3.7 Biological and Aquatic Resources

Since publication of the Draft Environmental Impact Report/Environmental Impact Statement (EIR/EIS), the following substantive changes have been made to this section:

- Impact evaluation methods were clarified to address public comments on the Draft EIR/EIS.
- Updates and revisions have been made per California Department of Fish and Wildlife (CDFW) comments on the Draft EIR/EIS with regard to effects to surface water resources as a result of tunnel construction.
- Discussion of impacts and mitigation were reviewed and revised as appropriate per public review comments and to clarify impact avoidance and minimization features (IAMF) and mitigation measures.
- Impact calculations were updated based on engineering and design refinements completed and incorporated into the project plans following the public circulation of the Draft EIR/EIS. These updates did not result in changes to impact discussions or conclusions.
- Special-status species habitat and aquatic resource acreages in impact tables were updated based on the engineering and design refinements. The engineering and design refinements did not result in changes to impact discussions or conclusions.
- Updates have been made throughout this section to include the revisions and the addition of new mitigation measures as identified in the Revised Draft EIR/Supplemental Draft EIS published in February 2021 and clarifying information to address public comments received on the Revised Draft EIR/Supplemental Draft EIS. The updates included are regarding potential project impacts to the monarch butterfly (Danaus plexippus plexippus) and the Southern California and Central Coast Evolutionarily Significant Unit (ESU) mountain lion (Puma concolor) population. New mitigation measures for potential impacts to monarch butterfly and mountain lion, and lighting impacts to wildlife during project construction and operation were added.
- Information regarding effects determinations under the Federal Endangered Species Act of 1973 (FESA) were updated to be consistent with the Biological Assessment that was submitted to the U.S. Fish and Wildlife Service (USFWS) in April 2020 (update submitted September 2020) and the Biological Assessment Supplement that was submitted in May 2021.

This section provides an analysis of biological and aquatic resources and the changes to these resources associated with the construction and operation of the Bakersfield to Palmdale Project Section (B-P) of the California High-Speed Rail (HSR) System. This section also discusses potential impacts on these resources from the B-P Build Alternatives, as well as avoidance, minimization, and mitigation measures as they apply to biological and aquatic resources.

Summary of Results

The B-P Build Alternatives would cause habitat disturbances to important habitat for a number of special-status species (including substantial temporary impact during construction). The Bakersfield to Palmdale Project Section traverses valley, mountain, and high desert terrain, as well as urban, rural, and agricultural lands. Approximately 40 percent of the B-P Build Alternative alignments would be adjacent to an existing, operating freight rail line, and the majority of the remaining areas fall within areas of existing human disturbance as mentioned above; there are a few exceptions, such as the Nuestra Señora Reina de La Paz/César E. Chávez National Monument (La Paz) area, and the Tehachapi Mountains, where the alignments would be elevated or within tunnels. Tunnel construction has the potential to cause indirect impacts, such as the desiccation (i.e., drying out) of aquatic resources (including springs, seeps, streams and

associated habitat), which in turn could result in impacts on associated special-status species habitat.[1] However, any such impacts would be temporary.

Biological Resources

Construction of infrastructure projects can result in the loss of ecosystems and displacement of wildlife, even in urban settings. Many of these resources are protected by statutes, executive orders, and regulations. The purpose of this section is to evaluate impacts on biological resources, including wildlife, fish, and their habitats, and describe ways to avoid, minimize, and/or mitigate these impacts.

Implementation of the proposed B-P Build Alternatives (including the César E. Chávez National Monument Design Option [CCNM Design Option], Refined César E. Chávez National Monument Design Option [Refined CCNM Design Option], and engineering and design refinements) would result in permanent impacts on suitable habitat for special-status species, as shown by Alternative alignment in Table 3.7-5, Table 3.7-6, and Table 3.7-11 later in this section. A portion of the direct impacts on vegetation and wildlife would occur during construction at bridge crossings, which would disturb about 13.58 acres of riparian vegetation. Additionally, some of the direct impact areas would occur at at-grade and cut locations where these areas have already been heavily modified by human activity, such as railroad rights-of-way and industrial, commercial, and residential areas. Security fencing and retaining walls in these disturbed locations would not be likely to affect any important areas for wildlife movement.

Under the No Project Alternative, the continuation of existing development trends, such as new residential communities and transportation infrastructure would affect biological and aquatic resources. This would include habitat conversion, habitat fragmentation, and indirect impacts such as vehicle strikes, noise, pollution, and dust. Special status species would be among those adversely affected.

The California High-Speed Rail Authority (Authority) has determined that all alignments of the Bakersfield to Palmdale Project Section may affect, and are likely to adversely affect, the Kern mallow (*Eremalche kernensis*), Bakersfield cactus (*Opuntia basilaris* var. *treleasei* [*O. treleasei*]), San Joaquin adobe sunburst (*Pseudobahia peirsonii*), Kern primrose sphinx moth (*Euproserpinus euterpe*), blunt-nosed leopard lizard (*Gambelia sila*), desert tortoise (*Gopherus agassizii*), least Bell's vireo (*Vireo bellii pusillus*), Tipton kangaroo rat (*Dipodomys nitratoides nitratoides*), and San Joaquin kit fox (*Vulpes macrotis mutica*). All B-P Build Alternative alignments for the Bakersfield to Palmdale Project Section may affect, but are not likely to adversely affect, California jewelflower (*Caulanthus californicus*), San Joaquin woolly-threads (*Monolopia congdonii*), yellow-billed cuckoo (Western Distinct Population Segment; *Coccyzus americanus*), southwestern willow flycatcher (*Empidonax traillii extimus*), and California condor (*Gymnogyps californianus*). Finally, the B-P Build Alternative alignments would have no impact on designated or proposed critical habitat for the desert tortoise, yellow-billed cuckoo, southwestern willow flycatcher, California condor, and least Bell's vireo.

Due to the finding of may affect, and likely to adversely affect, the Authority requested initiation of formal consultation with the USFWS in accordance with Section 7 of the FESA. With implementation of conservation measures, the Authority anticipates requesting concurrence from the USFWS regarding the determination that the proposed action would have no impact on critical habitat and "may affect, but is not likely to adversely affect" two plant and three bird species, as noted above. Additionally, if warranted, the Authority would obtain take authorization through a Section 2081 Incidental Take Permit from the CDFW for state-listed species.

The B-P Build Alternatives would result in between 92.0 and 102.9 acres (depending on the B-P Build Alternative) of direct, permanent impacts on aquatic resources within the Bakersfield to Palmdale Project Section resource study area (RSA), which includes several RSAs with varying distances from the project footprint. The aquatic resource study area (ARSA) is defined in Section 3.7.4.1 to include those aquatic resources delineated within 250 feet of the project footprint.

[1] Groundwater dependent ecosystems or species requiring the surface expression of groundwater (e.g., springs, wetlands) or ecosystems or species dependent upon subsurface availability of groundwater within the rooting depth of vegetation (e.g., woodlands, riparian habitats) (Eamus et. al. 2006).

Temporary impacts to aquatic resources would occur in the ARSA as a result of implementing the B-P Build Alternatives, with an impact ranging from 16.2 acres. As further described in Table 3.7-10, the Authority also estimated and analyzed potential impacts to additional CDFW 1600 resources based on CDFW input. Because the aquatic resources within the ARSA are considered to be isolated (nonnavigable, intrastate waters that do not have a continuous hydrologic surface connection to downstream waters), the U.S. Army Corps of Engineers (USACE) has determined that it will not assert jurisdiction under Section 404 of the Clean Water Act (CWA) over any areas that would be delineated as aquatic resources within the project footprint. Permits pursuant to the Porter/Cologne Water Quality Control Act and a CDFW 1600 Streambed Alteration Agreement shall be obtained for impacts to state-regulated aquatic resources. While the HSR project could cause disturbances to aquatic resources, they would be considered minimal after IAMFs and mitigation measures have been implemented.

Aquatic Resources

The protection of aquatic resources is critical for maintaining the physical, chemical, and biological integrity of all waterways. U.S. Congress and Executive Orders have identified aquatic resources as important, and some waterways and tributaries are termed waters of the U.S. Impacts to some of these waters are regulated federally and at the state level. The development of new linear transportation infrastructure projects has the potential to add to the loss of these waters unless appropriate avoidance, minimization, and/or mitigation measures are implemented. The purpose of this section is to evaluate impacts on aquatic resources and describe ways to avoid, minimize, and/or mitigate the impacts.

With implementation of the IAMFs and mitigation measures described herein, the B-P Build Alternatives would be designed to minimize biological impacts to result in no impact under the National Environmental Policy Act (NEPA) and less than significant impacts under the California Environmental Quality Act (CEQA).

3.7.1 Introduction

This section describes key definitions, the regulatory setting, and the affected environment for biological and aquatic resources. This section evaluates the potential impacts on these resources that could result from implementing the California HSR Project, and it identifies the measures that would reduce such impacts.

The term “biological resources” includes special-status plant and wildlife species and habitats of concern. Habitats of concern include special-status plant communities, aquatic resources, critical habitat, conservation areas (i.e., Recovery Plan areas for federally listed species, conservation easements, public lands, conservation banks, and Habitat Conservation Plans [HCP]), protected trees, and wildlife movement corridors. Disruptions to these biological resources could occur throughout the construction period with various intensities, depending on the type of construction activity. The Authority would minimize construction impacts through specific design features, (e.g., wildlife crossings), IAMFs, and mitigation measures, as described further in this section.

This section also summarizes detailed information contained in the *Bakersfield to Palmdale Project Section Biological and Aquatic Resources Technical Report* (Authority 2018a). For information on how to access and review technical reports, please refer to the Authority’s website at www.hsr.ca.gov.

The following sections include additional information regarding biological and aquatic resources:

- Section 3.4, Noise and Vibration, discusses noise and vibration that would take place in the project vicinity from operation of the project. Potential impacts on wildlife due to project noise and vibration were identified and assessed based on information provided in the High-Speed Ground Transportation Noise and Vibration Impact Assessment Manual (Federal Railroad Administration [FRA] 2005).
- Section 3.8, Hydrology and Water Resources, discusses existing surface water hydrology, water quality, groundwater, and floodplains, and it identifies potential impacts on these resources for each B-P Build Alternative.

- Section 3.14, Agricultural Farmland and Forest Land, discusses the range of impacts on agricultural lands that may overlap with the biological conditions discussed and evaluated in this section, and it addresses potential impacts on pollinating bees.
- Section 3.18, Regional Growth, includes a discussion of growth-inducing impacts.
- Section 3.19, Cumulative Impacts, describes the cumulative impacts of this and other past, present, and reasonably foreseeable future projects.

3.7.1.1 Key Definitions

Key definitions of special-status species, special-status plant communities, and aquatic resources are provided below. Each of these resources is further defined in the *Bakersfield to Palmdale Project Section Biological and Aquatic Resources Technical Report* (Authority 2018a).

- **Special-Status Species**—Special-status species are plants and animals that are legally protected under FESA (U.S. Code [U.S.C.] Title 16, § 1531 et seq.), the California Endangered Species Act (CESA; California Fish and Game Code [Cal. Fish and Game Code], §§ 2050–2085), the California Native Plant Protection Act (Cal. Fish and Game Code §§ 1900–1913), the California Fully Protected Species statutes, and other regulations, such as those species that meet the definitions of rare, threatened, or endangered under CEQA Guidelines §§ 15380 and 15125. Although the special-status species designation does not extend to all bird species protected under the Migratory Bird Treaty Act of 1918 (MBTA; 16 U.S.C. § 703–712) or the corresponding California bird protection statutes (Cal. Fish and Game Code §§ 3503, 3513), impacts on these species are discussed in Section 3.7.5.5, Special-Status Wildlife Species. For further detail, see the *Bakersfield to Palmdale Project Section Biological and Aquatic Resources Technical Report* (Authority 2018a).
- **Habitats of Concern**—Habitats of concern consist of special-status plant communities, riparian areas, aquatic resources, critical habitat, conservation areas (i.e., conservation easements, public lands, conservation banks, and HCPs), protected trees, and wildlife movement corridors.
  - **Special-Status Plant Communities**: Special-status plant communities are determined to be significant, to represent rare vegetation types as listed in the (California Natural Diversity Database [CNDDB]; CDFW 2016), or to have limited distribution statewide or within a county or region, and they include riparian areas that are jurisdictional to CDFW under Cal. Fish and Game Code § 1600 et seq. These communities are often vulnerable to the environmental impacts of projects (CDFW 2000). CDFW maintains a list of special-status plant communities in California in its *Vegetation Classification and Mapping Program—Natural Communities List* (CDFG 2010). The *Bakersfield to Palmdale Project Section Biological and Aquatic Resources Technical Report* (Authority 2018a) provides additional information.
  - **Riparian Areas**: Riparian areas are regulated under the California Fish and Game Code (Cal. Fish and Game Code § 1600 et seq., Streambed Alteration Agreement). A riparian area consists of the transitional habitat between terrestrial and aquatic ecosystems. For analysis purposes in this section of the EIR/EIS, riparian areas are the vegetated areas between the ordinary high water mark (OHWM) or boundary of a seasonal riverine feature and the outer drip line of the adjacent vegetation that is associated with the aquatic resources of the feature. Riparian vegetation supports a unique set of physical and biological processes, including temperature regulation and wildlife habitat, and provides valuable aquatic food web services (inputs for nutrient cycling and food availability) to adjacent aquatic ecosystems.
- **Aquatic Resources**—Aquatic resources in the project vicinity include state streambeds and lakes and other waters of the state, which are regulated by CDFW and the State Water Resources Control Board (SWRCB). Aquatic resources were identified during the jurisdictional delineation (see the *Bakersfield to Palmdale Project Section Aquatic Resources Delineation Report* [Authority 2016]). Note that the federal government (i.e., USACE)

determined that, although many features in these areas meet federal technical criteria that define wetlands and other waters, these features are not jurisdictional under the CWA due to their isolation. Because the waterbodies identified in the ARSA are all isolated, the USACE will not be asserting jurisdiction under Section 404 of the CWA over any areas that would otherwise be delineated as wetlands or waters of the U.S.

The categories presented in the aquatic resources sections were based on definitions from 1986, as modified in practice by the courts and guidance from USACE and the U.S. Environmental Protection Agency (USEPA) and state law. The 2015 Waters of the United States (WOTUS) Rule provided definitive categories for many situations where the agencies previously exercised discretion. However, on October 22, 2019, the USEPA and the USACE published a final rule ("Step One") to repeal the 2015 WOTUS Rule defining "waters of the United States" and to recodify the regulatory text that existed prior to 2015 WOTUS Rule. With this rule, the USEPA and the USACE would implement the pre-2015 WOTUS Rule regulations nationwide as informed by applicable agency guidance documents and consistent with Supreme Court decisions. This final rule became effective December 23, 2019. On January 23, 2020 the USEPA and the USACE released a prepublication version of the final rule (Step 2) further defining "waters of the United States" rejecting an expansive definition WOTUS. This rule is now in effect for California. Under any of the WOTUS definitions—because the ARSA is completely isolated from waters that provide interstate or foreign commerce, interstate waters, including wetlands, and territorial seas—there are no WOTUS in the ARSA. The definitions of OHWM and wetlands have not changed, and these definitions were applied as appropriate in the jurisdictional delineation to help define the boundaries of the water features that are present, regardless of jurisdiction.

- **Waters of the State**: Waters of the state are broadly defined by the Porter-Cologne Water Quality Control Act (Porter-Cologne; Cal. Water Code § 13050(e)) to mean any surface water or groundwater, including saline waters within the boundaries of the state. Under this definition, isolated wetlands that may not be subject to regulations under federal law are considered waters of the state and regulated accordingly.
- **State Lakes, Rivers, and Streambeds**: Under Cal. Fish and Game Code § 1602, CDFW has authority over lakes, rivers, and streambeds, to top-of-bank or edge of adjacent riparian vegetation where it extends beyond top-of-bank. Although CDFW has not published an official definition of lakes, rivers, or streams beyond that contained in the Cal. Fish and Game Code § 1600 et seq., state jurisdiction generally includes the streambed/lakebed and bank, together with the adjacent riparian vegetation where present.

- **Critical Habitat**—Critical habitat includes areas identified under Section 4 of FESA (15 U.S.C. § 1531–1544; FESA Section 3(5)(A)). Designated critical habitats are described in Code of Federal Regulations (C.F.R.) Title 50, Parts 17 and 226. Specifically, critical habitat includes areas for federally listed special-status species consisting of the specific areas within the geographic area occupied by the species at the time it is listed in accordance with the provisions of Section 4 of FESA, on which are found those physical or biological features (constituent elements) that are essential to the conservation of the species and that may require special management consideration or protection. Designated critical habitat also includes specific areas outside of the geographical area occupied by the species at the time it is listed in accordance with the provisions of Section 4 of FESA, on a determination by the Secretary of the Department of the Interior or Commerce that such areas are essential for the conservation of the species.
- **Conservation Areas**—Conservation areas include areas that have been identified as part of HCPs, Natural Community Conservation Plans (NCCP), or other approved local, regional, state, or federal habitat plans. Conservation areas include the following;
  - **Conservation Easements**: A conservation easement is a binding, legal agreement between a landowner and a land trust or government agency that limits use of the land to protect its conservation values and achieve specific conservation objectives. A

conservation easement allows landowners to continue to own and use their land. However, certain actions are prohibited, and the landowner agrees to conserve or restore habitat, open space, scenic, or other ecological resource values on the land covered by the easement.

- **Public Lands**: Public lands are those owned and typically maintained by the government, including cities, counties, states, or the federal government.
- **Conservation Banks**: Conservation banks are permanently protected lands that contain natural resource values. These lands are conserved and permanently managed for special-status species, aquatic resources, or other natural resources. Conservation banks function to offset adverse impacts on natural resources that occurred elsewhere. For this reason, these banks are sometimes referred to as off-site mitigation. In exchange for permanently protecting the land and managing it for natural resources, the natural resource regulatory agencies (e.g., USFWS, USACE, or CDFW) approve a specified number of natural resource (suitable habitat, species, or aquatic resource) credits that bank owners may sell.
- **Habitat Conservation Plans**: HCPs are planning documents required as part of an application for an Incidental Take Permit under Section 10 of FESA. Each HCP describes the anticipated impacts of the proposed taking, how those impacts would be minimized or mitigated, and how the HCP is to be funded.

- **Protected Trees**—Protected trees are trees or tree communities that have special significance and are afforded protection by, and specifically identified in, county and city ordinances, codes, or general plans. Cities and counties traversed by the B-P Build Alternatives include the Cities of Bakersfield and Palmdale, and the Counties of Kern and Los Angeles. The types of trees and specific physical characteristics required to meet the local definitions vary by city and county.
- **Wildlife Movement Corridors**—Wildlife movement corridors are areas defined by wildlife use for movement events on varying scales (e.g., daily foraging, seasonal migration, or dispersal). The wildlife movement corridors referenced in this document refer to areas that have been modeled for specific species based on different physical and biological parameters published in statewide reports. For the purposes of this document, the term "habitat linkage" is used synonymously with wildlife movement corridor. Habitat linkages are areas of land used for a variety of purposes that potentially serve as a corridor for movement or migration of wildlife. Habitat linkages aid in the dispersal and distribution of wildlife and are crucial for maintaining healthy populations of multiple species.

3.7.2 Laws, Regulations, and Orders

This section provides a summary of federal, state, and local laws, regulations, and agency jurisdiction and management guidance that may apply to biological resources. For full definitions and a discussion of permits and actions required to comply with the laws and regulations listed below, refer to the *Bakersfield to Palmdale Project Section Biological and Aquatic Resources Technical Report* (Authority 2018a).

3.7.2.1 Federal

Federal Railroad Administration Procedures for Considering Environmental Impacts (*Federal Register* Volume 64, Page 28545)

These Federal Railroad Administration (FRA) procedures state that an EIS should consider possible impacts on ecological systems, aquatic resource areas, and endangered species or wildlife. On May 26, 1999, the FRA released Procedures for Considering Environmental Impacts. These FRA procedures supplement the Council on Environmental Quality Regulations (40 C.F.R.

Part 1500 et seq.)[2] and describe the FRA's process for assessing the environmental impacts of actions and legislation proposed by the agency as well as for preparation of associated documents (42 U.S.C. § 4321 et seq.). The FRA Procedures for Considering Environmental Impacts state that "the EIS should identify any significant changes likely to occur in the natural environment and in the developed environment. The EIS should also discuss the consideration given to design quality, art, and architecture in project planning and development as required by U.S. Department of Transportation Order 5610.4."These FRA procedures state that an EIS should consider possible impacts on ecological systems, wetlands, and endangered wildlife species.

Endangered Species Act of 1973 (16 U.S.C. § 1531 et seq.)

FESA and its subsequent amendments provide guidance for conserving federally listed species and the ecosystems upon which they depend. The applicable sections of FESA are further discussed below.

- Section 7 requires federal agencies to consult with USFWS or the National Marine Fisheries Service (NMFS), as appropriate, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of threatened or endangered fish, wildlife, or plant species, or result in the destruction or adverse modification of designated critical habitat for any such species. As part of the consultation, USFWS and NMFS will issue a biological opinion and an incidental take statement for wildlife species to exempt the Section 9 take prohibition.
- Section 9 and its implementing regulations prohibit the take of any fish or wildlife species listed under FESA as endangered or threatened, unless otherwise authorized by federal regulations. The term "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Section 9 also prohibits a number of specified activities with respect to endangered plants.
- Section 10 provides a process by which nonfederal entities may obtain an Incidental Take Permit from USFWS or NMFS for otherwise lawful activities that might incidentally result in take of endangered or threatened species, subject to specific conditions. The HSR project is a federal agency project and therefore will not utilize Section 10.

Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. § 1801 et seq.)

The amended Magnuson-Stevens Fishery Conservation and Management Act, also known as the Sustainable Fisheries Act (Public Law 104-297), requires that all federal agencies consult with NMFS on activities or proposed activities authorized, funded, or undertaken by that agency that may adversely affect essential fish habitat of commercially managed marine and anadromous fish species.

Clean Water Act (33 U.S.C. § 1251 et seq.)

The federal CWA serves as the primary federal law protecting the quality of the nation's surface waters, including wetlands. Potentially applicable sections of the CWA are further discussed below.

- Under Section 401, a federal agency may not issue a permit or license to conduct any activity that may result in any discharge into waters of the United States unless a state where the discharge would originate issues a Section 401 water quality certification verifying compliance with existing water quality requirements or waives the certification requirement.

[2] The Council on Environmental Quality (CEQ) issued new regulations, effective September 14, 2020, updating the National Environmental Policy Act (NEPA) implementing procedures at 40 Code of Federal Regulations (C.F.R.) 1500-1508. However, because this project began the NEPA process before September 14, 2020, it is not subject to the new regulations. The Authority is relying on the regulations as they existed prior to September 14, 2020. Therefore, all citations to CEQ regulations in this environmental document refer to the 1978 regulations, pursuant to 40 C.F.R. 1506.13 (2020) and the preamble at 85 Fed Reg. 43340.

- Under Section 402, all point-source discharges (including, but not limited to, construction-related stormwater discharges to surface waters) are regulated through the National Pollutant Discharge Elimination System program. Project sponsors must obtain a National Pollutant Discharge Elimination System permit from the SWRCB.
- Under CWA Section 404, USACE and the USEPA regulate the discharge of dredged and fill materials into the waters of the U.S. Project sponsors must obtain a permit from USACE for discharges of dredged or fill materials into waters over which USACE determines that it will assert jurisdiction.

Rivers and Harbors Act of 1899 (33 U.S.C. § 401 et seq.)/General Bridge Act of 1946 (33 U.S.C. § 525 et seq.)

The Rivers and Harbors Act is a primary federal law regulating activities that may affect navigation on the nation's waterways, as described below:

- Section 9 of the Rivers and Harbors Act and Section 9 of the General Bridge Act require a permit for the construction of bridges and causeways over certain navigable waters of the U.S. to ensure marine traffic is not adversely affected. Navigable waters are defined as those waterbodies that are subject to the ebb and flow of the tide and that are utilized currently, potentially, or historically in their natural condition, or by reasonable improvements, as means to transport interstate or foreign commerce. Section 9 bridge permits are only required for waters that are currently or potentially navigable for commerce; general recreational boating is typically not sufficient to establish jurisdiction. Section 9 bridge permits are issued by the U.S. Coast Guard.
- Section 10 of the Rivers and Harbors Act requires authorization from USACE for the construction of any structure in or over any navigable waters of the U.S.
- Section 14 of the Rivers and Harbors Act(codified in 33 USC 408 (Section 408)) provides that the Secretary of the Army may, upon the recommendation of the Chief of Engineers, grant permission to other entities for the permanent or temporary alteration or use of any USACE Civil Works project. This requires a determination that the requested alteration is "not injurious to the public interest" and "will not affect the USACE project's ability to meet its authorized purpose". This means, that USACE has the authority to review, evaluate, and approve all alterations to federally authorized civil works projects to make sure they are not harmful to the public and still meet the project's intended purposes mandated by congressional authorization.

U.S. Fish and Wildlife Coordination Act (16 U.S.C. §§ 661–666c)

The U.S. Fish and Wildlife Coordination Act applies to any federal project where any body of water is impounded, diverted, deepened, or otherwise modified. Project proponents are required to consult with the USFWS and the appropriate state wildlife agency.

Migratory Bird Treaty Act of 1918 (16 U.S.C. §§ 703–712)

The MBTA prohibits the take of the nest, eggs, birds, or any parts thereof (listed at 50 C.F.R. Part 10.13, as modified by *Federal Register* Volume 75, Page 9281).

Migratory Bird Treaty Reform Act (16 U.S.C. § 703 et seq.; Public Law 108–447)

The Migratory Bird Treaty Reform Act amends the MBTA to exclude nonnative birds or birds that have been introduced by humans to the U.S. or its territories from protection under the MBTA. The statute defines a native migratory bird as a species present in the U.S. and its territories as a result of natural biological or ecological processes.

Bald and Golden Eagle Protection Act (16 U.S.C. §§ 668–668(d); 50 C.F.R. Part 22)

The Bald and Golden Eagle Protection Act prohibits anyone from taking, possessing, or transporting bald eagles (*Haliaeetus leucocephalus*) or golden eagles (*Aquila chrysaetos*), or the parts, nests, or eggs of such birds, without prior authorization. The Bald and Golden Eagle

Protection Act regulations authorize issuance of incidental take permits of bald and golden eagles under limited circumstances.

Protection of Wetlands (USEO 11990)

U.S. Presidential Executive Order (USEO) 11990 aims to avoid direct or indirect impacts on wetlands from federal or federally approved projects when a practicable alternative is available. If wetland impacts cannot be avoided, all practicable measures to minimize harm must be included.

Protection of Migratory Bird Populations (USEO 13186)

USEO 13186 directs each federal agency taking actions that have or may have an adverse impact on migratory bird populations to work with USFWS to develop a memorandum of understanding that will promote the conservation of migratory bird populations.

Invasive Species (USEO 13112)

USEO 13112 requires federal agencies to work cooperatively to prevent and control the introduction and spread of invasive plants and animals.

3.7.2.2 State

California Endangered Species Act (California Fish and Game Code, §§ 2050–2085)

CESA prohibits the take of any fish, wildlife, or plant species listed as endangered or threatened, or designated as candidates for listing, under CESA. Take refers to mortality or injury of the listed species itself and not the modification of a listed species habitat. CESA contains a procedure for CDFW to issue a Section 2081 Incidental Take Permit authorizing the take of listed and candidate species incidental to an otherwise lawful activity, subject to specified conditions, including that the impacts of the take are minimized and fully mitigated.

California Fish and Game Code §§ 3511, 4700, 5050, and 5515 (Fully Protected Species)

The Cal. Fish and Game Code designates 37 fully protected species and prohibits the take or possession at any time of such species with certain limited exceptions.

California Fish and Game Code §§ 3503, 3503.5, and 3513 (Bird Protections)

Cal. Fish and Game Code Section 3503 states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by code or any regulation made pursuant thereto. Section 3503.5 prohibits the take, possession, or destruction of any nests, eggs, or birds in the orders Falconiformes (New World vultures, hawks, eagles, ospreys, and falcons, among others) or Strigiformes (owls). Section 3513 prohibits the take or possession of any migratory nongame bird or part thereof, as designated in the MBTA. To avoid violation of the take provisions, it is generally required that project-related disturbance at active nesting territories be reduced or eliminated during the nesting cycle.

California Fish and Game Code §§ 1600 et. seq.–1616 (Lake and Streambed Alteration)

Section 1600 et seq. requires notifying CDFW prior to any project activity that might (1) substantially divert or obstruct the natural flow of any river, stream, or lake; (2) substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake; or (3) deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake.

If, after this notification, CDFW determines that the activity may substantially adversely affect fish and wildlife resources, a Lake or Streambed Alteration Agreement will need to be obtained.

Under Cal. Fish and Game Code Section 1602, the CDFW takes jurisdiction over rivers, streams, and lakes. The state's jurisdiction generally includes the streambed/lakebed to tops of bank. Although not specifically defined in Cal. Fish and Game Code Section 1602, jurisdiction in some instances may include adjacent riparian vegetation. The term "stream" is commonly understood as a watercourse having a source and terminus, banks, and a channel through which waters flow at least periodically. A "streambed" under Section 1602 includes the channel of a watercourse

which is generally defined to include the depression between the banks worn by the regular and usual flow of the water.

Natural Community Conservation Planning Act (California Fish and Game Code, §§ 2800–2835)

The NCCP Act was enacted to encourage broad-based planning to provide for effective protection and conservation of the state's wildlife resources while continuing to allow appropriate development and growth. NCCPs may be implemented that identify measures necessary to conserve and manage natural biological diversity within the planning area while allowing compatible and appropriate economic development, growth, and other human uses.

California Native Plant Protection Act (California Fish and Game Code §§ 1900–1913)

The California Native Plant Protection Act requires all state agencies to use their authority to carry out programs to conserve endangered and rare native plants. The act gives CDFW the power to designate native plants as "endangered" or "rare" and prohibits the take of such plants, with certain exceptions.

Porter-Cologne Water Quality Control Act (California Water Code § 13000 et seq.)

Porter-Cologne requires the regulation of all pollutant discharges, including wastes in project runoff, that could affect the quality of the state's water. Any entity proposing to discharge a waste must file a Report of Waste Discharge with the appropriate Regional Water Quality Control Board or SWRCB. The Regional Water Quality Control Boards are responsible for implementing CWA Sections 401, 402, and 303(d). Because the HSR project is a project of statewide importance, California Code of Regulations Title 23, Section 3855(b)(1) states that "an application for water quality certification shall be filed with the state board executive director... whenever a potential discharge from a proposed activity: (A) may fall under the jurisdiction of more than one regional board." Porter-Cologne also provides for the development and periodic reviews of basin plans that designate beneficial uses of California's major rivers and groundwater basins and establish water quality objectives for those waters.

On April 2, 2019, the State Water Resources Control Board (SWRCB) adopted its proposed State Wetland Definition and Procedures for Discharges of Dredge or Fill Material to Waters of the State (Procedures). Among other provisions, the Procedures define certain "wetlands" as "waters of the State" under Porter-Cologne. The Procedures also provide a jurisdictional framework for the determination of aquatic features as "wetlands." Such wetland features under the Procedures are identified and analyzed as "aquatic resources" throughout this document.

The January 19, 2017, memorandum of understanding between the Authority and the SWRCB expedites the SWRCB permit process to enable the Authority to meet the FRA construction deadlines for funding. The memorandum of understanding supplements an Interagency Agreement (HSR16-33) between the Authority and SWRCB. The Authority is currently working with the SWRCB to renew the memorandum of understanding. The SWRCB has published the "State Wetland Definition and Procedures for Discharges of Dredged or Fill Materials to Waters of the State," which becomes effective May 28, 2020. The new policy recognizes the memorandum of understanding and adopts the memorandum of understanding's procedures and requirements for submission, review or approval of Authority applications to the SWRCB.

3.7.2.3 Regional and Local

Local and regional municipal plans pertaining to the preservation and protection of biological resources are addressed in the various general plans for Kern and Los Angeles Counties and the Cities of Bakersfield, Tehachapi, Lancaster, and Palmdale. These plans address such issues as habitat, protection of wildlife, and conservation of wetlands and riparian communities. The *Bakersfield to Palmdale Project Section Biological and Aquatic Resources Technical Report* (Authority 2018a) provides more detail on the local plans and policies that were identified and considered in the preparation of this analysis. Refer to Appendix B, Regional and Local Policy Inventory, for a listing of these plans.

3.7.3 Regional and Local Policy Analysis

State and regional policies supporting the California HSR System are described in Section 3.7.2 of this document. Because the HSR project is an undertaking of the Authority in its capacity as a state and federal agency, under NEPA Assignment, (pursuant to 23 U.S.C 327 and a memorandum of understanding dated July 23, 2019, and executed by the FRA and the State of California), the project is not required to be consistent with local plans. The Council on Environmental Quality and FRA regulations, however, do require the discussion of any inconsistency or conflict of a proposed action with regional or local plans and laws. Where inconsistencies or conflicts exist, the Council on Environmental Quality and the Authority require a description of the extent of reconciliation and the reason for proceeding if full reconciliation is not feasible (40 C.F.R. Part 1506.2(d) and 64 C.F.R. 28545, 14(n) (15)). The CEQA Guidelines also require that an EIR discuss the inconsistencies between the project and applicable general plans, specific plans, and regional plans (CEQA Guidelines Section 15125(d)).

Because the HSR project is a state and federal government project, it is not subject to local government jurisdictional issues of land use. The discussion below is included to provide a local planning context. Appendix 2-H provides a detailed listing and analysis of the HSR project's consistency with local planning documents in Los Angeles and Kern Counties, where the project alignments are being proposed.

The Authority would comply with state and federal laws concerning the protection of threatened or endangered species, fully protected species and other special-status plant species, special-status plant communities, and special-status wildlife species that may be subject to particular regulations. Wherever possible, oak trees will be protected by adhering to the Kern County Municipal Code of Regulations that addresses oak trees, which will be incorporated into the project development plans as applicable. Therefore, the HSR project would be consistent with local plans protecting these areas.

In addition, the Authority would work with local cities and counties to remain consistent with local and regional plans, including HCPs. The construction and operation of the HSR system within the Bakersfield to Palmdale Project Section would not substantially conflict with these plans, as the project would be designed to be consistent with the plans.

The Bureau of Land Management (BLM) has adopted the Desert Renewable Energy Conservation Plan (DRECP). The Land Use Plan Amendment (LUPA) for the BLM Bakersfield Resource Management Plan identifies a Wildlife Allocation Area, the Tehachapi Linkage, which all B-P Build Alternatives would pass through. The Tehachapi Linkage includes private, state, and federal lands and mineral estate, identified principally for its high habitat and watershed integrity and importance in connecting the Coast and Transverse Ranges with the southern Sierra Nevada and foothills. The area extends from the conserved lands of the Tejon Ranch Conservancy in the Tehachapi Mountains to the Sequoia National Forest and preserves important opportunities for plant and animal populations to migrate along an elevation gradient in response to climate change.

The B-P Build Alternatives cross approximately 4.85 miles through this Wildlife Allocation Area, all of which is underground in a tunnel. The B-P Build Alternative does not run through an Area of Critical Environmental Concern (ACEC) or areas of Conservation and Management Action (CMA) beyond what is within the Wildlife Allocation Area.

The BLM Management Action for the Tehachapi Linkage that is most relevant to the HSR project at this location is to:

> *Eliminate, relocate, or redesign uses that may result or have resulted in unacceptable impacts on important biological resources, through actions such as, making season closures, modifying grazing prescriptions, installing bat compatible closures, restricting equestrian access, relocating camping areas, and closing or realigning travel routes.*

One of the four BLM parcels found within the project footprint falls within the DRECP designated Wildlife Allocation Area (Assessor's Parcel Number 223-020-12), as shown on Figure 3.7-1. The project alignment is designed to tunnel under the parcel at a depth of 200 feet and avoid impacts on vegetation and wildlife within the Wildlife Allocation Area; this approach is consistent with the recommended BLM Management Action to realign travel routes. Undergrounding the project for the Wildlife Allocation Area would make it compatible with surface wildlife uses.

The project would be consistent with regional and local policies regarding biological resources within the project footprint (Table 3.7-1).

Table 3.7-1 Regional and Local Policy Consistency Analysis Summary

Policy/Goal/Objective	Subsections	B-P Build Alternatives	Consistent
County of Kern			
Kern County General Plan (2007)	Unincorporated Kern County	All	Consistent
Kern County Valley Floor HCP (2006)	Unincorporated Kern County	All	Consistent
Kern County Municipal Code (2015)	Unincorporated Kern County	All	Consistent
Metropolitan Bakersfield General Plan (2007)	City of Bakersfield/Community of Edison	All	Consistent
Bakersfield Municipal Code (2016)	City of Bakersfield/Community of Edison	All	Consistent
Metropolitan Bakersfield HCP (1994)	City of Bakersfield	All	Consistent
Keene Ranch Specific Plan (1997)	Community of Keene	All	Consistent
City of Tehachapi General Plan (1999)	City of Tehachapi	All	Consistent
Tehachapi Municipal Code (2015)	City of Tehachapi	All	Consistent
Greater Tehachapi Area Specific and Community Plan (2010)	City of Tehachapi	All	Consistent
Greater Tehachapi Area Specific and Community Plan (2010)	City of Tehachapi	All	Consistent
Cameron Canyon Specific Plan (1986) Land Use, Open Space, and Conservation Element	Unincorporated Kern County (community of Cameron Canyon)	All	Consistent
Willow Springs Specific Plan (2008)	Unincorporated Kern County (community of Willow Springs)	All	Consistent
Rosamond Specific Plan (2008)	Community of Rosamond	All	Consistent
County of Los Angeles			
Los Angeles County General Plan 2035 (2015), Conservation and Open Space Element	Unincorporated Los Angeles County	All	Consistent
Los Angeles Municipal Code (2015) Section 12.28, Brush and Vegetation, Policy 12.28.030	Unincorporated Los Angeles County	All	Consistent
Los Angeles Municipal Code (2015)	Unincorporated Los Angeles County	All	Consistent
Los Angeles County Significant Ecological Areas (2015)	Unincorporated Los Angeles County	All	Consistent

Policy/Goal/Objective	Subsections	B-P Build Alternatives	Consistent
Antelope Valley Areawide General Plan (2015)	Cities of Lancaster and Palmdale and Unincorporated Los Angeles County	All	Consistent
Lancaster General Plan of 2030 (2009)	City of Lancaster	All	Consistent
Lancaster Municipal Code (as amended)	City of Lancaster	All	Consistent
Palmdale General Plan (1993)	City of Palmdale	All	Consistent
Palmdale Municipal Code (2015)	City of Palmdale	All	Consistent
PG&E San Joaquin Valley Operations HCP (2006)	City of Bakersfield and Unincorporated Kern County	All	Consistent
Tehachapi Uplands Multiple Species HCP (2013)	Greater Tehachapi Area	All	Consistent
Uplands Species San Joaquin Recovery Program (1998)	City of Bakersfield and Unincorporated Kern County	All	Consistent
Desert Renewable Energy Conservation Plan (2015)	Kern and Los Angeles Counties	All	Consistent
West Mojave Plan (2005) West Mojave Desert Tortoise Recovery Plan (2011)	Kern and Los Angeles Counties	All	Consistent

Source: California High-Speed Rail Authority, 2016

Authority = California High-Speed Rail Authority
B-P = Bakersfield to Palmdale Project Section
FESA = Federal Endangered Species Act
HCP = Habitat Conservation Plan
PG&E = Pacific Gas and Electric Company
RSA = resource study area
USFWS = U.S. Fish and Wildlife Service

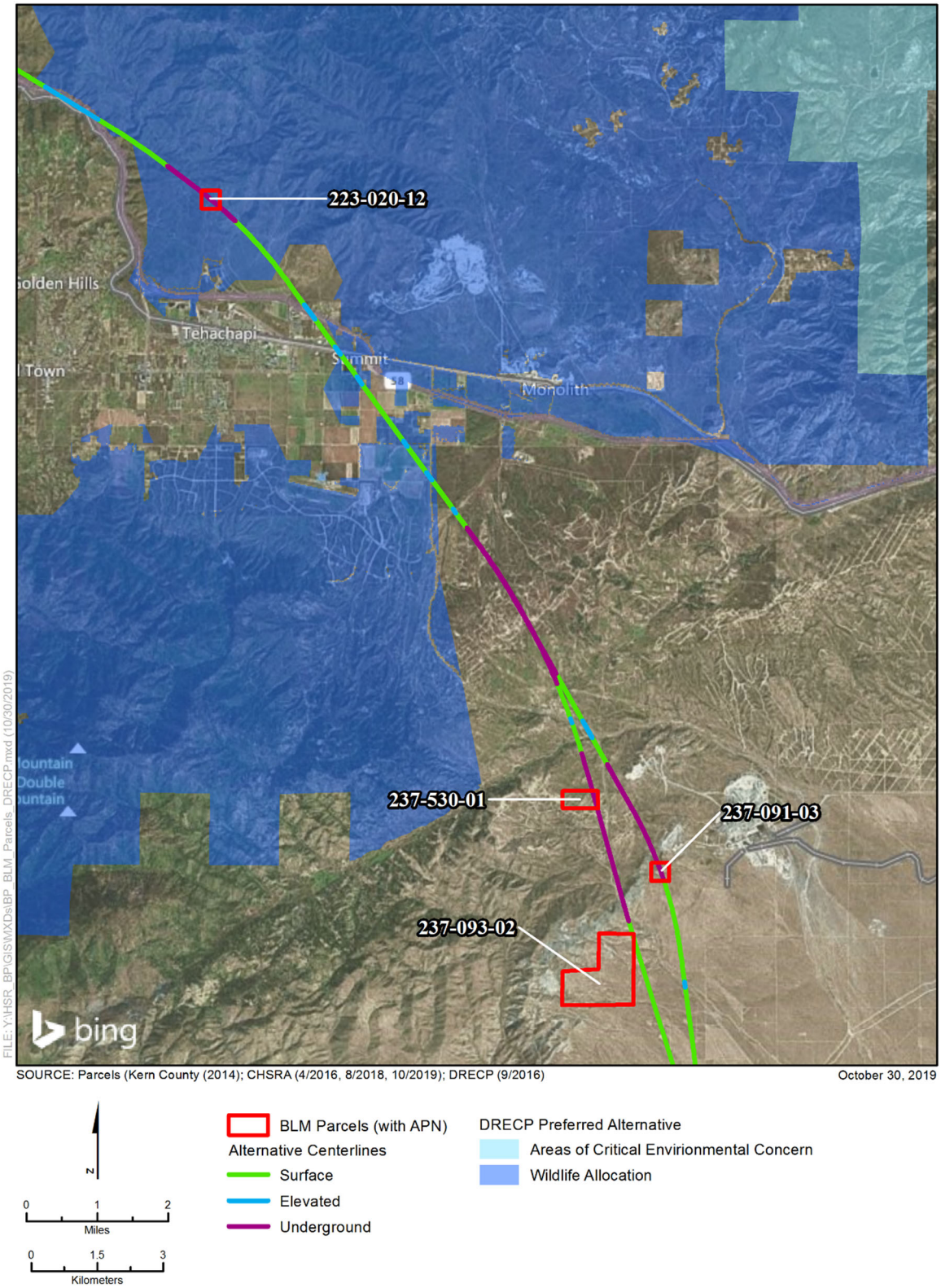

Figure 3.7-1 Bureau of Land Management Parcels with Desert Renewable Energy Conservation Plan Information

3.7.4 Methods for Evaluating Impacts

Evaluation of impacts on biological and aquatic resources is a requirement of several federal, state, regional, and local regulations and laws (as summarized in Sections 3.7.2 and 3.7.3): NEPA; CEQA; and the NEPA 404/408 Integration Memorandum of Understanding (CWA and Rivers and Harbor Act discussions in Section 3.7.2) among FRA, the Authority, the USACE, and the USEPA. This section describes the methods used for evaluating potential impacts on biological resources. It also defines the study areas used to identify biological resources and summarizes the background review and field surveys. Both the background literature review and field surveys identified potential biological resources within the footprints of the B-P Build Alternatives. This section also defines the types of potential impacts of the B-P Build Alternatives, describes the methods used to assess the various impacts, and presents the NEPA and the CEQA criteria used to evaluate the impacts.

Throughout this project section, resources that were not specifically mapped may be present in areas where permission to enter was not granted. For all areas where field access was limited, data could not always be collected on the ground. Therefore, as described in this section for these areas, estimates and assumptions regarding the presence of aquatic resources, special-status species, and special-status plant communities are based on assessments from adjacent areas, aerial photographic interpretation, or post-survey geographic information systems (GIS) analysis.

3.7.4.1 Study Area for Analysis

In addition to the following study areas for specific species and biological resources (as depicted on Figure 3.7-2), two species modeling efforts based on larger scale study areas were also used.

The RSA is the largest study area for environmental investigations specific to biological resources (including wildlife corridor analyses) and aquatic resources data searches, and it encompasses potential direct and indirect impacts within the Bakersfield to Palmdale Project Section of the HSR system.

The RSA includes four distinct study areas: (1) Supplemental Habitat Study Area, (2) Auxiliary Habitat Study Area, (3) Special-Status Plant Study Area (SSPSA), and (4) ARSA, each with a fixed buffer extending beyond the potential area of disturbance.

The potential area of disturbance associated with the project footprint includes the proposed HSR right-of-way and associated facilities such as:

- Traction power substations
- Switching and paralleling stations, and areas associated with modifying or relocating roadways for those facilities, including overcrossings and interchanges
- Maintenance facility sites
- Station alternatives
- Construction areas (including laydown, storage, and similar areas)
- Areas needed for in-situ and off-site mitigation measures
- Areas outside of the project footprint with potential indirect effects

The varied buffer sizes for each study area are based on the level of detail necessary to assess potential effects on the specific biological and aquatic resources addressed in each study area.

Figure 3.7-2 Resource Study Areas

Supplemental Habitat Study Area

The Supplemental Habitat Study Area extends up to 10 miles outward from the widest point of the project footprint. Records searches were conducted based on the Supplemental Habitat Study Area. Species-specific habitats were identified based on aerial photograph interpretation, documented occurrences of a species (e.g., CNDDB records), and field observations of special-status species and their habitats. The *Wildlife Corridor Assessment* (Authority 2017) included this study area in the wildlife corridor movement analysis. It should be noted that this study was conducted prior to the development of both the CCNM Design Option, but the methodologies and design standards apply to both CCNM Design Options. Within the Supplemental Habitat Study Area, focused surveys were conducted for golden eagle and Swainson's hawk (*Buteo swainsoni*) according to protocol (*USFWS Interim Golden Eagle Inventory and Monitoring Protocols* [Pagel et al. 2010]) and CDFW's *Swainson's Hawk Survey Protocols, Impact Avoidance, and Minimization Measures for Renewable Energy Projects in the Antelope Valley of Los Angeles and Kern Counties, California* (California Energy Commission and CDFW 2010), requiring 4-mile and 5-mile buffers, respectively.

Included within this 10-mile study area is the Tunnel Study Area, which is the area within 1 mile of the centerline of each B-P Build Alternative to evaluate indirect impacts to aquatic and riparian habitat and groundwater-dependent special-status species.

Auxiliary Habitat Study Area

The Auxiliary Habitat Study Area is the project footprint plus a 1,000-foot buffer around project elements to evaluate direct and indirect impacts on wildlife habitats and the special-status species that use them. Project-specific vegetation mapping was conducted within this 1,000-foot buffer. Species-specific habitats were identified based on vegetation mapping, aerial photograph interpretation, documented species occurrences (e.g., CNDDB records), and field observations of special-status species and their habitats.

Special-Status Plant Study Area

The SSPSA includes a 100-foot buffer around the project footprint to evaluate both direct and indirect effects on special-status plant resources. Special-status plant resources include special-status plant communities/special-status plants, protected trees (e.g., Joshua trees [*Yucca brevifolia*]), and elderberry shrubs.

Aquatic Resource Study Area

The ARSA includes a 250-foot buffer around the project footprint, which varies from 100 feet to 250 feet, based on project configuration (i.e., some areas are wider than 100 feet based on earthen/fill slope), to evaluate both direct and indirect effects on seasonal depressional wetlands resources and direct effects on aquatic resources.

3.7.4.2 Impact Avoidance and Minimization Features

Based on federal and state regulations, and on the *Statewide Program EIR/EIS for the Proposed California High-Speed Train System* (Authority and FRA 2005), the Authority has considered avoidance and minimization measures. These measures are identified as IAMFs and are described in Appendix 2-E of this EIR/EIS. The standard biological resources IAMFs identified below are part of the project and would avoid, minimize, and/or reduce potential direct and indirect effects on biological resources (e.g., special-status plant and wildlife species, habitats of concern, wildlife movement corridors, and native flora and fauna) associated with construction of the HSR project alignments, station sites, maintenance facilities, and electric power utility improvements.

The Section 7 process requires federal agencies to consult with USFWS and NMFS, as appropriate, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of threatened or endangered fish, wildlife, or plant species, or result in the destruction or adverse modification of designated critical habitat for any such species.

The following recommended standard IAMFs would be implemented, as applicable, during all construction and operations and maintenance activities to avoid and/or minimize adverse effects on biological resources:

- **BIO-IAMF#1: Designate Project Biologist, Designated Biologists, Species-Specific Biological Monitors and General Biological Monitors**—At least 15 business days prior to commencement of any ground-disturbing activity (including but not limited to geotechnical investigations, utility realignments, creation of staging areas, or initial clearing and grubbing), the Authority will submit the name(s) and qualifications of project biologists, designated biologists, species-specific biological monitors, and general biological monitors retained to conduct biological resource monitoring activities and implement avoidance and minimization measures.

  No ground-disturbing activity would begin until the Authority has received written approval from the USFWS, the NMFS, where applicable, and the CDFW that the biologists and monitors have been approved to conduct the specified work. The project biologist is responsible for ensuring the timely implementation of the biological avoidance and minimization measures, as outlined in the Biological Resources Management Plan (BRMP), and for guiding and directing the work of the designated biologists and Biological Monitors. Designated biologists will be responsible for directly overseeing and reporting the implementation of general and species-specific conservation measures. In some instances, designated biologists will only be approved for specific species, in which case they will only be authorized to conduct surveys and implement measures for the species for which they have been approved. Species-specific biological monitors will be responsible for implementation of species-specific measures for the species for which they have been approved and will report directly to a designated biologist. General biological monitors will report directly to a designated biologist or to the project biologist. General biological monitors will be responsible for conducting Worker Environmental Awareness Program (WEAP) training, implementing general conservation measures, conducting general compliance monitoring, and reporting on compliance monitoring activities.

  The term “project biologist” is used in these IAMFs to mean the project biologist, designated biologists, species-specific biological monitors, and general biological monitors, as appropriate. When the Authority is specified as implementing an IAMF, it is assumed that the Authority, or its contractor or agent, is implementing the IAMF under the supervision of biologists and biological monitors, as appropriate.

- **BIO-IAMF#2: Facilitate Agency Access**—Throughout the construction period, the Authority will allow access by the USFWS, NMFS, USACE, CDFW, and SWRCB to the project site. Because of safety concerns, all visitors will check in with the Authority’s resident engineer prior to entering the project footprint. In the event that agency personnel visit the project footprint, the project biologist will prepare a memorandum within 3 business days after the visit documenting the issues raised during the field meeting. The project biologist will report any issues regarding regulatory compliance raised by agency personnel to the Authority.

- **BIO-IAMF#3: Prepare WEAP Training Materials and Conduct Construction Period WEAP Training**—Prior to any ground-disturbing activity, the project biologist will prepare a WEAP for the purpose of training construction crews to recognize and identify sensitive biological resources that may be encountered in the project vicinity. The WEAP training materials will be submitted to the Authority for review and approval. A video of the WEAP training prepared and presented by the project biologist and approved by the Authority may be used if the project biologist is not available to present the training in person.

  At a minimum, WEAP training materials will include the following information: key provisions of FESA, CESA, the Bald and Golden Eagle Protection Act (BGEPA), the MBTA, Cal. Fish and Game Code 1600, Porter-Cologne, and the CWA; the consequences and penalties for violation of or noncompliance with these laws, regulations, and project authorizations; identification and characteristics of special-status plants, special-status wildlife, jurisdictional waters, and special-status plant communities, and explanations about their ecological value;

hazardous substance spill prevention and containment measures; the contact person in the event of the discovery of a dead or injured wildlife species; and review of avoidance, minimization, and mitigation measures.

The project biologist will present WEAP training to all construction personnel before they work in the project footprint. As part of the WEAP training, construction timing in relation to species' habitat and life-stage requirements will be detailed and discussed on project maps, which will show areas of planned minimization and avoidance measures. Crews will be informed during the WEAP training that, except when necessary as determined in consultation with the project biologist, travel within the project footprint is restricted to established roadbeds, which include all pre-existing and project-constructed unimproved and improved roads. A fact sheet conveying this information will be prepared by the project biologist for distribution to the construction crews and others who enter the project footprint. Fact sheet information will be duplicated in a wallet-sized format and will be provided in other languages as necessary to accommodate non-English-speaking workers. All construction staff will attend the WEAP training prior to beginning work on-site and will attend the WEAP training on an annual basis thereafter.

Upon completion of the WEAP training, each member of the construction crew will sign a form stating that they attended the training, understand the information presented, and agree to comply with the requirements set out in the WEAP training. The project biologist will submit the signed WEAP training forms to the Authority on a monthly basis. On an annual basis, the Authority will certify that WEAP training has been provided to all construction personnel. On a monthly basis, the project biologist will provide updates relevant to the training to construction personnel during the daily safety ("tailgate") meeting.

- **BIO-IAMF#4: Conduct Operation and Maintenance Period WEAP Training**—Prior to initiating operation and maintenance (O&M) activities, O&M personnel will attend a WEAP training session arranged by the Authority.

  At a minimum, O&M WEAP training materials will include the following information: key provisions of FESA, CESA, the BGEPA, the MBTA, Porter-Cologne, and the CWA; the consequences and penalties for violation of/noncompliance with these laws and regulations and project authorizations; identification and characteristics of special-status plants, special-status wildlife, jurisdictional waters, and special-status plant communities and explanations about their ecological value; hazardous substance spill prevention and containment measures; and the contact person in the event of the discovery of a dead or injured wildlife species. The training will include an overview of provisions of the biological resources management plan, annual vegetation, and management plan, weed control plan, and security fencing and wildlife exclusion fencing maintenance plans pertinent to O&M activities. A fact sheet prepared by the Authority's environmental compliance staff will be prepared for distribution to the O&M employees. The training will be provided by the Authority's environmental compliance staff. The training sessions will be provided to employees prior to their involvement in any O&M activity and will be repeated for all O&M employees on an annual basis. Upon completion of the WEAP training, O&M employees will, in writing, verify their attendance at the training sessions and confirm their willingness to comply with the requirements set out in those sessions.

- **BIO-IAMF#5: Prepare and Implement a Biological Resources Management Plan**—Prior to any ground-disturbing activity, the project biologist will prepare the BRMP, which would include a compilation of the biological resources avoidance and minimization measures applicable to the HSR section. All project environmental plans, such as the Restoration and Revegetation Plan (RPP) and Weed Control Plan (WCP), will be included as appendices to the BRMP. The BRMP is intended to serve as a comprehensive document that sets out the range of avoidance and minimization measures to support the appropriate and timely implementation of those measures. The implementation of these measures will be tracked through the final design, construction, and operation phases. The BRMP will contain, but not be limited to, the following information:

- A master schedule that shows construction of the project, pre-construction surveys, and establishment of buffers and exclusion zones to protect sensitive biological resources.
- Specific measures for the protection of special-status species.
- Identification (on construction plans) of the locations and quantity of habitats to be avoided or removed, along with the locations where habitats are to be restored.
- Identification of agency-approved project biologist(s) and biological monitor(s), including those responsible for notification and report of injury or death of federally or State-listed species.
- Measures to preserve topsoil and control erosion.
- Design of protective fencing around environmentally sensitive areas (ESA) and the construction staging areas.
- Locations of trees to be protected as wildlife habitat (roosting sites) and locations for planting replacement trees.
- Specification of the purpose, type, frequency, and extent of chemical use for insect and disease control operations as part of vegetative maintenance within sensitive habitat areas.
- Specific measures for the protection of vernal pool habitat and riparian areas. These measures may include erosion and siltation control measures, protective fencing guidelines, dust control measures, grading techniques, construction area limits, and biological monitoring requirements.
- Provisions for biological monitoring during ground-disturbing activities to confirm compliance and success of protective measures. The monitoring will: (1) identify specific locations of wildlife habitat and sensitive species to be monitored; (2) identify the frequency of monitoring and the monitoring methods (for each habitat and sensitive species to be monitored); (3) list required qualifications of biological monitor(s); (4) identify the reporting requirements; and (5) provide an accounting of impacts on special-status species habitat compared to pre-construction impact estimates.

The BRMP will be submitted to the Authority for review and approval prior to any ground-disturbing activity.

- **BIO-IAMF#6: Establish Monofilament Restrictions**—Prior to any ground-disturbing activity, the project biologist will verify that plastic monofilament netting (erosion control matting) or similar material is not being used as part of erosion control activities. The project biologist will identify acceptable material for such use, including: geomembranes, coconut coir matting, tackified hydroseeding compounds, and rice straw wattles (e.g., Earthsaver™ wattles: biodegradable, photodegradable, burlap). Within developed or urban areas, the project biologist may allow exceptions to the restrictions on the type of erosion control material if the project biologist determines that the construction area is of sufficient distance from natural areas to ensure the avoidance of potential impacts on wildlife.
- **BIO-IAMF#7: Prevent Entrapment in Construction Materials and Excavations**—At the end of each work day during construction, the Authority will cover all excavated, steep-sided holes or trenches more than 8 inches deep and that have sidewalls steeper than a 1:1 (45-degree) slope with plywood or similar materials, or provide a minimum of one escape ramp per 100 feet of trenching (with slopes no greater than 3:1) constructed of earth fill or wooden planks. The project biologist will thoroughly inspect holes and trenches for trapped animals at the start and end of each work day.

  The Authority will screen, cover, or elevate at least 1 foot above ground all construction pipe, culverts, or similar structures with a diameter of 3 inches or greater that are stored overnight within the project footprint. These pipes, culverts, and similar structures will be inspected by the project biologist for wildlife before such material is moved, buried, or capped.

- **BIO-IAMF#8: Delineate Equipment Staging Areas and Traffic Routes**—Prior to any ground-disturbing activity, the Authority will establish staging areas for construction equipment in areas that minimize effects on sensitive biological resources, including habitat for special-status species, aquatic features, and wildlife movement corridors. Staging areas (including any temporary material storage areas) will be located in areas that would be occupied by permanent facilities, where practicable. Equipment staging areas will be identified on final project construction plans. The Authority will flag and mark access routes to ensure that vehicle traffic within the project footprint is restricted to established roads, construction areas, and other designated areas.
- **BIO-IAMF#9: Dispose of Construction Spoils and Waste**—During ground-disturbing activities, the Authority may temporarily store excavated materials produced by construction activities in areas at or near construction sites within the project footprint. Where practicable, the Authority will return excavated soil to its original location to be used as backfill. Any excavated waste materials unsuitable for treatment and reuse will be disposed at an off-site location, in conformance with applicable state and federal laws.
- **BIO-IAMF#10: Clean Construction Equipment**—Prior to any ground-disturbing activity, the Authority will ensure that all equipment entering the work area is free of mud and plant materials. The Authority will establish vehicle cleaning locations designed to isolate and contain organic materials and minimize opportunities for weeds and invasive species to move in and out of the project footprint. Cleaning may be done by washing with water, blowing with compressed air, brushing, or other hand cleaning. The cleaning areas will be located so as to avoid impacts on surface waters and appropriate Stormwater Pollution Prevention Plan (SWPPP) best management practices (BMP) will be implemented so as to further control any potential for the spread of weeds or other invasive species. Cleaning stations will be inspected regularly (at least monthly).
- **BIO-IAMF#11: Maintain Construction Sites**—Prior to any ground-disturbing activity, the Authority will prepare a construction site BMP field manual. The manual will contain standard construction site housekeeping practices required to be implemented by construction personnel. The manual will identify BMPs for the following topics; temporary soil stabilization, temporary sediment control, wind erosion control, nonstormwater management, waste management and materials control, rodenticide use, and other general construction site cleanliness measures.

  All construction personnel will receive training on BMP field manual implementation prior to working within the project footprint. All personnel will acknowledge, in writing, their understanding of the BMP field manual implementation requirements. The BMP field manual will be updated by January 31 of each year. The Authority will provide, on an annual basis, training updates to all construction personnel.
- **BIO-IAMF#12: Design the Project to Be Bird Safe**—Prior to final construction design, the Authority will ensure that the catenary system, masts, and other structures such as fencing, electric lines, communication towers, and facilities are designed to be bird and raptor-safe in accordance with the applicable recommendations presented in *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006* (APLIC 2006) and *Reducing Avian Collisions with Power Lines: State of the Art in 2012* (APLIC 2012). Applicable APLIC recommendations include, but are not limited to:
  - Ensuring sufficient spacing of phase conductors to prevent bird electrocution
  - Configuring lines to reduce vertical spread of lines and/or decreasing the span length if such options are feasible
  - Marking lines and fences (e.g. Bird Flight Diverter for fencing and lines) to increase the visibility of lines and reduce the potential for collision. Where fencing is necessary, using bird compatible design standards to increase visibility of fences to prevent collision and entanglement.

- Installing perch deterrents to discourage avian presence on or near project facilities
- Minimizing the use of guywires. Where the use of guywires is unavoidable, demarcating guywires using the best available methods to minimize avian strikes (e.g. line markers).
- Reusing or co-locating new transmission facilities and other ancillary facilities with existing facilities and disturbed areas to minimize habitat impacts and avoid collision risks.
- Structures will be monopole or dual-pole design versus lattice tower design to minimize perching and nesting opportunities. Communication towers will conform to Recommended Best Practices for Communication Tower Design, Siting, Construction, Operation, Maintenance, and Decommissioning (USFWS 2021).
- Use of facility lighting that does not attract birds or their prey to project sites. These include using non-steady burning lights (red, dual red and white strobe, strobe-like flashing lights) to meet Federal Aviation Administration requirements, using motion or heat sensors and switches to reduce the time when lights are illuminated, using appropriate shielding to reduce horizontal or skyward illumination, and avoiding the use of high-intensity lights (e.g., sodium vapor, quartz, and halogen). Lighting will not be installed under viaduct and bridge structures in riparian habitat areas.
- Ensuring poles do not have openings that could entrap birds, including sealing or capping all openings in poles or providing for escape routes (e.g., openings accommodating escape for various species).
- Designing aerial structures (e.g., viaducts and bridges) and tunnel portals to discourage birds and bats from roosting in expansion joints or other crevices.
- Insulated wire or tree wire will be used for all electrical conduits to increase visibility of wires.

Additional bird operational actions would be required for dry lakes and playas, Audubon Important Bird Areas, and documented avian movement corridors. These measures include:

- Avoid, to the extent feasible, siting transmission lines across canyons or on ridgelines to prevent bird and raptor collisions.
- Install bird flight diverters on all facilities spanning or within 1,000 feet of stream and wash channels, canals, ponds, and any other natural or artificial body of water.

Fencing or other type of flight diverter will be installed on all viaduct structures to encourage birds and raptors to fly over the HSR and avoid flying directly in the path of oncoming trains.

- **HYD-IAMF#1: Stormwater Management**—Prior to construction, the contractor shall prepare a stormwater management and treatment plan for review and approval by the Authority. During the detailed design phase, each receiving stormwater system's capacity to accommodate project runoff would be evaluated. As necessary, on-site stormwater management measures, such as detention or selected upgrades to the receiving system, would be designed to provide adequate capacity and to comply with the design standards in the latest version of *Authority Technical Memorandum 2.6.5 Hydraulics and Hydrology Guidelines.* On-site stormwater management facilities would be designed and constructed to capture runoff and provide treatment prior to discharge of pollutant-generating surfaces, including station parking areas, access roads, new road over- and underpasses, reconstructed interchanges, and new or relocated roads and highways. Low-impact development techniques would be used to detain runoff on-site and to reduce off-site runoff. These techniques, which would include constructed wetland systems, biofiltration and bioretention systems, wet ponds, organic mulch layers, planting soil beds, and vegetated systems (biofilters), such as vegetated swales and grass filter strips, would be used where appropriate.

- **HYD-IAMF#2: Flood Protection**—Prior to construction, the contractor shall prepare a flood protection plan for Authority review and approval. The project would be designed both to remain operational during flood events and to minimize increases in 100-year or 200-year flood elevations, as applicable to locale. Design standards will include the following:
  - Establish track elevation to prevent saturation and infiltration of stormwater into the sub-ballast.
  - Minimize development within the floodplain to such an extent that water surface elevation in the floodplain would not increase by more than 1 foot, or as required by state or local agencies, during the 100-year or 200-year flood flow (as applicable to locale). Avoid placement of facilities in the floodplain or raise the ground with fill above the base-flood elevation.
  - Design the floodplain crossings to maintain a 100-year floodwater surface elevation of no greater than 1 foot above current levels, or as required by state or local agencies, and ensure that project features within the floodway itself would not increase existing 100-year floodwater surface elevations in Federal Emergency Management Agency-designated floodways, or as otherwise agreed upon with the county floodplains manager.

  The following design standards would minimize the effects of pier placement on floodplains and floodways:
  - Design site crossings to be as nearly perpendicular to the channel as feasible to minimize bridge length.
  - Orient piers to be parallel to the expected high-water flow direction to minimize flow disturbance.
  - Elevate bridge crossings at least 3 feet above the high-water surface elevation to provide adequate clearance for floating debris, or as required by local agencies.
  - Conduct engineering analyses of channel scour depths at each crossing to evaluate the depth for burying the bridge piers and abutments. Implement scour-control measures to reduce erosion potential.
  - Use quarry stone, cobblestone, or their equivalent for erosion control along rivers and streams, complemented with native riparian plantings or other natural stabilization alternatives that would restore and maintain a natural riparian corridor.
  - Place bedding materials under the stone protection at locations where the underlying soils require stabilization as a result of stream-flow velocity.

3.7.4.3 Modeling of Special-Status Species Occurrences

Regional Assessment Modeling

The project used Species Habitat Suitability modeling to assess potential impacts on federally and state-listed FESA and CESA species. This modeling effort incorporates the best available biological habitat and species data to inform the impacts analysis. The primary goal of the habitat modeling is to efficiently and accurately delineate suitable habitat of listed species and support the preparation of the project's Biological Assessment for the FESA Section 7 Consultation process with the USFWS and CDFW 2081(b) Incidental Take Permit within the project's required accelerated timeframe.

The use of habitat modeling also supports the project's planned regional approach to biological and aquatic resource mitigation, which has the benefit of identifying effective mitigation opportunities that will prioritize the preservation of high-quality habitat for multiple species and that will prioritize available, agency-identified sites that have been targeted for conservation. With this approach, mitigation priorities can be identified to target the most beneficial conservation opportunities and, where feasible, link project mitigation sites to existing protected areas, which aids in achieving resource agency and environmental nongovernment organization support.

Priority mitigation areas can be identified and ranked by regional and local criteria, giving regulatory agencies the confidence that mitigation is of the highest conservation value.

The modeling effort used is a combination of rule-based models and statistical models developed for previous regional planning efforts. The rule-based models were created using an intersection of habitat parameters in GIS. For example, a species would potentially occur in an area that has the appropriate vegetation community, appropriate soil type, and correct elevation range where the species is known to occur. To recognize a difference in model complexity between listed and nonlisted species, secondary types of rule-based models were defined: basic and specific. Basic habitat models were created through an intersection of land cover and geographic range (including elevation range in some cases) datasets in GIS. Basic habitat models were created primarily for nonlisted species, while specific habitat models use land cover and range data, and other species-appropriate parameters, such as: geology, soils, and hydrological data; and spatial measurements related to species movement, and area use (e.g., buffer distances related to dispersal, habitat patch size and shape related to resource availability, territory size, or microhabitat characteristics) to identify potentially suitable habitat. These two model types identify potential habitat preferences and life history for listed species. Figure 3.7-3 illustrates the species modeling study area that was used for these models.

MaxEnt Species Modeling

Maximum Entropy (MaxEnt) is a statistically based modeling method that identifies the likelihood of a species occurrence within a specified area. Prior to the development of the current habitat species modeling approach for the federal and state-listed as threatened and endangered species, MaxEnt modeling was used to help define the distribution and probability of the presence of special-status plant species in the region. This statistical model predicts habitat suitability for species and was used to determine potential impacts on the following nonlisted plant species within the project footprint:

- Alkali mariposa lily (*Calochortus striatus*)
- Barstow woolly sunflower (*Eriophyllum mohavense*)
- Calico monkeyflower (*Mimulus pictus*)
- Comanche Point layia (*Layia leucopappa*)
- Desert cymopterus (*Cymopterus deserticola*)
- Mojave tarplant (*Deinandra mohavensis*)
- Oil neststraw (*Stylocline citroleum*)
- Pale-yellow layia (*Layia heterotricha*)
- Palmer's mariposa lily (*Calochortus palmeri* var. *palmeri*)
- Piute Mountains navarretia (*Navarretia setiloba*)
- Recurved larkspur (*Delphinium recurvatum*)
- Round-leaved filaree (*California macrophylla*)
- Sagebrush loeflingia (*Loeflingia squarrosa* var. *artemisiarum*)
- Striped adobe-lily (*Fritillaria striata*)
- Tehachapi monardella (*Monardella linoides* ssp. *oblonga*)
- Tejon poppy (*Eschscholzia lemmonii* ssp. *kernensis*)
- Tracy's eriastrum (*Eriastrum tracyi*)
- Vasek's clarkia (*Clarkia tembloriensis* ssp. *calientensis*)

Figure 3.7-3 illustrates the species modeling study area for which MaxEnt statistical models were developed.

