
SR-12 Comprehensive Corridor Evaluation
and Corridor Management Plan,
From I-80 to I-5

Final Environmental Resources Scan

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Final Environmental Resources Scan

Executive Summary

Purpose of Study

SR-12 passes through four counties (Napa, Solano, Sacramento, and San Joaquin); three Caltrans Districts (4, 3, and 10); developed areas including Suisun City, Fairfield, and Rio Vista; rural communities, farmlands, and portions of the Delta. The 53-mile, multi-jurisdictional corridor also passes through three Metropolitan Planning Organizations (MPOs): the Metropolitan Transportation Commission (MTC), the Sacramento Area Council of Governments (SACOG), and the San Joaquin Council of Governments (SJCOG). The corridor also lies within the jurisdiction of the Napa County Transportation and Planning Agency (NCTPA) and the Solano Transportation Authority (STA). As such, the corridor impacts the daily lives of many interested stakeholders.

SR-12 supports interregional, recreational, commuter, agricultural, and military traffic between the Bay Area and the San Joaquin Valley. SR-12 is important for recreational travelers destined for Napa, Solano, and Sonoma Counties, as well as the Delta. It also serves as a commute corridor and a key interregional goods movement corridor because of its direct access to I-80, I-5, and Travis Air Force Base.

The purpose of this environmental resources scan is to provide a high-level overview of known environmental resources and potential constraints on the development of transportation improvement strategies in the corridor. It is not meant to be an all-inclusive analysis of all the resources in the corridor. This environmental scan relies on information from GIS and resource agency databases, a review of aerial photography, and existing environmental documentation for recently approved projects in the corridor. Information on environmental resources in the portion of the corridor between SR-29 and I-80 can be found in the Initial Study/Environmental Assessment (IS/EA) prepared for the Jameson Canyon Project.¹ The IS/EA for the Jameson Canyon is incorporated by reference and is not repeated here.

Stakeholder Participation in the Study

Extensive stakeholder coordination is an essential element of the study to gain input, reviews, and concurrence at key milestones of this study. There are four stakeholder groups assembled to serve in distinct roles to assure that all elements of the study receive interjurisdictional and public scrutiny. These stakeholder groups are:

- Project Development Team (PDT): comprised of professional staff from Caltrans Districts, MPOs, Counties, and the study consultant team, meeting monthly to direct and guide the study, and responsible for review of all work plans and products;

¹ *State Route 12 Jameson Canyon Road Widening & State Routes 29/12 Interchange Project Initial Study-Mitigated Negative Declaration (CEQA) and Environmental Assessment with Finding of No Significant Impact (NEPA) (January 2008).*

- Technical Advisory Group (TAG): comprised of executives from transportation agencies, city engineers, safety officers and highway patrol, transit agencies, ports, and regulatory agencies, meeting periodically at major study milestones to provide input and guidance;
- Corridor Stakeholders: organized groups with a special interest in the corridor, such as air quality officials, civic and environmental groups, downtown associations, private developers, and pedestrian and bicycle advocates, who are briefed by the PDT at major study milestones and asked to provide input; and
- Public: all citizens interested in the corridor, who are invited to attend open-house forums to review major study work products, ask questions, and provide input.

Key Issues

As described in this environmental resources scan, the SR-12 corridor passes through an area containing considerable environmental constraints, including human, natural, and physical. Each of these constrains has the potential to limit the range of alternative transportation improvements available for implementation in the corridor. This limitation is primarily due to potential constraints on the acquisition of new right-of-way from sensitive and protected land uses. Such constraints could include:

- **Threatened and Endangered Species:** 30 state- or federally-listed threatened or endangered species have the potential to occur in the corridor. Approval of transportation projects would require extensive coordination (consultation) with the U.S. Fish and Wildlife Service (USFWS) and/or the California Department of Fish and Game (CDFG). This coordination effort could have adverse effects on schedules and costs.
- **Critical Habitat:** Portions of the corridor have been designated critical habitat for delta smelt, delta green beetle, vernal pool fairy shrimp, vernal pool tadpole shrimp, California tiger salamander, and Contra Costa goldfields. Work in proximity to these areas could be subject to coordination with the U.S. Fish and Wildlife Service and/or National Oceanic and Atmospheric Administration (NOAA) Fisheries.
- **Wetlands and Waters of the U.S.:** Wetland types that exist along the corridor include vernal pools (potential endangered species habitat), seasonal wetlands, freshwater marsh, saline/alkaline marsh, riverine (rivers, creeks and streams), and irrigation canals. Wetlands and waters of the U.S. are protected under Sections 401 and 404 of the Federal Clean Water Act (CWA), which are administered, by the Regional Water Quality Control Board (RWQCB) and U.S. Army Corps of Engineers (USACE) respectively. Lakes, streams, and rivers receive additional protection under Sections 1600-1616 of the California Fish and Game Code that is administered by the California Department of Fish and Game (CDFG). If these wetlands and other waters cannot be avoided, then a permit under CWA Section 404 from USACE and a Water Quality Certification from the RWQCB must be obtained prior to any disturbance of the wetland or other water of the U.S. If the wetland feature is a stream or lake, then a Streambed Alteration Agreement from the CDFG must be obtained prior to any disturbance.
- **Farmlands:** The majority of the corridor in Sacramento and San Joaquin counties passes through lands designated as Prime Farmland by the Farmland Mapping and Monitoring Program. Federal acquisition of right-of-way in this portion of the corridor could require coordination with the Natural Resources Conservation Service (NRCS). The SR-12 corridor also passes through, or runs adjacent to properties that are under active Williamson Act contracts. Acquiring the land under contract, or portions of the land, would require contract cancellation. Specific findings would be required that there are no proximate non-contracted lands available and suitable for the proposed use or, that development of the contracted land would provide more contiguous patterns of urban development.
- **Protected Areas:** Protected areas in the corridor include the Suisun Marsh, parks, managed wildlife areas, and preserves. These areas are potential Section 4(f) resources. Federally-funded transportation projects that require the acquisition of right-of-way from these areas would require long lead time to demonstrate that there is no prudent and

feasible alternative to the acquisition. In addition, work in the Primary Management Area of the Suisun Marsh could be subject to BCDC approval.

Projects that do require right-of-way acquisition will require extensive coordination with the appropriate agencies during the planning and environmental phases of project development to demonstrate that all efforts have been made to avoid and minimize such acquisitions. This coordination must be taken into account when determining the schedules for the planning (project initiation documents such as Project Study Reports [PSRs], project approval/environmental document [PA/ED]), design, and construction phases of projects in the corridor. The environmental constraints in the corridor may also have a significant effect on project costs. Costs could escalate due to the requirement for the development and implementation of appropriate mitigations measures; project design requirements and/or construction techniques to avoid impacts; and/or construction timing restrictions imposed by permitting agencies.

Roadway improvements in the corridor would also be subject to a variety of state and federal environmental laws and regulations. These laws and regulations are summarized in Exhibit 1. It should be noted that the list in Exhibit 1 is not an exhaustive list of all regulations that may apply to projects in the corridor; rather the list includes regulations more commonly associated with roadway projects and/or regulations that typically have an adverse effect on project schedules.

Exhibit 1: State and Federal Environmental Regulations

Regulation	Lead Agency/Permitting Agency	Action Required
National Environmental Policy Act (NEPA)	Caltrans (as assigned by the Federal Highway Administration [FHWA])	Documentation required for Federal Actions (Categorical Exclusion, Environmental Assessment/Finding of No Significant Impact, or Environmental Impact Statement)
California Environmental Quality Act (CEQA)	Caltrans	Documentation Required for State and Local Actions (Categorical/Statutory Exemption, Initial Study/Negative Declaration, or Environmental Impact Report)
Clean Water Act (Section 401 – 404)	U.S. Army Corps of Engineers (Corps)/State Water Quality Control Board (SWRCB)	Permit for Discharge of Fill into Waters of the U.S., Compliance with National Pollutant Discharge Elimination System (NPDES) Program
The Executive Order 11990 for the Protection of Wetlands	Caltrans as delegated by FHWA	FHWA cannot undertake or provide assistance for new construction located in wetlands unless it can be determined that there is no practicable alternative to the construction and the proposed project includes all practicable measures to minimize harm
Rivers and Harbors Act (Sections 9 and 10)	U.S. Army Corps of Engineers/U.S. Coast Guard	Permit for work in Navigable Waters
NEPA/404 Memorandum of Understanding	Caltrans (as delegated by FHWA), Corps, U.S. Environmental Protection Agency (EPA), U.S. Fish and Wildlife Service (USFWS)	For projects that require an EIS and have five or more acres of permanent impact to Waters of the U.S.; coordination is required at three checkpoints: 1) purpose and need, 2) identification of range of alternatives, and 3) preliminary determination of the least environmentally damaging practicable alternative (LEDPA) and conceptual mitigation plan.
Federal Endangered Species Act	U.S. Fish and Wildlife Service and National Oceanic and Atmospheric Administration (NOAA) Fisheries	Section 7 consultation required for projects that may impact Endangered Species
California Endangered Species Act	California Department of Fish and Game	Regulatory responsibility for the protection of special-status species

Exhibit 1: State and Federal Environmental Regulations

Regulation	Lead Agency/Permitting Agency	Action Required
National Historic Preservation Act of 1966	Advisory Council on Historic Preservation	Section 106 evaluation of historic resources
Suisun Marsh Protection Act	Bay Conservation and Development Commission	Permits for impacts to the Suisun Marsh Primary Protection Area
Farmland Protection Policy Act	FHWA and Natural Resources Conservation Service (NRCS)	Coordination required for federal actions that may convert farmland to nonagricultural uses
Executive Order 12898 regarding Environmental Justice in Minority Populations and Low-Income Populations	Caltrans, as delegated by FHWA	Federal agencies must identify and address disproportionately high and adverse effects of federal projects on the health or environment of minority and low-income populations
Clean Air Act	FHWA	Federal projects must conform with State Implementation Plans for achieving the goals of the Clean Air Act
Department of Transportation Act of 1966	Caltrans, as delegated by FHWA	Regulate federal actions under Section 4(f) regarding the use of land from publicly owned parks, recreational areas, wildlife and waterfowl refuges, or public and private historical sites

In addition to the above-described regulations, all environmental documents prepared for projects in the corridor under the direction of Caltrans must comply with the Caltrans Standard Environmental Reference (SER).

As described in this environmental resources scan, the SR-12 corridor passes through an area containing considerable environmental constraints, including human, natural, and physical. Each of these constrains has the potential to limit the range of alternative transportation improvements available for implementation in the corridor. This limitation is primarily due to potential constraints on the acquisition of new right-of-way from sensitive and protected land uses.

Any projects that do require right-of-way acquisition will require extensive coordination with the appropriate agencies during the planning and environmental phases of project development to demonstrate that all efforts have been made to avoid and minimize such acquisitions. This coordination must be taken into account when determining the schedules for the planning (project initiation documents, project approval/environmental document [PA/ED]), design, and construction phases of projects in the corridor. The environmental constraints in the corridor may also have a significant effect on project costs. Costs could escalate due to the requirement for the development and implementation of appropriate mitigations measures; project design requirements and/or construction techniques to avoid impacts; and/or construction timing restrictions imposed by permitting agencies.

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Environmental Resources in the Corridor

This section of the environmental scan describes the known environmental resources and potential constraints in the corridor. As described above, it is not meant to be an all-inclusive analysis of all the resources in the corridor. Rather is it an overview of environmental concerns that will affect the range and design of future transportation projects in the corridor. The level of detail provided per resource reflects the potential effect the resource is anticipated to have on schedule and cost of transportation improvements in the corridor.

Biological Resources

Wetlands and Waters of the U.S.

Wetlands and waters of the U.S. are protected under Sections 401 and 404 of the Federal Clean Water Act (CWA), which are administered, by the Regional Water Quality Control Board (RWQCB) and U.S. Army Corps of Engineers (USACE) respectively. Lakes, streams and rivers receive additional protection under Sections 1600-1616 of the California Fish and Game Code that is administered by the California Department of Fish and Game (CDFG). To the extent feasible, projects in the corridor should be designed such that all encroachment of any wetlands or waters of the U.S. are avoided. If these wetlands and other waters cannot be avoided, then a permit under CWA Section 404 from USACE and a Water Quality Certification from the RWQCB must be obtained prior to any disturbance of the wetland or other water of the U.S. Additionally, any wetland features that do not fall under USACE jurisdiction still may receive protection from the RWQCB under the Porter-Cologne Act, California Code of Regulations Section 3831(k), and California Wetlands Conservation Policy. Finally, if the wetland feature is a stream or lake, then a Streambed Alteration Agreement from the CDFG must be obtained prior to any disturbance within the stream zone.

The assessment of wetland resources along the SR-12 alignment for this document was conducted through the review of aerial photography of the alignment, along with GIS wetland data for the region, as well as review of data from previous reports for other projects along the alignment. No field visits were conducted as a part of this analysis. Wetland types that exist along the corridor include vernal pools (potential endangered species habitat), seasonal wetlands, freshwater marsh, saline/alkaline marsh, riverine (rivers, creeks and streams), and irrigation canals. General locations of these wetland/waters types are shown in Exhibit 2.

Vernal pools and other seasonal wetlands are primarily restricted to the portion of the alignment west of Rio Vista, with the highest concentration between SR-113 and Suisun City. These features occur in relatively undisturbed grassland habitat, but may persist in areas with historic disturbance such as along roadsides and rail alignments, and in fallow agricultural fields.

