APPENDIX A

National Wetland Inventory and Central Valley Vernal Pool Complexes (Holland) Mapped Wetlands

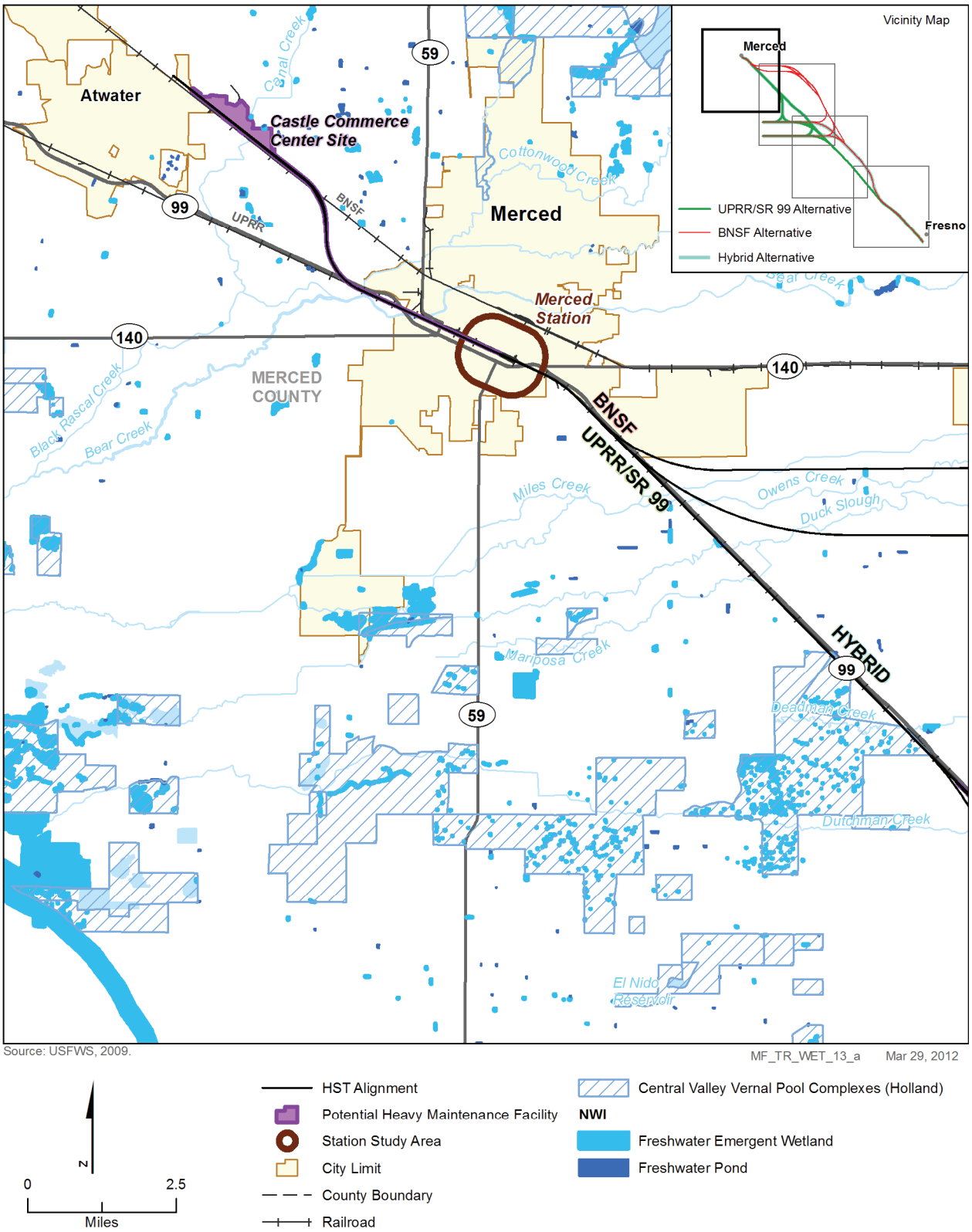
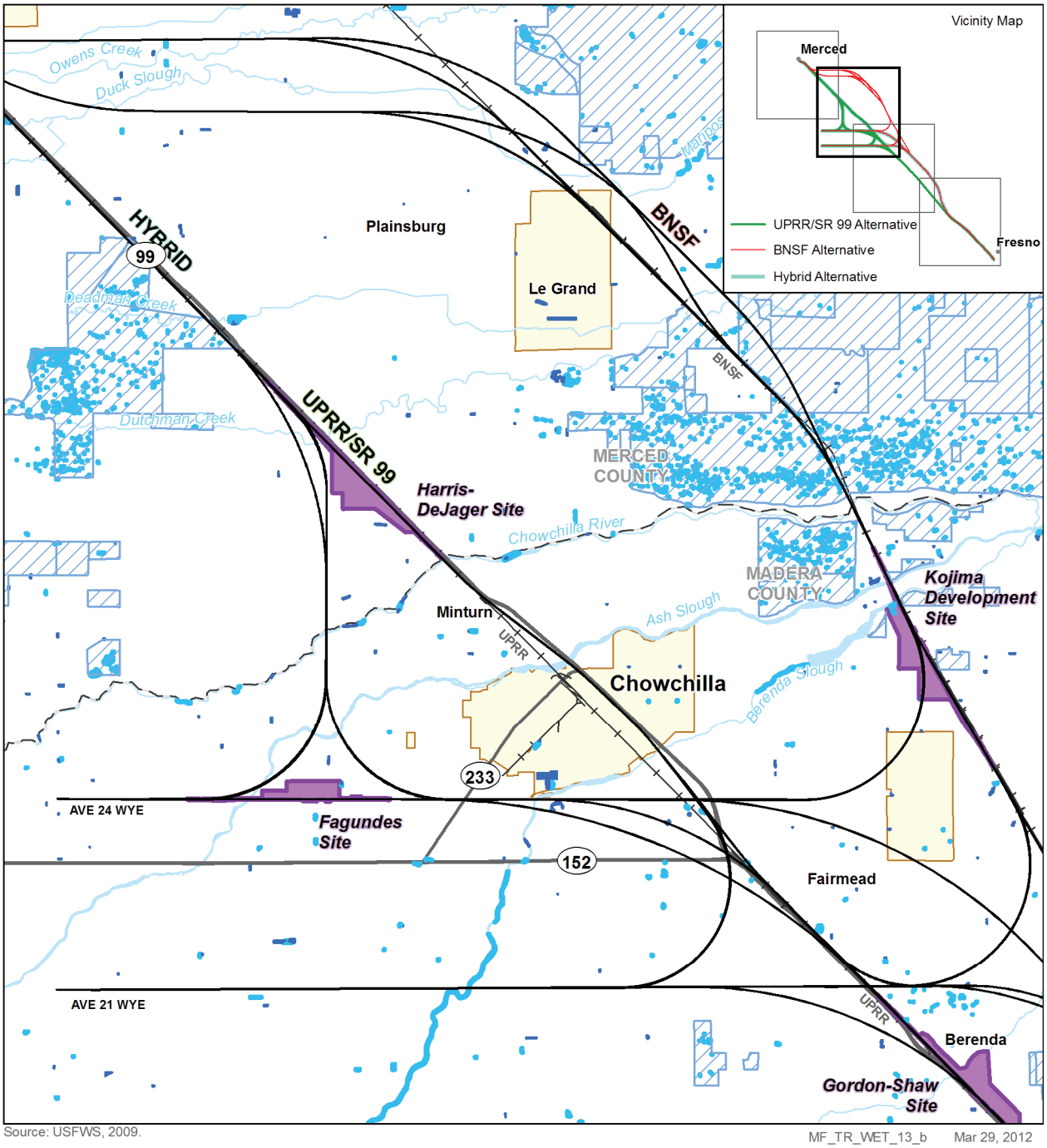


Figure A-1
National Wetland Inventory –
Merced Project Vicinity



Source: USFWS, 2009.

MF_TR_WET_13_b Mar 29, 2012

N

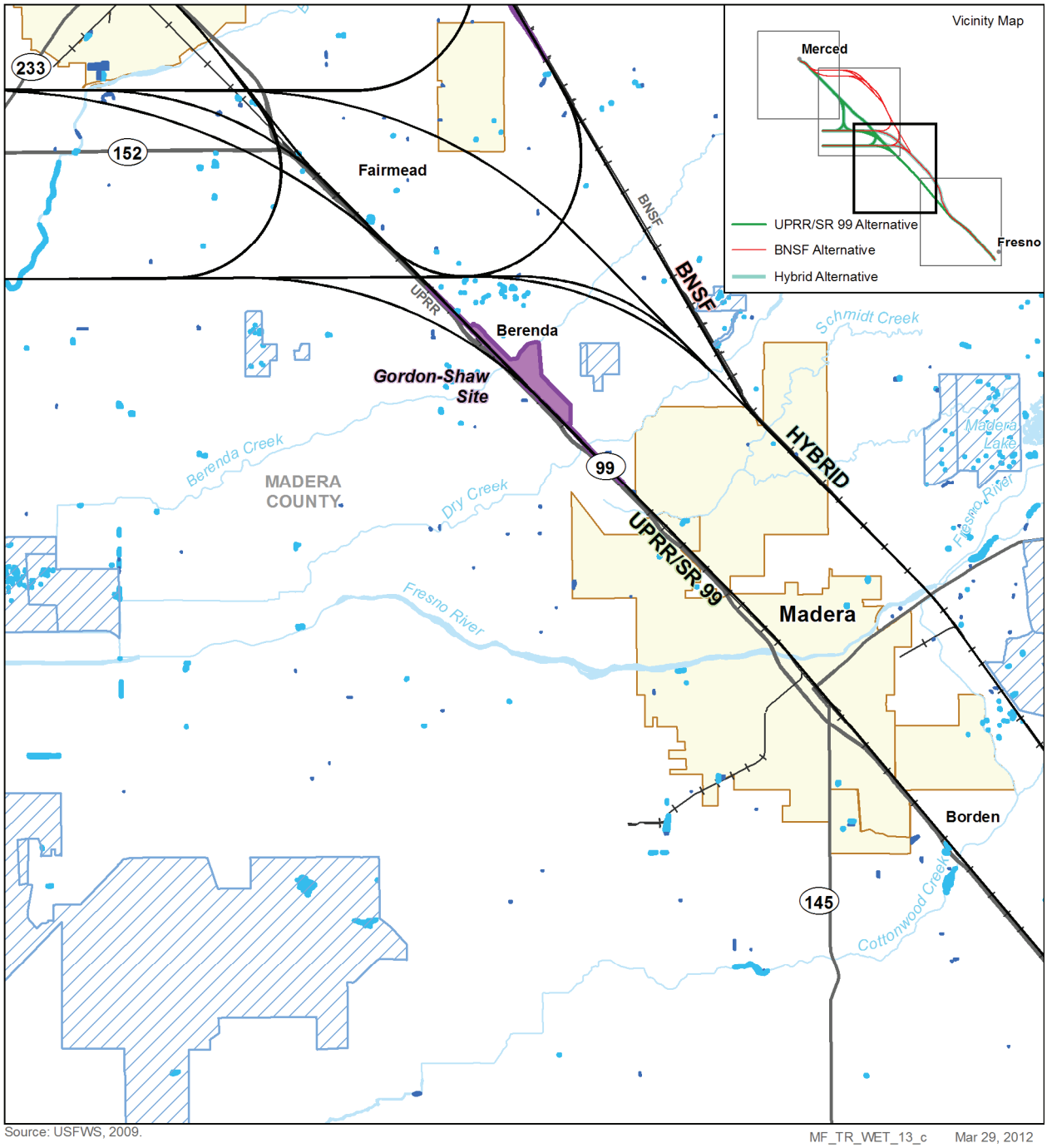
0 2.5
Miles

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

Central Valley Vernal Pool Complexes (Holland)

NWI
Freshwater Emergent Wetland
Freshwater Pond

Figure A-2
National Wetland Inventory –
Chowchilla Project Vicinity



Source: USFWS, 2009.

MF_TR_WET_13_c Mar 29, 2012

N

0 2.5
Miles

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

Central Valley Vernal Pool Complexes (Holland)

NWI
Freshwater Emergent Wetland
Freshwater Pond

Figure A-3
National Wetland Inventory –
Madera Project Vicinity

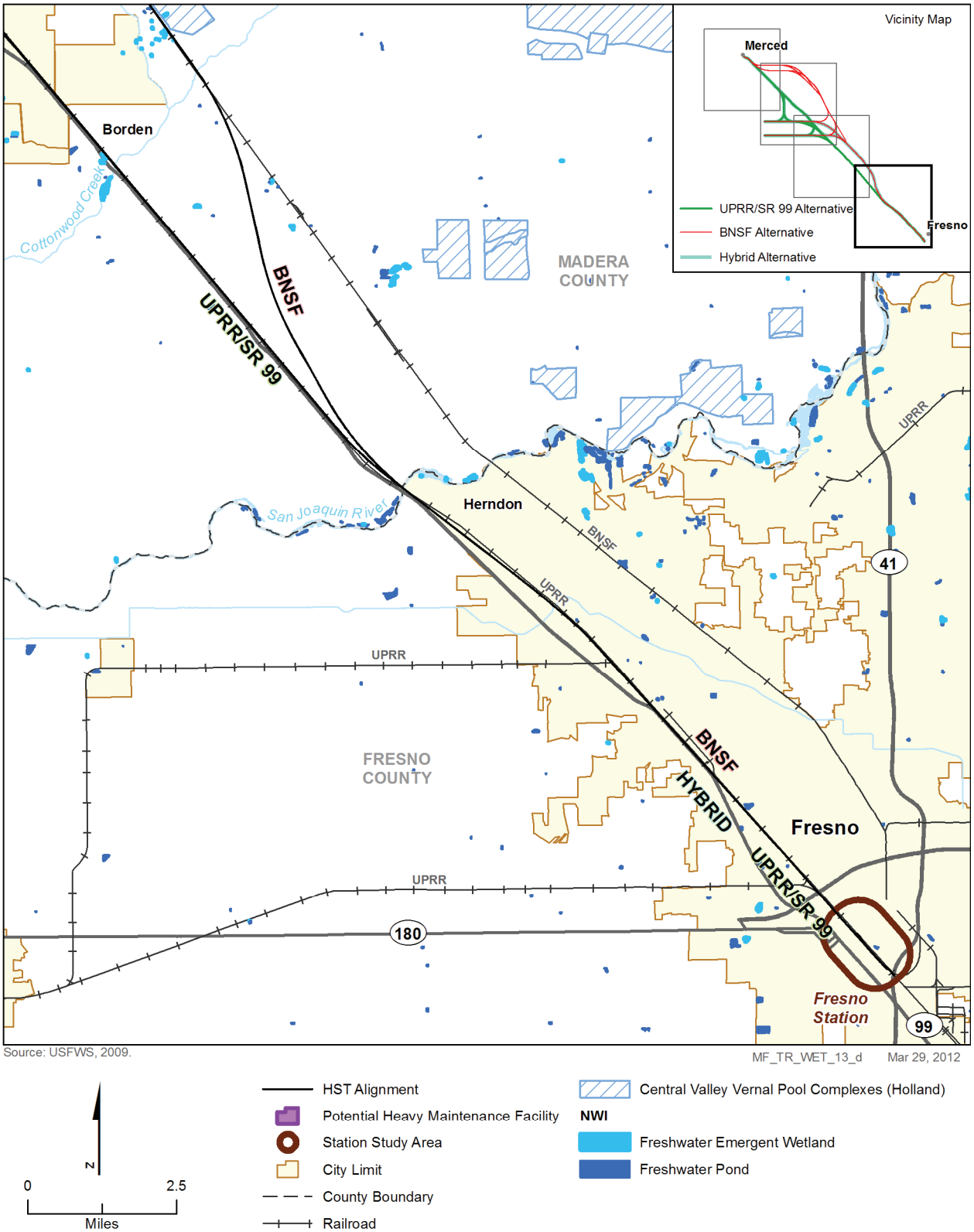


Figure A-4
National Wetland Inventory –
Fresno Project Vicinity

APPENDIX B

Central Valley Biological Resources and Wetlands Survey Plan

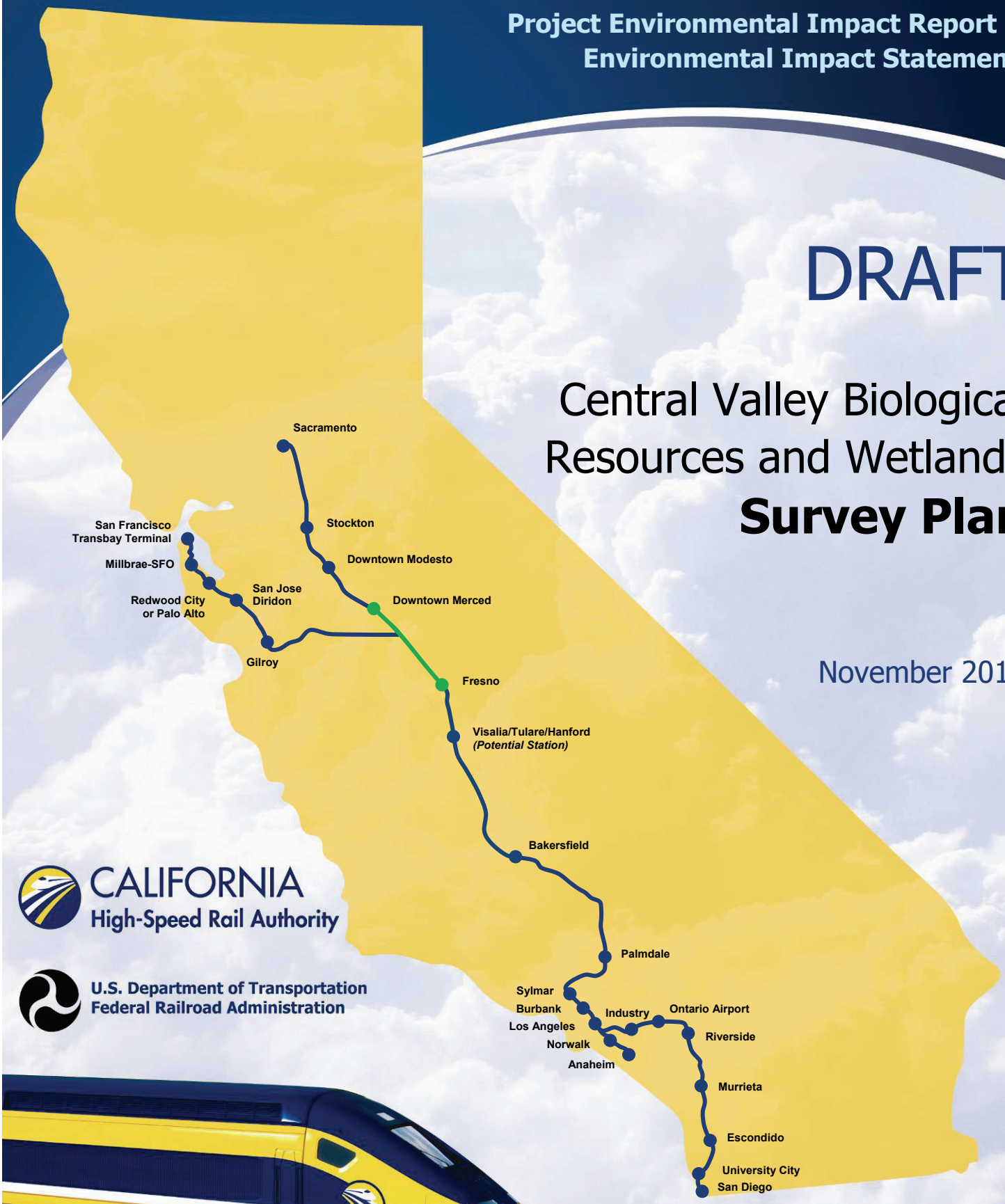
CALIFORNIA HIGH-SPEED TRAIN

Project Environmental Impact Report / Environmental Impact Statement

DRAFT

Central Valley Biological Resources and Wetlands **Survey Plan**

November 2010



CALIFORNIA High-Speed Rail Authority

U.S. Department of Transportation
Federal Railroad Administration

CALIFORNIA HIGH-SPEED TRAIN PROJECT EIR/EIS

Central Valley Biological Resources and Wetlands Survey Plan

San Jose to Merced Section
Merced to Fresno Section
Fresno to Bakersfield Section

Prepared by:

URS/HMM/Arup Joint Venture
CH2M HILL
ICF Jones and Stokes

November 2010

Contents

1.0 Introduction 1-1
1.1 Purpose of the Survey Plan 1-1
1.2 Types of Surveys Proposed 1-2
2.0 Project Overview 2-1
2.1 San Jose to Merced Section 2-1
2.2 Merced to Fresno Section 2-2
2.3 Fresno to Bakersfield Section 2-2
3.0 Regulatory Requirements 3-1
4.0 Methods: Preliminary Background Research 4-1
4.1 Definitions 4-1
4.2 Methods: Background Review 4-4
5.0 Results: Background Review 5-1
5.1 Wetlands and Other Waters 5-1
5.2 Plants 5-9
5.3 Wildlife 5-11
6.0 Studies to Be Conducted 6-1
6.1 Survey Area 6-1
6.2 Field Surveys 6-1
6.3 Timing and Duration 6-9
6.4 Reports 6-10
7.0 References 7-1
8.0 Preparer Qualifications 8-1

Tables

2.4-1 Consultants Associated with Central Valley HST Projects and Biology Points of Contact

5.2-1 Sensitive Natural Communities with Potential to Occur in the Central Valley HST Project Corridors

6.3-1 Proposed Biological Resources and Wetland Survey Schedule

8.0-1 Preparers' Qualifications

Figures

2-1 HST Project Overview

5-1 Watersheds: San Jose to Merced Section

5-2 Watersheds: Merced to Fresno Section

5-3 Watersheds: Fresno to Bakersfield Section

Appendixes

A Regulatory Agency Meeting Notes and Comments

B Table B-1: List of Special-Status Plant Species with Potential to Occur in the Central Valley HST Study Area

C Table C-1: List of Special-Status Wildlife Species with Potential to Occur in the Central Valley HST Study Area

ACROMYNS AND ABBREVIATIONS

Authority	California High-Speed Rail Authority
BNSF	BNSF Railroad
CDFG	California Department of Fish and Game
Central Valley HST Projects	San Jose to Merced Section, Merced to Fresno Section, and Fresno to Bakersfield Section of the High-Speed Train Projects
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CWA	Clean Water Act
CWHR	California Wildlife Habitat Relationship System
EIR/EIS	Environmental Impact Report/Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESRP	San Joaquin Valley Endangered Species Recovery Plan
GIS	Geographic Information System
GPS	Global Positioning System
HST	High Speed Train
HUC	Hydrologic Unit Code
MCV	Manual of California Vegetation
NRCS	Natural Resources Conservation Service
OHWM	Ordinary High Water Mark
Rapanos	Rapanos v. United States and Carabell v. Army Corps of Engineers
RPW	relatively permanent waters
RWQCB	Regional Water Quality Control Board
State	State of California
SWRCB	State Water Resources Control Board
Survey Plan	Biological Resources and Wetlands Survey Plan
TNW	traditionally navigable water
UPRR	Union Pacific Railroad
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WRAPP	Wetland and Riparian Area Protection Policy

Section 1.0
Introduction

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1.0 Introduction

Potential impacts on various biological resources presented in the Proposed California High-Speed Train (HST) System Program Environmental Impact Report/Environmental Impact Statement (EIR/EIS) (2005) and the Bay Area to Central Valley HST Program EIR/EIS (2008) relied primarily on available information. These Program EIR/EISs committed to subsequent analyses of biological resources for project environmental documents that would focus on project-specific impacts that reflect more precise definitions of the right of way, proposed facility locations, and operations. These subsequent analyses would support the overall biological resources mitigation strategy for the HST system which includes: (1) field verification of sensitive resources; (2) filling data gaps; (3) project-specific analyses of environmental impacts; (4) consultation with appropriate resource agencies to refine avoidance and mitigation measures, and; (5) developing and adopting a mitigation monitoring program.

The Central Valley Biological Resources and Wetlands Survey Plan (Survey Plan) summarizes the proposed survey methodologies for biological studies to be conducted on the following sections of the California High-Speed Rail Authority's (Authority) HST system: San Jose to Merced Section, Merced to Fresno Section, and Fresno to Bakersfield Section (Central Valley HST Projects).

The Survey Plan is organized as follows:

- Section 1 introduces the Survey Plan and provides background information.
- Section 2 defines the study area and describes the various Central Valley HST projects.
- Section 3 briefly summarizes the applicable regulatory requirements.
- Section 4 describes the background research methods.
- Section 5 describes the results of the background research.
- Section 6 identifies the proposed guidelines and methods that will be implemented to identify occurrences of waters of the U.S. and State (including wetlands), and California Department of Fish and Game (CDFG) lakes and streambeds, and special-status plant and wildlife species in the study area.
- Section 7 provides the references of documents cited within the Survey Plan.
- Section 8 provides a summary of the preparer's qualifications.

This document provides information necessary to implement biological resource surveys during the upcoming 2009-2010 survey season. These surveys will provide the information required for the Biological Resources and Wetlands Technical Report and the Biological Resources and Wetlands section of the Project EIR/EIS. The lead agencies are the Authority for the Environmental Impact Report (EIR) and the Federal Railroad Administration for the Environmental Impact Statement (EIS).

1.1 Purpose of the Survey Plan

On September 25, 2009, URS Corporation (URS), CH2M HILL, and ICF Jones and Stokes held a project workshop with the natural resources regulatory agencies (U.S. Environmental Protection Agency [EPA], U.S. Fish and Wildlife Service [USFWS], National Marine Fisheries Service [NMFS], U.S. Army Corps of Engineers [USACE], California Department of Fish and Game [CDFG]),and the Central Valley Regional Water Quality Control Board [RWQCB]) to introduce the HST system and elicit agency feedback regarding HST alignment alternatives in the Central Valley. One of the key requests from the agencies was the

consistency and approval of the proposed biological resources and wetlands survey methodologies to be used for surveys in the Central Valley.

On November 5, 2009 the Authority held a meeting with the various regulatory agencies (i.e. USFWS, USACE, and CDFG), URS, CH2M HILL, and ICF Jones and Stokes to discuss the October 2009 *Central Valley Biological Resources and Wetland Survey Plan* (FRA and Authority 2009). Revisions to the Survey Plan were made based on agency comments received during that meeting and the subsequent written comments received from agencies not in attendance. The November 5, 2009, meeting notes and the various written comments received from regulatory agencies are provided in Appendix A. This document is the revised Survey Plan; this revised plan incorporates the various comments received from the regulatory agencies.

Due to the large scale of the HST system and different consultants working on the sections of the HST system in the Central Valley, the need for a consolidated methodology was determined to be beneficial for both the consultants and the regulatory agencies. The proposed survey methods were developed to meet biological survey standards and satisfy a variety of regulatory needs including the preparation of project EIR/EISs for Central Valley sections of the HST system, technical reports, and permit applications.

1.2 Types of Surveys Proposed

Areas of possible further study identified in the Statewide HST System Program EIR/EIS and the Bay Area to Central Valley HST Program EIR/EIS (FRA and Authority 2005, 2008) included:

- Field surveys to determine the extent and type of general and sensitive biological resources
- Mapping of plant communities and sensitive biological resources within and adjacent to the right of way/impact footprint to address direct and indirect impacts on biological resources
- Study of wildlife movement/migration corridors
- Delineation of waters of the U.S. and State (including wetlands), and CDFG lakes and streambeds

Consistent with the studies envisioned in the Program EIR/EISs, surveys planned for the Central Valley HST Projects would include a wildlife habitat assessment and mapping, formal delineation of waters of the U.S. and State (including wetlands), CDFG lakes and streambeds, protocol-level botanical surveys for special-status plants, and field observations of wildlife movement/migration. The Survey Plan describes the methods that would be used to conduct these surveys. The proposed wildlife habitat assessment is a general assessment and not conducted to any protocol. CDFG or USFWS protocol-level habitat site assessments or protocol-level survey methods are not proposed within this Survey Plan. However, both the delineation of waters of the U.S. and State (including wetlands), and CDFG lakes and streambeds (where appropriate), and focused rare plant surveys will be conducted per the guidelines established by the U.S. Army Corps of Engineers (USACE [wetlands and other waters of the U.S.]), the USFWS (plants), CDFG (plants) and California Native Plant Society (CNPS; [plants]). The wildlife habitat assessment will be conducted using general habitat assessment guidelines associated with the CDFG's California Wildlife Habitat Relationship System (CWHR) in conjunction with pedestrian surveys and aerial photograph interpretation.

The Survey Plan describes the general methodologies used to determine which biological resources and wetlands are present in the broad study area and to describe the specific surveys for those species that will be conducted within the detailed survey area. The study area includes the Central Valley HST Projects and the surrounding area, extending laterally between 0.5 mile and more than 10 miles. The survey area, proposed for the specific and detailed mapping of the various biological resources, is focused primarily on the Central Valley HST Project alternative alignments and extends laterally between 100 and 1,000 feet.

Section 2.0
Project Overview

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2.0 Project Overview

In November 2005, the Federal Rail Administration, collectively with the Authority, prepared a Programmatic EIR/EIS that evaluated the ability of an HST system to meet the existing and future capacity demands on California's intercity transportation system. The 2005 Program EIR/EIS found that an HST system would meet the need for a safe and reliable mode of travel linking the major metropolitan areas of the state and delivering predictable, consistent travel times sustainable over an extended period. It also found that while highway and air transportation improvements would reduce travel times and congestion, these alternative modal improvements would also have greater potential for significant environmental impacts compared to the HST and would increase energy use, urban sprawl, and dependence on petroleum.

As a result of the 2005 and 2008 programmatic EIR/EIS analyses, the Authority and Federal Rail Administration chose to proceed with the HST system. They are now preparing project EIR/EISs for nine independent sections of the HST system. Five of these independent sections are located wholly or partially within California's Central Valley. Those sections are San Jose to Merced, Merced to Fresno, Merced to Sacramento, Fresno to Bakersfield, and Bakersfield to Palmdale. Three of those sections are included in this Survey Plan: San Jose to Merced, Merced to Fresno, and Fresno to Bakersfield. These three sections are collectively termed the Central Valley HST Projects in this Survey Plan and their locations are depicted in Figure 2-1.

Two sections of the HST system located in the Central Valley were excluded from the Survey Plan: Merced to Sacramento and Bakersfield to Palmdale. The Merced to Sacramento section is on an independent schedule and therefore information regarding potential alignments is speculative at this time. The Bakersfield to Palmdale section is not described in detail because the range of alternatives have not yet been defined and only a small portion of this project occurs within the Central Valley.

The Authority is in the process of evaluating alternative alignments for the Central Valley HST Projects. Therefore, alternatives identified to date may change as environmental analyses of these projects proceed.

2.1 San Jose to Merced Section

The San Jose to Merced Section of the HST system is approximately 135 miles long. The limits are from the San Jose HST station through the planned junction (wye) with the Merced to Fresno Section of the system. The program alignment for this section was adopted by the Authority as the locally preferred alternative in July 2008 and is fully described in the Authority's Final Bay Area to Central Valley High-Speed Train (HST) Program Environmental Impact Report / Environmental Impact Statement (EIR/EIS) (FRA and Authority 2008).

The San Jose to Merced Section is composed broadly of three distinct landscapes. The San Jose to Gilroy program alignment (approximately 36 miles) is within the Santa Clara Valley and generally follows the Caltrain and Union Pacific Railroad (UPRR) route until it turns east toward the Pacheco Pass. The Gilroy to Santa Nella (at Interstate 5) program alignment (approximately 21 miles) crosses the open spaces of the Pacheco Creek Valley, Pacheco Pass, and San Luis Reservoir. The program alignment passes from Santa Nella to the Merced to Fresno corridor (approximately 45 miles) crossing the San Joaquin Valley. The Grasslands Ecological Area is a defining feature of this area, along with the myriad of established agricultural uses.

For the purpose of this document, only the biological resources located east of the Santa Clara County Line (in the Central Valley) will be considered. This boundary is consistent with the CDFG and Regional Water Quality Control Board (RWQCB) jurisdictional boundary between the Central Region and the Bay Delta Region (CDFG) and the Central Valley and Bay Area (RWQCB). By using this boundary, the Survey

Plan is focused on the biological resources that occur within the Central Valley Region and does not address those resources that may be unique to the Bay Area-Delta Region.

2.2 Merced to Fresno Section

The Merced to Fresno Section of the HST system is approximately 56 miles long. Alternative route development for the Merced to Fresno section is based on the set of HST alternatives that were analyzed in the 2005 Final Program EIR/EIS for the Proposed HST System and the 2008 Bay Area to Central Valley HST Final Program EIR/EIS.

The Merced to Fresno Section begins north of the Castle Commerce Center in Atwater (north of the city of Merced) and ends near downtown Fresno. The Merced to Fresno alignment alternatives cross the southeastern part of Merced County, Madera County, and parts of Fresno County. The Merced to Fresno Section connects to the Merced to Sacramento section to the north, the San Jose to Merced section (via Pacheco Pass) to the west, and the Fresno to Bakersfield Section to the south. While the HST sections north and south will connect with a continuous high-speed train line, the connection to the San Jose to Merced section (via Pacheco Pass) to the west will require a railroad wye, which is a large divergence of two rail tracks curving northbound and two rail tracks curving southbound.

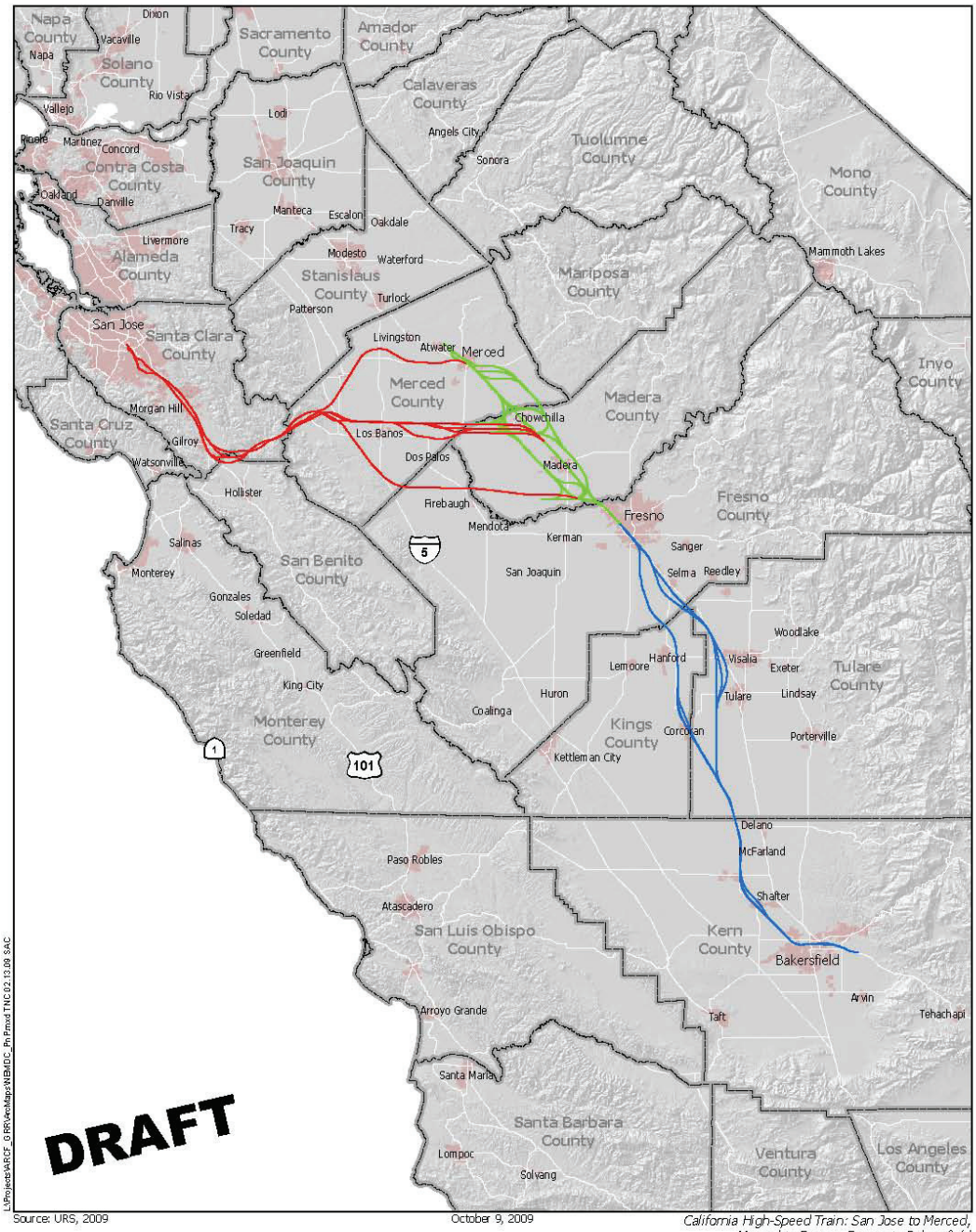
At this time, four alignment alternatives and three wye alternatives are under consideration. The four alignment alternatives follow either the BNSF Railroad (BNSF) railway or the UPRR railway adjacent to State Route 99 (with both an eastern and western alternative to avoid Madera and Chowchilla). The three wye alternatives are the alignments along (1) Avenue 24, north of State Route 152 along Avenue 24 and Henry Miller Road; (2) State Route 152; and (3) south of State Route 152 along Avenue 22.

The limits of the biological analysis for this section are between the Castle Commerce Center in Atwater and downtown Fresno (Clinton Avenue).

2.3 Fresno to Bakersfield Section

The Fresno to Bakersfield Section of the HST is approximately 113 miles long. The limits of the section are roughly from the Fresno HST station to the Bakersfield HST station. The Statewide Program EIR/EIS selected the BNSF corridor between Fresno and Bakersfield as the preferred alignment for this portion of the Central Valley. However, this alignment uses the UPRR corridor through the urban area of Fresno, and calls for a new high-speed alignment around the eastern side of the city of Hanford. Alignment alternatives will also be evaluated to serve a potential station in the Visalia/Hanford/Tulare area and avoid large properties in Kern County protected under Section 4(f) of the Department of Transportation Act.

The limits of the biological analysis for this section are generally from downtown Fresno (Clinton Avenue) to the eastern edge of the City of Bakersfield (Edison Boulevard).


Napa County
Napa
Vacaville
Dixon
Solano County
Rio Vista
Vallejo
Pittsburg
Martinez
Concord
Contra Costa County
Oakland
Danville
Sacramento County
Amador County
Calaveras County
Angels City
Sonora
Tuolumne County
Mono County
Mammoth Lakes
Lodi
San Joaquin County
Manteca
Escalon
Tracy
Oakdale
Livermore
Alameda County
Modesto
Waterford
Stanislaus County
Turlock
Patterson
Mariposa County
San Jose
Santa Clara County
Livingston
Atwater
Merced
Merced County
Madera County
Invo County
Morgan Hill
Santa Cruz County
Gilroy
Watsonville
Los Banos
Chowchilla
Dos Palos
Madera
Hollister
Firebaugh
Fresno
Fresno County
Mendota
Kerman
Salinas
Monterey
San Benito County
San Joaquin
Sanger
Selma
Reedley
Gonzales
Soledad
Woodlake
Greenfield
Hanford
Visalia
Exeter
Tulare County
Lemoore
King City
Huron
Tulare
Lindsay
Coalinga
Kings County
Corcoran
Porterville
Monterey County
Kettleman City
Delano
McFarland
Paso Robles
Shafter
Atascadero
San Luis Obispo County
Kern County
Bakersfield
Arvin
Arroyo Grande
Taft
Tehachapi
Santa Maria
Santa Barbara County
Lompoc
Solvang
Ventura County
Los Angeles County
DRAFT
5
1
101
Source: URS, 2009
October 9, 2009
California High-Speed Train: San Jose to Merced, Merced to Fresno, Fresno to Bakersfield
10 5 0 10 20 Miles
10 5 0 10 20 Kilometers
Legend
San Jose to Merced*
Merced to Fresno
Fresno to Bakersfield
HST Project Overview
Figure 2-1
*Biological Resources and Wetlands Survey Plan only includes analysis east of Santa Clara county line.

Environmental Consultants

Because of the large size of the HST system, a number of environmental, engineering, and specialty consultants are involved in the various HST projects. Table 2.4-1 shows which consultants are involved and provides contact information for the lead biological resource and wetland consultants associated with each of the Central Valley HST Projects.