Figure 3.7-3 Species Modeling Study Areas

3.7.4.4 Pre-Field Investigation and Consultation

Field surveys were conducted to augment the habitat models. Prior to initiating field surveys, existing background information was reviewed to identify the locations of aquatic resources, special-status plant and wildlife species, special-status plant communities, protected trees, wildlife movement areas, and federally designated or proposed critical habitat units recorded or potentially occurring within the Bakersfield to Palmdale Project Section.

This section summarizes the background information that was reviewed for the RSA.

The survey methods were developed through coordination efforts with agency staff starting in 2009. Coordination efforts involved South Coast Wildlands; the USACE (claypan methodology for aquatic resources); The Nature Conservancy; the Tejon Ranch Conservancy; the Tejon Ranch Company; the California Academy of Sciences; the California State University, Stanislaus, Endangered Species Recovery Program; CDFW; USFWS; the Strategic Growth Council; and the SWRCB.

Background Information Review

Special-Status Species

A list of known or potentially occurring special-status plant and wildlife, special-status species' designated and proposed critical habitat for federally listed species, special-status plant communities, and wildlife movement corridors was reviewed based on existing federal, state, and private databases, and well as agency information. Database queries included all reported special-status species occurrences within the RSA (a 1,000-foot buffer of the B-P Build Alternative alignments) based on the following data sources.

- **U.S. Fish and Wildlife Service, Sacramento, Ventura, and Carlsbad Field Office Websites:** A list of federal candidate, proposed, threatened, and endangered special-status plant and wildlife species, and their federally designated or proposed critical habitats, known or having the potential to occur within a nine-quadrangle search area around the B-P Build Alternatives was generated through the Information for Planning and Consultation system (USFWS 2015) and augmented through ongoing consultation with USFWS.
- **California Natural Diversity Database/RareFind:** Lists of special-status plant and wildlife species and special-status plant communities were prepared through a twofold inquiry consisting of a standard nine-quadrangle search using the RareFind program and a GIS mapping exercise of known occurrences within 10 miles of the project footprint within the Biological RSA. This twofold inquiry was performed to ensure that the query captured all special-status species, including those listed by CDFW as "sensitive," whose geographic location data had been suppressed (California Department of Fish and Game [CDFG][3] 2011; CDFW 2016).

  When an element occurrence is labeled "Suppressed," all location-specific data are restricted/suppressed. Data are considered "Sensitive" and their location information is consequently suppressed by the CNDDB for a number of possible reasons, including:

  - The element or site has been over-collected and restriction of the location information is needed
  - The data submitter or landowner requested that the CNDDB restrict release of the location information for a particular site or element
  - A site is in particular jeopardy of purposeful destruction
- **California Native Plant Society's Online Inventory of Rare and Endangered Plants of California:** A list and a map of the California Native Plant Society's special-status plant species that may occur within the nine-quadrangle search area were generated using the online inventory database (California Native Plant Society 2015).

[3] Until 2013, the CDFW was known as the California Department of Fish and Game (CDFG).

- **Department of Fish and Game's Natural Communities List Arranged Alphabetically by Life Form (CDFG 2010):** A list of plant communities or alliances based on *A Manual of California Vegetation* (Sawyer et al. 2009), with rarity rankings determined by CDFW, was used to designate the plant communities for the vegetation mapping.
- **California Wildlife Habitat Relationship System:** The list of CDFW special-status wildlife species was augmented through a GIS exercise that overlaid the B-P Build Alternative alignments with wildlife species (i.e., amphibians, reptiles, birds, and mammals) range maps available through the California Wildlife Habitat Relationship System (CDFG 2005). This query captured additional special-status species whose known geographic range occurs within 10 miles of the B-P Build Alternative alignments (the Supplemental Habitat Study Area) (CDFG 2008a).
- **U.S. Fish and Wildlife Service Recovery Plans:** These documents included the *Recovery Plan for Upland Species of the San Joaquin Valley, California* (USFWS 1998); the *Revised Recovery Plan of the Mojave Population of the Desert Tortoise* (USFWS 2011b); and the *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (USFWS 2005).
- **eBird (http://ebird.org/content/ebird/):** eBird is a real-time, online checklist program launched in 2002 by the Cornell Lab of Ornithology and National Audubon Society. It provides rich data sources for basic information on bird abundance and distribution at a variety of spatial and temporal scales.

Additionally, biologists familiar with the region and its biota used their professional knowledge, published literature, and unpublished reports to round out the list of species potentially present within the RSA.

A wildlife habitat assessment for special-status wildlife species was conducted in 2015 within the RSA using a web-based map viewer with GIS interactive data layers (i.e., rasters), including project-related vegetation mapping, CNDDB and additional public data records, and other reviewed literature, as described above. Wildlife habitat field surveys conducted for earlier design configurations that overlap with the current RSA were also utilized in the preparation of this report.

A desktop review of habitat for special-status fish species was conducted using *CalFish: A Cooperative Anadromous Fish and Habitat Data Program* (CalFish 2009), along with a review of available reports showing current known species distribution, to identify occupied stream course habitat and known barriers to both upstream and downstream movement and migration. A fishery biologist reviewed the project alignment to identify suitable aquatic habitat in the RSA to determine its potential to support special-status fish species based on features such as watershed boundaries, stream and habitat types, creek/stream/river substrates, and migration barriers, such as dams.

Aquatic Resources

Pre-field survey investigations generally consisted of reviewing available background information to gather relevant data for wetlands and other waters, and consultation with resource specialists. Where appropriate or necessary, aquatic resource specialists reviewed available resource information related to the project region and consulted with USACE and the SWRCB regarding methodology.

Special-Status Plant Communities

In preparation for mapping of special-status plant communities, the CNDDB (CDFW 2016) was searched for occurrences of special-status communities within the Supplemental Habitat Study Area (i.e., within 10 miles). Aerial photographs of the Supplemental Habitat Study Area taken from 1990 to 2014 and from *A Manual of California Vegetation* (Sawyer et al. 2009) were also reviewed to identify plant communities as well. To identify the requirements for protected trees, county and city ordinances and codes, as well as available general plans and HCPs, were reviewed.

Critical Habitat

Proposed and designated critical habitat GIS layers were obtained from the USFWS Sacramento, Ventura, and Carlsbad field office websites and reviewed in January 2019 to determine if any federally designated critical habitat occurs within the RSA.

Wildlife Movement Corridors

Wildlife movement corridors and wildlife habitat linkages are areas prioritized for conservation because they are expected to promote wildlife movement at various scales (i.e., daily foraging, seasonal migration, or dispersal). Wildlife movement corridors consist of natural areas connecting larger habitat patches that provide critical resources (i.e., food, cover, water, and space) necessary for populations to survive and thrive. The importance of habitat connectivity and corridors that facilitate animal dispersal and movement is well documented and accepted (Chester and Hilty 2010). Habitat connectivity is also important in biodiversity conservation, particularly because of the role it plays in maintaining demographic and gene flow (Beier and Noss 1998), maintaining ecological processes (Bennett 1999), and reducing species extinction risk (Crooks et al. 2011).

Well-designed wildlife crossings that are properly located in the landscape and sized appropriately will facilitate effective wildlife movement and recolonization, maintain and ensure future genetic exchange, and safeguard species populations against random environmental changes and natural disasters (Beier and Loe 1992; Beier et al. 2008).

The HSR would bisect the Tehachapi Mountains and foothills, which are the only forest and woodland connection between the 2,000-mile-long Sierra Cascade mountain system and the 800-mile-long mountain system of the Southern California Coastal Ranges, Transverse Ranges, and Peninsular Ranges. The Tehachapi Mountains provide a critical habitat connection for east-west and north-south wildlife gene flow within California and beyond. Previous conservation planning efforts, the *South Coast Missing Linkages: A Linkage Design for the Tehachapi Connection* (Penrod et al. 2003) and the *California Essential Habitat Connectivity Project* (Spencer et al. 2010) have identified the Tehachapi Mountains and foothills as a particularly important habitat linkage.

A literature review was conducted to identify any existing studies and papers related to wildlife movement and wildlife crossing design in the surrounding area. Federal, state, and local agencies, research institutions, and conservation organizations in the vicinity of the RSA were contacted via email and by phone to seek any reports or data that would be helpful in establishing baseline conditions for the analysis, or in developing priorities for wildlife connectivity mitigation. Field surveys were conducted to review existing conditions for crossing opportunities from public right-of-way, as described in Section 3.7.4.5.

The primary effect of the project on wildlife connectivity would be that the fenced at-grade segments would prevent wildlife from crossing at those locations. Wildlife would be able to cross the alignment between at-grade segments where the HSR would be elevated on a viaduct or underground in a tunnel. The project's impacts on connectivity were analyzed on both regional and local scales.

For the South Coast Missing Linkages (Penrod et al. 2003), effort modeling techniques were developed to identify constraints and opportunities for wildlife movement. One term used in this effort to describe the degree of movement opportunity is permeability. Areas with the highest potential for movement between areas on a regional scale are called least-cost corridors (cost represents the effort involved in movement). The basic modeling that was developed for Penrod's analyses was applied to the project vicinity to estimate local project-specific impacts on permeability. The local permeability analysis was developed to measure project-specific impacts on the relative cost for target focal species to move across a 6-kilometer-wide area (i.e., a 3-kilometer buffer on either side of the HSR alignment) between potential habitat cores and patches beyond the perimeter of the 6-kilometer-wide extent. The local permeability analysis modeled relative cost between source habitat patches for each focal species for Alternative 2 under three scenarios:

1. Existing conditions
2. Project with no wildlife crossings for the at-grade or surface segments
3. Project "improved" with wildlife crossings integrated into the at-grade segments

Three analyses were conducted for focal species that represent a range of wildlife species. Nine focal species were selected to model wildlife movement across the Bakersfield to Palmdale Project Section, including four listed species. The focal species included in the local permeability analysis are listed below:

- Mountain lion (*Puma concolor*), including the Southern California/Central Coast ESU of mountain lion (a candidate for state listing as threatened, and protected by Cal. Fish and Game Code Section 4800-4810 as a specially protected mammal)
- Mule deer (*Odocoileus hemionus*)
- American badger (*Taxidea taxus*) (protected by California Code of Regulations Title 14, § 461, and Cal. Fish and Game Code Section 4000)
- San Joaquin kit fox (*Vulpes macrotis mutica*) (Federally Endangered/State Threatened)
- Desert kit fox (*Vulpes macrotis*) (Fully Protected Fur-Bearing Species)
- Desert tortoise (*Gopherus agassizii*) (Federally Threatened/State Endangered)
- Western gray squirrel (*Sciurus griseus*)
- Tipton kangaroo rat (*Dipodomys nitratoides nitratoides*) (Federally/State Endangered)
- Blunt-nosed leopard lizard (*Gambelia sila*) (Federally/State Endangered, State Fully Protected)

These focal species were selected because the movement cost data were available from the Missing Linkages Project. These also are representative of the various geographic areas, habitat types, and ranges of movement across the project, including three ecoregions (Central Valley, Sierra Nevada, and South Coast). Penrod et al. (2003) modeled regional least-cost corridors for seven of these species in the Tehachapi Linkage Design (Penrod et al. 2003), while regional least-cost corridors for the other two species (i.e., desert tortoise and desert kit fox) were modeled in *A Linkage Network for the California Deserts* (Penrod et al. 2012; BLM 2016).

An analysis of the HSR centerline was conducted, quantifying the lengths of at-grade segments to determine which segments conform to the desired maximum at-grade section of no more than 1 mile between large structures (20-foot arch undercrossing) and no more than 0.31 mile between small crossing structures (6-foot arch undercrossing) recommended in the *Wildlife Crossing Structure Handbook* (Clevenger and Huijser 2009) and *Wildlife Crossings Guidance Manual* (Meese et al. 2009). The sections of elevated, surface, and underground rail segments were inventoried in the *Wildlife Corridor Assessment* (Authority 2017). It should be noted that although the *Wildlife Corridor Assessment* (Authority 2017) was conducted prior to development of the CCNM Design Option, the Refined CCNM Design Option, and the engineering and design refinements, these have since been evaluated for impacts based on the new footprint.

For most species, species-specific 30-meter (98-foot) pixel-scale habitat rasters were used. A pixel is the smallest measurable digital unit used in the analysis; in this case, the scale of each pixel is 30 meters (98 feet) squared. For each species, this single raster was used as both a habitat quality raster (lower values interpreted as higher quality) and a movement cost raster (higher values interpreted as high cost of movement for that species). To develop a species habitat raster, species experts assigned weights to each of four factors (i.e., elevation, land cover, road density, and topographic position) and to each class within a factor (Penrod et al. 2003, 2012). For each focal species, a cost threshold was identified, above which a pixel was considered unsuitable as breeding habitat. Desert kit fox was identified by diagnostic sign (e.g., tracks, scat, or burrow). Potential habitat for desert tortoise was identified based solely on land cover.

Based on the three scenarios identified above (existing conditions, project, and project with wildlife crossings), the accumulated mean (average) movement cost was calculated at a local permeability scale by the ArcGIS "corridor" function as well as with a moving average window analysis. The moving average window calculated the average value for all pixels within a 90-meter (295-foot) radius. This 90-meter radius pixel value was collected every 50 meters (164 feet) along the HSR alignment. The moving window average was calculated for existing conditions, project, and project with wildlife crossings scenarios for each focal species.

The analysis also considered how the HSR project would affect modeled regional corridors included in the Linkage Design for the Tehachapi Connection. The HSR project was analyzed to determine how much of the nine focal species' least-cost corridors and regional linkage design would be crossed by the HSR alignment. The percentage of regional linkages that would be disrupted was then determined. The focus of the wildlife crossings was not specific to the Tehachapi linkage but rather to maintain permeability across the entire project section. Eight of the 39 wildlife crossing occur within the Tehachapi linkage. Consideration was given for how the HSR system would affect the continuity of the modeled geographic ranges of seven focal species addressed in the Tehachapi Linkage and two Mojave Desert species. Finally, the four broad land-cover types (San Joaquin Valley grassland and savannah, oak woodland, montane forest, and Mojave Desert scrub) that intersect the HSR alignment were evaluated for continuity (uninterrupted habitat).

3.7.4.5 Field Surveys

The potential for project impacts on biological resources depends largely on the presence of suitable habitat within and adjacent to areas within and near the project footprint. The Authority's biologists conducted field surveys throughout the RSA to determine the presence or absence of biological resources and to document the location of any biological resources through habitat characterization and mapping.

Field surveys encountered limitations that resulted in reduced access within the RSA and may influence the results of the studies presented in this report. These limitations were beyond the Authority's control and were associated with the following issues:

- Lack of permission to enter on private property
- Lack of physical access (e.g., terrain, locked gates) on certain properties where permission to enter was granted but could not be completely exercised

For all areas where field access was limited, data could not always be collected on the ground. Therefore, estimates and assumptions regarding the presence of aquatic resources, special-status species, and plant communities are based on assessments from adjacent accessible areas, aerial photographic interpretation, or post-survey GIS analysis. The conservative estimations and assumptions resulted in a complete assessment for those areas where field access was limited.

The *Bakersfield to Palmdale Project Section Biological and Aquatic Resources Technical Report* (Authority 2018a) provides detailed descriptions of the various methods employed during the field surveys for biological resources.

This section provides the survey dates, describes the survey and types, and summarizes the methods used to complete the field surveys. Field surveys were conducted from 2011 to 2016.

Reconnaissance Field Surveys

Several reconnaissance field surveys were conducted to review and obtain preliminary information for the purpose of planning the various field survey efforts and to determine health and safety hazards, incidental biological resources, and potential biological or wetland issues that may have required specific preparation, further background review, or agency coordination. Reconnaissance surveys were conducted by driving through portions of the RSA that parallel major roadways (including State Route [SR] 58, SR 14, and Sierra Highway) and conducting

information surveys to collect plant phenology data. Vegetation mapping is discussed below as part of the botanical surveys.

Delineation of Aquatic and California Fish and Game Code Section 1600 et. seq. Resources

In order to identify and delineate aquatic features that are potentially under USACE, SWRCB, and CDFW jurisdiction, teams of qualified aquatic resource specialists conducted field surveys to delineate aquatic features (potential wetland and nonwetland waters of the U.S., and potential waters of the state and CDFW resources) within the ARSA from August 17 to September 2, 2015. Map verification was completed in October and November 2015. The objective of the surveys was to characterize and map each of the natural drainages and engineered features/facilities along the proposed alignment that may potentially fall under federal and/or state jurisdiction(s).

Initial field surveys of claypan reference sites were conducted as part of the development of a methodology (LSA Associates, Inc. 2016) to enable the reliable identification of claypans throughout the ARSA, using specially timed, high-resolution aerial photography.

The CCNM Design Option, the Revised CCNM Design Option, and the engineering and design refinements were finalized after the 2015 field surveys and mapping verification were completed. Although portions of both CCNM Design Options and engineering and design refinements fall in areas studied and mapped in 2015, not all areas were evaluated previously. Delineation of aquatic features was completed in the ARSA in the CCNM Design Option portion in January 2019, in the Refined CCNM Design Option portion in December 2019, and in the engineering and design refinement areas in August 2020. The methodology used to evaluate aquatic resources in these areas of the ARSA is provided in Appendix 3.7-C.

Jurisdictional features within the ARSA were classified as seasonal wetland, forested wetland, claypan features, desert washes, ephemeral streams, intermittent streams, perennial streams, riparian streambeds, canals, ditches, basins, and in-stream impoundments.

Where properties in the ARSA were not accessible due to lack of permission to enter, field teams performed visual surveys from adjacent public roads or adjacent parcels with permission to enter, and a remote methodology was used to aid delineation for locations that could not be directly accessed.

Botanical Surveys

Botanical surveys were conducted to map plant communities throughout the SSPSA and to identify and locate any special-status plant species, special-status plant communities, or protected trees. Surveys were conducted according to the methods described in the *Botanical Survey Guidelines* (California Native Plant Society 2001); the *Protocols for Surveying and Evaluating Impacts on Special-status Native Plant Populations and Natural Communities* (California Native Plant Society 2009); *Supplemental Survey Methods* (Cypher 2002a, 2002b, 2002c, 2002d); *Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants* (USFWS 1996); and *Survey Protocols Required for NEPA and Endangered Species Act Compliance for BLM Special-Status Plant Species* (BLM 2009, 2010).

Botanical surveys were conducted in 2011, 2013, 2015, and 2016. In 2015, one botanical survey was conducted in the SSPSA between May 12 and June 11, 2015. Surveys on the portion of the alignment that travels through Tejon Ranch were conducted between March 15 and March 31, 2016. In 2011, botanical surveys were conducted in the RSA within portions of the RSA that overlapped earlier project designs during the early spring (March 22–26), late spring (April 26–May 5), and early summer bloom periods (June 1–3). Three survey periods were conducted: March 20–28, April 15–25, and May 28–June 1, 2013.

Special-Status Plant Surveys

Preliminary surveys consisted of a vehicle survey of the SSPSA via public roads and private roads where permission to enter was granted. Areas lacking the potential to support special-

status plant species (e.g., urban and active agricultural areas) were eliminated from further review. For example, during the early-season surveys, the survey team determined that urban landscapes and some agricultural areas east of Bakersfield, being disturbed at high levels, do not contain suitable habitat for potential special-status plant species and special-status plant communities due to the high level of anthropogenic disturbance. In subsequent survey periods (mid- and late-season periods), these areas were not revisited.

In areas determined to have potential for special-status plant species, and where permission to enter was granted, surveys along meandering transects were conducted. Botanists walked pedestrian transects while working in teams of two to six and spaced 20 to 100 feet apart, or as necessary to visually assess the SSPSA. Where special-status plant species identified were identified, these were mapped using a Trimble global positioning system (GPS) unit and recorded on CNDDB California Native Species Field Survey Forms. Surveys were floristic in nature (i.e., all observed plant species were identified to the level necessary to determine whether or not they were a special-status species). For parcels within the SSPSA that lacked permission to enter, observations were recorded from public roads and lands or from adjacent parcels with permission to enter. Parcels with permission to enter, included 7 percent of the project footprint and the 250-foot buffer.

Plant Communities

Plant communities within the SSPSA were mapped according to the vegetation classification system described in *A Manual of California Vegetation* (Sawyer et al. 2009). Alliance names and definitions from that work were based on *A Manual of California Vegetation* (Sawyer et al. 2009) and *Vegetation Alliances and Associations of the Great Valley Ecoregion, California* (Buck-Diaz et al. 2012). In cases where the land cover could not be suitably represented by an alliance name, a California Wildlife Habitat Relationship category was used for the mapping; these were based on California Wildlife Habitat Relationship category names and definitions in *A Guide to Wildlife Habitats of California* (CDFG 1988). The minimum mapping unit was 0.5 acre, except for lacustrine communities, for which the minimum was 0.02 acre (871.2 square feet). Mapping was based on aerial photographic interpretation (1990 to 2014), which was ground-truthed along public rights-of-way and private properties for which permission to enter was granted.

Conservation status of vegetation communities was determined based on state ranks provided in *A Manual of California Vegetation*. Vegetation communities with state ranks of S1, S2, and S3 are considered to be rare and threatened statewide (Sawyer et al. 2009) and of “special concern” by CDFW (CDFW 2015). Additionally, some oak woodland and oak scrub communities are evaluated as special-status plant communities because they are subject to preservation requirements as oak woodlands under Section 1.10.10 of the Kern County General Plan (Kern County Planning Department 2007).

During the botanical surveys, protected trees in the RSA were identified based on the regulations summarized in Appendix B of the *Bakersfield to Palmdale Project Section Biological and Aquatic Resources Technical Report* (Authority 2018a). When permission to enter was granted, surveyors classified trees into species groups such as oak trees or Joshua trees. In areas where permission to enter was not granted, survey crews mapped these protected trees and “unknown” trees using aerial photographic interpretation and ArcGIS software.

Wildlife Habitat Assessment

Wildlife habitat assessment field surveys were conducted in portions of the RSA to help identify and map California Wildlife Habitat Relationship wildlife habitat types. The mapping was based on the wildlife habitat descriptions presented in *A Guide to Wildlife Habitats of California* (CDFG 1988) and the California Wildlife Habitat Relationship (CDFG 2008a). Field surveys were conducted in 2011, and an updated wildlife habitat assessment for special-status wildlife species was conducted in 2015 and 2019 within the RSA using a web-based map viewer with GIS interactive data layers.

Field studies included wildlife habitat mapping and general wildlife surveys within the RSA. Pertinent information from those field studies was utilized in this analysis. Field studies were

conducted from May 9 to 20, 2011, by three teams of three biologists each. Each team operated separately; however, in some instances, team members surveyed complex areas simultaneously. Wildlife habitat assessment surveys were conducted by a combination of meandering pedestrian transect surveys of the RSA, windshield surveys from existing public roads, and windshield surveys from individual parcels with permission to enter status. In areas where pedestrian or windshield surveys were prohibited, the wildlife habitat field assessment was augmented with aerial photographic interpretation and extrapolation of observations made on adjacent and nearby parcels.

Primary activities of the wildlife habitat assessment included the following:

- Investigating specific habitat elements (e.g., rock outcrops, north-facing slopes, burrow concentrations) that may be suitable for special-status wildlife species
- Confirming, identifying, and describing known or previously unreported suitable wildlife habitat
- Identifying and mapping locations of observed special-status wildlife species

The locations of observed special-status wildlife species were recorded using a GPS unit or hand-mapped, as appropriate. Observations included those species that were directly observed and those species whose presence could be inferred based on diagnostic signs such as burrows, fresh tracks, bird songs or calls, scat, or nests. Raptor nest sites were identified to the species level if possible; signs, including nest type, skeletal remains, feathers, and direct observation, were recorded. All wildlife species observed, regardless of listing status, were identified to the species level and recorded according to nomenclature found in *Complete List of Amphibian, Reptile, Bird, and Mammal Species in California* (CDFG 2008b).

For the RSA of earlier project configurations, the habitat assessment was augmented through two focused nighttime spotlighting surveys conducted from existing public roads, where permitted, and from individual parcels, depending on their permission to enter status. The surveys were conducted in two sections on May 13 and 18, 2011, from approximately 7:00 p.m. to 11:00 p.m., and included the Mojave Desert area between Palmdale and Rosamond, as well as the Tehachapi Mountains along SR 58 west of Keene. Two teams of three to four biologists drove slowly along accessible roads with 3-million-candlepower hand-held spotlights. One biologist slowly panned the spotlight around the landscape, while others scanned for animal eyeshine. If eyeshine was observed, the biologists would identify the animal to the species level with the aid of binoculars, when possible.

Focused Wildlife Surveys

Focused wildlife field surveys were conducted according to established protocols for desert tortoise, golden eagle, and Swainson's hawk for the project. These surveys are discussed below. Additional wildlife surveys were not conducted due to the lack of permission to enter throughout portions of the alignment.

Desert Tortoise Surveys

Protocol-level desert tortoise surveys were conducted from May 7 to 11 and May 21 to 25, 2012, in accordance to the USFWS protocol guidelines (USFWS 2010). The surveys were conducted in portions of the RSA that overlap previous project designs. Parcels that were completely developed or devoid of vegetation (such as disked fields) were not surveyed. For a more detailed discussion of survey methodology in 2012, refer to Appendix M, Desert Tortoise Survey Results, of the *Bakersfield to Palmdale Project Section Biological and Aquatic Resources Technical Report* (Authority 2018a).

Raptor Surveys and Studies

Protocol surveys for golden eagle (*Aquila chrysaetos*) and Swainson's hawk nest surveys were conducted in spring/summer 2016 for the Bakersfield to Palmdale Project Section of the HSR system.

Swainson's hawk surveys were conducted between approximately Bakersfield and Lancaster following the *Swainson's Hawk Survey Protocols, Impact Avoidance, and Minimization Measures for Renewable Energy Projects in the Antelope Valley of Los Angeles and Kern Counties, California* (California Energy Commission and CDFG 2010). Per the Antelope Valley protocol for Swainson's hawk (California Energy Commission and CDFG 2010), surveys were conducted in suitable rangeland and annual grassland habitats and included visual inspections of trees within 5 miles of the project boundary, to the extent feasible based on available permission to enter and public road access. Ninety-five percent of Swainson's hawk optimal suitable habitat was surveyed from the ground and 50 percent of suboptimal suitable habitat was surveyed on the ground or by helicopter.

Golden eagle surveys were conducted February 15 through June 6, 2016, for a total of 30 person-days of surveys. Surveys followed the helicopter survey methodology described in Section VII.b of Aerial Surveys of Pagel et al. (2010). One hundred percent of golden eagle suitable nesting habitat was surveyed by helicopter. Tree nesting habitat was surveyed by with an estimated accuracy of greater than 70 percent. Ground survey access included greater than 30 percent of golden eagle high-quality oak woodland and 30 percent of each savannah habitat.

Eight golden eagle CNDDB records have been reported within a 10-mile radius of the project footprint, but only one is from within the RSA (CDFW 2016). Two golden eagles were observed within the Caliente Creek area during the 2011 wildlife habitat assessment. A total of 37 golden eagle nests and 35 eagle observations were documented within the 4-mile study area during the 2016 survey. Of the 37 golden eagle nests detected, 17 nests were documented as active in 2016. Nests were located entirely within the Tehachapi Mountains and the southern Sierra Nevada. Eagles typically build multiple nests; thus, these are believed to represent up to 28 pairs of eagles. A few of these pairs have nests slightly outside of the raptor study area limits; however, they have territories that are almost certain to extend into the raptor study area. Fourteen active and inactive nests were observed in 2016 within the 1-mile buffer of the alignment. Seven nests were considered active, and one nest may need to be removed before construction.

For a more detailed discussion of raptor survey methodology in 2012, refer to Appendix N, Focused Raptor Survey/Study Results, of the *Biological and Aquatic Resources Technical Report* (Authority 2018a).

Wildlife Movement and Migration Corridor Assessment

There were two notable assessments of potential existing wildlife crossings at SR 58 and SR 14. The first existing crossing assessment was conducted by URS Corporation in 2012 along the previous HSR alignment. Although existing crossings were reviewed in proximity to the previous HSR alignment, the assessment remains relevant for the current proposed alignments because they do not differ significantly. The movement/migration corridors were assessed using eight attributes as indicators of connectivity. However, lack of accessibility limited the collection of all attributes for each underpass. Therefore, attributes with the most comprehensive data were used in the analysis. For most drainage or crossing features, the following information was recorded:

- **Dimensions:** Height, length, and width of structure
- **Surrounding Habitat:** Habitat types within 200 feet of structure
- **Substrate:** Ground types within and above structure
- **Natural Drainage:** Water drainage within or part of structure
- **Traffic Flow:** Density of vehicular traffic through structure
- **Visibility:** Clear line-of-sight through structure
- **Permeability:** Ability of wildlife to traverse structure
- **Human Disturbance:** Signs of disturbance within or near structure

Additionally, signs of wildlife use (e.g., scat, tracks, fur, or vegetation disturbance) were recorded at each structure when applicable. South Coast Wildlands provided similar data from the Tehachapi Linkage Design for Interstate 5, SR 58, and SR 138. Results of the field surveys are reported in the *Wildlife Connectivity Assessment* (Authority 2019b), attached in the *Biological and Aquatic Resources Technical Report* (Authority 2018a).

3.7.4.6 Method for Evaluating Impacts under NEPA

Pursuant to NEPA regulations (40 C.F.R. Parts 1500–1508), project impacts under NEPA are evaluated based on the criteria of context and duration (short- or long-term), along with implementation of mitigation measures, to determine whether or not an impact is significant. Context means the affected environment in which a proposed project occurs. Impacts from the project are identified and described where applicable. When there is no measurable effect, an impact is found not to occur. An impact would be identified and described according to the effects caused by the project after consideration of mitigation measures. Therefore, significance under NEPA is described as either an impact or no effect. Context is considered when determining whether an impact is significant under NEPA. The effectiveness of measures to avoid, minimize, and/or mitigate impacts is considered in making significance determinations under NEPA. Thus, if a measure sufficiently mitigates an impact, the effect is not significant.

3.7.4.7 Method for Determining Significance under CEQA

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

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the CDFW or USFWS
- Have a substantial adverse effect on state or federally protected wetlands, as defined by CWA Section 404 (including seasonal wetlands, canals, ditches, lacustrine habitats, retention and detention basins, and seasonal riverine habitats) through direct removal, filling, hydrological interruption, indirect or cumulative effects, or other means
- Interfere substantially with the movement of any native resident or migratory fish or wildlife species, or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance
- Conflict with the provisions of an adopted HCP, NCCP, or other approved local, regional, state, or federal HCP

Mandatory findings of significance within Section 15065 of the CEQA Guidelines require the lead agency to determine whether a project may have a significant effect on the environment where substantial evidence indicates that adverse impacts may occur to biological resources. The negative conditions are defined as:

- The project has the potential to substantially degrade the quality of the environment, reduce wildlife species habitat, cause wildlife populations to drop below self-sustaining levels, threaten to eliminate a plant or animal community, or substantially reduce or restrict the range of a listed species.
- The project has the potential to achieve short-term environmental goals to the disadvantage of long-term environmental goals.
- The project has environmental effects that are individually limited but cumulatively considerable.

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

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

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

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

3.7.5 Affected Environment

This section summarizes the existing biological resources within the RSA, which include the regional setting, special-status species, habitats of concern (special-status plant communities, aquatic resources, critical habitat, essential fish habitat, conservation areas [i.e., recovery plans for federally listed species, conservation easements, public lands, conservation banks, HCP areas, and protected trees]), and wildlife movement corridors.

3.7.5.1 Regional Setting

The RSA encompasses four major geographic regions: the Central Valley (which includes the metropolitan area of Bakersfield and adjacent agricultural areas), the Tehachapi foothill area, the Tehachapi Mountains, and the Mojave Desert. The RSA is primarily composed of open natural land subject to a moderate to low level of disturbance associated with activities such as cattle or sheep ranching, wind energy, and off-road vehicle use. However, mineral/rock extraction occurs in some locations, and within the larger metropolitan areas of Bakersfield, Tehachapi, and Palmdale, the habitat is highly disturbed and fragmented by urban, agricultural, highway, and local road land uses.

The portions of the RSA within and adjacent to the Central Valley are predominantly urban and agricultural, giving way to grassland and scalebroom (*Lepidospartum squamatum*) scrub at its eastern edge. The Tehachapi foothills along the edge of the urban and agricultural areas are predominantly covered in grassland. The Tehachapi Mountain area north and west of the City of Tehachapi is dominated by blue oak (*Quercus douglasii*) and California foothill pine (*Pinus sabiniana*) woodlands, with Fremont cottonwood (*Populus fremontii*), California sycamore (*Platanus racemosa*), and willows (*Salix* spp.) in the larger drainages. Disturbed areas are primarily occupied by annual grasslands, rubber rabbitbrush (*Ericameria nauseosa*), and California buckwheat (*Eriogonum fasciculatum*). The Mojave desert-facing slopes of the mountains are covered by California juniper (*Juniperus californica*) and California buckwheat scrub at higher elevations, and by Joshua tree woodland, creosote bush (*Larrea tridentata*) scrub, and cheesebush (*Ambrosia salsola*) scrub at lower elevations.

Undeveloped portions of the Mojave Desert along the project alignment are predominantly vegetated with creosote bush, cattle saltbush (*Atriplex polycarpa*), Joshua tree, and Nevada joint fir (*Ephedra nevadensis*) at higher elevations, and by shadescale (*Atriplex confertifolia*) at lower elevations, with rabbitbrush and grassland in disturbed areas. Additionally, much of the alignment passes through currently active and fallow agricultural lands. See Section 3.14, Agricultural Farmland and Forest Land, for additional information on these lands.

3.7.5.2 Watershed Profile

The RSA passes through two major subbasins based on the U.S. Geological Survey National Hydrography Dataset's Watershed Boundary Dataset at the eight-digit Hydrologic Unit Code (HUC) level: the Middle Kern-Upper Tehachapi-Grapevine Subbasin (HUC 18030003) and the Antelope-Fremont Valleys Subbasin (HUC 18090206) (U.S. Geological Survey 2015).

3.7.5.3 Special-Status Plant Species

The literature review identified 81 special-status plants as potentially occurring in the RSA. Eighteen of these species are federally listed as threatened or endangered, or state-listed as threatened, endangered, or rare.

Of the 81 special-status species identified in the literature review, it was determined that 32, including 8 that are federally or state-listed, occur or potentially occur in the SSPSA. The remaining species were determined to be absent from the SSPSA because habitat conditions are unsuitable or because the SSPSA is not within the ranges of the species.

Five of these species, including one that is federally and state-listed, were observed within the SSPSA during focused plant surveys between 2011 and 2016

- Vasek's clarkia (*Clarkia tembloriensis* ssp. *calientensis*)—(tentative identification) Rare Plant Rank 1B, BLM Sensitive
- Tejon poppy (*Eschscholzia lemmonii* ssp. *kernensis*)—Rare Plant Rank 1B
- Piute Mountains navarretia (*Navarretia setiloba*)—Rare Plant Rank 1B, BLM Sensitive
- Alkali mariposa lily (*Calochortus striatus*)—Rare Plant Rank 1B, BLM Sensitive
- Bakersfield cactus (*Opuntia basilaris* var. *treleasei*)—Federal/State Endangered, Rare Plant Rank 1B

The identification of Vasek's clarkia was tentative due to specimens not having all the morphological characters required for identification. However, the specimens were identified to this species and are most likely this subspecies based on their location. Alkali mariposa lily was found in saline-alkali soil at low elevations in the desert just north of Lancaster during surveys from 2011 to 2013, as well as in the 2015 surveys. Bakersfield cactus was found in the survey area in sandy soils at the edge of the Central Valley during the same survey periods. The remaining species were observed during the 2011–2013 or 2016 surveys in grasslands with clay loam or other loamy soils in the low foothills at the edge of the Central Valley.

Because permission to enter was not available for some portions of the SSPSA, definitive presence/absence determinations could not be made for all special-status plant species. Therefore, the special-status plant species that were not observed during the surveys still have the potential to occur in surveyed and unsurveyed areas where potentially suitable habitat exists.

The following federally or state listed plant species have the potential to occur within the SSPSA:

- California jewelflower (*Caulanthus californicus*)—Federal/State Endangered, Rare Plant Rank 1B
- Kern mallow (*Eremalche kernensis*)—Federally Endangered, Rare Plant Rank 1B
- San Joaquin woolly-threads (*Monolopia congdonii*)—Federally Endangered, Rare Plant Rank 1B
- San Joaquin adobe sunburst (*Pseudobahia peirsonii*)—Federally Threatened, State Endangered, Rare Plant Rank 1B
- Western Joshua tree (*Yucca brevifolia*)—Candidate State Endangered

No critical habitat has been designated for these federally listed species.

3.7.5.4 Nonlisted Plant Species

Nonlisted plant species are not federally or state listed as threatened, endangered or fully protected and have no official status, but they are of concern to conservation organizations and merit consideration under CEQA for purposes of providing information.

Six nonlisted species inhabit saline-alkali soils:

- Horn's milk-vetch (*Astragalus hornii* var. *hornii*)
- Lancaster milk-vetch (*Astragalus preussii* var. *laxiflorus*)
- Alkali mariposa lily (*Calochortus striatus*)
- Recurved larkspur (*Delphinium recurvatum*)
- Rosamond eriastrum (*Eriastrum rosamondense*)
- California alkali grass (*Puccinellia simplex*)

Three nonlisted species occur primarily on clay or clay loam soils:

- Round-leaved filaree (*California macrophylla*)
- Pale-yellow layia (*Layia heterotricha*)
- Piute Mountains navarretia (*Navarretia setiloba*)

Six nonlisted species occur primarily on sandy soils:

- Desert cymopterus (*Cymopterus deserticola*)
- Barstow woolly sunflower (*Eriophyllum mohavense*)
- Sagebrush loeflingia (*Loeflingia squarrosa* var. *artemisiarum*)
- Robbins' nemacladus (*Nemacladus secundiflorus* var. *robbinsii*)
- Oil neststraw (*Stylocline citroleum*)
- Mason's neststraw (*Stylocline masonii*)

The remaining nine species are less restricted by soil type:

- Palmer's mariposa lily (*Calochortus palmeri* var. *palmeri*)
- Vasek's clarkia (*Clarkia tembloriensis* ssp. *calientensis*)
- Clokey's cryptantha (*Cryptantha clokeyi*)
- Tejon poppy (*Eschscholzia lemmonii* ssp. *kernensis*)
- Comanche Point layia (*Layia leucopappa*)
- Madera leptosiphon (*Leptosiphon serrulatus*)
- Calico monkeyflower (*Mimulus pictus*)
- Tehachapi monardella (*Monardella linoides* ssp. *oblonga*)
- Aromatic canyon gooseberry (*Ribes menziesii* var. *ixoderme*)

3.7.5.5 Special-Status Wildlife Species

Based on the background review, 126 special-status wildlife species were initially evaluated for their potential to occur within the RSA. Because of changes in their listing status since publication of the Draft EIR/EIS on February 28, 2020,[4] the Southern California and Central Coast ESU of mountain lion (*Puma concolor*) and the monarch butterfly (*Danaus plexippus plexippus*) have also been evaluated for their potential to occur within the RSA. Sixty-eight of the 128 wildlife species were ruled out due to lack of suitable habitat, conversion of natural areas by human development, extensive water diversions, and local or regional extirpations, or because the RSA lies outside of these species' known geographic range. Therefore, these species are not discussed further in this report.

[4] Following the Authority's publication of the Draft EIR/EIS in February 2020, the Authority learned that the California Fish and Game Commission advanced the Southern California and Central Coast Evolutionarily Significant Unit mountain lion (*Puma concolor*) populations to candidacy for listing under the California Endangered Species Act. The Authority also learned that the U.S. Fish and Wildlife Service determined that listing the monarch butterfly (*Danaus plexippus plexippus*) under the Endangered Species Act is warranted, but that listing is precluded by other priorities; therefore, the monarch butterfly is now a candidate species under the Endangered Species Act. The U.S. Fish and Wildlife Service will review the species' status annually until a listing decision is made. The analysis in this Final EIR/EIS has been updated to include information relevant to these species that was included in the Revised Draft EIR/Supplemental Draft EIS.

The remaining 58 special-status wildlife species are evaluated further in the technical report, and 2 species (Southern California and Central Coast ESU of mountain lion and monarch butterfly) have been evaluated for their potential to occur in the RSA. This evaluation was informed by the results of the CNDDB search for special-status wildlife species occurrences within the RSA.

Of the 60 wildlife species potentially occurring in the RSA, 22 are federally or state-listed species, candidate species, or fully protected species, and 38 are considered species of concern by state or federal agencies. Critical habitat for the California condor is in the Supplemental Habitat Study Area (i.e., within 10 miles of the project footprint). The critical habitat for the California condor slightly overlaps the Supplemental Habitat Study Area in the foothills south of Tehachapi.

Fifteen special-status wildlife species were observed or identified by diagnostic sign (e.g., tracks, scat, or burrow) in the RSA during the 2011 wildlife habitat assessment, 2012 desert tortoise surveys, 2015 and 2016 field studies, and/or 2016 raptor surveys. These species are listed below.

- Yellow-blotched salamander (*Ensatina eschscholzii croceator*)—State Species of Special Concern (SSC)
- Blainville's horned lizard (*Phrynosoma blainvillii*)—State SSC
- Silvery legless lizard (*Anniella pulchra*)—State SSC
- Northern harrier (*Circus cyaneus*)—State SSC
- Swainson's hawk—State Threatened, BLM Sensitive
- Golden eagle—State Fully Protected, BLM Sensitive
- White-tailed kite (*Elanus leucurus*)—State Fully Protected, BLM Sensitive
- California condor (*Gymnogyps californianus*)—Federal/State Endangered, State Fully Protected
- Burrowing owl (*Athene cunicularia*)—State SSC, BLM Sensitive
- American peregrine falcon (*Falco peregrinus*)—State Fully Protected
- Loggerhead shrike (*Lanius ludovicianus*)—State SSC
- Yellow warbler (*Dendroica petechia sonora*)—State SSC
- Tricolored blackbird (*Agelaus tricolor*)—State Threatened, BLM Sensitive
- San Joaquin kit fox (*Vulpes macrotis mutica*)—Federally Endangered, State Threatened
- American badger—State SSC (protected by California Code of Regulations Title 14, § 461, and Cal. Fish and Game Code Section 4000)

The following 14 candidate and federally and state-listed wildlife species have the potential to occur within the RSA:

- Crotch bumblebee (*Bombus crotchii*)—Candidate for state listing
- Mountain lion (*Puma concolor*) Southern California/Central Coast ESU—Candidate for state listing as Threatened
- Kern primrose sphinx moth (*Euproserpinus euterpe*)—Federally Threatened, State Endangered
- Monarch butterfly (*Danaus plexippus plexippus*)—Candidate for federal listing as Threatened
- Blunt-nosed leopard lizard—Federally/State Endangered, State Fully Protected
- Desert tortoise—Federally Threatened, State Endangered
- Tricolored blackbird— State Threatened, BLM Sensitive

- Greater sandhill crane (*Grus Canadensis tabida*)—State Threatened, State Fully Protected, BLM Sensitive
- Yellow-billed cuckoo (*Coccyzus americanus*)—Federally Threatened, State Endangered
- Southwestern willow flycatcher (*Empidonax traillii extimus*)—Federally/State Endangered
- California condor (Gymnogyps californianus)—Federally/State Endangered, State Fully Protected
- Least Bell's vireo (*Vireo bellii pusillus*)—Federally/State Endangered
- Tipton kangaroo rat—Federally/State Endangered
- San Joaquin kit fox—Federally Endangered, State Threatened

Only one of the potentially occurring federally listed animal species has proposed or designated critical habitat within the RSA or within 10 miles of the RSA. Designated critical habitat for the California condor is located just inside the 10-mile buffer of the RSA to the south of Tehachapi.

The status of the southwestern willow flycatcher (*Empidonax traillii extimus*) is federally/state Endangered and all sub-species are state Endangered. A review of the CNDDB (CDFW 2016) and other sources show that the known geographic range of the southwestern willow flycatcher overlaps the RSA, although there have been no CNDDB occurrences within the RSA and none were seen during the 2011 habitat assessment. Willow flycatchers are common in the region during migration (eBird), and virtually all of these are believed to be little willow flycatchers (*E. t. brewsteri*), rather than southwestern willow flycatchers. The *Biological and Aquatic Resources Technical Report* (Authority 2018a) provides additional information.

Special-Status Waterbird Species

Three special-status duck, wading bird, and shorebird species, other than those previously discussed, are California SSC and are known to occur or have a low potential to occur in the RSA due to few suitable nesting sites: the redhead (*Aythya americana*), least bittern (*Ixobrychus exilis*), and western snowy plover (*Charadrius alexandrinus nivosus*).

Other Special-Status Raptor Species

Three special-status raptor species, other than those species previously discussed, are California SSC and are known to occur or have the potential to occur in the RSA: the northern harrier (*Circus cyaneus*), short-eared owl (*Asio flammeus*), and long-eared owl (*Asio otus*).

Other Special-Status Landbird Species

Nine additional California SSC bird species are known to occur or have the potential to occur in the RSA based on the availability of suitable nesting sites: Le Conte's thrasher (*Toxostoma lecontei*) has a high potential to be present; Oregon vesper sparrow (*Pooecetes gramineus affinis*) is considered an SSC by CDFW for its wintering range, and Kern red-winged blackbird (*Agelaius phoeniceus aciculatus*) has a moderate potential to be present; and vermillion flycatcher (*Pyrocephalus rubinus*) (State Endangered), purple martin (*Progne subis*), Bendire's thrasher (*Toxostoma bendirei*) (BLM Sensitive), yellow-breasted chat (*Icteria virens*), grasshopper sparrow (*Ammodramus savannarum*), and yellow-headed blackbird (*Xanthocephalus xanthocephalus*) have a low potential to be present.

Only three species have been reported to the CNDDB within a 10-mile radius of the project footprint (CDFW 2016): loggerhead shrike, purple martin, and Le Conte's thrasher. Seven loggerhead shrike CNDDB records have been reported within a 10-mile radius of the project footprint, all in the Mojave Desert region. One purple martin CNDDB record has been reported within a 10-mile radius of the project footprint in the Tehachapi area. Eleven Le Conte's thrasher CNDDB records have been reported within a 10-mile radius of the project footprint, all within the Antelope Valley.

Other Special-Status Mammal Species

The Tehachapi pocket mouse (*Perognathus alticolus inexpectatus*) and the Tulare grasshopper mouse (*Onychomys torridus tularensis*) are California SSC and are known to occur or have the potential to occur in the RSA, as well as the State Fully Protected ringtail (*Bassariscus astutus*). Additionally, the mountain lion (*Puma concolor*) is protected by Cal. Fish and Game Code Section 4800-4810 as a specially protected mammal with a species range that spans the Tehachapi Mountain corridor. The Southern California/Central Coast ESU mountain lion population, which is a candidate for state listing as threatened, extends to SR 58 as the northernmost limit of the ESU through the RSA.

Special-Status Bat Species

Six special-status bat species (California SSC, BLM Sensitive species, or both) have the potential to roost and forage in the RSA: western mastiff bat (*Eumops perotis californicus*) (BLM Sensitive), pocketed free-tailed bat (*Nyctinomops femorosaccus*), big free-tailed bat (*Nyctinomops macrotis*), western red bat (*Lasiurus blossevillii*), spotted bat (*Euderma maculatum*) (BLM Sensitive), and pallid bat (*Antrozous pallidus*) (BLM Sensitive).

3.7.5.6 Special-Status Plant Communities

Nine natural (plant) communities within the SSPSA are considered special-status plant communities. They include the following:

- Blue Oak Woodland
- Desert Riparian
- Desert Scrub
- Desert Wash
- Joshua Tree
- Mixed Chaparral
- Perennial Grassland
- Valley Foothill Riparian
- Valley Oak Woodland

Special-status plant communities are determined to represent rare vegetation types (CNDDB; CDFW 2016), or to have limited distribution statewide or within a county or region, and they include riparian areas that are jurisdictional to CDFW under Cal. Fish and Game Code Section 1600 et seq. These communities are often vulnerable to the environmental effects of projects (CDFG 2000). CDFW maintains a list of special-status plant communities in California in its *Vegetation Classification and Mapping Program—Natural Communities List* (CDFW 2010). The *Bakersfield to Palmdale Project Section Biological and Aquatic Resources Technical Report* (Authority 2018a) provides additional information.

According to their state rarity ranks, three of these communities—*Quercus douglasii* Woodland Alliance, *Quercus john-tuckeri* Shrubland Alliance, and *Quercus wislizeni* Woodland Alliance—would not normally be considered special-status plant communities; however, they are included in this section solely because they are subject to the preservation requirements of oak trees and oak woodlands in Section 1.10.10 of the Kern County General Plan. There are no oak communities mapped for the project within Los Angeles County.

3.7.5.7 Fur-Bearing Mammals

The desert kit fox (*Vulpes macrotis arsipus*) was identified by diagnostic sign (e.g., tracks, scat, or burrow).within the RSA. The desert kit fox is not a special-status species, nor is it covered under any existing conservation plans. The desert kit fox is protected by California Code of Regulations Title 14, § 460, and Cal. Fish and Game Code Section 4000, which regulate the intentional taking of fur-bearing mammals. The Cal. Fish and Game Code and the California Fish and Game Commission regulations do not provide a season for take of the desert kit fox at any time. Additionally, the American badger has the potential to occur within the RSA. The badger is also protected by California Code of Regulations Title 14, § 461, and Cal. Fish and Game Code Section 4000 as a fur-bearing mammal. The observations of American badger in relation to the

project footprint indicate that species occurrence within the RSA is widespread within suitable habitat. Potential American badger habitat occurs throughout the RSA in the following habitat types: annual grassland, alkali desert scrub, barren, blue oak woodland, desert scrub, Joshua tree woodland, mixed chaparral, montane hardwood, pasture, perennial grassland, pinyon-juniper woodland, ruderal, sagebrush, valley oak woodland, valley foothill riparian, and wet meadow.

3.7.5.8 Aquatic and California Fish and Game Code Section 1600 et seq. Resources

Aquatic and Cal. Fish and Game Code Section 1600 et. seq. resources and other waters in the project vicinity (including waters of the state and state streambeds and lakes) are regulated by the SWRCB and CDFW. These resources, wetlands and other waters, are collectively termed "aquatic resources," as identified in the *Bakersfield to Palmdale Project Section Aquatic Resources Delineation Report* (Authority 2016). Their definitions are discussed in Section 3.7.1.1.

This subsection presents the results of the delineation of aquatic resources in the ARSA, including waters, wetlands, streams, lakes, and riparian areas. The ARSA occurs in two major subbasins based on the U.S. Geological Survey National Hydrography Dataset's Watershed Boundary Dataset at the eight-digit HUC level: the Middle Kern-Upper Tehachapi-Grapevine Subbasin (HUC 18030003) and the Antelope-Fremont Valleys Subbasin (HUC 18090206) (U.S. Geological Survey 2015). The Middle Kern-Upper Tehachapi Subbasin drains toward the Kern Lake terminal dry lakebed, and the Antelope-Fremont Valleys Subbasin drains toward the Rosamond Lake terminal dry lakebed. Additionally, some features near Tehachapi drain toward the internally drained, intermittent Proctor Lake to the east. Recent approved jurisdictional determinations have been issued by USACE in the major watersheds within the ARSA, including the Caliente Creek Watershed, Proctor Lake Watershed, Oak Creek Watershed, and Lake Rosamond Watershed. USACE determined that although many features in these areas meet federal technical criteria that define wetlands and other waters, these features are not jurisdictional under the CWA due to isolation. Because the waterbodies identified in the ARSA are all isolated, USACE has confirmed that it will not assert jurisdiction under Section 404 of the CWA over any areas that would otherwise be delineated as wetlands or waters of the U.S., per the USACE letter dated December 11, 2017, and the approved jurisdictional determination from USACE.

Waters in the CCNM Aquatic Study Area adjoin or flow into waters determined to be isolated in the USACE's Approved Jurisdictional Delineation. Therefore, these additional waters are also presumed isolated. In summary, none of the resources identified in the CCNM Aquatic Study Area are WOTUS., as they are not traditionally navigable, do not have the potential to directly or indirectly affect interstate or foreign commerce (33 Code of Federal Regulations 3.28.3(a)(3)), and lack a significant nexus to jurisdictional waters. Based on these findings, it is anticipated that resources within the CCNM Aquatic Study Area will not be subject to CWA regulation or USEPA/USACE jurisdiction under the CWA Section 404.

Within the ARSA (21,344 acres in size), aquatic resources include 266.7 acres of wetlands; claypan features and other ponding in developed desert areas; ephemeral, intermittent, and perennial streams; desert washes; canals; ditches; retention/detention basins and instream impoundments; and riparian areas. In addition to the delineation of boundaries, the characteristics of these aquatic features are briefly described to allow the quality of wetlands, waters, and riparian areas to be considered in impact analysis and mitigation efforts. In some instances, waters extend beyond the area of investigation, such as with riverine features that continue upstream and downstream of the ARSA. These include natural and engineered features, where jurisdiction may vary by agency.

Aquatic resources in the ARSA were generally characterized by the dominance of hydrophytic plants in sites where hydrology is at least seasonal and surface water is present at least part of the year. Approximately 6.6 acres of seasonal and forested wetland features were delineated in the ARSA. Seasonal wetlands are characterized by cycles of natural inundation or saturation that occur during the winter and spring seasons, and may dry up during the summer and fall. Typical vegetation includes facultative or facultative wetland plant species, and obligate plant species

such as spikerush (*Eleocharis palustris*), rabbitsfoot grass (*Polypogon monspeliensis*), smartweed (*Persicaria amphibia*), barnyard grass (*Echinochloa* spp.), salt grass (*Distichlis spicata*), and creeping wild rye (*Elymus triticoides*), with tules and cattails noted in wetlands that are saturated for longer periods. In some areas mapped as forested wetland, willow canopy is also present with hydrophytic herbaceous understory. Although they may share a similar hydrologic regime, seasonal wetlands dominated by herbaceous vegetation are distinguished from claypan features by the absence of the distinctive floristic components, differences in soil and water chemistry, and the absence of a distinctive claypan or hardpan layer.

Features with the vegetation, hydric soil, and hydrology parameters (discussed in Section 5.3.2.1) were classified as wetlands for the purposes of this report. Where access to the features was permitted, wetland boundaries were determined by using paired data points in wetland and adjacent upland areas. At each sample point, the characteristic vegetation was recorded and soil test pits were hand-excavated to describe the soil profile, document the presence or absence of hydric soil indicators, and determine if saturation was present within the upper 12 to 18 inches of soil. Hydrophytic vegetation was evaluated using the most recent edition of the National Wetland Plant List to assign wetland indicator status, as discussed in the *Bakersfield to Palmdale Project Section Aquatic Resources Delineation Report* (Authority 2016). Similarly, indicators of wetland hydrology were documented. Data were recorded on standard Wetland Determination Data Forms developed by USACE for the Arid West Region. Where access to features was not permitted, features that appeared to contain hydrophytic plant species and that exhibited obvious wetland hydrology were assumed to be wetlands.

Cowardin classifications for seasonal wetlands in the ARSA are palustrine emergent, palustrine forested, and palustrine scrub-shrub (Federal Geographic Data Committee 2013). Seasonal wetlands in the ARSA occur primarily in the Tehachapi Mountains and foothills and in the Mojave Desert. These features were identified in the Tehachapi Mountains and foothills near the town of Keene east of Tehachapi and in the Mojave Desert between Rosamond and Lancaster along Sierra Highway. Emergent wetlands are present occasionally throughout the ARSA, with a few occurrences on the Tejon Ranch in the Tehachapi foothills and in the vicinity of Tehachapi Willow Springs Road and Oak Creek Road southeast of Tehachapi.

Claypans

Claypan

A claypan is a dense, hard layer of clay soil and is characteristic of soils in a portion of the Antelope Valley. Soil chemistry and water chemistry are typically alkaline, and salt concentrations are frequently elevated.

Claypans were delineated based on the detailed methodology provided in the *Bakersfield to Palmdale Project Section Biological and Aquatic Resources Technical Report* (Authority 2018a). Approximately 18.8 acres of ponding features in the Antelope Valley were delineated in the study area, of which 16.8 acres are claypan features and 2.0 acres were determined to be nonclaypan features “ponding in desert developed areas” (described in detail below). It should be noted that while many of the claypans would actually meet federal wetland technical criteria, others would not because of the absence of one or more observable federal wetland criteria. As discussed in the USACE-reviewed and approved methodology for delineating the claypan features (LSA Associates, Inc. 2016), the unusual soil chemistry associated with these claypans results in problematic conditions with respect to observation of both soil and hydrology criteria as set forth in the applicable (federal) wetland delineation manuals. Therefore, the USACE technical wetland hydrology standard, which is defined as surface ponding and/or soil saturation for at least 14 consecutive days during the growing season in most years, is the appropriate and most accurate and objective way to identify the claypan areas that meet federal wetland criteria for soils and hydrology. Furthermore, it was not feasible to assess the presence/absence of hydrophytic vegetation in this setting due to matters of obscurity and seasonality of the vegetation combined with the lack of available access. Therefore, the methodology identified claypans that are appropriately considered aquatic resources (even though some of them may not actually meet the federal wetland vegetation criteria). Consequently, the delineated claypans may also meet the proposed state definition of

wetlands, which relies on the combined federal criteria for soils and hydrology in cases where observable vegetation is absent, which is largely the case for the claypans.

During the mapping of these claypans, it became evident that some of the inundated or saturated areas occurred on existing developed property that had been subject to previous grading or other substantial disturbance. While these areas met the ponding/saturation criteria identified in the claypan delineation methodology, it is clear that they do not have the same functions and ecological value as other areas designated as claypans. Therefore, these areas are differentiated from claypans and are identified as "ponding in desert developed areas." For the purposes of the HSR analysis for the Bakersfield to Palmdale Project Section, where ponding is associated with heavily manipulated, compacted soils, these features were evaluated as waters of the state and potential jurisdictional wetlands or other aquatic resources. The SWRCB would assert jurisdiction over all of the claypans considered aquatic resources in the RSA.

With regard to the scope of Section 1600 et seq. of the Cal. Fish and Game Code, these claypans would not be considered subject to the requirements of Section 1602 as rivers, streams, or lakes except in those conditions where a claypan is directly contiguous with and conveys surface water into an adjoining feature that would be considered a river, stream, or lake.

Streams and Washes

Streams and washes that lack riparian canopy occupy 122.4 acres of the ARSA measured to the top of bank, 61.6 acres of which are below the ordinary high water mark. These include ephemeral, intermittent, and perennial streams, and desert washes.

Desert wash features are characterized by desert channels that flow episodically, typically after heavy rains or flooding events, and exhibit an incised bed and bank due to the high volume of flow transmitted through them in short periods of time. These features naturally transport significant volumes of sediment, and erosion is frequently very high. Desert washes often originate at the base of mountains, where topography begins to level, and end when the main channel branches into multiple channels that fan out and dissipate into the landscape as sheet flow. They are generally distinguished from ephemeral drainages by their landscape positions in relatively flat desert settings. Soils in desert washes are usually sandy to gravelly (Rowlands 1988). Desert washes may be found adjacent to a variety of desert upland and riparian habitats. The Cowardin classification for desert washes is riverine unconsolidated bottom. Some desert washes were mapped between claypan features where water has concentrated and carved a channel.

Desert washes in the ARSA occur in the Mojave Desert and in the southeastern Tehachapi Mountains and foothills, with concentrations occurring on the eastern slope of the mountains. Most of these washes flow into alluvial fans, where the water percolates into the sandy soils and dissipates laterally across the flat terrain. Some desert washes on hillsides north of the town of Rosamond are conveyed below Sierra Highway via culverts before they ultimately dissipate into downstream alluvial fans. Due to the ephemeral flow regime in these features, desert washes do not necessarily support riparian vegetation. Vegetation communities found in the uplands adjacent to desert washes in the ARSA include creosote bush scrub and Joshua tree woodland.

Ephemeral streams only convey water flow during and immediately after precipitation events. They typically occur in the higher reaches of a watershed and are distinguished from erosional features by the presence of a bed and bank. Ephemeral drainages typically carry flow into downslope intermittent or perennial streams, but in some instances in the Arid West Region, they may dissipate when topography changes to gentler slopes without connecting to a larger channel. The Cowardin classification for ephemeral drainages is riverine unconsolidated bottom. Ephemeral drainages in the ARSA are found in the San Joaquin Valley, the Tehachapi Mountains and foothills, and the Mojave Desert.

In the mountains and foothills, ephemeral drainage gradients are relatively steep and average OHWM widths were typically narrow. These features rarely exhibited signs of significant flow, such as sediment sorting or wrack lines, and were often vegetated with annual forbs and grasses. Caliente Creek east of Bakersfield is a major ephemeral stream that receives water from

Tehachapi Creek and its tributaries in the ARSA. This stream flows for only short periods of time in the ARSA, but it carries a large volume of water when it flows. Intermittent streams are waters that convey flow for a portion of the year, typically during the winter and spring months, when the streambed may be below the water table and/or when precipitation and runoff from surrounding uplands provides sustained flow. These streams are fed by smaller ephemeral drainages higher in the watershed, groundwater, and direct precipitation, including rain and snowmelt. Intermittent streams exhibit an established bed, bank, and OHWM. The Cowardin classification for intermittent streams is riverine unconsolidated bottom. Intermittent streams in the ARSA did not contain flowing water at the time of the field surveys, but signs of recent water flow were evident (wrack lines, matted vegetation, and sediment sorting). Intermittent streams in the vicinity of the ARSA include Oak Creek, south and southeast of Tehachapi, and Amargosa Creek in the Mojave Desert. Additionally, Tehachapi Creek is an intermittent stream with perennial pools, and its tributaries, Clear Creek and Tweedy Creek, have intermittent reaches within the ARSA. Some reaches of Tehachapi Creek may convey perennial flows in wet years. Tehachapi Creek is located in the Tehachapi Mountains and foothills area of the ARSA, north and northwest of Tehachapi. It joins Caliente Creek north of Bealville, where water percolates into the ground and it becomes an ephemeral stream. The geomorphology of Tehachapi Creek in the ARSA is generally unaltered, and it supports riparian vegetation along most of its length. Common tree species such as Fremont cottonwood (*Populus fremontii*), western sycamore (*Platanus racemosa*), and valley oak (*Quercus lobata*) are dominant in the canopy, and mugwort (*Artemisia douglasiana*) and western poison oak (*Toxicodendron diversilobum*) typically dominate the understory. Note that streambed with riparian canopy was mapped separately due to the higher quality of this habitat.

Flowing surface water was not present in Tehachapi Creek at the time of field surveys in 2016. The creek is a relatively steep-gradient stream through the ARSA, with riffle and pool complexes. The riffle runs contain large cobbles with scattered large boulders, and the pools have rocky bottoms. The creek is characterized by depositional activity as well as extreme scour, exhibited along shoreline areas containing sand bars and along steep, exposed banks overhanging the active channel. Some tributaries to Tehachapi Creek are also intermittent, carrying water for several weeks but not year-round. These features also support well-developed riparian woodland and riparian scrub in some reaches.

Perennial streams contain water continuously during a year of normal rainfall, often with the streambed located below the water table for most of the year. Groundwater supplies the base flow for these streams, but stormwater runoff may also supplement flow. Perennial streams are scarce in the ARSA and are limited to portions of a few spring-fed streams on Tejon Ranch, on Cummings Ranch, and into the Tehachapi foothills. The perennial reaches of these streams support hydrophytes. Access was not permitted and these features were delineated remotely. Therefore, seasonal wetlands were identified in areas that appeared to contain at least 5 percent of areal cover plants, and the plant community appeared to be dominated by hydrophytic vegetation.

Riparian

Riparian areas occupy 73.2 acres of the ARSA, including riparian areas within the OHWM or edge of wetland.

Some of the characteristics of and functions provided by riparian areas include flood attenuation during high-flow events, rich and productive soils, a water table that is accessible to plant roots, and plant and wildlife species that have adapted to the timing of fluvial events, such as flooding, drought, and sediment transport (Griggs 2009). Additionally, riparian habitat protects waterbodies from nonpoint-source pollution and stabilizes banks. Per CDFW general practice, riparian features are delineated as the area between the outer dripline of riparian vegetation on either each side of the stream.

Riparian

Riparian areas are transitional zones between terrestrial and aquatic ecosystems, and are characterized by gradients in biophysical conditions, ecological processes, and biota, which distinguish these areas from the surrounding landscape (NRC 2002; Gregory et al. 1991). Riparian areas can extend beyond the high water mark.

Riparian vegetation contributes vegetative input (leaves and woody debris) to adjacent waterbodies.

Riparian areas in the ARSA are generally characterized by willows, western sycamore, valley oak, interior live oak (*Quercus wislizeni*), and Fremont cottonwood. The largest riparian areas in the ARSA occur in corridors along Tehachapi Creek and tributaries to Oak Creek, but other, larger, intermittent streams in the ARSA also sustain patches of riparian vegetation along their banks. These riparian areas are found in the Tehachapi Mountains, north and south of the City of Tehachapi and east of SR 58. Riparian areas are mapped based on the outer drip line of riparian vegetation. Additionally, scalebroom scrub, which is sometimes associated with dry washes, was noted near Caliente Creek and in some desert washes. Where present as dominant cover, scalebroom scrub was included in riparian mapping.

Artificial Watercourses

Artificial watercourses in the ARSA include canals, ditches, retention/detention basins, and in-stream impoundments. They occupy 71.2 acres of the ARSA (measured to the top of bank), 61.0 acres of which are below the OHWM. Table 3.7-2 displays the Authority's survey results for the feature types of aquatic resources.

Canals include constructed features that have been built in uplands primarily for the conveyance of agricultural irrigation water or municipal water supplies. Because they are often lined and are frequently maintained, canals are typically devoid of vegetation and lack natural soils, although sediments often deposit on the channel bed. They are regularly maintained and the water levels are frequently regulated using a series of pumps. Scattered emergent vegetation may be present in some areas, but most canals are routinely cleared of vegetation or sprayed with herbicides. There are two canals mapped in the ARSA: the East Side Canal in Bakersfield and an unnamed canal south of the city of Tehachapi. Ditches are earthen features that share many characteristics with canals, but they usually are unlined, are smaller, and convey lower volumes of water. Ditches typically transmit roadside runoff, agricultural runoff, or stormwater. In the ARSA, ditches that exhibited a bed and bank or other forms of visible hydrology were mapped as potential aquatic resources. The Cowardin classification for ditches is riverine unconsolidated bottom.

Both irrigation and drainage ditches occur in the ARSA. Agricultural irrigation ditches are the predominant ditch type in the Bakersfield area. Irrigation ditches are often hydrologically controlled by gates, pumps, weirs, and other features that manipulate flow exclusively for agricultural purposes. Drainage ditches in nonagricultural settings are the predominant ditch type through the Tehachapi Mountains and foothills and within the Mojave Desert. Occasionally, ditches recruit wetland vegetation, but these features are frequently maintained, and vegetation is routinely removed. Evidence of regular maintenance was noted in the form of equipment marks, direct observation of recent maintenance, and comparison of historical aerials.

Retention/detention basins are artificially created features with hard-packed or reinforced earthen walls. These basins retain water for a number of uses, such as agricultural and urban stormwater collection. Basins built to retain urban runoff often contain concrete walls. These basins are often highly disturbed and routinely managed through vegetation removal and dredging. Hydrology also varies based on precipitation events, irrigation inputs/removal, and other management activities. Cowardin classifications for these basins in the ARSA include lacustrine unconsolidated bottom, lacustrine unconsolidated shore, palustrine aquatic bed, palustrine unconsolidated bottom, and palustrine unconsolidated shore.

In the ARSA, retention/detention basins occur primarily in the vicinity of Bakersfield and within the Mojave Desert. Most of the basins found in the ARSA are closely associated with agricultural activities and are used as water storage facilities or tailwater ponds (generally small, shallow basins excavated in agricultural fields for the purpose of capturing excess irrigation water). They are also used to retain urban stormwater, generally associated with residential developments near Bakersfield and Palmdale.

Table 3.7-2 Survey Results: Aquatic Resources in the Aquatic Resource Study Area[1]

Feature Type		Cowardin Classification	Acres Measured to OHWM or Edge of Wetland (where present)[2]	Acres Measured to Top of Bank or Edge of Riparian (where present)[2,3]
Seasonal Wetlands		Palustrine emergent	3.8	-
Forested Wetlands		Palustrine forested Palustrine scrub-shrub	2.8	-
Claypans and Desert Ponded Areas	Natural Claypans	Palustrine unconsolidated bottom Palustrine emergent	16.8	-
	Ponding in Desert Developed Areas	Palustrine unconsolidated bottom	2.0	-
Steams and Washes	Ephemeral Streams	Riverine unconsolidated bottom Palustrine scrub-shrub	24.4	51.7
	Desert Wash	Riverine unconsolidated bottom	16.2	38.7
	Intermittent Streams	Riverine unconsolidated bottom Palustrine forested Palustrine scrub-shrub	19.4	30.5
	Perennial Streams	Riverine unconsolidated bottom Palustrine forested Palustrine scrub-shrub	1.6	1.5
Riparian		Palustrine forested Palustrine scrub-shrub	-	73.2
Artificial Watercourses—In-stream Impoundments		Palustrine unconsolidated bottom Palustrine emergent	0.8	0.8
Artificial Watercourses—Canals		(Riverine unconsolidated bottom)	9.2	9.2
Artificial Watercourses—Ditches		(Riverine unconsolidated bottom)	5.8	12.5
Artificial Watercourses—Detention/Retention Basins		Palustrine unconsolidated bottom Palustrine emergent	45.2	48.7
Total Extent of Features			**147.9**	**266.7**

Source: Field Survey and Desktop Analysis, 2015, 2019, and 2020

[1] The ARSA includes linear and auxiliary project construction features (i.e., traction power substations, switching stations, paralleling stations, road overcrossings, and heavy maintenance facilities), operations and maintenance facilities and access points, temporary disturbance areas associated with construction, and a 250-foot buffer, from the southern terminus of the F Street Station near 34th Street and L Street in Bakersfield to Spruce Court in Palmdale. The ARSA includes incorporation of the CCNM Design Option, the Refined CCNM Design Option, and engineering and design refinements.