Freshwater marsh occurs at various locations along the corridor, and is typically associated with streams, rivers and sloughs crossing the corridor, but also occur in association with irrigation canals and reservoirs. While some freshwater marsh occurs in channels west of the Sacramento River, the greatest concentration of this habitat along the corridor occurs east of the Sacramento River with notable examples along Jackson Slough and in irrigation canals between Guard Road and I-5.

Saline/Alkaline marsh habitat appears to be restricted to the western portion of the alignment, west of Denverton Road, through Suisun City. The salinity and/or alkalinity of this habitat limits plant species to those tolerant to saline or alkaline conditions such as saltgrass (*Distichlis spicata*), pickleweed (*Salicornia virginica*), and alkali heath (*Frankenia salina*). This habitat also supports a variety of special-status plant and wildlife species (see below).

Riverine habitat along the corridor includes major waterways that cross the alignment such as the Sacramento River, Jackson Slough, Little Potato Slough, and the South Mokelumne River, but also includes the smaller drainages, canals and sloughs present there. These waters occur at various locations along the corridor, but are most extensive east of the Sacramento River.

Irrigation Canals are most abundant east of the Sacramento River, where agricultural land uses dominate, though some are present between Rio Vista and SR-113. These features can be both seasonal and perennial, and can fall under the justification of USACE, RWQCB, and/or CDFG depending on the source of the water, where it flows to, and what type of vegetation is associated with it. Although usually artificial in origin, irrigation canals can provide important habitat for a variety of special-status species, as discussed in the next section.

Further studies will need to be conducted to determine the acreage of those wetlands that could be affected by projects in the corridor. This would include the review of any previous wetland delineations that may be available, or the preparation of project-specific wetland delineation reports. This report would need to be submitted to the Corps for verification before any permitting can be initiated. In the event that any of these wetlands would be affected by the construction of proposed improvements, coordination between USACE, RWQCB, and CDFG will be necessary.

Threatened and Endangered Species

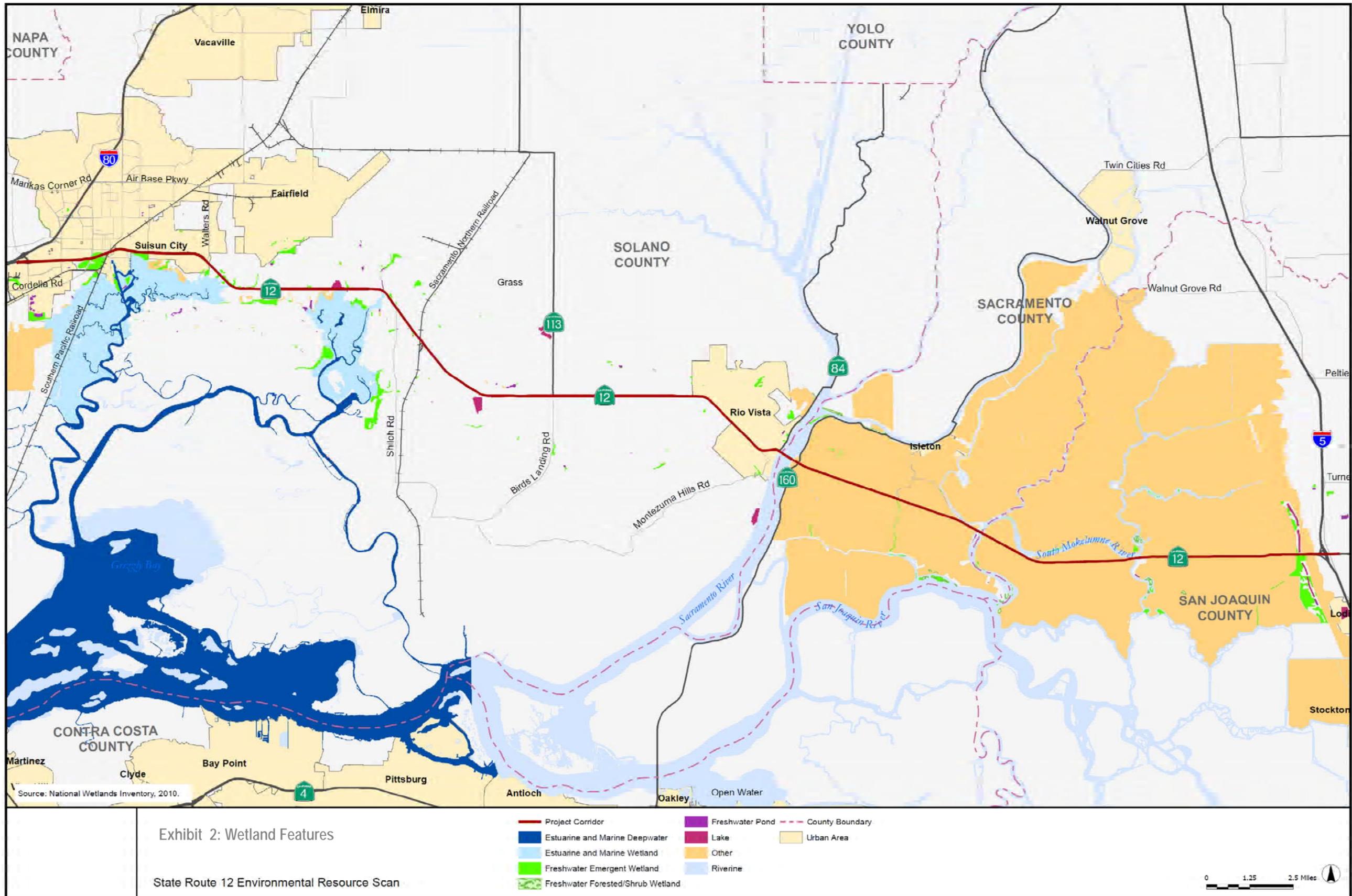
Habitats in the corridor consist of urban (developed and/or landscaped), non-native annual grassland, vernal pool grasslands, alkaline seasonal wetlands, freshwater marsh, saline/alkaline marsh, riparian, agricultural (row crops), and agricultural (orchards). These habitats potentially support a variety of plant and wildlife species known from the region that are protected under either the California Endangered Species Act (CESA), and/or the Federal Endangered Species Act (FESA). Disturbance to the habitat of these species, or activities that result in the loss of any individuals of these species is prohibited without prior approval from U.S. Fish and Wildlife Service (USFWS) or CDFG. To the extent feasible, projects in the corridor should be designed such that all encroachment on habitat for any of these species is avoided. If habitat for any of these threatened or endangered species cannot be avoided, then a permit under either CESA or FESA (or both) must be obtained prior to any disturbance. Other permitting regulations/mechanisms that provide protection for threatened or endangered species include the San Joaquin County Multi-species Habitat Conservation and Open Space Plan (SJMSCP), Delta Protection Act, the as yet to be adopted Solano Habitat Conservation Plan, and the McAteer-Petris Act and Suisun Marsh Preservation Act.

Based on a queries of the California Natural Diversity Database (CNDDDB), and the USFWS online threatened and endangered species database for the Fairfield North, Fairfield South, Denverton, Bird's Landing, Rio Vista, Isleton, Bouldin Island, Terminus, and Thornton USGS 7.5 minute quadrangles, a total of 30 state or federally listed as threatened or endangered species have the potential to occur in the region surrounding the alignment. This total includes 6 plants, 7 invertebrates, 5 fish, two amphibians, one reptile, 7 birds, and two mammals. These species are listed below. General regions along the corridor where the species on this list have been recorded to occur are shown in Exhibit 3

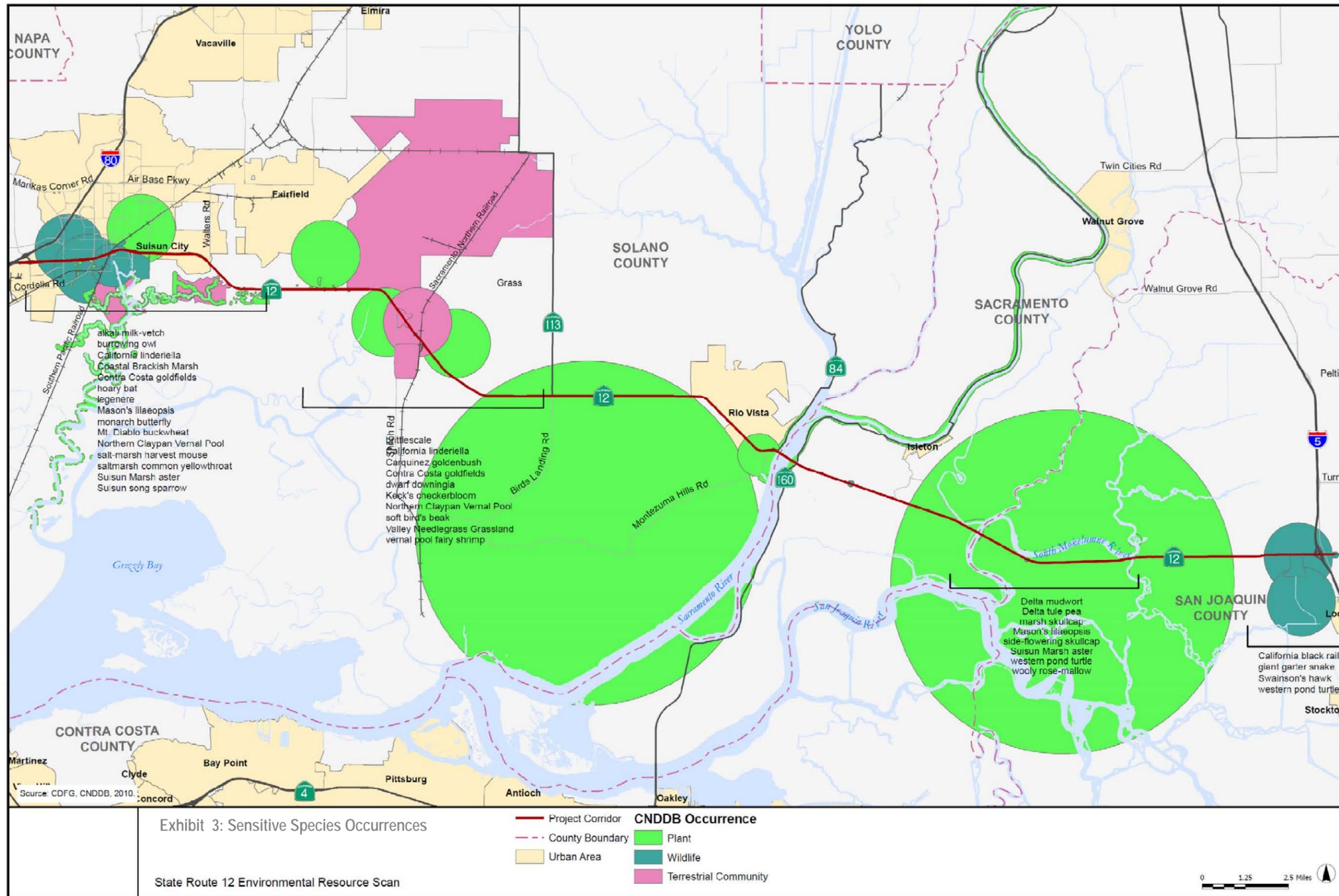
Exhibit 4 tabulates the results of the CNDDDB and USFWS database queries for species listed under the state or federal endangered species acts as threatened or endangered.

No impacts would occur on any of the following threatened or endangered species as either they do not have suitable habitat along the corridor, or the corridor is not included within the known range of these species. These species include Keck's checkerbloom, California freshwater shrimp, Callippe silverspot butterfly, California red-legged frog, California clapper rail, mountain plover, California brown pelican, northern spotted owl, California least tern, and riparian brush rabbit.

The remaining species on the above list are known to occur in the vicinity of the corridor, and have suitable habitat along or near the corridor. Further investigations would need to be conducted to determine if habitat for any of these species is occupied by those species, and if so, would the project have any potential to affect those species or their habitat. Habitats present along the corridor that could support these species include vernal pools, seasonal wetlands, freshwater marsh, saline/alkaline marsh, riparian, riverine aquatic, irrigation canals, annual grassland, and agricultural fields.



