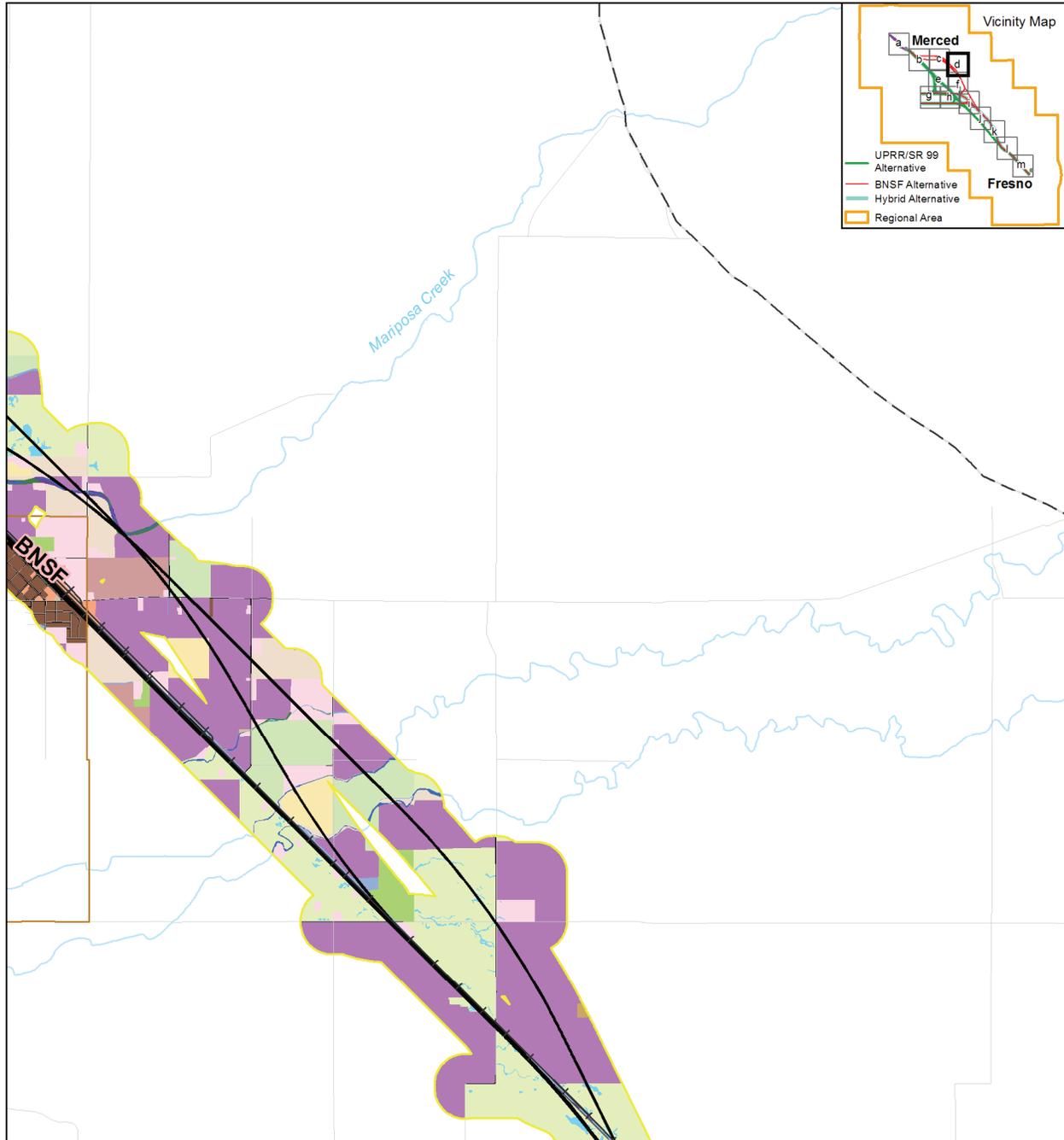
**Figure 4-2**  
 Observed Habitats within Habitat Study Area – Sheet 2 of 13



MF\_TR\_BIO\_31\_c Jul 06, 2011

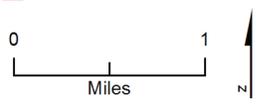


**Figure 4-3**  
 Observed Habitats within Habitat Study Area – Sheet 3 of 13

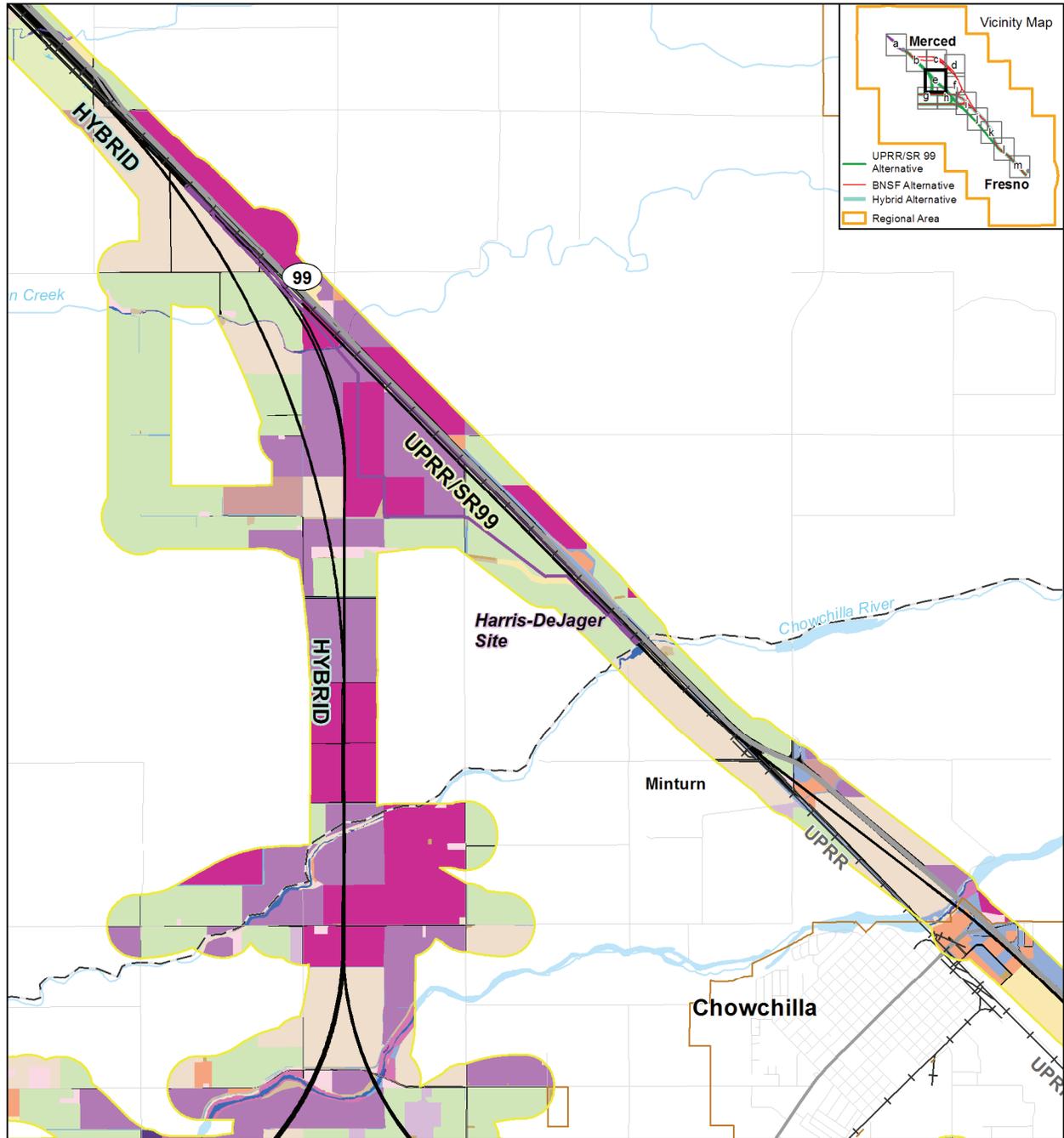


MF\_TR\_BIO\_31\_d Jul 06, 2011

- |                             |                              |                         |                                     |
|-----------------------------|------------------------------|-------------------------|-------------------------------------|
| <b>Agricultural Habitat</b> | <b>Aquatic Habitat</b>       | <b>Developed Area</b>   | <b>Natural and Seminatural Area</b> |
| Dairy                       | Palustrine Forested Wetland  | Transportation Corridor | Other Riparian                      |
| Inactive Agriculture        | Seasonal Wetland/Vernal Pool | Urban                   | Ruderal                             |
| Pasture                     | Freshwater Marsh             | Commercial/Industrial   | Eucalyptus                          |
| Field Crop                  | Constructed Basin            | Barren                  | Great Valley Mixed Riparian         |
| Row Crop                    | Constructed Watercourse      |                         | California Annual Grassland         |
| Vineyard                    | Natural Watercourse          |                         |                                     |
| Fallow Field                | Inundated Nonwetlands        |                         |                                     |
| Orchard                     |                              |                         |                                     |
| Rural Residential           |                              |                         |                                     |

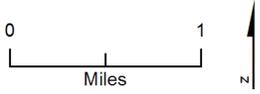


**Figure 4-4**  
 Observed Habitats within Habitat  
 Study Area – Sheet 4 of 13

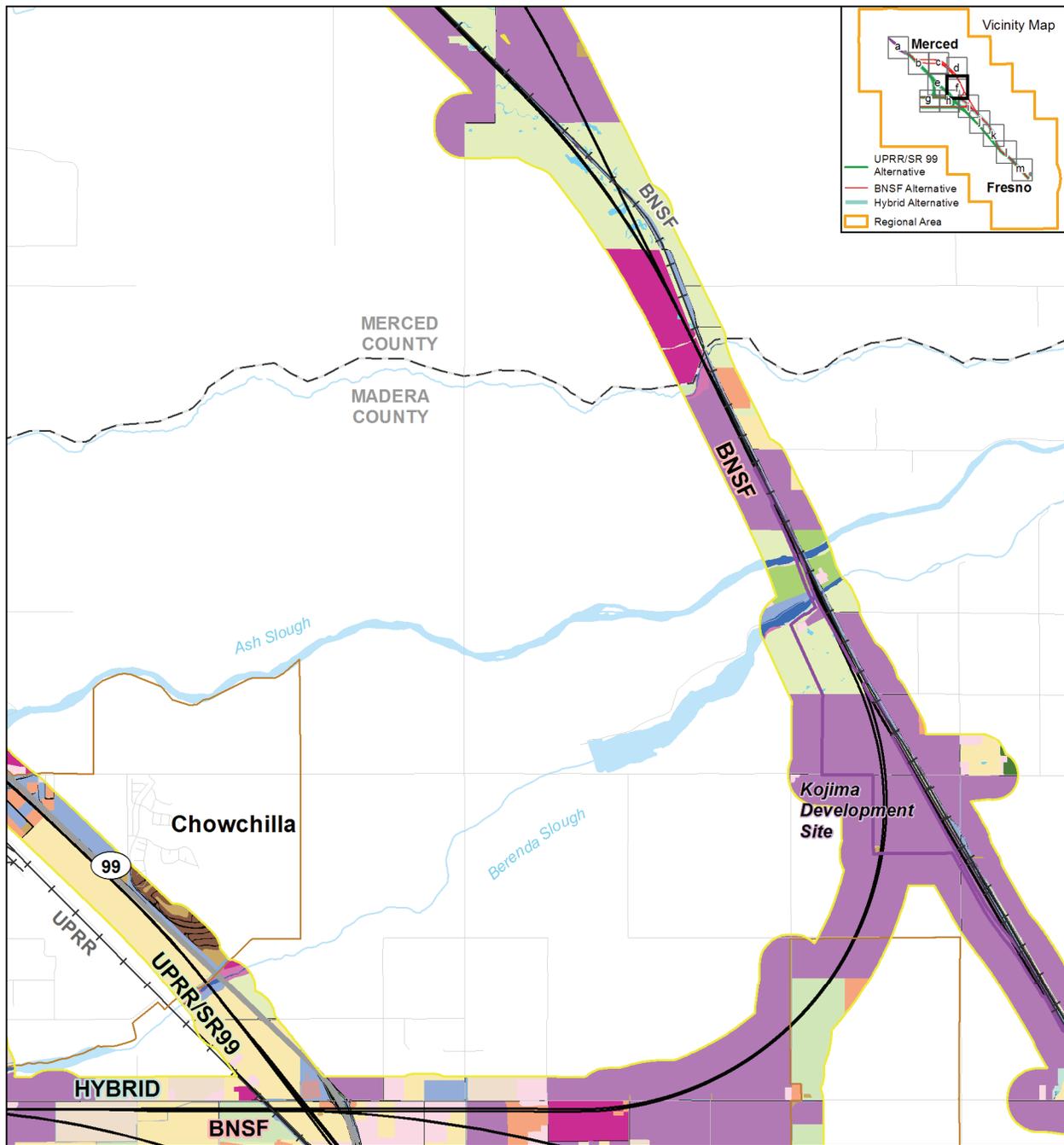


MF\_TR\_BIO\_31\_e Jul 06, 2011

- |                             |                              |                                     |                                      |
|-----------------------------|------------------------------|-------------------------------------|--------------------------------------|
| <b>Agricultural Habitat</b> | <b>Aquatic Habitat</b>       | <b>Developed Area</b>               | <b>Other</b>                         |
| Dairy                       | Palustrine Forested Wetland  | Transportation Corridor             | Habitat Survey Area                  |
| Inactive Agriculture        | Seasonal Wetland/Vernal Pool | Urban                               | Potential Heavy Maintenance Facility |
| Pasture                     | Freshwater Marsh             | Commercial/Industrial               | Station Study Area                   |
| Field Crop                  | Constructed Basin            | Barren                              | City Limit                           |
| Row Crop                    | Constructed Watercourse      | <b>Natural and Seminatural Area</b> | County Boundary                      |
| Vineyard                    | Natural Watercourse          | Other Riparian                      | Railroad                             |
| Fallow Field                | Inundated Nonwetlands        | Ruderal                             |                                      |
| Orchard                     |                              | Eucalyptus                          |                                      |
| Rural Residential           |                              | Great Valley Mixed Riparian         |                                      |
|                             |                              | California Annual Grassland         |                                      |

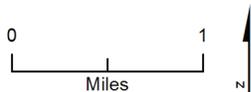


**Figure 4-5**  
 Observed Habitats within Habitat Study Area – Sheet 5 of 13

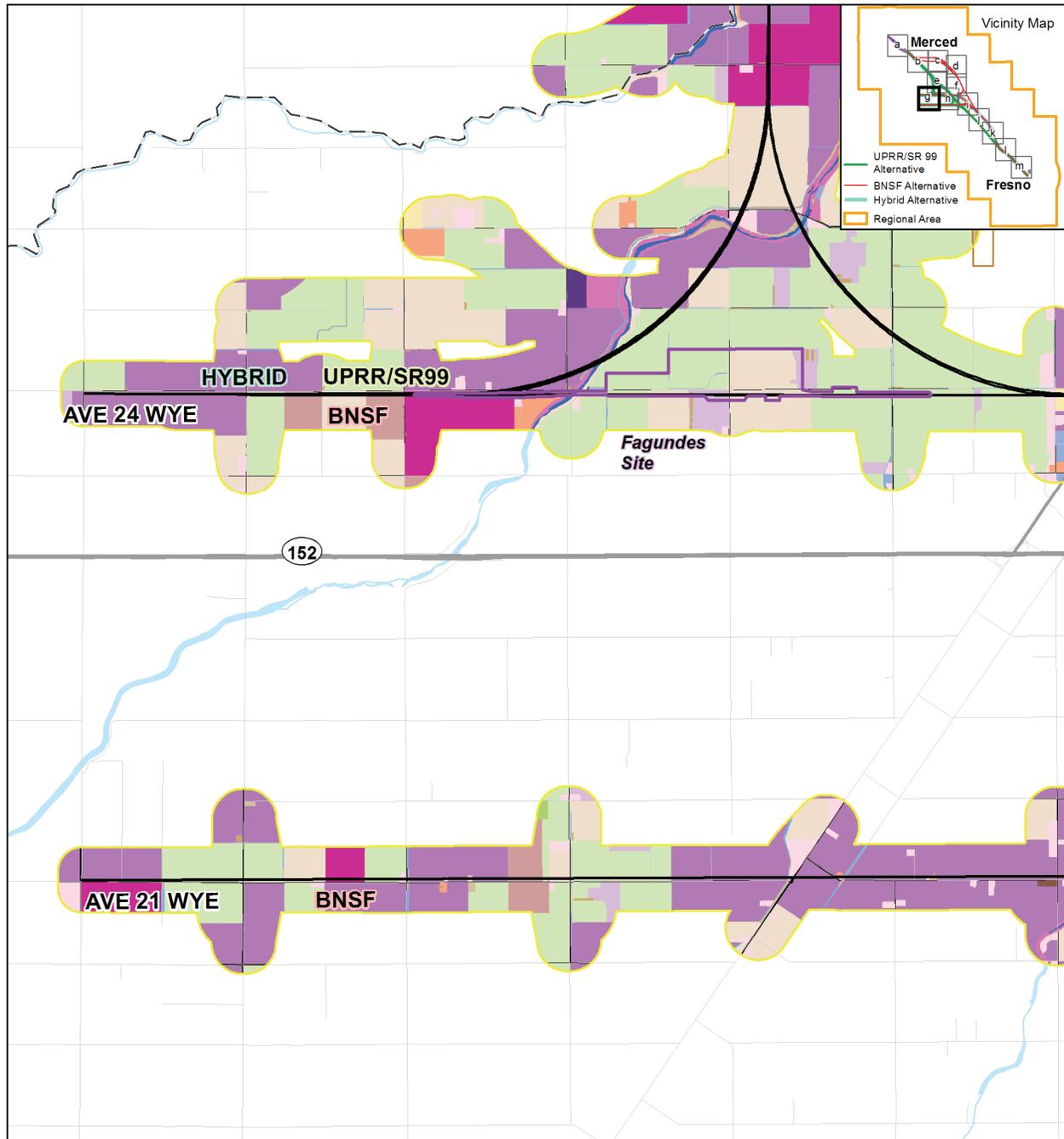


MF\_TR\_BIO\_31\_f Jul 06, 2011

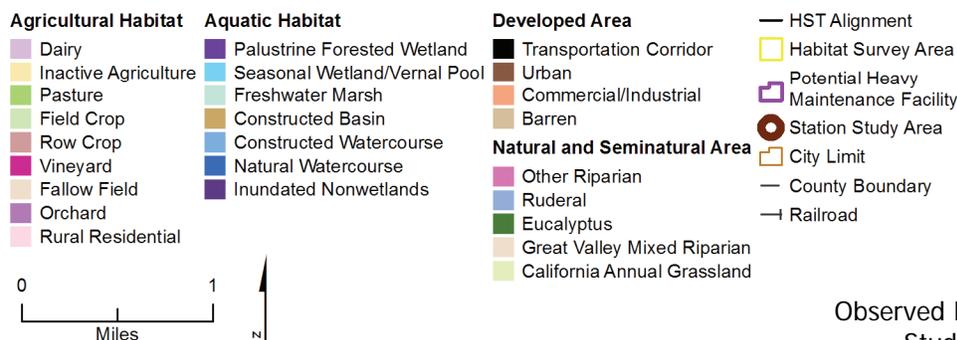
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| <p><b>Agricultural Habitat</b></p> <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #d9ead3; border: 1px solid black; margin-right: 5px;"></span> Dairy</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #fff2cc; border: 1px solid black; margin-right: 5px;"></span> Inactive Agriculture</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #d9ead3; border: 1px solid black; margin-right: 5px;"></span> Pasture</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #d9ead3; border: 1px solid black; margin-right: 5px;"></span> Field Crop</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #d9ead3; border: 1px solid black; margin-right: 5px;"></span> Row Crop</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #d9ead3; border: 1px solid black; margin-right: 5px;"></span> Vineyard</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #d9ead3; border: 1px solid black; margin-right: 5px;"></span> Fallow Field</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #d9ead3; border: 1px solid black; margin-right: 5px;"></span> Orchard</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #d9ead3; border: 1px solid black; margin-right: 5px;"></span> Rural Residential</li> </ul> | <p><b>Aquatic Habitat</b></p> <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #4f81bd; border: 1px solid black; margin-right: 5px;"></span> Palustrine Forested Wetland</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #4f81bd; border: 1px solid black; margin-right: 5px;"></span> Seasonal Wetland/Vernal Pool</li> <li><span style="display: inline-block; 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margin-right: 5px;"></span> Transportation Corridor</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #808080; border: 1px solid black; margin-right: 5px;"></span> Urban</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #808080; border: 1px solid black; margin-right: 5px;"></span> Commercial/Industrial</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #808080; border: 1px solid black; margin-right: 5px;"></span> Barren</li> </ul> <p><b>Natural and Seminatural Area</b></p> <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #808080; border: 1px solid black; margin-right: 5px;"></span> Other Riparian</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #808080; border: 1px solid black; margin-right: 5px;"></span> Ruderal</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #808080; border: 1px solid black; margin-right: 5px;"></span> Eucalyptus</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #808080; border: 1px solid black; margin-right: 5px;"></span> Great Valley Mixed Riparian</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #808080; border: 1px solid black; margin-right: 5px;"></span> California Annual Grassland</li> </ul> | <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; border-bottom: 1px solid black; margin-right: 5px;"></span> HST Alignment</li> <li><span style="display: inline-block; width: 15px; border: 1px solid black; margin-right: 5px;"></span> Habitat Survey Area</li> <li><span style="display: inline-block; width: 15px; border: 1px solid black; margin-right: 5px;"></span> Potential Heavy Maintenance Facility</li> <li><span style="display: inline-block; width: 15px; border: 1px solid black; margin-right: 5px;"></span> Station Study Area</li> <li><span style="display: inline-block; width: 15px; border: 1px solid black; margin-right: 5px;"></span> City Limit</li> <li><span style="display: inline-block; width: 15px; border-top: 1px dashed black; margin-right: 5px;"></span> County Boundary</li> <li><span style="display: inline-block; width: 15px; border-bottom: 1px solid black; margin-right: 5px;"></span> Railroad</li> </ul> |
|--|--|--|--|



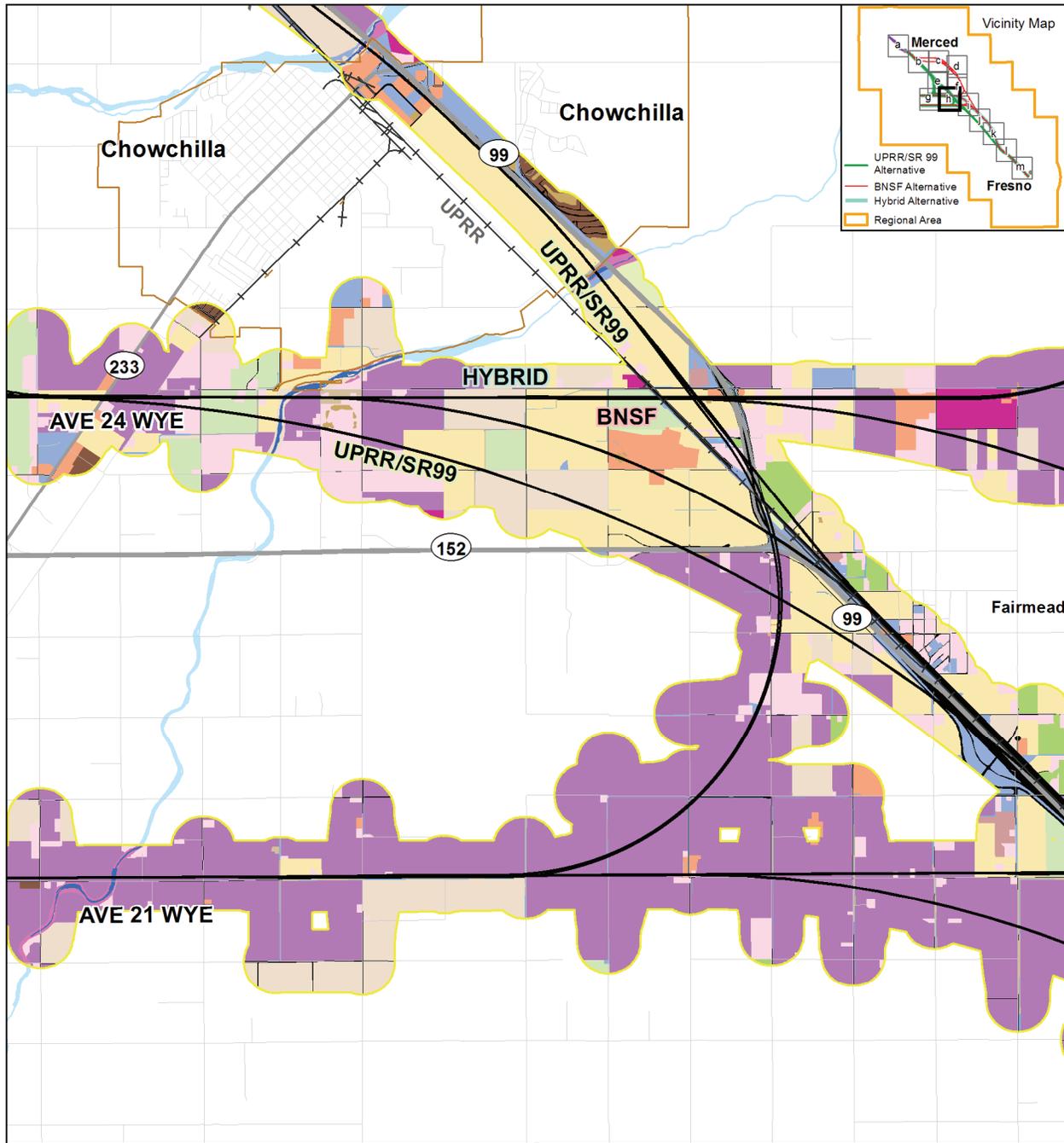
**Figure 4-6**  
 Observed Habitats within Habitat  
 Study Area – Sheet 6 of 13



MF\_TR\_BIO\_31\_g Jul 06, 2011



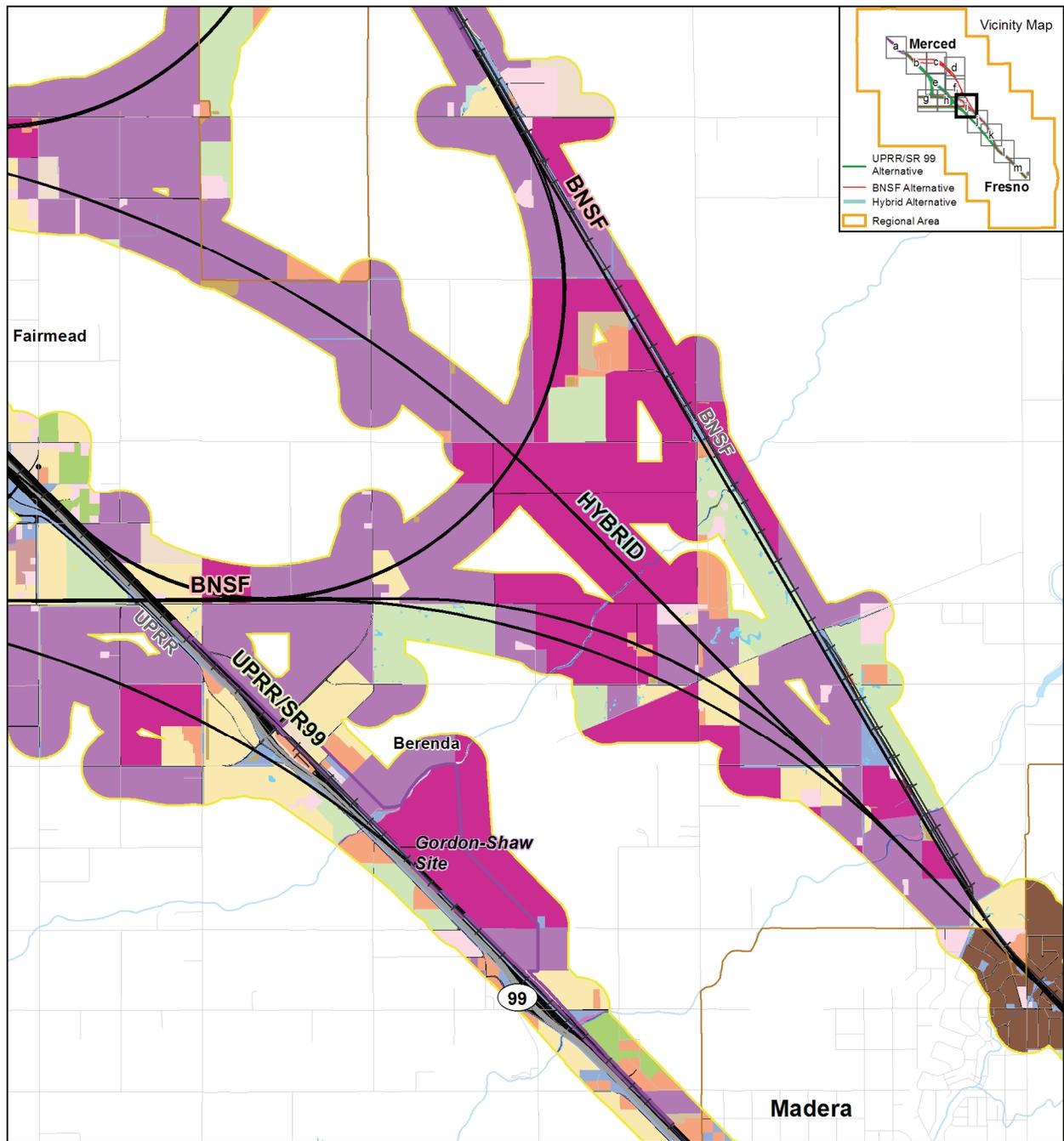
**Figure 4-7**  
 Observed Habitats within Habitat Study Area – Sheet 7 of 13



MF\_TR\_BIO\_31\_h Jul 06, 2011

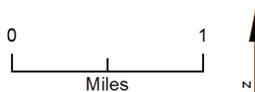


**Figure 4-8**  
 Observed Habitats within Habitat  
 Study Area – Sheet 8 of 13

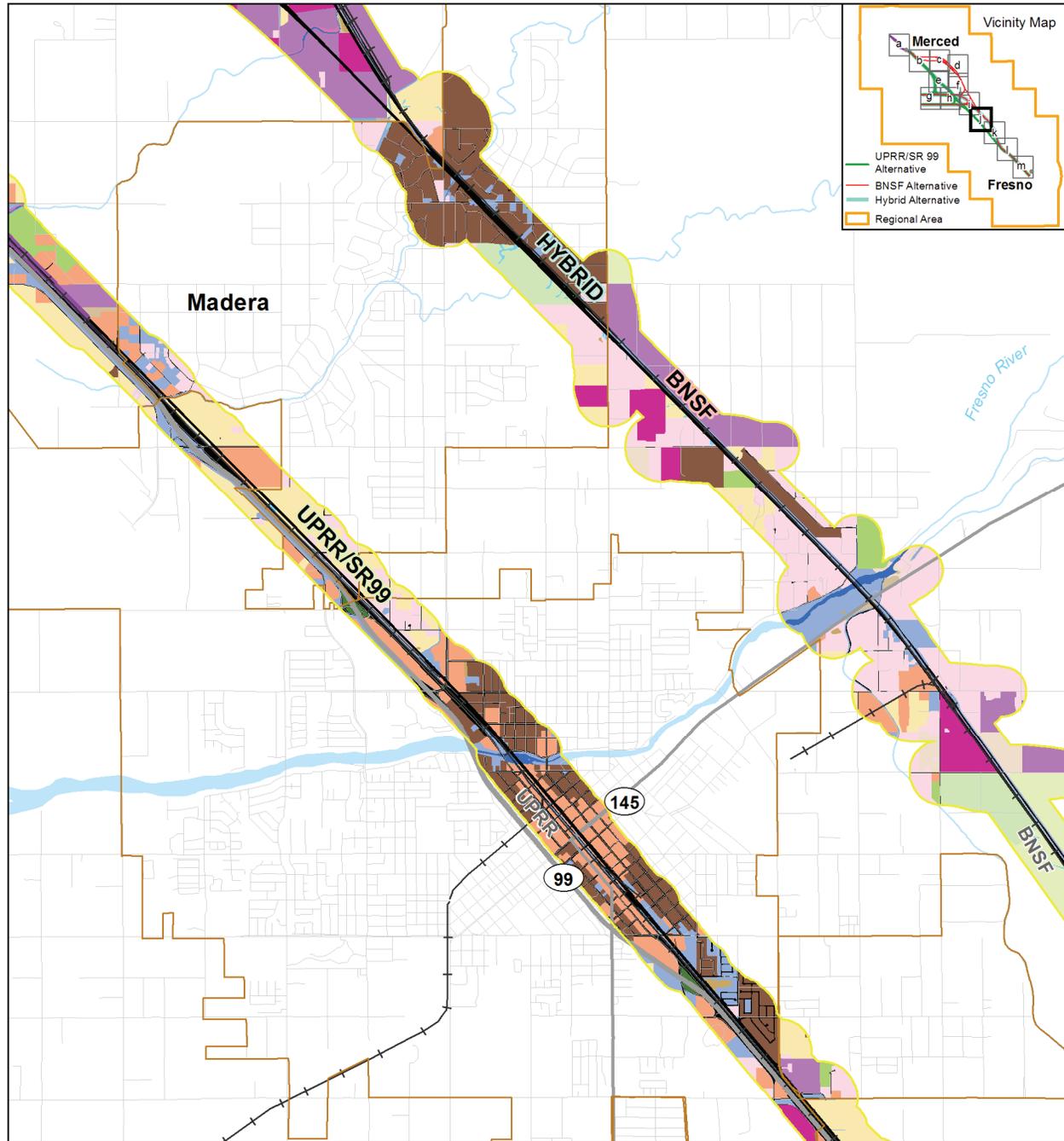


MF\_TR\_BIO\_31\_i Jul 06, 2011

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|---|---|---|--|
| <p><b>Agricultural Habitat</b></p> <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #d9ead3; border: 1px solid #000; margin-right: 5px;"></span> Dairy</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #f4cccc; border: 1px solid #000; margin-right: 5px;"></span> Inactive Agriculture</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #cfe2f3; border: 1px solid #000; margin-right: 5px;"></span> Pasture</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #fce4d6; border: 1px solid #000; margin-right: 5px;"></span> Field Crop</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #f4cccc; border: 1px solid #000; margin-right: 5px;"></span> Row Crop</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #f4cccc; border: 1px solid #000; margin-right: 5px;"></span> Vineyard</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #fce4d6; border: 1px solid #000; margin-right: 5px;"></span> Fallow Field</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #d9ead3; border: 1px solid #000; margin-right: 5px;"></span> Orchard</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #fce4d6; border: 1px solid #000; margin-right: 5px;"></span> Rural Residential</li> </ul> | <p><b>Aquatic Habitat</b></p> <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #4f81bd; border: 1px solid #000; margin-right: 5px;"></span> Palustrine Forested Wetland</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #4f81bd; border: 1px solid #000; margin-right: 5px;"></span> Seasonal Wetland/Vernal Pool</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #4f81bd; border: 1px solid #000; margin-right: 5px;"></span> Freshwater Marsh</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #4f81bd; border: 1px solid #000; margin-right: 5px;"></span> Constructed Basin</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #4f81bd; border: 1px solid #000; margin-right: 5px;"></span> Constructed Watercourse</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #4f81bd; border: 1px solid #000; margin-right: 5px;"></span> Natural Watercourse</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #4f81bd; border: 1px solid #000; margin-right: 5px;"></span> Inundated Nonwetlands</li> </ul> | <p><b>Developed Area</b></p> <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #808080; border: 1px solid #000; margin-right: 5px;"></span> Transportation Corridor</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #808080; border: 1px solid #000; margin-right: 5px;"></span> Urban</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #808080; border: 1px solid #000; margin-right: 5px;"></span> Commercial/Industrial</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #808080; border: 1px solid #000; margin-right: 5px;"></span> Barren</li> </ul> <p><b>Natural and Seminatural Area</b></p> <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #4f81bd; border: 1px solid #000; margin-right: 5px;"></span> Other Riparian</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #4f81bd; border: 1px solid #000; margin-right: 5px;"></span> Ruderal</li> <li><span style="display: inline-block; width: 15px; 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border-radius: 50%; margin-right: 5px;"></span> Station Study Area</li> <li><span style="display: inline-block; width: 15px; border-bottom: 1px solid black; margin-right: 5px;"></span> City Limit</li> <li><span style="display: inline-block; width: 15px; border-bottom: 1px solid black; margin-right: 5px;"></span> County Boundary</li> <li><span style="display: inline-block; width: 15px; border-bottom: 1px solid black; margin-right: 5px;"></span> Railroad</li> </ul> |
|---|---|---|--|

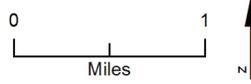


**Figure 4-9**  
 Observed Habitats within Habitat  
 Study Area – Sheet 9 of 13



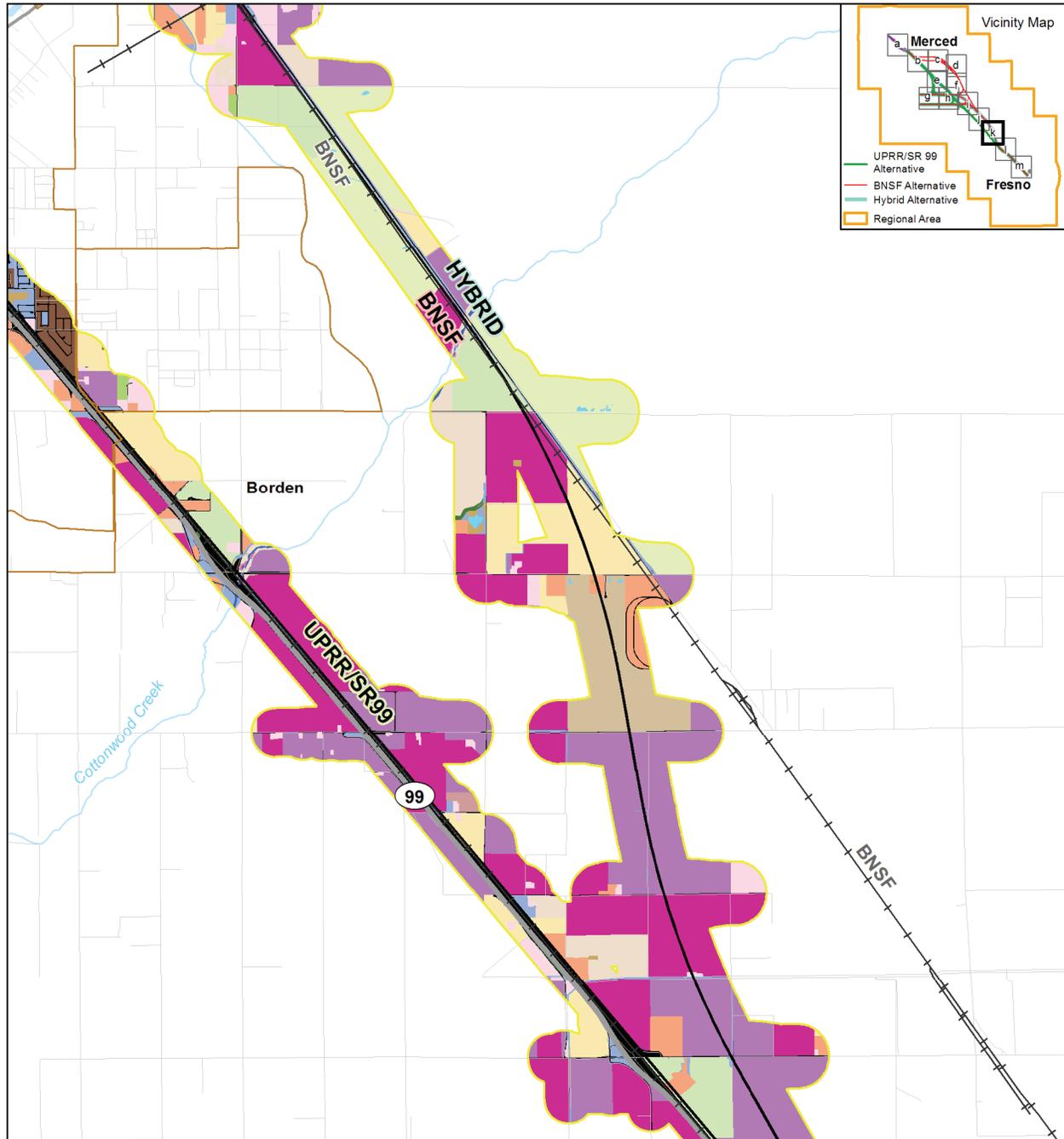
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- |                             |                              |                         |                                     |
|-----------------------------|------------------------------|-------------------------|-------------------------------------|
| <b>Agricultural Habitat</b> | <b>Aquatic Habitat</b>       | <b>Developed Area</b>   | <b>Natural and Seminatural Area</b> |
| Dairy                       | Palustrine Forested Wetland  | Transportation Corridor | Other Riparian                      |
| Inactive Agriculture        | Seasonal Wetland/Vernal Pool | Urban                   | Ruderal                             |
| Pasture                     | Freshwater Marsh             | Commercial/Industrial   | Eucalyptus                          |
| Field Crop                  | Constructed Basin            | Barren                  | Great Valley Mixed Riparian         |
| Row Crop                    | Constructed Watercourse      |                         | California Annual Grassland         |
| Vineyard                    | Natural Watercourse          |                         |                                     |
| Fallow Field                | Inundated Nonwetlands        |                         |                                     |
| Orchard                     |                              |                         |                                     |
| Rural Residential           |                              |                         |                                     |



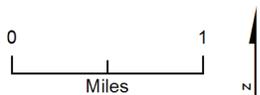
- HST Alignment
- Habitat Survey Area
- Potential Heavy Maintenance Facility
- Station Study Area
- City Limit
- County Boundary
- Railroad

**Figure 4-10**  
 Observed Habitats within Habitat Study Area – Sheet 10 of 13

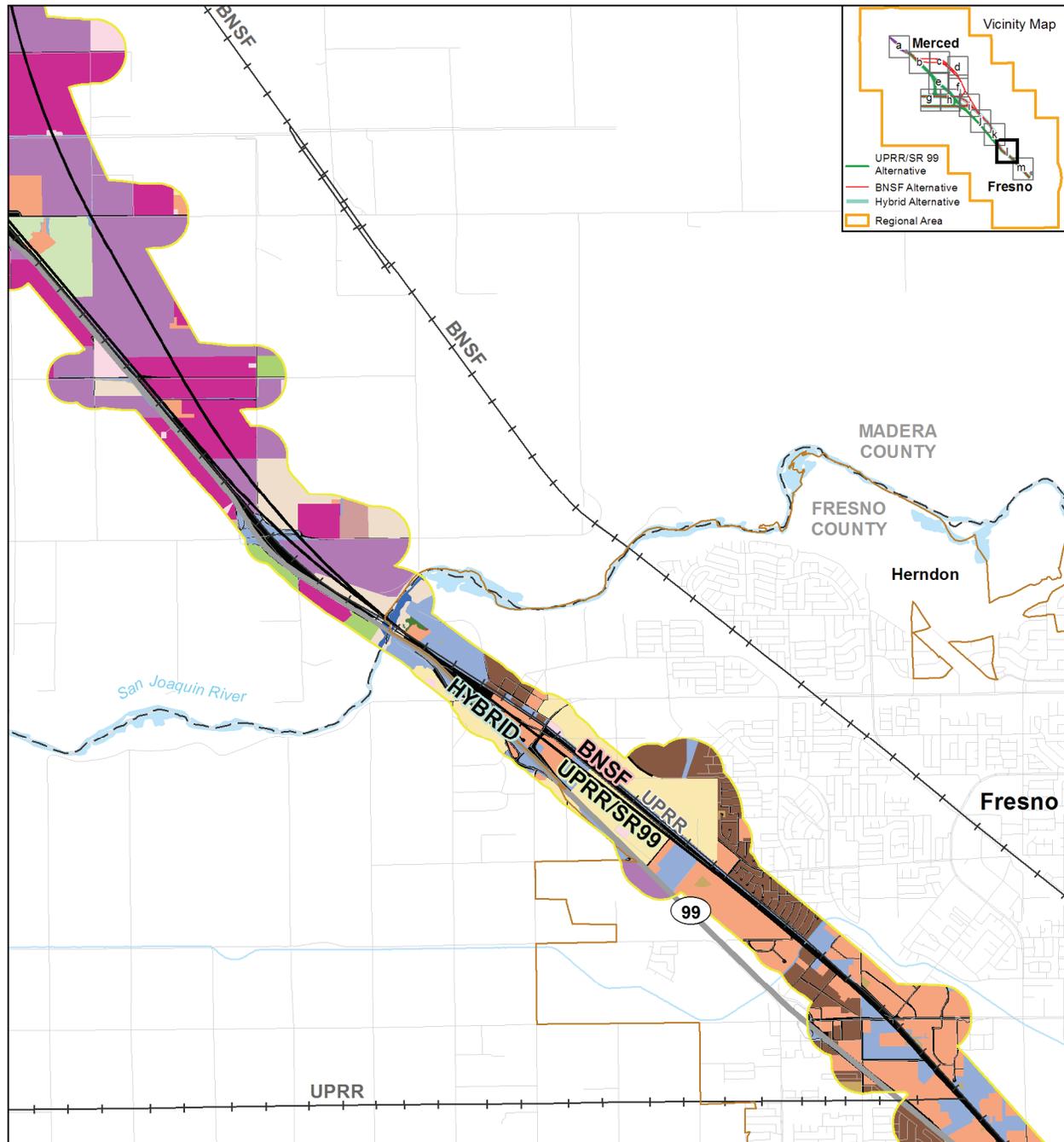


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- |                             |                              |                         |                                     |
|-----------------------------|------------------------------|-------------------------|-------------------------------------|
| <b>Agricultural Habitat</b> | <b>Aquatic Habitat</b>       | <b>Developed Area</b>   | <b>Natural and Seminatural Area</b> |
| Dairy                       | Palustrine Forested Wetland  | Transportation Corridor | Other Riparian                      |
| Inactive Agriculture        | Seasonal Wetland/Vernal Pool | Urban                   | Ruderal                             |
| Pasture                     | Freshwater Marsh             | Commercial/Industrial   | Eucalyptus                          |
| Field Crop                  | Constructed Basin            | Barren                  | Great Valley Mixed Riparian         |
| Row Crop                    | Constructed Watercourse      |                         | California Annual Grassland         |
| Vineyard                    | Natural Watercourse          |                         |                                     |
| Fallow Field                | Inundated Nonwetlands        |                         |                                     |
| Orchard                     |                              |                         |                                     |
| Rural Residential           |                              |                         |                                     |

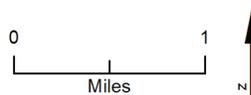


**Figure 4-11**  
 Observed Habitats within Habitat  
 Study Area – Sheet 11 of 13

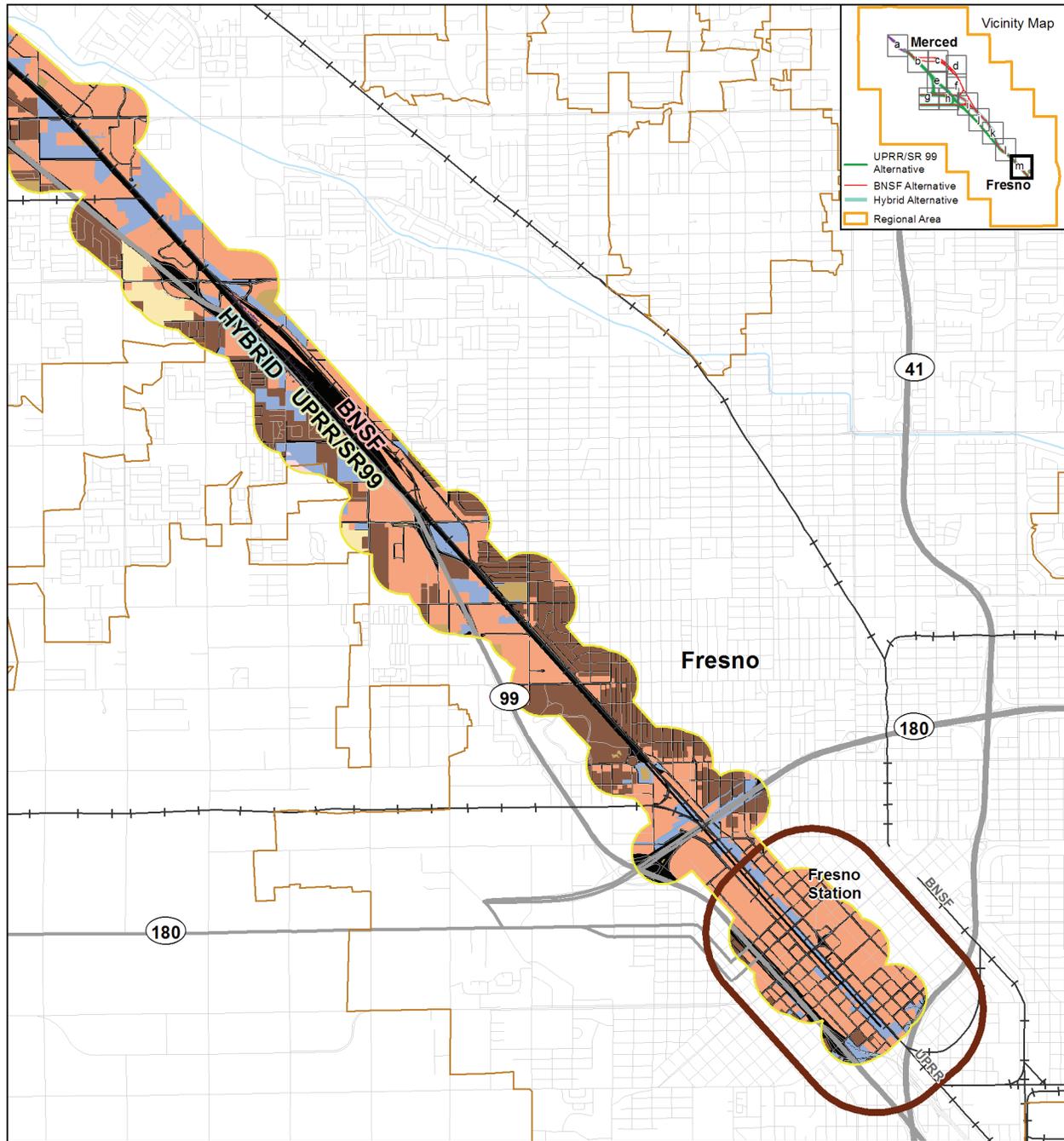


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- |                             |                              |                         |                                     |                                      |
|-----------------------------|------------------------------|-------------------------|-------------------------------------|--------------------------------------|
| <b>Agricultural Habitat</b> | <b>Aquatic Habitat</b>       | <b>Developed Area</b>   | <b>Natural and Seminatural Area</b> | <b>Other Symbols</b>                 |
| Dairy                       | Palustrine Forested Wetland  | Transportation Corridor | Other Riparian                      | HST Alignment                        |
| Inactive Agriculture        | Seasonal Wetland/Vernal Pool | Urban                   | Ruderal                             | Habitat Survey Area                  |
| Pasture                     | Freshwater Marsh             | Commercial/Industrial   | Eucalyptus                          | Potential Heavy Maintenance Facility |
| Field Crop                  | Constructed Basin            | Barren                  | Great Valley Mixed Riparian         | Station Study Area                   |
| Row Crop                    | Constructed Watercourse      |                         | California Annual Grassland         | City Limit                           |
| Vineyard                    | Natural Watercourse          |                         |                                     | County Boundary                      |
| Fallow Field                | Inundated Nonwetlands        |                         |                                     | Railroad                             |
| Orchard                     |                              |                         |                                     |                                      |
| Rural Residential           |                              |                         |                                     |                                      |

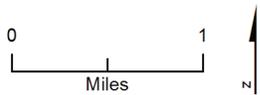


**Figure 4-12**  
 Observed Habitats within Habitat Study Area – Sheet 12 of 13



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- |                             |                              |                         |                                     |                                      |
|-----------------------------|------------------------------|-------------------------|-------------------------------------|--------------------------------------|
| <b>Agricultural Habitat</b> | <b>Aquatic Habitat</b>       | <b>Developed Area</b>   | <b>Natural and Seminatural Area</b> | <b>Legend</b>                        |
| Dairy                       | Palustrine Forested Wetland  | Transportation Corridor | Other Riparian                      | HST Alignment                        |
| Inactive Agriculture        | Seasonal Wetland/Vernal Pool | Urban                   | Ruderal                             | Habitat Survey Area                  |
| Pasture                     | Freshwater Marsh             | Commercial/Industrial   | Great Valley Mixed Riparian         | Potential Heavy Maintenance Facility |
| Field Crop                  | Constructed Basin            | Barren                  | California Annual Grassland         | Station Study Area                   |
| Row Crop                    | Constructed Watercourse      |                         |                                     | City Limit                           |
| Vineyard                    | Natural Watercourse          |                         |                                     | County Boundary                      |
| Fallow Field                | Inundated Nonwetlands        |                         |                                     | Railroad                             |
| Orchard                     |                              |                         |                                     |                                      |
| Rural Residential           |                              |                         |                                     |                                      |



**Figure 4-13**  
 Observed Habitats within Habitat Study Area – Sheet 13 of 13

## **Agricultural Lands**

Agricultural lands account for approximately 75.28% of the land use within the 1,000-foot-radius habitat study area. Orchards, vineyards, fallow fields, row crops and field crops constitute 56% while dairies, pastures, and inactive agriculture constitute an additional 9%. Constructed watercourses and basins associated with agriculture such as canals, drains, and tailwater ponds are discussed in Section 5.1, Jurisdictional Waters. Agricultural lands provide limited plant and wildlife habitat value relative to natural and seminatural habitats as a result of lower species diversity and uniform vegetation structure. Additionally, wildlife species are often regarded as pests and many farmers will actively haze birds and poison animals to reduce crop damage and loss. Vegetation other than the managed crop generally comprises weedy species adapted to high levels of disturbance and is often actively managed with herbicides, mowing, and/or tilling. Sparse annual grasses and weedy forbs may be present within hay fields and along the crop edges; however, because these weeds decrease crop value, these undesirable plants are often eradicated.

The following sections describe the agricultural types identified in the habitat study area.

### ***Orchards***

Almond trees (*Prunus dulcis*) are the most common orchard crop in the habitat study area. Other deciduous orchard crops include pistachios (*Pistacia vera*), walnut trees (*Juglans regia*), fig trees (*Ficus* sp.) and pomegranate trees (*Punica* spp.). Evergreen orchards such as oranges and lemons (*Citrus* spp.) are also present. Orchards consist of monocultures of evenly spaced, generally low bushy trees that are similar in canopy size and tree height. Canopy cover ranges from open to dense depending on the age of the trees, with saplings and young trees having relatively open canopies and older trees providing more closed canopy cover. Depending on management levels, the understory is either devoid of vegetation or comprised of various weedy annual grasses and forbs. Where herbaceous vegetation is present, it is often mowed, sprayed, or tilled to facilitate harvest and conserve water. Most of the orchards in the habitat study area are flood-irrigated.

### ***Vineyards***

Vineyards include cultivated wine, table, and raisin grapes (*Vitis* spp.) grown in evenly spaced rows that are variable in canopy cover depending on the age and growth of the vines. The understory vegetation is variable depending on management practices. In some vineyards, herbaceous vegetation is nearly absent and in other areas weedy annual grasses and forbs are common. Where herbaceous vegetation is present, it is often managed with herbicides, mowing, and/or tilling. Flood and drip methods are most commonly used to irrigate the vineyards in the habitat study area.

### ***Field Crops***

Field crops consist of monocultures that are intensely managed and frequently harvested and replanted, often on a seasonal rotational basis. Field crops include dry land grain crops and irrigated hay crops. Dry land grain crops include nonirrigated annual grass crops such as wheat (*Triticum* spp.), barley (*Hordeum* spp.), and rye (*Secale cereale*). Other annual grasses and herbaceous weeds are frequently interspersed along the margins of dry crop fields. Common irrigated hay crops include species such as timothy (*Phleum pratense*), oats (*Avena* spp.), orchard grass (*Dactylis glomerata*), millet (*Panicum miliaceum*), red clover (*Trifolium pratense*), and alfalfa (*Medicago sativa*). Within the habitat study area, these crops are planted as monocultures in large, predominantly flood-irrigated fields. Irrigated hay crops are common throughout the habitat study area and are often associated with dairy farms as they are grown as silage.

### ***Row Crops***

Irrigated row crops in the San Joaquin Valley include sweet potatoes (*Ipomoea batatas*), cotton (*Gossypium herbaceum*), tomatoes (*Solanum lycopersicum*), lettuce (*Lactuca* spp.), beans (*Phaseolus*

*vulgaris*), and garlic (*Allium sativum*). Most field and row crops in the habitat study area are flood-irrigated, although sprinkler irrigation is used in some areas.

Irrigated grain crops include corn (*Zea mays*), safflower (*Carthamus tinctorius*), and milo (*Sorghum* spp.) grown as silage for dairy cows. Non-native annual grasses and herbaceous weeds are uncommon as a result of active cultivation, herbicide application, and shading from the mature corn stalks.

### ***Fallow Fields***

Fallow fields, as used in this report, are defined as: 1) generally bare dirt agricultural fields that have been tilled but have no evidence of a currently planted crop; 2) old orchards and vineyards where the vines or trees had been cut and removed and the soil had recently been tilled; or 3) irrigated hay, grain, or field crops that had been recently harvested, but had no evidence of actively growing crops. Fallow fields are generally devoid of vegetation due to recent tilling and cultivation. Abandoned fields or recently disked fields that showed no evidence of recent cultivation and were characterized by nonnative annual grasses and other ruderal species were not considered fallow fields, but were mapped as either inactive agriculture or ruderal habitat as described below.

### ***Dairies***

Dairy farms within the habitat study area are large industrial-scale farming operations that include barns and other farm buildings, feed lots, silage storage areas, and manure settling basins. These areas are generally devoid of herbaceous vegetation but may include trees.

### ***Pastures***

Pastures are generally enclosed within fences and comprised of a mixture of annual and perennial grasses and forbs that provide forage for domestic livestock. Most of the pastureland in the habitat study area is associated with rural residential areas. While some pastures may be enhanced through the seeding of desirable forage plants such as tall fescue (*Schedonorus phoenix*), ryegrass (*Lolium multiflorum*), and various clovers (*Trifolium* spp.), they are less intensively managed than other types of agricultural lands and have a relatively low native diversity but often support some (usually minor) component of native California annual grassland species. Irrigation is variable, with some pasture areas flood- or sprinkler-irrigated while others are managed as dry-land pasture only. This habitat type is distinguished from extensive areas of California annual grassland that may be used as rangeland.

### ***Inactive Agriculture***

Inactive agriculture includes fields that have evidence of past cultivation (including surrounding landscape, evidence of tillage, leveled fields and/or irrigation checks and furrows) but are not currently used for crop production. These areas may have been recently disked but show no evidence of recent cultivation, resulting in dense growth of nonnative annual grasses such as ripgut brome (*Bromus diandrus*), soft chess, (*Bromus hordeaceus*), oats, Italian ryegrass (*Lolium* spp.), barley, and weedy forbs such as bur clover (*Medicago polymorpha*), prickly lettuce (*Lactuca serriola*), filaree (*Erodium* spp.), and yellow star-thistle (*Centaurea solstitialis*). While species composition is similar to that of California annual grassland and ruderal areas, inactive farmland areas generally support a very low diversity and abundance of native plant species and are distinguished by a high degree of disturbance as a result of past cultivation.

### **Developed Areas**

Developed areas constitute approximately 21% of the habitat study area and include various types of urban and rural developed land use. Developed areas include urban areas, commercial and industrial buildings, transportation corridors, and barren areas where vegetation has been removed or is absent.

### ***Barren***

Barren areas are open plots of rock, gravel or soil that are either completely devoid of vegetation or contain only sparse (less than 2%), widely scattered, predominantly weedy herbaceous plants. Within the habitat study area, barren areas are associated with equipment yards adjacent to agricultural fields and various water storage or delivery features.

### ***Urban***

Urban habitat includes relatively higher density residential areas and parks that may include landscaped areas, yards, gardens, and various buildings. Many urban areas include large landscape and shade trees such as ash (*Fraxinus* spp.), cedar (*Cedrus* spp.), eucalyptus (*Eucalyptus* spp.), London plane (*Platanus* spp.), maple (*Acer* spp.), redwood (*Sequoia sempervirens*), and pine (*Pinus* spp.). Because of a significant agricultural component, rural residential habitat is described above as an agricultural habitat type. Parkland includes developed and maintained open, grassy areas, picnic facilities and children's playgrounds. Larger parks, such as Roeding Park in the city of Fresno, may include a pond or small lake.

### ***Commercial and Industrial***

Commercial and industrial areas include urban shops, businesses, warehouses, industrial plants, factories, junkyards, equipment storage yards, airports, and various municipal facilities as well as associated parking lots. Rural commercial areas include landfills, farm equipment yards, and agricultural processing and storage facilities; dairy farms are not considered to be a commercial and industrial habitat type but are instead described separately as an agricultural habitat type. Urban commercial and industrial areas often have associated landscaped vegetation.

### ***Transportation Corridors***

Transportation corridors in the habitat study area include roads and railways, including portions of SR 99, SR 152, and SR 145, numerous paved urban and county roads, and the UPRR and BNSF railways. For the purpose of habitat characterization, narrow strips of landscaped and/or ruderal vegetation associated with these corridors were not separately mapped and quantified; instead, these areas were mapped together with their associated corridor. Dirt farm roads associated with agricultural fields also were not distinguished separately from the adjacent agricultural land use.

### **Natural and Seminal Areas**

Natural and seminal habitats are distinguished from the land uses and vegetation types described in the previous sections by the degree of current human influence on the vegetation composition and structure. While the natural and seminal vegetation types 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 vegetation and those in which the dominant vegetation comprises introduced species. Natural and seminal habitats associated with aquatic features such as vernal pools and other seasonal wetlands and riparian corridors are discussed in Section 5.1, Jurisdictional Waters. Natural and seminal terrestrial habitats including California annual grassland, Great valley mixed riparian forest, other riparian, eucalyptus woodland, and ruderal vegetation habitats are described below.

### ***California Annual Grassland***

California annual grassland habitat within the habitat study area is best classified as part of the Amsinckia (*menziesii*, *tessellata*) alliance as defined by Sawyer et al. (2009) and the nonnative grassland type described by Holland (1986) (Table 4-1). This community is characterized by an open to dense cover of grasses and herbaceous species less than 3 feet high. Scattered trees and shrubs may be present, but provide minimal cover.

California annual grassland in the habitat study area is characterized by large expanses of open grassland comprised of nonnative annual grasses such as ripgut brome, soft chess, foxtail barley, medusa-head (*Taeniatherum caput-medusae*), and wild oat. Common nonnative herbaceous species include yellow star-thistle, Italian thistle (*Carduus pycnocephalus*), prickly lettuce, mustards (*Brassica* spp.), and wild radish (*Raphanus sativa*). Many native annual and perennial herbaceous species may also be present within this grassland community; such species include Canadian horseweed (*Conzya canadensis*), telegraph weed (*Heterotheca grandiflora*), California poppy (*Eschscholzia californica*), and silver cudweed (*Gnaphalium canescens*). California annual grassland may be used for cattle or sheep grazing, but these areas are not actively managed as pasture. Areas of California annual grassland are on soils suitable for vernal pools and other seasonal wetlands. California annual grassland comprises 2.94% of the land use within the 1,000-foot-radius habitat study area.

### **Great Valley Mixed Riparian Forest**

Great Valley mixed riparian forest communities include sensitive riparian communities as identified on the *List of California Terrestrial Natural Communities Recognized by the CNDDDB* (CDFG 2003). As discussed later in Section 4.2.1, the sensitive biological community, Great Valley mixed riparian forest, is equivalent to the valley foothill riparian community as defined by the CWHR.

The cottonwood-willow riparian community is part of the *Populus fremontii* Forest Alliance, Fremont cottonwood forest as described by Sawyer et al. (2009) and most closely resembles the Great Valley cottonwood riparian forest described by Holland (1986). Mixed riparian forest and woodland most closely resembles the *Populus fremontii* Forest Alliance described by Sawyer et al. (2009), while Holland (1986) describes this community as Great Valley mixed riparian forest. Great Valley mixed riparian forest comprises 0.36% of the land use within the 1,000-foot-radius habitat study area.

### **Other Riparian**

Several types of nonsensitive riparian communities were identified within the study area. Willow riparian forest in the habitat study area may be classified as part of the *Salix lasiolepis* Shrubland Alliance (arroyo willow thickets) as defined by Sawyer et al. (2009) and most closely resembles the central coast arroyo willow riparian forest described by Holland (1986). Himalayan blackberry brambles and giant reed (*Arundo donax*) (Sawyer et al. 2009) are also present in riparian communities.

Riparian communities are located on the banks of natural waterways including streams, sloughs, and rivers and, in some cases, constructed waterway features. Riparian areas occur along the banks of rivers and streams and are generally characterized by a prevalence of hydrophytic vegetation but do not meet other criteria for wetlands. Riparian communities may consist of overstory species that are facultative wetland; however, soils, hydrology, and/or understory vegetation are not representative of wetland communities.

Riparian communities can be found throughout the regional area. Riparian areas form transition zones between terrestrial and aquatic ecosystems, providing essential habitat for a large variety of terrestrial as well as aquatic wildlife species. Other riparian communities comprise 0.27% of the land use within the 1,000-foot-radius habitat study area.

### **Eucalyptus Woodlands**

Eucalyptus woodlands are classified by Sawyer et al. (2009) as Eucalyptus (*globulus*, *camaldulensis*) seminatural woodland stands or eucalyptus groves. There is no corresponding natural community type in Holland (1986). These areas are characterized by relatively dense stands of eucalyptus trees. Within the habitat study area, the understory vegetation typically comprises introduced annual grasses such as ripgut brome and Bermuda grass with goose grass (*Galium aprine*) and dovefoot geranium (*Geranium molle*). In some areas, giant reed is also a common associated understory species. Eucalyptus woodlands comprise 0.06% of the land use within the 1,000-foot-radius habitat study area.

### ***Ruderal Vegetation***

Ruderal vegetation types occur in areas where the natural vegetation has been removed or significantly degraded by past or current human activity. Ruderal 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 riggut brome, soft chess, wild oat, Italian ryegrass, foxtail barley, and weedy forbs such as bur clover, filaree (*Erodium botrys*), yellow star-thistle, Italian thistle, milk thistle (*Silybum maritimum*), Russian thistle (*Salsola tragus*), and many others. Due to the highly variable nature of ruderal habitats, this type was not classified according to Sawyer et al. (2009) or Holland (1986). Ruderal areas may be similar to California annual grassland but are characterized by a greater level of disturbance. Ruderal areas are also similar to inactive farmland but do not occur in areas with evidence of active farming in the recent past. Ruderal vegetation comprises 3.43% of the land use within the 1,000-foot-radius habitat study area.

#### **4.1.2.2 Aquatic Habitats**

This section describes the wetland and other water features that were mapped in the habitat study area. These areas are illustrated in Figures 4-1 through 4-13 for the Merced, Chowchilla, Madera, and Fresno vicinities, respectively. Of the aquatic plant communities and land cover types identified in the habitat study area, the following fall under the jurisdiction of the USACE, RWQCB, and CDFG: vernal pools and other seasonal wetlands, Fremont cottonwood forested wetland, coastal valley freshwater marsh, natural watercourses, and constructed watercourses. Jurisdictional waters are further discussed as Habitats of Concern in Section 4.2.1 and are evaluated in detail in the *Merced to Fresno Section Wetland Delineation Report* (Authority and FRA 2011a). Jurisdictional water types have been broadly classified following the *Hydrogeomorphic Wetland Classification System* (USACE 1993) and the *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979).

#### **Depressional/Palustrine Wetlands**

Depressional wetlands are a hydrogeomorphic class of wetlands that occur in topographic depression where the dominant water sources are precipitation, groundwater discharge, and both inflow and overland flow from the adjacent uplands (USACE 1993). The Palustrine system is a broad class of nontidal wetlands that was developed to include vegetated wetlands traditionally called by names such as marsh, swamp, bog, fen, and prairie. The palustrine system also includes small, shallow permanent or intermittent water bodies such as ponds. Palustrine wetlands may be situated shoreward of lakes, river channels, or estuaries; on river floodplains; in isolated catchments; or on slopes. They may also occur as islands in lakes or rivers (Cowardin et al. 1979). Palustrine wetlands identified within the habitat study area include vernal pools, coastal and valley freshwater marsh, Fremont cottonwood forested wetlands, retention basins, and agricultural tailwater ponds.

#### ***Fremont Cottonwood Forested Wetland***

Fremont cottonwood forested wetlands occur on soils intermittently or seasonally flooded or saturated by freshwater systems. Frequently, these community types 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 wetlands may support emergent perennial vegetation such as cattails, sedges, and rushes. Freshwater forested wetlands are nontidal, flooded, depressional wetlands; and are categorized as Cowardin class: palustrine forested wetland (PFO). The *Populus fremontii* Forest Alliance, Fremont cottonwood forested wetland, is described by Sawyer et al. (2009) and is similar to the Great Valley cottonwood riparian forest described by Holland (1986). Fremont cottonwood forested wetland comprises 0.06% of the land use within the 1,000-foot-radius habitat study area.

### ***Vernal Pools and Other Seasonal Wetlands***

Vernal pools are a type of seasonal wetland characterized by a low, amphibious, herbaceous community dominated by annual herbs and grasses. Vernal pools are insular, astatic ecosystems that respond markedly to winter precipitation and summer desiccation. Vernal pools and other seasonal wetlands are associated with certain types of soil formations. Hardpan soil layers frequently form in the horizons of clay soils, leading to the formation of vernal pools and other seasonal wetlands with clay soils. California annual grassland can occur on similar types of soil formations, but are not exclusively found associated with vernal pools and other seasonal wetlands. Once formed, these vernal pools and other seasonal wetlands have a specific flora and fauna associated with seasonal hydrology. The standing water that forms in vernal pools and other seasonal wetlands is ideal breeding habitat for several special-status species such as vernal pool fairy shrimp, Conservancy fairy shrimp, vernal pool tadpole shrimp, 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 wetlands (PEMC).

Common plant species observed in vernal pools and other seasonal wetlands 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 and other seasonal wetlands 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 and other seasonal wetlands are often characterized by creeping spikerush (*Eleocharis macrostachya*). The quality of vernal pools and other seasonal wetlands identified within the habitat study area ranges from low quality (where they occur in areas of high disturbance, such as farmland and railroad rights-of-way) to moderate quality (where they occur in areas of moderate disturbance, such as California annual grassland with managed grazing). No high quality vernal pools and other seasonal wetlands with low to no disturbance and well developed plant associations were identified within the wetland resource/habitat study areas. Vernal pools and other seasonal wetlands comprise 0.17% of the land use within the 1,000-foot-radius habitat study area.

### ***Coastal and Valley Freshwater Marsh***

Coastal and valley freshwater marsh includes sensitive wetland communities as identified on the *List of California Terrestrial Natural Communities Recognized by the CNDDDB* (CDFG 2003). As discussed in Table 4-1 and Section 4.2.1, this biological community is equivalent to the *Schoenoplectus californicus* Herbaceous alliance (Sawyer et al. 2009) and freshwater emergent wetland (Mayer and Laudenslayer 1988).

Freshwater marsh habitats are semi-permanently flooded areas that typically support perennial emergent vegetation such as cattails (*Typha* spp.), sedges (*Carex* spp.; *Schoenoplectis* spp.) and rushes (*Juncus* spp.). Freshwater marshes are found on floodplains, backwater areas, and within the channels of rivers and sloughs. Freshwater marshes are nontidal, flooded, depressional wetlands and designated as palustrine emergent semi-permanently flooded wetlands (PEMF) in Cowardin (1979 et al.). Coastal and valley freshwater marsh comprises 0.04% of the land use within the 1,000-foot-radius habitat study area.

### ***Constructed Basins***

Constructed basins are included within the palustrine wetland class. These constructed basins are highly disturbed and may be routinely managed through vegetation removal and dredging. Depending on substrate and management regimes, vegetation type and presence varies. Hydrology is variable based on precipitation events, irrigation inputs/removal, and other management objectives. These landscape or management features make-up the constructed basin wetland types described below.

Stormwater retention basins are generally excavated earthen basins that have been constructed to hold urban stormwater runoff. Most of the stormwater retention basins in the study area are associated with urban communities as well as commercial and industrial areas. Most of these basins are devoid of vegetation or support ruderal species that become established when the water levels are low or the basins are dry. 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 brachiopods and California tiger salamanders.

Reservoirs include variously sized basins that have been constructed to hold water for urban, industrial, or agricultural use. Water is generally either diverted or pumped into these areas and is held for use at a later time. Reservoirs are often lined to prevent or reduce water loss as a result of seepage into the soil and are generally devoid of vegetation.

Agricultural tail water ponds are generally small, relatively shallow basins that are excavated in the low corners or along the side of an agricultural field or orchard for the purpose of capturing excess irrigation water. Excess water is then either allowed to gradually seep into the soil or is pumped into a nearby canal feature. Vegetation within these basins is often comprised of ruderal wetland plant species such as Bermuda grass (*Cynodon dactylon*), tall flat sedge (*Cyperus eragrostis*), sprangletop (*Leptochloa* spp.), and fireweed (*Epilobium* spp.).