Table 2.4-1
Consultants Associated with Central Valley HST Projects and Biology Points of Contact

Project Segment	Consultants	Contact (Biology)	Phone Number/Address	Email
San Jose to Merced Section	ICF Jones and Stokes	Troy Rahmig (Parsons, ICF Jones and Stokes)	408-434-2244 ICF Jones and Stokes 2841 Junction Ave Suite 114 San Jose, CA 95134	TRahmig@icfi.com
Merced to Fresno Section	CH2M HILL	Russel Huddleston (CH2M HILL)	510-58707681 155 Grand Avenue, Suite 800 Oakland, CA 94612	Russel.Huddleston@ch2m.com
Fresno to Bakersfield Section	URS Corp.	Justin Whitfield (URS, Hatch Mott McDonald, Arup)	510-874-3078 URS Corp. 1333 Broadway, Suite 800 Oakland, CA 94612	Justin_Whitfield@URSCorp.com

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Section 3.0
Regulatory Requirements

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3.0 Regulatory Requirements

The Survey Plan is being prepared for review by CDFG, the State Water Resource Control Board (SWRCB), the RWQCB, USFWS, NMFS, EPA, and USACE prior to conducting biological surveys for resources protected by federal and State of California (State) regulations. The following describes the primary laws, ordinances, regulations, and standards that are applicable or potentially applicable to biological resources and wetlands in the various Central Valley HST Projects:

Federal Regulations

- National Environmental Policy Act (42 U.S.C. 4321 et seq.)
- Federal Endangered Species Act (16 U.S.C 1531–1543)
    - Section 7: Interagency Cooperation
    - Section 9: Prohibited Acts
    - Section 10: Habitat Conservation Plans
- Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1801 et seq.)
- Clean Water Act (33 U.S.C. 1251–1376)
    - Section 401: State Discharge Certification
    - Section 402: National Pollutant Discharge Elimination System
    - Section 404: Wetland Discharge and Fill
    - Section 10: Rivers and Harbors Act
- Fish and Wildlife Coordination Act (16 U.S.C. 661–667e et seq.)
- Migratory Bird Treaty Act (16 U.S.C. 703–712)
- Bald and Golden Eagle Protection Act (16 U.S.C. 668–668d, 54 Stat. 250)
- Executive Order 11990, Protection of Wetlands
- Executive Order 13112, Invasive Species

State Regulations

- California Environmental Quality Act (Title 14 C.C.R. § 15000 et seq.)
- California Endangered Species Act (Fish and Game Code, Sections 2050 et seq.)
- California Fish and Game Code
    - Lake and Streambed Alteration (Section 1600 et seq.)
    - California Native Plant Protection Act (Fish and Game Code 1900–1913)
- Porter-Cologne Water Quality Control Act (California Water Code, Division 7)

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Section 4.0
Methods: Preliminary Background Research

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4.0 Methods: Preliminary Background Research

This section defines special-status species, waters of the U.S. and State (including wetlands), CDFG lakes and streambeds, and sensitive natural communities, and summarizes the methods that were used to conduct background research and obtain information about the various biological and aquatic resources that could occur or are known to occur in the vicinity of the Central Valley HST Projects. The background research consisted of reviews of regulatory agency and organization species lists and use of software programs (e.g., Rarefind) and Geographic Information System (GIS) to review databases and inventories. Background research was also conducted through a review of published literature, biological reference books, database searches and GIS data analysis. No field surveys were performed as part of the preliminary background research.

4.1 Definitions

The definitions of special-status species, wetlands, waters of the U.S. and State (including wetlands), and CDFG lakes and streambeds, and sensitive natural communities are provided in the following subsections.

4.1.1 Special-Status Species

Special-status species are plants or animals that are legally protected under the federal Endangered Species Act (ESA), California Endangered Species Act, or other regulations, as well as species considered sufficiently rare by the scientific community to qualify for such listing. Special-status species include:

- Species listed or proposed for listing as threatened or endangered under the ESA (50 C.F.R. 17.12 [listed plants]); 50 C.F.R. 17.11 [listed animals]; and various notices in the Federal Register [proposed species])
- Species that are candidates for possible future listing as threatened or endangered under the ESA (73 F.R 75176, December 10, 2008)
- Species listed or proposed for listing by the State of California as threatened or endangered under the California Endangered Species Act (14 C.C.R. 670.5)
- Species that meet the definitions of rare or endangered under the California Environmental Quality Act (CEQA Guidelines Sections 15380 and 15125)
- Plants presumed by the 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 (Fish and Game Code 1900 et seq.)
- Animal species of special concern to the CDFG (CDFG 2009a)
- Birds species of conservation concern as identified by USFWS in *Birds of Conservation Concern 2008* (USFWS 2008)

- Animals that are fully protected in California (California Fish and Game Code Sections 3511 [birds], 4700 [mammals], 5050 [amphibians and reptiles], and 5515 [fish]) (CDFG 2009a)

4.1.2 Wetlands, Waters of the U.S., Waters of the State, and CDFG Lakes and Streambeds

Wetlands and other waters (waters of the U.S.) are defined by federal regulations. Waters of the State are not clearly defined and a policy for regulating impacts to waters of the State has not been officially adopted, though a draft definition has been developed. The federal, State (as proposed), and CDFG definitions of lake and streambed are provided below.

A. Federal Definitions

The federal Clean Water Act defines waters of the U.S. as follows:

1. All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

2. All interstate waters including interstate wetlands; and

3. All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce…. (33 CFR 328.3[a]).

The federal Clean Water Act 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 C.F.R. 328.3[b]; 40 C.F.R. 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 EPA (2007) have developed specific criteria for determining whether features are waters of the U.S. based on these Court rulings.

<u>Solid Waste Agency of Northern Cook County v. United States Army Corps of Engineers</u>

On January 9, 2001, the U.S. Supreme Court issued a decision in Solid Waste Agency of Northern Cook County v. United States Army Corps of Engineers. The case involved the filling of hydrologically isolated waters that had formed in abandoned sand and gravel pits. In the 5-4 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 non-navigable, 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 non-wetland waters of the U.S.) are generally considered non-jurisdictional under the federal Clean Water Act.

<u>Rapanos v. United States and Carabell v. Army Corps of Engineers</u>

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) (hereafter referred to as "Rapanos"), challenged

USACE interpretation of waters of the U.S. (USACE and EPA 2007) The USACE had interpreted the Clean Water Act (CWA) 33 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' 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.

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 (TNW), wetlands adjacent to traditional navigable waters, non-navigable tributaries to TNWs that are relatively permanent waters (RPW), and wetlands that abut RPWs. The agencies may take jurisdiction over non-navigable tributaries that are not RPWs, wetlands that are adjacent to non-RPWs, and wetlands adjacent to but not directly abutting a relatively permanent non-navigable tributary. The agencies will generally not assert jurisdiction over swales, erosional features or ditches excavated wholly in and draining only uplands and that don't carry a relatively permanent flow of water.

The federal Clean Water Act 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 C.F.R. 328.3[b]); 40 C.F.R. 230.3[t]).

B. State Definitions

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 Clean Water Act. 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 the State Water Board Resolution No 2008-0026, a wetland definition will be developed as part of the Wetland and Riparian Area Protection Policy (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."

Although some RWQCBs have adopted a wetland definition in their basin plans, the Central Valley RWQCB has not adopted a wetland definition within the various basin plans under its jurisdiction.

C. CDFG Lakes and Streambeds

The CDFG is responsible for conserving, protecting, and managing California's fish, wildlife, and native plant resources. To meet this responsibility, the California Fish and Game Code (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.

4.1.3 Sensitive Natural Communities

Sensitive natural communities are communities that are of limited distribution statewide or within a county or region and are often vulnerable to environmental effects of projects (CDFG 2009b).. Both sensitive natural communities and other natural communities are tracked by the California Natural Diversity Database (CNDDB), and may or may not contain individual plants or animals classified as special-status species. The identification of vegetation communities by their rarity and threat level is an important component of vegetation classification and conservation. Although sensitive natural communities have no legal status along (with the exception of some sensitive natural communities [i.e., wetlands, riparian areas] that are afforded protection separately under federal and/or state regulations), lead and trustee agencies may request that impacts to these communities be addressed in environmental documents. Local agencies may also have policies requiring avoidance of rare community types.

The list of sensitive natural communities in California is currently maintained by CDFG in their *Vegetation Classification and Mapping Program List of California Terrestrial Natural Communities Recognized by the CNDDB* (CDFG 2003). Both the CNPS *Botanical Survey Guidelines* and *CDFG Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CNPS 2001; CDFG 2009) specify that the CNDDB's *List of California Terrestrial Natural Communities* is to be used as a guide to the names and status of sensitive natural communities. These communities are described based on a vegetation classification system developed by Sawyer and Keeler-Wolf, which is published in the first edition of the *Manual of California Vegetation* (MCV) (Sawyer and Keeler-Wolf 1995).

4.2 Methods: Background Review

Existing background information was reviewed to develop the survey plans for waters of the U.S. and State (including wetlands), and CDFG lakes and streambeds, and special-status species. A list of sensitive natural communities, federally designated critical habitat units and all special-status species recorded or potentially occurring within the Central Valley HST Project corridors was compiled based on background information. This subsection summarizes the existing information that was reviewed.

4.2.1 Wetlands, Waters of the U.S., Waters of the State, and CDFG Lakes and Streambeds

Background research to identify locations of aquatic features potentially present in the Central Valley HST Project area was conducted at both a watershed level and a project level. The watersheds associated with each of the Central Valley HST Project corridors were identified using the Natural Resources Conservation Service (NRCS) Hydrologic Unit Code (HUC) Basins dataset (USDA and NRCS 1999). The Central Valley RWQCB basin plans for the Central Valley HST Project were also reviewed. This review included the identification of the watershed and sub-watershed areas, surface water features, and beneficial uses identified in *Water Quality Control Plan (Basin Plan) for the Sacramento River Basin and San Joaquin River Basin* (CVRWQCB 2007) and the *Water Quality Control Plan for the Tulare Lake Basin* (CVRWCB 2004).

To determine the location, type, and potential extent of known waters of the U.S. and State (including wetlands), and CDFG lakes and streambeds potentially present, existing data from the USFWS, U.S. Geological Survey (USGS), and CDFG were reviewed.

The study area for wetlands and other waters consisted of the Central Valley HST Project alignments plus a 0.5-mile buffer on either side of the alignments. The 0.5-mile buffer was chosen to include wetlands, other waters, and vernal pool complexes that may be present next to the alignment and to encompass the general nature of the habitat surrounding the alignments. The desktop survey for wetlands, lakes, and streams consisted of a GIS compilation of data layers from the following sources:

- National Wetlands Inventory (USFWS 2009b)
- National Hydrography Dataset (USGS and EPA 1999)
- Holland Vernal Pools layer also known as the CDFG Central Valley Vernal Pool Habitat dataset (Holland 1998)

4.2.2 Plants and Sensitive Natural Communities

To develop a list of sensitive natural communities and special-status plants potentially occurring in the Central Valley HST Project corridors, existing special-status plant species databases and agency information were reviewed. Database queries included all reported occurrences within 10 miles of the project alignment or potentially found within the various USGS 7.5-minute quadrangles (quads) that overlapped with the proposed alignment and its eight surrounding quads (collectively referred to as a nine-quad search area) for the Central Valley HST Project corridors. The following data sources were used:

- USFWS Sacramento Field Office Web Site: An official list of federal candidate, proposed, threatened, and endangered plant species having the potential to occur within a nine-quad area around the project alignment was generated in October 2009 (USFWS 2009a).
- CNDDB: A list of federal and State special-status, proposed, threatened, and endangered plant species, CDFG designated sensitive natural communities, and CNPS listed special-status plant species that have documented occurrences within 10 miles of the Central Valley HST Project alignments was generated in September 2009 (CDFG 2009c).
- CNPS's Online Inventory of Rare and Endangered Plants of California: A list of CNPS special-status plant species that may occur in the project vicinity was generated using a nine-Quad search in September 2009 (CNPS 2009).

4.2.3 Wildlife

A list of federally designated critical habitats and special-status wildlife species with potential to occur within the Central Valley HST Project corridors was prepared based on a desktop review of special-status species lists and databases. Database queries included all reported occurrences within 10 miles of the Project alignment or found within the nine-quad search area for the Central Valley HST Project corridors. The following data sources were used:

- USFWS Sacramento Field Office Web Site: An official list was prepared by querying the database through a standard nine-quad search to include all federally threatened and endangered wildlife species and their federally designated or proposed critical habitats known or expected to occur in the Central Valley HST Project alignments (USFWS 2009a).
- CNDDB Rarefind: A list of special-status species was prepared through a two-fold inquiry of the CNDDB via a standard nine-quad search using the RareFind program and a GIS mapping exercise of all occurrences within 10 miles of the proposed alignment(s) to include all special-status species occurrences reported in the Project vicinity. This two-fold inquiry was performed to ensure that all

special-status species, including those listed by CDFG as "Sensitive" whose geographic location data has been suppressed, were captured in the query (CDFG 2009c).

- CWHR Information System: The list of CDFG special-status species was augmented through a GIS exercise that overlaid the proposed alignment(s) with species range maps available through the CWHR Information System (CDFG 1988, 2008a). This query was performed to capture any additional special-status species whose known geographic range occurs within 10 miles of the Central Valley HST Project alignment, but for whom no occurrence data have been reported (CDFG 2008a).

A preliminary review of important wildlife movement corridors was based on the findings of the report, *Missing Linkages: Restoring Connectivity to the California Landscape* (Penrod et al. 2001), which was prepared in response to the 2000 Missing Linkages conference, and the subsequent 2003 *South Coast Missing Linkages Project* report (Penrod et al. 2003). Additionally, a preliminary review of movement corridors was based on habitat and linkage corridor data made available by the San Joaquin Valley Endangered Species Recovery Program (ESRP 2009).

Section 5.0
Results: Background Review

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5.0 Results: Background Review

This section presents the information that was compiled from existing sources as described in the previous section. The results of the background research conducted for wetlands and other waters, special-status plant and wildlife species, sensitive natural communities, critical habitat, and wildlife movement corridors are summarized in this section.

5.1 Wetlands and Other Waters

Using the GIS data layers, the Central Valley HST Project corridors were analyzed both at a watershed level and at a scale of 1:84,000 inches (1 inch = 7,000 feet). Major features of the waters of the U.S. and State (including wetlands), and CDFG lakes and streambeds included in the analysis are described in this section; however, this information is not intended to summarize all of the wetlands and other waters present and only provides an overview of the major features identified in the background research. The wetland delineation will be conducted for the purpose of obtaining a *Preliminary Jurisdictional Delineation* and will provide physical information for the various waters of the U.S. and State (including wetlands), and CDFG lakes and streambeds present within each of the Central Valley HST Project corridors.

5.1.1 San Jose to Merced Section

The San Jose to Merced Section (Merced County) spans the Pajaro, Middle San Joaquin-Lower Chowchilla, and Upper Chowchilla-Upper Fresno watersheds (Figure 5-1). All drainages connect with the San Joaquin River, which drains into San Francisco Bay, a TNW. Major named waterways for the San Jose (east of the Santa Clara County line) to Merced Section include:

- Bear Creek
- Los Banos Creek
- Mud Slough
- Deep Slough
- San Joaquin River

The San Jose to Merced Section east of the Santa Clara county line contains wetlands, streams, vernal pools, and irrigation ditches/canals, among other features, scattered throughout various portions of the alignments. Significant quantities of wetlands and vernal pool complexes occur near Los Banos Creek, Mud Slough, and the San Joaquin River. The various San Jose to Merced Project corridors cross the San Joaquin River at distinctly separate locations. Irrigation canals appear more frequently in the vicinity of the San Joaquin River.

In addition, the Water Quality Control Plan for the Sacramento River basin and the San Joaquin River Basin identifies the following beneficial uses of water resources in this basin: Municipal and Domestic Supply, Agricultural Supply, Industrial Service Supply, Industrial Process Supply, Ground Water Recharge, Freshwater Replenishment, Navigation, Hydropower Generation, Water contact Recreation, Non-water Contact Recreation, Commercial Sport Fishing, Aquaculture, Warm freshwater Habitat, Cold Freshwater Habitat, Wildlife Habitat, Migration of Aquatic Organisms, Spawning, Reproduction, and/or Early Development (CVRWCB 2009).

5.1.2 Merced to Fresno Section

The Merced to Fresno Section spans the Middle San Joaquin-Lower Chowchilla, Upper Chowchilla-Upper Fresno, and the Upper Dry watersheds (Figure 5-2). All drainages connect with the San Joaquin River, which drains into San Francisco Bay, a TNW. Major named waterways for the Merced to Fresno Section include:

- Bear Creek
- Deadman's Creek
- Owens Creek
- Chowchilla River
- Ash Slough
- Berenda Slough
- Dry Creek
- Fresno River
- Cottonwood Creek
- San Joaquin River

The National Wetlands Inventory identified a number of small wetlands scattered throughout the Merced to Fresno Section. The various alignments cross some of these features but most appear to be outside of the Merced to Fresno Section corridor. Larger wetland areas within the Merced to Fresno Section appear to occur along major creeks and rivers. While the Merced to Fresno Section appears to avoid most of the larger vernal pool complexes, some vernal pools occur within the eastern alignments that cross low-foothill areas.

5.1.3 Fresno to Bakersfield Section

The Fresno to Bakersfield Section spans the following watersheds, as identified by the NRCS HUC Basins dataset (Figure 5-3): Upper Dry, Tulare-Buena Vista Lakes, Upper Kaweah, Upper Tule, Upper Deer-Upper White, Upper Poso, and Middle Kern-Upper Tehachapi Grapevine.

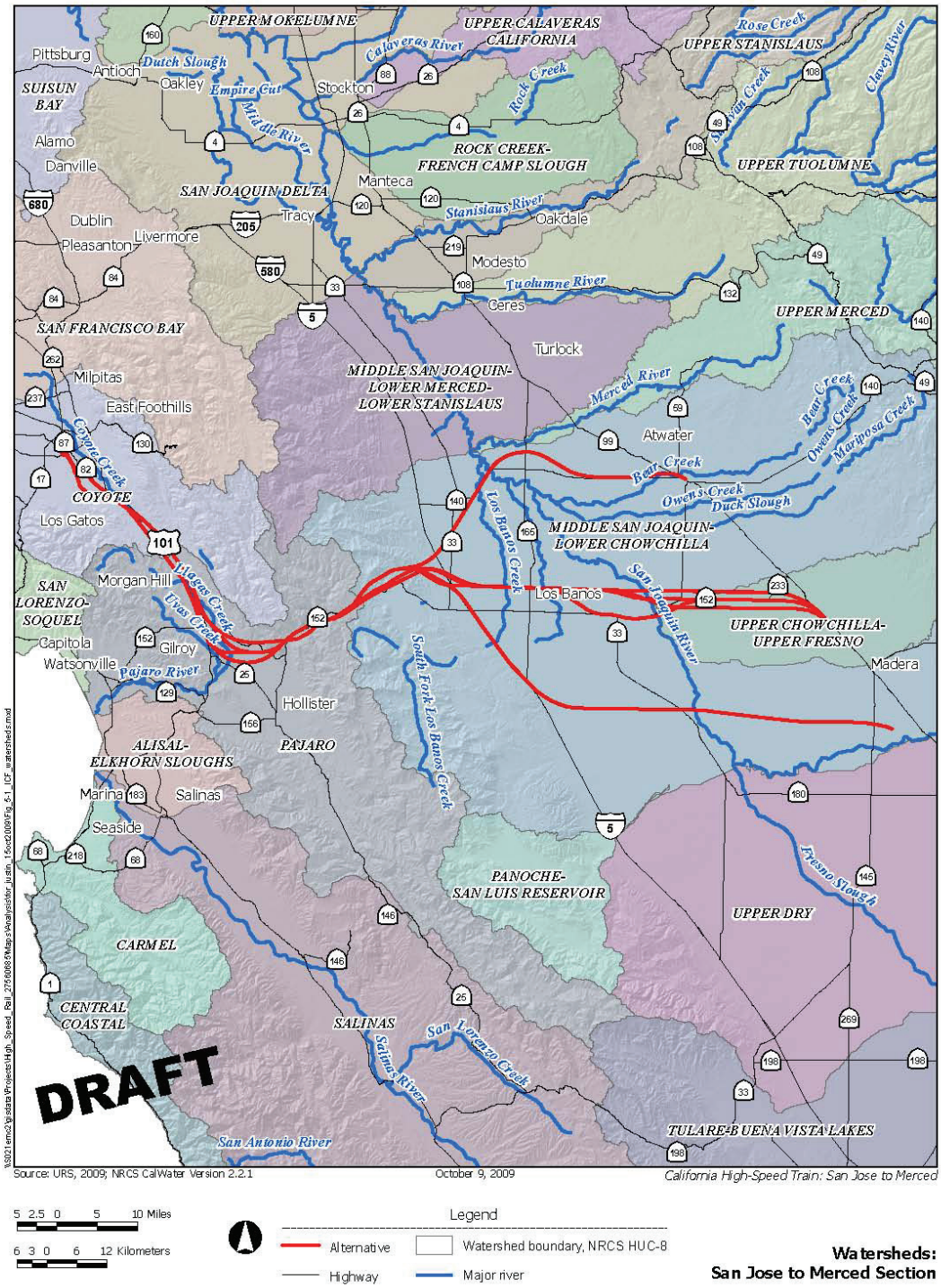
The proposed Fresno to Bakersfield Section occurs in the following surface water hydrologic units and hydrologic areas identified in the Water Quality Control Plan for the Tulare Lake Basin (CVRWCB 2004):

- South Valley Floor Hydrologic Unit: Raisin, Fresno, Consolidated, and Hanford-Lemoore hydrologic areas
- South Valley Floor Hydrologic Unit: Kern Delta and Arvin-Wheeler Ridge hydrologic areas
- South Valley Floor Hydrologic Unit: Kaweah Delta, Tule Delta, Lake Sump, Semitropic, and North Kern hydrological areas

In addition, the Water Quality Control Plan for the Tulare Lake Basin identifies the following groundwater sub-basins (CVRWCB 2004):

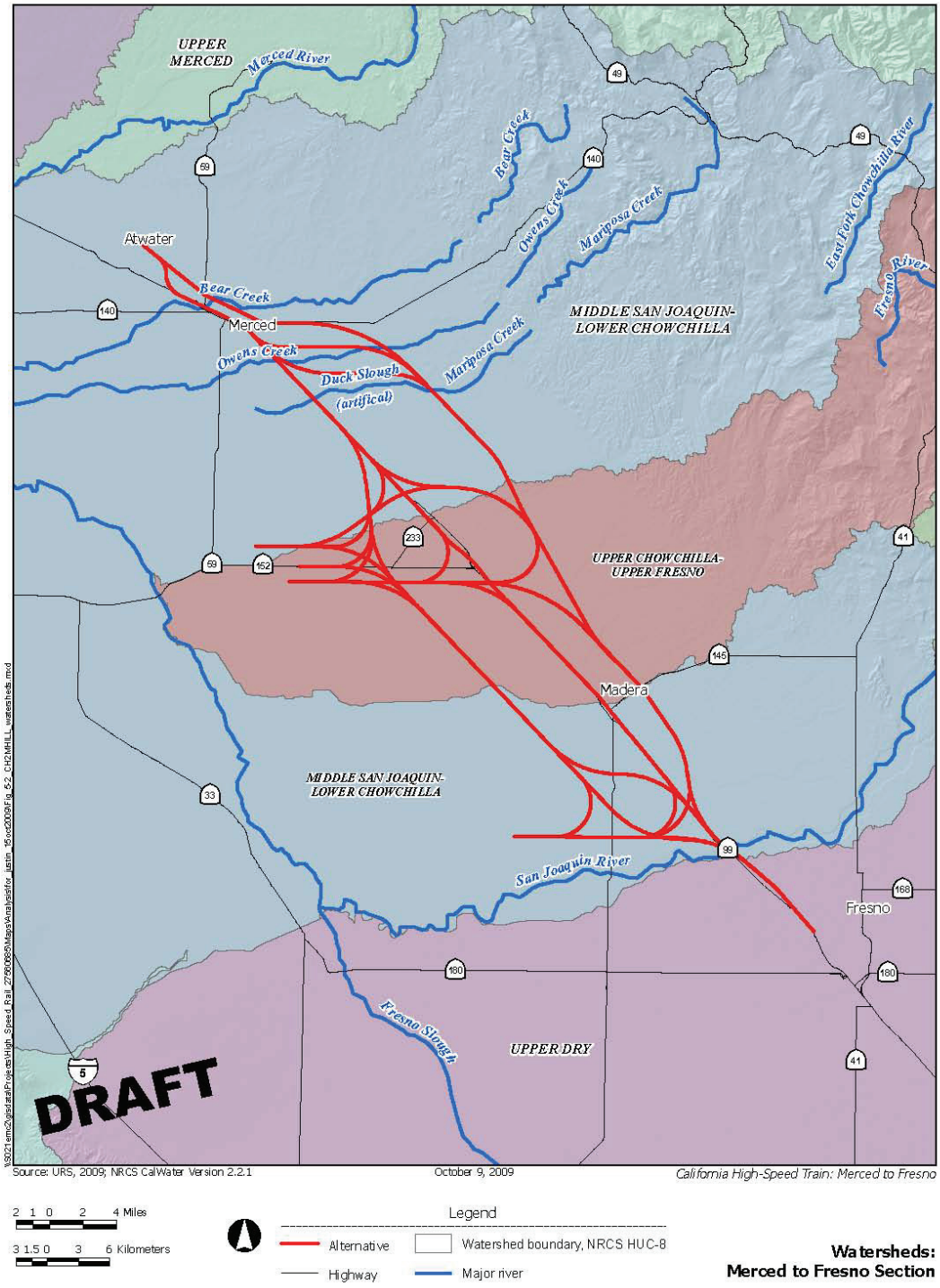
- Delta-Mendota Basin
- Kings Basin
- Kaweah Basin
- Tulare Lake Basin
- Tule Basin
- Kern County Basin

The basin plan identifies beneficial uses of groundwater and surface water features within the hydrologic areas listed above. The identified beneficial uses include Municipal and Domestic Supply, Agricultural Supply, Industrial Service Supply, Industrial Process Supply, Hydropower Generation, Water Contact Recreation, Non-Contact Water Recreation, Warm Freshwater Habitat, Cold Freshwater Habitat (Spawning only), Wildlife Habitat, Spawning-Reproduction and/or Early Development, Migration of Aquatic Organisms, Ground Water Recharge, Freshwater Replenishment, Aquaculture, Preservation of Biological Habitats of Special Significance, and Navigation.



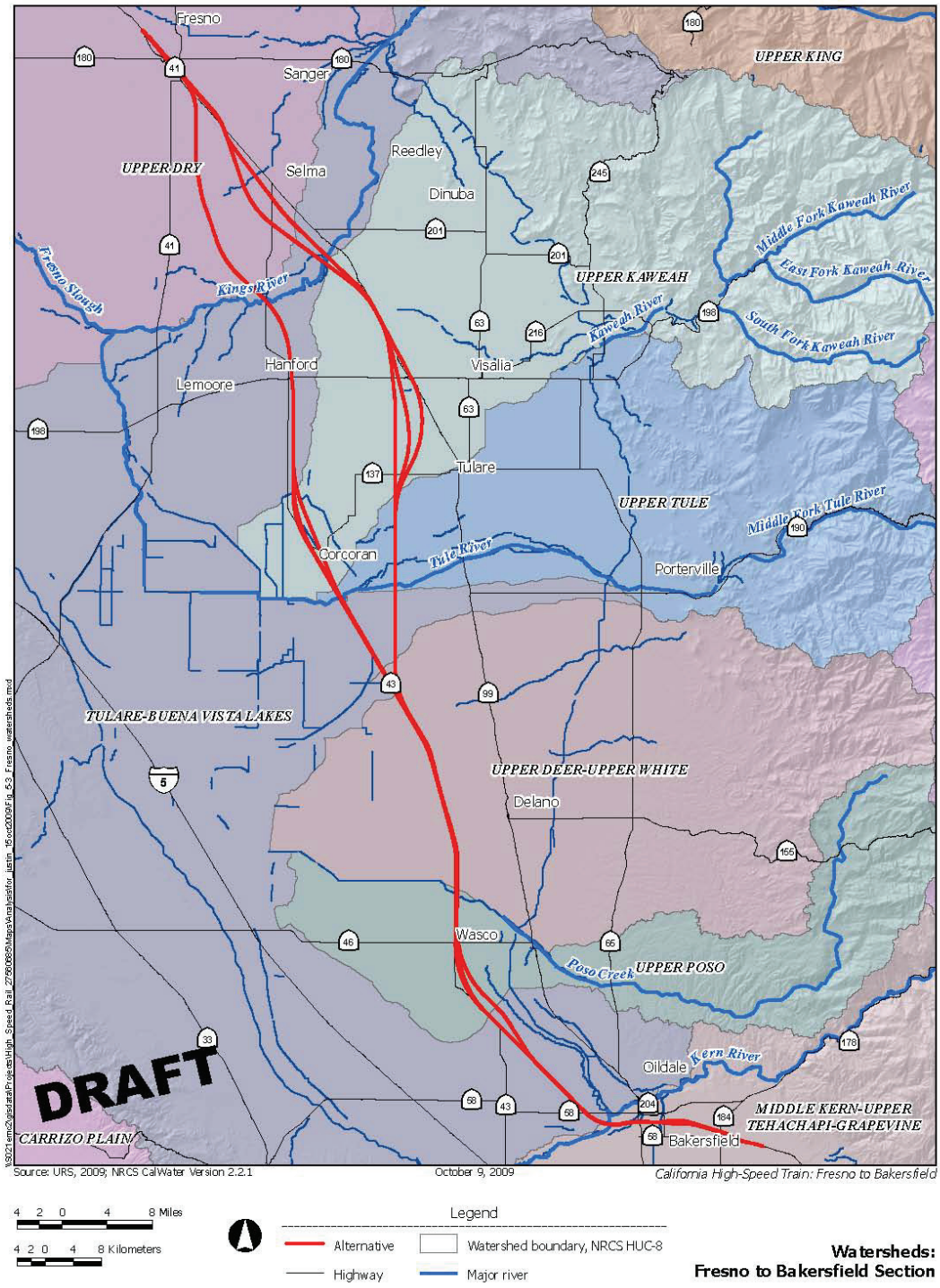
Watersheds:
San Jose to Merced Section

Figure 5-1



Watersheds: Merced to Fresno Section

Figure 5-2



Watersheds:
Fresno to Bakersfield Section

Figure 5-3

Unless otherwise designated by the Central Valley RWQCB, all groundwaters in the region are considered suitable or potentially suitable, at a minimum, for agricultural supply, industrial supply, and industrial process supply (CVRWQCB 2004).

Major rivers in the Fresno to Bakersfield Section include the Kern and Kings rivers. The Kern River historically emptied entirely into the now dry Buena Vista Lake at the southern end of the Central Valley. The river has been almost entirely diverted for irrigation, recharging aquifers, and the California Aqueduct, although some water empties into Lake Webb and Lake Evans, two small lakes in a portion of the former Buena Vista Lakebed (Katibah 1981). The Kings River flows about 125 miles to its discharge point in the Tulare Lake bed south of Stratford (Katibah 1981). Although the Kings River typically terminates in the Tulare Lake bed, in extremely wet years it flows into the San Joaquin River via Fresno Slough, eventually draining into San Francisco Bay. The remaining rivers and waterways in the Fresno to Bakersfield Section appear to terminate in the Central Valley, never reaching San Francisco Bay or the ocean. USACE guidance will be required regarding the federal jurisdiction of these waterways, and all waterways will be regulated as waters of the State. Major named waterways for the Fresno to Bakersfield Section include:

- Kings River
- Cross Creek
- Mill Creek
- Packwood Creek
- Tule River
- Elk Bayou
- Poso Creek
- Kern River

The Fresno to Bakersfield Section contains wetlands, streams, vernal pools, and irrigation ditches/canals, among other features, scattered throughout various portions of the alignments. A number of wetlands and vernal pool complexes occur near the Kings, Tule and the Kern Rivers. A large wetland complex is located at Allensworth Ecological Reserve (between Highways 43 and 99) managed by the CDFG.

5.2 Plants

The background research indicates that a total of 85 special-status plant species have potential to occur within the Central Valley HST Project corridors (Appendix B; Table B-1). The 85 species include 19 species listed as threatened and endangered under federal or State regulations and 66 species included under List 1, List 2, or List 3 of the CNPS Inventory of Rare and Endangered Plants.

Specifically, background research identified the following for the various Central Valley HST Project corridors:

- San Jose (Santa Clara County Line east) to Merced Section: 53 special-status plant species
    - 12 federal and State-listed species
    - 41 other special-status species
- Merced to Fresno Section: 42 special-status plant species
    - 12 federal and State-listed species
    - 30 other special-status species
- Fresno to Bakersfield Section: 54 special-status plant species
    - 13 federal and State-listed species
    - 41 other special-status species

Background research identified federally designated critical habitat for six federally listed plant species in the vicinity of the Central Valley HST Project corridors. Species with identified critical habitat include: succulent owl's-clover (*Castilleja campestris* ssp. *succulenta*), Hoover's spurge (*Chamaesyce hooveri*), Colusa grass (*Neostapfia colusana*), San Joaquin Valley Orcutt grass (*Orcuttia inaequalis*), hairy Orcutt grass (*Orcuttia pilosa*), and Green's tuctoria (*Tuctoria greenei*).

Further study will be required to determine whether these special-status plant species occur within the Central Valley HST Project corridors. Subsequent analysis based upon documented habitat and range for each species will allow further refinement and determination of likelihood of species occurrence within a specific Central Valley HST Project corridor. Focused botanical surveys will be conducted to determine the extent, location, and type of special-status plant species that occur in the Central Valley HST Project corridors.

A. Sensitive Natural Communities

The *List of California Terrestrial Natural Communities* (CDFG 2003) was based on the Vegetation Alliances (generic vegetation units) and Vegetation Associations (specific vegetation units) used in the first edition of the *Manual of California Vegetation* (Sawyer and Keeler-Wolf 1995). At the time the list was released (2003), the second edition of the *Manual of California Vegetation* (Sawyer et al 2009) was expected to be published in the near term. Therefore, CDFG stated that the *List of California Terrestrial Natural Communities* was an interim reference pending the release of the second edition of the *Manual of California Vegetation*. In 2009, with the publication of the second edition of the *Manual of California Vegetation*, CDFG prepared an updated *List of Vegetation Alliances* (CDFG 2009e) with associated rarity rankings, using NatureServes standard heritage program methodology (NatureServe 2010). However, these rankings have yet to be incorporated within the CNDDB and are therefore not part of the background research or results.

The CNDDB search identified 13 natural communities occurring in the vicinity of the Central Valley HST Project alignments. Eight of these are deemed sensitive natural communities, as described in *Vegetation Classification and Mapping Program List of California Terrestrial Natural Communities Recognized by the CNDDB* (CDFG 2003); the remaining 5 natural communities are tracked by the CNDDB. Additional natural communities not identified by the CNDDB may be present in the vicinity of the Central Valley HST Project alignments (e.g., willow riparian types and riparian oak woodland types). Both sensitive natural communities and additional communities tracked by the CNDDB are presented in Table 5.2-1.

Table 5.2-1
Sensitive Natural Communities with Potential to Occur in the Central Valley HST Project Corridors

Rare Plant Communities	San Jose to Merced Section	Merced to Fresno Section	Fresno to Bakersfield Section
Sensitive Natural Communities			
Great Valley Cottonwood Riparian Forest	✓	--	✓
Great Valley Mesquite Scrub	✓	--	✓
Great Valley Mixed Riparian	--	✓	--
Northern Claypan Vernal Pool	✓	✓	✓
Stabilized Interior Dunes	--	--	✓

Table 5.2-1
Sensitive Natural Communities with Potential to Occur in the Central Valley HST Project Corridors

Rare Plant Communities	San Jose to Merced Section	Merced to Fresno Section	Fresno to Bakersfield Section
Sycamore Alluvial Woodland	✓	✓	--
Valley Sacaton Grassland	✓	✓	✓
Other Natural Communities tracked by the CNDDB			
Alkali Seep	✓	--	--
Cismontane Alkali Marsh	✓	--	--
Coastal and Valley Freshwater Marsh	✓	✓	--
Valley Saltbush Scrub	--	--	✓
Valley Sink Scrub	✓	✓	✓

-- Not Known from the Vicinity of the Study Area
✓ Potential to Occur in the Study Area
Note: Other sensitive natural communities may occur in the HST Central Valley HST Project corridors that are not listed in this table.

The location, type and extent of sensitive natural communities, as identified in the second edition of the *Manual of California Vegetation* (Sawyer et al 2009), within the Central Valley HST Project corridors will be identified and mapped during the botanical surveys.

5.3 Wildlife

The background research identified 122 special-status wildlife species as having potential to occur within the Central Valley HST Project corridors (Appendix C; Table C-1).

The overall composition of special-status wildlife species includes:

- 5 invertebrate species
- 11 fish species
- 8 amphibian species
- 7 reptile species
- 74 bird species (plus all Migratory Bird Treaty Act species)
- 17 mammal species

Specifically, background research identified the following for the various Central Valley HST Projects:

- San Jose (Santa Clara County Line east) to Merced Section: 93 special-status wildlife species
    - 25 federal and State listed species, including:
        - 6 species with federally designated or proposed critical habitat in the various alignments

    - 8 fully protected species
    - 68 other special-status species
- Merced to Fresno Section: 92 special-status wildlife species
    - 23 federal and State listed species, including
        - 6 species with federally designated or proposed critical habitat in the various alignments
        - 5 fully protected species
        - 69 other special-status species
- Fresno to Bakersfield Section: 111 special-status wildlife species
    - 32 federal and State listed species, including
        - 3 species with federally designated or proposed critical habitat in the various alignments
        - 8 fully protected species
        - 79 other special-status species

Federally designated or proposed critical habitat was identified within the vicinity of the Central Valley HST Project corridors for a total of nine wildlife species including: Conservancy fairy shrimp (*Branchinecta conservatio*), longhorn fairy shrimp (*Branchinecta longiantenna*), vernal pool fairy shrimp (*Branchinecta lynchi*), vernal pool tadpole shrimp (*Lepidurus packardi*), Central Valley steelhead and Central California coast steelhead (*Oncorhynchus mykiss*), California tiger salamander (*Ambystoma californiense*), California red-legged frog (*Rana draytonii*), and Fresno kangaroo rat (*Dipodomys nitratoides exilis*).

Further evaluation will be required to determine whether the identified special-status wildlife species occur within the Central Valley HST Project corridors. Subsequent analysis of each species' habitat requirements and range will allow further refinement and determination of likelihood of species occurrence. A wildlife habitat assessment will be conducted to determine the location and extent of suitable habitat as described in Section 6.

5.3.1 Movement Corridors

Previous studies have identified several regional wildlife movement corridors that intersect the Central Valley HST Project corridors.

A. San Jose to Merced Section

Within the San Jose to Merced Section, four high-priority wildlife linkages were identified:

- Two high-priority north-south linkages in the vicinity of Grassland Ecological Area
- One high-priority east-west linkage that connects the eastern foothills of the Central Valley in northern Merced County
- One high-priority east-west corridor that connects the foothills and the Central Valley in southern Merced County (Penrod et al. 2001)

The San Jose to Merced Section also intersects several movement corridors identified by the San Joaquin Valley Endangered Species Recovery Program (ESRP 2009); these movement corridors are described as the areas between:

- The Santa Nella area.

Additional analysis throughout the San Jose to Merced Section will be necessary to address potential waterfowl wintering and stopover sites in the Grassland Ecological Area. Additional analysis will also be

necessary to address San Joaquin kit fox movements along the western side of the Central Valley in the Santa Nella area and through the Grassland Ecological Area.

Within the San Jose to Merced Section, three linkage corridors were identified in the *Missing Linkages: Restoring Connectivity to the California Landscape* Report: a San Joaquin kit fox (*Vulpes macrotis mutica*) corridor through the Santa Nella area (Linkage 8) and waterfowl wintering and stopover sites in the Grassland Ecological Area (Linkages 18 and 19 [Penrod et al. 2003]). Additional analysis will be necessary to address other potential movement corridors identified by the San Joaquin Valley Endangered Species Recovery Program.