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Exhibit 4: State or Federal Threatened and Endangered Species

Plants	
Showy Rancharia clover (<i>Trifolium amoenum</i>)	Suisun thistle (<i>Cirsium hydrophilum</i> var. <i>hydrophilum</i>) (species and its proposed critical habitat)
Mason's lilaeopsis (<i>Lilaeopsis masonii</i>)	Keck's checkerbloom (<i>Sidalcea keckii</i>)
Contra Costa goldfields (<i>Lasthenia conjugens</i>) (species and its critical habitat)	Soft bird's-beak (<i>Cordylanthus mollis</i> ssp. <i>mollis</i>) (species and its proposed critical habitat)
Invertebrates	
Vernal pool tadpole shrimp (<i>Lepidurus packardii</i>) (species and its critical habitat)	Valley elderberry longhorn beetle (<i>Desmocerus californicus dimorphus</i>)
Delta green ground beetle (<i>Elaphrus viridis</i>) (species and its critical habitat)	Vernal pool fairy shrimp (<i>Branchinecta lynchi</i>) (species and its critical habitat)
Conservancy fairy shrimp (<i>Branchinecta conservatio</i>) (species and its critical habitat)	Callippe silverspot butterfly (<i>Speyeria callippe callippe</i>)
California freshwater shrimp (<i>Syncaris pacifica</i>)	
Fish	
Delta smelt (<i>Hypomesus transpacificus</i>) (species and its critical habitat)	Green sturgeon (<i>Acipenser medirostris</i>)
Central Valley steelhead (<i>Oncorhynchus mykiss</i>) (species and its critical habitat)	Central Valley spring-run Chinook salmon (<i>Oncorhynchus tshawytscha</i>) (species and its critical habitat)
winter-run Chinook salmon, Sacramento River (<i>Oncorhynchus tshawytscha</i>) (species and its critical habitat)	
Amphibians	
California tiger salamander (<i>Ambystoma californiense</i>) (species and its critical habitat)	California red-legged frog (<i>Rana draytonii</i>) (species and its critical habitat)
Reptiles	
Giant garter snake (<i>Thamnophis gigas</i>)	
Birds	
California clapper rail (<i>Rallus longirostris obsoletus</i>)	California black rail (<i>Laterallus jamaicensis coturniculus</i>)
Mountain plover (<i>Charadrius montanus</i>)	Swainson's hawk (<i>Buteo swainsoni</i>)
California brown pelican (<i>Pelecanus occidentalis californicus</i>)	California least tern (<i>Sternula antillarum</i> (=Sterna, =albifrons) browni)
Northern spotted owl (<i>Strix occidentalis caurina</i>)	
Mammals	
Salt-marsh harvest mouse (<i>Reithrodontomys raviventris</i>)	Riparian brush rabbit (<i>Sylvilagus bachmani riparius</i>)

Source: CNDDDB and USFWS, 2011.

As stated previously in the wetlands section, vernal pools and other seasonal wetlands are primarily restricted to the portion of the alignment west of Rio Vista, with the highest concentration between SR-113 and Suisun City. These habitats support a variety of special-status plants and wildlife including Contra Costa goldfields, vernal pool fairy shrimp, vernal pool tadpole shrimp, Conservancy fairy shrimp, delta green ground beetle, and California tiger salamander.

Freshwater marsh occurs at various locations along the corridor as described in the wetlands section above. Threatened or endangered species that may occur in this habitat include giant garter snake and black rail. Black rail could occur in any suitable habitat along the corridor. Giant garter snake is restricted to the portion of the corridor east of the Sacramento River.

As stated above under the wetlands discussion, saline/alkaline marsh habitat is restricted to the western portion of the alignment, west of Denverton Road, through Suisun City. These habitats support a variety of threatened or endangered species including Suisun thistle, Mason's lilaepsis, soft bird's-beak, California black rail, and possibly salt marsh harvest mouse if the marshes are tidally influenced.

Riverine habitat, as described in the wetlands section above occurs at various locations along the corridor, but is most extensive east of the Sacramento River. This habitat type can include natural waterways as well as artificial canals. The Sacramento River and its tributaries support fish species such as Chinook salmon, steelhead, delta smelt, and green sturgeon. Larger waterways typically do not support giant garter snake, but this species may occur in smaller sloughs and canals along the corridor.

Riparian habitat is typically associated with rivers and streams, but can occur around irrigation canals, ponds, or lakes. Along the corridor, this habitat occurs from the vicinity of Rio Vista and the Sacramento River, east to I-5. Larger oaks, cottonwoods, and sycamore trees in this habitat provide potential nesting habitat for Swainson's hawk. Riparian habitat is also where elderberry shrubs occur that provide habitat for valley elderberry longhorn beetle.

Annual grasslands along the corridor occur primarily west of Rio Vista, with the highest concentration between SR-113 and Suisun City. This vegetation community provides upland habitat for California tiger salamander, and foraging habitat for Swainson's hawk. It is within annual grasslands that vernal pools and other seasonal wetlands occur (along with their associated species described above).

Agricultural fields, including various row crops, but excluding orchards, provide foraging habitat for Swainson's hawk. Agricultural fields are present east of SR-113, but are most abundant east of the Sacramento River.

Sensitive Species of Special Concerns

The species discussed in this section are not listed as threatened or endangered under either CESA or FESA. However, they do receive varying levels of protection from CDFG and USFWS under a variety of regulations such as the federal Migratory Bird Treaty Act, Fish and Game Code - Sections 3503 (bird nest and eggs), 3503.5 (birds of prey), 3511 (birds), 3513 (non-game migratory birds), 4700 (mammals), 5050 (reptiles and amphibians), and 5515 (fish); the Native Plant Protection Act; and the California Environmental Quality Act. Other permitting regulations/mechanisms that provide protection for special-status species include the San Joaquin County Multi-species Habitat Conservation and Open Space Plan (SJMSCP), Delta Protection Act, the as yet adopted Solano Habitat Conservation Plan, and the McAteer-Petris Act and Suisun Marsh Preservation Act.

Based on a query of the CNDDDB and USFWS online threatened and endangered species database, 50 special-status species, and five sensitive natural communities have the potential to occur in the region surrounding the corridor. This total includes 27 plants, 7 invertebrates, one fish, one amphibian, one reptile, 10 birds, and three mammals. To the extent feasible, projects in the corridor should be designed such that all encroachment on habitat for any of these species is avoided. If habitat for any of these

threatened or endangered species cannot be avoided, permits or other approvals must be obtained from the USFWS, and/or CDFG must be obtained prior to any disturbance.

Further investigations should be conducted to determine if habitat for any of these species is occupied by those species, and if so, will the project(s) have any potential to affect habitat for those species.

Exhibit 5 lists includes the results of the CNDDDB and USFWS database queries for species to be species of concern by the CDFG and/or USFWS.

No impacts would occur on any of the following special-status species as either they do not have suitable habitat along the corridor, or the corridor is not included within the known range of these species. These species include Bolander's water-hemlock, eel-grass pondweed, slender-leaved pondweed, Mount Diablo buckwheat, Sacramento anthicid beetle, Antioch Dunes anthicid beetle, Monarch butterfly, Wilbur Springs shorebug, and foothill yellow-legged frog.

The remaining species on the above list are either known to occur in the vicinity of the corridor, or have suitable habitat along or near the corridor. Further investigations would need to be conducted to determine if habitat for any of these species is occupied by those species, and if so, would the project have any potential to affect those species or their habitat.

Habitats present along the corridor that could support these species include vernal pools, seasonal wetlands, freshwater marsh, saline/alkaline marsh, riparian, riverine aquatic, irrigation canals, annual grassland, and agricultural fields.

As stated above, vernal pools and other seasonal wetlands, which include the sensitive natural community Northern Hardpan Vernal Pool, are primarily restricted to the portion of the alignment west of Rio Vista. These habitats potentially support a variety of special-status plants and wildlife including pappose tarplant, dwarf downingia, legenera, Baker's navarretia, bearded popcorn-flower, Midvalley fairy shrimp, California linderiella, and hairy water flea.

Freshwater marsh, which includes the sensitive natural community Coastal and Valley Freshwater Marsh, occurs at various locations along the corridor as described above. Special-status species that may occur in this habitat include bristly sedge, woolly rose-mallow, marsh skullcap, side-flowering skullcap, Sanford's arrowhead, western pond turtle, tricolored blackbird, short-eared owl, and northern harrier.

Saline/alkaline marsh habitat, which includes the sensitive natural community Coastal Brackish Marsh, is restricted to the western portion of the alignment, west of Denverton Road, through Suisun City. These habitats potentially support a variety of special-status species including delta tule pea, delta mudwort, Suisun Marsh aster, saltmarsh common yellowthroat, Suisun song sparrow, and Suisun shrew.

Riverine habitat, as described in the wetlands section above occurs at various locations along the corridor, but is most extensive east of the Sacramento River. This habitat type can include natural waterways as well as artificial canals. Special-status species expected to occur in this habitat includes Sacramento splittail, and western pond turtle.

Riparian habitat, which includes the sensitive natural community Great Valley Valley Oak Riparian Forest, is typically associated with rivers and streams, but can occur around irrigation canals, ponds, or lakes. Along the corridor, this habitat occurs from the vicinity of Rio Vista and the Sacramento River, east to I-5. Special-status species associated with this habitat include Northern California black walnut, western pond turtle, white-tailed kite, saltmarsh common yellowthroat, western red bat, and hoary bat.

Exhibit 5: State and Federal Species of Concern

Plants	
Heartscale (<i>Atriplex cordulata</i>)	Alkali milk-vetch (<i>Astragalus tener</i> var. <i>tener</i>)
San Joaquin spearscale (<i>Atriplex joaquiniana</i>)	Brittlescale (<i>Atriplex depressa</i>)
Pappose tarplant (<i>Centromadia parryi</i> ssp. <i>parryi</i>)	Bristly sedge (<i>Carex comosa</i>)
Hispid bird's-beak (<i>Cordylanthus mollis</i> ssp. <i>hispidus</i>)	Bolander's water-hemlock (<i>Cicuta maculata</i> var. <i>bolanderi</i>)
Dwarf downingia (<i>Downingia pusilla</i>)	Mt. Diablo buckwheat (<i>Eriogonum truncatum</i>)
Brewer's western flax (<i>Hesperolinon breweri</i>)	Fragrant fritillary (<i>Fritillaria liliacea</i>)
Carquinez goldenbush (<i>Isocoma arguta</i>)	Woolly rose-mallow (<i>Hibiscus lasiocarpus</i> var. <i>occidentalis</i>)
Delta tule pea (<i>Lathyrus jepsonii</i> var. <i>jepsonii</i>)	Northern California black walnut (<i>Juglans hindsii</i>)
Delta mudwort (<i>Limosella subulata</i>)	Legenere (<i>Legenere limosa</i>)
Baker's navaretia (<i>Navaretia leucocephala</i> ssp. <i>bakeri</i>)	Eel-grass pondweed (<i>Potamogeton zosteriformis</i>)
Slender-leaved pondweed (<i>Stuckenia filiformis</i>)	Bearded popcorn-flower (<i>Plagiobothrys hystriculus</i>)
Marsh skullcap (<i>Scutellaria galericulata</i>)	Sanford's arrowhead (<i>Sagittaria sanfordii</i>)
Side-flowering skullcap (<i>Scutellaria lateriflora</i>)	Saline clover (<i>Trifolium hydrophilum</i>)
Suisun Marsh aster (<i>Symphyotrichum lentum</i>)	
Invertebrates	
Sacramento anthicid beetle (<i>Anthicus sacramento</i>)	Antioch Dunes anthicid beetle (<i>Anthicus antiochensis</i>)
Monarch butterfly (<i>Danaus plexippus</i>)	Midvalley fairy shrimp (<i>Branchinecta mesovallensis</i>)
California linderiella (<i>Linderiella occidentalis</i>)	Hairy water flea (<i>Dumontia oregonensis</i>)
Wilbur Springs shorebug (<i>Saldula usingeri</i>)	
Fish	
Sacramento splittail (<i>Pogonichthys macrolepidotus</i>)	
Amphibians	
Foothill yellow-legged frog (<i>Rana boylei</i>)	
Reptiles	
Western pond turtle (<i>Actinemys marmorata</i>)	
Birds	
Tricolored blackbird (<i>Agelaius tricolor</i>)	Golden eagle (<i>Aquila chrysaetos</i>)
Great blue heron (<i>Ardea herodias</i>)	Short-eared owl (<i>Asio flammeus</i>)
Burrowing owl (<i>Athene cucularia</i>)	Ferruginous hawk (<i>Buteo regalis</i>)
Northern harrier (<i>Circus cyaneus</i>)	White-tailed kite (<i>Elanus leucurus</i>)
Saltmarsh common yellowthroat (<i>Geothlypis trichas sinuosa</i>)	Suisun song sparrow (<i>Melospiza melodia maxillaris</i>)
Mammals	
Western red bat (<i>Lasiurus blossevillei</i>)	Hoary bat (<i>Lasiurus cinereus</i>)
Suisun shrew (<i>Sorex ornatus sinuosus</i>)	
Sensitive Natural Communities	
Northern Claypan Vernal Pool	Coastal and Valley Freshwater Marsh
Coastal Brackish Marsh	Great Valley Valley Oak Riparian Forest
Valley Needlegrass Grassland	

Source: CNDDDB and USFWS, 2011.

Annual grasslands along the corridor occur primarily west of Rio Vista, with the highest concentration between SR-113 and Suisun City. This vegetation community, which can include the sensitive natural community Valley Needlegrass Grassland, provides habitat for heartscale, alkali milk-vetch, San Joaquin spearscale, brittlescale, pappose tarplant (particularly where soils are alkaline), and foraging habitat for golden eagle, short-eared owl, burrowing owl, ferruginous hawk, northern harrier, and white-tailed kite. Short-eared owl, burrowing owl, and northern harrier also nest in annual grassland habitats.

Agricultural fields along the corridor are most abundant east of the Sacramento River. This habitat, including various row crops, but excluding orchards, provides foraging habitat for golden eagle, short-eared owl, burrowing owl, ferruginous hawk, northern harrier, and white-tailed kite.

