2.4 Biological Environment

2.4.1 Natural Communities

This section of the document discusses natural communities of concern. The focus of this section is on biological communities, not individual plant or animal species, and their ecological function within the area. This section also includes information on wildlife corridors and habitat fragmentation. Wildlife corridors are areas of habitat used by wildlife for seasonal or daily migration. Habitat fragmentation involves the potential for dividing sensitive habitat and thereby lessening its biological value.

Wetlands and other waters are discussed in **Section 2.4.2**, **Wetlands and Other Waters**. Habitat areas that have been designated as critical habitat under the Federal Endangered Species Act are discussed in **Section 2.4.5**, **Threatened and Endangered Species**.

2.4.1.1 Affected Environment

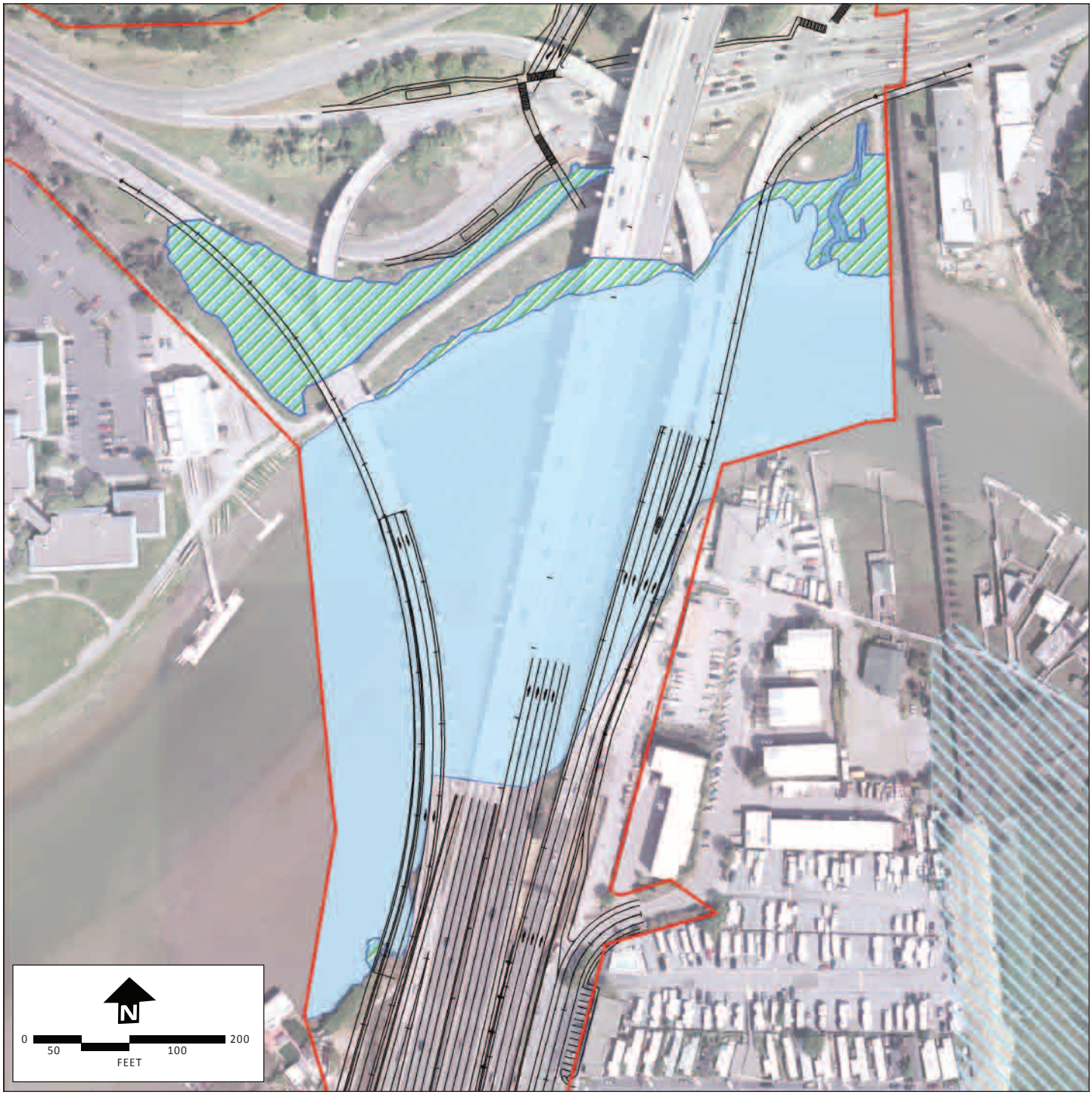
The following analysis is based on the *Natural Environment Study* (NES) completed in April 2012 (Caltrans, 2012b).