B. Merced to Fresno Section

Within the Merced to Fresno Section, a single wildlife linkage was identified. This linkage, called the Madera-Merced linkage, is considered a "choke point" and "missing link", and is ranked as a high priority (Linkage 18 [Penrod et al. 2003]). The Merced to Fresno Section also intersects two areas identified by the San Joaquin Valley Endangered Species Recovery Program (ESPR 2009); these movement corridors are described as the areas between the Chowchilla Canal area and the Sandy Mush Road area.

The Chowchilla Canal area provides potential movement corridors for blunt-nosed leopard lizard (*Gambelia silus*), Fresno kangaroo rat, and San Joaquin kit fox as well as providing habitat for palmate-bracted bird's beak (*Cordylanthus palmatus*). The Sandy Mush Road area provides a potential corridor for blunt-nosed leopard lizard, Fresno kangaroo rat, and San Joaquin kit fox as well as habitat for lesser saltscale (*Atriplex minuscula*), palmate-bracted bird's beak, and Lost Hill's saltbush (*Atriplex vallicola*).

C. Fresno to Bakersfield Section

Within the Fresno to Bakersfield Section, six general wildlife linkages were identified:

- Four medium-priority linkages within the Central Valley basin and its perimeter:
    - One linkage creates a corridor that bisects the City of Bakersfield via the Kern River.
    - Two linkages occur in the vicinity of Pixley-Allensworth Natural Area (Highway 43-Garces Highway and Deer Creek-San Ridge).
    - One linkage provides east-west connectivity across the Central Valley basin in the vicinity of Pozo Creek.
- Two low-priority linkages that connect the Sierra Nevada and foothills to the Central Valley (Penrod et al. 2001):
    - St. John's River-Cross Creek
    - King's River

The Fresno to Bakersfield Section also intersects four areas identified by the San Joaquin Valley Endangered Species Recovery Program (ESRP 2009); these movement corridors are described as the areas between:

- Pixley-Allensworth Natural Area and Creighton Ranch
- Pixley-Allensworth Natural Area and Semitropic Ridge natural areas
- Maricopa area on the west and Poso Creek on the northeast
- Bakersfield and the Elk Hills core population area, including parts of the Kern Fan Element

The proposed wildlife habitat assessment will evaluate the previously identified corridors and potentially identify additional wildlife movement corridors. The results of these studies will be reported in the Biological Resources and Wetlands Technical Report, as described in Section 6.

Section 6.0
Studies to Be Conducted

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6.0 Studies to Be Conducted

This section describes the proposed studies that will be conducted to identify and map wetlands and other waters, locate areas occupied by special-plant species, and identify habitats potentially used by special-status wildlife species. Methods are also proposed for the identification of fisheries resources, sensitive habitats, and wildlife species migration or movement corridors.

6.1 Survey Area

The survey area for the various biological resources studies for the Central Valley HST Projects are as follows:

- **Waters of the U.S. and Waters of the State:** The survey area for waters of the U.S. and waters of the State within the Central Valley HST Project alternatives is defined as the proposed rights-of-way of the alternatives and additional project areas such as the proposed staging, lay-down, and borrow areas, plus a 250-foot buffer. The survey area for the delineation of waters of the U.S. and State (including wetlands), and CDFG lakes and streambeds is referenced as the "wetland survey area."

- **Special-Status Plants:** The survey area for special-status plants within the Central Valley HST Project alternatives is defined as the proposed rights-of-way of the alternatives and additional project areas such as the proposed staging, lay-down, and borrow areas, plus a 100-foot buffer. The study area for the special-status plant surveys is referenced as the "botanical survey area".

- **Special-Status Wildlife and Wildlife Habitats:** The survey area for wildlife habitat assessments within the Central Valley HST Project alternatives is defined as the proposed rights-of-way of the alternatives and additional project areas such as the proposed staging, lay-down, areas and borrow areas, plus a 1,000-foot buffer. In most cases this will consist of a 2,100-foot-wide survey area. A supplemental habitat assessment will be conducted for select special-status species in general accordance with agency guidelines.

- The study area for the wildlife habitat assessment is referenced as the "habitat survey area." The habitat survey area will be divided into a core survey area, an auxiliary survey area, and a supplemental survey area. The core survey area will include the proposed rights-of-way of the alternatives and additional project areas plus a 250 foot buffer. The auxiliary survey area (from the edge of the core area laterally 750 feet) will be based on aerial photograph interpretation, observations made from with the core habitat survey area and windshield surveys. The supplemental survey area will extend laterally up to 1.24 miles, depending on target species, and will identify species-specific habitat based on aerial photograph interpretation and documented occurrences of species.

Due to circumstances beyond the Authority's control, in some instances the various survey areas may be reduced or not accessible. These instances would include areas where access is not available, agricultural areas where crops could be disturbed, and properties where health and safety concerns would limit access. Additionally, the various survey areas may also be reduced where other features are in the proposed survey area, including highways, railroads, and other features that may block or act as a barrier to indirect impacts. Instances where the various survey areas are reduced will be described and mapped as part of the various survey reports.

6.2 Field Surveys

Field surveys will be conducted to determine the presence of waters of the U.S. and State (including wetlands), CDFG lakes and streambeds, and special-status plants and to identify suitable habitat for

special-status wildlife species within the Central Valley HST Project corridors. Specific survey methods are described below.

6.2.1 Delineation of Waters of the U.S., Waters of the State, and CDFG Lakes and Streambeds

With the intent of obtaining a *Preliminary Jurisdictional Delineation*, teams of qualified biologists will walk meandering transects to visually access the wetland survey area for the presence of waters of the U.S. and waters of the State and CDFG lakes and streambeds. Survey transects will be spaced 20 to 100 feet apart, or as appropriate to the quality, topography, and character of the areas being examined. The extent of all observed waters of the U.S. and State (including wetlands), and CDFG lakes and streambeds will be identified and mapped using a handheld GPS unit with sub-meter accuracy. Locations of waters of the U.S. and State (including wetlands), and CDFG lakes and streambeds will also be marked on hard-copy maps. Surveyors will photograph each wetland and other water, or take representative photographs of wetland complexes to document physical characteristics. The landforms, vegetation, hydrology, and soil conditions will be noted where these characteristics are relevant to identification of the wetland type or boundary. A biologist will also review recent precipitation records including current and annual average rainfall for the area. Survey data and personnel will be recorded on the appropriate data sheets (Wetland Determination Data Form-Arid West Region or OHWM Datasheet).

In the event that property within the wetland survey area is not accessible to the field survey crews due to access limitations, field crews will use public roads or other suitable means to conduct a visual survey of the inaccessible areas and compare notes to aerial signatures identified on high resolution aerial imagery for the area. Where no access is possible, the biologists will use available resources, including current and historical aerial photography, to estimate the extent and location of wetlands and other waters.

The CHSRA may opt to obtain additional information while in the field, to support an *Approved Jurisdictional Determination.* This information would include completion of the *Approved Jurisdictional Determination Form (*Rapanos Data Form) per the *U.S. Army Corps of Engineers Jurisdictional Determination Form Instructional Guidebook* (USACE and EPA 2007). The Central Valley HST Projects do not intend to submit this information as part of the Wetland Delineation Report. However, individual HST Project sections may opt to provide this information in a Supplemental Wetland Delineation Report at a later time.

A. Wetlands

Wetlands in the wetland survey area will be delineated using the methods described in the *USACE Wetlands Delineation Manual* (Environmental Laboratory 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (USACE 2008a). All wetlands will be described using both Cowardin (Cowardin et al. 1979) and Holland classification systems (Holland 1986), or other recognized vegetation classification systems.

Before beginning the field investigation, biologists will review the following sources for information:

- Recent aerial photographs of the project site and vicinity
- Historical aerial photographs of the project site and vicinity
- Soil Surveys of appropriate counties
- Standard biological references and field guides including the Jepson Manual (Hickman 1993)
- National List of Plant Species That Occur in Wetlands (Reed 1988)

- National Wetlands Inventory (USFWS 2009b)
- USGS topographical maps
- CDFG hydrography data

Wetland boundaries will be determined by using paired data points in wetland and adjacent upland areas. The characteristic vegetation at each sample point will be recorded, and soil test pits will be hand excavated at each point to determine any ground water hydrology and soil conditions at those points. For large complexes of features, or repeated features of the same type, paired points will be recorded at representative features, but not at each individual feature. Where features vary from the larger complex, paired points will be taken. At these complexes, as with all test pits, photographs will be taken of the soil as well as the surrounding vegetation to fully document the area. After evaluating the hydrology, soils, and vegetation, all of the data points will be recorded on *Wetland Determination Data Form-Arid West Region* data sheets (USACE 2008a).

All features that potentially meet USACE, Waters of the State, or RWQCB criteria for wetlands will be recorded as line, point, or polygon features using the GPS unit and/or aerial photographs. The boundaries of wetlands will be extrapolated by following topographic contours, wetland vegetation boundaries, and clear hydrologic boundaries. Connectivity for each potential wetland feature will be analyzed in the field and relevant connective features, such as culverts and off-site drainage pathways, will be mapped.

B. Other Waters of the U.S.

Non-wetland waters in the wetland survey area will be delineated using the methods described in *A Field Guide to the Identification of the Ordinary High Water Mark in the Arid West Region of the Western United States* (USACE 2008b) and USACE Regulatory Guidance Letter No. 05-05 (USACE 2005), when appropriate. These manuals provide an approach for identifying the lateral limits of jurisdictional other waters using stream geomorphology and vegetation response to the dominant stream discharge (USACE 2008b). Indicators of OHWM to be evaluated in the field include, but are not limited to, natural lines impressed on banks, stain lines, depositional features, shelving, changes in soil character, changes in vegetation, destruction of terrestrial vegetation, and the presence of litter and debris.

The jurisdictional status of other waters of the U.S. will not be necessary for a *Preliminary Jurisdictional Delineation*. However, information will be gathered in the field regarding TNW's in case an Approved Jurisdictional Determination is sought at a later date. All TNW are jurisdictional waters of the U.S., a category that includes historical navigable waters (33 C.F.R. § 328.3[a][1]; 40 C.F.R. § 230.3[s][1]). In most cases, the USACE jurisdictional status of a water feature depends on whether the feature has a significant nexus with an established TNW. Background research will be conducted to determine the closest TNW to the study area and the jurisdictional status of any other large water features in the vicinity. A number of potentially jurisdictional features in the wetland survey area will be classified as irrigation ditches or canals. Previous guidance from USACE has stated that irrigation water originating from a TNW and draining back into a TNW will be jurisdictional. Biologists will examine each individual wash, culvert, ditch, canal, etc. along the wetland survey area to determine whether the feature could have a significant nexus with a potential TNW. Biologists will record information for each feature, by taking GPS points, field notes, and photographs.

C. Waters of the State and CDFG Lakes and Streambeds

As discussed above, all wetlands, waters of the U.S., and waters of the State will be investigated and mapped. Those features determined not to have a significant nexus for federal jurisdictional status (following an Approved Jurisdictional Determination) would qualify as waters of the State.

The SWRCB views the stream channel and the surrounding biological community as providing important functions that affect water quality, including groundwater recharge, surface water supply, nutrient cycling, water filtration, temperature control, maintenance of plant and animal communities, sediment transport and storage, stream channel dynamic equilibrium, and stream bank stabilization. Both the SWRCB and CDFG view the areas between the bed and the top of bank as well as adjacent floodplain and riparian habitat as important for flood conveyance and wildlife movement. As such, the extent of the area regulated as waters of the State and CDFG varies.

No formal guidelines exist for the identification of the extent of waters of the State or for CDFG streambeds. Generally, wetlands are delineated in the same manner as federal waters (including *USACE Wetlands Delineation Manual* (Environmental Laboratory 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (USACE 2008a). However, no guidance or policy is in place with respect to the identification or mapping of waters of the State for the SWRCB or for bed and bank for the CDFG. The extent of these regulated areas in some instances extends beyond that of waters of the U.S. (above the OHWM).

In addition to the methods provided for the identification of waters of the U.S., supplemental information for the waters of the State and CDFG lake and streambeds, which include ephemeral drainages, will be collected. Because no official guidance is available, the proposed methodology for approximating the extent of waters of the State and CDFG streambeds will vary based on the physical properties of each feature. For the extent of waters of the State, areas that have been identified on aerial photographs as having potential beneficial uses (from the respective basin plans) will be analyzed. If these areas are determined to have beneficial uses, they will be delineated appropriately. For CDFG streambeds, a variety of factors including bed, bank, riparian vegetation, and floodways, coupled with best scientific judgment, will be used to approximate the extent of each stream feature.

Because each waterway is different, biologists will consider all respective jurisdictions in making their determinations. The most extensive potential jurisdictional area (SWRCB or CDFG) will be identified and mapped. Where biologists believe there would be differences in area between the SWRCB jurisdiction and the CDFG jurisdiction, both extents will be mapped and described.

Biologists will map or record the extent of the SRWCB and CDFG areas for each waterway using GPS or by hand-drawing the estimated extent on aerial photographs. Field notes and photographs of these areas will be kept. In areas where riparian vegetation is present, the extent will be mapped, where appropriate, by the outer drip line of the riparian shrub and tree species. Biologists will record the composition and other physical characteristics of shrub and tree species in the streambed area.

E. Post-field Data Processing

Information gathered in the field will be organized in the office using GIS software and summarized in tables for future reference. All GPS data will be differentially corrected to achieve sub-meter accuracy.

Aerial imagery, historical aerial photography, topographic maps, and available hydrological data will be used to review the jurisdictional status of features identified in the field, based on post-Rapanos guidance by USACE (USACE and EPA 2007). At a later time, this information may be used to prepare an *Approved Jurisdictional Determination.* This information would not be submitted as part of the *Preliminary Jurisdictional Delineation.*

Paired data points recorded at wetland and upland boundaries will be labeled and mapped. All delineated features will be labeled with acronyms that correspond to their status, such as: wetlands (WL) and other waters of the U.S. (OWUS). Waters of the U.S. that are not regulated (jurisdictional) by the USACE will be considered regulated by the SWRCB and will be identified as waters of the State (WS). All areas solely regulated by the SWRCB or CDFG will be classified as waters of the State (WS).

The boundaries of all waters of the U.S., waters of the State, and CDFG lakes and streambeds within the wetland survey area will be mapped onto 1:2,400 (1 inch = 200 feet) aerial photographs of the wetland survey area.

6.2.2 Botanical Surveys

Botanical surveys will be conducted in accordance with the *CNPS Botanical Survey Guidelines* (CNPS 2001), the recently released *Protocols for Surveying and Evaluating Impacts to Special-status Native Plant Populations and Natural Communities* (CDFG 2009b), and *Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants (*USFWS 1996). In addition, where applicable, botanical surveys for five federally listed species will comply with supplemental guidance provided in *General Rare Plant Survey Guidelines* and the *Supplemental Survey Methods* for San Joaquin Woolly-threads (*Monopolies congdonii*), Kern mallow (*Eremalche kernensis*), California jewelflower (*Caulanthus californicus*), Bakersfield cactus (*Opuntia basilarus* var, *treleasii*), and Hoover's woolly-star (*Eriastrum hooveri*) (Cypher 2002). These surveys will be floristic in nature and will be conducted at the appropriate seasons and in a manner consistent with established conservation practices.

Before field surveys are conducted, CNDDB occurrences of special-status plant species and sensitive natural communities will be used to develop a field map of vegetation and special-status plants within and adjacent to the Central Valley HST Project sections.

Separate field maps will be produced at 1:2,400 (1 inch = 200 feet) to be used during the field survey. These maps will be produced on an aerial photograph base and will delineate the botanical survey area, geographic features, and other notable landmarks to help orient survey teams and provide a method for estimating location of special-status resources and sensitive natural communities.

A minimum of three botanical surveys will be conducted across the Central Valley HST Project corridors to coincide with the major bloom periods anticipated for the various special-status plants determined to have some potential to occur. Teams of qualified botanists will thoroughly examine the biological survey area. Within the survey area, meandering pedestrian transects will be spaced between 20 and 100 feet apart, or as necessary to visually assess the botanical survey area, and based on the quality, topography, and character of the habitat being examined.

It is anticipated that much of the Central Valley HST Project sections will be in areas of cultivated row crops, recently tilled land, and urban environments that are not expected to support special-status plant species, native vegetation, or sensitive natural communities. Depending on access, these areas will be visually accessed and noted on field maps; however, detailed pedestrian surveys will not be performed where habitat is unsuitable. Best professional judgment will be used to determine whether an agricultural or urban area could support special-status plant species. Any patches of native vegetation within a given agricultural or urban area will be surveyed. In the event that property within the botanical survey area is not accessible to field survey crews, observations will be recorded from public roads or other suitable means. Where no access is available, biologists will use available resources, including aerial photography, to compare their observations with vegetation-type signatures identified on high resolution local aerial imagery to evaluate habitat suitability for special-status plant species. Special-status plant species will be assumed to be present within inaccessible portions of the botanical survey area if habitat appears to be suitable.

Botanical surveys will be floristic in nature, meaning that all observed plants species (regardless of listing status) will be identified to the level necessary to determine whether they are a special-status species or not. Species will be identified and recorded according to nomenclature found in the *Jepson Manual of Higher Plants of California* (Hickman 1993). A complete list of all observed plant species will be maintained and included in the Biological Resources and Wetland Technical Report.

When necessary, the survey teams will visit reference populations of selected special-status plant species prior to conducting the field surveys. In the event that a special-status plant is observed in the botanical survey area, the extent of the population will be recorded on a GPS unit with sub-meter accuracy and marked by hand on the field maps. A *California Native Species Field Survey Form* will be completed for each special-status species occurrence observed in the botanical survey area (CDFG 2009d). Details regarding the phenology, location, habitat description and site information, as well as the approximate number of individuals for each special-status plant occurrence, will be recorded. All special-status plant species detected during surveys will reported to the CNDDB and CNPS for assimilation into their databases. Photographs of special-status plants observed during surveys will be taken with a digital camera. Botanists with valid CDFG collecting permits will be permitted to collect voucher specimens of known threatened, rare, or endangered plant species in the event that this collection will not jeopardize the continued existence of the local population.

Qualified botanists or vegetation ecologists will identify and map locations of sensitive natural communities while conducting the botanical surveys. Sensitive natural communities, as listed in *Vegetation Classification and Mapping Program List of California Vegetation Alliances* (CDFG 2009e) and described in *A Manual of California Vegetation, 2nd Edition* (Sawyer et al. 2009), will be delineated on field maps and/or using a GPS unit. Community types will be recorded using *CNPS Rapid Assessment Protocol* (CNPS 2007). This method is recognized by the CDFG (CDFG 2009b).

6.2.3 Wildlife Habitat Assessment

The wildlife habitat assessment will be conducted in the habitat survey area and will consist of field surveys to identify and map the various wildlife macro- and micro-habitats. Habitat will be mapped using the wildlife habitat descriptions presented in *A Guide to Wildlife Habitats of California* (CDFG 1988); these habitat types are used in the *California Wildlife Habitat Relationship System* (CDFG 2008a). The wildlife habitat assessment will be general in nature and will not be used as a substitute for protocol-level surveys.

Before field surveys are conducted, maps containing the locations of CNDDB documented special-status wildlife species and existing wildlife habitat types (as mapped by the CWHR) will be used to develop a field map of resources within the habitat survey area of the Central Valley HST Project corridor.

Separate field maps will be produced at a scale no larger than 1:4,800 (1 inch = 400 feet). In general these maps would contain the habitat survey area and aerial photographs, as well as the location of major road, geographic features, and other notable landmarks to help orient survey teams and provide a reference for estimating location of wildlife habitat, special-status resources, and movement corridors.

The wildlife habitat assessment will be conducted across the Central Valley HST Project corridors. Teams of wildlife biologists will examine the habitat survey area. Surveys will be conducted by a variety of means including meandering pedestrian transects in the habitat survey area, aerial photo interpretation, and extrapolation of data based on adjacent resources. Windshield surveys will be conducted where site access is limited to existing public roads.

Meandering pedestrian transects will be widely spaced to cover the habitat survey area, based on the quality, topography, and character of the habitat being evaluated. Given the wide breadth of the habitat survey area, wildlife habitat near the given alternative alignment will be prioritized, the core survey area will be the Central Valley HST Project corridor plus 250 feet on either side of the corridor, and an auxiliary survey area (from 250 feet up to 1,000 feet beyond the corridor) will be extrapolated. That extrapolation will be based on aerial photograph interpretation coupled with observations made from within the core habitat survey area, windshield surveys, as necessary, and existing and available GIS databases (e.g., National Wetland Inventory, California Gap Analysis Project, and Farmland Mapping and Monitoring Program), to define the wildlife habitat types located beyond the core habitat survey area.

The core and auxiliary wildlife habitat assessment will consist of the following general activities:

- Map and ground-truth wildlife habitats based on vegetation communities derived from the California Gap Analysis Project (UCSB 2002)
- Review and identify wetlands and other waters areas (initial identification or confirmation, depending on when the wetland delineation is conducted)
- Map habitat that may be suitable for special-status plant and wildlife species
- Confirm, identify, and describe known or previously unreported suitable wildlife habitat
- Map relevant wildlife macro- or micro-habitat elements
- Map and describe the presence of primary constituent element within areas of federally designated or proposed critical habitat units
- Identify and map locations of observed special-status wildlife species

The supplemental habitat assessment will be performed for three special-status species for which survey protocols have been developed: the Swainson's hawk (*Buteo swainsoni*), the California red-legged frog, and the California tiger salamander. The habitat assessment for these species will be performed in general accordance with the various protocol-level assessments for these species (SHTAC 2000; USFWS 2005a; USFWS and CDFG 2003). However, these surveys will be limited to desktop surveys beyond the auxiliary habitat survey area. The desktop assessment will consist of a review of existing data and aerial identification and interpretation of suitable habitat. A biologist will the use species range maps developed by the CWHR (CDFG 2008a) and CNDDB (CDFG 2009c) to determine the footprint of the supplemental habitat assessment area for each target species.

The supplemental habitat assessment for Swainson's hawk will include identification of documented nest trees and potential nest trees within 0.5 mile of the project area, in general accordance with *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (SHTAC 2000). Specific nest tree surveys are not proposed, but the habitat assessment will evaluate the general habitat conditions, describe existing known occurrences, and identify potential nest locations. Potential nest locations will be identified by aerial photograph interpretation to inform any subsequent protocol-level surveys. Also, areas of foraging habitat, including preferential row crops, will be identified.

The habitat assessment for the California red-legged frog and the California tiger salamander will include an evaluation of potential aquatic and upland habitat within 1.0 and 1.24 miles of the Project area (respectively). The habitat assessment will include identification, description, and evaluation of documented occurrences of these species in the region and an aerial interpretation of potential suitable aquatic and upland habitats outside of the core survey area. The supplemental assessment will be conducted in general accordance with site assessment guidelines in *Revised Guidance on Site Assessments and Field Surveys for the California Red-legged Frog* and *Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander* (USFWS 2005a; USFWS and CDFG 2003). Although focused surveys are not proposed, the habitat assessment will evaluate the habitat to inform future decisions regarding protocol-level surveys.

It is anticipated that the Central Valley HST Project sections will occur along large sections of cultivated row crop and recently tilled land that likely provides poor to marginal habitat. Depending on access, landowner agreements and the other concerns, these areas will be noted on field maps and visually accessed; however, a detailed pedestrian survey through these areas may not be warranted (i.e., recent disking, planting, or in cultivation). Patches of native vegetation, or other unique structures or physical

support, within a given agricultural field will be surveyed. In the event that property within the habitat survey area is not accessible to field survey crews, observations will be recorded from public roads or other suitable means. Where no access is possible, biologists will use available resources, including aerial photographs, to map wildlife habitat assessment findings on high resolution local aerial imagery.

The locations of special-status wildlife species observed within the habitat survey area will be recorded using a GPS unit or hand mapped, as appropriate. Observations include those species that are directly observed and those species for which presence can be inferred based on diagnostic signs such as burrows, fresh tracks, bird songs or calls, scat, or nests. Raptor nest sites will be identified to species if possible, and signs including nest type, skeletal remains, feathers, and direct observation will be recorded.

While the wildlife habitat assessment surveys will not be conducted using formal protocol methods, all observed wildlife species (regardless of listing status) will be identified to the species level and recorded according to nomenclature found in *A Complete List of Amphibian, Reptile, Bird, and Mammal Species in California* (CDFG 2008b). A complete list of all observed or inferred wildlife species will be maintained and included in the *Biological Resources and Wetland Technical Report*.

After all field work is completed, hand-drawn locations of wildlife habitats and observations of special-status wildlife species, their key macro or micro habitat elements, the locations of primary constituent elements within federally designated or proposed critical habitat units, preliminary results of the wetland delineation and special-status plant habitats, and any identified migration corridors or special wildlife notes will be digitized and GPS-collected data will be downloaded and imported into a GIS Program.

A. Mammals

To identify potentially suitable wildlife habitat for special-status mammal species, key habitat constituents mapped during field surveys will include the presence of small-, medium-, and large-sized mammal burrows and dens, friable soils, topography, the presence or absence of vegetative cover, foraging habitat, and migration barriers (i.e., canals, roadways, fence lines). Diagnostic signs of special-status wildlife species such as fresh tracks, scat, skeletal remains (of target special-status species or prey species) and freshly turned soils indicating active burrowing activity and dens will also be recorded and mapped.

B. Birds

Biologists will record observed occurrences of federal, State, and priority special-status bird species and map potential or confirmed active nest locations. Biologists will also record and map nest sites for raptors protected under the Migratory Bird Treaty Act (16 U.S.C. 703-712) and CDFG Fish and Game Code (DFG Code 3503.5) as well as maintain a list of all observed special-status bird species and migratory birds species. Identification of special-status and migratory bird species will be based on direct observation, call, song, or diagnostic signs including nest type (size) and pellets. To identify potentially suitable wildlife habitat for special-status and migratory bird species, key habitat constituents mapped during field surveys will include active and inactive nest sites, nesting and roosting habitat (i.e., mature trees, bridges, power lines, burrows), topography, the presence or absence of vegetative cover, vegetation communities, foraging habitat, and prey base. Diagnostic signs such as fresh whitewash, pellets and castings, feathers, courtship behavior, and nest-building activities will also be recorded and mapped.

C. Reptiles/Amphibians

To identify potentially suitable wildlife habitat for special-status amphibian and reptile species, key habitat constituents mapped during field surveys will include potential breeding pools (i.e., stock ponds, vernal pools, streams, canals, etc.), creek/stream/river substrates, refugia habitat (i.e., small mammal burrows, rock talus slopes), soil conditions (i.e., sandy soils, moist substrates, alkali soils), vegetation communities

(i.e., ephedra shrubland, saltbush scrub, alkali sink scrub), topography, watershed boundaries, foraging habitat, and prey base.

D. Fish

To identify potentially suitable habitat for special-status fish species, the habitat assessment will be largely limited to a desktop review of resources such as *CalFish: A Cooperative Anadromous Fish and Habitat Data Program*, together with distribution and status reports on species ranges to identify occupied habitats and known barriers to up- and downstream migration (CalFish 2009). A fisheries biologist will review the project alignment and determine all river/creek crossings in the Central Valley HST Project habitat survey area. The biologist will research these areas to identify which special-status fish species potentially occur. If it is determined that the water crossings will occur in habitat (or habitat with future potential based on changes in water release programs) or federally designated critical habitat for special-status fish species, the site will be visited to determine current habitat conditions. Key habitat constituents mapped during field surveys will include watershed boundaries, stream and habitat types, creek/stream/river substrates, migration barriers (i.e., dams), and description of the various physical features present within the water system.

E. Invertebrates

Suitable habitat for vernal pool invertebrate species will be based predominantly on the results of the delineation of wetlands. To further refine potentially suitable wildlife habitat for special-status branchiopods, key habitat constituents mapped or recorded during field surveys will include soil conditions (i.e., wetland indicators), topography, and other indicators that will help determine how long aquatic features retain water throughout the season. Key habitat constituents mapped for the sole invertebrate species not dependent on vernal pools, i.e., the valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), will consist of documenting and mapping the host plant: elderberry shrubs (*Sambucus* spp.) and documenting any exit holes observed during field surveys. This effort is not intended to substitute for the recommended guidelines for survey of the valley elderberry longhorn beetle.

F. Movement Corridors

The background review of movement corridors will be ground-truthed in the field to ascertain their utility as movement corridors on both a local and meta-population level. This field evaluation of potential movement corridors will address their availability and suitability for migratory species and identify changes in corridor quality on a rough, landscape level. This evaluation will be augmented as feasible by reviewing existing wildlife passages such as culverts, washes, and areas of cover in the habitat survey area, as well as looking at local wildlife movement studies.

Additional studies and information will be gathered from a variety of sources prior to field work.

6.3 Timing and Duration

The delineation of wetlands, waters of the U.S. and State (including wetlands), and CDFG lakes and streambeds, botanical surveys, and wildlife habitat assessments will be conducted by various environmental consulting firms at different times, depending on individual Central Valley HST Project schedules and the timing necessary to coincide with varying weather patterns and regional conditions. In general, these surveys will be conducted between November 2009 and August 2010. The majority of the surveys will be conducted during the optimal period to observe and record the various wetland, plant, and wildlife resources. The currently proposed schedule of anticipated survey windows for each resource and the Central Valley HST Projects is provided as Table 6.3-1.

Table 6.3-1
Proposed Biological Resources and Wetland Survey Schedule

Resource	San Jose to Merced Section (Parsons, ICF)	Merced to Fresno Section (AECOM, CH2M HILL)	Fresno to Bakersfield Section (URS, Hatch Mott McDonald, Arup)
Wetland Delineation	March – May 2010	November 2009-March 2010	March-April 2010
Wildlife Habitat Assessment	March – May 2010	November 2009	March-May 2010
Focused Plant Surveys	3 Events: March-April 2010 April-May 2010 June-July (August) 2010	3 Events: March-April 2010 May-June 2010 June-July (August) 2010	3 Events: March 2010 April 2010 May 2010

6.4 Reports

Separate reports will be prepared for each of the three Central Valley HST Projects. The reports will be prepared based on the technical biological resource and wetland data as well as the data collected for the waters of the U.S. and State, and CDFG lakes and streambeds. The data will be used for the production of technical reports, draft sections of the EIR/EIS, and for a variety of permit applications. The initial reports that will be prepared include a *Wetland Delineation Report,* a *Biological Resources and Wetland Technical Report*, and a *Biological Assessment*. Supplemental reports may be required to provide information regarding areas that may have been previously omitted from the survey. Supplemental reports will contain and provide information similar to that in the initial technical reports.

6.4.1 Wetland Delineation Report

A *Wetland Delineation Report* will be prepared to summarize the methods, results, and location and size of features observed during the delineation of wetlands and other waters. The *Wetland Delineation Report* will be written in accordance with the *Sacramento District Minimum Standards for Acceptance of Preliminary Wetland Delineations* (USACE 2001) to support a *Preliminary Jurisdictional Delineation*.

Although information may be collected in the field for *Approved Jurisdictional Determination* (USACE and EPA 2007), this information will not be presented within the *Wetland Delineation Report*. The *Wetland Delineation Report* will be used to satisfy the requirements of the DEIS/DEIR. Subsequently, the individual Central Valley HST Project sections may opt to submit information to support an *Approved Jurisdictional Determination* following the DEIS/DEIR in support of an individual permit application.

Specifically, the *Wetland Delineation Report* will support a *Preliminary Jurisdictional Delineation* and will include mapping and descriptions of waters of the U.S. and State (including wetlands), and CDFG lakes and streambeds. The report will include the following items:

- A summary of the methodologies employed
- A description of the site survey conditions
- A description and map of the various vegetation communities, including a list of observed plant species with wetland indicator status
- A description and maps of the various soil types
- Maps of waters of the U.S. and waters of the State at a scale of 1:2,400 (1 inch = 200 feet) showing wetland types and sample point locations

- A description of the hydrology sources and gradients
- A description and appropriate visual representation of waters of the U.S. and waters of the State (per *Minimum Standard for Acceptance of Preliminary Wetland Delineations* [USACE 2001])
- Completed Wetland Determination Data Form-Arid West Region, and OHWM Datasheet,, where appropriate

6.4.2 Biological Resources and Wetlands Technical Report

The results of the delineation of waters of the U.S. and State (including wetlands), and CDFG lakes and streambeds, botanical surveys, and wildlife habitat assessment survey efforts will be consolidated and described within a *Biological Resources and Wetlands Technical Report*. The report will assimilate and summarize the information provided in the *Wetland Delineation Technical Report.* The report will contain the following information per USFWS, CDFG and CNPS botanical survey guidelines:

- A project location and description with detailed and overview maps
- A methodology section summarizing the methods employed during the survey, including the list of special-status species with potential to occur on the site and assumed to be blooming during the survey periods
- A results section that provides descriptions of the rare plants (including number of individuals, density, life stage, and digital photographs) and sensitive natural communities found within each Central Valley HST Project and maps of any special-status species or sensitive natural communities observed (Information regarding site-specific characteristics of each occurrence will be recorded. A complete list of all plant species observed during the surveys will be appended to this section.)
- A discussion section describing any factors that may have affected the survey results and an assessment of potential impacts and recommendations for conservation in any areas where special-status species or sensitive natural communities were encountered.

The report will contain the following information regarding the wildlife habitat assessment:

- A summary of the methodology employed
- A list of the special-status species with potential to occur or assumed present based on range maps and habitat suitability
- A discussion of the results of the habitat assessment effort including maps of any special-status species or sensitive natural communities observed during the survey
- A list of all wildlife species observed during the field survey
- Recommendations for conservation in any areas where special-status species or sensitive natural communities were encountered

6.4.3 Biological Assessment

A Biological Assessment will be prepared to initiate informal or formal consultation with the USFWS and National Marine Fisheries Service, as necessary. The Biological Assessment will be prepared using the general guidelines outlined in the *Endangered Species Consultation Handbook* (USFWS and NFMS 1998). Additionally, the Authority has prepared a general outline of the *Biological Assessment*. This report will contain the following information:

- A summary of the proposed federal action
- Descriptions of the various vegetation and wildlife habitats
- Descriptions of the federally listed species potentially present within the study area, including the primary constituent elements associated with federally designated critical habitat
- Description of the project's potential direct, indirect, and beneficial effects on federally listed species and their federally designated critical habitat
- A summary of the conservation measures that will be implemented
- A summary of the determination of the effects on special-status species

Section 7.0
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7.0 References

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Section 8.0
Preparer Qualifications

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8.0 Preparer Qualifications

A number of qualified professional biologists were involved in the preparation of the Central Valley HST Project Biological Resources and Wetlands Survey Plan. The Survey Plan was primarily authored by URS Corp.; however, considerable effort and information was provided by CH2M HILL and ICF Jones and Stokes. Table 8.0-1 summarizes the preparer's qualifications involved in the production of this report.

Table 8.0-1
Preparers' Qualifications

Preparer's Name/Title	Project/Consulting Firm	Degree	Years of Professional Experience	Role
Alexandra Fraser/Senior Project Manager	Fresno to Bakersfield Section / URS	Ph.D.; Ecology; University of Kansas M.A.; Ecology; University of Kansas B.S.; Biology; Baylor University	15	Deputy Project Manager
Dennis Rowcliffe/Senior Word Technical Editor	Fresno to Bakersfield Section / URS	B.A.; American Studies and Journalism; California State University-Los Angeles	22	Technical Editor
Deb Fournier/Senior Word Processor	Fresno to Bakersfield Section / URS	-	40	Document Format
Steve Leach/Environmental Sciences Department Manager	Fresno to Bakersfield Section / URS	M.A.; Vegetation Ecology; University of California-Davis B.S.; Physical Geography; University of California-Davis	19	Internal Technical Reviewer
Justin Whitfield/Senior Ecologist	Fresno to Bakersfield Section / URS	B.S.; Biological Science; Florida State University	10	Coordinator, Document Composition
Rosemary Laird/Senior Ecologist	Fresno to Bakersfield Section / URS	M.S.; Marine Science; College of William & Mary B.S.; Conservation Resources; University of California-Berkeley	14	Wetlands
Jan Novak/Senior Soil Scientist	Fresno to Bakersfield Section / URS	B.S.; Soil Science, California Polytechnic State University, San Luis Obispo	8	Wetlands
Jessie Golding/Project Biologist	Fresno to Bakersfield Section / URS	B.A.; Integrative Biology, Environmental Earth Science; University of California- Berkeley	4	Wildlife
Galen Peracca/Project Biologist	Fresno to Bakersfield Section / URS	M.F.; Forestry; University of California- Berkeley B.S.; Resource Management; University of California-Berkeley	6	Plants
Todd Lemein/Project Vegetation Ecologist	Fresno to Bakersfield Section / URS	B.S.; Ecology and Evolution; University of California - Santa	4	Plants

Table 8.0-1
Preparers' Qualifications

Preparer's Name/Title	Project/Consulting Firm	Degree	Years of Professional Experience	Role
		Barbara		
Melissa Newman/Project Wildlife Biologist	Fresno to Bakersfield Section / URS	M.S.; Biology; University of California-San Diego B.S.; General Biology; University of California-San Diego	7	Wildlife
Matthew Bettelheim/Senior Wildlife Biologist	Fresno to Bakersfield Section / URS	B.S.; Ecology, Behavior and Evolution; University of California- San Diego	9	Wildlife
Chris Bente, GISP/Senior GIS Analyst	Fresno to Bakersfield Section / URS	B.A./Geography; San Francisco State University	7	GIS Data Queries and Figure Production
Troy Rahmig/Conservation Project Manager	San Jose to Merced Section / ICF Jones and Stokes	M.S./B.S.; Biology; Truman State University	6	Biology Lead
Kate Bode/Plant Ecologist	San Jose to Merced Section / ICF Jones and Stokes	M.A.; Ecology and Systematic Biology; B.S.; Botany; San Francisco State University	6	Plants, Wetlands
Brad Schafer/ Botanist, Wetlands Ecologist	San Jose to Merced Section / ICF Jones and Stokes	B.A.; Biology; Western Illinois University	12	Plants, Wetlands Review
Will Kohn/Senior Wildlife Biologist	San Jose to Merced Section / ICF Jones and Stokes	B.S.; Zoology; Humboldt State University	15	Wildlife
Donna Maniscalco/Fisheries Biologist	San Jose to Merced Section / ICF Jones and Stokes	B.S.; Wildlife Fish and Conservation Biology; University of California-Davis	8	Fish Habitat Assessment

Table 8.0-1
Preparers' Qualifications

Preparer's Name/Title	Project/Consulting Firm	Degree	Years of Professional Experience	Role
Karin Lilienbecker/Project Manager	Merced to Fresno Section / CH2M HILL	M.S.; Biology; University of San Francisco B.S.; Environmental Science; University of San Francisco	15	EIR/EIS Manager
Russell Huddleston/Project Biologist	Merced to Fresno Section / CH2M Hill	M.S.; Ecology; University of California-Davis B.S.; Biology; Southern Oregon University	10	Wetlands Lead
Michael Clary/Ecologist	Merced to Fresno Section / CH2M HILL	B.S.; Biology and Zoology; California State University-Humboldt	14	Project Information
Gretchen Herron/Project Biologist	Merced to Fresno Section / CH2M HILL	M.S., Disturbed Land Restoration, Montana State University B.S., Environmental Science, Allegheny College	13	Project Information

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APPENDIX A

Regulatory Agency Meeting Notes and Comments

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APPENDIX B

Table B-1: List of Species-Status Plant Species with Potential to Occur in the Central Valley HST Study Area

Table B-1
List of Special-Status Plant Species with Potential to Occur in the Central Valley HST Study Area

Scientific Name (Common Name)	Federal Status[A]	State/ CNPS Status[A]	San Jose to Merced Section	Merced to Fresno Section	Fresno to Bakersfield Section	General Habitat[B] (Wetland Indicator Status)[C,D]	Micro Habitat[B] (Elevation)[E]	Bloom Period[F]
Federal and State Listed Species								
Atriplex tularensis (Bakersfield smallscale)	--	SE/1B.1			✓	Chenopod scrub, alkali meadow. (FAC)	Valley sink scrub or with saltgrass (*Distichlis*), *Frankenia*, and *Atriplex bracteosa*. (90-200M)	Jun. – Oct.
Castilleja campestris ssp. *succulenta* (succulent owl's-clover)	FT	SE/1B.2	✓		✓	Northern Claypan and Northern Hardpan vernal pools within annual grasslands. (OBL)	Small and large vernal pools and swales. (25-750M)	Apr. - May
Castilleja campestris ssp. *succulenta* (succulent owl's-clover) *CRITICAL HABITAT*	D	--		✓	✓	Originally designated in the Federal Register, section 68:46683; August 6, 2003. Designation revised, section 70:46923; August 11, 2005. Species by unit designations were published in 71:7117 (PDF) February 10, 2006.		