Invasive Species

Invasive species are non-native invasive plants that have become established at various locations outside their natural ranges. These species are considered a nuisance since they crowd out native vegetation communities, and can result in a loss of special-status plant populations, and in a general loss of native plant community diversity (which typically has a negative effect on local native wildlife populations). Their presence in a particular area is usually attributable to human activity, particularly where ground disturbance has occurred. Such invasive species are therefore most common in and near areas of human habitation and agriculture, or in fallow areas where such activities have historically occurred (though less frequently, they can occur in undisturbed areas as well). Since no field surveys were conducted as a part of this analysis, it is difficult to determine specific areas where invasive species would occur, or what species would be present. However, since human habitation and agriculture are common along the corridor, many of these species are assuredly present there. The following discussion lists invasive species that are commonly known to occur in the region surrounding the corridor. It should be noted that this list is not exclusive, and many other invasive species could occur there as well.

Some or all of the following species are highly likely to be present along the majority of the corridor, and in a variety of habitats, though they are most frequently associated with non-native grasslands, vernal pools, seasonal wetlands, and fallow fields. These species include grasses such as ripgut brome (*Bromus diandrus*), soft chess (*Bromus hordeaceus*), red brome (*Bromus madritensis* ssp. *rubens*), Italian rye (*Lolium multiflorum*), wild oats (*Avena fatua*), foxtail barley (*Hordeum murinum* ssp. *leporinum*), and medusahead grass (*Taeniatherum caput-medusae*). Broadleaved annual and perennial noxious weed species likely to occur along the corridor would include black mustard (*Brassica nigra*), field bindweed (*Convolvulus arvensis*), yellow star thistle (*Centaurea solstitialis*), Italian thistle (*Carduus pycnocephalus*), bull thistle (*Cirsium vulgare*), fennel (*Foeniculum vulgare*), hyssop loostrife (*Lythrum hyssopifolium*), broad-leaved pepperweed (*Lepidium latifolium*), milk thistle (*Silybum marianum*), hairy vetch (*Vicia villosa*), and bristly oxtongue (*Picris echioides*).

In addition to many of the species discussed above, riparian and marsh habitats are also commonly invaded by other invasive species typically not seen in grasslands and fallow fields. These include species such as giant reed (*Arundo donax*), tree tobacco (*Nicotiana glauca*), floating water primrose (*Ludwigia peploides* ssp. *montevidensis*), and tamarisk (*Tamarix ramosissima*).

Ground disturbance related to road improvements along the corridor could promote the proliferation and spread of one or more invasive species. Field surveys for invasive species, which can be done concurrently with wetland or special-status species surveys, should be conducted along the corridor to determine where they occur and what species are present. If it is determined that road improvements along the corridor could promote the spread of invasive species, then preventative measures should be taken. Such measures could include, but not be limited to controlled burns prior to ground disturbance to eliminate noxious weeds before they seed, herbicide use prior to ground disturbance to destroy noxious weeds before they seed, and the careful removal and disposal mature of invasive species prior to construction disturbance such that no seeds or other plant parts capable of propagating are allowed survive.

Land Use

Lands adjacent to the SR-12 corridor is protected under different resource conservation plans due to the ecological services and critical habitat through which the corridor passes. There are a number of protected areas, such as parks, open space areas, wildlife areas, and habitat conservation areas, managed by a wide range of agencies such as local jurisdictions, USFWS, CDFG, and non-profits. These protected areas are depicted on Exhibit 6.

Depending on ownership and use, the protected areas in the corridor may be subject to the requirements of Section 4(f) of the Department of Transportation Act of 1966. Section 4(f) specifies that the Secretary of Transportation may approve a transportation program or project requiring the use of publicly-owned land of a public park, recreation area, or wildlife and waterfowl refuge of national, State, or local significance, or land of an historic site of national, State, or local significance² (as determined by the federal, state, or local officials having jurisdiction over the park, area, refuge, or site) only if:

- there is no prudent and feasible alternative to using that land; and
- the program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use.

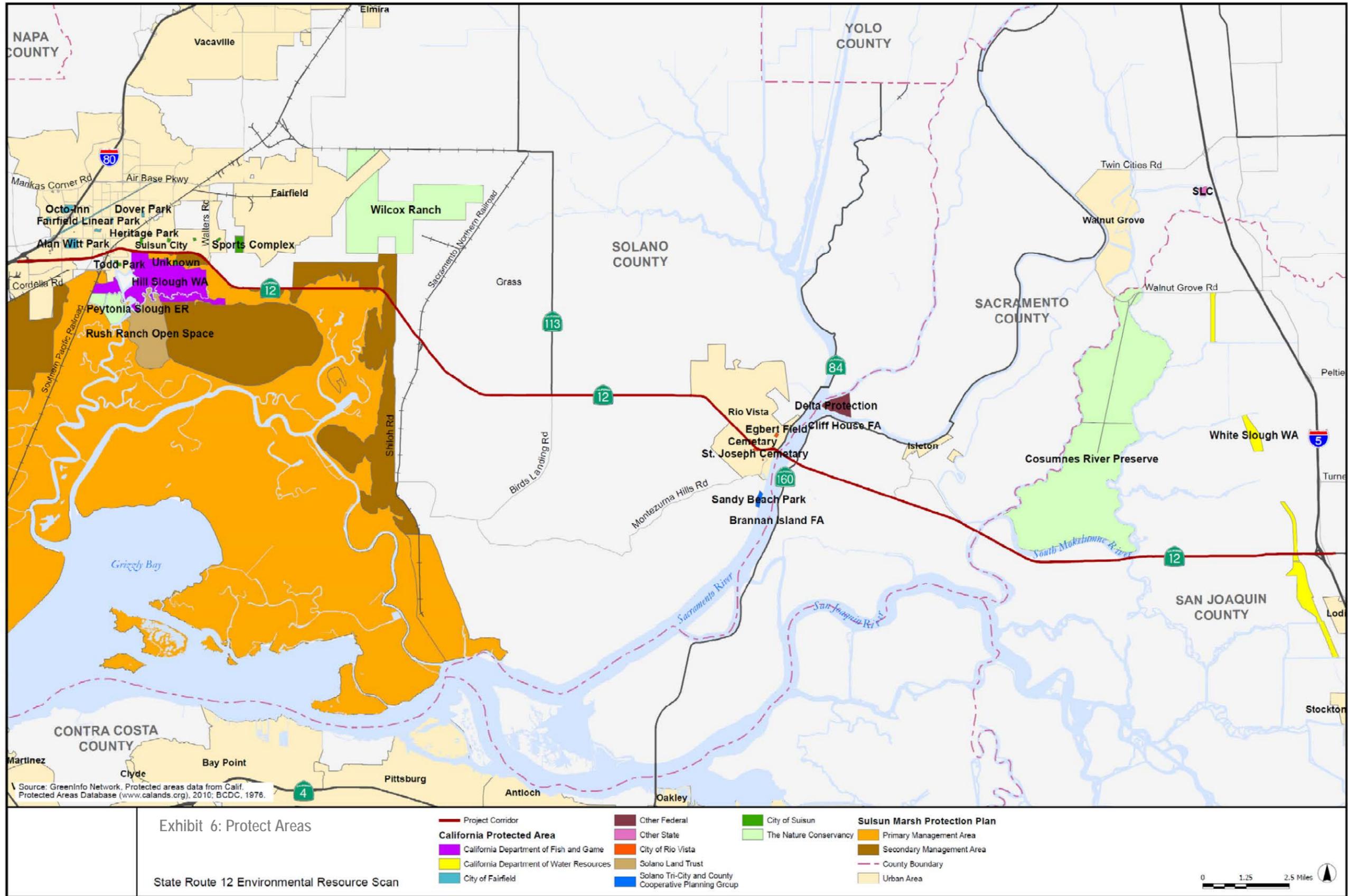
Compliance with the requirements of Section 4(f) would be necessary for all proposed projects in the corridor that that require a federal action, such as the appropriation of federal funding for project planning, construction, or right-of-way acquisition. Potential Section 4(f) resources that may be impacted by projects in the corridor (as depicted on Exhibit 6) include: the Suisun Marsh; the Hill Slough Wildlife Area; Bruna Vista Park in Rio Vista; the Consumnes River Preserve; and the White Slough Wildlife Area.

Much of the SR-12 corridor is located in managed wetland areas explicitly protected through conservation based policies established by local, state, and federal agencies. The two largest conservation areas within the SR-12 corridor are the Suisun Marsh Management Area within Solano County and the Primary Zone of the Delta within San Joaquin County. In 2001, the San Joaquin Council of Governments (SJCOG) adopted the San Joaquin County Multi Species Habitat Conservation and Open Space Plan (SJMSCP) to balance the needs to protect the regions environmental resources while accommodating economic growth. The Solano County Water Agency is currently in the process of drafting a Multi-Species Habitat Conservation Plan (HCP) that will cover a large proportion of land adjacent to the SR-12 corridor. The purpose of the HCP (among others) is to promote the conservation of biological diversity and the preservation of endangered species and their habitats. An overview of the major local management agencies immediately adjacent to existing SR-12 is presented below.

Suisun Marsh Protection Plan. The Suisun Marsh Protection Act (Marsh Act) was passed by the State Legislature in 1977, charging the San Francisco Bay Conservation and Development Commission (BCDC) with the responsibility of creating and administering the Suisun Marsh Protection Plan. Under the provisions of the Marsh Act, all affected governments and agencies are required to bring their general and specific plans, ordinances and zoning maps, land use regulations, and other related standards and controls into conformity with the provisions of the Marsh Act and the Suisun Marsh Protection Plan. The combination of all such land use and development policies, standards, and controls adopted by all of these agencies constitutes the Local Protection Program (LPP), while the controls adopted by an individual agency constitutes that agency's component of the LPP.³ BCDC remains the primary permitting and oversight body. Portions of SR-12 pass through the Primary and Secondary Management Area of Suisun Marsh near Suisun City in Solano County.

² See section titled "Historical/Cultural Resources."

³ Solano County, Suisun Marsh Local Protection Program Solano County Component: August 2010 Amendment, August 24, 2010.



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Delta Protection Commission. In 1992, the California Legislature passed the Delta Protection Act in order to protect the Sacramento-San Joaquin Delta's significant natural resources from urban encroachment. The Act includes mandates for the designation of primary and secondary zones within the legal Delta, creation of a Delta Protection Commission, and completion of a Land Use and Resource Management Plan for the Primary Zone.

Solano County Water Agency. The Solano County Water Agency is nearing completion of a Multispecies Habitat Conservation Plan that will allow future development projects to mitigate for project and cumulative impacts through payment of fees. The fee program will be used to acquire and preserve land and/or restore habitat to compensate for loss to biological resources.

San Joaquin County Multi Species Habitat Conservation and Open Space Plan. The primary purpose of the SJMSCP is to provide a strategy for balancing the need to conserve open space against providing for the economic growth of county while providing for the long-term management of plant, fish, and wildlife species. The SJMSCP is a 50-year plan with plan assessments based on a 50-year planning horizon. The Plan has established a number of mitigation preserves in the vicinity of the SR-12 corridor; including the Nuss Row and Field Crop Preserve north of SR-12 near Guard Road, established primarily to serve as habitat for Swainson's hawk, great egret, greater sandhill crane, and great blue heron.

Hill Slough Wildlife Area. The Hill Slough Wildlife Area is adjacent to the south side of SR-12 near Suisun City in Solano County. It is managed by CDFG and includes salt tidal marsh, managed marshes, sloughs, and upland grassland. The area supports a wide variety of waterfowl, raptors, and mammals.

White Slough Wildlife Area. The White Slough Wildlife Area straddles SR-12 8 miles west of Lodi in San Joaquin County. It is managed by CDFG and includes man-made ditches, canals (burrow ponds), freshwater marshes, grassland/upland, and riparian habitat.

In addition to regulations set forth in the above-mentioned conservation management plans, SR-12 is subject to various policies and objectives of the local governments through which the corridor passes. In general, these policies support the SR-12 corridor as a major transportation thoroughfare.

Farmlands

Farmland Mapping and Monitoring Program

The California Department of Conservation, Division of Land Resource Protection, administers the Farmland Mapping and Monitoring Program (FMMP) to analyze impacts on the state's agricultural resources. Land is rated based on its soil characteristics and irrigation status. These ratings are then used to help prioritize conservation efforts. The FMMP uses the term Important Farmland to describe parcels that meet certain criteria.

Prime Farmland is "farmland with the best combination of physical and chemical features able to sustain long term agricultural production. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. Land must have been used for irrigated agricultural production at some time during the four years prior to the mapping date."

Farmland of Statewide Importance is "farmland similar to Prime Farmland but with minor shortcomings, such as greater slopes or less ability to store soil moisture. Land must have been used for irrigated agricultural production at some time during the four years prior to the mapping date."

Unique Farmland is “farmland of lesser quality soils used for the production of the state’s leading agricultural crops. This land is usually irrigated, but may include non-irrigated orchards or vineyards as found in some climatic zones in California. Land must have been cropped at some time during the four years prior to the mapping date.”

These types of farmlands exist along the SR-12 corridor that runs through Solano County, Sacramento County, and San Joaquin County. The western end of the corridor consists of a more populated urban area. (Exhibit 7) The corridor passes through grazing land located to the north and south of SR-12 in Solano County and into Prime Farmland located north of SR-12 in Sacramento County and south of SR-12 in San Joaquin County. Farmland of statewide importance, unique farmland, as well as areas containing non-agricultural, natural vegetation, and vacant or disturbed land exist near the corridor at the eastern end.