### **Other Waters**

Nonwetland waters investigated in the habitat study area include natural and constructed watercourses located within the Merced, Chowchilla, Madera, and Fresno watersheds, as shown on Figures 4-1 through 4-13. All natural and constructed watercourses are considered potentially jurisdictional under the Preliminary JD format (USACE 2008). Natural drainage and constructed water features are discussed below with additional information located in the *Merced to Fresno Section Hydraulics and Floodplain Technical Report* (Authority and FRA 2011c) and in the *Merced to Fresno Section Wetland Delineation Report* (Authority and FRA 2011a). Appendices D-1, D-2, D-3, and D-4 list all natural and constructed water features located within the wetland resource study areas of the HST alternatives.

### ***Natural Watercourses***

Historically, natural watercourses included riverine areas of the habitat study area, including the perennial San Joaquin River, Bear Creek, and several intermittent to ephemeral sloughs and creeks. Most historically natural watercourses have ephemeral hydrology either because of their small watershed size or because they have been impounded or diverted upstream into other watercourses for agricultural purposes. All are low-gradient systems with emergent vegetation along margins of pool-run habitat units with bottom substrates dominated by fine sediments (i.e., sand, silt, or clay). Riffle and other fast-water habitats are uncommon.

Historically, natural watercourses have been influenced by the anthropogenic stressors affecting streams elsewhere in the San Joaquin Valley, such as agricultural land conversions of floodplains and associated water diversions combined with more than a century of exotic fish and invertebrate introductions (McBain and Trush 2002). For example, recent fish sampling on the San Joaquin River in the regional area and immediately upstream and downstream of the habitat study area yielded at least 10 nonnative fishes among 14 taxa, none of which were identified as special-status fishes (CDFG 2007). Agricultural and municipal watercourses could potentially support special-status species for short time periods, but these watercourses usually represent "false pathways"<sup>2</sup> for native fishes and are typically dominated by nonnative fishes that prey on or outcompete natives. For these reasons, special-status fishes were presumed to potentially occur only in historical natural watercourses. While many watercourses are now

<sup>2</sup> As described by McBain and Trush (2002), false pathways lead fish away from the life history trajectory (pathway) that will otherwise allow it to survive, grow, and complete its life cycle. False pathways affect both upstream and downstream fish movement. During upstream movement, flow may attract fish into drains and bypasses that do not provide habitat because spawning substrate or cover, food availability, water temperatures, dissolved oxygen concentrations, salinity, and other environmental conditions are unsuitable.

inhabited by primarily nonnative species, many native fish species still persist in the basin (Moyle 2002). Table 4-2 summarizes the natural watercourses located within the wetland resource study area. Natural watercourses comprise 0.47% of the land use within the 1,000-foot-radius habitat study area.

### ***Constructed Watercourses***

Constructed watercourses include linear water features such as canals and drains that have been constructed primarily for the conveyance of agricultural irrigation water. Canals range in size from small, shallow ditches (10 feet wide and 3 feet deep) to broad channels as much as 50 feet wide and 10 feet deep. Emergent vegetation as well as ruderal wetland species may occur in some areas, but many of the canals are routinely cleared of vegetation or treated with herbicide. A number of the canals convey water diverted from and discharge water into the natural drainage features described in the natural watercourse section above. Constructed waterways within the study area are considered potentially jurisdictional under the Preliminary JD format (USACE 2008). Constructed watercourses comprise 0.75% of the land use within the 1,000-foot-radius habitat study area.

### ***Inundated Nonwetlands***

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 non-native 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 fairy shrimp and western spadefoot toad.

Constructed watercourses also provide suitable habitat for special-status plants and wildlife, such as Sanford's arrowhead (*Sagittaria sanfordii*) and western pond turtle (*Actinemys marmorata*). Descriptions of 16 named canals identified within the wetland resource study area are provided in Table 4-3. Inundated nonwetlands comprise 0.05% of the land use within the 1,000-foot-radius habitat study area.

**Table 4-2**  
Natural Watercourses in the Wetland Resource Study Area

Watercourse	USGS-NHD Channel Type(s)	Apparent Hydrology <sup>a</sup>	Bankfull Width (feet)	Bankfull Depth (feet)	Substrates <sup>c</sup>						NW1 Code <sup>b</sup>	Discussion	
					Cobble	Gravel	Sand	Silt	Clay	Veg org material			Large Wood
Canal Creek	Stream / River: Intermittent / Artificial Path	Intermittent	27.7	4.4		X	X					R4SB4	Tributary to the San Joaquin River; unvegetated sandy channel with Eucalyptus woodland habitat downstream of a diversion structure.
Black Rascal Creek	Artificial Path	Intermittent	87.8	12.0	X		X	X				R4SB5	Tributary to the San Joaquin River; unvegetated silty clay substrate; Himalayan blackberry scrub.
Bear Creek	Artificial Path	Perennial	82.0-120.0	9.0-15.0	X	X	X	X	X		X	R2UB	Tributary to the San Joaquin River; unvegetated silty clay and sandy channel; mixed riparian forest and woodland.
Miles Creek	Canal Ditch	Intermittent	23.0	3.0		X		X	X			R4EM	Tributary to the San Joaquin River; silty clay channel with emergent vegetation; Himalayan blackberry scrub.
Owens Creek	Stream / River: Intermittent	Ephemeral	27.0	2.0-3.0			X	X	X		X	R4SB5	Tributary to the San Joaquin River; unvegetated silty clay channel; Willow Riparian Woodland.
Duck Slough	Artificial Path	Intermittent	30.0-63.0	9.0-15.0				X	X		X	R4SB5	Tributary to the San Joaquin River; unvegetated silty clay channel; discontinuous mixed riparian woodland.
South Slough (Russell Lateral)												R4SB5	Tributary to the San Joaquin River; unvegetated gravelly clay channel; valley oak riparian woodland.

Watercourse	USGS-NHD Channel Type(s)	Apparent Hydrology <sup>a</sup>	Bankfull Width (feet)	Bankfull Depth (feet)	Substrates <sup>c</sup>						NW1 Code <sup>b</sup>	Discussion
					Cobble	Gravel	Sand	Silt	Clay	Veg org material		
Deadman Creek	Canal Ditch	Ephemeral	14.8-19.9	2.2-2.4	X	X	X	X			R4SB5	Tributary to the Eastside Bypass of the San Joaquin River; mixed riparian woodland, unvegetated silty clay channel with Cottonwood-Willow Woodland Riparian Woodland; downstream channel becomes filled with common rush with no adjacent riparian vegetation.
Dutchman Creek	Stream / River: Intermittent	Intermittent	31.0	3.5		X		X			R4SB5	Tributary to the Eastside Bypass of the San Joaquin River; silty clay channel with scattered wetland vegetation; mixed riparian woodland.
Chowchilla River	Stream / River: Intermittent / Artificial Path	Intermittent-Ephemeral	27.0-150.0	2.0-4.0	X			X	X		R4SB4, R4SB7	Tributary to the Eastside Bypass of the San Joaquin River; R4SB4: broad sandy channel with mosaic of emergent vegetation other herbaceous species; mixed riparian woodland; R4SB7: sandy channel with dense ruderal and native vegetation; discontinuous valley oak riparian woodland along channel.
Ash Slough	Stream / River: Perennial / Artificial Path	Ephemeral	19.0-123.0	1.0-3.0	X	X			X		R4SB4	Tributary to the Eastside Bypass of the San Joaquin River; broad sandy-gravel channel with sparse emergent vegetation; mixed riparian woodland; patches of ruderal vegetation; Cottonwood-Willow Riparian Woodland; dense giant reed and other ruderal vegetation throughout the channel; giant reed riparian habitat.

Watercourse	USGS-NHD Channel Type(s)	Apparent Hydrology <sup>a</sup>	Bankfull Width (feet)	Bankfull Depth (feet)	Substrates <sup>c</sup>						NW1 Code <sup>b</sup>	Discussion
					Cobble	Gravel	Sand	Silt	Clay	Veg org material		
Berenda Slough	Stream / River: Intermittent / Artificial Path	Intermittent-Ephemeral	22.0-42.0	1.0-3.0		X	X	X		X	R4SB4, R4SB5	Tributary to the Eastside Bypass of the San Joaquin River; open sandy channel with sparse ruderal vegetation; Mixed Riparian Woodland; ruderal and wetland vegetation throughout the channel; mixed riparian woodland.
Berenda Creek	Stream / River: Intermittent	Intermittent	15.0-31.0	2.0-5.5	X		X	X		X	R4EM, R4EMx	Tributary to the Eastside Bypass of the San Joaquin River; sandy channel with patches of dense emergent vegetation; willow riparian woodland; constructed channel with emergent vegetation throughout much of the channel; open mixed riparian woodland.
Dry Creek	Stream / River: Intermittent / Canal Ditch	Intermittent	25.0-36.8	2.7-5.0		X	X	X			R4EM, R4SB5x	Tributary to the Eastside Bypass of the San Joaquin River; open water channel with dense emergent vegetation along the edges; Cottonwood-Willow Riparian Woodland; constructed earthen riprapped channel with sparse emergent vegetation; no adjacent riparian habitat.
Fresno River	Artificial Path	Ephemeral	35.0-60.0	2.0	X	X				X	R4SB4	Tributary to the Eastside Bypass of the San Joaquin River; channel bed is characterized by mosaic of open sand and ruderal vegetation; no adjacent riparian; habitat; vegetated sandy channel; Cottonwood-Willow Riparian Woodland.

Watercourse	USGS-NHD Channel Type(s)	Apparent Hydrology <sup>a</sup>	Bankfull Width (feet)	Bankfull Depth (feet)	Substrates <sup>c</sup>						NW1 Code <sup>b</sup>	Discussion
					Cobble	Gravel	Sand	Silt	Clay	Veg org material		
Cottonwood Creek	Stream / River: Intermittent	Intermittent	25.0-40.0	1.0-6.0	X	X	X	X	X	X	R4EM, R4EMx	Tributary to the Eastside Bypass of the San Joaquin River; open flow channel with dense emergent vegetation along the edges, mixed riparian woodland; constructed earthen channel with areas of dense emergent vegetation; giant reed and eucalyptus riparian habitat.
San Joaquin River	Artificial Path	Perennial	50.0-175.0	nr	nr	nr	nr	nr	nr	nr	R2UB3	Perennial river that flows generally north into the San Francisco Bay Delta; open water, mixed riparian woodland habitat.

Notes:

nr = not recorded

<sup>a</sup> Watercourse surveys performed April and December 2009; watercourses listed from north to south. Apparent Hydrology: Perennial, Intermittent (seasonal), Ephemeral (stormwater only)

<sup>b</sup> NW1 Codes:

R = Riverine

2 = Lower Perennial

4 = Intermittent

SB = Streambed

4 = Sand

5 = Mud

7 = Vegetated

UB = Unconsolidated Bottom

3 = Mud

EM = Emergent Wetland

x = Excavated

Source: *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979)

<sup>c</sup> Substrates: Cobble (64 – 250 mm), Gravel (2-64 mm), Sand (0.06-2 mm), Silt (0.00- 0.06 mm), Clay (<0.004 mm), Vegetative organic material, Large wood (> 1m x 0.1m) . x = present, X = dominant



**Table 4-3**  
 Constructed Watercourses in the Wetland Resource Study Area

Watercourse	USGS-NHD Channel Type(s)	Apparent Hydrology <sup>a</sup>	Bankfull Width (feet)	Bankfull Depth (feet)	Discussion
Cased Lateral	Canal/Ditch	Intermittent	14	5	Earthen canal; flows east to Bethel Canal. Bethel Canal goes underground at Avenue 18½ and Road 10½. Some sprangletop along the upper edges of the canal banks. Dry at the time of the survey.
Main Ashe Lateral	Canal/Ditch	Intermittent	12	4	Cement-lined channel with sandy deposit along the bottom; dry at the time of the survey; devoid of vegetation. Flows to the south into the Trindade Drain which flows into Black Rascal Creek.
Trindade Drain	Canal/Ditch	Intermittent	22-26	4 - 5	Earthen channel; dry at the time of the survey. Channel is vegetated throughout with cattails, hardstem bulrush, and curly dock with California blackberry, red willow, and giant reed growing along the channel edges. Flows south into Black Rascal Creek.
El Capitan Lateral	Canal/Ditch	Intermittent	50	15	Earthen canal, flowing water present at the time of the survey; devoid of vegetation. Flows south from Bear/Black Rascal Creek and appears to flow into Hartley Slough, which is a tributary to Owens Creek.
Lingard Lateral	Canal/Ditch	Intermittent	30	5	Earthen canal, dry at the time of the survey. Sparse vegetation within channel and along banks includes riggut brome and curly dock. Flows south into the Tetzlaff Lateral which flows into Mariposa Creek.
California Lateral Canal	Canal/Ditch	Intermittent	40	12	Earthen canal, flowing water present at time of the survey. Channel devoid of vegetation with the exception of scattered ruderal species along upper banks; flows west into Berenda Slough.
Herndon Canal	Canal/Ditch	Intermittent	50	10	Cement lined canal with sand deposits along the bottom; some flowing water was present at time of the survey. Devoid of vegetation. Flows south into Berenda Creek.
Victoria Canal	Canal/Ditch	Intermittent	12	5	Cement lined canal with sand deposits; dry at the time of the survey; no vegetation present. Flows to the west into the Houghton Canal which then goes underground at Neilson and Modoc Avenues near Kerman.
Justin Canal	Canal/Ditch	Intermittent	35	12	Earthen canal, some flowing water present at time of the survey. Tall flatsedge and fireweed throughout most of the channel. Flows south into the Chowchilla River.
Bethel Canal	Canal/Ditch	Intermittent	20	6	Earthen canal, some flowing water present

Watercourse	USGS-NHD Channel Type(s)	Apparent Hydrology <sup>a</sup>	Bankfull Width (feet)	Bankfull Depth (feet)	Discussion
					at the time of the survey. Some sprangletop and other grasses growing within the channel. Flows south and goes underground at Avenue 18 ½ and Road 10½.
Ashview Canal	Canal/Ditch	Intermittent	12	3	Earthen canal, some flowing water present at the time of the survey. Sparse vegetation along canal appears to be routinely sprayed with herbicides. Flows south into Ash Slough.
Ashview Lateral	Canal/Ditch	Intermittent	20	6	Earthen canal, some flowing water present at the time of the survey. Sparse vegetation along canal appears to be routinely sprayed with herbicides. Flows east into Ash Slough.
California Canal	Canal/Ditch	Intermittent	18	10	Earthen canal, some flowing water present at the time of the survey. Sparse vegetation along canal appears to be routinely sprayed with herbicides. Flows west into Berenda Creek.
Dixieland Canal	Canal/Ditch	Intermittent	20	5	Earthen canal, some flowing water present at the time of the survey. Sparse sprangletop and tall flatsedge within channel; vegetation along the edges appears routinely sprayed with herbicides. Flows south into Dry Creek.
Hugh Ditch	Canal/Ditch	Intermittent	12	4	Earthen canal, some flowing water present at time of the survey. Sparse vegetation along canal appears to be routinely sprayed with herbicides. Flows south into Cottonwood Creek.
Ripperdan Ditch	Canal/Ditch	Intermittent	20	6	Earthen canal, some flowing water present at time of the survey. Vegetation along the channel had recently been mowed at the time of the survey. Canal conveys flows south from Cottonwood creek and appears to terminate to go underground.
<sup>a</sup> Watercourse surveys performed April and December 2009; watercourses listed from north to south. Apparent Hydrology: Perennial, Intermittent (seasonal), Ephemeral (stormwater only).					

**4.1.2.3 Plants and Wildlife**

Plants and wildlife observed during field surveys are characteristics of the terrestrial habitats discussed in Section 4.1.2. Tables 4-4 and 4-5 provide lists of plants and animals observed in the habitat study area.

**Table 4-4**  
 Plant Species Observed in the Habitat Study Area

Scientific Name	Common Name	Status
<b>Alismataceae</b>		
<i>Sagittaria sanfordii</i>	Sanford's Arrowhead	CNPS <sup>a</sup> List 1B.2
<b>Amaranthaceae</b>		
<i>Amaranthus albus</i> *	prostrate pigweed	--
<b>Apiaceae</b>		
<i>Conium maculatum</i> *	poison hemlock	--
<i>Eryngium vaseyi</i>	coyote thistle	--
<i>Torilis arvensis</i> *	spreading hedgeparsley	--
<b>Asteraceae</b>		
<i>Achyrachaena mollis</i>	blow wifes	--
<i>Ambrosia psilostachya</i>	western ragweed	--
<i>Anthemis cotula</i> *	dog-fennel	--
<i>Artemisia douglasiana</i>	mugwort	--
<i>Baccharis salicifolia</i>	mulefat	--
<i>Carduus pycnocephalus</i> *	Italian thistle	--
<i>Centaurea solstitialis</i> *	yellow star-thistle	--
<i>Centromadia fitchii</i>	fitch spikeweed	--
<i>Chamomilla suaveolens</i> *	pineapple weed	--
<i>Cirsium vulgare</i> *	bull thistle	--
<i>Conyza canadensis</i>	common horseweed	--
<i>Gnaphalium luteo-album</i>	common cudweed	--
<i>Grindelia camporum</i>	gumplant	--
<i>Helianthus annuus</i>	common sunflower	--
<i>Hemizonia congesta</i>	hayfield tarweed	--
<i>Hypochaeris glabra</i> *	smooth cat's ear	--
<i>Hypochaeris radicata</i> *	rough cat's ear	--
<i>Lactuca serriola</i> *	prickly lettuce	--
<i>Lasthenia californica</i>	California goldfield	--
<i>Psilocarphus brevissimus</i>	woolly marbles	--
<i>Senecio vulgaris</i> *	common groundsel	--
<i>Sonchus oleraceus</i> *	common sowthistle	--

Scientific Name	Common Name	Status
<b>Boraginaceae</b>		
<i>Amsinckia lycopsoides</i>	tarweed fiddleneck	--
<i>Amsinckia menziesii</i> var. <i>intermedia</i>	common fiddleneck	--
<i>Plagiobothrys stipitatus</i> var. <i>maicranthus</i>	vernal pool popcorn flower	--
<b>Brassicaceae</b>		
<i>Brassica nigra</i> *	black mustard	--
<i>Hirschfeldia incana</i> *	shortpod mustard	--
<i>Raphanus sativus</i> *	wild radish	--
<b>Campanulaceae</b>		
<i>Downingia cuspidata</i>	toothed downingia	--
<b>Caryophyllaceae</b>		
<i>Silene gallica</i> *	common catchfly	--
<i>Stellaria media</i> *	common chickweed	--
<b>Chenopodiaceae</b>		
<i>Chenopodium album</i> *	lamb's quarters	--
<i>Salsola tragus</i> *	Russian thistle	--
<b>Convolvulaceae</b>		
<i>Convolvulus arvensis</i> *	bindweed	--
<b>Crassulaceae</b>		
<i>Crassula aquatica</i>	water pygmyweed	--
<b>Fabaceae</b>		
<i>Lotus purshianus</i> var. <i>purshianus</i>	Spanish-clover	--
<i>Lupinus bicolor</i>	miniature lupine	--
<i>Medicago polymorpha</i> *	burclover	--
<i>Melilotus indicus</i> *	sourclover	--
<i>Trifolium hirtum</i> *	rose clover	--
<i>Vicia americana</i> var. <i>Americana</i>	American vetch	--
<i>Quercus lobata</i>	valley oak	--
<b>Geraniaceae</b>		
<i>Erodium botrys</i> *	broadleaf filaree	--
<i>Erodium cicutarium</i> *	red-stemmed filaree	--
<b>Hydrophyllaceae</b>		
<i>Phacelia ramosissima</i>	branching phacelia	--

Scientific Name	Common Name	Status
<b>Hypericaceae</b>		
<i>Hypericum perforatum*</i>	St. John's wort	--
<b>Juglandaceae</b>		
<i>Juglans californica</i>	California walnut	--
<b>Juncaceae</b>		
<i>Juncus balticus</i>	wire rush	--
<i>Juncus bufonius</i>	toad rush	--
<b>Lamiaceae</b>		
<i>Trichostema lanceolatum</i>	vinegarweed	--
<b>Lythraceae</b>		
<i>Lythrum hyssopifolia</i>	hyssop loosestrife	--
<b>Malvaceae</b>		
<i>Malva neglecta*</i>	cheeseweed	--
<b>Myrtaceae</b>		
<i>Eucalyptus globulus*</i>	Blue gum	--
<b>Noctuidia</b>		
<i>Sidalcea hirsuta</i>	hairy checkerbloom	--
<b>Onagraceae</b>		
<i>Epilobium brachycarpum</i>	tall annual willowherb	--
<b>Papaveraceae</b>		
<i>Eschscholzia californica</i>	California poppy	--
<b>Plantaginaceae</b>		
<i>Plantago lanceolata</i>	English plantain	--
<b>Polygonaceae</b>		
<i>Polygonum hydropiperoides</i>	swamp smartweed	--
<i>Rumex crispus*</i>	curly dock	--
<i>Rumex pulcher*</i>	fiddle dock	--
<b>Rosaceae</b>		
<i>Prunus dulcis*</i>	almond	--
<i>Rubus discolor*</i>	Himalayan blackberry	--
<b>Rubiaceae</b>		
<i>Galium aparine</i>	common bedstraw	--
<b>Salicaceae</b>		
<i>Populus fremontii</i>	Fremont cottonwood	--

Scientific Name	Common Name	Status
<i>Salix exigua</i>	narrowleaf willow	--
<i>Salix laevigata</i>	red willow	--
<b>Scrophulariaceae</b>		
<i>Castilleja exserta</i>	purple owl's clover	--
<i>Mimulus guttatus</i>	seep monkeyflower	--
<i>Mimulus tricolor</i>	vernal pool monkeyflower	--
<b>Solanaceae</b>		
<i>Datura wrightii</i>	jimsonweed	--
<i>Nicotiana glauca</i> *	tree tobacco	--
<b>Tamaricaceae</b>		
<i>Tamarix sp</i> *	salt cedar	--
<b>Urticaceae</b>		
<i>Urtica dioica</i> *	stinging nettle	--
<b>Zygophyllaceae</b>		
<i>Tribulus terrestris</i> *	puncture vine	--
<b>Cyperaceae</b>		
<i>Cyperus eragrostis</i>	umbrella sedge	--
<i>Eleocharis macrostachya</i>	spikerush	--
<i>Scirpus americanus</i>	American tule	--
<b>Liliaceae</b>		
<i>Brodiaea elegans</i>	harvest brodiaea	--
<i>Triteleia hyacinthina</i>	white hyacinth	--
<b>Poaceae</b>		
<i>Arundo donax</i> *	giant reed	--
<i>Avena barbata</i> *	slender wild oats	--
<i>Avena fatua</i> *	wild oats	--
<i>Bromus diandrus</i> *	ripgut brome	--
<i>Bromus hordeaceus</i> *	soft chess	--
<i>Bromus madritensis</i> *	red brome	--
<i>Cynodon dactylon</i> *	Bermuda grass	--
<i>Deschampsia danthoniodes</i> *	annual hairgrass	--
<i>Distichlis spicata</i>	saltgrass	--
<i>Hordeum marinum ssp. Gussoneanum</i> *	Mediterranean barley	--

Scientific Name	Common Name	Status
<i>Hordeum murinum</i> *	foxtail barley	--
<i>Lolium multiflorum</i> *	Italian ryegrass	--
<i>Polypogon monspeliensis</i> *	rabbit's-foot grass	--
<i>Sorghum halepense</i> *	Johnsongrass	--
<i>Ventanata dubia</i> *	North African grass	--
<i>Vulpia microstachys</i> *	small fescue	--
<b>Typhaceae</b>		
<i>Typha angustifolia</i>	narrow-leaved cattail	--
Notes:		
* = Non-native species		
-- = No status designation.		
<sup>a</sup> CNPS		
LIST 1B = Rare, threatened, or endangered in California and elsewhere.		
.2 = Fairly endangered in California		
Sources: CNPS (2011), CNDDDB (2003d), and USFWS (2011).		

**Table 4-5**  
 Wildlife Species Observed in the Habitat Study Area

Scientific Name	Common Name	Status
<b>AMPHIBIANS</b>		
Anura		
<i>Bufo boreas</i>	western toad	--
<b>REPTILES</b>		
Suamata		
<i>Sceloporus occidentalis</i>	western fence lizard	--
<b>BIRDS</b>		
Accipitriformes		
<i>Accipiter cooperii</i>	Cooper's hawk	--
<i>Aquila chrysaetos</i>	golden eagle	BGEPA; FP
<i>Buteo lineatus</i>	red-shouldered hawk	--
<i>Buteo jamaicensis</i>	red-tailed hawk	--
<i>Circus cyaneus</i>	northern harrier	SSC
Anseriformes		
<i>Anas clypeata</i>	northern shoveler	--
<i>Anas platyrhynchos</i>	mallard	--

Scientific Name	Common Name	Status
<i>Branta canadensis</i>	Canada goose	--
<i>Cairina moschata</i> *	Muscovy duck	--
Cathartiformes		
<i>Cathartes aura</i>	turkey vulture	--
Ciconiiformes		
<i>Plegadis chihi</i>	white-faced ibis	--
Falconiformes		
<i>Falco sparverius</i>	American kestrel	--
Gruiformes		
<i>Fulica americana</i>	American coot	--
Pelecaniformes		
<i>Ardea alba</i>	great egret	--
<i>Ardea herodias</i>	great blue heron	--
<i>Butorides virescens</i>	green heron	--
<i>Egretta thula</i>	snowy egret	--
Podicipediformes		
<i>Podilymbus podiceps</i>	pied-billed grebe	--
Charadriiformes		
<i>Calidris alpina</i>	dunlin	--
<i>Charadrius vociferus</i>	killdeer	--
<i>Numenius americanus</i>	long-billed curlew	--
<i>Tringa spp.</i>	yellowlegs spp.	--
Columbiformes		
<i>Columba livia</i> *	rock dove	--
<i>Streptopelia decaocto</i> *	Eurasian-collared dove	--
<i>Zenaida macroura</i>	mourning dove	--
Passeriformes		
<i>Agelaius phoeniceus</i>	red-winged blackbird	--
<i>Anthus rubescens</i>	American pipit	--
<i>Aphelocoma californica</i>	western scrub-jay	--
<i>Carpodacus mexicanus</i>	house finch	--
<i>Cistothorus palustris</i>	marsh wren	--
<i>Corvus brachyrhynchos</i>	American crow	--

Scientific Name	Common Name	Status
<i>Dendroica coronata</i>	yellow-rumped warbler	--
<i>Euphagus cyanocephalus</i>	Brewer's blackbird	--
<i>Lanius ludovicianus</i>	loggerhead shrike	BCC, SSC
<i>Mimus polyglottos</i>	northern mockingbird	--
<i>Passer domesticus</i> *	house sparrow	--
<i>Passerculus sandwichensis</i>	savannah sparrow	--
<i>Pica nuttalli</i>	yellow-billed magpie	BCC
<i>Psaltriparus minimus</i>	bushtit	--
<i>Regulus calendula</i>	ruby-crowned kinglet	--
<i>Sayornis nigricans</i>	black phoebe	--
<i>Sayornis saya</i>	Say's phoebe	--
<i>Sialia mexicana</i>	western bluebird	--
<i>Sturnella neglecta</i>	western meadowlark	--
<i>Sturnus vulgaris</i> *	European starling	--
<i>Tyrannus verticalis</i>	western kingbird	--
<i>Turdus migratorius</i>	American robin	--
<i>Xanthocephalus xanthocephalus</i>	yellow-headed blackbird	--
<i>Zonotrichia leucophrys</i>	white-crowned sparrow	--
Piciformes		
<i>Colaptes auratus</i>	northern flicker	--
Trochiliformes		
<i>Calypte anna</i>	Anna's hummingbird	--
<b>Mammals</b>		
Didelphimorphia		
<i>Didelphis virginiana</i> *	Virginia opossum	--
Lagomorpha		
<i>Sylvilagus bachmani</i>	brush rabbit	--
Rodentia		
<i>Spermophilus beecheyi</i>	California ground squirrel	--
Carnivora		
<i>Canis latrans</i>	coyote	--
<i>Procyon lotor</i>	raccoon	--
<i>Vulpes vulpes</i> *	red fox	--

Scientific Name	Common Name	Status
Notes:		
* = Non-native species		
-- = No status designation.		
<sup>b</sup> State status:		
CDFG		
FP (Fully Protected)		
SSC (Species of Special Concern)		
USFWS		
BCC (Bird of Conservation Concern)		
BGEPA = Bald and Golden Eagle Protection Act of 1999.		
<sup>d</sup> Source: CNDDDB (2003e) and USFWS (2011).		

## 4.2 Habitats of Concern, Mitigation Banks, and Special-Status Species

Habitats of concern, mitigation banks, and special-status plants and animals that were determined to potentially occur within the habitat study area are discussed below.

### 4.2.1 Habitats of Concern

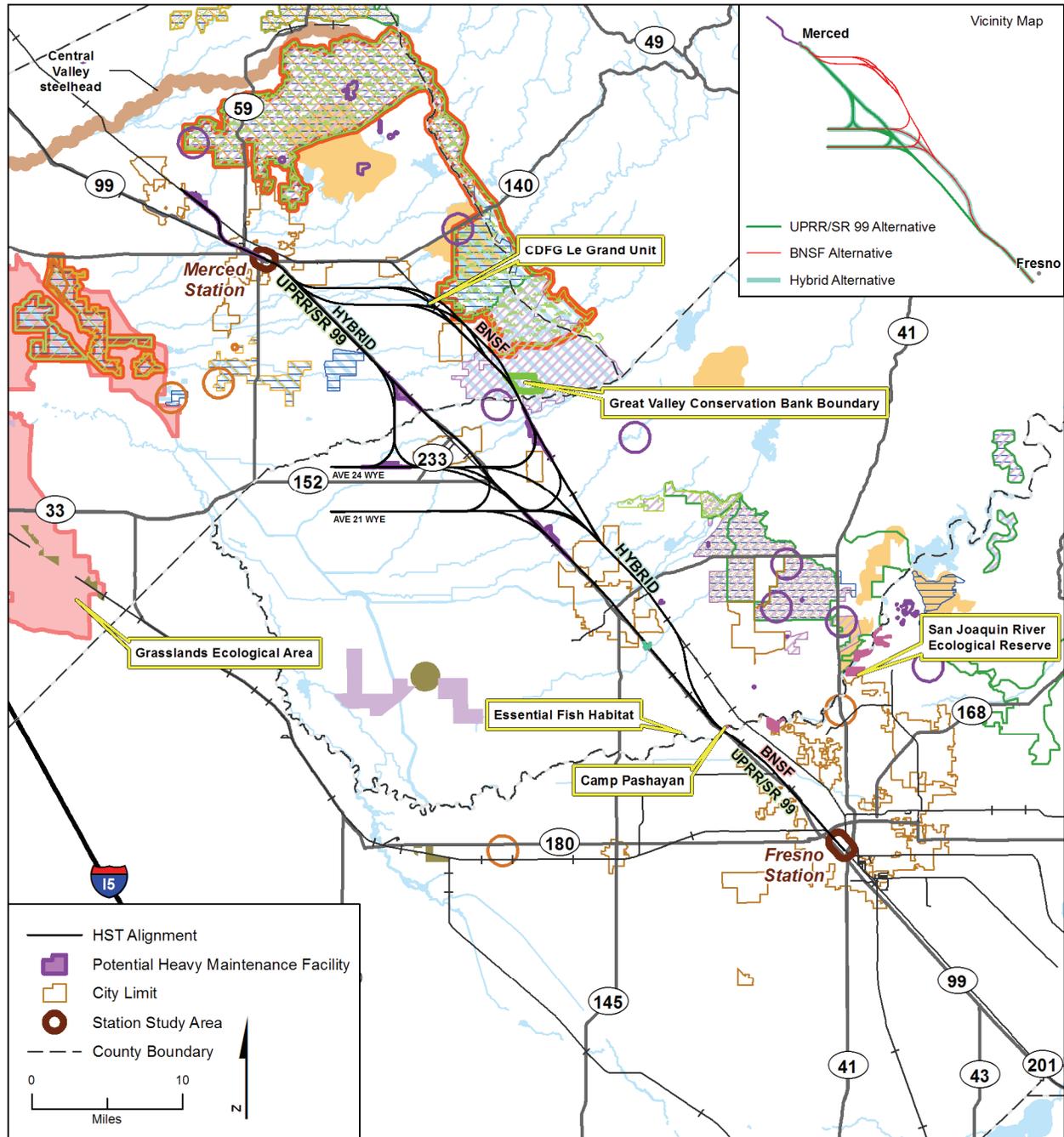
Habitats of concern evaluated in the regional area include special-status plant communities, critical habitat, core areas for recovery of federally-listed species, wildlife movement/linkage corridors, essential fish habitat, mitigation banks, and jurisdictional waters. Habitats of concern identified in the regional area are depicted on Figure 4-14.

#### 4.2.1.1 Sensitive Biological Communities

Sensitive biological communities on the List of California Terrestrial Natural Communities Recognized by the CNDDDB (CDFG 2003) and identified as potentially occurring in the regional area based on CNDDDB (2003a, 2003b, 2003c, 2003d, and 2003e) search results include Great Valley mixed riparian forest, northern claypan vernal pool, valley sacaton grassland, and sycamore alluvial woodland. In addition, two natural communities tracked by the CNDDDB were included in the database search for the regional area, including coastal and valley freshwater marsh and valley sink scrub. These CWHR habitat types identified as sensitive or as having a high inventory priority and determined to occur in the regional area are listed in Table 4-6. Figures 4-15 through 4-20 show the locations of known CNDDDB sensitive communities for plants; Figures 4-21 through 4-26 show the locations of known CNDDDB sensitive communities for animals. For purposes of this discussion, the term “sensitive” reflects terrestrial and aquatic plant communities that have been recognized as significant, represent a rare vegetation type, have limited distribution, and/or are recognized as such by CDFG. These communities are also recognized as applicable to CEQA significance criteria so that, if affected, a significant impact would occur.

**Table 4-6**  
 Sensitive Biological Communities Occurring in the Habitat Study Area

CDFG WHR (1988)	Sawyer et al. (2009)	Holland (1986)	Identified as High Inventory Priority by CDFG	
			Note <sup>a</sup>	Note <sup>b</sup>
Freshwater Emergent Wetland <sup>c</sup>	Schoenoplectus acutus Alliance	Coastal and Valley Freshwater Marsh	No	No
	Hardstem Bulrush Marsh			(Rank G5/S4)
	Schoenoplectus californicus Alliance	Coastal and Valley Freshwater Marsh	Yes	No
	California Bulrush Marsh			(Rank G5/S4?)
	Typha (agustifolia, domingensis, latifolia) Alliance	Coastal and Valley Freshwater Marsh	No	No
	Cattail Marshes			(Rank G5/S5)
Annual Grassland	N/A - To be classified during spring field surveys	Northern Claypan Vernal Pool and Northern Hardpan Vernal Pool	Yes	N/A  Global and State rankings to be determined after spring surveys and classifications completed.
Cottonwood- Willow Riparian <sup>c</sup>	Populus Fremontii Forest Alliance	Great Valley Cottonwood Riparian Forest	Yes	Yes  (Rank G4/S3)
Willow Riparian Forest and Woodland <sup>c</sup>	Salix Lasiolepis Shrubland Alliance	Central Coast Arroyo Willow Riparian	Yes	No  (Rank G4/S4)
Mixed Riparian Forest and Woodland <sup>3</sup>	Jugland hindsii; Hybrids Special; and Seminatural Woodland Stands	Great Valley Mixed Riparian Forest	Yes	Yes  (Rank G1/S1)
Valley Oak Riparian Forest and Woodland <sup>c</sup>	Valley Oak Woodland Alliance	Great Valley - Valley Oak Riparian Forest	Yes	Yes  (Rank G2/S2)
<p><sup>a</sup> Community identified in the <i>Vegetation Classification and Mapping Program: List of California Terrestrial Natural Communities Recognized by the California Natural Diversity Database</i> (CDFG 2003) as a special vegetation type either known or believed to be high priority for inventory in the CNDDDB.</p> <p><sup>b</sup> Community identified on the <i>Vegetation Classification and Mapping Program: List of California Vegetation Alliances</i> (CDFG 2009b) as a high priority for inventory. The conservation status is designated as 1 to 5, preceded by a letter reflecting the appropriate geographic scale of the assessment (G = Global, N = National, and S = Subnational). The numbers have the following meaning:                      1 = critically imperiled; 2 = imperiled; 3 = vulnerable; 4 = apparently secure; 5 = secure.</p> <p><sup>c</sup> Vegetation community may also be subject to federal and/or state regulations protecting wetland and riparian areas.</p>				

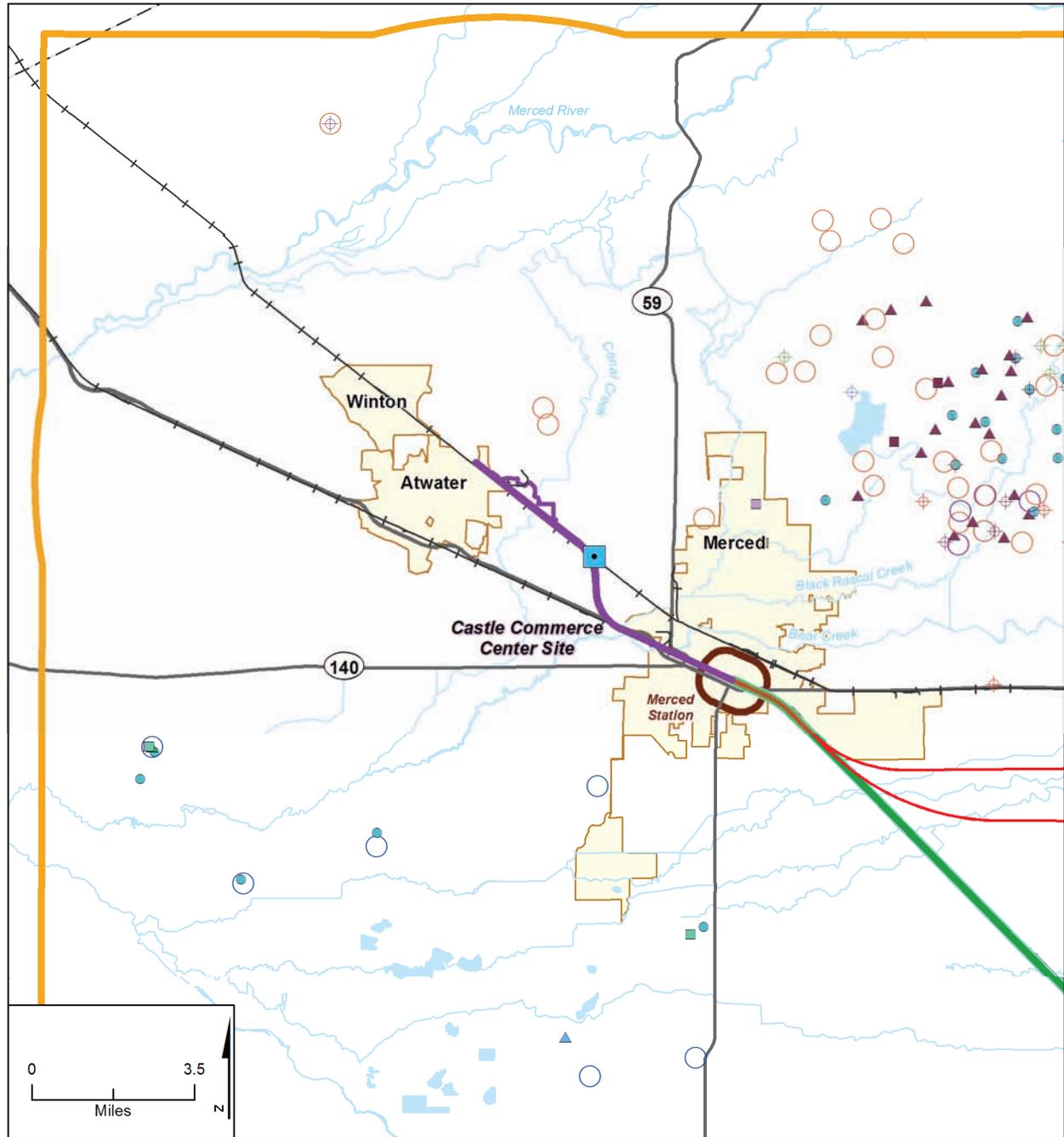


Source: U.S Fish & Wildlife Service, ESRP (2009), CNDDDB (2003), Conservation Land Group (2010), Lopez (2010).

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- |                                 |   |   |
|---------------------------------|---|---|
| <b>Critical Habitat</b>         |   | <b>Special-Status Plant Communities</b> |
| Hoover's spurge                 | Central Valley steelhead                | Northern Claypan Vernal Pool            |
| San Joaquin Valley Orcutt grass | California tiger salamander             | Northern Hardpan Vernal Pool            |
| hairy Orcutt grass              | <b>Caltrans Observed Data</b>           | Valley Sacaton Grassland                |
| succulent owl's-clover          | vernal pool                             | Valley Sink Scrub                       |
| Greene's tuctoria               | <b>Mitigation Banks/Reserves</b>        |   |
| Conservancy fairy shrimp        | San Joaquin River Ecological Reserve    |   |
| vernal pool fairy shrimp        | CDFG Le Grand Unit                      |   |
| vernal pool tadpole shrimp      | Great Valley Conservation Bank Boundary |   |
| Colusa grass                    | Grasslands Ecological Area              |   |

**Figure 4-14**  
 Regional Habitats of Concern

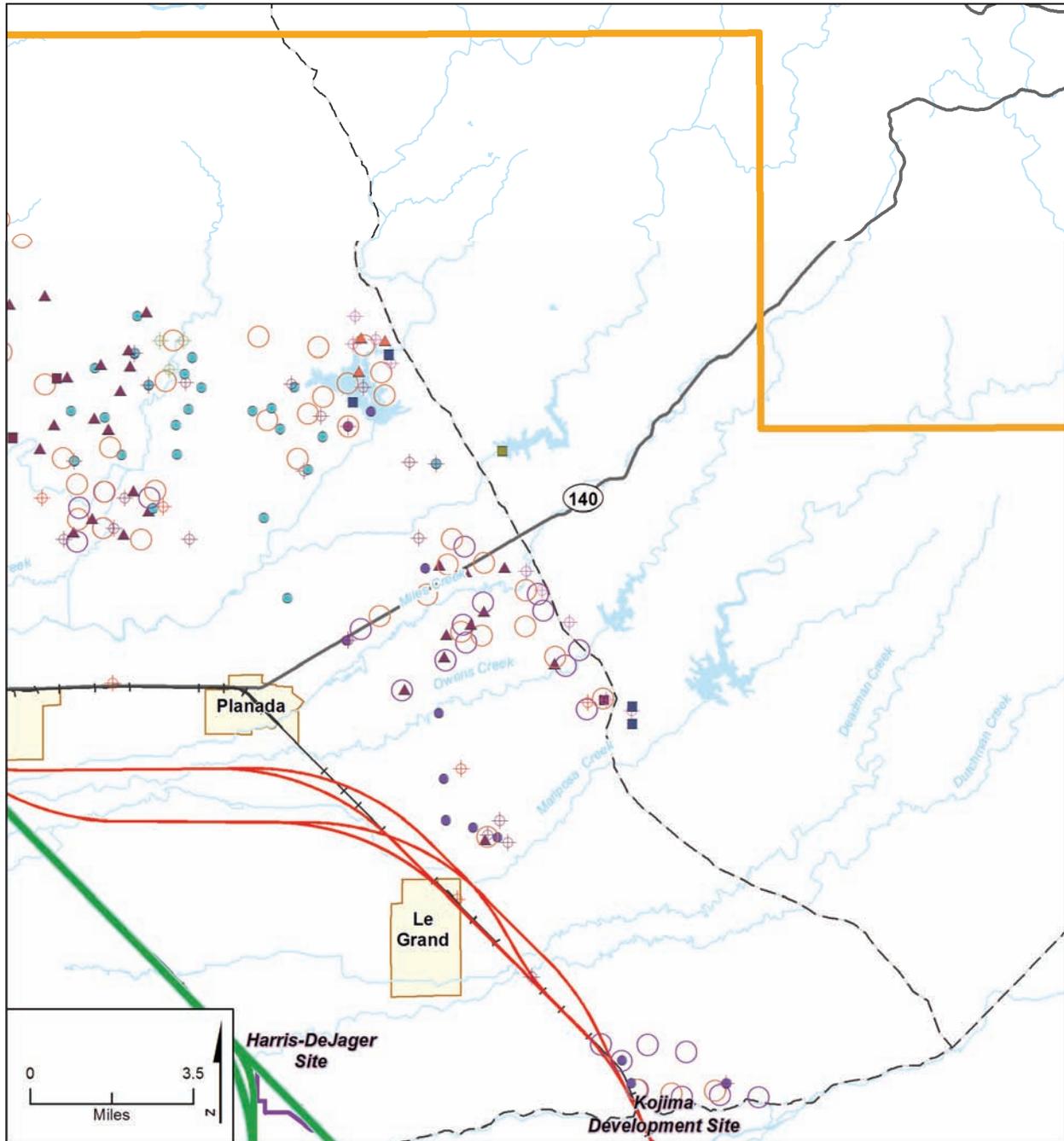


Source: CDFG, CNDDDB (2011), Caltrans

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- |   |                                   |                          |                               |  |
|---|-----------------------------------|--------------------------|-------------------------------|--|
| <b>Observed Special-Status Species</b>        |                                   | ◆ Keck's checkerbloom    | ▲ palmate-bracted bird's-beak | — UPRR/SR 99 Alternative               |
| ■ Sanford's arrowhead                         | ◆ Madera leptosiphon              | ▲ pincushion navarretia  | ▲ recurved larkspur           | — BNSF Alternative                     |
| <b>CNDDDB Reported Special-Status Species</b> |                                   | ◆ Merced phacelia        | ▲ shining navarretia          | — Hybrid Alternative                   |
| ● Boggs Lake hedge-hyssop                     | ◆ San Joaquin Valley Orcutt grass | ◆ Sanford's arrowhead    | ○ spiny-sepaed button-celery  | ▭ Regional Area                        |
| ● California jewel-flower                     | ■ alkali milk-vetch               | ■ beaked clarkia         | ○ subtle orache               | ▭ Potential Heavy Maintenance Facility |
| ● California satintail                        | ■ caper-fruited tropidocarpum     | ■ dwarf downingia        | ○ succulent owl's-clover      | ▭ City Limit                           |
| ● Colusa grass                                | ■ hairy Orcutt grass              | ■ heartscale             | ○ vernal pool smallscale      | - - - County Boundary                  |
| ● Greene's tuctoria                           | ■ lesser saltscale                | ◆ Caltrans Observed Data | ◆ elderberry                  | + + + Railroad                         |
| ● Henderson's bent grass                      |                                   |                          |                               |  |
| ● Hoover's calycadenia                        |                                   |                          |                               |  |
| ● Hoover's cryptantha                         |                                   |                          |                               |  |

**Figure 4-15**  
 Special-Status Plants in the  
 Merced Vicinity

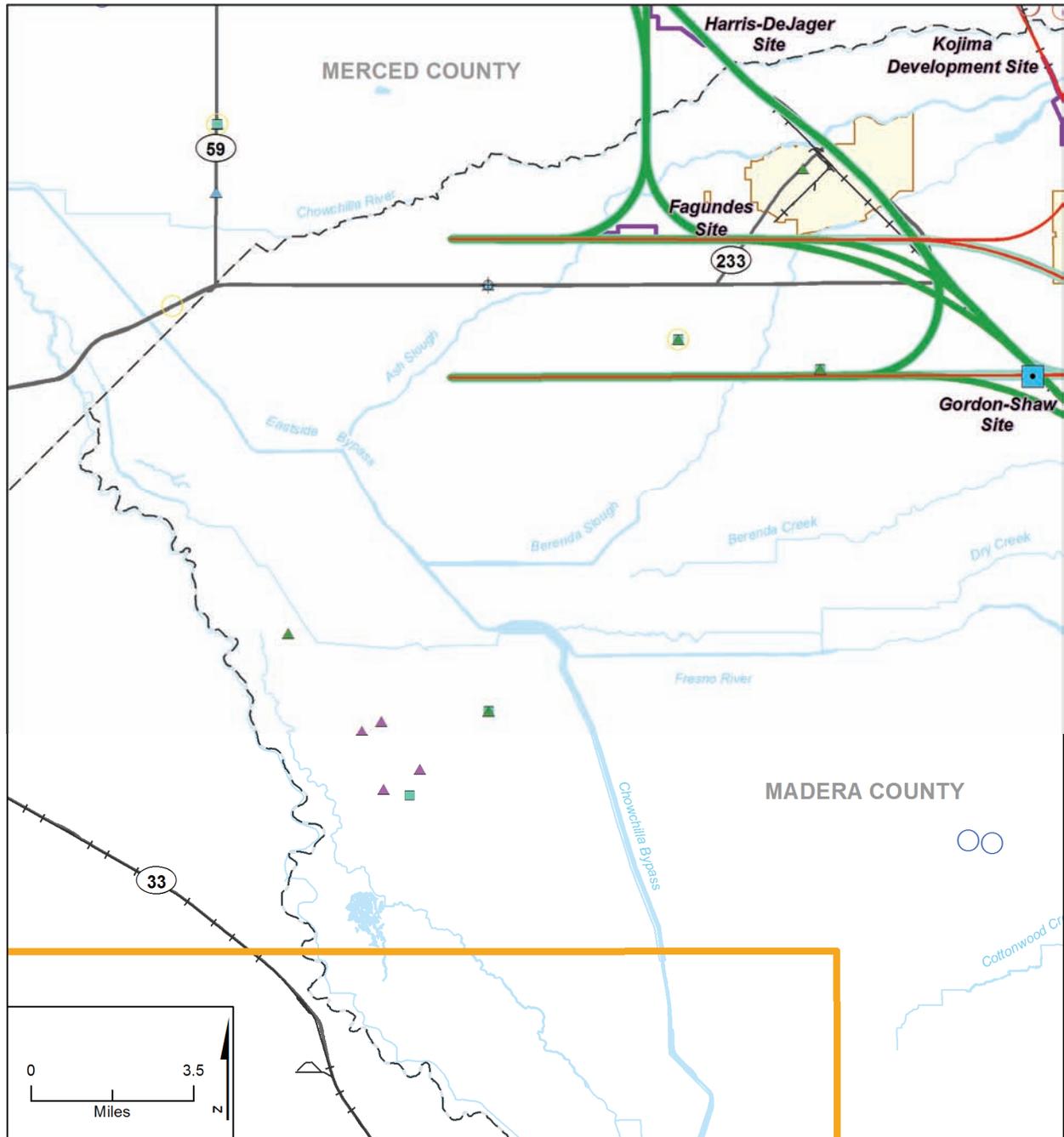


Source: CDFG, CNDDDB (2011), Caltrans

MF\_TR\_BIO\_23\_b Jul 06, 2011

- |   |   |   |  |
|---|---|---|--|
| <p><b>Observed Special-Status Species</b></p> <ul style="list-style-type: none"> <li>■ Sanford's arrowhead</li> </ul> <p><b>CNDDDB Reported Special-Status Species</b></p> <ul style="list-style-type: none"> <li>● Boggs Lake hedge-hyssop</li> <li>● California jewel-flower</li> <li>● California satintail</li> <li>● Colusa grass</li> <li>● Greene's tuctoria</li> <li>● Henderson's bent grass</li> <li>● Hoover's calycadenia</li> <li>● Hoover's cryptantha</li> </ul> | <ul style="list-style-type: none"> <li>◆ Keck's checkerbloom</li> <li>◆ Madera leptosiphon</li> <li>◆ Merced phacelia</li> <li>◆ San Joaquin Valley Orcutt grass</li> <li>◆ Sanford's arrowhead</li> <li>◆ alkali milk-vetch</li> <li>◆ beaked clarkia</li> <li>◆ caper-fruited tropidocarpum</li> <li>◆ dwarf downingia</li> <li>◆ hairy Orcutt grass</li> <li>◆ heartscale</li> <li>◆ lesser saltscale</li> </ul> | <ul style="list-style-type: none"> <li>▲ palmate-bracted bird's-beak</li> <li>▲ pincushion navarretia</li> <li>▲ recurved larkspur</li> <li>▲ shining navarretia</li> <li>○ spiny-sepaled button-celery</li> <li>○ subtle orache</li> <li>○ succulent owl's-clover</li> <li>○ vernal pool smallscale</li> </ul> <p><b>Caltrans Observed Data</b></p> <ul style="list-style-type: none"> <li>◆ elderberry</li> </ul> | <ul style="list-style-type: none"> <li>— UPRR/SR 99 Alternative</li> <li>— BNSF Alternative</li> <li>— Hybrid Alternative</li> <li>▭ Regional Area</li> <li>▭ Potential Heavy Maintenance Facility</li> <li>▭ City Limit</li> <li>- - - County Boundary</li> <li>—+— Railroad</li> </ul> |
|---|---|---|--|

**Figure 4-16**  
 Special-Status Plants in the  
 Le Grand Vicinity

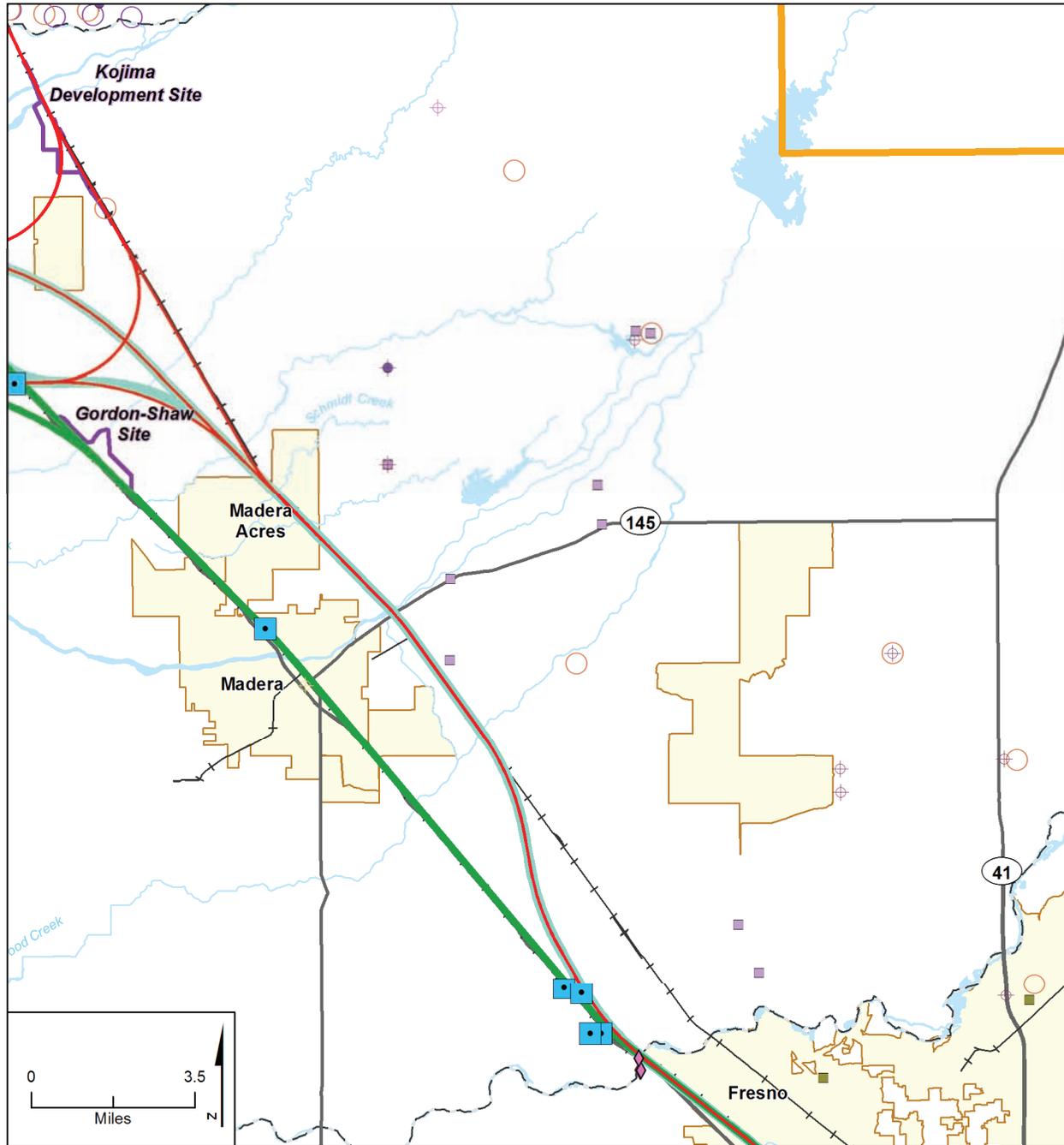


Source: CDFG, CNDDDB (2011), Caltrans

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- |   |   |   |  |
|---|---|---|--|
| <p><b>Observed Special-Status Species</b></p> <ul style="list-style-type: none"> <li>■ Sanford's arrowhead</li> </ul> <p><b>CNDDDB Reported Special-Status Species</b></p> <ul style="list-style-type: none"> <li>● Boggs Lake hedge-hyssop</li> <li>● California jewel-flower</li> <li>● California satintail</li> <li>● Colusa grass</li> <li>● Greene's tuctoria</li> <li>⊕ Henderson's bent grass</li> <li>⊕ Hoover's calycadenia</li> <li>⊕ Hoover's cryptantha</li> </ul> | <ul style="list-style-type: none"> <li>⊕ Keck's checkerbloom</li> <li>⊕ Madera leptosiphon</li> <li>⊕ Merced phacelia</li> <li>⊕ San Joaquin Valley Orcutt grass</li> <li>■ Sanford's arrowhead</li> <li>■ alkali milk-vetch</li> <li>■ beaked clarkia</li> <li>■ caper-fruited tropidocarpum</li> <li>■ dwarf downingia</li> <li>■ hairy Orcutt grass</li> <li>■ heartscale</li> <li>▲ lesser saltscale</li> </ul> | <ul style="list-style-type: none"> <li>▲ palmate-bracted bird's-beak</li> <li>▲ pincushion navarretia</li> <li>▲ recurved larkspur</li> <li>▲ shining navarretia</li> <li>○ spiny-sepaled button-celery</li> <li>○ subtle orache</li> <li>○ succulent owl's-clover</li> <li>○ vernal pool smallscale</li> </ul> <p><b>Caltrans Observed Data</b></p> <ul style="list-style-type: none"> <li>◆ elderberry</li> </ul> | <ul style="list-style-type: none"> <li>— UPRR/SR 99 Alternative</li> <li>— BNSF Alternative</li> <li>— Hybrid Alternative</li> <li>▭ Regional Area</li> <li>■ Potential Heavy Maintenance Facility</li> <li>▭ City Limit</li> <li>- - - County Boundary</li> <li>—+— Railroad</li> </ul> |
|---|---|---|--|

**Figure 4-17**  
 Special-Status Plants South of  
 Chowchilla

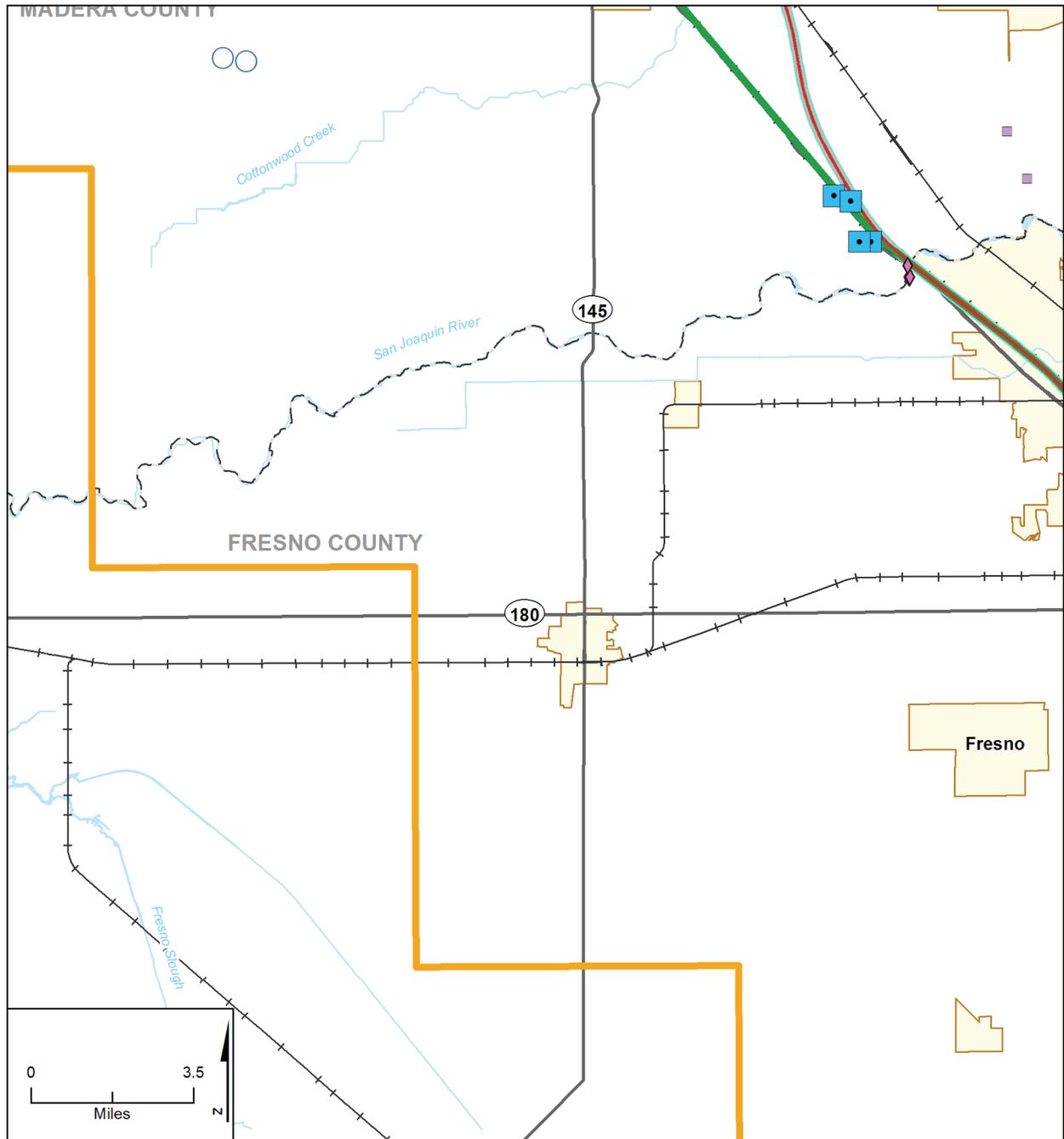


Source: CDFG, CNDDDB (2011), Caltrans

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- |   |   |   |  |
|---|---|---|--|
| <p><b>Observed Special-Status Species</b></p> <ul style="list-style-type: none"> <li>■ Sanford's arrowhead</li> </ul> <p><b>CNDDDB Reported Special-Status Species</b></p> <ul style="list-style-type: none"> <li>● Boggs Lake hedge-hyssop</li> <li>● California jewel-flower</li> <li>● California satintail</li> <li>● Colusa grass</li> <li>● Greene's tuctoria</li> <li>● Henderson's bent grass</li> <li>● Hoover's calycadenia</li> <li>● Hoover's cryptantha</li> </ul> | <ul style="list-style-type: none"> <li>⊕ Keck's checkerbloom</li> <li>⊕ Madera leptosiphon</li> <li>⊕ Merced phacelia</li> <li>⊕ San Joaquin Valley Orcutt grass</li> <li>■ Sanford's arrowhead</li> <li>■ alkali milk-vetch</li> <li>■ beaked clarkia</li> <li>■ caper-fruited tropidocarpum</li> <li>■ dwarf downingia</li> <li>■ hairy Orcutt grass</li> <li>■ heartscale</li> <li>▲ lesser saltscale</li> </ul> | <ul style="list-style-type: none"> <li>▲ palmate-bracted bird's-beak</li> <li>▲ pincushion navarretia</li> <li>▲ recurved larkspur</li> <li>▲ shining navarretia</li> <li>○ spiny-sepaled button-celery</li> <li>○ subtle orache</li> <li>○ succulent owl's-clover</li> <li>○ vernal pool smallscale</li> </ul> <p><b>Caltrans Observed Data</b></p> <ul style="list-style-type: none"> <li>◆ elderberry</li> </ul> | <ul style="list-style-type: none"> <li>— UPRR/SR 99 Alternative</li> <li>— BNSF Alternative</li> <li>— Hybrid Alternative</li> <li>▭ Regional Area</li> <li>■ Potential Heavy Maintenance Facility</li> <li>▭ City Limit</li> <li>- - - County Boundary</li> <li>—+— Railroad</li> </ul> |
|---|---|---|--|

**Figure 4-18**  
 Special-Status Plants in the  
 Madera Vicinity

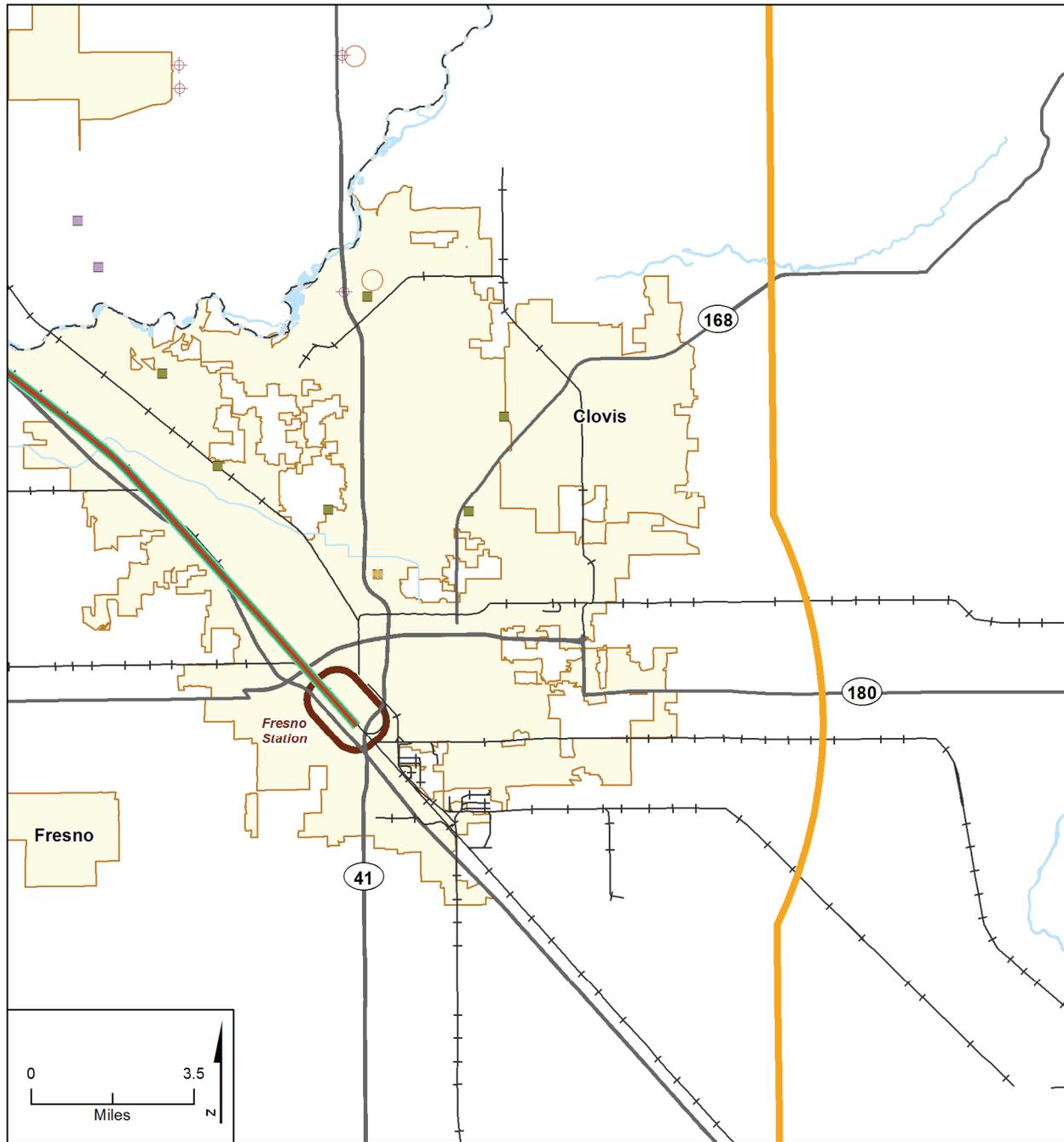


Source: CDFG, CNDDDB (2011), Caltrans

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- |   |                       |                                   |                               |  |
|---|-----------------------|-----------------------------------|-------------------------------|--|
| <b>Observed Special-Status Species</b>        |                       | ◆ Keck's checkerbloom             | ▲ palmate-bracted bird's-beak | — UPRR/SR 99 Alternative               |
| ■ Sanford's arrowhead                         | ◆ Madera leptosiphon  | ◆ Merced phacelia                 | ▲ pincushion navarretia       | — BNSF Alternative                     |
| <b>CNDDDB Reported Special-Status Species</b> |                       | ◆ San Joaquin Valley Orcutt grass | ▲ recurved larkspur           | — Hybrid Alternative                   |
| ● Boggs Lake hedge-hyssop                     | ◆ Sanford's arrowhead | ◆ alkali milk-vetch               | ▲ shining navarretia          | ▭ Regional Area                        |
| ● California jewel-flower                     | ◆ beaked clarkia      | ◆ caper-fruited troidocarpum      | ○ spiny-sepaled button-celery | ▭ Potential Heavy Maintenance Facility |
| ● California satintail                        | ◆ dwarf downingia     | ◆ hairy Orcutt grass              | ○ subtle orache               | ▭ City Limit                           |
| ● Colusa grass                                | ◆ heartscale          | ◆ Hoover's calycadenia            | ○ succulent owl's-clover      | --- County Boundary                    |
| ● Greene's tuctoria                           | ◆ lesser saltscale    | ◆ Hoover's cryptantha             | ○ vernal pool smallscale      | —+— Railroad                           |
| ◆ Henderson's bent grass                      |                       |                                   |                               |  |
| ◆ Hoover's cryptantha                         |                       |                                   |                               |  |
|   |                       | <b>Caltrans Observed Data</b>     | ◆ elderberry                  |  |

**Figure 4-19**  
 Special-Status Plants in  
 Fresno County

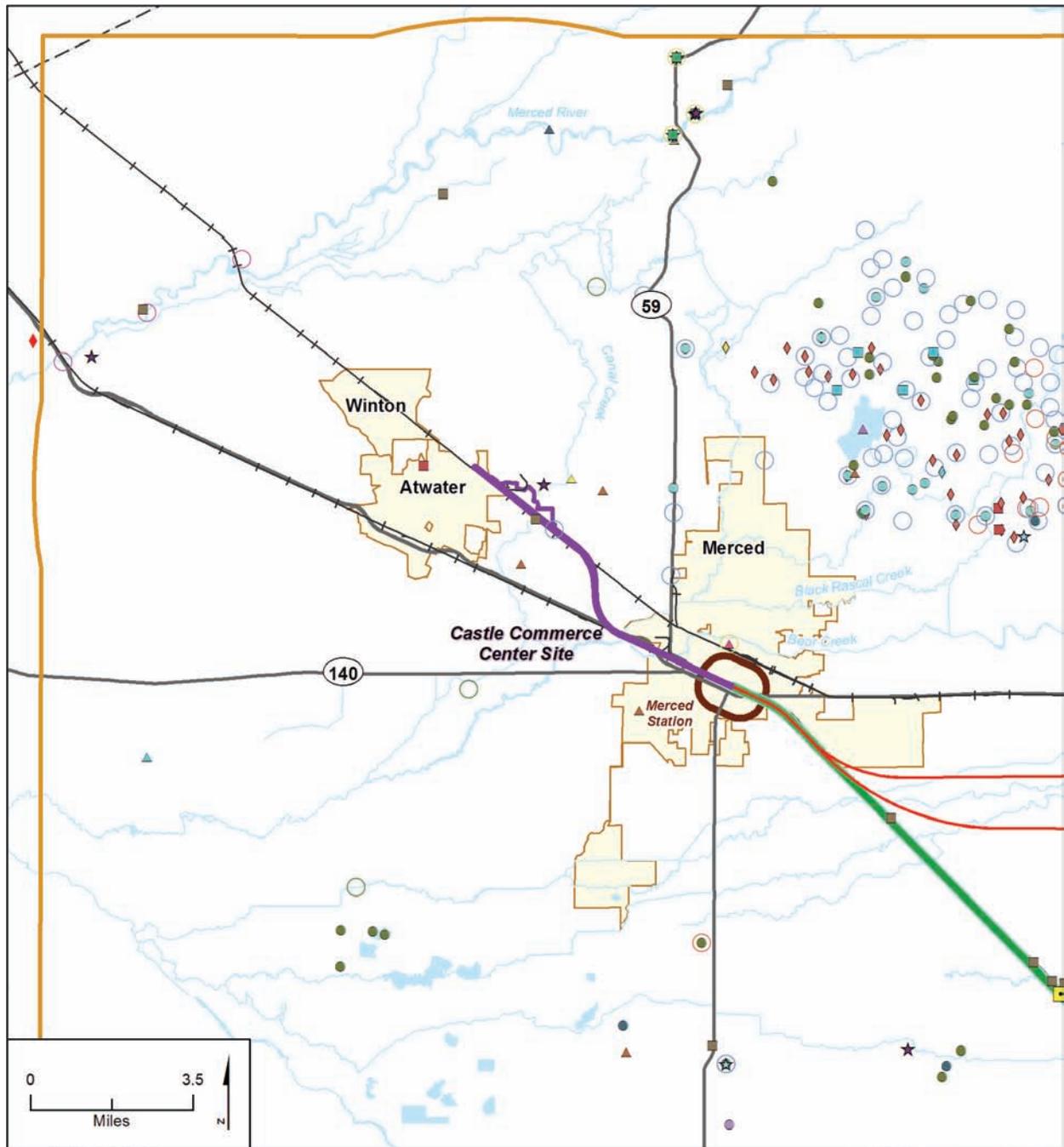


Source: CDFG, CNDDDB (2011), Caltrans

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- |  |   |   |  |
|--|---|---|--|
| <p><b>Observed Special-Status Species</b></p> <ul style="list-style-type: none"> <li>■ Sanford's arrowhead</li> </ul> <p><b>CNDDB Reported Special-Status Species</b></p> <ul style="list-style-type: none"> <li>● Boggs Lake hedge-hyssop</li> <li>● California jewel-flower</li> <li>● California satintail</li> <li>● Colusa grass</li> <li>● Greene's tuctoria</li> <li>● Henderson's bent grass</li> <li>● Hoover's calycadenia</li> <li>● Hoover's cryptantha</li> </ul> | <ul style="list-style-type: none"> <li>◆ Keck's checkerbloom</li> <li>◆ Madera leptosiphon</li> <li>◆ Merced phacelia</li> <li>◆ San Joaquin Valley Orcutt grass</li> <li>■ Sanford's arrowhead</li> <li>■ alkali milk-vetch</li> <li>■ beaked clarkia</li> <li>■ caper-fruited tropidocarpum</li> <li>■ dwarf downingia</li> <li>■ hairy Orcutt grass</li> <li>■ heartscale</li> <li>▲ lesser saltscale</li> </ul> | <ul style="list-style-type: none"> <li>▲ palmate-bracted bird's-beak</li> <li>▲ pincushion navarretia</li> <li>▲ recurved larkspur</li> <li>▲ shining navarretia</li> <li>○ spiny-sepaled button-celery</li> <li>○ subtle orache</li> <li>○ succulent owl's-clover</li> <li>○ vernal pool smallscale</li> </ul> <p><b>Caltrans Observed Data</b></p> <ul style="list-style-type: none"> <li>◆ elderberry</li> </ul> | <ul style="list-style-type: none"> <li>— UPRR/SR 99 Alternative</li> <li>— BNSF Alternative</li> <li>— Hybrid Alternative</li> <li>■ Regional Area</li> <li>■ Potential Heavy Maintenance Facility</li> <li>■ City Limit</li> <li>--- County Boundary</li> <li>— Railroad</li> </ul> |
|--|---|---|--|