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Scientific Name (Common Name)	Federal Status[A]	State/ CNPS Status[A]	San Jose to Merced Section	Merced to Fresno Section	Fresno to Bakersfield Section	General Habitat[B] (Wetland Indicator Status)[C,D]	Micro Habitat[B] (Elevation)[E]	Bloom Period[F]
Caulanthus californicus (California jewel-flower)	FE	SE/1B.1	✓	✓	✓	Chenopod scrub, valley and foothill grassland, pinyon-juniper woodland. (NL)	Historically from central valley and Carrizo plain. Occurs with *Vulpia microstachys*, *Trifolium* spp., *Calandrinia ciliata,* and *Lasthenia californica*. Usually on subalkaline sandy loams. (70-900M)	Feb. - May
Chamaesyce hooveri (Hoover's spurge)	FT	1B.2	✓	✓	✓	Valley and foothill grassland, vernal pools. (OBL)	Vernal pools on volcanic mudflow or clay substrate. (25-130M)	Jul. – Sept. [Oct.]
Chamaesyce hooveri (Hoover's spurge) *CRITICAL HABITAT*	D	--		✓	✓	Originally designated in the Federal Register, section 68:46683; August 6, 2003. Designation revised, section 70:46923; August 11, 2005. Species by unit designations were published in 71:7117 (PDF) February 10, 2006.		
Cordylanthus palmatus (palmate-bracted bird's-beak)	FE	SE/1B.1	✓	✓		Chenopod scrub, valley and foothill grassland. (OBL)	Usually on pescadero silty clay which is alkaline, with D*istichlis* sp., *Frankenia* sp., etc. (5-155M)	May – Oct.

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Scientific Name (Common Name)	Federal Status[A]	State/ CNPS Status[A]	San Jose to Merced Section	Merced to Fresno Section	Fresno to Bakersfield Section	General Habitat[B] (Wetland Indicator Status)[C,D]	Micro Habitat[B] (Elevation)[E]	Bloom Period[F]
Eremalche kernensis (Kern mallow)	FE	1B.1			✓	Chenopod scrub, valley and foothill grassland. (NL)	Dry, open sandy to clay soils, usually within valley saltbush scrub, edge of balds. (70-515M)	Mar. - May
Eryngium racemosum (Delta button-celery)	--	SE/1B.1	✓	✓		Riparian scrub. (OBL)	Seasonally inundated floodplain on clay. (3-75M)	June – Oct.
Fritillaria striata (striped adobe-lily)	--	ST/1B.1			✓	Cismontane woodland, valley and foothill grassland. (NL)	Heavy clay adobe soils in oak grassland. (135-1455M)	Feb. – Apr.
Gratiola heterosepala (Boggs Lake hedge-hyssop)	--	SE/1B.2	✓	✓		Marshes and swamps (freshwater), vernal pools. (OBL)	Clay soils; usually in vernal pools, sometimes on lake margins. (5-2400M)	Apr. – Aug.
Monolopia congdonii (San Joaquin woollythreads)	FE	1B.2	✓	✓	✓	Chenopod scrub, valley and foothill grassland. (NL)	Alkaline or loamy plains, sandy soils, with grasses and within chenopod scrub. (60-800M)	Feb. – May
Neostapfia colusana (Colusa grass)	FT	SE/1B.1	✓	✓		Vernal pools. (OBL)	Usually in large, or deep vernal pool bottoms; adobe soils. (5-110M)	May – Aug.

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Scientific Name (Common Name)	Federal Status[A]	State/ CNPS Status[A]	San Jose to Merced Section	Merced to Fresno Section	Fresno to Bakersfield Section	General Habitat[B] (Wetland Indicator Status)[C,D]	Micro Habitat[B] (Elevation)[E]	Bloom Period[F]
Neostapfia colusana (Colusa grass) *CRITICAL HABITAT*	D	--		✓		Originally designated in the Federal Register, section 68:46683; August 6, 2003. Designation revised, section 70:46923; August 11, 2005. Species by unit designations were published in 71:7117 February 10, 2006.		
Opuntia basilaris var. *treleasei* (Bakersfield cactus)	FE	1B.1			✓	Chenopod scrub, valley and foothill grassland, cismontane woodland. (NL)	Coarse or cobbly well-drained granitic sand on bluffs, low hills, and flats within grassland. (90-550M)	Apr. – May
Orcuttia inaequalis (San Joaquin Valley Orcutt grass)	FT	1B.1	✓	✓	✓	Vernal pool. (OBL)	Vernal pools averaging 1.5 acres. Acidic soils with clay to sandy loam texture. (10-755M)	Apr. – Sept.
Orcuttia inaequalis (San Joaquin Valley Orcutt grass) *CRITICAL HABITAT*	D	--		✓	✓	Originally designated in the Federal Register, section 68:46683; August 6, 2003. Designation revised, section 70:46923; August 11, 2005. Species by unit designations were published in 71:7117 February 10, 2006.		

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Orcuttia pilosa (hairy Orcutt grass)	FE	SE/1B.1	✓	✓	✓	Vernal pool. (OBL)	With *Eryngium vaseyi*, *Trichostema lanceolatum*, *Downingia* sp., surrounded by annual grassland. Average vernal pool size is 4.2 acres. (25-125M)	May – Sept.
Orcuttia pilosa (hairy Orcutt grass) *CRITICAL HABITAT*	D	--		✓	✓	Originally designated in the Federal Register, section 68:46683; August 6, 2003. Designation revised, section 70:46923; August 11, 2005. Species by unit designations were published in 71:7117 (PDF) February 10, 2006.		
Pseudobahia bahiifolia (Hartweg's golden sunburst)	FE	SE/1B.1		✓	✓	Valley and foothill grassland, cismontane woodland. (NL)	Clay soils, northern slopes of knolls, along shady creeks or near vernal pools. (15-150M)	Mar. – Apr.
Pseudobahia peirsonii (San Joaquin adobe sunburst)	FT	SE/1B.1			✓	Cismontane woodland, valley and foothill grassland. (NL)	Grassy valley floors and rolling foothills in heavy clay soil. (85-800M)	Mar. – Apr.

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List of Special-Status Plant Species with Potential to Occur in the Central Valley HST Study Area

Scientific Name (Common Name)	Federal Status[A]	State/ CNPS Status[A]	San Jose to Merced Section	Merced to Fresno Section	Fresno to Bakersfield Section	General Habitat[B] (Wetland Indicator Status)[C,D]	Micro Habitat[B] (Elevation)[E]	Bloom Period[F]
Sidalcea keckii (Keck's checkerbloom)	FE	1B.1	✓	✓		Cismontane woodland, valley and foothill grassland. (NL)	Grassy slopes in blue oak woodland. (180-425M)	Apr. – May
Tuctoria greenei (Green's tuctoria)	FE	SR/1B.1	✓	✓	✓	Vernal pools, valley and foothill grassland. (OBL)	Dry bottoms of vernal pools in open grasslands. Vernal pools averaging 1.5 acres. (30-1070M)	May – Jul. [Sept.]
Tuctoria greenei (Green's tuctoria) *CRITICAL HABITAT*	D	--		✓		Originally designated in the Federal Register, section 68:46683; August 6, 2003. Designation revised, section 70:46923; August 11, 2005. Species by unit designations were published in 71:7117 (PDF) February 10, 2006.		
Other Special-Status Plant Species								
Agrostis hendersonii (Henderson's bent grass)	--	3.2	✓	✓		Valley and foothill grassland, vernal pools. (NL)	Moist places in grassland or vernal pool habitat. (70-305M)	Apr. – Jun.

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Scientific Name (Common Name)	Federal Status[A]	State/ CNPS Status[A]	San Jose to Merced Section	Merced to Fresno Section	Fresno to Bakersfield Section	General Habitat[B] (Wetland Indicator Status)[C,D]	Micro Habitat[B] (Elevation)[E]	Bloom Period[F]
Astragalus hornii var. *hornii* (Horn's milk-vetch)	--	1B.1			✓	Alkali playa, meadows, seeps. (FAC) [D]	Lake margins, alkaline sites. (60-850M)	May – Oct.
Astragalus tener var. *tener* (alkali milk vetch)	--	1B.2	✓	✓		Alkali playa, valley and foothill grassland, vernal pools. (FACW)	Low ground, alkali flats, and flooded lands; in annual grassland or in playas or vernal pools. (1-170M)	Mar. – Jun.
Atriplex cordulata (heartscale)	--	1B.2	✓	✓	✓	Chenopod scrub, valley and foothill grassland, meadows. (FAC)	Alkaline flats and scalds in central valley; sandy soils. (1-375[600]M)	Apr. – Oct.
Atriplex depressa (brittlescale)	--	1B.2	✓	✓	✓	Alkali playa, chenopod scrub, meadows, playas, valley and foothill grassland, vernal pools. (FAC) [D]	Alkali scalds or alkali clay in meadows or annual grassland, rarely associated with riparian, marshes or vernal pools. (1-320M)	Apr. – Oct.
Atriplex erecticaulis (Earlimart orache)	--	1B.2	✓		✓	Valley and foothill grassland. (NL)	(40-100M)	Aug. – Sept.

Table B-1
List of Special-Status Plant Species with Potential to Occur in the Central Valley HST Study Area

Scientific Name (Common Name)	Federal Status[A]	State/ CNPS Status[A]	San Jose to Merced Section	Merced to Fresno Section	Fresno to Bakersfield Section	General Habitat[B] (Wetland Indicator Status)[C,D]	Micro Habitat[B] (Elevation)[E]	Bloom Period[F]
Atriplex joauiniana (San Joaquin spearscale)	--	1B.2	✓	✓		Chenopod scrub, alkali meadow, valley and foothill grassland. (NL)	In seasonal alkali wetlands or alkali sink scrub with *Distichlis spicata* sp., *Frankenia* sp. (1-250M)	Apr. – Oct.
Atriplex minuscula (lesser saltscale)	--	1B.1	✓	✓	✓	Alkali playa, chenopod scrub, playas, valley and foothill grassland. (FACU)[D]	Alkali sink and grassland in sandy, alkaline soils. (15-100M)	May – Oct.
Atriplex persistens (vernal pool smallscale)	--	1B.2	✓	✓	✓	Vernal pool. (NL)	Alkaline vernal pools. (10-115M)	Jun. – Oct.
Atriplex subtilis (subtle orache)	--	1B.2	✓	✓	✓	Valley and foothill grassland. (NL)	Saline depressions often within later growing vernal pools. (40-100M)	Jun. – Aug. [Oct.]
Atriplex vallicola (Lost Hills crownscale)	--	1B.2	✓	✓	✓	Chenopod scrub, valley and foothill grassland, vernal pools. (FACW)	Powdery, alkaline soils that are vernally moist. Commonly with *Frankenia* sp., other *Atriplex* spp., and *Distichlis* sp. (0-635M)	Apr. – Aug.
California macrophylla (round-leaved filaree)	--	1B.1	✓		✓	Cismontane woodland, valley and foothill grassland. (NL)	Clay soils, often in disturbed places. (15-1200M)	Mar. - May

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Calochortus clavatus var. avius (Pleasant Valley mariposa lily)	--	1B.2		✓		Lower montane coniferous forest. (NL)	Josephine silt loam and volcanically derived soil; often in rocky areas. (305-1700M)	May – Jul.
Calochortus striatus (alkali mariposa-lily)	--	1B.2			✓	Chaparral, chenopod scrub, mojavean desert scrub, meadows. (FACW)	Alkaline meadows and ephemeral washes, with *Atriplex* spp., *Suaeda moquinii*, and *Prosopis glandulos*. (90-1595M)	Apr. – Jun.
Calycadina hooveri (Hoover's calycadina)	--	1B.3	✓	✓		Cismontane woodland, valley and foothill grassland. (NL)	On exposed, rocky, barren soil. (65-260M)	Jul. – Sept.
Calyptridium parryi var. *hesseae* (Santa Cruz Mountains pussypaws)	--	1B.1	✓			Chaparral, Cismontane woodland. (NL)	Sandy or gravelly openings. (305-1530M)	May - Aug.
Campanula exigua (chaparral harebell)	--	1B.2	✓			Chaparral. (NL)	Rocky sites, usually on serpentine. (275-1250M)	May – Jun.

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Caulanthus coulteri var. *lemmonii* (Lemmon's jewelflower)	--	1B.2	✓			Pinyon and juniper woodland, Valley and foothill grassland. (NL)	Dry, exposed slopes. (80-1220M)	Mar. - May
Cirsium crassicaule (slough thistle)	--	1B.1			✓	Chenopod scrub, marshes and swamps, riparian scrub. (OBL)	Sloughs, riverbanks, and marshy areas. (3-100M)	May – Aug.
Clarkia rostrata (beaked clarkia)	--	1B.3	✓	✓		Cismontane woodland, valley and foothill grassland. (NL)	North-facing slopes; sometimes on sandstone. (60-460M)	Apr. – May
Clarkia tembloriensis ssp. *Calientensis* (Vasek's clarkia)	--	1B.1			✓	Valley and foothill grassland. (NL)	North-facing slopes, rocky, with *Isomeris* sp., other *Clarkia* spp. (270-335M)	Apr.
Cordylanthus mollis ssp. *hispidus* (hispid bird's-beak)	--	1B.1				Meadows, seeps, playas, valley and foothill grassland. (OBL)	Damp, alkaline soils. Especially in alkali meadows and sinks with *Distichlis* sp. (1-155M)	Jun. – Sept.
Cryptantha hooveri (Hoover's cryptantha)	--	1A	✓	✓		Valley and foothill grassland. (NL)	In coarse sand. (0-150M)	April – May

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Delphinium californicum ssp. *interius* (Hospital Canyon larkspur)	--	1B.2	✓			Cismontane woodland, chaparral. (FACU)	Wet boggy meadows, openings in chaparral and canyons. (230-1095M)	Apr. – Jun.
Delphinium purpusii (rose-flowered larkspur)	--	1B.3			✓	Chaparral, cismontane woodland, pinyon-juniper woodland. (NL)	Shady, rocky slopes, often on carbonates. (300-1300M)	[Mar.] Apr. – May
Delphinium recurvatum (recurved larkspur)	--	1B.2	✓	✓	✓	Chenopod scrub, valley and foothill grassland, cismontane woodland. (NL)	Alkaline soils, valley saltbush or valley chenopod scrub. (3-685M)	Mar. – Jun.
Downingia pusilla (dwarf downingia)	--	2.2	✓	✓	✓	Valley and foothill grassland (mesic sites), vernal pools. (OBL)	Vernal lake and pool margins in variety of vernal pool types. (1-485M)	Mar. - May
Eriastrum hooveri (Hoover's Woolly-star)	FD	4.2	✓		✓	Chenopod scrub, valley and foothill grassland, pinyon and juniper woodland. (NL)	On sparsely vegetated alkaline alluvial fans, also in the temblor range on sandy soils. (50-915M)	Mar. – Jul.
Eriogonum nortonii (Pinnacles buckwheat)	--	1B.3			✓	Chaparral, valley grassland. (NL)	Sandy soils, often on recent burns. (300-975M)	May – Aug. [Sept.]

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Scientific Name (Common Name)	Federal Status[A]	State/ CNPS Status[A]	San Jose to Merced Section	Merced to Fresno Section	Fresno to Bakersfield Section	General Habitat[B] (Wetland Indicator Status)[C,D]	Micro Habitat[B] (Elevation)[E]	Bloom Period[F]
Eryngium spinosepalum (spiny-sepaled button-celery)	--	1B.2	✓	✓	✓	Vernal pools, valley and foothill grassland. (FACW)	Clay soils of granitic origin, vernal pools within grasslands. (80-255[400]M)	Apr. - May
Eschscholzia lemmonii ssp. *kernensis* (Tejon poppy)	--	1B.1			✓	Valley and foothill grassland. (NL)	(250-750M)	Mar. - May
Fritillaria brandegeei (Greenhorn fritillary)	--	1B.3			✓	Lower montane coniferous forest. (NL)	Loamy, granitic soils, often mixed in conifer-black oak community. ([135]1200-1455[1900]M)	Apr. – Jun.
Hesperolinon serpentinum (Napa western flax)	--	1B.1	✓			Serpentine soils in chaparral. (NL)	([50]225-850M)	May – Jul.
Heterotheca shevockii (Shevock's golden-aster)	--	1B.3			✓	Chaparral, cismontane woodland, riparian woodland. (NL)	Ditches, crevices, shallow sand, disturbed, with *Artemisia douglasiana, Baccharis salicifolia, Cephalanthus occidentalis, Quercus wislizenii, Rorippa palustris, Salix* spp., *Verbascum thapsus*. (230-900M)	Aug. – Nov.

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Scientific Name (Common Name)	Federal Status[A]	State/ CNPS Status[A]	San Jose to Merced Section	Merced to Fresno Section	Fresno to Bakersfield Section	General Habitat[B] (Wetland Indicator Status)[C,D]	Micro Habitat[B] (Elevation)[E]	Bloom Period[F]
Imperata brevifolia (California satintail)	--	2.1	✓	✓	✓	Chaparral, coastal scrub, riparian scrub, mojavean scrub, meadows and seeps (alkali). (FAC)[D]	Mesic sites, alkali seeps, riparian areas. (0-500M)	Sept. – May
Lasthenia glabrata ssp. *coulteri* (Coulter's goldfields)	--	1B.1		✓	✓	Alkali playa, coastal salt marshes, playas, valley and foothill grassland, vernal pools. (FACW)	Alkaline soils in playas, sinks, and grasslands. (1-1400M)	[Feb.] Apr. – May [Jun.]
Layia heterotricha (pale-yellow layia)	--	1B.1			✓	Cismontane woodland, pinyon-juniper woodland, valley and foothill grassland. (FAC)	Alkaline or clay soils, open areas. (270-1365[2675]M)	Mar. – Jun.
Layia leucopappa (Comanche Point layia)	--	1B.1			✓	Chenopod scrub, valley and foothill grassland. (NL)	Dry hills in white-grey clay soils, with weedy grasses. (100-350M)	Mar. – Apr.
Layia munzii (Munz's tidy-tips)	--	1B.2	✓	✓	✓	Chenopod scrub, valley and foothill grassland. (FACW)	Hillsides, white-grey alkaline clay soils, with grasses and chenopod scrub associates, wetlands. (45-760M)	Mar. – Apr.

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Lepidium jaredii ssp. *album* (Panoche pepper-grass)	--	1B.2	✓		✓	Valley and foothill grassland. (NL)	Alkali bottoms, slopes, washes, alluvial fans, clay and gypsum-rich soils. ([65]185-275[1000]M)	Feb. – Jun
Leptosiphon serrulatus (Madera leptosiphon)	--	1B.2	✓	✓	✓	Cismontane woodland, lower montane coniferous forest. (NL)	Dry slopes, often on decomposed granite in woodland. ([80]300-1300[1575]M)	Apr. - May
Lupinus citrinus var. *citrinus* (orange lupine)	--	1B.2		✓		Chaparral, cismontane woodland, lower montane coniferous forest. (NL)	Rocky, decomposed granitic outcrops, usually open areas, on flat to rolling terrain. (600-1350M)	Apr. – Jul.
Malacothamnus arcuatus (arcuate bush-mallow)	--	1B.2	✓			Chaparral, cismontane woodland. (NL)	(15-355M)	Apr. – Sept.
Malacothamnus hallii (Hall's bush-mallow)	--	1B.2	✓			Chaparral, coastal scrub. (NL)	Sometimes on serpentine. (10-550[760]M)	May – Sept. [Oct.]
Mimulus acutidens (Kings River monkeyflower)	--	3			✓	Cismontane woodland, Lower montane coniferous forest. (NL)	(305-1220M)	Apr. - Jul.

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Mimulus pictus (calico monkeyflower)	--	1B.2			✓	Broadleaved upland forest, cismontane woodland. (NL)	Bare ground around gooseberry bushes, granite rock outcrops. (100-1300M)	Mar. – May
Monardella leucocephala (Merced monardella)	--	1A	✓	✓		Valley and foothill grassland. (NL)	Known from riverbeds, moist sandy depressions; requires moist subalkaline sands assoc with low elevation grassland. (35-100M)	May – Aug.
Monardella linoides ssp. *oblonga* (flaxleaf monardella)	--	1B.3			✓	Lower montane coniferous forest, pinyon and juniper woodland, upper montane coniferous forest. (NL)	(900-2470M)	Jun. – Apr.
Myosurus minimus ssp. *apus* (little mouse tail)	--	3.1		✓	✓	Valley and foothill grassland, vernal pools. (OBL)	Alkaline vernal pools. (20-640M)	Mar. – Jun.
Navarretia gowenii (Lime Ridge navarretia)	--	1B.1	✓			Chaparral. (NL)	Calcium carbonate rich soil with high clay content. (180-305M)	May – Jun.

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Navarretia myersii ssp. *myersii* (pincushion navarretia)	--	1B.1	✓	✓		Vernal pools, valley and foothill grassland. (NL)	Clay soils within nonnative grassland. (20-330M)	May
Navarretia nigelliformis ssp. *radians* (shining navarretia)	--	1B.2	✓	✓		Cismontane woodland, valley and foothill grassland, vernal pools. (FACW) [D]	Potentially in grassland, not necessarily in vernal pools. (200-1000M)	Apr. – Jul.
Navarretia prostrata (prostrate navarretia)	--	1B.1	✓	✓		Coastal scrub, valley and foothill grassland, vernal pools. (OBL)	Alkaline soils in grassland, or in vernal pools. mesic, alkaline sites. (15-700)	Apr. – Jul.
Navarretia setiloba (Piute Mountains navarretia)	--	1B.1			✓	Cismontane woodland, pinyon-juniper woodland, valley and foothill grassland. (NL)	Red clay soils, gravelly loam. (300-2100M)	Apr. – Jul.
Phacelia ciliata var. *opaca* (Merced phacelia)	--	1B.2	✓	✓		Valley and foothill grassland. (NL)	Adobe or clay soils of valley floors, open hills, or alkaline flats. (60-150M)	Feb. – May
Potamogeton filiformis (slender-leaved pondweed)	--	2.2	✓			Marshes and swamps. (OBL)	Shallow clear water of lakes and drainage channels. ([15]300-2150[2310]M)	May – Jul.

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Pterygoneurum californicum (California chalk moss)	--	1B.1			✓	Alpine boulder and rock field, chenopod scrub, alkali playas, valley and foothill grassland. (NL)	Grows on alkali soil. (10-100M)	NA
Sagittaria sanfordii (Sanford's arrowhead)	--	1B.2	✓	✓	✓	Marsh and swamp, wetland. (OBL)	Standing or slow-moving freshwater ponds, marshes, and ditches. (0-650M)	May – Oct.
Schizymenium shevockii (Shevock's copper moss)	--	1B.2			✓	Cismontane woodland. (NL)	Metamorphic rock, mesic areas. (750-1400M)	NA
Senecio aphanactis (chaparral ragwort)	--	2.2	✓			Chaparral, cismontane woodland, coastal scrub. (NL)	Drying alkaline flats. (15-575[800]M)	Jan. – Apr.
Streptanthus insignis ssp. *lyonii* (Arburua Ranch jewel-flower)	--	1B.2	✓			Coastal scrub. (NL)	Serpentine slopes, sometimes on non-serpentine. (230-855M)	Mar. - May
Stylocline citroleum (oil neststraw)	--	1B.1			✓	Chenopod scrub, coastal scrub. (NL)	Flats, clay soils in oil-producing areas. (50-400M)	Mar. – Apr.

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Stylocline masonii (Mason's neststraw)	--	1B.1			✓	Chenopod scrub, pinyon-juniper woodland. (NL)	Sandy washes. (100-400[1200]M)	Mar. - May
Tortula californica (California screw moss)	--	1B.2			✓	Chenopod scrub, valley and foothill grassland. (NL)	Grows on sandy soil. (10-1460M)	NA
Trichocoronis wrightii var. *wrightii* (Wright's trichocoronis)	--	2.1	✓	✓		Marshes and swamps, riparian forest, meadows and seeps, vernal pools. (OBL)	Mud flats of vernal lakes, drying river beds, alkali meadows. (5-435M)	May – Sept.
Tropidocarpum capparideum (caper-fruited tropidocarpum)	--	1B.1	✓	✓	✓	Valley and foothill grassland. (NL)	Alkaline clay. (0-455M)	Mar. – Apr.
Viola pinetorum ssp. *grisea* (goosefoot yellow violet)	--	1B.3			✓	Meadows and seeps, subalpine coniferous forest, upper montane coniferous forest, lodgepole forest (NL)	(1500-3400)	Apr. – Jul.

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A

-- = No status designation.

Federal

FD = Delisted. Status to be monitored for 5 years.
FE = Listed as endangered under the federal Endangered Species Act.
FT = Listed as threatened under the federal Endangered Species Act.
D = Designated Critical Habitat

State

SE = Listed as endangered under the California Endangered Species Act.
ST = Listed as threatened under the California Endangered Species Act.
SR = Listed as rare under the California Endangered Species Act.
SSC = Species of special concern in California.

CNPS

LIST 1A = Presumed extinct in California
LIST 1B = Rare, threatened, or endangered in California and elsewhere
0.1: Seriously endangered in California
0.2: Fairly endangered in California
0.3 Not very endangered in California
LIST 2 = Rare, threatened, or endangered in California, but more common elsewhere
0.1: Seriously endangered in California
0.2: Fairly endangered in California
0.3 Not very endangered in California
LIST 3 = More information about this plant (Review List).
0.1: Seriously endangered in California
0.2: Fairly endangered in California
0.3 Not very endangered in California

B

General and micro habitat information primarily drawn from CNDDB database:
California Department of Fish and Game (CDFG). California Natural Diversity Database (CNDDB). Version 3.1.0 (2009)

C

Wetland indicator status, Region 0:
Reed, P. B., Jr. 1988. National List of Plant Species that Occur in Wetlands: California (Region O). U.S. Fish and Wildlife Service Biological Report 88(26.10).

D

The 1988 list is incomplete in some cases where names have changed within a taxon. When a species was not listed in the 1988 list but the known ecology of the species indicated a wetland association the 1996 Wetland indicator status revision, Region 0 list was referenced:

Reed, P.B., Jr. (compiler). 1997. Revision of the National List of Plant Species that Occur in Wetlands. In Cooperation with the National and Regional Interagency Review Panels: U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, and Natural Resources Conservation Service. Department of Interior, U.S. Fish and Wildlife Service. Washington, DC, USA.

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E
Elevation information often conflicting between CNDDB, CNPS, The Jepson Manual, and specific recovery plans. Average elevation range is presented, and outlier data is presented in brackets:

California Department of Fish and Game (CDFG). 2009a. California Natural Diversity Database (CNDDB). Version 3.1.0

California Native Plant Society (CNPS). 2009. Inventory of Rare and Endangered Plants (online edition, v7-09c). California Native Plant Society. Sacramento, CA. Accessed on Mon, Sep. 28, 2009 from http://www.cnps.org/inventory.

Hickman, James C. (ed.). 1993. The Jepson Manual. Berkeley, CA: University of California Press.

U.S. Fish and Wildlife Service. 2005b. Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon. Portland, Oregon. xxvi + 606 pages.

U.S. Fish and Wildlife Service. 1998. Recovery plan for upland species of the San Joaquin Valley, California. Region 1, Portland, OR. 319 pp.

F
Bloom period data from CNPS and The Jepson Manual. Uncommon months are shown in brackets:

Hickman, James C. (ed.). 1993. The Jepson Manual. Berkeley, CA: University of California Press.

California Native Plant Society (CNPS). 2009. Inventory of Rare and Endangered Plants (online edition, v7-09c). California Native Plant Society. Sacramento, CA. Accessed on Mon, Sep. 28, 2009, from http://www.cnps.org/inventory

APPENDIX C

Table B-1: List of Special-Status Wildlife Species with Potential to Occur in the Central Valley HST Study Area

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Table C-1
List of Special-Status Wildlife Species with Potential to Occur in the Central Valley HST Study Area

Scientific Name COMMON NAME	Federal Status[1]	State Status[2]	San Jose to Merced Section	Merced to Fresno Section	Fresno to Bakersfield Section	Preferred Habitat
Federal and State Listed Species						
Invertebrates						
Branchinecta conservatio CONSERVANCY FAIRY SHRIMP	FE	--	✓	✓	✓	Found in large, turbid pools in the northern 2/3 of the Central Valley; inhabit astatic pools located in swales formed by old, braided alluvium, filled by winter/spring rains, which last until June.
Branchinecta conservatio CONSERVANCY FAIRY SHRIMP *CRITICAL HABITAT*	D	--	✓	✓		Primary constituent elements include: depressions that become inundated by winter rains and continuously hold water for a minimum of 19 days, located in pool complexes connected by swales with intermittently or continuously flowing surface water; and with sources of food and habitat structure within pools.
Branchinecta lynchi VERNAL POOL FAIRY SHRIMP	FT	--	✓	✓	✓	Found in vernal pools, particularly small, clear-water sandstone depression pools and grassy swale, earth slump, or basalt-flow depression pools.
Branchinecta lynchi VERNAL POOL FAIRY SHRIMP *CRITICAL HABITAT*	D	--	✓	✓	✓	Primary constituent elements include: complexes of swales and pools with intermittently or continuously flowing surface water; depressional features that become inundated by winter rains and continuously hold water for a minimum of 18 days; and sources of food and habitat structure within pools.
Branchinecta longiantenna LONGHORN FAIRY SHRIMP	FE	--	✓	✓		Endemic to the eastern margin of the central coast mountains in seasonally astatic grassland vernal pools. Inhabit small, clear-water depressions in sandstone and clear-to-turbid clay/grass-bottomed pools in shallow swales.

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Scientific Name COMMON NAME	Federal Status[1]	State Status[2]	San Jose to Merced Section	Merced to Fresno Section	Fresno to Bakersfield Section	Preferred Habitat
Branchinecta longiantenna LONGHORN FAIRY SHRIMP *CRITICAL HABITAT*	D	--	✓			Primary constituent elements include: complexes of swales and pools with intermittently or continuously flowing surface water; depressional features that become inundated by winter rains and continuously hold water for a minimum of 23 days; and sources of food and habitat structure within pools.
Desmocerus californicus dimorphus VALLEY ELDERBERRY LONGHORN BEETLE	FT	--	✓	✓	✓	Elderberry shrubs with stem diameters of 2-8 inches. Species always found close to host plant. Larvae may remain in stems for up to 2 years.
Lepidurus packardi VERNAL POOL TADPOLE SHRIMP	FE	--	✓	✓	✓	Found in vernal pools in unplowed grassland with old alluvial soils underlain by hardpan or in sandstone depressions; water in the vernal pools has very low alkalinity and conductivity.
Lepidurus packardi VERNAL POOL TADPOLE SHRIMP *CRITICAL HABITAT*	D	--	✓	✓	✓	Primary constituent elements include: complexes of swales and pools with intermittently or continuously flowing surface water; depressional features that become inundated by winter rains and continuously hold water for a minimum of 41 days; and sources of food and habitat structure within pools.
Fish						
Hypomesus transpacificus DELTA SMELT	FT*	ST		✓	✓	Occur in the low-mid reaches of San Joaquin-Sacramento Delta. Found in brackish water with very low salinity. Shortly before spawning, adults migrate upstream from the brackish-water habitat and disperse widely into river channels and tidally-influenced backwater sloughs and channel edgewaters. Spawn in these shallow, fresh or slightly brackish waters upstream of the mixing zone.

Table C-1
List of Special-Status Wildlife Species with Potential to Occur in the Central Valley HST Study Area

Scientific Name COMMON NAME	Federal Status[1]	State Status[2]	San Jose to Merced Section	Merced to Fresno Section	Fresno to Bakersfield Section	Preferred Habitat
Oncorhynchus mykiss CENTRAL VALLEY STEELHEAD	FT	--	✓	✓	✓	Anadromous. Found in Pacific Ocean and spawns in coastal streams and rivers. Requires mostly gravel-sized material for spawning, but will also use mixtures of sand-gravel and gravel-cobble.
Oncorhynchus mykiss CENTRAL VALLEY STEELHEAD *CRITICAL HABITAT*	D	--		✓		Primary constituent elements include: freshwater spawning and rearing areas with water quantity and quality, substrate, and forage supporting development; natural cover; freshwater migration corridors to and from spawning areas that are free of barriers and excessive predation and maintain proper flow and water conditions; and estuarine and near-shore areas of suitable water, forage, and cover conditions to support juvenile and adult physiological transitions.
Oncorhynchus mykiss CENTRAL CALIFORNIA COAST STEELHEAD	FT	--	✓			Cold, clear water with clean gravel of appropriate size for spawning. Most spawning occurs in headwater streams. Steelhead migrate to the ocean to feed and grow until sexually mature.
Oncorhynchus mykiss CENTRAL CALIFORNIA COAST STEELHEAD *CRITICAL HABITAT*	D		✓			Primary constituent elements include: migration corridors to and from spawning areas that are free of barriers and maintain proper flow and water quality; freshwater spawning and rearing areas of high water quality and suitable substrate and forage; and estuarine and near-shore rearing areas of suitable water quality and forage.

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Oncorhynchus tshawytscha CENTRAL VALLEY SPRING-RUN CHINOOK SALMON	FT	ST	✓*	✓*✓		Over-summer in deep pools of the main-stem Sacramento River and its large perennial tributaries where fish can access cold headwaters during the warmer months. Water temps above 27 degrees Celsius is lethal to adults. *This species ESU is included because restoration efforts related to the San Joaquin River Restoration Program could result in it returning to the section of the San Joaquin River that is inside of the study area.
Oncorhynchus tshawytscha SACRAMENTO RIVER WINTER-RUN CHINOOK SALMON	FE	SE	✓	✓		Historically spawned in Sacramento River tributaries above Shasta Dam; coldwater releases from Shasta allow spawning in the upper reaches of the Sacramento River below Keswick dam. Requires clean, cold water over gravel beds with water temperatures between 6 and 14 degrees Celsius for spawning.
Amphibians						
Ambystoma californiense CALIFORNIA TIGER SALAMANDER	FT	CSC / C(E)	✓	✓	✓	Annual grasslands and grassy understory of valley-foothill hardwood habitats (i.e., oak-savannah). Require vernal pools or other seasonal water sources for breeding. Require mammal burrows or other underground refuges.
Ambystoma californiense CALIFORNIA TIGER SALAMANDER *CRITICAL HABITAT*	D / P	--		✓	✓	Primary constituent elements include: standing bodies of fresh water which become inundated during winter rains and typically remain inundated for a minimum of 12 weeks; upland habitats that contain small mammal burrows or other underground refugia; upland dispersal habitat that allows for movement between occupied habitats.

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Batrachoseps simatus KERN CANYON SLENDER SALAMANDER	--	ST			✓	Restricted in range to the Kern River drainage in southern Sierra at elevations ranging between 980 to 6,300 feet; isolated colonies along streams, ridges and canyons on moist, shaded, north-facing rocky slopes and shaded tributary canyons in oak and mixed pine-oak woodland; found beneath rocks and rotting logs.
Batrachoseps stebbinsi TEHACHAPI SLENDER SALAMANDER	C(T/E)	ST			✓	Restricted in range between the southern Sierra Nevada mountain range and Fort Tejon at elevations ranging between 2,000 to 4,600 feet; habitat specialist limited to moist, seasonally shaded, north-facing rocky or talus slopes (e.g., limestone or granite) and oak and mixed pine-oak woodland along canyons and ravines; found beneath heavy leaf litter and rock, talus, and woody debris refugia.
Lithobates (=Rana) pipiens NORTHERN LEOPARD FROG *LIMITED TO* NATIVE POPULATIONS ONLY	C(T)	CSC		✓	✓	In California, native populations are limited in range to Modoc and Lassen counties; introduced populations are otherwise scattered throughout California, though their ability to naturalize is questionable. Habitat requirements include aquatic winter habitat with emergent vegetation for egg deposition, uplands dominated by grasses or forbs for foraging, and availability of moist substrate. Only native populations of this species receive consideration as California Species of Special Concern under California Fish and Game Code.
Rana draytonii (*Rana aurora draytonii*) CALIFORNIA RED-LEGGED FROG	FT	CSC	✓	✓	✓	Pools in marshes, streams, ponds, with emergent vegetation, and typically without predatory fish, require adequate hibernacula, such as small mammal burrows or moist leaf litter.

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Rana draytonii (*Rana aurora draytonii*) CALIFORNIA RED-LEGGED FROG *CRITICAL HABITAT*	D / P	--	✓			Critical habitat based on the presence of two or more suitable breeding habitats and/or permanent water sources; aquatic habitats located within 0.7 mile of each other or non-breeding aquatic habitat and connected by unobstructed dispersal habitat at least 200 feet in width; presence of associated suitable upland aestivation habitat up to 200 feet from the riparian corridor.
Reptiles						
Gambelia (=*Crotaphytus*) sila BLUNT-NOSED LEOPARD LIZARD	FE	SE / FP	✓	✓	✓	Resident of sparsely vegetated alkali and desert scrub habitats, in areas of low topographic relief. Seek cover in mammal burrows, under shrubs or structures such as fence posts; they do not excavate their own burrows.
Thamnophis gigas GIANT GARTER SNAKE	FT	ST	✓	✓	✓	Found in freshwater marshes and low-gradient streams. Prefers habitat with dense emergent vegetation, deep and shallow pools of water (which persist throughout the seasonal cycle of activity), open areas along water margins, and upland habitat with access to structures suitable for hibernation and escape from flooding. Has adapted to drainage canals and irrigation ditches.
Birds						
Aquila chrysaetos GOLDEN EAGLE	--	FP	✓	✓	✓	Permanent resident and migrant throughout California range. Found in mountains and foothills. Nests on cliff edges or large trees in open areas. Needs open terrain for hunting: grasslands, deserts, savannahs, and early successional stages of forest and shrub habitats.

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Buteo swainsoni SWAINSON'S HAWK	--	ST	✓	✓	✓	Breeds in California, no wintering. Found in open country such as grassland, shrubland, and agricultural areas. Nests in riparian areas and oak woodlands as well as isolated and roadside trees close to grassland or agricultural foraging habitat.
Charadrius alexandrinus nivosus WESTERN SNOWY PLOVER	FT•*	CSC	✓	✓	✓	Occurs year round in California range. Inhabits beaches, dry mud or salt flats, sandy shores of rivers, lakes, and ponds. Nests primarily on coastal beaches, but known to nest in the Central Valley. Breeds in loose colonies. *Federal listing applies only to the Pacific coastal population. CDFG "Species of Special Concern" designation refers to both the coastal & interior populations.*
Coccyzus americanus occidentalis WESTERN YELLOW-BILLED CUCKOO	C	SE	✓	✓	✓	Breeds in large blocks of riparian habitats (particularly woodlands with willow and cottonwood) along the broad lower flood bottoms of larger river systems. Dense understory foliage important.
Elanus leucurus WHITE-TAILED KITE	--	FP	✓	✓	✓	Found year-round within California range in grasslands, agricultural fields, oak woodlands, savannah, and riparian habitats in rural and urban areas. Often found along tree-lined river valleys with adjacent open areas. Nest in trees.
Empidonax trallii extimus SOUTHWESTERN WILLOW FLYCATCHER	FE•*	SE			✓	Breeds in relatively dense riparian tree and shrub communities (e.g., willow, cottonwood, tamarisk thickets and woodland) associated with rivers, swamps, and other wetlands, including lakes and reservoirs. Most of these habitats are classified as forested wetlands or scrub-shrub wetlands. Habitat requirements for wintering are not well known, but habitats used include brushy savanna edges, second growth, shrubby clearings and pastures, and woodlands near water.