The Farmland Protection Policy Act (FPPA, 7 USC 4201-4209; and its regulations, 7 CFR Part 658) require federal agencies, such as FHWA, to coordinate with the Natural Resources Conservation Service (NRCS) if their activities may irreversibly convert farmland (directly or indirectly) to nonagricultural use. For purposes of the FPPA, farmland includes prime farmland, unique farmland, and farmland of statewide or local importance. The FPPA requires federal agencies to apply Land Evaluation and Site Assessment (LESA) criteria for activities or responsibilities of the federal government that involve the financing or construction of improvement projects. The LESA system is implemented by completing the Farmland Conversion Impact Rating Form (Form AD-1006). Under the LESA system, project sites receive scores based on various criteria including soil quality and land use. The rating also assesses non-soil related criteria, such as the potential for impact to the local agricultural economy and compatibility with existing agricultural use. The highest score for a site is 260 points. Sites receiving a total score of less than 160 points are given a minimal level of consideration for protection and no alternative sites need to be evaluated for conversions of these lands. Sites with a LESA rating of 160 points or more are to be protected. Any federally-funded improvements in the corridor would be required to meet the requirements of the FPPA if the improvements resulted in the conversion of prime farmland, unique farmland, or farmland of statewide or local importance.

Within Solano County, the corridor passes through the Jepson Prairie and Montezuma Hills agricultural regions. The Jepson Prairie region occupies 52,943 acres and is used primarily for grazing cattle and sheep. It contains low hills and vernal pool habitat. The Montezuma Hills region is a mix of grazing land and cropland. The Montezuma Hills region is approximately 58,035 acres and is used for sheep grazing on the hillsides in a crop rotation system that includes the growing of small grains (such as oats and barley) and a fallow period. This area is experiencing some urbanization pressure around Rio Vista as the city begins to expand.

Williamson Act

The California Land Conservation Act of 1965 (referred to as the Williamson Act) is used to preserve agricultural land and to encourage open space preservation and efficient urban growth. The Williamson Act provides incentives to landowners through reduced property taxes to deter the early conversion of agricultural and open space lands to other uses. This voluntary program offers tax breaks by assessing lands based on actual use (agricultural or open space) as opposed to their potential full market value, creating a financial incentive to maintain farmland and open space, as opposed to allowing conversion to other uses. The Williamson Act program uses rolling 10-year contracts that renew annually until either party files a “notice of non-renewal.” If an owner decides to opt out, the land is still protected for 10 years while the tax liability increases in annual increments up to its full market value.

Exhibit 7: FMMP Designation

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A large portion of the SR-12 corridor passes through, or runs adjacent to properties that are under active Williamson Act contracts. Acquiring the land under contract, or portions of the land, may be required in order to proceed with expansion of SR-12 in certain locations. Only the landowner can petition to cancel a Williamson Act contract. To approve a tentative contract cancellation, a county or city must make specific findings that are supported by substantial evidence. In order to find that the cancellation is in the public interest the board/council must find that other public concerns outweigh the objectives of the Williamson Act, and that there are no proximate non-contracted lands available and suitable for the proposed use or, that development of the contracted land would provide more contiguous patterns of urban development. The existence of an opportunity for another use of the property is not sufficient reason for cancellation. In addition, the uneconomic character of an existing agricultural use shall not, by itself, be a sufficient reason to cancel a contract.

In addition, CEQA requires the review of projects that would convert Williamson Act contract land to non-agricultural uses.

Socioeconomic/Community Impacts

All projects involving a federal action (funding, permit, or land) must comply with Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, signed by President Clinton on February 11, 1994. This Executive Order directs federal agencies to take the appropriate and necessary steps to identify and address disproportionately high and adverse effects of federal projects on the health or environment of minority and low-income populations to the greatest extent practicable and permitted by law. Environmental justice refers to the fair treatment of people of all races, cultures, and incomes with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Low income is defined based on the Department of Health and Human Services poverty guidelines.

Using the latest data available from the 2000 Census and Geographic Information System (GIS) technology, a demographic profile was created for the 11 census tracts through which the corridor passes. Demographic and income data were obtained to determine the presence of environmental justice communities in the corridor. Determination of whether an environmental justice community is present was based on the following criteria: the minority population in the census track is greater than 50 percent or 10 percent greater than the county reference, or the poverty level in the census track is 25+ percent higher than "reference" community. Of the 11 Census tracts in the corridor, five environmental justice communities were identified based on population and one environmental justice community was identified based on population and income. These five communities are all in the census tracts at the western end of the corridor in Suisun City and Fairfield. All federally-funded projects proposed within these census tracts would require further analysis to ensure compliance with Executive Order 12898.

Historical/Cultural Resources

As part of the environmental scan, multiple cultural resource background studies were conducted for the project corridor; the project corridor is defined here as approximately 150 feet on either side of SR-12. Record searches were conducted at the Northwestern Information Center for Solano County; North Central Information Center for Sacramento County; and at the Central California Information Center for San Joaquin County. These searches included the National Register of Historic Places (NRHP); the California Register of Historical Resources (CRHR); California Inventory of Historic Resources; California Historical Landmarks; California Points of Historical Interest; the Caltrans State and Local Bridge Survey; previously recorded resources; previous studies; and historical maps as appropriate.

Based on the results of the background research conducted within the project corridor, the majority of cultural resources (described below) within the project corridor represent extant historic-era agricultural and engineering structures. No prehistoric archaeological sites have been previously identified within the project corridor. In sum, background research identified 24

previously recorded historic-era resources within the project corridor; 130 previous studies; two NRHP historic properties/CRHR historical resources (both bridges); and at least four resources that should be recorded prior to project implementation by cultural resource specialists that meet Caltrans PQS.

Cultural resource studies may be needed to address Section 106 requirements of the National Historic Preservation Act for the SR-12 Comprehensive Corridor Evaluation and Corridor Management Plan. A Historic Property Survey Report (HPSR), an Archaeological Survey Report (ASR), and a Historic Resources Evaluation Report (HRER) should be prepared to address the potential for impacts to historic and prehistoric resources located in the corridor. Native American consultation will also need to be conducted. Because of the presence of NRHP historic properties directly in the project corridor, a Section 4(f) evaluation may be needed. A Section 4(f) evaluation could impede the approval of proposed improvements if reviewing agencies and the local community disagree with the findings, and/or require additional research, review, and/or evaluation.

The cultural resources identified as a result of these efforts are discussed below.

Solano County. A record search conducted by the Northwestern Information Center on November 19, 2010 (NWIC File No. 10-0435) for Solano County. The record search identified the presence of 17 resources identified for Solano County. An additional 20 resources have been previously identified with the ¼ mile of the project corridor and 44 additional studies have been conducted within ¼ mile for these two counties. Exhibit 8 lists the resources within the project corridor for each county.

Exhibit 8: Previously Recorded Cultural Resources In Solano County

Solano County	Resource Number	Resource Name	Address	Type of Resource	Year of Construction or Association	Eligibility
Archaeological Sites						
Within Project Limits	CA-SOL-396H			historic-era foundations & refuse scatter	1848-1880	not evaluated
	P-48-000444	Round Hill School		site	ca. 1878	not evaluated
Historic Architectural Sites						
Within Project Limits	P-48-000527	Dan Wilson Creek Bridges	I-80 & Dan Wilson Creek (PM 13.92/KP 22.45)	concrete bridges (#23-0006R & -0006L)	both 1951	not eligible for NRHP or CRHR
	P-48-000528	Green Valley Creek Bridges	I-80 & Dan Wilson Creek (PM 13.49/KP 21.75)	concrete bridges (#23-0004R & -0004L)	1951 (4R) & 1928 (4L)	not eligible for NRHP or CRHR
	P-48-000739	Valine Farm	4004 Russell Road, Fairfield 94534	House & various farm related buildings	unknown; appear ca. 1940s	not eligible for NRHP or CRHR
	P-48-000797		just west of Rio Vista	Power line Segment	1946, 1973 & unknown	not evaluated
	P-48-000801		just west of Rio Vista	US Coast & Geodetic Survey Benchmark	1939	not evaluated
	P-48-000802		west of Church Road, outside of Rio Vista	US Coast & Geodetic Survey Benchmark	1931	not evaluated

Exhibit 8: Previously Recorded Cultural Resources In Solano County

Solano County	Resource Number	Resource Name	Address	Type of Resource	Year of Construction or Association	Eligibility
	P-48-000808	PG&E Vacaville-Moraga Transmission Line	500 feet from the intersection of SR-12 & I-80	Transmission Line	ca. 1940s	not eligible for NRHP or CRHR
	P-48-000809	Cody Hill Pumping Station	1827 State Highway 12, Solano County	Public Utility Building	between 1947-1951	not eligible for NRHP or CRHR
	P-48-000810			Residences & various farm related buildings	ca. 1950s & 1990s	not eligible for NRHP or CRHR
	P-48-000834		7983-89 State Highway 12, Solano County	Residences & various farm related buildings	ca. 1946, though some structures could be older & younger	not eligible for NRHP or CRHR
	P-48-000835		7828 State Highway 12, Solano County	Residence & various farm related buildings	ca. 1954	not eligible for NRHP or CRHR
	P-48-000836		7400 State Highway 12, Solano County	Residence & outbuildings	ca. 1918	not eligible for NRHP or CRHR
	P-48-000549	California Pacific Railroad/Southern Pacific Railroad			ca.1866	not evaluated
NRHP Properties						
Within Project Limits	P-48-000791	Denverton Overhead Bridge	SR-12 over SPRR tracks	concrete bridge (#23-20)	1924	Listed on NRHP and CRHR
CRHR Resources (based on OHP Directory)						
Within Project Limits	P-48-000791	Denverton Overhead Bridge	SR-12 over SPRR tracks	concrete bridge (#23-20)	1924	Listed on NRHP and CRHR
	P-48-044277	Bridge 23-17			1924	identified in reconnaissance; not evaluated
	P-48-044278	Rio Vista Bridge (#23-24)	SR-12 & Sacramento River	Steel truss vertical lift bridge	1944	Needs to be re-evaluated

Most of the resources identified within the project corridor in Solano County are historic architectural/built environment resources representing agricultural, residential, engineering, or utility constructions. Only two historic-era archaeological sites are present within the project corridor. No prehistoric archaeological resources have been identified within the project corridor; however two prehistoric archaeological sites are located within the ¼ mile of the corridor, just north of Cordelia Junction. Only one resource, P-48-000791, the Denverton Overhead Bridge (Bridge No. 23-20) which carries SR-12 over the SPRR in the vicinity of Fairfield, has been listed on the NRHP and CRHR. The Western Railway Museum is also adjacent to SR-12 at this location. The listing of P-48-000791 on the NRHP in 1979 makes it an historic property under Section 106 and therefore subject to a Section 4(f) Evaluation if project actions are determined to pose impacts to this resource.

This section of the project corridor ends at the Sacramento County line in the Sacramento River on the Rio Vista Bridge (Bridge No. 23-24) The Rio Vista Bridge was originally constructed in 1944 and is a steel truss vertical lift-style drawbridge, the longest in the Delta region. In 1999 it was re-named the Helene Madere after the Rio Vista vice-mayor in 1998 (Faigan 2010). Although this resource is designated as not eligible for listing on the NRHP on the Caltrans Historic Bridge Inventory (2010), it appears to be of local significance and the State Office of Historic Preservation Directory has determined that it needs to be re-evaluated. Lastly two cemeteries are present on the northwest side of Rio Vista adjacent to SR-12. If the highway should be re-aligned or widened in this area, Section 594.3 of the California Health and Safety Code as well as Senate Bill 341 may need to be addressed.

Sacramento County. The short section of the project corridor that travels through Sacramento County crosses many island tracts and sloughs. The area is primarily agricultural lands and has experienced very little urban development in the last 150 years. This section of SR-12 also crosses the Rio Vista Gas Field.

A cultural resources record search was conducted at the North Central Information Center on November 1, 2010 (NCIC file no. SAC-10-143). The record search revealed that seven cultural resource studies have been previously conducted within the project corridor and three studies within ¼ mile of the corridor. The record search also indicated that no previously identified cultural resources are present within the project corridor or within ¼ mile of the project corridor. Only one resource, a historic levee, is present just outside of this ¼ mile boundary. The two bridges in this section, one over Tomato Slough and the one over Jackson Slough, could not be located on either the Caltrans State Agency or Local Agency Historical Bridge inventories or in the information center records. These should be recorded prior to project implementation to accurately assess impacts to these resources. No properties listed on the NRHP or CRHR are present within the project corridor for Sacramento County. No prehistoric or historic archaeological sites have been recorded within or within ¼ mile of the project corridor in Sacramento County.

One type of cultural resource that may be present in the beginning of this section of the project corridor is shipwrecks in the Sacramento River. If proposed improvement would impact the Sacramento River, more investigation may be required to determine the presence or absence of such resources within the project corridor.

San Joaquin County. The final section of the project corridor in San Joaquin County begins at the crossing of the Mokelumne River and terminates just after the intersection of SR-12 with I-5, west of Lodi. Like the section in Sacramento County, this section of the SR-12 primarily passes through a landscape of island tracts (the Bouldin and Terminous tract), and sloughs where agricultural activities have been the only real development for the last 150 years. The Mokelumne River is adjacent to most of the western portion of this section and its confluence with the Sacramento River is just south of where SR-12 crosses. The old Western Pacific Railroad grade also parallels the remainder of the section, from Little Potato Slough to just east of the I-5 intersection.