**Figure 4-20**  
 Special-Status Plant in the  
 Fresno Vicinity

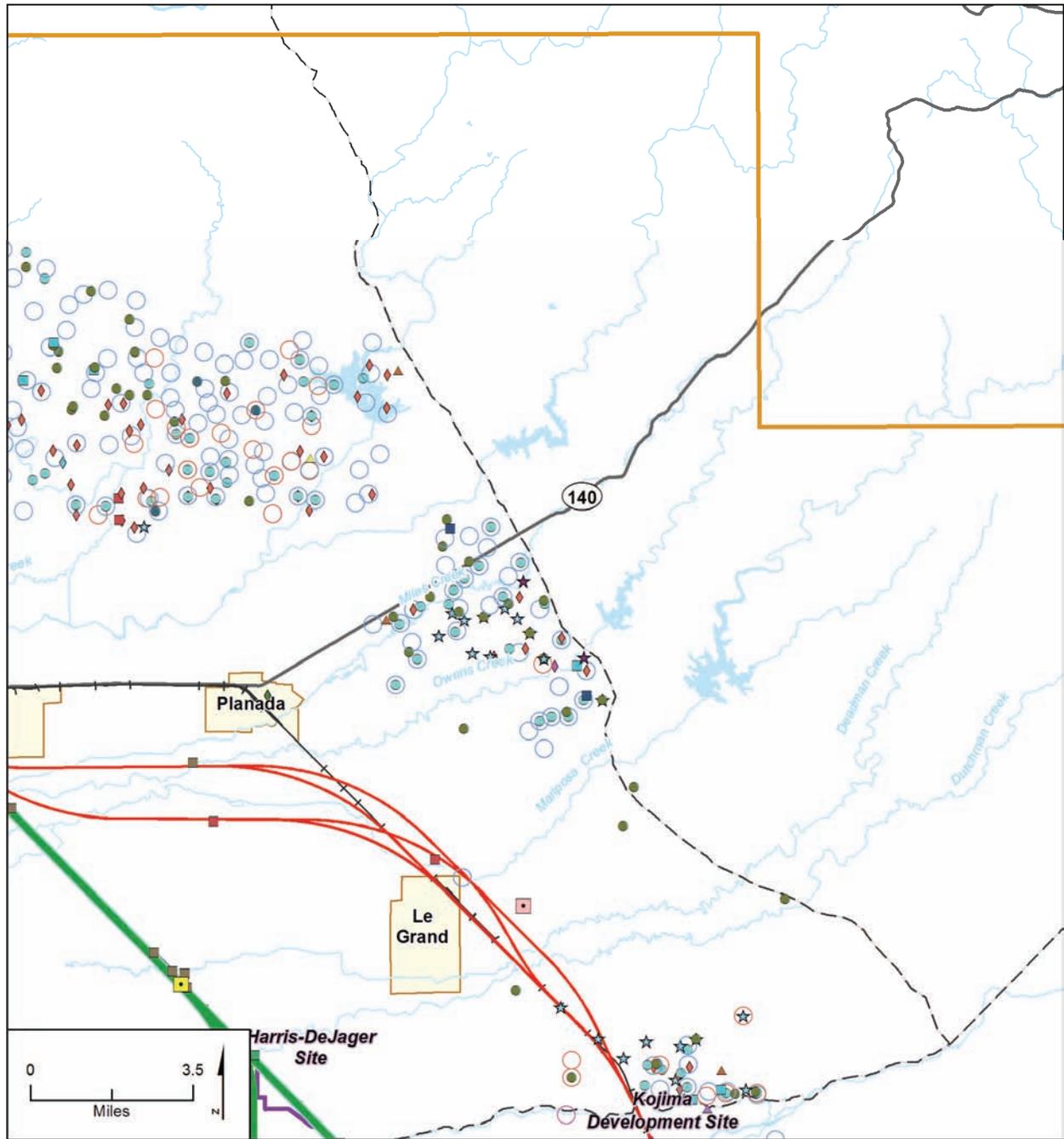


Source: CDFG, CNDDDB (2011)

MF\_TR\_BIO\_24\_a Jul 06, 2011

- |   |  |   |  |
|---|--|---|--|
| <p><b>Observed Special-Status Species</b></p> <ul style="list-style-type: none"> <li>■ loggerhead shrike</li> <li>■ northern harrier</li> <li>■ golden eagle</li> <li>■ yellow-headed blackbird</li> </ul> <p><b>CNDDDB Reported Special-Status Species</b></p> <ul style="list-style-type: none"> <li>● American badger</li> <li>● Antioch efferian robberfly</li> <li>● California horned lark</li> <li>● California linderella</li> <li>● California tiger salamander</li> <li>● Conservancy fairy shrimp</li> <li>● Fresno kangaroo rat</li> <li>● Hurd's metapogon robberfly</li> <li>● Merced kangaroo rat</li> </ul> | <ul style="list-style-type: none"> <li>■ San Joaquin kit fox</li> <li>■ San Joaquin pocket mouse</li> <li>■ Swainson's hawk</li> <li>■ Yuma myotis</li> <li>▲ bald eagle</li> <li>▲ blunt-nosed leopard lizard</li> <li>▲ burrowing owl</li> <li>▲ coast horned lizard</li> <li>▲ ferruginous hawk</li> <li>▲ giant garter snake</li> <li>▲ hardhead</li> <li>▲ hoary bat</li> <li>▲ merlin</li> <li>▲ midvalley fairy shrimp</li> <li>▲ moestan blister beetle</li> </ul> | <ul style="list-style-type: none"> <li>◆ molestan blister beetle</li> <li>◆ mountain plover</li> <li>◆ pallid bat</li> <li>◆ silvery legless lizard</li> <li>○ tricolored blackbird</li> <li>○ valley elderberry longhorn beetle</li> <li>○ vernal pool fairy shrimp</li> <li>○ vernal pool tadpole shrimp</li> <li>○ western mastiff bat</li> <li>★ western pond turtle</li> <li>★ western red bat</li> <li>★ western spadefoot</li> <li>★ western yellow-billed cuckoo</li> </ul> | <ul style="list-style-type: none"> <li>— UPRR/SR 99 Alternative</li> <li>— BNSF Alternative</li> <li>— Hybrid Alternative</li> <li>— Regional Area</li> <li>■ Potential Heavy Maintenance Facility</li> <li>— City Limit</li> <li>— County Boundary</li> <li>— Railroad</li> </ul> |
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**Figure 4-21**  
 Special-Status Animals in the  
 Merced Vicinity

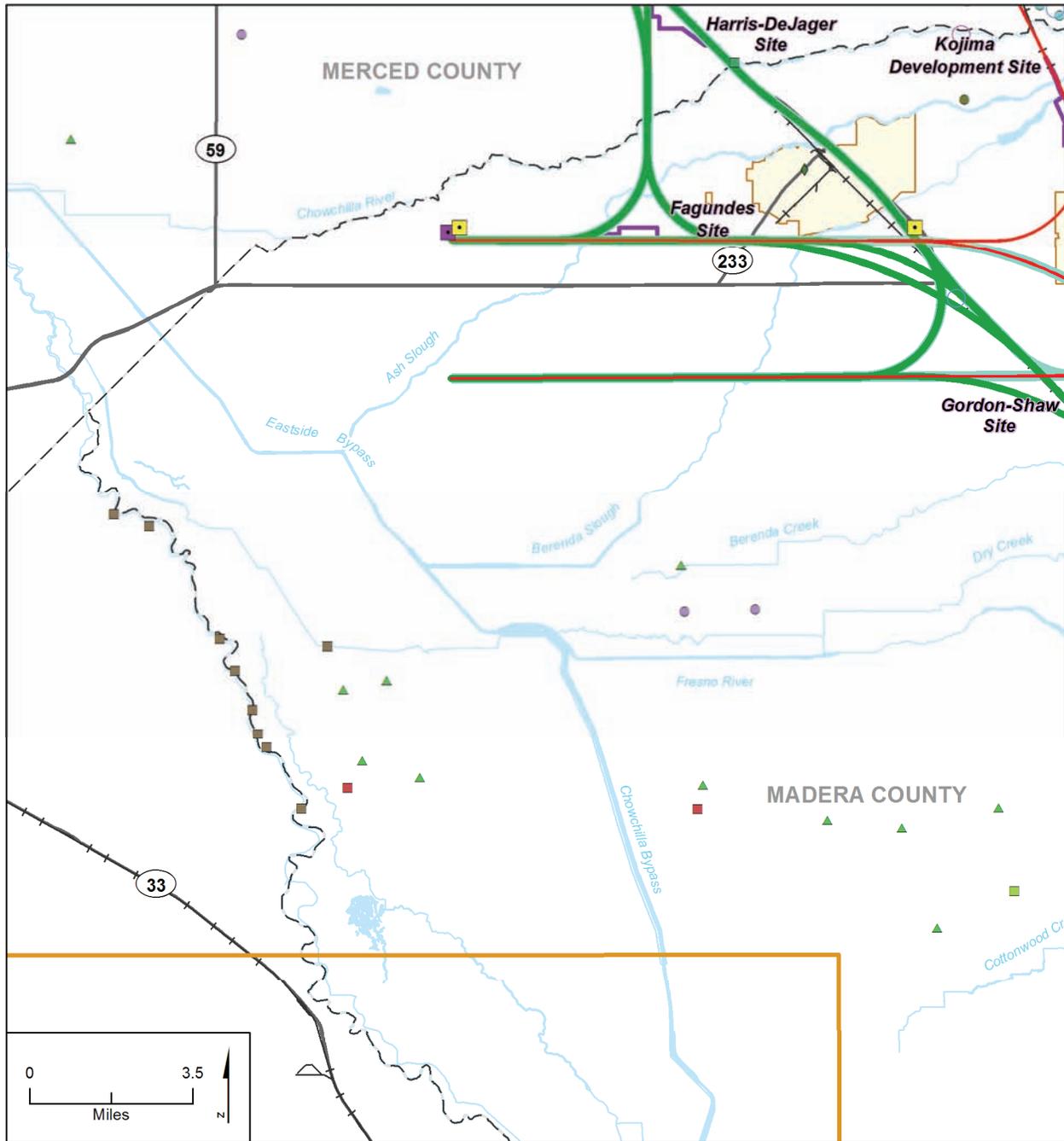


Source: CDFG, CNDDDB (2011)

MF\_TR\_BIO\_24\_b Jul 08, 2011

- |  |  |   |  |
|--|--|---|--|
| <p><b>Observed Special-Status Species</b></p> <ul style="list-style-type: none"> <li>■ loggerhead shrike</li> <li>■ northern harrier</li> <li>■ golden eagle</li> <li>■ yellow-headed blackbird</li> </ul> <p><b>CNDDDB Reported Special-Status Species</b></p> <ul style="list-style-type: none"> <li>● American badger</li> <li>● Antioch efferian robberfly</li> <li>● California horned lark</li> <li>● California linderiella</li> <li>● California tiger salamander</li> <li>● Conservancy fairy shrimp</li> <li>● Fresno kangaroo rat</li> <li>● Hurd's metapogon robberfly</li> <li>● Merced kangaroo rat</li> </ul> | <ul style="list-style-type: none"> <li>■ San Joaquin kit fox</li> <li>■ San Joaquin pocket mouse</li> <li>■ Swainson's hawk</li> <li>■ Yuma myotis</li> <li>▲ bald eagle</li> <li>▲ blunt-nosed leopard lizard</li> <li>▲ burrowing owl</li> <li>▲ coast horned lizard</li> <li>▲ ferruginous hawk</li> <li>▲ giant garter snake</li> <li>▲ hardhead</li> <li>▲ hoary bat</li> <li>▲ merlin</li> <li>▲ midvalley fairy shrimp</li> <li>▲ moestan blister beetle</li> </ul> | <ul style="list-style-type: none"> <li>◆ molestan blister beetle</li> <li>◆ mountain plover</li> <li>◆ pallid bat</li> <li>◆ silvery legless lizard</li> <li>○ tricolored blackbird</li> <li>○ valley elderberry longhorn beetle</li> <li>○ vernal pool fairy shrimp</li> <li>○ vernal pool tadpole shrimp</li> <li>○ western mastiff bat</li> <li>★ western pond turtle</li> <li>★ western red bat</li> <li>★ western spadefoot</li> <li>★ western yellow-billed cuckoo</li> </ul> | <ul style="list-style-type: none"> <li>— UPRR/SR 99 Alternative</li> <li>— BNSF Alternative</li> <li>— Hybrid Alternative</li> <li>— Regional Area</li> <li>■ Potential Heavy Maintenance Facility</li> <li>■ City Limit</li> <li>— County Boundary</li> <li>— Railroad</li> </ul> |
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**Figure 4-22**  
 Special-Status Animals in the Le Grand Vicinity

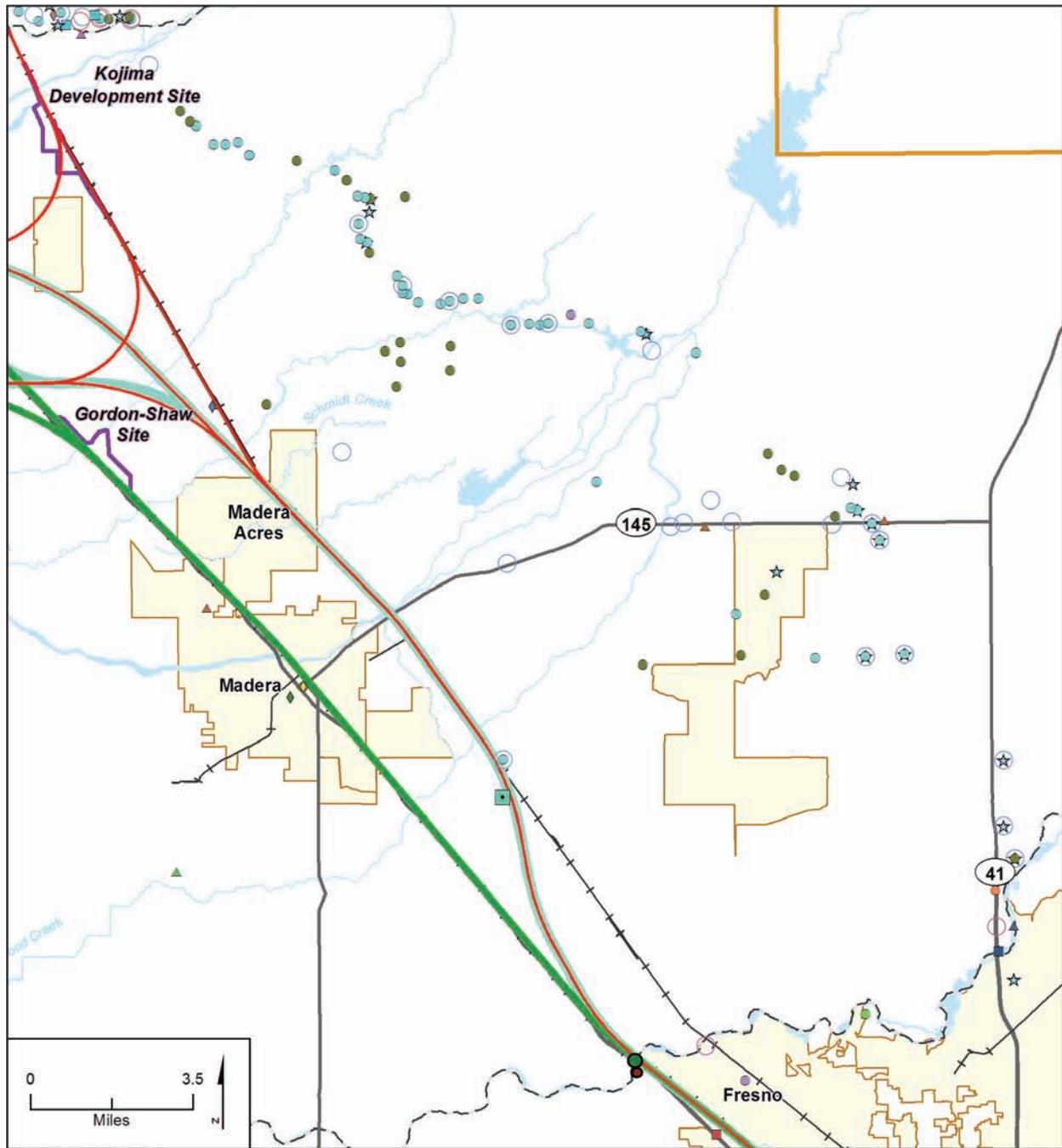


Source: CDFG, CNDDDB (2011)

MF\_TR\_BIO\_24\_c Jul 06, 2011

- |  |  |   |  |
|--|--|---|--|
| <p><b>Observed Special-Status Species</b></p> <ul style="list-style-type: none"> <li>■ loggerhead shrike</li> <li>■ northern harrier</li> <li>■ golden eagle</li> <li>■ yellow-headed blackbird</li> </ul> <p><b>CNDDDB Reported Special-Status Species</b></p> <ul style="list-style-type: none"> <li>● American badger</li> <li>● Antioch efferian robberfly</li> <li>● California horned lark</li> <li>● California linderiella</li> <li>● California tiger salamander</li> <li>● Conservancy fairy shrimp</li> <li>● Fresno kangaroo rat</li> <li>● Hurd's metapogon robberfly</li> <li>■ Merced kangaroo rat</li> </ul> | <ul style="list-style-type: none"> <li>■ San Joaquin kit fox</li> <li>■ San Joaquin pocket mouse</li> <li>■ Swainson's hawk</li> <li>■ Yuma myotis</li> <li>▲ bald eagle</li> <li>▲ blunt-nosed leopard lizard</li> <li>▲ burrowing owl</li> <li>▲ coast horned lizard</li> <li>▲ ferruginous hawk</li> <li>▲ giant garter snake</li> <li>▲ hardhead</li> <li>▲ hoary bat</li> <li>▲ merlin</li> <li>▲ midvalley fairy shrimp</li> <li>▲ moestan blister beetle</li> </ul> | <ul style="list-style-type: none"> <li>◆ molestan blister beetle</li> <li>◆ mountain plover</li> <li>◆ pallid bat</li> <li>◆ silvery legless lizard</li> <li>○ tricolored blackbird</li> <li>○ valley elderberry longhorn beetle</li> <li>○ vernal pool fairy shrimp</li> <li>○ vernal pool tadpole shrimp</li> <li>○ western mastiff bat</li> <li>★ western pond turtle</li> <li>★ western red bat</li> <li>★ western spadefoot</li> <li>★ western yellow-billed cuckoo</li> </ul> | <ul style="list-style-type: none"> <li>— UPRR/SR 99 Alternative</li> <li>— BNSF Alternative</li> <li>— Hybrid Alternative</li> <li>— Regional Area</li> <li>■ Potential Heavy Maintenance Facility</li> <li>— City Limit</li> <li>— County Boundary</li> <li>— Railroad</li> </ul> |
|--|--|---|--|

**Figure 4-23**  
 Special-Status Animals South of Chowchilla

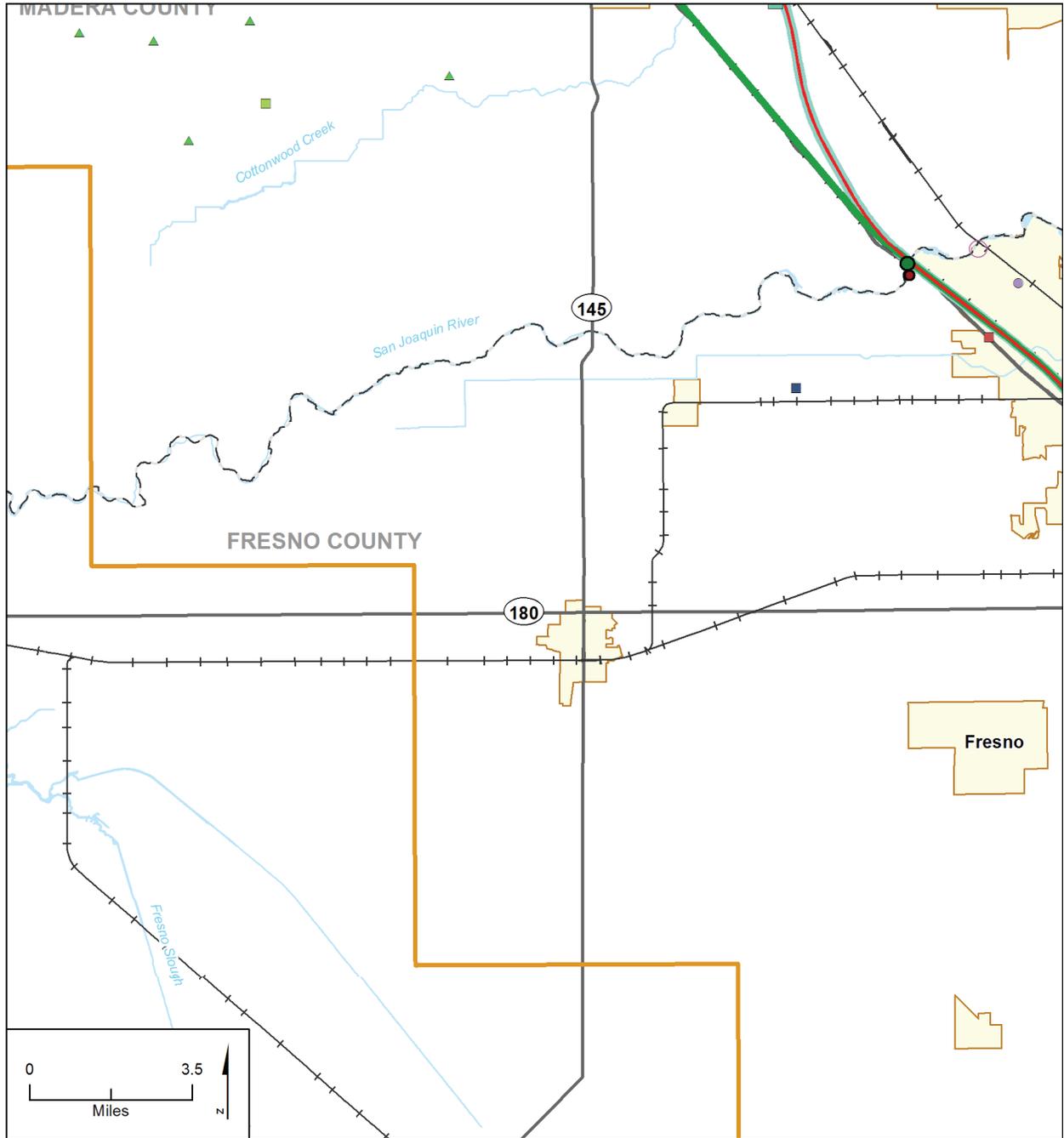


Source: CDFG, CNDDDB (2011)

MF\_TR\_BIO\_24\_d Jul 06, 2011

- |   |  |   |  |
|---|--|---|--|
| <p><b>Observed Special-Status Species</b></p> <ul style="list-style-type: none"> <li>■ loggerhead shrike</li> <li>■ northern harrier</li> <li>■ golden eagle</li> <li>■ yellow-headed blackbird</li> </ul> <p><b>CNDDDB Reported Special-Status Species</b></p> <ul style="list-style-type: none"> <li>● American badger</li> <li>● Antioch efferian robberfly</li> <li>● California horned lark</li> <li>● California linderella</li> <li>● California tiger salamander</li> <li>● Conservancy fairy shrimp</li> <li>● Fresno kangaroo rat</li> <li>● Hurd's metapogon robberfly</li> <li>■ Merced kangaroo rat</li> </ul> | <ul style="list-style-type: none"> <li>■ San Joaquin kit fox</li> <li>■ San Joaquin pocket mouse</li> <li>■ Swainson's hawk</li> <li>■ Yuma myotis</li> <li>▲ bald eagle</li> <li>▲ blunt-nosed leopard lizard</li> <li>▲ burrowing owl</li> <li>▲ coast horned lizard</li> <li>▲ ferruginous hawk</li> <li>▲ giant garter snake</li> <li>▲ hardhead</li> <li>▲ hoary bat</li> <li>▲ merlin</li> <li>▲ midvalley fairy shrimp</li> <li>▲ moestan blister beetle</li> </ul> | <ul style="list-style-type: none"> <li>◆ molestan blister beetle</li> <li>◆ mountain plover</li> <li>◆ pallid bat</li> <li>◆ silvery legless lizard</li> <li>○ tricolored blackbird</li> <li>○ valley elderberry longhorn beetle</li> <li>○ vernal pool fairy shrimp</li> <li>○ vernal pool tadpole shrimp</li> <li>○ western mastiff bat</li> <li>★ western pond turtle</li> <li>★ western red bat</li> <li>★ western spadefoot</li> <li>★ western yellow-billed cuckoo</li> </ul> | <ul style="list-style-type: none"> <li>— UPRR/SR 99 Alternative</li> <li>— BNSF Alternative</li> <li>— Hybrid Alternative</li> <li>— Regional Area</li> <li>■ Potential Heavy Maintenance Facility</li> <li>■ City Limit</li> <li>— County Boundary</li> <li>— Railroad</li> </ul> |
|---|--|---|--|

**Figure 4-24**  
 Special-Status Animals in the  
 Madera Vicinity



Source: CDFG, CNDDDB (2011)

MF\_TR\_BIO\_24\_e Jul 06, 2011

**Observed Special-Status Species**

- loggerhead shrike
- northern harrier
- golden eagle
- yellow-headed blackbird

**CNDDDB Reported Special-Status Species**

- American badger
- Antioch efferian robberfly
- California horned lark
- California linderiella
- California tiger salamander
- Conservancy fairy shrimp
- Fresno kangaroo rat
- Hurd's metapogon robberfly
- Merced kangaroo rat

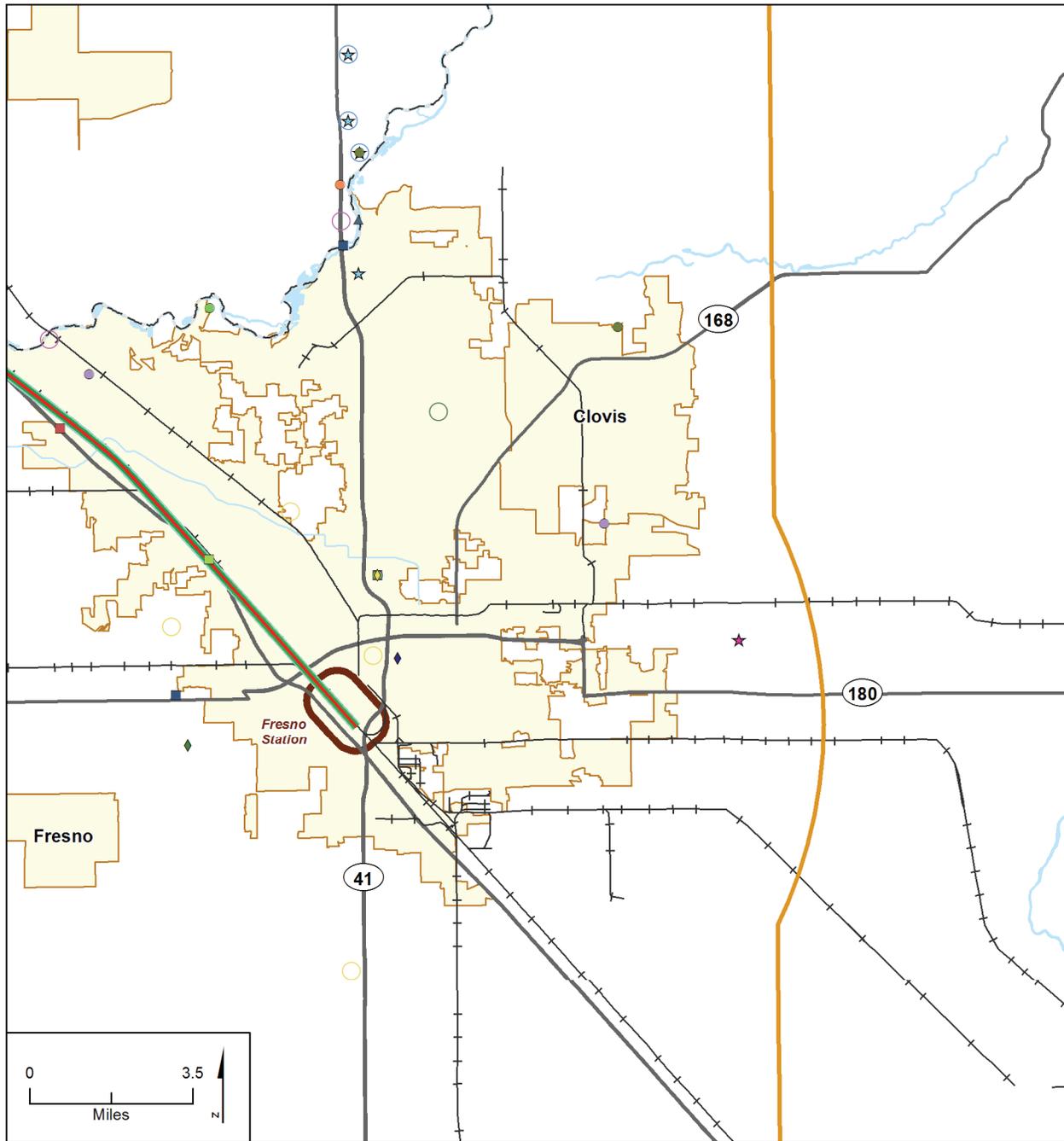
- San Joaquin kit fox
- San Joaquin pocket mouse
- Swainson's hawk
- Yuma myotis
- ▲ bald eagle
- ▲ blunt-nosed leopard lizard
- ▲ burrowing owl
- ▲ coast horned lizard
- ▲ ferruginous hawk
- ▲ giant garter snake
- ▲ hardhead
- ◆ hoary bat
- ◆ merlin
- ◆ midvalley fairy shrimp
- ◆ moestan blister beetle

- ◆ moestan blister beetle
- ◆ mountain plover
- ◆ pallid bat
- ◆ silvery legless lizard
- tricolored blackbird
- valley elderberry longhorn beetle
- vernal pool fairy shrimp
- vernal pool tadpole shrimp
- western mastiff bat
- ★ western pond turtle
- ★ western red bat
- ★ western spadefoot
- ★ western yellow-billed cuckoo

- UPRR/SR 99 Alternative
- BNSF Alternative
- Hybrid Alternative
- Regional Area
- Potential Heavy Maintenance Facility
- City Limit
- County Boundary
- Railroad

**Figure 4-25**  
 Special-Status Animals in  
 Fresno County





Source: CDFG, CNDDDB (2011)

MF\_TR\_BIO\_24\_f Jul 06, 2011

- |  |  |   |  |
|--|--|---|--|
| <p><b>Observed Special-Status Species</b></p> <ul style="list-style-type: none"> <li>■ loggerhead shrike</li> <li>■ northern harrier</li> <li>■ golden eagle</li> <li>■ yellow-headed blackbird</li> </ul> <p><b>CNDDDB Reported Special-Status Species</b></p> <ul style="list-style-type: none"> <li>● American badger</li> <li>● Antioch efferian robberfly</li> <li>● California horned lark</li> <li>● California linderiella</li> <li>● California tiger salamander</li> <li>● Conservancy fairy shrimp</li> <li>■ Fresno kangaroo rat</li> <li>■ Hurd's metapogon robberfly</li> <li>■ Merced kangaroo rat</li> </ul> | <ul style="list-style-type: none"> <li>■ San Joaquin kit fox</li> <li>■ San Joaquin pocket mouse</li> <li>■ Swainson's hawk</li> <li>■ Yuma myotis</li> <li>▲ bald eagle</li> <li>▲ blunt-nosed leopard lizard</li> <li>▲ burrowing owl</li> <li>▲ coast horned lizard</li> <li>▲ ferruginous hawk</li> <li>▲ giant garter snake</li> <li>▲ hardhead</li> <li>▲ hoary bat</li> <li>▲ merlin</li> <li>▲ midvalley fairy shrimp</li> <li>▲ moestan blister beetle</li> </ul> | <ul style="list-style-type: none"> <li>◆ molestan blister beetle</li> <li>◆ mountain plover</li> <li>◆ pallid bat</li> <li>◆ silvery legless lizard</li> <li>○ tricolored blackbird</li> <li>○ valley elderberry longhorn beetle</li> <li>○ vernal pool fairy shrimp</li> <li>○ vernal pool tadpole shrimp</li> <li>○ western mastiff bat</li> <li>★ western pond turtle</li> <li>★ western red bat</li> <li>★ western spadefoot</li> <li>★ western yellow-billed cuckoo</li> </ul> | <ul style="list-style-type: none"> <li>— UPRR/SR 99 Alternative</li> <li>— BNSF Alternative</li> <li>— Hybrid Alternative</li> <li>■ Regional Area</li> <li>■ Potential Heavy Maintenance Facility</li> <li>■ City Limit</li> <li>— County Boundary</li> <li>— Railroad</li> </ul> |
|--|--|---|--|

**Figure 4-26**  
 Special-Status Animals in the  
 Fresno Vicinity

Three of these communities were identified during reconnaissance level habitat mapping surveys and are described above under the corresponding CWHR habitat classification descriptions (i.e., Great Valley mixed riparian forest is equivalent to both cottonwood-willow riparian and mixed riparian forest and woodland; vernal pool is described under California annual grassland; and coastal and valley freshwater marsh is equivalent to freshwater emergent wetland). The three remaining sensitive biological communities identified in the regional area but not in the habitat study area (i.e., valley sacaton grassland, valley sink scrub, and sycamore alluvial woodland) are described in the following sections.

### **Valley Sacaton Grassland**

Valley sacaton grassland is characterized by mid-height tussock-forming grassland dominated by alkali sacaton (*Sporobolus airoides*). This natural community was formerly extensive in the Tulare Lake Basin and along the San Joaquin Valley north to Stanislaus and Contra Costa counties; however, its distribution is currently much reduced. Site factors include fine-textured, poorly drained, usually alkaline soils. Most sites have seasonally high water tables or are inundated during winter flooding.

### **Valley Sink Scrub**

The valley sink scrub community formerly surrounded the large San Joaquin Valley lakes (Kern, Buena Vista, Tulare, and Goose) and ran north along the trough of the San Joaquin Valley through Merced County to the grasslands of the Sacramento Valley (Solano to Glenn County, west of the Sacramento River); however, this community is now essentially extirpated due to flood control, agricultural developments, and groundwater pumping. It is characterized by low, open to dense succulent shrublands dominated by alkali-tolerant plants in the Chenopodiaceae family, especially iodinebush (*Allenrolfea occidentalis*) or several seepweed (*Sueda*) species. Understory vegetation in this community is usually lacking, although sparse herbaceous cover dominated by foxtail chess (*Bromus madritensis* ssp. *rubens*) occasionally develops. Site factors include heavy saline and/or alkaline clays of lakebeds or playas. High groundwater provides capillary water for the perennials in this community. Soil surfaces often have a brilliant white salty crust over dark, sticky clay.

### **Sycamore Alluvial Woodland**

Sycamore alluvial woodland is open to moderately closed, winter-deciduous broad-leaved riparian woodland overwhelmingly dominated by well-spaced California sycamore (*Platanus racemosa*). Species in the sub-canopy include widely spaced buckeye (*Aesculus californica*) and elderberry (*Sambucus mexicana*). The understory usually consists of grasses. This woodland community is generally found adjacent to intermittent streams that rely on rainfall, rather than snowmelt. It is found in the South Coast Ranges, from Alameda to Santa Barbara counties.

#### **4.2.1.2 Jurisdictional Waters**

##### **Wetlands**

Wetland types identified within the region include palustrine emergent wetlands such as freshwater marsh, retention basins and agricultural tailwater ponds. Vernal pools are also a type of palustrine emergent wetland; however, because of their importance as special-status species habitat, vernal pools and other seasonal wetlands are discussed and mapped separately in this report. Wetlands identified in the wetland resource study area are shown in the *Merced to Fresno Section Wetlands Delineation Report* (Authority and FRA 2011a).

All wetlands identified within the wetland resource study area are considered jurisdictional based on the preliminary JD option as described in the Jurisdictional Determinations, Regulatory Guidance Letter (USACE 2008). Wetlands are described under Section 5.1, Jurisdictional Waters.

## Other Waters

Nonwetland waters investigated in the wetland resource study area include natural and constructed watercourses. Natural watercourses include rivers, creeks, and sloughs while constructed watercourses include primarily agricultural canals (see the *Merced to Fresno Section Wetlands Delineation Report* [Authority and FRA 2011a]). All but one of the natural watercourses was determined to potentially support one or more special-status fishes.

All natural and constructed waterways are considered potentially jurisdictional under the preliminary JD format (USACE 2008).

### **4.2.1.3 Designated Critical Habitat**

Designated critical habitats are geographic areas currently occupied and provide essential habitat for one or more federally-listed threatened or endangered species. Under the federal ESA, conservation is defined as “any and all methods and procedures used to bring a species to recovery; the point at which the protections of the federal ESA are no longer needed” (3(3), 16 U.S.C. § 1532(2)).

Critical habitat is designated for 10 species within the regional area. Critical habitat for the following five species is present within the habitat study area along the BNSF alignment near the community of Le Grand in Merced County: 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*), and Greene's tuctoria (*Tuctoria greenei*). Critical habitat for vernal pool tadpole shrimp and vernal pool fairy shrimp is also present within approximately 50 feet of the habitat study area along the UPRR corridor, north of East Sandy Mush Road in Merced County (see the *Merced to Fresno Section Wetlands Delineation Report* [Authority and FRA 2011a]). Critical habitat for Hoover's spurge (*Chamaesyce hooveri*), hairy Orcutt grass (*Orcuttia pilosa*), Central Valley steelhead (*Oncorhynchus mykiss*), California tiger salamander (*Ambystoma californiense*), and Fresno kangaroo rat (*Dipodomys nitratoides exilis*) has been designated in the regional area, but does not occur within the habitat study area (see the *Merced to Fresno Section Wetlands Delineation Report* [Authority and FRA 2011a]).

### **4.2.1.4 Essential Fish Habitat**

Essential fish habitat 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 cover all habitat types used by a species throughout its life cycle. The Magnuson-Stevens Fisheries Conservation and Management Act 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 essential fish habitat. Adversely affect means any impact that reduces the quality and/or quantity of essential fish habitat. Adverse effects may include direct (e.g., contamination; physical disruption), indirect (e.g., loss of prey), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (NMFS 2009).

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

Though essential fish habitat 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 segment 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, the 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 2005). Essential fish habitat above the Merced River confluence, while potentially suitable for Chinook salmon, is largely, if not entirely, unoccupied due to habitat degradation and this managed fish barrier.

As a result of the San Joaquin River Restoration Program (SJRRP) Settlement (Natural Resources Defense Council [NRDC] 2005), the U.S. Bureau of Reclamation has implemented the SJRRP (Reclamation et al. 2009). 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. Spring-run Chinook salmon are scheduled to be reintroduced to the San Joaquin River no later than December 2012 (Reclamation et al. 2009).

#### 4.2.1.5 Core Areas for Recovery of Federally-Listed Species

The USFWS develops recovery plans for each federally-listed species. "Recovery" is the term that the USFWS uses to stem the population decline of an endangered or threatened species. When a species is deemed recovered under the provisions of the recovery plan, protection under the federal ESA is no longer necessary.

Recovery plans specify management plans for private, federal, and state cooperation in reducing threats to a listed species. Recovery actions within core recovery areas are specified for each entity. The recovery areas provide essential habitat for these species and are the focus of recovery efforts. A recovery plan is a nonregulatory document.

Recovery plans exist for 19 plant species and 6 wildlife species in the regional area. Plant species include San Joaquin wooly threads (*Monolopia congdonii*), California jewel flower (*Caulanthus californicus*), Merced monardella (*Monardella leucocephala*), Merced phacelia (*Phacelia ciliata* var. *opaca*), palmate-bracted bird's-beak (*Cordylanthus palmatus*), lesser saltscale (*Atriplex minuscula*), Munz's tidy-tips (*Layia munzii*), Lost Hills crownscale (*Atriplex vallicola*), alkali milkvetch (*Astragalus tener* var. *tener*), Boggs Lake hedge-hyssop (*Gratiola heterosepala*), Colusa grass (*Neostapfia colusana*), Greene's tuctoria (*Tuctoria greenei*), hairy Orcutt grass, Hoover's spurge, little mousetail (*Myosurus minimus* ssp. *apus*), San Joaquin Valley Orcutt grass, spiny-sepaled button celery (*Eryngium spinosepalum*), succulent owl's-clover, and vernal pool smallscale (*Atriplex persistens*). Wildlife species include vernal pool fairy shrimp, vernal pool tadpole shrimp, blunt nosed leopard lizard (*Gambelia sila*), giant garter snake (*Thamnophis gigas*), Fresno kangaroo rat, and San Joaquin kit fox (*Vulpes macrotis mutica*).

The Grassland Ecological Area (GEA) has been identified by the USFWS as a core recovery area for vernal pool fairy shrimp and vernal pool tadpole shrimp (USFWS 2005). The GEA has also been identified as critical habitat for both species.

Blunt-nosed leopard lizard and giant garter snake do not have recovery areas within the regional area (USFWS 1997, 1998).

Protecting natural land between the Alkali Sink Ecological Reserve and the San Joaquin River to the north (Sandy Mush Road/South Grasslands Area) is an identified "critical recovery action" for the Fresno kangaroo rat (USFWS 1998a). Subsequent to the 1998 recovery plan, the Endangered Species Recovery Program has stated that there are no known populations of Fresno kangaroo rat within the historical geographic range in Merced, Madera, and Fresno counties (ESRP 2006).

Linking the undeveloped natural areas surrounding Sandy Mush Road natural lands east of Merced is listed as a key recovery action for populations of San Joaquin kit fox in the *Draft Recovery Plan for Upland Species of the San Joaquin Valley, California* (USFWS 1998a).

#### 4.2.1.6 Mitigation Banks/Reserves

Mitigation banks and reserves are large blocks of land that are preserved, restored, and enhanced for the purpose of mitigating for projects that take special-status species, wetlands, or sensitive plant communities. The mitigation banks and reserves described below are established or proposed in the habitat study area.

- The Great Valley Conservation Bank, which covers a portion of the BNSF Alternative, is located southeast of Le Grand near Santa Fe Avenue and Marguerite Road. This 1,067-acre bank site includes existing vernal pools and other seasonal wetlands and California annual grassland within designated 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 (*Ambystoma californiense*), vernal pool tadpole shrimp, vernal pool fairy shrimp, western spadefoot (*Spea hammondi*), western burrowing owl, and San Joaquin kit fox. The bank is currently active (CH2M HILL 2010a, 2010b). In addition to the documented essential connectivity area, there are a series of riparian corridors that provide cover for free-ranging mammals, including areas along the Berenda Creek and Berenda Slough, which have been referenced by the Information Center for the Environment (Huber 2007) as wildlife corridors.
- Camp Pashayan, a 31-acre property located just east of the UPRR bridge on the south side of the San Joaquin River in Fresno, is within each of the HST alternatives (Figure 4-14). The California Wildlife Conservation Board acquired the property 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 a part of the San Joaquin River Ecological Reserve. A number of properties comprise the ecological reserve, and all of these properties are within the San Joaquin River Parkway. The parkway is comprised of those 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. The CDFG and the Conservation Trust jointly own and operate Camp Pashayan.
- Sensitive species such as Sanford's arrowhead (*Sagittaria sanfordii*), 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 has ownership on a 4.9-acre parcel near Le Grand (Le Grand Unit). The purpose of CDFG ownership is to provide wetland conservation opportunities. The parcel, which 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 (CDFG 2010), and is not further discussed as a specific CDFG-designated property. However, it is still a biological resource with the potential for mitigation/compensation opportunities.

#### 4.2.1.7 Wildlife Movement Corridors

Wildlife linkages are planning areas that, among other services, provide broad connections for wildlife movement between two or more habitat areas. The following discussion presents the chronology of landscape linkage and wildlife movement planning efforts within the Merced to Fresno Section study area and vicinity. Specifically, this discussion includes the following designated and modeled corridor areas:

- Sandy Mush Road Area for San Joaquin Valley Species Conservation
- Designation of the Madera-Merced Linkage
- Designation of the Eastman Lake-Bear Creek ECA
- Modeled Wildlife Corridors

### Sandy Mush Road Area for San Joaquin Valley Species Conservation

In 1998, the USFWS published the *Draft Recovery Plan for Upland Species of the San Joaquin Valley, California* (USFWS 1998a). Among other goals, this plan promoted the Sandy Mush Road area for its high biological function and value. Sandy Mush Road originates at the intersection of Nickel Road (about 13 miles northwest of Los Banos) and extends approximately 20 miles eastward to Plainsburg Road, immediately east of SR 99. From a habitat perspective, Sandy Mush Road largely follows the Dutchman Creek corridor, which crosses the UPRR/SR 99 Alternative just north of the potential Harris-DeJager HMF site, and crosses the BNSF and Hybrid alternatives south of Le Grand. With the exception of roadways and scattered urban centers, land use in the Sandy Mush Road area near the HST alternatives is almost entirely agricultural. Land use near the western origin of Sandy Mush Road is also agricultural, but is near the southern boundary of the Great Valley Grasslands State Park (GVGSP), which comprises expansive native grasslands and wetland complexes. GVGSP is part of the larger Grasslands Ecological Area, an approximately 160,000-acre habitat preserve located within the historic floodplain of the San Joaquin River.

To meet the objective of delisting species and to ensure the long-term conservation of other species, USFWS (1998a) adopted an ecosystem-level strategy that proposed a network of reserves and conservation areas, connected via linkages, which comprise many natural communities in San Joaquin upland ecosystems (USFWS 1998a). This ecosystem-level strategy seeks to connect areas of suitable habitat through the establishment of habitat linkages. The USFWS notes conservation of lands and linkages near Sandy Mush Road as a Priority 2 action (1998a). Priority 2 actions are those that must be taken to prevent a significant decline in a species' population or a decline in habitat quality or some other negative impact short of extinction.

Specific conservation goals USFWS (1998a) presented for the Sandy Mush Road area include:

- Protect natural land between the Alkali Sink Ecological Reserve and the San Joaquin River to the north (Sandy Mush Road/South Grasslands Area).
- Create a chain of habitat islands on the San Joaquin Valley floor that, together with establishing valley floor linkages through agricultural lands, link Merced County National Wildlife Refuges and state areas and other natural lands with the northwestern and northeastern portions of the San Joaquin Valley and with natural areas to the south.
- Maintain and enhance movement of San Joaquin kit fox between the Mendota area, Fresno County, natural lands in western Madera County, and natural lands along Sandy Mush Road and in the wildlife refuges and easement lands of Merced County. Specifically, maintain and enhance the Chowchilla or Eastside Bypass and natural lands along this corridor through acquisition, easement, or safe harbor initiatives.
- Link natural lands in the Sandy Mush Road area of Merced County with the population of San Joaquin kit fox on natural lands to the east by a safe harbor initiative on farmland.

Later work by conservation biologists recommended that San Joaquin kit fox be conserved aggressively in southwestern Merced County, which is currently understood to be the northern-most limit of self-sustaining populations of this species (Constable et al. 2009). The Sandy Mush Road area intersection of the HST alternatives is north of southwestern Merced County.

### Designation of the Madera-Merced Linkage

In late 2000, The Nature Conservancy of California and the California Wilderness Coalition formed the Missing Linkages Project and compiled habitat corridor information to promote and support a process to "*maintain a network of interconnected public and private conservation areas throughout [California]...*"

The proceedings of this effort were published in a document called "Missing Linkages: Restoring Connectivity to the California Landscape" (Penrod et al. 2001). Among other things, this planning 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 or 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.

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.

Of the approximately 232 linkages evaluated during this initial process, 136 (59%) were ranked as severely threatened. Considering target species present, conservation opportunity, overall threat, and documentation availability, 54 linkages were identified as high-priority sites, 99 were ranked as medium-priority sites, and 79 were ranked as low-priority sites. "Priority" as used in this ranking process denoted preservation/planning urgency.

Twenty-seven of the 232 linkages were identified within the Central Valley of California. Of these, 8 were ranked as high priority, 9 were ranked as medium-priority, and 10 were ranked as high conservation priority linkages. Penrod et al. (2001) identified the area near Deadman Creek and Dutchman Creek, near Sandy Mush Road and Le Grand, as the "Madera-Merced Linkage." This linkage is ranked as a high-priority choke-point and missing link. It is reportedly severely threatened, with only moderate conservation potential, reflecting existing functional impairments due to development.

### **Designation of the Eastman Lake-Bear Creek Essential Connectivity Area**

In August 2008, California Assembly Bill (AB) 2785 was passed into law to amend California Fish and Game Code and to revise the existing Significant Natural Areas Program to direct the CDFG to, among other things:

*"...investigate, study, and identify those areas in the state that are most essential as wildlife corridors and habitat linkages and prioritize vegetative data development in those areas. The bill would require the department to develop and maintain high-quality spatial data on vegetation and land cover that is standardized statewide, and to develop and maintain a spatial data system that identifies those areas in the state that are most essential for maintaining habitat connectivity, including wildlife corridors and habitat linkages. The bill would require the department to make all of the described data sets and associated analytical products available to the public and other government entities. The bill would require the department to actively pursue grants and cost-sharing opportunities with local, state, or federal agencies, or private entities that use the data sets and benefit from their creation and maintenance." (AB 2785).*

In 2010, the California Department of Transportation and the CDFG collaboratively published *The California Essential Habitat Connectivity Project: A Strategy for Conserving a Connected California* (Spencer et al. 2010). This project was commissioned in response to the passage of AB 2785.

The Essential Habitat Connectivity Project produced maps, data, and mitigation guidelines for ECAs, which were defined as areas essential for ecological connectivity between natural landscape blocks. Using GIS modeling processes very similar to those used by the Missing Linkages Project, Spencer et al. (2010) identified 192 ECAs within California linking blocks of habitat thought to be beneficial to wildlife.

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. Within this ecoregion, 54 ECAs were identified, with 7 of those in the vicinity of the Merced to Fresno Section study area (Figure 4-27). 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, the Merced to Fresno Section of the HST project would intersect only the Eastman Lake-Bear Creek ECA. 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."

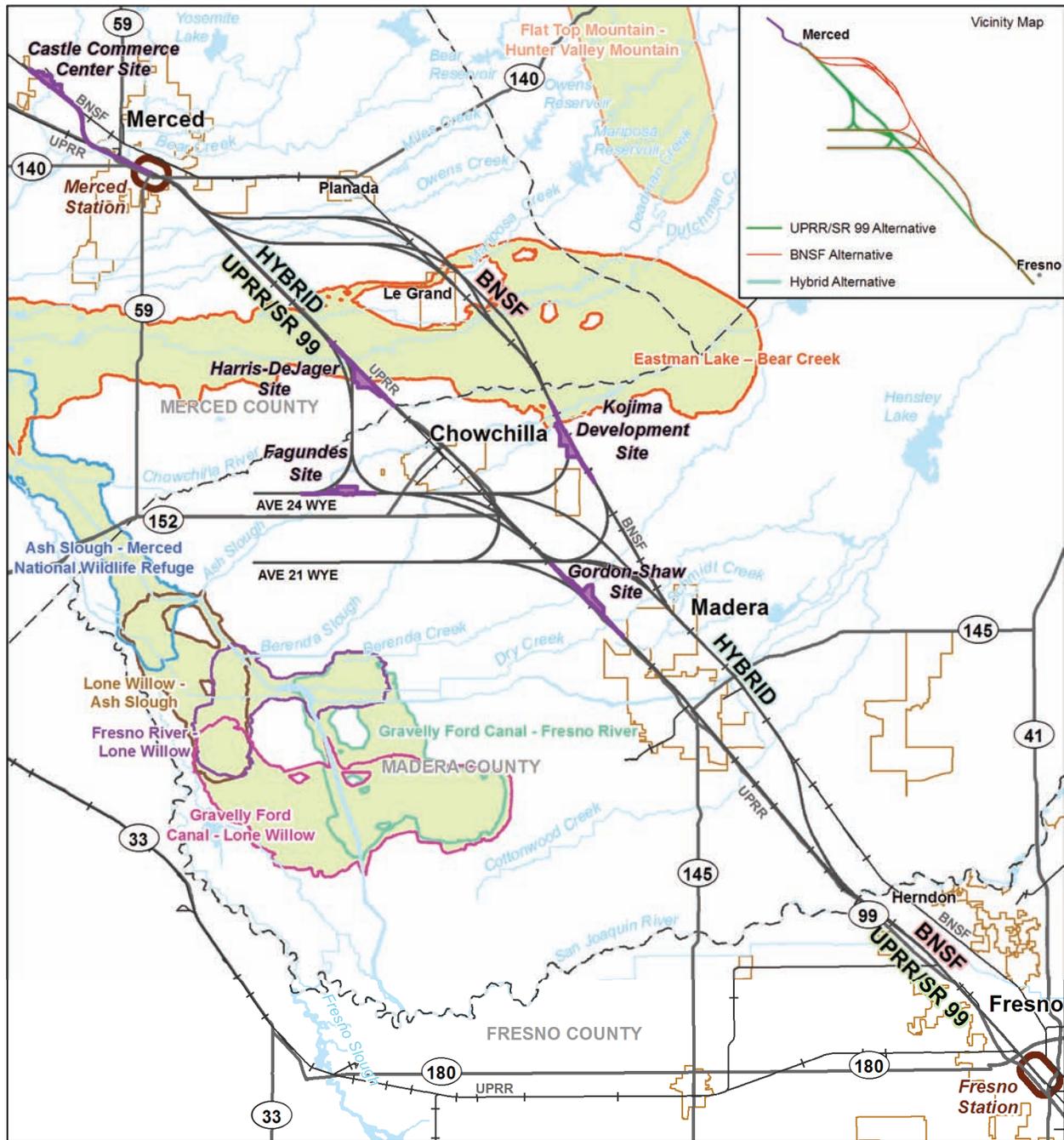
### **Modeled Wildlife Corridors**

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. The Merced to Fresno Section of the HST project would intersect these wildlife corridors. 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). Wildlife corridors are shown on Figures 4-28 to 4-31.

### **Watercourse Crossings within Wildlife Movement Corridors**

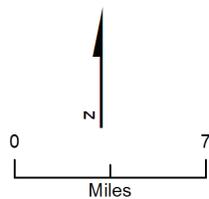
Within the Eastman Lake-Bear Creek ECA, the BNSF Alternative would intersect approximately over 6 miles of the ECA and, depending on the design option, would cross five to nine watercourses. All of the watercourses the BNSF Alternative would cross are natural watercourses. In contrast, the UPRR/SR 99 and Hybrid alternatives would each intersect approximately 3.6 to 4.1 miles of the noted ECA, and would cross zero to two watercourses, depending on the design option. Most of the watercourses the UPRR/SR 99 and Hybrid alternatives would cross are natural watercourses.

Within other modeled wildlife corridors that are present near the Berenda Slough and the Fresno River Channels, the BNSF Alternative would intersect approximately 3.6 to 9.1 miles of the corridor and, depending on the design option, would cross four to eight watercourses. All of the watercourses the BNSF Alternative would cross are constructed watercourses, such as canals. In contrast, the UPRR/SR 99 and Hybrid alternatives would each intersect approximately 3.6 to 7.75 miles of the corridor, and would cross zero to eight watercourses, depending on the design option. All of the watercourses the UPRR/SR 99 and Hybrid alternatives would cross are constructed watercourses.



Source: Spencer et al. (2010).

MF\_Permit\_CP-B\_18 Aug 05, 2011



- HST Alignment
- Station Study Area
- Potential Heavy Maintenance Facility
- City Limit
- - - County Boundary
- +— Railroad

- Essential Connectivity Area**
- Ash Slough - Merced National Wildlife Refuge
  - Eastman Lake - Bear Creek
  - Fresno River - Lone Willow
  - Gravelly Ford Canal - Fresno River
  - Gravelly Ford Canal - Lone Willow
  - Lone Willow - Ash Slough
  - Flat Top Mountain - Hunter Valley Mountain

**Figure 4-27**  
 ECAs in the Vicinity of the Merced  
 to Fresno Section Study Area

## **Bird Migration Routes**

The Pacific Flyway is a common bird migration route extending along the west coast of North and South Americas. The Pacific Flyway encompasses the western half of North America and South America from Alaska to Patagonia west to the pelagic areas of the Eastern Pacific to the Great Basin. This flyway spans the majority of California, including the three alternatives.

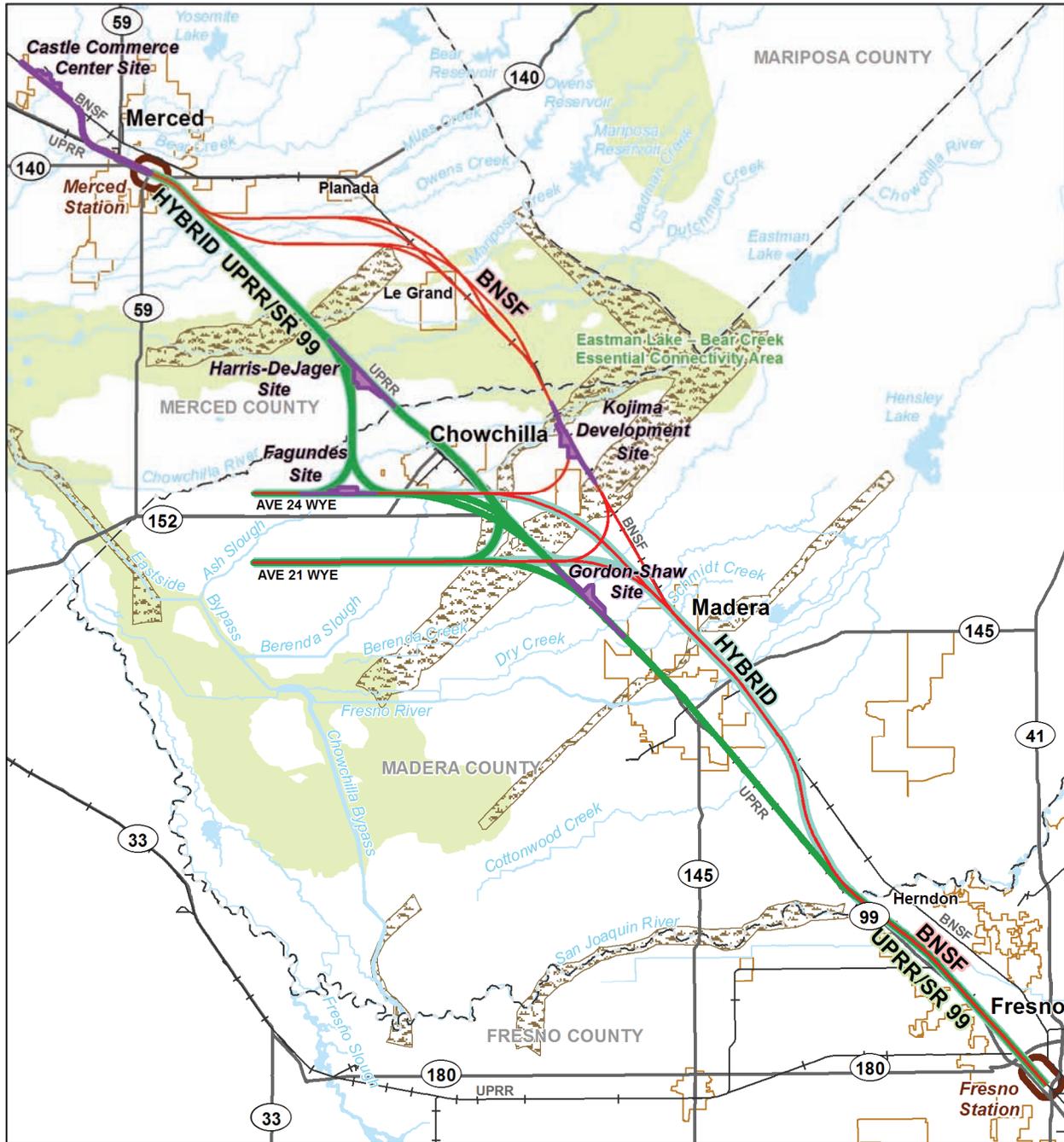
### **4.2.2 Special-Status Species**

#### **4.2.2.1 Plants**

Thirty-six special-status plant species, cited by the CNDDDB and CNPS, were determined to have a moderate or greater potential to occur within the habitat study area (CNDDDB 2003d and CNPS 2010). The CESA has jurisdiction over 10 plant species (9 endangered, 1 rare) and the federal ESA has jurisdiction over 9 plant species (4 threatened, 5 endangered). Appendix C-1 provides a compilation of special-status species with potential to occur in the regional area and includes information pertaining to each species' range, habitat requirements, and the likelihood that the species may be present in the habitat study area. See Figures 4-15 through 4-20 for locations of special-status plants in the regional area.

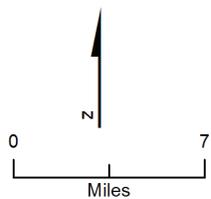
#### **4.2.2.2 Wildlife**

Eighty-nine sensitive wildlife species, cited by the CNDDDB, were determined to have a moderate or greater potential to occur within the habitat study area (CNDDDB 2003e). The CESA has jurisdiction over six wildlife species (five threatened, one endangered). Appendix C-2 provides a compilation of regional special-status species and includes information pertaining to each species' habitat requirements and the likelihood that those habitats are present in the habitat study area. See Figures 4-21 through 4-26 for locations of special-status wildlife species in the regional area.



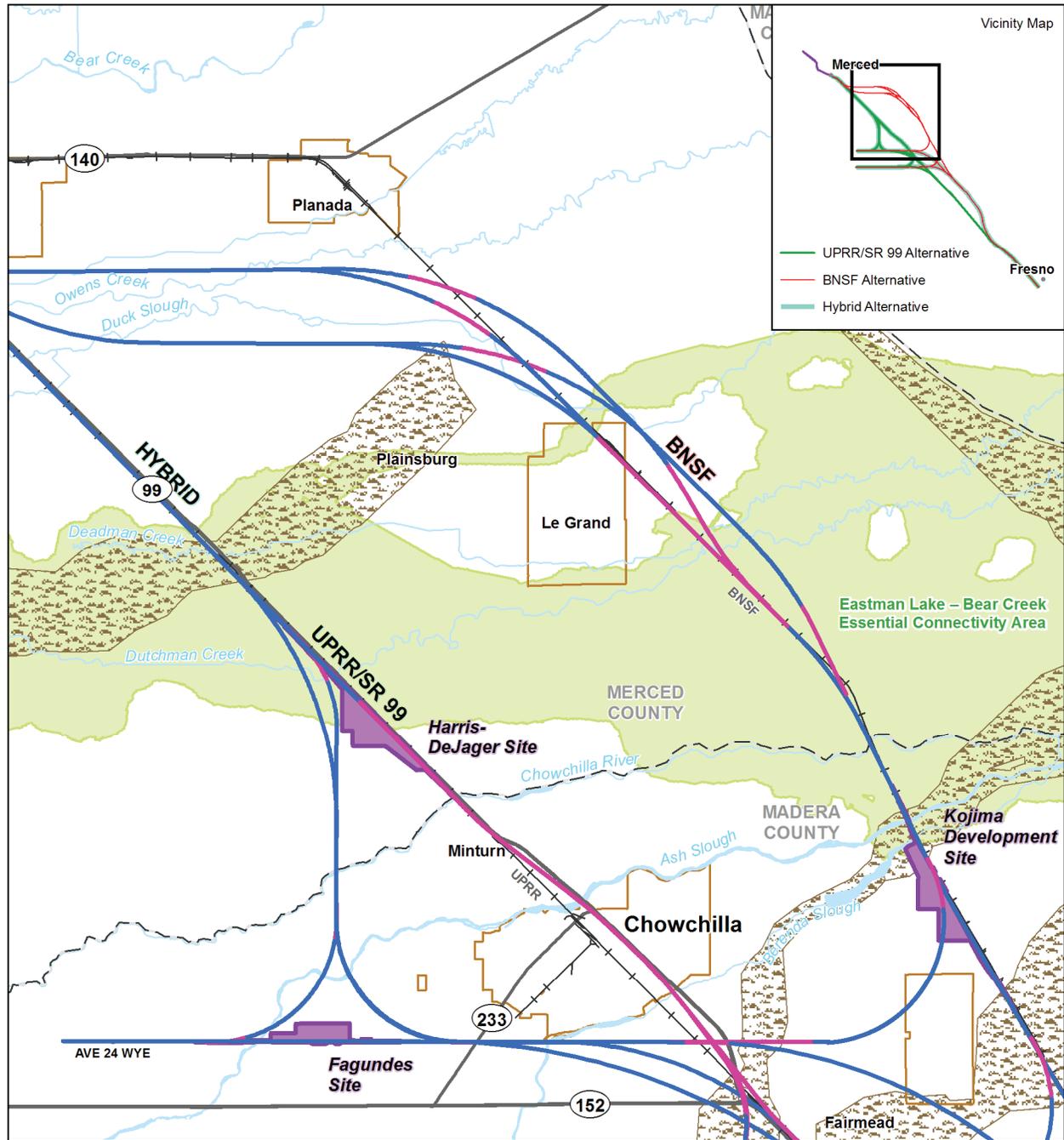
Source: Spencer et al. (2010), Huber (2007).

MF\_TR\_BIO\_36 Jul 06, 2011



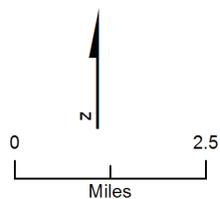
- UPRR/SR 99 Alternative
- BNSF Alternative
- Hybrid Alternative
- Station Study Area
- Potential Heavy Maintenance Facility
- City Limit
- - - County Boundary
- +— Railroad
- Essential Connectivity Area
- Modeled Wildlife Corridors

**Figure 4-28**  
 Wildlife Corridors in the Merced to Fresno Section



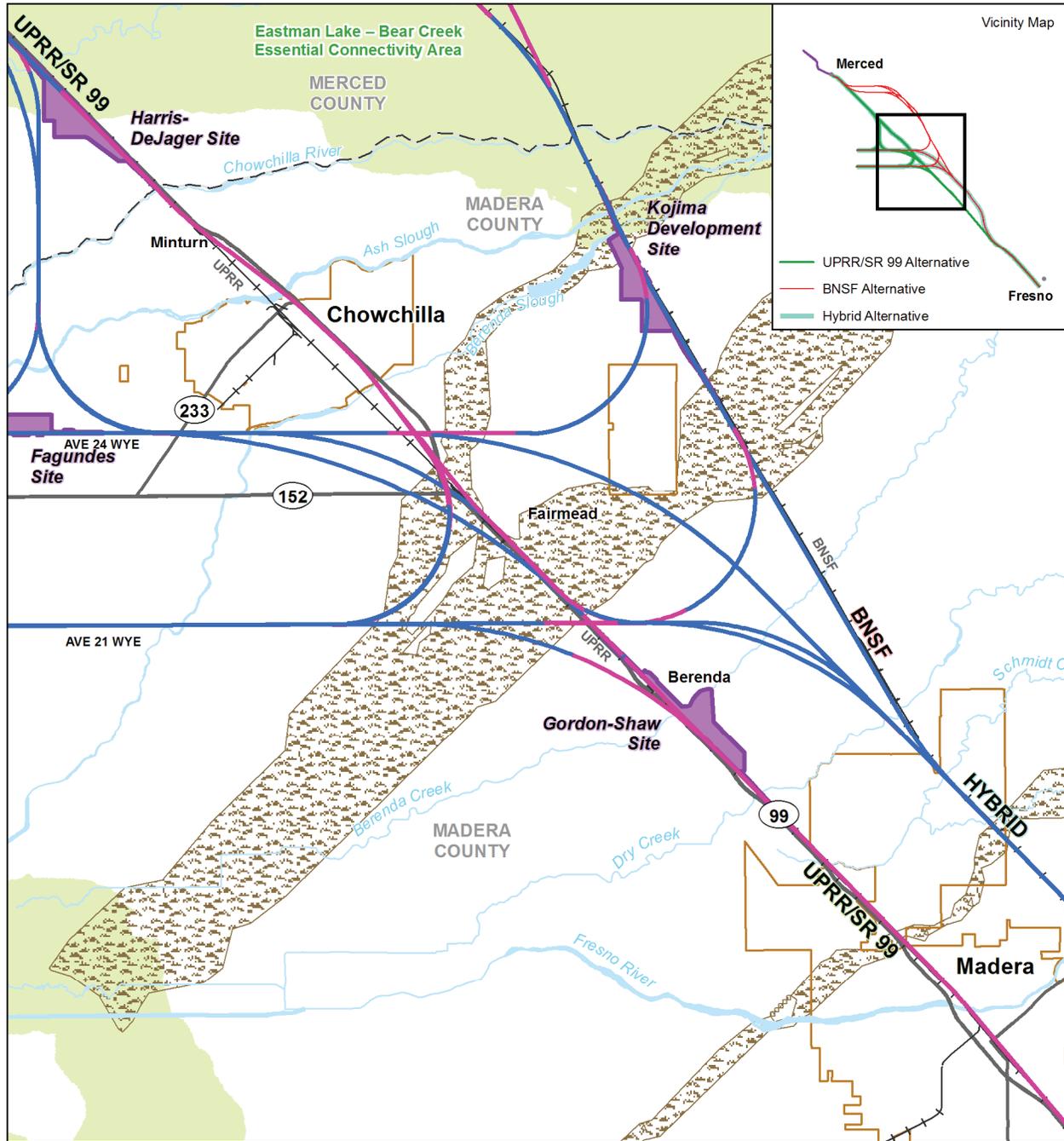
Source: Spencer et al. (2010), Huber (2007).