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Falco peregrinus anatum AMERICAN PEREGRINE FALCON	Delisted	SE/ FP	✓	✓	✓	Found year round within California range in a variety of habitats, most with cliffs for nesting and open areas for foraging. Uses large cities and nests on buildings.
Grus canadensis tabida GREATER SANDHILL CRANE	--	ST / FP	✓	✓	✓	Within California range winters in the Central Valley and nests in northeastern California. In summer, occurs in and near wet meadow, shallow lacustrine, and fresh emergent wetland habitats. In winter, frequents annual and perennial grassland habitats, moist croplands with rice or corn stubble, and open, emergent wetlands. It prefers relatively treeless plains.
Gymnogyps californianus CALIFORNIA CONDOR	FE▪*	SE/ FP	✓		✓	Permanent resident of the semi-arid, rugged mountain ranges surrounding southern San Joaquin Valley. Nests in caves, crevices, behind rock slabs, or on large ledges on high sandstone cliffs.
Haliaeetus leucocephalus BALD EAGLE	Delisted	SE / FP	✓	✓	✓	Mainly found in mountainous habitats near reservoirs, lakes and rivers and builds nests in the upper canopy of large coniferous trees. Most nest within 1 mile of water.
Passerculus sandwichensis beldingi BELDING'S SAVANNAH SPARROW	--	SE			✓	Wetland-dependant avian species that breeds in moist wetlands and meadows in interior Central Valley.
Synthliboramphus hypoleucus XANTUS'S MURRELET	FC / BCC	ST	✓	✓	✓	Breeds on offshore islands of Baja California and southern California; occasionally wanders north to Vancouver Island. An ocean-going species; nests in colonies on rocky sea islands, laying its eggs among boulders or in crevices off of island beaches.

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Vireo bellii pusillus LEAST BELL'S VIREO	FE	SE	✓		✓	Summers within California range. Typically inhabits structurally diverse dense riparian woodlands/shrubs along water courses or near open water. Nests in shrub or low tree, usually 1m above ground, in horizontal or down sloping twig fork, typically near edge of thicket. Obligate riparian species during breeding season. Brown-headed cowbird severe threat.
Mammals						
Ammospermophilus nelsonii NELSON'S (SAN JOAQUIN) ANTELOPE SQUIRREL	--	ST	✓	✓	✓	Occurs in the San Joaquin Valley, from southern Merced county south to King, Tulare and Kern counties, at elevations ranging from 200-1,200 feet; species typically found on dry sparsely vegetated loam soils and needs widely scattered shrubs, forbs, and grasses in broken terrain with gullies and washes.
Bassariscus astutus RINGTAIL	--	FP	✓	✓	✓	Occurs throughout California; inhabits areas with a mixture of forest and shrubland in close association with rocky areas or riparian habitats; typically forages in riparian areas; uses hollow trees, logs, abandoned burrows, and other features for refuge.
Dipodomys ingens GIANT KANGAROO RAT	FE	SE	✓		✓	Occurs in the western San Joaquin Valley; prefers annual grassland on gentle slopes (10 degrees) with friable, sandy-loam soils. Optimal cover consists of areas with almost no shrub cover.
Dipodomys nitratoides exilis FRESNO KANGAROO RAT	FE	SE	✓	✓	✓	Restricted to native grasslands in Fresno County within the San Joaquin Valley; nearly level, light, friable soils in chenopod scrub and grassland communities.

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Dipodomys nitratoides exilis FRESNO KANGAROO RAT *CRITICAL HABITAT*	D	--		✓		Primary constituent elements for the 857 acres of designated critical habitat for Fresno kangaroo rat were not defined at the time of the designation. However, the area contains sufficient vegetation cover for escape from predators, suitable food sources, land surface with hummocks to serve as burrowing sites, and substrate of suitable compactness to permit burrow construction.
Dipodomys nitratoides nitratoides TIPTON KANGAROO RAT	FE	SE			✓	Occurs in the Tulare Lake basin of the southern San Joaquin Valley; inhabits saltbrush scrub and sink scrub communities in the This species needs soft friable soils which escape seasonal flooding. Digs burrows in elevated soil mounds at bases of shrubs.
Sorex ornatus relictus BUENA VISTA LAKE SHREW	FE·*	CSC			✓	Occurs in the Tulare Basin in marshlands and riparian areas; prefers moist soil and uses stumps, logs, and litter for cover.
Vulpes macrotis mutica SAN JOAQUIN KIT FOX	FE	ST	✓	✓	✓	Occurs in the San Joaquin Valley in annual grassland or grassy open stages with scattered shrubby vegetation; requires loose-textured sandy soils for burrowing; requires suitable prey base of small rodents, including kangaroo rats or California ground squirrels.
Other Special-Status Wildlife Species						
INVERTEBRATES						
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Fish						
Archoplites interruptus SACRAMENTO PERCH	--	CSC			✓	Inhabits sloughs, slow-moving rivers, and lakes. Associated with beds of submerged and emergent vegetation, species can tolerate a wide variety of water quality, alkalinity, and turbidity. Usually, this species is extirpated in areas where non-native Centrarchid fish, especially crappie and bluegill, have been introduced. Currently extirpated from the San Joaquin River drainage.
Lampetra hubbsi KERN BROOK LAMPREY	--	CSC		✓	✓	Endemic to the east side of the San Joaquin Valley in silty backwaters of rivers emerging from the Sierra foothills.
Lampetra ayresi RIVER LAMPREY	--	CSC	✓			Occur in the Sacramento, San Joaquin, and Napa Rivers and tributaries of San Francisco Bay. Adults live in the ocean and migrate into fresh water to spawn
Lavinia symmetricus symmetricus SAN JOAQUIN ROACH	--	CSC		✓	✓	Small, intermittent to perennial drainages of the San Joaquin River and its tributaries. The introduction of predatory fishes, such as largemouth bass and sunfish, typically eliminates this species. This species is absent from the Kern River drainage.
Mylopharodon conocephalus HARDHEAD	--	CSC	✓	✓	✓	Distributed in low- to mid-elevation streams in the main Sacramento-San Joaquin drainage. Found in clear, high-quality streams with deep pool and sand-gravel-boulder substrates and slow velocities. Associated with Sacramento pikeminnow and usually with Sacramento sucker. Tend to be absent in streams with high densities of introduced fishes, particularly centrarchids.

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Oncorhynchus tshawytscha CENTRAL VALLEY FALL/LATE FALL-RUN CHINOOK SALMON	--	CSC	✓	✓		Occurs in well-oxygenated, cool, riverine habitat with water temperatures from 8.0 to 12.5°C. Habitat types are riffles, runs, and pools. Populations spawning in the Sacramento & San Joaquin Rivers and their tributaries.
Amphibians						
Ensatina eschscholtzii croceator YELLOW-BLOTCHED SALAMANDER	--	CSC		✓	✓	One of several differentiated forms of *Ensatina*; limited in range to predominantly Kern County in vicinity of Tehachapi Mountains, Mount Pinos, Fort Tejon, and Frazier-Alamo Mountain area; inhabits canyons in oak and pine dominated woodlands and forests beneath leaf litter.
Rana boylii FOOTHILL YELLOW-LEGGED FROG	--	CSC	✓	✓	✓	Frog restricted to partly shaded, shallow streams and riffles with a rocky substrate in a variety of habitats. Cobble-sized substrate required for egg-laying.
Spea (=*Scaphiopus*) *hammondii* WESTERN SPADEFOOT	--	CSC	✓	✓	✓	Grassland and valley-foothill hardwood woodlands, vernal pools or seasonal wetlands are essential for egg laying.
Reptiles						
Actinemys (=*Clemmys / Emys) marmorata* WESTERN POND TURTLE	--	CSC	✓	✓	✓	Ponds, marshes, rivers, streams, irrigation ditches, vernal pools. Needs basking sites such as partially submerged logs or rocks, and suitable upland habit (sandy banks or grassy open fields) for egg laying. Fresh, brackish or saltwater conditions.

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Anniella pulchra pulchra SILVERY LEGLESS LIZARD	--	CSC	✓	✓	✓	Semi-stabilized sand dunes, areas with sandy soil, and high moisture content, vegetated with oak or pine-oak woodland, chaparral; also wooded stream edges, and occasionally desert-scrub. Bush lupine often is an indicator of suitable conditions. Often found in leaf litter, under rocks, logs, and driftwood.
Masticophis flagellum ruddocki SAN JOAQUIN WHIPSNAKE	--	CSC	✓	✓	✓	Open, dry, treeless areas, including grassland and saltbush scrub. Takes refuge in rodent burrows, under shaded vegetation, and under surface objects. Within the project area, found only in the western San Joaquin Valley.
Phrynosoma coronatum frontale COAST (CALIFORNIA) HORNED LIZARD	--	CSC	✓	✓	✓	Sandy loam areas and on alkali flats. Dietary specialists dependent on ants, as well as beetles and other seasonally abundant insects. Forage on the ground in open areas, usually between shrubs and often near an ant nest. Utilize small mammal burrows or burrow under surface objects during periods of extended inactivity or hibernation.
Salvadora hexalepis virgultea COAST (WESTERN) PATCH-NOSED SNAKE	--	CSC			✓	Restricted in range to the Pacific coast between San Luis Obispo County and Baja California, Mexico; preferred prey of whiptail lizard (*Aspidoscelis* spp.); inhabit coastal sage, chaparral, and other brushy, shrubby vegetation habitats that provide a low shrub structure; utilize small mammal burrows (i.e., gophers) or woodrat (*Neotoma* spp.) sticknests to overwinter.

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Birds						
Agelaius tricolor TRICOLORED BLACKBIRD	--	CSC	✓	✓	✓	Almost endemic to California; permanent resident and migrant. Highly colonial species, most numerous in Central Valley and vicinity. Nests next to open water typically in freshwater marsh habitat where there is extensive emergent or riparian vegetation. Increasing percentage of breeding colonies has been reported in grain fields. Forages in grasslands, wetland habitats, and some agricultural areas.
Ammodramus savannarum GRASSHOPPER SPARROW	--	CSC	✓	✓	✓	Occurs in California primarily as a summer (breeding) resident. At least partly migratory. Ecological requirements vary substantially from region to region within its wide range. In general, prefer short to middle-height, moderately open grasslands with scattered shrubs. Ground nester.
Aphelocoma insularis ISLAND SCRUB-JAY	BCC	--	✓	✓	✓	Found only on Santa Cruz Island in the Channel Islands. Found in open oak woods and brushy patches. Builds stick nest in dense trees or shrubs.
Asio flammeus SHORT-EARED OWL	--	CSC		✓	✓	Year round resident in certain areas (few) within California; more numerous as winter migrants. Found in open county including grasslands, freshwater marshes, old pastures, irrigated alfalfa or grain fields, prairie, and meadows, with concentrations of small mammals. Ground nester.
Asio otus LONG-EARED OWL	--	CSC	✓	✓	✓	Occurs in California range year round. Nests in conifer, oak, riparian, pinyon-juniper, and desert woodlands that are either open or are adjacent to grasslands, meadows, or shrublands. Uses stick nests by other birds, and in rare cases, nests in cavities. Forage primarily at night in grasslands, meadows, active or fallow agricultural lands, sagebrush scrub, and desert scrub.

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Athene cunicularia WESTERN BURROWING OWL	--	CSC	✓	✓	✓	Year round resident throughout much of California range. Migrants from other parts of western North America may augment resident populations in winter. Found in open, dry, annual or perennial grasslands, deserts, and scrublands characterized by low-growing vegetation. Uses small burrows for nesting and roosting.
Aythya americana REDHEAD	--	CSC	✓	✓	✓	Permanent resident and winter migrant in California range. Usually nest in freshwater wetlands with tall emergent vegetation interspersed with areas of deep, open water. In winter and migration forage and rest on large, deep bodies of water and may form rafts far from shore.
Baeolophus inornatus OAK TITMOUSE	BCC	--	✓	✓	✓	Resident from southern Oregon south to Baja California. Prefers live oaks and deciduous growth of all kinds. Nests in tree cavities, fence-post holes, or crevices of old buildings; the nest is composed of grasses, fur, and some feathers.
Bucephala islandica BARROW'S GOLDENEYE	--	CSC		✓		Breeds in high central and northern Sierra Nevada mountains, near wooded mountain lakes or large streams. Nests in tree cavities, such as a deserted nest-hole of a pileated woodpecker or flicker; also use nest boxes.
Calidris canutus RED KNOT (ROSELAARI SSP.)	BCC	--	✓	✓	✓	Breeds in Siberia and northwestern Alaska and winters in Florida, Panama, and Venezuela. Nests on wet, low tundra to dry slopes and ridges. Common locally along sandy beaches. Nest is a depression on a grass hummock, lined with leaves and lichen.

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Calypte costae COSTA'S HUMMINGBIRD	BCC	--	✓	✓	✓	Breeds from central California, southern Nevada, and southwestern Utah southward and winters in southern California and Mexico. Found in low deserts; in California, chaparral. Nest is a delicately woven cup, with leaves or lichens fastened to the outside, built low on a protected branch of a bush or small tree.
Campylorhynchus brunneicapillus CACTUS WREN	BCC	--	✓	✓	✓	Resident from southern California, southern Nevada, Utah, and western Texas southward. Prefers desert thickets and cacti. Nest is a mass of fine grass and straw with a side entrance, lined with feathers and hair and placed in the top of a thorny desert shrub or spiny cactus.
Carduelis lawrencei LAWRENCE'S GOLDFINCH	BCC	--	✓	✓	✓	Breeds in central and southern California, west of Sierra Nevada and south into Baja California; winters south and east to extreme western Texas. Prefers dry grassy slopes with weed patches, chaparral, and open woodlands. Nest is a tightly woven cup in a low tree or bush.
Charadrius montanus MOUNTAIN PLOVER	--	CSC	✓	✓	✓	Winter visitor to California range. Roost and forage in short grasslands, freshly plowed fields, and bare ground with flat topography. Prefers fallow, grazed, or burned areas and alkali flats with burrowing rodents.
Chlidonias niger BLACK TERN	--	CSC	✓	✓	✓	Occurs primarily as a migrant and summer resident in California range. In general, nest semi-colonially in favorable, protected areas of marshes. In Central Valley typically breed in rice fields, flooded agricultural fields, and emergent wetlands.

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Circus cyaneus NORTHERN HARRIER	--	CSC	✓	✓	✓	Occurs year round within breeding range in California and may potentially winter in areas statewide. Breeds and forages in variety of open (treeless) habitats such as marshes, meadows, pastures, prairies, weedy borders of lakes, rivers, and streams, grasslands, some croplands, sagebrush flats, and desert sinks. Constructs nests on ground in open field or meadow in shrubby vegetation, usually near wet areas.
Coturnicops noveboracensis YELLOW RAIL	BCC	CSC	✓	✓	✓	Breeds from northern Canada south to North Dakota, Maine and Michigan. Winters in Florida and along Gulf Coast, rarely to southern California. Utilizes grassy marshes and wet meadows, building well-concealed firm grass cup nests. Especially secretive and seldom seen.
Cypseloides niger BLACK SWIFT	--	CSC			✓	Occurs in California range as a summer resident and migrant. Restricted to limited potential nesting locations: behind or beside permanent or semi-permanent waterfalls, on perpendicular cliffs near water, and in sea caves. Forage for flying ants far from nesting locales over a variety of habitat types.
Dendragapus fuliginosus howardi MOUNT PINOS SOOTY GROUSE	--	CSC			✓	Occurs year round in California range. Nests in high-elevation coniferous forest (i.e., mature *Abies*/*Pinus* forest) and raises brood in nearby meadows. Typically winters in conifers.
Dendrocygna bicolor FULVOUS WHISTLING-DUCK	--	CSC			✓	Occurs mainly as summer resident and migrant in California range. Found in freshwater and coastal marshes, rice fields, and flooded tall-grass areas with adjacent uplands. Feeds nocturnally on seeds of emergent vegetation. Ground nester. Nests built on dense floating or flooded emergent vegetation.

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Dendroica petechia brewsteri YELLOW WARBLER	--	CSC	✓	✓	✓	Occurs primarily as a migrant and summer resident in California range. Generally occupy riparian vegetation close to streams and in wet meadows. Nests placed in upright fork of shrub or tree.
Gavia immer COMMON LOON	--	CSC		✓		Nesting locations at certain large lakes and reservoirs in the interior of California, primarily in northeastern plateau region. Bodies of water regularly frequented are extensive, fairly deep, and produce quantities of large fish.
Geothlypis trichas COMMON YELLOWTHROAT (SINUOSA SSP.)	BCC	--	✓	✓	✓	The range of this subspecies is bounded by Tomales Bay on the north, Carquinez Strait on the east, and Santa Cruz County on the south. Inhabits moist thickets and tall grassy marshes. Nest is a loose cup mass of grass, sedge, and bark, concealed on or near the ground in a dense clump of weeds or grass.
Grus canadensis canadensis LESSER SANDHILL CRANE	--	CSC	✓		✓	Winters only within California range. Foraging habitat includes grasslands, pastures, meadows, crop and grain fields (i.e., corn, barley, wheat fields and to a minor extent rice), and shallow wetlands. Roost sites are in a variety of wetland habitats with shallow water (e.g., pooled agricultural fields, freshwater lakes and ponds, alkaline lakes, and channels of shallow rivers).
Haematopus bachmani BLACK OYSTERCATCHER	BCC	--	✓	✓	✓	Breeds in Baja California and is a casual visitor to California. Builds nests on rocky seacoasts creating a shallow depression among pebbles or, more rarely, on sand beaches.
Histioinicus histrionicus HARLEQUIN DUCK	--	CSC		✓		Breeds on west slope of the Sierra Nevada, nesting along shores of swift, shallow rivers. Nest often built in a recess, sheltered overhead by stream bank, rocks, woody debris, usually within 7 feet of water.

Table C-1
List of Special-Status Wildlife Species with Potential to Occur in the Central Valley HST Study Area

Scientific Name COMMON NAME	Federal Status[1]	State Status[2]	San Jose to Merced Section	Merced to Fresno Section	Fresno to Bakersfield Section	Preferred Habitat
Icteria virens YELLOW-BREASTED CHAT	--	CSC	✓	✓	✓	Occurs as migrant and summer resident in California range. Occupy riparian habitats with a well-developed dense shrub layer and an open canopy. Nesting habitat is usually restricted to the narrow border of streams, creeks, sloughs, and rivers. Nests placed in dense shrubs.
Ixobrychus exilis LEAST BITTERN	--	CSC	✓	✓	✓	Primarily a summer resident in California range, with some remaining during winter in a few locations. Breeding habitats include freshwater and brackish marshes with tall, dense emergent vegetation and clumps of woody plants over deep water. May require fairly large marshes for breeding.
Lanius ludovicianus LOGGERHEAD SHRIKE	--	CSC	✓	✓	✓	Year round throughout most of California range; some breeding populations may be migratory. Wintering individuals augment resident populations and occupy areas where none breed. Breeds and forages in open habitats interspersed with shrubs and small trees, including disturbed habitats. Nests placed in trees.
Laterallus jamaicensis BLACK RAIL	BCC	T	✓	✓	✓	Breeds along Pacific coast through San Francisco Bay and also over-winters in area. Uses matted dead marsh grasses and thick plant stands for cover and concealment. Builds cup nest of loose grasses on ground. Secretive and very rarely seen.
Limnodromus griseus SHORT-BILLED DOWITCHER	BCC	--	✓	✓	✓	Breeds in southern Alaska and parts of Canada and winters along coast from California and Virginia southward. Nests on moist tundra or beside forest pools; visits mudflats, creeks, salt marshes, and tidal estuaries during migration and in winter. Nest is a depression on the ground lined with grass and moss.

Table C-1
List of Special-Status Wildlife Species with Potential to Occur in the Central Valley HST Study Area

Scientific Name COMMON NAME	Federal Status[1]	State Status[2]	San Jose to Merced Section	Merced to Fresno Section	Fresno to Bakersfield Section	Preferred Habitat
Limosa fedoa MARBLED GODWIT	BCC	--	✓	✓	✓	Breeds on the central plains from Saskatchewan to Minnesota and winters on coasts from California and Virginia southward and along Gulf Coast. Nests on grassy plains; visits salt marshes, tidal creeks, mudflats, and sea beaches on migration. Creates a nest in a slight depression lined with grass on the ground and nests in loose colonies.
Melanerpes lewis LEWIS'S WOODPECKER	BCC	--	✓	✓	✓	Breeds from southern Canada south to central California, northern Arizona, and northern New Mexico. Winters from southern British Columbia and Oregon to Colorado and south to northern Mexico; wanders east to the Great Plains. Prefers open pine-oak woodlands, oak or cottonwood groves in grasslands, ponderosa pine country. Forms loose colonies nesting in cavities of dead stumps or tree limbs, often at a considerable height.
Melospiza melodia SONG SPARROW (GRAMINEA SSP.)	BCC	CSC	✓	✓	✓	Resident of Santa Barbara Island of the Channel Islands. Inhabits wooded edges, clearings, and thickets with open grassy feeding areas; uses low dense scrub for nesting; tall vantage points for singing. Nest is neat, well-hidden grassy cup nest often lined with hair, placed in a bush or on the ground.
Melospiza melodia SONG SPARROW (MAXILLARIS SSP.)	BCC	CSC	✓	✓	✓	Resident of the marshes of Suisun Bay. Inhabits thickets and marshes with open grassy feeding areas; uses low dense scrub for nesting; tall vantage points for singing. Nest is neat, well-hidden grassy cup nest often lined with hair, placed in a bush or on the ground.
Melospiza melodia SONG SPARROW (MODESTO POPULATION)	--	CSC		✓		Fresh emergent wetlands, and riparian willow thickets in the Sacramento Valley, Sacramento-San Joaquin River Delta, and northern San Joaquin Valley.

Table C-1
List of Special-Status Wildlife Species with Potential to Occur in the Central Valley HST Study Area

Scientific Name COMMON NAME	Federal Status[1]	State Status[2]	San Jose to Merced Section	Merced to Fresno Section	Fresno to Bakersfield Section	Preferred Habitat
Melospiza melodia SONG SPARROW (PUSILLULA SSP.)	BCC	CSC	✓	✓	✓	Resident of the eastern San Francisco Bay salt marshes. Inhabits clearings, thickets, and marshes with open grassy feeding areas; low dense scrub for nesting; tall vantage points for singing. Nest is a neat, well-hidden grassy cup nest often lined with hair, placed in a bush or on the ground.
Melospiza melodia SONG SPARROW (SAMUELIS SSP.)	BCC	CSC	✓	✓	✓	Resident of the northern portion of San Francisco Bay and San Pablo Bay. Inhabits clearings, thickets, and marshes with open grassy feeding areas; undergrowth in urban areas; uses low dense scrub for nesting and tall vantage points for singing. Nest is a neat, well-hidden grassy cup nest often lined with hair, placed in a bush or on the ground.
Numenius americanus LONG-BILLED CURLEW	BCC	--	✓	✓	✓	Breeds from southern Canada to northern California, Utah, northern New Mexico, and Texas. Winters from California, Texas, Louisiana, South Carolina, and Florida southward. Nests on plains and prairies; during migration frequents lake and river shores, mudflats, salt marshes, and sandy beaches. Uses a grass-lined nest in a hollow on the ground.
Numenius phaeopus WHIMBREL	BCC	--	✓	✓	✓	Breeds on Arctic tundra in Alaska and Canada, especially near coast; uses coastal salt meadows, mudflats, and grassy shoreline slopes during migration. Winters on the Gulf and Atlantic coasts and southern California. Nests in clumps of moss or grassy depressions on the ground.
Oceanodroma homochroa ASHY STORM-PETREL	BCC	CSC	✓	✓	✓	Pelagic marine species of the open ocean. Breeds on rocky islands from northern California to northern Baja California where it uses burrows or rock crevices and nests in large colonies.

Table C-1
List of Special-Status Wildlife Species with Potential to Occur in the Central Valley HST Study Area

Scientific Name COMMON NAME	Federal Status[1]	State Status[2]	San Jose to Merced Section	Merced to Fresno Section	Fresno to Bakersfield Section	Preferred Habitat
Otus flammeolus FLAMMULATED OWL	BCC	--	✓	✓	✓	Breeds in southern British Columbia south to southern California, Arizona, New Mexico, and western Texas. Winters south of United States. Inhabits coniferous woodlands and forest edges in the Northwest; dry ponderosa pine woods in the Southwest. Nests in a tree hollow or deserted woodpecker hole.
Pelecanus erythrorhynchos AMERICAN WHITE PELICAN	--	CSC	✓	✓	✓	Year round in California range, winters along coast and breeds only inland. Breed in multi-species assemblages of colonial nesters along lakes. Nest on ground on earthen, sandy, and rocky islands or (rarely) peninsulas and (locally) on floating tule-mat islands. Forage in shallow inland waters, such as open areas in marshes and along lake or river edges; wintering and non-breeding feed in shallow coastal marine habitats.
Phoebastria nigripes BLACK-FOOTED ALBATROSS	BCC	--	✓	✓	✓	Pelagic marine species of the open ocean that is rarely seen from shore. Uncommon non-breeding visitor to the Pacific coast of North America. Breeds on mid-Pacific islands, where it nests on the ground in shallow depressions.
Pica nuttalli YELLOW-BILLED MAGPIE	BCC	--	✓	✓	✓	Resident in California's Central Valley and adjacent foothills. Common in oak savannas, oak woods, riverside growth, ranches, and suburbs. Nests in colonies in tall trees with dense foliage and builds nests of twigs and sticks.
Picoides albolarvatus WHITE-HEADED WOODPECKER	BCC	--	✓	✓	✓	Resident from extreme south-central British Columbia, northeastern Washington, and Idaho, south to southern California and western Nevada. Prefers ponderosa pine belts of the mountains; also in subalpine belts of firs. Nest cavities are in a pine stub or snag, often close to the ground.

Table C-1
List of Special-Status Wildlife Species with Potential to Occur in the Central Valley HST Study Area

Scientific Name COMMON NAME	Federal Status[1]	State Status[2]	San Jose to Merced Section	Merced to Fresno Section	Fresno to Bakersfield Section	Preferred Habitat
Picoides nuttallii NUTTALL'S WOODPECKER	BCC	--	✓	✓	✓	Resident from northern California to Baja California. Prefers canyon scrub oaks, oak woodlands, and streamside growth. Nests in holes excavated in a thin dead branch of an oak or cottonwood, or even a large, thick-stemmed elderberry bush.
Pipilo maculatus SPOTTED TOWHEE (CLEMENTAE SSP.)	BCC	CSC	✓	✓	✓	Resident of Santa Rosa, Santa Catalina, and (formerly) San Clemente islands in the Channel Islands. Inhabits dense chaparral and woodlands. Nest is a loose cup built in a dense bush, close to or on the ground if sheltered by tall planting.
Pooecetes gramineus affinis OREGON VESPER SPARROW	--	CSC	✓		✓	Winters in California. Grassland wintering habitat characterized as mainly open ground with little vegetation, or short grass and low annuals, including stubble fields, meadows, and road edges.
Progne subis PURPLE MARTIN	--	CSC	✓		✓	Occurs as summer resident and migrant in California range. Use wide variety of nesting substrates (e.g., tree cavities, bridges, utility poles, lava tubes, buildings); however, sites must have low canopy cover at nest height. Most tree nest sites located in upper slopes of hilly and mountainous terrain. Abundant near large wetlands and other water bodies. Starlings must be present in low densities or absent.
Ptychoramphus aleuticus CASSIN'S AUKLET	BCC	CSC	✓	✓	✓	Breeds from the Aleutians to central Baja California. Winters in waters off southern part of breeding range. An open ocean species, it nests on sea cliffs and isolated headlands in colonies. Its nest is usually placed in a burrow but may also be found in a cavity among rocks.

Table C-1
List of Special-Status Wildlife Species with Potential to Occur in the Central Valley HST Study Area

Scientific Name COMMON NAME	Federal Status[1]	State Status[2]	San Jose to Merced Section	Merced to Fresno Section	Fresno to Bakersfield Section	Preferred Habitat
Puffinus creatopus PINK-FOOTED SHEARWATER	BCC	--	✓	✓	✓	Pelagic marine species of the open ocean that is seldom seem from shore. Common non-breeding visitor in the summer to the coasts of Oregon and California. Breeds on islands off of the coast of Chile, where is makes use of burrows and nests in colonies.
Puffinus opisthomelas BLACK-VENTED SHEARWATER	BCC	--	✓	✓	✓	Pelagic marine species of the open ocean that is often seen from shore. A year-round visitor to the waters of southern California. Breeds on islands off Baja California where it makes use of burrows and nests in colonies.
Riparia riparia BANK SWALLOW	--	CSC		✓		Colonial nester; nests primarily in riparian and other lowland habitats west of the desert. Requires vertical banks/cliffs with fine-textured/sandy soils near streams, rivers, lakes, ocean to dig nest cavity.
Rynchops niger BLACK SKIMMER	BCC	CSC	✓	✓	✓	Breeds along Atlantic and Gulf coasts from Massachusetts and Long Island to Florida and Texas. Winters north to southern California and Virginia. Nests chiefly on sandbars and beaches; feeds in shallow bays, inlets, and estuaries. Lays eggs on bare sand, usually among shell fragments and scattered grass clumps.
Selasphorus sasin ALLEN'S HUMMINGBIRD	BCC	--	✓	✓	✓	Breeds along coast from southern Oregon to southern California and is a resident of southern California. Also winters in Mexico. Prefers coastal chaparral, brushland, and edges of redwood forests. Nest is a tightly woven cup placed on a sheltered branch.

Table C-1
List of Special-Status Wildlife Species with Potential to Occur in the Central Valley HST Study Area

Scientific Name COMMON NAME	Federal Status[1]	State Status[2]	San Jose to Merced Section	Merced to Fresno Section	Fresno to Bakersfield Section	Preferred Habitat
Spizella atrogularis BLACK-CHINNED SPARROW	BCC	--	✓	✓	✓	Breeds from central California, southern Nevada, southern Utah, Arizona, southern New Mexico, and western Texas southward and winters along Mexican border. Prefers low, dense chaparral, mountain slopes; and sagebrush. Nest is a grass-lined cup well concealed in a low bush.
Sterna nilotica GULL-BILLED TERN	BCC	CSC	✓	✓	✓	Breeds primarily on the Atlantic and Gulf coasts and locally at the Salton Sea, California. Winters north to Gulf coast. Prefers coastal marshes and sandy beaches for nesting; at these locations, it forms shell-lined shallow depressions on a sandy island in a saltmarsh and nests in scattered colonies.
Strix occidentalis SPOTTED OWL (OCCIDENTALIS SSP.)	BCC	CSC	✓	✓	✓	Occurs throughout its historic range in California, extending along the west side of the Sierra Nevada, some eastern Sierra portions, areas of the central Coast range, and in all major mountains of southern California. Inhabits old-growth coniferous forests and densely wooded canyons. Nests in a natural tree or canyon wall cavity or an abandoned hawk's nest.
Toxostoma lecontei LE CONTE'S THRASHER	--	CSC			✓	Permanent resident within California range. Commonly found on very dry and lightly vegetated plains with desert scrub, particularly saltbush and creosote bush. Nests in thick, dense, and thorny desert shrubs or cholla cacti.
Xanthocephalus xanthocephalus YELLOW-HEADED BLACKBIRD	--	CSC	✓	✓	✓	Mainly summer resident and migrant in California range, small numbers winter. Breeds in loose colonies in freshwater wetlands (e.g., marshes) with tall dense emergent vegetation adjacent to deep water, and along borders of lakes or ponds. Places its nest over water, attached to cattails and reeds. Forages in the wetlands and in surrounding grasslands and croplands. In winter large flocks forage in agricultural areas.

Table C-1
List of Special-Status Wildlife Species with Potential to Occur in the Central Valley HST Study Area

Scientific Name COMMON NAME	Federal Status[1]	State Status[2]	San Jose to Merced Section	Merced to Fresno Section	Fresno to Bakersfield Section	Preferred Habitat
Mammals						
Antrozous pallidus PALLID BAT	--	CSC	✓	✓	✓	Occurs throughout California; species forages in open areas of grasslands, shrublands, woodlands, and forests from sea level up through 6,560 feet; roosts in caves, rock crevices, mines, hollow trees, buildings, and bridges.
Chaetodipus californicus femoralis DULZURA POCKET MOUSE	--	CSC			✓	Primarily distributed around the U.S.-Mexico border, with scattered occurrences in the Central Valley; occurs in a variety of habitats including coastal scrub, chaparral and grasslands, particularly grass-chaparral edges.
Corynorhinus townsendii TOWNSEND'S BIG-EARED BAT	--	CSC	✓	✓	✓	Occurs throughout California; found in a variety of habitats, most commonly in mesic sites, including coniferous forests, mixed meso-phytic forests, deserts, native prairies, riparian communities, active agricultural areas, and coastal habitat types.
Dipodomys nitratoides brevinasus SHORT-NOSED KANGAROO RAT	--	CSC	✓		✓	Occurs in scattered populations along the western edge of the Central Valley; occupies grassland and desert shrub associations on friable soils and open alkaline flats.
Euderma maculatum SPOTTED BAT	--	CSC		✓	✓	Occurs throughout California at elevations ranging from below sea level to 8,860 feet in a wide variety of habitats including arid, low desert habitats to high elevation coniferous forests; roost in cracks, crevices and caves high in rock cliffs.
Eumops perotis californicus WESTERN MASTIFF BAT	--	CSC	✓	✓	✓	Roosts in crevices in cliff faces, high buildings, and tunnels; forages in arid, semi arid habitat-coniferous and deciduous woodlands, coastal scrub, grasslands, and chaparral.

Table C-1
List of Special-Status Wildlife Species with Potential to Occur in the Central Valley HST Study Area

Scientific Name COMMON NAME	Federal Status[1]	State Status[2]	San Jose to Merced Section	Merced to Fresno Section	Fresno to Bakersfield Section	Preferred Habitat
Lasiurus blossevillii WESTERN RED BAT	--	CSC	✓	✓	✓	Occurs throughout California; roosts primarily in trees, typically adjacent to open fields or streams, which are protected above and open below for foraging; prefers habitat edges and mosaics with trees.
Onychomys torridus ramona SOUTHERN GRASSHOPPER MOUSE	--	CSC	✓		✓	Occurs in the Mojave Desert and the southern Central Valley in arid desert habitats; prefers alkali desert scrub and desert scrub; also occurs in coastal scrub, mixed chaparral, sagebrush, low sage and bitterbrush scrub habitats; found in areas of low to moderate shrub cover.
Onychomys torridus tularensis TULARE GRASSHOPPER MOUSE	--	CSC			✓	Occurs in the southern San Joaquin Valley; species historically occurred across the central and southern San Joaquin Valley but is currently only known from scattered populations; inhabits arid scrub communities, including saltbush scrub.
Taxidea taxus AMERICAN BADGER	--	CSC	✓	✓	✓	Occurs throughout California in grasslands, savannas, and mountain meadows near timberline; require friable soils, and relatively open, uncultivated ground; requires suitable prey base of burrowing rodents such as gophers, ground squirrels, marmots, and kangaroo rats.

Table C-1
List of Special-Status Wildlife Species with Potential to Occur in the Central Valley HST Study Area

Scientific Name COMMON NAME	Federal Status[1]	State Status[2]	San Jose to Merced Section	Merced to Fresno Section	Fresno to Bakersfield Section	Preferred Habitat

Notes:

[1] Federal Status

C(E) – Candidate for Endangered listing status

C(T) – Candidate for Threatened listing status

C(T/E) – Candidate for Threatened or Endangered listing status

FE – Endangered

FT – Threatened

D – Critical Habitat designated by the U.S. Fish and Wildlife Service.

P – Proposed Critical Habitat designated by the U.S Fish and Wildlife Service.

BCC – Birds of Conservation Concern designated by the U.S. Fish and Wildlife Service.

[2] State Status

C(E) – Candidate for Endangered listing status

C(T) – Candidate for Threatened listing status

SE – Endangered

ST – Threatened

CSC – California Species of Special Concern designated by the California Department of Fish and Game.

FP – Fully Protected species designated by the California Department of Fish and Game.

CSC – California Species of Special Concern designated by the California Department of Fish and Game.

FP – Fully Protected species designated by the California Department of Fish and Game.