A cultural resources record search was performed at the Central California Information Center on November 2, 2010 for the section of the project present in San Joaquin County (CCIC File No. 7820L). Results of record search indicate that 17 studies have previously been conducted within and two resources have been previously identified within the project corridor. Both resources represent historic engineering structures and are P-39-004541, the Mokelumne River Swing Truss Bridge, and P-39-004448, an unnamed canal associated with the Woodbridge Irrigation District at the intersection of SR-12 and Ray Road. The information center also noted that P-39-000039, the old Western Pacific Railroad grade also runs adjacent to the project corridor, and may cross into it in portions. This resource has not been previously recorded in this portion of San Joaquin County. A recording of the old Western Pacific Railroad grade by an archaeologist who meets Caltrans professional quality standards (PQS) should record this section of the resource prior to project implementation in order to help minimize impacts to this resource. Six additional studies and five additional resources have also been recorded within ¼ mile of the project corridor. These resources include two historic-era buildings, the Terminous Culling Chute, and two prehistoric archaeological sites. No prehistoric or historic archaeological sites have been previously recorded within the project corridor for San Joaquin County.

P-39-004541, the Mokelumne River Swing Truss Bridge represents the only historic property within this section of the study corridor. This bridge, No. 29-43, is a steel swing truss bridge built in 1942 was found eligible for listing on the NRHP by Caltrans in 2001 (Supernowicz 2000). This eligibility determination also makes the bridge a historical resource for the CRHR. The Terminous Culling Chute, also known as the Tower Park Culling Chute, is also a historic property listed on the NRHP. It is located on Little Potato Slough directly on the ¼ mile study area border and it is therefore unlikely to be impacted by project activities. Thus, the only known historic property that a Section 4(f) Evaluation might be required for in San Joaquin County is the Mokelumne River Swing Truss Bridge.

Besides the Mokelumne River Swing Truss Bridge, the only other bridge identified by the Caltrans Historic Bridge inventory was bridge No. 29-0101, the bridge over Little Potato Slough. This bridge has been determined to be not eligible for listing on the NRHP by Caltrans but a documented recordation of this bridge is not on file at the Central California Information Center.

Hydrology

The corridor is within a large drainage area where numerous drainages convey surface runoff that ultimately discharges runoff into the Sacramento River, San Joaquin River, Mokelumne River, Suisun Marsh, and Suisun Bay. Exhibit 10 shows the location of major and minor water crossings, water bodies, marshlands, and canals. Potential longitudinal encroachment could also occur along a portion of the South Mokelumne River, just east of the river crossing and along a portion of Georgiana Slough near confluence of the slough with the South Mokelumne River. Water crossings in the corridor include two major rivers, eight named creeks, four tributaries to named creeks, 16 unnamed creeks, three sloughs, The Big Ditch stream, and 22 unnamed canals.

Development of projects in the corridor could cross these numerous water courses and result in additional runoff through the creation of new impervious surfaces. The additional runoff would need to be addressed through the application of Best Management Practices (BMPs) to detain stormwater runoff. Crossing of water courses could fill wetlands and impede water flow. The corridor is already subject to extensive flooding (further described below); wetland fill and impeded flow could further exacerbate flood conditions. Appropriate structural design would be required to address the affects to water crossing.

The corridor is located in an area subject to extensive flood hazards from tidal actions, stormwater runoff, and sea level rise. Several areas of the corridor, including the entire area within Sacramento and San Joaquin counties, are located within 100-year floodplains (1 percent annual chance of occurrence). Exhibit 11 shows the FEMA-identified special flood hazard areas (1 percent annual chance of occurrence) and 0.2 percent annual chance of occurrence floodplains within the corridor.

Many water courses in this area are protected by levees insufficient to contain the 100-year flood event. In addition to 100-year flood hazards, portions of the corridor, including the entire area within Sacramento and San Joaquin counties, are subject to inundation in the event of a potential 55-inch sea level rise by 2100 (the sea level rise expected by 2100 for planning purposes) (see Exhibit 12).

Corridor improvements would occur within extensive areas subject to 100-year flood hazards and sea level rise inundation. In several areas, the flood depth water surface elevation has been identified and the road surface could be elevated to above the flood elevation. Regardless, because water courses in the area are subject to tidal conditions, sea level rise could exacerbate flood hazards.

Appropriate Hydraulic/hydrologic studies will need to be conducted in order to determine effects of future projects. A Location Hydraulic Study, Summary Floodplain Encroachment Report, and Floodplain Evaluation Report will need to be prepared in order to determine and assess the amount of runoff generated and the effects on existing drainage facilities. The amount of floodplain fill and effects on flood storage capacity and flood flow conveyance will also need to be identified. This will require hydrologic and hydraulic modeling of water crossing structures and displacement of floodplain storage effects.

Water Quality

The corridor passes through several watersheds and two Regional Water Quality Control Board (RWQCB) jurisdictions. Runoff from the corridor drains through sloughs, ditches, canals, and other drainages to eventually discharge to Suisun Bay. Exhibit 9 lists the major watersheds and relevant receiving waters.

Exhibit 9: Major Watersheds Traversed by SR-12 Corridor

Watershed	RWQCB	County	Basin Plan Area	Approximate Segment	Receiving Waters
Suisun Slough	2	Solano	Suisun Basin	I-80 east to Mauds Lane	Suisun Marsh, Laurel Creek, Ledge wood Creek, Montezuma Slough, Suisun Slough, Suisun Bay
Sacramento Delta	5	Solano and Sacramento	Sacramento - San Joaquin Delta	Mauds lane to Mokelumne River	Sacramento - San Joaquin Delta, Suisun Bay
San Joaquin Delta	5	San Joaquin	Sacramento - San Joaquin Delta	Mokelumne River to Hwy 5	Sacramento - San Joaquin Delta , Suisun Bay

Designated beneficial uses along with water quality objectives, identified in the respective basin plans, comprise the relevant water quality standards. Where no beneficial use has been explicitly identified for a water body, the nearest downstream standard is typically applicable.

Several water bodies to which the corridor drains have been listed as impaired (not meeting water quality standards) and requiring a total maximum daily load (TMDL) in accordance with the Clean Water Act section 303(d) (2006 listing). The Suisun Wetlands (Suisun Marsh) is also listed as impaired by metals, nutrients, organic enrichment/low dissolved oxygen, and salinity/total dissolved solids/chlorides by agriculture, urban runoff/storm sewers, and flow regulation/flow modification. The Suisun Wetlands are also listed as impaired by sediment from agriculture.

Exhibit 10: Water Crossings

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Exhibit 11: 100-Year Flood Hazards

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Exhibit 12: Sea Level Rise Inundated Area

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The depth to groundwater within the corridor is shallow and generally within 10 feet of the ground surface in San Joaquin and Sacramento counties.⁴ Near rivers and tributaries, shallow groundwater can be within a couple feet of the ground surface. In Solano County between I-80 and Sacramento County, groundwater is about 10 to 15 feet below the ground surface. Near I-80, groundwater is within 10 feet of the ground surface.

Construction and operation of the projects in the corridor would likely not affect impairment by pollutants with industrial point sources, municipal point sources, resource extraction, other, agriculture, or natural sources. Nor would construction or operation likely affect impairment by the dioxins and furan compounds, PCBs, or PCBs dioxin-like.

Projects in the corridor could, however, contribute to impairment by pesticides, unknown toxicity, mercury, and nickel. Projects could also contribute to impairment of the Suisun Wetlands by metals, nutrients, organic enrichment/low dissolved oxygen, and salinity/total dissolved solids from stormwater runoff and flow modifications. Additionally, projects could contribute construction pollutants and sediment to receiving waters and natural drainages, and altered water crossings and fill of natural drainages/wetlands could affect aquatic habitat.

The use of infiltration-type BMPs would be affected by the depth to shallow groundwater and soil characteristics within the area. Generally, because of shallow groundwater (within 10-feet of the ground surface), infiltration-type BMPs would not be permitted within the majority of the corridor.

In accordance with the Urban Creeks Pesticide Toxicity TMDL incorporated in the Region 2 Basin Plan, NPDES permits for urban runoff management agencies and similar entities responsible for controlling urban runoff require implementation of best management practices and control measures. Requirements in each NPDES permit issued or reissued and applicable for the term of the permit must be based on an updated assessment of control measures intended to reduce pesticides in urban runoff. Control measures implemented by urban runoff management agencies and other entities (except construction and industrial sites) would be required to reduce pesticides in urban runoff to the maximum extent practicable.

Because the corridor drains to impaired receiving waters, construction and operation of new projects could affect water quality and a Caltrans Water Quality Assessment Report would be required to identify potential risks to water quality. In compliance with Caltrans and State Non-Point Discharge Elimination System (NPDES), a Storm Water Data Report (SWDR) would also be required and stormwater quality BMPs incorporated into project design. Prior to construction of any project improvements, a Storm Water Pollution Prevention Plan (SWPPP) would also be required, including an assessment of the project's sediment pollution risk level and specific minimum BMPs, including monitoring and reporting requirements, based on the identified risk level.

Construction of projects resulting in fill of wetlands, alteration of drainages, and structure crossings of major channels and flood control features would require a USACE 404 permit, CWA Section 401 water quality certification, and CDFG Streambed Alteration Agreement.

⁴ SWRCB. Geotracker Database, monitoring data from various sites. Available at: <http://geotracker.swrcb.ca.gov/>, accessed November 23, 2010.

Geology

San Francisco Bay and the alluvial and estuarine deposits that underlie the SR-12 corridor occupy a structurally controlled basin in California's Coast Ranges province, which consists of approximately 500 miles of northwest-trending ridges and valleys. Late Pliocene and Early Pleistocene rocks (less than 3.3 million years old) followed by Late Pleistocene and Holocene sediments (less than 1 million years old) were deposited in the basin as it subsided and have weathered to form the soils present at the surface.⁵ In the corridor, the alluvium consists of stream and fan deposits of silt, sand, and gravel from I-80 to the southeast corner of Travis Field. The Montezuma Formation from Travis Field to Rio Vista is poorly consolidated alluvial sand and gravel. Alluvial terrace deposits of the Modesto Formation from Potato Slough Bridge to I-5 are gravelly sand. The estuarine sediments consist of Bay Mud south of Fairfield and Travis Field and Delta Mud from Rio Vista to Potato Slough Bridge. Artificial fill (historic gravel and sand used as road base) is present throughout the length of the SR-12 corridor. Historic dredged materials overlie the Bay Mud southeast of Fairfield.⁶

From I-80 to just west of Rio Vista Junction, slopes in the SR-12 corridor are from 0 percent to less than 4 percent. Slopes from Rio Vista Junction to Rio Vista Bridge are from less than 4 percent to about 8 percent. From Rio Vista Bridge to I-5, slopes are 0 percent to less than 2 percent.⁷ Consequently, no hazards from natural landslides would be expected and would not be a design concern for new projects. All the soils in the corridor and their underlying soil-forming parent materials have some caving potential in shallow excavations. The lowest potential is in the flat-lying alluvial deposits east of Rio Vista Junction and the nearly level delta deposits east of Rio Vista Bridge. From Rio Vista Junction to Rio Vista Bridge, the slightly coarser sediments have higher potential to cave in shallow excavations, especially when dry.⁸

The organic rich soils of the Sacramento-San Joaquin Delta islands are subsiding at average rates as rapid as 4.8 cm/yr (1.9 inches per year). The SR-12 corridor between Rio Vista Bridge and Potato Slough Bridge crosses some of the most rapidly subsiding portions of the Delta. Brannon Island (Rio Vista Bridge to Mokelumne Bridge) is now between 2.00 and 2.99 m (6.6 and 9.8 feet) below sea level and is expected to be between 3.00 and 3.99 m (9.8 and 13.1 feet) below sea level by 2050. Bouldin Island (Mokelumne Bridge to Potato Slough Bridge) is more than 5.00 m (16.4 feet) below sea level and could be more than 6.92 m (22.7 feet) below sea level by 2050. Terminus Tract (Potato Slough Bridge to I-5) is relatively stable at 1.00 to 1.99 m (3.3 to 6.5 feet) below sea level.⁹ Subsidence of these soils may have major impacts on the design and cost of transportation projects in the corridor.

The San Francisco Bay and Sacramento-San Joaquin Delta areas are in a seismically active region near the boundary between two major tectonic plates, the Pacific Plate to the southwest and the North American Plate to the northeast. These two plates move relative to each other in a predominantly lateral manner, with the San Andreas Fault Zone at the junction. The Pacific Plate, on the west side of the fault zone, is moving north relative to the North American Plate on the east. The relative movement between the Pacific and the North American Plates generally occurs across a 65-mile zone extending from the Point Reyes Fault about 50 miles west of Fairfield to the Great Valley Thrust Belt about 15 miles east of Fairfield.

⁵ San Francisco Redevelopment Agency and San Francisco Planning Department. 2009 (November 12). *Candlestick Point-Hunters Point Shipyard Phase II Development Plan Draft Environmental Impact Report*. State Clearinghouse No. 2007082168. San Francisco, CA. Page III.L-2.