The Biological Study Area (BSA) for the Greenbrae/Twin Cities Corridor encompasses all areas of ground disturbance that will occur during the construction of the Build Alternative. The BSA encompasses a total area of 122 acres.

Biologists conducted field surveys of the BSA on April 4 and April 24, 2008; April 23, April 27, June 23, and July 22, 2009; and April 2, 2010, to characterize and map the type and quality of natural communities and sensitive habitat in the study area.

Biologists identified the following eight land cover types within the BSA: paved roadway, landscaping, open water (Corte Madera Creek), ruderal vegetation, developed land (commercial properties), oak/non-native grassland, tidal salt marsh, and other wetlands (emergent wetlands, lagoons/ponds, seasonal wetlands). Historically, the majority of the BSA was dominated by tidal and brackish marsh habitat supported by the outlet of Corte Madera Creek into the San Francisco Bay, with upland habitats located at the northern and southern terminus. Currently, a majority of the salt marshes have been filled, and the BSA has become a highly urbanized transportation corridor with dense commercial and residential development. Within the BSA, only small portions of remnant marsh habitat exist along the edges of Corte Madera Creek, which have been manipulated or hydrologically altered using tide gates (see **Figure 2-17**). A larger portion of remnant tidal salt marsh habitat exists outside of the BSA to the east, bordering the San Francisco Bay, and is known as the Corte Madera Marsh Ecological Preserve (refer to Figures 3-2 and 3-3 in the NES for an illustration of the potential sensitive natural communities outside of the BSA).

Table 2.4-1 lists the acreage of land cover types present within the BSA. Principal characteristics and general locations of these land cover types are presented in the following descriptions. More detailed descriptions of each habitat and vegetation mapping are discussed in the NES.



Legend

Potential Special-Status Species Dispersal & Migratory Habitat within BSA

- **Salt Marsh Vegetation** (California clapper rail, California black rail, Salt marsh harvest mouse)
- **Open Water** (Tidewater goby, Central California Coast steelhead, Central California Coast coho salmon, Central Valley chinook salmon, North American green sturgeon, Longfin smelt)
- **Biological Study Area** (BSA)
- **Tidal Channel** (Tidewater goby, Central California Coast steelhead, Central California Coast coho salmon, Central Valley chinook salmon, North American green sturgeon)
- **Habitat Outside of BSA** (Salt marsh harvest mouse & California clapper rail)*

*Note: Potential habitat outside of BSA is based on reported special-status species occurences in the California Natural Diversity Database (CNDDB).

Suitable Habitat for Special-Status Species within the BSA

Figure **2-17**

Source: Natural Environment Study, 2012b.

Table 2.4-1: Land Cover Types and Amounts in the BSA

Land Cover Type	Area (ac)*	Percent of Total Area
Roadway/Paved	67	55%
Developed (commercial property)	7	6%
Landscaping	22	18%
Open Water (Corte Madera Creek)	10	8%
Ruderal	9	7%
Oak/Non-native grassland	4	3%
Salt Marsh (NCSM)	2	2%
Wetland/Other Waters (lagoons, seasonal wetlands, etc.)	1	1%
Approximate Total	**122**	**100%**

Landscaped

Approximately 18 percent of the BSA is characterized by ornamental landscaping. This natural community is dominated by ornamental shrubs (e.g., oleander and unknown horticultural species), native and non-native trees (e.g., sweetgum, eucalyptus, redwood, and pines), and nonnative groundcover and grasses (e.g., iceplant, ripgut brome). This ornamental landscaping is primarily found along the freeway and the local roadways within the BSA.

Ruderal Vegetation

Approximately 7 percent of the BSA is characterized as ruderal vegetation. Ruderal is the term used to describe roadside vegetation composed of primarily upland weedy, non-native grasses and forbs. It is distinguished from landscaped areas because it is highly disturbed and dominated by invasive weedy species. Species observed in this vegetation community include bromes (*Bromus hordeaceus, B. diandrus*), wild radish (*Raphanus sativus*), bristly ox-tongue (*Picris echioides*), and sweet fennel (*Foeniculum vulgare*).