ATTACHMENT C

Delineated Wetlands and Other Waters of the U.S. Study Area Maps

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potentially sensitive information

APPENDIX D

Wetland Determination Data Sheets

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potentially sensitive information

APPENDIX E

Wetland and Other Waters Photographs

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potentially sensitive information

APPENDIX F

Wetlands Identified in the Study Area

Table F-1
Wetlands Identified in the Study Area

Wetland ID	Area (acres)	Jurisdiction (Federal/State)	Appendix C, Figure Page Number
PEM Vernal Pool a			
9821	0.04	YES/YES	006
9822	0.20	YES/YES	006
5511	0.01	YES/YES	28
5233	0.01	YES/YES	033
5234	0.03	YES/YES	033
7727	0.21	YES/YES	033
8364	0.001	YES/YES	033
8365	0.001	YES/YES	033
8366	0.001	YES/YES	033
8368	0.001	YES/YES	033
8369	0.001	YES/YES	033
8371	0.001	YES/YES	033
8373	0.001	YES/YES	033
10633	4.75	YES/YES	033, 034, 037
1800	1.76	YES/YES	034
10756	0.05	YES/YES	037
5583	0.07	YES/YES	058, 059
5584	0.04	YES/YES	058, 059
5565	0.07	YES/YES	059
5566	0.30	YES/YES	059
5571	0.28	YES/YES	059
5572	0.48	YES/YES	059
5573	0.01	YES/YES	059
5574	0.004	YES/YES	059
5576	0.01	YES/YES	059
5577	0.002	YES/YES	059
5578	0.01	YES/YES	059
5579	0.002	YES/YES	059

Wetland ID	Area (acres)	Jurisdiction (Federal/State)	Appendix C, Figure Page Number
5580	0.003	YES/YES	059
5581	0.005	YES/YES	059
8534	0.27	YES/YES	102
8535	0.02	YES/YES	102
8536	0.02	YES/YES	102
10836	0.17	YES/YES	106
10837	0.16	YES/YES	106
10799	0.23	YES/YES	113
10763	0.35	YES/YES	119
10838	0.04	YES/YES	119
10839	0.03	YES/YES	119
10840	0.24	YES/YES	119, 120
10764	0.04	YES/YES	120
5166	0.07	YES/YES	123
5167	0.39	YES/YES	123
7586	0.19	YES/YES	123
7588	0.07	YES/YES	123
8147	0.02	YES/YES	205
8148	0.02	YES/YES	205
8149	0.01	YES/YES	205
5232	0.35	YES/YES	257
7190	1.15	YES/YES	262, 264
5229	0.24	YES/YES	263, 291
5594	0.004	YES/YES	263
5597	0.05	YES/YES	263, 291
5598	0.01	YES/YES	263
5599	0.01	YES/YES	263
8264	0.93	YES/YES	263, 292
5587	0.05	YES/YES	264
5588	0.90	YES/YES	264
5590	4.64	YES/YES	264

Wetland ID	Area (acres)	Jurisdiction (Federal/State)	Appendix C, Figure Page Number
5591	2.37	YES/YES	264
5592	1.19	YES/YES	264
10749	0.87	YES/YES	265, 294
5600	0.01	YES/YES	291
5227	0.01	YES/YES	308
5585	0.14	YES/YES	308
5586	0.18	YES/YES	308
7357	0.02	YES/YES	312
7358	0.08	YES/YES	312
10725	0.12	YES/YES	312
10726	0.12	YES/YES	312
10727	0.13	YES/YES	312
10728	0.43	YES/YES	312
5568	0.07	YES/YES	315
5569	0.92	YES/YES	315
5570	0.05	YES/YES	315
5575	0.03	YES/YES	315
5582	0.37	YES/YES	315
7356	0.11	YES/YES	315
10723	0.17	YES/YES	315, 316
10724	0.22	YES/YES	315
5219	0.01	YES/YES	316
5220	0.01	YES/YES	316
5221	0.01	YES/YES	316
5222	0.59	YES/YES	316, 317
7363	0.03	YES/YES	316
7364	0.15	YES/YES	316
7365	0.05	YES/YES	316
7366	0.05	YES/YES	316, 319
7369	0.16	YES/YES	316, 319
7372	0.15	YES/YES	316, 318, 319

Wetland ID	Area (acres)	Jurisdiction (Federal/State)	Appendix C, Figure Page Number
10722	0.33	YES/YES	316
5209	0.06	YES/YES	317
5210	0.01	YES/YES	317
5211	0.42	YES/YES	317
5212	0.02	YES/YES	317
5213	0.39	YES/YES	317
5214	0.08	YES/YES	317
5215	0.02	YES/YES	317
5216	0.03	YES/YES	317
5217	0.03	YES/YES	317
5218	0.34	YES/YES	317
7193	0.05	YES/YES	317
7373	0.06	YES/YES	318
7374	0.06	YES/YES	318
7376	0.003	YES/YES	318
7398	0.02	YES/YES	319
7399	0.04	YES/YES	319
7400	0.11	YES/YES	319
7401	0.12	YES/YES	319
7402	0.01	YES/YES	319
7403	0.09	YES/YES	319
10885	0.13	YES/YES	319
5205	1.57	YES/YES	320
5206	0.08	YES/YES	320
5207	0.77	YES/YES	320
5208	0.23	YES/YES	320
7194	0.06	YES/YES	320
7196	0.03	YES/YES	320
7198	0.03	YES/YES	320
7203	0.09	YES/YES	320
11073	0.24	YES/YES	321, 322

Wetland ID	Area (acres)	Jurisdiction (Federal/State)	Appendix C, Figure Page Number
7204	0.17	YES/YES	322
8288	0.28	YES/YES	322
8432	0.05	YES/YES	322
10719	0.66	YES/YES	322
10909	0.04	YES/YES	322
5201	0.01	YES/YES	324
5202	0.01	YES/YES	324
8292	0.13	YES/YES	324
8816	0.85	YES/YES	324, 326
8817	0.30	YES/YES	324
8818	0.46	YES/YES	324
8819	0.11	YES/YES	324
8821	0.09	YES/YES	324
9944	0.19	YES/YES	326
9945	0.18	YES/YES	326
9946	0.12	YES/YES	326
5193	0.44	YES/YES	327, 328
5194	0.06	YES/YES	327, 328
5195	0.15	YES/YES	327
5198	0.13	YES/YES	327
8303	4.38	YES/YES	327, 328
8822	0.02	YES/YES	327
9532	1.70	YES/YES	327
10716	0.09	YES/YES	327, 328
10878	0.06	YES/YES	327
10940	0.02	YES/YES	327
10942	0.45	YES/YES	327
5189	3.08	YES/YES	328, 329, 330, 331
5190	0.04	YES/YES	328
5191	0.15	YES/YES	328
5192	0.47	YES/YES	328

Wetland ID	Area (acres)	Jurisdiction (Federal/State)	Appendix C, Figure Page Number
9536	0.22	YES/YES	328
9846	3.41	YES/YES	328
10877	0.13	YES/YES	328
5187	0.04	YES/YES	330
5188	0.13	YES/YES	330
9537	0.30	YES/YES	331
10943	0.05	YES/YES	331
9947	0.45	YES/YES	332
10939	0.02	YES/YES	332
10941	0.36	YES/YES	332
5559	0.08	YES/YES	340
5560	0.04	YES/YES	340
5562	0.21	YES/YES	340
5563	0.05	YES/YES	340
5557	0.02	YES/YES	341
5558	0.03	YES/YES	341
5561	0.02	YES/YES	341
5184	0.01	YES/YES	342
5541	0.01	YES/YES	342
5547	0.22	YES/YES	342
5548	0.03	YES/YES	342
5550	0.01	YES/YES	342
5551	0.01	YES/YES	342
5552	0.01	YES/YES	342
5553	0.03	YES/YES	342
5544	0.03	YES/YES	343
5554	0.04	YES/YES	343
5555	0.03	YES/YES	343
5556	0.02	YES/YES	343
9955	0.12	YES/YES	346
10715	0.23	YES/YES	352

Wetland ID	Area (acres)	Jurisdiction (Federal/State)	Appendix C, Figure Page Number
9850	0.05	YES/YES	355
9851	0.05	YES/YES	355
9852	0.03	YES/YES	355
9956	0.15	YES/YES	355
9957	0.07	YES/YES	355
5182	0.08	YES/YES	356
5540	0.05	YES/YES	356
11175	0.05	YES/YES	356
9553	0.27	YES/YES	367
7257	0.55	YES/YES	369
9554	0.15	YES/YES	369
9555	0.14	YES/YES	370
9556	0.12	YES/YES	370, 372
5176	0.16	YES/YES	372
5177	0.40	YES/YES	372
9558	0.36	YES/YES	372
9559	0.41	YES/YES	372
9560	0.33	YES/YES	372
11179	0.02	YES/YES	372
5174	0.17	YES/YES	373
5175	0.05	YES/YES	373
5537	0.85	YES/YES	373
9562	0.24	YES/YES	373
9563	0.05	YES/YES	373
9565	0.24	YES/YES	373
7052	0.01	YES/YES	376
7121	0.05	YES/YES	376
7123	0.04	YES/YES	376
7141	0.003	YES/YES	376
10712	0.26	YES/YES	376
10714	0.17	YES/YES	376

Wetland ID	Area (acres)	Jurisdiction (Federal/State)	Appendix C, Figure Page Number
10875	0.01	YES/YES	376
10945	0.08	YES/YES	377
10946	0.06	YES/YES	377
10948	0.07	YES/YES	377
10949	0.08	YES/YES	377
10950	0.17	YES/YES	377, 378
10951	0.01	YES/YES	377
10953	0.09	YES/YES	377, 378
10952	0.09	YES/YES	378
10954	0.34	YES/YES	378
10955	0.64	YES/YES	378
11284	0.32	YES/YES	382
11298	0.05	YES/YES	382
5162	0.18	YES/YES	383
8542	0.01	YES/YES	383
8543	0.03	YES/YES	383
9587	0.15	YES/YES	383
9589	0.09	YES/YES	383
11285	0.08	YES/YES	383
7270	0.03	YES/YES	384
9591	0.19	YES/YES	384
7068	0.96	YES/YES	387
8545	0.04	YES/YES	388
8898	0.17	YES/YES	388
5516	0.04	YES/YES	389
5517	0.05	YES/YES	389
5518	0.03	YES/YES	389
5530	0.42	YES/YES	389
7301	0.08	YES/YES	389
8546	0.14	YES/YES	389
8582	0.01	YES/YES	389

Wetland ID	Area (acres)	Jurisdiction (Federal/State)	Appendix C, Figure Page Number
10705	0.16	YES/YES	389
10706	0.70	YES/YES	389
11288	0.17	YES/YES	389
7309	0.49	YES/YES	390
10704	0.24	YES/YES	390
5158	0.10	YES/YES	393
5159	0.10	YES/YES	393
8315	0.16	YES/YES	393
5154	0.31	YES/YES	409
5157	0.22	YES/YES	409
5151	0.31	YES/YES	410, 411
5152	0.05	YES/YES	410
5153	0.04	YES/YES	410
11299	0.05	YES/YES	410
11300	0.06	YES/YES	410
5146	0.18	YES/YES	414
5147	0.19	YES/YES	414
5148	0.87	YES/YES	414
5149	0.37	YES/YES	414
5150	0.04	YES/YES	414
10688	0.32	YES/YES	421, 423
7338	0.15	YES/YES	423
7339	0.07	YES/YES	423
7340	0.36	YES/YES	423
10687	0.10	YES/YES	423
10655	0.03	YES/YES	477
8802	0.65	YES/YES	614, 615
8803	0.23	YES/YES	614
8805	0.02	YES/YES	614
8806	0.11	YES/YES	614
8807	0.14	YES/YES	614

Wetland ID	Area (acres)	Jurisdiction (Federal/State)	Appendix C, Figure Page Number
8810	0.01	YES/YES	614
9960	0.08	YES/YES	614
8339	0.02	YES/YES	615
8340	0.10	YES/YES	615
8342	0.17	YES/YES	615
8344	0.03	YES/YES	615
9853	0.07	YES/YES	615
9854	0.06	YES/YES	615
9855	0.13	YES/YES	619
9856	0.44	YES/YES	619
9857	0.13	YES/YES	619
9858	0.09	YES/YES	624
9859	0.02	YES/YES	624
9860	0.19	YES/YES	624
9861	0.12	YES/YES	624
10893	0.23	YES/YES	625
10894	0.17	YES/YES	625
5535	0.27	YES/YES	626
8933	0.08	YES/YES	626, 627
8932	0.51	YES/YES	627
8934	0.07	YES/YES	627
8935	0.02	YES/YES	627
7574	0.04	YES/YES	629
8548	0.16	YES/YES	629
11619	0.17	YES/YES	064m
11621	0.16	YES/YES	064m
11614	0.003	YES/YES	064o
11615	0.002	YES/YES	064o
11628	0.91	YES/YES	064o, 064q
11629	1.35	YES/YES	064o
11630	0.16	YES/YES	064o

Wetland ID	Area (acres)	Jurisdiction (Federal/State)	Appendix C, Figure Page Number
11650	3.78	YES/YES	064o
11709	0.24	YES/YES	064o
11710	0.04	YES/YES	064o
11616	0.02	YES/YES	064q
11617	0.02	YES/YES	064q
11618	0.005	YES/YES	064q
11620	0.04	YES/YES	064q
11622	0.05	YES/YES	064q
11623	0.15	YES/YES	064q
11624	0.03	YES/YES	064q
11625	0.03	YES/YES	064q
11626	0.17	YES/YES	064q
11627	0.08	YES/YES	064q
11715	0.05	YES/YES	064q
11652	2.14	YES/YES	064r, 064s, 064t, 064u
11631	0.21	YES/YES	064s
11632	0.05	YES/YES	064t
PEM Seasonal Wetland			
324	0.25	YES/YES	005
9373	0.38	YES/YES	005
9374	0.16	YES/YES	005
9096	0.06	YES/YES	017
9097	0.03	YES/YES	017
9099	0.10	YES/YES	017
10630	0.11	YES/YES	030
5534	0.05	YES/YES	134
7823	0.09	YES/YES	136
7837	0.25	YES/YES	136
10667	0.89	YES/YES	140
10669	0.32	YES/YES	143
7918	0.05	YES/YES	148

Wetland ID	Area (acres)	Jurisdiction (Federal/State)	Appendix C, Figure Page Number
9847	0.19	YES/YES	307
7359	0.04	YES/YES	312
11358	0.06	YES/YES	319
5196	0.06	YES/YES	327
9954	0.59	YES/YES	340
5181	0.21	YES/YES	356
9862	0.25	YES/YES	356
5163	0.47	YES/YES	383
10711	0.39	YES/YES	384, 386
10708	0.02	YES/YES	386
11356	0.01	YES/YES	386
10700	0.75	YES/YES	394, 395
7332	0.35	YES/YES	404
7074	0.79	YES/YES	417, 419
PEM Emergent Freshwater Marsh			
2370	0.16	YES/YES	125
9903	0.54	YES/YES	260, 291
1798	0.04	YES/YES	286, 287
9538	0.08	YES/YES	333
9539	0.04	YES/YES	333
9540	0.10	YES/YES	333
8538	3.05	YES/YES	339, 340
1569	0.56	YES/YES	356
6737	0.46	YES/YES	622, 623
PFO Forested Wetland			
9819	0.37	YES/YES	005
9819	0.37	YES/YES	005
9820	0.01	YES/YES	006
10632	0.17	YES/YES	006
9874	0.22	YES/YES	018
9875	0.08	YES/YES	020

Wetland ID	Area (acres)	Jurisdiction (Federal/State)	Appendix C, Figure Page Number
9876	0.43	YES/YES	020, 021
10771	0.10	YES/YES	28
9878	0.02	YES/YES	040
9881	0.42	YES/YES	040
9882	0.38	YES/YES	040, 041
8306	1.02	YES/YES	041
9839	3.44	YES/YES	041
8871	2.02	YES/YES	043, 044
3006	3.47	YES/YES	044
9840	0.85	YES/YES	044, 045
9884	0.08	YES/YES	058
11148	0.10	YES/YES	058
10082	0.13	YES/YES	065
10087	0.13	YES/YES	066, 069
9887	0.21	YES/YES	070
9888	0.04	YES/YES	070
10088	0.65	YES/YES	070
10090	0.62	YES/YES	070
10653	0.39	YES/YES	095
9889	0.10	YES/YES	127
10134	0.04	YES/YES	127
10144	0.13	YES/YES	127
10145	0.09	YES/YES	127
10147	0.08	YES/YES	127
10150	0.05	YES/YES	127
10154	0.08	YES/YES	135
10155	0.17	YES/YES	135
10961	0.13	YES/YES	154, 028
10962	0.61	YES/YES	154, 028
9894	0.13	YES/YES	238
9895	0.26	YES/YES	238
9896	0.15	YES/YES	238

Wetland ID	Area (acres)	Jurisdiction (Federal/State)	Appendix C, Figure Page Number
9897	0.39	YES/YES	238
10160	0.21	YES/YES	257, 288
5231	0.65	YES/YES	260, 291
11337	0.75	YES/YES	260, 288, 291
11338	1.70	YES/YES	260, 288, 291
1941	0.99	YES/YES	263, 292
10167	1.13	YES/YES	263, 292
9942	0.61	YES/YES	291
10164	0.05	YES/YES	292
10166	0.03	YES/YES	292
1934	1.95	YES/YES	293, 294
1937	1.30	YES/YES	293, 294
10168	0.30	YES/YES	293
10169	0.35	YES/YES	293
10171	0.74	YES/YES	294
10174	0.33	YES/YES	294
10175	1.04	YES/YES	294, 297
10176	0.83	YES/YES	294
9863	0.04	YES/YES	356
9864	0.04	YES/YES	356
9865	0.06	YES/YES	356
11344	0.10	YES/YES	367
11306	0.44	YES/YES	439
9849	0.12	YES/YES	444
10050	0.35	YES/YES	458
10106	0.31	YES/YES	458
Total PEM Vernal Pools[a]			**85 acres [b]**
Total PEM Seasonal Wetlands [a]			**7 acres [b]**
Total PEM Coastal and Valley Freshwater Marsh Wetlands			**5 acre [b]**
Total PFO Forested Wetlands			**32 acre [b]**
Total Palustrine Wetlands in Wetland Study Area			**129 acres [b]**

[a] Acreages listed represents the entire area of a given unit, not just the portion presented on that mapbook page (Appendix C).
[b] Rounded to nearest whole number.

APPENDIX G

Acres of Delineated Wetlands and Other Waters in Wetland Study Area by Watershed

Table G-1
Acres of Wetlands and Other Waters in the WSA by Watershed[1]

Watershed	Middle San Joaquin-Lower Chowchilla (North)	Upper Chowchilla-Upper Fresno (Fresno River)	Middle San Joaquin-Lower Chowchilla (South)	Tulare-Buena Vista Lakes/Upper Dry
Wetlands (acres) = 129.06 acres total				
Vernal Pools	60.88	20.28	3.71	0.05
Seasonal Wetlands	1.46	4.31	1.19	--
Freshwater Marsh	0.81	4.22	--	--
Palustrine Forested Wetland	29.3	2.02	0.83	--
Total Wetland (acres)	**92.45**	**30.83**	**5.73**	**0.05**
Other Waters (acres) = 326.08 acres total				
Natural Watercourse	48.26	66.72	10.7	--
Constructed Watercourse	48.61	59.12	8.21	3.31
Constructed Basin	17.21	29.81	5.62	17.24
Open Water	2.32	4.51	1.24	3.2
Total Other Waters (acres)	**116.4**	**160.16**	**25.77**	**23.75**

[1] Wetlands and Other Waters (data generated March 3, 2012) located Within the Four Main Watersheds.

APPENDIX H

Total Range of Wetlands and Other Waters of the U.S. by Alternative (UPRR/SR 99, BNSF, Hybrid, and HMF)

Table H-1
Range of Wetlands and Other Waters Identified for the UPRR/SR 99 Alternative
(Study Area 250-foot Property Acquisition Buffer) [a]

UPRR/SR 99 Alternative	Freshwater Marsh	Seasonal Wetland/Vernal Pool	Forested Wetland	Natural Watercourse	Constructed Basin	Constructed Watercourse
Impacts by Project Combination						
UPRR/SR 99 with East Chowchilla DO NS	1.31	4.18	6.91	19.06	19.62	17.46
UPRR/SR 99 with East Chowchilla DO Ave 24 Wye	0.09	0.23	1.36	16.89	6.91	14.56
UPRR/SR 99 with East Chowchilla DO Ave 21 Wye	1.65	0.72	0.31	5.57	4.15	24.48
UPRR/SR 99 with West Chowchilla DO NS	1.59	3.57	6.68	27.51	27.98	28.64
UPRR/SR 99 with West Chowchilla DO Ave 24 Wye	0.00	0.03	0.00	11.03	3.68	9.58
Design Options to Fresno Station						
Kern Street Station	0.00	0.00	0.00	0.00	0.00	0.00
Mariposa Street Station	0.00	0.00	0.00	0.00	0.00	0.00
Impacts by Components Combined						
UPRR/SR 99 with East Chowchilla DO NS	1.31	4.18	6.91	19.06	19.62	17.46
UPRR/SR 99 with East Chowchilla DO Ave 24 Wye	0.09	0.23	1.36	16.89	6.91	14.56
UPRR/SR 99 with East Chowchilla DO Ave 21 Wye	1.65	0.72	0.31	5.57	4.15	24.48
UPRR/SR 99 with West Chowchilla DO NS	1.59	3.57	6.68	27.51	27.98	28.64
UPRR/SR 99 with West Chowchilla DO Ave 24 Wye	0.00	0.03	0.00	11.03	3.68	9.58
Total Range of Impacts for the UPRR/SR99 Alternative [a]						
UPRR/SR 99 with East Chowchilla	1.40 to 2.96	4.41 to 4.89	7.23 to 8.28	24.63 to 35.96	23.76 to 26.53	32.02 to 41.94
UPRR/SR 99 with West Chowchilla	1.59	3.60	6.68	38.54	31.66	38.22
Total Range of Impacts	***1.40 to 2.96***	***3.60 to 4.89***	***6.68 to 8.29***	***24.63 to 38.54***	***26.53 to 31.66***	***32.02 to 41.94***

[a] Total range of impacts for each alternative is calculated by adding the number of impacts for the option with the lowest and highest number of impacts.

Table H-2
Range of Wetlands and Other Waters Identified BNSF Alternative
(Study Area, 250-foot Property Acquisition Buffer) [a]

BNSF Alternatives	Freshwater Marsh	Seasonal Wetland/Vernal Pool	Forested Wetland	Natural Watercourse	Constructed Basin	Constructed Watercourse
Impacts to Project Combination						
BNSF north – south alignment NS	2.14	16.50	0.23	18.04	21.44	9.67
BNSF north – south alignment with Ave 24 Wye	0.84	1.44	0.00	9.87	7.45	16.51
BNSF north – south alignment with Ave 21 Wye	1.78	3.61	0.00	6.57	3.66	17.48
Le Grand Design Options						
Mission Ave	1.73	22.69	2.38	6.64	6.26	10.92
Mission Ave East of Le Grand	1.29	29.34	4.80	6.93	5.55	15.94
Mariposa Way	0.20	24.70	9.65	12.63	0.22	5.57
Mariposa Way East of Le Grand	0.20	23.60	11.19	12.73	2.13	9.46
Design Options to Fresno Station						
Kern Street Station	0.00	0.00	0.00	0.00	0.00	0.00
Mariposa Street Station	0.00	0.00	0.00	0.00	0.00	0.00
Impact of Components Combined						
BNSF Alternative, NS	2.35 to 3.87	39.19 to 45.84	2.61 to 11.42	24.68 to 30.76	21.65 to 27.69	15.24 to 25.62
BNSF Alternative, Ave 24 Wye	0.84	1.44	0.00	9.87	7.45	16.51
BNSF Alternative, Ave 21 Wye	1.78	3.61	0.00	6.57	3.66	17.48
Total Range of Impacts for the BNSF Alternative [a]						
BNSF Alternative, Ave 24	3.19 to 4.72	40.63 to 47.28	2.61 to 11.42	34.55 to 40.64	29.11 to 35.15	31.75 to 42.13
BNSF Alternative, Ave 21	4.13 to 5.65	42.80 to 49.45	2.61 to 11.42	31.25 to 37.34	25.31 to 31.35	32.72 to 43.10
Total Range of Impacts	***3.19 to 5.65***	***40.63 to 49.45***	***2.61 to 11.42***	***31.25 to 40.64***	***25.31 to 35.15***	***31.75 to 43.10***

[a] Total range of impacts for each alternative is calculated by adding the number of impacts for the option with the lowest and highest number of impacts.

Table H-3
Range of Wetlands and Other Waters Identified within the Hybrid Alternative
(Study Area, 250-foot Property Acquisition Buffer) [a]

Hybrid Alternative	Freshwater Marsh	Seasonal Wetland/Vernal Pool	Forested Wetland	Natural Watercourse	Constructed Basin	Constructed Watercourse
HST Alternative						
Impacts by Project Combination						
Hybrid North-South Alignment Ave 24	1.36	13.44	6.22	25.68	25.24	35.02
Hybrid North-South Alignment Ave 24 Wye	0.00	0.03	0.00	11.03	3.78	10.26
Hybrid North-South Alignment Ave 21	1.29	17.44	6.45	25.09	20.15	21.33
Hybrid North-South Alignment Ave 21 Wye	1.21	0.35	0.00	5.13	2.77	21.96
Design Options to Fresno Station						
Kern Street Station	0.00	0.00	0.00	0.00	0.00	0.00
Mariposa Street Station	0.00	0.00	0.00	0.00	0.00	0.00
Impact of Components Combined						
Hybrid Alternative, Ave 24	1.36	13.44	6.22	25.68	25.24	35.02
Hybrid Alternative, Ave 24 Wye	0.00	0.03	0.00	11.03	3.78	10.26
Hybrid Alternative, Ave 21	1.29	17.44	6.45	25.09	20.15	21.33
Hybrid Alternative, Ave 21 Wye	1.21	0.35	0.00	5.13	2.77	21.96
Total Range of Impacts for the Hybrid Alternative [a]						
Hybrid Alternative, Ave 24	1.36	13.47	6.22	36.71	29.02	45.28
Hybrid Alternative, Ave 21	2.50	17.79	6.45	30.22	22.92	43.29
Total Range of Impact	***1.36 to 2.50***	***13.47 to 17.79***	***6.22 to 6.45***	***30.22 to 36.71***	***22.92 to 29.02***	***43.29 to 45.28***

[a] Total range of impacts for each alternative is calculated by adding the number of impacts for the option with the lowest and highest number of impacts.

Table H-4
Range of Wetlands and Other Waters Identified in the HMF Sites
(Study Area, 250-foot Property Acquisition Buffer) [a]

HMF Alternatives	Freshwater Marsh	Seasonal Wetland/Vernal Pool	Forested Wetland	Natural Watercourse	Constructed Basin	Constructed Watercourse
Acres by Heavy Maintenance Facility Site						
Castle Commerce Center	0.00	1.32	1.29	7.91	4.38	7.46
Harris-DeJaeger	0.00	0.00	0.00	0.01	0.00	0.28
Fagundes	0.00	0.00	0.00	0.12	0.89	0.42
Gordon-Shaw	2.94	0.34	0.31	2.17	0.00	0.22
Kojima Development	2.13	1.54	0.00	5.54	0.00	0.11

APPENDIX I

Acres of Wetlands and Other Waters of the U.S. by Alternative (UPRR/SR 99, BNSF, and Hybrid)

Table I-1
Acres of Wetlands and Other Waters of the U.S. by Alternative (UPRR/SR 99, BNSF, Hybrid)

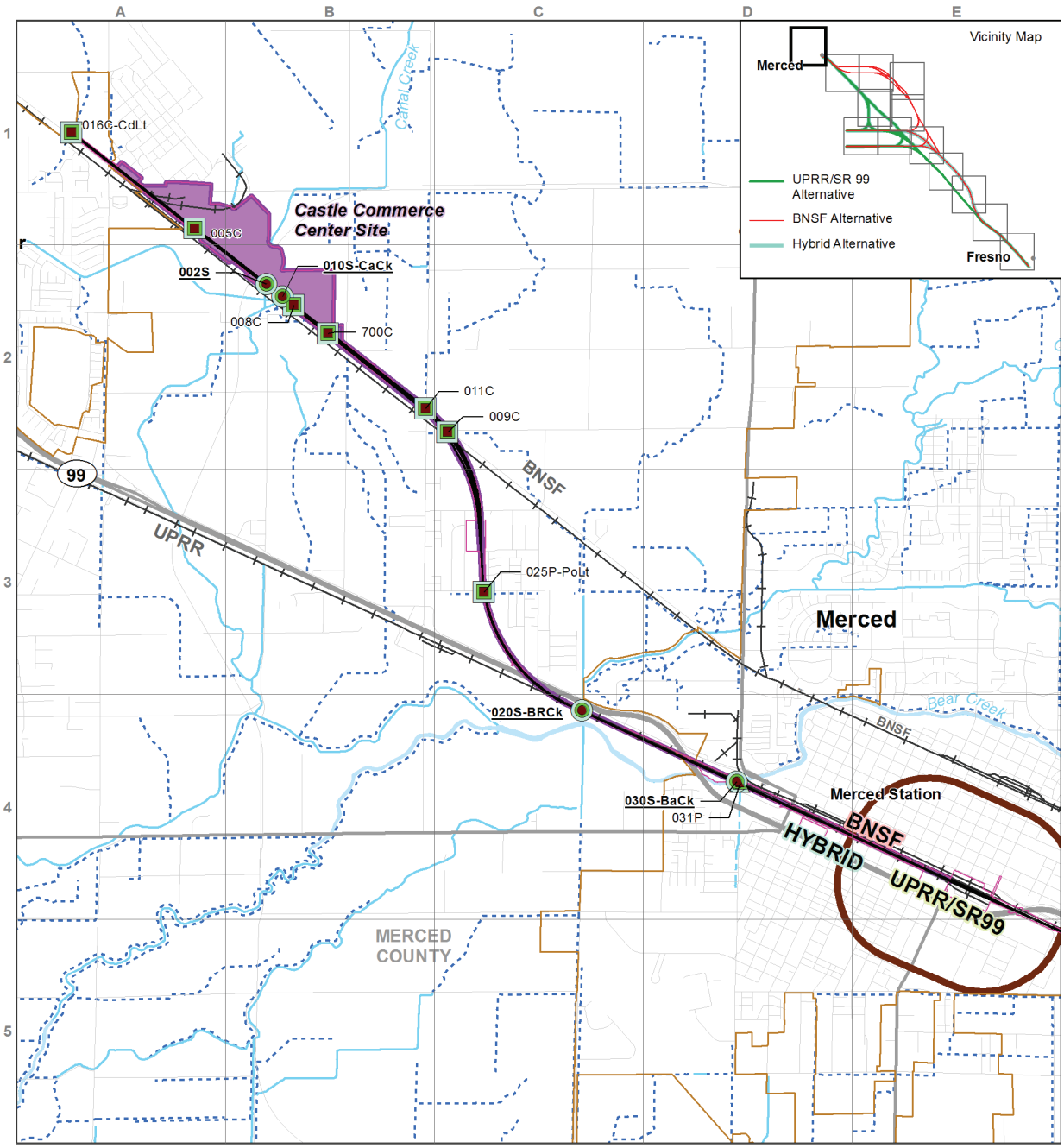
North-South Alignment Isolated and with Wye Design Option	HST Alternatives and Design Options													Station Alternative	
	UPRR/SR 99 Alternative			Hybrid Alternative		BNSF Alternative									
						Mariposa Way Design Options				Mission Ave Design Options					
	East Chowchilla Design Option	East Chowchilla Design Option	West Chowchilla Design Option	East Chowchilla Design Option	West Chowchilla Design Option	Le Grand	East of Le Grand	Le Grand	East of Le Grand	Le Grand	East of Le Grand	Le Grand	East of Le Grand	Kern Street Design Option	Mariposa Station Design Option
	(Ave 21)	(Ave 24)	(Ave 24)	(Ave 21)	(Ave 24)	(Ave 21)		(Ave 24)		(Ave 21)		(Ave 24)		(Ave 21)	(Ave 24)
Vernal Pools															
North-South Alignment	3.32	2.25	2.20	12.11	10.34	51.19	50.50	50.98	50.30	49.18	55.64	48.97	55.43	0.00	0.00
Ave 24 Wye	na	0.23	0.03	na	0.03	na	na	1.22	1.22	na	na	1.22	1.22	0.00	NA
Ave 21 Wye	0.76	na	na	0.39	na	2.77	2.77	na	na	2.77	2.77	na	na	0.00	NA
Seasonal Wetlands															
North-South Alignment	1.42	1.37	1.37	2.86	2.86	3.45	3.40	3.31	3.27	3.45	3.59	3.31	3.46	0.00	0.00
Ave 24 Wye	na	0.00	0.00	na	0.00	na	na	0.47	0.47	na	na	0.47	0.47	0.00	NA
Ave 21 Wye	0.00	na	na	0.00	na	0.47	0.47	na	na	0.47	0.47	na	na	0.00	NA
Freshwater Marsh															
North-South Alignment	0.00	0.00	0.00	0.26	0.00	1.69	1.69	1.68	1.68	2.19	1.65	2.18	1.64	0.00	0.00
Ave 24 Wye	na	0.00	0.00	na	0.00	na	na	0.27	0.27	na	na	0.27	0.27	NA	NA
Ave 21 Wye	0.00	na	na	0.00	na	0.20	0.20	na	na	0.20	0.20	na	na	NA	NA
Palustrine Forested Wetlands															
North-South Alignment	9.44	9.44	9.64	8.30	8.51	9.88	11.42	9.89	11.42	2.60	5.03	2.61	5.03	0.00	0.00
Ave 24 Wye	na	1.38	0.00	na	0.00	na	na	0.00	0.00	na	na	0.00	0.00	NA	NA
Ave 21 Wye	0.31	na	na	0.00	na	0.00	0.00	na	na	0.00	0.00	na	na	NA	NA
Natural Watercourses															
North-South Alignment	26.30	26.14	35.19	24.90	32.29	33.54	34.24	33.73	34.43	27.39	28.05	27.58	28.24	0.00	0.00
Ave 24 Wye	na	17.40	11.11	na	10.96	na	na	10.05	10.05	na	na	10.05	10.05	NA	NA
Ave 21 Wye	8.06	na	na	7.62	na	9.06	9.06	na	na	9.06	9.06	na	na	NA	NA
Constructed Watercourses															
North-South Alignment	18.74	18.92	30.19	21.22	34.39	16.15	17.65	16.22	17.72	21.36	23.57	21.43	23.64	0.00	0.00
Ave 24 Wye	na	14.44	10.34	na	10.42	na	na	16.24	16.24	na	na	16.24	16.24	NA	NA
Ave 21 Wye	23.97	na	na	21.93	na	17.48	17.48	na	na	17.48	17.48	na	na	NA	NA

North-South Alignment Isolated and with Wye Design Option	HST Alternatives and Design Options													Station Alternative	
	UPRR/SR 99 Alternative			Hybrid Alternative		BNSF Alternative									
						Mariposa Way Design Options				Mission Ave Design Options					
	East Chowchilla Design Option	East Chowchilla Design Option	West Chowchilla Design Option	East Chowchilla Design Option	West Chowchilla Design Option	Le Grand	East of Le Grand	Le Grand	East of Le Grand	Le Grand	East of Le Grand	Le Grand	East of Le Grand	Kern Street Design Option	Mariposa Station Design Option
	(Ave 21)	(Ave 24)	(Ave 24)	(Ave 21)	(Ave 24)	(Ave 21)		(Ave 24)		(Ave 21)		(Ave 24)		(Ave 21)	(Ave 24)
Constructed Basins															
North-South Alignment	24.38	24.42	32.61	22.51	27.40	23.95	26.42	23.11	25.58	29.99	29.28	29.15	28.44	0.00	0.00
Ave 24 Wye	na	6.90	3.84	na	3.94	na	na	7.45	7.45	na	na	7.45	7.45	NA	NA
Ave 21 Wye	7.06	na	na	2.77	na	3.66	3.66	na	na	3.66	3.66	na	na	NA	NA
Open Water															
North-South Alignment	5.17	5.17	4.49	5.27	4.58	5.60	4.91	5.62	4.93	5.73	5.63	5.75	5.65	0.00	0.00
Ave 24 Wye	na	0.22	0.30	na	0.42	na	na	0.48	0.48	na	na	0.48	0.48	NA	NA
Ave 21 Wye	0.36	na	na	0.34	na	0.23	0.23	na	na	0.23	0.23	na	na	NA	NA
Total Acres of Aquatic Resources by Alternative	**129.30**	**128.29**	**141.29**	**130.49**	**146.14**	**179.31**	**184.10**	**180.72**	**185.50**	**175.77**	**186.31**	**177.14**	**187.71**	**0.00**	**0.00**

* NA= not applicable

APPENDIX J

Water Crossings Maps



Source: CWD (n.d.), DeLorme (2008), Merced Irrig. Dist. (1973, 2000), USGS (2010a,b)

MF_TR_WET_15_a Mar 29, 2012

N

0 1
Miles

HST Alignment
Permanent Project Footprint
Potential Heavy Maintenance Facility
Station Study Area
City Limit
County Boundary
Railroad
Stream/River
Canal/Ditch
Pipeline

BNSF Waterbody Crossing
- Stream/River
- Canal
- Drainage
- Pipe

UPRR/SR 99 Waterbody Crossing
- Stream/River
- Canal
- Drainage
- Pipe

Hybrid Waterbody Crossing
- Stream/River
- Canal
- Drainage
- Pipe

Figure J-1a
Water Crossings – Map 1

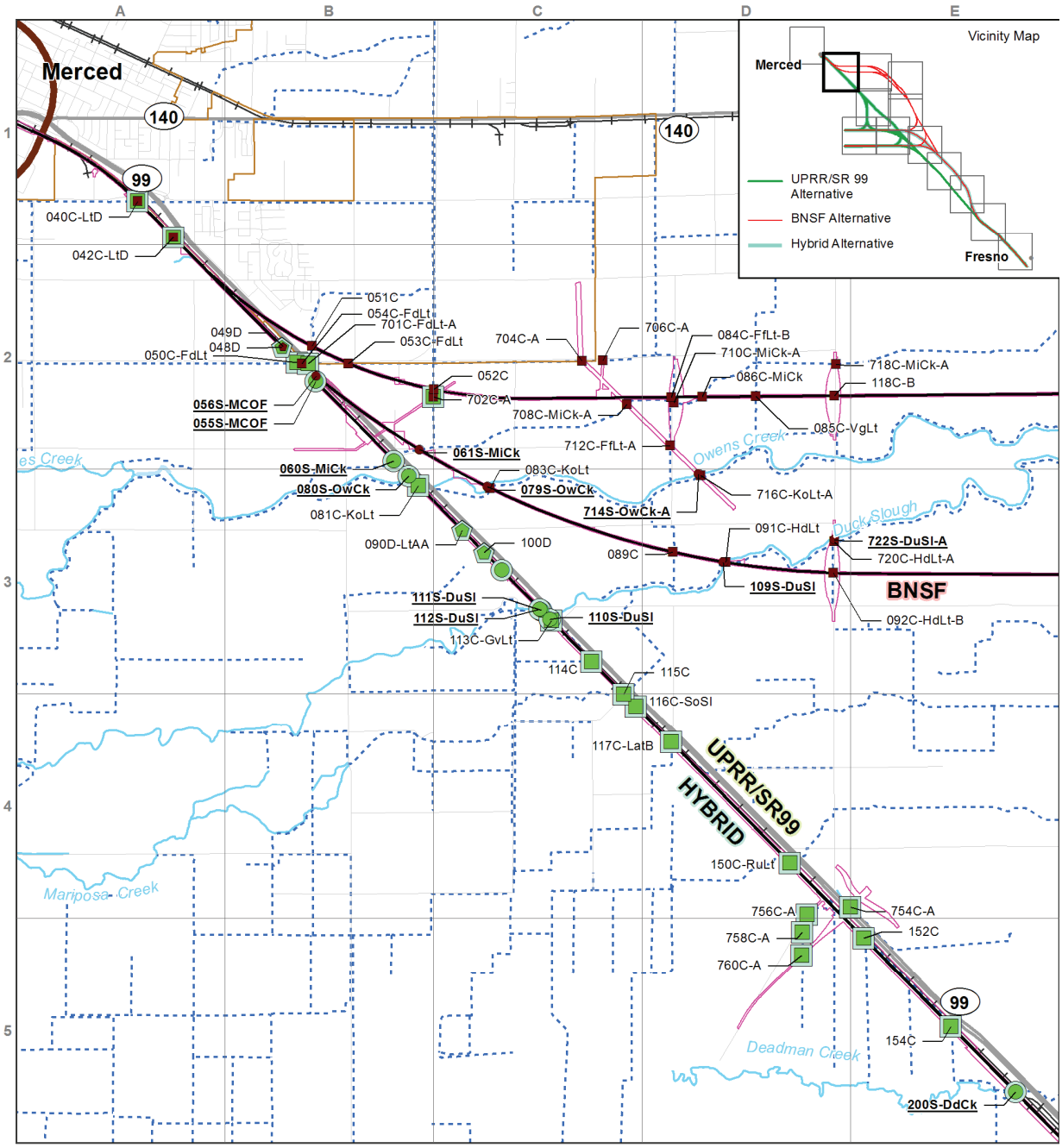
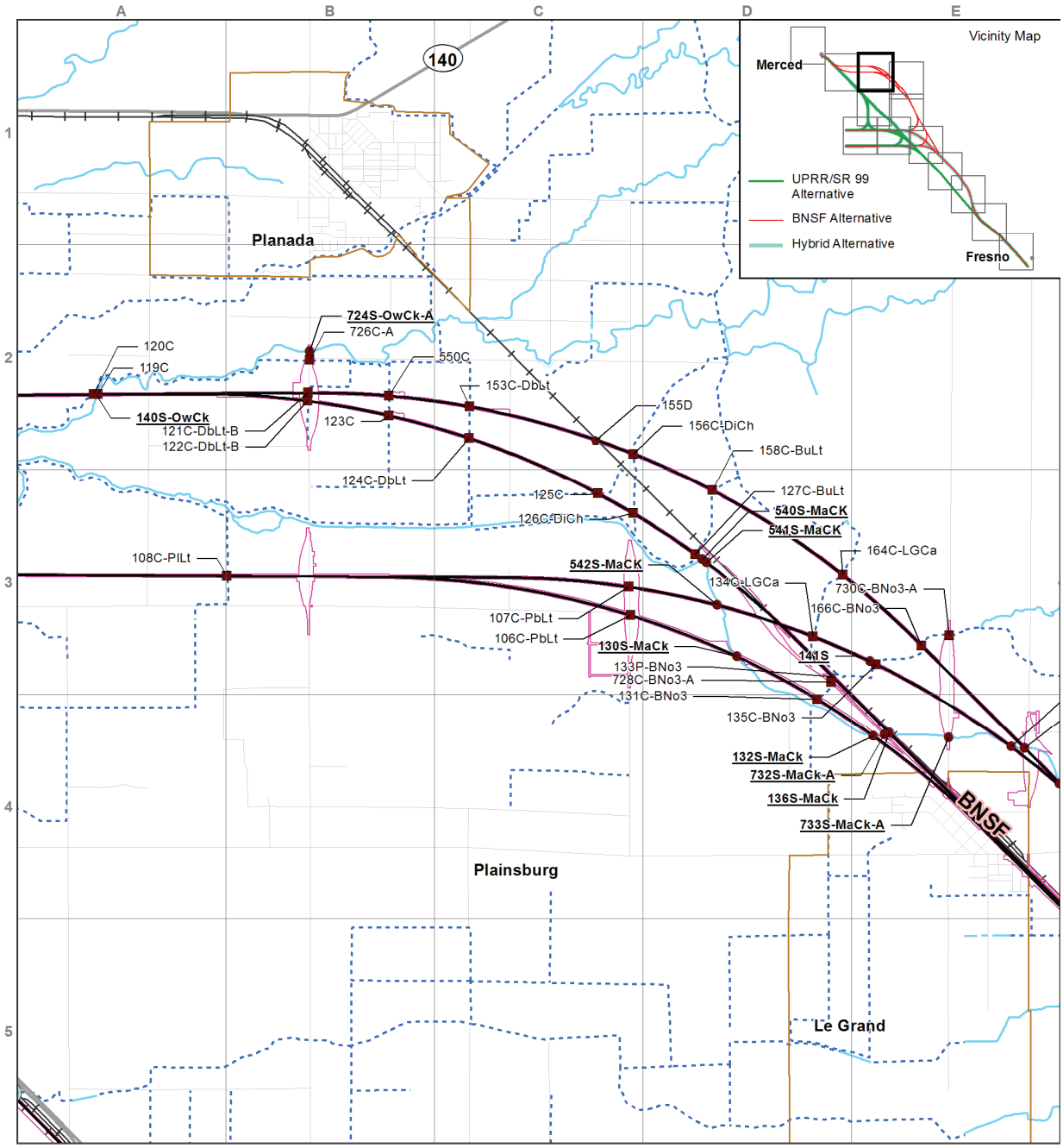


Figure J-1b
Water Crossings – Map 2



Source: CWD (n.d.), DeLorme (2008), Merced Irrig. Dist. (1973, 2000), USGS (2010a,b)