[2] Acreage values are calculated in the ARSA, which includes all project alternatives known at the time plus a 250-foot buffer. Acreage totals are derived from raw GIS data and, as a result, may not exactly equal the sum of the rounded values presented in the table.

[3] This column represents the Authority's mapped California Fish and Game Code Section 1600 et. seq. resources within the ARSA. See Table 3.7-10 for estimated California Fish and Game Code Section 1600 et. seq. resources based on CDFW's mapping methodology.

ARSA = aquatic resource study area
Authority = California High-Speed Rail Authority
CCNM = César E. Chávez National Monument
CDFW = California Department of Fish and Wildlife
GIS = geographic information systems
OHWM = ordinary high water mark

Basins constructed within streams, such as stockponds, are artificially created but capture natural surface waters and flow into natural surface waters. Instream impoundments occur in the ARSA in the Tehachapi foothills and mountains.

In some cases, these areas support hydrophytes such as broadleaf cattail (*Typha latifolia*), field horsetail (*Equisetum arvense*), willows, and bulrushes. Vegetation is frequently maintained in many of these structures. In these highly manipulated areas, hydrologic inputs are typically controlled by pumps, weirs, or storm drain systems. The frequency and duration of saturation or flooding in these areas are sufficient to support vegetation dominated by obligate wetland plants with roots that thrive in anaerobic conditions (Rowlands 1988).

As part of the consultation with CDFW regarding Cal. Fish and Game Code Section 1600 et. seq. resources, CDFW provided shapefiles to the Authority describing additional areas between historic Lake Thompson (2 miles north of the Los Angeles County line) and Palmdale that could contain features subject to CDFW's jurisdiction and requested that the Authority further evaluate those areas and provide additional information related to the remainder of the project section.

The Authority has continued to consult with CDFW to identify potential additional Section 1600 resources that may be present in the project section's ARSA. Based on those meetings and the information provided by CDFW, including the shapefiles and data sets, the Authority has estimated potential additional jurisdictional resources between the Bakersfield Station and historic Lake Thompson (2 miles north of the Los Angeles County line, which is the portion of the project section not covered by the CDFW's shapefiles or data sets). For a complete description of the methodology used to approximate the CDFW's suggested additional resources, see Appendix 3.7-B: Bakersfield to Palmdale Project Section Potential Additional Section 1600 Resources Memorandum. These additional potential resources were not identified in the Authority's Biological and Aquatic Resources Technical Report. The Authority believes that it has properly and adequately mapped the extent of Cal. Fish and Game Code Section 1600 resources as reported in its Biological and Aquatic Resources Technical Report and Aquatic Resources Delineation Report. Likewise, the Authority believes that it has properly mapped the extent of all other aquatic resources, including state waters, as those areas are depicted in the *Biological and Aquatic Resources Technical Report* (Authority 2018a) and the *Aquatic Resources Delineation Report* (Authority 2016). While the Authority and the CDFW have not yet reached agreement on the extent of Cal. Fish and Game Code Section 1600 jurisdiction, Section 3.7 analyzes the project's potential effect on both the Section 1600 resources estimated in the Authority's *Biological and Aquatic Resources Technical Report* and *Aquatic Resources Delineation Report* and those suggested by CDFW as potential additional Section 1600 resources. These results are provided in Table 3.7-9 and Table 3.7-10 in Section 3.7.6.4 below.

3.7.5.9 Habitats of Concern

Habitats of concern consist of special-status plant communities, aquatic resources, essential fish habitat, critical habitat, protected trees, and wildlife movement corridors as described previously in Section 3.7.1.1, Key Definitions. Habitats of concern include essential fish habitat, critical habitat, and wildlife movement corridors.

Special Status Plant Communities

Special-status plant communities are plant communities of limited distribution statewide or within a county or region that are often vulnerable to the environmental effects of projects. The list of special-status plant communities in California is currently maintained by the CDFW. See Table 3.7-11 later in this Section 3.7.6 for a full list of special-status plant communities found within the RSA.

Aquatic Resources

Aquatic resources and other waters in the project vicinity include state streambeds and lakes and other waters of the state, which are regulated by CDFW and the SWRCB. Wetlands and other waters, including springs, seeps, streams and associated habitat, are collectively termed "aquatic resources" for purposes of this discussion. Wetlands and other waters were identified during the jurisdictional delineation (see the *Bakersfield to Palmdale Project Section Aquatic Resources Delineation Report* [Authority 2016]). These aquatic resources were identified using the National Hydrography Dataset (U.S. Geological Survey 2015). Because the waterbodies identified in the ARSA are all isolated, the USACE will not be asserting jurisdiction under Section 404 of the CWA

over any areas that would otherwise be delineated as wetlands or waters of the U.S., and the Authority will confirm SWRCB and CDFW jurisdiction through the regulatory permitting process.

Essential Fish Habitat

Because the project does not encounter marine or anadromous fish habitat within the project footprint, the project would not adversely affect any marine or anadromous fish habitat. There is no essential fish habitat in the project footprint. Therefore, the Authority would not be required to consult with the NMFS under the Magnuson-Stevens Fishery Conservation and Management Act.

Critical Habitat

Only one of the potentially occurring federally listed plant and animal species have proposed or designated critical habitat within the RSA or within 10 miles of the RSA. Designated critical habitat for the California condor is located just inside the 10-mile buffer of the RSA to the south of Tehachapi. No other designated critical habitat occurs in or within 10 miles of the RSA.

Protected Trees

Protected trees are trees that have special significance and are afforded protection by, and specifically identified in, county and city ordinances, codes, or general plans. Cities and counties traversed by the proposed B-P Build Alternatives include the Counties of Kern and Los Angeles and the Cities of Bakersfield, Tehachapi, Rosamond, Lancaster, and Palmdale. The types of trees and specific physical characteristics required to meet the local definitions vary by city and county. Protected trees are found throughout the RSA or within 10 miles of the RSA.

Wildlife Movement Corridors

Areas where wildlife movement opportunities have been identified include the Central Valley, the Tehachapi Mountains and foothills, and the Mojave Desert.

Survey results from the three geographic regions show that there is currently a relatively high level of habitat connectivity between the suburban edges of Bakersfield and the desert area west of Rosamond where the Tehachapi Mountain foothills link the Sierra Nevada and the San Gabriel Mountains. Additionally, the Southern California/Central Coast ESU mountain lion (*Puma concolor*) population, a candidate for state listing as threatened, interfaces with the western Sierra Nevada mountain lion population within the Tehachapi Mountains at SR 58. As described in the *Wildlife Corridor Assessment* (WCA), Appendix I of the *Biological and Aquatic Resources Technical Report* (BARTR) (Authority 2018a), South Coast Wildlands previously modeled movement habitat for mountain lion, mule deer, American badger, San Joaquin kit fox, desert kit fox, desert tortoise, blunt-nose leopard lizard, and the Tehachapi pocket mouse. In previous conservation planning efforts, the *South Coast Missing Linkages: A Linkage Design for the Tehachapi Connection* (Penrod et al. 2003) and the *California Essential Habitat Connectivity Project* (Spencer et al. 2010) have identified the Tehachapi Mountains and foothills as a particularly important habitat linkage.

Farther south, lower levels of habitat connectivity occur between the community of Rosamond and the Cities of Lancaster and Palmdale. Maintaining and/or improving habitat connectivity is important because species also use and migrate through these areas. Therefore, wildlife crossings are being incorporated into the project design.

3.7.6 Environmental Consequences

3.7.6.1 Overview

Under the No Project Alternative, existing development trends affecting biological and aquatic resources are expected to continue and to further directly degrade some natural systems because development, such as new residential communities and transportation infrastructure, would convert undeveloped habitat to other uses. In addition, development would indirectly degrade remaining habitat through pollution, noise, and dust. Special-status species would be threatened with mortality from vehicle strikes, and development would result in increased loss, fragmentation, or impact on habitats of concern (including wildlife movement corridors).

The B-P Build Alternative alignments, light maintenance facility/maintenance-of-way facility (LMF/MOWF) alternatives, and station alternatives would result in direct and indirect impacts on biological resources as a result of both construction and project operation. The construction of the B-P Build Alternatives would result in impacts due to: (1) the disturbance or removal of lands that have been determined to support (or could potentially support) special-status species and special-status plant communities; (2) effects on habitats of concern (including wildlife movement corridors); and (3) direct mortality. Project operation activities associated with the B-P Build Alternatives would result in permanent impacts on special-status species and habitats of concern, and would degrade wildlife movement corridors.

A description of potential direct and indirect impacts is provided in Section 3.7.6.4 for biological and aquatic resources construction impacts, and are listed below for reference;

- Impact BIO #1: Construction Impacts on Special-Status Plant Species,
- Impact BIO#2: Construction Impacts on Special-Status Wildlife Species,
- Impact BIO #3: Construction Impacts on Special-Status Plant Communities,
- Impact BIO #4: Construction Impacts on Aquatic Resources,
- Impact BIO #5: Construction Impacts on Wildlife Movement,
- Impact BIO #6: Construction Impacts on Protected Trees.

A description of potential direct and indirect impacts is provided in Section 3.7.6.5 for biological and aquatic resources operational impacts, and are listed below for reference;

- Impact BIO #7: Operational Impacts on Special-Status Plant Species,
- Impact BIO #8: Operational Impacts on Special-Status Wildlife Species,
- Impact BIO #9: Operation Impacts on Special-Status Plant Communities,
- Impact BIO #10: Operation Impacts on Aquatic Resources,
- Impact BIO #11: Operation Impacts on Wildlife Movement,
- Impact BIO #12: Operation Impacts on Protected Trees,
- Impact BIO #13: Potential Conflicts with Conservation Plans and Easements.

The nature of these impacts and their magnitude (i.e., the impact acreage) are used to determine the intensity of the impact under NEPA and the significance of the impact under CEQA. The overall effect determinations for each of the B-P Build Alternatives are generally similar.

3.7.6.2 No Project Alternative

Under the No Project Alternative, existing trends affecting biological and aquatic resources are expected to continue or worsen, including habitat loss from development, mortality from vehicle strikes, habitat degradation from pollution (e.g., polluted stormwater runoff, inadvertent spills of hazardous materials), and noise and dust from development. Existing regulatory programs, such as the CWA and conservation programs (e.g., establishment of conservation easements and mitigation banks), would continue to abate the amount of habitat loss and degradation, if feasible. The following effects that would be expected to continue are as follows:

- Changes in crop production and rotation would continue to improve or degrade habitat conditions for species that forage or nest on farmland.
- Transportation agencies would implement programmed and funded improvements to the intercity transportation system through 2040 (Section 3.2, Transportation). In some cases, widening existing corridors or new improvements could result in additional impacts on biological and aquatic resources. Each of these improvement projects would be subject to environmental impact analysis and evaluation of the impacts of habitat loss, habitat degradation, and “take” of special-status species. Impacts on biological and aquatic resources would be mitigated as part of those projects, including avoidance of “take” during construction, minimization of impacts during construction and operation, restoration of disturbed sites, and preservation of compensatory habitat.
- Development pressure would continue in Kern and Los Angeles Counties based on adopted general and specific plans (Section 3.13, Station Planning, Land Use, and Development, and Section 3.18, Regional Growth). Low-density development on the urban fringe would likely

continue and potentially result in the loss of habitat in these currently undeveloped areas, including high-value habitat such as wetlands and riparian areas. Current and future conservation easements on properties near urban boundaries would protect some areas. Impacts on biological and aquatic resources would be avoided, reduced, and, in accordance with permit requirements for the development projects, mitigated through the preservation of compensatory habitat and restoration of disturbed sites. These projects would continue to have some impact on the wildlife, wetlands, native vegetation, oak woodland, and other biological resources in local areas between Bakersfield and Palmdale.

In addition, the historical trend of converting native plant communities to agricultural production has compromised the biological complexity of the region. With continued growth and development under the No Project Alternative, the loss of native plant communities will likely continue. Foreseeable projects that are planned, committed, or otherwise part of a general plan or specific plan would continue the trend of converting open spaces with native plant communities to more urban uses.

3.7.6.3 Bakersfield to Palmdale Project Section Build Alternatives

This section evaluates direct and indirect impacts associated with biological and aquatic resources that could result from construction and operation of the Bakersfield to Palmdale Project Section of the proposed HSR system. For this discussion, impacts are evaluated and assessed after consideration and incorporation of IAMFs, which are listed in Section 3.7.4.2.

3.7.6.4 Construction Impacts—Biological Resource Impacts Common to All Bakersfield to Palmdale Project Section Build Alternatives

Construction-period impacts could result in temporary direct and indirect effects on a number of biological and aquatic resources, including special-status plant and wildlife species, habitats of concern (encompasses aquatic resources), and wildlife movement corridors. Direct impacts on biological and aquatic resources would result from activities within temporary impact areas of the construction footprint (i.e., staging areas, temporary access roads, and temporary dewatering of surface waters) as well as the permanent project footprint as discussed below. Indirect temporary impacts would occur within and adjacent to the construction footprint. The types of direct and indirect impacts would be common among all B-P Build Alternatives (including both of the CCNM Design Options) and are discussed below for each resource.

Urban and agricultural lands affected by construction-period activities are not expected to: (1) provide conditions that support special-status plant species or special-status plant communities; (2) provide preferred habitat for special-status wildlife species; (3) support high- quality aquatic resources; or (4) facilitate the movement or migration of wildlife species. However, these areas often contain degraded or marginal habitats that are used by a number of special-status wildlife species, in particular the San Joaquin kit fox, which is known to occur within the RSA. In some instances, they support aquatic resources (specifically, retention and detention basins) and are used for movement and migration by a number of wildlife species. Direct (and in some instances indirect) impacts associated with urban, agricultural, and natural lands are described for the various biological and aquatic resources. For a more complete description of the impacts on agricultural lands, see Section 3.14, Agricultural Farmland and Forest Land.

The discussion of impacts on biological and aquatic resources is presented below for two subsections between Bakersfield and Palmdale:

- From the intersection of 34th Street and L Street to Oswell Street
- Oswell Street to Palmdale Station

Fresno to Bakersfield Locally Generated Alternative from the Intersection of 34th Street and L Street to Oswell Street

The study area for the biological and aquatic resources analysis of the portion of the Fresno to Bakersfield Locally Generated Alternative (F-B LGA) alignment from the intersection of 34th Street and L Street to Oswell Street is described in Section 3.7 of the *Fresno to Bakersfield Draft*

Supplemental EIR/EIS (Authority and FRA 2017). Study areas were developed for the various biological resources (jurisdictional waters, plants, wildlife, and habitats) that occur or have the potential to occur in the study area (refer to Section 3.7.2.3 of the *Fresno to Bakersfield Supplemental EIR/EIS*). Due to the dense urban environment of the study area, impacts on natural resources resulting from the construction and operation of the portion of the F-B LGA from the intersection of 34th Street and L Street to Oswell Street (corresponding with Impacts BIO #1 through BIO #13 in this EIR/EIS) have the potential to impact aquatic resources (1.03 acres), potentially suitable special-status plant species habitat (22.24 acres), and habitats that support special-status wildlife species (100.79 acres), as shown in Table 3.7-3 and Table 3.7-4.

Table 3.7-3 Biological Resources Impacts in the Fresno to Bakersfield Locally Generated Alternative Area

Resource	34th Street and L Street to Oswell Street
Biological and Aquatic Resources Direct Impacts (acres)	
Aquatic Resources (Waters of the United States)	1.03
Special-Status Plant Communities (Black Willow Thickets)	0.00
Potentially Suitable Special-Status Plant Species Habitat	22.24
Habitats that Support Special-Status Wildlife Species	100.79

Table 3.7-4 Potential Areas of Section 1600 Jurisdiction in the Fresno to Bakersfield Locally Generated Alternative Area of the Aquatic Resource Study Area

Feature Type	Cowardin Classification	Project-Specific Delineation Extent of Feature[2]		
		Total Mapped in ARSA (acres)	Permanent Impact (acres)	Temporary Impact (acres)
Fresno to Bakersfield Locally Generated Alternative Area				
Ponding	Palustrine unconsolidated bottom Palustrine emergent	1.07	–	0.37
Streambeds	Riverine unconsolidated bottom Palustrine scrub-shrub Palustrine forested	6.84 (1.78 mi)	0.01 (0.003 mi)	0.66 (0.11 mi)
Total Extent of Features		**7.91**	**0.01**	**1.03**

Source: California High-Speed Rail Authority, 2016, 2018b

[1] The ARSA includes linear and auxiliary project construction features (i.e., traction power substations, switching stations, paralleling stations, road overcrossings, and heavy maintenance facilities), operations and maintenance facilities and access points, temporary disturbance areas associated with construction, plus a 250-foot buffer.

[2] Acreage values are calculated in the ARSA, which included all B-P Build Alternatives known at the time plus a 250-foot buffer. Acreage totals are derived from raw geographic information system data and, as a result, may not exactly equal the sum of the rounded values presented in the table.

ARSA = Aquatic Resources Study Area mi = miles

CEQA Conclusion

Impacts on biological resources resulting from construction and operation of the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street, prior to implementing mitigation measures, could have significant impacts under CEQA (Impact BIO #1 through Impact BIO #4, Impact BIO #6 through Impact BIO #10, Impact BIO #12, and Impact BIO #13 in this EIR/EIS). No impacts would occur under Impact BIO #5 and Impact BIO #11 as outlined in this EIR/EIS.

There are no biological or aquatic resources identified in the portion of the F-B LGA from the intersection of 34th Street and L Street to Oswell Street that are not already addressed in this EIR/EIS. Therefore, with implementation of the mitigation measures outlined in Section 3.7.7 of this EIR/EIS, all impacts on biological resources identified as significant under CEQA for this section of the alignments would be reduced to less than significant.

Oswell Street to the Palmdale Station

The sections below discuss in detail the impacts of the B-P Build Alternatives south of Oswell Street to the Palmdale Station on biological and aquatic resources. Although there are areas of temporary impact associated with the LMF/MOWF alternatives and station alternatives, these impact areas overlap areas of permanent impact. Therefore, impacts on these areas are considered permanent. Permanent direct and indirect impacts on biological and aquatic resources associated with the LMF/MOWF alternatives and station alternatives are discussed in the various impact discussions below.

Impact BIO #1: Construction Impacts on Special-Status Plant Species

Construction of the Bakersfield to Palmdale Project Section may result in potential direct and indirect impacts on special-status plant species identified as either occurring or having potential to occur within the project footprint based on the presence of suitable habitat. This includes the areas within the CCNM Design Option, the Refined CCNM Design Option, and the engineering and design refinements. In general, special-status plant species within areas of permanent impacts would be permanently removed. Although constructed areas of elevated train track, including bridges and viaducts, are considered to be permanent impacts, these structures would only require the permanent removal of vegetation within a limited portion of the overlying footprint where supports and pilings are located. Outside the limited area, suitable habitat for special-status plant species adjacent to bridges or viaducts could potentially be degraded, but it would not be permanently removed. To provide a conservative estimate of potential impacts on special-status plant species, the portion of the footprint beneath elevated structures is considered to be permanently affected.

Table 3.7-5 shows the estimated potential impacts on modeled potentially suitable habitat of each special-status plant species habitat within the RSA. The acreage totals presented do not represent an estimate of impacts on actual plant occurrences, but instead represent an estimate of affected suitable habitat for the species.

Temporary

Temporary impacts on special-status plant species may result from construction activities such as construction vehicle traffic; the temporary use of land for staging and access areas, including temporary dewatering of surface waters (although these areas would be sited within areas planned for permanent impacts to the maximum extent practicable); noise, light, and vibration from construction activities; and other construction-related activities that are temporary in nature and that would allow for the plant populations to reestablish after the construction period.

Direct, temporary impacts on special-status plant species from construction activities could occur due to the clearing, grubbing, covering, undercutting, and damaging of roots, or the unearthing of individual plants. Dust and airborne soil, which may settle on plants (particularly herbs), may inhibit their ability to photosynthesize or reproduce through pollination. Soil compaction and the placement of fill may directly affect special-status plant species by causing decreased fitness or death by root compaction, decreased germination from the seed bank, and/or the plants being covered with soil. Chemical spills have the potential to contaminate the soil and groundwater, resulting in mortality, habitat degradation, or reduced reproductive success of special-status plant species.

Indirect, temporary impacts on special-status plant species could occur as a result of changes in erosion and sedimentation resulting from construction activities. Displaced sediment and changes to microtopography could alter the soil and substrate conditions required for special-status plants. Impacts on hydrology, such as from tunneling activities, may affect water availability to plant species, inhibit growth, and hinder survival during harsh conditions and/or germination.

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Table 3.7-5 Comparison of Estimated Potential Effects on Suitable Habitats for Special-Status Plant Species within the Resource Study Area

Special-Status Plant Species	Alternative 1		Alternative 2		Alternative 3		Alternative 5		CCNM Design Option		Refined CCNM Design Option	
	Permanent (acres)	Temporary (acres)	Permanent (acres)	Temporary (acres)	Permanent (acres)	Temporary (acres)	Permanent (acres)	Temporary (acres)	Permanent (acres)	Temporary (acres)	Permanent (acres)	Temporary (acres)
Alkali mariposa lily (*Calochortus striatus*)	141.3	33.4	141.3	33.4	141.3	33.4	141.3	33.4	no change	no change	no change	no change
Aromatic canyon gooseberry (*Ribes menziesii* var. *ixoderme*)	743.8	244.7	743.8	244.7	743.8	244.7	743.8	244.7	-50.7	13.5	235.6	-53.6
Barstow woolly sunflower (*Eriophyllum mohavense*)	1,201.8	352.5	1,201.8	352.5	1,231.8	348.8	1,172.3	345.4	no change	no change	no change	no change
Calico monkeyflower (*Mimulus pictus*)	783.0	254.1	783.0	254.1	781.7	253.3	783.0	254.1	-50.7	13.5	226.9	-51.4
California alkaligrass (*Puccinellia simplex*)	141.3	33.4	141.3	33.4	141.3	33.4	141.3	33.4	no change	no change	no change	no change
Clokey's cryptantha (*Cryptantha clokeyi*)	696.0	50.9	696.0	50.9	703.5	49.4	678.5	47.1	no change	no change	no change	no change
Comanche Point layia (*Layia leucopappa*)	145.5	90.2	107.3	97.2	145.5	90.2	145.5	90.2	no change	no change	no change	no change
Desert cymopterus (Cymopterus deserticola)	600.5	97.8	600.5	97.8	663.1	110.5	604.5	97.5	no change	no change	no change	no change
Horn's milk-vetch (*Astragalus hornii* var. *hornii*)	141.3	33.4	141.3	33.4	141.3	33.4	141.3	33.4	no change	no change	no change	no change
Lancaster milk-vetch (*Astragalus preussii* var. *laxiflorus*)	76.4	20.1	76.4	20.1	76.4	20.1	76.4	20.1	no change	no change	no change	no change
Madera leptosiphon (*Leptosiphon serrulatus*)	821.3	264.4	821.3	264.4	820.5	264.3	821.3	264.4	-45.6	11.4	229.7	-49.7
Mason's neststraw (*Stylocline masonii*)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	no change	no change	no change	no change
Oil neststraw (*Stylocline citroleum*)	87.8	12.3	65.8	19.2	87.8	12.3	87.8	12.3	no change	no change	no change	no change
Pale-yellow layia (*Layia heterotricha*)	732.2	246.6	694.0	253.6	732.8	246.7	732.2	246.6	-7.9	6	129.8	-27.6
Palmer's mariposa lily (*Calochortus palmeri* var. *palmeri*)	38.3	10.3	38.3	10.3	38.8	10.9	38.3	10.3	5.2	-2.1	9.5	3
Piute Mountains navarretia (*Navarretia setiloba*)	2,202.5	642.0	2,132.3	658.1	2,209.3	626.8	2,202.5	642.0	-50.8	20.8	683.5	-80.3
Recurved larkspur (*Delphinium recurvatum*)	141.3	33.4	141.3	33.4	141.3	33.4	141.3	33.4	no change	no change	no change	no change
Robbins' nemacladus (*Nemacladus secundiflorus* var. *robbinsii*)	488.8	146.1	488.8	146.1	492.3	140.2	488.8	146.1	no change	no change	no change	no change
Rosamond eriastrum (*Eriastrum rosamondense*)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	no change	no change	no change	no change
Round-leaved filaree (*California macrophylla*)	188.1	61.5	188.1	61.5	188.7	61.7	188.1	61.5	-7.9	6	32.7	-27.3
Sagebrush loeflingia (*Loeflingia squarrosa* var. *artemisiarum*)	600.5	97.8	600.5	97.8	663.1	110.5	604.5	97.5	no change	no change	no change	no change
Tehachapi monardella (*Monardella linoides* ssp. *oblonga*)	116.0	43.4	116.0	43.4	137.1	31.7	116.0	43.4	2.1	-2.8	-1.8	-1.6
Tejon poppy (*Eschscholzia lemmonii* ssp. *kernensis*)	5.6	4.6	5.6	4.6	5.6	4.6	5.6	4.6	no change	no change	-2.7	-1.4
Vasek's clarkia (*Clarkia tembloriensis* ssp. *calientensis*)	538.6	172.4	468.4	188.5	538.6	172.4	538.6	172.4	no change	no change	no change	no change

Source: California High-Speed Rail Authority, 2020
Both CCNM Design Options data is applicable to all of the B-P Build Alternatives, and the values represent the increase/decrease compared to the B-P Build Alternatives.
B-P = Bakersfield to Palmdale Project Section
CCNM = César E. Chávez National Monument

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Tunnel construction may affect subsurface and surface water resources, which could result in desiccation of springs, seeps, streams and associated habitat that provide habitat for flora and fauna, and could impact special-status plant species that are groundwater dependent. As explained in Section 3.8, based on prior tunnel construction monitoring in other locations, these effects are expected to be temporary, lasting months or up to several years after the tunnels are constructed (Berg 2012).

In addition, fragmentation could result from the construction of temporary features, especially staging areas and access roads that bisect special-status plant species' habitats. Construction activities could facilitate the spread of invasive and noxious weeds through introduction of seeds by construction equipment, vehicles, and personnel, and could provide ample habitat for colonization where temporary ground-disturbing activities occur.

Permanent

Permanent construction-period impacts include the permanent conversion of habitat to project infrastructure, which could result in the loss of individual special-status plant species and their habitats within the limits of disturbance.

Direct, permanent impacts on special-status plants would result from the construction of track, stations, maintenance and equipment storage areas, access roads, road overcrossings, substations, and other permanent facilities. These activities may require the removal of individual plants and could prevent regeneration through the placement of fill and other materials. These structures could also form an impenetrable cap over the seed bank. Excess dust and piled dirt could lower the success of a viable seed bank or otherwise negatively alter surface areas for special-status plants and their habitats. Indirect impacts on special-status plant species could occur from the construction of HSR components that alter the landscape and may include changes in erosion and sedimentation resulting from construction activities. Displaced sediment and major changes to microtopography could alter the soil and substrate conditions preferred by special-status species. Impacts on hydrology may affect water availability to special-status plant species and may inhibit growth, survival during harsh conditions, and germination. Fragmentation would result from the construction of permanent features, especially linear features (e.g., track and access roads) that bisect special-status plant species' habitats. Construction activities could facilitate the spread of invasive and noxious weeds through the introduction of seeds by construction equipment, vehicles, and personnel, and could provide ample habitat for colonization where permanent ground-disturbing activities would occur. Indirect impacts could include increasing the potential for introducing and spreading invasive and nonnative species and harmful pathogens to special-status plants.

As part of the B-P Build Alternatives, BIO-IAMF#1 through BIO-IAMF#3 and BIO-IAMF#5 through BIO-IAMF#11 would be incorporated to avoid and/or minimize impacts on biological and aquatic resources from project construction, as applicable and discussed in Section 3.7.4.2. The Authority would incorporate these IAMFs to reduce and minimize impacts by designating a project biologist and species-specific and general biological monitors during construction (BIO-IAMF#1). In addition, the Authority would develop and implement a BRMP to identify special-status species to be avoided during construction (BIO-IAMF#5). The BRMP would be a compilation of the biological resources avoidance and minimization measures applicable to the project section and other project environmental plans, such as the RPP and WCP. Requirements would also be incorporated that would require the Authority to delineate environmentally sensitive areas (ESA) or environmentally restricted areas on final construction plans and in the field using measures such as flagging or fencing under the direction of the project biologist (BIO-IAMF#5). Under all of the B-P Build Alternatives, the Authority would require construction crews to attend WEAP training and certify that they understand the regulatory agency requirements and procedures necessary to protect biological resources (BIO-IAMF#3). This would avoid some (but not all) direct impacts on special-status plant species because it would establish that contractors must be aware of and avoid affecting special-status plant species occurrences during construction. In addition, HYD-IAMF#1 and HYD-IAMF#2 would be implemented. HYD-IAMF#1 addresses stormwater management and requires that a plan for management and treatment be prepared

prior to construction. HYD-IAMF#2 requires preparation of a flood protection plan prior to construction.

CEQA Conclusion

The design characteristics of the B-P Build Alternatives, including the CCNM Design Option, the Refined CCNM Design Option, and engineering and design refinements, include effective IAMFs to identify special-status plant species and delineate ESAs or environmentally restricted areas on final construction plans and in the field. These measures would minimize, but not avoid, the removal of special-status plant species within the project footprint. Based on the CEQA thresholds identified in Section 3.7.4.7, the impact under CEQA to special-status plant species would be potentially significant under any of the B-P Build Alternatives. This determination is because permanent and temporary removal or disturbance of vegetation for the placement of permanent infrastructure, and/or for construction access, would cause a substantial adverse effect on special-status plant species, if present. With implementation of IAMF-HYD#5, the Build Alternatives would not result in a substantial adverse effect to special-status plants and habitat as a result of groundwater depletion, and this indirect impact would therefore be less than significant for all Build Alternatives.

To address permanent and temporary removal or disturbance of vegetation for the placement of permanent infrastructure, and/or for construction access, effective mitigation measures have been identified in Section 3.7.7 to reduce impacts on special-status plant species to a less than significant level by avoidance, protection, or restoration methods. These measures include BIO-MM#1, which would require surveys to identify special-status plant species that were not identified in areas where permission to enter was not granted prior to construction, potentially allowing for some level of avoidance of special-status plant species during final design. BIO-MM#2 would allow for the removal and relocation of special-status plant species prior to ground disturbance. In addition, BIO-MM#6, BIO-MM#38, BIO-MM#47, BIO-MM#50, and BIO-MM#53 would provide for on-site and off-site habitat restoration and preservation of special-status plant species.

In addition, as discussed in Section 3.8, Hydrology and Water Resources, the Authority would implement WQ-MM#3, Tunnel Constructability and Hydrogeological Monitoring, which would reduce potential impacts on springs and seeps during construction of the tunnels. WQ-MM#3 would implement the preparation of a Groundwater Adaptive Management and Monitoring Plan (AMMP) to minimize potential impacts on water resources supported by groundwater, including springs, seeps, and surface water resources supported by groundwater. WQ-MM#3 would therefore reduce potential impacts on springs, seeps, streams, and associated habitat if tunneling disrupts water flow to those areas. These measures would work together with design features to minimize or avoid impacts on special-status plant species. Additional measures, such as BIO-MM#55, BIO-MM#56, and BIO-MM#61 would further mitigate and minimize impacts on special-status plant species by removing nonnative plant species that would compete for the same habitat and would provide ongoing monitoring and reporting of the WCP. Therefore, impacts would be avoided or mitigated through mitigation measures that would require the Authority to provide restoration, enhancement, and/or preservation for identified impacts on special-status plant species, with potentially more rigorous plans and specifications for FESA and CESA authorizations.

During construction of the B-P Build Alternatives, impacts would be reduced and considered less than significant under CEQA after implementation of BIO-MM#1, BIO-MM#2, BIO-MM#6, BIO-MM#38, BIO-MM#47, BIO-MM#50, BIO-MM#53, BIO-MM#55, BIO-MM#56, BIO-MM#58, BIO-MM#61, BIO-MM#75, and WQ-MM#3. Because these mitigation measures would provide for on-site and off- site habitat restoration and preservation of special-status plant species in an amount equivalent to or greater than the area impacted by the B-P Build Alternatives, no substantial adverse effect would occur, either directly or through habitat modifications, on any special-status plant species.

Impact BIO#2: Construction Impacts on Special-Status Wildlife Species

Construction of the project may result in direct and indirect impacts on special-status wildlife species and their habitat. Potential impacts on special-status wildlife species were determined using a habitat suitability approach. Table 3.7-6 provides a comparison of estimated potential impacts on suitable habitat for special-status wildlife species within the RSA. Additionally, Table 3.7-7 displays the results of the habitat species modeling used to address potential impacts on federally and state-listed species. This includes the areas within the CCNM Design Option, the Refined CCNM Design Option, and the engineering and design refinements.

Temporary

Temporary construction impacts on special-status wildlife species may result from activities such as construction vehicle traffic; the temporary use of land for staging and access areas (although these areas would be sited within areas planned for permanent impacts to the maximum extent practicable); noise, light, and vibration from construction activities; temporary dewatering of surface waters during construction; and other construction-related activities that would be temporary in nature. In addition, as noted in Impact BIO#1, groundwater depletion during tunnel construction could result in indirect impacts on surface waters and associated aquatic resources, with durations of effects lasting days to months, or up to several years after tunnel completion. These impacts could affect suitable habitat for special-status wildlife species.

Amphibians

Alteration of the inundation period or a change to the water table could cause a surface water feature to dry up or partially dry up. Depending on the time of year and/or the timing of drying, a change in the hydroperiod of surface water features could affect breeding success, survivability of eggs or larvae, and in extreme cases, can cause the desiccation and mortality of individuals if other nearby surface waters are not present. While effects could occur on amphibian species and habitat, the assessment represents a worst-case evaluation of effects because previous monitoring of tunnel effects has shown that effects decrease with distance from the tunnel, and not all surface waters are typically affected, or affected to the same extent.

Reptiles

Impacts on special-status reptiles (blunt-nosed leopard lizard [*Gambelia sila*] and desert tortoise [*Gopherus agassizii*]) as a result of tunnel construction would not occur because the species are not groundwater dependent.

Birds (including Migratory Birds Protected by the California Fish and Game Code)

Special-status birds that occur in the Tunnel RSA and that require wetland or aquatic habitats (including riparian habitats) could be adversely affected by groundwater depletion. Adverse effects could occur because of an alteration of the inundation period or a change to the water table, which could cause a surface water feature to dry up or partially dry up. For special-status bird species, the primary impact of this hydrological interruption could be a lack of surface drinking water and dessication or mortality of groundwater dependent habitats, such as riparian trees and shrubs. Depending on the time of year and/or the timing of drying, these changes can affect breeding success, survivability of eggs or young, and in extreme cases, can cause the mortality of individuals if other nearby surface waters are not present. While effects could occur, the assessment represents a worst-case evaluation of effects because previous monitoring of tunnel effects has shown that effects decrease with distance from the tunnel, and not all surface waters are typically affected, or affected to the same extent.

Mammals

Adverse effects could occur because of an alteration of the inundation period or a change to the water table which could cause a surface water feature to dry up or partially dry up. For special-status mammals, the primary impact of this hydrological interruption could be a lack of surface drinking water and dessication or mortality of groundwater dependent habitats, such as riparian trees and shrubs, which the species depends on. Depending on the time of year and/or the timing of drying, these changes could affect breeding success, foraging, and could alter behavior if other nearby surface waters are not present. While effects could occur on special-status mammals, the assessment represents a worst-case evaluation of effects because previous monitoring of tunnel

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Table 3.7-6 Comparison of Estimated Potential Effects on Suitable Habitat for Special-Status Wildlife Species within the Resource Study Area

Special-Status Wildlife Species	Alternative 1		Alternative 2		Alternative 3		Alternative 5		CCNM Design Option		Refined CCNM Design Option	
	Permanent (acres)	Temporary (acres)	Permanent (acres)	Temporary (acres)	Permanent (acres)	Temporary (acres)	Permanent (acres)	Temporary (acres)	Permanent (acres)	Temporary (acres)	Permanent (acres)	Temporary (acres)
American badger (*Taxidea taxus*)	2,746.3	698.2	2,680.1	713.1	2,700.6	686.0	2,715.7	704.8	-50.8	20.7	688.4	-78.2
Bendire's thrasher (*Toxostoma bendirei*)	319.8	24.7	319.8	24.7	284.9	15.1	317.8	25.7	no change	no change	no change	no change
Blainville's horned lizard (*Phrynosoma blainvilli*)	4,078.9	1,389.6	3,996.7	1,401.4	4,037.6	1,371.5	4,078.9	1,389.6	-50.3	14.6	670.1	-86.0
California legless lizard (*Anniella pulchra pulchra*)	1,030.3	312.3	1,034.4	311.0	992.8	301.6	1,030.3	312.3	-50.7	13.5	473.0	-59.3
Crotch bumblebee (*Bombus crotchii*)	5,451.7	1,359.3	5,385.6	1,374.2	5,510.2	1,352.3	5,399.5	1,359.3	-48.0	14.3	688.9	-84.8
Golden eagle (*Aquila chrysaetos*)	5,495.2	1,369.0	5,430.5	1,383.7	5,552.7	1,362.5	5,439.8	1,369.0	-47.9	14.3	682.1	-85.7
Grasshopper sparrow (*Ammodramus savannarum*)	768.0	222.7	697.8	238.8	768.0	222.7	768.0	222.7	no change	no change	216.0	-13.1
Le Conte's thrasher (*Toxostoma lecontei*)	265.4	9.1	265.4	9.1	265.4	9.1	263.4	10.1	no change	no change	no change	no change
Loggerhead shrike (*Lanius ludovicianus*)	3,210.1	1,069.8	3,170.8	1,066.9	3,171.7	1,056.6	3,178.8	1,076.4	-50.8	20.7	689.1	-78.1
Long-eared owl (*Asio otus*)	784.8	254.7	784.8	254.7	783.5	253.9	784.8	254.7	-50.7	13.5	226.2	-52.2
Mountain plover (*Charadrius montanus*)	269.2	55.2	269.2	55.2	282.1	55.6	240.7	60.9	no change	no change	no change	no change
Northern harrier (*Circus cyaneus*)	1,465.1	380.4	1,394.9	396.5	1,458.4	380.3	1,436.6	386.1	0.0	7.3	214.6	-18.4
Oregon vesper sparrow (*Pooecetes gramineus affinis*)	1,203.5	443.2	1,164.2	440.3	1,203.5	443.2	1,203.5	443.2	no change	no change	216.0	-13.1
Pallid bat (*Antrozous pallidus*)	5,708.9	1,479.5	5,680.7	1,468.5	5,766.4	1,473.0	5,653.6	1,479.5	-47.9	14.3	689.2	-84.2
Purple martin (*Progne subis*)	855.8	265.5	855.8	265.5	854.4	264.7	855.8	265.5	-50.7	13.5	473.5	-60.4
Redhead (*Aythya americana*)	6.2	0	6.2	0	6.2	0	3.8	0	no change	no change	no change	no change
San Joaquin whipsnake (*Masticophis flagellum ruddocki*)	794.9	228.6	728.8	243.4	794.9	228.6	794.9	228.6	no change	no change	216.0	-13.1
Short-eared owl (*Asio flammeus*)	1,932.6	749.9	1,890.8	748.1	1,933.0	748.3	1,901.7	755.6	0.0	7.3	214.6	-18.4
Spotted bat (*Euderma maculatum*)	4,546.3	1,105.1	4,546.3	1,105.1	4,603.9	1,098.6	4,491.0	1,105.1	-47.9	14.3	225.9	-62.9
Tehachapi pocket mouse (*Perognathus alticolus inexpectatus*)	427.2	53.0	431.3	51.7	389.6	41.6	425.2	53.9	no change	no change	0.0	0.0
Townsend's big-eared bat (*Corynorhinus townsendii*)	869.3	268.5	869.3	268.5	869.4	269.0	868.5	268.5	-50.7	13.5	473.1	-59.8
Tricolored blackbird (*Agelaius tricolor*)	1,699.6	637.4	1,619.7	661.6	1,700.0	635.8	1,671.1	643.1	0.0	7.3	212.8	-18.4
Tulare grasshopper mouse (*Onychomys torridus tularensis*)	2,661.0	930.5	2,585.1	953.4	2,657.4	926.4	2,632.5	936.2	-50.8	20.7	688.4	-78.7
Vermillion flycatcher (*Pyrocephalus rubinus*)	59.8	16.1	59.8	16.1	66.9	14.6	59.8	16.1	no change	no change	no change	no change
Western burrowing owl (*Athene cunicularia*)	2,126.9	690.4	2,051.0	713.3	2,089.7	677.5	2,096.3	697.0	0.0	7.3	214.6	-18.4
Western mastiff bat (*Eumops perotis californicus*)	7,404.6	1,949.0	7,322.4	1,960.8	7,469.8	1,942.7	7,315.5	1,950.6	-50.3	14.6	670.1	-86.0
Western pond turtle (*Actinemys marmorata*)	875.0	267.4	876.6	267.2	873.7	266.6	872.6	267.4	-50.7	13.5	473.5	-59.9
Western red bat (*Lasiurus blossevillii*)	2,596.5	602.1	2,594.3	589.6	2,593.7	601.7	2,559.6	603.7	-53.2	13.8	455.1	-61.2
Western snowy plover (*Charadrius alexandrinus nivosus*)	6.2	0	6.2	0	6.2	0	3.8	0	no change	no change	no change	no change
Yellow-blotched salamander (*Ensatina eschscholtzii croceator*)	855.8	265.5	855.8	265.5	854.4	264.7	855.8	265.5	-50.7	13.5	473.5	-59.9
Yellow-breasted chat (*Icteria virens*)	16.6	4.6	16.6	4.6	16.7	5.0	16.6	4.6	0.1	0.0	0.3	0.3
Yellow-headed blackbird (*Xanthocephalus xanthocephalus*)	0	0	0	0	0	0	0	0	no change	no change	no change	no change
Yellow warbler (*Dendroica petechia brewsteri*)	798.3	257.9	798.3	257.9	798.4	258.4	798.3	257.9	-50.7	13.5	226.9	-51.7

Source: California High-Speed Rail Authority, 2020
Data for both CCNM Design Options are applicable to all of the B-P Build Alternatives, and the values represent the increase/decrease compared to the B-P Build Alternatives.
B-P = Bakersfield to Palmdale Project Section
CCNM = César E. Chávez National Monument

Table 3.7-7 Intersection of the Bakersfield to Palmdale Project Section Build Alternatives (Station to Station) and Modeled Federal and State Threatened/Endangered Species Habitat

Species	Category	Alternative 1		Alternative 2		Alternative 3		Alternative 5		CCNM Design Option		Revised CCNM Design Option	
		Permanent (acres)	Temporary (acres)	Permanent (acres)	Temporary (acres)	Permanent (acres)	Temporary (acres)	Permanent (acres)	Temporary (acres)	Permanent (acres)	Temporary (acres)	Permanent (acres)	Temporary (acres)
Bakersfield Cactus	Core Suitable Habitat	1,840.3	512.1	1,774.1	527.0	1,840.3	512.1	1,840.3	512.1	-48.6	10.0	605.9	-86.2
	Core Suitable Habitat - Intermediate Zone	593.3	150.2	593.3	150.2	601.5	161.8	584.1	152.7	no change	no change	no change	no change
	Potentially Suitable Habitat	76.6	17.4	76.6	17.4	76.6	17.4	76.6	17.4	-2.2	10.7	67.8	4.8
	Potentially Suitable Habitat - Intermediate Zone	107.3	18.5	107.3	18.5	107.3	18.5	88.1	21.7	no change	no change	no change	no change
	Bakersfield Cactus Total	**2,617.6**	**698.3**	**2,551.4**	**713.1**	**2,625.7**	**709.8**	**2,589.1**	**703.9**	**-50.8**	**20.7**	673.7	-81.4
Blunt-nosed Leopard Lizard	Atypical Habitat	0.3	0.1	0.3	0.1	0.3	0.1	0.3	0.1	no change	no change	no change	no change
	Core Suitable Habitat	524.5	136.2	524.5	136.2	524.5	136.2	524.5	136.2	no change	no change	97.4	-2.0
	Potentially Suitable Habitat	318.0	97.4	270.8	106.9	318.0	97.4	318.0	97.4	-2.7	1.6	143.4	-19.5
	Blunt-nosed Leopard Lizard Total	**842.8**	**233.7**	**795.6**	**243.1**	**842.8**	**233.7**	**842.8**	**233.7**	**-2.7**	**1.6**	**240.7**	**-21.5**
California Condor	Potentially Suitable Habitat	2,470.0	793.6	2,471.0	793.8	2,404.7	789.5	2,470.0	793.6	-47.9	14.3	689.2	-84.2
	California Condor Total	**2,470.0**	**793.6**	**2,471.0**	**793.8**	**2,404.7**	**789.5**	**2,470.0**	**793.6**	**-47.9**	**14.3**	**689.2**	**-84.2**
California Jewelflower	Core Suitable Habitat	804.2	215.1	736.3	231.0	804.2	215.1	804.2	215.1	-1.7	1.5	246.5	-13.5
	Potentially Suitable Habitat	62.9	20.1	60.6	20.3	62.9	20.1	62.9	20.1	-0.9	0.1	-3.1	-7.0
	California Jewelflower Total	**867.1**	**235.2**	**796.9**	**251.3**	**867.1**	**235.2**	**867.1**	**235.2**	**-2.7**	**1.6**	**243.4**	**-20.5**
California Red-Legged Frog	Breeding Season Aquatic Habitat	0	0	0	0	0	0	0	0	No change	No change	No change	No change
	Dispersal/Seasonal Movement Habitat	0	0	0	0	0	0	0	0	No change	No change	No change	No change
	Other Potential Movement Habitat	0	0	0	0	0	0	0	0	No change	No change	No change	No change
	Permeable Movement Area (Dev, Ag, Disturbed)	0	0	0	0	0	0	0	0	No change	No change	No change	No change
	Refugia/Foraging Habitat	0	0	0	0	0	0	0	0	No change	No change	No change	No change
	California Red-Legged Frog Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**No change**	**No change**	**No change**	**No change**
Desert Tortoise	Moderately High Value Suitable Habitat	864.5	245.8	864.5	245.8	921.6	264.3	864.5	245.8	no change	no change	no change	no change
	Potentially Suitable Habitat in Urban Setting	887.8	48.8	887.8	48.8	887.8	48.8	866.8	49.6	no change	no change	no change	no change
	Desert Tortoise Total	**1,752.3**	**294.7**	**1,752.3**	**294.7**	**1,809.4**	**313.2**	**1,731.3**	**295.4**	**no change**	**no change**	**no change**	**no change**
Kern Mallow	Core Suitable Habitat	685.5	184.4	617.6	200.4	685.5	184.4	685.5	184.4	no change	no change	no change	no change
	Potentially Suitable Habitat	53.6	11.4	51.3	11.5	53.6	11.4	53.6	11.4	no change	no change	no change	no change
	Kern Mallow Total	**739.1**	**195.8**	**668.9**	**211.9**	**739.1**	**195.8**	**739.1**	**195.8**	**no change**	**no change**	**no change**	**no change**
Kern Primrose Sphinx Moth	Potentially Suitable Habitat	894.0	214.5	858.1	224.1	894.0	214.5	894.0	214.5	no change	no change	110.1	-6.2
	Kern Primrose Sphinx Moth Total	894.0	214.5	858.1	224.1	894.0	214.5	894.0	214.5	no change	no change	110.1	-6.2
Least Bell's Vireo	Recolonization Breeding Habitat	14.2	4.7	14.0	4.8	14.6	4.7	14.2	4.7	0.1	no change	4.3	0.8
	Least Bell's Vireo Total	**14.2**	**4.7**	**14.0**	**4.8**	**14.6**	**4.7**	**14.2**	**4.7**	**0.1**	no change	4.3	0.8
Mohave Ground Squirrel	High Value Suitable Habitat	356.8	98.9	356.8	98.9	356.8	98.9	339.8	89.7	no change	no change	no change	no change
	Moderately High Value Suitable Habitat	981.9	274.0	981.9	274.0	994.7	273.8	978.2	277.2	no change	no change	no change	no change
	Potentially Suitable Habitat in Urban Setting	242.7	16.6	242.7	16.6	242.7	16.6	225.8	16.7	no change	no change	no change	no change
	Mohave Ground Squirrel Total	**1,581.4**	**389.4**	**1,581.4**	**389.4**	**1,594.2**	**389.2**	**1,543.7**	**383.6**	**no change**	**no change**	**no change**	**no change**

Species	Category	Alternative 1		Alternative 2		Alternative 3		Alternative 5		CCNM Design Option		Revised CCNM Design Option	
		Permanent (acres)	Temporary (acres)	Permanent (acres)	Temporary (acres)	Permanent (acres)	Temporary (acres)	Permanent (acres)	Temporary (acres)	Permanent (acres)	Temporary (acres)	Permanent (acres)	Temporary (acres)
Monarch Butterfly	Breeding and Foraging Habitat	7,375.10	1,892.00	7,318.70	1,882.70	7,421.20	1,863.80	7,270.10	1,915.00	-11.6	15.2	783	-81.2
	Monarch Butterfly Total	**7,375.10**	**1,892.00**	**7,318.70**	**1,882.70**	**7,421.20**	**1,863.80**	**7,270.10**	**1,915.00**	**-11.6**	**15.2**	**783**	**-81.2**
Mojave Tarplant	High Value Suitable Habitat	2.6	0.8	2.6	0.8	44.7	7.8	2.6	0.8	no change	no change	no change	no change
	Moderately High Value Suitable Habitat	359.8	73.0	359.8	73.0	380.1	68.4	359.8	73.0	no change	no change	34.0	-0.6
	Mojave Tarplant Total	**362.4**	**73.8**	**362.4**	**73.8**	**424.9**	**76.2**	**362.4**	**73.8**	**no change**	**no change**	**34.0**	**-0.6**
	Core and Patch Habitat	33.4	12.6	33.4	12.6	33.4	12.6	33.4	12.6	No change	No change	No change	No change
	Other Potential Suitable Habitat	621.1	334	621.1	334	661.9	332.4	621.1	334	No change	No change	-4	-4.5
	SC/CC ESU of Mountain Lion Habitat Total	**654.5**	**346.6**	**654.5**	**346.6**	**674.5**	**345**	**654.5**	**346.6**	**No change**	**No change**	**No change**	**No change**
San Joaquin Adobe Sunburst	Core Suitable Habitat	47.1	21.3	43.2	21.9	47.1	21.3	47.1	21.3	-1.2	3.0	9.8	0.4
	Potentially Suitable Habitat	1,011.3	232.1	945.4	248.9	1,011.3	232.1	1,011.3	232.1	-10.2	0.2	518.8	-25.6
	San Joaquin Adobe Sunburst Total	**1,058.4**	**253.4**	**988.6**	**270.7**	**1,058.4**	**253.4**	**1,058.4**	**253.4**	**-11.4**	**3.2**	**528.6**	**-25.3**
San Joaquin Kit Fox	High Value Suitable Habitat	103.0	23.6	94.3	21.6	103.0	23.6	103.0	23.6	no change	no change	no change	no change
	Low Value Suitable Habitat	1,087.2	365.4	1,071.1	366.9	1,087.2	365.4	1,087.2	365.4	no change	no change	389.6	-19.3
	Moderate Value Suitable Habitat	88.4	26.2	89.0	27.3	88.4	26.2	88.4	26.2	no change	no change	77.8	-4.2
	Urban Suitable Habitat	356.5	160.1	298.5	171.3	356.5	160.1	356.5	160.1	no change	no change	no change	no change
	San Joaquin Kit Fox Total	**1,635.1**	**575.3**	**1,552.9**	**587.1**	**1,635.1**	**575.3**	**1,635.1**	**575.3**	**no change**	**no change**	**467.3**	**-23.5**
San Joaquin Woolythreads	Core Suitable Habitat	759.4	200.4	693.3	215.2	759.4	200.4	759.4	200.4	no change	no change	no change	no change
	Potentially Suitable Habitat	6.7	1.3	6.7	1.3	6.7	1.3	6.7	1.3	no change	no change	no change	no change
	San Joaquin Woolythreads Total	**766.0**	**201.7**	**699.9**	**216.5**	**766.0**	**201.7**	**766.0**	**201.7**	**no change**	**no change**	**no change**	**no change**
Striped Adobe Lily	Core Suitable Habitat	15.1	8.3	15.1	8.3	15.1	8.3	15.1	8.3	-1.5	10.1	11.4	0.5
	Potentially Suitable Habitat	1,361.4	406.9	1,310.3	417.1	1,360.6	406.8	1,360.6	406.9	-48.7	10.0	646.7	-69.7
	Striped Adobe Lily Total	**1,376.6**	**415.2**	**1,325.4**	**425.4**	**1,375.7**	**415.1**	**1,375.7**	**415.2**	**-50.2**	**20.1**	**658.1**	**-69.2**
Swainson's Hawk	Active Nesting Habitat	3.1	0.6	3.1	0.6		1.5	3.1	0.6	no change	no change	no change	no change
	Inactive Nesting Habitat	126.4	1.7	126.4	1.7	126.4	1.7	112.6	1.8	no change	no change	no change	no change
	Migratory Season Foraging Habitat	1,304.1	487.7	1,304.1	487.7	1,321.9	496.5	1,304.1	487.7	-41.0	14.2	143.5	-59.0
	Other Potential Breeding Season Foraging Habitat	637.7	241.8	615.5	253.5	609.9	237.7	636.8	241.8	-11.7	1.8	37.9	3.4
	Potential Primary Foraging Habitat	169.6	11.3	169.6	11.3	169.6	11.3	156.4	16.3	no change	no change	no change	no change
	Potential Secondary Foraging Habitat	842.3	146.4	842.3	146.4	842.3	146.4	833.0	140.5	no change	no change	no change	no change
	Primary Active Foraging Habitat	161.7	61.7	161.7	61.7	254.7	74.6	161.7	61.7	no change	no change	9.6	no change
	Secondary Active Foraging Habitat	1,520.3	431.0	1,520.3	431.0	1,482.1	416.0	1,520.3	431.0	0.2	-0.3	474.5	-20.0
	Swainson's Hawk Total	**4,765.3**	**1,382.1**	**4,743.2**	**1,393.8**	**4,807.0**	**1,385.8**	**4,728.1**	**1,381.4**	**-52.5**	**15.8**	**665.5**	**-75.6**
Tehachapi Slender Salamander	Core Occupied Habitat	40.7	6.0	40.7	6.0	40.7	6.0	40.7	6.0	no change	no change	5.7	2.7
	Potentially Suitable Habitat	75.3	29.1	75.3	29.1	85.4	30.6	75.3	29.1	0.5	3.4	64.5	0.2
	Tehachapi Slender Salamander Total	**116.0**	**35.1**	**116.0**	**35.1**	**126.1**	**36.6**	**116.0**	**35.1**	**0.5**	**3.4**	**70.2**	**2.9**

Species	Category	Alternative 1		Alternative 2		Alternative 3		Alternative 5		CCNM Design Option		Revised CCNM Design Option	
		Permanent (acres)	Temporary (acres)	Permanent (acres)	Temporary (acres)	Permanent (acres)	Temporary (acres)	Permanent (acres)	Temporary (acres)	Permanent (acres)	Temporary (acres)	Permanent (acres)	Temporary (acres)
Tipton Kangaroo Rat	Other Potentially Suitable Habitat	156.4	66.2	103.8	76.2	155.6	66.2	155.6	66.2	no change	no change	234.0	-3.8
	Tipton Kangaroo Rat Total	**156.4**	**66.2**	**103.8**	**76.2**	**155.6**	**66.2**	**155.6**	**66.2**	**no change**	**no change**	**234.0**	**-3.8**
Tricolored Blackbird	Breeding Season Foraging - Agriculture	174.4	240.0	164.7	243.5	174.4	240.0	174.4	240.0	no change	no change	no change	no change
	Breeding Season Foraging - Natural	1,150.7	297.6	1,121.5	304.8	1,133.7	293.4	1,144.9	302.6	1.1	5.6	220.0	-13.6
	Non-Breeding Season Foraging - Agriculture	59.8	16.1	59.8	16.1	66.9	14.7	59.8	16.1	no change	no change	no change	no change
	Non-Breeding Season Foraging - Natural	45.6	11.8	45.6	11.8	49.7	15.9	45.6	11.8	no change	no change	no change	no change
	Occupied Colony Habitat	3.0	0.6	3.0	0.6	3.0	0.6	3.0	0.6	no change	no change	no change	no change
	Suitable Colony Habitat	3.9	0.8	3.7	0.7	3.6	0.9	3.9	0.8	no change	no change	no change	no change
	Tricolored Blackbird Total	**1,437.3**	**566.8**	**1,398.3**	**577.5**	**1,431.3**	**565.5**	**1,431.5**	**571.9**	**1.1**	**5.6**	**220.0**	**-13.6**
Western Yellow-billed Cuckoo	Other Potentially Suitable Breeding Habitat	1.0	0.2	1.0	0.2	1.0	0.2	1.0	0.2	no change	no change	no change	no change
	Western Yellow-billed Cuckoo Total	1.0	0.2	1.0	0.2	1.0	0.2	1.0	0.2	no change	no change	no change	no change
Willow Flycatcher	Moderate Potentially Suitable Habitat	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	no change	no change	no change	no change
	Potentially Suitable Habitat	23.6	5.2	23.4	5.3	22.7	5.7	22.8	5.2	0.1	no change	4.3	0.8
	Willow Flycatcher Total	**23.6**	**5.2**	**23.4**	**5.3**	**22.7**	**5.8**	**22.8**	**5.2**	**0.1**	**no change**	**4.3**	**0.8**

Source: California High-Speed Rail Authority, 2021
Data for both CCNM Design Options are applicable to all of the B-P Build Alternatives, and the values represent the increase/decrease compared to the B-P Build Alternatives.
B-P = Bakersfield to Palmdale Project Section
ESU = Evolutionarily Significant Unit
CCNM = César E. Chávez National Monument
SC/CC = Southern California/Central Coast

effects has shown that effects decrease with distance from the tunnel, and not all surface waters are typically affected, or affected to the same extent.

Permanent
Permanent construction impacts include the permanent conversion of habitat to project infrastructure, which could result in the loss of individuals of special-status wildlife species and their habitats within the limits of disturbance.

Amphibians
Direct impacts on special-status amphibian species (Tehachapi slender salamander [*Batrachoseps stebbinsi*], foothill yellow-legged frog [*Rana boylii*], western spadefoot toad [*Spea hammondii*], and yellow-blotched salamander [*Ensatina eschscholzii croceator]*) could include mortality and injury of adults, eggs or egg masses, and larvae resulting from construction activities in suitable upland or aquatic habitat. Amphibians and their eggs or larvae could be disturbed, injured, or killed if any construction activity, such as temporary dewatering of surface waters to enable construction, occurs within wetlands, ponds, or streams. Mortality and injury or harassment may also occur if these species become trapped in open, excavated areas. Other direct impacts on habitat for these species could include destruction of refugia (e.g., burrows), temporary shifts in foraging patterns or territories, and increased predation as a result of increased noise and vibration, light, and ground disturbance. Direct impacts from construction activities could include displacement, mortality or injury, or harassment as a result of the destruction, temporary dewatering, degradation, fill, pollution, or permanent conversion of aquatic breeding or upland refugia habitat. Additionally, direct impacts may result from permanent changes in micro-/local hydrology.

Indirect impacts on aquatic habitat could occur as a result of changes in the retention/infiltration of runoff to aquatic habitat, or a disturbance of the underlying hardpan soils of these habitats. Indirect impacts on amphibians could occur from the construction of HSR components that alter the landscape and may include changes in water velocity and periods of inundation in nearby habitats. The fragmentation of the habitats and landscapes resulting from construction of the HSR project components (e.g., security fences, elevated structures, railbeds, and associated facilities) may interfere with the daily and seasonal movement and dispersal of the special-status amphibian species. Indirect impacts could also result from the introduction and colonization of nonnative plant species, which may reduce habitat quality.

Reptiles
Direct impacts on special-status reptiles (blunt-nosed leopard lizard [*Gambelia sila*] and desert tortoise [*Gopherus agassizii*]) could include mortality, injury, or harassment (in the case of the federally listed desert tortoise) of adults, eggs, or juveniles as a result of construction activities in suitable habitat. Construction may result in the destruction or degradation of habitat and the loss of nesting areas, burrows, or other refugia. In addition, ground disturbance, noise, and vibration associated with these activities could disrupt the activities of individuals and may impair normal life cycle behaviors. Mortality, injury, or harassment may also occur if these species become trapped in open, excavated areas. The Authority understands that the blunt-nosed leopard lizard is fully protected and the project would be designed to avoid take if potential direct impacts on this species are identified. Indirect impacts on reptiles may include the inadvertent introduction of invasive (noxious) weeds (e.g., yellow star-thistle [*Centaurea solstitialis*]), which can reduce habitat suitability. The fragmentation of the habitats and landscapes resulting from construction of the HSR project components (e.g., security fences, elevated structures, railbeds, and associated facilities) may interfere with the daily and seasonal movement and dispersal of the special-status reptile species. Indirect impacts could also result from the introduction and colonization of nonnative plant species, which may reduce habitat quality. In addition, soil compaction and the placement of fill in suitable habitat may indirectly affect special-status reptiles by prohibiting burrowing or by changing the frequency of vegetative cover.

Insects
Direct impacts on special-status insects (Crotch bumblebee [*Bombus crotchii*], monarch butterfly [*Danaus plexippus plexippus*], and Kern primrose sphinx moth [*Euproserpinus Euterpe*]) could include mortality or injury of adults, eggs, or juveniles as a result of construction activities in

suitable habitat. Construction may also result in the destruction or degradation of habitat and the loss of hives. Mortality, injury, or harassment may also occur if these species become trapped in open, excavated areas.

Indirect impacts on special-status insects (Crotch bumblebee, monarch butterfly, and Kern primrose sphinx moth) fragmentation of habitats and landscapes resulting from construction of the HSR project components (e.g., security fences, elevated structures, and associated facilities) which may interfere with the daily and seasonal movement and dispersal of the special-status insect species. Indirect impacts could also result from the introduction and colonization of nonnative plant species, which may reduce habitat quality.

Birds (including Migratory Birds Protected by the California Fish and Game Code)

Construction activities may directly affect a number of special-status passerine birds, special-status wading birds, special-status raptors, shorebirds, duck species, and migratory birds (including bird species listed in Table 3.7-6 and Table 3.7-7) through the disturbance of potential habitat. Such disturbance includes noise and vibration associated with construction activities and equipment. Impacts may include the displacement, mortality, or injury of special-status bird species. If construction occurs during the breeding season (February 1–September 1), active nests could be disturbed, potentially causing the loss of eggs or developing young (i.e., nest abandonment during the incubation, nestling, or fledgling stages of these species). Direct impacts from construction activities could include displacement, mortality, injury, or harassment as a result of the destruction, degradation, fill, pollution, or permanent conversion of aquatic breeding or upland refugia habitat for water birds. Additionally, direct impacts may result from permanent changes in micro-/local hydrology, and construction generated disturbance such as noise and vibration associated with construction activities near nests could disrupt individuals and cause adults to abandon their eggs or recently hatched young if they perceive such disturbances as a threat.

Indirect impacts on birds as a result of temporary habitat conversion could include shifts in foraging patterns or territories, increased predation, and decreased reproductive success. The inadvertent introduction of invasive (noxious) weeds could reduce habitat suitability for these species.

Direct impacts from construction activities may include the removal, disturbance, or abandonment of potential nesting habitat for special-status passerine birds, special-status wading birds, special-status raptors, shorebirds, duck species, and migratory birds. Direct impacts could result from the fragmentation of the landscape, which may interfere with daily or seasonal movement, foraging, and dispersal of bird species.

Indirect impacts on birds may result from fragmentation of the landscape. This may result in shifts in foraging patterns or territories, or in decreased reproductive success and reduced population viability. Indirect impacts may include any additional habitat changes from the colonization and spread of nonnative plant species, which may further reduce adjacent habitat suitability.

Of particular concern would be bird species that have a regulatory status beyond the MBTA and California Fish and Game Code sections that apply to virtually all native species (e.g., threatened, endangered, and fully protected species). Among the latter are the California condor and golden eagle, which merit focused discussion because of particular nesting requirements and, in the case of the California condor, a propensity to investigate unusual activities within their territories.

Human presence associated with project construction activities may deter nesting by golden eagle at any of the 14 active nests that are currently known within 1 mile of the project alignment, and it is possible that 1 or 2 nest sites would be directly impacted. However, based on available information (Bloom 2019; Braham et al. 2015; Poessel et al. 2016) it is difficult to estimate the effect in terms of the number of pairs as there are several factors to be considered with respect to golden eagle utilization of the project vicinity:

1. There are currently approximately 28 to 30 golden eagle territories within the raptor study area.
2. Golden eagle pairs are known to use multiple nest sites, such that the loss of a specific site may or may not affect the success of a territory.
3. There is a great deal of variation in the impacts of human presence on a particular nest site, depending on the specific spatial relationships relative to terrain and the nature of the activity.
4. Golden eagle territories are large, highly variable in size, and highly variable seasonally. For example, studies in the Mojave Desert and the Tehachapi Mountains (Braham and Poessler, respectively) have found average home range sizes on the order of 98 to 120 square miles, and minimum and maximum home ranges of 2 square miles and 1,370 square miles, respectively.

These factors provide context for considering the potential impacts of the project, which include the permanent loss of approximately 10 square miles of foraging habitat in a raptor study area that includes approximately 537 square miles of foraging habitat.

While there are currently no known California condor nests in the project vicinity, foraging occurs in the Tehachapi Mountains and foothills, and California condors are known to investigate areas of human activity and to be attracted to anthropogenic objects, including trash.

Mammals

Construction activities also have the potential to affect special-status mammals (Mohave ground squirrel [*Xerospermophilus mohavensis*], Tipton kangaroo rat [*Dipodomys nitratoides nitratoides*], Townsend's big-eared bat [*Corynorhinus townsendii*], San Joaquin kit fox [*Vulpes macrotis mutica*], ringtail [*Bassariscus astutus*], and mountain lion [*Puma concolor*]) directly and indirectly. This includes the Southern California/Central Coast ESU of mountain lion population (south of SR 58), which is now a candidate for listing under CESA due to the continued fragmentation and loss of habitat. As described in the WCA (Authority 2018a), the project would maintain permeability across the project alignment for mammals through a combination of 52 elevated viaducts, 9 underground tunnels, and 39 dedicated wildlife crossings underneath fenced at-grade segments. Within the mountain lion species range, there are 14 elevated viaducts, 6 underground tunnels, and 5 dedicated wildlife crossings that would facilitate wildlife movement and maintain existing genetic exchange between the Southern California/Central Coast ESU of mountain lion population and the Western Sierra Nevada population. The Local Permeability Assessment described in the WCA modeled wildlife movement across a 6-kilometer (3.73-mile) wide corridor using South Coast Wildlands movement data for select representative focal species and compared it with project conditions that prohibit wildlife from crossing at fenced at-grade segments. Because of the number, size, and distribution of the elevated viaducts, underground tunnels, and dedicated wildlife crossings, the project would reduce permeability for mountain lion by only 1 percent.

Direct impacts could include mortality and injury of mammal species from vehicle strikes in construction work areas or the incidental collapsing of occupied burrows/dens by construction equipment. Noise, dust, and increased vibration may also directly affect mammal species' populations and habitat. Lighted construction areas could disorient species (e.g., bats) and disrupt nocturnal foraging activities of other mammal species. Ground disturbance could lead to the temporary loss of foraging and burrowing habitat. Direct impacts on mammals would be primarily related to habitat conversion. Burrowing, denning, and foraging habitat may be lost through ground disturbance and/or habitat degradation, temporary dewatering, or land conversion from natural and bare-earth habitats to developed, hardscaped land uses. In addition, increased noise levels and human presence may influence local shifts in populations, and noise and vibration associated with construction activities could disrupt individuals and may impair normal life cycle behaviors.

Indirect impacts on mammal species from temporary habitat conversion could include shifts in foraging patterns or territories, increased predation, and decreased reproductive success. Alteration and compaction of soils could result in indirect impacts by creating less-suitable burrow habitat. Removal of burrowing prey species may indirectly affect food availability for predatory

mammal species. The inadvertent introduction of invasive (noxious) weeds could reduce habitat suitability for these species. Indirect impacts on special-status mammal species could result from fragmentation of the landscape. This may result in shifts in foraging patterns, territories, or dispersal movements; increased predation; decreased reproductive success; and reduced population viability. Indirect impacts may include any additional habitat changes from the colonization and spread of nonnative plant species, which may further reduce adjacent habitat suitability. In addition, as noted above for various special-status species, indirect impacts could occur from a disruption of groundwater flow to springs, seeps, streams associated habitat from tunnel construction activities. This construction may interfere with water flows, occasionally causing desiccation of these aquatic resources that could provide critical habitat for special-status mammal species. These springs, seeps, streams and associated habitat are identified and discussed in Aquatic Resources under BIO-Impact #4.

Native Fauna

Direct and indirect impacts for other native fauna (e.g., insects, mollusks, crustaceans, amphibians, reptiles, birds, and mammals) are similar to those described above for special-status wildlife species.