MF\_TR\_BIO\_32 Jul 06, 2011



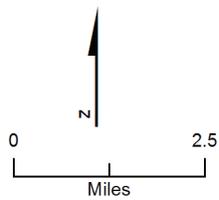
- At-Grade Track
- Elevated Track
- Potential Heavy Maintenance Facility
- Station Study Area
- City Limit
- - - County Boundary
- + -+ Railroad
- Essential Connectivity Area
- Modeled Wildlife Corridors

**Figure 4-29**  
 Wildlife Corridors  
 (North of Chowchilla)



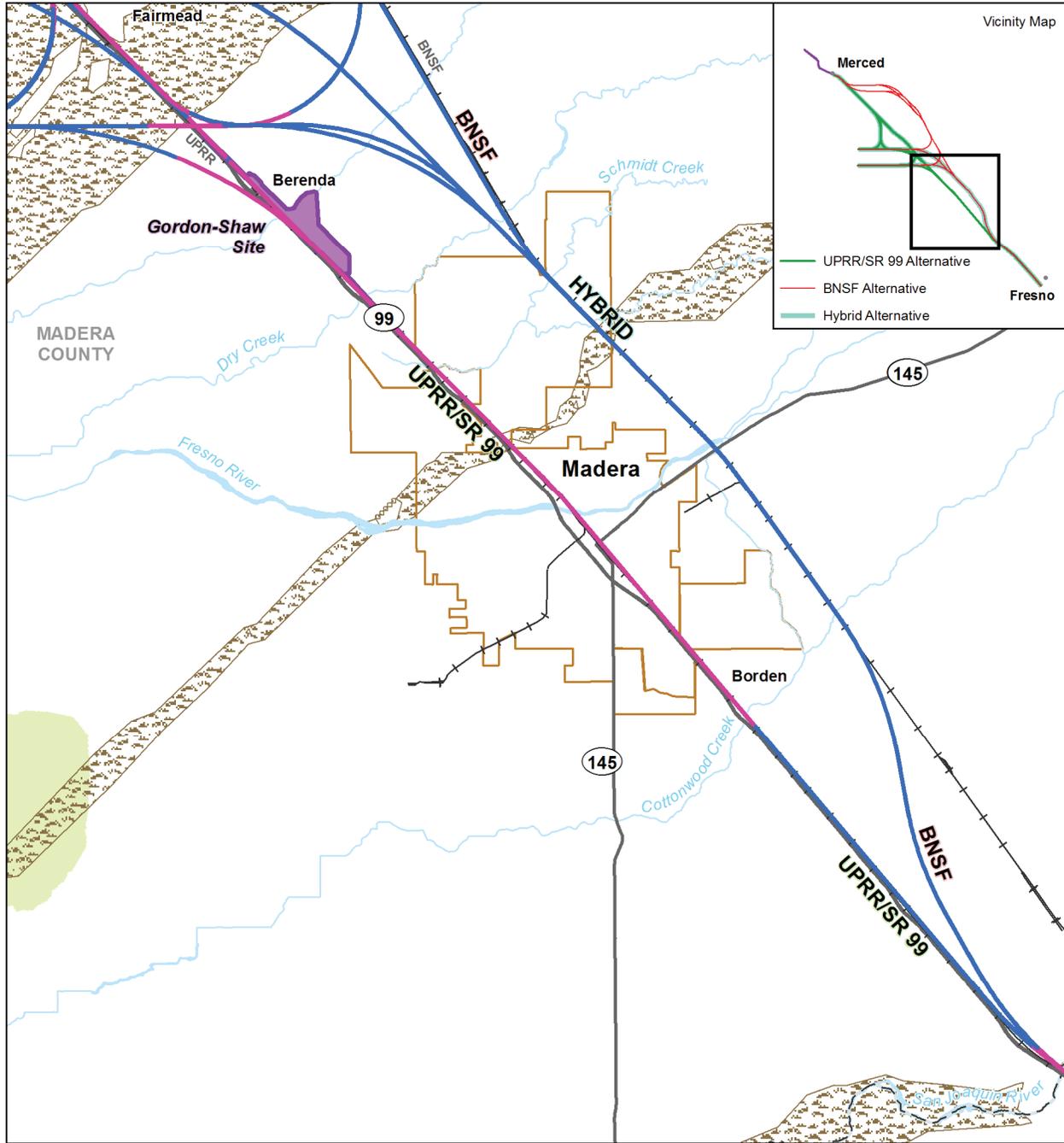
Source: Spencer et al. (2010), Huber (2007).

MF\_TR\_BIO\_33 Jul 06, 2011



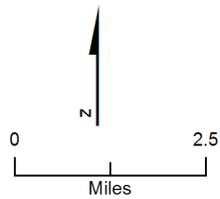
- At-Grade Track
- Elevated Track
- Potential Heavy Maintenance Facility
- Station Study Area
- City Limit
- - - County Boundary
- +— Railroad
- Essential Connectivity Area
- Modeled Wildlife Corridors

**Figure 4-30**  
 Wildlife Corridors  
 (South of Chowchilla)



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

MF\_TR\_BIO\_34 Jul 06, 2011



- At-Grade Track
- Elevated Track
- Potential Heavy Maintenance Facility
- Station Study Area
- City Limit
- - - County Boundary
- +— Railroad
- Essential Connectivity Area
- Modeled Wildlife Corridors

**Figure 4-31**  
 Wildlife Corridors  
 (Madera Area)



## 5.0 Results: Biological Resources, Impacts, and Mitigation

Jurisdictional waters and biological resources with the potential to occur in the various study areas that may be affected by the Merced to Fresno HST Project are discussed in this chapter. This section includes discussions of jurisdictional waters, special-status plants and wildlife, a summary of impacts on biological resources, and proposed mitigation for these impacts.

### 5.1 Jurisdictional Waters

Jurisdictional waters investigated in the wetland resource study area include wetlands, natural watercourses, and constructed watercourses, as described in the Wetlands Delineation Report. The discussion below will be updated as necessary following completion of the *Wetlands Delineation Report Merced to Fresno Section* (Authority and FRA 2011a).

#### 5.1.1 Wetlands

Within the Central Valley, land management, diversion and channelization of surface water, and urbanization have homogenized the historic landscape and existing plant communities. On a localized scale, land-use intensity and ecological integrity differ between the UPRR/SR 99, BNSF and Hybrid alternatives.

Within the UPRR/SR 99 Alternative, high intensity agriculture has fragmented or eliminated the majority of wetland habitats. Overall, natural wetland communities are uncommon along this alignment and are limited to uncultivated areas supporting nonnative annual grasslands and narrow bands of riparian and emergent wetland habitat along the rivers, creeks, and sloughs. Some areas of nonnative grassland may support vernal pools and other seasonal wetlands. Wetlands, where present, are confined spatially and limited functionally by agricultural practices. Within the UPRR/SR 99 Alternative wetland conversions to agriculture and other activities have reduced or eliminated wetland acreage and function through impacts on plant community diversity, topographic variance, hydrologic connectivity, wildlife habitat, flood attenuation, and surface water storage.

In comparison to the UPRR/SR 99 Alternative, wetland acreage and function are not affected as intensively within the BNSF Alternative. In general, agricultural practices along the BNSF Alternative are less intense relative to the UPRR/SR 99 and Hybrid alternatives. The BNSF Alternative is also characterized by a larger area of rural residential development relative to the UPRR/SR 99 Alternative. Within the BNSF Alternative, several large vernal pool complexes were identified in annual grasslands with low intensity grazing. Vernal pools and other seasonal wetlands within the BNSF Alternative appear to function at a higher level than the UPRR/SR 99 Alternative features, as many of the open spaces have not been graded for flood irrigation or converted to row agriculture. In general, wetland function within the BNSF Alternative is characterized as having fair to good plant diversity, topographic variance, hydrologic connectivity, wildlife habitat, and some ability to support flood attenuation and surface water storage.

#### 5.1.2 Other Waters

Natural watercourses and constructed watercourses evaluated during the field surveys are discussed below. For more detailed information on water resources in the project vicinity, refer to the *Hydraulics and Floodplain Technical Report Merced to Fresno Section* (Authority and FRA 2011c).

##### 5.1.2.1 Natural Watercourses

Surveys conducted in March and April of 2009 and in April of 2010 identified 17 named natural watercourses (rivers, creeks, and sloughs) in the wetland resource study area crossed by the proposed

UPRR/SR 99 and the BNSF alternatives. Fourteen of these natural watercourses are crossed by both alternatives, while three occur only within the UPRR/SR 99 Alternative. There are no named watercourse crossings that are unique to the BNSF alternative.

Natural watercourses that occur within the wetland resource study area have ephemeral hydrology 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 resource 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 and Trush, Inc. 2002). 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.

Table 4-2 summarizes the natural watercourses within the wetland resource study area. All of the natural watercourses have been determined to potentially support one or more special-status fish species. Natural watercourses are shown on Figure 2-1.

### **Canal Creek**

Canal Creek has been highly altered by channelization, an impoundment structure, and water diversions. Within the wetland resource study area, immediately to the southwest of North Santa Fe Avenue, the channel is impounded and diverted into the Livingston Canal that flows northwest and west for approximately 13 miles, where it discharges into the Merced River. On the northeast side of the weir structure, the channel is characterized by a broad, open sandy area that is generally devoid of vegetation both within the channel and along the adjacent banks. Small localized patches of hardstem bulrush (*Schoenoplectur acutus*), cattails (*Typha latifolia*) and sparse scattered herbs such as fireweed (*Epilobium* sp.), rabbitsfoot grass (*Polypogon monspeliensis*), cudweed (*Gnaphalium* sp.), and horseweed (*Conyza* sp.) are present around the upper edges. A single large eucalyptus tree occurs on the south side of the channel east of the UPRR tracks. Within the wetland resource study area, the channel ranges in size from approximately 45 to 60 feet wide with an average depth of approximately 10 feet. At the time of the survey, there were a few small, shallow braided flow channels with less than 6 inches of water present within the channel.

Southwest of the diversion structure, Canal Creek is a U-shaped earthen channel with sandy substrate that is generally devoid of vegetation. Although shallow (2 to 4 inches deep) areas of standing water were observed, no flow was present at the time of the survey. The ordinary high water mark (OHWM) is approximately 4.5 feet above the channel bed. The adjacent riparian vegetation is composed of dense eucalyptus woodland with an understory of giant reed, Bermuda grass (*Cynodon dactylon*), bindweed (*Convolvulus arvensis*), goose grass (*Gallium* sp.), and some Himalayan blackberry (*Rubus discolor*). This channel continues for approximately 3.5 miles to the south, where it meets Black Rascal Creek. From the confluence, Black Rascal Creek flows to the southwest for approximately 5.2 miles into Bear Creek, which continues to flow to the west for approximately 12.5 miles to the San Joaquin River.

### **Black Rascal Creek**

The portion of Black Rascal Creek within the wetland resource study area has been channelized and comprises a section of the El Capitan Canal. The broad, U-shaped channel has a silty clay and gravel substrate that is devoid of vegetation. At the time of the field survey, shallow flowing water (6 to 12 inches deep) was present in the lower part of the channel. The active flow channel is approximately 90 feet wide and 12 feet deep. The adjacent riparian community is limited to a narrow band of common rush just above the OHWM along the east bank and to Himalayan blackberry with scattered almond trees along the edge of a cultivated field on the upper west bank. From the proposed alternative, the creek

flows to the south for approximately 400 feet, where it intersects Bear Creek. From the confluence, Bear Creek flows approximately 16 miles to the west into the San Joaquin River.

### **Bear Creek**

Bear Creek is part of the Merced County Stream Group that originates east and northeast of the city of Merced. The wetland resource study area includes portions of Bear Creek at two locations, the first at the confluence with Black Rascal Creek and the second between SR 99 and SR 59 in eastern Merced. At the confluence with Black Rascal Creek, the broad open channel has a silty clay and cobble substrate that is devoid of vegetation. Shallow flowing water (less than 18 inches deep) was present in the bottom of the channel at the time of the survey. The active flow channel is approximately 120 feet wide and 12 feet deep. Limited riparian vegetation in this area consists of patches of giant reed, along with dense Johnson grass (*Sorghum halepense*), poison hemlock (*Conium maculatum*), and common rush.

Bear Creek in eastern Merced is characterized by an open sandy/gravel/cobble channel. Riprap, including large boulders, chunks of cement, and old asphalt, is present along some sections of the creek banks in this area. Numerous homeless camps were observed in the adjacent riparian vegetation and trash and debris were widely scattered throughout the channel. Shallow flowing water was present in the lower part of the channel at the time of the survey. Water depth at the time of the survey was variable, from a depth of approximately 4 inches in the upstream areas to an estimated depth of 3 to 4 feet in the downstream portions of the channel near SR 99. The active flow channel ranges from approximately 75 to 85 feet wide, with an estimated OHWM of 10 to 12 feet. The active flow channel is devoid of vegetation. The adjacent riparian community is variable. On the north side of Highway 59, the riparian community is limited to a narrow band of mostly large cottonwood and alder trees. Moving downstream, the riparian community is characterized by dense giant reed with scattered black locust, cottonwood, and eucalyptus trees. From the wetland resource study area in eastern Merced, Bear Creek flows generally to the west for approximately 13.3 miles to the San Joaquin River.

### **Miles Creek**

Within the wetland resource study area, Miles Creek appears to be a channelized natural tributary to Owens Creek. Shallow flowing water (less than 8 inches deep) was present at the time of the survey. The active flow channel is approximately 25 feet wide with an average high-water depth of 3 feet. The substrate is a gravelly silty clay with wetland and emergent vegetation consisting of hardstem bulrush, common rush, sprangletop, tall flat sedge, and sparse smartweed along the edges of the channel. The narrow band of riparian vegetation along the upper banks is characterized by dense patches of Himalayan blackberry and scattered ruderal herbaceous species such as mustard, milk thistle, and poison hemlock. A dead and partially cut black walnut tree is present near the UPRR right-of-way and a few cottonwood trees are present near the western edge of the wetland resource study area. From this crossing location, Miles Creek flows generally to the west for 0.6 mile into Owens Creek. From the confluence with Owens Creek, water flows approximately 19 miles generally to the west into Deep Slough, where it then flows north through Deep and Bravel sloughs for approximately 3.8 miles to the Bear River. From the confluence of Bravel Slough, the Bear River flows another 1.6 miles to the northwest into the San Joaquin River.

### **Owens Creek**

The section of Owens Creek within the wetland resource study area appears to have been channelized and is characterized by well defined, steep vertical banks and a flat channel bottom with a silty clay substrate. The channel was completely dry at the time of the survey. The average channel width is 25 feet with an ordinary high-water depth of approximately 3 feet. The channel is largely devoid of vegetation, with the exception of narrow patches of common rush and tall flat sedge in some areas along the channel edges. The adjacent slopes are characterized by dense Himalayan blackberry with an overstory of arroyo willow and black willow trees. A few fig trees are also present. At the time of the survey, the tops of all of the larger willow trees located beneath a power distribution line that parallels the creek in this location had been trimmed. This section of Owens Creek is located approximately



850 feet southeast of the Miles Creek crossing described above. The Miles Creek confluence is located approximately 0.75 mile from this location. As previously noted, Owens Creek flows generally to the west for 25 miles, ultimately connecting to the San Joaquin River. The Koff Lateral is located immediately south of Owens Creek.

### **Duck Slough**

Within the wetland resource study area, Duck Slough is a broad, open channel with a silty clay substrate devoid of vegetation. At the time of the survey, the channel was largely dry with scattered areas of shallow standing water (less than 6 inches deep). The active flow channel is approximately 65 feet wide with an ordinary high-water depth of 9 feet. A narrow band of common rush exists just above the OHWM. Riparian vegetation is discontinuous and comprised mostly of dense patches of sandbar willow or Himalayan blackberry with scattered cottonwood trees. A weir is located approximately 1,800 feet downstream of the SR 99 overcrossing, just outside of the wetland resource study area. The Givens Lateral Canal is located immediately south of the slough. From this crossing location, Duck Slough flows to the west for approximately 25 miles, where it joins Owens Creek. Owens Creek flows to the west-northwest into Bear Creek. Bear Creek then flows to the northwest, through Deep Slough and Bravel Slough, for approximately 9 miles, where it joins the San Joaquin River.

### **South Slough (also known as Russell Lateral)**

The portion of South Slough within the wetland resource study area is a channelized, earthen feature with a gravelly clay substrate that was dry at the time of the survey. The active flow channel is 16 feet wide with an ordinary high-water depth of just over 2 feet. No emergent or aquatic vegetation was present within the channel at the time of the survey. The riparian community consists of a narrow band of large valley oaks along the upper edges of the channel with a few large cottonwoods toward the western edge of the wetland resource study area. A segment of this feature between the UPRR railroad tracks and East Le Grand Road is cement-lined, with no adjacent riparian vegetation. South Slough flows approximately 2 miles to the west through a series of constructed canals and then flows into the Nido Canal. It continues to flow to the north for 2 miles into Duck Slough, just west of the wetland resource study area at this location. As previously noted, Duck Slough is a tributary of the San Joaquin River.

### **Deadman Creek**

Within the wetland resource study area, Deadman Creek has gravelly silty clay substrate that was dry at the time of the survey. The active flow channel ranges from 14 to 20 feet wide with an ordinary high-water depth ranging from 18 to 24 inches above the channel bottom. The narrow riparian community along most of the channel consists of cottonwoods, including numerous saplings as well as large mature trees. This section of the channel is devoid of emergent and aquatic vegetation, but does contain some woody debris. The cottonwood riparian vegetation ends abruptly near the southwestern boundary of the wetland resource study area, and the channel bed becomes mostly filled with dense common rush on either side with a 3- to 5-foot-wide open channel. Immediately west of the wetland resource study area, Deadman Creek has been diverted from its natural channel into a constructed canal that flows to the south for approximately 0.5 mile and then west for another 3.8 miles before returning to its natural channel. It appears to flow through its natural channel for approximately 2.5 miles before returning to a channelized ditch, where it then flows south for 1,300 feet into Dutchman Creek. From this point, Dutchman Creek continues to flow generally to the west for 13 miles into the Eastside Bypass of the San Joaquin River.

### **Dutchman Creek**

The northeastern portion of Dutchman Creek within the wetland resource study area is highly disturbed with no riparian vegetation. The sandy substrate in this area has been disturbed by several unimproved roads, both parallel to the railroad tracks as well as crossing under the highway. To the southwest, the channel and adjacent riparian habitat are much less disturbed. In this area, the channel has a silty clay substrate with scattered patches of common rush, tall flat sedge, and curly dock scattered throughout.

Small patches of cattail are also present in some sections of the channel, towards the southwestern end of the wetland resource study area. The channel was dry at the time of the survey with an active flow channel ranging from 20 to 30 feet wide. The depth of the ordinary high water appears to be between 2 and 3.5 feet. The narrow riparian community comprises large cottonwood and black walnut trees with scattered arroyo willow. Some trash and debris is present within the channel in this area. Dutchman Creek flows generally west for approximately 21 miles, where it enters the Eastside Bypass of the San Joaquin River.

### **Chowchilla River**

Within the wetland resource study area, the Chowchilla River is a low, broad sandy channel that supports a mosaic of emergent vegetation, active flow channels, and riparian woodland. There was no flowing water present at the time of the surveys, but shallow pockets of ponding water (less than six inches deep) were present along the channel bottom. Some of these pockets contained mosquito fish (*Gambusia affinis*). The active flow channel in this area appears to be variable, ranging from 30 to 60 feet wide with an estimated ordinary high-water depth of three feet. Vegetation within the channel includes patches of cattail as well as scattered tall flat sedge, cocklebur, dallisgrass, rabbitsfoot grass, and a number of other herbaceous species. Water primrose (*Ludwigia peploides*) was observed in a few areas where standing water was present within the channel. The open riparian woodland adjacent to the river includes a number of large alder trees and several smaller arroyo willows.

Downstream (at Avenue 26) the channel lacked a defined active flow channel and was completely filled with vegetation. Species observed within the channel included: common rush, sprangletop, Johnsongrass, tall flat sedge, and creeping wild rye. Cattail and smartweed were also present in small localized patches near the Avenue 26 Bridge. The river channel in this area was estimated to be 30 feet wide. The adjacent riparian community included discontinuous areas of large valley oak trees, scattered alder, and a few small cottonwood saplings. The Chowchilla River flows approximately 14.5 miles to the west into the Eastside Bypass of the San Joaquin River.

### **Ash Slough**

The section of Ash Slough is a broad, open sandy-gravel channel that was dry at the time of the survey. The average active flow channel is 70 feet wide with an ordinary high-water depth of 3 feet. The channel is largely devoid of emergent vegetation with the exception of a few small patches of cattail and hardstem bulrush in scattered locations. Riparian vegetation along the edges of the channel includes a mixture of dense patches of giant reed intermixed with cottonwood and willow trees and open areas characterized by ruderal grassland habitat. Other riparian vegetation includes Himalayan blackberry, Mexican rush (*Juncus mexicanus*), and sandbar willow. In some areas along the slough, giant reed had been cut and treated with herbicides in an apparent effort to manage this highly invasive species.

In the vicinity of the Ave 24 Wye crossing locations, Ash Slough was dry at the time of the survey and much of the channel was vegetated. The active flow channel in this area is approximately 20 feet wide with an ordinary high-water depth of 2 feet. Vegetation within the channel varies, with most areas characterized by dense giant reed. Other vegetation observed within the channel included scattered Himalayan blackberry, Johnson grass, verbena, Bermuda grass, tall flat sedge, bristle grass (*Setaria* spp.), and cocklebur. Occasional sandbar and black willows are also present in some locations within the channel. The adjacent riparian vegetation is predominantly dense giant reed with scattered large cottonwood trees. Other observation points indicated substantial disturbance from earth work, gravel mining, and vehicular traffic. As a result of the grading and excavation it was difficult to determine the extent and depth of the active flow channel. Ash Slough flows for approximately 14 miles to the southwest, where it enters the Eastside Bypass of the San Joaquin River.

### **Berenda Slough**

Near the UPRR/SR 99 Alternative, Berenda Slough is an open sandy channel that was dry at the time of the survey. The active flow channel has an average width of 40 feet with an ordinary high-water depth

around 3 feet. The active flow channel is generally devoid of vegetation, with the exception of occasional small areas of Bermuda grass, cocklebur, filaree, trefoil, and giant reed. The broad, low terrace adjacent to the channel supports open riparian woodland characterized by cottonwood, black walnut, arroyo willow, and black locust trees, with an understory of mule fat, sandbar willow, creeping wild rye, ripgut brome, and mustard. Additional observations at Berenda Slough identified a small section of standing water within the channel, but most of the sandy channel downstream of Avenue 21½ was dry and densely vegetated. The active flow channel in this area is approximately 45 feet wide with an estimated ordinary high-water depth of 3 feet. The riparian community immediately adjacent to the channel is characterized by Himalayan blackberry, sandbar willow, and common rush. The outer banks support dense giant reed with scattered eucalyptus and cottonwood trees. Other areas of the slough are characterized by dense growth of cattail, with some hardstem bulrush likely the result of impounded water in this section of the slough. Berenda Slough flows to the southwest for approximately 15 miles, where it then flows into the Eastside Bypass of the San Joaquin River.

### **Berenda Creek**

Berenda Creek is a small, intermittent stream. The channel in this area has a sandy substrate with some cobbles and woody debris. At the time of the survey, water was not flowing in the creek, but shallow ponded water (6 to 10 inches deep) was present in some areas along the channel bed. Within the wetland resource study area, the channel is characterized by patches of dense cattail and open unvegetated areas. Riparian vegetation along the edges of the channel consists of a dense patch of arroyo and sandbar willow at the edge of the UPRR right-of-way and two large arroyo willows to the northeast, with an understory of creeping wild rye. Downstream, Berenda Creek has been channelized into a drainage ditch that flows to the west and then runs to the north along Avenue 18. The channel is characterized by steep vertical banks approximately 15 feet wide. Water was flowing at the time of the survey. The ordinary high-water depth was estimated to be between 2 and 3 feet. Scattered emergent vegetation, including cattails and hardstem bulrushes, occurs throughout much of the channel in this area. Vegetation along the upper banks is characterized by Himalayan blackberry, small black walnut trees, giant reed, and scattered cottonwood trees. Berenda Creek flows generally to the southwest for approximately 9.5 miles into the Eastside Bypass of the San Joaquin River.

### **Dry Creek**

Dry Creek is characterized by an open water channel lined with dense growth of cattail and hardstem bulrush on both sides. The channel has a sandy substrate and an active flow channel between 35 to 38 feet wide with an ordinary high-water depth of 3 feet. The adjacent riparian community is characterized by scattered large arroyo willow and cottonwood trees, localized dense thickets of sandbar willow, and open areas with creeping wild rye, ripgut brome, saltgrass, mustard, and common rush. Further downstream, Dry Creek has been channelized and converted into a routinely maintained agricultural irrigation canal. The constructed earthen channel is 25 feet wide and approximately 5 feet deep with riprap along the edges. The channel supports small patches of cattail and hardstem bulrush with some tall flat sedge, sprangletop, common rush, and horseweed growing along the upper edges. Farm and canal maintenance roads are present along both sides of the channel and the area has no adjacent riparian vegetation. From the downstream location Dry Creek flows approximately 5 miles to the southwest into the Fresno River, which continues to the west for approximately 7 miles, where it discharges into the Eastside Bypass of the San Joaquin River.

### **Fresno River**

The Fresno River near the wetland resource study area contains sections of low, broad, routinely maintained channel located in an urban area on the east side of Madera. Most of the sandy channel was dry at the time of the survey, but a small flow channel fed by inflows from a stormwater culvert near Riverside Drive was observed at the time of the survey. The sandy channel in this area is highly disturbed as a result of vegetation clearing and grading, presumably done for flood control maintenance. Trash and debris are also common and widespread throughout the channel. The river channel ranges from approximately 185 to 375 feet wide, although the active flow channel consists of several small braided

channels estimated to be 35 feet wide in total. The depth of the ordinary high water in these areas appears to be around 2 feet. Residential, commercial, and industrial developments are present along both sides of the river and no riparian habitat was observed other than a few small patches of sandbar willow within the channel. Most of the channel bed is characterized by a mosaic of largely ruderal vegetation and open sandy areas. Characteristic plants observed within the channel include giant reed, telegraph weed, filaree, cocklebur, riggut brome, mustard, and curly dock. Further downstream, the Fresno River was dry at the time of the survey. In this location, neither a defined channel nor obvious evidence of recent flows were observed; however, an approximately 100-foot-wide channel appears to be present and appears to be maintained occasionally by grading and vegetation removal. The ordinary high-water depth was estimated to be between 2 and 3 feet. At the time of the survey, evidence of past channel maintenance was observed, but a substantial portion of the channel was vegetated with sandbar willow, scattered patches of cattail, hardstem bulrush, sprangletop, tall flat sedge, Bermuda grass, and fireweed. The adjacent riparian area included some large cottonwood trees, mostly along the south bank, and relatively dense sandbar willow on the low terrace adjacent to the presumably maintained portion of the channel. From the downstream location, the Fresno River flows 11 miles to the west into the Eastside Bypass of the San Joaquin River.

### **Cottonwood Creek**

Within the wetland resource study area, Cottonwood Creek has a broad, sandy channel with dense emergent vegetation along the edges of an open flow channel. The active flow channel is estimated to be 60 feet wide, with the unvegetated central portion averaging around 25 feet wide. The ordinary high-water depth was estimated to be around 4 feet. Water was not flowing at the time of the survey, but a large ponded area was present in the section of the creek immediately south of Avenue 12. Large woody debris was also present in this area. Riparian vegetation along both sides of the creek consists of large cottonwood, arroyo willow, and eucalyptus trees, with a dense understory of giant reed, sandbar willow, and Himalayan blackberry. Downstream, Cottonwood Creek contains sections of excavated 25-foot-wide channel with steep vertical banks with weir structures present. The channel has sandy clay substrate with patches of emergent vegetation comprised of cattail and hardstem bulrush within the channel, as well as some areas of common rush west of the weir structure. The edges of the channel and adjacent banks in this area are characterized by dense growth of giant reed and eucalyptus trees. Sections of the channel are routinely maintained and were devoid of vegetation with no adjacent riparian habitat. From this location, Cottonwood Creek flows approximately 16 miles to the southwest into the Eastside Bypass of the San Joaquin River.

### **San Joaquin River**

The San Joaquin River is the largest and most substantial water feature in the wetland resource study area. Sections of the river are characterized by a single large flow channel with an average width of 150 feet. To the southwest of SR 99, the river splits into multiple braided channels, including some larger backwater ponded areas. A detailed investigation of the adjacent riparian habitat was not conducted during the field survey because of property access limitations; however, observations of the area were made from West Herndon Avenue on the southeast side of the river. The riparian community within the wetland resource study area is an open mixed woodland comprised of valley oak, California sycamore, and eucalyptus trees. The open understory consists of typical California annual grassland species with occasional patches of sandbar willow and elderberry. The San Joaquin River flows to the west and then north, where it eventually enters the San Francisco Bay Delta.

#### **5.1.2.2 Constructed Watercourses**

Constructed watercourses within the wetland resource study area include linear water features such as irrigation canals and tailwater drains that have been constructed primarily for the conveyance of agricultural water. Most of these features are excavated U-shaped or trapezoidal channels that are routinely maintained. Canals range in size from small shallow distribution ditches to broad conveyance channels. Emergent vegetation and ruderal wetland species are present in some areas, but most of the canals and drains are routinely cleared of vegetation and/or sprayed with herbicides. A number of the



canals convey water diverted from and/or discharge water to the natural drainage features described in the previous section. A large number of constructed watercourses, including approximately 50 named agricultural irrigation canals and drains, are present in the wetland resource study areas of the HST alternatives.

## 5.2 Special-Status Species

This section discusses special-status plant and wildlife species determined through prefield investigations and reconnaissance-level field surveys to have potential to occur within the habitat study area. Each discussion provides a summary of the species' regulatory status, physical and ecological description, observed or nearest reported occurrence, and potential to occur. Determinations on occurrence potential follow the criteria in Section 3.3.7. Figures 4-15 through 4-26 show the location of special-status species that were observed during field surveys or that have reported occurrences that intersect the habitat study area.

### 5.2.1 Special-Status Plant Species

Special-status plant species include those that have been afforded special status and/or recognition by federal or state resource agencies and private conservation organizations because of documented or perceived decline or limitation of population size or geographical extent.

Appendix C-1 summarizes special-status plant species determined to have potential to occur in the special-status plant study area, and Figures 4-15 through 4-20 show the location of special-status species observed or reported in the habitat study area.

Appendix C-1 includes a list of all special-status plant species with potential to occur in the region, including those with an unlikely or no potential to occur within the habitat study area. Descriptions of the 36 special-status plant species determined to have moderate or high potential to occur in the special-status plant study area are provided below. Reference to suitable habitat for each species is also discussed as related to the specific species (Appendix C-1). More detail on special-status plant species is discussed in the *Merced to Fresno Section Special-Status Plants Survey Report* (Authority and FRA 2011b).

#### **Sanford's Arrowhead (*Sagittaria sanfordii*)**

Sanford's arrowhead, a CNPS List 1B.2 species, is an aquatic perennial in the water plantain family (*Alismataceae*). It grows from 5.5 to 9.8 inches tall with white flowers in several whorls located well below leaf ends. The lowest whorl has three flowers with pistils, but no stamens. This species blooms from May to October (Hickman 1993).

This species is found in diverse shallow, freshwater habitats, including marshes and swamps, ponds, vernal pools and other seasonal wetlands, lakes, reservoirs, sloughs, canals, streams, rivers, and ditches at elevations between 0 and 2,100 feet. Sanford's arrowhead is found in Butte, Del Norte, El Dorado, Fresno, Merced, Mariposa, Orange, Placer, Sacramento, Shasta, San Joaquin, Tehama, and Ventura counties. Habitat loss resulting from overgrazing, development, recreational activities, displacement by nonnative plants, road widening, and channel alteration poses the greatest threat to existing populations (CNPS 2009).

Sanford's arrowhead was observed within the habitat study area during the April 2010 habitat reconnaissance surveys in an irrigation ditch north of the City of Merced. The nearest presumed extant occurrence of Sanford's arrowhead reported in the CNDDDB is located approximately 17 miles northeast of the project footprint in a ditch under the Santa Fe Railroad at Shaw Avenue in Fresno, and was last reported in 1980 (Occurrence #7; CNDDDB 2003d).

Because this species has been observed in the habitat study area, and because the study area supports an array of natural and constructed watercourses and coastal and valley freshwater marshes, Sanford's arrowhead has a high potential to occur within the construction footprint.

#### **Delta Button-Celery (*Eryngium racemosum*)**

Delta button-celery, a state endangered and CNPS List 1B.2 species, is an annual herb in the celery family (*Apiaceae*). It has stout, branching stems 12 to 30 inches tall. The short petioled, sharply serrated leaves are 1 to 3 inches long. The flower heads are spherical-shaped and contain more than 10 flowers each. This species blooms from June to October (Hickman 1993).

Delta button-celery is found in riparian scrub often in vernal mesic clay depressions at elevations between 9 and 100 feet. Its range includes the Central Valley from Contra Costa County south to Fresno County. Habitat loss resulting from agriculture and flood control activities poses the greatest threat to existing populations (CNPS 2009).

CNPS and CNDDDB both report occurrences of this species in the regional area (CNPS 2011, CNDDDB 2003d). Although the CNDDDB has no reported occurrences of Delta button-celery within 10 miles of the project footprint, the habitat study area has the potential to be within the current range of this species. Potentially suitable, but moderate quality, riparian scrub, vernal pools, and other seasonal wetlands have been identified within the habitat study area; therefore, Delta button-celery is determined to have a moderate potential to occur within the project footprint where these habitats occur.

#### **Spiny-Sepaled Button-Celery (*Eryngium spinosepalum*)**

Spiny-sepaled button-celery, a CNPS List 1B.2 species, is an annual herb in the celery family (*Apiaceae*). The stout branching stems are between 12 and 30 inches tall. The leaves range from 3.5 to 13.8 inches long, are short petioled, and may be spiny-toothed or deeply-lobed. The flower heads are spherical or egg-shaped and contain more than 10 flowers each. It blooms from April to May (Hickman 1993).

Spiny-sepaled button-celery is found in valley and foothill grasslands and northern claypan vernal pools at elevations from 260 to 840 feet. This species is found in Fresno, Madera, Merced, Stanislaus, Tulare, and Tuolumne counties. Habitat loss resulting from development, overgrazing, road maintenance, hydrological alterations, and agriculture poses the greatest threat to existing populations (CNPS 2009).

Vernal pool habitat and moderate quality annual grassland habitat are present in the special-status plant study area. The nearest reported occurrence is presumed extant and is located within the special-status plant study area, less than 5 feet from the project footprint (Occurrence #32; CNDDDB 2003d); therefore, spiny-sepaled button-celery has a moderate potential to occur in California annual grassland, vernal pools, and other seasonal wetlands within the project footprint.

#### **Hoover's Calycadenia (*Calycadenia hooveri*)**

Hoover's calycadenia, a CNPS List 1B.3 species, is an annual herb endemic to California in the sunflower family (*Asteraceae*). This species grows to a height of 3.9 to 23.6 inches with spike-like flower heads on terminal branchlets with 1 to 4 flowers per node. This species blooms from July to September (Hickman 1993).

Hoover's calycadenia is found in cismontane woodland and valley and foothill grasslands, often on barren, rocky, exposed substrate at elevations between 215 and 860 feet. Hoover's calycadenia is found in Calaveras, Madera, Merced, Mariposa, and Stanislaus counties. Habitat loss resulting from development, overgrazing, and agriculture poses the greatest threat to existing populations (CNPS 2009).

The habitat study area is presumed to be within the current range of this species and potentially suitable California annual grassland is present within the habitat study area. The nearest reported occurrence is approximately 4.5 miles northeast of the project footprint and is presumed extant (Occurrence #14;



CNDDDB 2003d); therefore, Hoover's calycadenia has a moderate potential to occur in California annual grassland within the project footprint.

#### **Coulter's Goldfields (*Lasthenia glabrata* ssp. *coulteri*)**

Coulter's goldfields, a CNPS List 1B.1 species, is an annual herb in the sunflower family (*Asteraceae*). It has an erect, branching stem about 24 inches tall with 7 to 15 yellow ray flowers. Leaves are linear, glabrous, and 2 to 6 inches long. The fruits are warty and hairy. This species blooms from February to June (Hickman 1993).

Coulter's goldfields is found on alkali or mesic clay soils in meadows and seeps, playas, and vernal pools at elevations between 3 and 4,000 feet. This species is found in Colusa, Kern, Los Angeles, Merced, Orange, Riverside, Santa Barbara, San Bernardino, San Diego, San Luis Obispo, Tulare, and Ventura counties. Habitat loss resulting from agriculture and development poses the greatest threat to existing populations (CNPS 2009).

Vernal pool habitat is present in the special-status plant study area. Although the CNPS and CNDDDB both report occurrences of this species in the regional area (CNPS 2011, CNDDDB 2003d), no occurrences have been identified within 10 miles of the project footprint. Coulter's goldfields has a moderate potential to occur in California annual grassland that supports vernal pools and other seasonal wetlands within the habitat study area.

#### **Hartweg's Golden Sunburst (*Pseudobahia bahiifolia*)**

Hartweg's golden sunburst, a federally and state endangered species and CNPS List 1B.1 species, is an annual herb in the sunflower family (*Asteraceae*). It has one to a few stems, 2 to 6 inches tall, with narrow, undivided leaves. Hartweg's golden sunburst is distinguished from other members of the genus by the shape of its largest leaves, which are entire or three-lobed. The golden yellow flowers bloom from May to August (Hickman 1993).

Hartweg's golden sunburst is found in clay soils, often acidic, in chenopod scrub and valley and foothill grasslands at elevations between 150 and 1,000 feet. This species is currently found in El Dorado, Fresno, Madera, Merced, Stanislaus, Tuolumne, and Yuba counties. Habitat loss resulting from development, overgrazing, trampling, and agriculture poses the greatest threat to existing populations (CNPS 2009).

Moderate quality annual grassland habitat is present in the special-status plant study area. Although the CNPS and CNDDDB both report occurrences of this species in the regional area (CNPS 2011, CNDDDB 2003d), no occurrences have been identified within 10 miles of the project footprint. Hartweg's golden sunburst is determined to have a moderate potential to occur in California annual grassland within the habitat study area.

#### **Wright's Trichocoronis (*Trichocoronis wrightii* var. *wrightii*)**

Wright's trichocoronis, a CNPS List 2.1 species, is an annual herb in the sunflower family (*Asteraceae*). It has slender, weak stems up to 10 inches long with opposite linear leaves on the lower part of the stem, and it may have alternate or opposite leaves on the upper stem. The slender white ray flowers are terminal and bloom from May to September (Hickman 1993).

Wright's trichocoronis is found on alkaline soils in marshes, seeps, swamps, riparian forest, and vernal pools at elevations between 15 and 1,435 feet. This species is found in Colusa, Merced, San Joaquin, and Riverside counties. Habitat loss resulting from development, overgrazing, and agriculture poses the greatest threat to existing populations (CNPS 2009).

Riparian scrub and vernal pool habitats are present in the special-status plant study area. Although the CNPS and CNDDDB both report occurrences of this species in the regional area (CNPS 2011, CNDDDB 2003d), no CNDDDB occurrences have been identified within 10 miles of the project footprint. Wright's



trichocoronis is determined to have a moderate potential to occur in riparian habitat and vernal pools within the habitat study area.

### **Heckard's Pepper Grass (*Lepidium latipes* var. *heckardii*)**

Heckard's pepper grass is an annual herb in the mustard family (*Brassicaceae*) that occurs in alkali soils in valley grassland and wetland/vernal pool habitats (USFWS 2011). It is 3 to 25 centimeters tall, densely hairy, with 5- to 10-centimeter-long, linear leaves. Small, greenish flowers with ciliate petals are borne in dense spikes. This variety is identifiable by its erect stems with well-spaced nodes and flat, oval fruits that are deeply notched at the top (Hickman 1993).

The nearest reported and presumed extant CNDDDB occurrence of Heckard's pepper grass is located approximately 15.5 miles west of the special-status plant species study area (Occurrence #14, CNDDDB 2003d). It is a CNPS 1B.2 species and has been recorded in Merced County near the special-status study area (CNDDDB 2003d). Heckard's pepper grass is threatened by agricultural conversion, grazing, and urban development (CNPS 2011).

Moderate quality valley grassland habitat is present in the special-status plant study area. The CNPS reports an occurrence of this species in the USGS 7.5-minute Arena quadrangle north of the special-status plant study area (CNPS, 2011); therefore, Heckard's pepper grass has a moderate potential to occur in the special-status plant study area (CNDDDB 2003d).

### **Caper-Fruited Tropidocarpum (*Tropidocarpum capparideum*)**

Caper-fruited tropidocarpum, a CNPS List 1B.1 species, is an annual herb in the mustard family (*Brassicaceae*). It has prostrate to erect hairy stems up to 20 inches long. The alternate leaves are deeply pinnate-lobed and the flowers are yellow with spoon-shaped petals. This species blooms from March to April (Hickman 1993).

Caper-fruited tropidocarpum is found in alkaline soils in valley and foothill grasslands at elevations between 3 and 1,660 feet. This species is found in Alameda, Contra Costa, Fresno, Glenn, Monterey, Santa Clara, San Joaquin, and San Luis Obispo counties. Habitat loss resulting from development, overgrazing, military activities, trampling, and competition with nonnative plants poses the greatest threat to existing populations (CNPS 2009).

There is one historic occurrence of caper-fruited tropidocarpum reported within the habitat study area from 1930 near Fresno (exact location unknown), and this population is believed to be extant (Occurrence #22; CNDDDB 2003d).

Because a presumed extant occurrence and potentially suitable California annual grassland is present within the habitat study area, Caper-fruited tropidocarpum is determined to have a high potential to occur within the construction footprint in this habitat type.

### **Dwarf Downingia (*Downingia pusilla*)**

Dwarf downingia, a CNPS List 2.2 species, is an annual herb in the bellflower family (*Campanulaceae*). It is 1.2 to 3.2 inches tall, with small linear leaves and small, radially symmetric flowers less than 2.5 inches across. The flowers are variable and may be all white or blue with two small yellow spots near the throat. This species blooms from March to May (Hickman 1993).

This species is found in vernal pools and other seasonal wetlands, vernal lakes, and mesic valley and foothill grasslands at elevations between 3 and 1,600 feet. Dwarf downingia is found in Fresno, Merced, Napa, Placer, Sacramento, San Joaquin, Solano, Sonoma, Stanislaus, Tehama, and Yuba counties. Habitat loss resulting from development, agriculture, recreational activities, and displacement by nonnative plants poses the greatest threat to existing populations (CNPS 2009).

The nearest presumed extant CNDDDB occurrence of dwarf downingia is located approximately 3 miles northeast of the project footprint (Occurrence #109; CNDDDB 2003d). The habitat study area is presumed to be within the current range of this species. Potentially suitable, but moderate quality, vernal pools and other seasonal wetlands are present within the habitat study area; therefore, dwarf downingia is determined to have a moderate potential to occur in this habitat type within the habitat study area.

### **Heartscale (*Atriplex cordulata*)**

Heartscale, a CNPS List 1B.2 species, is an annual herb in the goosefoot family (*Chenopodiaceae*). It grows from 3.8 to 20 inches tall and has small, heart-shaped, gray leaves and small, reddish, ovate fruit bracts that are less than 0.5 inch across. This species blooms from April to October (Hickman 1993).

Heartscale is associated with sandy and alkaline soils in chenopod scrub, meadows and seeps, and valley and foothill grasslands at elevations from 0 to 1,000 feet. This species occurs in Alameda, Butte, Colusa, Fresno, Glenn, Kern, Madera, Merced, San Joaquin, Solano, San Luis Obispo, Stanislaus, Tulare, and Yolo counties. Habitat loss resulting from development, agriculture, displacement by nonnative plants, and trampling poses the greatest threat to existing populations (CNPS 2009).

The CNDDDB denotes two extirpated occurrences within the project footprint (Occurrences #18 and #19; CNDDDB 2003d). Based on review of recent aerial imagery, habitat at these locations has been converted to agricultural uses (Google Earth 2010). The nearest presumed extant occurrence is located approximately 4 miles southwest of the project footprint (Occurrence #15; CNDDDB 2003d).

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, California annual grassland is present within the habitat study area; therefore, Heartscale is determined to have a moderate potential to occur in this habitat type within the habitat study area.

### **Brittlescale (*Atriplex depressa*)**

Brittlescale, a CNPS List 1B.2 species, is an annual herb in the goosefoot family (*Chenopodiaceae*). It grows 4 to 8 inches tall and has ovate to cordate white scaly leaves and small, ovate reddish fruit bracts that are less than 0.5 inch across. This species blooms from April to October (Hickman 1993).

Brittlescale is found in clay and alkaline soils in chenopod scrub, meadows and seeps, and valley and foothill grasslands at elevations from 0 to 660 feet. This species is found throughout northern California as well as in Merced, Fresno, King, and Tulare counties. Habitat loss resulting from development, agriculture, displacement from nonnative plants, and trampling poses the greatest threat to existing populations (CNPS 2009).

The CNPS reports this species in the regional area (CNPS 2011); however, no CNDDDB occurrences have been identified within 10 miles of the project footprint.

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, California annual grassland and vernal pools and other seasonal wetlands are present within the habitat study area. Therefore, brittlescale is determined to have a moderate potential to occur in these habitat types within the habitat study area.

### **San Joaquin Spearscale (*Atriplex joaquiniana*)**

San Joaquin spearscale, a CNPS List 1B.2 species and a California endemic, is an annual herb in the goosefoot family (*Chenopodiaceae*). It grows from 3.8 to 36 inches tall and has ovate to triangular leaves that are 0.4 to 2.7 inches long. The reddish purple fruit bracts are congested on the ends of the main stem and branches. This species blooms from April to October (Hickman 1993).

San Joaquin spearscale occurs on alkaline soils in chenopod scrub, alkali meadows and seeps, and valley and foothill grasslands at elevations from 3 to 825 feet. This species is found in Alameda, Contra Costa,

Colusa, Fresno, Glenn, Merced, Monterey, Napa, San Benito, Santa Clara, San Joaquin, Solano, San Luis Obispo, Tulare, and Yolo counties. Habitat loss resulting from development, agriculture, and overgrazing poses the greatest threat to existing populations (CNPS 2009).

The nearest reported CNDDDB occurrence of San Joaquin spearscale is located approximately 10 miles southwest of the project footprint and is presumed extant (Occurrence #74; CNDDDB 2003d).

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, California annual grassland is present within the habitat study area. Therefore, San Joaquin spearscale is determined to have a moderate potential to occur in this habitat type within the habitat study area.

#### **Lesser Saltscale (*Atriplex minuscula*)**

Lesser saltscale, a CNPS List 1B.1 species and a California endemic, is an annual herb in the goosefoot family (*Chenopodiaceae*). Lesser saltscale has many upright, reddish stems up to 16 inches tall. The leaves are egg-shaped with entire margins and are typically opposite on the upper part of the stem and alternate on the lower part of the stem. Each fruit consists of a single reddish seed that is enclosed by two egg- to diamond-shaped bracts covered with tubercles (wart-like projections). This species blooms from May to October (Hickman 1993).

Lesser saltscale is found in sandy and alkaline soils in chenopod scrub, playas, and valley and foothill grasslands at elevations from 130 to 330 feet. This species is found in Butte, Fresno, Kern, Madera, Merced, Tulare, and Stanislaus counties. Habitat loss resulting from development, agriculture, and overgrazing poses the greatest threat to existing populations (CNPS 2009).

There are two presumed extant occurrences within the project footprint (Occurrences #25 and #26; CNDDDB 2003d). Based on review of recent aerial imagery, most of the habitat at the reported locations for these populations has been converted to agricultural uses and residential development (Google Earth 2010).

Because there is a reported extant occurrence of this species and potentially suitable California annual grassland is present within the habitat study area, lesser saltscale is determined to have a high potential to occur in this habitat type within the habitat study area.

#### **Vernal Pool Smallscale (*Atriplex persistens*)**

Vernal pool smallscale, a CNPS List 1B.2 species and a California endemic, is an annual herb in the goosefoot family (*Chenopodiaceae*). The long, upright stems grow from 4.0 to 8.0 inches tall. It has alternate, sessile, gray, egg-shaped leaves with smooth margins that are 0.08 to 0.16 inch long. Each fruit consists of a single, reddish-brown seed enclosed by two bracts. This species blooms June to October (Hickman 1993).

Vernal pool smallscale is found in vernal pools associated with alkaline soils at elevations between 26 and 345 feet. This species occurs in Glenn, Madera, Merced, Solano, Tulare, and Stanislaus counties. Habitat loss resulting from development, agriculture, and flood control activities poses the greatest threat to existing populations (CNPS 2009).

There is one historic CNDDDB occurrence reported for vernal pool smallscale located approximately 3 miles southwest of Merced approximately 2.5 miles southwest of the project footprint (Occurrence #7; CNDDDB 2003d). This population was last reported in 1926 and is recorded as possibly extirpated. Based on review of recent aerial imagery, there may be potential habitat at the reported location; however, the immediate surrounding area has been converted to agricultural uses (Google Earth 2010). The nearest presumed extant occurrence is located approximately 6 miles west of the project footprint (Occurrence #3; CNDDDB 2003d).

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, vernal pools and other seasonal wetlands are present within the habitat study area. Therefore, vernal pool smallscale is determined to have a moderate potential to occur in these habitat types within the habitat study area.

**Subtle Orache (*Atriplex subtilis*)**

Subtle orache, a CNPS List 1B.2 species and a California endemic, is an annual herb in the goosefoot family (*Chenopodiaceae*). It has upright stems between 9 and 12 inches tall. The heart-shaped, white scaly leaves are generally opposite, and less than 0.1 inch long. This species blooms from June to August (Hickman 1993).

Subtle orache is found in sandy and alkaline soils in valley foothill grasslands at elevations between 120 and 330 feet. Subtle orache is found in Butte, Fresno, Kings, Kern, Madera, Merced, and Tulare counties. Habitat loss resulting from development, overgrazing, and agriculture poses the greatest threat to existing populations (CNPS 2009).

Subtle orache has been reported in 25 locations, including 1 historic population, within the project footprint (Occurrence #4; CNDDDB 2003d). This population was last reported in 1936 and is listed as presumed extant. Based on review of recent aerial imagery, the habitat at the reported location has been entirely converted to agriculture (Google Earth 2010).

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, California annual grassland is present within the habitat study area. Therefore, subtle orache is determined to have a high potential to occur in this habitat type within the habitat study area.

**Lost Hills Crownscale (*Atriplex vallicola*)**

Lost Hills crownscale, a CNPS List 1B.2 species, is an annual herb in the goosefoot family (*Chenopodiaceae*). The short stems have few branches and alternate, egg-shaped leaves with entire margins. The fruit bracts are broadly triangular, irregularly toothed, and may or may not have tubercles (warty projections). Each pair of bracts enclose a flattened, dark brown seed. This species blooms from April to August (Hickman 1993).

Lost Hills crownscale is found in alkaline soils in chenopod scrub, valley, and foothill grasslands, and associated with vernal pools and other seasonal wetlands at elevations ranging from 0 to 2,000 feet. This species is found in Fresno, Kings, Kern, Merced, and San Luis Obispo counties. Habitat loss resulting from overgrazing, agriculture, and energy projects poses the greatest threat to existing populations (CNPS 2009).

CNPS reports occurrence of this species in the regional area (CNPS 2011); however, no CNDDDB occurrences have been identified within 10 miles of the project footprint. Currently, this species is known from Lost Hills to extreme southern Kings County, the Kerman Ecological Reserve in Fresno County, the Soda Lake region of the Carrizo Plain, the Lokern-McKittrick area of Kern County, and southwestern Merced County (USFWS 1998a).

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, California annual grassland and vernal pools and other seasonal wetlands are present within the habitat study area. Therefore, Lost Hills crownscale is determined to have a moderate potential to occur in these habitat types within the habitat study area.

**Hoover's Spurge (*Chamaesyce hooveri*)**

Hoover's spurge, a federally threatened and CNPS List 1B.2 species, is an annual herb in the spurge family (*Euphorbiaceae*). Hoover's spurge has a prostrate growth, reaching only 2 inches tall. Its flower

has petal-like glands that are red to olive in color. This species blooms from July to October (Hickman 1993).

Hoover's spurge is found on volcanic basalt or clay substrates in vernal pool grassland complexes at elevations between 75 and 400 feet. This species is found in Butte, Colusa, Glenn, Merced, Tehama, Tulare, and Stanislaus counties. Habitat loss resulting from development, overgrazing, agriculture, and nonnative species poses the greatest threat to existing populations (CNPS 2009).

The nearest reported CNDDDB occurrence for Hoover's spurge is approximately 10 miles southwest of the project footprint (Occurrence #22; CNDDDB 2003d). This population was last seen in 1987 and is presumed to be extant. Based on review of recent aerial imagery, habitat at this location may be present for this species (Google Earth 2010). Critical habitat for Hoover's spurge has been designated in the regional area approximately 8 miles southwest of the project footprint.

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, California annual grassland is present within the habitat study area. Therefore, Hoover's spurge is determined to have a moderate potential to occur in this habitat type within the habitat study area.

#### **Alkali Milk-Vetch (*Astragalus tener* var. *tener*)**

Alkali milk-vetch, a CNPS List 1B.2 species and California endemic, is an annual herb in the pea family (*Fabaceae*) that grows from 1.5 to 12 inches tall. The leaflets are variable, from narrow and pointed to wedge-shaped with blunt or notched tips. The fruit is 0.4 to 1.0 inch long, straight, or only slightly curved with a rounded base. This species blooms from March to June (Hickman 1993).

Alkali milk-vetch is associated with alkaline soils in vernal pool grassland complexes and playas at elevations between 3 and 560 feet. This species is found in Alameda, Contra Costa, Merced, Monterey, Napa, San Benito, Santa Clara, San Francisco, San Joaquin, Solano, Sonoma, Yolo, and Stanislaus counties. Habitat loss resulting from development, overgrazing, agriculture, and displacement by nonnative species poses the greatest threat to existing populations (CNPS 2009).

There is one presumed extant CNDDDB-reported occurrence of alkali milk-vetch near the Arena Plains National Wildlife Refuge, approximately 9 miles southwest of the project footprint (Occurrence #55; CNDDDB 2003d). This population is recorded as last seen in 2002 and is presumed to be extant.

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, California annual grassland and vernal pools and other seasonal wetlands are present within the habitat study area. Therefore, alkali milk-vetch is determined to have a moderate potential to occur in these habitat types within the habitat study area.

#### **Merced Phacelia (*Phacelia ciliata* var. *opaca*)**

Merced phacelia, a CNPS List 1B.2 species and California endemic, is an annual herb in the waterleaf family (*Hydrophyllaceae*). It grows from 3.9 to 21.7 inches tall. The leaves vary in size and shape, ranging from 1 to 6 inches long and from deeply-lobed to-divided. Each branch tip is coiled like a scorpion's tail and holds many flowers. The individual bell-shaped flowers are blue with pale centers. This species blooms from February to May (Hickman 1993).

Merced phacelia is found in heavy clay and sometimes alkaline soils in grasslands, on alkaline flats, on valley floors, and on open hills at elevations between 200 and 500 feet. This species is known only from Merced County. Habitat loss resulting from development, overgrazing, agriculture, and displacement by nonnative species poses the greatest threat to existing populations (CNPS 2009).

Merced phacelia is presumed to be extant within the habitat study area (Occurrence #6; CNDDDB 2003d). Because of a presumed extant occurrence and suitable California annual grassland is present in the

habitat study area, Merced phacelia is determined to have a high potential to occur in this habitat type within the habitat study area.

**Keck's Checkerbloom (*Sidalcea keckii*)**

Keck's checkerbloom, a federally endangered and CNPS List 1B.1 species, is an annual herb in the mallow family (*Malvaceae*). The erect stems range from 6 to 12 inches tall. Leaves are 7- to 9-lobed and tapered at the base. The deep pink flowers have linear lobes 0.05 inch long. This species blooms from April to May (Hickman 1993).

Keck's checkerbloom is found in clay and serpentine substrates in cismontane woodland and valley and foothill grasslands at elevations between 500 and 1,500 feet. This species is found in Colusa, Fresno, Merced, Napa, Solano, Tulare, and Yolo counties. Habitat loss resulting from development, overgrazing, agriculture, and displacement by nonnative species poses the greatest threat to existing populations (CNPS 2009).

The nearest CNDDDB-reported occurrence of Keck's checkerbloom is located just north of Yosemite Lake, approximately 6.5 miles northeast of the habitat study area. This population was last seen in 2005 and is presumed to be extant (Occurrence #6; CNDDDB 2003d). The closest occurrence of designated critical habitat for this species is more than 10 miles from the habitat study area.

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, California annual grassland is present within the habitat study area. Therefore, Keck's checkerbloom is determined to have a moderate potential to occur in this habitat type within the habitat study area.

**Beaked Clarkia (*Clarkia rostrata*)**

Beaked clarkia, a CNPS List 1B.3 species, is an annual herb in the evening primrose family (*Onagraceae*). It grows 14 to 24 inches tall and has linear leaves and short petioles. Its small, pendent buds are recurved at the tip and the hypanthium has a ring of hairs. The fan-shaped pinkish-lavender petals fade to white near the middle. This species blooms from April to May (Hickman 1993).

Beaked clarkia is found in cismontane woodlands and valley and foothill grasslands at elevations between 180 and 1,550 feet. This species is found in Merced, Mariposa, Tuolumne, and Stanislaus counties. Habitat loss resulting from development, overgrazing, and agriculture poses the greatest threat to existing populations (CNPS 2009).

The nearest presumed extant CNDDDB occurrence of beaked clarkia is located approximately 4.5 miles northeast of the project footprint (Occurrence #2; CNDDDB 2003d).

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, California annual grassland is present within the habitat study area. Therefore, beaked clarkia is determined to have a moderate potential to occur in this habitat type within the habitat study area.

**Henderson's Bent Grass (*Agrostis hendersonii*)**

Henderson's bent grass, a CNPS List 3.2 species, is an erect, loosely tufted grass in the grass family (*Poaceae*). It grows between 2.4 and 27.6 inches tall and is characterized by smooth leaf sheaths and 0.5- to 2-inch greenish to yellowish spikelets tinged with purple at the tips. This species blooms from April to June (Hickman 1993).

Henderson's bent grass is found along the wet margins of vernal pools, on thin vernal moist soils, and in other seasonal wetlands associated with valley and foothill annual grasslands at elevations from 230 to 1,000 feet. Henderson's bent grass is found in Calaveras, Merced, Shasta, Tehama, and Tuolumne

counties. Habitat loss resulting from development poses the greatest threat to existing populations (CNPS 2009).

The nearest reported and presumed extant CNDDDB occurrence of Henderson's bent grass is located approximately 5 miles northeast of the project footprint (Occurrence #15, CNDDDB 2003d).

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, vernal pools and other seasonal wetlands and California annual grassland are present within the habitat study area. Therefore, Henderson's bent grass is determined to have a moderate potential to occur in these habitat types within the habitat study area.

### **California Satintail (*Imperata brevifolia*)**

California satintail, a CNPS List 2.1 species, is a rhizomatous grass in the grass family (*Poaceae*). It has hard, scaly rhizomes with stems that are 24 to 48 inches long. It has narrow leaves and a densely white-silky inflorescence. Anthers are brown and the glumes are five-veined. This species blooms from September to May (Hickman 1993).

California satintail is often found in alkaline or mesic clay soils in chaparral, coastal scrub, Mojave Desert scrub, meadows and seeps, and riparian scrub at elevations between 0 and 1,640 feet. This species occurs in Butte, Fresno, Imperial, Inyo, Kern, Lake, Los Angeles, Orange, Riverside, San Bernardino, Tehama, Tulare, and Ventura counties. Habitat loss resulting from agriculture and development poses the greatest threat to existing populations (CNPS 2009).

The CNDDDB reported one occurrence of California satintail within the habitat study area. The exact location is not known; however, this population is presumed to be extant (Occurrence #22; CNDDDB 2003d). Because a presumed extant occurrence and suitable riparian habitat are both present in the habitat study area, California satintail is determined to have a high potential to occur.

### **Colusa Grass (*Neostapfia colusana*)**

Colusa grass, a federally threatened, state endangered, and CNPS List 1B.1 species, is an annual in the grass family (*Poaceae*). The stems are decumbent and characterized by a zigzag growth form. Overall stem length ranges from 3.9 to 11.8 inches. The entire plant is pale green when young and becomes brownish with age as the exudate darkens. Leaves range from 2.0 to 3.9 inches long. Each stem produces one dense, cylindrical inflorescence that is 0.8 to 3.1 inches long and 0.31 to 0.47 inch broad. Within the inflorescence, the spikelets are densely packed in a spiral arrangement. This species blooms from May to August (Hickman 1993).

Colusa grass is found in large vernal pools in adobe clay soils at elevations between 15 and 365 feet. This species is currently known from Colusa, Glenn, Merced, Solano, Stanislaus, and Yolo counties. Habitat loss resulting from development, flood control activities, and agricultural conversions poses the greatest threat to existing populations (CNPS 2009).

The three nearest occurrences are reported as extirpated (Occurrence #42; CNDDDB 2003d) and possibly extirpated (Occurrences #12 and #39; CNDDDB 2003d), located approximately 2.5 miles north, 3 miles northeast, and 4 miles southwest of the project footprint, respectively. The nearest presumed extant occurrence is located approximately 5 miles north of the project footprint (Occurrence #43; CNDDDB 2003d). Critical habitat for this species has been designated in the regional area approximately 2 miles southwest of the project footprint.

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, vernal pools and other seasonal wetlands are present within the habitat study area. Therefore, Henderson's bent grass is determined to have a moderate potential to occur in this habitat type within the habitat study area.

### **San Joaquin Valley Orcutt Grass (*Orcuttia inaequalis*)**

San Joaquin Valley Orcutt grass, a federally threatened, state endangered and CNPS List 1B.1 species, is a tufted annual in the grass family (*Poaceae*). It grows 2 to 6 inches tall and is characterized by irregularly toothed glumes and widely elliptical fruits. Leaf blades are generally 0.05 to 0.3 inch wide. This species blooms from April to September (Hickman 1993).

San Joaquin Valley Orcutt grass is found on volcanic basalt or clay substrates in vernal pool grassland complexes at elevations between 100 and 2,500 feet. This species is found in Fresno, Madera, Merced, Solano, Stanislaus, and Tulare counties. Habitat loss resulting from development, agriculture, overgrazing, and displacement by nonnative plants poses the greatest threat to existing populations (CNPS 2009).

There is one possibly extirpated occurrence located within the project footprint (Occurrence #10; CNDDDB 2003d). The nearest presumed extant occurrence is located approximately 1 mile northeast of the project footprint (Occurrence #51; CNDDDB 2003d). Critical habitat for this species has been designated within the project footprint.

Although no extant occurrences of this species have been reported in the habitat study area, the presence of critical habitat and nearby extant occurrences warrant a determination that San Joaquin Valley Orcutt grass has a high potential to occur in California annual grassland and vernal pools and other seasonal wetlands within the habitat study area.

### **Hairy Orcutt Grass (*Orcuttia pilosa*)**

Hairy Orcutt grass, a federally and state endangered and CNPS List 1B.1 species, is a tufted annual in the grass family (*Poaceae*). The plant has several stems that are 2 to 8 inches tall and that branch only from the lower nodes. Each stem ends in a long, spike-like inflorescence. Leaves are grayish, with soft, straight hairs. The upper spikelets are densely crowded and hairy. This species blooms from May to September (Hickman 1993).

Hairy Orcutt grass is found on volcanic basalt or clay substrates in vernal pool grassland complexes at elevations between 150 and 650 feet. This species is found in Butte, Glenn, Madera, Merced, Stanislaus, and Tehama counties. Habitat loss resulting from development, agriculture, overgrazing, trampling, and displacement by nonnative plants poses the greatest threat to existing populations (CNPS 2009).

The CNDDDB reports one presumed extant occurrence within the project footprint (Occurrence #19; CNDDDB 2003d). Based on review of recent aerial imagery, potential habitat for this species appears to be present (Google Earth 2010). Critical habitat for this species has been designated in the regional area approximately 2.5 miles northeast of the project footprint.

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, vernal pools and other seasonal wetlands and California annual grassland are present within the habitat study area. Therefore, hairy Orcutt grass is determined to have a high potential to occur in these habitat types within the habitat study area.

### **Greene's Tuctoria (*Tuctoria greenei*)**

Greene's tuctoria, a federally endangered, state rare, and CNPS List 1B.1 species, is in the grass family (*Poaceae*). The plant is 2 to 6 inches tall with stems becoming decumbent and often purplish colored. The outward curving leaves are less than 1 inch long. The spikelet tips are irregularly short-toothed and deeply veined. Fruits are slightly flattened laterally. This species blooms from May to July (Hickman 1993).

Greene's tuctoria is found in clay or Tuscan loam substrates in vernal pool grassland complexes at elevations between 100 and 3,515 feet. This species is found in Butte, Colusa, Fresno, Glenn, Madera, Merced, Modoc, Shasta, San Joaquin, Stanislaus, Tulare, and Tehama counties. Habitat loss resulting

from development, agriculture, and overgrazing poses the greatest threat to existing populations (CNPS 2009).

The CNDDDB reports one presumed extant occurrence within the project footprint (Occurrence #28; CNDDDB 2003d). Critical habitat for this species has been designated within the project footprint. Because a presumed extant occurrence of this species and suitable habitat are present in the habitat study area, Greene's tuctoria is determined to have a high potential to occur in California annual grassland that supports vernal pools and other seasonal wetlands within the project footprint.

#### **Pincushion Navarretia (*Navarretia myersii* ssp. *myersii*)**

Pincushion navarretia, a CNPS List 1B.1 species, is an annual herb in the phlox family (*Polemoniaceae*). It is a relatively small, low-growing plant with a recurved primary stem reaching no more than 0.65 inch tall. Leaves are linear and generally radiate from the base of the center stem. The white and tubular flowers generally bloom in May (Hickman 1993).

Pincushion navarretia is found in acidic soils in vernal pools at elevations between 65 and 1,090 feet. Pincushion navarretia is currently known from fewer than 20 occurrences in Amador, Calaveras, Merced, Placer, and Sacramento counties. Habitat loss resulting from development and agricultural conversion poses the greatest threat to existing populations (CNPS 2009).

The nearest reported occurrence is presumed extant and is located approximately 6 miles northeast of the project footprint (Occurrence #14; CNDDDB 2003d).

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, vernal pools and other seasonal wetlands and California annual grassland are present within the habitat study area. Therefore, pincushion navarretia is determined to have a moderate potential to occur in these habitat types within the habitat study area.

#### **Shining Navarretia (*Navarretia nigelliformis* ssp. *radians*)**

Shining navarretia, a CNPS List 1B.2 species and California endemic, is an annual herb in the phlox family (*Polemoniaceae*). It is a relatively small, low-growing plant with recurved stems typically 3 to 12 inches tall. Small, narrow leaves are twice pinnate and only 0.04 inch wide. The flowers are yellow with purple and brown spots on the lower lobes. This species blooms from April to July (Hickman 1993).

Shining navarretia is found in cismontane woodlands, valley and foothill grasslands, and vernal pools at elevations between 250 and 3,300 feet. Shining navarretia occurs in Fresno, Merced, Monterey, San Benito, and San Luis Obispo counties. Habitat loss resulting from development and competition from nonnative plants poses the greatest threat to existing populations (CNPS 2009).

The nearest reported occurrence is presumed extant and is located approximately 0.5 mile northeast of the project footprint (Occurrence #44; CNDDDB 2003d).

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, vernal pools and other seasonal wetlands and California annual grassland are present within the habitat study area. Therefore, shining navarretia is determined to have a moderate potential to occur in these habitat types within the habitat study area.

#### **Prostrate Vernal Pool Navarretia (*Navarretia prostrata*)**

Prostrate vernal pool navarretia, a CNPS List 1B.1 species, is an annual herb in the phlox family (*Polemoniaceae*). This low-growing plant has stems bearing central floral heads and radiating leaves. Stems are generally leafless except those with floral heads. Hairs are typically recurved throughout. Flowers are blue to white with linear lobes. This species blooms from April to July (Hickman 1993).

Prostrate vernal pool navarretia is found in alkaline soils in coastal scrub, meadows and seeps, and vernal pool grassland complexes at elevations between 45 and 2,300 feet. Prostrate vernal pool navarretia is found in Alameda, Los Angeles, Merced, Monterey, Orange, Riverside, San Bernardino, San Benito, San Diego, and San Luis Obispo counties. Habitat loss resulting from development and agriculture poses the greatest threat to existing populations (CNPS 2009).

The nearest reported occurrence is approximately 9.5 miles southwest of the project footprint and is located in vernal pools of the Arena Plains National Wildlife Refuge. This population was last reported observed in 1999 and is presumed to be extant (Occurrence #24; CNDDDB 2003d).

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, vernal pools and other seasonal wetlands and California annual grassland are present within the habitat study area. Therefore, prostrate vernal pool navarretia is determined to have a moderate potential to occur in these habitat types within the habitat study area.

### **Recurved Larkspur (*Delphinium recurvatum*)**

Recurved larkspur, a CNPS List 1B.2 species and a California endemic, is a perennial herb in the buttercup family (*Ranunculaceae*). It grows 7 to 34 inches tall with basal leaves characterized by 3 to 11 lobes. The inflorescence is a 0.25- to 2.25-inch long raceme with 10 to 25 flowers. Flowers consist of five light blue sepals and four white petals. Fruit are follicles with winged seeds. This species blooms from March to June (Hickman 1993).

Recurved larkspur is found in poorly drained alkaline soils in chenopod scrub, saltbush scrub, valley sink scrub, cismontane woodland, and valley and foothill grassland elevations between 100 and 2,000 feet. Recurved larkspur is found in Alameda, Butte, Contra Costa, Colusa, Fresno, Glenn, Kings, Kern, Madera, Merced, Monterey, San Joaquin, San Luis Obispo, Solano, and Tulare counties. Habitat loss resulting from development, agriculture, overgrazing, and trampling poses the greatest threat to existing populations (CNPS 2009).

There is one reported historic (1955) occurrence located approximately 0.5 mile from the project footprint (Occurrence #77; CNDDDB 2003d). This occurrence is possibly extirpated. Based on review of recent aerial imagery, the reported location has been converted to agriculture (Google Earth 2010). The nearest presumed extant location is located approximately 5 miles west of the project footprint (Occurrence #78; CNDDDB 2003d).

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, California annual grassland is present within the habitat study area. Therefore, recurved larkspur is determined to have a moderate potential to occur in these habitat types within the habitat study area.

### **Little Mousetail (*Myosurus minimus* ssp. *apus*)**

Little mousetail, a CNPS List 3.1 species, is an annual herb in the buttercup family (*Ranunculaceae*). This small tufted plant has narrow leaves that are 0.8 to 3.5 inches long with a cylindrical inflorescence up to 2.8 inches long consisting of clusters of inconspicuous greenish-white flowers. The achenes are more or less rectangular. This species blooms from March to June (Hickman 1993).

Little mousetail is found in alkaline soils in vernal pools and valley and foothill grassland at elevations between 65 and 2,115 feet. This species occurs in Alameda, Contra Costa, Colusa, Lake, Merced, Riverside, San Bernardino, San Diego, Solano, Tulare, and Yolo counties. Habitat loss resulting from off-road vehicles, development, and agriculture poses the greatest threat to existing populations (CNPS 2009).

The CNPS reports this species in the regional area, but the CNDDDB reports no occurrences within 10 miles of the project footprint (CNDDDB 2003d).

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, vernal pools and other seasonal wetlands are present within the habitat study area. Therefore, recurved larkspur is determined to have a moderate potential to occur in this habitat type within the habitat study area.

**Succulent Owl's-clover (*Castilleja campestris* ssp. *succulenta*)**

Succulent owl's-clover, a federally threatened, state endangered, and CNPS List 1B.2 species, is an annual herb in the snapdragon family (*Scrophulariaceae*). It grows 4 to 12 inches tall and has spear-shaped leaves with smooth edges. Inflorescences are spike-like with green spear-shaped bracts that are generally larger than the deep yellow to orange flowers. This species blooms from April to May (Hickman 1993).

Succulent owl's-clover is found in acidic soils in vernal pool grassland complexes at elevations between 160 and 2,400 feet. Succulent owl's-clover is found in Fresno, Madera, Merced, Mariposa, San Joaquin, and Stanislaus counties. Habitat loss resulting from development, agriculture, overgrazing, and trampling poses the greatest threat to existing populations (CNPS 2009).

There is one presumed extant occurrence reported within the project footprint (Occurrence #62; CNDDDB 2003d). Critical habitat for this species has been designated within the project footprint.

Succulent owl's clover is determined to have a high potential to occur in the habitat study area due to a presumed extant occurrence and potentially suitable habitat in California annual grassland and vernal pools and other seasonal wetlands.

**Palmate-Bracted Bird's-beak (*Cordylanthus palmatus*)**

Palmate-bracted bird's-beak, a federally and state endangered and CNPS List 1B .1 species, is an annual hemiparasitic herb in the snapdragon family (*Scrophulariaceae*) that grows 4 to 12 inches tall. The stems and leaves are grayish green and sometimes covered with salt crystals excreted by glandular hairs. Small, pale whitish flowers are 0.5 to 1 inch long and arranged in dense clusters surrounded by leaf-like bracts. It blooms from May to October (Hickman 1993).

Palmate-bracted bird's-beak is found in alkaline soils in chenopod scrub and valley and foothill grasslands, at elevations between 15 and 515 feet. Palmate-bracted bird's-beak is found in Alameda, Colusa, Fresno, Glenn, Madera, San Joaquin, and Yolo counties. Habitat loss resulting from development, agriculture, overgrazing, vehicles, and altered hydrology poses the greatest threat to existing populations (CNPS 2009).

The nearest reported occurrence is presumed extant and is located approximately 7.5 miles south of the project footprint (Occurrence #26; CNDDDB 2003d).

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, California annual grassland is present within the habitat study area. Therefore, palmate-bracted bird's-beak is determined to have a moderate potential to occur in this habitat type within the habitat study area.

**Boggs Lake Hedge Hyssop (*Gratiola heterosepala*)**

Boggs Lake hedge hyssop, a state endangered and CNPS List 1B.2 species, is an annual herb in the snapdragon family (*Scrophulariaceae*). It has erect hollow stems 0.8 to 3.9 inches tall. The leaves are opposite and have entire margins. Leaves near the base of the stem are 0.4 to 0.8 inch long and lance-shaped, but the leaves become shorter, wider, and blunt-tipped farther up on the stem. The yellow and white flowers are borne singly in the upper leaf axils and are 0.23 to 0.31 inch long. It blooms from April to August (Hickman 1993).