MF_TR_WET_15_c Mar 29, 2012

N

0 1
Miles

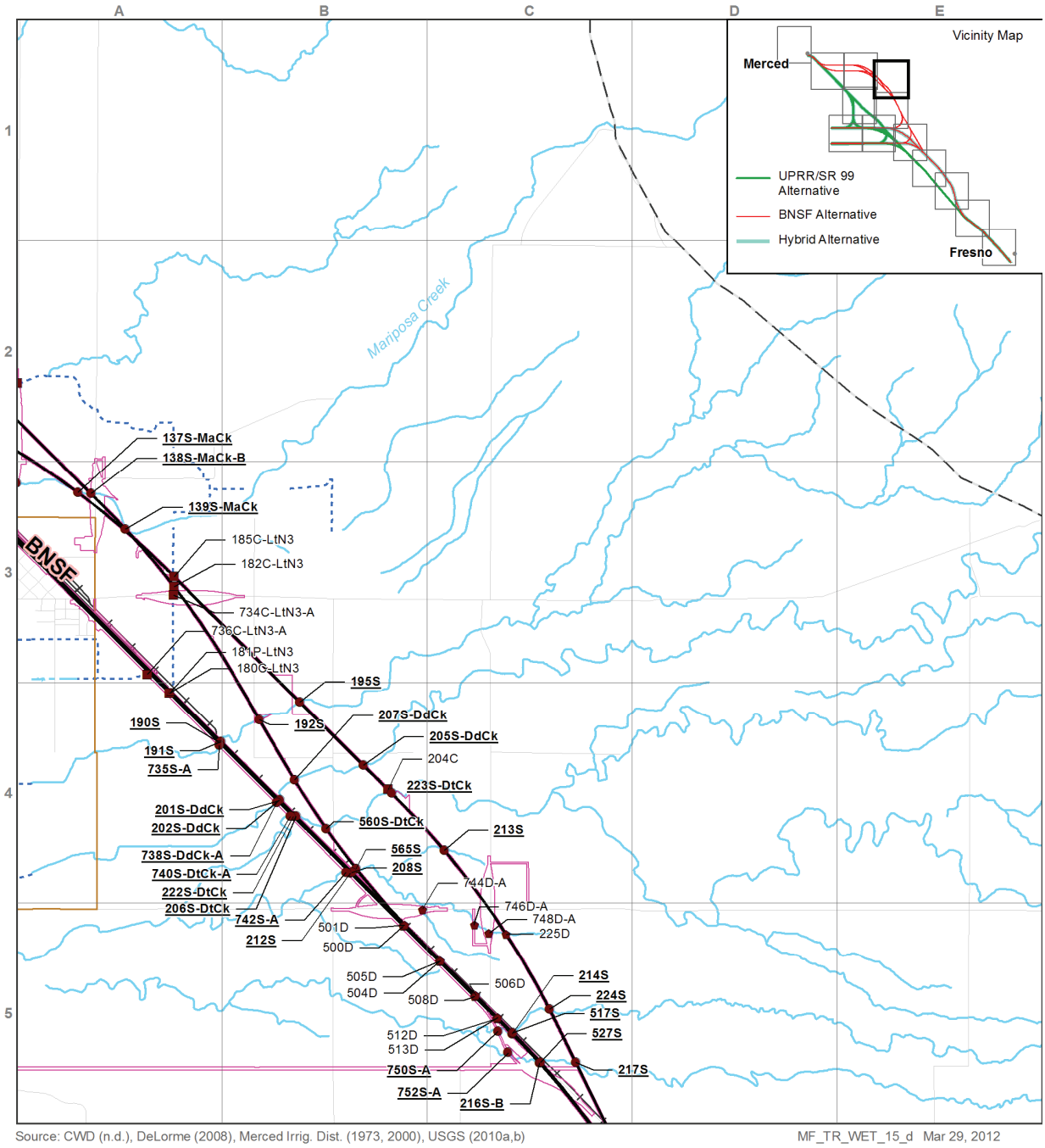
HST Alignment
Permanent Project Footprint
Potential Heavy Maintenance Facility
Station Study Area
City Limit
County Boundary
Railroad
Stream/River
Canal/Ditch
Pipeline

BNSF Waterbody Crossing
- **Stream/River**
- Canal
- Drainage
- Pipe

UPRR/SR 99 Waterbody Crossing
- **Stream/River**
- Canal
- Drainage
- Pipe

Hybrid Waterbody Crossing
- **Stream/River**
- Canal
- Drainage
- Pipe

Figure J-1c
Water Crossings – Map 3



N

0 1
Miles

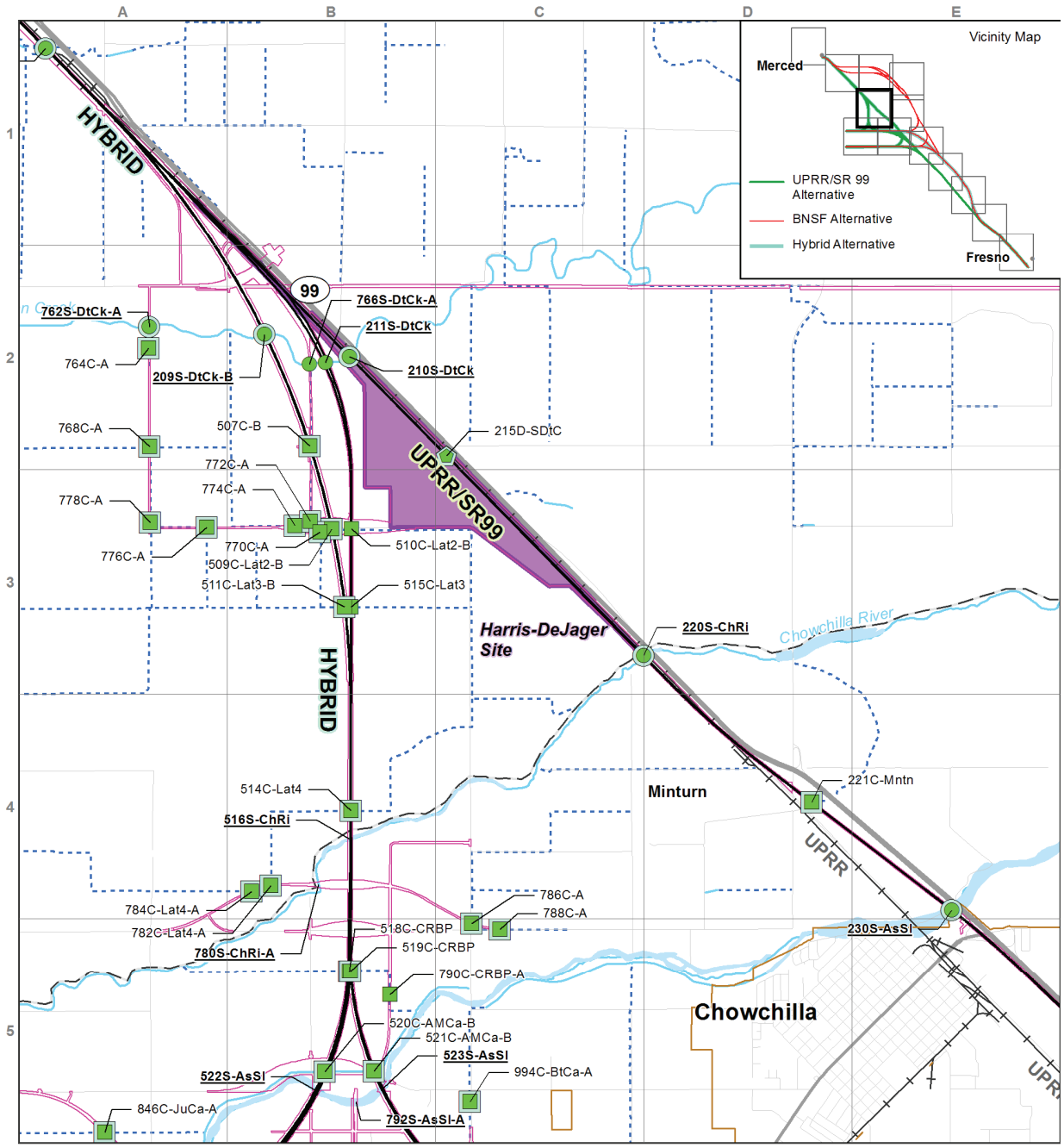
HST Alignment
Permanent Project Footprint
Potential Heavy Maintenance Facility
Station Study Area
City Limit
County Boundary
Railroad
Stream/River
Canal/Ditch
Pipeline

BNSF Waterbody Crossing
- Stream/River
- Canal
- Drainage
- Pipe

UPRR/SR 99 Waterbody Crossing
- Stream/River
- Canal
- Drainage
- Pipe

Hybrid Waterbody Crossing
- Stream/River
- Canal
- Drainage
- Pipe

Figure J-1d
Water Crossings – Map 4



Source: CWD (n.d.), DeLorme (2008), Merced Irrig. Dist. (1973, 2000), USGS (2010a,b)

MF_TR_WET_15_e Mar 29, 2012

N

0 1

Miles

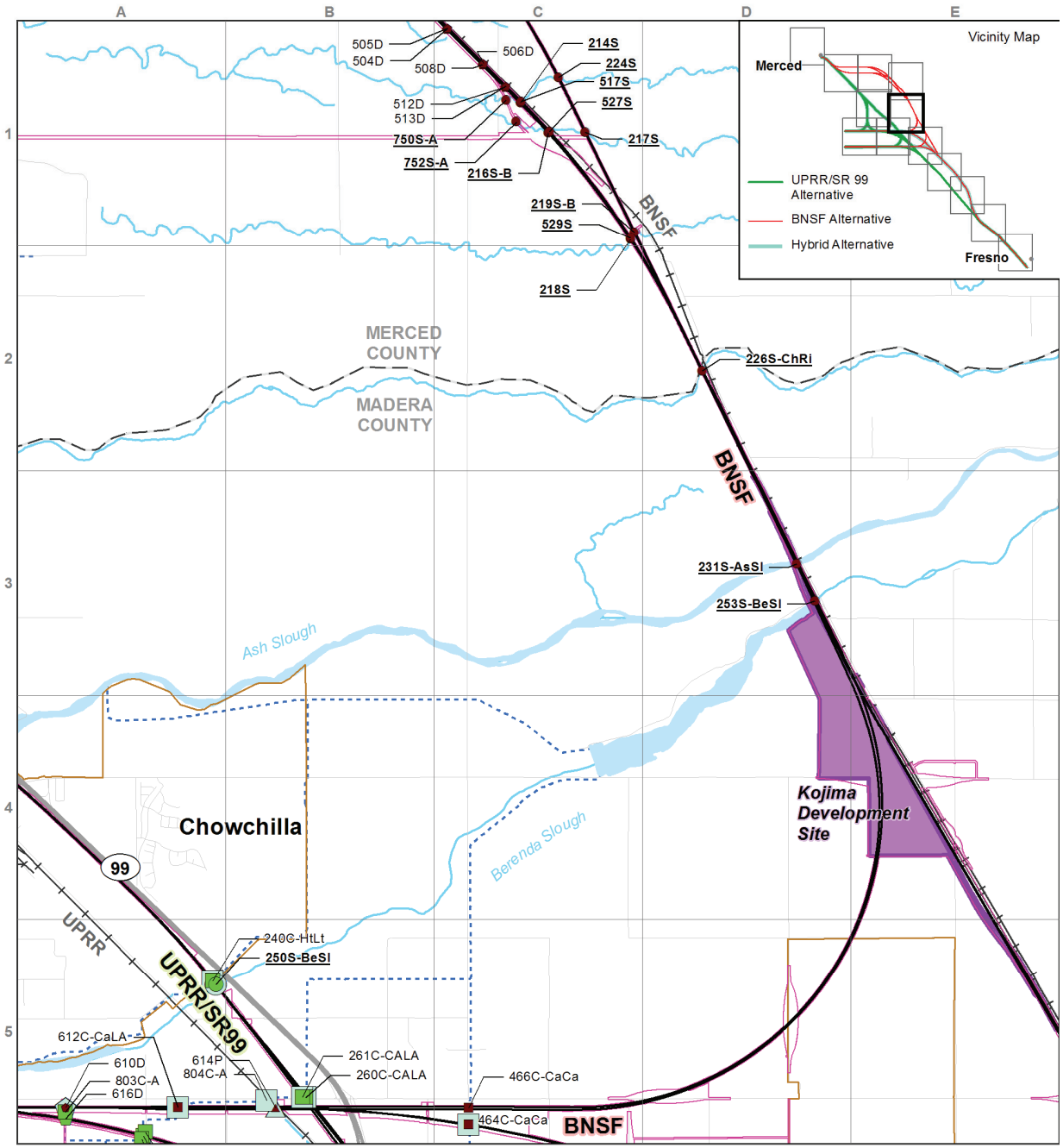
HST Alignment
Permanent Project Footprint
Potential Heavy Maintenance Facility
Station Study Area
City Limit
County Boundary
Railroad
Stream/River
Canal/Ditch
Pipeline

BNSF Waterbody Crossing
- Stream/River
- Canal
- Drainage
- Pipe

UPRR/SR 99 Waterbody Crossing
- Stream/River
- Canal
- Drainage
- Pipe

Hybrid Waterbody Crossing
- Stream/River
- Canal
- Drainage
- Pipe

Figure J-1e
Water Crossings – Map 5



Source: CWD (n.d.), DeLorme (2008), Merced Irrig. Dist. (1973, 2000), USGS (2010a,b)

MF_TR_WET_15_f Mar 29, 2012

N

0 1

Miles

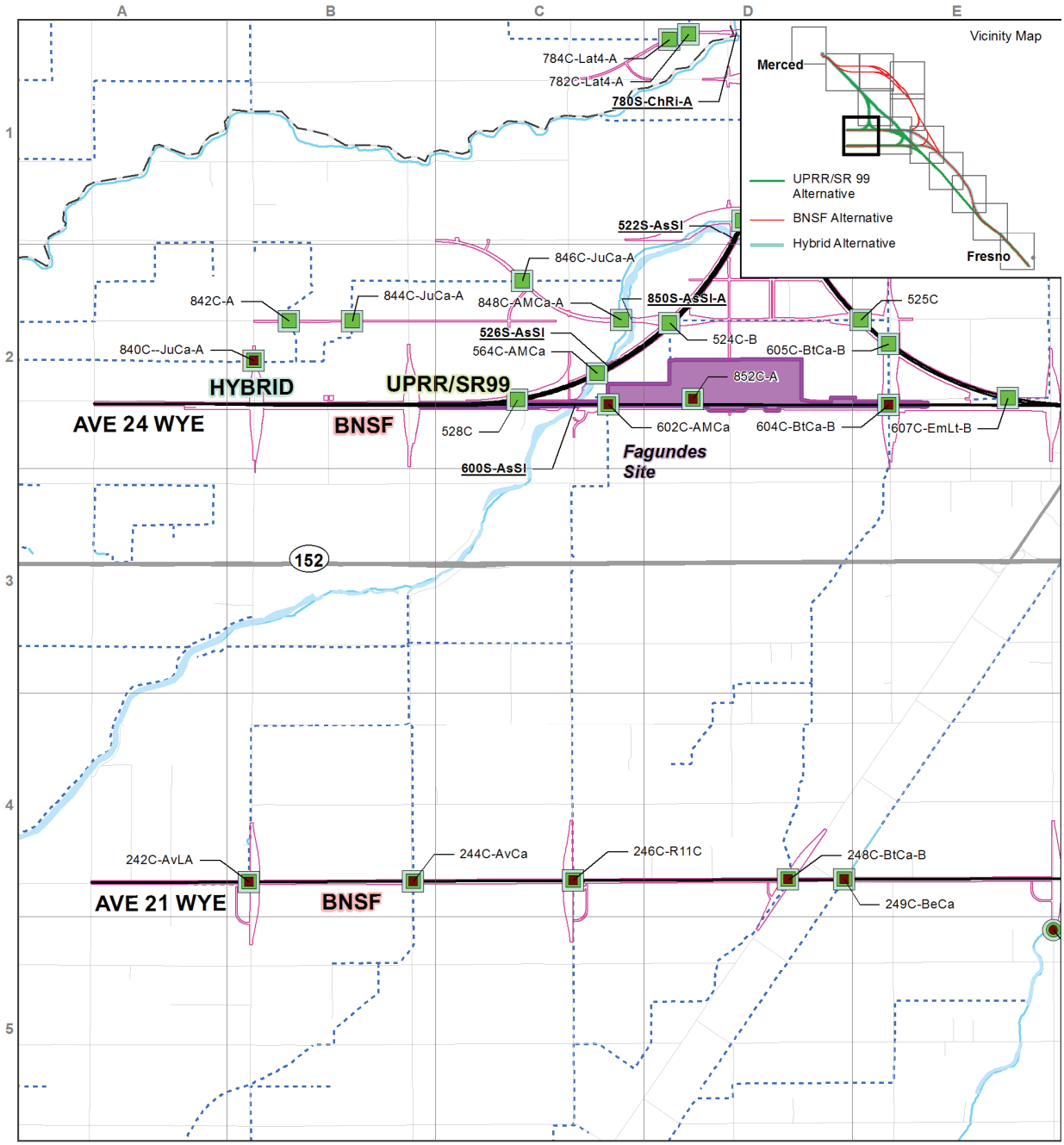
HST Alignment
Permanent Project Footprint
Potential Heavy Maintenance Facility
Station Study Area
City Limit
County Boundary
Railroad
Stream/River
Canal/Ditch
Pipeline

BNSF Waterbody Crossing
- Stream/River
- Canal
- Drainage
- Pipe

UPRR/SR 99 Waterbody Crossing
- Stream/River
- Canal
- Drainage
- Pipe

Hybrid Waterbody Crossing
- Stream/River
- Canal
- Drainage
- Pipe

Figure J-1f
Water Crossings – Map 6



Source: CWD (n.d.), DeLorme (2008), Merced Irrig. Dist. (1973, 2000), USGS (2010a,b)

MF_TR_WET_15_g Mar 29, 2012

N

0 1
Miles

HST Alignment
Permanent Project Footprint
Potential Heavy Maintenance Facility
Station Study Area
City Limit
County Boundary
Railroad
Stream/River
Canal/Ditch
Pipeline

BNSF Waterbody Crossing
Stream/River
Canal
Drainage
Pipe

UPRR/SR 99 Waterbody Crossing
Stream/River
Canal
Drainage
Pipe

Hybrid Waterbody Crossing
Stream/River
Canal
Drainage
Pipe

Figure J-1g
Water Crossings – Map 7

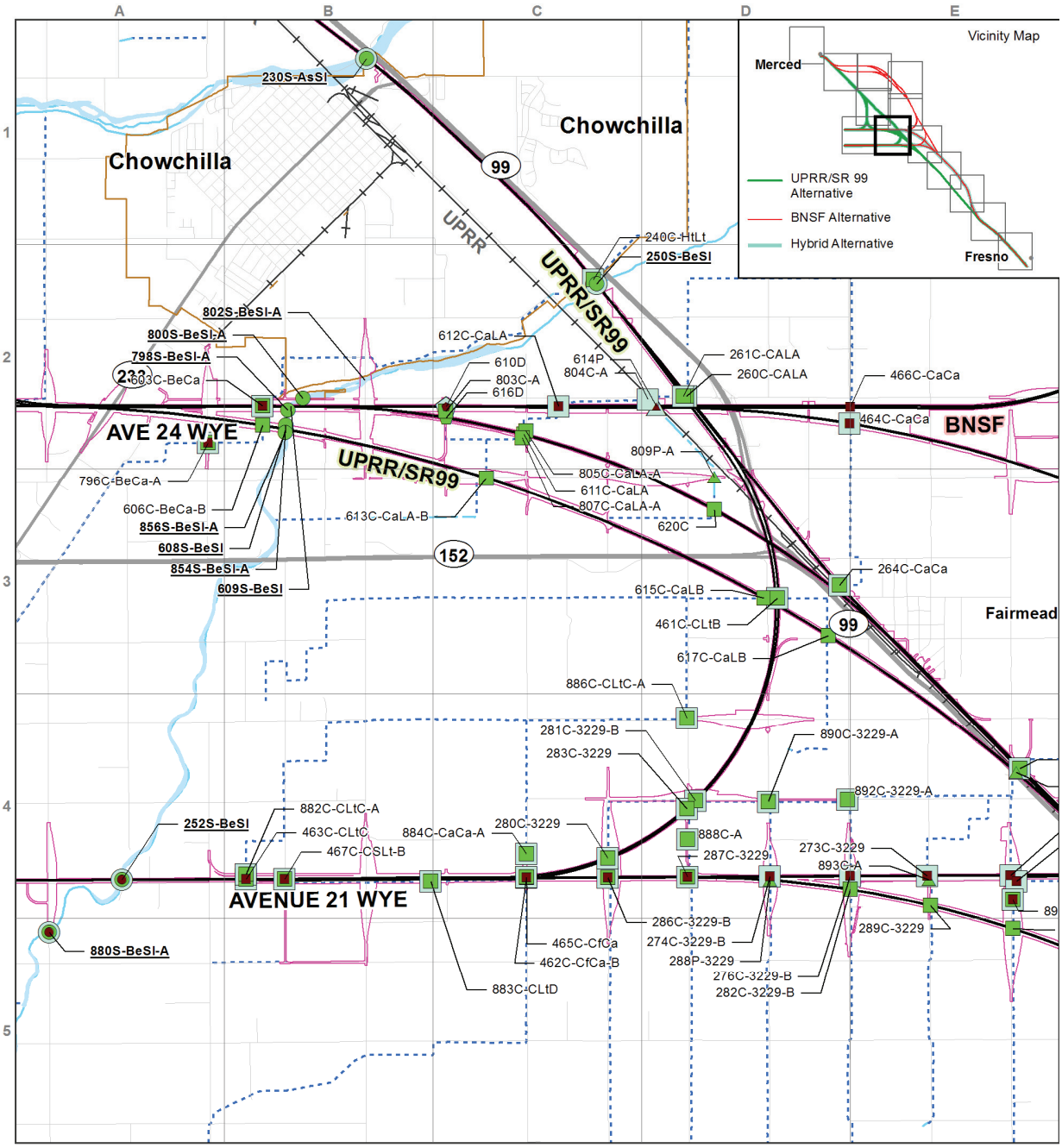
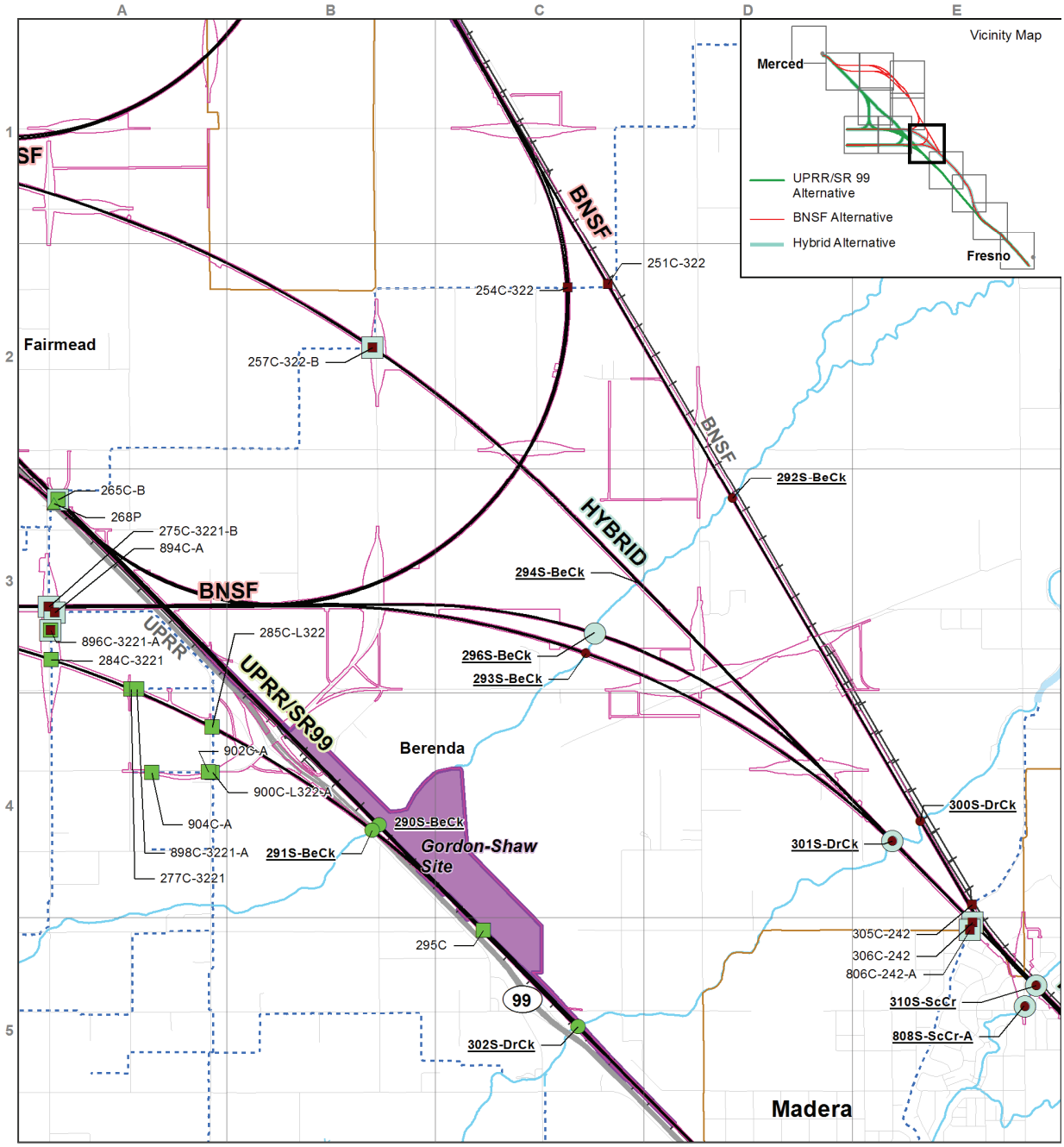


Figure J-1h
Water Crossings – Map 8



Source: CWD (n.d.), DeLorme (2008), Merced Irrig. Dist. (1973, 2000), USGS (2010a,b)

MF_TR_WET_15_i Mar 29, 2012

0 1 Miles

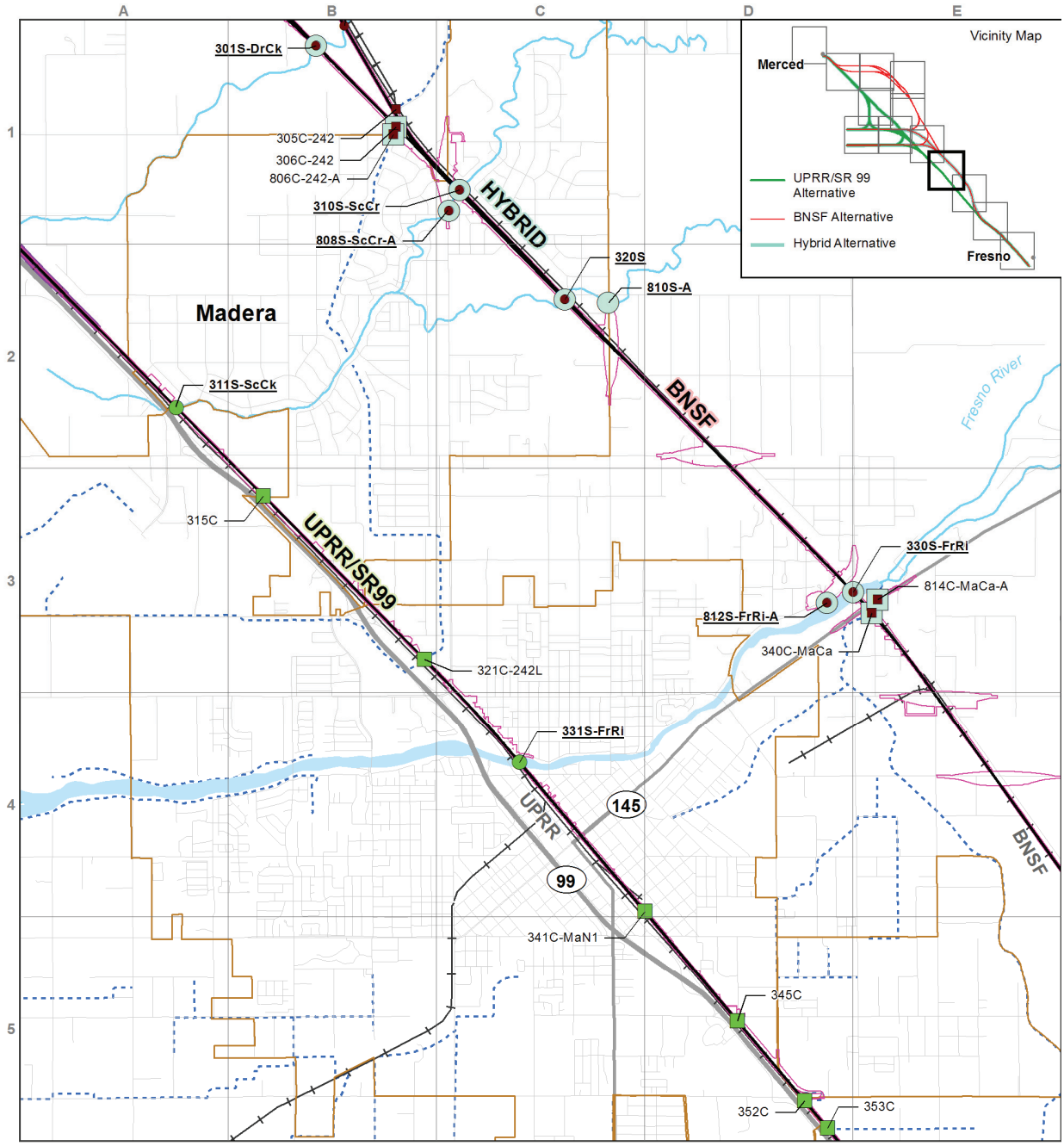
HST Alignment
Permanent Project Footprint
Potential Heavy Maintenance Facility
Station Study Area
City Limit
County Boundary
Railroad
Stream/River
Canal/Ditch
Pipeline

BNSF Waterbody Crossing
- Stream/River
- Canal
- Drainage
- Pipe

UPRR/SR 99 Waterbody Crossing
- Stream/River
- Canal
- Drainage
- Pipe

Hybrid Waterbody Crossing
- Stream/River
- Canal
- Drainage
- Pipe

Figure J-1i
Water Crossings – Map 9



Source: CWD (n.d.), DeLorme (2008), Merced Irrig. Dist. (1973, 2000), USGS (2010a,b)

MF_TR_WET_15_j Mar 29, 2012

N

0 1

Miles

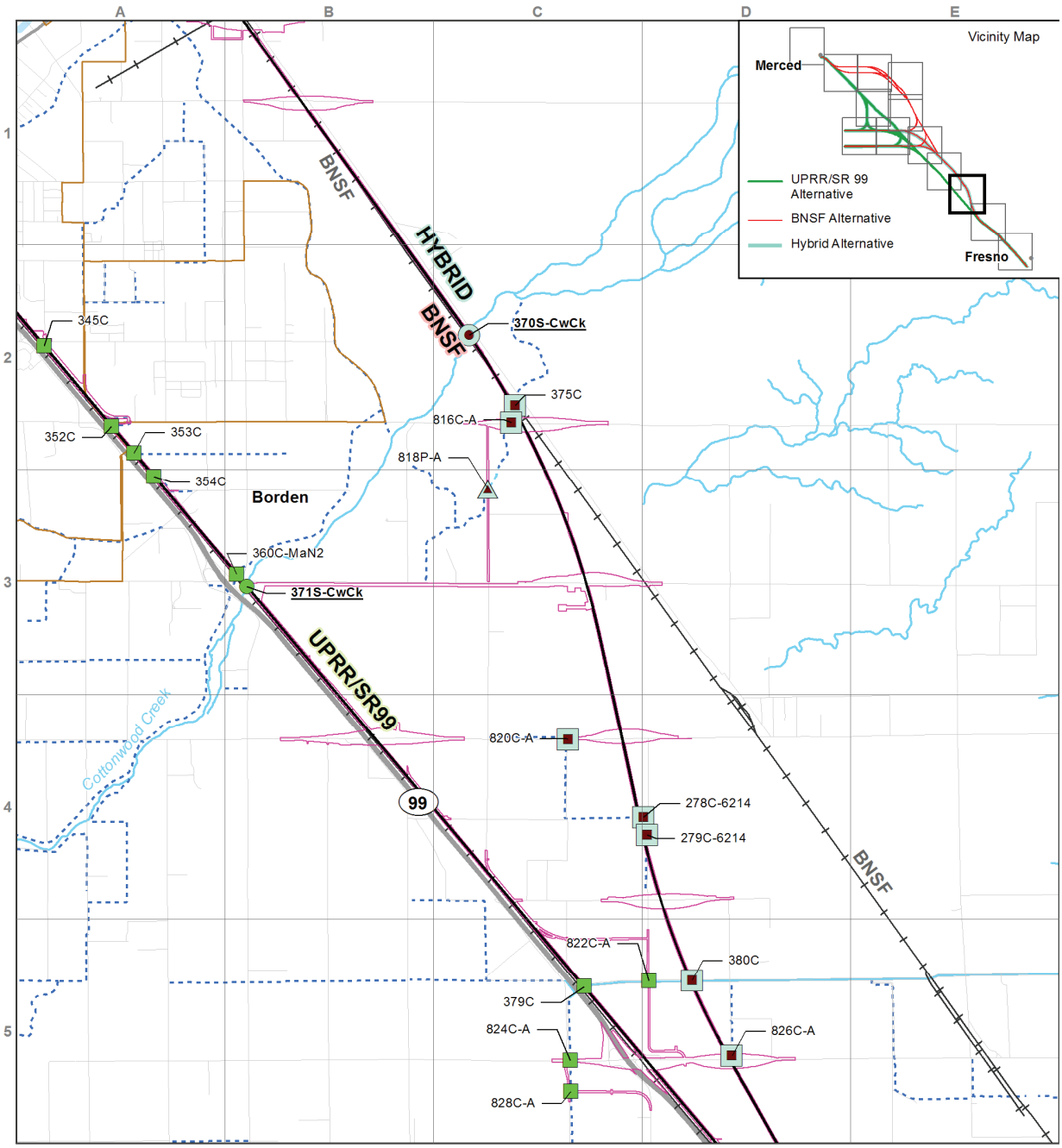
HST Alignment
Permanent Project Footprint
Potential Heavy Maintenance Facility
Station Study Area
City Limit
County Boundary
Railroad
Stream/River
Canal/Ditch
Pipeline

BNSF Waterbody Crossing
- **Stream/River**
- Canal
- Drainage
- Pipe

UPRR/SR 99 Waterbody Crossing
- **Stream/River**
- Canal
- Drainage
- Pipe

Hybrid Waterbody Crossing
- **Stream/River**
- Canal
- Drainage
- Pipe

Figure J-1j
Water Crossings – Map 10



Source: CWD (n.d.), DeLorme (2008), Merced Irrig. Dist. (1973, 2000), USGS (2010a,b)

MF_TR_WET_15_k Mar 29, 2012

N

0 1
Miles

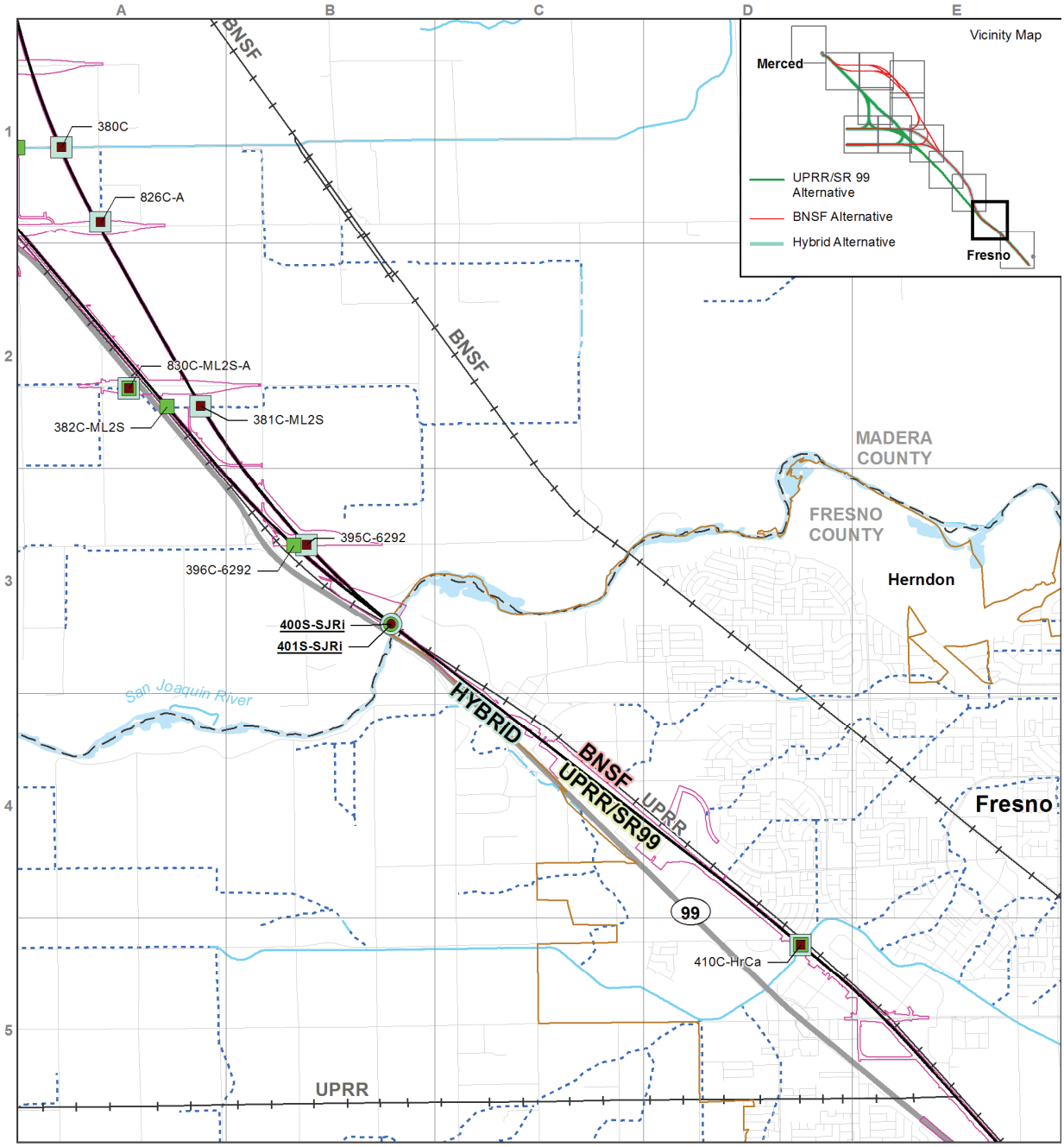
HST Alignment
Permanent Project Footprint
Potential Heavy Maintenance Facility
Station Study Area
City Limit
County Boundary
Railroad
Stream/River
Canal/Ditch
Pipeline

BNSF Waterbody Crossing
- Stream/River
- Canal
- Drainage
- Pipe

UPRR/SR 99 Waterbody Crossing
- Stream/River
- Canal
- Drainage
- Pipe

Hybrid Waterbody Crossing
- Stream/River
- Canal
- Drainage
- Pipe

Figure J-1k
Water Crossings – Map 11



Source: CWD (n.d.), DeLorme (2008), Merced Irrig. Dist. (1973, 2000), USGS (2010a,b)