Oak/Non-native Grassland

Approximately 3 percent of the BSA is made up of remnant oaks and nonnative grassland. This area is located north of Corte Madera Creek and is fragmented into small islands along US 101 and Sir Francis Drake Boulevard. This natural community is dominated by coast live oaks (*Quercus agrifolia*) with a few, interspersed Monterey Pines (*Pinus radiata*), and ornamental trees. The understory is made up of non-native grasses, including slender wild oat (*Avena barbata*), soft-chess and ripgut bromes, Mediterranean barley (*Hordeum marinum ssp. gussoneanum*), and Italian ryegrass (*Festuca perennis*). The nonnative forbs wild radish, Italian thistle (*Carduus pycnocephalus*), and stork's bill (*Erodium cicutarium*) were also prevalent.

Northern Coastal Salt Marsh

Approximately 2 percent of the BSA is made up of the northern coastal salt marsh (NCSM) community. This area is predominantly located along the northern bank of Corte Madera Creek. However, most of the NCSM has been hydrologically manipulated by man-made dikes and tide gates or has been fragmented by roads. The vegetation found in the NCSM represents plant types typical of a tidally influenced marsh. Cordgrass (*Spartina sp*.), pickleweed (*Salicornia pacifica*) and saltgrass (*Distichlis spicata*) are found along the tide channel edges. Other plants found in this natural community include fleshy jaumea (*Jaumea carnosa*), alkali heath (*Frankenia salina*), and marsh rosemary (*Limonium californicum*).

Wetlands and Other Waters

Corte Madera Creek is a brackish (both salt water and fresh water) creek that receives freshwater runoff from upstream and tidal influences from the San Francisco Bay. It is a perennial watercourse, and is considered to be a "Traditional Navigable Waterway" by the USACE. The creek bisects the BSA near the northern terminus of the study area, is approximately 300 feet wide, and makes up approximately 8 percent of the total area of the BSA. In addition, there are a few tidal channels that originate from Corte Madera Creek, which run north through tidal salt marsh habitat. One of the tidal channels is separated from the creek by a tide gate.

In addition to Corte Madera Creek and the NCSM, there are other types of wetlands and waters found in the BSA, making up approximately 1 percent of the BSA. These features include seasonal wetlands, emergent wetlands, lagoons, ponds, and small drainages. All of these features are a result of man-made manipulation. The lagoons and ponds are controlled by tide gates or culverts and are hydrologically connected to either Corte Madera Creek or the San Francisco Bay. The seasonal and emergent wetlands are found in the drainages built along the shoulders of US Highway 101 or in the intersections within the highway right-of-way. Vegetation identified in these wetland features includes rabbit-foot grass (*Polypogon monspeliensis*), Italian ryegrass (*Festuca perennis*), American bulrush (*Schoenoplectus*), cattail (*Typha latifolia*), spreading rush (*Juncus patens*), and brass-buttons (*Cotula coronopifolia*). One large pond, known as Edgewater Lagoon is located west of US 101 and is approximately 0.5-acre and is perennially ponded. It is influenced by a tide gate and culvert that runs under US 101.

Sensitive Natural Communities

Within the BSA, NCSM was the only natural community of special concern identified in the California Natural Diversity Database (CNDDB) search of the United States Geological Survey (USGS) San Rafael 7.5-minute quadrangle and seven surrounding maps (San Quentin, San Francisco North, Point Bonita, Bolinas, San Geronimo, Novato, and Petaluma Point). The occurrence of NCSM within the BSA is described above.

Wildlife Corridors

With the exception of the remnant tidal marsh communities, there are no other undisturbed natural communities (i.e., intact vegetation communities found naturally in California) in the BSA. Much of the natural communities that were identified in the BSA are a result of landscaping efforts along US 101

within the highway right-of-way and consist generally of disturbed terrestrial and aquatic areas. However, despite alterations to Corte Madera Creek, it continues to support habitat for plants and wildlife ranging from breeding and dispersal habitats to migratory pathways for many species in the region.

The BSA is not within any regional conservation plans, such as habitat conservation plans or multiple species conservation plans.

2.4.1.2 Environmental Consequences

Build Alternative

Adverse effects related to wetlands and other waters of the U.S., including NCSM habitat, are discussed in **Section 2.4.2, Wetlands and Other Waters** below. Adverse effects related to special-status plant and animal species associated with the natural communities of the BSA are discussed in **Sections 2.4.3, Plant Species**; **2.4.4, Animal Species**; and **2.4.6, Invasive Species**.