As part of the B-P Build Alternatives, BIO-IAMF#1 through BIO-IAMF#3, BIO-IAMF#5 through BIO-IAMF#12, and HYD-IAMF#1 and HYD-IAMF#2 would be incorporated to avoid and/or minimize impacts on biological and aquatic resources from project construction, as applicable and discussed in Section 3.7.4.2. The Authority would incorporate these IAMFs to reduce and minimize impacts by designating a project biologist and species-specific and general biological monitors during construction (BIO-IAMF#1). In addition, the Authority would develop and implement a BRMP to identify special-status species to be avoided during construction (BIO-IAMF#5). The BRMP would be a compilation of the biological resources avoidance and minimization measures applicable to the project section and other project environmental plans, such as the RPP and WCP. Requirements have also been incorporated that would require the Authority to delineate ESAs or environmentally restricted areas on final construction plans and in the field using measures such as flagging or fencing. Under all of the B-P Build Alternatives, the Authority would require construction crews to attend WEAP training and certify that they understand the regulatory agency requirements and procedures necessary to protect biological resources (BIO-IAMF#3). This would avoid some (but not all) direct impacts on special-status wildlife species because it would establish that contractors must be aware of and avoid affecting special-status wildlife species occurrences during construction. Removal and disturbance of potential habitat in temporary impact areas and for the placement of permanent infrastructure from construction of the B-P Build Alternatives would directly affect special-status wildlife species as listed and discussed above. HYD-IAMF#1 and HYD-IAMF#2 would also be implemented. HYD-IAMF#1 addresses stormwater management and requires that a plan for management and treatment be prepared prior to construction. HYD-IAMF#2 requires preparation of a flood protection plan prior to construction.

CEQA Conclusion

The design characteristics of the B-P Build Alternatives include effective IAMFs to identify special-status wildlife species (including amphibians, reptiles, insects, birds, and mammals) habitat and delineate ESAs, or environmentally restricted areas, on final construction plans and in the field. These measures would reduce, but not avoid, impacts on special-status wildlife species and habitat. Based on the CEQA thresholds identified in Section 3.7.4.7, the impact under CEQA to special-status wildlife species and habitat would be potentially significant under any of the B-P Build Alternatives. This determination is because habitat removal, degradation, or modification resulting from ground disturbance during construction and potential wildlife disturbances/losses from construction activities; noise and vibration activities that could cause roost abandonment; and disruption of normal life cycle behaviors could cause a substantial adverse effect on special-status wildlife species and habitat.

To address permanent and temporary removal or disturbance of vegetation for the placement of permanent infrastructure, and/or for construction access, effective mitigation measures have been identified in Section 3.7.7 to reduce impacts on special-status wildlife species and habitat to

a less than significant level by avoidance, protection, or restoration methods. These measures include the following:

- **Amphibians, Reptiles, and Insects**
  - BIO-MM#7: Conduct Pre-Construction Surveys for Special-Status Reptile and Amphibian Species
  - BIO-MM#8: Implement Avoidance and Minimization Measures for Special-Status Reptile and Amphibian Species
  - BIO-MM#11: Conduct Surveys for Blunt-Nosed Leopard Lizard
  - BIO-MM#13: Implement Avoidance Measures for Blunt-Nosed Leopard Lizard
  - BIO-MM#36: Install Aprons or Barriers within Security Fencing
  - BIO-MM#50: Implement Measures to Minimize Impacts during Off-Site Habitat Restoration, or Enhancement, or Creation on Mitigation Sites
  - BIO-MM#55: Prepare and Implement a Weed Control Plan
  - BIO-MM#58: Establish Environmentally Sensitive Areas and Non-Disturbance Zones
  - BIO-MM#61: Establish and Implement a Compliance Reporting Program
  - BIO-MM#62: Prepare Plan for Dewatering and Water Diversions
  - BIO-MM#63: Work Stoppage
  - BIO-MM#75: Minimize Impacts on Kern Primrose Sphinx Moth Host Plants
  - BIO-MM#79: Mitigation for Desert Tortoise
  - BIO-MM#80 Conduct Surveys and Implement Avoidance Measures Crotch Bumble Bee
  - BIO-MM#82: Avoid Direct Impacts on Monarch Butterfly Host Plants
  - BIO-MM#83: Provide Compensatory Mitigation for Impacts on Monarch Butterfly Breeding and Foraging Habitat
  - BIO-MM#86: Implement Lighting Minimization Measures During Construction
  - WQ-MM#3: Tunnel Constructability and Hydrogeological Monitoring
- **Birds (Including Migratory Birds Protected by California Fish and Game Code)**
  - BIO-MM#14: Conduct Pre-Construction Surveys and Delineate Active Nest Buffers Exclusion Areas for Breeding Birds
  - BIO-MM#15: Conduct Pre-Construction Surveys and Monitoring for Raptors
  - BIO-MM#16: Implement Avoidance Measures for California Condor
  - BIO-MM#17: Conduct Surveys for Swainson's Hawk Nests and Implement Avoidance and Minimization Measures
  - BIO-MM#18: Implement Avoidance and Minimization Measures for Swainson's Hawk Nests
  - BIO-MM#20: Conduct Protocol Surveys for Burrowing Owls
  - BIO-MM#21: Implement Avoidance and Minimization Measures for Burrowing Owl
  - BIO-MM#36: Install Aprons or Barriers within Security Fencing
  - BIO-MM#56: Conduct Monitoring of Construction Activities
  - BIO-MM#58: Establish Environmentally Sensitive Areas and Non-Disturbance Zones
  - BIO-MM#61: Establish and Implement a Compliance Reporting Program

- BIO-MM#62: Prepare Plan for Dewatering and Water Diversions
- BIO-MM#63: Work Stoppage
- BIO-MM#65: Conduct Pre-construction Surveys and Monitoring for Bald and Golden Eagles
- BIO-MM#66: Implement Avoidance Measures for Active Eagle Nests
- BIO-MM#68: Avoid and Minimize Impacts on White-Tailed Kite
- BIO-MM#69: Conduct Surveys and Implement Avoidance Measures for Active Tricolored Blackbird Nest Colonies
- BIO-MM#71: Implement California Condor Avoidance Measures during Helicopter Use
- BIO-MM#72: Implement Avoidance of Nighttime Light Disturbance for California Condor
- BIO-MM#74: Implement Bird Nest and Avian Special Status Species Avoidance Measures for Helicopter-Based Construction Activities
- BIO-MM#76: Implement Wildlife Rescue Measures
- BIO-MM#86: Implement Lighting Minimization Measures During Construction
- WQ-MM#3: Tunnel Constructability and Hydrogeological Monitoring

- **Mammals**
  - BIO-MM#22: Conduct Pre-Construction Surveys for Nelson's Antelope Squirrel, Tipton Kangaroo Rat, Dulzura Pocket Mouse, and Tulare Grasshopper Mouse
  - BIO-MM#23: Implement Avoidance and Minimization Measures for Nelson's Antelope Squirrel, Tipton Kangaroo Rat, Dulzura Pocket Mouse, and Tulare Grasshopper Mouse
  - BIO-MM#25: Conduct Pre-Construction Surveys for Special-Status Bat Species
  - BIO-MM#26: Implement Bat Avoidance and Relocation Measures
  - BIO-MM#27: Implement Bat Exclusion and Deterrence Measures
  - BIO-MM#28: Conduct Pre-Construction Surveys for Ringtail and Ringtail Den Sites and Implement Avoidance Measures
  - BIO-MM#29: Conduct Pre-Construction Surveys for American Badger Den Sites and Implement Minimization Measures
  - BIO-MM#30: Conduct Pre-Construction Surveys for San Joaquin Kit Fox
  - BIO-MM#31: Minimize Impacts on San Joaquin Kit Fox
  - BIO-MM#36: Install Aprons or Barriers within Security Fencing
  - BIO-MM#56: Conduct Monitoring of Construction Activities
  - BIO-MM#58: Establish Environmentally Sensitive Areas and Non-Disturbance Zones
  - BIO-MM#60: Limit Vehicle Traffic and Construction Site Speeds
  - BIO-MM#61: Establish and Implement a Compliance Reporting Program
  - BIO-MM#62: Prepare Plan for Dewatering and Water Diversions
  - BIO-MM#63: Work Stoppage
  - BIO-MM#76: Implement Wildlife Rescue Measures
  - BIO-MM#77: Implement Wildlife Height Requirements for Enhanced Security Fencing
  - BIO-MM#78: Install Wildlife Jump-Outs

- BIO-MM#84: Conduct Pre-Construction Surveys and Implement Avoidance and Minimization Measures for Mountain Lion Dens
- BIO-MM#86: Implement Lighting Minimization Measures During Construction
- WQ-MM#3: Tunnel Constructability and Hydrogeological Monitoring

The measures outlined above would allow for the removal or exclusion of special-status wildlife species from the construction site prior to ground disturbance. In the case of fully protected terrestrial species (i.e., the blunt-nosed leopard lizard and ringtail), capture is not authorized and "removal" must be passive (BIO-MM#11, BIO-MM#13, and BIO-MM#28). Other fully protected species are birds, which naturally avoid humans in close proximity; however, the curiosity of the California condor may lead to a situation where hazing in accordance with USFWS approved methods, which is not considered take, is appropriate per the mitigation measures provided in 3.7.7.

In addition, as discussed in Section 3.8, Hydrology and Water Resources, WQ-MM#3, Tunnel Constructability and Hydrogeological Monitoring, would be implemented to reduce potential impacts on springs and seeps during construction of the tunnels. WQ-MM#3 would implement the preparation of an AMMP to minimize potential impacts on water resources supported by groundwater resources, including springs, seeps, and surface water resources supported by groundwater, therefore reducing potential impacts on special-status wildlife species that use these springs, seeps, streams, and associated habitat.

The following compensatory mitigation measures would allow for on-site and off-site habitat restoration and preservation of special-status wildlife species:

- BIO-MM#42: Provide Compensatory Mitigation for Impacts on Habitat for Blunt-Nosed Leopard Lizard, Tipton Kangaroo Rat, and Nelson's Antelope Squirrel
- BIO-MM#43: Provide Compensatory Mitigation for Loss of Swainson's Hawk Nesting Trees and Habitat
- BIO-MM#44: Provide Compensatory Mitigation for Loss of Active Burrowing Owl Burrows and Habitat
- BIO-MM#47: Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts on Aquatic Resources
- BIO-MM#50: Implement Measures to Minimize Impacts during Off-Site Habitat Restoration, or Enhancement, or Creation on Mitigation Sites
- BIO-MM#53: Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat
- BIO-MM#67: Provide Compensatory Mitigation for Loss of Eagle Nests
- BIO-MM#70: Provide Compensatory Mitigation for Impacts on Tricolored Blackbird Habitat
- BIO-MM#81: Provide Compensatory Mitigation for Impacts on Crotch Bumble Bee
- BIO-MM#83: Provide Compensatory Mitigation for Impacts on Monarch Butterfly Breeding and Foraging Habitat
- BIO-MM#85: Provide Compensatory Mitigation for Impacts on Mountain Lion Core and Patch Habitat

These measures would work together with design features to minimize or avoid impacts on special-status wildlife species. In addition, the following would further mitigate and minimize impacts on special-status wildlife species by removing nonnative species that would compete for habitat, and would provide for ongoing monitoring and reporting efforts:

- BIO-MM#55: Prepare and Implement a Weed Control Plan
- BIO-MM#56: Conduct Monitoring of Construction Activities

- BIO-MM#58: Establish Environmentally Sensitive Areas and Non-Disturbance Zones
- BIO-MM#60: Limit Vehicle Traffic and Construction Site Speeds
- BIO-MM#61: Establish and Implement a Compliance Reporting Program
- BIO-MM#62: Prepare Plan for Dewatering and Water Diversions
- BIO-MM#63: Work Stoppage

The Authority would use all measures in this EIR/EIS to avoid species during construction activities. With regard to special-status wildlife species discussed in this section, impacts would be avoided, minimized and mitigated through mitigation measures that would require the Authority to minimize impacts and provide restoration, enhancement, and/or preservation after construction is completed.

Therefore, during construction of the B-P Build Alternatives, impacts on special-status wildlife species would be reduced and considered less than significant under CEQA after the implementation of mitigation measures identified above and in Section 3.7.7. Because these mitigation measures would provide for on-site and off-site habitat restoration and preservation of special-status wildlife species in an amount equivalent to or greater than the area impacted by the B-P Build Alternatives, no substantial adverse effect would occur, either directly or through habitat modifications. For wide-ranging, multihabitat species, such as the golden eagle, the preservation and restoration of habitat for all of the other special status animal species would provide extensive habitat conservation in areas that are currently degraded or not conserved, thus ensuring preservation of habitat that would continue to support these species in the future.

Impact BIO #3: Construction Impacts on Special-Status Plant Communities

The project would result in direct and indirect impacts on special-status plant communities that occur within the project footprint. Of the nine plant communities identified as potentially being in the project footprint, the following seven special-status plant communities would be affected by project construction of the B-P Build Alternatives: blue oak woodland, desert wash, valley foothill riparian, mixed chaparral, desert riparian, perennial grassland, and Joshua tree woodland (Table 3.7-11). Potential temporary and permanent impacts on special-status plant communities that may result from project construction are described in the subsections below.

Temporary

Temporary impacts on special-status plant communities may result from activities such as construction vehicle traffic; the temporary use of land for staging and access areas, including temporary dewatering of surface waters to enable construction (although these areas would be sited within areas that would have permanent impacts already, to the maximum extent feasible); noise, light, dust, and vibration from construction activities; and other construction-related activities that are temporary in nature.

Indirect impacts on special-status plant communities could occur as a result of changes in erosion and sedimentation from construction activities or groundwater depletion from tunnel construction. Upland vegetation and special-status plants such as grassland species and shrubs would not be affected by potential groundwater depletion because these species have shallow roots, or relatively shallow roots, and are not dependent on groundwater. However, certain upland trees, such as oaks, can have deep roots that can reach to groundwater.

Adverse effects in the moderate and high risk areas could occur because of an alteration of the inundation period (also referred to as the hydroperiod), a change to the water table that could cause desiccation and mortality of special-status plant communities, or a change that affects the germination or ability of plants to complete their life cycle due to drought stress or other causes. Special-status plant communities occurring along stream channels fed by surface flows during the winter and spring months and by springs and subsurface water flows during the summer and fall months would likely become stressed if subsurface water flows were disrupted by tunnel construction. While effects could occur on such vegetation communities, the assessment represents a worst-case evaluation of effects because the amount of special-status plant communities is likely to be a subset of the overall vegetation communities they occur in, and

previous monitoring of tunnel construction effects has shown that effects decrease with distance from the tunnel, and not all surface waters are typically affected, or affected to the same extent.

Other temporary adverse effects could include displaced sediment and changes to microtopography that could alter the soil and substrate conditions preferred by vegetation. Impacts on hydrology may include water availability to plant species, inhibiting growth, survival during harsh conditions, and germination. Fragmentation would result from the construction of temporary features, especially staging areas and access roads that may bisect special-status plant communities. Construction activities could facilitate the spread of invasive and noxious weeds through introduction of seeds by construction equipment, vehicles, and personnel.

Permanent
Permanent impacts on special-status plant communities may result from the conversion of habitat to permanent facilities or other project infrastructure that would not allow the plant community to re-establish after the construction period.

Direct impacts on special-status plant communities from construction activities may result from the displacement of plant populations for stations, tracks, maintenance and equipment storage areas, access roads, road overcrossings, substations, and other permanent facilities. These activities would require the removal, destruction, covering, or unearthing of plant populations, in addition to soil compaction and the placement of fill and other material. Excess dust and piled dirt could bury viable seed bank, lower germination rates, or otherwise negatively alter surface areas within special-status plant communities. In addition to removal, permanent degradation of communities dependent on direct sunlight may result from shading by overcrossings and structures.

Indirect impacts on special-status plant communities could occur as a result of changes from erosion and sedimentation. Displaced sediment and major changes to microtopography could alter the soil and substrate conditions preferred by current vegetation and favor other vegetation types. Habitat fragmentation from project infrastructure could reduce the viability of special-status plant communities in a number of ways. For example, fragmentation could alter the survival and movement of wildlife that facilitate pollination or dispersal of plant species comprising special-status plant communities. Construction activities could facilitate the spread of invasive and noxious weeds through introduction of seeds by construction equipment, vehicles, and personnel. The egress and ingress of machinery and personnel could also spread or inadvertently introduce harmful or devastating pathogens, such as sudden oak death, to special-status plant communities, which are more susceptible in fragmented communities.

As part of the B-P Build Alternatives, BIO-IAMF#1 through BIO-IAMF#3 and BIO-IAMF#5 through BIO-IAMF#11 would be incorporated to avoid and/or minimize impacts on biological and aquatic resources from project construction, as applicable and discussed in Section 3.7.4.2. The Authority would incorporate these IAMFs to reduce and minimize impacts by designating a project biologist and species-specific and general biological monitors during construction (BIO-IAMF#1). In addition, the Authority would develop and implement a BRMP to identify special-status species to be avoided during construction (BIO-IAMF#5). The BRMP would be a compilation of the biological resources avoidance and minimization measures applicable to the project section and other project environmental plans, such as the RPP and WCP. Requirements have also been incorporated that would require the Authority to delineate ESAs or environmentally restricted areas on final construction plans and in the field using measures such as flagging or fencing under direction of the project biologist. Under all of the B-P Build Alternatives, the Authority would require construction crews to attend WEAP training and certify that they understand the regulatory agency requirements and procedures necessary to protect biological resources (BIO-IAMF#3). This would avoid some (but not all) direct impacts on special-status plant communities because it would establish that contractors must be aware of and avoid affecting special-status plant communities occurrences during construction. In addition, HYD-IAMF#1 and HYD-IAMF#2 would be implemented. HYD-IAMF#1 addresses stormwater management and requires that a plan for stormwater management and treatment be prepared prior to construction. HYD-IAMF#2 requires preparation of a flood protection plan prior to construction.

CEQA Conclusion

The design characteristics of the B-P Build Alternatives and both CCNM Design Options include effective IAMFs to identify special-status plant species and delineate ESAs or environmentally restricted areas on final construction plans and in the field. These measures would minimize, but not avoid, the removal of special-status plant communities within the project footprint. Based on the CEQA thresholds identified in Section 3.7.4.7, the impact under CEQA to special-status plant communities would be potentially significant under any of the B-P Build Alternatives. This determination is because permanent and temporary removal and disturbance of vegetation for the placement of permanent infrastructure, and/or for construction access, would cause a substantial adverse effect on special-status plant communities.

To address permanent and temporary removal or disturbance of vegetation for the placement of permanent infrastructure, and/or for construction access, effective mitigation measures have been identified in Section 3.7.7 to reduce impacts on special-status plant communities to a less than significant level by avoidance, protection, or restoration methods. These measures include BIO-MM#1, which would require surveys to identify special-status plant species that were not identified in areas where permission to enter was not granted prior to construction, potentially allowing for some level of avoidance of special-status plant species. They also include BIO-MM#47, BIO-MM#50, and BIO-MM#53, which would provide for on- and off-site habitat restoration and preservation of special-status plant communities. In addition, as discussed in Section 3.8, Hydrology and Water Resources, WQ-MM#3, Tunnel Constructability and Hydrogeological Monitoring, would be implemented, which would reduce potential impacts on springs and seeps during construction of the tunnels. WQ-MM#3 would implement the preparation of an AMMP to minimize potential impacts on water resources supported by groundwater resources, including springs, seeps, and surface water resources supported by groundwater. This mitigation measure would reduce potential impacts to special-status plant communities that use these springs, seeps, streams.

These measures would work together with design features to minimize or avoid impacts on special-status plant communities. Additional measures, such as BIO-MM#54 and BIO-MM#61, would further mitigate and minimize impacts on special-status plant communities by removing nonnative plant species that would compete for the same habitat and would provide ongoing monitoring and reporting of the WCP. Therefore, impacts would be avoided or mitigated through mitigation measures that would require the Authority to provide restoration, enhancement, and/or preservation methods for identified impacts on special-status plant communities.

During construction of the B-P Build Alternatives, impacts on special-status plant communities would be reduced and considered less than significant under CEQA after implementation of BIO-MM#1, BIO-MM#6, BIO-MM#47, BIO-MM#50, BIO-MM#53, BIO-MM#54, BIO-MM#58, BIO-MM#61, BIO-MM#75, and WQ-MM#3. Because these mitigation measures would provide for on-site and off-site habitat restoration and preservation of special-status plant communities in an amount equivalent to or greater than the area impacted by the B-P Build Alternatives, no substantial adverse effect would occur, either directly or through habitat modifications, on any special-status plant communities.

Impact BIO #4: Construction Impacts on Aquatic Resources

Construction of the project would result in direct and indirect impacts on aquatic resources. Table 3.7-8, Table 3.7-9, and Table 3.7-10 show the impacts on the following classes of aquatic resources within the ARSA (250-foot buffer), including the areas of the CCNM Design Option, the Refined CCNM Design Option, and engineering and design refinements; wetland waters, claypans, streams and washes, riparian habitat, and artificial watercourses. In general, aquatic resource features within areas of permanent impacts would be permanently filled. Areas of elevated train track, including bridges and viaducts, are considered to be a permanent effect for the entire footprint, not just where supports and pilings are located. Since the waterbodies identified in the ARSA are all isolated, USACE has made a determination not to assert jurisdiction under CWA Section 404 over any areas south of Oswell Street that would be delineated as wetlands for the section (per USACE letter dated December 11, 2017). Because waters in the

Table 3.7-8 Comparison of Potential Estimated Effects on Aquatic Resources—Ordinary High Water Mark or Edge of Wetland[1]

Jurisdictional Wetlands and Waters		Alternative 1		Alternative 2		Alternative 3		Alternative 5		CCNM Design Option2		CCNM Refined Design Option2	
		Permanent (acres)	Temporary (acres)	Permanent (acres)	Temporary (acres)	Permanent (acres)	Temporary (acres)	Permanent (acres)	Temporary (acres)	Permanent (acres)	Temporary (acres)	Permanent (acres)	Temporary (acres)
Seasonal Wetland		2.1	0.2	2.1	0.2	1.2	0.1	2.1	0.1	0.0	0.0	-0.1	0.0
Forested Wetland		0.9	0.0	0.9	0.0	0.8	0.2	0.9	0.0	0.0	0.0	0.0	0.0
Claypans	Natural Claypans	6.7	2.6	6.7	2.6	6.7	2.6	6.5	2.6	0.0	0.0	0.0	0.0
	Ponding in Desert Developed Areas	0.6	0.1	0.6	0.1	0.6	0.1	0.6	0.1	0.0	0.0	0.0	0.0
Streams and washes	Ephemeral Stream	7.6	1.8	7.6	1.7	8.2	2.0	7.6	1.8	+0.1	+0.03	+1.5	-0.2
	Desert Wash	7.1	1.0	7.1	1.0	7.2	1.0	7.1	1.0	0.0	0.0	0.0	0.0
	Intermittent Stream	5.0	1.0	5.0	1.0	4.9	0.9	5.0	1.0	-0.01	+0.02	+0.6	+0.6
	Perennial Stream	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	-0.01	-0.01
Artificial Watercourses—In-Stream Impoundments		0.5	0.1	0.6	0.0	0.5	0.1	0.5	0.1	0.0	0.0	0.0	0.0
Artificial Watercourse—Canals		0.0	0.7	0.0	0.7	0.0	0.7	0.0	0.7	0.0	0.0	0.0	0.0
Artificial Watercourse—Ditches		3.9	0.7	3.9	0.7	3.9	0.7	3.6	0.7	0.0	0.0	0.0	0.0
Artificial Watercourse—Detention/Retention Basins		24.1	2.8	25.2	2.9	24.1	2.8	20.1	2.8	0.0	0.0	0.0	0.0
Total Effects		**58.6**	**11.0**	**59.8**	**11.0**	**58.1**	**11.3**	**54.2**	**11.0**	**+0.1**	**+0.1**	**+2.0**	**+0.4**

Source: California High-Speed Rail Authority, 2016, 2018, 2020
[1] Acreage values are calculated in the ARSA, which included all project alternatives known at the time plus a 250-foot buffer. Acreage totals are derived from raw GIS data and, as a result, may not exactly equal the sum of the rounded values presented in the table.
[2] CCNM Design Option columns show the change in impact should that Design Option be selected. "+" indicates increased impact; "-" indicates decreased impact. For these columns, the "Total" row depicts overall change in impact.
The CCNM Design Option data is applicable to all of the B-P Build Alternatives, and the values represent the increase/decrease compared to the B-P Build Alternatives.
ARSA = Aquatic Resource Study Area
B-P = Bakersfield to Palmdale Project Section
CCNM = César E. Chávez National Monument
GIS = geographic information systems

Table 3.7-9 Comparison of Potential Estimated Effects on Aquatic Resources—Top of Bank or Edge of Riparian[1]

Jurisdictional Wetlands and Waters		Alternative 1		Alternative 2		Alternative 3		Alternative 5		CCNM Design Option2		Refined CCNM Design Option2	
		Permanent (acres)	Temporary (acres)	Permanent (acres)	Temporary (acres)	Permanent (acres)	Temporary (acres)	Permanent (acres)	Temporary (acres)	Permanent (acres)	Temporary (acres)	Permanent (acres)	Temporary (acres)
Streams and Washes	Ephemeral Stream	16.7	3.8	16.6	3.7	17.7	4.2	16.7	3.8	+0.2	+0.03	+3.1	-0.4
	Desert Wash	18.4	1.9	18.4	1.9	18.4	1.9	18.4	1.9	0.0	0.0	0.0	0.0
	Intermittent Stream	9.1	1.9	9.1	1.9	9.0	1.7	9.1	1.9	-0.1	+0.1	+0.5	+0.2
	Perennial Stream	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.0	0.0	-0.01
Riparian		11.6	4.0	11.6	4.0	11.7	4.3	11.6	4.0	-0.1	+0.1	+2.0	+0.1
Artificial Watercourses—In-Stream Impoundments		0.5	0.1	0.6	0.0	0.5	0.1	0.5	0.1	0.0	0.0	0.0	0.0
Artificial Watercourse—Canals		0.0	0.7	0.0	0.7	0.0	0.7	0.0	0.7	0.0	0.0	0.0	0.0
Artificial Watercourse—Ditches		9.3	0.9	9.3	0.9	9.3	0.9	8.6	1.0	0.0	0.0	0.0	0.0
Artificial Watercourse—Detention/Retention Basins		27.2	2.8	28.3	2.9	27.2	2.8	23.2	2.8	0.0	0.0	0.0	0.0
Total Effects		**96.5**	**16.4**	**97.5**	**16.2**	**96.3**	**17.0**	**91.9**	**16.3**	**+0.1**	**+0.2**	**+5.4**	**-0.02**

Source: California High-Speed Rail Authority, 2016, 2018, 2020
[1] Acreage values are calculated in the ARSA, which included all project alternatives known at the time plus a 250-foot buffer. Acreage totals are derived from raw GIS data and, as a result, may not exactly equal the sum of the rounded values presented in the table.
[2] CCNM Design Options columns show the change in impact should that design option be selected. "+" indicates increased impact; "-" indicates decreased impact. For these columns, the "Total" row depicts the overall change in impact.
Both CCNM Design Options data is applicable to all of the B-P Build Alternatives, and the values represent the increase/decrease as compared to the B-P Build Alternatives.
ARSA = Aquatic Resource Study Area
B-P = Bakersfield to Palmdale Project Section
CCNM = César E. Chávez National Monument
GIS = geographic information systems

Table 3.7-10 Potential Areas of Section 1600 Jurisdiction in the Aquatic Resource Study Area[1, 2]

Feature Type	Authority-Mapped 1600 Resources (acres)[3]			Additional Mapping Based on CDFW Methodology (acres)[3]			Difference (acres)[3]		
	Total Mapped in ARSA	Permanent Impact	Temporary Impact	Total Mapped in ARSA	Permanent Impact	Temporary Impact	Total Mapped in ARSA	Permanent Impact	Temporary Impact
Alternative 1									
Claypan	-	-	-	15.3	5.8	1.9	15.3	5.8	1.9
Ponding	50.5	28.3	3.0	2,130.7	1,036.9	226.9	2,080.2	1,008.6	223.9
Streambeds	120.5 (61.6 mi)	53.6 (27.2 mi)	9.2 (6.0 mi)	393.0 (245.8 mi)	190.7 (113.6 mi)	42.0 (29.4 mi)	272.5 (184.2 mi)	137.1 (86.4 mi)	32.8 (23.4 mi)
Riparian	63.3	12.6	4.0	83.4	20.9	5.5	20.0	8.3	1.4
Seasonal Wetland	3.7	2.1	0.2	12.9	6.3	0.9	9.1	4.2	0.7
Total Extent of Features	**238.1**	**96.5**	**16.4**	**2,635.2**	**1,260.6**	**277.2**	**2,397.0**	**1,164.0**	**260.8**
Alternative 2									
Claypan	-	-	-	15.3	5.8	1.9	15.3	5.8	1.9
Ponding	50.2	29.4	3.0	2,129.9	1,036.5	227.3	2,079.7	1,007.1	224.3
Streambeds	120.6 (61.4 mi)	53.4 (27.2 mi)	9.0 (5.9 mi)	394.2 (245.2 mi)	190.6 (110.9 mi)	41.2 (29.1 mi)	273.6 (183.8 mi)	137.2 (83.7 mi)	32.2 (23.2 mi)
Riparian	63.3	12.6	4.0	83.4	20.9	5.4	20.0	8.4	1.4
Seasonal Wetland	3.7	2.1	0.2	12.9	6.3	0.9	9.1	4.2	0.7
Total Extent of Features	**237.8**	**97.5**	**16.2**	**2,635.6**	**1,260.1**	**276.8**	**2,397.7**	**1,162.7**	**260.5**
Alternative 2 with CCNM Design Option									
Claypan	-	-	-	15.3	5.8	1.9	15.3	5.8	1.9
Ponding	50.2	29.4	3.0	2,130.0	1,036.6	227.3	2,079.8	1,007.2	224.3
Streambeds	120.4 (61.2 mi)	53.6 (27.4 mi)	9.2 (5.9 mi)	393.4 (244.5 mi)	187.9 (109.2 mi)	42.4 (29.9 mi)	273.0 (183.3 mi)	134.3 (81.8 mi)	33.2 (24.0 mi)
Riparian	63.4	12.5	4.1	83.3	21.0	5.5	19.9	8.5	1.4

Feature Type	Authority-Mapped 1600 Resources (acres)[3]			Additional Mapping Based on CDFW Methodology (acres)[3]			Difference (acres)[3]		
	Total Mapped in ARSA	Permanent Impact	Temporary Impact	Total Mapped in ARSA	Permanent Impact	Temporary Impact	Total Mapped in ARSA	Permanent Impact	Temporary Impact
Seasonal Wetland	3.7	2.1	0.2	12.9	6.3	0.9	9.1	4.2	0.7
Total Extent of Features	**237.7**	**97.6**	**16.4**	**2,634.9**	**1,257.6**	**278.0**	**2,397.1**	**1,160.0**	**261.5**
Alternative 2 with Refined CCNM Design Option[4]									
Claypan	-	-	-	15.3	5.8	1.9	15.3	5.8	1.9
Ponding	50.4	29.4	3.0	2,130.0	1,036.5	227.3	2,079.6	1,007.1	224.3
Streambeds	127.0 (66.0 mi)	56.9 (30.5 mi)	8.9 (5.4 mi)	13.3 (259.8 mi)	203.2 (123.6 mi)	39.5 (27.2 mi)	286.3 (193.8 mi)	146.3 (93.1 mi)	30.6 (21.8 mi)
Riparian	65.2	14.5	4.1	85.6	22.7	6.1	20.4	8.2	1.9
Seasonal Wetland	3.7	2.0	0.2	12.9	6.2	0.9	9.1	4.2	0.7
Total Extent of Features	**246.2**	**102.9**	**16.2**	**2,657.1**	**1,274.4**	**275.7**	**2,410.8**	**1,171.6**	**259.4**
Alternative 3									
Claypan	-	-	-	15.3	5.8	1.9	15.3	5.8	1.9
Ponding	50.5	28.3	3.0	2,131.0	1,037.2	227.1	2,080.5	1,008.9	224.1
Streambeds	125.0 (62.9 mi)	54.4 (27.9 mi)	9.4 (6.0 mi)	411.9 (248.5 mi)	193.7 (114.7 mi)	44.1 (29.6 mi)	286.9 (185.6 mi)	139.3 (86.8 mi)	34.7 (23.6 mi)
Riparian	63.5	12.4	4.4	84.1	20.8	6.0	20.6	8.3	1.6
Seasonal Wetland	2.7	1.2	0.1	12.1	4.9	0.9	9.4	3.8	0.7
Total Extent of Features	**241.8**	**96.3**	**17.0**	**2,654.4**	**1,262.3**	**280.0**	**2,412.7**	**1,166.1**	**263.0**
Alternative 5									
Claypan	-	-	-	15.1	5.6	1.9	15.1	5.6	1.9
Ponding	48.9	24.3	3.0	2,072.0	980.4	226.6	2,023.1	956.1	223.6
Streambeds	120.4 (61.5 mi)	52.9 (25.9 mi)	9.2 (6.0 mi)	392.1 (244.2 mi)	189.7 (111.7 mi)	42.1 (29.9 mi)	271.7 (182.7 mi)	136.8 (85.8 mi)	32.9 (23.9 mi)

Feature Type	Authority-Mapped 1600 Resources (acres)[3]			Additional Mapping Based on CDFW Methodology (acres)[3]			Difference (acres)[3]		
	Total Mapped in ARSA	Permanent Impact	Temporary Impact	Total Mapped in ARSA	Permanent Impact	Temporary Impact	Total Mapped in ARSA	Permanent Impact	Temporary Impact
Riparian	63.3	12.6	4.0	83.1	20.1	5.5	19.8	7.6	1.4
Seasonal Wetland	3.7	2.1	0.1	12.8	6.3	0.9	9.1	4.2	0.7
Total Extent of Features	**236.4**	**91.9**	**16.3**	**2,575.0**	**1,202.2**	**277.0**	**2,338.7**	**1,110.3**	**260.5**

Source: Authority-*mapped Section 1600 resource delineations from the ARDR (*Authority *2016), BARTR (Authority 2018a), and Aquatic Resources Memorandum (Authority 2020).*

[1] The ARSA includes linear and auxiliary project construction features (i.e., traction power substations, switching stations, paralleling stations, road overcrossings, and heavy maintenance facilities), operations and maintenance facilities and access points, and temporary disturbance areas associated with construction, plus a 250-foot buffer, from the southern terminus of the F Street Station near 34th Street and L Street in Bakersfield to Spruce Court in Palmdale. The datasets used to support the CDFW estimation mapping did not categorize features consistently with the Authority's classification of estimated 1600 features used in the BARTR or ARDR. Therefore, to estimate the total acreage of each feature type and to compare these findings with the datasets provided by CDFW, feature types were simplified into four categories: ponded (which includes desert ponded areas, in-stream impoundments, and artificial watercourses), streambed (which includes stream and washes, canals, and ditches), riparian (which includes riparian and forested wetlands), and seasonal wetlands (designated as "slope wetlands" which include seasonal wetlands).

[2] The results incorporate the most recent updated and released publicly available resource information for the NHD (U.S. Geological Survey, 2015; accessed July 2020) and NWI (accessed August 2020).

[3] Acreage values are calculated in the ARSA, which included all project alternatives known at the time plus a 250-foot buffer. Acreage totals are derived from raw GIS data, and as a result, they may not exactly equal the sum of the rounded values presented in the table.

[4] Alternative 2 with the Refined CCNM Design Option is the State's Preferred Alternative for the Bakersfield to Palmdale Project Section.

ARSA = Aquatic Resources Study Area
CCNM = César E. Chávez National Monument
CDFW = California Department of Fish and Wildlife
GIS = geographic information systems
mi = miles
NHD = National Hydrography Dataset
NWI = National Wetlands Inventory

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area of both CCNM Design Options adjoin or flow into waters determined to be isolated in the USACE's Approved Jurisdictional Delineation, these additional waters are also presumed isolated and it is anticipated that these resources will also not be subject to CWA regulation or USEPA/USACE jurisdiction under the CWA Section 404.

Temporary
Outside of the limited area of fill, state-regulated waters spanned by elevated track (viaducts) or bridges could be degraded but would not be permanently filled. However, to provide a conservative maximum estimate of potential impacts on state-regulated waters, the portion of the footprint beneath the bridge or elevated track structure is considered to be permanently affected.

In addition to direct impacts, indirect impacts are also evaluated for claypan features that fall within the 250-foot buffer of the ARSA. These features may be indirectly affected because filling or disturbing portions of the claypan features have the potential to alter hydrology and, therefore, may indirectly affect claypan wetlands that are wholly or partially within the 250-foot buffer. The following describes potential impacts on aquatic resources caused by HSR project construction. Temporary impacts on state jurisdictional regulated waters may result from the placement of temporary fill during construction in both artificial and natural state jurisdictional regulated waters. Temporary fill could be placed in or dredging could take place from state jurisdictional regulated waters within aquatic resources during the construction of access roads and staging/equipment storage areas. The temporary fill would result in a temporal loss of aquatic resources; potential impacts on the physical, chemical, and biological characteristics of aquatic substrates and food webs; and a potential increase in erosion and sediment transport into adjacent aquatic areas. Chemical spills or leaks of fuel, transmission fluid, lubricating oil, or motor oil from construction equipment could also contaminate waters and degrade their quality.

Temporary dewatering of surface waters may be necessary for site access and to avoid water quality impacts associated with construction. When necessary, work will be conducted when surface flows and ponded water are not present to the greatest extent practicable. If water is encountered during project activities, surface and subsurface water will be dewatered via surface diversion and/or discharged in accordance with standard BMPs or will be hauled offsite and disposed of at an authorized sanitary sewer facility. The size of the dewatered area will depend upon the size and location of the water and the construction or maintenance needs at the time. Temporary coffer dams may be constructed if surface flows require diversion and may be an installed inflatable coffer dam or constructed using materials such as concrete blocks, K-rails, sandbags, plywood, block netting, and corrugated plastic pipe. Following dewatering, if residual surface flow is present within the work area, flow rerouting may be required. Flow rerouting may occur through excavation of a small drainage channel that allows water to flow downstream and out of the work area. If a pump is used to dewater surface or subsurface water, it will have a screened intake of 3 millimeters and placed within a screened box (3-millimeter mesh) to reduce debris and to avoid impingement of aquatic species. The pump rate would convey adequate flows necessary for aquatic species. Piping for the intake would be white in color and covered with hay or light-colored tarps to maintain adequate water quality and temperature for aquatic species. The potential reduction of groundwater flows from tunnel construction may indirectly impact aquatic resources, including springs, seeps and streams and their associated habitat, with durations of effects lasting days, months, or up to several years after tunnel completion. Perennial, intermittent, and ephemeral streams exist in various locations throughout the tunnel construction study area. Existing data from the National Hydrography Dataset was used to identify springs in the tunnel construction study area (USGS 2020). Two springs in the permanent impact area of the footprint are within approximately 0.2 mile of Tunnel #4 (Figure 3.7-4 and Figure 3.7-5), and two springs are within approximately 0.3 mile of Tunnel #8 (Figure 3.7-6 and Figure 3.7-7). No other springs are within the 1-mile Tunnel Study Area. The springs and streams in the study area are near the White Wolf and Garlock Fault Zones, which may make them more vulnerable to impacts if tunnel construction intersects underground faults, potentially draining off some of the water from the fractures associated with the fault. Impacts could occur because of a change to the inundation period or a change to the water table, which could cause the springs or stream reaches to fully or partially dry up. Modifications to seeps, springs, and stream flows could affect

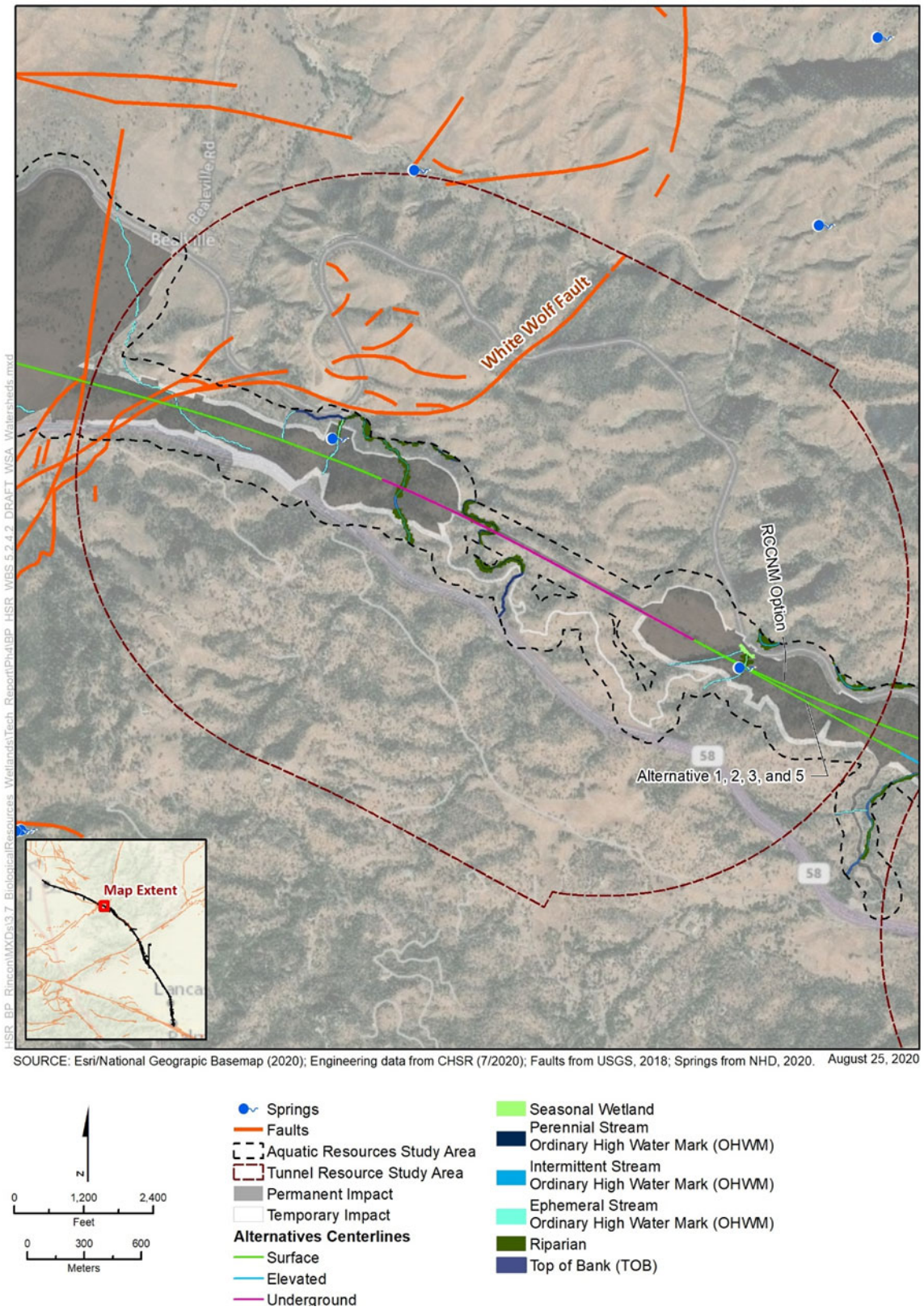

Figure 3.7-4 Springs near Tunnel #4

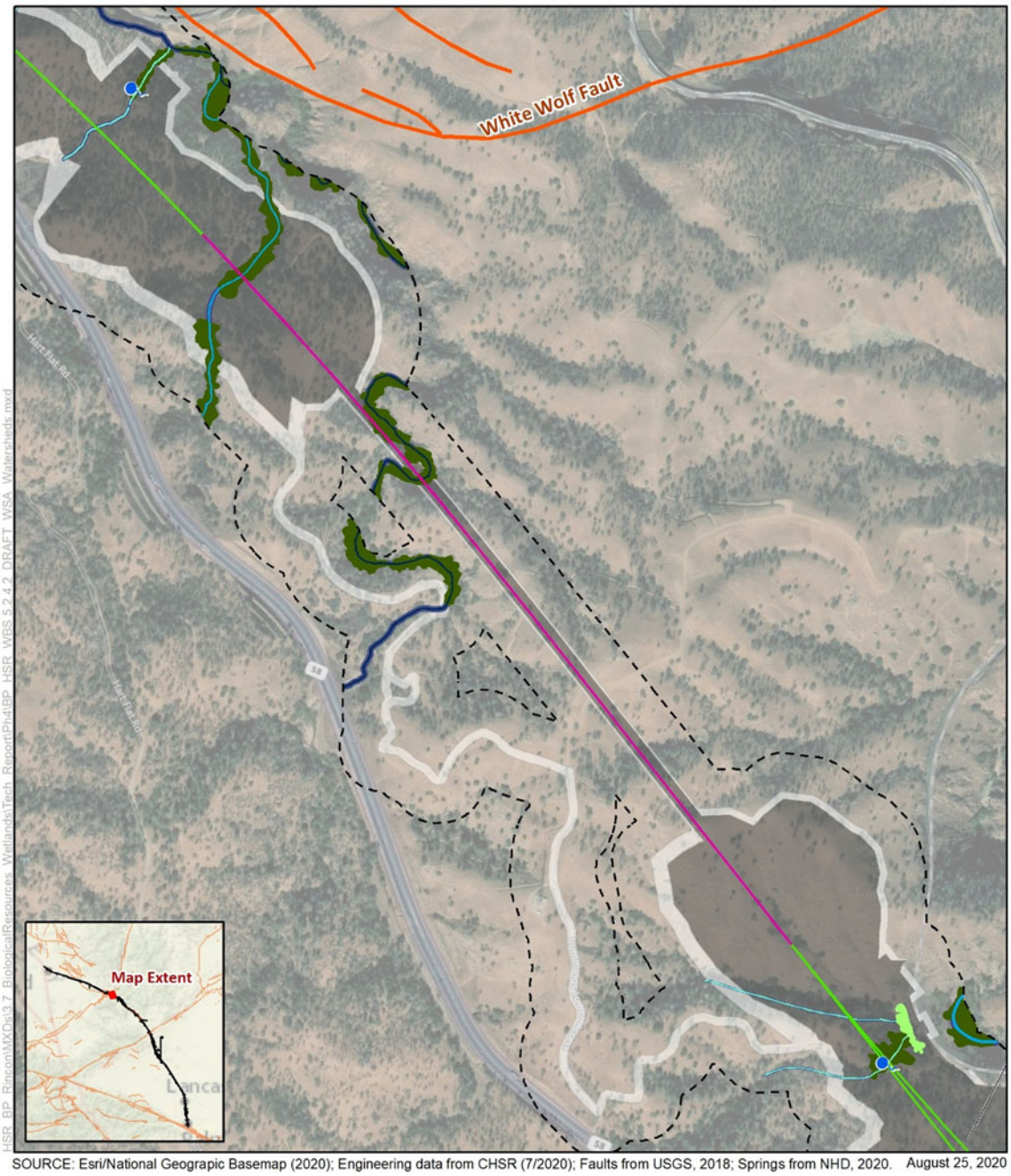

Figure 3.7-5 Zoomed View of Springs near Tunnel #4

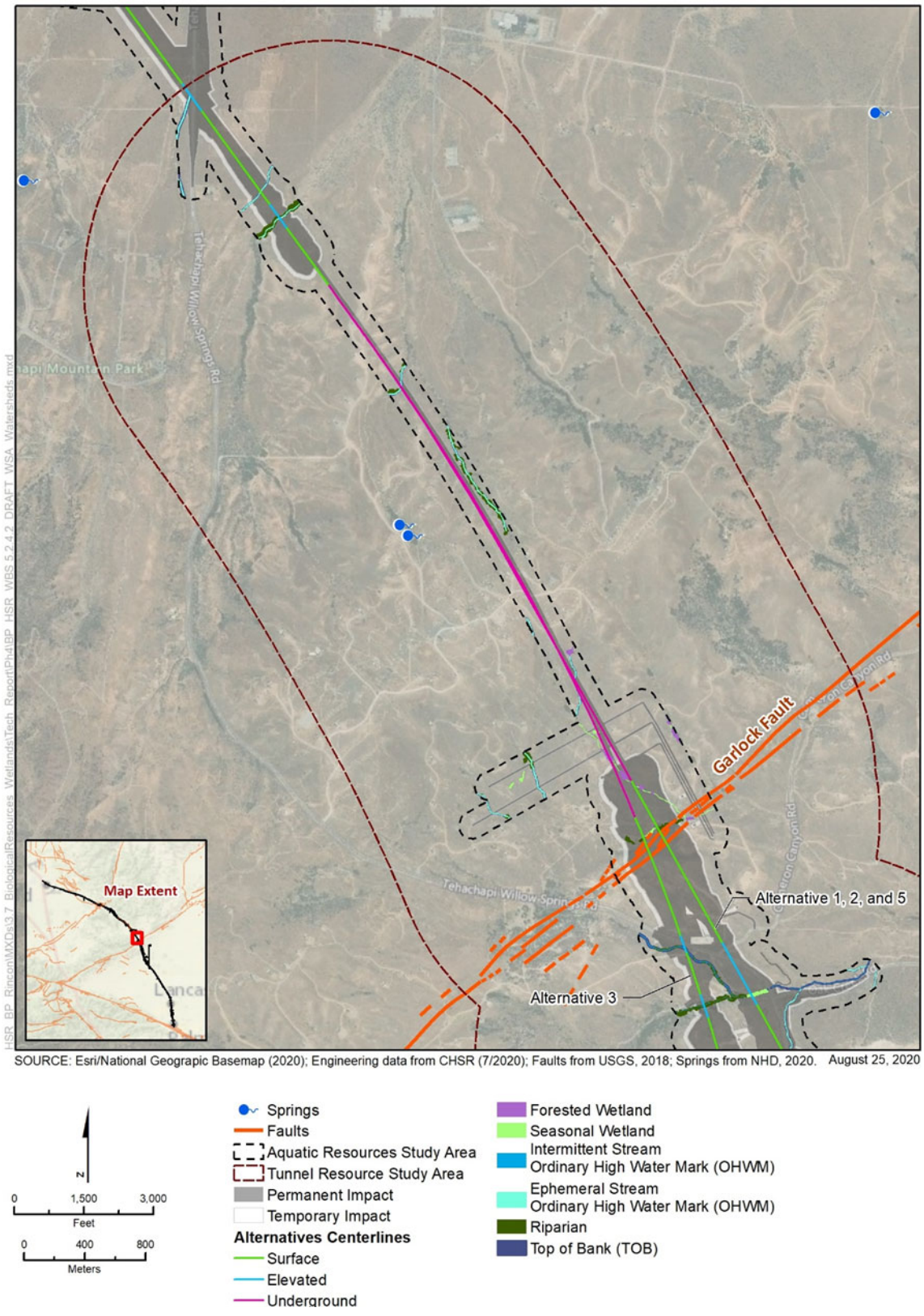

Figure 3.7-6 Springs near Tunnel #8

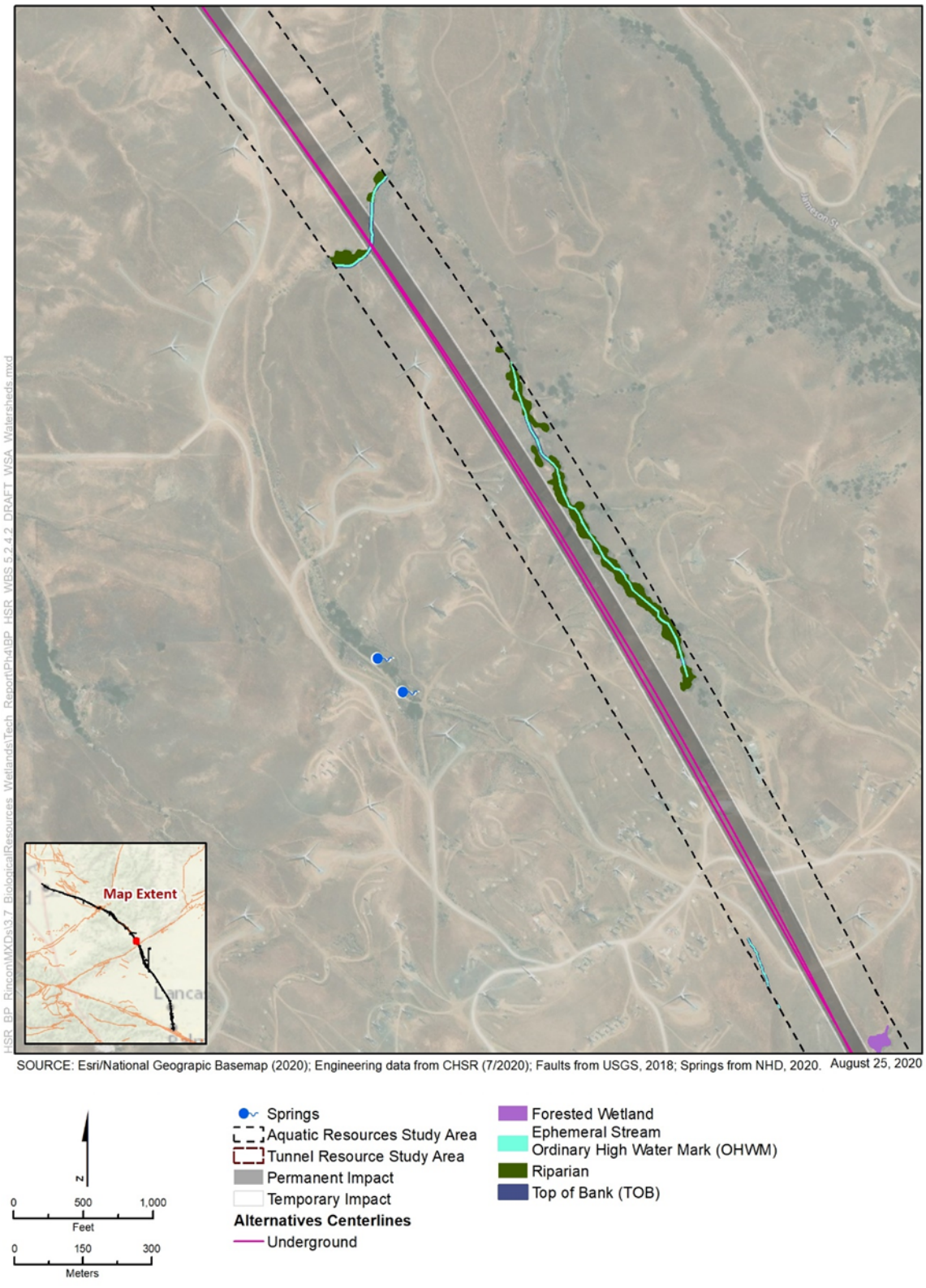

Figure 3.7-7 Zoomed View of Springs near Tunnel #8

downstream or downslope receiving streams and aquifers by reducing groundwater infiltration and altering flow levels as well as the extent and quality of aquatic habitats that support fish, wildlife, and plant species.

BMPs would be implemented to ensure that sediment from diverted and/or pumped water does not adversely affect water quality. If necessary, water will be filtered through an appropriate BMP structure (e.g., sediment filter bag, hay bales, sandbags, or other suitable materials) prior to discharge. Long-term sediment release is not expected, and none (short- or long-term) is expected to create conditions that would be greater than those caused by storm flows. All diversion and/or dewater materials will be removed upon completion of work and the streambed would be recontoured to conditions that promote connectivity between surface flow in accordance with the project design. Final dewatering practices and procedures will be discussed with the appropriate regulatory agencies during project permitting and incorporated into a project specific dewatering and diversion plan. All dewatering activities and work within regulated surface waters will be conducted in accordance with necessary permits. A dewatering plan will be prepared in advance for each location and will be included with the necessary notifications to the regulatory agencies.

Permanent

Direct permanent impacts on natural and artificial (engineered) aquatic resources include the removal or modification of local hydrology, or the redirection of flow, by the placement of fill material or excavation within aquatic features. Heavy machinery would be used to recontour the landscape and place permanent fill materials (e.g., culverts, dirt, and/or engineering structures) in aquatic resources. Direct permanent impacts on aquatic resources would also occur as a result of the construction of bridges and elevated structures (e.g., viaducts) over natural aquatic resources (e.g., rivers, creeks, and wetlands), as well as over artificial ditches and basins. These impacts would include the shading of aquatic resources by elevated structures (where the elevated structure is near the ground), the placement of piles to support the elevated structures and bridges, and the permanent removal of vegetation. In the case of artificial features, these impacts would remove or disrupt the limited biological functions these features provide. In natural areas, these activities would remove or disrupt the hydrology, vegetation, wildlife use, water quality conditions, and other biological functions provided by the resources.

The CCNM Design Option analysis indicates very little difference of impact (temporary or permanent) to aquatic resources. The Refined CCNM Design Option shows an increase in permanent impacts of 2 to 5.4 acres, primarily on ephemeral and intermittent streams and riparian areas, as shown in Table 3.7-8 and Table 3.7-9. Because waters in the area of both CCNM Design Options adjoin or flow into waters determined to be isolated in the USACE's Approved Jurisdictional Delineation, these additional waters are also presumed isolated and it is anticipated that these resources will also not be subject to CWA regulation or USEPA/USACE jurisdiction under the CWA Section 404.

In addition, there is a slight chance of indirect permanent impacts on aquatic resources that could occur in the form of water quality-related impacts: erosion, siltation, chemical spills or leaks, and runoff into natural and constructed water features and fill downstream of the construction footprint. For most aquatic features, these indirect impacts would be minor, and hydrologic changes would be minimal. However, for a few natural features (e.g., seasonal wetlands and claypan features depressions and wetlands) (located outside the project footprint) that may be dependent on very localized hydrology, the impacts may result in changes in the natural hydrological regime. In some areas, the hydroperiod may be either reduced or extended where sheet flow is limited. Indirect impacts on seasonal riverine and riparian areas may include localized changes in water temperature caused by the removal of riparian trees that provide shade, shading of open water, and reduced contribution to and ability to recycle nutrients.

As part of the B-P Build Alternatives, BIO-IAMF#1 through BIO-IAMF#3 and BIO-IAMF#5 through BIO-IAMF#11 would be incorporated to avoid and/or minimize impacts on biological and aquatic resources from project construction and operation, as applicable and discussed in Section 3.7.4.2. The Authority would incorporate these IAMFs to reduce and minimize impacts by designating a project biologist and species-specific and general biological monitors during

construction (BIO-IAMF#1). In addition, the Authority would develop and implement a BRMP to identify special-status species to be avoided during construction (BIO-IAMF#5). The BRMP would be a compilation of the biological resources avoidance and minimization measures applicable to the project section and other project environmental plans, such as the RPP and WCP. Requirements would also be incorporated that would require the Authority to delineate ESAs or environmentally restricted areas on final construction plans and in the field using measures such as flagging or fencing. Under all of the B-P Build Alternatives, the Authority would require construction crews to attend WEAP training and certify that they understand the regulatory agency requirements and procedures necessary to protect aquatic resources (BIO-IAMF#3). This would avoid some (but not all) direct impacts on aquatic resources because it would establish that contractors must be aware of and avoid affecting these resources during construction. In addition, HYD-IAMF#1 and HYD-IAMF#2 would be implemented to protect aquatic resources by requiring that a stormwater management plan and flood protection plan be prepared prior to construction.

CEQA Conclusion

The design characteristics of the B-P Build Alternatives, including both CCNM Design Options, include effective IAMFs to identify aquatic resources and delineate ESAs or environmentally restricted areas on final construction plans and in the field. These measures would minimize, but not avoid, the potential impact on those resources from construction activities. Based on the CEQA thresholds identified in Section 3.7.4.7, the impact under CEQA on aquatic resources would be potentially significant under any of the B-P Build Alternatives. This determination is because permanent and temporary disturbance of aquatic resources during construction activities could cause a substantial adverse effect by damaging the sensitive ecosystem.

To address permanent and temporary removal or disturbance of aquatic resources, vegetation for the placement of permanent infrastructure, and/or for construction access, effective mitigation measures have been identified in Section 3.7.7 to reduce impacts on aquatic resources to a less than significant level by avoidance, protection, or restoration methods. These measures include: BIO-MM#6, BIO-MM#34, BIO-MM#47, BIO-MM#58, BIO-MM#61, and BIO-MM#62. In addition, BIO-MM#50 and BIO-MM#33 would provide for on- and off-site habitat restoration and preservation of aquatic resources.

In addition, as discussed in Section 3.8, Hydrology and Water Resources, the Authority would implement WQ-MM#3, Tunnel Constructability and Hydrogeological Monitoring, which would reduce potential impacts on springs and seeps during construction of the tunnels. Implementation of WQ-MM#3 would reduce potential impacts on the two springs, seeps, streams, and their associated habitat during construction of Tunnel #8. WQ-MM#3 would implement the preparation of an AMMP to minimize potential impacts on water resources supported by groundwater, including springs, seeps, and surface water resources. WQ-MM#3 would therefore reduce potential impacts on aquatic resources, if tunneling disrupts water flow to springs, seeps, streams, and associated habitat.

These measures would work together with design features to minimize or avoid impacts on aquatic resources. Therefore, impacts would be avoided or mitigated through mitigation measures that would require the Authority to provide restoration, enhancement, and/or preservation methods for identified impacts on aquatic resources.

During construction of the B-P Build Alternatives, impacts would be reduced and considered less than significant under CEQA after implementation of BIO-MM#6, BIO-MM#33, BIO-MM#34, BIO-MM#47, BIO-MM#50, BIO-MM#61, BIO-MM#62, and WQ-MM#3. Because these mitigation measures would provide for on-site and off-site restoration and preservation of aquatic resources in an amount equivalent to or greater than the area impacted by the B-P Build Alternatives, no substantial adverse effect would occur, either directly or indirectly, on aquatic resources.

Impact BIO #5: Construction Impacts on Wildlife Movement

Temporary

Direct impacts from placement of temporary barriers (e.g., temporary fencing), construction staging areas, increased vehicular traffic, or construction laydown within natural lands and known

linkages may affect the ability of wildlife (both special-status and common wildlife species) to move freely. Further, noise, vibrations, light, dust, or human disturbance within construction areas may dissuade wildlife from using those areas for daily or seasonal movement or foraging. These direct impacts could permanently alter historical migration corridors, territories, or foraging habitats. However, because these are temporary impacts, it is likely that wildlife could alter their normal functions for the duration of project construction and then reestablish these functions once all temporary construction activities have been removed.

The activities listed above may also result in indirect impacts on wildlife movement, including habitat shifts, increased foraging competition, or genetic isolation of populations. However, these indirect impacts are unlikely to last if wildlife reestablishes movement patterns and habitat use once all temporary construction activities have been completed and all equipment has been removed.

Permanent

Direct impacts from installation of track segments, road crossing stations, maintenance facilities, or electrical substations may affect wildlife movement or generally alter the effectiveness of existing wildlife movement corridors, and physical barriers, such as fencing, could hinder wildlife movement through normal ranges or along migration routes. The segment of the HSR system between the towns of Cameron and Mojave would diverge from SR 58 and cut across the Mojave Desert before rejoining SR 14. This would represent a new barrier in an already fragmented portion of the Mojave Desert. Wildlife undercrossing or overcrossing structures that would be incorporated into the project's design would ameliorate this effect, depending on their placement and eventual usage. Building structures could also hinder movement depending on their location and size; however, these facilities are generally located within previously developed areas, and wildlife would probably avoid such structures by moving around them. Indirect impacts from installation of track, fencing, and building structures may include the alteration of long-term movement, foraging ranges, and genetic distribution of a species. Specifically, linear obstacles, such as track and fencing, may prevent wildlife from moving throughout their ranges during daily foraging, migration, or the breeding season. This could result in habitat fragmentation, habitat shifts, increased foraging competition, or limitations on genetic exchange. However, the construction of tunnels and viaducts, particularly in the mountainous areas, would allow for continued wildlife movement over and under the alignments. In addition, wildlife undercrossings and overcrossings would be installed along the length of the track. This would further reduce the impacts on normal wildlife movement throughout ranges. However, wildlife crossing effectiveness would depend on wildlife usage and continual maintenance of the structures.

As part of the B-P Build Alternatives and both CCNM Design Options, the project would minimize impacts on wildlife movement through the incorporation of tunnels and viaducts into the design that allow wildlife to freely move over or under the alignment. In addition, the design incorporates 39 wildlife crossings, including 27 small undercrossings (6-foot arch), 3 medium undercrossings (10-foot arch), 5 dual-use road undercrossings (combined road and wildlife undercrossing), 2 dual-use drainage overcrossings (synonymous with the term "overheads") (combined drainage and wildlife overcrossing), 1 dual-use road overcrossing (combined road and wildlife overcrossing), and 1 overcrossing. The wildlife crossings were located to maintain permeability through the at-grade segments throughout the Project Section consistent with *Wildlife Crossing Structure Handbook* (Clevenger and Huijser 2009) and *Wildlife Crossings Guidance Manual* (Meese et al. 2009) recommendations where feasible. Of the 39 wildlife crossings, eight of the crossings are within the Tehachapi linkage.

In addition, BIO-IAMF#1 through BIO-IAMF#3 and BIO-IAMF#5 through BIO-IAMF#11 include measures to minimize impacts on biological resources and wildlife connectivity from project construction and operation, as applicable and discussed in Section 3.7.4.2. The Authority would incorporate these IAMFs to reduce and minimize impacts by designating a project biologist and species-specific and general biological monitors during construction (BIO-IAMF#1). In addition, the Authority would develop and implement a BRMP to identify special-status species and their habitat to be avoided during construction (BIO-IAMF#5). The BRMP would be a compilation of the biological resources avoidance and minimization measures applicable to the project section and other project environmental plans, such as the RPP and WCP. In addition, implementing BIO-IAMF#8 would minimize impacts on wildlife movement corridors by requiring the Authority to

identify sensitive biological resources, including habitat for special-status species, seasonal wetlands, and wildlife movement corridors, and flagging and marking construction staging areas and access routes to ensure that vehicle traffic within the project footprint is restricted to established roads, construction areas, and other designated areas. Under all of the B-P Build Alternatives, the Authority would require construction crews to attend WEAP training and certify that they understand the regulatory agency requirements and procedures necessary to protect biological resources, including wildlife crossings (BIO-IAMF#3). This would avoid some (but not all) direct impacts on wildlife crossings and habitat linkages because it would establish that contractors must be aware of and avoid affecting these areas during construction. In addition, HYD-IAMF#1 and HYD-IAMF#2 would be implemented. HYD-IAMF#1 addresses stormwater management and requires that a plan for management and treatment be prepared prior to construction. HYD-IAMF#2 requires preparation of a flood protection plan prior to construction.

Additionally, specific wildlife movement features were developed to address impacts on wildlife movement that were not covered by the general biological IAMFs. These wildlife movement IAMFs include WM-IAMF#1: Minimize impediments to wildlife movement, WM-IAMF#2: Minimize impacts from night lighting, WM- IAMF#3: Minimize impacts from construction noise, WM-IAMF#4: Wildlife exclusion fencing to funnel wildlife to crossings, WM-IAMF#5: Minimize impacts from vehicle traffic, and WM-IAMF#6: Implementation of a restoration and revegetation plan for wildlife movement corridors. These IAMFs can be found in the WCA (Authority 2018a).These IAMFs will help avoid impediments to movement, and avoid or minimize impacts from night lighting, construction noise, and vehicle traffic. Restoration and revegetation plans would be also implemented to address impacts on special-status species and wildlife movement corridors.

CEQA Conclusion

Based on the CEQA thresholds identified in Section 3.7.4.7, the impact under CEQA to wildlife crossings and habitat linkages would be potentially significant under any of the B-P Build Alternatives and both CCNM Design Options. This determination is because disturbance of wildlife crossings and habitat for construction access and activities could interfere substantially with the movement of native wildlife species.

The design characteristics of the B-P Build Alternatives, and both CCNM Design Options, include effective IAMFs to identify wildlife crossings and delineate ESAs or environmentally restricted areas on final construction plans and in the field (BIO-IAMF#8 and BIO-IAMF#5). These measures minimize, but do not avoid, the potential impact on wildlife crossings from construction activities. Therefore, effective mitigation measures have been identified in Section 3.7.7 to reduce impacts on wildlife crossings and habitat linkages to a less than significant level by avoidance, protection, or restoration methods. These measures include: BIO-MM#42, BIO-MM#36, BIO-MM#37, BIO-MM#50, BIO-MM#56, BIO- MM#64, BIO-MM#77, BIO-MM#78, and BIO-MM#86, which would allow for the protection of habitat linkages. These measures would work together with design features to minimize or avoid impacts on wildlife crossings during construction activities so as not to interfere substantially with the movement of native wildlife species. Therefore, impacts would be considered less than significant under CEQA after implementation of BIO-MM#42, BIO-MM#37, BIO-MM#56, BIO-MM#64, BIO-MM#77, BIO-MM#78, and BIO-MM#86. No substantial adverse effect would occur, either directly or indirectly.

Impact BIO #6: Construction Impacts on Protected Trees

Construction of the project would result in direct and indirect impacts on trees protected under county and local plans and ordinances. Several protected tree species also receive protection as the dominant species within special-status plant communities (also discussed in Impact BIO #3, with quantifications of tree-dominated communities in Table 3.7-11). The trees within the special-status plant communities that overlap the project footprint would be directly affected during construction. This includes the areas within the CCNM Design Option, the Refined CCNM Design Option, and the engineering and design refinements.

Potential temporary and permanent impacts on protected trees that may result from project construction are described below.