MF_TR_WET_15_I Mar 29, 2012

N

0 1

Miles

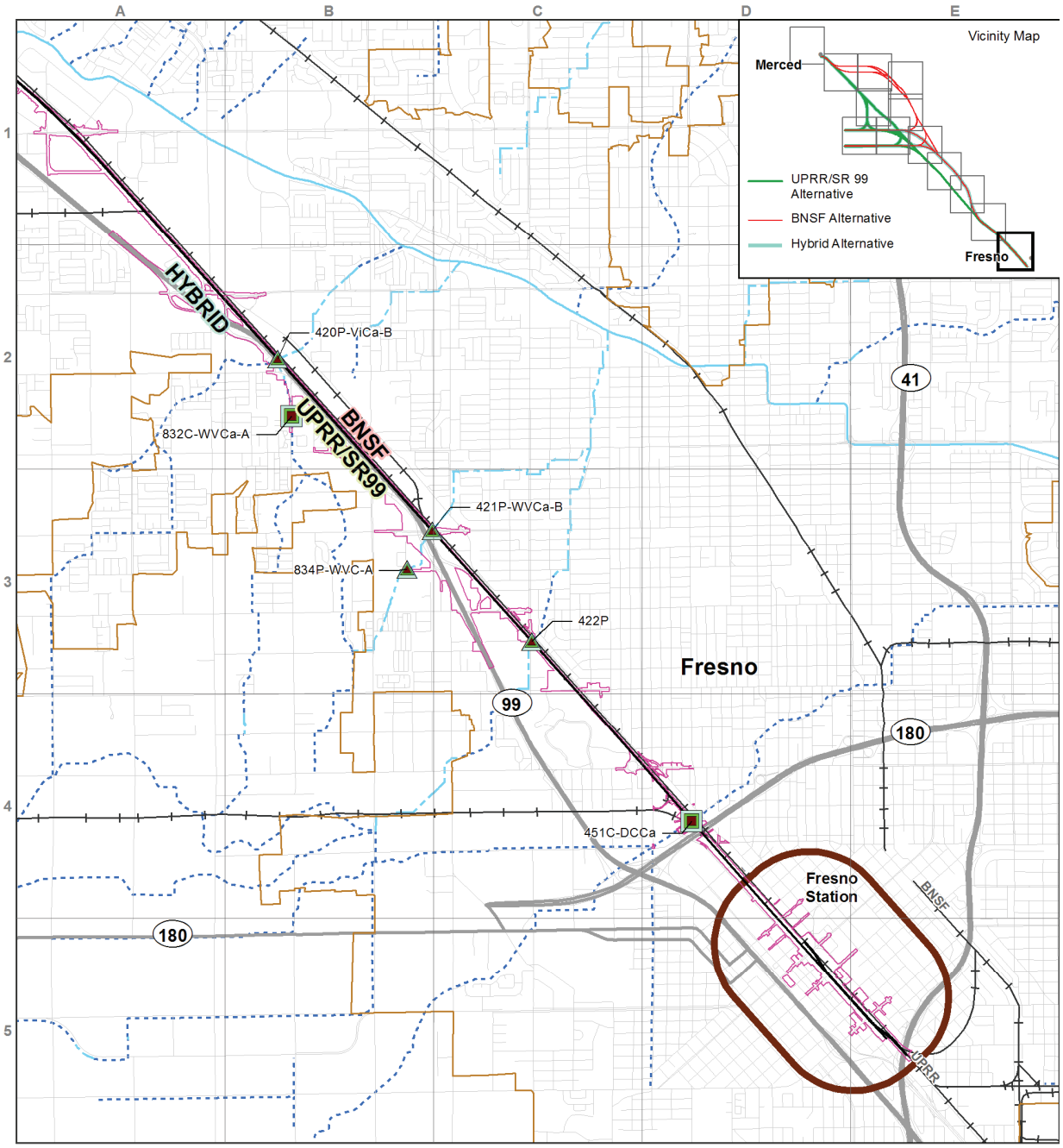
HST Alignment
Permanent Project Footprint
Potential Heavy Maintenance Facility
Station Study Area
City Limit
County Boundary
Railroad
Stream/River
Canal/Ditch
Pipeline

BNSF Waterbody Crossing
Stream/River
Canal
Drainage
Pipe

UPRR/SR 99 Waterbody Crossing
Stream/River
Canal
Drainage
Pipe

Hybrid Waterbody Crossing
Stream/River
Canal
Drainage
Pipe

Figure J-1l
Water Crossings – Map 12



Source: CWD (n.d.), DeLorme (2008), Merced Irrig. Dist. (1973, 2000), USGS (2010a,b)

MF_TR_WET_15_m Mar 29, 2012

N

0 1
Miles

HST Alignment
Permanent Project Footprint
Potential Heavy Maintenance Facility
Station Study Area
City Limit
County Boundary
Railroad
Stream/River
Canal/Ditch
Pipeline

BNSF Waterbody Crossing
- Stream/River
- Canal
- Drainage
- Pipe

UPRR/SR 99 Waterbody Crossing
- Stream/River
- Canal
- Drainage
- Pipe

Hybrid Waterbody Crossing
- Stream/River
- Canal
- Drainage
- Pipe

Figure J-1m
Water Crossings – Map 13

APPENDIX K

Other Waters Identified in Study Area

Table K-1
Waters Identified in CAHSR Merced to Fresno Wetland Study Area[a]
(construction footprint plus 250-foot buffer)

Water ID	Area (acres)	Jurisdiction (Federal/State)	Appendix C, Figure Page Number
Natural Watercourse			
3745	4.43	YES/YES	005
11874	4.41	YES/YES	005, 006
11870	1.23	YES/YES	018
11867	3.80	YES/YES	020, 021
11860	1.16	YES/YES	037, 038, 040, 041
11858	2.58	YES/YES	040, 041
11854	2.27	YES/YES	044, 045, 271, 274
11843	0.44	YES/YES	058
11834	2.45	YES/YES	087, 088
11827	0.41	YES/YES	095
11823	1.55	YES/YES	099
11817	0.001	YES/YES	102
11818	0.001	YES/YES	102
11809	3.49	YES/YES	124, 125, 127
11803	0.73	YES/YES	135
11798	6.34	YES/YES	144
11794	0.52	YES/YES	154, 28
11790	9.21	YES/YES	180, 181
11866	1.53	YES/YES	232, 233, 234
11862	0.75	YES/YES	238
11864	0.30	YES/YES	240
11857	14.33	YES/YES	253, 254, 257, 260, 263, 288, 291, 292, 293, 294, 297
11853	0.92	YES/YES	260, 263, 291
11852	0.16	YES/YES	263
11861	0.52	YES/YES	267, 268
11855	0.75	YES/YES	272, 274, 275
11856	0.35	YES/YES	281

Water ID	Area (acres)	Jurisdiction (Federal/State)	Appendix C, Figure Page Number
11850	0.33	YES/YES	306, 308
11851	0.75	YES/YES	306, 307
11849	1.51	YES/YES	309, 310, 312
11848	1.78	YES/YES	310, 312, 313
11841	0.15	YES/YES	324, 325
11837	0.36	YES/YES	333
11833	3.02	YES/YES	338, 339
11832	5.01	YES/YES	339, 340
11813	0.57	YES/YES	369, 370
11810	1.50	YES/YES	371, 622, 623, 625
11807	1.75	YES/YES	379, 380
11804	0.23	YES/YES	386
11805	0.33	YES/YES	386
11806	0.11	YES/YES	386
11800	5.88	YES/YES	399, 401
11795	0.97	YES/YES	412
11829	1.35	YES/YES	444, 445
11830	0.80	YES/YES	444
11824	17.97	YES/YES	456, 457, 458, 466, 479, 480, 481
11819	10.33	YES/YES	505, 506, 509
11811	7.62	YES/YES	564, 565, 566
11840	2.74	YES/YES	064c, 064d, 064e, 065, 066, 069, 070
11839	0.54	YES/YES	064f, 064g
Constructed Watercourse			
322	0.75	YES/YES	001
472	0.14	YES/YES	001
10012	0.10	YES/YES	001, 002
11191	0.75	YES/YES	001, 002
11193	0.29	YES/YES	002
322	3.37	YES/YES	003, 004, 006, 006
11195	0.17	YES/YES	003

Water ID	Area (acres)	Jurisdiction (Federal/State)	Appendix C, Figure Page Number
2334	0.12	YES/YES	006
7667	0.04	YES/YES	006
7670	0.02	YES/YES	006
9093	0.63	YES/YES	006, 007
9967	0.10	YES/YES	006
2327	0.04	YES/YES	008
7673	0.27	YES/YES	008, 009
2326	0.07	YES/YES	009
1614	0.15	YES/YES	011
9985	0.05	YES/YES	011
10629	0.01	YES/YES	011
1610	0.11	YES/YES	012
7693	0.05	YES/YES	012
316	0.12	YES/YES	015
9826	0.16	YES/YES	015
7705	0.51	YES/YES	017, 018, 019
170	0.21	YES/YES	28
315	0.61	YES/YES	028, 029, 030
8524	0.80	YES/YES	030, 031, 032, 033
305	0.54	YES/YES	033, 036
309	0.62	YES/YES	033
308	0.21	YES/YES	034
298	0.29	YES/YES	035, 038
9109	0.06	YES/YES	036
9110	0.03	YES/YES	036
1603	0.04	YES/YES	038
1758	0.63	YES/YES	040, 041
292	0.38	YES/YES	041
11271	0.25	YES/YES	041, 042
9116	0.39	YES/YES	042, 043, 044
11063	0.09	YES/YES	042, 043

Water ID	Area (acres)	Jurisdiction (Federal/State)	Appendix C, Figure Page Number
7718	0.62	YES/YES	044, 045
9117	0.15	YES/YES	045, 046
272	0.26	YES/YES	046
11197	0.29	YES/YES	046
270	0.32	YES/YES	047
9118	0.28	YES/YES	047
9120	0.001	YES/YES	047
268	0.32	YES/YES	049
266	2.56	YES/YES	051, 055, 056, 057
9128	0.03	YES/YES	051
9129	0.17	YES/YES	051
11145	0.03	YES/YES	051
11146	0.01	YES/YES	051
9131	0.32	YES/YES	053, 054
9136	0.03	YES/YES	058
9142	0.58	YES/YES	060, 061, 063, 065, 066
9925	0.04	YES/YES	065
9927	0.15	YES/YES	065, 066
10072	0.41	YES/YES	065, 068
9143	0.04	YES/YES	066
9151	2.05	YES/YES	070, 074, 077, 082
10084	0.24	YES/YES	076
9168	0.91	YES/YES	079, 083, 084, 085, 086
10085	0.63	YES/YES	080, 081
9170	1.17	YES/YES	081, 082
9930	0.03	YES/YES	081
10086	0.07	YES/YES	081
9174	0.06	YES/YES	082
9175	1.09	YES/YES	082, 083
9206	0.02	YES/YES	089
9207	0.02	YES/YES	089

Water ID	Area (acres)	Jurisdiction (Federal/State)	Appendix C, Figure Page Number
9208	0.04	YES/YES	089, 090
7773	0.19	YES/YES	092
9209	0.03	YES/YES	092
9210	0.15	YES/YES	096
9211	0.23	YES/YES	099
9213	0.01	YES/YES	099
7469	0.35	YES/YES	101
9219	0.03	YES/YES	101, 102
11201	0.69	YES/YES	101, 515
224	0.18	YES/YES	104
214	0.18	YES/YES	108, 591
9224	0.65	YES/YES	108, 585
398	0.002	YES/YES	109
9232	0.26	YES/YES	109
9237	0.38	YES/YES	115, 116
11236	1.18	YES/YES	118, 603
2112	0.49	YES/YES	120, 606
2110	0.06	YES/YES	121
9250	0.41	YES/YES	121
9258	0.33	YES/YES	131
9263	0.07	YES/YES	132
10005	0.03	YES/YES	136
11163	0.14	YES/YES	138
11164	0.11	YES/YES	138
9274	0.20	YES/YES	142
10900	0.16	YES/YES	146
9281	0.17	YES/YES	151
9284	0.10	YES/YES	151
9291	0.05	YES/YES	156, 157
9292	0.25	YES/YES	158
166	0.26	YES/YES	163

Water ID	Area (acres)	Jurisdiction (Federal/State)	Appendix C, Figure Page Number
164	0.07	YES/YES	164
9297	0.16	YES/YES	165
7964	0.04	YES/YES	166
163	0.40	YES/YES	170, 171
9298	0.004	YES/YES	170
9301	0.16	YES/YES	170
161	0.59	YES/YES	171
9304	0.11	YES/YES	172
8779	0.42	YES/YES	181
156	0.49	YES/YES	185, 186, 188
9314	0.64	YES/YES	192, 193
9340	0.03	YES/YES	199
9341	0.03	YES/YES	200
9936	0.17	YES/YES	202
9342	0.14	YES/YES	204, 205
9344	0.16	YES/YES	205
8214	0.59	YES/YES	217
8218	0.17	YES/YES	217
10358	0.72	YES/YES	217, 219
10357	0.16	YES/YES	219
9351	0.07	YES/YES	227
9352	0.08	YES/YES	228
310	0.29	YES/YES	229, 230
9353	0.06	YES/YES	229
11273	1.07	YES/YES	230, 232
313	1.03	YES/YES	232, 267
1762	0.21	YES/YES	233
7187	0.52	YES/YES	234, 235
7188	0.36	YES/YES	234, 235
7184	0.27	YES/YES	235
9361	0.16	YES/YES	235, 236

Water ID	Area (acres)	Jurisdiction (Federal/State)	Appendix C, Figure Page Number
300	0.27	YES/YES	237
9363	0.09	YES/YES	237
301	0.37	YES/YES	238
302	0.40	YES/YES	240, 243
311	0.13	YES/YES	240
11238	0.12	YES/YES	240
303	0.22	YES/YES	241, 244
299	0.89	YES/YES	243, 248
9396	0.49	YES/YES	243, 248
295	0.44	YES/YES	245
297	0.38	YES/YES	245
9391	0.04	YES/YES	245
294	0.70	YES/YES	246, 250
8220	0.13	YES/YES	246
9395	0.03	YES/YES	248
9398	0.12	YES/YES	250
9399	0.57	YES/YES	250, 253
291	0.33	YES/YES	251
8239	0.15	YES/YES	253
9940	0.13	YES/YES	253, 254
8233	0.03	YES/YES	254
9412	0.27	YES/YES	254, 257
280	0.34	YES/YES	259
11243	0.23	YES/YES	259
279	0.53	YES/YES	260
275	0.57	YES/YES	261, 263
276	0.49	YES/YES	261, 262
9424	0.03	YES/YES	261
277	0.34	YES/YES	262
435	0.000	YES/YES	262
7189	0.13	YES/YES	262

Water ID	Area (acres)	Jurisdiction (Federal/State)	Appendix C, Figure Page Number
11245	0.23	YES/YES	262
9870	0.61	YES/YES	263, 291
10754	0.19	YES/YES	263, 291
9447	0.19	YES/YES	267, 268
287	0.44	YES/YES	270, 273
285	0.40	YES/YES	271, 274
135	0.04	YES/YES	272
288	0.13	YES/YES	272
9455	0.13	YES/YES	272, 275
11249	0.13	YES/YES	272
283	0.09	YES/YES	274
284	0.26	YES/YES	274, 275
9456	0.20	YES/YES	275
281	0.39	YES/YES	280
7174	0.10	YES/YES	281
9478	0.04	YES/YES	293
9484	0.04	YES/YES	294
9489	0.02	YES/YES	297
9490	0.19	YES/YES	298, 301
9497	0.11	YES/YES	298, 301
9498	0.02	YES/YES	301
9499	0.11	YES/YES	301
7351	0.22	YES/YES	302, 305
8223	0.29	YES/YES	310
11066	0.21	YES/YES	320
9527	0.29	YES/YES	324, 326, 327
9541	0.04	YES/YES	337
9542	0.32	YES/YES	344, 345
9543	0.02	YES/YES	346
7096	0.39	YES/YES	349, 351
7111	0.001	YES/YES	352

Water ID	Area (acres)	Jurisdiction (Federal/State)	Appendix C, Figure Page Number
222	0.47	YES/YES	361
223	0.23	YES/YES	361
7569	0.14	YES/YES	378
9568	1.11	YES/YES	378, 629
9574	0.11	YES/YES	379
9582	0.11	YES/YES	379
2101	0.49	YES/YES	381, 383
2106	0.01	YES/YES	381
11115	0.15	YES/YES	383
11277	0.14	YES/YES	383
10709	0.03	YES/YES	390, 391
175	1.47	YES/YES	399, 401
9948	0.01	YES/YES	399
10689	0.005	YES/YES	403
10690	0.13	YES/YES	403, 404
11305	0.01	YES/YES	413
8888	0.41	YES/YES	417
354	0.15	YES/YES	420
10685	0.13	YES/YES	423
5789	0.19	YES/YES	426
5790	0.40	YES/YES	426
168	0.72	YES/YES	429, 430
169	0.13	YES/YES	429
105	0.13	YES/YES	434
167	0.50	YES/YES	434
7951	0.14	YES/YES	434
7952	0.42	YES/YES	434
7156	0.11	YES/YES	435
258	0.48	YES/YES	439
9598	0.02	YES/YES	441
9600	0.18	YES/YES	443

Water ID	Area (acres)	Jurisdiction (Federal/State)	Appendix C, Figure Page Number
6903	1.10	YES/YES	447
10060	0.23	YES/YES	447
6911	0.22	YES/YES	449
419	0.70	YES/YES	452, 453, 455
255	1.85	YES/YES	455, 457, 458
10048	0.29	YES/YES	455, 457, 458
254	0.38	YES/YES	456, 457
11261	0.40	YES/YES	456
11263	0.38	YES/YES	456, 457
10105	0.07	YES/YES	457
10099	0.19	YES/YES	460, 470, 471
7611	0.12	YES/YES	461, 471
8492	0.23	YES/YES	461, 471
10100	0.17	YES/YES	461, 471
10045	0.15	YES/YES	462
10037	0.09	YES/YES	463, 472
10102	0.36	YES/YES	463, 464
9612	0.15	YES/YES	465, 466
9613	0.32	YES/YES	465, 481, 483
9615	0.26	YES/YES	466, 467
248	1.18	YES/YES	467, 486, 487
10022	0.18	YES/YES	467, 486
10094	0.001	YES/YES	467
7595	0.26	YES/YES	470
10098	0.14	YES/YES	470
7610	0.21	YES/YES	471
10101	0.65	YES/YES	471
10036	0.15	YES/YES	472
10038	0.03	YES/YES	472
10039	0.04	YES/YES	473
9618	0.15	YES/YES	474, 475

Water ID	Area (acres)	Jurisdiction (Federal/State)	Appendix C, Figure Page Number
9620	0.04	YES/YES	474
9619	0.02	YES/YES	475
247	0.96	YES/YES	479
11265	0.30	YES/YES	480
11267	0.26	YES/YES	480
7662	0.88	YES/YES	481, 482, 484
8557	0.36	YES/YES	481
9632	0.42	YES/YES	483, 486
7492	0.53	YES/YES	486, 487
11081	0.22	YES/YES	486
236	1.43	YES/YES	487, 488, 489
9635	0.47	YES/YES	487, 488, 489, 491
241	1.09	YES/YES	491, 493, 494
10026	0.02	YES/YES	498
239	1.31	YES/YES	501, 502, 505
230	0.33	YES/YES	502
9654	0.52	YES/YES	504, 508, 509
11259	0.22	YES/YES	504
10029	0.02	YES/YES	505
9678	1.02	YES/YES	509, 510, 513, 514
11203	1.02	YES/YES	513, 515, 516
11205	0.18	YES/YES	514
11200	0.35	YES/YES	515, 516
10034	0.01	YES/YES	516
9685	0.09	YES/YES	517
9688	0.75	YES/YES	521, 522
10108	0.59	YES/YES	523, 527
10111	0.29	YES/YES	523
9693	0.07	YES/YES	527
9694	0.20	YES/YES	528, 529
10117	0.93	YES/YES	530, 533. 534

Water ID	Area (acres)	Jurisdiction (Federal/State)	Appendix C, Figure Page Number
10115	0.03	YES/YES	534
10123	0.22	YES/YES	534, 535, 536
10113	0.18	YES/YES	536
10124	0.02	YES/YES	536
9704	0.12	YES/YES	538
215	1.33	YES/YES	540, 541
8466	0.17	YES/YES	546
9708	0.05	YES/YES	547, 550
9709	0.07	YES/YES	548
11083	0.11	YES/YES	548, 549
9716	0.21	YES/YES	549
195	0.24	YES/YES	551
201	0.91	YES/YES	553, 554
11211	0.59	YES/YES	554, 555
11213	0.21	YES/YES	554
200	0.28	YES/YES	558, 559
11182	0.17	YES/YES	558
11184	0.07	YES/YES	558
11180	0.28	YES/YES	559
182	0.60	YES/YES	561
11187	0.07	YES/YES	561
187	0.35	YES/YES	568
184	1.15	YES/YES	570, 572, 573, 574
7537	0.33	YES/YES	571, 575
7428	0.52	YES/YES	572
8766	0.18	YES/YES	572
9777	4.07	YES/YES	572, 576, 579, 580
2114	0.00002	YES/YES	580
209	2.44	YES/YES	582, 583, 584, 589
9762	0.36	YES/YES	587
11257	2.05	YES/YES	589, 590, 594

Water ID	Area (acres)	Jurisdiction (Federal/State)	Appendix C, Figure Page Number
11221	0.15	YES/YES	590
11275	0.11	YES/YES	591
189	1.59	YES/YES	594, 595, 596
11224	0.81	YES/YES	594, 598
6055	0.25	YES/YES	596
11227	0.14	YES/YES	598
11228	0.72	YES/YES	598, 599
197	0.49	YES/YES	599, 600
9797	0.88	YES/YES	599, 600, 601
11231	0.22	YES/YES	599
11233	0.13	YES/YES	599
11235	0.82	YES/YES	602, 603
204	1.40	YES/YES	603, 604, 605
10068	0.01	YES/YES	603
10069	0.01	YES/YES	603
11209	1.09	YES/YES	608, 609
7589	0.24	YES/YES	609
11208	0.19	YES/YES	609
11253	0.38	YES/YES	623, 626
7557	0.73	YES/YES	626
11704	0.02	YES/YES	064c
11693	0.35	YES/YES	064g, 064i, 064k
Constructed Basins			
9091	0.23	Yes/Potentially	004
9092	0.31	Yes/Potentially	004
10631	0.08	Yes/Potentially	005
3603	1.02	Yes/Potentially	007
9094	0.19	Yes/Potentially	007
9376	0.04	Yes/Potentially	007
9976	0.23	Yes/Potentially	009
1801	1.33	Yes/Potentially	011

Water ID	Area (acres)	Jurisdiction (Federal/State)	Appendix C, Figure Page Number
3602	0.41	Yes/Potentially	014
7703	0.47	Yes/Potentially	014
7702	0.03	Yes/Potentially	015
3601	0.45	Yes/Potentially	032, 033
3600	3.25	Yes/Potentially	033, 034
3599	0.73	Yes/Potentially	037
11147	0.02	Yes/Potentially	051
10083	0.10	Yes/Potentially	072, 076
3597	0.14	Yes/Potentially	074
4	0.12	Yes/Potentially	082, 083
3591	0.42	Yes/Potentially	101
10960	0.11	Yes/Potentially	106
10959	2.91	Yes/Potentially	121, 609
5168	1.26	Yes/Potentially	123
7816	0.06	Yes/Potentially	123
9269	0.18	Yes/Potentially	137
10004	0.42	Yes/Potentially	137
3575	0.29	Yes/Potentially	139
3574	0.22	Yes/Potentially	142
10009	0.18	Yes/Potentially	147
3573	3.05	Yes/Potentially	148, 149
8916	0.08	Yes/Potentially	185
8917	0.62	Yes/Potentially	185
10958	0.74	Yes/Potentially	185
9935	0.03	Yes/Potentially	189
3560	0.18	Yes/Potentially	194, 195
5093	0.15	Yes/Potentially	194, 195
3571	0.24	Yes/Potentially	197
8098	0.29	Yes/Potentially	197
8099	0.17	Yes/Potentially	197
8100	0.56	Yes/Potentially	197

Water ID	Area (acres)	Jurisdiction (Federal/State)	Appendix C, Figure Page Number
9339	0.30	Yes/Potentially	199
9953	0.03	Yes/Potentially	199
8103	0.29	Yes/Potentially	200
3568	0.08	Yes/Potentially	201
3566	0.14	Yes/Potentially	202, 203
3567	0.05	Yes/Potentially	202
3607	0.35	Yes/Potentially	202
8176	0.16	Yes/Potentially	208
8177	0.06	Yes/Potentially	208
8181	0.76	Yes/Potentially	209
3565	3.13	Yes/Potentially	212
3605	1.98	Yes/Potentially	212
3557	4.48	Yes/Potentially	213
9345	1.99	Yes/Potentially	216, 217
9346	0.04	Yes/Potentially	216
9347	0.32	Yes/Potentially	216
1063	0.58	Yes/Potentially	236
1064	0.43	Yes/Potentially	236
1065	0.57	Yes/Potentially	236
9362	0.27	Yes/Potentially	236
9941	0.63	Yes/Potentially	257, 258
3598	1.99	Yes/Potentially	261, 263
7176	0.14	Yes/Potentially	286, 287
9943	0.08	Yes/Potentially	300
11172	0.56	Yes/Potentially	323
14	0.84	Yes/Potentially	350
5178	0.08	Yes/Potentially	365
8229	0.14	Yes/Potentially	367
8230	0.11	Yes/Potentially	367
11346	0.06	Yes/Potentially	367
9959	0.21	Yes/Potentially	379

Water ID	Area (acres)	Jurisdiction (Federal/State)	Appendix C, Figure Page Number
3577	2.54	Yes/Potentially	380
11351	0.07	Yes/Potentially	384
7328	1.00	Yes/Potentially	401
9841	0.23	Yes/Potentially	401
7330	0.11	Yes/Potentially	403
7070	0.97	Yes/Potentially	419
9952	0.25	Yes/Potentially	423
5976	0.47	Yes/Potentially	445
8772	0.17	Yes/Potentially	448
10054	0.12	Yes/Potentially	448
7497	0.35	Yes/Potentially	449
9609	0.08	Yes/Potentially	458
8498	0.38	Yes/Potentially	463, 472
9611	0.06	Yes/Potentially	465
3594	0.63	Yes/Potentially	466, 483
8607	0.37	Yes/Potentially	467
9616	0.47	Yes/Potentially	467
9617	1.39	Yes/Potentially	467
7592	0.08	Yes/Potentially	468
7663	0.10	Yes/Potentially	470
8497	0.16	Yes/Potentially	471
7597	0.08	Yes/Potentially	474
7608	0.02	Yes/Potentially	474
7609	0.11	Yes/Potentially	474
7600	0.08	Yes/Potentially	476
9621	0.01	Yes/Potentially	476
7615	0.09	Yes/Potentially	477
10035	0.05	Yes/Potentially	477
238	0.15	Yes/Potentially	478
7620	0.24	Yes/Potentially	480
1618	0.11	Yes/Potentially	481

Water ID	Area (acres)	Jurisdiction (Federal/State)	Appendix C, Figure Page Number
3592	1.05	Yes/Potentially	482
7627	0.10	Yes/Potentially	483, 484
7628	0.05	Yes/Potentially	484
9633	0.89	Yes/Potentially	484, 487
3623	0.16	Yes/Potentially	486
3593	0.22	Yes/Potentially	487, 491
7629	0.05	Yes/Potentially	488, 489
10025	0.04	Yes/Potentially	494
9638	0.03	Yes/Potentially	498
10656	0.07	Yes/Potentially	498
3586	1.23	Yes/Potentially	506
3587	0.47	Yes/Potentially	506
3588	0.45	Yes/Potentially	506
3589	0.22	Yes/Potentially	506
3590	2.27	Yes/Potentially	506
7658	0.07	Yes/Potentially	506, 510
10031	0.13	Yes/Potentially	508, 509
3585	0.39	Yes/Potentially	516
7479	1.59	Yes/Potentially	516, 517
10033	0.01	Yes/Potentially	516
1795	0.90	Yes/Potentially	519
7472	0.20	Yes/Potentially	523
7473	0.17	Yes/Potentially	527
9699	0.01	Yes/Potentially	529
5952	0.43	Yes/Potentially	534
9702	0.27	Yes/Potentially	536
3579	0.83	Yes/Potentially	548
9711	0.04	Yes/Potentially	548
9714	0.08	Yes/Potentially	549
9718	0.02	Yes/Potentially	551
10902	0.16	Yes/Potentially	552

Water ID	Area (acres)	Jurisdiction (Federal/State)	Appendix C, Figure Page Number
3580	0.33	Yes/Potentially	553
3578	1.04	Yes/Potentially	554
7426	0.11	Yes/Potentially	554
7534	0.06	Yes/Potentially	554
9738	0.01	Yes/Potentially	563
7437	0.08	Yes/Potentially	593, 594
7444	0.02	Yes/Potentially	599, 600
9806	0.04	Yes/Potentially	606
1794	0.82	Yes/Potentially	626
7578	0.03	Yes/Potentially	629
11391	0.95	Yes/Potentially	064e
11683	0.58	Yes/Potentially	064i
11682	0.07	Yes/Potentially	064k
Open Waters			
7664	0.32	Yes/Potentially	002
7671	0.05	Yes/Potentially	006
7672	0.03	Yes/Potentially	008
7681	0.08	Yes/Potentially	010
7682	0.07	Yes/Potentially	011
7698	0.01	Yes/Potentially	012
7730	0.16	Yes/Potentially	064
7732	0.04	Yes/Potentially	064
7733	0.01	Yes/Potentially	066
7735	0.01	Yes/Potentially	066
7738	0.01	Yes/Potentially	066
7739	0.02	Yes/Potentially	066
7740	0.02	Yes/Potentially	066
7749	0.09	Yes/Potentially	079, 083
7750	0.06	Yes/Potentially	079
7751	0.03	Yes/Potentially	079
7752	0.02	Yes/Potentially	079

Water ID	Area (acres)	Jurisdiction (Federal/State)	Appendix C, Figure Page Number
7753	0.05	Yes/Potentially	079
7756	0.05	Yes/Potentially	089
7759	0.02	Yes/Potentially	089, 090
7760	0.05	Yes/Potentially	089, 091
7758	0.01	Yes/Potentially	090
7761	0.04	Yes/Potentially	091
7762	0.01	Yes/Potentially	091
7763	0.03	Yes/Potentially	091
7764	0.01	Yes/Potentially	091
7765	0.02	Yes/Potentially	091
7772	0.04	Yes/Potentially	091, 092
7769	0.02	Yes/Potentially	092
7770	0.03	Yes/Potentially	092
7780	0.02	Yes/Potentially	099
7781	0.01	Yes/Potentially	102
7782	0.03	Yes/Potentially	104
7784	0.01	Yes/Potentially	104
7785	0.06	Yes/Potentially	104
7786	0.03	Yes/Potentially	104
7787	0.06	Yes/Potentially	104
7809	0.08	Yes/Potentially	106
7810	0.07	Yes/Potentially	106
7447	0.02	Yes/Potentially	121
8349	0.27	Yes/Potentially	130, 131
8351	0.04	Yes/Potentially	131
7817	0.03	Yes/Potentially	134
7818	0.02	Yes/Potentially	134
7819	0.39	Yes/Potentially	135
7820	0.21	Yes/Potentially	135
7839	0.63	Yes/Potentially	136
7849	0.19	Yes/Potentially	136, 137

Water ID	Area (acres)	Jurisdiction (Federal/State)	Appendix C, Figure Page Number
7840	0.03	Yes/Potentially	137
7845	0.03	Yes/Potentially	137
7846	0.03	Yes/Potentially	137
7850	0.05	Yes/Potentially	139
7857	0.002	Yes/Potentially	141
7859	0.03	Yes/Potentially	141
7860	0.02	Yes/Potentially	141
7864	0.002	Yes/Potentially	143
7876	0.02	Yes/Potentially	146, 147
7881	0.02	Yes/Potentially	147
7883	0.004	Yes/Potentially	147
7890	0.02	Yes/Potentially	147
7891	0.01	Yes/Potentially	147
7913	0.01	Yes/Potentially	147
7914	0.05	Yes/Potentially	147
7915	0.01	Yes/Potentially	147
7916	0.02	Yes/Potentially	147
7917	0.07	Yes/Potentially	147
7910	0.03	Yes/Potentially	148
7911	0.01	Yes/Potentially	148
7912	0.02	Yes/Potentially	148
7920	0.02	Yes/Potentially	148
7921	0.02	Yes/Potentially	149
7926	0.01	Yes/Potentially	151
7935	0.01	Yes/Potentially	152
7936	0.03	Yes/Potentially	152
7946	0.01	Yes/Potentially	156
7943	0.02	Yes/Potentially	157, 158
7948	0.02	Yes/Potentially	157
7944	0.02	Yes/Potentially	158
7949	0.07	Yes/Potentially	158

Water ID	Area (acres)	Jurisdiction (Federal/State)	Appendix C, Figure Page Number
7965	0.06	Yes/Potentially	164
7169	0.02	Yes/Potentially	165
7959	0.03	Yes/Potentially	165
7969	0.02	Yes/Potentially	170
7971	0.02	Yes/Potentially	171
7980	0.03	Yes/Potentially	174
7979	0.01	Yes/Potentially	176
7984	0.03	Yes/Potentially	177
7985	0.11	Yes/Potentially	177, 178
8008	0.04	Yes/Potentially	184
8003	0.02	Yes/Potentially	185
8005	0.03	Yes/Potentially	185
8006	0.02	Yes/Potentially	185
8007	0.03	Yes/Potentially	185
8011	0.03	Yes/Potentially	185
8002	0.02	Yes/Potentially	186
8010	0.05	Yes/Potentially	186
8032	0.02	Yes/Potentially	188
8033	0.01	Yes/Potentially	188
8034	0.005	Yes/Potentially	188
8035	0.003	Yes/Potentially	188
8036	0.004	Yes/Potentially	188
8037	0.01	Yes/Potentially	188
8038	0.01	Yes/Potentially	188
8042	0.03	Yes/Potentially	188
8054	0.004	Yes/Potentially	189
8055	0.01	Yes/Potentially	189
8056	0.01	Yes/Potentially	189
8057	0.01	Yes/Potentially	189
8058	0.04	Yes/Potentially	189
8066	0.02	Yes/Potentially	189

Water ID	Area (acres)	Jurisdiction (Federal/State)	Appendix C, Figure Page Number
8067	0.03	Yes/Potentially	189
8079	0.004	Yes/Potentially	189, 190
8080	0.005	Yes/Potentially	189
8081	0.004	Yes/Potentially	189
8082	0.02	Yes/Potentially	189
8077	0.02	Yes/Potentially	190
8078	0.01	Yes/Potentially	190
8093	0.04	Yes/Potentially	190
8089	0.09	Yes/Potentially	191
8090	0.01	Yes/Potentially	191
8091	0.04	Yes/Potentially	191
8092	0.02	Yes/Potentially	191
8095	0.02	Yes/Potentially	197
8096	0.06	Yes/Potentially	197
8104	0.01	Yes/Potentially	201
8105	0.01	Yes/Potentially	201
8106	0.005	Yes/Potentially	201
8107	0.01	Yes/Potentially	201
8108	0.01	Yes/Potentially	201
8109	0.01	Yes/Potentially	201
8114	0.01	Yes/Potentially	203
8115	0.01	Yes/Potentially	203
8117	0.32	Yes/Potentially	203
8120	0.01	Yes/Potentially	203
8121	0.06	Yes/Potentially	203
8124	0.04	Yes/Potentially	203
8131	0.01	Yes/Potentially	203
8132	0.18	Yes/Potentially	203
8133	0.04	Yes/Potentially	203
8134	0.38	Yes/Potentially	203
8135	0.02	Yes/Potentially	203

Water ID	Area (acres)	Jurisdiction (Federal/State)	Appendix C, Figure Page Number
8137	0.003	Yes/Potentially	203
8138	0.37	Yes/Potentially	203
8139	0.20	Yes/Potentially	204
8140	0.11	Yes/Potentially	204
8141	0.02	Yes/Potentially	204
8142	0.03	Yes/Potentially	204
8143	0.10	Yes/Potentially	204
8146	0.07	Yes/Potentially	204
8154	0.11	Yes/Potentially	204
8155	0.02	Yes/Potentially	204
8156	0.005	Yes/Potentially	204
8157	0.01	Yes/Potentially	204
8144	0.03	Yes/Potentially	205
8166	0.01	Yes/Potentially	207
8167	0.02	Yes/Potentially	207
8168	0.01	Yes/Potentially	207
8169	0.01	Yes/Potentially	207
8170	0.01	Yes/Potentially	207
8171	0.01	Yes/Potentially	207
8172	0.02	Yes/Potentially	207
8173	0.06	Yes/Potentially	207
8174	0.02	Yes/Potentially	207
8178	0.01	Yes/Potentially	210
8179	0.01	Yes/Potentially	210
8180	0.02	Yes/Potentially	210
8182	0.03	Yes/Potentially	210
8183	0.02	Yes/Potentially	210
8187	0.01	Yes/Potentially	214
8189	0.01	Yes/Potentially	214
7091	0.08	Yes/Potentially	229
7343	0.05	Yes/Potentially	293, 296

Water ID	Area (acres)	Jurisdiction (Federal/State)	Appendix C, Figure Page Number
7344	0.04	Yes/Potentially	299
7345	0.04	Yes/Potentially	299
7352	0.03	Yes/Potentially	308
7370	0.06	Yes/Potentially	316, 319
7408	0.07	Yes/Potentially	319
7410	0.04	Yes/Potentially	321
8301	0.25	Yes/Potentially	327
8302	0.22	Yes/Potentially	327
7103	0.01	Yes/Potentially	351
7104	0.01	Yes/Potentially	351
7105	0.05	Yes/Potentially	351
7106	0.09	Yes/Potentially	351
7108	0.16	Yes/Potentially	351
7220	0.02	Yes/Potentially	356
7114	0.04	Yes/Potentially	365
7115	0.05	Yes/Potentially	365
7116	0.02	Yes/Potentially	365
7119	0.01	Yes/Potentially	365
7120	0.04	Yes/Potentially	365
7222	0.02	Yes/Potentially	365
7223	0.01	Yes/Potentially	365
7224	0.03	Yes/Potentially	365
7256	0.03	Yes/Potentially	365
7235	0.02	Yes/Potentially	367
7236	0.01	Yes/Potentially	367
7244	0.02	Yes/Potentially	367
7245	0.03	Yes/Potentially	367
7247	0.03	Yes/Potentially	367
7252	0.07	Yes/Potentially	367
7253	0.04	Yes/Potentially	367
7254	0.06	Yes/Potentially	367

Water ID	Area (acres)	Jurisdiction (Federal/State)	Appendix C, Figure Page Number
7255	0.02	Yes/Potentially	367
7129	0.02	Yes/Potentially	376
7262	0.02	Yes/Potentially	383
7263	0.03	Yes/Potentially	383
7268	0.06	Yes/Potentially	383
7269	0.04	Yes/Potentially	383
7287	0.16	Yes/Potentially	386
7292	0.06	Yes/Potentially	386
7293	0.04	Yes/Potentially	386
7295	0.07	Yes/Potentially	386
10710	0.08	Yes/Potentially	386
7307	0.10	Yes/Potentially	390
7308	0.02	Yes/Potentially	390
7143	0.04	Yes/Potentially	404
7150	0.02	Yes/Potentially	404
7151	0.02	Yes/Potentially	404
7152	0.10	Yes/Potentially	404
7335	0.02	Yes/Potentially	407
7336	0.07	Yes/Potentially	421
7158	0.03	Yes/Potentially	435
7159	0.02	Yes/Potentially	435
7161	0.01	Yes/Potentially	435
7168	0.01	Yes/Potentially	435
7598	0.02	Yes/Potentially	469
7612	0.05	Yes/Potentially	475
7613	0.05	Yes/Potentially	475
7614	0.07	Yes/Potentially	475
7601	0.06	Yes/Potentially	476
7604	0.04	Yes/Potentially	476
7605	0.02	Yes/Potentially	476
7618	0.01	Yes/Potentially	477

Water ID	Area (acres)	Jurisdiction (Federal/State)	Appendix C, Figure Page Number
7619	0.04	Yes/Potentially	478
7488	0.06	Yes/Potentially	479
7655	0.02	Yes/Potentially	504
7505	0.04	Yes/Potentially	548
7522	0.01	Yes/Potentially	550
7523	0.01	Yes/Potentially	550
7524	0.01	Yes/Potentially	550
7525	0.01	Yes/Potentially	550
7530	0.01	Yes/Potentially	550
7531	0.02	Yes/Potentially	550
7532	0.01	Yes/Potentially	550
7533	0.01	Yes/Potentially	550
7439	0.01	Yes/Potentially	598
Total Natural Watercourses			**126 acres[b]**
Total Constructed Watercourses			**119 acres[b]**
Total Constructed Basins			**70 acres[b]**
Total Open Waters			**11 acres[b]**
Total Waters (Constructed and Natural) in Wetland Study Area			***326 acres[b]***

[a] Acreages listed represents the entire area of a given unit, not just the portion presented on that mapbook page (Appendix C).
[b] Rounded to the nearest whole number.

CALIFORNIA High-Speed Rail Authority
U.S. Department of Transportation Federal Railroad Administration