No-Build Alternative

The No-Build Alternative will make no physical or operational improvements to US 101 or the connecting roadways within the BSA, and will therefore avoid the effects to natural communities associated with the Build Alternative.

2.4.1.3 Avoidance Minimization, and/or Mitigation Measures

Avoidance, minimization, and/or mitigation measures related to wetlands and other waters of the U.S., including NCSM habitat, are discussed in **Section 2.4.2, Wetlands and Other Waters** below. Measures related to potential adverse effects to special-status plant and animal species associated with the natural communities of the BSA are discussed in **Sections 2.4.3, Plant Species; 2.4.4, Animal Species**; and **2.4.6**, **Invasive Species**.

2.4.2 Wetlands and Other Waters

2.4.2.1 Regulatory Setting

Wetlands and other waters are protected under a number of laws and regulations. At the federal level, the Federal Water Pollution Control Act, more commonly referred to as the Clean Water Act (CWA) (33 United States Code [USC] 1344) is the primary law regulating wetlands and surface waters. One purpose of the CWA is to regulate the discharge of dredged or fill material into waters of the United States (U.S.), including wetlands. Waters of the U.S. include navigable waters, interstate waters, territorial seas and other waters that may be used in interstate or foreign commerce. To classify wetlands for the purposes of the CWA, a three-parameter approach is used that includes the presence of hydrophytic (water-loving) vegetation, wetland hydrology, and hydric soils (soils formed during saturation/inundation). All three parameters must be present, under normal circumstances, for an area to be designated as a jurisdictional wetland under the CWA.

Section 404 of the CWA establishes a regulatory program that provides that discharge of dredged or fill material cannot be permitted if a practicable alternative exists that is less damaging to the aquatic environment or if the nation's waters would be significantly degraded. The Section 404 permit program

is run by the U.S. Army of Engineers (USACE) with oversight by the United States Environmental Protection Agency (U.S. EPA).

USACE issues two types of 404 permits: Standard and General permits. There are two types of General permits, Regional permits and Nationwide permits. Regional permits are issued for a general category of activities when they are similar in nature and cause minimal environmental effect. Nationwide permits are issued to authorize a variety of minor project activities with no more than minimal effects.

There are two types of Standard permits: Individual permits and Letters of Permission. Ordinarily, projects that do not meet the criteria for a Nationwide Permit may be permitted under one of USACE's Standard permits. For Standard permits, the USACE decision to approve is based on compliance with U.S. EPA's Section 404(b)(1) Guidelines (U.S. EPA 40 CFR Part 230), and whether permit approval is in the public interest. The Section 404 (b)(1) Guidelines were developed by the U.S. EPA in conjunction with USACE, and allow the discharge of dredged or fill material into the aquatic system (waters of the U.S.) only if there is no practicable alternative which would have less adverse effects. The Guidelines state that USACE may not issue a permit if there is a least environmentally damaging practicable alternative (LEDPA) to the proposed discharge that would have lesser effects on waters of the U.S., and not have any other significant adverse environmental consequences.

The Executive Order for the Protection of Wetlands (EO 11990) also regulates the activities of federal agencies with regard to wetlands. Essentially, this EO states that a federal agency, such as the FHWA and/or Caltrans, as assigned, cannot undertake or provide assistance for new construction located in wetlands unless the head of the agency finds: 1) that there is no practicable alternative to the construction and 2) the proposed project includes all practicable measures to minimize harm.

At the state level, wetlands and waters are regulated primarily by the California Department of Fish and Game (CDFG), the State Water Resources Control Board (SWRCB) and the Regional Water Quality Control Boards (RWQCB). In certain circumstances, the Coastal Commission (or Bay Conservation and Development Commission) may also be involved. Sections 1600-1607 of the California Fish and Game Code require any agency that proposes a project that will substantially divert or obstruct the natural flow of or substantially change the bed or bank of a river, stream, or lake to notify CDFG before beginning construction. If CDFG determines that the project may substantially and adversely affect fish or wildlife resources, a Lake or Streambed Alteration Agreement will be required. CDFG jurisdictional limits are usually defined by the tops of the stream or lake banks, or the outer edge of riparian vegetation, whichever is wider. Wetlands under jurisdiction of the USACE may or may not be included in the area covered by a Streambed Alteration Agreement obtained from the CDFG.