Table 3.7-11 Comparison of Impacts on Special-Status Plant Communities

Special-Status Plant Community	Alternative 1		Alternative 2		Alternative 3		Alternative 5		CCNM Design Option		Refined CCNM Design Option	
	Permanent (acres)	Temporary (acres)	Permanent (acres)	Temporary (acres)	Permanent (acres)	Temporary (acres)	Permanent (acres)	Temporary (acres)	Permanent (acres)	Temporary (acres)	Permanent (acres)	Temporary (acres)
Blue Oak Woodland	851.9	263.9	851.9	263.9	851.9	263.9	851.9	263.9	-50.8	13.5	472.7	-60.1
Desert Riparian	15.6	4.0	15.6	4.0	15.7	4.4	14.8	4.0	no change	-0.1	0.7	0.5
Desert Scrub	76.4	20.4	76.4	20.4	75.8	20.5	76.4	20.4	no change	no change	no change	no change
Desert Wash	31.0	7.8	35.0	6.5	28.9	6.0	31.0	7.8	no change	no change	no change	no change
Joshua Tree[1]	320.0	24.7	320.0	24.7	285.1	15.1	317.9	25.7	no change	no change	no change	no change
Mixed Chaparral	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	no change	no change	no change	0.5
Perennial Grassland	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	no change	no change	1.8	no change
Valley Foothill Riparian	1.8	0.6	1.8	0.6	1.8	0.6	1.8	0.6	0.1	0.1	-0.4	-0.2
Valley Oak Woodland	2.1	0.9	2.1	0.9	0.8	0.2	2.1	0.9	no change	no change	1.1	-0.1
Total Impacts	1,298.8	322.4	1,302.8	321.1	1,259.9	310.8	1,295.9	323.4	-50.7	13.5	476.0	-59.5

Source: California High-Speed Rail Authority, 2020

Both CCNM Design Options data is applicable to all of the B-P Build Alternatives, and the values represent the increase/decrease compared to the B-P Build Alternatives.

[1] The western Joshua tree was petitioned to the California Fish and Game Commission for listing as endangered under the California Endangered Species Act. The California Fish and Game Commission accepted the petition on September 22, 2020, which caused the Joshua tree to become a special-status species at that time. Impacts to the western Joshua tree, however, were analyzed in the Draft EIR/EIS, and no changes were necessary based on the subsequent change in legal status.

B-P = Bakersfield to Palmdale Project Section

CCNM = César E. Chávez National Monument

Temporary
Direct impacts from construction activities on protected trees could occur from minor trimming or pruning of trees for stations, tracks, maintenance and equipment storage areas, access roads, road overcrossings, and substations.

Dust, debris, and other airborne pollutants resulting from construction activities may temporarily affect trees by covering leaves with substances that may inhibit photosynthesis. Soil compaction, placement of fill and other material, shading by equipment, and alterations to the microtopography could stress trees, causing poor growth and loss of leaves or roots during the construction period. Direct impacts from construction activities could result from unintentional contamination, such as chemical leaks and spills that may affect water or soils on which protected trees depend and thereby may weaken or damage protected trees. These impacts could become permanent if the source of the unintentional contamination is not properly removed and protected trees die or fail to produce seeds.

Indirect impacts on protected trees could result from temporary changes in hydrology and topography (as a result of temporary staging areas; access roads; equipment storage; and foot, vehicle, and machine traffic), which may inhibit water and nutrient intake and thereby inhibit growth or cause leaf mortality. In addition, temporary impacts on plant species (either common or special-status) could indirectly affect trees if these species were removed and therefore not providing needed nitrogen, soil aeration, root protection, or moisture retention.

Permanent
Direct permanent impacts on protected trees are anticipated in areas where permanent infrastructure (e.g., rail track and road overpasses, proposed stations) or temporary activities that require clearing (e.g., materials staging, temporary access roads, construction rights-of-way) that would cause a permanent effect by removal or severe pruning. Direct impacts from construction activities could result from unintentional contamination, such as chemical leaks and spills, which could affect water or soils used by protected trees, potentially resulting in their mortality. These impacts could be temporary if contaminants are properly removed.

Indirect permanent impacts on protected trees could occur as a result of changes in erosion and sedimentation. Displaced sediment and alterations to microtopography could change the soil and substrate conditions required by protected trees. Permanent changes in hydrology and topography could damage the soil environment surrounding a tree's roots by affecting the level of necessary symbionts in the soil (i.e., mycorrhizae for oaks) or lead to fungal infections, root rot, lack of proper drainage, and difficulty in obtaining oxygen or other necessary elements. These factors ultimately affect the growth of roots and vegetation and could lead to the mortality of protected trees.

As part of the B-P Build Alternatives and both CCNM Design Options, BIO-IAMF#1 through BIO-IAMF#3 and BIO-IAMF#6 through BIO-IAMF#11 would be incorporated to avoid and/or minimize impacts on biological and aquatic resources (including protected trees) from project construction, as applicable and discussed in Section 3.7.4.2. The Authority would incorporate these IAMFs to reduce and minimize impacts by designating a project biologist and species-specific and general biological monitors during construction (BIO-IAMF#1). Requirements would also be incorporated that would require the Authority to delineate ESAs (including protected trees) or environmentally restricted areas on final construction plans and in the field under the direction of the project biologist. Under all of the B-P Build Alternatives, the Authority would require construction crews to attend WEAP training and certify that they understand the regulatory agency requirements and procedures necessary to protect biological resources (including protected trees) (BIO-IAMF#3). These trees would also be protected under a stormwater management and flood protection plan by the Authority's hydrology IAMFs (HYD-IAMF#1 and HYD-IAMF#2).

CEQA Conclusion
The design characteristics of the B-P Build Alternatives and both CCNM Design Options, include effective IAMFs to identify protected trees and delineate ESAs on final construction plans and in the field. These measures would minimize, but not avoid, potential impacts on protected trees from construction activities. Based on the CEQA thresholds identified in Section 3.7.4.7, the

impact under CEQA on protected trees would be potentially significant under any of the B-P Build Alternatives because disturbance of protected trees could cause a substantial adverse effect due to destruction or damage of protected trees during construction.

Therefore, mitigation measures have been identified in Section 3.7.7 to reduce these impacts. These measures include: BIO-MM#35 and BIO-MM#56, as well as BIO-MM#50, BIO-MM#58, and BIO-MM#61, which would provide for on-site and off-site habitat restoration and preservation of protected trees. These measures would work together with design features to minimize or avoid impacts by transplantation and compensatory measures and would provide ongoing monitoring and reporting of the WCP.

Additionally, as discussed in Section 3.8, Hydrology and Water Resources, WQ-MM#3 Tunnel Constructability and Hydrogeological Monitoring, would be implemented to reduce potential impacts on springs and seeps during construction of the tunnels. WQ-MM#3 would implement the preparation of an AMMP to minimize potential impacts on water resources supported by groundwater, including springs, seeps, and surface water resources supported by groundwater. This mitigation measure would reduce potential impacts to protected trees in riparian areas that use these aquatic resources.

Therefore, because impacts would be avoided or mitigated through transplantation and compensatory mitigation, impacts on protected trees from construction of the B-P Build Alternatives would be reduced and considered less than significant under CEQA after implementation of BIO-MM#35, BIO-MM#50, BIO-MM#56, BIO-MM#58,BIO-MM#61, and WQ-MM#3.

3.7.6.5 Operations Impacts

Impact BIO #7: Operational Impacts on Special-Status Plant Species

Direct temporary operational impacts may result from maintenance along the project infrastructure that would occur on a temporary basis. Accidental clearing or trampling of vegetation communities, thinning of vegetation for access, dust from vehicle and machinery disturbance, and equipment and foot traffic may affect the individuals of special-status plant species growing adjacent to maintenance areas.

Indirect impacts from maintenance activities could result from unintentional pollution and/or contamination, which could affect water or soils depended on by special-status plant communities.

Table 3.7-5 shows the estimated potential impacts on special-status plant species habitat within the RSA. The acreage totals presented do not represent an estimate of impacts on individual plants, but instead represent an estimate of affected suitable habitat for the species. As discussed in the assessment in the *Biological and Aquatic Resources Technical Report* (Authority 2019a) the acreage estimates are based on regional modeling that considers the relatively general range of known habitat requirements for the various species. In reality, the actual distribution of the plants considered is very sparse within the known habitat parameter. By their nature, the actual occurrences of these species are limited by a number of factors, including past disturbance (such as grazing), potential lack of dispersal mechanisms that lead to wide distribution, and limiting environmental factors, such as specific soil or moisture characteristic, or competition from other species that cannot reasonably be modeled. As a result, the actual occurrences (if any) of these species in the project vicinity are certainly far less than the acreage estimates.

As part of the B-P Build Alternatives, Section 3.7.4.2 discusses IAMFs that would be incorporated to avoid and/or minimize impacts on biological and aquatic resources from project construction and operation. Specifically for operations impacts, BIO-IAMF#4 would require the Authority to ensure that maintenance personnel attend WEAP training and certify that they understand the regulatory agency requirements and procedures necessary to protect biological resources, including special-status plant species. Plant species would also be protected under a flood protection plan by the Authority's hydrology IAMFs (HYD-IAMF#2).

CEQA Conclusion

The design characteristics of the B-P Build Alternatives include effective IAMFs to minimize the removal of special-status plant species within the project footprint during construction. Most of these IAMFs would not be used during operation. Under the B-P Build Alternatives, the impact under CEQA would be potentially significant because the potential disturbance of vegetation during maintenance activities could cause a substantial adverse effect on local occurrences of special-status plant species in previously undisturbed areas. Therefore, Mitigation Measure BIO-MM#60 has been identified in Section 3.7.7 to reduce impacts during operation. BIO-MM#60 would require the project biologist to ensure that appropriate measures have been instituted to restrict project vehicle traffic within the maintenance footprint to established roads, maintenance areas, and other permissible areas. The project biologist would also direct that access routes be flagged and marked and that measures be adopted to prevent off-road vehicle traffic, allowing for avoidance of special-status plant species during O&M activities. In areas where special-status plant species have been identified as potentially present, BIO-MM#60 would work together with design features to mitigate impacts on special-status plant species by utilizing established maintenance roads and avoiding those species identified during the pre-construction surveys. No substantial adverse effect would occur after the implementation of mitigation, either directly or through habitat modifications, on any special-status plant species.

Additionally, BIO-MM#6 would require implementation of a plan for salvage and relocation of special-status plant species. BIO-MM#50 and BIO-MM#53 would require preparation of a restoration plan and a CMP for species and species habitat. These restoration and compensatory mitigation plans would be maintained during maintenance and operation activities. BIO-MM#54 would implement an annual vegetation control plan to be maintained during operation.

Therefore, under the B-P Build Alternatives, after the implementation of BIO-MM#6, BIO-MM#50, BIO-MM#53, and BIO-MM#60, operations impacts on special-status plant species would be reduced because impacts on populations associated with the alignment would have been mitigated to some extent. BIO-MM#54 would further reduce impacts during O&M by controlling competition from introduced nonnative species. Therefore, overall impacts would be reduced and considered less than significant under CEQA.

Impact BIO #8: Operational Impacts on Special-Status Wildlife Species

Potential temporary and permanent impacts on special-status wildlife species that may result from project O&M activities are described in the subsections below. Temporary operational impacts may occur as a result of activities along the project infrastructure that would occur infrequently or on a temporary basis. In general, those impacts would be restricted to access roads and project infrastructure; therefore, impacts on special-status wildlife would be minimal. Permanent operational impacts, which include frequent noise, light, vibration, and the high wind speeds and turbulence generated by a train moving up to 220 miles per hour, may occur on a daily basis from operation of the HSR system. Permanent operational impacts are in addition to the permanent presence of project infrastructure, which are discussed under permanent construction impacts. However, operational impacts can only be described qualitatively.

Noise is defined as undesirable sound. The analysis of noise effects relies upon the theory and methods of acoustics, as applied to sensitive resources. Those resources include terrestrial wildlife in the RSA: amphibians, reptiles, birds, and mammals. All native wildlife species potentially present in the RSA were considered as potentially vulnerable to noise effects; however, this analysis focuses more on mammals because reptiles and amphibians have very limited sensitivity to sound but appreciable sensitivity to vibration. Thus, HSR impacts for vibration are more substantial for reptiles and amphibians. No evidence suggests invertebrates have a sensitivity to noise.

Potential wildlife exposure to train noise was identified by determining the maximum noise levels that would be produced by operational trains and the frequency with which trains would operate. Noise levels at various distances from the train were determined by use of an acoustic model. Existing noise levels at various locations on the landscape were determined with reference to

noise monitoring data presented in the *Bakersfield to Palmdale Project Section: Noise and Vibration Technical Report* (Authority 2019). Potential presence of wildlife in different portions of the alignment was determined with reference to special-status wildlife species models as discussed in Impact BIO # 2, and effects of noise on wildlife movement were assessed as discussed in BIO Impact # 5, Wildlife Movement. Effects of train noise on wildlife behavior were determined by reference to published literature as identified in the WCA (Authority 2018a).

The HSR Bakersfield to Palmdale Project Section maintains wildlife permeability across the alignment through a series of elevated viaducts, tunnels and dedicated wildlife crossings. The project includes 52 elevated viaducts, 9 underground tunnels and 39 dedicated wildlife crossings (Table 2-1 in the WCA, Appendix I in the BARTR [Authority 2018a]). The Local Permeability Assessment, described in the WCA modeled wildlife movement across a 6-kilometer (3.73-mile) wide corridor using South Coast Wildlands movement data for select representative focal species and compared it with project conditions that prohibit wildlife from crossing at fenced at-grade segments. Because of the number, sizes, and distribution of the elevated viaducts, underground tunnels, and dedicated wildlife crossings, the project would reduce permeability for mountain lion by 1 percent, mule deer by 2 percent, American badger by 3 percent, San Joaquin kit fox by 1 percent, desert kit fox by 9 percent, desert tortoise by 7 percent, western gray squirrel by 2 percent, blunt-nosed leopard lizard by 1 percent, and Tipton kangaroo rat by 1 percent.

Table 3.7-9 provides a comparison of estimated potential impacts on suitable habitat for special-status wildlife species within the RSA. Additionally, Table 3.7-10 outlines the results of the habitat species modeling approach used to address potential impacts on federally and state-listed species.

Amphibians, Reptiles, and Insects

If operations and/or maintenance activities are required in areas of suitable habitat for special-status amphibians, reptiles, and/or insects, direct impacts could include the incidental trampling or crushing of individuals by maintenance vehicles or equipment and the temporary disturbance of habitat. Noise, dust, and increased vibration may also directly affect amphibian, reptile, and insect species.

The security fencing would likely not prohibit most amphibian, reptile, or insect species from accessing the right-of-way, and direct impacts from train operations could include injury or mortality associated with direct strikes with the train itself. Therefore, as described in the mitigation measures, in areas of suitable habitat for various amphibians and reptiles, buried sheathing with fencing would be installed to deter those animals from entering the alignment right-of-way. The wildlife exclusion fencing shall incorporate a lower component consisting of a corrosion-resistant metal, with no larger than 0.5inch mesh. This component of the fence shall extend from a minimum of 24 inches below the ground surface to 48 inches above the ground. Additionally, an annual vegetation control plan will be prepared and implemented and the alignment will be essentially devoid of any vegetation post-construction, deterring insects from accessing potential host plants within the right-of way during train operations. With the exception of nighttime lighting, direct impacts on most species from train operations are not anticipated.

Indirect impacts on amphibians, reptiles, and insects could include increased predation from birds, such as raptors and corvids, as a result of the new artificial perch sites created by the project (e.g., project components such as security fencing, electrical infrastructure, and elevated structures). Maintenance vehicles may facilitate the spread of invasive plant species, which could reduce habitat suitability for special-status species.

Birds (Including Migratory Birds Covered under the Migratory Bird Treaty Act and California Fish and Game Code)

Direct impacts from maintenance activities (e.g., mowing, weed control) could include the removal or disturbance of areas that provide potential nesting habitat for a diverse population of birds. Potential disturbance includes noise and vibration associated with maintenance activities and equipment use. Maintenance activities conducted in areas of nesting habitat during the breeding season (generally between February 1 and September 1) could disturb nesting birds. This

disturbance could cause nest abandonment and subsequent loss of eggs or developing young at active nests in or near the area of activity.

Direct impacts from project O&M could include injury or mortality from bird interactions such as electrocution and strikes/collisions. Regular train operations may reduce the suitability of nesting habitat adjacent to the HSR alignment, and maintenance activities may result in disturbance of nesting birds, resulting in nest abandonment, or may result in the trampling of nests on the ground or underground. Indirect impacts may occur if maintenance vehicles facilitate the spread of invasive plant species, which may reduce habitat suitability for these species.

Mammals

Direct impacts from O&M activities could include the injury or mortality of individuals from maintenance vehicles or equipment, electrocution associated with power supply lines, and strikes/collisions with new structures, especially in the case of bats. Driving off established roadways or along unpaved access roads could collapse burrows and injure or kill mammal individuals. Noise, dust, and increased vibration may also indirectly affect mammal species.

Mammalian wildlife use sound mainly to forage, to evade predators, and for communication. Mammalian wildlife responses to noise depend on the timing, intensity, and frequency of the sound, as well as the species' tolerance to noise. The project alternatives would not create noise at magnitudes that could cause traumatic effects such as temporary or permanent loss of hearing. Depending on timing, intensity, and frequency, exposure to noise can result in behavioral changes (e.g., fleeing or hiding), interference with auditory cues (e.g., interference with mate attraction), or physiological responses (e.g., stress), each of which can result in broader impacts on movement, foraging efficiency, reproductive success, and survival (Francis and Barber 2013). Among wildlife, hearing is particularly important for mammals. Hearing enables predators to be effective in situations where vision has limited usefulness, such as dense vegetation or darkness. Some animals such as mountain lions likely locate each other with auditory (as well as olfactory) signals (Center for Biological Diversity 2019). The primary impact of noise on mammalian wildlife is the masking of acoustic information. Masking effects are only present for the duration of the noise exposure. If the noise is brief, normal behaviors return immediately upon cessation of the noise.

Therefore, analysis of mammalian wildlife response to noise generated by HSR traffic relies upon considerations of exposure and response. Exposure describes the noise itself, and response describes how the noise affects the animal. Existing studies of HSR noise and existing baseline noise sources, along with acoustic models, permit a quantitative estimation of noise exposure. Response, however, generally cannot be described in quantitative terms and must be inferred from published studies that consider different noise sources, different animals, and different locations compared to those that occur in the study area.

Exposure has several components, such as:

1. The timing and duration of the noise
2. The distribution of noise energy at different frequencies
3. How loud the noise is at different distances from the rail line
4. How loud it is relative to background noise levels from other sources such as highways and airports.

The noise analysis used the conservative assumption that the train is producing the same amount of noise as if it were traveling at 220 mph. The noise levels generated by such a train are shown in Table 3.7-12.

Table 3.7-12 Modeled Unshielded Distance to L_{max} Noise Contour for a Train Moving at 220 mph

L_{max}	Rail Alignment Type	
	Aerial (feet)	Embankment (feet)
93 dBA	93	138
87 dBA	278	320
81 dBA	555	760
75 dBA	1,100	1,580
69 dBA	2,200	3,180
63 dBA	4,400	6,350
57 dBA	8,800	12,700
51 dBA	17,600	25,400
45 dBA	35,200	50,800
39 dBA	70,400	101,600

Source: Authority 2021
All distance estimates are subject to acoustic model assumptions of flat terrain, agricultural vegetation, and no wind. Actual distances would be expected to vary depending on local conditions of train speed, wind speed and direction, air temperature, humidity, topography, buildings, and vegetation cover.
dBA = A-weighted decibel
L_{max} = maximum sound level
mph = miles per hour

It is assumed that a typical train would be 660 feet long and that approximately 176 trains would pass any given point in any given 24-hour period, with most of the traffic during the daylight hours and minimal traffic between 11 p.m. and 5 a.m. A train moving past a given point would take 2.05 seconds to pass at a speed of 220 mph or 4.10 seconds at 110 mph; thus, maximum noise levels would be experienced for 5.8 minutes per day along parts of the alignment where trains were moving 220 mph or 11.6 minutes per day where trains were moving 110 mph. Train noise is also propagated forward and backward along the track, so lower noise levels would be experienced for longer durations.

Indirect impacts from noise, vibration, and wind could result in the displacement of mammal species. These impacts may result in shifts in foraging patterns or territories, shifts in dispersal movements, increased predation, decreased reproductive success, and reduced population viability. As explained in Section 3.4, Noise and Vibration (see Impact N&V #4), unconfined wild animals can avoid ground-borne noise levels by moving away from the track as trains approach, and noise from intermittent pass-bys would be short, taking place primarily during daylight hours. In addition, sound barriers would be implemented as identified in the Wildlife Corridor Assessment (Authority 2018a).

The Southern California/Central Coast ESU mountain lion occurs within the Tehachapi Mountains and interfaces with the Western Sierra Nevada mountain lion population along SR 58. Within the mountain lion species range, genetic connectivity is maintained between these populations through the use of 14 elevated viaducts, 6 underground tunnels, and 5 dedicated wildlife crossings. As part of the development of the *South Coast Missing Linkages: A Linkage Design for the Tehachapi Connection* (Penrod et al. 2003), South Coast Wildlands developed modeled least cost corridors (top 1 percent of movement habitat) for a number of focal species, including mountain lion. The mountain lion least cost corridor crosses the HSR alignment at a 2.37-mile-long underground tunnel segment, which would allow mountain lion to freely cross over the project unimpeded.

Indirect impacts could result from project components such as security fencing. Mammals may become ensnared or stuck on fences, or cornered by predators (e.g., coyotes, domestic/wild dogs) while traveling parallel to fence lines. Additionally, ongoing operation activities and increased human presence could influence species distribution.

Native Fauna

Direct and indirect impacts for other native fauna (e.g., insects, mollusks, crustaceans, amphibians, reptiles, fish, birds, and mammals) would be similar to those impacts described above for special-status wildlife species.

As part of the B-P Build Alternatives, Section 3.7.4.2 discusses IAMFs that would be incorporated to avoid and/or minimize impacts on biological and aquatic resources from project construction and operation. Specifically for operations impacts, BIO-IAMF#4 would require the Authority to ensure that maintenance personnel attend WEAP training and certify that they understand the regulatory agency requirements and procedures necessary to protect biological resources, including special-status wildlife species. Wildlife species would also be protected under a flood protection plan by the Authority's hydrology IAMFs (HYD-IAMF#2).

CEQA Conclusion

Under any of the B-P Build Alternatives, the impact under CEQA would be potentially significant because of the potential for habitat degradation or modifications during maintenance activities, which could cause a substantial adverse effect on special-status wildlife species in areas that did not previously have this type of disturbance. The design characteristics of the B-P Build Alternatives include effective mitigation, including the relocation of special-status wildlife species within the project footprint during construction with agency approval, and habitat would be removed during construction within at-grade portions of the alignment. Therefore, most of the IAMFs and mitigation measures identified in this document would not be directly applicable during operation. However, there are mitigation measures that have been identified in Section 3.7.7 to reduce impacts during operation. These mitigation measures (listed below) use effective methods to identify and avoid special-status wildlife species during maintenance activities and operation of the B-P Build Alternatives.

- **Amphibians, Reptiles, and Insects**
  - BIO-MM#36: Install Aprons or Barriers within Security Fencing
  - BIO-MM#42: Provide Compensatory Mitigation for Impacts on Habitat for Blunt-Nosed Leopard Lizard, Tipton Kangaroo Rat, and Nelson's Antelope Squirrel
  - BIO-MM#47: Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts on Aquatic Resources
  - BIO-MM#50: Implement Measures to Minimize Impacts during Off-Site Habitat Restoration, or Enhancement, or Creation on Mitigation Sites
  - BIO-MM#53: Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat
  - BIO-MM#79: Mitigation for Desert Tortoise
  - BIO-MM#81: Provide Compensatory Mitigation for Impacts on Crotch Bumble Bee
  - BIO-MM#83: Provide Compensatory Mitigation for Impacts on Monarch Butterfly Breeding and Foraging Habitat
  - BIO-MM#87: Implement Lighting Minimization Measures for Operations
- **Birds (Including Migratory Birds Protected by California Fish and Game Code)**
  - BIO-MM#43: Provide Compensatory Mitigation for Loss of Swainson's Hawk Nesting Trees and Habitat

- BIO-MM#44: Provide Compensatory Mitigation for Loss of Active Burrowing Owl Burrows and Habitat
- BIO-MM#47: Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts on Aquatic Resources
- BIO-MM#50: Implement Measures to Minimize Impacts during Off-Site Habitat Restoration, or Enhancement, or Creation on Mitigation Sites
- BIO-MM#53: Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat
- BIO-MM#67: Provide Compensatory Mitigation for Loss of Eagle Nests
- BIO-MM#70: Provide Compensatory Mitigation for Impacts on Tricolored Blackbird Habitat
- BIO-MM#71: Implement California Condor Avoidance Measures during Helicopter Use
- BIO-MM#73: Implement Removal of Carrion that May Attract Condors and Eagles
- BIO-MM#76: Implement Wildlife Rescue Measures
- BIO-MM#87: Implement Lighting Minimization Measures for Operations

- **Mammals**
  - BIO-MM#36: Install Aprons or Barriers within Security Fencing
  - BIO-MM#42: Provide Compensatory Mitigation for Impacts on Habitat for Blunt-Nosed Leopard Lizard, Tipton Kangaroo Rat, and Nelson's Antelope Squirrel
  - BIO-MM#45: Provide Compensatory Mitigation for Impacts on San Joaquin Kit Fox Habitat
  - BIO-MM#47: Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts on Aquatic Resources
  - BIO-MM#53: Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat
  - BIO-MM#64: Establish Wildlife Crossings
  - BIO-MM#76: Implement Wildlife Rescue Measures
  - BIO-MM#77: Implement Wildlife Height Requirements for Enhanced Security Fencing
  - BIO-MM#78: Install Wildlife Jump-outs
  - BIO-MM#85: Provide Compensatory Mitigation for Impacts on Mountain Lion Core and Patch Habitat
  - BIO-MM#87: Implement Lighting Minimization Measures for Operations

These measures would work together with design features to minimize or avoid impacts on special-status wildlife species and to provide for on-site and off-site habitat restoration and preservation of special-status wildlife species in an amount equivalent to or greater than the area impacted by the B-P Build Alternatives during both construction and operation.

In addition, the following measure would further mitigate and minimize impacts on special-status wildlife species by removing nonnative plant species that would compete for the same habitat, and would provide ongoing monitoring and reporting of the WCP; BIO-MM#55: Prepare and Implement a Weed Control Plan.

Potential adverse impacts, such as electrocution and train strikes/collisions, could occur on wildlife species. These are of particular concern for Fully Protected species such as the California condor and the blunt-nosed leopard lizard, because "take" of these species cannot be authorized. Per the APLIC guidance, the catenary system would avoid electrocution with a design that ensures a minimum safe distance between the conductors of 83 inches horizontal and 52 inches

vertical (APLIC 2006, 2012). Additionally, exclusionary fencing would be permanently installed along any portion of the permanent right-of-way that is adjacent to natural habitats (e.g., alkali desert scrub, annual grassland) and would be enhanced with a barrier (e.g., fine mesh fencing) that extends at least 12 inches below ground and 12 inches aboveground to prevent blunt-nosed leopard lizard from accessing the right-of-way in order to reduce the potential for mortality to a low probability.

Therefore, mitigation measures are designed to prevent such impacts resulting from operation of the B-P Build Alternatives. These measures are: BIO-MM#36, BIO-MM#42, BIO-MM#44, BIO-MM#45, BIO-MM#47, BIO-MM#50, BIO-MM#53, BIO-MM#64, BIO-MM#67, BIO-MM#71, BIO-MM#73, BIO-MM#76, BIO-MM#77, BIO-MM#78, BIO-MM#83, BIO-MM#85, and BIO-MM#87. These measures would avoid or mitigate impacts through restoration, enhancement, and/or preservation methods during O&M activities. The Authority would use these avoidance and minimization measures to protect all wildlife species discussed in this section.

Therefore, impacts during maintenance activities and operation would be reduced and considered less than significant under CEQA.

Impact BIO #9: Operation Impacts on Special-Status Plant Communities

Potential temporary and permanent impacts on special-status plant communities that may result from project operation are described in the subsections below.

Temporary

Direct temporary operational impacts on special-status plant communities may result from maintenance or any other activities along the project infrastructure that occur infrequently or on an intermittent basis. Accidental clearing or trampling of vegetation communities, thinning of vegetation for access, dust from vehicle and machinery disturbance, and equipment and foot traffic may affect special-status plant communities growing adjacent to maintenance areas.

Permanent

Direct impacts on special-status plants in close proximity to the HSR alignment may result from frequent wind disturbance generated by moving trains. Forceful wind would damage individuals of special-status plant species growing adjacent to the tracks, stunt new growth, and promote desiccation. Strong winds could also prevent the settlement of seeds and impede replacement of plants within areas adjacent to the tracks.

Indirect impacts could include increasing the potential for introducing and spreading invasive and nonnative species and harmful or devastating pathogens to special-status plant communities.

As part of the B-P Build Alternatives, Section 3.7.4.2 discusses IAMFs that would be incorporated to avoid and/or minimize impacts on biological and aquatic resources from project construction and operation. Specifically for operations impacts, BIO-IAMF#4 would require the Authority to ensure that maintenance personnel attend WEAP training and certify that they understand the regulatory agency requirements and procedures necessary to protect biological resources, including special-status plant communities. Plant communities would also be protected under a flood protection plan by the Authority's hydrology IAMFs (HYD-IAMF#2).

CEQA Conclusion

Under the B-P Build Alternatives, the impact under CEQA would be potentially significant because the potential disturbance of vegetation during maintenance activities could cause a substantial adverse effect on special-status plant communities in areas that did not previously have this type of disturbance. The design characteristics of the B-P Build Alternatives include effective IAMFs to minimize the removal of special-status plant communities within the project footprint during construction. Most of these IAMFs would not be used during operation. Therefore, mitigation measures have been identified in Section 3.7.7 to reduce impacts during operation. These measures include BIO-MM#6, BIO-MM#46, BIO-MM#47, BIO-MM#50, BIO-MM#53, and BIO-MM#54, which would allow for on- and off-site habitat restoration and preservation of special-status plant communities. These measures would work together with design features to mitigate

impacts on special-status plant communities by providing for on-site and off-site habitat restoration and preservation of special-status plant communities in an amount equivalent to or greater than the area impacted by the B-P Build Alternatives during both construction and operation. No substantial adverse effect would occur after implementation of mitigation, either directly or through habitat modifications, on any special-status plant communities listed in local or regional plans, policies, or regulations.

Therefore, under the B-P Build Alternatives, after implementation of BIO-MM#6, BIO-MM#32, BIO-MM#46, BIO-MM#47, BIO-MM#50, BIO-MM#53, and BIO-MM#54, impacts during maintenance and operation would be reduced and considered less than significant under CEQA.

Impact BIO #10: Operation Impacts on Aquatic Resources

The following paragraphs describe impacts on aquatic resources that may result from project operation. Table 3.7-8 and Table 3.7-9 present the following classes of aquatic resources within the ARSA (250-foot buffer). This table quantifies the impacts for construction, but indirect operations impacts are not quantifiable. This includes the areas within the CCNM Design Option, the Refined CCNM Design Option, and the associated stockpile area. With the addition of the Refined CCNM Design Option, the earthwork in that area would not be balanced and there would be an excess of material. This excess material would be stored in a stockpile area that is located next to the Refined CCNM Design Option alignment just north of SR 58 in the vicinity of Bealville Road (see Chapter 2, Figure 2-63). This area is included in the analysis below.

Temporary

Temporary O&M activities may result in indirect temporary impacts where aquatic resources cross the HSR right-of-way or overlap with temporary maintenance areas. These impacts may include a potential increase in erosion and sediment transport into adjacent aquatic areas. Chemical spills or leaks of fuel, transmission fluid, lubricating oil, or motor oil from construction equipment could also contaminate waters and degrade their quality.

Permanent

Indirect permanent operations impacts may result from the operation of the train system itself through the deposition of sediment from dust. Train movement through desert or other dust-prone areas could contribute to dust formation in the air, which could deposit on aquatic resources that overlap with the HSR right-of-way, reducing water quality.

Indirect permanent impacts of dust and sediments carried to adjacent or downstream aquatic resources could occur. Operation of the HSR system would increase the amount of pollutants associated with rail operations. Specifically, dust generated by braking would be continuously generated and released by trains. Brake dust consists primarily of particulate metals (iron, copper, silicon, calcium, manganese, chromium, and barium), and some of these metals could become dissolved in rainwater. Although brake dust would be released into the environment during operations, the electric trains would use regenerative braking technology, resulting in reduced physical braking and associated wear compared to conventional petroleum-fueled trains. Brake dust would not be generated in equal amounts throughout the HSR alignment. The primary locations where brake dust would be generated are areas where the trains must reduce their travel speed, such as approaches to stations, turns, and elevation changes (primarily descents). Long stretches of flat terrain with a straight rail alignment would generate less brake dust than other areas.

In consideration of the potential for brake-pad particles to be conveyed to surface waters during a rain event, the Authority would prepare a stormwater management and treatment plan under HYD-IAMF#1. This plan would include post-construction BMPs and techniques to reduce the quantity and improve the quality of stormwater runoff before runoff is discharged into a surface waterbody. BMPs would be site specific and would include, but not limited to, biofiltration swales, biofiltration strips, infiltration devices, detention devices, media filters, multichambered treatment trains, wet basins, dry-weather diversion, and gross solids removal devices. All of these BMPs are capable of reducing particulate and dissolved metal concentrations in runoff. Post-

construction BMPs would minimize potential continuous impacts from brake dust deposited on impervious surfaces by capturing runoff and improving the quality of runoff prior to discharge into waterbodies. Along at-grade, cut, and fill sections of the HSR alignment, brake dust is generally anticipated to be retained in track ballast. Accordingly, post-construction BMPs would minimize potential continuous impacts from brake dust deposited on impervious surfaces by capturing and improving the quality of runoff prior to discharge into waterbodies. See Section 3.8, Hydrology and Water Resources for further discussions on stormwater management and water quality BMPs.

As part of the B-P Build Alternatives, Section 3.7.4.2 discusses IAMFs that would be incorporated to avoid and/or minimize impacts on biological and aquatic resources from project construction and operation. Specifically for operations impacts, BIO-IAMF#4 would require the Authority to ensure that maintenance personnel attend WEAP training and certify that they understand the regulatory agency requirements and procedures necessary to protect biological and aquatic resources. Aquatic resources would also be protected under a flood protection plan by the Authority's hydrology IAMFs (HYD-IAMF#2).

CEQA Conclusion

Under the B-P Build Alternatives, including both CCNM Design Options, the impact under CEQA would be potentially significant because disturbance of aquatic resources during maintenance activities could cause a substantial adverse effect in areas that did not previously have this type of disturbance. The design characteristics of the B-P Build Alternatives include effective IAMFs to minimize the removal of aquatic resources within the project footprint during construction. Most of these IAMFs would not be used during operation. Therefore, mitigation measures have been identified in Section 3.7.7 to reduce impacts during operation. These measures include BIO-MM#6, BIO-MM#47, and BIO-MM#50, which would provide for on-site and off-site habitat restoration and preservation of aquatic resources. In addition, if required after construction is complete, the Authority would implement BIO-MM#33 and BIO-MM#58 for aquatic resources. These measures would work together with design features to minimize or avoid impacts by providing for on- and off-site habitat restoration and preservation of aquatic resources in an amount equivalent to or greater than the area impacted by the B-P Build Alternatives during both construction and operation. No substantial adverse effect would occur after the implementation of mitigation on any aquatic resources.

Therefore, under the B-P Build Alternatives, after the implementation of BIO-MM#6, BIO-MM#33, BIO-MM#47, BIO-MM#50, and BIO-MM#58, impacts on aquatic resources during maintenance and operation would be reduced and considered less than significant under CEQA.

Impact BIO #11: Operation Impacts on Wildlife Movement

Temporary

Maintenance or any other activities along the project infrastructure that would occur infrequently or on a temporary basis may directly affect wildlife crossings by limiting their use by wildlife. Occasional project maintenance activities would likely cause wildlife to avoid the maintenance area, causing wildlife to abort crossing attempts and either turn back, attempt crossing return at a later time, or attempt to locate another crossing.

Intermittent maintenance activities are unlikely to have a long-term effect on wildlife movement corridors in terms of their effectiveness for gene flow and dispersion. For the reasons mentioned above, minor indirect impacts on foraging and other localized activities may occur.

Permanent

Direct impacts from daily train operation or regularly scheduled maintenance activities may interfere with wildlife movement between habitats. Regularly passing trains may not provide enough undisturbed time between passes, thus causing wildlife to discontinue use of some or all crossing structures. Regularly scheduled maintenance activities at specific sites may deter wildlife from approaching those areas or using them as part of a wildlife movement corridor, as wildlife may associate them with human presence and disturbance.

Regular train operation or frequent maintenance activities may result in indirect impacts if they restrict movement within wildlife movement corridors. This could lead to a decrease in foraging habitat, restriction of gene flow, and habitat fragmentation. Regular maintenance at specific sites could similarly dissuade wildlife movement near these areas because they become associated with human presence and noise. If these sites are near wildlife crossings, movement through specific crossings could be obstructed, thus causing wildlife to turn back or find another undisturbed crossing. This result could lead to further habitat fragmentation, restricted movement within wildlife corridors, habitat shifts, increased foraging competition, and possibly increased predation near undisturbed crossings.

As part of the B-P Build Alternatives, IAMFs and mitigation measures, identified in Section 3.7.7, would be incorporated to avoid and/or minimize impacts on biological and aquatic resources, including wildlife movement crossings. Specific wildlife movement features were developed to address impacts on wildlife movement. These wildlife movement IAMFs include WM-IAMF#1: Minimize Impediments to Wildlife Movement, WM-IAMF#2: Minimize Impacts from Night Lighting, WM-IAMF#3: Minimize Impacts from Construction Noise, WM-IAMF#4: Wildlife Exclusion Fencing to Funnel Wildlife to Crossings, WM-IAMF#5: Minimize Impacts from Vehicle Traffic, and WM-IAMF#6: Implement Restoration and Revegetation plan for Wildlife Movement Corridors. These IAMFs can be found in the WCA (Authority 2018a). These measures help to reduce impacts by avoiding and reducing impediments to movement, impacts from night lighting, construction noise, and vehicle traffic, and implementing restoration efforts to address impacts on special-status species and wildlife movement corridors. These measures would minimize impacts from project construction and operation.

Specifically for operations impacts, BIO-IAMF#4 would require the Authority to ensure that maintenance personnel attend WEAP training and certify that they understand the regulatory agency requirements and procedures necessary to protect biological resources, including wildlife movement crossings and habitat linkages. To minimize operation noise impacts, the Authority will implement noise reduction measures as outlined in the WCA. In particular, the Authority will use sound barriers such as berms and berm/wall combinations to shield nearby natural habitat and/or crossing structures that wildlife could use for movement corridors from loud noise that exceeds the FRA noise criteria for wildlife. Any potential noise barriers on viaducts would be limited by engineering weight restrictions. Wildlife movement crossings and habitat linkages would also be protected from inundation by water under a flood protection plan by the Authority's hydrology IAMFs (HYD-IAMF#2).

CEQA Conclusion

The design characteristics of the B-P Build Alternatives and both CCNM Design Options include effective IAMFs to minimize the impact on wildlife movement crossings and habitat linkages within the project footprint during construction. Although most of these IAMFs would not be used during operation, there are specific details that are in the project design—such as tunnels and viaducts to maintain crossings, and berms and sound walls to minimize noise and lighting impacts during operation—as described in the WCA and Chapter 2 of this Final EIR/EIS.

Under the B-P Build Alternatives, the impact under CEQA would be potentially significant because potential disturbance of wildlife crossings and habitat linkages during maintenance activities could cause a substantial adverse effect to areas that did not previously have this type of disturbance. Therefore, mitigation measures have been identified in Section 3.7.7 to reduce impacts during operation. These measures include: BIO-MM#76, BIO-MM#77, BIO-MM#78, and BIO-MM#64, which would provide for the protection of habitat linkages. These measures would work together with design features to minimize, avoid, or mitigate impacts on wildlife movement during project operation.

Therefore, under the B-P Build Alternatives, after implementation of BIO-MM#64, BIO-MM#76, BIO-MM#77, BIO-MM#78 and BIO-MM#87, impacts on wildlife movement during maintenance and operation would be reduced to less than significant level under CEQA.

Impact BIO #12: Operation Impacts on Protected Trees

Potential impacts on protected trees that may result from project operation are described in the subsections below.

Temporary

Temporary operations impacts may result from maintenance or any other activities along the project infrastructure that occur infrequently or on a temporary basis.

Direct temporary operations impacts on protected trees may result from pruning and thinning foliage for access, visibility, and aesthetics. Dust from vehicle and machinery disturbance, and equipment and foot traffic may affect individuals of protected trees growing adjacent to maintenance areas. Direct impacts from maintenance activities could result from unintentional contamination, such as chemical leaks and spills, which could affect water or soils used by protected trees. Litter and accidental refuse associated with the HSR system could limit the soil surface area necessary for nutrient intake. If these contaminations are not removed, they may become permanent.

Operations impacts on plant species, either common or special-status, could indirectly affect protected trees if these species provide nitrogen, soil aeration, root protection, seedling protection, and moisture retention. The egress and ingress of machinery and personnel, and of the HSR system itself could also spread or inadvertently introduce invasive and noxious weeds such as tamarisk and gum. These species could compete with protected trees.

Permanent

Permanent operations impacts, which include frequent noise, light, vibration, and wind/turbulence resulting from train speeds of up to 220 miles per hour, may occur on a daily basis from the operation of the HSR system. Additionally, constant operations impacts associated with the proposed tracks and stations would include high vehicle and foot traffic.

Direct impacts on protected trees in immediate proximity to the tracks may result from constant wind disturbance generated by moving trains. Trees growing adjacent to tracks and stations may be damaged by forceful wind, which would also stunt growth and promote desiccation. Over time, these impacts would become permanent.

Indirect impacts on protected trees could result from permanent changes in hydrology and topography, which may also affect the soil environment surrounding a tree's roots. Compaction of soil from high foot and vehicle traffic at the proposed stations or in maintenance access areas could inhibit the tree's oxygen and nutrient intake around the root zone. These changes may also alter the level of necessary symbionts in the soil (i.e., mycorrhizae for oaks) or cause fungal infections, root rot, and lack of proper drainage. These factors may ultimately result in the death of the tree.

Permanent operations impacts on wildlife species may also indirectly inhibit the health or survival of trees within specific communities that require wildlife to facilitate aeration or soil composition. Permanent impacts on plant species (either common or special-status) could indirectly affect trees if these species provide nitrogen, soil aeration, root protection, and moisture retention.

As part of the B-P Build Alternatives, Section 3.7.4.2 discusses IAMFs that would be incorporated to avoid and/or minimize impacts on biological and aquatic resources, including protected trees, from project construction and operation. Specifically for operations impacts, BIO-IAMF#4 would require the Authority to ensure that maintenance personnel attend WEAP training and certify that they understand the regulatory agency requirements and procedures necessary to protect biological resources, including protected trees. These trees would also be protected under a flood protection plan by the Authority's hydrology IAMFs (HYD-IAMF#2).

CEQA Conclusion

The design characteristics of the B-P Build Alternatives and both CCNM Design Options include effective IAMFs to minimize, but not avoid, the potential impact on protected trees in the project

footprint during construction. Most of these IAMFs would not be used during operation. Under the B-P Build Alternatives, the impact under CEQA would be potentially significant because disturbance of protected trees for maintenance activities could cause a substantial adverse effect in areas that did not previously have this type of disturbance. Therefore, mitigation measures have been identified in Section 3.7.7 to reduce impacts during operation. These measures include BIO-MM#35 and BIO-MM#50, which would provide for on-site and off-site habitat restoration of protected trees. These measures would work together with design features to minimize, avoid, or mitigate impacts on protected trees during project operation. No substantial adverse effect would occur after implementation of mitigation, either directly or indirectly, resulting from maintenance and operation activities, on any protected trees listed in local or regional plans, policies, or regulations.

Therefore, under the B-P Build Alternatives, after implementation of BIO-MM#35, and BIO-MM#50, impacts on protected trees during maintenance and operation would be reduced to less than significant under CEQA.

Impact BIO #13: Potential Conflicts with Conservation Plans and Easements

Desert Renewable Energy Conservation Plan

The BLM has adopted the DRECP. One of the four BLM parcels within the project alignment falls within the DRECP and a DRECP designated Wildlife Allocation Area (Assessor's Parcel Number 223-020-12). The project alignment is designed to tunnel under the parcel and avoid impacts on wildlife within the Wildlife Allocation Area. Therefore, the project is not anticipated to conflict with the Wildlife Allocation designation or other conservation measures identified in this plan through project compliance (IAMFs, mitigation measures, and permits) with CEQA, NEPA, CESA, and FESA.

Metropolitan Bakersfield Habitat Conservation Plan

The project is not anticipated to conflict with this plan or the Kern County Valley Floor HCP through project compliance (IAMFs, mitigation measures, and permits) with CEQA, NEPA, CESA, and FESA.

Kern County Valley Floor Habitat Conservation Plan

The project is not anticipated to conflict with this plan, as the acquisition areas allow for the installation of infrastructure such as transit and transportation facilities.

White Wolf Conservation Easement

The project is not anticipated to conflict with this easement, as the acquisition areas allow for the installation of infrastructure such as transit and transportation facilities.

West Mojave Plan

The project is not anticipated to conflict with this plan, as the project right-of-way does not lie within any conservation areas. The project may enhance the plan's goals when considered with the habitat conservation measures developed through project compliance with CEQA, NEPA, CESA, and FESA.

Tehachapi Uplands Habitat Conservation Plan

Because a very small portion of the project's 1,000-foot buffer lies within the plan area, and because there would be no direct effects on that area, the project would not conflict with this plan. Additionally, through compliance with CESA and FESA, the project would not conflict with this plan.

Pacific Gas and Electric Company San Joaquin Valley Operations and Maintenance Habitat Conservation Plan

The project is not anticipated to conflict with this plan when considered with the habitat conservation measures developed through project compliance with CEQA, NEPA, CESA, and FESA.

Upland Species San Joaquin Recovery Program

The project does cross the Tehachapi linkage identified by Penrod et al. (2003) that serves as a linkage between portions of the Bakersfield Urban Satellite population of San Joaquin kit fox and a core population to the west as identified in the recovery plan. However, the Wildlife Corridor Assessment prepared for the HSR project, using assessment methodology developed by Penrod, found that the increase in "movement cost" across the most functional portion of the linkage would be approximately 2 percent for San Joaquin kit fox and 3 percent for blunt-nosed leopard lizard, compared to existing conditions. Additionally, through compliance with CESA and FESA, the HSR project is not anticipated to conflict with this program due to the design of crossings to facilitate wildlife movement and the preservation of selected lands that would enhance the preservation and recovery of the species in the region.

Therefore, it is not anticipated that the B-P Build Alternatives would cause any impacts due to conflicts with conservation plans and/or easements.

CEQA Conclusion

Under the B-P Build Alternatives, no conflict with conservation plans would occur. The design characteristics of the B-P Build Alternatives, as discussed in Section 3.7.4.2, include effective IAMFs to minimize potential conflicts during construction and operation. It is expected that CESA and FESA authorizations will be obtained through a CESA incidental take permit and FESA Section 7 consultation for the entire HSR project rather than compliance with any of the aforementioned plans and their attendant mitigation commitments. Nevertheless, the HSR project CESA and FESA authorizations may incorporate measures identified in the existing plans as appropriate. No additional mitigation measures are required for Impact BIO #13. Therefore, impacts would be considered less than significant under CEQA and no mitigation measures are required.

3.7.7 Mitigation Measures

The mitigation measures in this section identify mitigation in the form of avoidance, minimization, and habitat compensation measures to minimize potential impacts on biological and aquatic resources (e.g., special-status plant and wildlife species, habitats of concern, wildlife movement corridors, and protected trees) affected by the B-P Build Alternative alignments, station alternatives, and LMF/MOWF alternatives. Because the types of direct and indirect impacts would be common among all B-P Build Alternatives, including both CCNM Design Options, as discussed in Section 3.7.6.4, the mitigation measures noted below can be used across all alternative alignments. In addition, many of these mitigation measures have multiple benefits that avoid, protect, or compensate for the impacts on various biological resources.

For unavoidable adverse impacts on special-status species, compensatory mitigation would be provided, with an emphasis on conserving occupied habitat, wildlife corridors, and other important regional landscape features. The goal of the habitat mitigation is to ensure the future conservation of affected resources on a regional scale such that the benefits to the affected resources offset the impacts of the narrow, linear project, which would affect a relatively small percentage of the important resources in the region. In some cases, and in consultation with the USFWS and CDFW, the compensatory mitigation may be weighted in favor of resources for which conservation is a higher priority than for more common resources or resources that would experience lesser impacts.

Implementation of the mitigation measures can be the responsibility of the Authority or its design-build contractor. Monitoring would generally be the responsibility of the design-build contractor, with oversight provided by the Authority during construction. Long-term mitigation monitoring and compensatory mitigation would be the responsibility of the Authority. Comparable compensatory mitigation other than land conservation could be provided, such as habitat enhancement or restoration on conserved land.

As the CEQA lead agency and proponent of this project, the Authority would implement the mitigation measures through its own actions, those of its contractors, and those taken in

cooperation with other agencies and entities. The Authority would oversee the administration of the mitigation monitoring and reporting program. The responsibilities of mitigation implementation, monitoring, and reporting extend to several entities, as outlined in the Mitigation Monitoring Enforcement Plan; however, the Authority would bear the primary responsibility for verifying that the mitigation measures are implemented.

Section 3.7.2 presents the regulatory programs that apply to the B-P Build Alternatives. The primary agreements and regulatory requirements include FESA (Section 7), CESA (Section 2081), certain provisions of the CWA (Section 402), Porter-Cologne, and the CDFW Lake and Streambed Alteration Program (Section 1600).

The mitigation measures presented below were refined in some cases as a result of coordination with federal, state, and local agencies. Representative agencies involved in early coordination include the USFWS, USACE, USEPA, CDFW, and SWRCB. This coordination effort included consideration of the types, timing, and locations of mitigation measures, including consideration for early implementation, as feasible.

3.7.7.1 Fresno to Bakersfield LGA Mitigation Measures from 34th Street and L to Oswell Street

The Fresno to Bakersfield Section Final Supplemental EIR (Authority 2018b) and the Final Supplemental EIS (Authority 2019c) identified mitigation measures that are applicable to the entire length of the F-B LGA from just north of Poplar Avenue to Oswell Street. Not all measures identified in the Final Supplemental EIR and the Final Supplemental EIS are applicable to the portion of the F-B LGA from 34th Street and L Street to Oswell Street. See Section 3.1.3.7 for further explanation. The following biological resources and aquatic resources-related mitigation measures are applicable to the portion of the F-B LGA from 34th Street and L Street to Oswell Street:

- **F-B LGA BIO-MM#1: Designate Project Biologist(s), Regulatory Specialist (Waters), Project Botanist, and Project Biological Monitor(s)**—A Project Biologist shall be designated by the Environmental Compliance Manager to oversee regulatory compliance requirements and monitor the restoration activities associated with ground-disturbing activities in accordance with the adopted mitigation measures and applicable laws. The Project Biologist, Regulatory Specialist, and Project Botanist are responsible for the timely implementation of the biological mitigation measures as outlined in the MMEP, construction documents, and pertinent resource agency permits. Resumes for the Designated Project Biologist(s), Regulatory Specialists (Waters), and Project Botanists, and Project Biological Monitors(s) must be submitted to the USFWS during final design. Additional duties of the Project Biologist, Regulatory Specialist (Waters) and Project Botanist include reviewing design documents and construction schedules, determining project biological monitoring needs, and guiding and directing the work of the Project Biological Monitors. The duties of the Project Biological Monitor include monitoring construction crew activities, as needed, to document applicable mitigation measures and permit conditions. The Project Biologist(s), Regulatory Specialist(s) (Waters), Project Botanist(s) and the Project Biological Monitor(s) report to the Mitigation Manager. The Project Biologist(s), Regulatory Specialist(s) (Waters), Project Botanist(s) and/or the Project Biological Monitor(s) may require special approval from the USFWS and CDFW to implement certain mitigation measures. In these circumstances, they are referred to as agency-approved biologist(s).
- **F-B LGA BIO-MM#2: Regulatory Agency Access**—If requested, before, during, or on completion of ground-disturbing activities, the Contractor will allow access by USFWS, USACE, SWRCB, and CDFW staff to the construction site. Because of safety concerns, all visitors will be required to check in with the Contractor before accessing the construction site. If agency personnel access the construction site, the Project Biologist will prepare a memorandum within 1 day of the visit to document agency access and the issues raised during the field meeting. This memorandum will be submitted to the Mitigation Manager. Any non-compliance issues will be reported to the Contractor and Authority.

- **F-B LGA BIO-MM#3: Prepare and Implement a Worker Environmental Awareness Program**—Before the start of ground-disturbing activities, the Project Biologist, Regulatory Specialist (Waters) and Project Botanist will prepare and implement a WEAP for construction crews. WEAP training materials will include the following: discussion of the federal Endangered Species Act (federal ESA), the California Endangered Species Act (CESA), the Bald and Golden Eagle Protection Act (BGEPA), the Migratory Bird Treaty Act (MBTA), and the Clean Water Act (CWA); the consequences and penalties for violation or noncompliance with these laws and regulations and project permits; identification of special-status plants, special-status wildlife, jurisdictional waters, and special-status plant communities and explanations about their value; hazardous substance spill prevention and containment measures; the contact person in the event of the discovery of a dead or injured wildlife species; and review of mitigation measures. In the WEAP, construction timing in relation to species' habitat and life-stage requirements will be detailed and discussed on project maps, which will show areas of planned minimization and avoidance measures. A fact sheet conveying this information will be prepared by the Project Biologist, Regulatory Specialist (Waters) and Project Botanist for distribution to the construction crews and to others who enter the construction footprint. On completion of the WEAP training, construction crews will sign a form stating that they attended the training, understood the information presented, and will comply with the WEAP requirements. The Project Biologist, Regulatory Specialist (Waters) and Project Botanist will submit the signed WEAP training forms to the Mitigation Manager on a monthly basis. Construction crews will be informed during the WEAP training that, except when necessary as determined in consultation with the Project Biologist, Regulatory Specialist (Waters) and Project Botanist travel within the marked project site will be restricted to established roadbeds. Established roadbeds include all pre-existing and project-constructed unimproved and improved roads.
- **F-B LGA BIO-MM#4: Prepare and Implement a Weed Control Plan and Annual Vegetation Control Plan**—A construction-phase Weed Control Plan and an operation phase Annual Vegetation Control Plan will be developed and implemented. Before the start of ground-disturbing activities, the Project Botanist will prepare and oversee the implementation a Weed Control Plan to minimize or avoid the spread of weeds during ground-disturbing activities.

  The Weed Control Plan will address the following: Schedule for noxious weed surveys to be conducted in coordination with the Biological Resources Management Plan (BRMP) (BIO-MM#5)·

  The success criteria for noxious and invasive weed control, as established by a qualified biologist. The success criteria will be linked to the Biological Resources Management Plan [BRMP] (BIO-MM#5) standards for onsite work during construction. In particular, the criteria will limit the introduction and spread of highly invasive species, as defined by the California Invasive Plant Council (CalIPC), to less than or equal to the pre-disturbance conditions in areas temporarily impacted by construction activities. If invasive species cover is found to exceed by 10% the pre-disturbance conditions during monitoring—or is 10% more compared with a similar, nearby reference site with similar vegetation communities and management—a control effort will be implemented. If the target, or other success criteria identified in the Comprehensive Mitigation and Monitoring Plan (CMMP), has not been met by the end of the BRMP monitoring and implementation period, the Authority or its designee will continue the monitoring and control efforts, and remedial actions would be identified and implemented until the success criteria are met. Depending on monitoring results, additional or revised measures may be needed to ensure that the introduction and spread of noxious weeds are not promoted by the construction and operation of the project. Provisions to ensure that the development of the Weed Control Plan will be coordinated with development of the Restoration and Revegetation Plan (RRP) (BIO-MM#6) so that the RRP incorporates measures to reduce the spread and establishment of noxious weeds, and incorporates percent cover of noxious weeds into revegetation performance standards. Identification of weed control treatments, including the use of permitted herbicides, and manual and

mechanical removal methods. Herbicide application will be restricted from use in Environmentally Sensitive Areas and on compensatory mitigation sites, which are defined in BIO-MM#7, Delineate Environmentally Sensitive Area and Environmental Restricted Area (on plans and in field).

Determination of timing of the weed control treatment for each plant species. Identification of fire prevention measures. During operation, the Authority will generally follow the procedures established in Chapter C2 of the Caltrans Maintenance Manual to manage vegetation on Authority property (Caltrans 2010). Vegetation would be controlled by chemical, thermal, biological, cultural, mechanical, structural, and manual methods. A separate plan, the Annual Vegetation Control Plan, would also be developed each winter for implementation no later than April 1 of each year.

That plan would consist of site-specific vegetation control methods, as outlined below: Chemical vegetation control noting planned usage. Mowing program. Other non-chemical vegetation control plans (manual, biological, cultural, thermal (includes the use of propane heat or steam and is not specific to controlled burning) and structural). List of sensitive areas. Other chemical pest control plans (e.g., insects, snail, rodent). Only Caltrans-approved herbicides will be used in the vegetation control program. Pesticide application will be conducted in accordance with all requirements of the California Department of Pesticide Regulation and County Agricultural Commissioners by certified pesticide applicators. Noxious/invasive weeds will be treated where requested by County Agricultural Commissioners. The Authority will cooperate in area-wide control of noxious/invasive weeds if established by local agencies. Farmers/landowners who request weed control on state right-of-way that is not identified in the annual vegetation control plan will be encouraged to submit a permit request application for weed control that identifies the target weeds and control method desired. The Contractor will implement the Weed Control Plan during the construction period. The Authority will require that HSR maintenance crews follow the guidelines in the Weed Control Plan and Annual Vegetation Control Plan during project operation. The Authority or its designee will appoint the responsible party during the operations period to ensure the Annual Vegetation Control Plan is being carried out appropriately and effectively. A monthly memorandum will be prepared by the Project. Botanist to document the progress of the plan and its implementation.

- **F-B LGA BIO-MM#5: Prepare and Implement a Biological Resources Management Plan**—During final design, the Mitigation Manager, or its designee (Project Biologist, Regulatory Specialist or Project Botanist) will prepare the Biological Resources Management Plan (BRMP) and assemble the biological resources mitigation measures. The BRMP will include terms and conditions from applicable permits and agreements and make provisions for monitoring assignments, scheduling, and responsibility. The BRMP will also include habitat replacement and revegetation, protection during ground-disturbing activities, performance (growth) standards, maintenance criteria, and monitoring requirements for temporary and permanent native plant community impacts. The parameters for the BRMP will be formed with the mitigation measures from this project-level EIR/EIS, including terms and conditions as applicable from the USFWS, USACE, SWRCB, and CDFW permits. The goal of the BRMP is to provide an organized reporting tool to ensure that the mitigation measures and terms and conditions are implemented in a timely manner and are reported on. These measures, terms, and conditions include all avoidance, minimization, repair, mitigation, and compensatory actions stated in the mitigation measures or terms and conditions from the permits referenced above. These measures, terms, and conditions are tracked through final design, implementation, and post-construction phases. The BRMP will help the long-term perpetuation of biological resources within the temporarily disturbed areas and protect adjacent targeted habitats.

  The BRMP will be submitted to the Contractor and will contain, but not be limited to, the following information:

a. A master schedule that shows that construction of the project, Pre-construction surveys, and establishment of buffers and exclusions zones to protect sensitive biological resources.

b. Specific measures for the protection of special-status species.

c. Identification (on construction plans) of the locations and quantity of habitats to be avoided or removed, along with the locations where habitats are to be restored.

d. Procedures for vegetation analyses of temporarily affected habitats to approximate their relative composition and procedures for site preparation, irrigation, planting, and maintenance. This information may be used to determine the requirements of the revegetation areas for both onsite temporary impacts and offsite compensatory sites.

e. Sources of plant materials and methods of propagation.

f. Identification of specific parameters consistent with mitigation ratios and permit conditions for determining the amount of replacement habitat for temporary disturbance areas.

g. Specification of parameters for maintenance and monitoring of re-established habitats, including weed control measures, frequency of field checks, and monitoring reports for temporary disturbance areas.

h. Specification of performance standards for the re-established plant communities within the construction limits.

i. Specification of the remedial measures to be taken if performance standards are not met (e.g., a form of adaptive management).

j. Methods and requirements for monitoring restoration/replacement efforts, which will be a combination of qualitative and quantitative data consistent with mitigation measures and permit conditions.

k. Measures to preserve topsoil and control erosion.

l. Design of protective fencing around Environmentally Sensitive Areas (ESA), environmentally restricted areas (ERA), and the construction staging areas.

m. Specification of the locations and quantities of gallinaceous guzzlers (catch basin/artificial watering structures) and the monitoring of water levels in them.

n. Locations of trees to be protected as wildlife habitat (roosting sites) and locations for planting replacement trees.

o. Specification of the purpose, type, frequency, and extent of chemical use for insect and disease control operations as part of vegetative maintenance within sensitive habitat areas.

p. Specific construction monitoring programs for habitats of concern and special-status species, as needed.

q. Specific measures for the protection of vernal pool habitat and riparian areas. These measures may include erosion and siltation control measures, protective fencing guidelines, dust control measures, grading techniques, construction area limits, and biological monitoring requirements.

r. Provisions for biological monitoring during ground-disturbing activities to confirm compliance and success of protective measures. The monitoring procedures will (1) identify specific locations of wildlife habitat and sensitive species to be monitored; (2) identify the frequency of monitoring and the monitoring methods (for each habitat and sensitive species to be monitored); (3) list required qualifications of biological monitor(s), and (4) identify the reporting requirements.

- **F-B LGA BIO-MM#6: Prepare and Implement a Restoration and Revegetation Plan**—During final design, the Project Botanist will prepare a Restoration and Revegetation Plan (RRP) for temporarily disturbed upland communities. (Site restoration will also be conducted to restore temporary impacts on valley foothill riparian areas [BIO-MM#47] and jurisdictional waters [BIO-MM#48].) In the RRP, impacts on habitat subject to temporary ground disturbances that will require decompaction or regrading will be addressed, if appropriate. The Project Biologist will approve the seed mix. The standards for onsite work during construction will limit highly invasive species, as defined by the California Invasive Plant Council, to less than 10% greater than the pre-disturbance condition or as determined through a comparison with an appropriate reference site with similar natural communities and management. During ground-disturbing activities, the Contractor will implement the RRP in temporarily disturbed areas. The Project Biologist will prepare and submit compliance reports to the Mitigation Manager to document implementation and performance of the RRP.
- **F-B LGA BIO-MM#7: Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in field)**—Before the start of ground-disturbing activities, the Project Biologist, Regulatory Specialist (Waters), and Project Botanist will verify that ESAs and ERAs are delineated on final construction plans (including grading and landscape plans) and in the field and will update as necessary. ESAs are areas within the construction zone, or on compensatory mitigation sites, containing suitable habitat for special-status species and habitats of concern that may allow construction activities but have restrictions based on the presence of special-status species or habitats of concern at the time of construction. ERAs are sensitive areas that are typically outside the construction footprint that must be protected in place during all construction activities. Before and during the implementation of ground-disturbing activities, the Project Biologist, Regulatory Specialist (Waters), and Project Botanist, will mark ESAs and ERAs with high-visibility temporary fencing, flagging, or other agency-approved barriers to prevent encroachment of construction personnel and equipment. Sub-meter accurate Global Positioning System (GPS) equipment will be used to delineate all ESAs and ERAs. The Contractor will remove ESA and ERA fencing when construction is complete or when the resource has been cleared according to agency permit conditions in the MMRP and construction drawings and specifications. The Project Biologist, Regulatory Specialist (Waters), and Project Botanist, will submit a memorandum regarding the field delineation and installation of all ESAs/ERAs to the Mitigation Manager.
- **F-B LGA BIO-MM#8: Wildlife Exclusion Fencing**—The Contractor, under the supervision of the Project Biologist will install wildlife-specific exclusion barriers at the edge of the construction footprint. Exclusion barriers will be made of durable material, regularly maintained, and installed below-grade by the Contractor under the supervision of the Project Biologist. Wildlife exclusion fencing will be installed along the outer perimeter of ESAs and ERAs and below-grade (e.g., 6 to 10 inches below-grade). The design specifications of the exclusion fencing will be determined through consultation with USFWS and/or CDFW. The wildlife exclusion barrier will be monitored, maintained at regular intervals throughout construction, and removed after the completion of major construction activities. The Project Biologist will submit a memorandum to the Mitigation Manager to document compliance with this measure.
- **F-B LGA BIO-MM#9: Equipment Staging Areas**—Before the start of ground-disturbing activities, the Project Biologist, Regulatory Specialist (Waters), and Project Botanist will confirm that staging areas for construction equipment are outside areas of sensitive biological resources, including habitat for special-status species, habitats of concern, and wildlife movement corridors, to the extent feasible. The Project Biologist, Regulatory Specialist (Waters), and Project Botanist will submit a memorandum to the Mitigation Manager to document compliance with this measure.
- **F-B LGA BIO-MM#10: Mono-Filament Netting**—Before and during the implementation of ground-disturbing activities, the Project Biologist will verify that that the Contractor is not using plastic mono-filament netting (erosion-control matting) or similar material in erosion

control materials; acceptable substitutes include coconut coir matting, tackified hydroseeding compounds, rice straw wattles (e.g., Earthsaver wattles: biodegradable, photodegradable, burlap), and other reusable erosion, sediment, and wildlife control systems that may be approved by the regulatory agencies (e.g., ERTEC Environmental Systems products). The Project Biologist will submit memoranda to the Mitigation Manager to document compliance with this measure; the memoranda will be submitted monthly or as appropriate throughout project construction.

- **F-B LGA BIO-MM#11: Vehicle Traffic**—During ground-disturbing activities, the contractor will restrict project vehicle traffic within the construction area to established roads, construction areas, and other designated areas. The contractor will establish vehicle traffic in locations disturbed by previous activities to prevent further adverse effects, require observance of a 15 mile per hour (mph) speed limit for construction areas with potential special-status species habitat, clearly flag and mark access routes, and prohibit off-road traffic. The Project Biologist will submit a memorandum to the Mitigation Manager to document compliance with this measure; memoranda will be submitted on a weekly basis or as appropriate throughout project construction.
- **F-B LGA BIO-MM#12: Entrapment Prevention**—To prevent inadvertent entrapment of protected species, the Contractor, under the guidance of the Project Biologist, will cover all excavated, steep-sided holes or trenches more than 8 inches deep at the close of each work day with plywood or similar materials or provide a minimum of one escape ramp per 10 feet of trenching (with slopes no greater than a 3:1) constructed of earth fill or wooden planks. The Project Biologist will thoroughly inspect holes and trenches for trapped animals before leaving the construction site each day. The Contractor will either screen, cover, or store more than 1 foot off the ground all construction pipe, culverts, or similar structures with a diameter of 3 inches or greater that are stored at the construction site for one or more overnight periods and these pipes, culverts, and similar structures will be inspected by the Project Biologist for wildlife before the material is moved, buried, or capped. The Project Biologist will clear stored material reserved for common and special-status wildlife species before the pipe is subsequently buried, moved, or capped (covered). The Project Biologist will submit memoranda to the Mitigation Manager to document compliance with this measure; the memoranda will be submitted on a weekly basis or as appropriate throughout project construction.
- **F-B LGA BIO-MM#13: Work Stoppage**—During ground-disturbing activities, the Project Biologist, Regulatory Specialist (Waters), Project Botanist or Biological Monitor will halt work in the event that a special-status wildlife species gains access to the construction footprint. This work stoppage will be coordinated with the resident engineer and/or the Authority or its designee. The Contractor will suspend ground-disturbing activities in the immediate construction area where the potential construction activity could result in “take” of special-status wildlife species or until non-listed species, including mammals, are relocated; work may continue in other areas. Written permission will be obtained from CDFW to relocate any non-listed mammals before their being relocated. The Contractor will continue the suspension until the individual leaves voluntarily, or is relocated to a release area using USFWS- and/or CDFW-approved handling techniques and relocation methods, or as required by USFWS or CDFW. The Project Biologist, Regulatory Specialist (Waters), and Project Botanist will submit a memorandum to the Mitigation Manager to document compliance within 1 day of the work stoppage and subsequent action.
- **F-B LGA BIO-MM#14: “Take” Notification and Reporting**—The Project Biologist, Regulatory Specialist (Water), or Project Botanist will immediately notify the Mitigation Manager in the event of an accidental death or injury to a federal- or state-listed species during project activities. The Project Biologist will then notify USFWS and/or CDFW within 24 hours in the event of an accidental death or injury to a federal- or state-listed species during project activities. The Project Biologist will submit a memorandum to the Mitigation Manager to document compliance with this measure. The memorandum will also identify suggested

revisions to the construction activities or additional measures that will be implemented to minimize or prevent future impacts.