Boggs Lake hedge hyssop is found on clay soils in marshes, swamps, vernal pools, and lake margins at elevations between 30 and 8,000 feet. This species is found in Fresno, Madera, Merced, Lake, Lassen, Modoc, Placer, Sacramento, Shasta, Siskiyou, San Joaquin, Solano, and Tehama counties. Habitat loss resulting from agriculture, development, overgrazing, trampling, and off-road vehicles poses the greatest threat to existing populations (CNPS 2009).

The nearest CNDDDB occurrence of Boggs Lake hedge hyssop is located approximately 7.5 miles north of the project footprint in a vernal pool complex on a property south of Merced known as Flying M Ranch. This population was recorded in 2000 and is presumed to be extant (Occurrence #83; CNDDDB 2003d).

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, California annual grassland and vernal pools and other seasonal wetlands are present within the habitat study area. Therefore, Boggs Lake hedge hyssop is determined to have a moderate potential to occur in these habitat types within the habitat study area.

## 5.2.2 Special-Status Wildlife

Appendix C-2 includes all special-status wildlife species with potential to occur in the region, including those with an unlikely or no potential to occur within the habitat study area. The special-status wildlife species determined to have future, low, moderate, or high potential to occur in the habitat study area are described below. The following section is divided into special-status invertebrates, fish, amphibians, reptiles, birds, and mammals. Reference to suitable habitat for each species is also discussed as related to the specific species (Appendix C-2).

### 5.2.2.1 Invertebrates

Four special-status invertebrates have a moderate or greater potential to occur in vernal pools and other seasonal wetlands and Mexican elderberry shrubs within the habitat study area (CNDDDB 2003e) – Conservancy fairy shrimp, vernal pool fairy shrimp, vernal pool tadpole shrimp, and Valley elderberry longhorn beetle.

#### **Conservancy Fairy Shrimp (*Branchinecta conservatio*)**

Conservancy fairy shrimp is listed as a federally endangered species. It grows throughout the Central Valley in California, although only in six locations: Vina Plains, Tehama County; south of Chico, Butte County; Jepson Prairie, Solano County; Sacramento National Wildlife Refuge, Glenn County; near Haystack Mountain northeast of Merced, Merced County; and the Lockwood Valley, northern Ventura County (Johnson and Williams 2010). Conservancy fairy shrimp are typically found in turbid and large (1 to 2 acres) to very large (88 acres) vernal pools (Helm and Vollmar 2002).

The nearest CNDDDB-reported occurrence is located approximately 2 miles south of the project footprint and is presumed extant (Occurrence #34; CNDDDB 2003e). Critical habitat for this species has been designated within the project footprint.

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, vernal pool habitat is present within the habitat study area. Therefore, Conservancy fairy shrimp have a moderate potential to occur in this habitat type within the habitat study area.

#### **Vernal Pool Fairy Shrimp (*Branchinecta lynchi*)**

The vernal pool fairy shrimp is listed as a federally threatened species. It is widely distributed in California and is found throughout the Central Valley, along the Coast Range from Solano County to Santa Barbara County, and in southern California in Riverside and San Diego counties.

Populations of vernal pool fairy shrimp in each pool are often small, and can be outnumbered by other co-occurring species. Vernal pool fairy shrimp occur in a wide variety of pool types, but are frequently

found in small swales or vernal pools in unplowed grasslands with cool water (approximately 50°F) of moderate alkalinity and conductivity that are less than 3 feet deep (Gallagher 1996).

There are three CNDDDB-reported presumed extant occurrences of this species within the project footprint (Occurrences #12, #153, and #181; CNDDDB 2003e). One additional presumed extant occurrence is located within the habitat study area 0.1 mile southwest of the project footprint (Occurrence #310; CNDDDB 2003e). Critical habitat for this species has been designated within the project footprint.

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, vernal pool habitat is present within the habitat study area. Therefore, vernal pool fairy shrimp have a high potential to occur in vernal pool habitat within the construction footprint.

#### **Vernal Pool Tadpole Shrimp (*Lepidurus packardii*)**

The vernal pool tadpole shrimp is federally listed as endangered. It is primarily found in the Central Valley from Shasta County to Merced County. Populations of vernal pool tadpole shrimp are found in vernal pool complexes rather than individual pools and range in size from 0.001 acre to 89 acres (Fugate 1992, USFWS 2001).

There are two CNDDDB-reported and presumed extant occurrences within the project footprint (Occurrences #81 and #244; CNDDDB 2003e). Critical habitat for this species has been designated within the project footprint.

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, vernal pool habitat is present within the habitat study area. Therefore, vernal pool tadpole shrimp have a high potential to occur in vernal pools and other seasonal wetlands in the construction footprint.

#### **Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*)**

The valley elderberry longhorn beetle is listed as a federal threatened species and is dependent on its host plant, the blue or Mexican elderberry (*Sambucus mexicana*). The elderberry beetle is endemic to riparian woodlands in the Sacramento and San Joaquin valleys. The beetle is rarely observed and often the only exterior evidence of the beetle in an elderberry shrub is the exit hole created by the larva as it enters the pupal stage outside the shrub. The beetle spends most of its life in the larval stage, living within the stems of an elderberry plant. Adult beetles emerge from the stem from late March through June, the same time the shrub blooms. The beetle's life cycle lasts approximately 1 to 2 years.

Although critical habitat has been established for this species, no critical habitat occurs in the project vicinity; all critical habitat areas are located in Sacramento County.

Valley elderberry longhorn beetles have been documented in riparian areas near the habitat study area. The nearest CNDDDB-reported occurrence is located approximately 1 mile northeast of the project footprint and is presumed extant (Occurrence #134; CNDDDB 2003e).

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, riparian habitat is present within the habitat study area. Therefore, Valley elderberry longhorn beetles are determined to have a moderate potential to occur in this habitat type within the habitat study area. Specific locations of elderberry shrubs identified during the protocol-level rare plant surveys is discussed in the *Merced to Fresno Section Special-Status Plants Survey Report* (Authority and FRA 2011b).

#### **5.2.2.2 Fish**

As discussed in Section 5.1.2, Other Waters, the UPRR/SR 99 and BNSF alternatives cross 17 historically natural watercourses and approximately 50 named canals and drains. These crossings were evaluated relative to their potential to provide suitable habitat for special-status aquatic species based on the

criteria presented in Section 5.1.2, Other Waters. Through field surveys at crossings, all natural watercourses were determined to potentially support one or more special-status fishes. Watercourse channel types, alignment crossings, and aquatic habitat conditions are summarized for the 17 watercourses identified as potentially supporting special-status fishes in Tables 4-2 and 4-3. Other than the San Joaquin River, the alignments do not cross any watercourses identified by the SJRRP Settlement (NRDC 2005) for conveyance of interim and restoration flows. Bypasses for conveyance of interim and restoration flows, including the Eastside Bypass, Chowchilla Bypass, and Mariposa Bypass, are located west of the habitat study area.

Six special-status fish species have a moderate or greater potential to occur in the habitat study area (CNDDDB 2003e)—Kern brook lamprey, Central Valley steelhead, Central Valley spring-run Chinook salmon, Central Valley fall/late fall-run Chinook salmon, hardhead, and San Joaquin roach. Species descriptions as well as known and potential occurrences of these special-status fish species that could occur at Merced to Fresno Section watercourse crossings are described below.

### **Kern Brook Lamprey (*Lampetra hubbsi*)**

Kern brook lamprey is a CDFG SSC. It is nonmigratory and is endemic to the east side of the San Joaquin Valley (Moyle 2002). Larval lampreys (*Ammocoetes*) usually occur in shallow pools along edges of runs where water velocities are slower. Larval lampreys remain burrowed in the substrate (mixture of sand and mud) for several years before metamorphosing into adults in the fall. Adults spawn in gravel riffles in native environments in the spring and die after spawning. Kern brook lamprey have been found in the lower reaches of the Merced, Kaweah, Kings, and San Joaquin rivers as well as in the Friant-Kern Canal, where the species was first described. However, this and other canal populations are likely in sink habitats and do not contribute to the survival of the species given that the adults remain in the water conveyance system.

Unidentified ammocoetes that could be Kern brook lamprey have been found in the main-stem San Joaquin River near the alignment crossings (CDFG 2007). Elsewhere in the regional area, habitat for Kern brook lamprey is limited to perennial watercourses or habitats that remain continuously wet, as other more intermittent and ephemeral watercourses have dry periods that would result in loss of larval lampreys through desiccation.

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, riverine habitat is present within the habitat study area. Therefore, Kern brook lamprey are determined to have a moderate potential to occur in this habitat type within the habitat study area.

### **Central Valley Steelhead (*Oncorhynchus mykiss*)**

Central Valley steelhead is a federally threatened species and a CDFG SSC. Adult steelhead migrate through the main-stem Sacramento and San Joaquin rivers from July through March (Moyle 2002) on their way to spawning grounds in streams above the valley floor. Migration is generally associated with higher flow events and lower water temperatures. Steelhead in the Central Valley spawn primarily from January through March, but spawning can begin as early as late December and can extend through April (Moyle 2002). Following emergence from spawning gravels, juveniles either remain in their native streams or move downstream to rear in main-stem rivers and estuaries before entering the ocean. A self-sustaining population does not occur in the habitat study area because of numerous downstream fish barriers and bypasses, which lead fish away from potential habitat and expose them to higher water temperatures, low dissolved-oxygen concentrations, high dissolved salts, and high risks of predation (McBain and Trush 2002). Although the SJRRP is targeting spring-run Chinook salmon, flow restoration of the main-stem San Joaquin River could potentially benefit Central Valley steelhead (NMFS 2009) as well, and it is likely that this species will be present in the habitat study area in the future.

Cottonwood Creek could also potentially support a self-sustaining population of steelhead under augmented flows from Madera Canal (Stillwater Sciences 2003). Although steelhead restoration in

Cottonwood Creek is not currently planned under the SJRRP, steelhead could occur in this or other tributaries in the future (Reclamation et al. 2009).

Critical habitat for this species has been designated within the regional area, approximately 6 miles northwest of the project footprint.

The habitat study area is presumed to be within the current range of this species and potentially suitable but low quality riverine habitat for this species is present within the habitat study area. Therefore, Central Valley steelhead are determined to have a low potential to occur in this habitat type, but may have a moderate potential to occur following habitat restoration activities.

### **Central Valley Spring-run Chinook Salmon (*Oncorhynchus tshawytscha*)**

Spring-run Chinook salmon is a state and federally threatened species. Spring-run Chinook salmon migrate upstream during the spring, hold over in deep pools of the main-stem Sacramento River and its large perennial tributaries where fish can access cold headwaters during the summer months, and spawn from mid-August through mid-October (Moyle 2002). Egg incubation occurs from mid-August through mid-January. Spring-run Chinook salmon in the Sacramento River generally exhibit an ocean-type life history, emigrating as fry, sub-yearlings, and yearlings (Good et al. 2005). Based on observations at the Red Bluff Diversion Dam, juvenile emigration from the upper Sacramento River typically occurs from November through April (Moyle 2002). Spring-run Chinook salmon were extirpated from the San Joaquin River by the 1950s (Moyle 2002), so no run currently exists in the habitat study area.

Spring-run Chinook salmon have been specifically targeted for recovery in the regional area (NMFS 2009), and the main-stem San Joaquin River has a high potential to support this run pending implementation of the SJRRP (Reclamation et al. 2009). Therefore, this species has a future potential to occur in the San Joaquin River. Other riverine watercourses in the habitat study area would not provide habitat for spring-run Chinook salmon.

### **Central Valley Fall/Late Fall-run Chinook Salmon (*Oncorhynchus tshawytscha*)**

Fall/late fall-run Chinook salmon is a CDFG SSC. It is found throughout the Sacramento and San Joaquin river basins in the main-stem and tributaries of the Sacramento, Feather, American, Yuba, Merced, Stanislaus, Tuolumne, and San Joaquin rivers. Fall-run Chinook salmon adults migrate upstream beginning in late summer, and late fall-run Chinook adults migrate through late winter. These runs spawn from fall through early spring. Following emergence from gravels in spring, juveniles move downstream within a few months to rear in main-stem rivers and estuaries for several months before entering the ocean (Moyle 2002). A self-sustaining population does not occur in the habitat study area because of numerous downstream fish barriers and bypasses, which lead fish away from potential habitat and expose them to higher water temperatures, low dissolved-oxygen concentrations, high dissolved salts, and high risks of predation (McBain and Trush 2002).

Suitable habitat for this species is currently considered to be of low or marginal quality. Although the SJRRP is targeting spring-run Chinook salmon, flow restoration of the main-stem San Joaquin River would also benefit Central Valley fall/late fall-run Chinook (Reclamation et al. 2009), and it is highly likely that this species will be present in the habitat study area in the future. The other riverine watercourses in the habitat study area would not provide habitat for fall- and late fall-run Chinook salmon. Because of the presence of marginal quality habitat, this species currently has a low potential to occur in riverine areas.

### **Hardhead (*Mylopharodon conocephalus*)**

Hardhead is a CDFG SSC. It is widely distributed in low- to mid-elevation streams in the main Sacramento-San Joaquin drainage as well as in the Russian River drainage (Moyle 2002). In the San Joaquin drainage, populations are scattered in the tributary streams, but are absent from the valley reaches of the San Joaquin River (Moyle 2002). Hardhead forage for benthic invertebrates and aquatic plant material in clear, deep pools with sand-gravel-boulder substrates and slow water velocities. Spawning activity has not been documented, but reproductive behavior presumably involves mass

spawning in upstream gravel riffles. Hardhead are usually absent from streams where introduced species, especially centrarchids, predominate and from streams that have been severely altered.

Limited habitat for hardhead exists in the regional area, although a hardhead occurrence is documented from the late 1980s in and along Bear Creek downstream of Merced (CNDDDB 2003b). The CNDDDB reports a presumed extant occurrence approximately 6.5 miles northeast of the project footprint (Occurrence #12; CNDDDB 2003e). Hardhead has not been recently documented in the main-stem San Joaquin River upstream and downstream of the alignment crossings (CDFG 2007). Hardhead has a moderate potential to occur in Bear Creek, but has a low potential to occur in lower quality riverine areas elsewhere in the habitat study area.

### **San Joaquin Roach (*Lavinia symmetricus symmetricus*)**

San Joaquin roach is a CDFG SSC. It is a small native minnow and one of six subspecies of California roach (Moyle 2002). The San Joaquin roach grows throughout the San Joaquin River drainage and tributaries to San Francisco Bay. It is generally found in small, warm streams but is also found in cool, headwater streams. It is generally absent where predatory fish, such as green sunfish (*Lepomis cyanellus*) and largemouth bass (*Micropterus salmoides*), are present. Spawning occurs between March and early July. Habitat for San Joaquin roach exists in the regional area, but presence of this species has not been documented.

San Joaquin roach has not been recently documented in the main-stem San Joaquin River upstream and downstream of the alignment crossings (CDFG 2007); however, it could occur in any of the other 15 watercourses identified in the habitat study area where nonnative, predatory fishes do not predominate.

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, riverine habitat is present within the habitat study area. Therefore, San Joaquin roach has a moderate potential to occur in this habitat type.

### **5.2.2.3 Amphibians**

Two special-status amphibians have a moderate or greater potential to occur in vernal pools and other seasonal wetlands and adjacent California annual grassland within the habitat study area (CNDDDB 2003e) – California tiger salamander and western spadefoot toad.

### **California Tiger Salamander (*Ambystoma californiense*)**

The California tiger salamander is federally listed as a threatened species and as a CDFG SSC. The CFGC determined that the California tiger salamander should be state listed as Threatened on May 20, 2010; however, this determination still needs to be finalized by the Office of Administrative Law. The species is restricted to undeveloped grasslands and foothill regions lower than 1,500 feet where aquatic sites are available for breeding.

California tiger salamanders prefer to breed in natural seasonal (vernal) pools or ponds that mimic them such as stock ponds that are allowed to go dry (USFWS 2009c). During summer months, California tiger salamanders use subterranean refuge sites, usually small mammal burrows but also crevices in the soil, known as "aestivation" sites. Aestivation habitat is generally constructed by mammals that live underground such as ground squirrels (*Spermophilus beecheyi*) and Botta's pocket gophers (*Thomomys bottae*) (Goals Project 2000). After winter rains have saturated the soil, the California tiger salamanders emerge from their refugia and migrate to breeding pools. California tiger salamanders require seasonally inundated pools that are unsuitable habitat for nonnative fish species in order for successful population recruitment. Females deposit eggs singly or in small groups in the water and attach them to submerged vegetation or debris. Aquatic juveniles usually complete metamorphosis 3 to 6 months after hatching. Following metamorphosis, juveniles spend a few days at the pond margin, and then migrate to refuge sites. Overland migration may extend up to 1.2 miles, but most California tiger salamanders remain within 0.4 mile of their breeding ponds (USFWS 2004). Critical habitat has been established for this

species, but it is not within the regional area. The closest critical habitat to the project vicinity is approximately 7.5 miles northwest of the habitat study area.

This species has been observed in vernal pool habitat adjacent to the BNSF alignment during field surveys. The CNDDDB reports three occurrences within the project footprint; two are denoted as extirpated (Occurrences #583 and #616; CNDDDB 2003e) and one is presumed extant (Occurrence #901; CNDDDB 2003e). Critical habitat for this species has been designated within the regional area, approximately 1.5 miles northeast of the project footprint.

Potentially suitable breeding habitat exists in vernal pools and seasonal retention basins that are surrounded by California annual grassland. Potentially suitable upland habitat for this species exists in California annual grassland if they are adjacent to potentially suitable breeding habitat. Figure 5-1 shows the retention basins and vernal pools within approximately 1.5 miles of the habitat study area. Because extant occurrences have been reported and potentially suitable habitat for this species exists, the California tiger salamander has a high potential to occur within the construction footprint.

### **Western Spadefoot Toad (*Spea hammondi*)**

The western spadefoot toad is a CDFG SSC. It is found in the Central Valley and adjacent foothills and occurs in grassland and valley-foothill hardwood woodlands. Vernal pools are essential for egg-laying.

The CNDDDB reports three presumed extant occurrences within the project footprint (Occurrences #168, #376, and #377; CNDDDB 2003e). One additional occurrence is located within the habitat study area, approximately 0.1 mile northeast of the project footprint (Occurrence #240; CNDDDB 2003e).

Because there is a presumed extant occurrence and potentially suitable habitat within the habitat study area, western spadefoot toad is considered to have a high potential to occur within the construction footprint.

#### **5.2.2.4 Reptiles**

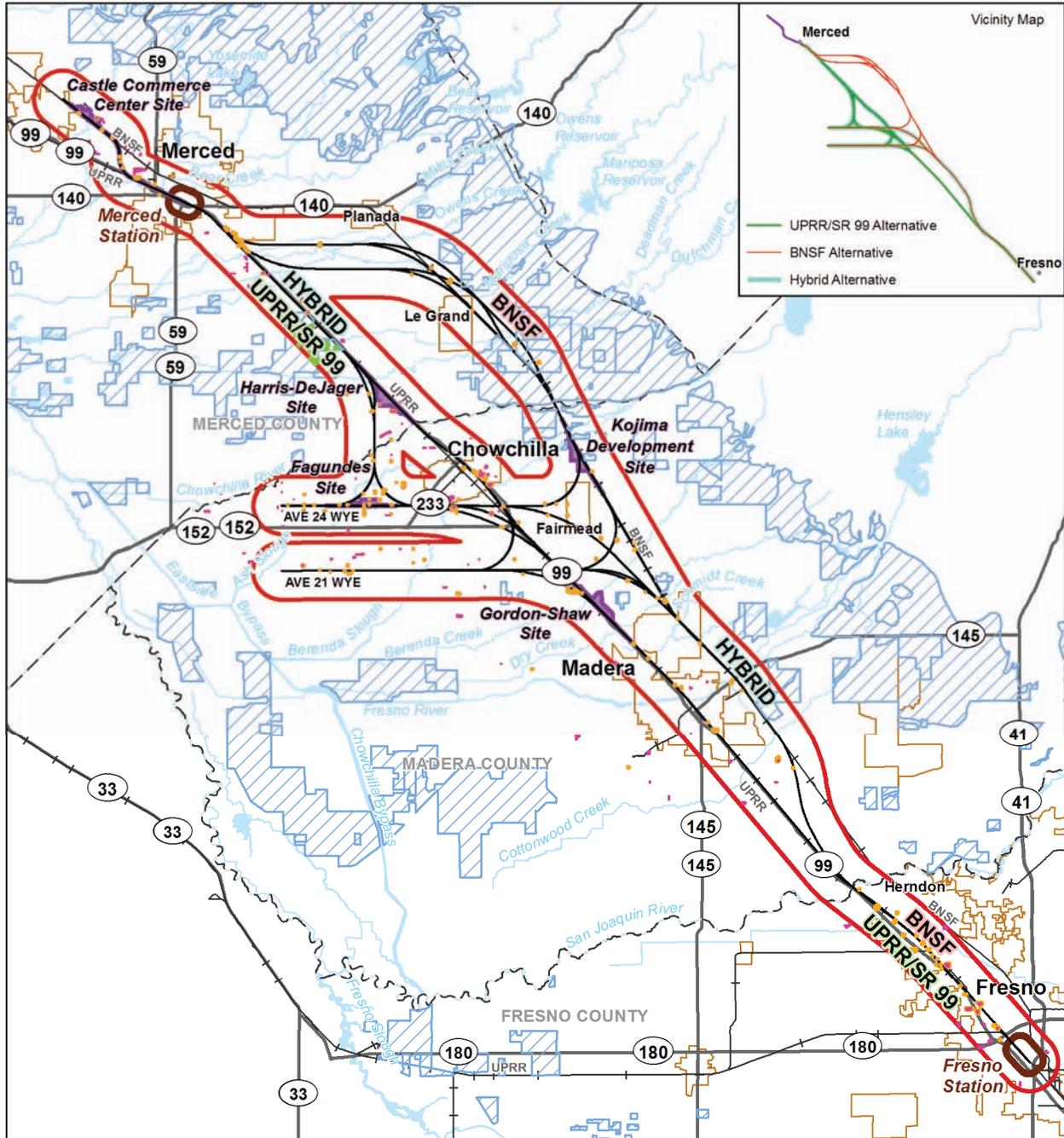
One special-status reptile has a moderate or greater potential to occur in watercourses throughout the habitat study area (CNDDDB 2003e) – western pond turtle.

### **Western Pond Turtle (*Actinemys marmorata*)**

Western pond turtles, including both the northwestern (ssp. *marmorata*) and southwestern (ssp. *pallida*) subspecies, are a CDFG SSC. A broad range of intergradation occurs from the American River south through the San Joaquin Valley (Stebbins 2003). Western pond turtles range throughout California and occur in a variety of permanent and intermittent aquatic habitats, such as ponds, marshes, rivers, streams, and ephemeral pools. Pond turtles require suitable basking and haul-out sites, such as emergent rocks or floating logs, which they use to regulate their temperature throughout the day (Holland 1994). In addition to appropriate aquatic habitat, these turtles require an upland area for breeding in the vicinity of the aquatic habitat, often within 656 feet. While the turtles may be active all year along the coast, at interior locations such as the Central Valley, pond turtles are more likely to be active between April and October. Western pond turtles have been documented hibernating up to 1,110 feet from a watercourse (Jennings and Hayes 1994) and underwater in mud (Zeiner et al. 1988-1990).

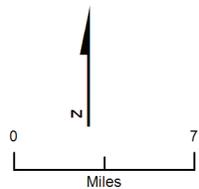
The nearest CNDDDB-reported occurrence is located approximately 0.5 mile northeast of the project footprint, and is presumed extant (Occurrence #321; CNDDDB 2003e).

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, natural and constructed watercourse habitats are present within the habitat study area. Therefore, the western pond turtle has a moderate potential to occur in these habitat types within the habitat study area.



Source: Holland, 1998.

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- HST Alignment
- Potential Heavy Maintenance Facility
- City Limit
- Station Study Area
- - - County Boundary
- 1.3 Mile Buffer
- Potential California Tiger Salamander Habitat**
- Open Water Basin (Seasonal or Perennial)
- Vernal Pool
- Retention Basin
- ▨ Central Valley Vernal Pool Complexes (Holland)

**Figure 5-1**  
 Aquatic Habitat for California Tiger Salamander within 1.5 Miles of the HST Alternatives

### 5.2.2.5 Birds

Thirty-eight special-status bird species have a low, moderate, or high potential to occur in the habitat study area (CNDDDB 2033e). Swainson's hawk (*Buteo swainsoni*), a state-listed threatened species, was reported and observed in the habitat study area. Three additional species that are CDFG SSC and/or USFWS BCC were observed in the habitat study area during field surveys – the northern harrier (*Circus cyaneus*), loggerhead shrike (*Lanius ludovicianus*), and yellow-billed magpie (*Pica nuttalli*). With few exceptions, any bird present in the HST alternatives would also be protected under the MBTA.

#### **Fulvous Whistling-Duck (*Dendrocygna bicolor*)**

Fulvous whistling-duck is a CDFG SSC. It is a large duck with long legs and a long neck (Robbins et al. 1966). The fulvous whistling-duck was known to nest in the San Joaquin Valley and occurred rarely as far north as San Francisco Bay and the Delta. However, it has not been observed in these regions over the past two decades except as a very rare vagrant (Shuford and Gardali 2008). Its occurrence in California is now thought to be restricted to post-breeding wanderers in the Imperial Valley in dense wetlands of cattails along the south end of the Salton Sea (Shuford and Gardali 2008). It lives in fresh emergent wetlands and shallow lacustrine and quiet riverine waters. It also feeds in wet croplands and pastures. Elsewhere in California, it is rare and irregular (McCaskie et al. 1979, Garrett and Dunn 1981), with most records from the San Joaquin Valley.

There are no CNDDDB-reported occurrences of this species within 10 miles of the project footprint (CNDDDB 2003e).

The habitat study area is presumed to be within the current range of this species and potentially suitable but moderate wetland, riverine, and field and row crop habitats exist within the habitat study area. Therefore, the fulvous whistling-duck has a moderate potential to occur in these habitat types within the habitat study area.

#### **Redhead (*Aythya americana*)**

Redhead is a CDFG SSC. It is a medium-sized diving duck with a smoothly rounded head and dark wings with grayish secondaries (Robbins et al. 1966). In the Central Valley and coastal lowlands, redheads are most common during the fall and winter, when numbers are bolstered by overwintering migrants from the north. This species formerly bred in large numbers throughout the valley, but numbers have steadily declined over the last century. They are now an uncommon and local breeder from the Butte Sink south to Kern County, Orange County, San Diego coast, and Imperial Valley (Shuford and Gardali 2008).

There are no CNDDDB-reported occurrences of this species within 10 miles of the project footprint (CNDDDB 2003e).

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, wetland, riverine, and retention basin habitats are present within the habitat study area. Therefore, the redhead has a moderate potential to occur in these habitat types within the habitat study area.

#### **American White Pelican (*Pelecanus erythrorhynchos*)**

American white pelican is a CDFG SSC. It is a large white bird with black primary and outer secondary feathers (Robbins et al. 1966). In California, the American white pelican now nests only at large lakes in the Klamath Basin, especially Clear Lake National Wildlife Refuge (Shuford 2005). It is common to abundant on nesting grounds from April to August (sometimes March to September). It bred at Honey Lake in 1990 (Shuford and Gardali 2008), and formerly bred in large numbers in the Central Valley and Salton Sea (Cogswell 1977). From August to December, it is common on the salt ponds of San Francisco Bay and on the coastal slope from Sonoma County south. It is locally uncommon to common on large lakes and estuaries in the Central Valley and is fairly common at Lake Tahoe and Salton Sea in late spring



and summer. Migrant flocks pass overhead at almost any time of the year, but mainly in the spring and fall throughout the state (Cogswell 1977, McCaskie et al. 1979, Garrett and Dunn 1981).

There are no CNDDDB-reported occurrences of this species within 10 miles of the project footprint (CNDDDB 2003e).

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, riverine habitat is present within the habitat study area. Therefore, American white pelican has a moderate potential to occur in this habitat type within the habitat study area.

### **Least Bittern (*Ixobrychus exilis*)**

Least bittern is a CDFG SSC. It is a very small wading bird with a white chin, throat, foreneck, and belly, and has a buff face and wings (Robbins et al. 1966). In southern California, least bittern is a common summer resident (especially from April to September) at the Salton Sea and Colorado River in dense emergent wetlands near sources of freshwater, and in desert riparian (salt cedar scrub) habitat. It usually nests only in emergent wetlands. In deserts and coastal lowlands, it is quite rare, but it breeds locally in the Owens Valley and Mojave Desert. It is a rare to uncommon breeder from April to September in large, freshwater emergent wetlands of cattails and hardstem bulrushes from San Diego to Morro Bay, and in the Sacramento and San Joaquin valleys (Shuford and Gardali 2008).

There are no CNDDDB-reported occurrences of this species within 10 miles of the project footprint (CNDDDB 2003e).

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, wetland, riverine, and riparian habitats are present within the habitat study area. Therefore, the least bittern has a moderate potential to occur in these habitat types within the habitat study area.

### **White-tailed Kite (*Elanus leucurus*)**

White-tailed kite is a CDFG FP species. It is a medium-sized, mostly white raptor with pointed wings and a long, squared-off tail (Robbins et al. 1966). White-tailed kite is a year-long resident in coastal and valley lowlands, and is frequently found in agricultural areas. In cismontane habitats of California, the white-tailed kite inhabit open and herbaceous habitats and forage in undisturbed, open grasslands, meadows, farmlands, and emergent wetlands. Trees with dense canopies are used for cover, nesting, and roosting. White-tailed kite nests consist of loosely piled sticks and twigs lined with grass, straw, or roots near the top of dense oak, willow, or other tree stands usually 20 to 100 feet above ground (Dixon et al. 1957). Nesting tree and shrub species are extremely variable, from shrubs greater than 9.8 feet tall (e.g., *Atriplex* and *Baccharis*) to large trees greater than 164 feet tall (e.g., *Sequoia sempervirens* and *Picea sitchensis* [Dunk 1995]). Nests are usually located near an open foraging area (CDFG 2005). White-tailed kites may be found breeding from February through August. Non-breeding populations of this species are limited primarily by food, whereas breeding populations appear limited both by food and nest-site availability. Territory size for this kite is a function of both prey and competitor abundance (Dunk 1995).

There are no CNDDDB-reported occurrences of this species within 10 miles of the project footprint (CNDDDB 2003e).

Although not reported or observed within the habitat study area during field surveys, white-tailed kite is a common species that is likely to forage and nest in the habitat study area. This species has a high potential to occur in California annual grassland, pasture, field crops, row crops, and riparian habitat within the construction footprint.

### **Bald Eagle (*Haliaeetus leucocephalus*)**

The bald eagle has been delisted under federal ESA but retains protections under the BGEPA, and is a USFWS BCC. It is a state endangered and a CDFG FP species. It is a very large, broad-winged, and broad-tailed eagle with rounded wings and a thick, hooked bill (Robbins et al. 1966). The bald eagle is an uncommon to fairly common migrant and winter visitor to most of California from its breeding grounds at higher-elevation lakes (El Dorado and Lake counties to the north). It winters near large lakes, reservoirs, and rivers across the state (Zeiner et al. 1988-1990).

This species was observed within the habitat study area on May 25, 2010. However, there are no CNDDDB-reported occurrences of this species within 10 miles of the project footprint (CNDDDB 2003e).

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, riverine, and riparian habitats are present within the habitat study area. Therefore, the bald eagle has a moderate potential to occur in these habitat types within the habitat study area.

### **Northern Harrier (*Circus cyaneus*)**

Northern harrier is a CDFG SSC. It is a medium-sized, long-winged, long-tailed hawk with a white rump and a short, dark, hooked beak (Robbins et al. 1966). Northern harriers are found throughout the United States and Canada. Northern harriers typically construct nests of small twigs and dried grass stalks on the ground in tall grass, open fields, or clearings, usually near water. They prefer low perches such as fence posts or stumps in open, low woody or herbaceous vegetation for nesting and hunting. Continued loss of freshwater and estuarine wetlands in the U.S. poses a threat to breeding and wintering populations. Conversion of native grassland prairies for monotypic farming has contributed to local population declines, and remains a major threat to populations. In upland areas, mechanized agriculture and early mowing have increased the threat of nest destruction. Overgrazing of pastures and the advent of larger crop fields and fewer fencerows, together with the widespread use of insecticides and rodenticides, have reduced prey availability and thus the amount of appropriate habitat for the species (MacWhirter and Bildstein 1996). Northern harriers usually nest adjacent to hunting grounds and where nest predation is low. Peak nesting months are April through July (Zeiner et al. 1988-1990). The type of prey taken depends upon locality, but is generally quite diverse, from small reptiles and amphibians to rodents and small birds.

Northern harriers were observed in the habitat study area during field surveys (Figures 4-21 through 4-26). There are no CNDDDB-reported occurrences of this species within 10 miles of the project footprint (CNDDDB 2003e).

Because this species was observed during field surveys, it has a high potential to nest in riparian areas and forage in field crops, row crops, and California annual grassland habitats within the habitat study area.

### **Swainson's Hawk (*Buteo swainsoni*)**

Swainson's hawk is a state threatened species that breeds in California and winters in Central and South America. It is a large, broad-winged, and broad-tailed hawk with wings that taper noticeably at the tip (Robbins et al. 1966). Swainson's hawks require large, open grasslands with abundant prey in association with suitable nest trees. Over 85% of Swainson's hawk territories in the Central Valley are in riparian systems adjacent to suitable foraging habitats. Swainson's hawks often nest peripherally to riparian systems of the valley and use lone trees or groves of trees in agricultural fields. Valley oak, Fremont cottonwood, eucalyptus, walnut, and large willow with an average height of about 58 feet, and ranging from 41 to 82 feet, are the most commonly used nest trees in the Central Valley. Suitable nest sites may be found in mature riparian forest, lone trees or groves of oaks, other trees in agricultural fields, and mature roadside trees. Suitable foraging areas include native grasslands or lightly grazed pastures, alfalfa and other hay crops, and certain grain and row croplands. Swainson's hawks return from migration to breed in California in March and most migrate out of California in September, with a small number of mostly dark-morph individuals remaining in the Delta region through the winter (England et al. 1997).

Unsuitable foraging habitat includes crops such as vineyards, orchards, and certain row crops such as rice, corn, and cotton (CDFG 1983).

Swainson's hawk has been observed in the project footprint (Figures 4.21 through 4.26). The CNDDDB reports two presumed extant occurrences of this species within the project footprint (Occurrences #476 and #821; CNDDDB 2003e). Five additional presumed extant occurrences are located within the habitat study area. Occurrences #1690 and #1692 are both located less than 20 feet from the project footprint (CNDDDB 2003e). Occurrences #820 and #749 are respectively located approximately 0.01 mile to the north and northeast of the project footprint (CNDDDB 2003e). Occurrence #1000 is located approximately 0.2 mile to the northeast of the project footprint (CNDDDB 2003e).

Because it has been reported and observed within the project footprint, Swainson's hawk has a high potential to nest and forage in eucalyptus woodland, riparian, field and row cropland, and California annual grassland habitats within the habitat study area.

### **Golden Eagle (*Aquila chrysaetos*)**

Golden eagle is a CDFG FP species and is protected under the BGEPA. It is a very large, broad-winged, and broad-tailed eagle with a short, dark, hooked beak (Robbins et al. 1966). Golden eagles are found throughout western North America in remote, open habitats, including savanna woodlands, grasslands, aspen parklands, high and low deserts, and in the taiga zone. They mostly feed on lagomorphs and rodents, but also take other mammals, birds, reptiles, and some carrion in these open habitats. Because they nest almost exclusively on cliff ledges and steep canyon walls, golden eagles do not typically breed in the Central Valley, but nonbreeding individuals may be seen in the region throughout the year. Their breeding season begins in late January, continues through August, and peaks from March through July. Numbers in the Central Valley peak between October and March (Zeiner et al. 1988-1990).

This species was observed in non-nesting, vernal pool habitat along the BNSF alignment on March 17, 2011 (Figures 4.21 through 4.26). The nearest CNDDDB-reported occurrence is located approximately 1 mile northeast of the project footprint and is presumed extant (Occurrence #263; CNDDDB 2003e).

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, California annual grassland and pasture habitats are present within the habitat study area. Therefore, the golden eagle has a moderate potential to occur in these habitat types within the habitat study area.

### **American Peregrine Falcon (*Falco peregrinus anatum*)**

American peregrine falcon is a USFWS BCC, a state endangered species, and a CDFG FP species. It is a large falcon with long, pointed wings and a short, dark, hooked beak (Robbins et al. 1966). American peregrine falcon is an uncommon breeding resident on the California coast from Orange County north, and in the Sierra and Cascade mountains. In winter, it is found inland throughout the Central Valley and occasionally on the Channel Islands. Migrants occur along the coast and in the western Sierra Nevada in spring and fall. It breeds mostly in woodland, forest, and coastal habitats. Riparian areas and coastal and inland wetlands are important habitats yearlong, especially during the nonbreeding seasons. The species also occasionally inhabits man-made structures.

Populations declined drastically during the 20th century (Thelander 1975, 1976); 39 breeding pairs were known in California in 1981 (Monk 1981). Domestic banning of the pesticide DDT along with aggressive rehabilitation programs have brought the species back from the brink of extirpation, culminating in its removal in 1999 from the federal ESA (64 FR 46541).

There are no CNDDDB-reported occurrences of this species within 10 miles of the project footprint (CNDDDB 2003e).

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, riparian, wetland, and commercial-industrial habitats are present within the habitat



study area. Therefore, the peregrine falcon has a moderate potential to occur in these habitat types within the habitat study area.

### **Lesser Sandhill Crane (*Grus canadensis canadensis*)**

Lesser sandhill crane is a CDFG SSC. It is smaller and has blacker primary feathers than the greater sandhill crane (Alderfer 2006). This migratory subspecies winters in habitats similar to those of the greater sandhill crane in the San Joaquin and Imperial valleys (Shuford and Gardali 2008), and to a lesser extent in the Sacramento Valley. In southern California, sandhill cranes concentrate on the Carrizo Plain in San Luis Obispo County, with smaller flocks near Brawley in Imperial County and Blythe in Riverside County (Garrett and Dunn 1981). The latter two flocks may be partly, or largely *G. c. tabida*, which formerly wintered more commonly in southern California but have declined greatly there and throughout its range. Outside of known wintering grounds, the lesser sandhill crane is extremely rare, except that it migrates over much of interior California.

There are no CNDDDB-reported occurrences of this species within 10 miles of the project footprint (CNDDDB 2003e).

The habitat study area is not within the known wintering grounds of this species; however, it may pass over the area during migration. Potentially suitable, but moderate quality, wetland, riverine, and retention basin habitats are present within the habitat study area. Therefore, the lesser sandhill crane has a moderate potential to occur in these habitat types within the habitat study area.

### **Greater Sandhill Crane (*Grus canadensis tabida*)**

The greater sandhill crane is state listed as threatened and is a CDFG FP species. It is a large, long-legged and long-necked bird with a long, pointed bill and dark gray legs that are extended in flight. In California, it winters in the Central Valley and nests in northeastern California (Robbins et al. 1966).

Both greater (*G. c. tabida*) and lesser (*G. c. canadensis*) sandhill cranes occur in California. Historically, *G. c. tabida* was a fairly common breeder on the northeastern plateau (Grinnell and Miller 1944). Now reduced greatly in numbers, it breeds only in Siskiyou, Modoc, and Lassen counties and in the Sierra Valley in Plumas and Sierra counties (James 1977, Remsen 1978, McCaskie et al. 1979). In summer, this species occurs in and near wet meadow, shallow lacustrine, and fresh emergent wetland habitats. It winters primarily in the Sacramento and San Joaquin valleys from Tehama County south to Kings County (Grinnell and Miller 1944), where it frequents annual and perennial grassland habitats, moist croplands with rice or corn stubble, and open, emergent wetlands. It prefers relatively treeless plains.

There are no CNDDDB-reported occurrences of this species within 10 miles of the project footprint (CNDDDB 2003e).

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, wetland, riverine, and retention basin habitats are present within the habitat study area. Therefore, the greater sandhill crane has a moderate potential to occur in these habitat types within the habitat study area.

### **Snowy Plover (*Charadrius alexandrinus*) (Interior Population)**

Snowy plover is federally listed as threatened and is a CDFG SSC. Snowy plovers are small, compact shorebirds with short black bills, short black legs, light brown upperparts, and clean white underparts. The coastal populations of this species reside on sandy beaches from Washington to the Baja Peninsula. The interior populations occupy alkali playas in the Great Basin and the dry margins of wetlands in the Great Plains and California's Central Valley (Alderfer 2006). This species was formerly a locally common breeder at several sites in the northern San Joaquin Valley (Grinnell and Miller 1944), but since the 1970s, it has only been documented breeding at three sites: Modesto Sewage Ponds, Kesterson National Wildlife Refuge, and Grasslands Ecological Area near Los Banos (Shuford and Gardali 2008).

There are no CNDDDB-reported occurrences of this species within 10 miles of the project footprint (CNDDDB 2003e).

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, vernal pools and retention basins are present within the habitat study area. Therefore, the snowy plover has a moderate potential to occur in these habitat types within the habitat study area.

### **Mountain Plover (*Charadrius montanus*)**

Mountain plover is proposed for listing as threatened by the state, is a USFWS BCC, and is a CDFG SSC. It is a medium-sized, long-winged shorebird with a very short, fairly thick bill and yellowish to flesh-colored legs (Robbins et al. 1966). Mountain plovers nest on the high plains from Saskatchewan to north Texas. They are a winter resident in the Central Valley from September through March and can be found on short grasslands and plowed fields from Sutter and Yuba counties southward. It is also found in foothill valleys west of San Joaquin Valley, Imperial Valley, plowed fields of Los Angeles and western San Bernardino counties, and along the central Colorado River Valley. It prefers fallow, grazed, or burned areas and alkali flats with burrowing rodents.

The nearest CNDDDB-reported occurrence is located approximately 5.5 miles north of the project footprint (Occurrence #8; CNDDDB 2003e).

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, California annual grassland, field crops, pasture, and barren habitats are present within the habitat study area. Therefore, mountain plover has a moderate potential to occur in these habitat types within the habitat study area.

### **Whimbrel (*Numenius phaeopus*)**

Whimbrel is a USFWS BCC. It is a large shorebird with a long decurved bill, grayish-white and brown head stripes, a brown streaked neck and breast, brown upperparts with small light and dark spots, white belly and undertail coverts, and dark legs (Robbins et al. 1966). Whimbrel is fairly common to abundant as a spring migrant through the Central Valley from mid-March to late May. It is less common, but still numerous, in fall migration from early August to mid-October. In winter, it is very rare in the Central Valley, but fairly common along the California coast where small numbers of nonbreeders occur regularly through the summer (Alderfer 2006). It is very rare during all seasons in mountainous regions and in the Great Basin (McCaskie et al. 1979). On the coast, it forages on rocky intertidal and sandy beach marine habitats, on the intertidal mudflats of estuarine habitats, and on wet meadow and pasture habitats adjacent to the immediate coast. It occasionally forages on lawns or golf courses. Inland, it prefers flooded fields, wet meadows, croplands, and the margins of riverine and lacustrine habitats (Cogswell 1977, Garrett and Dunn 1981).

There are no CNDDDB-reported occurrences of this species within 10 miles of the project footprint (CNDDDB 2003e).

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, field crops, row crops, pasture, and riparian habitats are present within the habitat study area. Therefore, the whimbrel has a moderate potential to forage but not to nest in these habitat types within the habitat study area.

### **Long-billed Curlew (*Numenius americanus*)**

Long-billed curlew is a USFWS BCC. It is a very large, long-necked, and small-headed shorebird with a brownish rump and a barred tail (Robbins et al. 1966). Long-billed curlew is an uncommon to fairly common breeder from April to September in wet meadow habitat in northeastern California in Siskiyou, Modoc, and Lassen counties. It can be common as a winter visitor from early July to early April along most of the California coast, and in the Central and Imperial valleys, where the largest flocks occur.

Preferred winter habitats include large coastal estuaries, upland herbaceous areas, and croplands. On estuaries, feeding occurs mostly on intertidal mudflats. Small numbers of nonbreeders remain on the coast in summer, and, during some years, larger numbers have remained in the Central Valley (Cogswell 1977, Page et al. 1979, Garrett and Dunn 1981).

There are no CNDDDB-reported occurrences of this species within 10 miles of the project footprint (CNDDDB 2003e).

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, California annual grassland, pasture, and field and row crop habitats are present within the habitat study area. Therefore, the long-billed curlew has a moderate potential to forage but not nest in these habitat types within the habitat study area.

### **Marbled Godwit (*Limosa fedoa*)**

Marbled godwit is a USFWS BCC. It is a very large, long-legged, and long-necked shorebird with a very long, slightly recurved bill (Robbins et al. 1966).

Marbled godwit is a common to abundant migrant and winter visitor from mid-August to early May in estuarine habitats along the entire California coast. It is a fairly common migrant and winter visitor at the Salton Sea, but is generally rare elsewhere in the interior of the state. Small numbers regularly winter at Los Banos in Merced County. Small numbers of nonbreeders remain on the coast and at the Salton Sea through the summer. On the coast, it is most common on estuarine mudflats, but also occurs on sandy beaches, open shores, saline emergent wetlands, and adjacent wet upland fields (Cogswell 1977, McCaskie et al. 1979, Garrett and Dunn 1981).

There are no CNDDDB-reported occurrences of this species within 10 miles of the project footprint (CNDDDB 2003e).

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, vernal pools and other seasonal wetlands are present within the habitat study area. Therefore, the marbled godwit has a moderate potential to forage but not nest in this habitat type within the habitat study area.

### **Red Knot (*Calidris canutus*)**

Red knot is a USFWS BCC. It is a fairly small shorebird with a thin and dark medium-length bill, dark legs, a gray wing stripe, and a gray rump and tail (Robbins et al. 1966). Red knot is uncommon to fairly common during fall and spring migrations along coastal estuarine habitats (Cogswell 1977, McCaskie et al. 1979, Garrett and Dunn 1981). It prefers estuarine sand or mud flats and grows less often on sandy beaches on the outer coast. In winter, it is rare along the coast except at Humboldt, Bodega, San Francisco, Monterey, and San Diego bays, where it may be fairly common at times (Alderfer 2006). At the Salton Sea, it is fairly common in the spring, but is uncommon in the fall (Garrett and Dunn 1981). Small numbers occur in the Central Valley during migration. Red knot does not breed in California.

There are no CNDDDB-reported occurrences of this species within 10 miles of the project footprint (CNDDDB 2003e).

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, vernal pools and other seasonal wetlands are present within the habitat study area. Therefore, the red knot has a moderate potential to forage but not nest in this habitat type within the habitat study area.

### **Short-billed Dowitcher (*Limnodromus griseus*)**

Short-billed dowitcher is a USFWS BCC. It is a medium-sized shorebird with a long, straight bill, yellowish legs, a white rump, and a black and white barred tail (Robbins et al. 1966). Short-billed dowitcher is

common to abundant during spring (late March to mid-May) and fall (mid-July to October) migration along the entire coast of California, where it typically occurs on intertidal mudflats of estuarine habitats (Cogswell 1977, Garrett and Dunn 1981). In winter, it is rare to uncommon along the north coast, and along much of central and southern coastal California. It may be abundant in San Francisco, Morro, Newport, and San Diego bays (Garrett and Dunn 1981). It is generally rare to uncommon in the Central Valley, mountain, Great Basin, and southeastern desert regions during migration (McCaskie et al. 1979, Garrett and Dunn 1981). At the Salton Sea, however, it is common during the fall and spring migrations (Garrett and Dunn 1981). It is a rare migrant on the Channel Islands. The largest numbers in central coastal California occur from late March to early April (Page et al. 1979). A few stragglers remain in California through summer (Cogswell 1977). In winter, it occurs almost exclusively in estuarine habitats; at other seasons it may frequent the borders of shallow ponds and lakes or irrigated fields. It is generally much more common in saltwater habitats than is the long-billed dowitcher (Pitelka 1950). It breeds in subarctic regions of southern Alaska and central Canada (Johnsgard 1981).

There are no CNDDDB-reported occurrences of this species within 10 miles of the project footprint (CNDDDB 2003e).

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, vernal pools and other seasonal wetlands are present within the habitat study area. Therefore, the short-billed dowitcher has a moderate potential to forage but not nest in this habitat type within the habitat study area.

### **Black Tern (*Chlidonias niger*)**

Black tern is a CDFG SSC. It is a small tern with a relatively short black bill, very short dark legs, a short notched tail, and a smoothly rounded head (Robbins et al. 1966). The black tern was formerly a very common spring and summer visitor to fresh emergent wetlands of California (Grinnell and Miller 1944). Numbers have declined throughout the range, especially in the Central Valley (Cogswell 1977). It is currently a fairly common migrant and breeder on wetlands of the northeastern plateau area, but absent from some historic nesting localities, such as Lake Tahoe (Cogswell 1977). Despite the presence of apparently suitable habitat in rice farming areas, breeding is questionable in the Central Valley (Gaines 1974). Although restricted to freshwater habitats while breeding, it can be fairly common in bays, salt ponds, river mouths, and pelagic waters in spring and fall migration (Grinnell and Miller 1944, Cogswell 1977).

There are no CNDDDB-reported occurrences of this species within 10 miles of the project footprint (CNDDDB 2003e).

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, vernal pool and row crops habitats are present within the habitat study area. Therefore, the black tern has a moderate potential to forage but not nest in these habitat types within the habitat study area.

### **Western Yellow-Billed Cuckoo (*Coccyzus americanus occidentalis*)**

Western yellow-billed cuckoo is a candidate for listing under federal ESA, a USFWS BCC, and is state listed as endangered. It is a slender, long-tailed bird with a yellow orbital ring, a white breast, and brown back (Robbins et al. 1966). Western yellow-billed cuckoo is a rare and rapidly declining summer resident of valley foothill and desert riparian habitats in scattered locations in California. Along the Colorado River, the breeding population on the California side was estimated at 180 pairs in 1977 (Gaines 1977a). Recent efforts to confirm any successfully nesting cuckoos there have failed (Johnson et al. 2006). A very few pairs persist in the northern Central Valley along the Sacramento and Feather rivers. The largest remnant population in the state nests along the South Fork of the Kern River in Kern County, numbering about 24 pairs in 1992 (Laymon et al. 1998). It was formerly much more common and widespread throughout lowland California, but numbers have been drastically reduced by habitat loss (Grinnell and Miller 1944,

Gaines 1974, Garrett and Dunn 1981). Current population estimations show about 50 pairs existing in California (Hughes 1999).

The CNDDDB reports one extirpated occurrence approximately 7.5 miles east of the project footprint (Occurrence #87; CNDDDB 2003e). No presumed extant occurrences have been reported within 10 miles of the project footprint.

Although an historic occurrence of western yellow-billed cuckoo has been reported in the habitat study area, the area is not believed to be in the current range for this species. Therefore, this species has a low potential to nest and forage in riparian habitat within the habitat study area.

### **Western Burrowing Owl (*Athene cunicularia*)**

Western burrowing owl is a USFWS BCC and a CDFG SSC. It is a ground-dwelling owl with long legs and a round head that lacks ear tufts (Alderfer 2006). Burrowing owl habitat can be found in annual and perennial grasslands, deserts, and arid scrublands characterized by low-growing vegetation. Suitable owl habitat may also include trees and shrubs if the canopy covers less than 30% of the ground surface (California Burrowing Owl Consortium [CBOC] 1993). They are opportunistic feeders, primarily of arthropods, small mammals, and birds, although amphibians and reptiles are also reported in their diet (Haug et al. 1993). Burrows are the essential component of burrowing owl habitat. Both natural and artificial burrows provide protection, shelter, and nests for burrowing owls. They typically use burrows made by mammals that live underground, such as ground squirrels or badgers, but also may use man-made structures such as cement culverts, debris piles, or openings beneath cement or asphalt pavement. Burrowing owls may use a site for breeding, wintering, foraging, and/or migration stopovers. Burrowing owl nesting season begins as early as February 1 and continues through August 31 (Haug et al. 1993). Breeding occurs from March through August, with peak breeding occurring in April and May. The young emerge from the burrow at about two weeks of age, and they are able to fly beginning at about four weeks (CDFG 2001).

The CNDDDB reports one possibly extirpated occurrence approximately 0.5 mile southwest of the project footprint (Occurrence #757; CNDDDB 2003e). The nearest presumed extant occurrence is located approximately 1 mile southwest of the project footprint (Occurrence #877; CNDDDB 2003e).

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, field crops, pasture, California annual grassland, ruderal, and constructed watercourse habitats are present within the habitat study area. Therefore, the western burrowing owl has a moderate potential to forage and nest in these habitat types within the habitat study area.

### **Long-eared Owl (*Asio otus*)**

Long-eared owl is a CDFG SSC. It is a large bird with a rounded head, long ear tufts, yellow eyes, and rusty facial disks. It has gray-brown upperparts with small black and white markings and white underparts with black cross-shaped markings (Robbins et al. 1966). Long-eared owl is an uncommon yearlong resident throughout the state, scarcest in the Central Valley and southern California deserts where it is an uncommon winter visitor, and rare breeder. Riparian habitat is required, but it also uses live oak thickets and other dense stands of trees. Resident populations in the state have been declining since the 1940s, especially in southern California (Grinnell and Miller 1944, Remsen 1978). Shuford and Fitton (1998) suggested populations of long-eared owl are still abundant in the Great Basin regions of California. In the Central Valley, the only records for long-eared owls are from the Panoche Hills in Fresno County and Kern National Wildlife Refuge in Kern County (Shuford and Gardali 2008). All reasons for decline are not known, but substantial losses of riparian habitat and live oak groves have been major factors (Remsen 1978). Urban development and agriculture have been the major causes for decline in coastal southern California (Bloom 1994).

There are no CNDDDB-reported occurrences of this species within 10 miles of the project footprint (CNDDDB 2003e).

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, California annual grassland, orchards, and riparian habitats are present within the habitat study area. Therefore, the long-eared owl has a moderate potential to occur in these habitat types within the habitat study area.

### **Short-eared Owl (*Asio flammeus*)**

Short-eared owl is a CDFG SSC. It is a medium-sized owl with a dark face and yellow eyes. The breast is tawny with darker streaks fading to a white belly with diffuse darker streaking (Robbins et al. 1966). The short-eared owl is one of the world's most widely distributed owls and is found throughout the northern states and Canada. It is usually found in open areas with few trees, such as annual and perennial grasslands, prairies, dunes, meadows, irrigated lands, and saline and freshwater emergent wetlands (Wiggins et al. 2006, Zeiner et al. 1988-1990). Short-eared owls are often observed using fence posts and small mounds as perches (Zeiner et al. 1988-1990). Reproduction and population dynamics of this species are closely linked to the density of its primary prey. Its primary prey includes voles, meadow mice, gophers, and other small rodents. Other prey items include insects, birds, frogs, and, occasionally, small snakes and fish (Zeiner et al. 1988-1990). Like other birds that depend on such a fluctuating food resource, the short-eared owl shows considerable local variation in its numbers and reproductive success, and is even nomadic at times (Wiggins et al. 2006). This species is more gregarious in the nonnesting months and often roosts in colonies. During the breeding months, individual pairs become more solitary. Short-eared owls typically nest in a slight depression concealed by vegetation on dry ground in open grassland habitat (Zeiner et al. 1988-1990). Breeding occurs from February through the first part of July. In recent decades, short-eared owls have declined in many areas of North America, especially the northeastern United States; habitat loss owing to human activities appears to be the major cause. As a ground-nester, it may also be vulnerable to increased levels of predation (Wiggins et al. 2006).

There are no CNDDDB-reported occurrences of this species within 10 miles of the project footprint (CNDDDB 2003e).

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, California annual grassland, field crops, row crops, and pasture habitat habitats are present within the habitat study area. Therefore, the short-eared owl has a moderate potential to forage but not nest in these habitat types within the habitat study area.

### **Costa's Hummingbird (*Calypte costae*)**

Costa's hummingbird is a USFWS BCC. It is a small hummingbird with a long, straight, thin bill; a bright green back and crown; and white underparts with greenish flanks (Robbins et al. 1966). Costa's hummingbird is common in summer and uncommon in winter in California. It is most common and widespread in southern California, but also breeds locally along the western edge of the San Joaquin Valley (McCaskie et al. 1979) and the eastern edge of the Sierra Nevada north through Inyo County. It has nested in Monterey County since 1981, and occurs regularly in spring and summer in Siskiyou County (McCaskie et al. 1988). In winter, it is largely restricted to the southern coast, but also winters in southern deserts (Garrett and Dunn 1981). There is upslope movement after breeding and during fall migration (Garrett and Dunn 1981). It occurs in more arid habitats than other hummingbirds in California. Primary habitats are desert wash, edges of desert riparian and valley foothill riparian, coastal scrub, desert scrub, desert succulent shrub, lower-elevation chaparral, and palm oasis. It is an uncommon transient on the Channel Islands (Garrett and Dunn 1981), and it is an uncommon and irregular visitor in the northern San Joaquin Valley region, mainly coming as a spring overshoot.

There are no CNDDDB-reported occurrences of this species within 10 miles of the project footprint (CNDDDB 2003e).

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, agricultural and urban habitats are present within the habitat study area.

Therefore, Costa's hummingbird has a moderate potential to occur in these habitat types within the habitat study area.

### **Loggerhead Shrike (*Lanius ludovicianus*)**

Loggerhead shrike is a USFWS BCC and a CDFG SSC. It has a gray head with a black mask and a heavy, hooked bill, a gray back, white underparts, black wings with white wing patches, and a black tail with white outer tail feathers (Robbins et al. 1966). The loggerhead shrike is a common resident and winter visitor in lowlands and foothills throughout California. Loggerhead shrikes are birds of open places; throughout their range, their habitat typically includes grasslands interspersed with scattered trees and shrubs, with posts, fences, or utility lines that provide nesting and perching sites. Shrikes differ from other songbirds in that their diet regularly includes small vertebrate prey including small lizards. This species breeds from March to July and builds nests on stable branches in densely foliated shrubs or trees, usually well concealed (Zeiner et al. 1988-1990).

Loggerhead shrikes were observed in the habitat study area during field surveys (Figures 4-21 through 4-26). There are no CNDDDB-reported occurrences of this species within 10 miles of the project footprint (CNDDDB 2003e).

Because loggerhead shrike was observed during field surveys, this species has a high potential to occur in California annual grassland, field crops, row crops, and pasture habitats within the habitat study area.

### **Least Bell's Vireo (*Vireo bellii pusillus*)**

Least Bell's vireo is federally and state listed as endangered and is a USFWS BCC. Least Bell's vireos are small, 4.5 to 5 inches long, with short, rounded wings, and short, straight bills. This species has a faint white eye ring. Feathers are mostly gray above and pale below (USFWS 2010b).

Least Bell's vireo was formerly a common and widespread summer resident below about 2,000 feet in the western Sierra Nevada, throughout the Sacramento and San Joaquin valleys, and in the coastal valleys and foothills from Santa Clara County south. It also was common in coastal southern California from Santa Barbara County south, below about 4,000 feet east of the Sierra Nevada, in Owens and Benton valleys, along the Mojave River and other streams at the western edge of southeastern deserts, and along the entire length of the Colorado River (Grinnell and Miller 1944). It declined drastically or vanished entirely throughout much of its California range during the latter half of the 20th century, apparently from cowbird parasitism and habitat destruction and degradation (Goldwasser et al. 1980).

The least Bell's vireo was listed as endangered by the USFWS in 1986 (endemic to California and northern Baja California), but has slowly begun re-establishing itself in parts of its former range. The species population in California has increased from an estimated 300 pairs in 1986 to 2,500 pairs in 2004 (ESA 2011) after the implementation of control measures for brown headed cowbirds and invasive riparian plants. The population increase in southern California is allowing least Bell's vireos to expand eastward and northward into formerly occupied habitat. A least Bell's vireo pair reared two successful broods at the San Joaquin River National Wildlife Refuge in 2005 after an absence of over 50 years (PRBO Conservation Service 2005).

The least Bell's vireo is now an uncommon local summer resident below about 2,000 feet in willows and other low, dense valley foothill riparian habitat and lower portions of canyons, as near to the Central Valley as San Benito and Monterey counties; in coastal southern California from Santa Barbara County south; and along the western edge of the deserts in desert riparian habitat.

The habitat study area is presumed to be within the potential historic range of this species and potentially suitable, but moderate quality, riparian habitat is present within the habitat study area. Although this area is the only known habitat for least Bell's vireo in the Central Valley, there are no CNDDDB-reported occurrences of this species within 10 miles of the project footprint (CNDDDB 2003e). Therefore, the least Bell's vireo has a moderate potential to occur in this habitat type within the habitat study area.

**Yellow-billed Magpie (*Pica nuttalli*)**

Yellow-billed magpie is a USFWS BCC. It is similar to black-billed magpie but with a yellow bill and yellow skin beneath the eye (Alderfer 2006). Yellow-billed magpie is a common, yearlong resident of the Central Valley and coastal mountain ranges south from San Francisco Bay to Santa Barbara County. It also breeds locally on the coast in Monterey County, and is casual in winter on the coast north to Sonoma County. It is a rare visitor in Shasta Valley, Siskiyou County (McCaskie et al. 1979). It was formerly more widespread in the south. Range contraction may be related to local eradication attempts (Garrett and Dunn 1981). It inhabits valley foothill hardwood, valley foothill hardwood-conifer, valley foothill riparian, orchard, vineyard, cropland, pasture, and urban habitats.

There are no CNDDDB-reported occurrences of this species within 10 miles of the project footprint (CNDDDB 2003e); however, this species was observed in the habitat study area during field surveys (Figures 4-21 through 4-26).

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, wetland, riverine, and retention basin habitats are present within the habitat study area. Therefore, yellow-billed magpie has a moderate potential to occur in these habitat types within the habitat study area. Because yellow-billed magpie were observed during field surveys, this species has a high potential to occur in riparian, orchard, vineyard, field crops, row crops, pasture, and urban habitats within the habitat study area.

**Purple Martin (*Progne subis*)**

Purple martin is a CDFG SSC. It is the largest swallow, albeit with a tiny bill (Robbins et al. 1966). Purple martin is an uncommon to rare local summer resident in a variety of wooded, low-elevation habitats throughout California. It is a rare migrant in spring and fall and is absent in winter. It uses valley foothill and montane hardwood and riparian habitats. It also occurs in coniferous habitats, including closed-cone pine-cypress, ponderosa pine, Douglas-fir, and redwood. In the south, it is now only a rare and local breeder on the coast and in interior mountain ranges, with few breeding localities (Garrett and Dunn 1981). It is absent from higher desert regions except as a rare migrant. In the north, it is an uncommon to rare local breeder on the coast and inland to Modoc and Lassen counties (McCaskie et al. 1979, Airola 1980). It is absent from higher slopes of the Sierra Nevada. Historically, purple martins nested in buildings and riparian areas and were fairly common from Stockton north throughout the Sacramento Valley as recently as the 1970s. Subsequently, competition for nest cavities from the newly arrived European starling played a major role in the species' disappearance from all but a select few colonies in the Sacramento area (Shuford and Gardali 2008). It inhabits open forests, woodlands, and riparian areas, as well as urban bridges and overpasses in breeding season. It is found in a variety of open habitats during migration, including grassland, wet meadow, and fresh emergent wetland, usually near water.

There are no CNDDDB-reported occurrences of this species within 10 miles of the project footprint (CNDDDB 2003e).

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, California annual grassland and wetland habitats are present within the habitat study area. Therefore, the purple martin has a moderate potential to occur in these habitat types within the habitat study area.

**Yellow Warbler (*Dendroica petechia brewsteri*)**

Yellow warbler is a USFWS BCC and a CDFG SSC. It is a small insect-eating bird with a thin, pointed bill. It displays mostly yellow plumage with greenish-yellow upperparts, a plain yellow face with yellow eye ring and yellowish legs (Robbins et al. 1966). The yellow warbler's breeding distribution spans from the coast range in Del Norte County east to Modoc plateau, south along the coast range to Santa Barbara and Ventura counties, and along the western slope of the Sierra Nevada south to Kern County. It also breeds along the eastern side of California from the Lake Tahoe area south through Inyo County in several southern California mountain ranges and throughout most of San Diego County. It winters in the

Imperial and Colorado River valleys and sparingly along the southern coast from Santa Barbara to San Diego (Zeiner et al. 1988-1990). It breeds in riparian woodlands from coastal and desert lowlands up to 8,000 feet in the Sierra Nevada. It also breeds in montane chaparral and in open ponderosa pine and mixed conifer habitats with substantial amounts of brush. Numbers of breeding pairs have declined dramatically in recent decades in many lowland areas (southern coast, Colorado River, San Joaquin, and Sacramento valleys). While it is still a common and often abundant spring and fall migrant through the Central Valley, yellow warbler is now largely extirpated as a breeder there (Shuford and Gardali 2008).

There are no CNDDDB-reported occurrences of this species within 10 miles of the project footprint (CNDDDB 2003e).

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, riparian habitat is present within the habitat study area. Therefore, the yellow warbler has a moderate potential to occur in this habitat type within the habitat study area.

### **Yellow-breasted Chat (*Icteria virens*)**

Yellow-breasted chat is a CDFG SSC. It is the largest warbler and has a thick bill and fairly long tail. It has a yellow throat and breast, a whitish belly, olive upperparts, and dark legs (Robbins et al. 1966). Yellow-breasted chat is an uncommon summer resident and migrant in coastal California and in foothills of the Sierra Nevada. It is found up to about 4,800 feet in valley foothill riparian habitat, and up to 6,500 feet east of the Sierra Nevada in desert riparian habitats (Gaines 1977b, DeSante and Ainley 1980, Garrett and Dunn 1981). It is uncommon along the coast of northern California east to the Cascades and occurs only locally south of Mendocino County (McCaskie et al. 1979). In southern California, it breeds locally on the coast and very locally inland (Garrett and Dunn 1981). In migration, it may be found in lower elevations of mountains in riparian habitat (McCaskie et al. 1979). Numbers have been reduced in recent decades (Remsen 1978).

Yellow-breasted chat occurs as a migrant and uncommon local breeder in the San Joaquin Valley, known only to nest at a select few sites in San Joaquin and Stanislaus counties (Ricketts and Kus 2000). It occupies riparian habitats with a well-developed dense shrub layer and an open canopy. Nesting habitat is usually restricted to dense shrubs in the narrow borders of streams, creeks, sloughs, and rivers.

There are no CNDDDB-reported occurrences of this species within 10 miles of the project footprint (CNDDDB 2003e).

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, riparian habitat is present within the habitat study area. Therefore, the yellow-breasted chat has a moderate potential to occur in this habitat type within the habitat study area.

### **Spotted Towhee (*Pipilo maculatus*)**

Spotted towhee is a USFWS BCC. It has a conical bill, rusty sides, a white belly, spotted back, white wing bars, a long tail with buffy undertail coverts, and white outer tail feathers (Robbins et al. 1966).

Spotted towhee is a common resident throughout California except at high elevations in the Sierra Nevada and lowlands of southern deserts. It is found in chaparral and other shrub habitats and in open stands of riparian, hardwood, and hardwood-conifer habitats, and in lower-elevation conifer habitats. It occupies relatively tall, dense stands of shrubs and riparian thickets with accumulations of leaf litter and humus, especially decadent stands and those at the bottom of slopes. East of the Cascade Range and Sierra Nevada, it breeds south to Owens Valley in Inyo County. In southeastern deserts, it breeds in higher ranges but not in lowlands. It is a rare winter visitor of the Colorado River and Salton Sea areas, and locally elsewhere in southern California deserts. In winter, this species mostly withdraws from montane habitats, moving downslope, at least in northern California and desert ranges (Grinnell and Miller 1944, McCaskie et al. 1979, Garrett and Dunn 1981).

There are no CNDDDB-reported occurrences of this species within 10 miles of the project footprint (CNDDDB 2003e).

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, riparian habitat is present within the habitat study area. Therefore, the spotted towhee has a moderate potential to occur in this habitat type within the habitat study area.

### **Oregon Vesper Sparrow (*Pooecetes gramineus affinis*)**

Oregon vesper sparrow is a CDFG SSC. Vesper sparrows have a moderately long tail with distinctive white outer tail feathers, a prominent white eye ring, and a dark ear patch bordered in white. The Oregon subspecies is smaller and darker than other vesper sparrows (Alderfer 2006). The Great Basin race of vesper sparrow is a common summer resident east of the Cascade-Sierra Nevada crest, but Oregon vesper sparrow does not breed in the vast majority of California (although it was recently noted breeding regularly in coastal Del Norte County [Shuford and Gardali 2008]). It is uncommon in the Central Valley and bordering foothills and fairly common locally in southern deserts in winter. It occupies grasslands, croplands, and open brushlands in winter. It is most common in winter at the Colorado River and Salton Sea, but occurs very locally north to the Owens Valley, Carrizo Plain, and Antelope Valley. It also occurs, uncommonly, on coastal slopes (Grinnell and Miller 1944; McCaskie et al. 1979, 1988; Garrett and Dunn 1981).

No occurrences of Oregon vesper sparrow have been reported in the habitat study area, and the CNDDDB reports no occurrences of Oregon vesper sparrow (CNDDDB 2003e).

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, California annual grassland and field crop habitats are present within the habitat study area. Therefore, the Oregon vesper sparrow has a moderate potential to forage but not nest in these habitat types within the habitat study area.

### **Grasshopper Sparrow (*Ammodramus savannarum*)**

Grasshopper sparrow is a CDFG SSC. It has a large, dark head with a narrow whitish crown stripe and a buffy face and breast (Robbins et al. 1966). Grasshopper sparrow is an uncommon and local summer resident and breeder in foothills and lowlands west of the Cascade-Sierra Nevada crest from Mendocino and Trinity counties south to San Diego County. It occurs in dry, dense grasslands, especially those with a variety of grasses and tall forbs and scattered shrubs for singing perches. In southern California, it occurs mainly on hillsides and mesas in coastal districts, but has bred up to 5,000 feet in the San Jacinto Mountains. It also has been found in Shasta Valley in Siskiyou County. In the northern portion of the San Joaquin Valley, grasshopper sparrows have been known to breed in very small numbers during the last decade at a few wildlife areas in Merced and Fresno counties (Shuford and Gardali 2008). It is secretive in winter and may occur more regularly than indicated by infrequent records, chiefly in coastal southern California (Grinnell and Miller 1944, McCaskie et al. 1979, Garrett and Dunn 1981).

There are no CNDDDB-reported occurrences of this species within 10 miles of the project footprint (CNDDDB 2003e).

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, California annual grassland habitat is present within the habitat study area. Therefore, the grasshopper sparrow has a moderate potential to occur in this habitat type within the habitat study area.

### **Song Sparrow (*Melospiza melodia*) (Modesto Population)**

Song sparrow (Modesto population) is a CDFG SSC. Song sparrows are a common resident of most of California, but they avoid higher mountains and occur only locally in southern deserts. In winter, most leave montane habitats and are then more abundant and widespread in lowlands and deserts. At all seasons, this species prefers riparian, fresh or saline emergent wetland, and wet meadow habitats. It

breeds in riparian thickets of willows, other shrubs, vines, tall herbs, and in fresh or saline emergent vegetation. In winter in much of northern California, this species may be found far from water in open habitats with thickets of shrubs or tall herbs. It usually avoids densely wooded habitats except along forest edges. It is an uncommon resident in suitable habitat in southern deserts and in the Imperial and Colorado River valleys (Grinnell and Miller 1944, McCaskie et al. 1979, Garrett and Dunn 1981). The Modesto population is known to occur in fresh emergent wetlands and riparian willow thickets in the Sacramento Valley, Sacramento-San Joaquin River Delta, and northern San Joaquin Valley.

There are no CNDDDB-reported occurrences of this species within 10 miles of the project footprint (CNDDDB 2003e).

The northern portion of the habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, vernal pools and other seasonal wetlands and riparian habitats are present within the habitat study area. Therefore, the song sparrow (Modesto population) has a moderate potential to occur in these habitat types within the habitat study area.

### **Tricolored Blackbird (*Agelaius tricolor*)**

Tricolored blackbird is a USFWS BCC and a CDFG SSC. Adult males display a bright red patch on the shoulder similar to the more common red-winged blackbird (*Agelaius phoeniceus*), but bordered by white instead of yellow (Robbins et al. 1966).

The geographic range of the tricolored blackbird is restricted to the Central Valley and surrounding foothills, throughout coastal and some inland localities in southern California, and scattered sites in Oregon, western Nevada, central Washington, and western coastal Baja California. This species breeds and winters in California and nests primarily in scattered locations throughout the Central Valley from March through August. They are sympatric with red-winged blackbirds. Unlike red-winged blackbirds, however, tricolored blackbirds breed in dense colonies and may travel several kilometers to secure food for their nestlings. Tricolored blackbirds form the largest colonies of any North American passerine bird. Breeding colonies may attract thousands of birds to a single site and they may nest more than once at different locations in a breeding year. They nest in freshwater marshes dominated by cattails or bulrushes and some colonies have been found in willows, blackberries (*Rubus* spp.), thistles (*Cirsium* and *Centaurea* spp.), and nettles (*Urtica* sp.). Tricolored blackbirds experience large annual losses of reproductive effort to crop-harvesting activities and suffer habitat losses to land conversions from rangeland to vineyards, orchards, and urban development (Beedy and Hamilton 1999).

There are no CNDDDB-reported occurrences of this species within 10 miles of the project footprint (CNDDDB 2003e).

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, California annual grassland, vernal pool, and field crop habitats are present within the habitat study area. Therefore, the tricolored blackbird has a moderate potential to occur in these habitat types.