The RWQCBs were established under the Porter-Cologne Water Quality Control Act to oversee water quality. The RWQCB also issues water quality certifications for impacts to wetlands and waters in compliance with Section 401 of the CWA. Please see the Water Quality section for additional details.

2.4.2.2 Affected Environment

The following analysis is based on the NES completed in April 2012 (Caltrans, 2012b). Wetland delineations were conducted within the BSA by consultant biologists on April 23, April 27, and July 22, 2009, as well as on April 2, 2010. The delineations were conducted in accordance with the U.S. Army

Corps of Engineers (USACE) guidance. A preliminary *Wetland Delineation Report* is provided in Appendix A of the NES.

As shown in **Table 2.4-2**, Waters of the U.S. occupy approximately 13.11 acres of the BSA. All conclusions regarding jurisdictional status are preliminary and subject to verification by the USACE and the State. Detailed mapping of the jurisdictional areas is included in the *Wetland Delineation Report*.

Table 2.4-2: Total Waters of the United States (WUS) identified in the BSA

Waters of the United States (WUS) Type	Acres
Total Emergent Wetlands	0.79
Total Seasonal Wetlands	0.02
Total Northern Coastal Salt Marsh Wetlands	2.11
Total Wetlands	2.92
Total Relatively Permanent Waters	0.04
Total Open Water	0.59
Total Corte Madera Creek & tide channels	9.56
Total Waters	10.19
Total WUS	**13.11**

Potentially jurisdictional aquatic features identified within the BSA consist of the following: NCSM wetlands, emergent wetlands, seasonal wetlands, ponds, non-relatively permanent waters, relatively permanent waters, Corte Madera Creek and the Creek's tide channels.

2.4.2.3 Environmental Consequences

Build Alternative

Areas of temporary and permanent impacts to waters of the U.S. are described in **Table 2.4-3**. Temporary impacts are activities that will temporarily remove one or more of a habitat's essential components for special-status species. However, the habitat will be restored to pre-project conditions of equal or greater habitat value upon completion of the Build Alternative activities. According to the Sacramento Field Office of the USFWS, for impacts to be considered temporary, the affected habitat of the listed species must be totally restored within one season or one year from the date of project-related disturbances. For the proposed Build Alternative, the contractor may need access to the BSA for a duration exceeding one year and it cannot be guaranteed that habitat will be restored within one season. For the proposed project, when the habitat is replanted after construction activities are completed, vegetation height, density, and overall cover quality would not return to preconstruction conditions for a few years, and would not provide the essential habitat components necessary to support special-status species for several years after the initial disturbance. Therefore, most construction-related impacts are characterized as permanent. Permanent impacts are anticipated to be caused by removal of vegetation, increased shading, and placement of fill material (i.e. bridge piles) within Corte Madera Creek.

Direct Impacts

The proposed widening of the SB US 101/Sir Francis Drake Boulevard on-ramp will require approximately 45 permanent, cast-in-shell-steel piles, estimated to be 16 inches in diameter, to be placed

in Corte Madera Creek. The on-ramp improvements will also require temporary scaffolding to support construction equipment and workers. Approximately 228 temporary steel scaffolding piles, estimated to be 24 inches in diameter, will be placed in and around Corte Madera Creek to support the construction scaffolding. The placement of scaffolding support pilings for construction in this area will result in less than 0.02 acres (715 square feet) of direct, permanent impacts to the Corte Madera Creek. In addition, less than 0.02 acres (776 square feet) of NCSM may be permanently impacted by construction activities planned along the south shore of Corte Madera Creek. Upon completion of construction, the area will be allowed to naturally return to pre-construction conditions.

The proposed northbound auxiliary lane from the existing NB US 101/Tamalpais Drive on-ramp to the new NB US 101/Wornum Drive off-ramp, and proposed Wornum Drive ramp improvements, will result in the fill of approximately 0.1 acre (4,356 square feet) of emergent and seasonal wetlands and 0.06 acre (2,613 square feet) of open water.