- **F-B LGA BIO-MM#15: Post-Construction Compliance Reports**—After each construction package, construction phase, permitting phase, or other portion of the HSR section as defined by Authority is completed, the Mitigation Manager, or their designee, will submit post-construction compliance reports consistent with the requirements of the protocols of each appropriate agency (e.g., USFWS, CDFW), including compliance with regulatory agency permits. The Mitigation Manager will submit a memorandum to the regulatory agencies to document compliance with this measure. The frequency of the memorandum compilation and submission will be consistent with the requirements in the regulatory agency permits.
- **F-B LGA BIO-MM#16: Conduct Protocol-Level Preconstruction Surveys for Special-Status Plant Species and Special-Status Plant Communities**—The Project Botanist will conduct protocol-level, Pre-construction botanical surveys for special-status plant species and special-status plant communities in all potentially suitable habitats where permission to enter was not granted during the spring and summer 2010 field surveys or 2011 supplemental surveys. The surveys will be conducted during the appropriate blooming period(s) for the species before the start of ground-disturbing activities for salvage and relocation activities. The Project Botanist will mark the locations of all special-status plant species and special-status plant communities observed for the Contractor to avoid. Before the start of ground-disturbing activities, all populations of special-status plant species and special-status plant communities identified during Pre-construction surveys within 100 feet of the construction footprint will be protected and delineated by the Contractor (directed by the Project Botanist) as ERAs. As appropriate, the Project Botanist will update the mapping of special-status species or habitats of concern within the construction limits based on resource agency permits. Portions of the construction footprint that support special-status plant species that will be temporarily disturbed will be restored onsite to Pre-construction conditions. Before disturbance, Pre-construction conditions, including species composition, species richness, and percent cover of key species will be documented, and photo points will be established. If special-status plant species cannot be avoided, mitigation for impacts on these species will be documented (density, percent cover, key habitat characteristics, including soil type, associated species, hydrology, topography, and photo documentation of Pre-construction conditions) and incorporated into a relocation/compensation program, as defined in BIO-MM#17. The Project Botanist will provide verification of survey results and report findings through a memorandum to the Mitigation Manager to document compliance with this measure.
- **F-B LGA BIO-MM#17: Prepare and Implement Plan for Salvage, Relocation and/or Propagation of Special-Status Plant Species**—The Project Botanist will prepare a plan before the start of ground-disturbing activities to address monitoring, salvage, relocation, and propagation of special-status plant species. The relocation or propagation of plants and seeds will be performed at a suitable mitigation site approved by the appropriate regulatory agencies, and as appropriate per species. Documentation will include provisions that address the techniques, locations, and procedures required for the successful establishment of the plant populations. The plan will include provisions for performance that address survivability requirements, maintenance, monitoring, implementation, and the annual reporting requirements. Permit conditions issued by the appropriate resource agencies (e.g., USFWS, CDFW) will guide the development of the plan and performance standards. The Project Botanist will submit a memorandum to the Mitigation Manager to document compliance with this measure.
- **F-B LGA BIO-MM#22: Conduct Preconstruction Surveys for Special-Status Reptile and Amphibian Species**—Before the start of ground-disturbing activities, the Project Biologist will conduct Preconstruction surveys in suitable habitats to determine the presence or absence of special-status reptiles and amphibian species within the construction footprint. Surveys will be conducted no more than 30 days before the start of ground-disturbing activities and will be phased with project build-out. The results of the Pre-construction survey

will be used to guide the placement of the environmentally sensitive areas, ERAs, and wildlife exclusion fencing. The Project Biologist will submit a memorandum, on a weekly basis or at other appropriate intervals, to the Mitigation Manager to document compliance with this measure.

- **F-B LGA BIO-MM#23: Conduct Special-Status Reptile and Amphibian Monitoring, Avoidance, and Relocation**—During ground-disturbing activities, the Project Biological Monitor will observe all construction activities in habitat that supports special-status reptiles and amphibians. If suitable habitat is present and environmentally sensitive areas are deemed necessary, the Project Biological Monitor will conduct a clearance survey within the area for special-status reptiles and amphibians after wildlife exclusion fencing is installed. If a special-status reptile or amphibian is present during construction, the Contractor will avoid the special-status reptile or amphibian specie. Otherwise, the Project Biological Monitor will relocate special-status reptiles or amphibians (other than California tiger salamander) found in the Environmentally Sensitive Area or construction footprint to an area outside the construction area as determined through consultation with USFWS and/or CDFW. If necessary, clearance surveys will be conducted daily. The Project Biologist will submit a memorandum, on a weekly basis or at other appropriate intervals, to the Mitigation Manager to document compliance with this measure.
- **F-B LGA BIO-MM#29: Conduct Preconstruction Surveys and Delineate Active Nest Exclusion Areas for Other Breeding Birds**—Before the start of ground-disturbing activities, the Project Biologist will conduct visual Preconstruction surveys where suitable habitats are present for nesting birds protected by the MBTA if construction and habitat removal activities are scheduled to occur during the bird breeding season (February 1 to August 15). In the event active bird nests are encountered during the Pre-construction survey, the Project Biologist in conjunction with the Contractor will establish nest avoidance buffer zones as appropriate. The buffer distances will be consistent with the intent of the MBTA. The Project Biologist will delineate nest avoidance buffers established for ground-nesting birds in a manner that does not create predatory bird perch points in close proximity (150 feet) to the active nest site. The Project Biologist or Biological Monitor will periodically monitor active bird nests. The Project Biologist will maintain the nest avoidance buffer zone until nestlings have fledged and are no longer reliant on the nest or parental care for survival or the nest is abandoned (as determined by the Project Biologist). The Project Biologist will submit a memorandum, on a weekly basis or at other appropriate intervals, to the Mitigation Manager to document compliance with this measure.
- **F-B LGA BIO-MM#30: Conduct Preconstruction Surveys and Monitoring for Raptors**—No more than 14-days before the start of ground-disturbing activities, the Project Biologist will conduct visual Pre-construction surveys where suitable habitats are present for nesting raptors if construction and habitat removal activities are scheduled to occur during the bird-breeding season (February 1 to August 15). Surveys will be conducted in areas within the construction footprint and, where permissible, within 500 feet of the construction footprint for raptor species (not Fully Protected species) and 0.5 mile of the construction footprint for Fully Protected raptor species. The required survey dates will be modified based on local conditions. If breeding raptors with active nests are found, the Project Biologist in conjunction with the Contractor will establish a 500-foot buffer around the nest to be maintained until the young have fledged from the nest and are no longer reliant on the nest or parental care for survival or the nest fails (as determined by the Project Biologist). If fully protected raptors (e.g., white tailed-kite) with active nests are found, the Project Biologist in conjunction with Contractor will establish a 0.5-mile buffer around the nest to be maintained until the young have fledged from the nest or the nest fails (as determined by the Project Biologist). Adjustments to the buffer(s) will require prior approval by USFWS and/or CDFW. The Project Biologist will submit a memorandum, on a weekly basis or at other appropriate intervals, to the Mitigation Manager to document compliance with this measure.
- **F-B LGA BIO-MM#31: Bird Protection**—During Final Design, the Project Biologist will verify that the catenary system, masts, and other structures such as fencing are designed to be bird

and raptor-safe in accordance with the applicable recommendations presented in Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006 (APLIC 2006) and Reducing Avian Collisions with Power Lines: State of the Art in 2012 (APLIC 2012). The Project Biologist will check the final design drawings and submit a memorandum to the Mitigation Manager to document compliance with this measure.

- **F-B LGA BIO-MM#32: Conduct Protocol and Pre-construction Surveys for Swainson's Hawks**—The Project Biologist will conduct Pre-construction surveys for Swainson's hawks as described in the Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley (Swainson's Hawk Technical Advisory Committee [SHTAC] 2000). Surveys will be performed during the nesting season (March 1 through August 1) in the year before ground-disturbing activities within the construction footprint and within a 0.5-mile buffer, where access is permitted. The Pre-construction nest surveys following the Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley (Swainson's Hawk Technical Advisory Committee 2000) will be phased with project build-out. The Pre-construction surveys will determine the status (i.e., active, inactive) of observed nests. The Project Biologist will submit a memorandum, on a weekly basis or at other appropriate intervals, to the Mitigation Manager to document compliance with this measure.
- **F-B LGA BIO-MM#33: Swainson's Hawk Nest Avoidance and Monitoring**—If active Swainson's hawk nests (defined as a nest used one or more times in the last 5 years) are found within 0.5-mile of the construction footprint during the nesting season (March 1 to August 1), the active nests within the 0.50-mile buffer of the construction footprint will be monitored daily by the Project Biological Monitor to assess whether the nest is occupied. If the nest is occupied, the health and status of the nest will be monitored until the young fledge or for the length of construction, whichever occurs first. The Project Biologist in conjunction with the Contractor, will implement buffers restricting construction activities, following CDFW's Staff Report Regarding Mitigation for Impacts to Swainson's Hawks (Buteo swainsoni) in the Central Valley of California (CDFG 1994). Adjustments to the buffer(s) may be made in consultation with CDFW. The Project Biologist will submit a memorandum, on a weekly basis or at other appropriate intervals, to the Mitigation Manager to document compliance with this measure.
- **F-B LGA BIO-MM#34: Monitor Removal of Nest Trees for Swainson's Hawks**—Before the start of ground-disturbing activities, the Project Biological Monitor will monitor nest trees for Swainson's hawks in the construction footprint following the guidelines and methods presented in the Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley (SHTAC 2000). If an occupied Swainson's hawk nest must be removed, the Authority will obtain take authorization through a Section 2081 Incidental Take Permit (including compensatory mitigation to offset the loss of the nest tree) from CDFW. If ground-disturbing activities or other project activities may cause nest abandonment by a Swainson's hawk or forced fledging within the specified buffer area, monitoring of the nest site by the Project Biological Monitor will be conducted to determine if the nest is abandoned. Removal of nesting trees outside of the nesting season (generally between October 1 and February 1) does not require authorization under the Section 2081 Incidental Take Permit. The Project Biologist will submit a memorandum, on a weekly basis or at other appropriate intervals, to the Mitigation Manager to document compliance with this measure.
- **F-B LGA BIO-MM#35: Conduct Protocol Surveys for Burrowing Owls**—Before the start of ground-disturbing activities a qualified, agency-approved biologist, designated by the Project Biologist, will conduct protocol-level surveys in accordance with CDFW's Staff Report on Burrowing Owl Mitigation (CDFG 2012). The Project Biologist or designee will conduct these surveys at appropriate timeframes within suitable habitat located in the construction footprint. Results of the surveys will be used to inform BIO-MM#36. These surveys will be conducted within suitable habitat of the construction footprint and within a 150-meter (approximately 500-foot) buffer. The Project Biologist will submit a memorandum, on a

weekly basis or at other appropriate intervals, to the Mitigation Manager to document compliance with this measure.

- **F-B LGA BIO-MM#36: Burrowing Owl Avoidance and Minimization**—The Project Biologist will implement burrowing owl avoidance and minimization measures following CDFW's Staff Report on Burrowing Owl Mitigation (CDFG 2012). During the nesting season (February 1 through August 31) occupied burrowing owl burrows will not be disturbed unless it is verified that either the birds have not begun egg-laying and incubation or the juveniles from the occupied burrows are foraging independently and are capable of independent survival (as determined by the Project Biologist). Unless otherwise authorized by CDFW, the Project Biologist in conjunction with the Contractor, will establish buffers (as an ESA) between the construction work area and occupied burrowing owl nesting sites as described in Table 3.7-19.[5] Adjustments to the buffer(s) will require prior approval by CDFW. Eviction of burrowing owls outside the nesting season may be permitted pending evaluation of eviction plans and receipt of formal written approval from the CDFW authorizing the eviction. If burrowing owls must be moved from the project area, the Project Biologist will undertake passive relocation measures, including monitoring, in accordance with CDFW's (CDFW 2012) guidelines. The Project Biologist will submit a memorandum, on a weekly basis or at other appropriate intervals, to the Mitigation Manager to document compliance with this measure. California Department of Fish and Wildlife recommended restricted activity dates and setback distances by level of disturbance for burrowing owls is noted below:

  - Location Time of Year Level of Disturbance
  - Low Medium High
  - Nesting Sites April 1–Aug 15 200 meters 500 meters 500 meters
  - Nesting Sites Aug 16–Oct 15 200 meters 200 m 500 meters
  - Nesting Sites Oct 16–March 31 50 meters 100 meters 500 meters

- **F-B LGA BIO-MM#37: Conduct Surveys for Nelson's Antelope Squirrel, Tipton Kangaroo Rat, Dulzura Pocket Mouse, and Tulare Grasshopper Mouse**—Before the start of construction, the Project Biologist will conduct a habitat assessment in potentially suitable habitat within the project footprint to determine presence of special-status small mammal species burrows or their signs. The habitat assessment surveys will be conducted within 2 years, and no more than 14 days before the start of construction or ground-disturbing activities and may be phased with project build-out. If no burrows or signs of special-status small mammal species are detected, no further measures will be required. The Project Biologist will submit a memorandum, on a weekly basis or at other appropriate intervals, to the Mitigation Manager to document compliance with this measure.

- **F-B LGA BIO-MM#38: Implement Avoidance and Minimization Measures for Nelson's Antelope Squirrel, Tipton Kangaroo Rat, Dulzura Pocket Mouse, and Tulare Grasshopper Mouse**—If during the habitat assessment, burrows or signs of special-status small mammal species are detected, the Project Biologist will establish non-disturbance exclusion zones (i.e., wildlife exclusion fencing [e.g., a silt fence or similar material]) in areas where special-status small mammal species are believed to be present. Non-disturbance exclusion zones will be established at least 14 days before the start of ground-disturbing activities. The non-disturbance exclusion fence with one-way exit/escape points will be placed to exclude the special-status small mammals from the construction area. The wildlife exclusion fence will be established around burrows in a manner that allows state-listed species to leave the construction footprint. Additional measures such as one or both of the following will be implemented after the exclusion fencing is installed.

  - The Contractor will trim and clear vegetation to the ground by hand or using hand-operated equipment to discourage the presence of special-status small mammal species in the construction footprint. The cleared vegetation will remain undisturbed by project

[5] This table refers to Table 3.7-19 of the Final F-B LGA EIR.

construction equipment for 14 days to allow species to passively relocate through the one-way exit/escape points along the wildlife exclusion fencing.

- A qualified, agency-approved biologist, designated by the Project Biologist, will conduct small-mammal trapping and relocation in general accordance with the survey protocols in the California Valley Solar Ranch Project: Plan for Relocation of Giant Kangaroo Rats (*Dipodomys ingens*) (H.T. Harvey & Associates 2011) or as determined in consultation with CDFW and USFWS.

- **F-B LGA BIO-MM#40: Conduct Preconstruction Surveys for Special-Status Bat Species**—Before the start of ground-disturbing activities, a qualified, agency-approved biologist, designated by the Project Biologist, will conduct a visual and acoustic Pre-construction survey for roosting bats. A minimum of one day and one evening will be included in the visual Pre-construction survey. The Project Biologist, in coordination with the Mitigation Manager and Authority, will contact CDFW if any hibernation roosts or active nurseries are identified within or immediately adjacent to the construction footprint, as appropriate. The Project Biologist will submit a memorandum, on a weekly basis or at other appropriate intervals, to the Mitigation Manager to document compliance with this measure.
- **F-B LGA BIO-MM#41: Bat Avoidance and Relocation**—During ground-disturbing activities, if active or hibernation roosts are found, the Contractor will avoid them, if feasible, for the period of activity. If avoidance of the hibernation roost is not feasible, the Project Biologist, will prepare a relocation plan and coordinate the construction of an alternative bat roost with CDFW. The Contractor, under the direction of the Project Biologist will implement the Bat Roost Relocation Plan before the commencement of construction activities. The Contractor, under the supervision of the Biological Monitors, will remove roosts with approval from CDFW before hibernation begins (October 31), or after young are flying (July 31), using exclusion and deterrence techniques described in BIO-MM#42, below. The timeline to remove vacated roosts is between August 1 and October 31. All efforts to avoid disturbance to maternity roosts will be made during construction activities. The Project Biologist will submit a memorandum to the Mitigation Manager, on a weekly basis or at other appropriate intervals, to document compliance with this measure.
- **F-B LGA BIO-MM#42: Bat Exclusion and Deterrence**—During ground-disturbing activities, if non-breeding or non-hibernating individuals or groups of bats are found within the construction footprint, the Project Biologist will direct the Contractor to safely exclude the bats by either opening the roosting area to change the lighting and air-flow conditions or installing one-way doors or other appropriate methods specified by CDFW. The Contractor will leave the roost undisturbed by project activities for a minimum of 1 week after implementing exclusion and/or eviction activities. The Contractor will not implement exclusion measures to evict bats from established maternity roosts or occupied hibernation roosts. The Project Biologist will submit a memorandum, on a weekly basis or at other appropriate intervals, to the Mitigation Manager to document compliance with this measure.
- **F-B LGA BIO-MM#43: Conduct Preconstruction Surveys for American Badger and Ringtail**—Before the start of ground-disturbing activities, the Project Biologist will conduct Pre-construction surveys for den sites within suitable habitats in the construction footprint. These surveys will be conducted no more than 30 days before the start of ground-disturbing activities and phased with project build-out. The Project Biologist will submit a memorandum, on a weekly basis or at other appropriate intervals, to the Mitigation Manager to document compliance with this measure.
- **F-B LGA BIO-MM#44: American Badger and Ringtail Avoidance**—The Contractor, under the direction of the Project Biologist, will establish a 50-foot buffer around occupied dens. The Contractor and Project Biologist will establish a 100-foot buffer around maternity dens through the pup-rearing season (American badger: February 15 through July 1; Ringtail: May 1 through June 15). Adjustments to the buffer(s) will require prior approval by CDFW as coordinated by the Project Biologist, under the supervision of the Mitigation Manager. The

Project Biologist will submit a memorandum, on a weekly basis or at other appropriate intervals, to the Mitigation Manager to document compliance with this measure.

- **F-B LGA BIO-MM#45: Conduct Preconstruction Surveys for San Joaquin Kit Fox**—Before the start of ground-disturbing activities, the Project Biologist will conduct Preconstruction surveys in accordance with USFWS' San Joaquin Kit Fox Survey Protocol for the Northern Range (USFWS 1999b). Preconstruction surveys for the kit fox will be conducted between May 1 and September 30 within the study area in suitable habitat areas (alkali desert scrub, annual grassland, pasture, barren, and compatible-use agricultural lands) to identify known or potential San Joaquin kit fox dens. Pre-construction surveys will be conducted by a USFWS-approved project biologist within 30 days before the start of construction or ground-disturbing activities and will be phased with project build-out. The Project Biologist will submit a memorandum, on a weekly basis or at other appropriate intervals, to the Mitigation Manager to document compliance with this measure.
- **F-B LGA BIO-MM#46: Minimize Impacts on San Joaquin Kit Fox**—The Contractor, under direction of the Project Biologist, will implement USFWS' Standardized Recommendations for Protection of the San Joaquin Kit Fox Prior to or During Ground Disturbance (USFWS 2011a) to minimize ground disturbance-related impacts on this species. The Project Biologist will submit a memorandum, on a weekly basis or at other appropriate intervals, to the Mitigation Manager to document compliance with this measure.
- **F-B LGA BIO-MM#47: Restore Temporary Riparian Impacts**—During post-construction, the Contractor, under the direction of the Project Botanist, will revegetate all disturbed valley foothill riparian areas using appropriate plants and seed mixes. The Project Botanist will monitor restoration activities consistent with provisions in the RRP, as described in BIO-MM#6. The Project Botanist will submit a memorandum, on a weekly basis or at other appropriate intervals, to the Mitigation Manager documenting compliance and other reporting requirements required by the regulatory agency permits (e.g., 1600 Streambed Alteration Agreement).
- **F-B LGA BIO-MM#48: Restore Temporary Impacts on Jurisdictional Waters**—During or after the completion of construction, the Contractor, under direction of the Regulatory Specialist (Waters) and Project Botanist, will restore disturbed jurisdictional waters to original topography using stockpiled and segregated soils. In areas where gravel or geotextile fabrics have been placed to protect substrate and minimize impacts on jurisdictional waters, these materials will be removed and affected features will be restored. The Contractor, under supervision of the Project Botanist, will conduct revegetation using appropriate plants and seed mixes. The Authority will conduct maintenance monitoring consistent with the provisions in the RRP (BIO-MM#6). The Project Botanist will submit a memorandum, on a weekly basis or at other appropriate intervals, to the Mitigation Manager to document compliance with this measure.
- **F-B LGA BIO-MM#49: Monitor Construction Activities within Jurisdictional Waters**—During ground-disturbing activities, the Regulatory Specialist (Waters) and Project Biological Monitor will conduct monitoring within and adjacent to jurisdictional waters, including monitoring of the installation of protective devices (silt fencing, sandbags, fencing, etc.), installation and/or removal of creek crossing fill, construction of access roads, vegetation removal, and other associated construction activities. The Project Biological Monitor will conduct biological monitoring to document adherence to habitat avoidance and minimization measures addressed in the project mitigation measures, including, but not limited to, the provisions outlined in BIO-MM#5, BIO-MM#7, BIO-MM#8, BIO-MM#10, BIO-MM#12 through BIO-MM#15, BIO-MM#47, and BIO-MM#48. The monitor will also document adherence to all relevant conservation measures as listed in the USFWS, CDFW, SWRCB, and USACE permits. The Regulatory Specialist (Waters) will submit a memorandum, on a weekly basis or at other appropriate intervals, to the Mitigation Manager to document compliance with this measure.

- **F-B LGA BIO-MM#50: Mitigation and Monitoring of Protected Trees**—Before, during, and after construction, the following methods to preserve and/or mitigate for impacts on protected trees will be implemented:
  - A qualified biologist, designated by the Project Botanist, will conduct surveys before removal or disturbance to evaluate the condition of all protected trees found within areas directly and indirectly affected by the Fresno to Bakersfield Section.
  - The Authority will compensate for impacts and effects to protected tree resources, including removal or trimming of naturally occurring native protected trees and landscape or ornamental trees (see BIO-MM#64, Compensate for Impacts on Protected Trees).
  - The Contractor, under the direction of the Project Botanist, will fence protected trees that may be indirectly affected by construction activities 5 feet from their drip lines to form ERAs.
  - The Authority will prepare and implement a monitoring and maintenance program that monitors transplanted trees for reestablishment of root systems. The Project Botanist will submit a memorandum to the Mitigation Manager to document compliance with this measure.
- **F-B LGA BIO-MM#51: Install Flashing or Slats within Security Fencing**—During construction, the Contractor, under the direction of the Project Biologist, will install permanent security fencing consistent with the final design along portions of the project that are adjacent to wildlife movement corridors and natural habitats (e.g., alkali desert scrub, annual grassland). The security fencing will be enhanced with flashing or slats for 6 inches below ground surface to 12 inches above to prevent special-status reptiles and mammals from moving into the right-of-way. The fencing flashing or slats will be maintained during operation of the HSR project. The Project Biologist will verify that the installation is consistent with the designated terms and conditions in the applicable permits. The design of the reptile and mammal-proof fencing and the exact locations where reptile and mammal-proof fencing will be installed will be determined in consultation with USFWS and CDFW. The Project Biologist will submit a memorandum, on a yearly basis or at other appropriate intervals, to the Mitigation Manager to document compliance with this measure.
- **F-B LGA BIO-MM#53: Compensate for Impacts on Special-Status Plant Species**—Before final design, the Authority will mitigate the impacts on special-status plants in accordance with the USFWS Biological Opinion (USFWS 2013) by implementing the following measures:
  - Compensation for federally listed plant species that are observed within the project footprint and that cannot be avoided will be compensated at a 1:1 ratio based on actual acres of direct effects by the following:
    - Identification of suitable sites to receive the listed plants.
      i. Pixley National Wildlife Refuge, Allensworth Ecological Reserve/State Historic Park, Kern National Wildlife Refuge, Atwell Island, Alkali Sink Ecological Reserve, Semitropic Ecological Reserve, and Kern Water Bank.
      ii. Authority-proposed permittee-responsible mitigation sites.
      iii. Other locations approved by USFWS.
    - Collection of seeds, plant materials, and top soil from the project footprint before construction impacts. The Authority or its designee will submit a memorandum to the USFWS and or CDFW to document compliance with this measure.
- **F-B LGA BIO-MM#58: Compensate for Loss of Swainson's Hawk Nesting Trees**—To compensate for the loss of occupied Swainson's hawk nesting trees or mortality to offspring, the Authority will provide project specific compensatory mitigation that replaces nesting trees and provides natural lands for foraging. Compensatory mitigation for Swainson's hawk will be

based on the number of trees with "active" nests that are removed by construction activities, or where construction activities create a significant habitat modification that leads to a reduction in reproductive success, or nest abandonment. If project construction occurs within 0.5 mile of a documented or observed active nest, the Authority will acquire and preserve 150 acres of natural habitat, per active nest tree removed by construction activities, or where construction activities create a significant habitat modification that leads to reduce reproductive success or nest abandonment. At a minimum, the habitat preserved will contain trees suitable to support nesting and natural foraging habitat for Swainson's hawk. The Authority will submit a memorandum to the CDFW to document compliance with this measure.

- **F-B LGA BIO-MM#59: Compensate for Loss of Burrowing Owl Active Burrows and Habitat**—To compensate for permanent impacts on nesting, occupied, and satellite burrows and/or burrowing owl habitat, the Authority will provide compensatory mitigation based on CDFW's (CDFG 2012) Staff Report on Burrowing Owl Mitigation. The Authority will submit a memorandum to the CDFW to document compliance with this measure.
- **F-B LGA BIO-MM#60: Compensate for Destruction of San Joaquin Kit Fox Habitat**—The Authority will mitigate the destruction of San Joaquin kit fox habitat by the purchase of suitable, approved habitat (USFWS and CDFW). Habitat will be replaced at a minimum ratio of 1:1 for natural lands and a ratio of 0.1:1 for suitable urban or agricultural lands to provide additional protection and habitat in a location that is consistent with the recovery of the species. The Authority will mitigate the impacts on San Joaquin kit fox in accordance with the USFWS Biological Opinion (USFWS 2013) and/or CDFW 2081(b). The Authority will submit a memorandum to the USFWS and CDFW to document compliance with this measure.
- **F-B LGA BIO-MM#62: Prepare and Implement a Site-Specific Comprehensive Mitigation and Monitoring Plan**—As part of the USFWS, USACE, SWRCB, and CDFW permit applications and before the start of ground-disturbing activities, the Authority will prepare a CMMP to mitigate for temporary and permanent impacts on biological resources (i.e., special-status wildlife, jurisdictional waters, and riparian areas). In the CMMP, performance standards, including percent cover of native species, survivability, tree height requirements, wildlife utilization, the acreage basis, restoration ratios, and the combination of onsite and/or offsite mitigation will be detailed; preference will be given to conducting the mitigation within the same HUC-8 or HUC-6 watershed where the impact occurs. The Project Biologist will work with the USACE, SWRCB, and CDFW to develop appropriate avoidance, minimization, mitigation, and monitoring measures to be incorporated into the CMMP. The CMMP will outline the intent to mitigate for the lost conditions, functions, and values of impacts on jurisdictional waters and state streambeds consistent with resource agency requirements and conditions presented in Sections 404 and 401 of the CWA and Section 1600 of the CFGC. The CMMP will incorporate the following standard requirements consistent with USACE, SWRCB, and CDFW guidelines:
  - Description of the project impact/site.
  - Goal(s) (i.e., functions and values or conditions) of the compensatory mitigation project.
  - Description of the proposed compensatory mitigation site.
  - Implementation plan for the proposed compensatory mitigation site.
  - Maintenance activities during the monitoring period.
  - Monitoring plan for the compensatory mitigation site.
  - Completion of compensatory mitigation.
  - Financial assurances.
  - Contingency measures.
  - Also, the following will be included at a minimum for the implementation plan:

- Site analysis for appropriate soils and hydrology.
- Site preparation specifications based on site analysis, including but not limited to grading and weeding.
- Soil and plant material salvage from impact areas, as appropriate to the timing of impact and restoration as well as the location of restoration sites.
- Specifications for plant and seed material appropriate to the locality of the mitigation site.
- Specifications for site maintenance to establish the habitats, including but not limited to weeding and temporary irrigation.

Habitat preservation, enhancement, and/or establishment or restoration activities will be conducted on some of the compensatory (i.e., selected permittee-responsible) mitigation sites to achieve the mitigation goals. A detailed design of the mitigation habitats will be created in coordination with the permitting agencies and be described in the CMMP. It is recognized that several CMMPs will be developed consistent with the selected mitigation sites and the resources mitigated at each. The primary engineering and construction Contractor will ensure, through coordination with the Project Biologist, that construction is implemented in a manner that minimizes disturbance of such areas. Temporary fencing will be used during construction to avoid sensitive biological resources that are located adjacent to construction areas and can be avoided. Performance standards are targets for determining the effectiveness of the mitigation and assessing the need for adaptive management (e.g., mitigation design or maintenance revisions). The performance standards are developed so that progress towards meeting final success criteria can be assessed on an annual basis; the standard for each year is progressively closer to the final criteria (e.g., vegetation cover standards may increase annually until reaching the success criteria objective in the final year of monitoring).

Success criteria are formal criteria that must be met after a specific timeframe to meet regulatory requirements of the permitting agencies. Where applicable, replacement planting/seeding will be implemented if monitoring demonstrates that performance standards or success criteria are not met during a particular monitoring interval. The performance standards will be used to determine whether the habitat improvement is trending toward sustainability (i.e., reduced human intervention) and to assess the need for adaptive management. These standards must be met for the habitat improvement to be declared successful, both during a particular monitoring year and at the end of the establishment period.

These performance standards will be developed in consultation with the permitting agencies and described in the CMMP. The final success criteria will be developed in coordination with the regulatory agencies and presented in the CMMP. Examples of success criteria, which could be included in the CMMP, and would be assessed at the end of the monitoring period (assumed to be 5 years or as directed by agencies), include:

- Percent survival of planted trees (65 - 85 %, depending on species and habitat).
- Percent absolute cover of highly invasive species, as defined by the California Invasive Plant Council (<5%).
- Percent total absolute cover of plant species (50 - 80 %, depending on habitat type).
- Designed wetlands will meet U.S. Army Corps of Engineers criteria for hydrophytic vegetation, hydric soils, and hydrology as defined in the “Corps of Engineers wetland delineation manual” (Environmental Laboratory 1987).
- Designed vernal pools and seasonal wetlands will meet inundation and seasonal drying requirements as specified in the design and indicated by agencies.

- Species composition and community diversity, relative to reference sites, and/or as described in the guidelines issued by permitting agencies (e.g., USFWS conservation guidelines for valley elderberry longhorn beetle).

Performance standards and success criteria will be provided for each of the years of monitoring and will be specific to habitat types at each permittee-responsible mitigation site. The monitoring schedule will be detailed in the site-specific CMMPs.

To be deemed successful, the site will be required to meet the performance standards established for the year in which monitoring is being conducted (e.g., monitoring conducted at intervals with increasing performance requirements). However, if performance standards are not met in specific years, remedial measures, such as regrading, adjustment to modify the hydrological regime, and/or replacement planting or seeding, must be implemented and that year's monitoring must be repeated the following year until the performance standards are met. The success criteria specified must be reached without human intervention (e.g., irrigation, replacement plantings) aside from maintenance practices described in the site-specific CMMPs for maintenance during the establishment period.

The Project Biologist will oversee the implementation of all CMMP elements and monitor consistent with the prescribed maintenance and performance monitoring requirements. The Authority, or its designee, will prepare annual monitoring reports for 5 years (or less if success criteria are met as described earlier) and/or other documentation prescribed in the resource agency permits. The Authority will submit a memorandum to the regulatory agencies to document compliance with this measure.

- **F-B LGA BIO-MM#63: Compensate for Permanent and Temporary Impacts on Jurisdictional Waters—**The Authority will mitigate permanent and temporary wetland impacts through compensation determined in consultation with the USACE, SWRCB, USFWS, and CDFW, in order to be consistent with the CMMP (BIO-MM#62).

  Regulatory compliance for jurisdictional waters includes relevant terms and conditions from the USACE 404 Permit, SWRCB 401 Permit, and CDFW 1600 Streambed Alteration Agreement.

  Compensation shall include aquatic resources restoration, establishment, enhancement, or preservation through one or more of the following methods:

  - Purchase of credits from an agency-approved mitigation bank.
  - Fee-title-acquisition of natural resource regulatory agency-approved property.
  - Permittee-responsible mitigation through the establishment, re-establishment, restoration, enhancement, or preservation of aquatic resources and the establishment of a conservation easement or other permanent site protection method, along with financial assurance for long-term management of the property-specific conservation values.

  In lieu fee contribution determined through negotiation and consultation with the various natural resource regulatory agencies. The following ratios are proposed as a minimum for compensation for permanent impacts; final ratios will be determined in consultation with the appropriate agencies:

  - Vernal pools: 2:1.
  - Seasonal wetlands: between 1.1:1 and 1.5:1 based on impact type and function and values lost; 1:1 offsite for permanent impacts; 1:1 onsite and 0.1:1 to 0.5:1 offsite for temporary impacts. The Authority will mitigate impacts on jurisdictional waters by replacing, creating, restoring, enhancing or preserving aquatic resource at the ratios presented above or other ratios, as determined in consultation with the appropriate agencies, which compensates for functions and values lost. The Authority will consider modifying the vernal pool mitigation ratios in the final permits based on site-specific conditions and the specific life history requirements of vernal pool branchiopods, California tiger salamander, and western spadefoot toad. Where an HSR alternative affects an existing conservation area (e.g., Allensworth ER), the Authority will modify the

mitigation ratio to meet the vernal pool mitigation requirement. Either the affected portion of the conservation area will be relocated or compensation will be provided to the holder of Allensworth ER in accordance with the Uniform Relocation and Real Property Policy Act of 1970, as amended.

- Through the CMMP reporting program and the applicable terms and conditions from the USACE 404 Permit, SWRCB 401 Permit, and the CDFW 1600 Streambed Alteration Agreement, the Authority, or its designee, will document compliance and submit it to the regulatory agencies.

- **F-B LGA BIO-MM#64: Compensate for Impacts on Protected Trees**—The Authority will compensate for impacts, including removal or trimming of naturally occurring native protected trees and landscape or ornamental protected trees, in accordance with the local regulatory body (city or county government). The local regulations and laws allow for a number of potential mitigation opportunities. The Authority will provide mitigation commensurate with the regulations and laws in that jurisdiction such that the resulting impact on protected trees is less than significant and may include, but is not limited to, the following, depending on the local jurisdiction:
  - Transplant directly affected protected trees that are judged by an arborist to be in good condition to a suitable site outside the zone of impact.
  - Replace directly affected protected trees at an onsite or offsite location, based on the number of protected trees removed, at a ratio not to exceed 3:1 for native trees or 1:1 for landscape or ornamental trees.
  - Contribute to a tree-planting fund. The Authority will submit a memorandum to the local regulatory body to document compliance with this measure.
- **F-B LGA BIO-MM#65: Offsite Habitat Restoration, Enhancement, and Preservation**—Before site preparation at a mitigation site, the Authority will consider the offsite habitat restoration, enhancement, and preservation program and identify short-term temporary and/or long-term permanent effects on the natural landscape. A determination will be made on any effects from the physical alteration of the site to onsite biological resources, including plant communities, land cover types, and the distribution of special-status plant and wildlife. Appropriate seasonal restrictions (e.g., breeding season) on activities that result in physical alteration of the site may be applicable if suitable habitats for special-status species and sensitive habitats exist onsite. Activities resulting in the physical alteration of the site include grading/modifications to onsite topography, stockpiling, storage of equipment, installation of temporary irrigation, removal of invasive species, and alterations to drainage features.

  In general, the long-term improvements to habitat functions and values will offset temporary effects during restoration, enhancement, and preservation activities.

  The offsite habitat restoration, enhancement, and preservation program will be designed, implemented, and monitored in ways that are consistent with the terms and conditions of the USACE Section 404 Permit, CDFW 1600 Streambed Alteration Agreement, and CESA and federal ESA as they apply to their jurisdiction and resources onsite. Potential effects on site-specific hydrology and the downstream resources will be evaluated as a result of implementation of the restoration-related activity. Site-specific BMPs and a Storm Water Pollution Prevention Plan (SWPPP) will be implemented as appropriate. The Authority will report on compliance with the permitting requirements. The Authority, or its designee, will be responsible for the monitoring and tracking of the program, will prepare a memorandum of compliance, and will submit it to the appropriate regulatory agency.

3.7.7.2 Mitigation Measures for Biological and Aquatic Resources

BIO-MM#1: Conduct Presence/Absence Pre-construction Surveys for Special-Status Plant Species and Special-Status Plant Communities

Prior to any ground disturbing activity, the project biologist will conduct presence/absence botanical field surveys for special-status plant species and special-status plant sensitive natural communities in all potentially suitable habitats within a Work Area. The surveys shall be consistent with Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities (CDFW 2018) and Guidelines for Conducting and Report Botanical Inventories for Federally Listed, Proposed and Candidate Plants (USFWS 2001). The Project Biologist will flag and record in GIS the locations of any observed special-status plant species and special-status plant sensitive natural communities and provide appropriate buffers for avoidance.

This mitigation measure is anticipated to be effective because it identifies, documents, and protects special-status plant species within 100 feet of the project footprint, reducing the potential for disturbance during construction. Implementation of this measure would not trigger secondary environmental impacts because it would not change the scope, scale, or location of construction activities beyond those that have been described as part of the B-P Build Alternatives.

BIO-MM#2: Prepare and Implement Plan for Salvage and Relocation of Special-Status Plant Species

Prior to any ground disturbing activity, the Project Biologist will collect seeds and plant materials and stockpile and segregate the top four inches of topsoil from locations within the Work Area where species listed as threatened or endangered under the FESA, threatened, endangered, or candidate for listing under CESA, state-designated “Rare” species, and California Rare Plant Rank 1B and 2 species were observed during surveys for use on off-site locations. Suitable sites to receive salvaged material include Authority mitigation sites, refuges, reserves, federal or state lands, and public/private mitigation banks.

If relocation or propagation is required by authorizations issued under the FESA and/or CESA, the Project Biologist will prepare a plant species salvage plan to address monitoring, salvage, relocation and/or seed banking of federal or State-listed plant species

The plan will include provisions that address the techniques, locations, and procedures required for the collection, storage, and relocation of seed or plant material; collection, stockpiling, and redistribution of topsoil and associated seed. The plan will also include requirements related to outcomes such as percent absolute cover of highly invasive species, as defined by the California Invasive Plant Council (less than documented baseline conditions), maintenance, monitoring, implementation, and the annual reporting. The plan will reflect conditions required under regulatory authorizations issued for federal or state-listed species. The Project Biologist will submit the plan to the Authority for review and approval.

This mitigation measure is anticipated to be effective because it salvages unavoidable special-status species within the project footprint; relocates salvaged species to suitable habitat acquired within the region, and monitors relocated species per the Special Plant Species Management Plan to provide for suitable survival of special-status plant species, reducing the potential for disturbance during construction.

BIO-MM#2 would have a temporary impact on special-status plants through direct disturbance as part of salvage and relocation efforts, but ultimately would be beneficial because the plan would salvage, relocate, and protect special-status plants.

Implementation of this mitigation measure may also require the acquisition of suitable additional lands outside of the project footprint for the purposes of relocating special-status plant species. This land may be converted from other current uses, such as agriculture, which in turn could have potential secondary environmental impacts on agricultural resources (through farmland conversion), other biological resources (through direct and indirect impacts on species habitat), and cultural resources (through disturbance of archaeological resources and impacts on historic

properties). Such secondary impacts from off-site mitigation activities are addressed under BIO-MM#50. Impacts on additional environmental resources are not anticipated.

BIO-MM#6: Prepare and Implement a Restoration and Revegetation Plan

Prior to any ground disturbing activity, the Project Biologist will prepare a Restoration and Revegetation Plan (RRP) to address temporary impacts resulting from ground disturbing activities within areas that potentially support special-status species, wetlands and/or other aquatic resources. Restoration activities may include, but not be limited to: grading landform contours to approximate pre-disturbance conditions, re-vegetating disturbed areas with native plant species, and using certified weed-free straw and mulch. The Authority will implement the RRP in all temporarily disturbed areas outside of the permanent right-of-way that potentially support special-status species, wetlands and/or other aquatic resources.

Consistent with section 1415 of the Fixing America's Surface Transportation Act (FAST Act) restoration activities will provide habitat for native pollinators through plantings of native forbs and grasses. The Project Biologist will obtain a locally sourced native seed mix. The restoration success criteria will include limits on invasive species, as defined by the California Invasive Plant Council, to an increase no greater than 10 percent compared to the pre-disturbance condition, or to a level determined through a comparison with an appropriate reference site consisting of similar natural communities and management regimes. The RRP will outline at a minimum:

a. Procedures for documenting pre-construction conditions for restoration purposes.

b. Sources of plant materials and methods of propagation.

c. Specification of parameters for maintenance and monitoring of re-established habitats, including weed control measures, frequency of field checks, and monitoring reports for temporary disturbance areas.

d. Specification of success criteria for re-established plant communities.

e. Specification of the remedial measures to be taken if success criteria are not met.

f. Methods and requirements for monitoring restoration/replacement efforts, which may involve a combination of qualitative and/or quantitative data gathering.

g. Maintenance, monitoring, and reporting schedules, including an annual report due to the Authority by January 31st of the following year.

The RRP will be submitted to the Authority and regulatory agencies, as defined in the conditions of regulatory authorizations, for review and approval.

This mitigation measure is anticipated to be effective because it creates an RRP to restore, revegetate, and monitor lands that provide suitable habitat for the special-status species affected by the B-P Build Alternatives. The RRP would establish specifications of success criteria to gauge the effectiveness of restoration and function of the mitigation lands. The mitigation lands, their management, and monitoring serve to allow for intended ecologic function of compensation habitat for sensitive plant species and special-status species habitat loss related to the B-P Build Alternatives.

Overall, the impacts of this measure would be beneficial to biological resources because the Authority would further consider impacts and would implement strategies to avoid temporary impacts during mitigation and restoration activities. If land is acquired for off-site mitigation, these lands may be converted from other current uses which could have potential impacts on agricultural resources (through farmland conversion), other biological resources (through direct and indirect impacts on species habitat), and cultural resources (through disturbance of archaeological resources and impacts on historic properties). Such secondary impacts from off-site mitigation activities are addressed under BIO-MM#50.

BIO-MM#7: Conduct Pre-construction Surveys for Special-Status Reptile and Amphibian Species

Prior to any ground disturbing activities, the Project Biologist will conduct pre-construction surveys in suitable habitat to determine the presence or absence of special-status reptiles and amphibian species within the Work Area. These surveys will be conducted in accordance with any required protocols. Surveys will be conducted no more than 30 days before the start of ground- disturbing activities in a Work Area. The results of the pre-construction survey will be used to guide the placement of Environmentally Sensitive Areas (ESAs) or conduct species relocation.

This mitigation measure is anticipated to be effective because it identifies and documents special-status reptile and amphibian species and their habitat within the project footprint, informing methods for the species' avoidance, protective fencing placement, and relocation activities. Implementation of this measure would have temporary impacts on special-status reptiles and amphibians resulting from take (harassment) of a few individuals, if identified during surveys. The sampling is an assessment that would be useful in understanding the species present and would help guide the implementation of the performance standards to be consistent with other mitigation requirements. In general, the surveys are minimally invasive and would not result in physical disturbance outside the project footprint. Implementation of this measure would not trigger secondary environmental impacts because it would not change the scope, scale, or location of construction activities beyond those that have been described as part of the B-P Build Alternatives.

BIO-MM#8: Implement Avoidance and Minimization Measures for Special-Status Reptile and Amphibian Species

The Project Biologist will monitor all initial ground disturbing activities that occur within suitable habitat for special-status reptiles and amphibians, and will conduct clearance surveys of suitable habitat in the Work Area on a daily basis. If a special-status reptile or amphibian is observed, the Project Biologist will identify actions, to the extent feasible, sufficient to avoid impacts on the species and to allow it to leave the area on its own volition. Such actions may include establishing a temporary ESA in the area where a special-status reptile or amphibian has been observed and delineating a 50-foot no-work buffer around the ESA. In circumstances where a no-work buffer is not feasible the Project Biologist will relocate any of the species observed from the Work Area. For federal or state-listed species, relocations will be undertaken in accordance with regulatory authorizations issued under the FESA and/or CESA.

This mitigation measure is anticipated to be effective because it implements wildlife exclusion fencing around the construction area, clearance surveys and construction monitoring for special-status reptile and amphibian species, avoidance of the species if present, and relocation of any individuals within the active construction area to areas outside of the footprint that otherwise could be harmed by construction activities. Implementation of this measure would have temporary impacts on special-status reptiles and amphibians resulting from take (harassment) of individuals, if identified during clearance surveys or monitoring. Surveys, construction monitoring, and relocation are minimally invasive and would not result in additional physical disturbance outside the project footprint. Implementation of this measure would not trigger secondary environmental impacts because it would not change the scope, scale, or location of construction activities beyond those that have been described as part of the B-P Build Alternatives.

BIO-MM#11: Conduct Surveys for Blunt-Nosed Leopard Lizard

No more than twelve months before the start of any ground disturbing activity, in accordance with authorizations under FESA, a habitat assessment of the project footprint will be conducted by the Project Biologist in suitable habitat for the blunt-nosed leopard lizard to identify all habitat suitable for blunt-nosed leopard lizard within the project footprint. Within twelve months prior to any ground-disturbing activity, the Project Biologist will conduct surveys for blunt nosed leopard lizard in blunt-nosed lizard suitable habitats (e.g., areas containing burrows) within the Work Area. These surveys will be conducted in accordance with the Approved Survey Methodology for the Blunt-Nosed Leopard Lizard (CDFW 2019), or other more recent guidelines, if available.

In instances where blunt-nosed leopard lizards are observed at any time during presence/absence surveys, pre-construction surveys, or construction monitoring, USFWS and CDFW will be notified of the occurrence within two business days.

This mitigation measure is anticipated to be effective because it identifies and documents blunt-nosed leopard lizard individuals and their habitat within 250 feet of the project footprint, informing the species' avoidance, protective fencing placement, and mitigation. Implementation of this measure would not trigger secondary environmental impacts because it would not change the scope, scale, or location of construction activities beyond those that have been described as part of the B-P Build Alternatives.

BIO-MM#13: Implement Avoidance Measures for Blunt-Nosed Leopard Lizard

For Work Areas where surveys confirm that blunt-nosed leopard lizards are absent, the Project Biologist may install Wildlife Exclusion Fencing (WEF) along the perimeter of the Work Area. The WEF will be monitored daily and maintained.

During the non-active season for blunt-nosed leopard lizards (October 16 through April 14), to the extent feasible, ground disturbing activities will not occur in areas where blunt-nosed leopard lizards or signs of the species have been observed and that contain burrows suitable for blunt-nosed leopard lizards. If ground disturbing activities are scheduled during the non-active season, suitable burrows identified during the surveys will be avoided through establishment of 50-foot no-work buffers. The Project Biologist may reduce the size of the no-work buffers if information indicates that the extent of the underground portion of burrows is less than 50 feet.

During the active season when blunt-nosed leopard lizards are moving above-ground (April 15 through October 15), the following measures will be implemented in areas where blunt-nosed leopard lizards or signs of blunt-nosed leopard lizards have been observed:

- Establishment of No-Work Buffers. The Project Biologist will establish, monitor, and maintain 50-foot no-work buffers around burrows and egg clutch sites identified during surveys. The 50-foot no-work buffers will be established around burrows in a manner that allows for a connection between the burrow site and the suitable natural habitat adjacent to the Construction Footprint so that blunt-nosed leopard lizards and/ or hatchlings may leave the area after eggs have hatched. Construction activities will not occur within the 50-foot no-work buffers until such time as the eggs have hatched and blunt-nosed leopard lizards have left the area.
- Fencing of Work Areas. Prior to installing wildlife exclusion fence (WEF), the Project Biologist will confirm that no blunt-nosed leopard lizards are present within a Work Area by conducting focused blunt-nosed leopard lizard observational surveys for 12 days over the course of a 30 to 60-day period. At least one survey session will occur over 4 consecutive days. These observational surveys may be paired with scent detection dog surveys for blunt-nosed leopard lizard scat.
  - Within 3 days of completing these surveys with negative results, WEF will be installed in a configuration that accounts for burrow locations and enables blunt-nosed leopard lizards to leave the Work Area. The following day, the Project Biologist will conduct an observational survey. If no blunt-nosed leopard lizards are observed, the Project Biologist will install additional WEF to further enclose the Work Area. This Work Area will be monitored daily while the WEF is in place.
  - If blunt-nosed leopard lizards are observed prior to installing the last of the WEF, the Project Biologist will continue observational surveys until the lizard is observed leaving the Work Area or until 30 days elapse with no blunt-nosed leopard lizards observations within the Work Area.

This mitigation measure is anticipated to be effective because it provides for regular surveys and monitoring of blunt-nosed leopard lizard during both active and non-active seasons for this species, thus informing the species' avoidance, protective fencing placement, and mitigation. Implementation of this measure would not trigger secondary environmental impacts because it

would not change the scope, scale, or location of construction activities beyond those that have been described as part of the B-P Build Alternatives.

BIO-MM#14: Conduct Pre-construction Surveys and Delineate Active Nest Exclusion Areas for Breeding Birds

Prior to any ground-disturbing activity, including vegetation removal, staging, and site visits scheduled to occur during the bird breeding season (February 1 to September 1), the Project Biologist will conduct visual pre-construction surveys within the Work Area for nesting birds and active nests (nests with eggs or young) of non-raptor species listed under the Migratory Bird Treaty Act and/or the Fish and Game Code. These surveys will be conducted in accordance with any required protocols.

In the event that active bird nests are observed during the pre-construction survey, the Project Biologist will delineate no-work buffers. No-work buffers will be set at a distance of 75 feet, unless a larger buffer is required pursuant to regulatory authorizations issued under the FESA and/or CESA. No-work zone buffers will be maintained until nestlings have fledged and are no longer reliant on the nest or parental care for survival or the Project Biologist determines that the nest has been abandoned. In circumstances where it is not feasible to maintain the standard no-work buffer, the no-work buffer may be reduced, provided that the Project Biologist monitors the active nest during the construction activity to ensure that the nesting birds do not become agitated. Additional measures that may be used when no-work buffers are reduced include visual screens and sound barriers. If established no-work zone buffers cannot be implemented, the Project Biologist will establish a new buffer.

This mitigation measure is anticipated to be effective because it would require identification and documentation of active nests within 500 feet of the proposed construction area, establishes protective buffers from construction around active nests, and monitors the nests until they are inactive. The buffers and subsequent nest monitoring prevent construction activities from disturbing nests while active, allowing young to develop and fledge. Implementation of this measure would not trigger secondary environmental impacts because it would not change the scope, scale, or location of construction activities beyond those that have been described as part of the B-P Build Alternatives.

BIO-MM#15: Conduct Pre-construction Surveys and Monitoring for Raptors

If construction or other vegetation removal activities are scheduled to occur during the breeding season for raptors (January 1 to September 1), no more than 14-days before the start of the activities, the Project Biologist will conduct pre-construction surveys for nesting raptors in areas where suitable habitat is present. Specifically, such surveys will be conducted in habitat areas within the Construction Footprint and, where access is available, within 500 feet of the boundary of the Construction Footprint. If breeding raptors with active nests are found, the Project Biologist will delineate a 500-foot buffer (or as modified by regulatory authorizations for species listed under FESA and/or CESA) around the nest to be maintained until the young have fledged from the nest and are no longer reliant on the nest or parental care for survival or until such time as the Project Biologist determines that the nest has been abandoned. Nest buffers may be adjusted if the Project Biologist determines that smaller buffers would be sufficient to avoid impacts on nesting raptors. If established no-work zone buffers cannot be implemented, Project Biologist will establish a new buffer.

BIO-MM#15 would have temporary impacts on nesting raptors from the disruption or disturbance required during surveys. Overall, this measure would be beneficial and would allow the B-P Build Alternatives to avoid the removal of occupied nests.

This mitigation measure is anticipated to be effective because it would require identification and documentation of active raptor nests within 500 feet of the proposed construction area, establishes protective buffers from construction around active nests, and monitors the nests until they are inactive. The buffers and subsequent nest monitoring prevent construction activities from disturbing raptor nests while active, allowing young to develop and fledge. Implementation of this measure would not trigger secondary environmental impacts because it would not change the

scope, scale, or location of construction activities beyond those that have been described as part of the B-P Build Alternatives.

BIO-MM#16: Implement Avoidance Measures for California Condor

During any ground-disturbing activities within the range of the California condor, as delineated in the USFWS database, the Authority will implement the following avoidance measures:

- The Project Biologist will be present for construction activities occurring within two miles of known California condor roosting sites.
- If USFWS informs the Authority or if the Authority is otherwise made aware that California condors are roosting within 0.5 miles of a Work Area, no construction activity will occur during the period between one hour before sunset and one hour after sunrise.
- All construction materials located within Work Areas, including items that could pose a risk of entanglement, such as ropes and cables, will be properly stored, covered, and secured when not in use.
- Littering of trash and food waste is prohibited. All litter, small artificial items (screws, washers, nuts, bolts, etc.), and food waste will be collected and disposed of from Work Areas on at least a daily basis.
- All fuels and components with hazardous materials or wastes will be handled in accordance with applicable regulations. These materials will be kept in segregated, secured and/or secondary containment facilities as necessary. Any spills of liquid substances that could harm condors will be immediately addressed.
- Avoid the use of ethylene glycol-based anti-freeze or other ethylene glycol-based liquid substances. All parked vehicles/equipment will be kept free of leaks, particularly anti-freeze. Vehicles will be checked daily for leaks.
- Polychemical lines will not be used or stored on-site to preclude condors from obtaining and ingesting pieces of polychemical lines.
- If a California condor(s) lands in any Work Area, the Project Biologist will assess construction activities occurring at the time and determine whether those activities present a potential hazard to the individual California condor. Activities determined by the Project Biologist to present a potential hazard to the California condor will be stopped until the bird has abandoned the area. Methods approved by USFWS for hazing California condors to encourage abandonment of the construction site, Guidance on Hazing California Condors (September 2014), may be used as necessary.
- The Project Biologist will coordinate with USFWS prior to construction-related uses of helicopters to establish that no California condors are present in the area. If California condors are observed in the area in which helicopters will operate, helicopter use will not be permitted until the Project Biologist has determined that the California condors have left the area.

This mitigation measure is anticipated to be effective because it would restrict construction activities in areas within 0.5 miles of roosting California condors and provides specific measures for keeping the Work Area free of materials that would attract or endanger California condors. Implementation of this measure would not trigger secondary environmental impacts because it would not change the scope, scale, or location of construction activities beyond those that have been described as part of the B-P Build Alternatives.

BIO-MM#17: Conduct Surveys for Swainson's Hawk Nests and Implement Avoidance and Minimization Measures

Surveys must be performed no more than one year prior to the commencement of construction activities. The Project Biologist will conduct surveys for Swainson's hawk during the nesting season (March through August) within both the Work Area and a 0.5-mile buffer surrounding the Work Area, provided access to such areas is available. No sooner than 30 days prior to any ground disturbing activity, the Project Biologist will conduct pre-construction surveys of nests

identified during the earlier surveys to determine if any are occupied. The initial nesting season surveys and subsequent pre-construction nest surveys will follow the protocols set out in the *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (Swainson's Hawk Technical Advisory Committee [SHTAC] 2000), and for the areas within the Antelope Valley, the *Swainson's Hawk Survey Protocols, Impact Avoidance, and Minimization Measures for Renewable Energy Projects in the Antelope Valley of Los Angeles and Kern Counties, California* (California Energy Commission and California Department of Fish and Game, 2010).

This mitigation measure is anticipated to be effective because it would require identification and documentation of active Swainson's hawk nests within 0.5-mile of the proposed construction area, and establishes protective buffers from construction around active nests. The buffers and subsequent nest monitoring prevent construction activities from disturbing raptor nests while active, allowing young to develop and fledge. Implementation of the mitigation measure would have temporary impacts on Swainson's hawks from the disruption or disturbance required to survey for them. Implementation of this measure would not trigger secondary environmental impacts because it would not change the scope, scale, or location of construction activities beyond those that have been described as part of the B-P Build Alternatives.

BIO-MM#18: Implement Avoidance and Minimization Measures for Swainson's Hawk Nests

Any active Swainson's hawk nests (defined as a nest used one or more times in the last five years) found within 0.5-mile of the boundary of the Work Area during the nesting season (February 1 to September 1) will be monitored daily by the Project Biologist to assess whether the nest is occupied. If the nest is occupied, the Project Biologist will establish no-work buffers following consultation with CDFW and CDFW's Staff Report Regarding Mitigation for Impacts to Swainson's hawks (*Buteo swainsoni*) in the Central Valley of California (CDFG 1994). The status of the nest will be monitored until the young fledge or for the length of construction activities, whichever occurs first. Adjustments to the buffer(s) may be made in consultation with CDFW.

If an occupied Swainson's hawk nest tree is to be removed, an incidental take permit under CESA will be obtained and impacts will be minimized and fully mitigated.

This mitigation measure is anticipated to be effective because it would require identification and documentation of active Swainson's hawk nests within 0.5-mile of the proposed construction area, establishes protective buffers from construction around active nests, and monitors the nests until they are inactive. The buffers and subsequent nest monitoring prevent construction activities from disturbing Swainson's hawk nests while active, allowing young to develop and fledge. Implementation of the mitigation measure would have temporary impacts on Swainson's hawks from the disruption or disturbance required to survey for them. Implementation of this measure would not trigger secondary environmental impacts because it would not change the scope, scale, or location of construction activities beyond those that have been described as part of the B-P Build Alternatives.

BIO-MM#20: Conduct Protocol Surveys for Burrowing Owls

Prior to any ground disturbing activity, the Project Biologist will conduct protocol-level surveys for burrowing owl within suitable habitat located in the Work Area and/or extending 500 feet from the boundary of the Work Area, where access is available. Surveys will be conducted in accordance with guidelines in the CDFW Staff Report on Burrowing Owl Mitigation (CDFG 2012c).

BIO-MM#20 would have temporary impacts on burrowing owls from disruption of their normal behavior resulting from conducting surveys. Overall, the measure would be beneficial because it would allow the B-P Build Alternatives to avoid affecting burrowing owls. Implementation of this measure would not result in additional physical disturbance outside the project footprint. Therefore, there is no potential for additional impacts on biological or other resources

This mitigation measure is anticipated to be effective because it would require identification and documentation of active burrowing owl burrows and foraging habitat within 500 feet of the proposed construction area to avoid impacts from construction activities, and guides future protective buffer

placement and mitigation. Implementation of this measure would not trigger secondary environmental impacts because it would not change the scope, scale, or location of construction activities beyond those that have been described as part of the B-P Build Alternatives.

BIO-MM#21: Implement Avoidance and Minimization Measures for Burrowing Owl

Occupied burrowing owl burrows that will be directly affected by ground disturbing activities will be relocated in accordance with CDFW's *Staff Report on Burrowing Owl Mitigation* (CDFG 2012). To the extent feasible, the Project Biologist will establish 600-foot no-work buffers around occupied burrowing owl burrows in the Work Area during the nesting season (February 1 through September 1). If the no-work buffer is not feasible and occupied burrows will be relocated during the nesting season, relocation will occur either before the birds have begun egg-laying and incubation or after the Project Biologist has determined that the juveniles from the occupied burrows are foraging independently and are capable of independent survival.

This mitigation measure is anticipated to be effective because it would require identification and documentation of active burrowing owl burrows, foraging habitat, and nest burrows within 500 feet of the proposed construction area; establishes buffers around active nest burrows; monitors nest burrows to determine when they are no longer active; and evicts owls from non-nest burrows in the project footprint to avoid owl mortality from construction activities. This measure would have temporary impacts on non-nesting burrowing owls because it would allow the B-P Build Alternatives to avoid the loss of burrowing owls by avoiding the removal of occupied burrows outside of the nesting season. The buffers, monitoring, and eviction prevent construction activities from disturbing active nest burrows or occupied non-nest burrows, allowing young to develop and fledge and owls to vacate the project footprint prior to construction disturbance.

Implementation of this measure would not trigger secondary environmental impacts because it would not change the scope, scale, or location of construction activities beyond those that have been described as part of the B-P Build Alternatives.

BIO-MM#22: Conduct Pre-Construction Surveys for Nelson's Antelope Squirrel, Tipton Kangaroo Rat, Dulzura Pocket Mouse, and Tulare Grasshopper Mouse

Prior to any ground disturbing activity, the Project Biologist will conduct pre-construction surveys in potentially suitable habitat within the Work Area to identify burrows or signs of presence of Nelson's antelope squirrel, Tipton kangaroo rat, Dulzura pocket mouse, or Tulare grasshopper mouse. The surveys will be conducted within two years of, and at least 14 days before, the start of ground disturbing activities in a Work Area. These surveys will be conducted in accordance with any required protocols.

This mitigation measure is anticipated to be effective because it would require identification and documentation of potential Nelson's Antelope Squirrel, Tipton kangaroo rat, Dulzura Pocket Mouse, and Tulare Grasshopper Mouse burrows within the Work Area plus a 50-foot buffer to avoid mortality or injury of individuals from construction activities, and guides future protective avoidance and relocation.

Implementation of this measure would not trigger secondary environmental impacts because it would not change the scope, scale or location of construction activities beyond those that have been described as part of the B-P Build Alternatives.

BIO-MM#23: Implement Avoidance and Minimization Measures for Nelson's Antelope Squirrel, Tipton Kangaroo Rat, Dulzura Pocket Mouse, and Tulare Grasshopper Mouse

If burrows or signs of Nelson's antelope squirrel, Tipton kangaroo rat, Dulzura pocket mouse, or Tulare grasshopper mouse are observed during pre-construction surveys, the Project Biologist will establish Environmentally Sensitive Areas (ESAs) and install Wildlife Exclusion Fencing at least 14 days before the start of ground disturbing activities in areas where burrows or signs were observed. To the extent feasible, no-work buffers extending 50 feet beyond the ESAs will be established. The WEF will be installed in a manner that provides for the exclusion of the special-status small mammals from the Work Area, but allows them to exit the area.

After the WEF is installed, the Project Biologist will conduct trapping and relocation for Nelson's antelope squirrel, Tipton kangaroo rat, Dulzura pocket mouse, and Tulare grasshopper mouse, in coordination with CDFW and USFWS regarding appropriate methods and required permits.

This mitigation measure is anticipated to be effective because it identifies and documents Nelson's Antelope Squirrel, Tipton kangaroo rat, Dulzura Pocket Mouse, and Tulare Grasshopper Mouse within the Work Area and a 50-foot buffer, installs WEF to prevent special-status mammals from entering the Work Area, and if needed, routinely monitors and relocates individuals to suitable habitat outside of the Work Area to avoid mortality or injury of individuals from construction activities. BIO-MM#23 would have temporary impacts on Nelson's Antelope Squirrel, Tipton kangaroo rat, Dulzura Pocket Mouse, and Tulare Grasshopper Mouse from catching and relocating individuals, which would disrupt their normal behavior and movement patterns. Overall, this measure would minimize the potential of mortality to Nelson's Antelope Squirrel, Tipton kangaroo rat, Dulzura Pocket Mouse, and Tulare Grasshopper Mouse.

Implementation of this measure would not result in additional physical disturbance outside the project footprint. Therefore, there is no potential for secondary impacts on biological or other resources.

BIO-MM#25: Conduct Pre-construction Surveys for Special-Status Bat Species

No earlier than thirty days prior to the start of ground disturbing activities in a Work Area, the Project Biologist will conduct a visual and acoustic survey (over the course of one day and one evening at a minimum) for roosting bats in the Work Area and extending 500 feet from the boundary of the Work Area, where access is available. Such surveys will be conducted only in those areas in which bridges, abandoned structures, trees with large cavities or dense foliage are present within a half mile of the boundary of the Work Area.

This mitigation measure is anticipated to be effective because it would require identification and documentation of active bat roosts (hibernation and nursery) within and immediately adjacent to the proposed Work Area to avoid impacts from construction activities, and guides future protective avoidance and relocation. This measure would have no impacts on roosting bats because noninvasive survey techniques would be used.

Implementation of this measure would not trigger secondary environmental impacts because it would not change the scope, scale, or location of construction activities beyond those that have been described as part of the B-P Build Alternatives.

BIO-MM#26: Implement Bat Avoidance and Relocation Measures

Prior to any ground-disturbing activity, the Project Biologist shall survey for active hibernacula or maternity roosts. If active hibernacula or maternity roosts are identified in the Work Area or 500 feet extending from the Work Area during pre-construction surveys, they will be avoided to the extent feasible. Clearing and grubbing will be prohibited adjacent to the roost site. Lighting use near the roost site where it would shine on the roost or interfere with bats entering or leaving the roost will also be prohibited. Operation of internal combustion equipment, such as generators, pumps and vehicles shall be prohibited within 300 feet of the roost site.

If avoidance of a hibernacula is not feasible, through coordination with CDFW, portions of the features that provide naturalized habitat will be maintained to the greatest extent possible. In addition, improvements will be made to existing roost sites and/or new roost sites on buildings or within the project site area will be provided. New roosts will be in place prior to the initiation of project-related activities to allow enough time for bats to relocate.

Additionally, if avoidance of a hibernacula is not feasible, the Project Biologist will prepare a relocation plan to remove the hibernacula and provide for construction of an alternative bat roost outside of the Work Area. The relocation plan will be submitted to CDFW for review prior to construction activities.

The Project Biologist will implement the relocation plan before the commencement of any ground disturbing activities that will occur within 500 feet of the hibernacula. Removal of roosts will be guided by accepted exclusion and deterrent techniques.

This mitigation measure is anticipated to be effective because it avoids (to the extent feasible) and monitors active bat roosts (hibernation and nursery) within and immediately adjacent to the proposed construction area to avoid impacts from construction activities, requires preparation of a Bat Roost Relocation Plan before construction disturbance; and removes roosts before the hibernation period and after young are volant to avoid bat mortality from construction activities. The avoidance, relocation plan, seasonal restrictions on roost removal, and roost removal prevent construction activities from disturbing active bat roosts, allowing young to develop and bats to vacate the project footprint and immediately adjacent areas prior to construction disturbance. Implementation of this measure would not trigger secondary environmental impacts because it would not change the scope, scale, or location of construction activities beyond those that have been described as part of the B-P Build Alternatives.

BIO-MM#27: Implement Bat Exclusion and Deterrence Measures

If non-breeding or non-hibernating individuals or groups of bats are found roosting within the Work Area, the Project Biologist will facilitate the eviction of the bats by either opening the roosting area to change the lighting and airflow conditions, or installing one-way doors or other appropriate methods.

To the extent feasible, the Authority will leave the roost undisturbed by project activities for a minimum of one week after implementing exclusion and/or eviction activities. Steps will not be taken to evict bats from active maternity or hibernacula; instead such features may be relocated pursuant to a relocation plan.

This mitigation measure is anticipated to be effective because it deters (to the extent feasible) bat roosting and evicts bats from the proposed construction area and immediately adjacent areas before the hibernation period and after young are volant to avoid bat mortality prior to construction activities. The bat deterrence, seasonal restrictions on roost removal, and bat eviction prevent construction activities from disturbing active bat roosts, allow young to develop, and permit bats to vacate the project footprint and immediately adjacent areas prior to construction disturbance avoiding bat mortality. Implementation of this measure would not trigger secondary environmental impacts because it would not change the scope, scale, or location of construction activities beyond those that have been described as part of the B-P Build Alternatives.

BIO-MM#28: Conduct Pre-construction Surveys for Ringtail and Ringtail Den Sites and Implement Avoidance Measures

Prior to any ground disturbing activity, the Project Biologist will conduct pre-construction surveys for ringtail and ringtail den sites within suitable habitat located within the Work Area. These surveys will be conducted no more than 30 days before the start of ground disturbing activities in a Work Area. The Project Biologist will establish 100-foot no-work buffers around occupied maternity dens throughout the pup-rearing season (May 1 through June 15) and a 50-foot no work buffer around occupied dens during other times of the year.

This mitigation measure is anticipated to be effective because it would require identification and documentation of active ringtail dens within the project footprint to avoid mortality or injury of individuals from construction activities, and guides future protective avoidance.

Implementation of this measure would not trigger secondary environmental impacts because it would not change the scope, scale, or location of construction activities beyond those that have been described as part of the B-P Build Alternatives.

BIO-MM#29: Conduct Pre-Construction Surveys for American Badger Den Sites and Implement Minimization Measures

Prior to any ground disturbing activity, the Project Biologist will conduct pre-construction surveys for American Badger den sites within suitable habitat located within the Work Area. These surveys will be conducted no less than 14 days and no more than 30 days prior to the start of ground disturbing activities in a Work Area. The Project Biologist will establish a 100-foot no-work buffer around occupied maternity dens throughout the pup-rearing season (February 15 through July 1) and a 50-foot no-work buffer around occupied dens during other times of the year. If non-maternity dens are found and cannot be avoided during construction activities, they will be monitored for badger activity. If the Project Biologist determines that dens may be occupied, passive den exclusion measures will be implemented for three to five days to discourage the use of these dens prior to project disturbance activities.

This mitigation measure is anticipated to be effective because it avoids occupied and maternity American Badger dens within the project footprint during construction activities to allow young to develop, and badgers to vacate the dens and the project footprint, avoiding mortality or injury of individuals from construction activities.

Implementation of this measure would not result in additional physical disturbance outside the project footprint. Therefore, there is no potential for secondary impacts on biological or other resources.

BIO-MM#30: Conduct Pre-construction Surveys for San Joaquin Kit Fox

Within 30 days prior to the start of any ground disturbing activity, the Project Biologist will conduct pre-construction surveys in modeled suitable habitat, including urban suitable habitat, within the Work Area. The surveys will be conducted in accordance with USFWS' San Joaquin Kit Fox Survey Protocol for the Northern Range (USFWS 1999) between May 1 and September 30 for the purpose of identifying potential San Joaquin kit fox dens. If any occupied or potential dens are found during pre-construction surveys, they will be flagged and a 50-foot no-work buffer will be established around the den until the den is cleared, if necessary to allow construction activities to proceed.

This mitigation measure is anticipated to be effective because it identifies and documents active San Joaquin kit fox dens within 250 feet of the project footprint to avoid mortality or injury of individuals from construction activities, and guides future protective avoidance and minimization. Implementation of BIO-MM#30 would have temporary impacts on San Joaquin kit fox as a result of disruption of their normal behavior resulting from conducting surveys. Overall, this measure would be beneficial to San Joaquin kit foxes because it would allow the B-P Build Alternatives to avoid the loss of this species.

Implementation of this measure would not result in additional physical disturbance outside the project footprint. Therefore, there is no potential for secondary impacts on biological or other resources.