### **Yellow-headed Blackbird (*Xanthocephalus xanthocephalus*)**

Yellow-headed blackbird is a CDFG SSC. Adult males display a bright yellow head and breast, a black body and tail, and black wings with a white patch (Robbins et al. 1966). Yellow-headed blackbird breeds commonly, but locally, east of the Cascade Range and Sierra Nevada, in the Imperial and Colorado River valleys, in the Central Valley, and at selected locations in the Coast Range west of the Central Valley. It nests in fresh emergent wetland with dense vegetation and deep water, often along the borders of lakes or ponds. It forages in emergent wetland and moist, open areas, especially cropland and muddy shores of lacustrine habitat. It has a restricted distribution in the Central Valley in winter, occurring mainly in the western portion. It is fairly common in winter in the Imperial Valley. It occurs as a migrant and local breeder in wetland complexes and wildlife areas in Merced and Fresno counties (Shuford and Gardali 2008), as well as deserts and along the Orange County coast. It has bred, at least irregularly, as high as

6,600 feet in the San Bernardino Mountains (Grinnell and Miller 1944, McCaskie et al. 1979, Garrett and Dunn 1981).

This species has been observed in the habitat study area during field surveys; however, there are no CNDDDB-reported occurrences of this species within 10 miles of the project footprint (CNDDDB 2003e).

Because yellow-headed blackbird was observed during field surveys, it has a high potential to occur in vernal pools and other seasonal wetlands, California annual grassland, and field crop habitats within the habitat study area.

#### **Lawrence's Goldfinch (*Carduelis lawrencei*)**

Lawrence's goldfinch is a USFWS BCC. It is a small, seed-eating bird with a short, conical bill and a short, forked tail (Robbins et al. 1966). Lawrence's goldfinch is highly erratic and localized in occurrence. It is rather common along the western edge of southern deserts, fairly common but with erratic numbers from year to year in Santa Clara County (Kaiser 1976) and on the coastal slope from Monterey County south. It is uncommon in foothills surrounding the Central Valley. It is present mostly from April through September. It breeds in open oak or other arid woodland and chaparral, near water. It rarely breeds along the immediate coast. Typical habitats include valley foothill hardwood, valley foothill hardwood-conifer, and in southern California, desert riparian, palm oasis, pinyon-juniper, and lower montane habitats. Nearby herbaceous habitats are often used for feeding. It winters erratically in southern coastal lowlands and the Colorado River Valley, and small numbers also winter in northern California (Grinnell and Miller 1944, McCaskie et al. 1979, Garrett and Dunn 1981). Lawrence's goldfinch prefers drier interior foothills and montane valleys, but breeding areas are not consistent from year to year; habitat for this species may be present in the Central Valley.

There are no CNDDDB-reported occurrences of this species within 10 miles of the project footprint (CNDDDB 2003e).

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, orchard, inactive farmland, rural residential, California annual grassland, eucalyptus woodland, riparian, and ruderal habitats are present within the habitat study area. Therefore, Lawrence's goldfinch has a moderate potential to occur in these habitat types within the habitat study area.

#### **5.2.2.6 Mammals**

Five special-status mammals have a moderate or greater potential to occur within the habitat study area (CNDDDB 2003e) – western red bat, pallid bat, western mastiff bat, San Joaquin kit fox, and American badger.

#### **Western Red Bat (*Lasiurus blossevillii*)**

The western red bat is a CDFG SSC and ranges from Shasta County to the Mexican border, west of the Sierra Nevada/Cascade crest and deserts. It roosts primarily in mature orchards, oak woodland, low-elevation conifer forest, along riparian corridors, and among nonnative trees in urban and rural residential areas. It may also forage in habitats and agricultural areas adjacent to streams and rivers that do not provide roosting habitat. Western red bats prefer mature, extensive riparian habitat to less extensive or degraded habitat, although mature orchards with dense canopies may provide alternate roosting and foraging habitat (Pierson and Rainey 2002, Pierson et al. 2000).

The nearest CNDDDB occurrence is located approximately 8 miles north of the project footprint and is presumed extant (Occurrence #79; CNDDDB 2003e). Unidentified bats were observed during the habitat assessment conducted in November 2009 in the town of Chowchilla.

The habitat study area is presumed to be within the current range of this species, and potentially suitable, but moderate quality, agricultural, riparian, commercial/industrial, and residential habitats are

present within the habitat study area. Therefore, the western red bat has a moderate potential to roost and forage in these habitat types within the habitat study area.

### **Pallid Bat (*Antrozous pallidus*)**

The pallid bat is a CDFG SSC. It ranges throughout California and roosts in buildings, caves, mines, and tree snags. At lower elevations it is strongly associated with oak savanna habitat and forages along riparian corridors, over grasslands, and possibly in agricultural areas. Pallid bats have also been captured while drinking at stock ponds (Pierson and Rainey 2002).

The nearest CNDDDB-reported occurrence is located 1.34 miles northeast of the project footprint and is presumed extant (Occurrence #147; CNDDDB 2003e). As stated previously, unidentified bats were observed during the habitat assessment conducted in November 2009 in the town of Chowchilla.

The habitat study area is presumed to be within the current range of this species and potentially suitable, but moderate quality, riparian, California annual grassland, and agricultural foraging habitats are present within the habitat study area. Therefore, the pallid bat has a moderate potential to forage but not roost in these habitat types within the habitat study area.

### **Western Mastiff Bat (*Eumops perotis californicus*)**

The western mastiff bat is a CDFG SSC. A free-tailed bat, it is the largest native bat in California. In California, it ranges in the north from the San Francisco Bay area east to the Sierra Nevada mountain ranges and southward through the rest of the state. It occupies arid and semiarid areas and roosts primarily in crevices in vertical cliffs and in broken terrain with exposed rock faces. It is also found in high buildings, trees, and tunnels. It has been known to forage up to 15 miles from the nearest roost site. Unlike other bats, it rarely uses night roosts due to the long distances it travels to forage (Barbour 1969).

The CNDDDB reports one presumed extant occurrence within the project footprint (Occurrence #71; CNDDDB 2003e) and one additional presumed extant occurrence within the habitat study area, 0.1 mile northeast of the project footprint (Occurrence #47; CNDDDB 2003e). As stated previously, unidentified bats were observed during the habitat assessment conducted in November 2009 in the town of Chowchilla.

Because a presumed extant occurrence of western mastiff bat occurs within the habitat study area and potentially suitable, but moderate quality, ruderal, California annual grassland, and riparian foraging habitats are present within the habitat study area, the western mastiff bat has a high potential to occur in these habitat types within the habitat study area. Suitable roosting habitat is also present in structures throughout the habitat study area.

### **San Joaquin Kit Fox (*Vulpes macrotis mutica*)**

The San Joaquin kit fox is federally listed as endangered and state listed as threatened. It inhabits valley and foothill grasslands, sparsely vegetated shrubby habitats, and agricultural and urban areas. The San Joaquin kit fox is primarily nocturnal and uses its dens for breeding, safety, and shelter. Dens tend to occur in relatively flat terrain or gently sloping hills, in washes, drainages, and roadside berms. They have also been known to den in man-made structures such as culverts and pipes.

The population consists of three main metapopulations (Carrizo Plain National Monument, LoKern Natural Area, Panoche Hills region) and a number of smaller "satellite" populations (Bjurlin et al. 2005). Movement of foxes among these populations is critical for maintaining genetic and demographic exchange (Cypher et al. 2007). Linking the undeveloped area surrounding Sandy Mush Road with the population of kit foxes on natural lands east of Merced is listed in the *Draft Recovery Plan for Upland Species of the San Joaquin Valley, California* (USFWS 1998a) as a recovery action. This undeveloped area around Sandy Mush Road was also listed as a wildlife movement corridor important to kit fox in *the Missing Linkages: Restoring Connectivity to the California Landscape Conference Proceedings* (Penrod and Merrifield 2001). Critical habitat has not been established for this species.

The CNDDDB reports two presumed extant occurrences within the project footprint (Occurrences #24 and #25; CNDDDB 2003e), and one additional presumed extant occurrence within the habitat study area, 0.01 mile southwest of the project footprint.

Because San Joaquin kit fox has multiple presumed extant occurrences and suitable habitat in the habitat study area, this species has a high potential to occur in California annual grassland and agriculture habitats, primarily in areas associated with wildlife movement corridors such as the Eastman Lake-Bear Creek ECA (Figures 4-21 through 4-26).

### **American Badger (*Taxidea taxus*)**

The American badger is a CDFG SSC. It lives throughout California and is capable of living in a variety of habitats, including grasslands, savannas, chaparral, and riparian habitats, with typically less than 50% plant cover. Badgers dig profusely and use their burrows for cover and reproduction. Largely nocturnal, the American badger primarily feeds on burrowing rodents, including gophers (*Thomomys* spp.) and California ground squirrels.

The nearest CNDDDB-reported occurrence is located approximately 0.5 mile northeast of the project footprint and is presumed extant (Occurrence #79; CNDDDB 2003e).

The habitat study area is presumed to be within the current range of this species, and potentially suitable, but moderate quality, riparian and California annual grassland habitat is present within the habitat study area. Therefore, American badger has a moderate potential to occur in these habitat types within the habitat study area.

## **5.3 Environmental Consequences**

### **5.3.1 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, and wildlife movement corridors. The BNSF Alternative would result in moderate effects on critical habitat, while the other two HST alternatives would have no effect. The Harris-DeJager site would have moderate effects on the Eastman Lake-Bear Creek ECA while the other four HMF sites would have no effect.

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

Operation of the UPRR/SR 99, BNSF, and Hybrid alternatives would have moderate effects on special-status plants and a moderate effect on special-status wildlife. All of the HMF sites would have either no effect or a moderate effect on special-status plants and wildlife.

The UPRR/SR 99 Alternative and the Hybrid Alternative would have a moderate effect on wildlife movement corridors, specifically within the Eastman Lake-Bear Creek ECA. The BNSF Alternative would have a moderate effect on the Eastman Lake-Bear Creek ECA. The Harris-DeJager HMF site would have a moderate effect on the Eastman Lake-Bear Creek ECA. The Castle Commerce Center, Fagundes, and the Gordon-Shaw HMF sites would have no effect on wildlife movement corridors and the Kojima HMF site would have a negligible effect.

Construction of any of the HST or HMF alternatives would require permitting for adverse effects on 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). The project would also require interagency consultations with both NMFS for anadromous fishes and their habitats, and the USFWS for other federally listed species and their habitats.

### 5.3.2 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. Existing regulatory programs, such as the CWA and conservation programs, (e.g., establishment of conservation easements and mitigation banks) would continue to abate the amount of habitat loss and degradation if feasible. 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. 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 the *Merced to Fresno Section Transportation Technical Report* [Authority and FRA 2011d]). 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 the Merced to Fresno Section Community Impact Assessment [Authority and FRA 2011e]). 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 will continue to have some impact on the wildlife, vernal pools and 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 and 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 will 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.



### 5.3.3 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 5.4. 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 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 effects are expected to be temporary and short term in nature and the area of impact would be restored to its original conditions (i.e., contour, landscaping, etc.), the effect conclusion under NEPA would be moderate in most cases. The moderate effect determination recognizes that wildlife would have an adverse reaction to these impacts, but that over time, habitat would be restored. The construction schedule identifies an 8-year window from mobilization to station build-out and HMF implementation. 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 are considered 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 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*.

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 3-1, 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 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 are vernal pools and other seasonal wetlands, Great Valley mixed riparian forest and other riparian communities and land cover types. The following discussion for direct impacts during construction is focused on 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 will 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 will be 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) of an elevated segment would be considered directly but temporarily impacted from ground disturbing activities. 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 (i.e., 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 are vernal pools and other seasonal wetlands, Great Valley mixed riparian forest and other riparian communities and land cover types. The following discussion for indirect impacts during construction is focused on 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 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 will 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 and other seasonal wetlands, Fremont cottonwood forested wetland, coastal and valley freshwater marsh, and natural and constructed watercourses (Tables 5-1 and 5-2). 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 substantial under NEPA and significant under CEQA. As described in Section 4.2 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).

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 is considered moderate under NEPA and significant under CEQA. The moderate effect relates to the lower number of acres located within the construction footprint.

**Table 5-1**  
 Terrestrial Communities Potentially Affected  
 during the Construction Period of the UPRR/SR 99 Alternative (acres <sup>a</sup>)

UPRR/SR 99 Alternative	Developed Areas	Agricultural Lands	Ruderal Vegetation	California Annual Grassland	Great Valley Mixed Riparian Forest	Other Riparian	Eucalyptus Woodlands
<b>Impacts by Project Combination</b>							
West Chowchilla Design Option & Ave 24 Wye	89	226	40	4	2	1	--
East Chowchilla Design Option & Ave 24 Wye	103	284	42	4	3	1	<0.5
East Chowchilla Design Option & Ave 21 Wye	105	231	47	4	2	<0.5	<0.5
<b>Fresno Station Alternatives</b>							
Mariposa Street Station	5	--	<0.5	--	--	--	--
Kern Street Station	2	--	--	--	--	--	--
<b>Total Range of Impacts <sup>b</sup></b>	<b>91 to 110</b>	<b>226 to 284</b>	<b>40 to 48</b>	<b>4</b>	<b>2 to 3</b>	<b>&lt;0.5 to 1</b>	<b>0 to &lt;0.5</b>
<sup>a</sup> All values that are greater than 0.5 acres are rounded to the nearest whole number (e.g., 0.51 is reported as 1; 2.5 is reported as 2). Totals from 0.01 to 0.5 acre are stated as <0.5 acre. Totals below 0.01 acre are stated as <0.01 acre. <sup>b</sup> Total range of impacts includes the least amount of habitat affected by the HST alternative to the most amount of impact by the HST alternative. Where values of <0.01 or <0.5 acre are combined with larger values to calculate the minimum and maximum, the total has been rounded to the next whole number (<0.01 rounded to 0 and <0.5 rounded to 1). When the minimum or maximum of the range is <0.01 or <0.5 it is not rounded.							

**Table 5-2**  
 Aquatic Communities Potentially Affected  
 during the Construction Period of the UPRR/SR 99 Alternative (acres <sup>a</sup>)

UPRR/SR 99 Alternative	Vernal Pools and Other Seasonal Wetlands	Fremont Cottonwood Forested Wetlands	Coastal and Valley Freshwater Marsh	Natural Watercourses	Constructed Watercourses <sup>b</sup>	Inundated Nonwetlands
<b>Impacts by Project Combination</b>						
West Chowchilla Design Option & Ave 24 Wye	1	2	<0.5	2	4	<0.5
East Chowchilla Design Option & Ave 24 Wye	1	2	<0.5	2	5	<0.5
East Chowchilla Design Option & Ave 21 Wye	1	2	<0.5	2	5	<0.5
<b>Fresno Station Alternatives</b>						
Mariposa Street Station	--	--	--	--	--	--
Kern Street Station	--	--	--	--	--	--
<b>Total Range of Impacts<sup>c</sup></b>	<b>1</b>	<b>2</b>	<b>&lt;0.5</b>	<b>2</b>	<b>4 to 5</b>	<b>&lt;0.5</b>
All impacts were calculated based on the construction footprint design. <sup>a</sup> All values that are greater than 0.5 acres are rounded to the nearest whole number (e.g., 0.51 is reported as 1; 2.5 is reported as 2). Totals from 0.01 to 0.5 acre are stated as <0.5 acre. Totals below 0.01 acre are stated as <0.01 acre. Totals from 0.01 to 0.5 acre are stated as <0.5 acre. Totals below 0.01 acre are stated as <0.01 acre. <sup>b</sup> Includes constructed basins. <sup>c</sup> Total range of impacts includes the least amount of habitat affected by the HST alternative to the most amount of impact by the HST alternative. Where values of <0.01 or <0.5 acre are combined with larger values to calculate the minimum and maximum, the total has been rounded to the next whole number (<0.01 rounded to 0 and <0.5 rounded to 1). When the minimum or maximum of the range is <0.01 or <0.5 it is not rounded. The sum of Vernal Pools and Other Seasonal Wetlands, Fremont Cottonwood Forested Wetland, Coastal Valley Freshwater Marsh, Natural Watercourses and Constructed Watercourses represent potential impacts on jurisdictional waters.						

**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 and other seasonal wetlands, coastal and valley freshwater marsh, and natural and constructed watercourses (Tables 5-3 and 5-4). 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 substantial under NEPA and 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 is considered moderate under NEPA and significant under CEQA. The moderate effect relates to the lower number of acres located within the construction footprint.

**Table 5-3**  
 Terrestrial Communities Potentially Affected  
 during the Construction Period of the BNSF Alternative (acres <sup>a</sup>)

BNSF Alternative	Developed Areas	Agricultural Lands	Ruderal Vegetation	California Annual Grassland	Great Valley Mixed Riparian Forest	Other Riparian	Eucalyptus Woodlands
<b>Impacts by Project Combination</b>							
BNSF north - south alignment with Ave 24 Wye	82	249	36	5	1	<0.5	<0.5
BNSF north - south alignment Ave with 21 Wye	59	142	36	5	1	<0.5	<0.5
<b>Le Grand Design Options</b>							
Mission Ave	18	29	4	1	<0.5	--	--
Mission Ave East of Le Grand	15	41	7	1	<0.5	--	1
Mariposa Way	22	35	21	4	1	<0.5	--
Mariposa Way East of Le Grand	13	44	4	3	1	<0.5	<0.5
<b>Fresno Station Alternatives</b>							
Mariposa Street Station	5	--	<0.5	--	--	--	--
Kern Street Station	2	--	--	--	--	--	--
<b>Impact of Components Combined <sup>b</sup></b>							
BNSF Alternative, Ave 24 Wye	97 to 109	278 to 293	40 to 58	6 to 9	2	<0.5 to 1	<0.5 to 1
BNSF Alternative, Ave 21 Wye	74 to 86	171 to 186	40 to 58	6 to 9	2	<0.5 to 1	<0.5 to 1
<b>Total Range of Impact <sup>b</sup></b>	<b>74 to 109</b>	<b>171 to 293</b>	<b>40 to 58</b>	<b>6 to 9</b>	<b>2</b>	<b>&lt;0.5 to 1</b>	<b>&lt;0.5 to 1</b>
<sup>a</sup> All values that are greater than 0.5 acres are rounded to the nearest whole number (e.g., 0.51 is reported as 1; 2.5 is reported as 2). Totals from 0.01 to 0.5 acre are stated as <0.5 acre. Totals below 0.01 acre are stated as <0.01 acre. <sup>b</sup> Total range of impacts includes the least amount of habitat affected by the HST alternative to the most amount of impact by the HST alternative. Where values of <0.01 or <0.5 acre are combined with larger values to calculate the minimum and maximum, the total has been rounded to the next whole number (<0.01 rounded to 0 and <0.5 rounded to 1). When the minimum or maximum of the range is <0.01 or <0.5 it is not rounded.							

**Table 5-4**  
 Aquatic Communities Potentially Affected  
 during the Construction Period of the BNSF Alternative (acres <sup>a</sup>)

BNSF Alternative	Vernal Pools and Other Seasonal Wetlands	Fremont Cottonwood Forested Wetlands	Coastal and Valley Freshwater Marsh	Natural Watercourses	Constructed Watercourses <sup>b</sup>	Inundated Nonwetlands
<b>Impacts by Project Combination</b>						
BNSF north - south alignment with Ave 24 Wye	1	--	<0.5	3	2	<0.5
BNSF north - south alignment Ave with 21 Wye	1	--	<0.5	3	1	<0.5
<b>Le Grand Design Options</b>						
Mission Ave	<0.5	<0.5	--	<0.5	1	<0.5
Mission Ave East of Le Grand	<0.5	<0.5	<0.5	<0.5	1	<0.5
Mariposa Way	2	<0.5	--	1	1	<0.5
Mariposa Way East of Le Grand	1	<0.5	--	1	1	--
<b>Fresno Station Alternatives</b>						
Mariposa Street Station	--	--	--	--	--	--
Kern Street Station	--	--	--	--	--	--
<b>Impact of Components Combined <sup>c</sup></b>						
BNSF Alternative, Ave 24	2 to 3	<0.5	<0.5 to 1	4	3	<0.5 to 1
BNSF Alternative, Ave 21	2 to 3	<0.5	<0.5 to 1	4	2	<0.5 to 1
<b>Total Range of Impact <sup>c</sup></b>	<b>2 to 3</b>	<b>&lt;0.5</b>	<b>&lt;0.5 to 1</b>	<b>4</b>	<b>2 to 3</b>	<b>&lt;0.5 to 1</b>
<sup>a</sup> All values that are greater than 0.5 acres are rounded to the nearest whole number (e.g., 0.51 is reported as 1; 2.5 is reported as 2). Totals from 0.01 to 0.5 acre are stated as <0.5 acre. Totals below 0.01 acre are stated as <0.01 acre. <sup>b</sup> Includes constructed basins. <sup>c</sup> Total range of impacts includes the least amount of habitat affected by the HST alternative to the most amount of impact by the HST alternative. Where values of <0.01 or <0.5 acre are combined with larger values to calculate the minimum and maximum, the total has been rounded to the next whole number (<0.01 rounded to 0 and <0.5 rounded to 1). When the minimum or maximum of the range is <0.01 or <0.5 it is not rounded.						

**Hybrid Alternative**

The Hybrid Alternative 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 and other seasonal wetlands, Fremont cottonwood forested wetland, coastal and valley freshwater marsh, and natural and constructed watercourses (Tables 5-5 and 5-6). 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 significant under NEPA and 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 is considered moderate under NEPA and significant under CEQA. The moderate effect relates to the lower number of acres located within the construction footprint.

**Table 5-5**  
 Terrestrial Communities Potentially Affected  
 during the Construction Period of the Hybrid Alternative (acres <sup>a</sup>)

Hybrid Alternative	Developed Areas	Agricultural Lands	Ruderal Vegetation	California Annual Grassland	Great Valley Mixed Riparian Forest	Other Riparian	Eucalyptus Woodlands
<b>Impacts by Project Combination</b>							
Hybrid Alignment with Ave 24 Wye	73	248	27	4	2	<0.5	<0.5
Hybrid Alignment with Ave 21 Wye	123	262	25	4	3	<0.5	<0.5
<b>Fresno Station Alternatives</b>							
Mariposa Street Station	5	--	<0.01	--	--	--	--
Kern Street Station	2	--	--	--	--	--	--
<b>Total Range of Impacts <sup>b</sup></b>	<b>75 to 128</b>	<b>248 to 262</b>	<b>25 to 27</b>	<b>4</b>	<b>2 to 3</b>	<b>&lt;0.5</b>	<b>&lt;0.5</b>
<sup>a</sup> All values that are greater than 0.5 acres are rounded to the nearest whole number (e.g., 0.51 is reported as 1; 2.5 is reported as 2). Totals from 0.01 to 0.5 acre are stated as <0.5 acre. Totals below 0.01 acre are stated as <0.01 acre. <sup>b</sup> Total range of impacts includes the least amount of habitat affected by the HST alternative to the most amount of impact by the HST alternative. Where values of <0.01 or <0.5 acre are combined with larger values to calculate the minimum and maximum, the total has been rounded to the next whole number (<0.01 rounded to 0 and <0.5 rounded to 1). When the minimum or maximum of the range is <0.01 or <0.5 it is not rounded.							

**Table 5-6**  
 Aquatic Communities Potentially Affected  
 during the Construction Period of the Hybrid Alternative (acres <sup>a</sup>)

Hybrid Alternative	Vernal Pools and Other Seasonal Wetlands	Fremont Cottonwood Forested Wetlands	Coastal and Valley Freshwater Marsh	Natural Watercourses	Constructed Watercourses <sup>b</sup>	Inundated Nonwetlands
<b>Impacts by Project Combination</b>						
Hybrid North-South Alignment with Ave 24 Wye	<0.5	1	<0.5	2	4	<0.5
Hybrid North-South Alignment with Ave 21 Wye	1	1	<0.5	5	4	<0.5
<b>Fresno Station Alternatives</b>						
Mariposa Street Station	--	--	--	--	--	--
Kern Street Station	--	--	--	--	--	--
<b>Total Range of Impacts <sup>c</sup></b>	<b>&lt;0.5 to 1</b>	<b>1</b>	<b>&lt;0.5</b>	<b>2 to 5</b>	<b>4</b>	<b>&lt;0.5</b>
<p><sup>a</sup> All values that are greater than 0.5 acres are rounded to the nearest whole number (e.g., 0.51 is reported as 1; 2.5 is reported as 2). Totals from 0.01 to 0.5 acre are stated as &lt;0.5 acre. Totals below 0.01 acre are stated as &lt;0.01 acre.</p> <p><sup>b</sup> Includes constructed basins.</p> <p><sup>c</sup> Total range of impacts includes the least amount of habitat affected by the HST alternative to the most amount of impact by the HST alternative. Where values of &lt;0.01 or &lt;0.5 acre are combined with larger values to calculate the minimum and maximum, the total has been rounded to the next whole number (&lt;0.01 rounded to 0 and &lt;0.5 rounded to 1). When the minimum or maximum of the range is &lt;0.01 or &lt;0.5 it is not rounded.</p> <p>The sum of Vernal Pools and Other Seasonal Wetlands, Fremont Cottonwood Forested Wetland, Coastal Valley Freshwater Marsh, Natural Watercourses and Constructed Watercourses represent potential impacts on jurisdictional waters.</p>						

**Heavy Maintenance Facility Alternatives**

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 (Tables 5-7 and 5-8). 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 significant under NEPA and significant under CEQA.

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 is considered moderate under NEPA and significant under CEQA. The moderate effect relates to the lower number of acres located within the construction footprint.

Harris-DeJager HMF: The Harris-DeJager HMF site does not contain riparian habitat, other sensitive natural communities, or federally protected wetlands (Tables 5-7 and 5-8). 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 (Tables 5-7 and 5-8).

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 is considered moderate under NEPA and 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 and other seasonal wetlands, coastal and valley freshwater marsh and natural watercourses (Tables 5-7 and 5-8). 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 be considered moderate under NEPA and 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 is considered moderate under NEPA and significant under CEQA. The moderate effect relates to the lower number of acres located within the construction footprint.

**Table 5-7**  
 Terrestrial Communities Potentially Affected  
 during the Construction Period of the HMF Alternatives (acres <sup>a</sup>)

HMF Alternatives	Developed Areas	Agricultural Lands	Ruderal Vegetation	California Annual Grassland	Great Valley Mixed Riparian Forest	Other Riparian	Eucalyptus Woodlands
Castle Commerce Center	34	7	9	--	<0.5	<0.5	<0.5
Harris-DeJager	--	--	--	--	--	--	--
Fagundes	<0.5	3	--	--	--	--	--
Gordon-Shaw	--	<0.5	--	--	--	--	--
Kojima Development	--	7	<0.5	<0.5	<0.5	--	--

All impacts were calculated based on the construction footprint design.

<sup>a</sup> All values that are greater than 0.5 acres are rounded to the nearest whole number (e.g., 0.51 is reported as 1; 2.5 is reported as 2). Totals from 0.01 to 0.5 acre are stated as <0.5 acre. Totals below 0.01 acre are stated as <0.01 acre.

**Table 5-8**  
 Aquatic Communities Potentially Affected  
 during the Construction Period of the HMF Alternatives (acres <sup>a</sup>)

HMF Alternatives	Vernal Pools and Other Seasonal Wetlands	Fremont Cottonwood Forested Wetlands	Coastal and Valley Freshwater Marsh	Natural Watercourses	Constructed Watercourses <sup>b</sup>	Inundated Nonwetlands
Castle Commerce Center	--	<0.5	--	<0.5	<0.5	--
Harris-DeJager	--	--	--	--	--	--
Fagundes	--	--	--	--	--	--
Gordon-Shaw	--	--	<0.5	<0.5	--	-
Kojima Development	<0.5	--	<0.5	<0.5	--	--

All impacts were calculated based on the construction footprint design.

<sup>a</sup> All values that are greater than 0.5 acres are rounded to the nearest whole number (e.g., 0.51 is reported as 1; 2.5 is reported as 2). Totals from 0.01 to 0.5 acre are stated as <0.5 acre. Totals below 0.01 acre are stated as <0.01 acre.

<sup>b</sup> Includes constructed basins.

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

**Special-Status Plant Species**

Thirty-six special-status plant species were determined to have a moderate or greater potential to occur within the habitat study area (CNDDDB 2003d and CNPS 2010). Appendix C-1, 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 on special-status plants reflect the conservative 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 D 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 (i.e., access, laydown area, etc.) would be restored after construction activities are completed. Mitigation measures are discussed in Section 5.4.

Vernal pools and other seasonal wetlands support special-status plant species, including those listed or proposed for listing 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 are considered moderate under NEPA and 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 be considered moderate under NEPA and 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 is considered moderate under NEPA and 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 be considered moderate under NEPA and 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 is considered moderate under NEPA and 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 be considered moderate under NEPA and 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 is considered moderate under NEPA and 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 be considered moderate under NEPA and significant under CEQA.

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

Because construction of the Harris-DeJager HMF has the potential to result in the temporary 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 is considered moderate under NEPA and 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 be considered moderate under NEPA and significant under CEQA.

Because construction of the Fagundes HMF has the potential to result in the temporary 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 is considered moderate under NEPA and 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 be considered moderate under NEPA and significant under CEQA.

Because construction of the Gordon-Shaw HMF 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 is considered moderate under NEPA and 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 be considered moderate under NEPA and significant under CEQA.

Because construction of the Kojima Development HMF 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 is considered moderate under NEPA and significant under CEQA.

### ***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 lifecycles 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. 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. Appendix D 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 this report.

### 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 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.

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 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 open-cut trenching during construction, resulting in decreased shading, increased water temperatures, and displacement of fish. However, streamside clearing would be localized. Final bridge design plans are not currently available, but construction may require work below the ordinary high-water mark.

#### 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.

Birds (includes native birds covered under MBTA): 37 special-status bird species listed in Appendix C-2, have been identified as having a moderate or higher potential to occur within the region. 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 and could cause 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 violate the MBTA and would constitute a moderate effect 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.
- 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 will 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 will 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 will avoid lights, motion, noise and otherwise startle activities that elicit a negative response and avoidance of the area; however, there are instances where kit fox may use the construction footprint.
- 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 a moderate amount of 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 is considered moderate under NEPA and 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 is considered moderate under NEPA and 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 is considered moderate under NEPA and 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 is considered moderate under NEPA and 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 spring-run Chinook salmon, hardhead, and San Joaquin roach. Essential fish habitat 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 re-establishment of special-status fish along the San Joaquin River; as such, essential fish habitat is regulated by NMFS, CDFG and USFWS. Although the potential impacts are being considered during the project design, impacts on essential fish habitat during construction are considered moderate under NEPA and significant under CEQA.

Because construction of the UPRR/SR 99 Alternative would temporarily affect these special-status fish, both directly and indirectly as described above, the impact is considered moderate under NEPA and 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 is considered moderate under NEPA and significant under CEQA.

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

Because construction of the UPRR/SR 99 Alternative would temporarily affect the western pond turtle both directly and indirectly as described above, the impact is considered moderate under NEPA and 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 is considered a moderate effect under NEPA and significant under CEQA.

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

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

### **BNSF Alternative**

Invertebrates: The BNSF Alternative contains a relatively small amount of vernal pools and other seasonal wetlands, including a moderate amount of 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 is considered moderate under NEPA and 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 is considered moderate under NEPA and 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 is considered moderate under NEPA and 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 is considered moderate under NEPA and significant under CEQA.

Fish: The BNSF Alternative contains aquatic habitats (primarily along the San Joaquin River) known to support Kern brook lamprey, Central Valley spring-run Chinook salmon, hardhead, and San Joaquin roach. Essential fish habitat 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 re-establishment of special-status fish along the San Joaquin River; as such, essential fish habitat is regulated by NMFS, CDFG and USFWS. Although the potential impacts are being considered during the project design, impacts on essential fish habitat during construction are considered moderate under NEPA and significant under CEQA.

Because construction of the BNSF Alternative would temporarily affect these special-status fish, both directly and indirectly as described above, the impact is considered moderate under NEPA and 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 is considered a moderate under NEPA and significant under CEQA.

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

Because construction of the BNSF Alternative would temporarily affect the western pond turtle both directly and indirectly as described above, the impact is considered moderate under NEPA and 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 is considered a moderate effect under NEPA and significant under CEQA.

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

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

### **Hybrid Alternative**

Invertebrates: The Hybrid Alternative contains a relatively small amount of vernal pools and other seasonal wetlands, including a moderate amount of 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 is considered moderate under NEPA and 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 is considered moderate under NEPA and 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 is considered moderate under NEPA and 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 is considered moderate under NEPA and significant under CEQA.

**Fish:** The Hybrid Alternative contains aquatic habitats (primarily along the San Joaquin River) known to support Kern brook lamprey, Central Valley spring-run Chinook salmon, hardhead, and San Joaquin roach. Essential fish habitat 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 re-establishment of special-status fish along the San Joaquin River; as such, essential fish habitat is regulated by NMFS, CDFG and USFWS. Although the potential impacts are being considered during the project design, impacts on essential fish habitat during construction are considered moderate under NEPA and significant under CEQA.

Because construction of the Hybrid Alternative would temporarily affect these special-status fish, both directly and indirectly as described above, the impact is considered moderate under NEPA and 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 is considered a moderate under NEPA and significant under CEQA.

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

Because construction of the Hybrid Alternative would temporarily affect the western pond turtle both directly and indirectly as described above, the impact is considered moderate under NEPA and 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 is considered a moderate effect under NEPA and significant under CEQA.

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

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

**Heavy Maintenance Facility Alternatives**

The conclusions presented in Table 5-9 are based on the potential terrestrial and aquatic communities presence 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 5-9**  
 Special-Status Wildlife Species Potentially Affected during the Construction Period of the HMF Alternatives <sup>a</sup>

HMF Alternatives	Vernal Pool Branchiopods	Valley Elderberry Longhorn Beetle	Fish	Amphibians	Reptiles	Birds <sup>b</sup>	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

<sup>a</sup> 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)

<sup>b</sup> Includes all migratory birds covered under the MBTA.

**Habitats of Concern**

As described in Section 4.2 above, 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 marsh, and 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) would 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 and 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 either moderate or substantial under NEPA and significant under CEQA. The moderate effect relates to the relatively low number of acres located within the construction footprint.

Because construction of the UPRR/SR 99 Alternative has the potential to result in the temporary loss or disturbance of these special-status plant communities (excluding coastal and valley freshwater marsh) for reasons identified above, the impact is considered moderate under NEPA and 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. They are regulated by USACE. Any substantive impacts that result in reduction of jurisdictional waters are considered moderate to substantial under NEPA and significant under CEQA. The moderate effect relates to the relatively low number of acres located within the construction footprint.

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 is considered moderate under NEPA and 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. Camp Pashayan is a CDFG administered mitigation property that is part of a regional planning process for conservation. Impacts on Camp Pashayan are considered moderate under NEPA and 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 is considered moderate under NEPA and significant under CEQA.

Essential Fish Habitat: The UPRR/SR 99 Alternative is elevated where it crosses the San Joaquin River, which contains essential fish habitat for Chinook salmon within and adjacent to the construction footprint. Final bridge design plans are not currently available, but may require placing pilings within the San Joaquin River. However, for the UPRR/SR 99 Alternative and for all HST Alternatives, there are no plans to modify the physical characteristics of the San Joaquin River channel in the area of the SR 99 San Joaquin River crossing. The HST crossing would be designed with the planned increase in river flows and would not conflict with the goals of the restoration flows. The location of the project crossing is in Reach 1, which has been identified as the reach where spawning may occur. A program-level environmental document on the SJRRP has been prepared *Draft Program Environmental Impact Statement/Environmental Impact Report for the San Joaquin River Restoration Program* (USBR and DWR 2011). During an initial coordination meeting with the U.S. Bureau of Reclamation and the Department of Water Resources on June 6, 2011, it was determined that the project design would not conflict with the SJRRP. The Authority will continue to coordinate with SJRRP.

Essential fish habitat 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 re-establishment of special-status fish along the San Joaquin River; as such, essential fish habitat is regulated by NMFS, CDFG and USFWS. Although the potential impacts are being considered during the project design, impacts on essential fish habitat during construction are considered moderate under NEPA and significant under CEQA.

Because construction of the UPRR/SR 99 Alternative has the potential to result in direct and indirect impacts on essential fish habitat as described above, the impact is considered moderate under NEPA and significant under CEQA.

### **BNSF Alternative**

Special-Status Plant Communities: Vernal pools and other seasonal wetlands, coastal and valley freshwater marsh, 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 are considered substantial under NEPA and significant under CEQA. The moderate effect 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 temporary loss or disturbance of these special-status plant communities for reasons identified above, the impact is considered moderate under NEPA and significant under CEQA.

Jurisdictional Waters: Natural and constructed watercourses, vernal pools and 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 reduction of jurisdictional waters are considered moderate under NEPA and significant under CEQA. The moderate effect 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 direct and indirect impacts on jurisdictional waters as described above, the impact is considered moderate under NEPA and 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. Although critical habitat is a federal requirement in identifying key areas for endangered species recovery, the impact of taking critical habitat does affect the planning,

policies, and regulations under the provisions within CEQA. Consequently, the impact is considered moderate under NEPA and significant under CEQA.

Table 5-10 summarizes the critical habitat potentially affected by the BNSF Alternative during construction. Because construction of the BNSF Alternative has the potential to result in direct and indirect impacts on critical habitat as described above, the impact is considered moderate under NEPA and significant under CEQA.

**Table 5-10**

Critical Habitat Potentially Affected during the Construction Period of the BNSF Alternative (acres <sup>a</sup>)

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)
<b>Impacts by Project Combination</b>						
BNSF north - south alignment with Ave 24 Wye	--	--	--	--	--	--
BNSF north - south alignment with Ave 21Wye	--	--	--	--	--	--
<b>Le Grand Design Options</b>						
Mission Ave	1	--	--	--	--	1
Mission Ave East of Le Grand	1	--	--	--	--	1
Mariposa Way	10	--	--	--	--	10
Mariposa Way East of Le Grand	7	--	--	--	--	7
<b>Design Options to Fresno Station</b>						
Mariposa Street Station	--	--	--	--	--	--
Kern Street Station	--	--	--	--	--	--
<b>Impacts of Components Combined</b>						
BNSF Alternative, Ave 24 Wye	1 to 10	--	--	--	--	1 to 10
BNSF Alternative, Ave 21 Wye	1 to 10	--	--	--	--	1 to 10
<b>Total Range of Impacts for the BNSF Alternative<sup>a</sup></b>	<b>1 to 10</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>1 to 10</b>
Notes: No critical habitat is present along the wyes and Fresno Station design options. All impacts were calculated based on the construction footprint design. <sup>a</sup> Total range of impacts includes the least amount of habitat affected by the HST alternatives to the most amount of impact by the HST alternatives.						

**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 the ability of the property to function as a conservation bank. The potential impacts on conservation properties is considered moderate under NEPA and 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 is considered moderate under NEPA and significant under CEQA.

**Essential Fish Habitat:** The BNSF Alternative is elevated where it crosses the San Joaquin River, which contains essential fish habitat for Chinook salmon within and adjacent to the HST System footprint. Final bridge design plans are not currently available, but may require placing pilings within the San Joaquin River. The BNSF Alternative plan and profile is identical to the UPRR/SR 99 at the San Joaquin River Channel. There are no plans to modify the physical characteristics of the San Joaquin River channel in the area of the SR 99 San Joaquin River crossing. The HST crossing would be designed with the planned increase in river flows and would not conflict with the goals of the restoration flows. The project crossing near the existing SR 99 will be designed so as not to be in conflict with the SJRRP or any actions under the SJRRP. The Authority will continue to coordinate with SJRRP and respect regulations regarding construction during the spawning and migration season.

Essential fish habitat 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 re-establishment of special-status fish along the San Joaquin River; as such, essential fish habitat is regulated by NMFS, CDFG and USFWS. Although the potential impacts are being considered during the project design, impacts on essential fish habitat during construction are considered moderate under NEPA and significant under CEQA.

Because construction of the BNSF Alternative has the potential to result in direct and indirect impacts on essential fish habitat as described above, the impact is considered moderate under NEPA and significant under CEQA.

### **Hybrid Alternative**

**Special-Status Plant Communities:** Vernal pools and 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 reduction of riparian habitat values and federally protected wetlands are considered moderate to substantial under NEPA and significant under CEQA. The moderate effect relates to the relatively low number of acres located within the construction footprint.

Because construction of the Hybrid Alternative has the potential to result in the temporary loss or disturbance of these special-status plant communities for reasons identified above, the impact is considered moderate under NEPA and 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 reduction of jurisdictional waters are considered moderate to substantial under NEPA and significant under CEQA. The moderate effect relates to the relatively low number of acres located within the construction footprint.

Because construction of the Hybrid Alternative has the potential to result in direct and indirect impacts on jurisdictional waters as described above, the impact is considered moderate under NEPA and 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. Camp Pashayan is a CDFG administered mitigation property that is part of a regional planning process for conservation. Impacts on Camp Pashayan are considered moderate under NEPA and significant under CEQA.

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

Essential Fish Habitat: The Hybrid Alternative is elevated where it crosses the San Joaquin River, which contains essential fish habitat for Chinook salmon within and adjacent to the HST System footprint. Final bridge design plans are not currently available, but may require placing pilings within the San Joaquin River. However, for the Hybrid Alternative and for all HST Alternatives, there are no plans to modify the physical characteristics of the San Joaquin River channel in the area of the SR 99 San Joaquin River crossing. The HST crossing would be designed with the planned increase in river flows and would not conflict with the goals of the restoration flows. The location of the project crossing is in Reach 1, which has been identified as the reach where spawning may occur. A program-level environmental document on the SJRRP has been prepared *Draft Program Environmental Impact Statement/Environmental Impact Report for the San Joaquin River Restoration Program* (USBR and DWR 2011). During an initial coordination meeting with the U.S. Bureau of Reclamation and the Department of Water Resources on June 6, 2011, it was determined that the project design would not conflict with the SJRRP. The Authority will continue to coordinate with SJRRP.

Essential fish habitat 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 re-establishment of special-status fish along the San Joaquin River; as such, essential fish habitat is regulated by NMFS, CDFG and USFWS. Although the potential impacts are being considered during the project design, impacts on essential fish habitat during construction are considered moderate under NEPA and significant under CEQA.

Because construction of the Hybrid Alternative has the potential to result in direct and indirect impacts on essential fish habitat as described above, the impact is considered moderate under NEPA and significant under CEQA.

### **Heavy Maintenance Facility Alternatives**

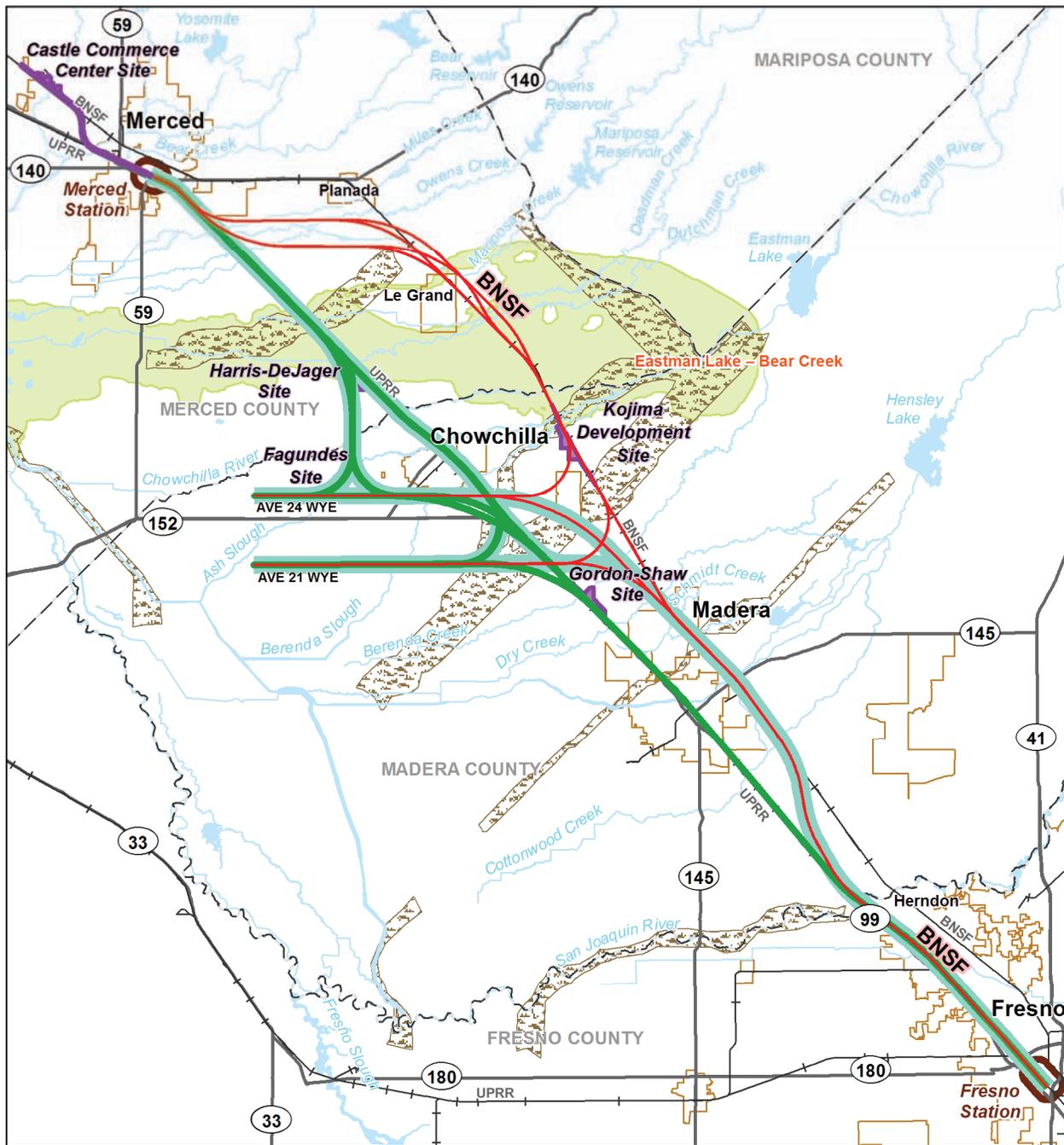
Habitats of concern potentially affected by the HMF sites are addressed in Table 5-11. This table lists the presence or absence of habitats of concern within each HMF construction footprint and the potential for construction-related impacts to occur. The conclusions presented in Table 5-11 are based on the occurrence of special-status plant communities, jurisdictional waters, critical habitat, mitigation banks/reserves, and essential fish habitat. Resources found within the construction footprint are considered moderate under NEPA and significant under CEQA for any acreage as they are regulated by CDFG, USFWS, or USACE.

**Table 5-11**  
 Habitats of Concern Potentially Affected during the Construction Period of the HMF Alternatives <sup>a</sup>

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
<sup>a</sup> 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)					

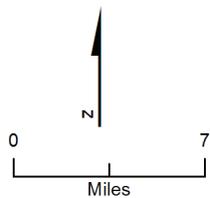
**Wildlife Movement Corridors**

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 5-2 illustrates the watercourse crossings within the Eastman Lake-Bear Creek ECA and within modeled wildlife corridors with all alternatives, including all design options. Figures 5-3 to 5-10 are a series of select focused illustrations, generally following a north to south orientation. Tables E-1 through E-6 provided in Appendix E 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 only focus on watercourse crossings outside the ECA within the modeled wildlife corridors limits to avoid duplication of watercourse crossing information.



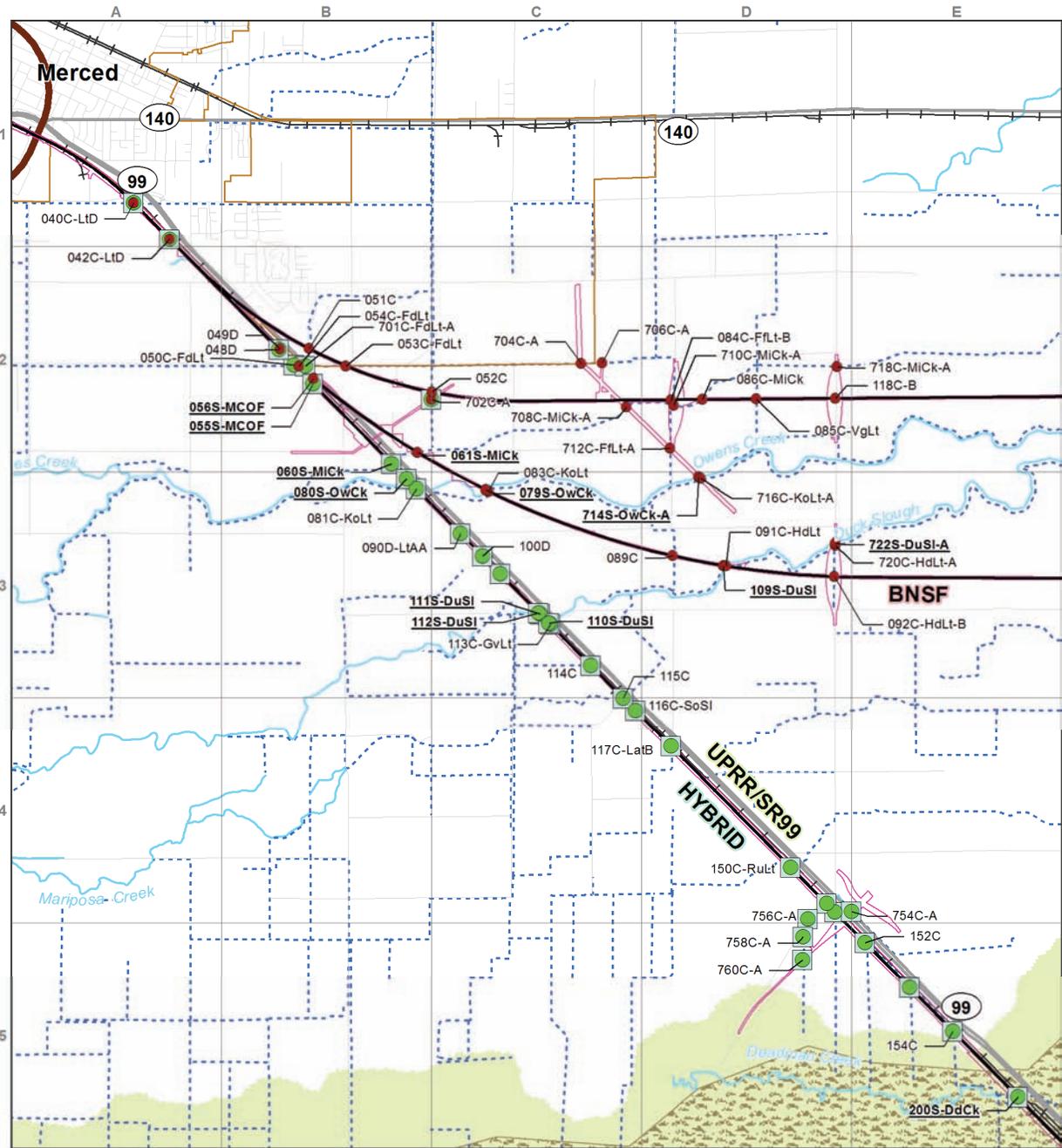
Source: Spencer et al. (2010), Huber (2007).

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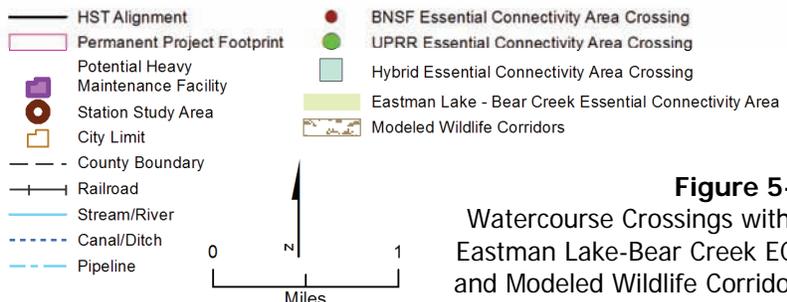
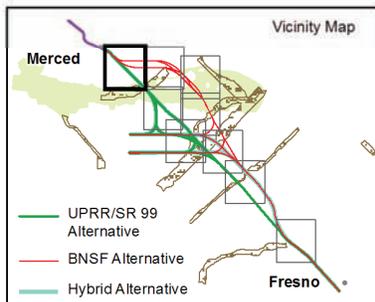
- UPRR/SR 99 Alternative
- BNSF Alternative
- Hybrid Alternative
- Station Study Area
- Potential Heavy Maintenance Facility
- City Limit
- - - County Boundary
- +— Railroad
- Eastman Lake - Bear Creek Essential Connectivity Area
- Modeled Wildlife Corridors

**Figure 5-2**  
 Watercourse Crossings within Eastman Lake - Bear Creek ECA and Modeled Wildlife Corridors – All Alternatives

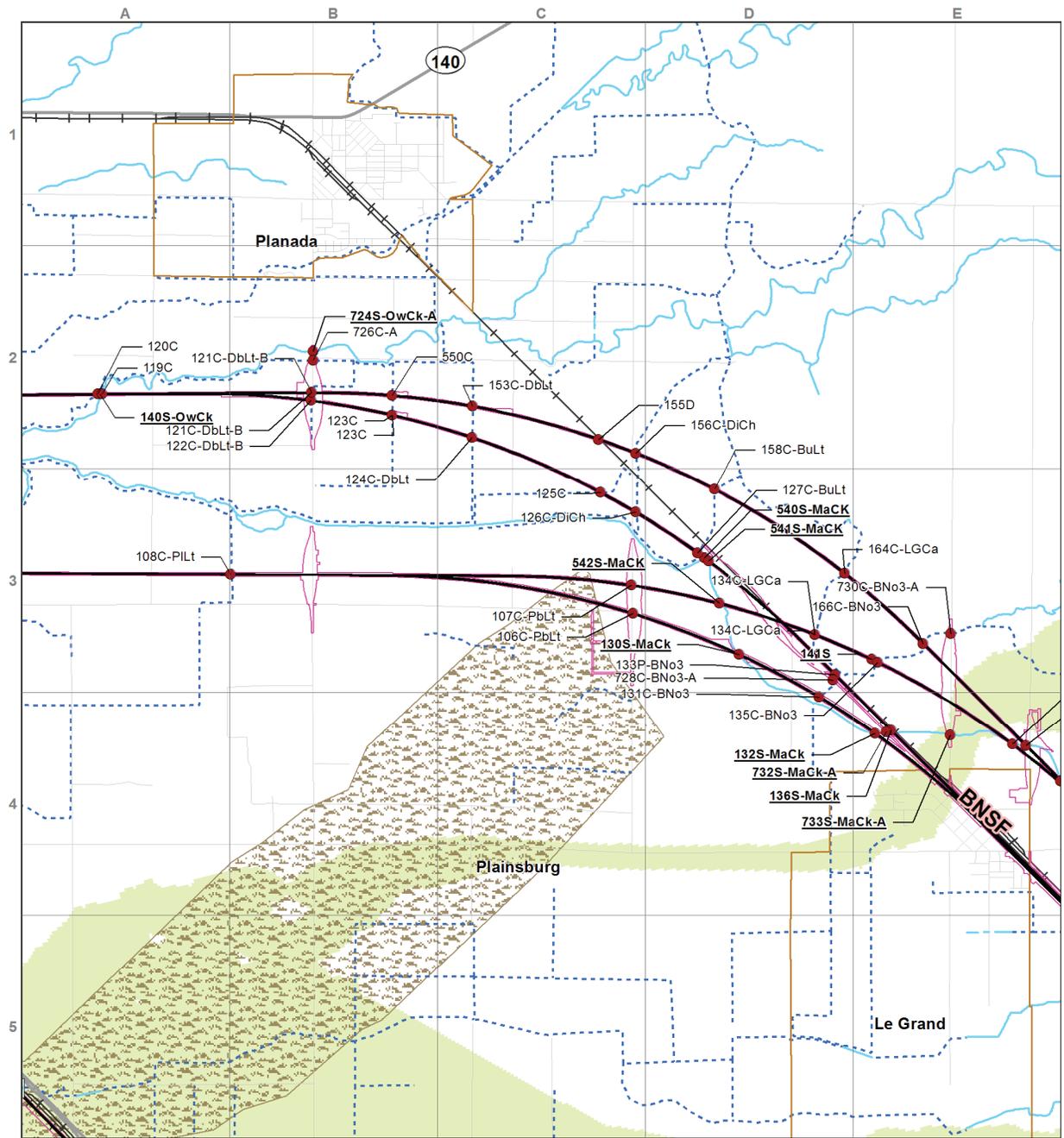


Source: CWD (n.d.), DeLorme (2008), Merced Irrig. Dist. (1973, 2000), USGS (2010a,b), Spencer et al. (2010), Huber (2007).

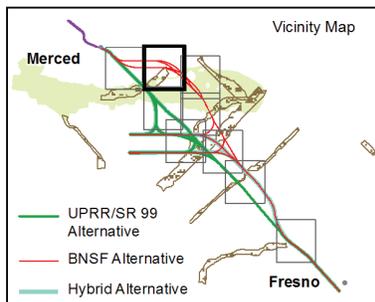
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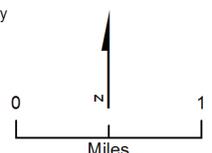
**Figure 5-3**  
 Watercourse Crossings within  
 Eastman Lake-Bear Creek ECA  
 and Modeled Wildlife Corridors  
 – All Alternatives



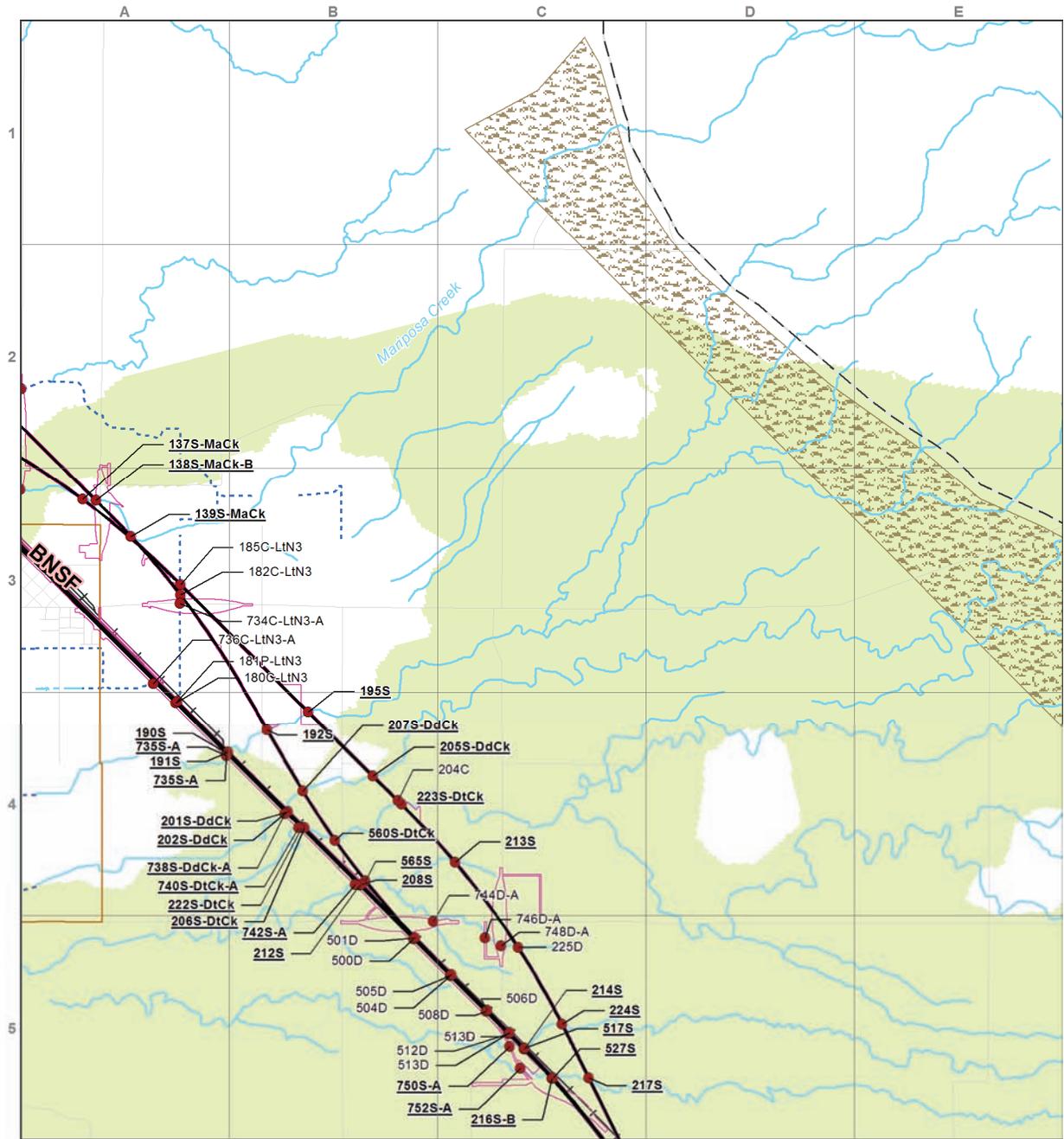
Source: CWD (n.d.), DeLorme (2008), Merced Irrig. Dist. (1973, 2000), USGS (2010a,b), Spencer et al. (2010), Huber (2007). MF\_TM\_BIO\_02\_c Jun 09, 2011



- HST Alignment
- Permanent Project Footprint
- Potential Heavy Maintenance Facility
- Station Study Area
- City Limit
- County Boundary
- Railroad
- Stream/River
- Canal/Ditch
- Pipeline
- BNSF Essential Connectivity Area Crossing
- UPRR Essential Connectivity Area Crossing
- Hybrid Essential Connectivity Area Crossing
- Eastman Lake - Bear Creek Essential Connectivity Area
- Modeled Wildlife Corridors

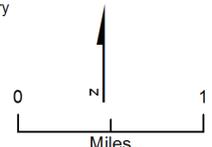
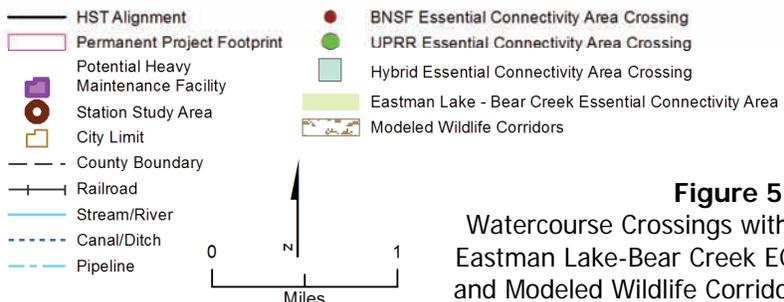
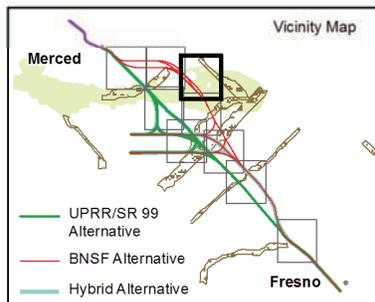


**Figure 5-4**  
 Watercourse Crossings within  
 Eastman Lake-Bear Creek ECA  
 and Modeled Wildlife Corridors  
 – All Alternatives

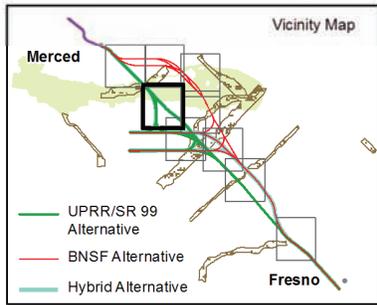
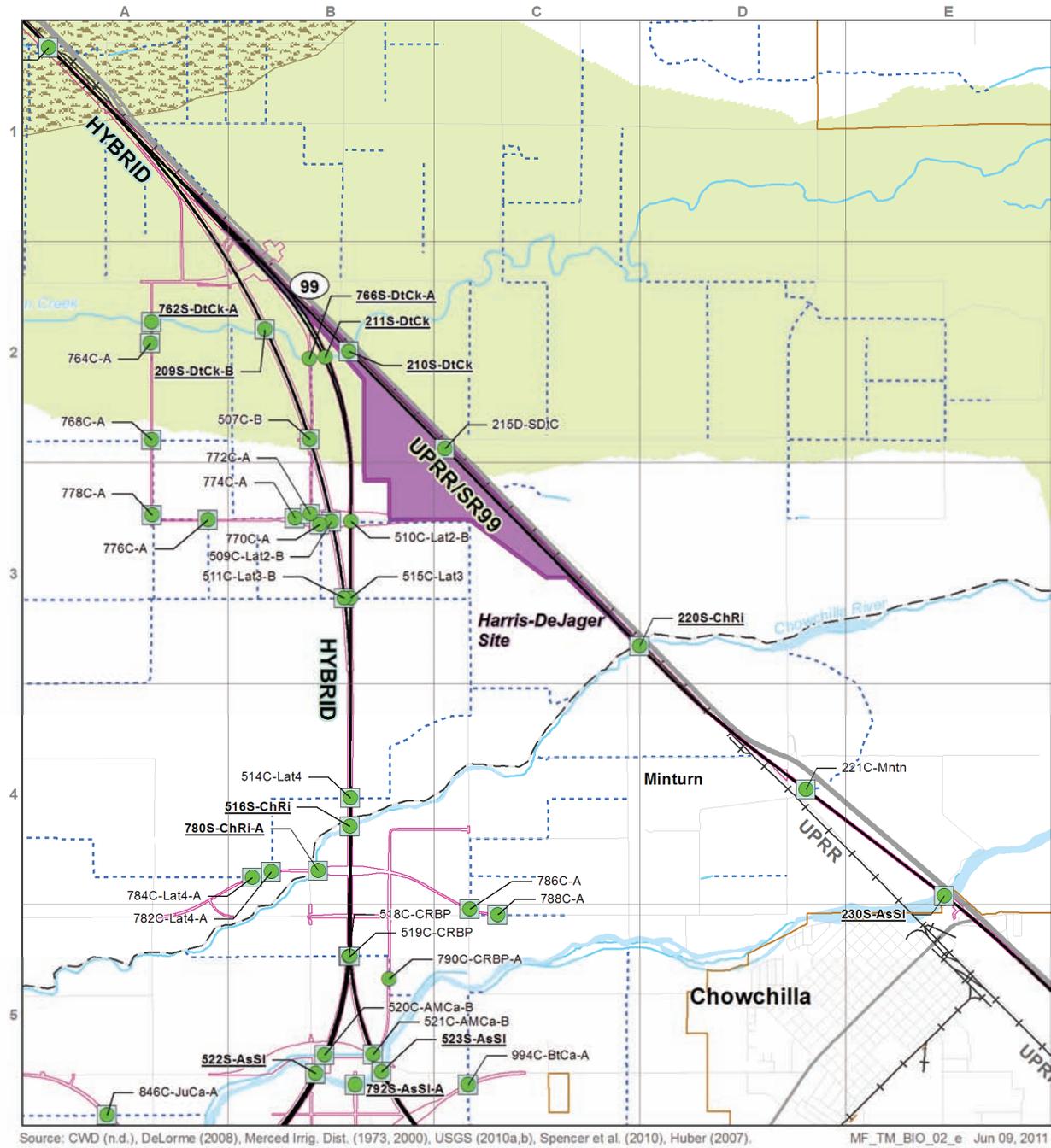


Source: CWD (n.d.), DeLorme (2008), Merced Irrig. Dist. (1973, 2000), USGS (2010a,b), Spencer et al. (2010), Huber (2007).

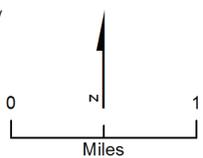
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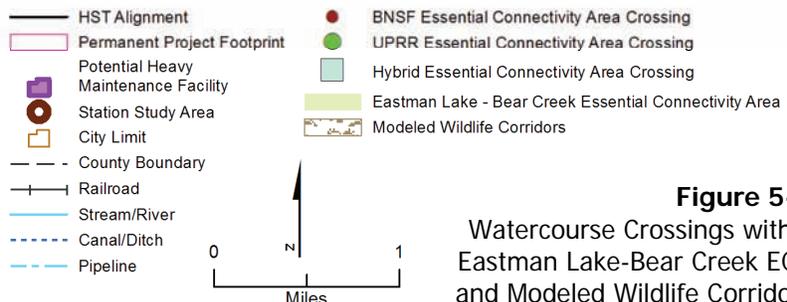
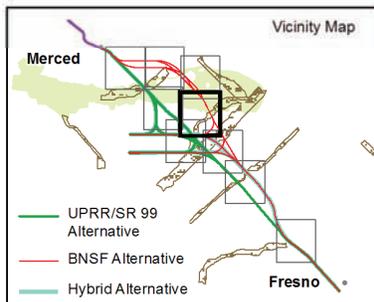
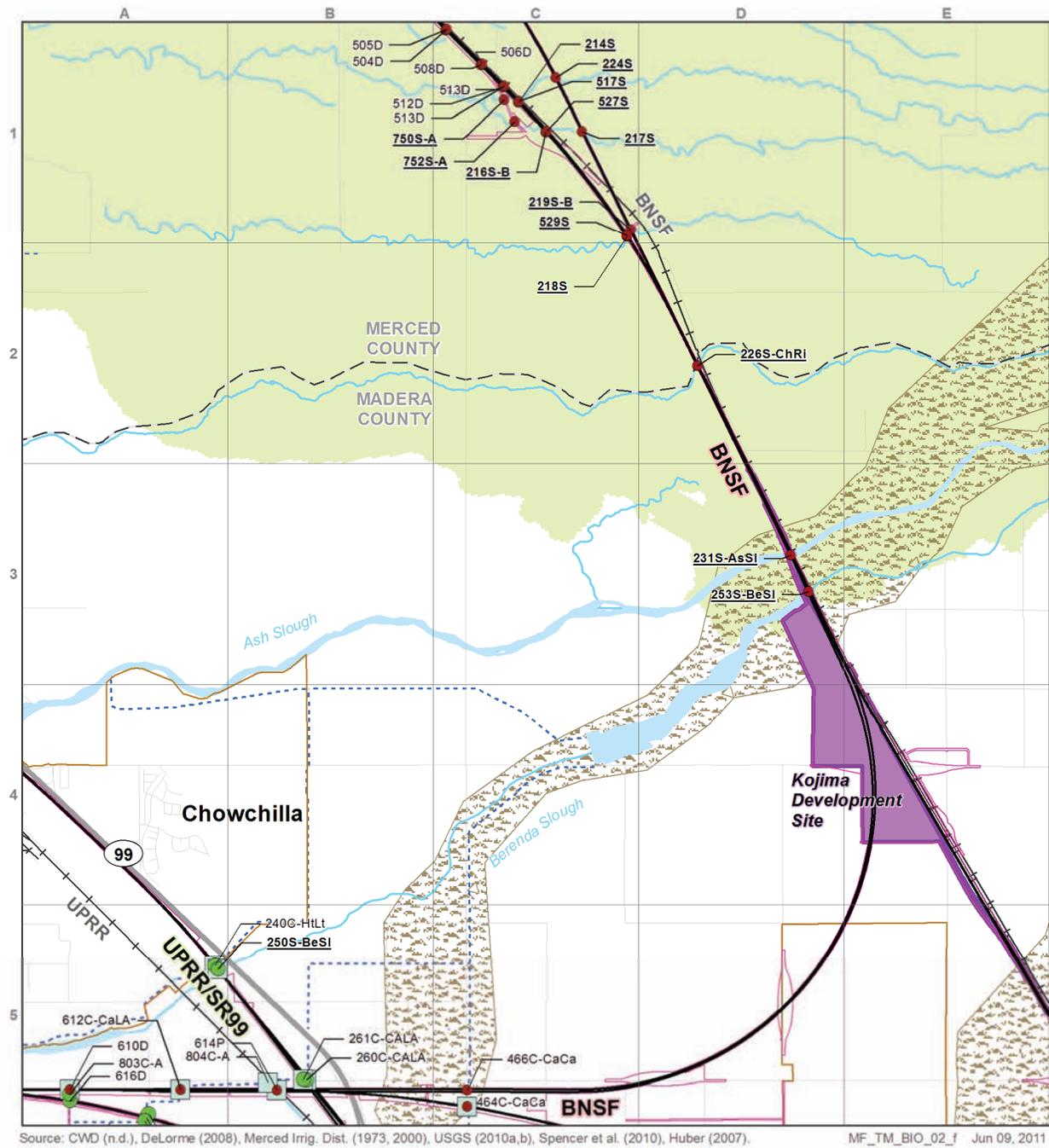
**Figure 5-5**  
 Watercourse Crossings within  
 Eastman Lake-Bear Creek ECA  
 and Modeled Wildlife Corridors  
 – All Alternatives



- HST Alignment
- Permanent Project Footprint
- Potential Heavy Maintenance Facility
- Station Study Area
- City Limit
- County Boundary
- Railroad
- Stream/River
- Canal/Ditch
- Pipeline
- BNSF Essential Connectivity Area Crossing
- UPRR Essential Connectivity Area Crossing
- Hybrid Essential Connectivity Area Crossing
- Eastman Lake - Bear Creek Essential Connectivity Area
- Modeled Wildlife Corridors

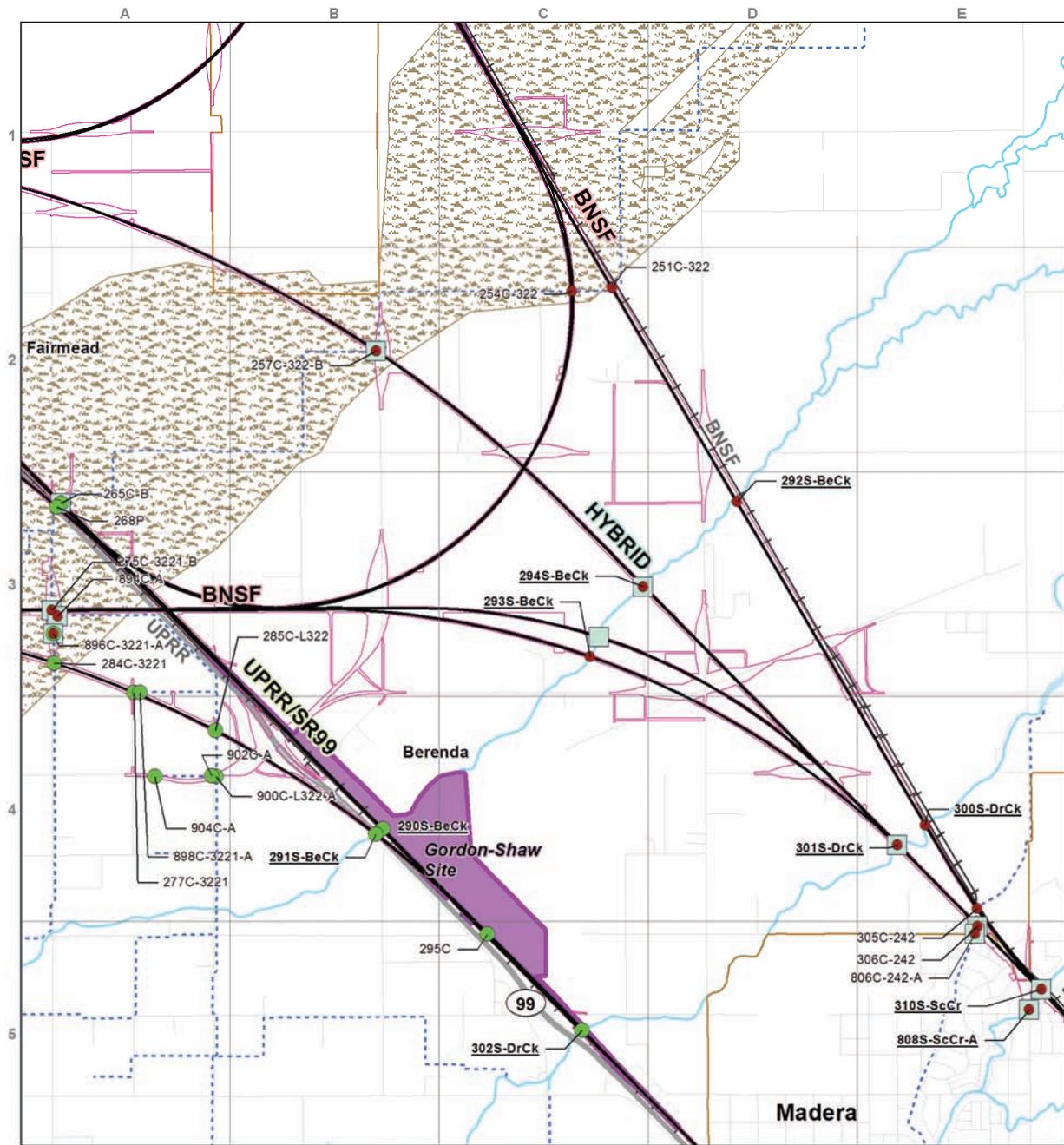


**Figure 5-6**  
 Watercourse Crossings within  
 Eastman Lake-Bear Creek ECA  
 and Modeled Wildlife Corridors  
 – All Alternatives



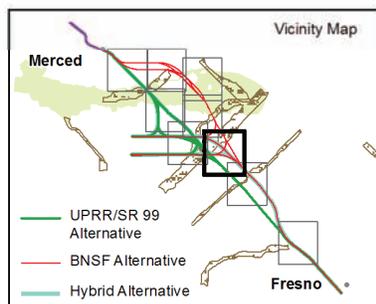
**Figure 5-7**  
 Watercourse Crossings within  
 Eastman Lake-Bear Creek ECA  
 and Modeled Wildlife Corridors  
 – All Alternatives



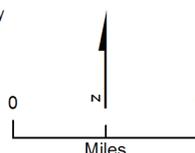


Source: CWD (n.d.), DeLorme (2008), Merced Irrig. Dist. (1973, 2000), USGS (2010a,b), Spencer et al. (2010), Huber (2007).