⁶ a) Graymer, R.W., D.L. Jones and E.E. Brabb. 2002. United States Geological Survey Miscellaneous Field Studies Map MF 2403, version 1.0. *Geologic Map and Map Database of Northeastern San Francisco Bay Region, California*.

b) Helley, E.J. and D.S. Harwood. 1985. United States Geological Survey Miscellaneous Field Studies Map MF-1790, *Geologic Map of the Late Cenozoic Deposits of the Sacramento Valley and the Northern Sierran Foothills, California*.

⁷ United States Department of Agriculture, Natural Resources Conservation Service. 2010 (November 15). *Custom Soil Resource Report for Sacramento County, California, San Joaquin County, California, and Solano County, California, SR-12 Environmental Scan*. Web Soil Survey <http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>. Accessed by G.J. Burwasser, PG 7151, November 15, 2010.

⁸ United States Department of Agriculture. 2010. Op cit.

⁹ Mount, J. and R. Twiss. 2005 (March). *Subsidence, Sea Level Rise, and Seismicity in the Sacramento-San Joaquin Delta*. California Bay-Delta Authority Science Program: San Francisco Estuary & Watershed Science. Vol 3, Issue 1, Pages 9 and 11.

The Alquist-Priolo Earthquake Fault Zoning Act establishes regulatory zones, called Earthquake Fault Zones, around the surface traces of active faults likely to rupture. Buildings for human occupancy are not permitted to be constructed across the surface trace of active faults, but other uses, such as roads and utility lines, are permitted.¹⁰ Several other faults that are not in Alquist-Priolo Earthquake Fault Zones, but that are considered sources of groundshaking and potential sources of ground rupture by Caltrans, cross the SR-12 corridor. The west branch of the Vaca-Kirby Hill-Montezuma Hill fault trends toward the corridor between Fairfield and Rio Vista Junction: the east branch crosses the corridor west of Rio Vista Junction. The Coast Ranges-Sierra Block fault crosses the corridor west of Rio Vista Junction. For the purposes of road design, Caltrans considers all these faults seismic hazards. Two branches of the Midland fault zone cross the corridor at Rio Vista Bridge and two other branches trend toward Mokelumne Bridge and Potato Slough Bridge. These inactive faults are not considered seismic hazards by Caltrans.¹¹

Some earthquakes are capable of producing sufficiently strong groundshaking to cause a phenomenon called liquefaction, in which saturated granular, non-plastic sediments temporarily lose their shear strength. Liquefied soil may lose its ability to support structures, and this loss of bearing strength may cause structures founded on the liquefied materials to tilt or possibly topple over. The liquefaction potential of the underlying materials in the SR-12 corridor can be derived from the geologic maps of the region. From I-80 to the Union Pacific Railroad right-of-way west of Fairfield, the young (Holocene) alluvial fan and natural levee deposits have moderate to high liquefaction potential. The artificial fill (historic) over Bay Mud (Holocene) east of the Union Pacific Railroad right-of-way has very high liquefaction potential. The older (late Pleistocene) alluvium south of Fairfield has very low liquefaction potential. South of Travis Air Force Base, the Bay Mud and Holocene/late Pleistocene alluvium has moderate to high liquefaction potential. From west of Rio Vista Junction to Rio Vista Bridge, the early Pleistocene Montezuma formation sandy gravel has very low liquefaction potential. East of Rio Vista Bridge to I-5, the Holocene/late Pleistocene Modesto formation gravelly sand and clay has moderate liquefaction potential.¹²

Soils

The SR-12 corridor crosses seven soils associations in Solano County, three in Sacramento County, and four in San Joaquin County. From I-80 east to Rio Vista Bridge, the soils that underlie the corridor are mostly the fine grained terrestrial and estuarine sediments typical of bay margins, consisting of clays, silts, and loams, with minor amounts of muck and made land (artificial fill including dredged materials). East of Rio Vista Bridge to I-5, the soils typical are of deltaic deposition, consisting of silty fine sandy loams, clay loams, muck, and peat. From Rio Vista Bridge to Mokelumne Bridge, the corridor crosses alluvial silty clay, organic soils (peat and muck), and mixed mineral/organic silty clay loam. From Mokelumne Bridge to I-5, the corridor crosses alluvial sandy loam, organic muck and peaty muck, mixed mineral/organic silty clay loam, and, at the eastern end, Valley plain soils consisting of sandy loam. The soils in Sacramento and San Joaquin counties are prime agricultural lands.¹³

In the Solano County portion of the corridor, the soils are highly to moderately expansive. For the most part, the soils are not especially prone to wind or water erosion in their natural states. One exception is an area of well-drained dissected clay terraces just east of Rio Vista Junction that is susceptible to severe erosion. In Sacramento County, from Rio Vista Bridge east to Mokelumne Bridge, the floodplain soils have low expansion and erosion potential. In San Joaquin County, from Mokelumne Bridge east to about midway between Potato Slough Bridge and I-5, expansion, and wind erosion potential are moderate to high.

¹⁰ *Alquist-Priolo Earthquake Fault Zoning Act*. California Public Resources Code, Division 2. "Geology, Mines and Mining," Chapter 7.5 "Earthquake Fault Zones," Sections 2621 through 2630; signed into law 22 December 1972, amended 1974, 1975, 1976, 1979, 1990, 1991, 1992, 1993, and 1997.

¹¹ Mualchin, L., Senior Engineering Seismologist. 1996 (July). California Department of Transportation, Engineering Service Center, Office of Earthquake Engineering. *A Technical Report to accompany the Caltrans California Seismic Hazards Map 1996 (Based on Maximum Credible Earthquakes)*. Last updated May 8, 2006.

¹² Graymer, Jones and Brabb. 2002. Helley and Harwood. 1985. Op cit.

¹³ United States Department of Agriculture. 2010. Op cit.

From there the corridor passes from the organic delta soils into sandy valley plain soils in which expansion potential is low and erosion potential is moderate.¹⁴

From Fairfield to Rio Vista Junction, the corridor skirts soils (south of the corridor) with high organic content that may contain peat deposits. Between Rio Vista Junction and Rio Vista Bridge are three areas of clayey soils subject to ponding, but these areas do not contain peat. From Rio Vista Bridge to Mokelumne Bridge, the floodplain soils have high organic content in the form of peat and muck; they are subject to subsidence. East of Mokelumne Bridge to about midway between Potato Slough Bridge and I-5, the delta islands and tracts are mostly peaty muck. The valley plain soils to the east do not contain peat.¹⁵

Paleontology

Paleontological resources are protected by federal regulation under the 1906 Federal Antiquities Act (United States Code, Title 16, Sections 431–433). The federal Paleontological Resources Preservation Act of 2002 codifies the generally accepted practice of limiting the collection of vertebrate fossils and other rare and scientifically significant fossils to qualified researchers who obtain permits from the appropriate state or federal agencies and agree to donate any materials recovered to recognized public institutions, where they will remain accessible to the public and to other researchers. NEPA directs federal agencies to use all practicable means to "Preserve important historic, cultural, and natural aspects of our national heritage..." (Section 101(b) (4)). Consideration of paleontological resources may be required under NEPA when a project is proposed for development on federal land, land under federal jurisdiction, or with funds provided by a federal agency.

Paleontological resources are protected by environmental legislation set forth under CEQA that indicates that a project would have a significant environmental impact if it would disturb or destroy a unique paleontological resource or site or unique geologic feature. Public agencies and private interests are required to identify the environmental consequences of their proposed projects on any object or site of significance to the scientific annals of California including unique paleontological resources or sites.

Database searches of the University of California Museum of Paleontology to identify previously reported vertebrate fossil finds in Solano, Sacramento, and San Joaquin counties indicate nearly the entire SR-12 corridor has high potential for the discovery of these paleontological resources. Only the artificial fill and the historic dredged materials have no potential to contain scientifically useful fossils. In Solano County, fossil-bearing locations in the alluvial deposits of Suisun Creek and the terraces north of SR-12 from west of Fairfield to Rio Vista Bridge, the Bay Mud of Suisun Slough south of Fairfield, and the alluvium of the Montezuma Formation in the Montezuma Hills south of SR-12 from west of Rio Vista Junction to Rio Vista Bridge have yielded the remains of horses, deer, camels, ground sloths, rodents, and mammoths. In Sacramento County, the Delta Mud deposits in the vicinity of the SR-12 corridor have not had vertebrate fossil-bearing locations reported from them, but similar deposits farther south in the San Joaquin portion of the delta have yielded similar remains, as well as those of bison and ground squirrels. In San Joaquin

¹⁴ United States Department of Agriculture.2010. Op cit.

¹⁵ United States Department of Agriculture.2010. Op cit.

County, the alluvial Modesto Formation extending from the eastern edge of the delta to several miles east of Lodi also contains a similar suite of fossils remains.¹⁶

A Paleontological Resources Monitoring and Mitigation Program (PRMMP) may be necessary, if excavation in the SR-12 corridor is expected to disrupt deposits that are highly sensitive with respect to paleontological resources. A qualified paleontological consultant with expertise in California paleontology should design and implement the PRMMP which would include a description of when and where construction monitoring would be necessary; emergency discovery procedures; sampling and data recovery procedures; procedures for the preparation, identification, analysis, and curation of fossil specimens and data recovered; preconstruction coordination procedures; and procedures for reporting the results of the monitoring program.

Hazardous Waste

Phase I Environmental Site Assessments (ESAs) are used to assess whether potentially hazardous materials are located on a property. Standards for Phase I ESAs have been developed by the American Society for Testing and Materials (ASTM) and are used routinely to determine the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products, onto the surface or into the ground, groundwater, or surface water of the property. If a Phase I ESA finds that hazardous materials found on the property may have been released, then a Phase II ESA is usually recommended. A Phase II investigation, known as a Preliminary Site Assessment (PSA), typically includes collection and analysis of soil and water samples. Based on the results, the Phase II ESA may recommend additional testing, remediation, or other controls to address contamination.

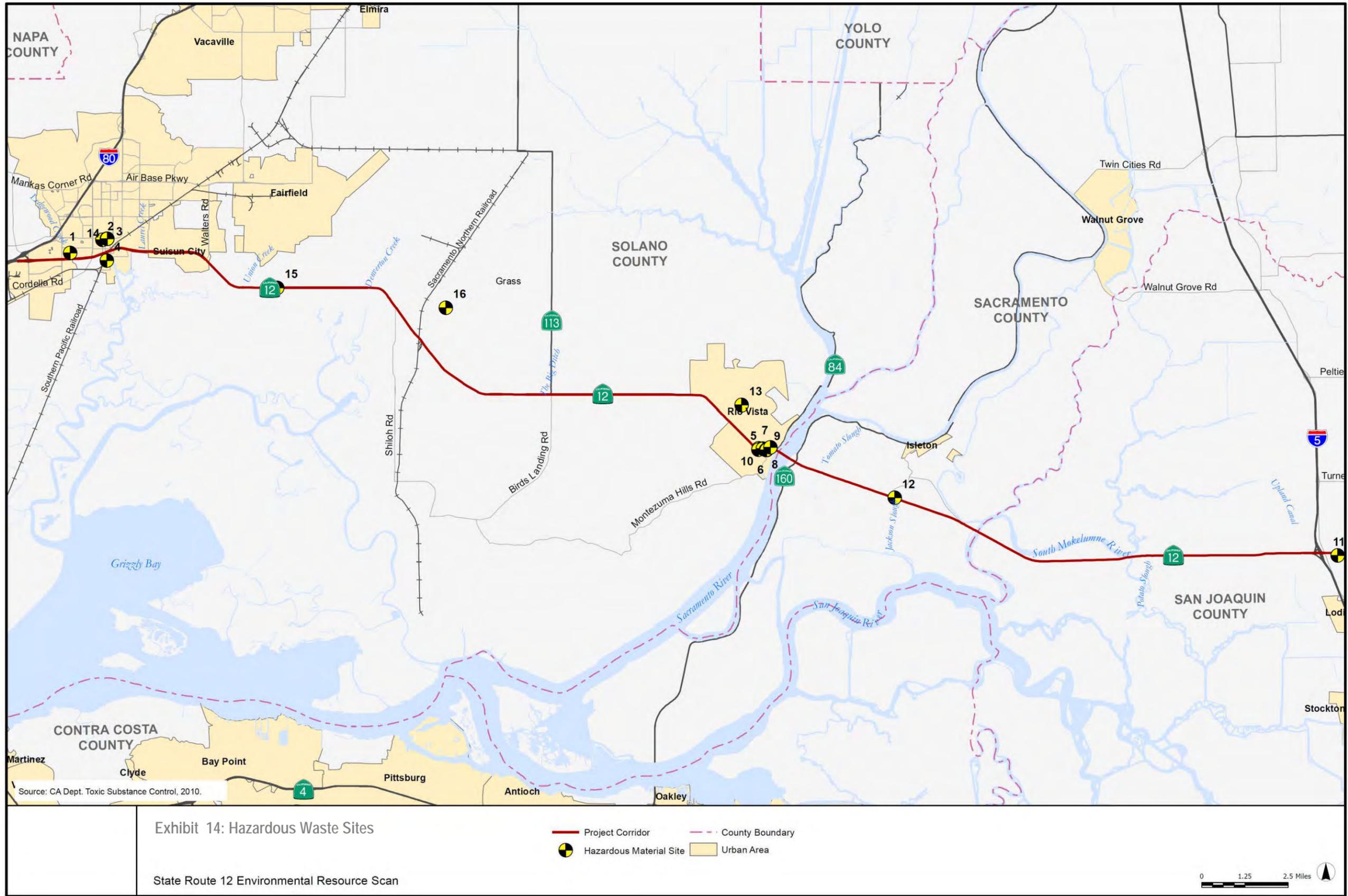
There are various sites within the SR-12 corridor that are under the oversight of the San Francisco Bay Area Regional Water Quality Control Board for hazardous waste cleanup. These sites could include currently active or historic underground storage tanks (USTs); currently active or historic gasoline service stations; currently active or historic automobile service/repair facilities; and documented locations of a release/spill of hazardous materials. The sites closest to the corridor are listed in Exhibit 13 depicted on Exhibit 14. Also of concern are pesticides, herbicides, and fungicides used on properties where crops are grown, as well as aurally deposited lead in soils within 50 feet of heavily traveled roadways built before 1987.