BIO-MM#31: Minimize Impacts on San Joaquin Kit Fox

The Authority will implement USFWS' *Standardized Recommendations for Protection of the San Joaquin Kit Fox Prior to or During Ground Disturbance* (USFWS 2011a) to minimize impacts on this species, including:

- Disturbance to all kit fox dens will be avoided to the extent feasible.
- Construction activities that occur within 200 feet of any occupied dens will cease within one-half hour after sunset and will not begin earlier than one-half hour before sunrise, to the extent feasible.
- All construction pipes, culverts, or similar structures with a diameter of 4 inches or greater that are stored within the Construction Footprint for one or more overnight periods will be thoroughly inspected for kit foxes before the pipe is subsequently buried, capped, or otherwise used or moved.

- If a San Joaquin kit fox is detected within a Work Area during construction, the Project Biologist will request approval from the Service and CDFW to capture and relocate the kit fox if it does not safely leave the area by its own volition.
- To minimize the temporary impacts of WEF and construction exclusion fencing on kit fox and their movement/migration corridors during construction, artificial dens will be installed along the outer perimeter of WEF and construction exclusion fencing. Artificial dens or similar escape structures will also be installed at dedicated wildlife crossing structures to provide escape cover and protection against predation. The artificial dens will be located on parcels owned by the Authority or at locations where access is available.

This mitigation measure is anticipated to be effective because it identifies and implements BMPs to avoid active San Joaquin kit fox dens within 250 feet of the project footprint to prevent mortality or injury of individuals from construction activities and minimize impacts on individuals from ground disturbance. BIO-MM#31 would have temporary impacts on San Joaquin kit fox as a result of disruption of their normal behavior resulting from conducting protective measures for individuals. Overall, this measure would be beneficial to San Joaquin kit foxes because it would allow the B-P Build Alternatives to avoid causing the loss of individuals of this species.

Implementation of this measure would not result in additional physical disturbance outside the project footprint. Therefore, there is no potential for secondary impacts on biological or other resources.

BIO-MM#32: Restore Temporary Riparian Habitat Impacts

Within ninety days of completing construction in a Work Area, the Project Biologist will direct the revegetation and recontouring, as necessary, of any riparian areas temporarily disturbed as a result of the construction activities, using appropriate native plants and seed mixes. Native plants and seed mixes will be obtained from stock originating from areas within the local watershed, to the extent feasible. The Project Biologist will monitor restoration activities consistent with provisions in the Restoration and Revegetation Plan (RRP) (BIO-MM#6).

This mitigation measure is anticipated to be effective because it implements the RRP from BIO-MM#6 to restore riparian areas affected by the B-P Build Alternatives. The RRP would establish success criteria to gauge the effectiveness of restoration and function of the riparian habitat that was temporarily disturbed within the Work Area.

Implementation of this measure would not result in additional physical disturbance outside the project footprint. Therefore, there is no potential for secondary impacts on biological or other resources.

BIO-MM#33: Restore Aquatic Resources Subject to Temporary Impacts

Within ninety day of the completion of construction activities in a Work Area, the Authority will begin to restore aquatic resources that were temporarily affected by the construction. Aquatic resources are those resources considered waters of the U.S. under the federal Clean Water Act and/or waters of the state under the Porter-Cologne Act. As set out in the Restoration and Revegetation Plan (RRP), such areas will be, to the extent feasible, restored to their natural topography. In areas where gravel or geotextile fabrics have been installed to protect substrate and to otherwise minimize impacts, the material will be removed and the affected features will be restored. The Authority will revegetate affected aquatic resources using appropriate native plants and seed mixes (from local vendors where available). The Authority will conduct maintenance monitoring consistent with the provisions of the RRP.

This mitigation measure is anticipated to be effective because it implements the RRP from BIO-MM#6 to restore aquatic resources impacted by the B-P Build Alternatives. The RRP would establish success criteria to gauge the effectiveness of restoration and function of the aquatic resources that were temporarily disturbed within the Work Area.

Implementation of this measure would not result in additional physical disturbance outside the project footprint. Therefore, there is no potential for secondary impacts on biological or other resources.

BIO-MM#34: Monitor Construction Activities within Aquatic Resources

The Project Biologist will monitor construction activities that occur within or adjacent to aquatic resources, including activities associated with the installation of protective barriers (e.g., silt fencing, sandbags, fencing), install and/or removal of creek material to accommodate crossings, construction of access roads, and removal of vegetation. As part of this effort, the Project Biologist will document compliance with applicable avoidance and minimization measures including measures set forth in regulatory authorizations issued under the CWA and/or Porter-Cologne.

This mitigation measure is anticipated to be effective because it ensures protection of aquatic resources within or adjacent to the Work Area through compliance with applicable avoidance and minimization measures as set forth in regulatory authorizations issued under the CWA and/or Porter-Cologne. Implementation of this measure would not result in additional physical disturbance outside the project footprint. Therefore, there is no potential for secondary impacts on biological or other resources.

BIO-MM#35: Implement Transplantation and Compensatory Mitigation Measures for Protected Trees

Prior to ground disturbing activities, the Project Biologist will conduct surveys in the Work Area to identify protected trees.

The Project Biologist will establish ESAs around protected trees with the potential to be affected by construction activities, but do not require removal. The ESAs will extend outward five feet from the drip lines of such protected trees.

The Authority will provide compensatory mitigation for impacts on protected trees, including impacts associated with removing or trimming a protected tree. Compensation will be based on requirements set out in applicable local government ordinances, policies and regulations. Compensatory mitigation may include, but is not limited to, the following:

- Transplantation of protected trees to areas outside of the Work Area.
- Replacement of protected trees at an off-site location, based on the number of protected trees impacted, at a ratio not to exceed 3:1 for native trees, 10:1 for heritage trees, or 1:1 for ornamental trees, unless higher ratios are required by local government ordinances or regulations.
- Contribution to a tree-planting fund.

This mitigation measure is anticipated to be effective because it ensures that any protected trees within the work area are either transplanted or replaced. Implementation of this measure may result in some additional physical disturbance outside the project footprint for any protected trees transplanted outside of the Work Area.

BIO-MM#36: Install Aprons or Barriers within Security Fencing

Prior to final construction design the Project Biologist will review the fencing plans along any portion of the permanent right-of-way that is adjacent to natural habitats (e.g., alkali desert scrub, annual grassland) and confirm that the permanent security fencing will be enhanced with a barrier (e.g., fine mesh fencing) that extends at least 12 inches below ground and 12 inches above ground to prevent special-status reptiles, amphibians and mammals from moving through or underneath the fencing and gaining access to areas within the right-of-way. At the 12-inch depth of the below grade portion of the apron, it will extend or be bent at an approximately 90-degree angle and oriented outward from the right-of-way a minimum of 12-inches, to prevent fossorial mammals, reptiles, and amphibians from digging or tunneling below the security fence and gaining access to the right-of-way. A climber barrier (e.g., rigid curved or bent overhang) will be

installed at the top of the apron to prevent reptiles, amphibians and mammals from climbing over the apron.

The Project Biologist will ensure that the selected apron material and climber barrier does not cause harm, injury, entanglement, or entrapment to wildlife species. The Authority will provide for quarterly inspection and repair of the fencing.

The specific design and method for installation of an apron or barrier may vary as required by regulatory authorizations issued under FESA and/or CESA. Prior to operation the Project Biologist will field inspect the fencing along any portion of the permanent right-of-way that is adjacent to natural habitats (e.g., alkali desert scrub, annual grassland) and confirm that the fencing has been appropriately installed. Fencing plan review and field inspection will be documented in a memorandum from the Project Biologist and provided to the Authority.

This mitigation measure is anticipated to be effective because it implements fencing to exclude special-status mammals and reptiles from 250 feet of the project footprint to prevent mortality or injury of individuals from construction activities. BIO-MM#36 would affect wildlife movement because it would create a new barrier in areas that are currently barrier-free. However, because it would prevent terrestrial wildlife from entering the railroad right-of-way, it would also likely reduce wildlife mortality. In addition, impacts on wildlife movement would be minimized through the creation of wildlife crossing structures near known wildlife corridors.

Implementation of this measure would not result in additional physical disturbance outside the project footprint. Therefore, there is no potential for secondary impacts on biological or other resources.

BIO-MM#37: Minimize Effects to Wildlife Movement Corridors during Construction

To the extent feasible, the Authority will avoid placing fencing, either temporarily or permanently, within known wildlife movement corridors in those portions of the alignment where the tracks are elevated (e.g., viaducts or bridges). The Authority will avoid conducting ground disturbing activities in wildlife movement corridors during nighttime hours, to the extent feasible, and will shield nighttime lighting to avoid illuminating wildlife movement corridors in circumstances where avoidance of such activities is not feasible. Steps to minimize lighting effects to wildlife movement corridors during construction will be consistent with BIO-MM#86: Implement Lighting Minimization Measures During Construction.

This mitigation measure is anticipated to be effective because it minimizes construction-related disturbance to terrestrial wildlife using established wildlife movement linkages. By limiting the amount of construction fencing and permanent fencing, the impacts on wildlife movement corridors would be reduced. Furthermore, by reducing the amount of light and noise where construction is required over linkages (e.g., stream crossings), individual animals would be less likely to avoid the area and alter their natural behavioral patterns.

Implementation of this measure would not result in additional physical disturbance outside the project footprint. Therefore, there is no potential for secondary impacts on biological or other resources.

BIO-MM#38: Compensate for Impacts to Listed Plant Species

The Authority will provide compensatory mitigation for direct impacts to federal and State-listed plant species based on the number of acres of plant habitat directly affected. Such mitigation will include the following measures:

- Compensatory mitigation will be provided at a 1:1 ratio to offset direct impacts to federally listed plant species habitat, unless a higher ratio is required pursuant to regulatory authorizations issued under FESA.
- Compensatory mitigation will be provided at a 1:1 ratio to offset direct impacts to State-listed plant species habitat, unless a higher ratio is required pursuant to regulatory authorizations issued under CESA.

Compensatory mitigation will be provided using one or more of the methods described in the Compensatory Mitigation Plan, Bio-MM# 53

This mitigation measure is anticipated to be effective because it provides a minimum compensatory mitigation standard for special-status plants (i.e., 1:1 ratio). Potential secondary impacts on biological and other resources from this measure would be the same as those described under BIO-MM#50. No other secondary impacts are anticipated.

BIO-MM#42: Provide Compensatory Mitigation for Impacts on Habitat for Blunt-Nosed Leopard Lizard, Tipton Kangaroo Rat and Nelson's Antelope Squirrel

The Authority will provide compensatory mitigation to offset the permanent and temporary loss of suitable habitat for the Tipton kangaroo rat and Nelson's antelope squirrel. Mitigation will be provided at a ratio of 1:1, unless a higher ratio is required by authorizations issued under FESA for Tipton kangaroo rat or blunt-nosed leopard lizard, or under CESA for Tipton kangaroo rat or Nelson's antelope squirrel. Compensatory mitigation will be provided using one or more of the methods described in the Compensatory Mitigation Plan, BIO-MM#53.

This mitigation measure is anticipated to be effective because it provides compensatory mitigation at a minimum 1:1 ratio for the Tipton kangaroo rat, Nelson's antelope squirrel, and Blunt-nosed leopard lizard. Potential secondary impacts on biological and other resources from this measure would be the same as those described under BIO-MM#50. No other secondary impacts are anticipated.

BIO-MM#43: Provide Compensatory Mitigation for Loss of Swainson's Hawk Nesting Trees and Habitat

To compensate for permanent impacts on active Swainson's hawk nest trees (i.e., trees in which Swainson's hawks were observed building nests during protocol-level surveys described in BIO-MM#48) and foraging habitat, the Authority would provide project-specific compensatory mitigation that replaces affected nest trees and provides foraging habitat. Lands proposed as compensatory mitigation for Swainson's hawk would meet the following minimum criteria:

- Support at least three mature native riparian trees suitable for Swainson's hawk nesting (i.e., valley oak, Fremont cottonwood, or willow) for each Swainson's hawk nest tree (native or nonnative) removed by construction of the project extent, which results in a 3:1 ratio.
- Support at least one Swainson's hawk nesting territory in the last 5 years.
- Contribute to the project extent's mitigation commitment for Swainson's hawk foraging habitat, which would be calculated based on the following ratios:
  - 1:1 for impacts on Active Primary Foraging Habitat
  - 0.75:1 for impacts on Active Secondary Foraging Habitat
  - 0.5:1 for impacts on Active Tertiary Foraging Habitat.

This mitigation measure is anticipated to be effective because it provides minimum compensatory mitigation standards for nesting Swainson's hawks. Implementation of this mitigation measure may also require the acquisition of suitable additional lands outside of the project footprint for the purposes of providing nesting habitat for Swainson's hawks. This land may be converted from other current uses, such as agriculture, which in turn could have potential secondary environmental impacts on agricultural resources (through farmland conversion). Such secondary impacts from off-site mitigation activities are addressed under BIO-MM#50.

BIO-MM#44: Provide Compensatory Mitigation for Loss of Active Burrowing Owl Burrows and Habitat

To compensate for permanent impacts on nesting, occupied, and satellite burrows for burrowing owls and/or their habitat, the Authority will provide compensatory mitigation at a minimum ratio of 1:1 using one or more of the methods described in the Compensatory Mitigation Plan, BIO-MM#53.

This mitigation measure is anticipated to be effective because it provides minimum compensatory mitigation standards for burrowing owl. Implementation of this mitigation measure may also require the acquisition of suitable additional lands outside of the project footprint for the purposes of providing habitat for burrowing owls. This land may be converted from other current uses, such as agriculture, which in turn could have potential secondary environmental impacts on agricultural resources (through farmland conversion). Such secondary impacts from off-site mitigation activities are addressed under BIO-MM#50.

BIO-MM#45: Provide Compensatory Mitigation for Impacts on San Joaquin Kit Fox Habitat

The Authority will provide compensatory mitigation for impacts on modeled San Joaquin kit fox habitat through the acquisition of suitable habitat that is acceptable to USFWS and CDFW. Habitat will be replaced at a minimum ratio of 1:1 for natural lands and at a ratio of 3:1 for suitable urban or agricultural lands, unless a higher ratio is required by regulatory authorizations issued under FESA and/or CESA.

Compensatory mitigation will be provided using one or more of the methods described in the Compensatory Mitigation Plan, Bio-MM# 53.

This mitigation measure is anticipated to be effective because it provides minimum compensatory mitigation standards for San Joaquin kit fox. Implementation of this mitigation measure may also require the acquisition of suitable additional lands outside of the project footprint for the purposes of providing habitat for San Joaquin kit fox. This land may be converted from other current uses, such as agriculture, which in turn could have potential secondary environmental impacts on agricultural resources (through farmland conversion). Such secondary impacts from off-site mitigation activities are addressed under BIO-MM#50.

BIO-MM#46: Provide Compensatory Mitigation for Permanent Impacts on Riparian Habitat

The Authority will compensate for permanent impacts on riparian habitats at a ratio of 2:1, unless a higher ratio is required by agencies with regulatory jurisdiction over the resource. Compensatory mitigation may occur through habitat restoration, the acquisition of credits from an approved mitigation bank, or participation in an in lieu fee program.

This mitigation measure is anticipated to be effective because it provides minimum compensatory mitigation standards for riparian habitats. Potential secondary impacts on biological and other resources from this measure are not anticipated if mitigation is provided through acquisition of credits from an approved mitigation bank or participation in an in lieu fee program. If mitigation is provided through off-site habitat restoration, then secondary impacts may occur as a result of lands being converted from other current uses, such as agriculture, which in turn could have potential secondary environmental impacts on agricultural resources (through farmland conversion). Such secondary impacts from off-site mitigation activities are addressed under BIO-MM#50.

BIO-MM#47: Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts on Aquatic Resources

The Authority will prepare and implement a Compensatory Mitigation Plan (CMP) that identifies mitigation to address temporary and permanent loss, including functions and values, of aquatic resources as defined as waters of the U.S. under the federal Clean Water Act (CWA) and/or waters of the State under the Porter-Cologne Act. Compensatory mitigation may involve the restoration, establishment, enhancement, and/or preservation of aquatic resources through one or more of the following methods:

- Purchase of credits from an agency-approved mitigation bank.
- Preservation of aquatic resources through acquisition of property.
- Establishment, restoration, or enhancement of aquatic resources.
- In lieu fee contribution determined through consultation with the applicable regulatory agencies.

The following ratios will be used for compensatory mitigation unless a higher ratio is required pursuant to regulatory authorizations issued under Section 404 of the CWA and/or the Porter-Cologne Act:

- Vernal pools: 2:1.
- Seasonal wetlands: between 1.1:1 and 1.5:1 based on impact type, function and values lost.
- 1:1 off-site for permanent impacts.
- 1:1 on-site and 0.1:1 to 0.5:1 off-site for temporary impacts.

For mitigation involving establishment, restoration, enhancement, or preservation of aquatic resources by the Authority, the CMP will contain the following information:

- Objectives. A description of the resource types and amounts that will be provided, the type of compensation (i.e., restoration, establishment, enhancement, and/or preservation), and the manner in which the resource functions of the compensatory mitigation project will address the needs of the watershed or ecoregion.
- Site selection. A description of the factors considered during the term sustainability of the resource.
- Adaptive management plan. A management strategy to address changes in site conditions or other components of the compensatory mitigation project.
- Financial assurances. A description of financial assurances that will be provided to ensure that the compensatory mitigation will be successful.

In circumstances where the Authority intends to fulfill compensatory mitigation obligations by securing credits from approved mitigation banks or in-lieu fee programs, the CMP need only include the name of the specific mitigation bank or in-lieu fee program to be used and the method for calculating credits.

The proposed mitigation ratios are anticipated to be effective because they provide minimum compensatory mitigation standards for aquatic resources and maintain compliance with the no net loss policy. Potential secondary impacts on biological and other resources from this measure are not anticipated if mitigation is provided through acquisition of credits from an approved mitigation bank or participation in an in lieu fee program. If mitigation is provided through off-site establishment, restoration, or enhancement of aquatic resources, then secondary impacts may occur as a result of lands being converted from other current uses, such as agriculture. Ground disturbing restoration activities could have potential secondary environmental impacts on agricultural resources (through farmland conversion), other biological resources (through direct and indirect impacts on species habitat), and cultural resources (through disturbance of archaeological resources and impacts on historic properties). Such secondary impacts from off-site mitigation activities are addressed under BIO-MM#50.

BIO-MM#50: Implement Measures to Minimize Impacts during Off-Site Habitat Restoration, or Enhancement, or Creation on Mitigation Sites

Prior to ground disturbing activities associated with habitat restoration, enhancement, and/or creation actions at a mitigation site, the Authority will conduct a site assessment of the Work Area to identify biological and aquatic resources, including plant communities, land cover types, and the distribution of special-status plants and wildlife.

Based on the results of the site assessment, the Authority will obtain any necessary regulatory authorizations prior to conducting habitat restoration, enhancement and/or creation activities, including authorization under FESA or CESA, Fish and Game Code Section 1600 et seq., the Clean Water Act, and the Porter-Cologne Act.

The Authority will implement the following measures to avoid or minimize impacts to species habitat and aquatic biological resources during habitat restoration, enhancement or creation activities:

- IAMF: Prepare WEAP Training Materials and Conduct Construction Period WEAP Training
- IAMF: Establish Monofilament Restrictions
- IAMF: Prevent Entrapment in Construction Materials and Excavations
- IAMF: Delineate Equipment Staging Areas and Traffic Routes
- IAMF: Dispose of Construction Spoils and Waste
- IAMF: Clean Construction Equipment
- IAMF: Maintain Construction Sites
- MM: Conduct Pre-construction Surveys and Delineate Active Nest Buffers Exclusion Areas for Breeding Birds
- MM: Conduct Pre-construction Surveys and Monitoring for Raptors
- MM: Restore Temporary Riparian Habitat Impacts
- MM: Restore Aquatic Resources Subject to Temporary Impacts
- MM: Prepare and Implement a Weed Control Plan
- MM: Notify and Report on "Take"
- MM: Delineate Environmentally Sensitive Areas and Install Wildlife Exclusion Fencing
- MM: Limit Vehicle Traffic and Construction Site Speeds
- MM: Work Stoppage

The off-site habitat restoration, enhancement, and preservation program would be designed, implemented, and monitored consistent with the terms and conditions of the federal and State permit authorizations as they apply to their jurisdiction and resources on-site. Potential impacts on site-specific hydrology and the downstream resources would be evaluated as a result of implementation of the restoration-related activity. Site-specific BMPs and a stormwater pollution prevention plan would be implemented as appropriate.

The Authority or its designee would report on compliance with permitting requirements. The Authority, or its designee, would be responsible for the monitoring and tracking of the program, would prepare a memorandum of compliance, and would submit it to the appropriate regulatory agency.

This mitigation measure is anticipated to be effective because it quantifies and compensates for temporary and permanent impacts (i.e., conversion of grassland special-status habitat to wetland) on the natural landscape that would occur from the restoration, enhancement, and preservation program actions at off-site mitigation sites, thereby avoiding a net loss of special-status species habitat.

Other Potential Impacts and Mitigations for Off-Site Mitigation Sites

Environmental impacts on other resource categories (beyond biological resources) are possible through implementing restoration activities at off-site mitigation sites. These impacts would result from transportation to and from the mitigation sites and from ground-disturbing activities on these sites to create habitat. Table 3.7-13 includes a discussion of the different resource categories and the potential for impacts from the off-site restoration activities.

Table 3.7-13 Potential Nonbiological Impacts of Off-Site Mitigation Activities

Resource Type	Potential for Impacts
Transportation	No. During initial restoration of habitat areas, earthmoving equipment and other construction vehicles would be transported to the sites. These trips would be relatively few in number and would not be anticipated to cause traffic congestion near or en route to/from the sites. After restoration, there would be intermittent transportation to and from the mitigation sites. These trips would be intermittent and largely single-vehicle trips and would not be anticipated to cause traffic congestion near or en route to/from the sites.
Air Quality and Global Climate Change	Yes, for criteria pollutant emissions. Construction vehicle exhaust and vehicle trips during management activities would contribute to diesel particulate emissions. Earthmoving, grading, and vegetation removal activities on the mitigation sites would result in fugitive dust during construction. However, the B-P Build Alternatives include application of site BMPs and the inclusion of IAMFs to reduce fugitive dust. Habitat restoration and re-vegetation would occur on off-site mitigation sites in rural areas, and potential receptors sensitive to localized air impacts are anticipated to be distant. The establishment and management of these mitigation sites do not include any materials or activities that may subject receptors to objectionable odors. Vehicle trips and the use of mowers and other machinery associated with the establishment and management of the mitigation sites would contribute to GHG emissions. However, these activities would be short-term during construction and intermittent afterwards and, as stated in Section 3.3, Air Quality and Global Climate Change, the increase in the construction GHG emissions of the B-P Build Alternatives generated during construction would be offset by the net GHG reductions during operation.
Noise and Vibration	No. Restoration activities may result in noise and vibration impacts from vehicles, heavy equipment, mowers, and other small machinery. These activities would occur in a limited capacity and for a short duration in comparison with the overall construction noise of the B-P Build Alternatives. As these sites are located in a rural environment, sensitive receptors are generally distant. Thus, human receptors would not be exposed to the generation of noise levels in excess of established standards or local noise ordinances.
Electromagnetic Interference and Electromagnetic Fields	No. No large electrical equipment would be installed or removed at the mitigation sites and no ongoing radio or electrical transmissions would be required at the mitigation sites. Therefore, no electromagnetic fields would be generated that could cause electromagnetic interference.
Public Utilities and Energy	No. No existing energy infrastructure would be affected or required for the mitigation sites. The removal of existing irrigation systems, removal of agricultural plantings, and removal of any existing structures on the mitigation sites would generate small quantities of solid waste. These quantities are expected to be relatively small in the context of the total solid waste generated for construction of the B-P Build Alternatives, and local landfills have adequate capacity to accept any waste materials that would be hauled from the sites. At mitigation sites where irrigation infrastructure is currently in place, the existing irrigation water supply may be temporarily used. Water supply uses may include regular watering of native plantings to facilitate vegetation establishment and growth. Once success criteria have been met, the irrigation system would be removed and the watering efforts would cease. During this period, water use is not expected to exceed current water use patterns required for the existing agricultural uses. After establishment, these sites would not require irrigation water, and as such would increase the amount of water available for downstream uses. No irrigation facility would be removed or added that would affect the existing water supply for downstream water customers. Mitigation sites would not require construction or expansion of wastewater treatment facilities or stormwater drainage facilities.

Resource Type	Potential for Impacts
Hydrology and Water Resources	No. Restoration activities at mitigation sites could result in channel/basin excavation, wetland and upland habitat enhancement and re-vegetation (hydroseed/plantings), channel enhancement and stabilization (installation of large woody debris, excavation of pools), and installation of erosion measures. As stated in Section 3.8, Hydrology and Water Resources, construction BMPs would be used to minimize or avoid the discharge of sediment from construction activities to waterways. Activities at mitigation sites would not include actions that would deplete groundwater supplies or interfere with groundwater recharge, such as creating an increase in impervious surfaces. Temporary construction activities associated with mitigation measures would not alter drainage patterns to a degree that would result in flooding or exceed the capacity of stormwater drainage facilities.
Geology, Soils, Seismicity, and Paleontological Resources	No. Restoration of the mitigation sites would not expose people or structures to potential impacts from the ruptures of an earthquake, strong seismic ground shaking, seismic-related ground failure, or landslides because no structures are proposed as part of the mitigation. Excavation and vegetation removal could result in soil erosion. However, erosion control measures would be implemented that would prevent impacts from soil erosion and landslides. No structures are proposed that could be affected by unstable soils, lateral spreading, subsidence, liquefaction, or collapse. Ground-disturbing activities associated with the restoration of mitigation sites could result in impacts on known and previously unknown paleontological deposits. The design of the B-P Build Alternatives includes effective measures to engage a paleontological resource specialist for direct monitoring during construction and provisions to halt construction if paleontological resources are found. These measures would avoid and reduce the potential loss of valuable paleontological resources.
Hazardous Materials and Wastes	No. The establishment and management of off-site mitigation lands, including agricultural infrastructure removal, operation of heavy equipment, and use of herbicides, could result in a temporary increase in the transportation, use, and storage of hazardous materials. Demolition of existing structures is unlikely but, if needed, may result in a temporary increase in waste disposal. However, structures likely to be removed would be small in scale, such as agricultural infrastructure involving wood, wire, metal, piping, and concrete materials and are not anticipated to contain large amounts of hazardous materials. Facilities and construction sites that use, store, generate, or dispose of hazardous materials or wastes and hazardous material/waste transporters are required to maintain plans for warning, notification, evacuation, and site security under stringent regulations (Section 3.10, Hazardous Materials and Wastes). Routine transport, use, storage, and disposal of hazardous materials are governed by numerous laws, regulations, and ordinances, thereby reducing the risk of accidental spills or releases.
Safety and Security	No. These mitigation sites would not be open to the public, and there would be no safety and security issues related to their establishment and management.
Socioeconomics and Communities	No. The use of these off-site mitigation sites would not divide an established community or displace housing or businesses. These sites do not presently contain public facilities that would require relocation and would not affect the economy through changes in property tax or sales tax revenues. If these sites are presently in agricultural production, their removal from production may result in minor changes to the agricultural economy and job base.
Station Planning, Land Use, and Development	No. These mitigation sites would not conflict with any applicable land use plans, policies, or regulations. As these sites are presently agricultural or range land, their protection from development to use for biological resource mitigation would not create new incompatible land uses.

Resource Type	Potential for Impacts
Agricultural Farmland and Forest Land	Yes. The partial or complete conversion of these mitigation sites to biological habitat could result in the loss of existing farmland or ranchland, including designated Important Farmland. It is not anticipated that there would be any required changes to Williamson Act contracts because the preservation of the land through the use of conservation easements and acquisition of the property would not threaten or violate the terms of most of the Williamson Act contracts.
Parks, Recreation, and Open Space	No. No impacts on parks and recreation would occur because these measures would not prevent the use of parks or recreation areas, acquire any current public open-space areas, create a barrier to the access of any park or recreation area, result in the acquisition of a recreation resource, increase the use of existing neighborhood and regional parks, or result in the alteration of existing recreational facilities.
Aesthetics and Visual Resources	No. No structures are needed or proposed for the mitigation sites and no lighting would be used. Therefore, none of the mitigation activities would block views or be sources of nighttime glare or light.
Cultural Resources	Yes, for archaeological resources, if such resources were demolished or altered. Ground-disturbing activities associated with the restoration of mitigation sites could result in impacts on known and previously unknown archaeological deposits. These resources may be eligible for the CRHR or the NRHP. The eligibility of historic architectural resources on these mitigation sites has not yet been evaluated and would take place prior to construction. Existing structures, including agricultural outbuildings and irrigation infrastructure, could be found to be eligible for the CRHR or the NRHP. Existing project design features and legal requirements would prevent the destruction or unauthorized alteration of any such architectural resources.

Source: California High-Speed Rail Authority and Federal Railroad Administration, 2019
BMP = best management practice
CRHR = California Register of Historical Resources
GHG = greenhouse gas
IAMF = impact avoidance and minimization feature
NRHP = National Register of Historic Places

For potential air quality impacts related to criteria pollutants, the following IAMFs and mitigation measures would be implemented:

- **AQ-IAMF#4:** Reduce Criteria Exhaust Emissions from Construction Equipment
- **AQ-IAMF#5:** Reduce Criteria Exhaust Emissions from On-Road Construction Vehicles
- **AQ-MM#1:** Offset Construction Emissions through a San Joaquin Valley Air Pollution Control District Voluntary Emission Reduction Agreement

See Section 3.3 of this EIR/EIS for more information on these mitigation measures and how they would reduce impacts. With implementation of these mitigation measures, it is anticipated that criteria pollutant emission association with the off-site mitigation sites would effectively reduce potential impacts.

For potential impacts on agricultural farmland, the following mitigation measures would be implemented:

- **AG-MM#1:** Conserve Important Farmland (Prime Farmland, Farmland of Statewide Importance, Farmland of Local Importance, and Unique Farmland)

While this mitigation measure would reduce the impact of the conversion of farmland at the mitigation sites, it may not completely avoid it and a net loss of Important Farmland may occur. As noted in Section 3.14, agricultural farmland has been converted to nonagricultural uses on a large scale throughout the San Joaquin Valley as a result of development pressures, and because agricultural farmland cannot be created, the loss of any such land is considerable. This impact is unavoidable and no additional mitigation is possible. For more information, refer to Section 3.14 of this EIR/EIS.

The potential impacts on cultural resources are discussed in Section 3.17 of this EIR/EIS. The following mitigation measures would reduce potential impacts of the off-site mitigation sites:

- **CUL-MM#1:** Mitigate Adverse Effects to Archaeological and Built Environment Resources Identified During Phased Identification. Comply with the Stipulations Regarding the Treatment of Archaeological and Historic Built Resources in the PA and MOA
- **CUL-MM#2:** Halt Work in the Event of an Archaeological Discovery and Comply with the PA, MOA, ATP, and all State and Federal Laws, as Applicable

In conclusion, there are no new impacts or unique impacts associated with the establishment and management of the off-site mitigation areas that have not already been evaluated and addressed in other sections of this EIR/EIS.

BIO-MM#53: Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat

The Authority will prepare a Compensatory Mitigation Plan that sets out the compensatory mitigation that will be provided to offset permanent and temporary impacts to federal and State-listed species and their habitat, fish and wildlife resources regulated under Section 1600 et seq. of the Fish and Game Code, and certain other special-status species. The CMP will include the following:

- A description of the species and habitat types for which compensatory mitigation is being provided.
- A description of the methods used to identify and evaluate mitigation options. Mitigation options will include one or more of the following:
  - Purchase of mitigation credits from an agency-approved mitigation bank.
  - Protection of habitat through acquisition of fee-title or conservation easement and funding for long-term management of the habitat. Title to lands acquired in fee will be transferred to CDFW and conservation easements will be held by an entity approved in writing by the applicable regulatory agency. In circumstances where the Authority protects habitat through a conservation easement, the terms of the conservation easement will be subject to approval of the applicable regulatory agencies, and the conservation easement will identify applicable regulatory agencies as third party beneficiaries with a right of access to the easement areas.
  - Payment to an existing in-lieu fee program.
- A summary of the estimated direct permanent and temporary impacts to species and species habitat.
- A description of the process that will be used to confirm impacts. Actual impacts to species and habitat could differ from estimates. Should this occur, adjustments will be made to the compensatory mitigation that will be provided. Adjustments to impact estimates and compensatory mitigation will occur in the following circumstances:
  - Impacts to species (typically measured as habitat loss) are reduced or increased as a result of changes in project design,
  - Pre-construction site assessments indicate that habitat features are absent (e.g., because of errors in land cover mapping or land cover conversion),
  - The habitat is determined to be unoccupied based on negative species surveys, or
  - Impacts initially categorized as permanent qualify as temporary impacts.
- An overview of the strategy for mitigating effects to species. The overview will include the ratios to be applied to determine mitigation levels and the resulting mitigation totals.

- A description of habitat restoration or enhancement projects, if any, that will contribute to compensatory mitigation commitments.
- A description of the success criteria that will be used to evaluate the performance of habitat restoration or enhancement projects, and a description of the types of monitoring that will be used to verify that such criteria have been met.
- A description of the management actions that will be used to maintain the habitat on the mitigation sites, and the funding mechanisms for long-term management.
- A description of adaptive management approaches, if applicable, that will be used in the management of species habitat:
  - A description of financial assurances that will be provided to demonstrate that the funding to implement mitigation is assured.

This mitigation measure is anticipated to be effective because it creates a CMP to provide compensatory mitigation to offset permanent and temporary impacts to special status species and habitats. The CMP will provide descriptions for compensatory mitigation to restore, and/or mitigate for suitable habitat affected by the B-P Build Alternatives. The CMP would establish specifications of success criteria to gauge the effectiveness of restoration and function of the mitigation lands. The mitigation lands, their management, and monitoring serve to allow for intended ecologic function of compensation habitat for sensitive plant species and special-status species habitat loss related to the B-P Build Alternatives.

Potential secondary impacts on biological and other resources from this measure are not anticipated if mitigation is provided through acquisition of credits from an approved mitigation bank or participation in an in lieu fee program. If mitigation is provided through off-site establishment, restoration, or enhancement of habitat for federal and State-listed species, then secondary impacts may occur as a result of lands being converted from other current uses, such as agriculture. Ground disturbing restoration activities could have potential secondary environmental impacts on agricultural resources (through farmland conversion), other biological resources (through direct and indirect impacts on species habitat), and cultural resources (through disturbance of archaeological resources and impacts on historic properties). Such secondary impacts from off-site mitigation activities are addressed under BIO-MM#50.

BIO-MM#54: Prepare and Implement an Annual Vegetation Control Plan

Prior to the operation and maintenance of the HSR, the Authority will prepare an Annual Vegetation Control Plan (VCP) to address vegetation removal for the purpose of maintaining clear areas around facilities, reducing the risk of fire, and controlling invasive weeds during the operational phase. The Authority will generally follow the procedures established in Chapter C2 of the Caltrans Maintenance Manual to manage vegetation on Authority property (California Department of Transportation [Caltrans] 2010). Vegetation will be controlled by chemical, thermal, biological, cultural, mechanical, structural, and manual methods. The VCP will be updated each winter and completed in time to be implemented no later than April 1 of each year. The annual update to the VCP would include a section addressing issues encountered during the prior year and changes to be incorporated into the VCP. The plan will describe site-specific vegetation control methods, as outlined below:

- Chemical vegetation control methods
- Mowing program consistent with Section 1415 of the FAST Act
- Other non-chemical vegetation control
- Other chemical pest control methods (e.g., insects, snail, rodent)

Only Caltrans-approved herbicides may be used in the vegetation control program. Pesticide application will be conducted in accordance with all requirements of the California Department of Pesticide Regulation and County Agricultural Commissioners by certified pesticide applicators. Noxious/invasive weeds will be treated where requested by County Agricultural Commissioners. The Authority will cooperate in area-wide efforts to control of noxious/invasive weeds if such programs have been established by local agencies.

This mitigation measure is anticipated to be effective because it implements a VCP for vegetation thereby controlling noxious/invasive weeds around facilities. The VCP would provide information on the previous year's issues encountered and resolved. Overall, the impacts of this measure would be beneficial to biological resources because the Authority would implement strategies to control the spread of noxious/invasive weeds. Potential secondary impacts of this measure could result from any spillage of pesticides; however, these impacts would be avoided or minimized through compliance with procedures stipulated in the Caltrans Maintenance Manual.

BIO-MM#55: Prepare and Implement a Weed Control Plan

Prior to any ground disturbing activity during the construction phase, the Project Biologist will develop a Weed Control Plan (WCP), subject to review and approval by the Authority and the SWRCB. The purpose of the WCP is to establish approaches to minimize and avoid the spread of invasive weeds during ground disturbing activities during construction and operations and maintenance.

The WCP will include, at a minimum, the following:

- A requirement to delineate Environmentally Sensitive Areas (ESAs) in the field prior to weed control activities.
- A schedule for weed surveys to be conducted in coordination with the BRMP.
- Success criteria for invasive weed control. The success criteria would be linked to the BRMP standards for on-site work during ground disturbing activities. In particular, the criteria would establish limits on the introduction and spread of invasive species, as defined by the California Invasive Plant Council (Cal-IPC), to less than or equal to the pre-disturbance conditions in the area temporarily affected by ground disturbing activities. If invasive species cover is found to exceed pre-disturbance conditions by greater than 10 percent or is 10 percent greater than levels at a similar, nearby reference site, a control effort will be implemented. If the target, or other success criteria identified in the WCP, has not been met by the end of the WCP monitoring and implementation period, the Authority will continue the monitoring and control efforts, and remedial actions will be identified and implemented until the success criteria are met.
- Provisions to ensure consistency between the WCP and the RRP, including verification that the RRP includes measures to minimize the risk of the spread and/or establishment of invasive species and reflects the same revegetation performance standards as the WCP.
- Identification of weed control treatments, including permitted herbicides and manual and mechanical removal methods.
- Timeframes for weed control treatment for each plant species.
- Identification of fire prevention measures.

This mitigation measure is anticipated to be effective because it implements a WCP for vegetation thereby controlling noxious/invasive weeds in areas of disturbance during construction and operations and maintenance. Overall, the impacts of this measure would be beneficial to biological resources because the Authority would implement strategies to control the spread of noxious/invasive weeds. Potential secondary impacts of this measure could result from any spillage of herbicides; however, these impacts would be avoided or minimized through compliance with procedures stipulated in the Caltrans Maintenance Manual.

BIO-MM#56: Conduct Monitoring of Construction Activities

During any initial ground disturbing activity, the Project Biologist will be present in the Work Area to verify compliance with avoidance and minimization measures, to establish ESAs, and install wildlife exclusion fencing (WEF) and construction exclusion fencing (exclusion fencing).

This mitigation measure is anticipated to be effective because it would provide monitoring and reporting during ground disturbance activities. Overall, the impacts of this measure would be beneficial to biological resources because the Authority would implement strategies to avoid

temporary impacts during construction activities. Implementation of this measure would not result in additional physical disturbance outside the project footprint. Therefore, there is no potential for secondary impacts on biological or other resources.

BIO-MM#58: Establish Environmentally Sensitive Areas and Non-Disturbance Zones

Prior to any ground disturbing activity in a Work Area, the Project Biologist will use flagging to mark Environmentally Sensitive Areas (ESAs) that support special-status species or aquatic resources and are subject to seasonal restrictions or other avoidance and minimization measures. The Project Biologist will also direct the installation of Wildlife Exclusion Fencing (WEF) to prevent special-status wildlife species from entering Work Areas. The WEF will have exit doors to allow animals that may be inside an enclosed area to leave the area. The Project Biologist will also direct the installation of construction exclusionary fencing (exclusionary fencing) at the boundary of the Work Area, as appropriate, to avoid and minimize impacts to special-status species or aquatic resources outside of the Work Area during the construction period. The ESAs, WEF, and exclusionary fencing will be delineated by the Project Biologist based on the results of habitat mapping or modeling and any pre-construction surveys, and in coordination with the Authority. The ESA, WEF, and exclusionary fencing will be regularly inspected and maintained by the Project Biologist.

The ESA, WEF, and exclusionary fencing locations will be identified and depicted on an exclusion fencing exhibit. The purpose of the ESAs and WEF will be explained at WEAP training and the locations of the ESA and WEF areas will be noted during worker tailgate sessions.

This mitigation measure is anticipated to be effective because it would provide identification and flagging of sensitive areas during construction activities. Overall, the impacts of this measure would be beneficial to biological resources because the Authority would implement strategies to avoid temporary impacts during construction activities. Implementation of this measure would not result in additional physical disturbance outside the project footprint. Therefore, there is no potential for secondary impacts on biological or other resources.

BIO-MM#60: Limit Vehicle Traffic and Construction Site Speeds

Prior to any ground disturbing activities, the Project Biologist will ensure that appropriate measures have been instituted to restrict project vehicle traffic within the Construction Footprint to established roads, construction areas, and other permissible areas. The Project Biologist will establish vehicle speed limits of no more than 15 mph for unimproved access roads and for temporary and permanent construction areas within the Construction Footprint. The Project Biologist will also direct that access routes be flagged and marked and that measures be adopted to prevent off-road vehicle traffic.

This mitigation measure is anticipated to be effective because it would provide measures and signage of traffic routes and speeds on the project site during construction. In addition, this measure provides for flagging of sensitive areas near construction vehicle routes so that they are not impacted by the movement of construction vehicles. Overall, the impacts of this measure would be beneficial to biological resources because the Authority would implement strategies to avoid temporary impacts from construction vehicles during construction activities. Implementation of this measure would not result in additional physical disturbance outside the project footprint. Therefore, there is no potential for secondary impacts on biological or other resources.

BIO-MM#61: Establish and Implement a Compliance Reporting Program

The Project Biologist will prepare monthly and annual reports documenting compliance with all IAMFs, mitigation measures, and requirements set forth in regulatory agency authorizations. The Authority will review and approve all compliance reports prior to submittal to the regulatory agencies. Reports will be prepared in compliance with the content requirements outlined in the regulatory agency authorizations.

Pre-activity survey reports will be submitted within 15 days of completing the surveys and will include:

- Location(s) of where pre-activity surveys were completed, including latitude and longitude, Assessor Parcel Number, and HST parcel number.
- Written description of the surveyed area. A figure of each surveyed location will be provided that depicts the surveyed area and survey buffers over an aerial image.
- Date, time, and weather conditions observed at each location.
- Personnel who conducted the pre-activity surveys.
- Verification of the accuracy of the Authority's habitat mapping at each location, provided in writing and on a figure.
- Observations made during the survey, including the type and locations (written and GIS) of any sensitive resources detected.
- Identification of relevant measures from the BRMP to be implemented as a result of the survey observations.

Daily Compliance Reports will be submitted to the Authority via EMMA within 24 hours of each monitoring day. Non-compliance events will be reported to the Authority the day of the occurrence. Daily Compliance Reports will include:

- Date, time, and weather conditions observed at each location where monitoring occurred.
- Personnel who conducted compliance monitoring.
- Project activities monitored, including construction equipment in use.
- Compliance conditions implemented successfully.
- Non-compliance events observed.

Daily Compliance Reports will also be included in the Monthly Compliance Reports, which will be submitted to the Authority by the 10th of each month and will include:

- Summary of construction activities and locations during the reporting month, including any non-compliance events and their resolution, work stoppages, and take of threatened or endangered species.
- Summary of anticipated project activities and Work Areas for the upcoming month.
- Tracking of impacts to suitable habitats for each threatened and endangered species identified in USFWS and CDFW authorizations, including:
  - An accounting of the number of acres of habitats for which we provide compensatory mitigation that has been disturbed during the reporting month, and
  - An accounting of the cumulative total number of acres of threatened and endangered species habitat that has been disturbed during the project period.
- Up-to-date GIS layers, associated metadata, and photo documentation used to track acreages disturbed.
- Copies of all pre-activity survey reports, daily compliance reports, and non-compliance/ work stoppage reports for the reporting month.

Annual Reports will be submitted to the Authority by the 20th of January and will include:

- Summary of all Monthly Compliance Reports for the reporting year.
- A general description of the status of the project, including projected completion dates.
- All available information about project-related incidental take of threatened and endangered species.
- Information about other project impacts on the threatened and endangered species.

- A summary of findings from pre-construction surveys (e.g., number of times a threatened or endangered species or a den, burrow, or nest was encountered, location, if avoidance was achieved, if not, what other measures were implemented).
- Written description of disturbances to threatened and endangered species habitat within Work Areas, both for the preceding 12 months and in total since issuance of regulatory authorizations by USFWS and CDFW, and updated maps of all land disturbances and updated maps of identified habitat features suitable for threatened and endangered species within the project area.
- Written compliance with the reporting requirements established by any WDRs that have been issued.

In addition to the compliance reporting requirements outlined above, the following items will be provided for compliance documentation purposes:

- If agency personnel visit the Construction Footprint in accordance with BIO-IAMF#2, the Project Biologist will prepare a memorandum within one day of the visit that memorializes the issues raised during the field meeting. This memorandum will be submitted to the Authority via EMMA. Any issues regarding regulatory compliance raised by agency personnel will be reported to the Authority and the Contractor.
- Compliance reporting will be submitted to the Authority via EMMA in accordance with the report schedule. The Project Biologist will prepare and submit compliance reports that document the following:
  - Implementation and performance of the Restoration and Revegetation Plan described in BIO-MM.
  - Summary of progress made regarding the implementation of the Weed Control Plan described in BIO-MM.
  - Compliance with work window restrictions described in BIO-IAMF. The memorandum will be provided to the Authority for compliance monitoring documentation purposes.
  - Compliance with BIO-MM: Notify and Report on “Take”.
  - Compliance with BIO-MM: Establish Environmentally Sensitive Areas and Non-Disturbance Zones and Install Wildlife Exclusion Fencing.
  - Compliance with BIO-IAMF: Establish Monofilament Restrictions; the Project Biologist.
  - Compliance with BIO-IAMF: Prevent Entrapment in Construction Materials and Excavations.
  - Compliance with BIO-IAMF: Delineate Equipment Staging Areas.
  - Compliance with BIO-IAMF: Clean Construction Equipment.
  - Compliance with BIO-MM: Limit Vehicle Traffic and Construction Site Speed.
  - Compliance with BIO-IAMF: Design the Project to be Bird Safe.
  - Compliance with BIO-IAMF: Dispose of Construction Spoils and Waste has been properly disposed.
  - BMP field manual implementation and any recommended changes to construction site housekeeping practices outlined in BIO-IAMF: Maintain Construction Sites.
- Work stoppages and measures taken under BIO-MM: Stop Work and Remove Special Status Species from Construction Sites will be documented in a memorandum prepared by the Project Biologist and submitted to the Authority within two business days of the work stoppage.

This mitigation measure is anticipated to be effective because it would provide monitoring and reporting procedures during construction activities to ensure that all IAMFs and Mitigation Measures are implemented. Overall, the impacts of this measure would be beneficial to biological resources because the monitoring and reporting will ensure the ongoing avoidance and minimization of temporary impacts during construction activities. Implementation of this measure would not result in additional physical disturbance outside the project footprint. Therefore, there is no potential for secondary impacts on biological or other resources.

BIO-MM#62: Prepare Plan for Dewatering and Water Diversions

Prior to initiating any construction activity that occurs within open or flowing water, the Authority will prepare a dewatering plan, which will be subject to the review and approval by the applicable regulatory agencies. The plan will incorporate measures to minimize turbidity and siltation. The Project Biologist will monitor the dewatering and/or water diversion sites, including collection of water quality data, as applicable. Prior to the dewatering or diverting of water from a site, the Project Biologist will conduct pre-activity surveys to determine the presence or absence of special-status species within the affected waterbody. In the event that special-status species are detected during pre-activity surveys, the Project Biologist will relocate the species (unless the species is Fully Protected under State law), with any regulatory authorizations applicable to the species.

This mitigation measure is anticipated to be effective because it would provide a dewatering plan to provide measures for minimizing impacts to waters and special-status species within affected waterbodies during construction activities. Overall, the impacts of this measure would be beneficial to aquatic resources because the measure would maintain water quality and ensure no impacts to special-status species within affected waterbodies. Implementation of this measure would not result in additional physical disturbance outside the project footprint. Therefore, there is no potential for secondary impacts on biological or other resources.

BIO-MM#63: Work Stoppage

In the event that any special-status wildlife species is found in a Work Area, the Project Biologist will have the authority to halt work to prevent the death or injury to the species. Any such work stoppage will be limited to the area necessary to protect the species and work may be resumed once the Project Biologist determines that the individuals of the species have moved out of harm's way or the Project Biologist has relocated them out of the Work Area.

Any such work stoppages and the measures taken to facilitate the removal of the species, if any, will be documented in a memorandum prepared by the Project Biologist and submitted to the Authority within two business days of the work stoppage.

This mitigation measure is anticipated to be effective because it would provide procedures for the project biologist to stop work during construction activities to prevent adverse impacts to special-status wildlife species during construction. Implementation of this measure would not result in additional physical disturbance outside the project footprint. Therefore, there is no potential for secondary impacts on biological or other resources.

BIO-MM#64: Establish Wildlife Crossings

The Authority will create dedicated wildlife crossings to accommodate wildlife movement across permanently fenced infrastructure (consistent with any wildlife corridor assessment prepared), where wildlife movement would be significantly reduced. Prior to final construction design the Project Biologist shall confirm appropriate placement and dimensions of wildlife crossings.

For terrestrial wildlife, all crossings will conform to the minimum spacing and dimensions identified in the Wildlife Corridor Assessment (Appendix I of the *Biological and Aquatic Resources Technical Report*), unless different dimensions are specified in authorizations issued under FESA or CESA.

To the extent feasible, all wildlife crossings created specifically for terrestrial species will include the following features and design considerations:

- Native earthen bottom
- Ledges or tunnels will be incorporated into the design to facilitate safe passage of small mammals
- Unobstructed entrances (e.g., no riprap, energy dissipaters, grates), although vegetative cover, adjacent to and near the entrances of crossings, is permissible
- Openness and clear line of sight from end to end
- Year-round absence of water for a portion of the width of the crossing (i.e., no flowing water)
- Slight grade at approaches to prevent flooding
- Limited open space between crossing and cover/habitat
- Separation from human use areas (e.g., trails, multiuse undercrossings)
- Avoidance of artificial light at approaches to wildlife crossings (Steps to minimize lighting effects to wildlife crossings will be consistent with BIO-MM#86: Implement Lighting Minimization Measures During Construction, and BIO-MM#87: Implement Lighting Minimization Measures for Operations.)
- Implement the following noise minimization measures identified in the Wildlife Corridor Assessment.
  - Implement Proposed California High-Speed Train Project Noise Mitigation Guidelines (www.hsr.ca.gov/).
  - Install sound barriers to minimize noise impacts, as follows;
    - Peak train sound exposure levels (SEL) that exceed 100 dBA at a distance of 50 feet beyond the perimeter fence along the full extent of all at-grade rail segments within the Tehachapi Linkage Design.
    - Peak train SEL less than 100 dBA below or within 200 feet of any viaduct sections passing through areas of natural vegetation.
    - Peak train SEL less than 80 dBA at the entrance or approach to smaller crossing structures (bridges or culverts). Although 100 dBA is the generally accepted threshold for impacts to wildlife, most humans are “highly annoyed” by 80 dBA noise. The Occupational Safety and Health Administration requires that hearing protection be available to workers in environments that exceed 85 dBA and that workers use hearing protection at 90 dBA. Therefore, an 80 dBA threshold is appropriate for confined structures intended to facilitate animal movement.

Berms and berm/wall combinations will be used to shield nearby natural habitat and/or crossing structures from loud noise that exceeds 100 dBA at distances greater than 50 feet from the perimeter fence. In addition, the Authority will incorporate features to accommodate wildlife movement into the design of bridges and culverts that are replaced or modified as part of project construction, wherever feasible. Project Biologist review of final construction design for consistency with placement and dimensions of wildlife crossings will be verified in a memorandum provided to the Authority.

The Authority would also develop a monitoring and adaptive management plan to monitor the effectiveness and use of crossing designs. The plan would include the following minimum components:

- **Monitoring Methods.** Consistent with local monitoring efforts, which primarily use camera stations and other remote sensing equipment to document use, monitoring would focus on crossings within defined wildlife movement corridors. To the extent feasible, the Authority could also contribute funding to local organizations currently conducting wildlife movement monitoring to meet monitoring requirements outlined in the measure, provided the efforts are occurring within the same defined wildlife movement corridors.

- **Monitoring.** Monitoring would start no less than 2 years following construction (to allow time for habituation), and total initial monitoring period would not exceed 5 years following construction. Additional monitoring associated with adaptive management would be confined to the location triggering the adaptive management and would not exceed 5 years.
- **Success Criteria.** Success criteria would be based on expected use by movement guild representatives known to be present in the region.
- **Adaptive Management.** Adaptive management would include modifications to design features, if feasible, such as cover and substrate; use of new technologies to attract animals to the crossing; fencing; adjacent land management changes, if feasible; or other measures that may be determined to be feasible in the future.

The monitoring and adaptive management plan would be developed in coordination with wildlife agency staff and local wildlife movement stakeholders.

This mitigation measure is anticipated to be effective because it describes how to avoid affecting wildlife movement, and methods for creating new barrier-free areas. Where the alignment is not on viaduct or in tunnel, fencing to prevent terrestrial wildlife from entering the railroad right-of-way, to reduce wildlife mortality, could obstruct wildlife crossings. Therefore, creating new barrier-free locations along the B-P Build Alternatives would minimize impacts on wildlife through the creation of new wildlife crossing structures near known wildlife corridors.

Implementation of this measure would not result in additional physical disturbance outside the project footprint. Therefore, there is no potential for secondary impacts on biological or other resources.

BIO-MM#65: Conduct Pre-construction Surveys and Monitoring for Bald and Golden Eagles

At least one year prior to the start of any ground disturbing activities and construction, the Project Biologists will conduct nesting season surveys for eagles. Surveys for bald and golden eagle nests will be conducted within 4 miles of any construction areas supporting suitable nesting habitat and important eagle roost sites and foraging areas. Surveys will be conducted in accordance with the USFWS Interim Golden Eagle Inventory and Monitoring Protocols (USFWS 2010a), and CDFW's Bald Eagle Breeding Survey Instructions (CDFG 2010), or current guidance. A nesting territory or inventoried habitat will be considered unoccupied by golden eagles only after completing at least two full surveys in a single breeding season. Prior to initial construction activities, the Project Biologist will conduct a pre-construction sweep of the project site for golden eagle use and will provide no-work zone buffers where active nests are identified.

This mitigation measure is anticipated to be effective because it would require identification and documentation of active golden eagle nests within 0.4-mile of the proposed construction area, and establishes protective buffers from construction around active nests. The buffers and subsequent nest monitoring prevent construction activities from disturbing golden eagle nests while active, allowing young to develop and fledge. Implementation of the mitigation measure would have temporary impacts on golden eagles from the disruption or disturbance required to survey for them. Implementation of this measure would not trigger secondary environmental impacts because it would not change the scope, scale, or location of construction activities beyond those that have been described as part of the B-P Build Alternatives

BIO-MM#66: Implement Avoidance Measures for Active Eagle Nests

Prior to the start of any ground disturbing activity, if an occupied nest (as defined by Pagel et al., 2010) is detected within 4 miles of the work areas, the Authority will implement a 1-mile line-of-sight and 0.5 mile no line-of-sight no work buffer during the breeding season (January 1 through August 31) to ensure that construction activities do not result in injury or disturbance to eagles.

The no work buffer will be maintained throughout the breeding season or until the young have fledged and are no longer dependent upon the nest or parental care that includes nest use for survival. Factors to be considered for determining buffer size will include: the presence of natural

buffers provided by vegetation or topography; nest height; locations of foraging territory; and baseline levels of noise and human activity. Buffers will be maintained and nests monitored until the Project Biologist has determined that young have fledged and are no longer reliant upon the nest or parental care that includes nest use for survival.

Eagle nest exclusion zones may be removed if monitoring reveals the nest to be inactive as determined by the Project Biologist. An inactive eagle nest is one that is "no longer being used by eagles as determined by the continuing absence of any adult, egg, or dependent young at the nest for at least 10 consecutive days prior to, and including, at present" (USFWS 2016). Monitoring to demonstrate inactivity of eagle nests will follow observational procedures described by Pagel et al. (2010).

In bald and golden eagle nesting territories, the Project Biologist will examine debris piles daily and determine if there is a potential to attract prey species. If the Project Biologist determines debris piles may attract prey species and pose a danger to eagles, the debris piles will be removed or moved.

This mitigation measure is anticipated to be effective because it would restrict construction activities in areas within 0.4 miles of active golden eagle nests and provides specific measures for keeping the Work Area free of materials that would attract or endanger the Golden Eagle. Implementation of this measure would not trigger secondary environmental impacts because it would not change the scope, scale, or location of construction activities beyond those that have been described as part of the B-P Build Alternatives.

BIO-MM#67: Provide Compensatory Mitigation for Loss of Eagle Nests

If preconstruction surveys identify active eagle nests in the permanent impact area, the Authority, in consultation with the USFWS and the CDFW, will develop a nest relocation or replacement plan for the affected nest(s). The plan will describe why there is no practicable alternative to nest removal while enabling project extent construction. Any relocation or replacement of eagle nests will be in accordance with the Bald and Golden Eagle Protection Act and subject to the following minimum requirements:

- The nest will be relocated, or a suitable nest will be provided, within the same territory to provide a viable nesting option for the affected eagle pair.
- Post construction monitoring to confirm continued nesting within the affected nesting territory will occur for a minimum of 3 years using observation procedures described by Pagel et al. (2010).

This mitigation measure is anticipated to be effective because the high standards of the Bald and Golden Eagle Protection Act will ensure that any practicable alternatives to nest relocation or replacement, such as additional protective measures, will be identified prior to implementation of the last choice option of relocation or replacement. Similarly, the requirement of the Act will ensure that the best scientific information field experience will be utilized to implement relocation or replacement. Implementation of this measure would not trigger secondary environmental impacts because it would not change the scope, scale, or location of construction activities beyond those that have been described as part of the B-P Build Alternatives.

BIO-MM#68: Avoid and Minimize Impacts to White-tailed kite

If construction activities are scheduled to occur between February 1 and August 31, the Project Biologist will conduct surveys for white-tailed kite. Surveys will cover a minimum of a 0.5-mile radius around the construction area. If nesting white-tailed kites are detected, the Project Biologist will establish a 0.25 mile no disturbance buffer unless the Project Biologist determines that smaller buffers would be sufficient to avoid impacts, with agency consultation. Buffers will be maintained until the Project Biologist has determined that the young have fledged and are no longer reliant upon the nest or parental care that includes nest use for survival.

This mitigation measure is anticipated to be effective because it would restrict construction activities in areas within 0.25 mile of active white-tailed kite nests. Implementation of this measure

would not trigger secondary environmental impacts because it would not change the scope, scale, or location of construction activities beyond those that have been described as part of the B-P Build Alternatives.

BIO-MM#69: Conduct Surveys and Implement Avoidance Measures for Active Tricolored Blackbird Nest Colonies

Prior to initiation of construction at any location within 300 feet of suitable nesting habitat, The Project Biologist with experience surveying for and observing tricolored blackbird will conduct preconstruction surveys to establish use of nesting habitat by tricolored blackbird colonies. Surveys will be conducted in suitable habitat within 300 feet of proposed construction areas, where access allows, during the nesting season (February 1–September 15).

If construction is initiated near suitable habitat during the nesting season, pre-construction nesting surveys will be conducted within 10 days prior to construction. If active tricolored blackbird nesting colonies are identified, construction activities will avoid the nesting colonies during the breeding season (February 1–September 15) to the extent practicable within 300 feet of the colony, consistent with the CDFW's Staff Guidance Regarding Avoidance of Impacts to Tricolored Blackbird Breeding Colonies on Agricultural Fields in 2015 (CDFW 2015). This minimum buffer may be reduced in areas with dense forest, buildings, or other habitat features between the construction activities and the active nest colony, or where there is sufficient topographic relief to protect the colony from excessive noise or visual disturbance as determined through coordination with CDFW. If tricolored blackbirds colonize habitat adjacent to construction after construction has been initiated, the Authority will coordinate with CDFW to determine the best course of action to avoid impacts.

This mitigation measure is anticipated to be effective because it would outline protocol to conducting surveys prior to construction to locate active nest colonies within 300 feet of the construction Work Area. Implementation of this measure would not trigger secondary environmental impacts because it would not change the scope, scale, or location of construction activities beyond those that have been described as part of the Preferred Alternative.

BIO-MM#70: Provide Compensatory Mitigation for Impacts on Tricolored Blackbird Habitat

The Authority will provide compensatory mitigation to offset impacts on tricolored blackbird. Compensatory mitigation will replace permanent loss of habitat with habitat that is commensurate with the type (nesting, roosting, and foraging) and amount of habitat lost. Suitable tricolored blackbird nesting habitat will be permanently protected or restored and managed at a ratio of 3:1 (protected or restored: affected) at a location subject to CDFW approval, and in close proximity to the nearest breeding colony observed within the past 15 years, if possible. Suitable breeding season foraging habitat will be protected and managed at a ratio of 1:1 (protected: affected) at a location subject to CDFW approval. Suitable roosting habitat will be protected or restored at a ratio of 1:1 (protected: affected) if not occupied, and a ratio of 2:1 (protected: affected) if occupied by tricolored blackbirds.

Compensatory mitigation will be provided using one or more of the methods described in the Compensatory Mitigation Plan, BIO-MM#53.

This mitigation measure is anticipated to be effective because tricolored blackbird roosting and foraging habitat is fairly common and/or easily restored. The primary limiting factor for this species is nesting habitat, but that is easily, preserved, restored or created. This is because nesting colonies of the species often use habitat that is inadvertently created in association with agricultural operations, such as stock ponds or irrigation ponds that support emergent wetland vegetation, that commonly occurs in shallow perennial wetlands. Implementation of this measure would not trigger secondary environmental impacts because it would not change the scope, scale, or location of construction activities beyond those that have been described as part of the B-P Build Alternatives, and any off-site habitat creation would consist of conversion of common anthropogenic habitats into higher value, for a number of species.

BIO-MM#71: Implement California Condor Avoidance Measures during Helicopter Use

Prior to construction-related uses of helicopters, the Project Biologist will coordinate with USFWS to establish that no California condors are present in the area. If California condors are observed in the area in which helicopters will operate, including the helicopter's flight pattern from its origination, during construction use and the return flight, helicopter use will not be permitted until the Project Biologist has determined that the California condors have left the area.

This mitigation measure is anticipated to be effective because it would restrict construction-related helicopter use wherever California condors are present; condor presence is easily detected by observation and routine electronic tracking. Implementation of this measure would not trigger secondary environmental impacts because it would not change the scope, scale, or location of construction activities beyond those that have been described as part of the B-P Build Alternatives.

BIO-MM#72: Implement Avoidance of Nighttime Light Disturbance for California Condor

Nighttime light disturbance will be minimized in and adjacent to suitable habitat where California condor may be present. In the event that nighttime lighting is required, it will be focused, shielded, and directed away from adjacent suitable habitat including nighttime roost areas. During construction, the Project Biologist will be on site during nighttime light use to determine if the lighting poses a risk or otherwise disturbs or harms condors.

This mitigation measure is anticipated to be effective because it would restrict nighttime light disturbances of roosting California condors and provides specific measures for monitoring during nighttime construction activities. Implementation of this measure would not trigger secondary environmental impacts because it would not change the scope, scale, or location of construction activities beyond those that have been described as part of the B-P Build Alternatives.

BIO-MM#73: Implement Removal of Carrion that may Attract Condors and Eagles

During operation and within California condor foraging areas, automated security monitoring and track inspections will be used to detect fence failures and/or the presence of a carcass (carrion) within the right-of-way that could be an attractant to condors and eagles. Dead and injured wildlife found in the right-of-way will be removed during construction and during operations when the train is not in operation.

This mitigation measure is anticipated to be effective because it provides methods for automated security monitoring for protection of California condors and eagles within the right-of-way. Implementation of this measure would not trigger secondary environmental impacts because it would not change the scope, scale, or location of construction activities beyond those that have been described as part of the B-P Build Alternatives.

BIO-MM#74: Implement Bird Nest and Avian Special Status Species Avoidance Measures for Helicopter-Based Construction Activities

For construction activities involving the use of a helicopter, the buffer for nesting birds will be 200-feet horizontal and 150-feet vertical. Buffers will be measured from the location of the nest. If a nest is located on a tower or a tree the vertical buffer begins from the nest location. For raptors, that are not state or federal special status raptors the default buffer is 300-feet.

This mitigation measure is anticipated to be effective because it would provide methods for creating buffers around nesting birds within or adjacent to the construction Work Area. Implementation of this measure would not trigger secondary environmental impacts because it would not change the scope, scale, or location of construction activities beyond those that have been described as part of the B-P Build Alternatives.

BIO-MM#75: Minimize Impacts on Kern Primrose Sphinx Moth Host Plants

Prior to ground disturbing activity in areas that Kern primrose sphinx moths are found, the following additional measures will be implemented:

- All Biological Monitors will be trained on the life history and identification of Kern primrose sphinx moth.
- As necessary, conduct an additional survey(s) for Kern primrose sphinx moth host and nectaring plants in areas where adults are observed. To the maximum extent feasible, host and nectaring plants will be flagged and a 25-foot buffer shall be installed to avoid when eggs and/or larvae may be present (February through May). Larval host plants include evening primrose (*Camissionia contorta epilobiodes*) and filaree (*Erodium cicutarium*).
- Initial ground or vegetation disturbing activities will be avoided in areas where Kern primrose sphinx have been observed until the flight and larval seasons (cumulatively, February 1 through May 31) are passed to allow sufficient time for the adults to lay eggs and for the larvae to pupate.

This mitigation measure is anticipated to be effective because it is a multi-faceted approach to both detecting adult moths and avoiding easily detected potential larval host plants during the cumulative flight and larval season. Implementation of this measure would not trigger secondary environmental impacts because, while it may temporarily delay some construction activities, it would not change the scope, scale, or location of construction activities beyond those that have been described as part of the B-P Build Alternatives.

BIO-MM#76: Implement Wildlife Rescue Measures

During construction, maintenance and operation if an injured or trapped wildlife species, including but not limited to birds and raptors, are observed the Project Biologist shall be notified immediately to determine if it is appropriate to release or take the wildlife species to the nearest CDFW permitted rehabilitation center. The Project Biologist will follow all relevant guidelines for federal and state listed species. If an injured or trapped bird is incidentally observed during maintenance or construction, personnel will notify the Project Biologist immediately to determine if it is appropriate to release or take the bird to the nearest CDFW permitted rehabilitation center.

This mitigation measure is anticipated to be effective because construction crews will be trained to be alert to such incidents and experienced biological monitors will be present to capture and release or transport injured animals as appropriate. This is a common and intuitive construction minimization measure with which most construction personnel are familiar. Implementation of this measure would not trigger secondary environmental impacts because it would not change the scope, scale, or location of construction activities beyond those that have been described as part of the B-P Build Alternatives.

BIO-MM#77: Implement Wildlife Height Requirements for Enhanced Security Fencing

Prior to final construction design the Project Biologist shall review the fencing plans to confirm Security Fencing design will prevent access into the right-of-way and tracks by mountain lion. Security fencing height will be increased to a minimum of 10-feet tall in mountain lion suitable habitat as identified in the Wildlife Corridor Assessment and determined by the Project Biologist. If the fence is placed on a slope, the fence height will be adjusted (increased) to ensure that mountain lion and mule deer cannot jump from an upslope position over the fence; fence height on slopes will be determined by Project Biologist. During the fencing plan review the Project Biologist will evaluate the fence design for the purpose of avoiding harm, injury, entanglement or entrapment to wildlife species. Prior to operation, the Project Biologist will field inspect the fencing along any portion where increased height was determined necessary during the plan review. Fencing plan review and field inspection shall be documented in a memorandum from the Project Biologist and provided to the Authority.

This mitigation measure is anticipated to be effective because ever-increasing knowledge of wildlife behavior in the vicinity of linear transportation projects has been generated over the last several decades, due to both safety concerns and a focus on wildlife movement. This knowledge can be used to develop appropriate fencing specifications and ensure that the specifications are practicably and effectively implemented. Implementation of this measure would not trigger secondary environmental impacts because it would not change the scope, scale, or location of

construction activities beyond those that have been described as part of the B-P Build Alternatives.

BIO-MM#78: Install Wildlife Jump-outs

Prior to final construction design the Project Biologist shall review the fencing plans for placement of wildlife jump-outs. In areas with documented ungulate or other large mammal movement, where terrain or project design (e.g., at-grade crossings) could allow these large animals to enter the right-of-way, features to reduce access (e.g., taller fencing or wildlife barriers at crossings) or features to allow large animals to escape from the fenced right-of-way (e.g., wildlife jump-outs or escape ramps) would be incorporated into the project at these locations. Specific locations of these features would be based on the behavior of target species (e.g. mule deer, mountain lion, black bear), adjacent habitat and terrain, and other design constraints as determined by the Project Biologist and Project Engineer. Prior to operation, the Project Biologist will field inspect the fencing for appropriate placement of jump-outs as determined necessary during the plan review. Fencing plan review and field inspection shall be documented in a memorandum from the Project Biologist and provided to the Authority.

This mitigation measure is anticipated to be effective because ever-increasing knowledge of wildlife behavior in the vicinity of linear transportation projects has been generated over the last several decades, due to both safety concerns and a focus on wildlife movement. Experience with implementation of measures to prevent transportation/wildlife conflicts has shown that jumpouts can be an effective tool to minimize collisions, and knowledge gained from their use on other facilities can be used to develop appropriate locations and designs. Implementation of this measure would not trigger secondary environmental impacts because it would not change the scope, scale, or location of construction activities beyond those that have been described as part of the B-P Build Alternatives.