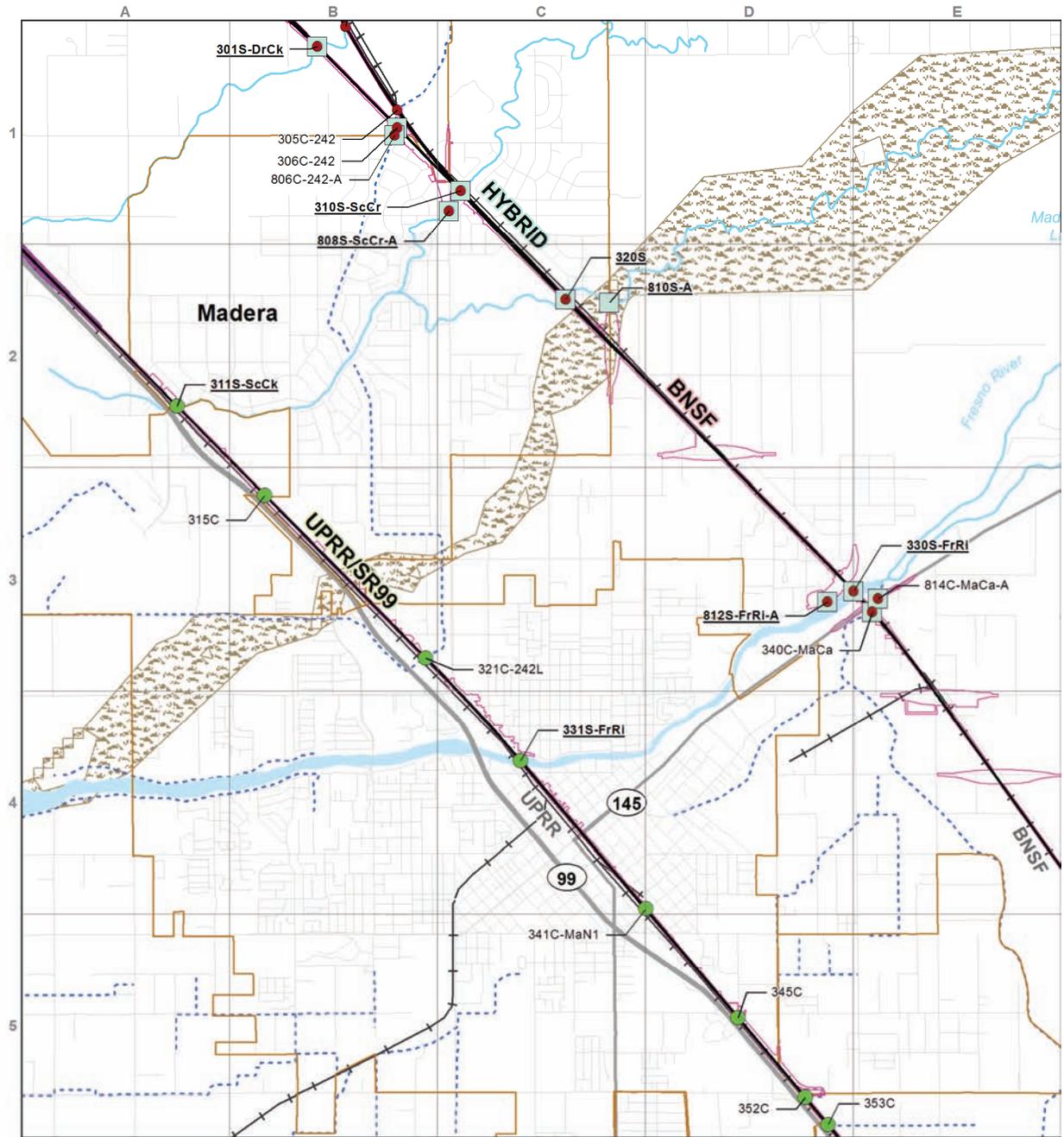
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- HST Alignment
- Permanent Project Footprint
- Potential Heavy Maintenance Facility
- Station Study Area
- City Limit
- County Boundary
- Railroad
- Stream/River
- Canal/Ditch
- Pipeline
- BNSF Essential Connectivity Area Crossing
- UPRR Essential Connectivity Area Crossing
- Hybrid Essential Connectivity Area Crossing
- Eastman Lake - Bear Creek Essential Connectivity Area
- Modeled Wildlife Corridors

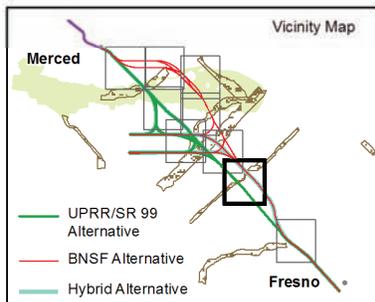


**Figure 5-9**  
 Watercourse Crossings within  
 Eastman Lake-Bear Creek ECA  
 and Modeled Wildlife Corridors  
 – All Alternatives

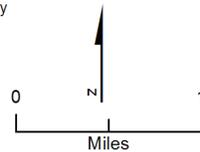


Source: CWD (n.d.), DeLorme (2008), Merced Irrig. Dist. (1973, 2000), USGS (2010a,b), Spencer et al. (2010), Huber (2007).

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- HST Alignment
- Permanent Project Footprint
- Potential Heavy Maintenance Facility
- Station Study Area
- City Limit
- County Boundary
- Railroad
- Stream/River
- Canal/Ditch
- Pipeline
- BNSF Essential Connectivity Area Crossing
- UPRR Essential Connectivity Area Crossing
- Hybrid Essential Connectivity Area Crossing
- Eastman Lake - Bear Creek Essential Connectivity Area
- Modeled Wildlife Corridors



**Figure 5-10**  
 Watercourse Crossings within  
 Eastman Lake-Bear Creek ECA  
 and Modeled Wildlife Corridors  
 – All Alternatives

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 would 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 would 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 would 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 would be given a moderate crossing value as it would provide some cover and connectivity, whereas a single-span bridge with well-developed riparian habitat would provide more cover and connectivity and would 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 would 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 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 F. 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. However, for the HST alternatives, the opportunities are at the drainages and there are limited, but some, drainage features that include wildlife movement opportunities. The number of water crossings and their proximity is important. Each crossing provides animals a choice to move through the project. An underlying assumption is that since the crossings occur at the major drainages and it is recognized that the nearby SR 99 and UPRR also need to facilitate the low and high flood waters and have somewhat corresponding undercrossings. These should supplement and further facilitate wildlife moving east and west across the HST. This is an important consideration/assumption with the evaluation as immediate upstream/downstream restrictions and barriers would obviate wildlife dispersal opportunity.

### **Direct Impacts during Construction**

Temporary impacts from placement of barriers during construction activities would 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 4.2 above, the *Draft Recovery Plan for Upland Species of the San Joaquin Valley* (USFWS 1998a) 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.

Because 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 for reasons identified above, the impact is considered moderate under NEPA and 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 *Draft Recovery Plan for Upland Species of the San Joaquin Valley* (USFWS 1998a) 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.

Because 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 for reasons identified above, the impact is considered moderate under NEPA and 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 *Draft Recovery Plan for Upland Species of the San Joaquin Valley* (USFWS 1998a) 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.

Because 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 for reasons identified above, the impact is considered moderate under NEPA and significant under CEQA.

**Heavy Maintenance Facility Alternatives**

Wildlife movement corridors potentially affected by the HMF sites are addressed in Table 5-12. 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. Since the Harris-DeJager HMF overlays an estimated 30% of the ECA, a moderate effect was determined under NEPA.

**Table 5-12**  
 Wildlife Movement Corridors Potentially Affected during the Construction Period of the HMF Alternatives

HMF Alternatives	Wildlife Movement Corridor NEPA/CEQA Significance Conclusion <sup>a</sup>
Castle Commerce Center	NE/NI
Harris-DeJager	ME/SI
Fagundes	NE/NI
Gordon-Shaw	NE/NI
Kojima Development	NE/LI (Ash and Berenda Slough riparian corridors)
<sup>a</sup> 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 (Conclusion not applicable above) SE/SI = Substantial Effect/Significant Impact	

**Project 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 3-1, 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 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 activities are vernal pools and other seasonal wetlands, Great Valley mixed riparian forest and other riparian communities and land cover types. The following discussion for direct impacts during the project period is focused on 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 will 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 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 activities are vernal pools and other seasonal wetlands, Great Valley Mixed Riparian Forest and other riparian communities and land cover types, and other project environmental effects. The following discussion for 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 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 project footprint. Drilling, excavating or other activities that occur within the construction footprint will 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 in 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 and 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 reduction of riparian habitat values would be considered substantial under NEPA and significant under CEQA. The moderate effect relates to the low number of acres located within the project footprint. As described in Section 4.2 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).

Tables 5-13 and 5-14 list the amount of terrestrial and aquatic habitats (in acres) that would be potentially affected by the UPRR/SR 99 Alternative and design options. 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 reasons identified above, the impact is considered moderate under NEPA and significant under CEQA.

**Table 5-13**  
 Terrestrial Communities Potentially Affected during the Project Period  
 of the UPRR/SR 99 Alternative (acres <sup>a</sup>)

UPRR/SR 99 Alternative	Developed Areas	Agricultural Lands	Ruderal Vegetation	California Annual Grassland	Great Valley Mixed Riparian Forest	Other Riparian	Eucalyptus Woodlands
<b>Impacts by Project Combination</b>							
West Chowchilla Design Option & Ave 24 Wye	617	1,147	107	12	9	7	--
East Chowchilla Design Option & Ave 24 Wye	618	1,114	110	12	6	5	--
East Chowchilla Design Option & Ave 21 Wye	653	1,184	127	13	3	2	<0.5
<b>Fresno HST Station Design Options</b>							
Mariposa Street Station	49	--	16	--	--	--	--
Kern Street Station	113	--	16	--	--	--	--
<b>Total Range of Impacts <sup>b</sup></b>	<b>666 to 766</b>	<b>1,114 to 1,184</b>	<b>123 to 143</b>	<b>12 to 13</b>	<b>3 to 9</b>	<b>2 to 7</b>	<b>0 to &lt;0.5</b>
All impacts were calculated based on the construction footprint design.							
<sup>a</sup> All values that are greater than 0.5 acres are rounded to the nearest whole number (e.g., 0.51 is reported as 1; 2.5 is reported as 2). Totals from 0.01 to 0.5 acre are stated as <0.5 acre. Totals below 0.01 acre are stated as <0.01 acre.							
<sup>b</sup> Total range of impacts includes the least amount of habitat affected by the HST alternative to the most amount of impact by the HST alternative. Where values of <0.01 or <0.5 acre are combined with larger values to calculate the minimum and maximum, the total has been rounded to the next whole number (<0.01 rounded to 0 and <0.5 rounded to 1). When the minimum or maximum of the range is <0.01 or <0.5 it is not rounded.							

**Table 5-14**  
 Aquatic Communities Potentially Affected during the Project Period  
 of the UPRR/SR 99 Alternative (acres <sup>a</sup>)

UPRR/SR 99 Alternative	Vernal Pools and Other Seasonal Wetlands	Fremont Cottonwood Forested Wetlands	Coastal and Valley Freshwater Marsh	Natural Watercourses	Constructed Watercourses <sup>b</sup>	Inundated Nonwetlands
<b>Impacts by Project Combination</b>						
West Chowchilla Design Option & Ave 24 Wye	1	3	<0.5	8	21	3
East Chowchilla Design Option & Ave 24 Wye	1	3	<0.5	6	17	1

UPRR/SR 99 Alternative	Vernal Pools and Other Seasonal Wetlands	Fremont Cottonwood Forested Wetlands	Coastal and Valley Freshwater Marsh	Natural Watercourses	Constructed Watercourses <sup>b</sup>	Inundated Nonwetlands
East Chowchilla Design Option & Ave 21 Wye	2	3	<0.5	3	22	1
<b>Fresno HST Station Design Options</b>						
Mariposa Street Station	--	--	--	--	--	--
Kern Street Station	--	--	--	--	--	--
<b>Total Range of Impacts<sup>c</sup></b>	<b>1 to 2</b>	<b>3</b>	<b>&lt;0.5</b>	<b>3 to 8</b>	<b>17 to 22</b>	<b>1 to 3</b>
All impacts were calculated based on the construction footprint design. <sup>a</sup> All values that are greater than 0.5 acres are rounded to the nearest whole number (e.g., 0.51 is reported as 1; 2.5 is reported as 2). Totals from 0.01 to 0.5 acre are stated as <0.5 acre. Totals below 0.01 acre are stated as <0.01 acre <sup>b</sup> Includes constructed basins. <sup>c</sup> Total range of impacts includes the least amount of habitat affected by the HST alternative to the most amount of impact by the HST alternative. Where values of <0.01 or <0.5 acre are combined with larger values to calculate the minimum and maximum, the total has been rounded to the next whole number (<0.01 rounded to 0 and <0.5 rounded to 1). When the minimum or maximum of the range is <0.01 or <0.5 it is not rounded. The sum of Vernal Pools and Other Seasonal Wetlands, Fremont Cottonwood Forested Wetland, Coastal Valley Freshwater Marsh, Natural Watercourses and Constructed Watercourses represent potential impacts on jurisdictional waters.						

**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 and 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 substantial under NEPA and significant under CEQA.

Tables 5-15 and 5-16 list the amount of terrestrial and aquatic habitats (in acres) that would be potentially affected by the BNSF Alternative and design options. 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 is considered moderate under NEPA and significant under CEQA. The moderate effect relates to the low number of acres located within the project footprint.

**Table 5-15**

Terrestrial Communities Potentially Affected during the Project Period of the BNSF Alternative (acres <sup>a</sup>)

BNSF Alternative	Developed Areas	Agricultural Lands	Ruderal Vegetation	California Annual Grassland	Great Valley Mixed Riparian Forest	Other Riparian	Eucalyptus Woodlands
<b>Impacts by Project Combination</b>							
BNSF north - south alignment with Ave 24 Wye	610	1,216	128	52	4	3	<0.5
BNSF north - south alignment Ave with 21 Wye	598	1,143	129	43	2	3	<0.5
<b>Le Grand Design Options</b>							
Mission Ave	64	253	51	64	1	<0.5	--
Mission Ave East of Le Grand	33	295	18	53	1	<0.5	<0.5
Mariposa Way	42	256	12	69	2	<0.5	--
Mariposa Way East of Le Grand	28	310	6	33	3	<0.5	1
<b>Fresno Station Alternatives</b>							
Mariposa Street Station	49	--	16	--	--	--	--
Kern Street Station	48	--	16	--	--	--	--
<b>Impact of Components Combined <sup>b</sup></b>							
BNSF Alternative, Ave 24	686 to 723	1,469 to 1,526	150 to 195	85 to 121	5 to 7	4	<0.5 to 1
BNSF Alternative, Ave 21	674 to 711	1,396 to 1,453	151 to 196	76 to 112	3 to 5	4	<0.5 to 1
<b>Total Range of Impact <sup>b</sup></b>	<b>674 to 723</b>	<b>1,396 to 1,526</b>	<b>150 to 196</b>	<b>76 to 121</b>	<b>3 to 7</b>	<b>4</b>	<b>&lt;0.5 to 1</b>
<p>All impacts were calculated based on the construction footprint design.</p> <p><sup>a</sup> All values that are greater than 0.5 acres are rounded to the nearest whole number (e.g., 0.51 is reported as 1; 2.5 is reported as 2). Totals from 0.01 to 0.5 acre are stated as &lt;0.5 acre. Totals below 0.01 acre are stated as &lt;0.01 acre.</p> <p><sup>b</sup> Total range of impacts includes the least amount of habitat affected by the HST alternative to the most amount of impact by the HST alternative. Where values of &lt;0.01 or &lt;0.5 acre are combined with larger values to calculate the minimum and maximum, the total has been rounded to the next whole number (&lt;0.01 rounded to 0 and &lt;0.5 rounded to 1). When the minimum or maximum of the range is &lt;0.01 or &lt;0.5 it is not rounded.</p>							

**Table 5-16**

Aquatic Communities Potentially Affected during the Project Period of the BNSF Alternative (acres <sup>a</sup>)

<b>BNSF Alternative</b>	<b>Vernal Pools and Other Seasonal Wetlands</b>	<b>Fremont Cottonwood Forested Wetlands</b>	<b>Coastal and Valley Freshwater Marsh</b>	<b>Natural Watercourses</b>	<b>Constructed Watercourses <sup>b</sup></b>	<b>Inundated Nonwetlands</b>
<b>Impacts by Project Combination</b>						
BNSF north - south alignment with Ave 24 Wye	6	<0.5	1	5	16	2
BNSF north - south alignment Ave with 21 Wye	6	<0.5	1	4	15	2
<b>Le Grand Design Options</b>						
Mission Ave	8	<0.5	<0.5	2	4	1
Mission Ave East of Le Grand	8	1	<0.5	2	7	1
Mariposa Way	6	1	<0.5	1	1	1
Mariposa Way East of Le Grand	3	2	<0.5	2	3	--
<b>Fresno Station Alternatives</b>						
Mariposa Street Station	--	--	--	--	--	--
Kern Street Station	--	--	--	--	--	--
<b>Impact of Components Combined <sup>c</sup></b>						
BNSF Alternative, Ave 24	9 to 14	1 to 3	2	6 to 7	17 to 23	2 to 3
BNSF Alternative, Ave 21	9 to 14	1 to 3	2	5 to 6	16 to 22	2 to 3
<b>Total Range of Impact <sup>c</sup></b>	<b>9 to 14</b>	<b>1 to 3</b>	<b>2</b>	<b>5 to 7</b>	<b>16 to 23</b>	<b>2 to 3</b>
All impacts were calculated based on the construction footprint design. <sup>a</sup> All values that are greater than 0.5 acres are rounded to the nearest whole number (e.g., 0.51 is reported as 1; 2.5 is reported as 2). Totals from 0.01 to 0.5 acre are stated as <0.5 acre. Totals below 0.01 acre are stated as <0.01 acre. <sup>b</sup> Includes constructed basins. <sup>c</sup> Total range of impacts includes the least amount of habitat affected by the HST alternative to the most amount of impact by the HST alternative. Where values of <0.01 or <0.5 acre are combined with larger values to calculate the minimum and maximum, the total has been rounded to the next whole number (<0.01 rounded to 0 and <0.5 rounded to 1). When the minimum or maximum of the range is <0.01 or <0.5 it is not rounded. The sum of Vernal Pools and Other Seasonal Wetlands, Fremont Cottonwood Forested Wetland, Coastal Valley Freshwater Marsh, Natural Watercourses and Constructed Watercourses represent potential impacts on jurisdictional waters.						

**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 and 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 moderate to substantial under NEPA and significant under CEQA.

Tables 5-17 and 5-18 list the amount of terrestrial and aquatic habitats (in acres) that would be potentially affected by the Hybrid Alternative and design options. 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 is considered moderate under NEPA and significant under CEQA. The moderate effect relates to the low number of acres located within the project footprint.

**Table 5-17**

Terrestrial Communities Potentially Affected during the Project Period of the Hybrid Alternative (acres <sup>a</sup>)

Hybrid Alternative	Developed Areas	Agricultural Lands	Ruderal Vegetation	California Annual Grassland	Great Valley Mixed Riparian Forest	Other Riparian	Eucalyptus Woodlands
<b>Impacts by Project Combination</b>							
Hybrid North-South Alignment Ave 24 Wye	620	1,465	111	47	7	6	<0.5
Hybrid North-South Alignment Ave 21 Wye	602	1,336	123	48	3	2	<0.5
<b>Fresno Station Alternatives</b>							
Mariposa Street Station	49	--	16	--	--	--	--
Kern Street Station	48	--	16	--	--	--	--
<b>Total Range of Impacts <sup>b</sup></b>	<b>650 to 669</b>	<b>1,336 to 1,465</b>	<b>127 to 139</b>	<b>47 to 48</b>	<b>3 to 7</b>	<b>2 to 6</b>	<b>&lt;0.5</b>
All impacts were calculated based on the construction footprint design.							
<sup>a</sup> All values that are greater than 0.5 acres are rounded to the nearest whole number (e.g., 0.51 is reported as 1; 2.5 is reported as 2). Totals from 0.01 to 0.5 acre are stated as <0.5 acre. Totals below 0.01 acre are stated as <0.01 acre.							
<sup>b</sup> Total range of impacts includes the least amount of habitat affected by the HST alternative to the most amount of impact by the HST alternative. Where values of <0.01 or <0.5 acre are combined with larger values to calculate the minimum and maximum, the total has been rounded to the next whole number (<0.01 rounded to 0 and <0.5 rounded to 1). When the minimum or maximum of the range is <0.01 or <0.5 it is not rounded.							

**Table 5-18**

Aquatic Communities Potentially Affected during the Project Period of the Hybrid Alternative (acres <sup>a)</sup>)

Hybrid Alternative	Vernal Pools and Other Seasonal Wetlands	Fremont Cottonwood Forested Wetlands	Coastal and Valley Freshwater Marsh	Natural Watercourses	Constructed Watercourses <sup>b</sup>	Inundated Nonwetlands
<b>Impacts by Project Combination</b>						
Hybrid North-South Alignment Ave 24 Wye	5	3	<0.5	7	23	3
Hybrid North-South Alignment Ave 21 Wye	5	3	<0.5	4	22	1
<b>Fresno Station Alternatives</b>						
Mariposa Street Station	--	--	--	--	--	--
Kern Street Station	--	--	--	--	--	--
<b>Total Range of Impacts <sup>c</sup></b>	<b>5</b>	<b>3</b>	<b>&lt;0.5</b>	<b>4 to 7</b>	<b>22 to 23</b>	<b>1 to 3</b>
All impacts were calculated based on the construction footprint design. <sup>a</sup> All values that are greater than 0.5 acres are rounded to the nearest whole number (e.g., 0.51 is reported as 1; 2.5 is reported as 2). Totals from 0.01 to 0.5 acre are stated as <0.5 acre. Totals below 0.01 acre are stated as <0.01 acre <sup>b</sup> Includes constructed basins. <sup>c</sup> Total range of impacts includes the least amount of habitat affected by the HST alternative to the most amount of impact by the HST alternative. Where values of <0.01 or <0.5 acre are combined with larger values to calculate the minimum and maximum, the total has been rounded to the next whole number (<0.01 rounded to 0 and <0.5 rounded to 1). When the minimum or maximum of the range is <0.01 or <0.5 it is not rounded. The sum of Vernal Pools and Other Seasonal Wetlands, Fremont Cottonwood Forested Wetland, Coastal Valley Freshwater Marsh, Natural Watercourses and Constructed Watercourses represent potential impacts on jurisdictional waters.						

**Heavy Maintenance Facility Alternatives**

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 and 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 moderate to substantial under NEPA and significant under CEQA.

Tables 5-19 and 5-20 list the amount of terrestrial and aquatic habitats (in acres) that would be potentially affected by the HMFs. 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 is considered moderate under NEPA and significant under CEQA. The moderate effect relates to the low number of acres located within the project footprint.

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 inundated nonwetlands.

Tables 5-19 and 5-20 list the amount of terrestrial and aquatic habitats (in acres) that would be potentially affected by the HMFs. 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 is considered moderate under NEPA and significant under CEQA.

It should be noted that California annual grassland, Great Valley mixed riparian forest, eucalyptus woodlands, vernal pools and 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 reduction of riparian habitat values would be considered moderate to substantial under NEPA and significant under CEQA.

Tables 5-19 and 5-20 list the amount of terrestrial and aquatic habitats (in acres) that would be potentially affected by the HMFs. 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 is considered moderate under NEPA and significant under CEQA. The moderate effect relates to the low number of acres located within the construction footprint.

It should be noted that California annual grassland, eucalyptus woodlands, vernal pools and other seasonal wetlands, Fremont cottonwood forested wetland, coastal and valley freshwater marsh, and inundated nonwetlands 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 inundated nonwetlands.

Tables 5-19 and 5-20 list the amount of terrestrial and aquatic habitats (in acres) that would be potentially affected by the HMFs. 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 is considered moderate under NEPA and significant under CEQA.

It should be noted that California annual grassland, Great Valley mixed riparian forest, eucalyptus woodlands, and 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 and 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 moderate to substantial under NEPA and significant under CEQA.

Tables 5-19 and 5-20 list the amount of terrestrial and aquatic habitats (in acres) that would be potentially affected by the HMFs. 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 is considered moderate under NEPA and significant under CEQA. The Kojima Development HMF is the only HMF to result in direct impacts on vernal pools and other seasonal wetlands. The moderate effect relates to the low number of acres located within the construction footprint.

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

**Table 5-19**

Terrestrial Communities Potentially Affected during the Project Period of the HMF Alternatives (acres <sup>a</sup>)

HMF Alternatives	Developed Areas	Agricultural Lands	Ruderal Vegetation	California Annual Grassland	Great Valley Mixed Riparian Forest	Other Riparian	Eucalyptus Woodlands
Castle Commerce Center	99	174	28	--	0.21	0.81	0.27
Harris-DeJager	2	309	2	--	--	0.08	--
Fagundes	4	173	0.02	--	0.20	0.16	--
Gordon-Shaw	8	309	11	--	--	1.02	--
Kojima Development	1	254	1	72	1	--	--

All impacts were calculated based on the construction footprint design.  
<sup>a</sup> All values that are greater than 0.5 acres are rounded to the nearest whole number (e.g., 0.51 is reported as 1; 2.5 is reported as 2). Totals from 0.01 to 0.5 acre are stated as <0.5 acre. Totals below 0.01 acre are stated as <0.01 acre.

**Table 5-20**

Aquatic Communities Potentially Affected during the Project Period of the HMF Alternatives (acres <sup>a</sup>)

HMF Alternatives	Vernal Pools and Other Seasonal Wetlands	Fremont Cottonwood Forested Wetlands	Coastal and Valley Freshwater Marsh	Natural Watercourses	Constructed Watercourses <sup>b</sup>	Inundated Nonwetlands
Castle Commerce Center	0.40	0.40	--	2	6	--
Harris-DeJager	--	0.09	--	0.08	0.31	0.16

HMF Alternatives	Vernal Pools and Other Seasonal Wetlands	Fremont Cottonwood Forested Wetlands	Coastal and Valley Freshwater Marsh	Natural Watercourses	Constructed Watercourses <sup>b</sup>	Inundated Nonwetlands
Fagundes	--	--	--	0.18	0.76	--
Gordon-Shaw	--	0.04	2	2	0.27	0.12
Kojima Development	1	--	0.50	0.73	0.10	--

All impacts were calculated based on the construction footprint design.  
<sup>a</sup> All values that are greater than 0.5 acres are rounded to the nearest whole number (e.g., 0.51 is reported as 1; 2.5 is reported as 2). Totals from 0.01 to 0.5 acre are stated as <0.5 acre. Totals below 0.01 acre are stated as <0.01 acre. The sum of Vernal Pools and Other Seasonal Wetlands, Fremont Cottonwood Forested Wetland, Coastal Valley Freshwater Marsh, Natural Watercourses and Constructed Watercourses represent potential impacts on jurisdictional waters.  
<sup>b</sup> Includes constructed basins.

**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 habitat study area. 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 E 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 moderate 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 (non native, 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 be considered moderate under NEPA and 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 is considered moderate under NEPA and 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 be considered moderate under NEPA and 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-sepaed 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 is considered moderate under NEPA and 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 be considered moderate under NEPA and 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 is considered moderate under NEPA and 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 be considered moderate under NEPA and 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 is considered moderate under NEPA and 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 be considered moderate under NEPA and 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 is considered moderate under NEPA and 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 be considered moderate under NEPA and 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 is considered moderate under NEPA and 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 be considered moderate under NEPA and 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 is considered moderate under NEPA and 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 E 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 pilings within the San Joaquin River, permanently converting a small amount of occupied habitat. However, the HST alternatives are elevated where each would cross the river.

Birds: Thirty-eight special-status bird species listed in Appendix C-2, have been identified as having a low, moderate, or high potential to occur within the region (CNDDDB 2003e).

Project 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. Direct impacts would also result from avian collisions with HSTs.

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 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 best management practices (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 will 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 to water quality would be similar to those discussed for the 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 a moderate amount of 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 be considered moderate under NEPA and 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 is considered moderate under NEPA and 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 be considered moderate under NEPA and 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 is considered moderate under NEPA and 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 spring-run Chinook salmon, hardhead, and San Joaquin roach. Essential fish habitat 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 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 to essential fish habitat are anticipated to be avoided after construction is complete.

Because implementation of the UPRR/SR 99 Alternative would not directly or indirectly affect these special-status fish as described above, the impact is considered negligible under NEPA and 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 be considered moderate under NEPA and 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 is considered moderate under NEPA and 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 be considered moderate effect under NEPA and 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 is considered moderate under NEPA and 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 29 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 be considered a moderate effect under NEPA and 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 is considered moderate under NEPA and 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 be considered moderate under NEPA and 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 is considered moderate under NEPA and 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 a moderate amount of 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 be considered moderate under NEPA and 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 is considered moderate under NEPA and 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 be considered moderate under NEPA and 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 is considered moderate under NEPA and significant under CEQA.

Fish: The BNSF Alternative contains aquatic habitats (primarily along the San Joaquin River) known to support Kern brook lamprey, Central Valley spring-run Chinook salmon, hardhead, and San Joaquin roach. Essential fish habitat 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 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 to essential fish habitat are anticipated to be avoided after construction is complete.

Because implementation of the BNSF Alternative would not directly or indirectly affect these special-status fish as described above, the impact is considered negligible under NEPA and 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 be considered moderate under NEPA and 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 is considered moderate under NEPA and 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 be considered a moderate effect under NEPA and significant under CEQA.

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

Birds (includes all migratory birds covered under MBTA): The BNSF Alternative contains a wide range of habitats known to support 29 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 be considered a moderate effect under NEPA and significant under CEQA.

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

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

## Hybrid Alternative

**Invertebrates:** The Hybrid Alternative contains a relatively small amount of vernal pools and other seasonal wetlands, including a moderate amount of 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 be considered moderate under NEPA and 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 is considered moderate under NEPA and 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 be considered moderate under NEPA and 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 is considered moderate under NEPA and significant under CEQA.

**Fish:** The Hybrid Alternative contains aquatic habitats (primarily along the San Joaquin River) known to support Kern brook lamprey, Central Valley spring-run Chinook salmon, hardhead, and San Joaquin roach. Essential fish habitat 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 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 to essential fish habitat are anticipated to be avoided after construction is complete.

Because implementation of the Hybrid Alternative would not directly or indirectly affect these special-status fish as described above, the impact is considered negligible under NEPA and 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 be considered moderate under NEPA and 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 is considered moderate under NEPA and 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 be considered a moderate effect under NEPA and significant under CEQA.

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

**Birds (includes all native birds covered under MBTA):** The Hybrid Alternative contains a wide range of habitats known to support 29 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 be considered a moderate effect under NEPA and significant under CEQA.

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

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

**Heavy Maintenance Facility Alternatives**

Special-status wildlife species potentially affected by the HMF sites are addressed in Table 5-21. 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 5-21 are based on the potential terrestrial and aquatic communities presence 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 5-21**

Special-Status Wildlife Species Potentially Affected during the Project Period of the HMF Alternatives <sup>a</sup>

HMF Alternatives	Vernal Pool Branchiopods	Valley Elderberry Longhorn Beetle	Fish	Amphibians	Reptiles	Birds <sup>b</sup>	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

<sup>a</sup> 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)

<b>HMF Alternatives</b>	<b>Vernal Pool Branchiopods</b>	<b>Valley Elderberry Longhorn Beetle</b>	<b>Fish</b>	<b>Amphibians</b>	<b>Reptiles</b>	<b>Birds<sup>b</sup></b>	<b>Mammals</b>	<b>Bats</b>
<sup>b</sup> 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 5-19 and 5-20, which list the amount of terrestrial and aquatic habitats (in acres), respectively, that would potentially be affected by the HMF 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 substantial riparian or aquatic habitat and all would result in a substantial effect finding.

**Direct Impacts during the Project Period**

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

Project 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 and 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 substantial under NEPA and 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 is considered moderate under NEPA and significant under CEQA. The moderate effect relates to the relatively low number of acres located within the construction footprint.

Jurisdictional Waters: Natural and constructed watercourses, Fremont cottonwood forested wetlands, coastal and valley freshwater marsh, and 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 be considered moderate to substantial under NEPA and 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 is considered substantial under NEPA and 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 the footprint of the UPRR/SR 99 Alternative. Camp Pashayan is a CDFG administered mitigation property that is part of a regional planning process for conservation. 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 is considered moderate under NEPA and significant under CEQA.

Essential Fish Habitat: The UPRR/SR 99 Alternative is elevated where it crosses the San Joaquin River, which contains essential fish habitat for Chinook salmon within and adjacent to the HST System footprint. Final bridge design plans are not currently available, but may require placing pilings within the San Joaquin River. However, for the UPRR/SR 99 Alternative and for all HST Alternatives, there are no plans to modify the physical characteristics of the San Joaquin River channel in the area of the SR 99 San Joaquin River crossing. The HST crossing would be designed with the planned increase in river flows and would not conflict with the goals of the restoration flows. The location of the project crossing is in Reach 1, which has been identified as the reach where spawning may occur. A program-level environmental document on the SJRRP has been prepared *Draft Program Environmental Impact Statement/Environmental Impact Report for the San Joaquin River Restoration Program* (USBR and DWR 2011). During an initial coordination meeting with the U.S. Bureau of Reclamation and the Department of Water Resources on June 6, 2011, it was determined that the project design would not conflict with the SJRRP. The Authority will continue to coordinate with SJRRP. The UPRR/SR 99 Alternative would not affect essential habitat during the project period.

Because implementation of the UPRR/SR 99 Alternative would not affect essential fish habitat during the project period, there would be no effect under NEPA or impact under CEQA.

### **BNSF Alternative**

Special-Status Plant Communities: Vernal pools and other seasonal wetlands, coastal and valley freshwater marsh, 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 be considered substantial under NEPA and 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 is considered substantial under NEPA and significant under CEQA.

**Jurisdictional Waters:** Natural and constructed watercourses, vernal pools and other seasonal wetlands, and coastal and valley freshwater marsh 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 be considered moderate to substantial under NEPA and 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 is considered substantial under NEPA and 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. Refer to Table 5-22, which lists critical habitat (in acres) that would potentially be affected by the BNSF alternative. Although critical habitat is a federal requirement in identifying key areas for endangered species recovery, the impact of taking critical habitat does affect the planning, policies, and regulations under the provisions within CEQA. Consequently, the impact would be considered moderate under NEPA and significant under CEQA.

**Table 5-22**

Critical Habitat Potentially Affected during the Project Period of the BNSF Alternative (acres <sup>a</sup>)

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)
<b>Impacts by Project Combination</b>						
BNSF north - south alignment with Ave 24 Wye	<0.5	--	--	--	--	<0.5
BNSF north - south alignment with Ave 21Wye	<0.5	--	--	--	--	<0.5
<b>Le Grand Design Options</b>						
Mission Ave	90	--	--	--	--	90
Mission Ave East of Le Grand	70	10	10	10	10	82
Mariposa Way	86	--	--	--	--	86
Mariposa Way East of Le Grand	60	5	5	5	5	65
<b>Design Options to Fresno Station</b>						
Kern Street Station	--	--	--	--	--	--
Mariposa Street Station	--	--	--	--	--	--
<b>Impacts of Components Combined</b>						
BNSF Alternative, Ave 24 Wye	60 to 90	0 to 10	0 to 10	0 to 10	0 to 10	65 to 90

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)
BNSF Alternative, Ave 21 Wye	60 to 90	0 to 10	0 to 10	0 to 10	0 to 10	65 to 90
<b>Total Range of Impacts for the BNSF Alternative <sup>a</sup></b>	60 to 90	0 to 10	0 to 10	0 to 10	0 to 10	65 to 90

Notes: No critical habitat is present along the Fresno Station design options. All impacts were calculated based on the construction footprint design.

<sup>a</sup> Total range of impacts includes the least amount of habitat affected by the HST alternative to the most amount of impact by the HST alternative. Where values of <0.01 or <0.5 acre are combined with larger values to calculate the minimum and maximum, the total has been rounded to the next whole number (<0.01 rounded to 0 and <0.5 rounded to 1). When the minimum or maximum of the range is <0.01 or <0.5 it is not rounded.

Because implementation of the BNSF Alternative has the potential to result in direct and indirect impacts on critical habitat as described above, the impact is considered moderate under NEPA and 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 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 the ability of the property to function as a conservation bank. The potential impacts on conservation properties would be considered moderate under NEPA and significant under CEQA.

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

Essential Fish Habitat: The BNSF Alternative is elevated where it crosses the San Joaquin River, which contains essential fish habitat for Chinook salmon within and adjacent to the HST system footprint. The bridge may have pilings within the San Joaquin River. The BNSF Alternative plan and profile is identical to the UPRR/SR 99 at the San Joaquin River Channel. There are no plans to modify the physical characteristics of the San Joaquin River channel in the area of the SR 99 San Joaquin River crossing. The HST crossing would be designed with the planned increase in river flows and would not conflict with the goals of the restoration flows. The project crossing near the existing SR 99 will be designed so as not to be in conflict with the SJRRP or any actions under the SJRRP. The Authority will continue to coordinate with SJRRP and respect regulations regarding construction during the spawning and migration season. The BNSF Alternative would not affect essential habitat during the project period.

Because implementation of the BNSF Alternative would not affect essential fish habitat during the project period, there would be no effect under NEPA or impact under CEQA.

### Hybrid Alternative

Special-Status Plant Communities: Vernal pools and 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 be considered moderate to substantial under NEPA and significant under CEQA. The moderate effect relates to the relatively low number of acres located within the construction footprint.

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 is considered substantial under NEPA and significant under CEQA.

Jurisdictional Waters: Natural and constructed watercourses, Fremont cottonwood forested wetlands, coastal and valley freshwater marsh, and vernal pools and other seasonal wetlands are present within the Hybrid 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 reduction of jurisdictional waters would be considered moderate to substantial under NEPA and 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 is considered substantial under NEPA and 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. Camp Pashayan is a CDFG administered mitigation property that is part of a regional planning process for conservation. Impacts on Camp Pashayan would be considered moderate under NEPA and significant under CEQA.

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

Essential Fish Habitat: The Hybrid Alternative is elevated where it crosses the San Joaquin River, which contains essential fish habitat for Chinook salmon. The bridge may have pilings within the San Joaquin River. However, for the Hybrid Alternative and for all HST Alternatives, there are no plans to modify the physical characteristics of the San Joaquin River channel in the area of the SR 99 San Joaquin River crossing. The HST crossing would be designed with the planned increase in river flows and would not conflict with the goals of the restoration flows. The location of the project crossing is in Reach 1, which has been identified as the reach where spawning may occur. A program-level environmental document on the SJRRP has been prepared *Draft Program Environmental Impact Statement/Environmental Impact Report for the San Joaquin River Restoration Program* (USBR and DWR 2011). During an initial coordination meeting with the U.S. Bureau of Reclamation and the Department of Water Resources on June 6, 2011, it was determined that the project design would not conflict with the SJRRP. The Authority will continue to coordinate with SJRRP. The Hybrid Alternative would not affect essential habitat during the project period.

Because implementation of the Hybrid Alternative would not affect essential fish habitat during the project period, there would be no effect under NEPA or impact under CEQA.

**Heavy Maintenance Facility Alternatives**

Habitats of concern potentially affected by the HMF sites are addressed in Table 5-23. 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 5-23 are based on the occurrence of special-status plant communities, jurisdictional waters, critical habitat, mitigation banks/reserves, and essential fish habitat. Resources found within the construction footprint are considered moderate under NEPA and significant under CEQA for any acreage as they are regulated by CDFG, USFWS, or USACE.

**Table 5-23**  
 Habitats of Concern Potentially Affected during the Project Period of the HMF Alternatives <sup>a</sup>

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
<sup>a</sup> 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***

### **Direct Impacts during the Project Period**

Sections of the HST alternatives include elevated tracks (approximately 16 feet in height), which could allow for unimpeded wildlife movement. However, at-grade sections of the HST alternatives would result in direct impacts at crossings of the Eastman Lake-Bear Creek ECA and other modeled wildlife corridors near the Berenda Slough and the Fresno River Channels.

Direct impacts include the permanent blockage or barrier effect of the constructed HST along the reach of wildlife movement corridors. Depending on the crossing locations selected within the ECA and other potential movement areas, the magnitude of effect an alternative could range from no effect (i.e., no crossing) to substantial effect with installation of a barrier. In most instances, if the HST alternative crosses the ECA and other potential movement areas, the effect would be moderate to substantial, depending on whether the crossing is elevated or creates a partial or complete barrier. The quality of the wildlife movement is also relevant as cover of vegetation, noise, motion, startle and the landscape coverage all affect the ability of free-ranging mammal movement. Sound walls installed for noise mitigation would not affect wildlife movement (see the Merced to Fresno Section Noise and Vibration Technical Report [Authority and FRA 2011f]).

The area near Deadman and Dutchman Creeks have been identified as a high-priority choke-point and missing link and is severely threatened with moderate conservation potential as it is impaired due to development and obstructions. The placement of the HST across this choke-point may effectively eliminate or further fragment any movement that exists as it is already compromised. The project has incorporated hydraulic features which will provide crossing opportunities. However, even with the crossings, additional barriers are unavoidable with the project across the ECA and the other modeled wildlife corridors to the south. The HST project may result in a substantial impact on movement of resident wildlife even with the design components in place. Because these additional constraints and barriers are anticipated to result in fewer movement opportunities for free-ranging mammals, the HST project during the project period would result in a moderate effect under NEPA and a significant impact under CEQA.

### **Indirect Impacts during the Project Period**

In addition to HSTs passing over tracks through wildlife movement corridors, 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 the Draft Noise and Vibration Technical Report, Merced to Fresno Section [Authority and FRA 2011f], 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 decibels on an A-weighted scale (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 SEL (dBA) exposure 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 SEL (dBA) threshold are considered to elicit a negative response from

mammals and birds and result in an adverse effect. It is expected that the 100 SEL (dBA) occurs consistently throughout and applies equally among the alternatives.

For noise exposure, the 100 SEL (dBA) 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 and primarily the Eastman Lake- Bear Creek ECA and riparian corridors are expected to experience noise exposure that exceed the 100 SEL (dBA) threshold and would potentially elicit a startle, avoidance or negative behavior. Additional details are provided in the Draft Noise and Vibration Technical Report, Merced to Fresno Section [Authority and FRA 2011f].

### **UPRR/SR 99 Alternative**

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 E-1 and Table E-2 in Appendix E.

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 multispan 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 culverts. All design options provide free-ranging mammals with opportunities (some more limited than others, particularly those that include culverts) to disperse across the ECA and the modeled wildlife corridors.

The West Chowchilla design option with Ave 24 Wye includes only at-grade crossings within the ECA. However, the West Chowchilla design option with Ave 24 Wye includes two multispan bridges along Dutchman Creek which may facilitate wildlife movement most effectively based on the more expansive opening. Of the UPRR/SR 99 design options, this may be the most conducive to wildlife movement within the ECA based on the shorter traverse through the ECA, and the two multi-span bridges that offer more opportunities for wildlife movement.

Within the other modeled wildlife corridors, the West Chowchilla design option with Ave 24 Wye includes just one at-grade crossing that is associated with a canal that is planned to be in a culvert. The project design features associated with this constructed watercourse are expected to provide more limited opportunities for free-ranging mammals to disperse under HST as the expanse of the culvert is limited and there are few movement opportunities. Wildlife movement in this area is more restrictive.

It is important to recognize that the HST is a barrier to wildlife movement where it occurs, although it is acknowledged that the ECA has restrictions within the existing landscape. The most effective alignment would avoid watercourses/riparian corridors to minimize barrier effects. Where bridges and culverts are placed, these locations represent some current dispersal opportunities. An effective strategy is to avoid the crossings where practical and in the case of HST the better alternatives are those that do that.

For the Ave 24 Wye options, the UPRR/SR 99 Alternative West Chowchilla design option with Ave 24 Wye appears to be a better alternative as it crosses Deadman Creek one time as does the other UPRR/SR 99 Alternative design options along the mainline, but only crosses Dutchman Creek once along the mainline and once along an access road. On the other hand, the East Chowchilla design option with Ave 24 Wye crosses Dutchman Creek three times (mainline twice and access road once). However, the best alternative is the UPRR/SR 99 Alternative East Chowchilla with Ave 21 Wye as it crosses Deadman Creek once and Dutchman Creek just once with no other access road crossing inside the ECA. This design option also includes five canal/culverts at-grade although these are very low value crossings.

Overall, the UPRR/SR 99 Alternative would increase barriers to wildlife movement and could result in temporary avoidance behavior by wildlife at locations where culverts and bridges are placed within the ECA and within other modeled wildlife corridors although over time they may be used by free-ranging mammals as designed. Because implementation 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 for reasons identified above, the impact is considered moderate under NEPA and significant under CEQA.

In addition, the UPRR/SR 99 Alternative would expose wildlife to noise levels that could exceed 100 SEL (dBA) for at-grade watercourse crossings within the Eastman Lake-Bear Creek ECA and within the other modeled wildlife corridors. The 100 SEL criteria would be exceeded, but for only a short distance (i.e., traversed) within immediate proximity to the at-grade watercourse crossings. Refer to the *Merced to Fresno Section Noise and Vibration Technical Report* [Authority and FRA 2011f] for more information concerning noise exposure impacts on 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 the Deadman Creek, Dutchman Creek, Mariposa Creek, 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 E-3 and Table E-4 in Appendix E.

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 crossings within the ECA include single-span or multi-span bridges at natural watercourses, such as Deadman Creek, Dutchman Creek, Mariposa Creek, 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 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 (some more limited than others, particularly those that include culverts) to disperse across the ECA and the modeled wildlife corridors.

The Mission Ave design option with Ave 24 Wye and Ave 21 Wye includes only at-grade crossings within the ECA. However, the Mission Ave design option with Ave 24 Wye and Ave 21 Wye includes five multispan 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 provides free-ranging mammals with some 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 provides free-ranging mammals with some 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 multispan 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 project design features associated with the constructed watercourses are expected to provide some limited opportunities for free-ranging mammals to disperse under HST as the expanse of the culvert is limited, although the bridge structures provide a better opportunity.

The BNSF Alternative has the most crossings of all of the alternatives along the watercourses and has the most length of barrier effect within the ECA. The Mission Ave East of Le Grand with both Wye options have 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.

Overall, the BNSF Alternative would increase barriers to wildlife movement and could result in temporary avoidance behavior by wildlife at locations where culverts and bridges are placed within the ECA and within other modeled wildlife corridors although over time they may be used by free-ranging mammals as designed. Because implementation 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 for reasons identified above, the impact is considered moderate under NEPA and significant under CEQA.

In addition, the BNSF Alternative would expose wildlife to noise levels that could exceed 100 SEL (dBA) for at-grade watercourse crossings within the Eastman Lake-Bear Creek ECA and within the other modeled wildlife corridors. The 100 SEL criteria would be exceeded, but for only a short distance (i.e., traversed) within immediate proximity to the at-grade watercourse crossings. Refer to the Draft Noise and Vibration Technical Report, Merced to Fresno Section [Authority and FRA 2011f] for more information concerning noise exposure impacts on wildlife and mitigation measures (such as sound barriers).

### **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 E-5 and Table E-6 in Appendix E.

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 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 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 multispan 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 provides free-ranging mammals with some 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. This alternative with Ave 21 Wye provides free-ranging mammals with some 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. These project design features associated with the constructed watercourses are expected to provide some limited opportunities for free-ranging mammals to disperse under HST as the expanse of the culvert is limited, although the bridge structure may provide a better opportunity.

Similar to that for the UPRR/SR 99 Alternative, the Hybrid Alternative with the Ave 21 design option is best since it crosses just once at the Deadman Creek and Dutchman Creek locations whereas the Ave 24 design option has three crossings including two at Dutchman Creek.

Overall, the Hybrid Alternative with Ave 24 Wye and Ave 21 Wye would increase barriers to wildlife movement and could result in temporary avoidance behavior by wildlife at locations where culverts and bridges are placed within the ECA and within other modeled wildlife corridors although over time they may be used by free-ranging mammals as designed. Because implementation 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 for reasons identified above, the impact is considered moderate under NEPA and significant under CEQA.

In addition, the Hybrid Alternative would expose wildlife to noise levels that could exceed 100 SEL (dBA) for at-grade watercourse crossings within the Eastman Lake-Bear Creek ECA and within the other modeled wildlife corridors. The 100 SEL criteria would be exceeded, but for only a short distance (i.e., traversed) within immediate proximity to the at-grade watercourse crossings. Refer to the Draft Noise and Vibration Technical Report, Merced to Fresno Section [Authority and FRA 2011f] for more information concerning noise exposure impacts on wildlife and mitigation measures (such as sound barriers).

**Heavy Maintenance Facility Alternatives**

Wildlife movement corridors potentially affected by the HMF sites are addressed in Table 5-24. This table lists the presence or absence of wildlife movement corridors within each HMF footprint and the potential for project-related impacts.

**Table 5-24**  
 Wildlife Movement Corridors Potentially Affected  
 during the Project Period of the HMF Alternatives

HMF Alternatives	Wildlife Movement Corridors NEPA/CEQA Significance Conclusion <sup>a</sup>
Castle Commerce Center	NE/NI
Harris-DeJager	ME/SI
Fagundes	NE/NI
Gordon-Shaw	NE/NI

HMF Alternatives	Wildlife Movement Corridors NEPA/CEQA Significance Conclusion <sup>a</sup>
Kojima Development	NE/LI (Ash and Berenda Slough riparian corridors)
<sup>a</sup> CEQA/NEPA 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)	

**Summary**

Depending on the HST Alternative, there are multiple undercrossing opportunities based on hydraulic locations for each alternative within the ECA and modeled wildlife corridors. Table 5-25 summarizes the number of crossing opportunities by alternative in combination with the total linear distance across the ECA and modeled wildlife corridors. The BNSF Alternative would result in the greatest number of high-valued crossings (specifically, eight high-valued crossings associated with the Mariposa Way East of Le Grand design option with Ave 24 Wye and Ave 21 Wye in the ECA), and also traverses the greatest distance) across the ECA (approximately 6 miles for all BNSF design options) and modeled wildlife corridors (9.1 miles for all BNSF design options with Ave 21 Wye) which substantially impacts wildlife dispersal within the ECA and modeled wildlife corridors. In addition, the BNSF Alternative would result in the longest stretch of track without a crossing in the ECA (specifically, 3.9 miles between Dutchman Creek and Chowchilla River along the track in a north-south direction associated with the Mission Avenue and Mariposa Way design options with Ave 24 Wye) and in the modeled wildlife corridors (specifically, 3.8 miles between two canals along the track in a north-south direction associated with all design options and Ave 21 Wye). Refer to Appendix F for a detailed summary of the distance between crossings in the ECA and modeled wildlife corridors for each alternative.

The UPRR/SR 99 Alternative would offer a lower number of high-valued crossing opportunities (specifically, two high-valued crossings associated with the East Chowchilla and West Chowchilla design options with Ave 24 Wye) than the BNSF Alternative but would traverse a shorter distance across the ECA (approximately 4.1 miles for the East Chowchilla design option with Ave 24 Wye and Ave 21 Wye) and modeled wildlife corridors (approximately 7.75 miles associated with East Chowchilla design option with Ave 21 Wye). In addition, the UPRR/SR 99 Alternative would result in a shorter stretch of track without a crossing in the ECA than the BNSF Alternative (specifically, 2.69 miles between Deadman Creek and Dutchman Creek along the track in a north-south direction associated with the East Chowchilla design option with Ave 24 Wye and Ave 21 Wye) and would result in the shortest stretch of track without a crossing in the modeled wildlife corridors (specifically, 2.03 miles between two canals along the track in a north-south direction associated with the East Chowchilla design option with Ave 21 Wye). However, it should be noted that there are no watercourse crossings associated with the East Chowchilla design option with Ave 24 Wye within the modeled wildlife corridors.

The Hybrid Alternative offers the same number of high-valued crossings as the UPRR/SR 99 Alternative (specifically, two high-valued crossings associated with the Hybrid Alternative with Ave 24 Wye) and traverses the same distance across the ECA as the UPRR/SR 99 Alternative (approximately 4.1 miles associated with the Hybrid Alternative with Ave 21 Wye) and the shortest distance across the modeled wildlife corridors (specifically, 5.3 miles associated with the Hybrid Alternative with Ave 21 Wye). In addition, the Hybrid Alternative would result in the same length of track without a crossing in the ECA as the UPRR/SR 99 Alternative (specifically, 2.69 miles between Deadman Creek and Dutchman Creek along the track in a north-south direction associated with the Hybrid Alternative with Ave 21 Wye) but would result in a longer stretch of track without a crossing in the modeled wildlife corridors (specifically, 3.25 miles between two canals along the track in a north-south direction associated with the Hybrid Alternative with Ave 24 Wye).

**Table 5-25**  
Summary of Significant Biological Resource Impacts and Mitigation Measures

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
<b>UPRR/SR 99 Alternative</b>								
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
<b>Total</b>	<b>3.6 to 4.1</b>	<b>0 to 2</b>	<b>1 to 2</b>	<b>0 to 1</b>	<b>5.25 to 7.75</b>	<b>0</b>	<b>0</b>	<b>0 to 5</b>
<b>BNSF Alternative</b>								
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 Wye	6.8	5	2	0	3.6	0	0	4
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
<b>Total</b>	<b>6.1 to 6.8</b>	<b>5 to 8</b>	<b>0 to 2</b>	<b>0</b>	<b>3.6 to 9.1</b>	<b>0</b>	<b>0</b>	<b>4 to 8</b>
<b>Hybrid Alternative</b>								
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
<b>Total</b>	<b>3.6 to 4.1</b>	<b>1 to 2</b>	<b>1</b>	<b>0</b>	<b>3.6 to 5.3</b>	<b>0</b>	<b>0</b>	<b>2 to 8</b>

In conclusion, it is important to recognize that the HST is a barrier to wildlife movement where it occurs, although it is acknowledged that the ECA has restrictions within the existing landscape. The most effective alignment would avoid watercourses/riparian corridors to minimize barrier effects. Where bridges and culvers are placed, these locations represent some current dispersal opportunities. An effective strategy is to avoid the crossings where practical and in the case of HST the better alternatives are those that do that.

The best alternative is the UPRR/SR 99 Alternative East Chowchilla design option and Ave 21 Wye as it crosses Deadman Creek once and Dutchman Creek just once with no other access road crossing inside the ECA. This design option also includes five canal/culverts at grade although these are very low value crossings.

Similar to that for the UPRR/SR 99 Alternative, the Hybrid Alternative with the Ave 21 design option is best since it crosses just once at the Deadman Creek and Dutchman Creek locations.

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

## 5.4 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.

Coordinate with federal, state, and local agencies to refine the mitigation measures presented here. Representative agencies involved in early coordination include USFWS, USACE, EPA, CDFG, and RWQCB. This coordination effort includes consideration for the type, timing, and location of mitigation measures, including consideration for early implementation as feasible.

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, and species-specific measures will not be required when the habitat or range is not located within the construction footprint.

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 represents the construction management team, reports directly to the Construction Management Team, and is 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 is also responsible for ensuring that the terms and conditions in USFWS, USACE, RWQCB, 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 will 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, RWQCB, 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 would 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.

Statewide Programmatic EIR/EIS mitigation strategies have been refined and adapted for this proposed project. The following mitigation measures could be implemented to reduce substantial, adverse environmental impacts and effects resulting from the construction and operation of the Merced to Fresno Section HST System. These mitigation measures could 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.

#### 5.4.1 Common Mitigation Measures For Biological Resources

The following common mitigation measures could 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 on the specific biological resource (e.g., special-status species, habitats of concern, and wildlife movement corridor). Many of the common 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, 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 to 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, allow access by USFWS, USACE, RWQCB, and CDFG staff to the construction site. Due to safety concerns, check in with the Resident Engineer prior to accessing the construction site.

**Bio-MM#3: Prepare and Implement a Worker Environmental Awareness Program.** Prior to ground-disturbing activities, prepare and implement a Worker Environmental Awareness Program (WEAP) for construction crews. WEAP training materials 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, detail construction timing in relation to habitat and species' life stage requirements and discuss project maps, showing areas of planned minimization and avoidance measures.

Implement the WEAP training before the initiation of construction activities and repeat, as needed, when new personnel begin work within the construction footprint. Perform daily updates and synopsis of the training during the daily safety ("tailgate") meeting. Require that all personnel who attend the training sign an attendance list stating that they have received the WEAP training. Require that HST maintenance crews attend a WEAP training annually.

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

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

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, including the operation period.

**Bio-MM#5: Prepare and Implement a Biological Resources Management Plan.** During final design, prepare the Biological Resources Management Plan (BRMP), and assemble the biological resources mitigation measures. In the BRMP, 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. Form the parameters for the BRMP with the mitigation measures from this project-level EIR/EIS, including terms and conditions as applicable from the USFWS, USACE, RWQCB, and CDFG permits.

In the BRMP, organize the biological resources mitigation measures and terms and conditions to help facilitate their implementation. Oversee the implementation of the BRMP and prepare compliance reports to document implementation and performance.

**Bio-MM#6: Prepare and Implement a Restoration and Revegetation Plan.** During final design, prepare a restoration and revegetation plan (RRP) for upland communities, as Bio-MM #48 addresses riparian impacts and Bio-MM #57 addresses jurisdictional waters. In the RRP, address impacts on habitat subject to temporary ground disturbances that would require decompaction or regrading, if appropriate.

During ground-disturbing activities, implement the RRP in temporarily disturbed areas. Prepare and submit compliance reports to document implementation and performance standards.

**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, verify that environmental sensitive areas and environmentally restricted areas (ERAs) are delineated as appropriate. Environmentally sensitive areas 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, include all environmentally sensitive areas and ERAs on final construction plans (including grading and landscape plans). Prepare, review and approve the map of all environmentally sensitive areas and ERAs on the design drawings and work to update the map as necessary.

Prior to ground-disturbing activities, install the environmentally sensitive area and ERAs. Mark environmentally sensitive areas and ERAs with high visibility temporary fencing to prevent encroachment of construction personnel and equipment onto sensitive areas. Designate the two categories, environmentally sensitive area and ERA, differently in the field (e.g., different colored flagging/fencing). Use sub-meter accurate GPS equipment to delineate all environmentally sensitive areas and ERAs. Remove environmentally sensitive areas 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.

**Bio-MM#8: Equipment Staging Areas.** Prior to ground-disturbing activities, locate staging areas for construction equipment outside sensitive biological resources including habitat for special-status species, habitats of concern, and wildlife movement corridors, to the maximum extent possible.

**Bio-MM#9: Mono-Filament Netting.** During ground-disturbing activities, 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.

**Bio-MM#10: Vehicle Traffic.** During ground-disturbing activities, 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.

**Bio-MM#11: Entrapment Prevention.** Cover all excavated, steep-sided holes or trenches, more than eight inches deep, at the close of each working day with plywood or similar materials, or provide a minimum of one escape ramp per ten feet of trenching constructed of earth fill. Thoroughly inspect such holes or trenches for trapped animals before filling.

Screen all culverts, or similar enclosed structures, with a diameter of four inches or greater to prevent use by wildlife. Clear stored material at the construction site for common and special-status wildlife species before the material is subsequently used or moved.

**Bio-MM#12: Work Stoppage.** During ground-disturbing activities, halt work in the event that a special-status wildlife species gains access to the construction footprint. Suspend ground-disturbing activities in the immediate construction area that could reasonably result in a take of special-status wildlife species. 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.

**Bio-MM#13: 'Take' Notification and Reporting.** 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.

**Bio-MM#14: Post-Construction Compliance Reports.** After each construction phase is completed, submit post-construction compliance reports consistent with the appropriate agency (e.g., USFWS and CDFG) protocols.

## 5.4.2 Construction-Period Mitigation Measures

### Plant Communities and Cover Types

**Bio-MM#15: Restore Temporary Riparian Impacts.** During post-construction, revegetate all disturbed riparian areas using appropriate plants and seed mixes, and monitor restoration activities consistent with provisions in the Habitat Mitigation and Monitoring Plan (HMMP).

**Bio-MM#16: Mitigation and Monitoring of Protected Trees.** Prior to, during, and post-construction, implement the following methods to preserve and/or mitigate impacts on protected trees:

- (1) 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) Transplant all directly affected trees that are in good condition to a suitable site outside the construction footprint;
- (3) Fence trees which may be indirectly affected by construction activities 5 feet from their driplines to form exclusion zones; and
- (4) Prepare a monitoring and maintenance program to monitor transplanted trees for re-establishment of root systems.

### Special-Status Species

#### *Plants*

**Bio-MM#17: Conduct Pre-Construction Surveys for Special-Status Plant Species.** Conduct pre-construction surveys for special-status plant species in suitable habitat areas, subject to ground-disturbing activities. Conduct surveys in the appropriate season prior to ground-disturbing activities for salvage and relocation activities. 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. 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#49: Compensate for Impacts on Special-Status Plant Species.

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

**Bio-MM#18: Prepare and Implement Plan for Salvage, Relocation and/or Propagation of Special-Status Plant Species.** Prepare a plan prior to ground-disturbing activities to address monitoring, salvage, relocation, and propagation of special-status plant species. Permit conditions issued by the appropriate resource agencies (e.g., USFWS, CDFG) will guide the development of the plan.

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

- AQ-MM#1: Reduce Fugitive Dust by Watering.

- AQ-MM#3: Reduce Fugitive Dust from Material Hauling.
- 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.
- WR-MM#1: Construction Stormwater Pollution Prevention Plan.

### ***Wildlife***

#### **Invertebrates**

##### *Vernal Pool Branchiopods*

Prior to final design and during the permitting process, comply with CESA and federal ESA.

**Bio-MM#19: Conduct Pre-Construction Sampling and Assessment for Vernal Pool Fauna.** Prior to ground-disturbing activities, conduct pre-construction, non-protocol surveys in seasonally inundated habitats (seasonal wetlands, noninundated wetlands) within the construction footprint. 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 inundated nonwetland. 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).

The sampling is an assessment that will guide the implementation of performance standards to be consistent with mitigation measures for vernal pool special-status species (e.g., vernal pool branchiopods, western spadefoot toads, and California tiger salamanders).

**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), do not work within 250' 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 as a buffer between ground-disturbing activities and the vernal pools and other seasonal wetlands as determined through consultations with USFWS/USACE.

**Bio-MM#21: Implement and Monitor Vernal Pool Protection.** For temporary impacts on vernal pools and other seasonal wetlands that cannot be avoided, apply geotextile fabric and a layer of gravel over the affected vernal pool(s) prior to ground-disturbing activities to protect the contours. Implement this measure within temporary impact areas adjacent to or within the construction footprint.

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

- AQ-MM#1: Reduce Fugitive Dust by Watering.



- AQ-MM#3: Reduce Fugitive Dust from Material Hauling.
- 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#14: Post-Construction Compliance Reports.
- WR-MM#1: Construction Stormwater Pollution Prevention Plan.
- WR-MM#2: 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.

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, 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).

Other measures that potentially apply to valley elderberry longhorn beetle include:

- AQ-MM#1: Reduce Fugitive Dust by Watering.
- AQ-MM#3: Reduce Fugitive Dust from Material Hauling.
- 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.
- WR-MM#1: Construction Stormwater Pollution Prevention Plan.

## Amphibians

### California Tiger Salamander

**Bio-MM#23: Translocation of California Tiger Salamanders.** Prior to ground-disturbing activities, 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). Relocate any individuals, within the construction footprint, to adjacent mitigation ponds per coordination with the USFWS. Conduct pit trapping in tandem with installing amphibian exclusion fencing specified in Bio-MM#24.

**Bio-MM#24: Erect Amphibian Exclusion Fencing.** Install exclusion barriers (e.g., silt fences) at the edge of 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).

Other measures that potentially apply to California tiger salamander include:

- AQ-MM#1: Reduce Fugitive Dust by Watering.
- AQ-MM#3: Reduce Fugitive Dust from Material Hauling.
- 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#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 Preconstruction Sampling and Assessment for Vernal Pool Fauna.
- Bio-MM#20: Seasonal Vernal Pool Work Restriction.
- Bio-MM#21: Implement and Monitor Vernal Pool Protection.
- WR-MM#1: Construction Stormwater Pollution Prevention Plan.
- WR-MM#2: 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.



### Western Spadefoot Toad

The following measures potentially apply to western spadefoot toad:

- AQ-MM#1: Reduce Fugitive Dust by Watering.
- AQ-MM#3: Reduce Fugitive Dust from Material Hauling.
- 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#9: Mono-Filament Netting.
- Bio-MM#12: Work Stoppage.
- Bio-MM#20: Seasonal Vernal Pool Work Restriction.
- Bio-MM#21: Implement and Monitor Vernal Pool Protection.
- Bio-MM#24: Erect Amphibian Exclusion Fencing.
- WR-MM#1: Construction Stormwater Pollution Prevention Plan.
- WR-MM#2: 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.

## Reptiles

### Western Pond Turtle

**Bio-MM#25: 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.

**Bio-MM#26: Conduct Western Pond Turtle Monitoring.** During ground-disturbing activities, observe all construction activities immediately adjacent to, or within, habitat that supports populations of western pond turtles. If environmentally sensitive areas are deemed necessary, 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.

**Bio-MM#27: 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, avoid western pond turtles, where feasible. If not feasible, coordinate with CDFG to identify where to relocate western pond turtles. Coordinate specific trapping and relocation protocols with CDFG for adults, hatchlings, and eggs prior to ground-disturbing activities. Do not move eggs or hatchlings without prior coordination with CDFG.

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#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#20: Seasonal Vernal Pool Work Restriction.
- Bio-MM#21: Implement and Monitor Vernal Pool Protection.
- WR-MM#1: Construction Stormwater Pollution Prevention Plan.
- WR-MM#2: 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.

#### 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.
- WR-MM#1: Construction Stormwater Pollution Prevention Plan
- WR-MM#2: 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.

#### 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#28: Conduct Pre-Construction Surveys and Monitoring for Raptors.** Prior to ground-disturbing activities, 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). 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-radius 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 would not jeopardize the nest.

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, establish a 1,000-foot-radius buffer area. Adjust the 1,000-foot-radius buffer as needed to reflect existing conditions including ambient noise, topography, and disturbance with the approval of the USFWS or CDFG, as appropriate. 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. 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. Approve ground-disturbing activities within the buffer area, pending site conditions that do not jeopardize the nest.

**Bio-MM#29: 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, establish nest avoidance buffer zones as appropriate. Establish suitable buffer distances consistent with the intent of the MBTA. 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. Periodically monitor active bird nests. Maintain the nest avoidance buffer zone until nestlings have fledged or the nest is abandoned.

**Bio-MM#30: Raptor Protection on Power Lines.** During final design, 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).

Other measures that potentially apply to raptors and breeding birds include the following:

- AQ-MM#1: Reduce Fugitive Dust by Watering.
- AQ-MM#3: Reduce Fugitive Dust from Material Hauling.
- 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.

## Raptors

### *Swainson's Hawks*

**Bio-MM#31: Conduct Pre-Construction Surveys for Swainson's Hawks.** 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. Conduct the pre-construction nest surveys at least 30 days prior to ground-disturbing activities and phase with project build out. The pre-construction surveys would determine the status (i.e. active, inactive) of the nest.

**Bio-MM#32: 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), 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.

**Bio-MM#33: Monitor Removal of Nest Trees for Swainson's Hawks.** Prior to ground-disturbing activities, 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, 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).

Other measures that potentially apply to Swainson's hawk include the following:

- AQ-MM#1: Reduce Fugitive Dust by Watering.
- AQ-MM#3: Reduce Fugitive Dust from Material Hauling.
- 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#12: Work Stoppage.
- Bio-MM#13: 'Take' Notification and Reporting.
- Bio-MM#14: Post-Construction Compliance Reports.

#### Burrowing Owls

**Bio-MM#34: Conduct Protocol Surveys for Burrowing Owls.** Prior to ground-disturbing activities, conduct protocol-level surveys in accordance with CDFG's *Staff Report on Burrowing Owl Mitigation* (CDFG 1995). Conduct the protocol-level surveys during the winter (December 1 through January 31) and breeding season (April 15 through July 15). Conduct these surveys within suitable habitat of the construction footprint and within a 500-foot-radius buffer.

**Bio-MM#35: Burrowing Owl Avoidance and Minimization.** Implement burrowing owl avoidance and minimization measures following CDFG's *Staff Report on Burrowing Owl Mitigation* (CDFG 1995).

- Do 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. 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, establish a 250-foot-radius buffer (as an environmentally sensitive area) between the construction work area and nesting burrowing owls during the nesting season. 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, establish a 160-foot-radius buffer (as an environmentally sensitive area) between the construction work area and occupied burrows during the non-breeding season (September 1 through January 31). 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, undertake the passive relocation measures in accordance with CDFG's (1995) guidelines.

Other measures that potentially apply to burrowing owls include the following:

- AQ-MM#1: Reduce Fugitive Dust by Watering.
- AQ-MM#3: Reduce Fugitive Dust from Material Hauling.
- 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.

## Mammals

### Special-Status Bats

**Bio-MM#36: Conduct Pre-Construction Surveys for Special-Status Bat Species.** Prior to any ground-disturbing activities, 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. Contact CDFG if any hibernation roosts or active nurseries are identified within or immediately adjacent to the construction footprint, as appropriate.

**Bio-MM#37: Bat Avoidance and Relocation.** If feasible for the period of activity avoid active hibernation nests, if found, during ground-disturbing activities, avoid. If avoidance of the hibernation roost is not feasible, prepare a relocation plan and coordinate the construction of an alternative bat roost with CDFG. 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#38 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.