Due the presence of know hazardous waste sites and the potential for unknown site in the corridor, Phase I ESAs would be required during the PA/ED phase of transportation projects proposed in the corridor. Depending on the results of the Phase I ESAs, Phase II ESAs may be required, as well as the adoption of mitigation and minimization measures to protect workers and the public during construction activities.

¹⁶ a) Burwasser, G.J., PG 7151, Online Search Number 654349 - Solano County vertebrates through UCMP Locality Search, University of California Museum of Paleontology, December 13, 2010, at <http://bscit.berkeley.edu/ucmp/loc.shtml>
b) Burwasser, G.J., PG 7151, Online Search Number 431306 - Sacramento County vertebrates through UCMP Locality Search, University of California Museum of Paleontology, December 09, 2010, at <http://bscit.berkeley.edu/ucmp/loc.shtml>
c) Burwasser, G.J., PG 7151, Online Search Number 468698 - San Joaquin County vertebrates through UCMP Locality Search, University of California Museum of Paleontology, December 09, 2010, at <http://bscit.berkeley.edu/ucmp/loc.shtml>.
d) Lawler, D. 2005 (November). *Paleontological Resources Technical Report, Trans Bay Cable Project, San Francisco Bay Region, California*. Lawler Associates Geoscience, Berkeley, California.
e) County of Sacramento, Department of Environmental, Review and Assessment. 2008 (March). *Draft Environmental Impact Report, Franklin & Freeport General Plan Amendment*. Chapter 11, Cultural & Paleontological Resources. State Clearinghouse Number 2007092001
f) Wagner, D.L., C.W. Jennings, T.L. Bedrossian, and E.J. Bortugno. 1981. *Geologic Map of the Sacramento Quadrangle-Map No. 1A (Geology)*. California Geological Survey. Regional Geologic Map Series.
g) Graymer, et al. 2002. Op cit.
h) Helley and Harwood. 1985. Op cit.

Exhibit 13: Sites of Concern for Potential Contamination

ID	Address	Contamination	Status
1	1745 Enterprise Dr, Fairfield, CA 94533	Mainly Volatile Organic Compounds (VOC) in soil and groundwater	Open Site Assessment
2	625 Jackson St, Fairfield, CA 94534	Solvents and non-petroleum hydrocarbon, tetrachlorethylene (PCE), trichlorethylene (TCE) mainly in soil (not aquifer)	Open Site Assessment
3	721-729 Texas Street, Fairfield, CA	Contamination consists of Benzene, gasoline and petroleum hydrocarbons. Both soil and groundwater are impacted.	Open Site Assessment
4	526 School St, Suisun City, CA 94585	Contamination consists of chlorinated solvents, mainly TCE. It is considered a Category 1 site contamination.	Open Site Assessment and Interim Remedial Action
5	660 Hwy 12, Rio Vista, CA 94571	LUST Cleanup Site. Gasoline is the contaminant of concern; contaminated media is an aquifer used for drinking water supply.	Open Remediation
6	659 Hwy 12, Rio Vista, CA 94571	LUST Cleanup Site. Gasoline is the contaminant of concern; contaminated media is an aquifer used for drinking water supply	Open Remediation
7	510 Hwy 12, Rio Vista, CA 94571	LUST Cleanup Site. Gasoline is the contaminant of concern; contaminated media is an aquifer used for drinking water supply	Open Assessment & Interim Remedial Action
8	419 Hwy 12, Rio Vista, CA 95571	Lust Cleanup Site. Gasoline is the contaminant of concern; contaminated media is an aquifer used for drinking water supply	Open Remediation
9	409 Hwy 12 Rio Vista, CA 94571	LUST Cleanup Site. Gasoline is the contaminant of concern; contaminated media is an aquifer used for drinking water supply	Open - Verification Monitoring
10	210 Hwy 12, Rio Vista, CA 94571	LUST Cleanup Site. Main contaminants of concern include solvent or non-petroleum hydrocarbon. Contaminated media is an aquifer used for drinking water	Open - Verification Monitoring
11	6437 W. Banner Street, Lodi, Ca 95242	The case was opened following an unauthorized release from an underground storage tank system at the subject site.	
12	Jackson Slough Rd @ Inter Of SR-12, Isleton, Ca	Benzene and petroleum are the main contaminants of concern; contaminated media is an aquifer used for drinking water supply.	Open - Verification Monitoring
13	Brockton Place, Rio Vista, CA 94571	Contaminants of concern include SOLVENTs and non-petroleum hydrocarbon.	Open - Verification Monitoring
14	701 Texas Street Fairfield, CA 94533	Contamination consists of benzene, gasoline, toluene in groundwater, soil vapor and soil.	
15	3530 Branscombe Road, Fairfield, CA	Contaminant of concern are lead, solvents, non-petroleum hydrocarbon, perchlorate	Open - Assessment & Interim Remedial Action
16	6111 Lambie Road, Suisun, CA	Contaminants of concern include chromium, copper and nickel (metals) in soil and groundwater.	Open - Verification Monitoring



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Noise

For highway transportation projects with FHWA involvement, the federal-Aid Highway Act of 1970 and the associated implementing regulations (23 CFR 772) govern the analysis and abatement of traffic noise impacts. The regulations require that potential noise impacts in areas of frequent human use be identified during the planning and design of a highway project. The regulations contain noise abatement criteria (NAC) that are used to determine when a noise impact would occur. The NAC differ depending on the type of land use under analysis. For example, the NAC for residences (67 dBA) is lower than the NAC for commercial areas (72 dBA).

In accordance with the Department's Traffic Noise Analysis Protocol for New Highway Construction and Reconstruction Projects, August 2006, a noise impact occurs when the future noise level with the project results in a substantial increase in noise level (defined as a 12 dBA or more increase) or when the future noise level with the project approaches or exceeds the NAC. Approaching the NAC is defined as coming within 1 dBA of the NAC.

If it is determined that a project will have noise impacts, then potential abatement measures must be considered. Noise abatement measures that are determined to be reasonable and feasible at the time of final design are incorporated into the project plans and specifications.

The SR-12 corridor includes a number of receptors that could be impacted by improvements within the corridor. Noise levels for residential, commercial, and church uses within the corridor would need to be compared to the FHWA NAC to determine if abatement measures must be considered.

In Fairfield, east of I-80 to approximately Beck Avenue there are residential receptors north of the SR-12 alignment and commercial uses south of SR-12. Residents on the western portion of the corridor include sound walls under existing conditions; however, as you move eastward along SR-12, the residential uses move farther north providing more separation between the residents and SR-12. Beginning at Ontario Street, uses north of SR-12 do not include sound walls. Residential uses along James Street include existing wood fencing that may provide some noise reduction benefits.

In Suisun City between the railroad tracks and Marina Boulevard, uses adjacent to SR-12 include commercial uses and residents within a mobile home park. The mobile home park includes an existing sound wall. East of Marina Boulevard to just east of Walters Road, residential and commercial uses are adjacent to SR-12, and include existing sound walls for residential uses.

Between Fairfield and Rio Vista there are scattered residential uses, most of which are setback from the roadway and do not include sound walls. In Rio Vista, there are primarily commercial uses, with limited residential receptors.

East of Rio Vista to I-5 there are primarily agricultural uses, with scattered residential uses. At Potato Road, there is a residential development south of SR-12, which includes a sound wall.

Climate Change

While climate change has been a concern since at least 1988, as evidenced by the establishment of the United Nations and World Meteorological Organization's Intergovernmental Panel on Climate Change (IPCC), the efforts devoted to greenhouse gas (GHG) emissions reduction and climate change research and policy have increased dramatically in recent years. These efforts are primarily concerned with the emissions of GHG related to human activity that include carbon dioxide (CO₂), methane, nitrous

oxide, tetrafluoromethane, hexafluoroethane, sulfur hexafluoride, HFC-23 (fluoroform), HFC-134a (s, s, s, 2 –tetrafluoroethane), and HFC-152a (difluoroethane).

In 2002, with the passage of Assembly Bill 1493 (AB 1493), California launched an innovative and pro-active approach to dealing with greenhouse gas emissions and climate change at the state level. Assembly Bill 1493 requires the California Air Resources Board (CARB) to develop and implement regulations to reduce automobile and light truck greenhouse gas emissions. These stricter emissions standards were designed to apply to automobiles and light trucks beginning with the 2009-model year; however, in order to enact the standards California needed a waiver from the U.S. Environmental Protection Agency (EPA). The waiver was denied by Environmental Protection Agency in December 2007 and efforts to overturn the decision had been unsuccessful. See *California v. Environmental Protection Agency*, 9th Cir. Jul. 25, 2008, No. 08-70011. On January 26, 2009, it was announced that EPA would reconsider their decision regarding the denial of California's waiver. On May 18, 2009, President Obama announced the enactment of a 35.5 mpg fuel economy standard for automobiles and light duty trucks which will take effect in 2012. On June 30, 2009 EPA granted California the waiver. California is expected to enforce its standards for 2009 to 2011 and then look to the federal government to implement equivalent standards for 2012 to 2016. The granting of the waiver will also allow California to implement even stronger standards in the future. The state is expected to start developing new standards for the post-2016 model years later this year.

On June 1, 2005, Governor Arnold Schwarzenegger signed Executive Order S-3-05. The goal of this Executive Order is to reduce California's GHG emissions to: 1) 2000 levels by 2010, 2) 1990 levels by the 2020 and 3) 80 percent below the 1990 levels by the year 2050. In 2006, this goal was further reinforced with the passage of Assembly Bill 32 (AB 32), the Global Warming Solutions Act of 2006. AB 32 sets the same overall GHG emissions reduction goals while further mandating that CARB create a plan, which includes market mechanisms, and implement rules to achieve "real, quantifiable, cost-effective reductions of greenhouse gases." Executive Order S-20-06 further directs state agencies to begin implementing AB 32, including the recommendations made by the state's Climate Action Team. With Executive Order S-01-07, Governor Schwarzenegger set forth the low carbon fuel standard for California. Under this executive order, the carbon intensity of California's transportation fuels is to be reduced by at least 10 percent by 2020.

According to *Recommendations by the Association of Environmental Professionals on How to Analyze GHG Emissions and Global Climate Change in CEQA Documents* (March 5, 2007), an individual project does not generate enough GHG emissions to significantly influence global climate change. Rather, global climate change is a cumulative impact. This means that a project may participate in a potential impact through its incremental contribution combined with the contributions of all other sources of GHG. In assessing cumulative impacts, it must be determined if a project's incremental effect is "cumulatively considerable." See CEQA Guidelines sections 15064(i)(1) and 15130. To make this determination the incremental impacts of the project must be compared with the effects of past, current, and probable future projects.

Caltrans and its parent agency, the Business, Transportation, and Housing Agency, have taken an active role in addressing GHG emission reduction and climate change. Recognizing that 98 percent of California's GHG emissions are from the burning of fossil fuels and 40 percent of all human made GHG emissions are from transportation (see Climate Action Program at Caltrans (December 2006), Caltrans has created and is implementing the Climate Action Program at Caltrans that was published in December 2006. This document can be found at: <http://www.dot.ca.gov/docs/ClimateReport.pdf>.

One of the main strategies in the Department's Climate Action Program to reduce GHG emissions is to make California's transportation system more efficient. The highest levels of carbon dioxide from mobile sources, such as automobiles, occur at stop-and-go speeds (0-25 miles per hour) and speeds over 55 mph; the most severe emissions occur from 0-25 miles per hour. To the extent that a project relieves congestion by enhancing operations and improving travel times in high congestion travel corridors GHG emissions, particularly CO₂, may be reduced.

Visual/Aesthetic

Visual resources in the corridor include agricultural landscapes, the Sacramento–San Joaquin Delta and marshlands, oak trees, and grasslands. Major portions of the corridor lack visual obstructions, allowing for expansive views over agricultural fields to the Coast Range west and south west of the corridor, and to Mount Diablo in Contra Costa County south of the corridor. In other portions of the corridor, including portions in the cities of Fairfield, Suisun City, and Rio Vista, only foreground views are present because development and roadside vegetation obstruct middle and background views. The landscape in the urban segments of the corridor generally consists of single-family track homes, one- to two-stories high, with landscaping of shrubs and trees typical of housing developments. Larger light industrial and warehouse uses are also visible along portions of the west end corridor in Fairfield.

According to Caltrans, SR-12 is not on the state list of eligible or officially designated Scenic Routes. In addition, there are no known recognized scenic viewpoints or resources in the corridor. However, projects proposed in the corridor will require analysis to demonstrate compatibility with the existing visual landscape in the corridor.