BIO-MM#79: Mitigation for Desert Tortoise

In addition to the IAMFs and Standard Biological Mitigation Measures discussed previously in this section and other sections, such as Section 3.3: Air Quality and Global Climate Change and Section 3.8: Hydrology and Water Resources, the following mitigation would be implemented to avoid and minimize effects of the proposed action on desert tortoise during construction and O&M activities. These measures include, worker environmental awareness program (WEAP) trainings; biological monitoring during all ground-and vegetation-disturbing activities; wildlife exclusion barriers and fencing of environmentally sensitive areas; monofilament netting restrictions; specific entrapment avoidance procedures for open holes and trenches; establishment of vehicle traffic routes and construction site speed limits; the authority for the biological monitor(s) to halt work in the event a listed species is identified; and the configuration of wildlife crossing infrastructure. The preparation and implementation of the following plans will also be integrated into the project; Restoration and Revegetation Plan; Biological Resources Management Plan; Annual Vegetation Management Plan; Weed Control Plan; BMP Field Manual for construction site housekeeping that includes trash containment and disposal; a Fugitive Dust Control Plan; a Construction Management Plan that addresses spill prevention; and a Construction Stormwater Pollution Prevention Plan.

In addition, the following species-specific mitigation measures will be implemented to further avoid and minimize potential adverse effects of the proposed action on desert tortoise;

- Prior to construction activities, a project-specific Desert Tortoise Translocation/Relocation Plan will be prepared for incorporation in to the project's Biological Resources Management Plan (Plan). The Plan will provide details on desert tortoise clearance surveys and relocation, including procedures to follow in the event that a tortoise becomes trapped. These will be consistent with *Guidelines for Handling Desert Tortoise during Construction Projects*, or other current USFWS guidelines (USFWS 2009). The Plan will also include methodology for visual desert tortoise body condition assessments, in accordance with the Health Assessment Handbook or most up-to-date USFWS guideline.

- Conduct phased, focused pre-activity clearance surveys prior to the start of ground or vegetation disturbing activities in modeled suitable habitat for desert tortoise, or areas of documented occurrences if outside of modeled habitat. The survey(s) shall be conducted by Project Biologist(s) or their designee familiar with desert tortoise and their sign. The surveys shall be conducted in general accordance with the USFWS protocol *Preparing for Any Action That May Occur within the Range of the Mojave Desert Tortoise (Gopherus agassizii)* (USFWS 2010). The survey will occur no more than 48 hours before planned activity and may be conducted during any time of year, but preferably during the desert tortoise active period (i.e., early March through early November). It will consist of transect surveys spaced no greater than 15 feet and include a 50-foot buffer.
- All burrows that could provide shelter for desert tortoise will be avoided to the greatest extent practical. If active burrows are identified in the project footprint, a 50-foot non-disturbance buffer will be established, maintained, and monitored. The buffer will be established by routing the ESA fence and wildlife exclusion fencing (WEF) around the active burrows in a manner that allows for desert tortoise to leave the project footprint. Burrows that cannot be avoided will be excavated during the clearance survey by the Project Biologist or their designee.
- Following the pre-activity survey(s):
  - Where construction activities will occur for more than one consecutive month, desert tortoise exclusionary fencing, and barriers will be installed and maintained to avoid take of desert tortoise, including destruction of nests, or their potential habitat within the project footprint. ESA fencing and WEF will be used to delineate the area (in accordance with BIO-MM#36). The WEF will be maintained and monitored daily during the desert tortoise activity period (i.e., early March through early November) to ensure it is maintained in good condition, and to determine if tortoises are “trapped” along the fence searching for a way to access the other side. Outside of the desert tortoise activity period, fence inspections will occur at least once weekly.
  - Where construction activities will be of short duration (i.e., less than one month), full-time monitoring by the Biological Monitor may be used in lieu of fencing. In these situations, a daily pre-activity clearance sweep will be conducted by the Biological Monitor prior to start of daily construction activities.
  - If any project vehicle must drive off established routes in suitable tortoise habitat, the route or work location will be walked immediately prior to, or in front of vehicle being driven by the Biological Monitor. The Biological Monitor shall visually account for 100 percent of the footprint of the route or work location plus a 15-foot buffer on each side.
- Any construction pipe, culvert, or similar structure with a diameter greater than three inches stored less than eight inches aboveground, outside a fenced area of desert tortoise habitat, and left unattended for any length of time during the desert tortoise active period (i.e., early March through early June, and September through early November) will be inspected for desert tortoise before the material is moved, buried, or capped. As an alternative, all such structures may be capped prior to staging or placed on pipe racks.
- Any time a vehicle or construction equipment is parked for more than 10 minutes outside of the fenced area, the ground under the vehicle will be inspected for the presence of desert tortoise before the vehicle/equipment is moved. If a desert tortoise is present, the vehicle/equipment will not be moved until the desert tortoise moves on its own away from the vehicle/equipment. If it does not move in 15 minutes during construction, the Biological Monitor may capture and relocate the animal to a safe location according to USFWS protocol and in accordance with the Desert Tortoise Relocation Plan. During O&M, trained and approved personnel may move a desert tortoise out of harm’s way that does not move on its own, in accordance with the approved Desert Tortoise Relocation Plan.

- To the extent feasible, nighttime light disturbance will be minimized in and adjacent to suitable habitat where desert tortoise may be present. In the event that nighttime lighting is required, the lighting will be focused, shielded, and directed away from adjacent suitable habitat.
- Measures will be implemented to ensure that construction and O&M activities do not attract common ravens to the ROW by providing food or water subsidies, perch sites, roost sites, or nest sites. All activity work areas will be kept free of trash and debris. Particular attention will be paid to remove and avoid accumulation of "micro-trash" (including such small items as screws, nuts, washers, nails, coins, rags, small electrical components, small pieces of plastic, glass or wire, and any debris or trash that is colorful or shiny) and organic waste that may attract or subsidize predators. All trash will be covered, kept in closed containers, or otherwise removed from the project site at the end of each day or at regular intervals prior to periods when workers are not present at the site. Dead and injured wildlife found in the project footprint will be removed, as needed, to reduce attraction of opportunistic predators. Dead and injured wildlife will be handled and removed in accordance with any applicable project permits and plans.
- The ESA fence, the WEF, and the O&M Security Fence Maintenance Plan will include provisions for reptiles and mammals (e.g., enhanced with barriers, such as flashing or slats, for six inches below ground surface to 12 inches above) along portions of the project that are adjacent to modeled suitable habitat to prevent individuals from gaining access to the alignment ROW.
- Water or dust palliatives will be applied to the construction ROW, dirt roads, trenches, spoil piles, and other areas where ground disturbance takes place to minimize dust emissions and topsoil erosion. Dust palliatives will be nontoxic to wildlife and plants. For construction within suitable habitat for listed species, the Biological Monitor will patrol areas of disturbance to ensure that water does not puddle for long periods and attract listed species, common ravens, or other wildlife to the project site. Operational ponding will be avoided through careful grading and hydrologic design.

This mitigation measure is anticipated to be effective because it identifies and documents Desert Tortoise and their habitat within 50 feet of the construction Work Area, informing the actions needed for species' avoidance, protective fencing placement, and other mitigation. Implementation of this measure would not trigger secondary environmental impacts because it would not change the scope, scale, or location of construction activities beyond those that have been described as part of the B-P Build Alternatives.

BIO-MM#80: Conduct Surveys and Implement Avoidance Measures for Crotch Bumble Bee

Surveys for Crotch bumble bee in suitable habitat (identified by species habitat suitability modeling) in the project footprint would be conducted by qualified biologists within 1 year prior to the start of construction. Surveys would be conducted during four evenly spaced sampling periods during the flight season (March–September) (Thorp et al. 1983). For each sampling event, the biologist(s) would survey suitable habitat within the project footprint and, as access outside the footprint permits, a 100-foot buffer surrounding the project footprint using nonlethal netting methods for 1 person-hour per 3 acres of the highest quality habitat or until 150 bumble bees are sighted, whichever comes first. If initial sampling of a given habitat area indicates that the habitat is of low quality or nonexistent, no further sampling of that area would be required. General guidelines and best practices for bumble bee surveys would follow USFWS' *Survey Protocols for the Rusty Patched Bumble Bee* (*Bombus affinis*) (USFWS 2019), which are consistent with other bumble bee survey protocols used by The Xerces Society (Hatfield et al. 2017; Washington Department of Fish and Wildlife et al. 2019).

If surveys conducted within 1 year prior to construction identify occupied Crotch bumble bee habitat within the project footprint or the 100-foot buffer, the project biologist would then conduct additional pre-construction surveys of such habitat for active bee nest colonies and associated floral resources (i.e., flowering vegetation on which bees from the colony are observed foraging)

no more than 30 days prior to any ground disturbance between March and September. The purpose of this pre-construction survey would be to identify active nest colonies and associated floral resources outside of impact areas that could be avoided by construction personnel. The project biologist would establish, monitor, and maintain no-work buffers around nest colonies and floral resources identified during surveys. The size and configuration of the no-work buffer would be based on best professional judgment of the project biologist. At a minimum, the buffer would provide at least 50 feet of clearance around nest entrances and maintain disturbance-free airspace between the nest and nearby floral resources. Construction activities would not occur within the no-work buffers until the colony is no longer active (i.e., no bees are seen flying in or out of the nest for three consecutive days, indicating the colony has completed its nesting season and the next season's queen has dispersed from the colony).

BIO-MM#81: Provide Compensatory Mitigation for Impacts on Crotch Bumble Bee Habitat

The Authority would provide compensatory mitigation for impacts on occupied habitat for Crotch bumble bee. Impacts on occupied habitat (confirmed through surveys as described in BIO-MM#80) would be compensated for at a ratio of 3:1, unless a higher ratio is required pursuant to an authorization issued under CESA, through the purchase of CDFW-approved bank credits (if available) or through preservation of habitat in perpetuity, including suitable habitat currently preserved by the Authority.

BIO-MM#82: Avoid Direct Impacts on Monarch Butterfly Host Plants

Prior to any ground-disturbing activities, the Project Biologist would survey for monarch butterfly larval host plants (native milkweed species) within suitable habitat. If host plants are found, the Project Biologist would conduct surveys for adult butterflies during the peak flight period for Southern California (approximately October 1 through March 15) to determine presence/absence or presence may be assumed. Where adult butterflies are present or assumed to be present, construction personnel would avoid host plants in temporary impact areas, where feasible. In the event host plants are impacted in temporary impact areas, native milkweed species would be replanted.

BIO-MM#83: Provide Compensatory Mitigation for Impacts on Monarch Butterfly Breeding and Foraging Habitat

The Authority would provide compensatory mitigation to offset impacts on breeding and foraging habitat for monarch butterfly at a ratio of 2 to 1. Compensatory mitigation could include one or more methods as described in BIO-MM#53.

BIO-MM#84: Conduct Pre-Construction Surveys and Implement Avoidance and Minimization Measures for Mountain Lion Dens

It is recognized that mountain lions are secretive and difficult to survey and can change den locations every couple of weeks. Prior to the initiation of construction, the Authority would consult with the CDFW and other mountain lion experts to develop a survey protocol to locate and identify denning mountain lions in and adjacent to the project to avoid adversely disturbing the mother and kittens. Prior to any ground-disturbing activity, regardless of the time of year, the Project Biologist would conduct pre-construction surveys for known or potential mountain lion dens within suitable habitat located within the work area and within 2,000 feet of the work area, where access is permitted. These surveys would be conducted no less than 14 days and no more than 30 days prior to the start of ground-disturbing activities in a work area.

The definition for known and potential mountain lion den types is as follows;

- **Known Den.** Any existing natural den or human-made structure that is used or has been used at any time in the past by a mountain lion. Evidence of use may include historical records; past or current radio telemetry or tracking study data; mountain lion sign, such as tracks, scat, and/or prey remains; or other reasonable proof that a given den is being or has been used by a mountain lion;

- **Potential Den.** Any thick vegetation, boulder piles, rocky outcrops, or undercut cliffs within the species' range for which available evidence is insufficient to conclude that it is being used or has been used by a mountain lion. Potential dens will include the following characteristics: 1) refuge from predators (coyotes, golden eagles, other mountain lions) or 2) shielding of the litter from heavy rain and hot sun.

The Project Biologist will use location-specific survey methods to identify known and potential dens. The survey method will consider topography, vegetation density, safety, and other factors. Surveys will be conducted by a qualified biologist (i.e., a biologist with demonstrated experience in mountain lion biology, identification, and survey techniques) and may involve the establishment of camera stations, scent stations, pedestrian surveys (looking for tracks, caches, etc.), or other appropriate methods. Survey methods used will be designed to avoid the disturbance of known or potential dens, to the extent feasible.

If known, or potential, mountain lion dens are identified or observed during pre-construction surveys, mountain lion dens will be assumed to have kittens present until the Project Biologist can document that they are not present and/or that the den is not being used. A nondisturbance buffer of at least 2,000 feet will be established around the known or potential den until the Project Biologist can document and confirm that the den is not occupied. If the den is determined to be occupied, the 2,000-foot nondisturbance buffer will be maintained until the den is confirmed abandoned by the Project Biologist. Construction may proceed if the Project Biologist determines that the den is not being used by mountain lions. However, ground disturbance would be limited to those days between October 1 and January 31 within 2,000 feet of known or potential dens to the extent feasible. Mountain lions can breed year-round; however, most breeding activity and births occur during the spring and summer months between February 1 and September 30.

BIO-MM#85: Provide Compensatory Mitigation for Impacts on Mountain Lion Core and Patch Habitat

The Authority would provide compensatory mitigation for impacts on mountain lion core and patch habitat through the preservation of suitable habitat that is acceptable to CDFW. Habitat would be replaced at a minimum ratio of 2:1 for permanent impacts on breeding/foraging habitat and high-priority foraging and dispersal habitat, and at a ratio of 1:1 for low-priority foraging and dispersal habitat, unless a higher ratio is required by regulatory authorizations issued under the California Endangered Species Act. Compensatory mitigation would be provided using one or more of the methods described in BIO-MM#53 and would, where feasible and acceptable to CDFW, contribute to preserving important movement lands across the HSR alignment.

BIO-MM#86: Implement Lighting Minimization Measures During Construction

The Authority would avoid conducting ground-disturbing activities within known wildlife habitat during nighttime hours, to the extent feasible. If nighttime work is necessary, the Authority would minimize impacts to adjacent habitat by:

- Conducting night work only within the boundaries of previously disturbed, cleared and grubbed areas
- Shielding and directing nighttime lighting to avoid illuminating wildlife habitat, including movement corridors
- Using the minimum lighting levels approved by OSHA (29 C.F.R. 1926.56) for general construction (i.e., 5 foot-candles or 54 lux)
- Minimizing the direction of construction vehicle headlights towards offsite locations and use low beams or turn off headlights when safety considerations permit
- Minimizing the duration of lighting by using remote monitoring systems or other methods to ensure security of the construction site during hours it is not in use

BIO-MM#87: Implement Lighting Minimization Measures for Operations

To address the permanent and intermittent impacts from lighting, the Authority would implement measures to minimize the intensity and duration of operational lighting of permanent facilities (e.g., traction power facilities, radio sites, and maintenance facilities), as well as intermittent train lighting, to the extent feasible:

- Outdoor lighting at operational facilities would be consistent with minimum OSHA requirements established by 29 C.F.R. 1926.56 when the facilities are in use. To the extent feasible, the Authority would minimize the duration of lighting at operational facilities by using methods other than lighting (e.g., remote monitoring systems), to ensure security of facilities during nighttime hours they are not in use,
- Nighttime lighting will have shields or cowls (or other devices to limit lighting) installed to direct the light downward to reduce the standard luminous intensity distribution curve to contain the light to the boundaries of the project site to the extent practicable,

Train headlights would use the minimum standard allowed by the FRA under 49 C.F.R. 229.125 (a single headlight of at least 200,000 candelas) within non-tunnel portions of the project section.

3.7.8 NEPA Impacts Summary

Under NEPA, project impacts are evaluated based on the criteria of context, intensity, and duration (short- or long-term). An impact would be identified and described according to the effects caused by the project after consideration of the project IAMFs and mitigation measures as identified above in Sections 3.7.6.3 and 3.7.7. The effectiveness of measures to avoid, minimize, and/or mitigate impacts is considered in making impact determinations under NEPA. Thus, if a measure sufficiently mitigates an impact, the effect is not significant. Therefore, significance under NEPA is described as either an impact or no effect.

General indicators of significance, based on the guidelines or criteria in NEPA, CESA, FESA, and regulatory guidance from FRA, include:

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

Following is a summary of the NEPA determination of impacts and how those determinations were made.

Under the No Project Alternative, existing development trends affecting biological resources are expected to continue and to potentially degrade natural systems. Expanded development in the region would continue resulting in direct effects, including habitat loss, mortality from vehicle strikes, and indirect effects associated with habitat degradation from pollution, noise, and dust effects on special-status species and habitats; creation of barriers to wildlife movement; habitat fragmentation; and other effects. These effects would result in incremental regional impacts on biological resources. Given that some remaining biological resources are rare, imperiled, or otherwise already degraded at the regional scale, continued development in the area, and the resulting degradation of biological resources under the No Project Alternative, are considered an adverse impact. However, ongoing and future conservation planning and regulatory controls have the potential to be a mechanism for maintaining a degree of biological resources within the RSA with regard to the ongoing development trend without installation of the HSR system.

The proposed B-P Build Alternatives for the Bakersfield to Palmdale Project Section would incorporate the IAMFs to minimize impacts on biological and aquatic resources. These IAMFs include pre-construction surveys; designated areas for staging, access, and construction materials; biological monitors; and the establishment of protocols to further avoid or minimize effects on biological and aquatic resources. The IAMFs are considered part of the project and are not the same as mitigation measures. The IAMFs are described in detail in Section 3.7.4.2.

In addition to various technical reports prepared for the Bakersfield to Palmdale Project Section, a draft Biological Assessment was prepared and submitted to the USFWS for review prior to the publication of the Draft EIR/EIS for public review. The Authority submitted the Biological Assessment to the USFWS on April 28, 2020 and requested the initiation of formal Section 7 Consultation. The Authority submitted a Biological Assessment Supplement to the USFWS in May 2021. The Biological Assessment and Biological Assessment Supplement evaluate the potential adverse effects of the proposed action on species that are listed as endangered or threatened, that are proposed for listing as endangered or threatened, or that are candidates for listing as endangered or threatened under FESA, as well as designated or proposed critical habitats. Potential effects on federally listed species are evaluated in accordance with the legal requirements set forth in Section 7 of FESA (16 U.S.C. Sections 1531 et seq.).

After evaluating the potential effects of the proposed action, but prior to implementation of IAMFs and/or mitigation, the Authority has determined that the Bakersfield to Palmdale Project Section may affect, and is likely to adversely affect, the following species:

- Kern mallow (*Eremalche kernensis*)
- Bakersfield cactus (*Opuntia basilaris* var. *treleasei* [*O. treleasei*])
- San Joaquin adobe sunburst (*Pseudobahia peirsonii*)
- Kern primrose sphinx moth (*Euproserpinus euterpe*)
- Blunt-nosed leopard lizard (*Gambelia sila*) (Fully Protected)
- Desert tortoise (*Gopherus agassizii*)
- Least Bell's vireo (*Vireo bellii pusillus*)
- Tipton kangaroo rat (*Dipodomys nitratoides nitratoides*)
- San Joaquin kit fox (*Vulpes macrotis mutica*)

Due to the finding of may affect, and is likely to adversely affect, the Authority requested initiation of formal consultation with the USFWS in accordance with Section 7 of FESA, which could result in an Incidental Take Statement for the following species: Kern mallow, Bakersfield cactus (only on federal lands), San Joaquin adobe sunburst, Kern primrose sphinx moth, desert tortoise, least Bell's vireo, Tipton kangaroo rat, and San Joaquin kit fox. Although project impacts during construction and operation may remain likely to adversely affect the blunt-nosed leopard lizard, the Authority would implement IAMFs and mitigation measures to completely avoid these species, or wait until these species have moved to another area, before beginning construction in habitat areas. With implementation of the conservation measures discussed therein, the Authority requested concurrence from the USFWS regarding the determination that the proposed action would have no effect on critical habitat and may affect, but is not likely to adversely affect, California jewelflower, San Joaquin woolly-threads, yellow-billed cuckoo, southwestern willow flycatcher, and California condor.

The species determination of effect and critical habitat determination from the Biological Assessment and Biological Assessment Supplement are shown below in Table 3.7-14.

Table 3.7-14 Summary of Effects for Federally Listed Species and Their Critical Habitat

Scientific Name Common Name	Federal Status	Species Determination	Critical Habitat Determination
Plants			
Caulanthus californicus California jewelflower	FE	May affect, but is not likely to adversely affect	N/A
Eremalche kernensis Kern mallow	FE	May affect, and is likely to adversely affect	N/A
Monolopia congdonii San Joaquin woolly-threads	FE	May affect, but is not likely to adversely affect	N/A
Pseudobahia peirsonii San Joaquin adobe sunburst	FT	May affect, and is likely to adversely affect	N/A
Opuntia basilaris var. *treleasei* (*O. treleasei*) Bakersfield cactus	FE	May affect, and is likely to adversely affect	N/A
Invertebrates			
Euproserpinus euterpe Kern primrose sphinx moth	FT	May affect, and is likely to adversely affect	N/A
Reptiles			
Gambelia sila Blunt-nosed leopard lizard	FE	May affect, and is likely to adversely affect	N/A
Gopherus agassizii Desert tortoise	FT	May affect, and is likely to adversely affect	No Effect
Birds			
Coccyzus americanus Yellow-billed cuckoo (Western Distinct Population Segment)	FT	May affect, but is not likely to adversely affect	No Effect
Empidonax traillii extimus Southwestern willow flycatcher	FE	May affect, but is not likely to adversely affect	No Effect
Gymnogyps californianus California condor	FE	May affect, but is not likely to adversely affect	No Effect
Vireo bellii pusillus Least Bell's vireo	FE	May affect, and is likely to adversely affect	No Effect
Mammals			
Dipodomys nitratoides Tipton kangaroo rat	FE	May affect, and is likely to adversely affect	N/A
Vulpes macrotis mutica San Joaquin kit fox	FE	May affect, and is likely to adversely affect	N/A

Source: California High-Speed Rail Authority, 2020, 2021
Status acronyms are FT= Federal Threatened, FE= Federal Endangered.
N/A = not applicable

Implementation of the IAMFs will allow the B-P Build Alternatives to be designed using known methods of avoidance and minimization efforts, such as pre-construction surveys; designated areas for staging, access, and construction; biological monitors; and the establishment of protocols, as outlined in Section 3.7.4.2, to further avoid or minimize impacts. These design features would reduce many of the adverse effects on biological and aquatic resources.

In addition, the B-P Build Alternatives would incorporate biological mitigation measures to further minimize impacts on special-status plant and wildlife species, habitats of concern, wildlife movement corridors, and protected trees, as outlined in detail in Section 3.7.7. These efforts would reduce adverse impacts by implementing the following measures.

- **Impact BIO #1:** Construction of the B-P Build Alternatives would directly or indirectly impact suitable habitat that has the potential to support special-status plant species.
  - **BIO-MM#1:** Conduct Presence/Absence Pre-Construction Surveys for Special-Status Plant Species and Special-Status Plant Communities
  - **BIO-MM#2:** Prepare and Implement Plan for Salvage and Relocation of Special-Status Plant Species
  - **BIO-MM#6:** Prepare and Implement a Restoration and Revegetation Plan
  - **BIO-MM#38:** Compensate for Impacts to Listed Plant Species
  - **BIO-MM#47:** Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resources
  - **BIO-MM#50:** Implement Measures to Minimize Impacts During Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites
  - **BIO-MM#53:** Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat
  - **BIO-MM#55:** Prepare and Implement a Weed Control Plan
  - **BIO-MM#56:** Conduct Monitoring of Construction Activities
  - **BIO-MM#58:** Establish Environmentally Sensitive Areas and Non-Disturbance Zones
  - **BIO-MM#61:** Establish and Implement a Compliance Reporting Program
  - **BIO-MM#75:** Minimize Impacts on Kern Primrose Sphinx Moth Host Plants
  - **WQ-MM#3:** Tunnel Constructability and Hydrogeological Monitoring
- **Impact BIO #2:** Construction of the B-P Build Alternatives would disturb suitable habitat that has the potential to support special-status reptile, amphibian, and insect species, special-status bird species (including raptors), and special-status mammal species.
  - **BIO-MM#7:** Conduct Pre-Construction Surveys for Special-Status Reptile and Amphibian Species
  - **BIO-MM#8:** Implement Avoidance and Minimization Measures for Special-Status Reptile and Amphibian Species
  - **BIO-MM#11:** Conduct Surveys for Blunt-Nosed Leopard Lizard
  - **BIO-MM#13:** Implement Avoidance Measures for Blunt-Nosed Leopard Lizard
  - **BIO-MM#14:** Conduct Pre-Construction Surveys and Delineate Active Nest Buffers Exclusion Areas for Breeding Birds
  - **BIO-MM#15:** Conduct Pre-Construction Surveys and Monitoring for Raptors
  - **BIO-MM#16:** Implement Avoidance Measures for California Condor

- **BIO-MM#17:** Conduct Surveys for Swainson's Hawk Nests and Implement Avoidance and Minimization Measures
- **BIO-MM#18:** Implement Avoidance and Minimization Measures for Swainson's Hawk Nests
- **BIO-MM#20:** Conduct Protocol Surveys for Burrowing Owls
- **BIO-MM#21:** Implement Avoidance and Minimization Measures for Burrowing Owl
- **BIO-MM#22:** Conduct Pre-Construction Surveys for Nelson's Antelope Squirrel, Tipton Kangaroo Rat, Dulzura Pocket Mouse, and Tulare Grasshopper Mouse
- **BIO-MM#23:** Implement Avoidance and Minimization Measures for Nelson's Antelope Squirrel, Tipton Kangaroo Rat, Dulzura Pocket Mouse, and Tulare Grasshopper Mouse
- **BIO-MM#25:** Conduct Pre-Construction Surveys for Special-Status Bat Species
- **BIO-MM#26:** Conduct Pre-Construction Surveys for Special-Status Bat Species
- **BIO-MM#27:** Implement Bat Exclusion and Deterrence Measures
- **BIO-MM#28:** Conduct Pre-Construction Surveys for Ringtail and Ringtail Den Sites and Implement Avoidance Measures
- **BIO-MM#29:** Conduct Pre-Construction Surveys for American Badger Den Sites and Implement Minimization Measures
- **BIO-MM#30:** Conduct Pre-Construction Surveys for San Joaquin Kit Fox
- **BIO-MM#31:** Minimize Impacts on San Joaquin Kit Fox
- **BIO-MM#36:** Install Aprons or Barriers within Security Fencing
- **BIO-MM#42:** Provide Compensatory Mitigation for Impacts to Habitat for Blunt-Nosed Leopard Lizard, Tipton Kangaroo Rat, and Nelson's Antelope Squirrel
- **BIO-MM#43:** Provide Compensatory Mitigation for Loss of Swainson's Hawk Nesting Trees and Habitat
- **BIO-MM#44:** Provide Compensatory Mitigation for Loss of Active Burrowing Owl Burrows and Habitat
- **BIO-MM#47:** Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resources
- **BIO-MM#50:** Implement Measures to Minimize Impacts During Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites
- **BIO-MM#53:** Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat
- **BIO-MM#55:** Prepare and Implement a Weed Control Plan
- **BIO-MM#56:** Conduct Monitoring of Construction Activities
- **BIO-MM#58:** Establish Environmentally Sensitive Areas and Non-Disturbance Zones
- **BIO-MM#60:** Limit Vehicle Traffic and Construction Site Speeds
- **BIO-MM#61:** Establish and Implement a Compliance Reporting Program
- **BIO-MM#62:** Prepare Plan for Dewatering and Water Diversions
- **BIO-MM#63:** Work Stoppage
- **BIO-MM#65**: Conduct Pre-construction Surveys and Monitoring for Bald and Golden Eagles

- **BIO-MM#66:** Implement Avoidance Measures for Active Eagle Nests
- **BIO-MM#67:** Provide Compensatory Mitigation for Loss of Eagle Nests
- **BIO-MM#68:** Avoid and Minimize Impacts to White-tailed kite
- **BIO-MM#69:** Conduct Surveys and Implement Avoidance Measures for Active Tricolored Blackbird Nest Colonies
- **BIO-MM#70:** Provide Compensatory Mitigation for Impacts on Tricolored Blackbird Habitat
- **BIO-MM#71:** Implement California Condor Avoidance Measures during Helicopter Use
- **BIO-MM#72:** Implement Avoidance of Nighttime Light Disturbance for California Condor
- **BIO-MM#74:** Implement Bird Nest and Avian Special Status Species Avoidance Measures for Helicopter-Based Construction Activities
- **BIO-MM#76:** Implement Wildlife Rescue Measures
- **BIO-MM#77:** Implement Wildlife Height Requirements for Enhanced Security Fencing
- **BIO-MM#78:** Install Wildlife Jump-outs
- **BIO-MM#79:** Mitigation for Desert Tortoise
- **BIO-MM#80:** Conduct Surveys and Implement Avoidance Measures for Crotch Bumblebee
- **BIO-MM#82:** Avoid Direct Impacts on Monarch Butterfly Host Plants
- **BIO-MM#83:** Provide Compensatory Mitigation for Impacts on Monarch Butterfly Breeding and Foraging Habitat
- **BIO-MM#84:** Conduct Pre-Construction Surveys and Implement Avoidance and Minimization Measures for Mountain Lion Dens
- **BIO-MM#85:** Provide Compensatory Mitigation for Impacts on Mountain Lion Core and Patch Habitat
- **BIO-MM#86:** Implement Lighting Minimization Measures During Construction
- **WQ-MM#3:** Tunnel Constructability and Hydrogeological Monitoring

- **Impact BIO#3:** Construction of the B-P Build Alternatives would disturb special-status plant communities and riparian areas.
  - **BIO-MM#1:** Conduct Presence/Absence Pre-Construction Surveys for Special-Status Plant Species and Special-Status Plant Communities
  - **BIO-MM#6:** Prepare and Implement a Restoration and Revegetation Plan
  - **BIO-MM#47:** Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resources
  - **BIO-MM#50:** Implement Measures to Minimize Impacts during Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites
  - **BIO-MM#53:** Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat
  - **BIO-MM#54:** Prepare and Implement an Annual Vegetation Control Plan
  - **BIO-MM#58:** Establish Environmentally Sensitive Areas and Non-Disturbance Zones
  - **BIO-MM#61:** Establish and Implement a Compliance Reporting Program
  - **BIO-MM#75:** Minimize Impacts on Kern Primrose Sphinx Moth Host Plants
  - **WQ-MM#3:** Tunnel Constructability and Hydrogeological Monitoring

- **Impact BIO#4:** Construction of the B-P Build Alternatives would have direct and indirect impacts on aquatic resources.
  - **BIO-MM#6:** Prepare and Implement a Restoration and Revegetation Plan
  - **BIO-MM#33:** Restore Aquatic Resources Subject to Temporary Impacts
  - **BIO-MM#34:** Monitor Construction Activities within Aquatic Resources
  - **BIO-MM#47:** Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resources
  - **BIO-MM#50:** Implement Measures to Minimize Impacts during Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites
  - **BIO-MM#58:** Establish Environmentally Sensitive Areas and Non-Disturbance Zones
  - **BIO-MM#61:** Establish and Implement a Compliance Reporting Program
  - **BIO-MM#62:** Prepare Plan for Dewatering and Water Diversions
  - **WQ-MM#3:** Tunnel Constructability and Hydrogeological Monitoring
- **Impact BIO#5:** Project impacts from the B-P Build Alternatives would temporarily reduce the functionality of wildlife movement corridors and habitat linkages.
  - **BIO-MM#37:** Minimize Effects to Wildlife Movement Corridors during Construction
  - **BIO-MM#36:** Install Aprons or Barriers within Security Fencing
  - **BIO-MM#56:** Conduct Monitoring of Construction Activities
  - **BIO-MM#50:** Implement Measures to Minimize Impacts during Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites
  - **BIO-MM#64:** Establish Wildlife Crossings
  - **BIO-MM#77:** Implement Wildlife Height Requirements for Enhanced Security Fencing
  - **BIO-MM#78:** Install Wildlife Jump-outs
  - **BIO-MM#42:** Provide Compensatory Mitigation for Impacts to Habitat for Blunt-Nosed Leopard Lizard, Tipton Kangaroo Rat, and Nelson's Antelope Squirrel
  - **BIO-MM#86:** Implement Lighting Minimization Measures During Construction
- **Impact BIO#6:** Construction impacts from the B-P Build Alternatives would temporarily affect protected trees.
  - **BIO-MM#35:** Implement Transplantation and Compensatory Mitigation Measures for Protected Trees
  - **BIO-MM#50:** Implement Measures to Minimize Impacts during Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites
  - **BIO-MM#56:** Conduct Monitoring of Construction Activities
  - **BIO-MM#58:** Establish Environmentally Sensitive Areas and Non-Disturbance Zones
  - **BIO-MM#61:** Establish and Implement a Compliance Reporting Program
  - **WQ-MM#3:** Tunnel Constructability and Hydrogeological Monitoring
- **Impact BIO#7:** Construction of the B-P Build Alternatives would directly or indirectly impact suitable habitat that has the potential to support special-status plant species.
  - **BIO-MM#6:** Prepare and Implement a Restoration and Revegetation Plan
  - **BIO-MM#50:** Implement Measures to Minimize Impacts during Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites

  - **BIO-MM#53:** Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat
  - **BIO-MM#54:** Prepare and Implement an Annual Vegetation Control Plan
  - **BIO-MM#60:** Limit Vehicle Traffic and Construction Site Speeds
- **Impact BIO #8:** Construction of the B-P Build Alternatives would disturb suitable habitat that has the potential to support special-status reptiles, amphibian, and insect species, special-status bird species (including raptors), and special-status mammal species.
  - **BIO-MM#36:** Install Aprons or Barriers within Security Fencing
  - **BIO-MM#42:** Provide Compensatory Mitigation for Impacts to Habitat for Blunt-Nosed Leopard Lizard, Tipton Kangaroo Rat, and Nelson's Antelope Squirrel
  - **BIO-MM#43:** Provide Compensatory Mitigation for Loss of Swainson's Hawk Nesting Trees and Habitat
  - **BIO-MM#44:** Provide Compensatory Mitigation for Loss of Active Burrowing Owl Burrows and Habitat
  - **BIO-MM#45:** Provide Compensatory Mitigation for Impacts to San Joaquin Kit Fox Habitat
  - **BIO-MM#47:** Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resources
  - **BIO-MM#50:** Implement Measures to Minimize Impacts during Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites
  - **BIO-MM#53:** Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat
  - **BIO-MM#55:** Prepare and Implement a Weed Control Plan
  - **BIO-MM#56:** Conduct Monitoring of Construction Activities
  - **BIO-MM#64:** Establish Wildlife Crossings
  - **BIO-MM#67:** Provide Compensatory Mitigation for Loss of Eagle Nests
  - **BIO-MM#70:** Provide Compensatory Mitigation for Impacts on Tricolored Blackbird Habitat
  - **BIO-MM#71:** Implement California Condor Avoidance Measures during Helicopter Use
  - **BIO-MM#73:** Implement Removal of Carrion that May Attract Condors and Eagles
  - **BIO-MM#76:** Implement Wildlife Rescue Measures
  - **BIO-MM#77:** Implement Wildlife Height Requirements for Enhanced Security Fencing
  - **BIO-MM#78:** Install Wildlife Jump-Outs
  - **BIO-MM#79:** Mitigation for Desert Tortoise
  - **BIO-MM#81:** Provide Compensatory Mitigation for Impacts on Crotch Bumblebee
  - **BIO-MM#83:** Provide Compensatory Mitigation for Impacts on Monarch Butterfly Breeding and Foraging Habitat
  - **BIO-MM#85:** Provide Compensatory Mitigation for Impacts on Mountain Lion Core and Patch Habitat
  - **BIO-MM#87:** Implement Lighting Minimization Measures for Operations
- **Impact BIO#9:** Project impacts from the B-P Build Alternatives would permanently impact special-status plant communities and riparian areas.

  - **BIO-MM#6:** Prepare and Implement a Restoration and Revegetation Plan
  - **BIO-MM#32:** Restore Temporary Riparian Habitat Impacts
  - **BIO-MM#46:** Provide Compensatory Mitigation for Permanent Impacts to Riparian Habitat
  - **BIO-MM#47:** Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resources
  - **BIO-MM#50:** Implement Measures to Minimize Impacts during Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites
  - **BIO-MM#53:** Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat
  - **BIO-MM#54:** Prepare and Implement an Annual Vegetation Control Plan
- **Impact BIO#10:** Project impacts from the B-P Build Alternatives would permanently affect aquatic resources.
  - **BIO-MM#6:** Prepare and Implement a Restoration and Revegetation Plan
  - **BIO-MM#33:** Restore Aquatic Resources Subject to Temporary Impacts
  - **BIO-MM#47:** Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resources
  - **BIO-MM#50:** Implement Measures to Minimize Impacts during Offsite Habitat Restoration, or Creation on Mitigation Sites
  - **BIO-MM#58:** Establish Environmentally Sensitive Areas and Non-Disturbance Zones, Enhancement, or Creation on Mitigation Sites
- **Impact BIO#11:** Project impacts from the B-P Build Alternatives would permanently reduce the functionality of wildlife movement corridors and habitat linkages.
  - **BIO-MM#64** Establish Wildlife Crossings
  - **BIO-MM#76** Implement Wildlife Rescue Measures
  - **BIO-MM#77** Implement Wildlife Height Requirements for Enhanced Security Fencing
  - **BIO-MM#78** Install Wildlife Jump-Outs
  - **BIO-MM#87:** Implement Lighting Minimization Measures for Operations
- **Impact BIO#12:** Project impacts from the B-P Build Alternatives would permanently affect protected trees.
  - **BIO-MM#35:** Implement Transplantation and Compensatory Mitigation Measures for Protected Trees
  - **BIO-MM#50:** Implement Measures to Minimize Impacts during Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites

The Authority would avoid and minimize impacts by implementing the mitigation measures identified for the Bakersfield to Palmdale Project Section as outlined in this document.

3.7.9 CEQA Significance Conclusions

As discussed previously in Section 3.7.4.7, mandatory findings of significance within CEQA Guidelines Section 15065 require the lead agency to determine whether a project may have a significant effect on the environment where substantial evidence indicates that adverse impacts may occur to biological resources.

For the purposes of this project, the following thresholds were used to define a significant impact on biological resources. The project would result in a significant impact on biological resources if it would:

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the CDFW or USFWS
- Have a substantial adverse effect on federally protected wetlands, as defined by CWA Section 404 (including seasonal wetlands, canals, ditches, lacustrine habitats, retention and detention basins, and seasonal riverine habitats) through direct removal, filling, hydrological interruption, indirect or cumulative effects, or other means
- Substantially reduce the habitat of a fish or wildlife species
- Cause a fish or wildlife population to drop below self-sustaining levels
- Threaten to eliminate a plant or animal community
- Substantially reduce the number or restrict the range of an endangered, rare, or threatened species
- Interfere substantially with the movement of any native resident or migratory fish or wildlife species, or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance
- Conflict with the provisions of an adopted HCP, NCCP, or other approved local, regional, state, or federal HCP

Mandatory findings of significance within Section 15065 of the CEQA Guidelines require the lead agency to determine whether a project may have a significant effect on the environment where substantial evidence indicates that adverse impacts may occur to biological resources. The negative conditions are defined as:

- The project has the potential to substantially degrade the quality of the environment, reduce wildlife species habitat, cause wildlife populations to drop below self-sustaining levels, threaten to eliminate a plant or animal community, or substantially reduce or restrict the range of a listed species.
- The project has the potential to achieve short-term environmental goals to the disadvantage of long-term environmental goals.
- The project has environmental effects that are individually limited but cumulatively considerable.

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

- Potential modification or destruction of habitat, movement corridors, or breeding, feeding, and sheltering areas for endangered, threatened, rare, or other special-status species

- Potential measurable degradation of protected habitats, sensitive vegetation communities, wetlands, or other habitat areas identified in plans, policies, or regulations
- Potential loss of a substantial number of any species that could affect the abundance or diversity of that species beyond the level of normal variability
- Potential indirect impacts, both temporary and permanent, from excessive noise and vibration that elicits a negative response and avoidance behavior

Under the No Project Alternative, existing development trends affecting biological resources are expected to continue and to potentially further degrade natural systems. Expanded development in the region would continue to result in direct effects, including habitat loss and mortality from vehicle strikes, as well as indirect effects associated with habitat degradation from pollution, noise, vibration, and dust effects on special-status species and habitats; creation of barriers to wildlife movement; habitat fragmentation; and other effects. These effects would result in incremental regional impacts on biological resources. Given that the remaining biological resources are rare, imperiled, or otherwise already degraded at the regional scale, continued development in the area and the resulting degradation of biological resources under the No Project Alternative are considered a significant impact. However, ongoing and future conservation planning and regulatory controls are a mechanism for maintaining a degree of biological and natural resources within the RSA with the potential of mitigating impacts.

All of the B-P Build Alternatives would incorporate IAMFs equally to minimize impacts on biological and aquatic resources. These IAMFs include pre-construction surveys; designated staging, access, and construction areas; biological monitors; and establishment of protocols to further avoid or minimize impacts on biological and aquatic resources (e.g., special-status plant and wildlife species, habitats of concern, wildlife movement corridors, and protected trees). The IAMFs are described above in Section 3.7.4.2.

Mitigation measures have been identified, and are described above in Sections 3.7.7, for potentially significant impacts that cannot be avoided or minimized adequately by refining project design. These mitigation measures would be incorporated in all four B-P Build Alternatives to reduce impacts on biological and aquatic resources to a less than significant level.

Implementation of the IAMFs will allow the B-P Build Alternatives to be designed using known methods of avoidance and minimization efforts, such as pre-construction surveys; designated areas for staging, access, and construction; biological monitors; and the establishment of protocols as outlined in Section 3.7.6.4, to further avoid or minimize impacts. These design features would reduce impacts from implementation of the project on biological and aquatic resources. In addition, based on incorporation of the project design features (e.g., dedicated wildlife movement structures) and addition of the compensatory mitigation sites, the significance conclusion for wildlife movement after mitigation would also be less than significant.

The B-P Build Alternatives would incorporate biological mitigation measures to further minimize impacts on special-status plant and wildlife species, habitats of concern, wildlife movement corridors, and protected trees, as outlined in detail in Section 3.7.7. The Authority would reduce significant impacts by implementing the mitigation measures identified for the B-P Build Alternatives as outlined in this document, to ensure that impacts would be less than significant under CEQA.

Table 3.7-15 summarizes the CEQA impacts, the associated mitigation measures, and the level of significance after mitigation. The table presents only the impacts that are significant under CEQA prior to mitigation. The determinations presented for each impact represent the impact of the entire Bakersfield to Palmdale Project Section.

Table 3.7-15 Summary of CEQA Significance Conclusions, Mitigation Measures, and Level of Significance after Mitigation

Impact	Impact Avoidance, Minimization Features	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
Construction				
Special-Status Plant Species				
BIO #1: Construction of the B-P Build Alternatives would directly or indirectly impact suitable habitat that has the potential to support special-status plant species.	**BIO-IAMF#1:** Designate Project Biologist, Designated Biologists, Species-Specific Biological Monitors and General Biological Monitors	Potentially Significant	**BIO-MM#1:** Conduct Presence/Absence Pre-Construction Surveys for Special-Status Plant Species and Special-Status Plant Communities	Less than significant for all B-P Build Alternatives (including both CCNM Design Options)
	BIO-IAMF#3: Prepare WEAP Training Materials and Conduct Construction Period WEAP Training		**BIO-MM#2:** Prepare and Implement Plan for Salvage and Relocation of Special-Status Plant Species	
	BIO-IAMF#5: Prepare and Implement a Biological Resources Management Plan		**BIO-MM#6:** Prepare and Implement a Restoration and Revegetation Plan	
	BIO-IAMF#6: Establish Monofilament Restrictions		**BIO-MM#38:** Compensate for Impacts to Listed Plant Species	
	BIO-IAMF#7: Prevent Entrapment in Construction Materials and Excavations		**BIO-MM#47:** Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resources	
	BIO-IAMF#8: Delineate Equipment Staging Areas and Traffic Routes		**BIO-MM#50:** Implement Measures to Minimize Impacts during Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites	
	BIO-IAMF#9: Dispose of Construction Spoils and Waste		**BIO-MM#53:** Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat	
	BIO-IAMF#10: Clean Construction Equipment		**BIO-MM#55:** Prepare and Implement a Weed Control Plan	
	BIO-IAMF#11: Maintain Construction Sites		**BIO-MM#56:** Conduct Monitoring of Construction Activities	
	HYD-IAMF#1: Stormwater Management		**BIO-MM#58:** Establish Environmentally Sensitive Areas and Non-Disturbance Zones	
	HYD-IAMF#2: Flood Protection		**BIO-MM#61:** Establish and Implement a Compliance Reporting Program	
			BIO-MM#75: Minimize Impacts on Kern Primrose Sphinx Moth Host Plants	
			WQ-MM#3: Tunnel Constructability and Hydrogeological Monitoring	

Impact	Impact Avoidance, Minimization Features	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
Special-Status Wildlife Species				
BIO #2: Construction of the B-P Build Alternatives would disturb suitable habitat that has the potential to support special-status reptile, amphibian species, and insect species.	**BIO-IAMF#1:** Designate Project Biologist, Designated Biologists, Species-Specific Biological Monitors and General Biological Monitors	Potentially Significant	**BIO-MM#7:** Conduct Pre-construction Surveys for Special-Status Reptile and Amphibian Species	Less than significant for all B-P Build Alternatives (including both CCNM Design Options)
	BIO-IAMF#2: Facilitate Agency Access		**BIO-MM#8:** Implement Avoidance and Minimization Measures for Special-Status Reptile and Amphibian Species	
	BIO-IAMF#3: Prepare WEAP Training Materials and Conduct Construction Period WEAP Training		**BIO-MM#11:** Conduct Surveys for Blunt-Nosed Leopard Lizard	
	BIO-IAMF#4: Conduct Operation and Maintenance Period WEAP Training		**BIO-MM#13:** Implement Avoidance Measures for Blunt-Nosed Leopard Lizard	
	BIO-IAMF#5: Prepare and Implement a Biological Resources Management Plan		**BIO-MM#36:** Install Aprons or Barriers within Security Fencing	
	BIO-IAMF#6: Establish Monofilament Restrictions		**BIO-MM#42:** Provide Compensatory Mitigation for Impacts to Habitat for Blunt-Nosed Leopard Lizard, Tipton Kangaroo Rat, and Nelson's Antelope Squirrel	
	BIO-IAMF#7: Prevent Entrapment in Construction Materials and Excavations		**BIO-MM#47:** Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resources	
	BIO-IAMF#8: Delineate Equipment Staging Areas and Traffic Routes		**BIO-MM#50:** Implement Measures to Minimize Impacts during Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites	
	BIO-IAMF#9: Dispose of Construction Spoils and Waste		**BIO-MM#53:** Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat	
	BIO-IAMF#10: Clean Construction Equipment		**BIO-MM#55:** Prepare and Implement a Weed Control Plan	
	BIO-IAMF#11: Maintain Construction Sites		**BIO-MM#58:** Establish Environmentally Sensitive Areas and Non-Disturbance Zones	
	BIO-IAMF#12: Design the Project to be Bird Safe		**BIO-MM#61:** Establish and Implement a Compliance Reporting Program	
	HYD-IAMF#1: Stormwater Management			
	HYD-IAMF#2: Flood Protection		**BIO-MM#62:** Prepare Plan for Dewatering and Water Diversions	

Impact	Impact Avoidance, Minimization Features	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
			BIO-MM#63: Work Stoppage	
			BIO-MM#65: Conduct Pre-construction Surveys and Monitoring for Bald and Golden Eagles	
			BIO-MM#75: Minimize Impacts on Kern Primrose Sphinx Moth Host Plants	
			BIO-MM#79: Mitigation for Desert Tortoise	
			BIO-MM#80: Conduct Surveys and Implement Avoidance Measures for Crotch Bumblebee	
			BIO-MM#82: Avoid Direct Impacts on Monarch Butterfly Host Plants	
			BIO-MM#83: Provide Compensatory Mitigation for Impacts on Monarch Butterfly Breeding and Foraging Habitat	
			BIO-MM#86: Implement Lighting Minimization Measures During Construction	
			WQ-MM#3: Tunnel Constructability and Hydrogeological Monitoring	
BIO #2: Construction of the B-P Build Alternatives would disturb suitable habitat that has the potential to support special-status bird species (including raptors).	**BIO-IAMF#1:** Designate Project Biologist, Designated Biologists, Species-Specific Biological Monitors and General Biological Monitors	Potentially Significant	**BIO-MM#14:** Conduct Pre-Construction Surveys and Delineate Active Nest Buffers Exclusion Areas for Breeding Birds	Less than significant for all B-P Build Alternatives (including both CCNM Design Options)
	BIO-IAMF#2: Facilitate Agency Access		**BIO-MM#15:** Conduct Pre-Construction Surveys and Monitoring for Raptors	
	BIO-IAMF#3: Prepare WEAP Training Materials and Conduct Construction Period WEAP Training		**BIO-MM#16:** Implement Avoidance Measures for California Condor	
	BIO-IAMF#5: Prepare and Implement a Biological Resources Management Plan		**BIO-MM#17:** Conduct Surveys for Swainson's Hawk Nests and Implement Avoidance and Minimization Measures	
	BIO-IAMF#6: Establish Monofilament Restrictions		**BIO-MM#18:** Implement Avoidance and Minimization Measures for Swainson's Hawk Nests	
	BIO-IAMF#7: Prevent Entrapment in Construction Materials and Excavations		**BIO-MM#20:** Conduct Protocol Surveys for Burrowing Owls	
	BIO-IAMF#8: Delineate Equipment Staging Areas and Traffic Routes		**BIO-MM#21:** Implement Avoidance and Minimization Measures for Burrowing Owl	

Impact	Impact Avoidance, Minimization Features	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
	BIO-IAMF#9: Dispose of Construction Spoils and Waste		**BIO-MM#43:** Provide Compensatory Mitigation for Loss of Swainson's Hawk Nesting Trees and Habitat	
	BIO-IAMF#10: Clean Construction Equipment		**BIO-MM#44:** Provide Compensatory Mitigation for Loss of Active Burrowing Owl Burrows and Habitat	
	BIO-IAMF#11: Maintain Construction Sites		**BIO-MM#47:** Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resources	
	BIO-IAMF#12: Design the Project to be Bird Safe		**BIO-MM#50:** Implement Measures to Minimize Impacts during Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites	
	HYD-IAMF#1: Stormwater Management		**BIO-MM#53:** Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat	
	HYD-IAMF#2: Flood Protection		**BIO-MM#56:** Conduct Monitoring of Construction Activities	
			BIO-MM#58: Establish Environmentally Sensitive Areas and Non-Disturbance Zones	
			BIO-MM#61: Establish and Implement a Compliance Reporting Program	
			BIO-MM#62: Prepare Plan for Dewatering and Water Diversions	
			BIO-MM#63: Work Stoppage	
			BIO-MM#66: Implement Avoidance Measures for Active Eagle Nests	
			BIO-MM#67: Provide Compensatory Mitigation for Loss of Eagle Nests	
			BIO-MM#68: Avoid and Minimize Impacts to White-Tailed Kite	
			BIO-MM#69: Conduct Surveys and Implement Avoidance Measures for Active Tricolored Blackbird Nest Colonies	
			BIO-MM#70: Provide Compensatory Mitigation for Impacts on Tricolored Blackbird Habitat	
			BIO-MM#71: Implement California Condor Avoidance Measures During Helicopter Use	
			BIO-MM#72: Implement Avoidance of Nighttime Light Disturbance for California Condor	
			BIO-MM#74: Implement Bird Nest and Avian Special Status Species Avoidance Measures for Helicopter-Based Construction Activities	

Impact	Impact Avoidance, Minimization Features	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
			BIO-MM#76: Implement Wildlife Rescue Measures	
			BIO-MM#86: Implement Lighting Minimization Measures During Construction	
			WQ-MM#3: Tunnel Constructability and Hydrogeological Monitoring	
BIO #2: Construction of the B-P Build Alternatives would disturb suitable habitat that has the potential to support special-status mammal species.	**BIO-IAMF#1:** Designate Project Biologist, Designated Biologists, Species-Specific Biological Monitors and General Biological Monitors	Potentially Significant	**BIO-MM#22:** Conduct Pre-Construction Surveys for Nelson's Antelope Squirrel, Tipton Kangaroo Rat, Dulzura Pocket Mouse, and Tulare Grasshopper Mouse	Less than significant for all B-P Build Alternatives (including both CCNM Design Options)
	BIO-IAMF#2: Facilitate Agency Access		**BIO-MM#23:** Implement Avoidance and Minimization Measures for Nelson's Antelope Squirrel, Tipton Kangaroo Rat, Dulzura Pocket Mouse, and Tulare Grasshopper Mouse	
	BIO-IAMF#3: Prepare WEAP Training Materials and Conduct Construction Period WEAP Training		**BIO-MM#25:** Conduct Pre-construction Surveys for Special-Status Bat Species	
	BIO-IAMF#5: Prepare and Implement a Biological Resources Management Plan		**BIO-MM#26:** Implement Bat Avoidance and Relocation Measures	
	BIO-IAMF#6: Establish Monofilament Restrictions		**BIO-MM#27:** Implement Bat Exclusion and Deterrence Measures	
	BIO-IAMF#7: Prevent Entrapment in Construction Materials and Excavations		**BIO-MM#28:** Conduct Pre-Construction Surveys for Ringtail and Ringtail Den Sites and Implement Avoidance Measures	
	BIO-IAMF#8: Delineate Equipment Staging Areas and Traffic Routes		**BIO-MM#29:** Conduct Pre-Construction Surveys for American Badger Den Sites and Implement Minimization Measures	
	BIO-IAMF#9: Dispose of Construction Spoils and Waste		**BIO-MM#30:** Conduct Pre-Construction Surveys for San Joaquin Kit Fox	
	BIO-IAMF#10: Clean Construction Equipment		**BIO-MM#31:** Minimize Impacts on San Joaquin Kit Fox	
	BIO-IAMF#11: Maintain Construction Sites		**BIO-MM#36:** Install Aprons or Barriers within Security Fencing	

Impact	Impact Avoidance, Minimization Features	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
	BIO-IAMF#12: Design the Project to Be Bird Safe		**BIO-MM#42:** Provide Compensatory Mitigation for Impacts to Habitat for Blunt-Nosed Leopard Lizard, Tipton Kangaroo Rat, and Nelson's Antelope Squirrel	
	HYD-IAMF#1: Stormwater Management		**BIO-MM#47:** Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resources	
	HYD-IAMF#2: Flood Protection		**BIO-MM#50:** Implement Measures to Minimize Impacts during Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites	
			BIO-MM#53: Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat	
			BIO-MM#56: Conduct Monitoring of Construction Activities	
			BIO-MM#58: Establish Environmentally Sensitive Areas and Non-Disturbance Zones	
			BIO-MM#60: Limit Vehicle Traffic and Construction Site Speeds	
			BIO-MM#61: Establish and Implement a Compliance Reporting Program	
			BIO-MM#62: Prepare Plan for Dewatering and Water Diversions	
			BIO-MM#63: Work Stoppage	
			BIO-MM#76: Implement Wildlife Rescue Measures	
			BIO-MM#77: Implement Wildlife Height Requirements for Enhanced Security Fencing	
			BIO-MM#78: Install Wildlife Jump-Outs	
			BIO-MM#84: Conduct Pre-Construction Surveys and Implement Avoidance and Minimization Measures for Mountain Lion Dens	
			BIO-MM#85: Provide Compensatory Mitigation for Impacts on Mountain Lion Core and Patch Habitat	
			BIO-MM#86: Implement Lighting Minimization Measures During Construction	
			WQ-MM#3: Tunnel Constructability and Hydrogeological Monitoring	

Impact	Impact Avoidance, Minimization Features	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
Habitats of Concern				
Special-Status Plant Communities				
BIO #3: Construction of the B-P Build Alternatives would disturb special-status plant communities and riparian areas.	**BIO-IAMF#1:** Designate Project Biologist, Designated Biologists, Species-Specific Biological Monitors and General Biological Monitors	Potentially Significant	**BIO-MM#1:** Conduct Presence/Absence Pre-Construction Surveys for Special-Status Plant Species and Special-Status Plant Communities	Less than significant for all B-P Build Alternatives (including both CCNM Design Options)
	BIO-IAMF#3: Prepare WEAP Training Materials and Conduct Construction Period WEAP Training		**BIO-MM#6:** Prepare and Implement a Restoration and Revegetation Plan	
	BIO-IAMF#5: Prepare and Implement a Biological Resources Management Plan		**BIO-MM#47:** Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resources	
	BIO-IAMF#6: Establish Monofilament Restrictions		**BIO-MM#50:** Implement Measures to Minimize Impacts during Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites	
	BIO-IAMF#7: Prevent Entrapment in Construction Materials and Excavations		**BIO-MM#53:** Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat	
	BIO-IAMF#9 Dispose of Construction Spoils and Waste		**BIO-MM#54:** Prepare and Implement an Annual Vegetation Control Plan	
			BIO-MM#58: Establish Environmentally Sensitive Areas and Non-Disturbance Zones	
			BIO-MM#61: Establish and Implement a Compliance Reporting Program	
			BIO-MM#75: Minimize Impacts on Kern Primrose Sphinx Moth Host Plants	
			WQ-MM#3: Tunnel Constructability and Hydrogeological Monitoring	

Impact	Impact Avoidance, Minimization Features	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
Aquatic Resources				
BIO #4: Construction of the B-P Build Alternatives would have direct and indirect impacts on aquatic resources.	**BIO-IAMF#3:** Prepare WEAP Training Materials and Conduct Construction Period WEAP Training	Potentially Significant	**BIO-MM#6:** Prepare and Implement a Restoration and Revegetation Plan	Less than significant for all B-P Build Alternatives (including both CCNM Design Options)
	BIO-IAMF#5: Prepare and Implement a Biological Resources Management Plan		**BIO-MM#33:** Restore Aquatic Resources Subject to Temporary Impacts	
	BIO-IAMF#9: Dispose of Construction Spoils and Waste		**BIO-MM#34:** Monitor Construction Activities within Aquatic Resources	
	HYD-IAMF#1: Stormwater Management		**BIO-MM#47:** Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resources	
	HYD-IAMF#2: Flood Protection		**BIO-MM#50:** Implement Measures to Minimize Impacts during Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites	
			BIO-MM#58: Establish Environmentally Sensitive Areas and Non-Disturbance Zones	
			BIO-MM#61: Establish and Implement a Compliance Reporting Program	
			BIO-MM#62: Prepare Plan for Dewatering and Water Diversions	
			WQ-MM#3: Tunnel Constructability and Hydrogeological Monitoring	
Wildlife Movement Corridors				
BIO #5: Construction impacts from the B-P Build Alternatives would temporarily reduce the functionality of wildlife movement corridors and habitat linkages.	**BIO-IAMF#1:** Designate Project Biologist, Designated Biologists, Species-Specific Biological Monitors and General Biological Monitors	Potentially Significant	**BIO-MM#36:** Install Aprons or Barriers within Security Fencing	Less than significant for all B-P Build Alternatives (including both CCNM Design Options)
	BIO-IAMF#7: Prevent Entrapment in Construction Materials and Excavations		**BIO-MM#37:** Minimize Effects on Wildlife Movement Corridors During Construction	
	BIO-IAMF#8: Delineate Equipment Staging Areas and Traffic Routes		**BIO-MM#50** Implement Measures to Minimize Impacts during Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites	
	HYD-IAMF#1: Stormwater Management		**BIO-MM#56:** Conduct Monitoring of Construction Activities	
	HYD-IAMF#2: Flood Protection		**BIO-MM#64:** Establish Wildlife Crossings	

Impact	Impact Avoidance, Minimization Features	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
			BIO-MM#42: Provide Compensatory Mitigation for Impacts to Habitat for Blunt-Nosed Leopard Lizard, Tipton Kangaroo Rat, and Nelson's Antelope Squirrel	
			BIO-MM#77: Implement Wildlife Height Requirements for Enhanced Security Fencing	
			BIO-MM#78: Install Wildlife Jump-outs	
			BIO-MM#86: Implement Lighting Minimization Measures During Construction	
Protected Trees				
BIO #6: Construction impacts from the B-P Build Alternatives would temporarily affect protected trees.	**BIO-IAMF#1:** Designate Project Biologist, Designated Biologists, Species-Specific Biological Monitors and General Biological Monitors	Potentially Significant	**BIO-MM#35:** Implement Transplantation and Compensatory Mitigation Measures for Protected Trees	Less than significant for all B-P Build Alternatives (including both CCNM Design Options)
	BIO-IAMF#7: Prevent Entrapment in Construction Materials and Excavations		**BIO-MM#50:** Implement Measures to Minimize Impacts during Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites	
	BIO-IAMF#11: Maintain Construction Sites		**BIO-MM#56:** Conduct Monitoring of Construction Activities	
	HYD-IAMF#1: Stormwater Management		**BIO-MM#58:** Establish Environmentally Sensitive Areas and Non-Disturbance Zones	
	HYD-IAMF#2: Flood Protection		**BIO-MM#61:** Establish and Implement a Compliance Reporting Program	
			WQ-MM#3: Tunnel Constructability and Hydrogeological Monitoring	

Impact	Impact Avoidance, Minimization Features	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
Operation				
Special-Status Plant Species				
BIO #7: Project impacts from the B-P Build Alternatives would directly or indirectly impact suitable habitat that has the potential to support special-status plant species.	**BIO-IAMF#4:** Conduct Operation and Maintenance Period WEAP Training	Potentially Significant	**BIO-MM#6:** Prepare and Implement a Restoration and Revegetation Plan	Less than significant for all B-P Build Alternatives (including both CCNM Design Options)
	HYD-IAMF#1: Stormwater Management		**BIO-MM#50:** Implement Measures to Minimize Impacts During Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites	
	HYD-IAMF#2: Flood Protection		**BIO-MM#53:** Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat	
			BIO-MM#54: Prepare and Implement an Annual Vegetation Control Plan	
			BIO-MM#60: Limit Vehicle Traffic and Construction Site Speeds	
Special-Status Wildlife Species				
BIO #8: Project impacts from the B-P Build Alternatives would disturb suitable habitat that has the potential to support special-status reptile, amphibian, and insect species.	**BIO-IAMF#4:** Conduct Operation and Maintenance Period WEAP Training	Potentially Significant	**BIO-MM#36:** Install Aprons or Barriers within Security Fencing	Less than significant for all B-P Build Alternatives (including both CCNM Design Options)
	HYD-IAMF#1: Stormwater Management		**BIO-MM#42:** Provide Compensatory Mitigation for Impacts to Habitat for Blunt-Nosed Leopard Lizard, Tipton Kangaroo Rat, and Nelson's Antelope Squirrel	
	HYD-IAMF#2: Flood Protection		**BIO-MM#47:** Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resources	
			BIO-MM#50: Implement Measures to Minimize Impacts during Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites	
			BIO-MM#53: Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat	
			BIO-MM#79: Mitigation for Desert Tortoise **BIO-MM#81:** Provide Compensatory Mitigation for Impacts to Crotch Bumblebee	
			BIO-MM#83: Provide Compensatory Mitigation for Impacts on Monarch Butterfly Breeding and Foraging Habitat	
			BIO-MM#87: Implement Lighting Minimization Measures for Operations	

Impact	Impact Avoidance, Minimization Features	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
BIO #8: Project impacts from the B-P Build Alternatives would permanently impact suitable habitat that has the potential to support special-status bird species.	**BIO-IAMF#4:** Conduct Operation and Maintenance Period WEAP Training	Potentially Significant	**BIO-MM#43:** Provide Compensatory Mitigation for Loss of Swainson's Hawk Nesting Trees and Habitat	Less than significant for all B-P Build Alternatives (including both CCNM Design Options)
	HYD-IAMF#1: Stormwater Management		**BIO-MM#44:** Provide Compensatory Mitigation for Loss of Active Burrowing Owl Burrows and Habitat	
	HYD-IAMF#2: Flood Protection		**BIO-MM#47:** Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resources	
			BIO-MM#50: Implement Measures to Minimize Impacts during Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites	
			BIO-MM#53: Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat	
			BIO-MM#67: Provide Compensatory Mitigation for Loss of Eagle Nests	
			BIO-MM#70: Provide Compensatory Mitigation for Impacts on Tricolored Blackbird Habitat	
			BIO-MM#71: Implement California Condor Avoidance Measures During Helicopter Use	
			BIO-MM#73: Implement Removal of Carrion that may Attract Condors and Eagles	
			BIO-MM#76: Implement Wildlife Rescue Measures	
			BIO-MM#87: Implement Lighting Minimization Measures for Operations	

Impact	Impact Avoidance, Minimization Features	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
BIO #8: Project impacts from the B-P Build Alternatives would permanently impact suitable habitat that has the potential to support special-status mammal species.	**BIO-IAMF#4:** Conduct Operation and Maintenance Period WEAP Training	Potentially Significant	**BIO-MM#36:** Install Aprons or Barriers within Security Fencing	Less than significant for all B-P Build Alternatives (including both CCNM Design Options)
	HYD-IAMF#1: Stormwater Management		**BIO-MM#42:** Provide Compensatory Mitigation for Impacts to Habitat for Blunt-Nosed Leopard Lizard, Tipton Kangaroo Rat, and Nelson's Antelope Squirrel	
	HYD-IAMF#2: Flood Protection		**BIO-MM#45:** Provide Compensatory Mitigation for Impacts to San Joaquin Kit Fox Habitat	
			BIO-MM#47: Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resources	
			BIO-MM#50: Implement Measures to Minimize Impacts During Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites	
			BIO-MM#53: Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat	
			BIO-MM#64: Establish Wildlife Crossings	
			BIO-MM#76: Implement Wildlife Rescue Measures	
			BIO-MM#77: Implement Wildlife Height Requirements for Enhanced Security Fencing	
			BIO-MM#78: Install Wildlife Jump-outs	
			BIO-MM#85: Provide Compensatory Mitigation for Impacts on Mountain Lion Core and Patch Habitat	
			BIO-MM#87: Implement Lighting Minimization Measures for Operations	

Impact	Impact Avoidance, Minimization Features	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
Habitats of Concern				
Special-Status Plant Communities				
BIO #9: Project impacts from the B-P Build Alternatives would permanently impact special-status plant communities and riparian areas.	**BIO-IAMF#4:** Conduct Operation and Maintenance Period WEAP Training	Potentially Significant	**BIO-MM#6:** Prepare and Implement a Restoration and Revegetation Plan	Less than significant for all B-P Build Alternatives (including both CCNM Design Options)
	HYD-IAMF#1: Stormwater Management		**BIO-MM#32:** Restore Temporary Riparian Habitat Impacts	
	HYD-IAMF#2: Flood Protection		**BIO-MM#46:** Provide Compensatory Mitigation for Permanent Impacts to Riparian Habitat	
			BIO-MM#47: Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resources	
			BIO-MM#50: Implement Measures to Minimize Impacts during Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites	
			BIO-MM#53: Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat	
			BIO-MM#54: Prepare and Implement an Annual Vegetation Control Plan	
Aquatic Resources				
BIO #10: Project impacts from the B-P Build Alternatives would permanently affect aquatic resources.	**BIO-IAMF#4:** Conduct Operation and Maintenance Period WEAP Training	Potentially Significant	**BIO-MM#6:** Prepare and Implement a Restoration and Revegetation Plan	Less than significant for all B-P Build Alternatives (including both CCNM Design Options)
	HYD-IAMF#1: Stormwater Management		**BIO-MM#33:** Restore Aquatic Resources Subject to Temporary Impacts	
	HYD-IAMF#2: Flood Protection		**BIO-MM#47:** Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resources	
			BIO-MM#50: Implement Measures to Minimize Impacts during Offsite Habitat Restoration	
			BIO-MM#58: Establish Environmentally Sensitive Areas and Non-Disturbance Zones, Enhancement, or Creation on Mitigation Sites	

Impact	Impact Avoidance, Minimization Features	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
Wildlife Movement Corridors				
BIO #11: Project impacts from the B-P Build Alternatives would permanently reduce the functionality of wildlife movement corridors and habitat linkages.	**BIO-IAMF#4:** Conduct Operation and Maintenance Period WEAP Training	Potentially Significant	**BIO-MM#64:** Establish Wildlife Crossings	Less than significant for all B-P Build Alternatives (including both CCNM Design Options)
	HYD-IAMF#1: Stormwater Management		**BIO-MM#76:** Implement Wildlife Rescue Measures	
	HYD-IAMF#2: Flood Protection		**BIO-MM#77:** Implement Wildlife Height Requirements for Enhanced Security Fencing	
			BIO-MM#78: Install Wildlife Jump-Outs	
			BIO-MM#87: Implement Lighting Minimization Measures for Operations	
Protected Trees				
BIO #12: Project impacts from the B-P Build Alternatives would permanently affect protected trees.	**BIO-IAMF#4:** Conduct Operation and Maintenance Period WEAP Training	Potentially Significant	**BIO-MM#35:** Implement Transplantation and Compensatory Mitigation Measures for Protected Trees	Less than significant for all B-P Build Alternatives (including both CCNM Design Options)
	HYD-IAMF#1: Stormwater Management		**BIO-MM#50:** Implement Measures to Minimize Impacts during Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites	
	HYD-IAMF#2: Flood Protection			

Source: California High-Speed Rail Authority, 2018a
B-P = Bakersfield to Palmdale Project Section
CCNM = César E. Chávez National Monument
WEAP = Worker Environmental Awareness Program