**Bio-MM#38: 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. Leave the roost undisturbed by project-related activities for a minimum of one week after implementing exclusion and/or eviction activities. Do not implement exclusion measures to evict bats from established maternity roosts or occupied hibernation roosts.

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#39: Conduct Pre-Construction Surveys for American Badger.** Prior to ground-disturbing activities, conduct pre-construction surveys for American badger den sites within suitable habitats in the construction footprint. Conduct these surveys no more than 30 days before the start of ground-disturbing activities and phase with project build out.

**Bio-MM#40: American Badger Avoidance.** Establish a 50-foot-radius buffer around occupied American badger dens. Establish a 200-foot-radius buffer around badger maternity dens through the pup-rearing season (February 15 through July 1). Adjustments to the buffer(s) would require prior approval by CDFG.

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.
- Bio-MM#13: 'Take' Notification and Reporting.
- Bio-MM#14: Post-Construction Compliance Reports.

*San Joaquin Kit Fox*

**Bio-MM#41: Conduct Pre-Construction Surveys for San Joaquin Kit Fox.** Prior to the start of ground-disturbing activities, conduct pre-construction surveys in accordance with the USFWS' *San Joaquin Kit Fox Survey Protocol for the Northern Range* (USFWS 1999c).

**Bio-MM#42: Minimize Impacts on San Joaquin Kit Fox.** 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.

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:

- AQ-MM#1: Reduce Fugitive Dust by Watering.
- AQ-MM#3: Reduce Fugitive Dust from Material Hauling.
- 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.
- WR-MM#1: Construction Stormwater Pollution Prevention Plan.

### ***Jurisdictional Waters***

**Bio-MM#43: Restore Temporary Impacts on Jurisdictional Waters.** During or post-construction, restore disturbed jurisdictional waters using stockpiled and segregated soils. Conduct revegetation using appropriate plants and seed mixes, and conduct maintenance monitoring consistent with the provisions in the HMMP.

**Bio-MM#44: Monitor Construction Activities within Jurisdictional Waters.** During ground-disturbing activities, conduct monitoring within and adjacent to 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. 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, RWQCB, and USACE permits conditions.

Other measures that potentially apply to jurisdictional waters include the following:

- AQ-MM#1: Reduce Fugitive Dust by Watering.
- AQ-MM#3: Reduce Fugitive Dust from Material Hauling.
- 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.WR-MM#1: Construction Stormwater Pollution Prevention Plan.
- Bio-MM#19: Conduct Preconstruction 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 Endangered Species Act. 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.

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:

- AQ-MM#1: Reduce Fugitive Dust by Watering.
- AQ-MM#3: Reduce Fugitive Dust from Material Hauling.
- 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 Preconstruction Sampling and Assessment for Vernal Pool Fauna.
- Bio-MM#20: Seasonal Vernal Pool Work Restriction.
- Bio-MM#21: Implement and Monitor Vernal Pool Protection.
- WR-MM#1: Construction Stormwater Pollution Prevention Plan.
- WR-MM#2: 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.

### ***Essential Fish Habitat***

The following measures potentially apply to essential fish habitat (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#15: Restore Temporary Riparian Impacts.
- WR-MM#1: Construction Stormwater Pollution Prevention Plan.
- WR-MM#2: 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.

### ***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)**

Mitigation for Camp Pashayan (within the San Joaquin River Ecological Reserve) is addressed through a Parks, Recreation, and Open Space mitigation Measure:

- PK-MM#3: Acquire Property for Camp Pashayan. Final design would continue to seek to minimize right-of-way impacts and pier placement in Camp Pashayan. If necessary, ecological reserve property would be obtained by agreement with the jurisdictional owner.

#### **Great Valley Conservation Bank**

The resources present in the Great Valley Conservation Bank include vernal pools and other seasonal wetlands, vernal pool species, and special-status plants and wildlife local to the area. Mitigation resulting from the BNSF Alternative would 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#43: Restore Temporary Impacts on Jurisdictional Waters.

### **Wildlife Movement Corridors**

As part of the project design, wildlife movement corridors are incorporated as a project design feature.

**Bio-MM#45: Wildlife Corridor Undercrossing (Implementation).** During ground-disturbing activities, install wildlife corridor 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. Openness ratios of 0.40 should

be designed for. Where existing riparian vegetation exists at watercourse features, crossing structures should be oversized to meet an openness ratio of at least 0.40. Check the installation for consistency with final design.

**Bio-MM#46: Install Wildlife Fencing.** Prior to operation of the HST, install free-ranging mammal-proof fencing along portions of the proposed project that are adjacent to wildlife movement corridors consistent with final design. Verify that the installation is consistent with the designated terms and conditions in the applicable permits.

**Bio-MM#47: Construction in Wildlife Movement Corridors.** Before ground-disturbing activities, submit a construction avoidance and minimization plan for the Eastman Lake-Bear Creek ECA to the Project Biologist for concurrence. During ground-disturbing activities, keep the Eastman Lake-Bear Creek ECA and select riparian corridors free of all equipment, storage materials, construction materials, and any significant potential impediments. Minimize ground-disturbing activities within the Eastman Lake-Bear Creek ECA 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.

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#43: Restore Temporary Impacts on Jurisdictional Waters.
- N & V-MM#1: Construction Noise Mitigation Measures.

### 5.4.3 Project Mitigation Measures

#### Plant Communities and Land Cover Types

**Bio-MM#48: Compensate for Permanent Riparian Impacts.** 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 and/or by purchasing credits in a mitigation bank. The HMMP will provide the planning details. 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#55: Conduct Delineation of Jurisdictional Waters and State Streambeds.
- Bio-MM#56: Prepare and Implement a Habitat Mitigation and Monitoring Plan.
- Bio-MM#57: Compensate for Permanent Impacts on Jurisdictional Waters.

### **Special-Status Species**

#### ***Plants***

**Bio-MM#49: Compensate for Impacts on Special-Status Plant Species.** Prior to Final Design and during the permitting process, comply with CESA and the federal ESA by implementing the following measures:

- (1) 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.
- (2) 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 special-status plant species include the following:

- Bio-MM#4: Prepare and Implement a Weed Control Plan.
- Bio-MM#50: Implement Conservation Guidelines During the Project Period for Valley Elderberry Longhorn Beetle.
- Bio-MM#55: Conduct Delineation of Jurisdictional Waters and State Streambeds.
- Bio-MM#56: Prepare and Implement a Habitat Mitigation and Monitoring Plan.
- Bio-MM#57: Compensate for Permanent Impacts on Jurisdictional Waters.

#### ***Wildlife***

#### **Invertebrates**

##### **Vernal Pool Branchiopods**

Mitigate direct and indirect impacts, including temporary and permanent, on vernal pool branchiopod habitat through compensation determined in consultation with the USFWS. Vernal pool branchiopods are addressed for the project-period mitigation measures under jurisdictional waters to re-establish vernal pool branchiopod habitat values.

##### **Valley Elderberry Longhorn Beetle**

**Bio-MM#50: Implement Conservation Guidelines During the Project Period for Valley Elderberry Longhorn Beetle.** 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).

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#51: Compensate for Impacts on California Tiger Salamander.** Determine compensatory mitigation for the temporary and permanent loss of suitable upland and aquatic breeding habitat through agency consultation with the USFWS and CDFG. 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 following measures potentially apply to California tiger salamander:

- Bio-MM#4: Prepare and Implement a Weed Control Plan.
- Bio-MM#55: Conduct Delineation of Jurisdictional Waters and State Streambeds.
- Bio-MM#56: Prepare and Implement a Habitat Mitigation and Monitoring Plan.
- Bio-MM#57: Compensate for Permanent Impacts on Jurisdictional Waters.

## Reptiles

### *Western Pond Turtle*

Mitigate the impacts on western pond turtle in accordance with the USFWS Biological Opinion and/or CDFG 2081(b).

The following measures potentially apply to western pond turtle:

- Bio-MM#4: Prepare and Implement a Weed Control Plan.
- Bio-MM#48: Compensate for Permanent Riparian Impacts.
- Bio-MM#55: Conduct Delineation of Jurisdictional Waters and State Streambeds.
- Bio-MM#56: Prepare and Implement a Habitat Mitigation and Monitoring Plan.
- Bio-MM#57: 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#48: Compensate for Permanent Riparian Impacts.
- Bio-MM#55: Conduct Delineation of Jurisdictional Waters and State Streambeds.
- Bio-MM#56: Prepare and Implement a Habitat Mitigation and Monitoring Plan.
- Bio-MM#57: 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#48: Compensate for Permanent Riparian Impacts.
- Bio-MM#55: Conduct Delineation of Jurisdictional Waters and State Streambeds.



- Bio-MM#56: Prepare and Implement a Habitat Mitigation and Monitoring Plan.
- Bio-MM#57: Compensate for Permanent Impacts on Jurisdictional Waters.
- Bio-MM#60: Compensate for Impacts to Protected Trees.

### Raptors

#### *Swainson's Hawks*

**Bio-MM#52: Compensate for Loss of Swainson's Hawk Foraging Habitat.** To compensate for the loss of Swainson's hawk foraging habitat, provide compensatory mitigation that follows the ratios recommended by CDFG's (1994) *Staff Report Regarding Mitigation for Impacts to Swainson's Hawks* (*Buteo swainsoni*) in the Central Valley. The ratios are based on the distance from the project 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#48: Compensate for Permanent Riparian Impacts.
- Bio-MM#55: Conduct Delineation of Jurisdictional Waters and State Streambeds.
- Bio-MM#56: Prepare and Implement a Habitat Mitigation and Monitoring Plan.
- Bio-MM#57: Compensate for Permanent Impacts on Jurisdictional Waters.
- Bio-MM#60: Compensate for Impacts to Protected Trees.

#### *Burrowing Owls*

**Bio-MM#53: Compensate for Loss of Burrowing Owl Foraging and Breeding Habitat.** 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 would 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*.

### **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#48: Compensate for Permanent Riparian Impacts.
- Bio-MM#55: Conduct Delineation of Jurisdictional Waters and State Streambeds.
- Bio-MM#56: Prepare and Implement a Habitat Mitigation and Monitoring Plan.
- Bio-MM#57: Compensate for Permanent Impacts on Jurisdictional Waters.

### American Badger

The following measures potentially apply to American badgers:

- Bio-MM#4: Prepare and Implement a Weed Control Plan.
- Bio-MM#55: Conduct Delineation of Jurisdictional Waters and State Streambeds.
- Bio-MM#56: Prepare and Implement a Habitat Mitigation and Monitoring Plan.
- Bio-MM#57: Compensate for Permanent Impacts on Jurisdictional Waters.

### San Joaquin Kit Fox

**Bio-MM#54: Compensate for Destruction of Natal Dens.** 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).

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#55: Conduct Delineation of Jurisdictional Waters and State Streambeds.
- Bio-MM#56: Prepare and Implement a Habitat Mitigation and Monitoring Plan.
- Bio-MM#57: Compensate for Permanent Impacts on Jurisdictional Waters.
- Bio-MM#58: Wildlife Corridor Artificial Dens.
- Bio-MM#59: Monitoring and Reporting of Wildlife Corridor Undercrossings.

### Habitats of Concern

#### *Jurisdictional Waters*

**Bio-MM#55: Conduct Delineation of Jurisdictional Waters and State Streambeds.** Prior to final design, prepare a jurisdictional delineation, documenting jurisdictional waters and state streambeds consistent with USACE, RWQCB, and CDFG guidance. As part of the delineation, determine the functions and values of the jurisdictional waters using accepted methods such as the California Rapid Assessment Method 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.

**Bio-MM#56: Prepare and Implement a Habitat Mitigation and Monitoring Plan.** As part of the USFWS, USACE, RWQCB, and CDFG permit applications and prior to ground-disturbing activities, prepare an HMMP to mitigate for temporary and permanent impacts on jurisdictional waters and state streambeds. In the HMMP, detail the acreage basis, restoration ratios, and the combination of onsite and/or offsite mitigation; give preference to conduct the mitigation within the same watershed where the impact occurs. Work with the USACE, RWQCB, and CDFG to develop appropriate avoidance, minimization, mitigation, and monitoring measures to be incorporated into the HMMP. In the HMMP, outline the intent 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. In the HMMP, incorporate the following standard requirements consistent with USACE, RWQCB, 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.

Where the HST alignment affects an existing mitigation bank, modify the mitigation ratio to meet the vernal pool mitigation requirement. 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.

Conduct monitoring within and adjacent to state streambeds, 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. Conduct biological monitoring to document adherence to habitat avoidance and minimization measures addressed in the project mitigation measures and listed in the USFWS, CDFG, and USACE permit conditions.

Oversee the implementation of all HMMP elements and monitor consistent with the prescribed maintenance and performance monitoring requirements.

**Bio-MM#57: Compensate for Permanent Impacts on Jurisdictional Waters.** Mitigate permanent wetland impacts through compensation determined in consultation with the USACE, RWQCB, USFWS, and CDFG, in order to be consistent with the HMMP. 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 temporarily lost.
- Ratios determined in consultation with the appropriate agencies.

Modify 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, 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.

### ***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 essential fish habitat. There would 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, of the EIR/EIS. The following measures would apply:

- PK-MM#1: Compensate for Staging in Park Property for Construction.
- PK-MM#2: Acquire Park Property.

#### **Great Valley Conservation Bank**

The resources present with the Great Valley Conservation Bank include vernal pools and other seasonal wetlands, vernal pool species, and special-status plants and wildlife local to the area. Mitigation resulting from the BNSF Alternative would, therefore, likely include many of the mitigation measures that address these resources, depending on specific resources impacted, including the following:

- Bio-MM#48: Compensate for Permanent Riparian Impacts.
- Bio-MM#49: Compensate for Impacts on Special-Status Plant Species.
- Bio-MM#55: Conduct Delineation of Jurisdictional Waters and State Streambeds.
- Bio-MM#56: Prepare and Implement a Habitat Mitigation and Monitoring Plan.
- Bio-MM#57: Compensate for Permanent Impacts on Jurisdictional Waters.

### ***Wildlife Movement Corridors***

**Bio-MM#58: Wildlife Corridor Artificial Dens.** To prevent predation by larger predators (e.g., coyotes, bobcats, red foxes, and dogs) at wildlife undercrossings, install artificial dens at each, dedicated wildlife crossing structure to provide escape cover for wildlife (e.g., San Joaquin kit foxes).

**Bio-MM#59: Monitoring and Reporting of Wildlife Corridor Undercrossings.** During final design, prepare the Wildlife Corridor Monitoring Program which would document wildlife usage of the undercrossing(s). 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: Installation of Noise Barriers.

### **Protected Trees**

**Bio-MM#60: Compensate for Impacts to Protected Trees.** Compensate 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:

- 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.

- 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.
- Contribute to a city or county tree-planting fund within the jurisdiction of a regulatory agency.

## 5.5 NEPA Impacts Summary

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. Conservation planning and regulatory controls are a mechanism for maintaining a degree of natural heritage.

Construction of the HST alternatives and HMF sites would result in moderate effects on biological resources. The reasons for the moderate evaluation is due to an incremental regional effect that has although measureable and adverse impacts may occur to terrestrial/aquatic plant communities, jurisdictional waters/wetlands, special-status species and wildlife movement, these due to extensive habitat modification for agricultural and urban landscapes. Construction of the HST alternatives and the HMF sites would affect biological resources due to the removal of plant communities and land cover types during construction, and would alter the landscape that supports special-status plant communities, special-status species, and habitats of concern (i.e. jurisdictional waters and wetlands, critical habitat) as well as wildlife movement. In addition to the direct effect of habitat removal, there are indirect effects such as noise, motion, startle, dust and changes in the hydrologic regime that have potential impacts during construction and project period. The key difference between the alternatives is the plant community type and the extent of its removal within overall construction footprint as they contain the habitat, hydrology and cover for sustaining biological resources.

The construction of the UPRR/SR 99, BNSF and Hybrid alternatives would have a moderate effect on special-status plant communities, special-status wildlife, special-status plants, jurisdictional waters and wetlands and wildlife movement within the Eastman Lake-Bear Creek ECA and modeled wildlife corridors. All of the HST alternatives impact riparian communities and jurisdiction waters and wetlands and the ranges are similar depending on the design option. The BNSF Alternative crosses the most constructed watercourses with a few riparian corridors; this alternative would create a larger barrier to free-ranging mammals. The BNSF alternative also impacts critical habitat whereas the UPRR/SR 99 and Hybrid alternatives do not. All of the HST alternatives impact riparian corridors.

The Harris-DeJager HMF site would have a moderate effect on the Eastman Lake-Bear Creek ECA whereas the other HMF sites would have no effect or only a negligible effect due to some overlap with the Kojima Development site. All five HMF sites would have a moderate effect on special-status plants and special-status wildlife due to the type of habitats present on each site; however, most of the HMF sites impact both special-status plants and wildlife. The HMF sites vary in impacts on habitats of concern depending on their location and plant community composition. None of the HMF sites impact critical habitat, mitigation banks/reserves or essential fish habitat.

Construction-period impacts include moderate effects due to the temporary impact of removing or altering riparian habitat including Great Valley Mixed riparian forest and aquatic habitats. However, a mitigation program with a focus on restoration will reduce the impacts to negligible as habitat values are replaced. Construction-period impacts on special-status plant species are moderate after mitigation (depending on impact of mitigation banks and salvage/restoration efforts). Construction-period impacts on vernal pool branchiopods are moderate and would remain moderate after mitigation. Construction-period impacts from the BNSF Alternative on critical habitat, Great Valley Conservation Bank and to Camp Pashayan is moderate and remains moderate after mitigation depending on the mitigation bank or restoration programs outlined within Section 7 consultation. The construction-period impacts on wildlife

movement are moderate and remain moderate with mitigation due to the length of barrier created along the Eastman Lake-Bear Creek ECA. Construction-period impacts on essential fish habitat are moderate, but become negligible with mitigation and BMPs implemented during the construction period. Most impacts on special-status wildlife during construction are moderate but with mitigation become negligible due to avoidance, relocation, exclusion fencing, and the establishment of Environmentally Sensitive Areas and ERAs.

Project-period impacts are moderate due to the permanent removal of riparian habitat and aquatic habitats. The project period impacts remain moderate depending on the mitigation bank and success of the restoration and creation efforts over time. Project-period impacts on special-status plant species are moderate with mitigation (depending on the availability of mitigation banks and effectiveness of salvage/restoration efforts). Project-period impacts on vernal pool branchiopods are moderate and would remain moderate after mitigation (depending on the mitigation bank and creation/restoration efforts). Project-period impacts are considered moderate for jurisdictional waters and wetlands and remain moderate after mitigation (depending on the mitigation bank and creation/restoration efforts). Project-period impacts for the BNSF Alternative on critical habitat, Great Valley Conservation Bank, and Camp Pashayan remains moderate after mitigation depending on the mitigation bank or restoration programs outlined within Section 7 consultation. The project project-period impacts to wildlife movement remain moderate even with project design incorporating wildlife underpasses at the water crossings and follow-up mitigation due to the length of barrier along the Eastman Lake – Bear Creek ECA as well as other modeled wildlife corridors. Project-period impacts to essential fish habitat are negligible. Most impacts to special-interest wildlife during the project are moderate but with mitigation are reduced to negligible due to the mitigation program and regulatory guidance for mitigation banking and restoration.

## 5.6 CEQA Significance Conclusions

Table 5-25 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 5-25**  
 Summary of Significant Biological Resource Impacts and Mitigation Measures

Impact	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
<b>COMMON MITIGATION MEASURES</b>			
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 impact categories.	N/A	<b>Bio-MM#1:</b> Designate Project Biologist(s), Contractor’s Biologist(s), and Project Biological Monitor(s); <b>Bio-MM#2:</b> Regulatory Agency Access; <b>Bio-MM#3:</b> Prepare and Implement a Worker Environmental Awareness Program; <b>Bio-MM#4:</b> Prepare and Implement a Weed Control Plan; <b>Bio-MM#5:</b> Prepare and Implement a Biological Resources Management Plan; <b>Bio-MM#6:</b> Prepare and Implement a Restoration and Revegetation Plan; <b>Bio-MM#7:</b> Delineate Environmentally Sensitive Areas and Environmentally	N/A

Impact	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
		Restricted Areas (on plans and in-field); <b>Bio-MM#8:</b> Equipment Staging Areas; <b>Bio-MM#9:</b> Mono-Filament Netting; <b>Bio-MM#10:</b> Vehicle Traffic; <b>Bio-MM#11:</b> Entrapment Prevention; <b>Bio-MM#12:</b> Work Stoppage; <b>Bio-MM#13:</b> 'Take' Notification and Reporting; <b>Bio-MM#14:</b> Post-Construction Compliance Reports.	
<b>CONSTRUCTION-PERIOD MITIGATION MEASURES</b>			
Plant Communities and Land Cover Types			
<b>Bio#1: Construction of the HST alternatives would introduce noxious weeds.</b>	Significant	<b>Bio-MM#4:</b> Prepare and Implement a Weed Control Plan; <b>Bio-MM#5:</b> Prepare and Implement a Biological Resources Management Plan.	Less than Significant
<b>Bio#2: Construction of the HST alternatives would disturb Great Valley mixed riparian forest and other riparian habitat.</b>	Significant	<b>AQ-MM#1:</b> Reduce Fugitive Dust by Watering; <b>AQ-MM#3:</b> Reduce Fugitive Dust from Material Hauling; <b>Bio-MM#4:</b> Prepare and Implement a Weed Control Plan; <b>Bio-MM#5:</b> Prepare and Implement a Biological Resources Management Plan; <b>Bio-MM#6:</b> Prepare and Implement a Restoration and Revegetation Plan; <b>Bio-MM#7:</b> Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field); <b>Bio-MM#8:</b> Equipment Staging Areas; <b>Bio-MM#10:</b> Vehicle Traffic; <b>Bio-MM#15:</b> Restore Temporary Riparian Impacts; <b>WR-MM#1:</b> Construction Stormwater Pollution Prevention Plan; <b>WR-MM#2:</b> 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.	Less than Significant
Special-Status Plants			
<b>Bio#3: Construction of the HST alternatives would disturb suitable habitat that has potential to support</b>	Significant	<b>AQ-MM#1:</b> Reduce Fugitive Dust by Watering; <b>AQ-MM#3:</b> Reduce Fugitive Dust from Material Hauling;	Significant

Impact	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
special-status plant species.		<p><b>Bio-MM#14:</b> Post-Construction Compliance Reports;</p> <p><b>Bio-MM#17:</b> Conduct Pre-Construction Surveys for Special-Status Plant Species;</p> <p><b>Bio-MM#18:</b> Prepare and Implement Plan for Salvage, Relocation and/or Propagation of Special-Status Plant Species;</p> <p><b>WR-MM#1:</b> Construction Stormwater Pollution Prevention Plan.</p>	
Special-Status Wildlife – Invertebrates			
<p><b>Bio#4:</b> Construction of the HST alternatives would disturb suitable habitat that has potential to support vernal pool branchiopods</p>	Significant	<p><b>AQ-MM#1:</b> Reduce Fugitive Dust by Watering;</p> <p><b>AQ-MM#3:</b> Reduce Fugitive Dust from Material Hauling;</p> <p><b>Bio-MM#4:</b> Prepare and Implement a Weed Control Plan;</p> <p><b>Bio-MM#5:</b> Prepare and Implement a Biological Resources Management Plan;</p> <p><b>Bio-MM#6:</b> Prepare and Implement a Restoration and Revegetation Plan;</p> <p><b>Bio-MM#7:</b> Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field);</p> <p><b>Bio-MM#8:</b> Equipment Staging Areas;</p> <p><b>Bio-MM#10:</b> Vehicle Traffic;</p> <p><b>Bio-MM#12:</b> Work Stoppage;</p> <p><b>Bio-MM#14:</b> Post-Construction Compliance Reports;</p> <p><b>Bio-MM#19:</b> Conduct Pre-Construction Sampling and Assessment for Vernal Pool Fauna;</p> <p><b>Bio-MM#20:</b> Seasonal Vernal Pool Work Restriction;</p> <p><b>Bio-MM#21:</b> Implement and Monitor Vernal Pool Protection;</p> <p><b>WR-MM#1:</b> Construction Stormwater Pollution Prevention Plan;</p> <p><b>WR-MM#2:</b> 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.</p>	Significant
<p><b>Bio#5:</b> Construction of the HST alternatives would disturb suitable habitat that has potential to support the valley elderberry longhorn</p>	Significant	<p><b>AQ-MM#1:</b> Reduce Fugitive Dust by Watering;</p> <p><b>AQ-MM#3:</b> Reduce Fugitive Dust from Material Hauling;</p>	Less than Significant

Impact	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
beetle.		<p><b>Bio-MM#3:</b> Prepare and Implement a Worker Environmental Awareness Program;</p> <p><b>Bio-MM#4:</b> Prepare and Implement a Weed Control Plan;</p> <p><b>Bio-MM#5:</b> Prepare and Implement a Biological Resources Management Plan;</p> <p><b>Bio-MM#6:</b> Prepare and Implement a Restoration and Revegetation Plan;</p> <p><b>Bio-MM#7:</b> Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field);</p> <p><b>Bio-MM#8:</b> Equipment Staging Areas;</p> <p><b>Bio-MM#10:</b> Vehicle Traffic;</p> <p><b>Bio-MM#11:</b> Entrapment Prevention;</p> <p><b>Bio-MM#12:</b> Work Stoppage;</p> <p><b>Bio-MM#13:</b> 'Take' Notification and Reporting;</p> <p><b>Bio-MM#14:</b> Post-Construction Compliance Reports;</p> <p><b>Bio-MM#22:</b> Implement Conservation Guidelines During the Construction Period for Valley Elderberry Longhorn Beetle;</p> <p><b>Bio-MM#23:</b> Translocation of California Tiger Salamanders;</p> <p><b>Bio-MM#24:</b> Erect Amphibian Exclusion Fencing;</p> <p><b>WR-MM#1:</b> Construction Stormwater Pollution Prevention Plan.</p>	
Special-Status Wildlife-Amphibians			
<p><b>Bio#6: Construction of the HST alternatives would disturb California tiger salamander habitat.</b></p>	Significant	<p><b>AQ-MM#1:</b> Reduce Fugitive Dust by Watering;</p> <p><b>AQ-MM#3:</b> Reduce Fugitive Dust from Material Hauling;</p> <p><b>Bio-MM#3:</b> Prepare and Implement a Worker Environmental Awareness Program;</p> <p><b>Bio-MM#4:</b> Prepare and Implement a Weed Control Plan;</p> <p><b>Bio-MM#5:</b> Prepare and Implement a Biological Resources Management Plan;</p> <p><b>Bio-MM#6:</b> Prepare and Implement a Restoration and Revegetation Plan;</p> <p><b>Bio-MM#7:</b> Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field);</p> <p><b>Bio-MM#8:</b> Equipment Staging Areas;</p>	Less than Significant

Impact	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
		<p><b>Bio-MM#9:</b> Mono-Filament Netting;  <b>Bio-MM#10:</b> Vehicle Traffic;  <b>Bio-MM#11:</b> Entrapment Prevention;  <b>Bio-MM#12:</b> Work Stoppage;  <b>Bio-MM#13:</b> 'Take' Notification and Reporting;  <b>Bio-MM#14:</b> Post-Construction Compliance Reports;  <b>Bio-MM#15:</b> Restore Temporary Riparian Impacts;  <b>Bio-MM#19:</b> Conduct Pre-Construction Sampling and Assessment for Vernal Pool Fauna;  <b>Bio-MM#20:</b> Seasonal Vernal Pool Work Restriction;  <b>Bio-MM#21:</b> Implement and Monitor Vernal Pool Protection;  <b>Bio-MM#23:</b> Translocation of California Tiger Salamanders;  <b>Bio-MM#24:</b> Erect Amphibian Exclusion Fencing;  <b>WR-MM#1:</b> Construction Stormwater Pollution Prevention Plan;  <b>WR-MM#2:</b> 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.</p>	
<p><b>Bio#7: Construction of the HST alternatives would disturb western spadefoot toad habitat.</b></p>	<p>Significant</p>	<p><b>AQ-MM#1:</b> Reduce Fugitive Dust by Watering;  <b>AQ-MM#3:</b> Reduce Fugitive Dust from Material Hauling;  <b>Bio-MM#3:</b> Prepare and Implement a Worker Environmental Awareness Program;  <b>Bio-MM#4:</b> Prepare and Implement a Weed Control Plan;  <b>Bio-MM#5:</b> Prepare and Implement a Biological Resources Management Plan;  <b>Bio-MM#6:</b> Prepare and Implement a Restoration and Revegetation Plan;  <b>Bio-MM#7:</b> Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field);  <b>Bio-MM#8:</b> Equipment Staging Areas;  <b>Bio-MM#9:</b> Mono-Filament Netting;  <b>Bio-MM#10:</b> Vehicle Traffic;</p>	<p>Less than Significant</p>

Impact	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
		<p><b>Bio-MM#12:</b> Work Stoppage;</p> <p><b>Bio-MM#13:</b> 'Take' Notification and Reporting;</p> <p><b>Bio-MM#14:</b> Post-Construction Compliance Reports;</p> <p><b>Bio-MM#15:</b> Restore Temporary Riparian Impacts;</p> <p><b>Bio-MM#19:</b> Conduct Pre-Construction Sampling and Assessment for Vernal Pool Fauna;</p> <p><b>Bio-MM#20:</b> Seasonal Vernal Pool Work Restriction;</p> <p><b>Bio-MM#21:</b> Implement and Monitor Vernal Pool Protection;</p> <p><b>Bio-MM#24:</b> Erect Amphibian Exclusion Fencing;</p> <p><b>WR-MM#1:</b> Construction Stormwater Pollution Prevention Plan;</p> <p><b>WR-MM#2:</b> 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.</p>	
Special-Status Wildlife - Reptiles			
<p><b>Bio#8: Construction of the HST alternatives would disturb habitat that supports the western pond turtle.</b></p>	<p>Significant</p>	<p><b>Bio-MM#3:</b> Prepare and Implement a Worker Environmental Awareness Program;</p> <p><b>Bio-MM#4:</b> Prepare and Implement a Weed Control Plan;</p> <p><b>Bio-MM#5:</b> Prepare and Implement a Biological Resources Management Plan;</p> <p><b>Bio-MM#6:</b> Prepare and Implement a Restoration and Revegetation Plan;</p> <p><b>Bio-MM#7:</b> Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field);</p> <p><b>Bio-MM#8:</b> Equipment Staging Areas;</p> <p><b>Bio-MM#10:</b> Vehicle Traffic;</p> <p><b>Bio-MM#12:</b> Work Stoppage;</p> <p><b>Bio-MM#13:</b> 'Take' Notification and Reporting;</p> <p><b>Bio-MM#14:</b> Post-Construction Compliance Reports;</p> <p><b>Bio-MM#15:</b> Restore Temporary Riparian Impacts;</p> <p><b>Bio-MM#22:</b> Implement Conservation Guidelines During the Construction Period</p>	<p>Less than Significant</p>

Impact	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
		for Valley Elderberry Longhorn Beetle; <b>Bio-MM#25:</b> Conduct Western Pond Turtle Pre-Construction Surveys and Relocation; <b>Bio-MM#26:</b> Conduct Western Pond Turtle Monitoring; <b>Bio-MM#27:</b> Implement Western Pond Turtle Avoidance and Relocation; <b>Bio-MM#43:</b> Restore Temporary Impacts on Jurisdictional Waters; <b>Bio-MM#44:</b> Monitor Construction Activities on Jurisdictional Waters; <b>WR-MM#1:</b> Construction Stormwater Pollution Prevention Plan; <b>WR-MM#2:</b> 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.	
Special-Status Wildlife – Fish			
<b>Bio#9: Construction of the HST alternatives would disturb special-status fish due to potential for turbidity, sediment deposition, and noise exposure.</b>	Significant	<b>Bio-MM#3:</b> Prepare and Implement a Worker Environmental Awareness Program; <b>Bio-MM#5:</b> Prepare and Implement a Biological Resources Management Plan; <b>Bio-MM#7:</b> Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field); <b>Bio-MM#8:</b> Equipment Staging Areas; <b>Bio-MM#10:</b> Vehicle Traffic; <b>Bio-MM#12:</b> Work Stoppage; <b>Bio-MM#14:</b> Post-Construction Compliance Reports; <b>Bio-MM#15:</b> Restore Temporary Riparian Impacts; <b>WR-MM#1:</b> Construction Stormwater Pollution Prevention Plan; <b>WR-MM#2:</b> 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.	Less than Significant
Special-Status Wildlife-Birds and Raptors			
<b>Bio#10: Construction of the HST alternatives would disturb nesting Swainson’s hawk.</b>	Significant	<b>AQ-MM#1:</b> Reduce Fugitive Dust by Watering; <b>AQ-MM#3:</b> Reduce Fugitive Dust from Material Hauling;	Less than Significant

Impact	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
		<p><b>Bio-MM#3:</b> Prepare and Implement a Worker Environmental Awareness Program;</p> <p><b>Bio-MM#5:</b> Prepare and Implement a Biological Resources Management Plan;</p> <p><b>Bio-MM#7:</b> Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field);</p> <p><b>Bio-MM#8:</b> Equipment Staging Areas;</p> <p><b>Bio-MM#10:</b> Vehicle Traffic;</p> <p><b>Bio-MM#12:</b> Work Stoppage;</p> <p><b>Bio-MM#13:</b> 'Take' Notification and Reporting;</p> <p><b>Bio-MM#14:</b> Post-Construction Compliance Reports;</p> <p><b>Bio-MM#28:</b> Conduct Pre-Construction Surveys and Monitoring for Raptors;</p> <p><b>Bio-MM#30:</b> Raptor Protection on Power Lines;</p> <p><b>Bio-MM#31:</b> Conduct Pre-Construction Surveys for Swainson's Hawks;</p> <p><b>Bio-MM#32:</b> Swainson's Hawk Nest Avoidance;</p> <p><b>Bio-MM#33:</b> Monitor Removal of Nest Trees for Swainson's Hawk.</p>	



Impact	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
<p><b>Bio# 11: Construction of the HST alternatives would disturb breeding birds, including raptors.</b></p>	<p>Significant</p>	<p><b>AQ-MM#1:</b> Reduce Fugitive Dust by Watering;  <b>AQ-MM#3:</b> Reduce Fugitive Dust from Material Hauling;  <b>Bio-MM#3:</b> Prepare and Implement a Worker Environmental Awareness Program;  <b>Bio-MM#5:</b> Prepare and Implement a Biological Resources Management Plan;  <b>Bio-MM#7:</b> Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field);  <b>Bio-MM#8:</b> Equipment Staging Areas;  <b>Bio-MM#10:</b> Vehicle Traffic;  <b>Bio-MM#12:</b> Work Stoppage;  <b>Bio-MM#13:</b> 'Take' Notification and Reporting;  <b>Bio-MM#14:</b> Post-Construction Compliance Reports;  <b>Bio-MM#28:</b> Conduct Pre-Construction Surveys and Monitoring for Raptors;  <b>Bio-MM#29:</b> Delineate Active Nest Exclusion Areas for Other Breeding Birds;  <b>Bio-MM#30:</b> Raptor Protection on Power Lines.</p>	<p>Less than Significant</p>
<p><b>Bio# 12: Construction of the HST alternatives would disturb or cause the loss of burrowing owls and their habitat.</b></p>	<p>Significant</p>	<p><b>AQ-MM#1:</b> Reduce Fugitive Dust by Watering;  <b>AQ-MM#3:</b> Reduce Fugitive Dust from Material Hauling;  <b>Bio-MM#3:</b> Prepare and Implement a Worker Environmental Awareness Program;  <b>Bio-MM#5:</b> Prepare and Implement a Biological Resources Management Plan;  <b>Bio-MM#7:</b> Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field);  <b>Bio-MM#8:</b> Equipment Staging Areas;  <b>Bio-MM#10:</b> Vehicle Traffic;  <b>Bio-MM#13:</b> 'Take' Notification and Reporting;  <b>Bio-MM#14:</b> Post-Construction Compliance Reports;  <b>Bio-MM#34:</b> Conduct Protocol Surveys for Burrowing Owls;  <b>Bio-MM#35:</b> Burrowing Owl Avoidance and Minimization;</p>	<p>Significant</p>

Impact	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
		<b>AQ-MM#1:</b> Reduce Fugitive Dust by Watering.	
Special-Status Wildlife - Mammals			
<b>Bio#13: Construction of the HST alternatives would disturb breeding or nonbreeding bats.</b>	Significant	<b>Bio-MM#5:</b> Prepare and Implement a Biological Resources Management Plan; <b>Bio-MM#7:</b> Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field); <b>Bio-MM#8:</b> Equipment Staging Areas; <b>Bio-MM#10:</b> Vehicle Traffic; <b>Bio-MM#12:</b> Work Stoppage; <b>Bio-MM#13:</b> 'Take' Notification and Reporting; <b>Bio-MM#14:</b> Post-Construction Compliance Reports; <b>Bio-MM#36:</b> Conduct Pre-Construction Surveys for Special-Status Bat Species; <b>Bio-MM#37:</b> Bat Avoidance and Relocation; <b>Bio-MM#38:</b> Bat Exclusion and Deterrence.	Less than Significant
<b>Bio#14: Construction of the HST alternatives would disturb American badger dens.</b>	Significant	<b>Bio-MM#3:</b> Prepare and Implement a Worker Environmental Awareness Program; <b>Bio-MM#5:</b> Prepare and Implement a Biological Resources Management Plan; <b>Bio-MM#8:</b> Equipment Staging Areas; <b>Bio-MM#10:</b> Vehicle Traffic; <b>Bio-MM#11:</b> Entrapment Prevention; <b>Bio-MM#12:</b> Work Stoppage; <b>Bio-MM#13:</b> 'Take' Notification and Reporting; <b>Bio-MM#39:</b> Conduct Pre-Construction Surveys for American Badger; <b>Bio-MM#40:</b> American Badger Avoidance; <b>Bio-MM#43:</b> Restore Temporary Impacts on Jurisdictional Waters; <b>Bio-MM#44:</b> Monitor Construction Activities on Jurisdictional Waters.	Less than Significant
<b>Bio#15: Construction of the HST alternatives would disturb San Joaquin kit fox dens.</b>	Significant	<b>Bio-MM#3:</b> Prepare and Implement a Worker Environmental Awareness Program; <b>Bio-MM#5:</b> Prepare and Implement a Biological Resources Management Plan;	Less than Significant

Impact	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
		<p><b>Bio-MM#7:</b> Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field);</p> <p><b>Bio-MM#8:</b> Equipment Staging Areas;</p> <p><b>Bio-MM#10:</b> Vehicle Traffic;</p> <p><b>Bio-MM#11:</b> Entrapment Prevention;</p> <p><b>Bio-MM#12:</b> Work Stoppage;</p> <p><b>Bio-MM#13:</b> 'Take' Notification and Reporting;</p> <p><b>Bio-MM#14:</b> Post-Construction Compliance Reports;</p> <p><b>Bio-MM#41:</b> Conduct Pre-Construction Surveys for San Joaquin Kit Fox;</p> <p><b>Bio-MM#42:</b> Minimize Impacts on San Joaquin Kit Fox;</p> <p><b>Bio-MM#43:</b> Restore Temporary Impacts on Jurisdictional Waters;</p> <p><b>Bio-MM#44:</b> Monitor Construction Activities on Jurisdictional Waters.</p>	
<b>Habitats of Concern</b>			
Special-Status Plant Communities			
<p><b>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).</b></p>	Significant	<p><b>AQ-MM#1:</b> Reduce Fugitive Dust by Watering;</p> <p><b>AQ-MM#3:</b> Reduce Fugitive Dust from Material Hauling;</p> <p><b>Bio-MM#4:</b> Prepare and Implement a Weed Control Plan;</p> <p><b>Bio-MM#5:</b> Prepare and Implement a Biological Resources Management Plan;</p> <p><b>Bio-MM#6:</b> Prepare and Implement a Restoration and Revegetation Plan;</p> <p><b>Bio-MM#7:</b> Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field);</p> <p><b>Bio-MM#8:</b> Equipment Staging Areas;</p> <p><b>Bio-MM#10:</b> Vehicle Traffic;</p> <p><b>Bio-MM#15:</b> Restore Temporary Riparian Impacts;</p> <p><b>Bio-MM#16:</b> Mitigation and Monitoring of Protected Trees;</p> <p><b>Bio-MM#19:</b> Conduct Pre-Construction Sampling and Assessment for Vernal Pool Fauna;</p> <p><b>Bio-MM#20:</b> Seasonal Vernal Pool Work Restriction;</p> <p><b>Bio-MM#21:</b> Implement and Monitor</p>	Less than Significant

Impact	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
		Vernal Pool Protection; <b>WR-MM#1:</b> Construction Stormwater Pollution Prevention Plan; <b>WR-MM#2:</b> 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.	
Jurisdictional Waters			
<b>Bio#17: Construction of the HST alternatives would have indirect impacts on jurisdictional waters.</b>	Significant	<b>AQ-MM#1:</b> Reduce Fugitive Dust by Watering; <b>AQ-MM#3:</b> Reduce Fugitive Dust from Material Hauling; <b>Bio-MM#3:</b> Prepare and Implement a Worker Environmental Awareness Program; <b>Bio-MM#4:</b> Prepare and Implement a Weed Control Plan; <b>Bio-MM#5:</b> Prepare and Implement a Biological Resources Management Plan; <b>Bio-MM#6:</b> Prepare and Implement a Restoration and Revegetation Plan; <b>Bio-MM#7:</b> Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field); <b>Bio-MM#8:</b> Equipment Staging Areas; <b>Bio-MM#10:</b> Vehicle Traffic; <b>Bio-MM#15:</b> Restore Temporary Riparian Impacts; <b>Bio-MM#19:</b> Conduct Pre-Construction Sampling and Assessment for Vernal Pool Fauna; <b>Bio-MM#20:</b> Seasonal Vernal Pool Work Restriction; <b>Bio-MM#21:</b> Implement and Monitor Vernal Pool Protection; <b>Bio-MM#43:</b> Restore Temporary Impacts on Jurisdictional Waters; <b>Bio-MM#44:</b> Monitor Construction Activities on Jurisdictional Waters; <b>WR-MM#1:</b> Construction Stormwater Pollution Prevention Plan; <b>WR-MM#2:</b> 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.	Less than Significant

Impact	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
Critical Habitat			
<p><b>Bio#18: Construction of the HST alternatives would disturb critical habitat.</b></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 Endangered Species Act. 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><b>AQ-MM#1:</b> Reduce Fugitive Dust by Watering;  <b>AQ-MM#3:</b> Reduce Fugitive Dust from Material Hauling;  <b>Bio-MM#14:</b> Post-Construction Compliance Reports;  <b>Bio-MM#15:</b> Restore Temporary Riparian Impacts;  <b>Bio-MM#17:</b> Conduct Pre-Construction Surveys for Special-Status Plant Species;  <b>Bio-MM#18:</b> Prepare and Implement Plan for Salvage, Relocation and/or Propagation of Special-Status Plant Species;  <b>Bio-MM#19:</b> Conduct Pre-Construction Sampling and Assessment for Vernal Pool Fauna;  <b>Bio-MM#20:</b> Seasonal Vernal Pool Work Restriction;  <b>Bio-MM#21:</b> Implement and Monitor Vernal Pool Protection;  <b>Bio-MM#43:</b> Restore Temporary Impacts on Jurisdictional Waters;  <b>Bio-MM#44:</b> Monitor Construction Activities within Jurisdictional Waters;  <b>WR-MM#1:</b> Construction Stormwater Pollution Prevention Plan;  <b>WR-MM#2:</b> 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.</p>	<p>Significant</p>

Impact	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
Essential Fish Habitat			
<p><b>Bio#19: Construction of the HST alternatives would disturb Essential Fish Habitat.</b></p>	<p>Significant</p>	<p><b>AO-MM#1:</b> Reduce Fugitive Dust by Watering;  <b>AQ-MM#3:</b> Reduce Fugitive Dust from Material Hauling;  <b>Bio-MM#3:</b> Prepare and Implement a Worker Environmental Awareness Program;  <b>Bio-MM#5:</b> Prepare and Implement a Biological Resources Management Plan;  <b>Bio-MM#6:</b> Prepare and Implement a Restoration and Revegetation Plan;  <b>Bio-MM#7:</b> Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field);  <b>Bio-MM#8:</b> Equipment Staging Areas;  <b>Bio-MM#10:</b> Vehicle Traffic;  <b>Bio-MM#14:</b> Post-Construction Compliance Reports;  <b>Bio-MM#15:</b> Restore Temporary Riparian Impacts;  <b>WR-MM#1:</b> Construction Stormwater Pollution Prevention Plan;  <b>WR-MM#2:</b> 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.</p>	<p>Less than Significant</p>

Impact	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
Mitigation Banks/Reserves			
<p><b>Bio#20: Construction of the BNSF Alternative would disturb portions of the Great Valley Conservation Bank.</b></p>	Significant	<p><b>Bio-MM#15:</b> Restore Temporary Riparian Impacts;</p> <p><b>Bio-MM#17:</b> Conduct Pre-Construction Surveys for Special-Status Plant Species;</p> <p><b>Bio-MM#18:</b> Prepare and Implement Plan for Salvage, Relocation and/or Propagation of Special-Status Plant Species;</p> <p><b>Bio-MM#19:</b> Conduct Pre-Construction Sampling and Assessment for Vernal Pool Fauna;</p> <p><b>Bio-MM#20:</b> Seasonal Vernal Pool Work Restriction;</p> <p><b>Bio-MM#21:</b> Implement and Monitor Vernal Pool Protection;</p> <p><b>Bio-MM#43:</b> Restore Temporary Impacts on Jurisdictional Waters.</p>	Significant
<p><b>Bio#21: Construction of the HST alternatives would disturb Camp Pashayan (San Joaquin River Ecological Reserve).</b></p>	Significant	<p><b>Bio-MM#15:</b> Restore Temporary Riparian Impacts;</p> <p><b>Bio-MM#17:</b> Conduct Pre-Construction Surveys for Special-Status Plant Species;</p> <p><b>Bio-MM#18:</b> Prepare and Implement Plan for Salvage, Relocation and/or Propagation of Special-Status Plant Species;</p> <p><b>Bio-MM#19:</b> Conduct Pre-Construction Sampling and Assessment for Vernal Pool Fauna;</p> <p><b>Bio-MM#20:</b> Seasonal Vernal Pool Work Restriction;</p> <p><b>Bio-MM#21:</b> Implement and Monitor Vernal Pool Protection;</p> <p><b>Bio-MM#43:</b> Restore Temporary Impacts on Jurisdictional Waters.</p>	Significant
Wildlife Movement Corridors			
<p><b>Bio#22: Construction of the HST alternatives during the construction period would act as a barrier to free-ranging mammal movement within the ECA and modeled wildlife corridors.</b></p>	Significant	<p><b>Bio-MM#45:</b> Wildlife Corridor Undercrossing (Implementation);</p> <p><b>Bio-MM#46:</b> Install Wildlife Fencing;</p> <p><b>Bio-MM#47:</b> Construction in Wildlife Movement Corridors.</p>	Significant

Impact	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
<b>PROJECT MITIGATION MEASURES</b>			
Plant Communities and Land Cover Types			
<p><b>Bio#23: Project impacts from the HST alternatives would permanently convert Great Valley mixed riparian forest and other riparian habitat (Coastal Valley Freshwater Marsh and vernal pools addressed in Bio#37).</b></p>	Significant	<p><b>Bio-MM#4:</b> Prepare and Implement a Weed Control Plan;  <b>Bio-MM#14:</b> Post-Construction Compliance Reports;  <b>Bio-MM#48:</b> Compensate for Permanent Riparian Impacts;  <b>Bio-MM#55:</b> Conduct Delineation of Jurisdictional Waters and State Streambeds;  <b>Bio-MM#56:</b> Prepare and Implement a Habitat Mitigation and Monitoring Plan;  <b>Bio-MM#57:</b> Compensate for Permanent Impacts on Jurisdictional Waters (addresses riparian habitat).</p>	Significant
Special-Status Plant Species			
<p><b>Bio#24: Project impacts from the HST alternatives would permanently convert suitable habitat that has potential to support special-status plant species.</b></p>	Significant	<p><b>Bio-MM#4:</b> Prepare and Implement a Weed Control Plan;  <b>Bio-MM#14:</b> Post-Construction Compliance Reports;  <b>Bio-MM#49:</b> Compensate for Impacts on Special-Status Plant Species;  <b>Bio-MM#50:</b> Implement Conservation Guidelines During the Project Period for Valley Elderberry Longhorn Beetle;  <b>Bio-MM#55:</b> Conduct Delineation of Jurisdictional Waters and State Streambeds;  <b>Bio-MM#56:</b> Prepare and Implement a Habitat Mitigation and Monitoring Plan;  <b>Bio-MM#57:</b> Compensate for Permanent Impacts on Jurisdictional Waters.</p>	Significant
Special-Status Wildlife - Invertebrates			
<p><b>Bio#25: Project impacts from the HST alternatives would permanently convert suitable habitat that has the potential to support vernal pool branchiopods.</b></p>	Significant	<p><b>Bio-MM#14:</b> Post-Construction Compliance Reports;  <b>Bio-MM#55:</b> Conduct Delineation of Jurisdictional Waters and State Streambeds;  <b>Bio-MM#56:</b> Prepare and Implement a Habitat Mitigation and Monitoring Plan;  <b>Bio-MM#57:</b> Compensate for Permanent Impacts on Jurisdictional Waters.</p>	Significant

Impact	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
<p><b>Bio#26: Project impacts from the HST alternatives would permanently convert suitable habitat that has the potential to support valley elderberry longhorn beetle.</b></p>	<p>Significant</p>	<p><b>Bio-MM#4:</b> Prepare and Implement a Weed Control Plan;  <b>Bio-MM#14:</b> Post-Construction Compliance Reports;  <b>Bio-MM#50:</b> Implement Conservation Guidelines During the Project Period for Valley Elderberry Longhorn Beetle.</p>	<p>Less than Significant</p>
<p>Special-Status Wildlife - Amphibians</p>			
<p><b>Bio#27: Project impacts from the HST alternatives would permanently convert suitable habitat that has the potential to support California tiger salamander.</b></p>	<p>Significant</p>	<p><b>Bio-MM#4:</b> Prepare and Implement a Weed Control Plan;  <b>Bio-MM#14:</b> Post-Construction Compliance Reports;  <b>Bio-MM#51:</b> Compensate for Impacts on California Tiger Salamander;  <b>Bio-MM#55:</b> Conduct Delineation of Jurisdictional Waters and State Streambeds;  <b>Bio-MM#56:</b> Prepare and Implement a Habitat Mitigation and Monitoring Plan;  <b>Bio-MM#57:</b> Compensate for Permanent Impacts on Jurisdictional Waters.</p>	<p>Less than Significant</p>
<p><b>Bio#28: Project impacts from the HST alternatives would permanently convert suitable habitat that has the potential to support western spadefoot toad.</b></p>	<p>Significant</p>	<p><b>Bio-MM#4:</b> Prepare and Implement a Weed Control Plan;  <b>Bio-MM#14:</b> Post-Construction Compliance Reports;  <b>Bio-MM#51:</b> Compensate for Impacts on California Tiger Salamander;  <b>Bio-MM#55:</b> Conduct Delineation of Jurisdictional Waters and State Streambeds;  <b>Bio-MM#56:</b> Prepare and Implement a Habitat Mitigation and Monitoring Plan;  <b>Bio-MM#57:</b> Compensate for Permanent Impacts on Jurisdictional Waters.</p>	<p>Less than Significant</p>
<p>Special-Status Wildlife - Reptiles</p>			
<p><b>Bio#29: Project impacts from the HST alternatives would permanently convert suitable habitat that has the potential to support western pond turtle.</b></p>	<p>Significant</p>	<p><b>Bio-MM#4:</b> Prepare and Implement a Weed Control Plan;  <b>Bio-MM#14:</b> Post-Construction Compliance Reports;  <b>Bio-MM#48:</b> Compensate for Permanent Riparian Impacts;  <b>Bio-MM#55:</b> Conduct Delineation of Jurisdictional Waters and State Streambeds;  <b>Bio-MM#56:</b> Prepare and Implement a Habitat Mitigation and Monitoring Plan;</p>	<p>Less than Significant</p>

Impact	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
		<b>Bio-MM#57:</b> Compensate for Permanent Impacts on Jurisdictional Waters.	
Special-Status Wildlife - Fish			
<b>Bio#30:</b> Project impacts from the HST alternatives would permanently convert suitable habitat that has the potential to support special-status fish.	Significant	<b>Bio-MM#4:</b> Prepare and Implement a Weed Control Plan; <b>Bio-MM#14:</b> Post-Construction Compliance Reports; <b>Bio-MM#48:</b> Compensate for Permanent Riparian Impacts; <b>Bio-MM#55:</b> Conduct Delineation of Jurisdictional Waters and State Streambeds; <b>Bio-MM#56:</b> Prepare and Implement a Habitat Mitigation and Monitoring Plan; <b>Bio-MM#57:</b> Compensate for Permanent Impacts on Jurisdictional Waters.	Less than Significant
Special-Status Wildlife – Birds and Raptors			
<b>Bio#31:</b> Project impacts from the HST alternatives would permanently convert suitable habitat that has the potential to support nesting Swainson’s hawk.	Significant	<b>Bio-MM#4:</b> Prepare and Implement a Weed Control Plan; <b>Bio-MM#14:</b> Post-Construction Compliance Reports; <b>Bio-MM#48:</b> Compensate for Permanent Riparian Impacts; <b>Bio-MM#52:</b> Compensate for Loss of Swainson’s Hawk Foraging Habitat; <b>Bio-MM#55:</b> Conduct Delineation of Jurisdictional Waters and State Streambeds; <b>Bio-MM#56:</b> Prepare and Implement a Habitat Mitigation and Monitoring Plan; <b>Bio-MM#57:</b> Compensate for Permanent Impacts on Jurisdictional Waters; <b>Bio-MM#60:</b> Compensate for Impacts to Protected Tress.	Less than Significant
<b>Bio#32:</b> Project impacts from the HST alternatives would permanently convert suitable habitat that has the potential to support burrowing owls.	Significant	<b>Bio-MM#53:</b> Compensate for Loss of Burrowing Owl Foraging and Breeding Habitat.	Significant
<b>Bio#33:</b> Project impacts from the HST alternatives would permanently convert suitable habitat that has the potential to support breeding birds, including raptors and burrowing owls.	Significant	<b>Bio-MM#4:</b> Prepare and Implement a Weed Control Plan; <b>Bio-MM#14:</b> Post-Construction Compliance Reports; <b>Bio-MM#48:</b> Compensate for Permanent Riparian Impacts; <b>Bio-MM#52:</b> Compensate for Loss of	Less than Significant

Impact	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
		Swainson's Hawk Foraging Habitat; <b>Bio-MM#53:</b> Compensate for Loss of Burrowing Owl Foraging and Breeding Habitat. <b>Bio-MM#55:</b> Conduct Delineation of Jurisdictional Waters and State Streambeds; <b>Bio-MM#56:</b> Prepare and Implement a Habitat Mitigation and Monitoring Plan; <b>Bio-MM#57:</b> Compensate for Permanent Impacts on Jurisdictional Waters; <b>Bio-MM#60:</b> Compensate for Impacts to Protected Tress.	
Special-Status Wildlife - Mammals			
<b>Bio#34: Project impacts from the HST alternatives would permanently convert suitable habitat that has the potential to support special-status bats.</b>	Significant	<b>Bio-MM#4:</b> Prepare and Implement a Weed Control Plan; <b>Bio-MM#14:</b> Post-Construction Compliance Reports; <b>Bio-MM#48:</b> Compensate for Permanent Riparian Impacts; <b>Bio-MM#55:</b> Conduct Delineation of Jurisdictional Waters and State Streambeds; <b>Bio-MM#56:</b> Prepare and Implement a Habitat Mitigation and Monitoring Plan; <b>Bio-MM#57:</b> Compensate for Permanent Impacts on Jurisdictional Waters.	Less than Significant
<b>Bio#35: Project impacts from the HST alternatives would permanently convert suitable habitat that has the potential to support American badger dens.</b>	Significant	<b>Bio-MM#4:</b> Prepare and Implement a Weed Control Plan; <b>Bio-MM#58:</b> Wildlife Corridor Artificial Dens; <b>Bio-MM#59:</b> Monitoring and Reporting of Wildlife Corridor Undercrossings; <b>N &amp; V-MM#3:</b> Installation of Noise Barriers.	Less than Significant
<b>Bio#36: Project impacts from the HST alternatives would permanently convert suitable habitat that has the potential to support San Joaquin kit fox dens.</b>	Significant	<b>Bio-MM#4:</b> Prepare and Implement a Weed Control Plan; <b>Bio-MM#54:</b> Compensate for Destruction of Natal Dens; <b>Bio-MM#58:</b> Wildlife Corridor Artificial Dens; <b>Bio-MM#59:</b> Monitoring and Reporting of Wildlife Corridor Undercrossings; <b>N &amp; V-MM#3:</b> Installation of Noise Barriers.	Less than Significant

Impact	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
<b>Habitat of Concern</b>			
Special-Status Plant Communities			
<p><b>Bio#37: Project impacts from the HST alternatives would permanently convert special-status plant communities (Great Valley Mixed Riparian and other riparian addressed in Bio#22).</b></p>	Significant	<p><b>Bio-MM#14:</b> Post-Construction Compliance Reports;</p> <p><b>Bio-MM#48:</b> Compensate for Permanent Riparian Impacts;</p> <p><b>Bio-MM#50:</b> Implement Conservation Guidelines During the Project Period for Valley Elderberry Longhorn Beetle;</p> <p><b>Bio-MM#55:</b> Conduct Delineation of Jurisdictional Waters and State Streambeds;</p> <p><b>Bio-MM#56:</b> Prepare and Implement a Habitat Mitigation and Monitoring Plan;</p> <p><b>Bio-MM#57:</b> Compensate for Permanent Impacts on Jurisdictional Waters.</p>	Significant
Jurisdictional Waters			
<p><b>Bio#38: Project impacts from the HST alternatives would permanently convert jurisdictional waters.</b></p>	Significant	<p><b>Bio-MM#14:</b> Post-Construction Compliance Reports;</p> <p><b>Bio-MM#48:</b> Compensate for Permanent Riparian Impacts;</p> <p><b>Bio-MM#55:</b> Conduct Delineation of Jurisdictional Waters and State Streambeds;</p> <p><b>Bio-MM#56:</b> Prepare and Implement a Habitat Mitigation and Monitoring Plan;</p> <p><b>Bio-MM#57:</b> Compensate for Permanent Impacts on Jurisdictional Waters.</p>	Significant
Critical Habitat			
<p><b>Bio#39: Project impacts from the HST alternatives would include critical habitat for vernal pool species.</b></p>	Significant	<p><b>Bio-MM#14:</b> Post-Construction Compliance Reports;</p> <p><b>Bio-MM#48:</b> Compensate for Permanent Riparian Impacts;</p> <p><b>Bio-MM#49:</b> Compensate for Impacts on Special-Status Plant Species;</p> <p><b>Bio-MM#55:</b> Conduct Delineation of Jurisdictional Waters and State Streambeds;</p> <p><b>Bio-MM#56:</b> Prepare and Implement a Habitat Mitigation and Monitoring Plan;</p> <p><b>Bio-MM#57:</b> Compensate for Permanent Impacts on Jurisdictional Waters.</p>	Significant

Impact	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
Essential Fish Habitat			
<b>Bio#40: Project impacts from the HST alternatives would require construction in essential fish habitat.</b>	Significant	Construction period mitigation measures address impacts associated with essential fish habitat. There would be no impacts related to project impacts.	Less than Significant
Mitigation Banks/Reserves			
<b>Bio#41: All of the HST alternatives would affect Camp Pashayan (within the San Joaquin River Ecological Reserve).</b>	Significant	<b>PK-MM#1:</b> Compensation for Staging in Park Property for Construction; <b>PK-MM#2:</b> Acquire Park Property.	Significant
<b>Bio#42: Project impacts from the BNSF Alternative would affect portions of the Great Valley Conservation Bank.</b>	Significant	<b>Bio-MM#48:</b> Compensate for Permanent Riparian Impacts; <b>Bio-MM#49:</b> Compensate for Impacts on Special-Status Plant Species; <b>Bio-MM#55:</b> Conduct Delineation of Jurisdictional Waters and State Streambeds; <b>Bio-MM#56:</b> Prepare and Implement a Habitat Mitigation and Monitoring Plan; <b>Bio-MM#57:</b> Compensate for Permanent Impacts on Jurisdictional Waters; <b>PK-MM#1:</b> Compensate for Staging in Park Property for Construction; <b>PK-MM#2:</b> Acquire Park Property.	Significant
Wildlife Movement Corridors			
<b>Bio#43: Project impacts from the HST alternatives would permanently reduce the functionality of wildlife corridors such as Eastman Lake-Bear Creek ECA.</b>	Significant	<b>Bio-MM#4:</b> Prepare and Implement a Weed Control Plan; <b>Bio-MM#55:</b> Conduct Delineation of Jurisdictional Waters and State Streambeds; <b>Bio-MM#56:</b> Prepare and Implement a Habitat Mitigation and Monitoring Plan; <b>Bio-MM#57:</b> Compensate for Permanent Impacts on Jurisdictional Waters; <b>Bio-MM#58:</b> Wildlife Corridor Artificial Dens; <b>Bio-MM#59:</b> Monitoring and Reporting of Wildlife Corridor Undercrossings; <b>N&amp;V-MM#3:</b> Installation of Noise Barriers.	Significant
<b>Bio#44: Project impacts from the HST alternatives would permanently impact the modeled wildlife corridor linear features, including the</b>	Significant	<b>Bio-MM#4:</b> Prepare and Implement a Weed Control Plan; <b>Bio-MM#55:</b> Conduct Delineation of Jurisdictional Waters and State	Significant

Impact	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
<p><b>Berenda Slough and other riparian corridors.</b></p>		<p>Streambeds;  <b>Bio-MM#56:</b> Prepare and Implement a Habitat Mitigation and Monitoring Plan;  <b>Bio-MM#57:</b> Compensate for Permanent Impacts on Jurisdictional Waters;  <b>Bio-MM#58:</b> Wildlife Corridor Artificial Dens;  <b>Bio-MM#59:</b> Monitoring and Reporting of Wildlife Corridor Undercrossings;  <b>N&amp;V-MM#3:</b> Installation of Noise Barriers.</p>	
<p><b>Bio#45: Project impacts from the Harris-DeJager HMF site would permanently impact the Eastman Lake-Bear Creek ECA.</b></p>	<p>Significant</p>	<p><b>Bio-MM#4:</b> Prepare and Implement a Weed Control Plan;  <b>Bio-MM#14:</b> Post-Construction Compliance Reports;  <b>Bio-MM#55:</b> Conduct Delineation of Jurisdictional Waters and State Streambeds;  <b>Bio-MM#56:</b> Prepare and Implement a Habitat Mitigation and Monitoring Plan;  <b>Bio-MM#57:</b> Compensate for Permanent Impacts on Jurisdictional Waters;  <b>Bio-MM#58:</b> Wildlife Corridor Artificial Dens;  <b>Bio-MM#59:</b> Monitoring and Reporting of Wildlife Corridor Undercrossings;  <b>N&amp;V-MM#3:</b> Installation of Noise Barriers.</p>	<p>Significant</p>
<p><b>Bio#46: Project impacts from the Kojima Development HMF site would permanently impact the Berenda Slough riparian corridor.</b></p>	<p>Significant</p>	<p><b>Bio-MM#4:</b> Prepare and Implement a Weed Control Plan;  <b>Bio-MM#55:</b> Conduct Delineation of Jurisdictional Waters and State Streambeds;  <b>Bio-MM#56:</b> Prepare and Implement a Habitat Mitigation and Monitoring Plan;  <b>Bio-MM#57:</b> Compensate for Permanent Impacts on Jurisdictional Waters;  <b>Bio-MM#58:</b> Wildlife Corridor Artificial Dens;  <b>Bio-MM#59:</b> Monitoring and Reporting of Wildlife Corridor Undercrossings;  <b>N&amp;V-MM#3:</b> Installation of Noise Barriers.</p>	<p>Significant</p>

## 6.0 Permits and Technical Studies for Special Laws or Conditions

Permits expected for the Merced to Fresno HST Project include two Section 7 Biological Opinions with ITPs from the USFWS and NMFS; a CWA Section 404 Permit from the USACE; a CWA 401 Water Quality Certification from the RWQCB; a CFGC Section 2081 permit from the CDFG; and a CDFG Section 1602 Lake and Streambed Alteration Agreement. Other regulations that guide permitting and consultation include the federal MBTA, CESA, the BGEPA, and sections of the CFGC.

### 6.1 Federal/State Endangered Species Act Consultation Summary

Consultation with the USFWS has been ongoing to discuss issues related to habitat assessment and protocol-level survey areas and methodology, wildlife corridors and passage design, conservation measures, mitigation banks, and future meeting schedules. USFWS and CH2M HILL biologists met on September 23 and November 5, 2009 and on February 10 and June 9, 2010. Coordination is ongoing. Initial meetings with CDFG discussed methodology for studies. CH2M HILL biologists subsequently met with CDFG on June 7, 2010 to discuss listed species, streambed alteration, survey timelines, and mitigation strategies.

### 6.2 Federal Fisheries and Essential Fish Habitat Consultation Summary

The Authority initiated informal consultation with NMFS on September 23, 2009, to discuss potential effects from the Merced to Fresno HST Project to special-status anadromous fishes pursuant to Section 7 of the federal ESA as well as the Magnuson-Stevens Fishery Conservation and Management Act. On January 5, 2010, the Authority met with NMFS to discuss the Merced to Fresno HST Project and agreed that additional information on the proposed project should be gathered prior to determining whether proposed actions could potentially affect special-status anadromous fish. However, given the current understanding of the types and extent of potential effects, it was initially determined that three fish species may need to be analyzed for potential effects: Central Valley steelhead, Central Valley spring-run Chinook salmon, and Central Valley fall/late fall-run Chinook salmon. On February 1, 2011, NMFS provided the Merced to Fresno Regional Consultant team with a list of federal resources under NMFS's jurisdiction to be analyzed for ESA compliance. This list included Central Valley steelhead and a foreseeable future condition for reintroduced spring-run Chinook salmon. Also included in this NMFS list was essential fish habitat for Chinook salmon.

The Magnuson-Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), requires all federal agencies to consult with NMFS on all actions or proposed actions (permitted, funded, or undertaken by the agency) that may adversely affect habitats for commercially important fishes. Under the provisions of the act, Congress mandated the identification of habitats essential to managed species (e.g., commercial species) and measures to conserve and enhance this habitat. The act requires cooperation among NMFS, the councils, fishing participants, and federal and state agencies to protect, conserve, and enhance essential fish habitat. It is defined as those waters and substrate necessary to fish for spawning, breeding, feeding, and growth to maturity (50 CFR 600.10).

Pacific salmon are managed under the Magnuson-Stevens Act, and NMFS has designated as essential fish habitat most water bodies historically accessible to Chinook salmon, including the Middle San Joaquin-Lower Chowchilla hydrologic unit (HU 18040001; Pacific Fisheries Management Council 2003). The Merced to Fresno HST Project occurs in this hydrologic unit and thus actions affecting watercourses in the project footprint will be subject to essential fish habitat consultations. Given that the Merced to Fresno HST Project involves federal actions and federal ESA-listed species, essential fish habitat consultations will

be combined with Section 7 consultation under the federal ESA to accommodate the substantive requirements of both federal ESA and the Magnuson-Stevens Act, as appropriate (Pacific Fisheries Management Council 2003).

### **6.3 Jurisdictional Waters Coordination Summary**

An introductory meeting with USACE and EPA was held on February 10, 2010, with USACE regulatory staff. Topics discussed included an overview of the program EIR/EIS alternatives analysis and schedule issues related to the completion of wetland delineations and associated verifications.

Preliminary coordination meetings were held with the USACE on June 2, 2010, and April 25, 2011, to discuss Section 404(b)(1) analysis, project overview, field surveys, jurisdiction, mitigation, and schedule.

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## 8.0 Preparer Qualifications

### Michael Benner

Michael Benner has 34 years of experience preparing environmental documentation and conducting natural resources planning. This experience includes overseeing the preparation of biological resource studies compliant with requirements of the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA) and supporting regulatory compliance activities. Mr. Benner earned his Bachelor of Arts in the Biological Sciences in 1976 and his Masters in Science in Environmental Studies in 1979 from California State University at Fullerton. He currently serves as a Vice President in AECOM's Orange Office.

### Michael Clary

Michael Clary provides botanical, wildlife, and natural resource regulatory expertise for the natural resources planning and management group in CH2M HILL's Sacramento Office. Mr. Clary earned his Bachelor of Science degree in Ecology and Zoology from California State University at Humboldt in 1993 and has 16 years of professional experience conducting ecological studies throughout California and the desert southwest. He specializes in conducting studies in support of federal and state regulatory and permitting requirements including NEPA, CEQA, federal ESA and CWA.

### Russel Huddleston

Russel Huddleston is a wetland ecologist/botanist in the Environmental Business Group in CH2M HILL's Bay Area office. He has more than 10 years of professional experience in wetland science, plant community classification, habitat assessment, and special-status species surveys. In addition, he has training and experience with global positioning system (GPS) technology used for habitat mapping, wetland delineation, and special-status species surveys. Mr. Huddleston received his masters in Ecology from the University of California at Davis in 2001 and his Bachelors in Biology from Southern Oregon University in 1998. Mr. Huddleston is a Certified Professional Wetland Scientist and has worked in a variety of wetland types throughout the western United States including Mr. Huddleston is a member of the Society of Wetland Scientists and has been a volunteer docent at the Jepson Prairie vernal pool preserve for over 9 years.

### Thomas Juhasz

Thomas Juhasz is a field biologist who has experience with endangered species in California, Hawaii, and the Caribbean. As a vernal pool specialist, Mr. Juhasz has USFWS protocol-level experience with California red legged frog, vernal pool branchiopods (fairy shrimp), and special-status vernal pool plants. His regulatory experience includes the implementation and coordination of federal and state compliance requirements such as Habitat Conservation Planning (HCP) documents, general biological assessments (GBA), and focus species reports. Mr. Juhasz has experience planning and implementing rare plant salvage programs, propagation protocol and sourcing, and comprehensive restoration plans. Mr. Juhasz is experienced in writing and coordinating environmental regulatory documents for NEPA and CEQA compliance for special-status plant and animal species as well as wetland resources.

### Corinna Lu

Corinna Lu is an ecologist with more than 11 years experience implementing and managing biological resource projects for private and government clients. Her areas of expertise include environmental impacts assessment, wetlands mitigation and delineation and special status wildlife surveys. Ms. Lu is also familiar with NEPA, CEQA and other regulations pertaining to special status species and wetlands.

### **Neil Nikirk**

Neil Nikirk is a fisheries biologist with more than 13 years of professional experience as a consultant to private and public entities on fisheries and natural-resource-related issues. He is familiar with federal and California regulations pertaining to fisheries and wildlife resources, including Endangered Species Acts (federal and state ESAs), the CEQA, the NEPA, and the Clean Water Act. Mr. Nikirk has participated in the development of HCPs, Natural Community Conservation Plans, and the associated environmental documents. He has managed and participated in a wide range of fisheries and water quality evaluations that have addressed a variety of issues, species, and aquatic habitats. In addition, he has several years of experience in the conduct of field data collection for fisheries-related projects and has participated in a number of habitat management projects in California. Mr. Nikirk's expertise includes population dynamics, stock assessment, habitat conservation planning, environmental documentation, and data analysis for technical environmental issues.

### **Andrea Stassi**

Andrea Stassi is an Environmental/Regulatory Analyst in the Transportation Business Group in AECOM's Orange Office. She has over 4 years of experience in the environmental field, most recently 3 years related to fishery biological services. Her specific expertise includes aquatic grass mitigation and monitoring database management; GIS map development for marine habitat projects; side-scan sonar and mobile GIS technology implementation in ecological field studies; and assessment of population dynamics at habitat restoration sites in biological field studies. Prior to her most recent experience, Ms. Stassi has worked on various international projects related to environmental planning and land management.

### **Jeff Tupen**

Jeff Tupen is an Ecosystem Planning and Restoration Senior Technologist in CH2M HILL's Sacramento, California, office. He has over 25 years of professional experience in natural resource management and environmental consulting, which has encompassed extensive experience in marine and freshwater fisheries issues, including baseline studies, habitat assessments, impact evaluations, and mitigation and enhancement planning. He is experienced in wetland characterization, delineation, and Section 404 permitting; stream ecology and fluvial geomorphology studies; riparian and aquatic habitat characterization and restoration; federal and California ESA compliance and permitting; and water quality monitoring.

### **Deborah Waller**

Deborah Waller is an Environmental Scientist in CH2M HILL's Oakland office. She has over 17 years of experience in vegetation analysis, including wetland delineations, rare plant surveys, tree surveys, and habitat evaluations and associated regulatory compliance activities including permit application preparation and agency negotiations. She has conducted floristic and rare plant studies and wetland delineations throughout California, Nevada and Utah. Ms. Waller has provided senior review for preparation of CEQA/NEPA documents, Natural Environmental Study reports, Biological Assessments, wetland delineations, rare plant surveys and habitat analyses. She has expertise in USACE, USFWS, CDFG, San Francisco Bay Conservation and Development Commission (BCDC), California Coastal Commission (CCC), and RWQCB permitting processes and agency coordination activities involving wetlands, stream crossings, and sensitive species and habitats issues. She is experienced in the planning, implementation and monitoring of restoration and mitigation projects for wetland habitats including salt marsh, seasonal wetlands and riparian habitats. Ms. Waller has additional experience in the preparation and review of construction specifications and construction oversight and monitoring.