Table 2.4-3: Areas of Temporary and Permanent Impacts (Fills) to Waters of the United States

Waters of the US	Permanent Impacts		Temporary Impacts	
	Direct Impacts[1]	Indirect Impacts[2]	Direct Impacts	Indirect Impacts
NCSM	<0.02 ac (776 ft^2)	<0.02 ac (879 ft^2)	N/A	N/A
Emergent and Seasonal Wetlands	0.10 ac (4,356 ft^2)	N/A	N/A	N/A
Other Waters (Ponds/Standing Water)	0.06 ac (2,613 ft^2)	N/A	N/A	N/A
Corte Madera Creek	0.001 ac (63 ft^2)	N/A	<0.02 ac (715 ft^2)	N/A
Total Impacts to WUS	0.18 ac (7,808 ft^2)	-	<0.02 ac (715 ft^2)	-

Notes: Impacts are subject to change and will be finalized prior to CWA Section 404 permit issuance.
[1] Acres are rounded to the nearest hundredth and therefore square footage is provided for greater accuracy.
[2] Impacts are calculated per USACE jurisdictional considerations (i.e., amount of permanent fill material within a WUS).

Direct Impacts

The proposed widening of the SB US 101/Sir Francis Drake Boulevard on-ramp will require approximately 45 permanent, cast-in-shell-steel piles, estimated to be 16 inches in diameter, to be placed in Corte Madera Creek. The on-ramp improvements will also require temporary scaffolding to support construction equipment and workers. Approximately 228 temporary steel scaffolding piles, estimated to be 24 inches in diameter, will be placed in and around Corte Madera Creek to support the construction scaffolding. The placement of scaffolding support pilings for construction in this area will result in less than 0.02 acres (715 square feet) of direct, permanent impacts to the Corte Madera Creek. In addition, less than 0.02 acres (776 square feet) of NCSM may be permanently impacted by construction activities planned along the south shore of Corte Madera Creek. Upon completion of construction, the area will be allowed to naturally return to pre-construction conditions.

The proposed northbound auxiliary lane from the existing NB US 101/Tamalpais Drive on-ramp to the new NB US 101/Wornum Drive off-ramp, and proposed Wornum Drive ramp improvements, will result in the fill of approximately 0.1 acre (4,356 square feet) of emergent and seasonal wetlands and 0.06 acre (2,613 square feet) of open water.

San Francisco Bay Conservation and Development Commission Jurisdiction

The segment of Corte Madera creek in the BSA falls under BCDC's Bay jurisdiction, which defines fill differently than the USACE. In accordance with BCDC regulation, fill is defined as "earth or any other substance or material, including pilings or structures placed on pilings, and structures floating at some or all times and moored for extended periods, such as houseboats and floating docks." Therefore, jurisdictional waters that are displaced by the placement of pilings in Corte Madera Creek, and additional surface areas created from widening of the bridges, is considered fill pursuant to BCDC. The Build Alternative may add 0.31 acres (13,638 square feet) of additional permanent surface area "fill" and 0.5 acres (21,780 square feet) of additional temporary surface area "fill" placed on pilings over Corte Madera Creek; and 22,619 cubic feet of permanent displaced volume "fill" (assuming 16 inch diameter, 90 foot long piles) and 64,179 cubic feet of temporary displaced volume "fill" (assuming 24 inch diameter, 90 foot long temporary piles).

Indirect Impacts

Indirect impacts from the widening of the SB US 101/Sir Francis Drake Boulevard on-ramp may result from increasing the shading over existing NCSM habitat. Permanent shading over NCSM habitat is estimated to be less than 0.02 acres (657 square feet).

Indirect impacts to the wetlands and other waters within the BSA could occur during construction. Potential fluid leaks from construction workers parking their vehicles in close proximity to this habitat could result in harmful run-off that degrades the water quality and soil conditions. Erosion during and after construction work that involves grading and other earth moving activities can contribute large amounts of sediment and silt to storm water runoff, which can deteriorate the water quality of the wetlands and other waters that receive storm water from the study area.

No-Build Alternative

The No-Build Alternative will make no physical or operational improvements to US 101 or the connecting roadways within the BSA, and will therefore avoid the effects to wetlands and waters of the U.S. associated with the Build Alternative.

2.4.2.4 Avoidance Minimization, and/or Mitigation Measures

To reduce the potentially adverse effects of the Build Alternative on wetlands and other waters, the following minimization and mitigation measures will be implemented.

Establish Boundary for Work Area within Sensitive Habitat

Prior to the start of construction, barrier fencing will be established around all waters of the U.S. to delineate the boundary between where construction activities are allowed and prohibited. The fencing will prevent construction encroachment into the surrounding prohibited areas. The final project plans will depict the locations where fencing will be installed and how it will be installed. The special provisions of the bid package will clearly describe acceptable fencing material and prohibited construction-related activities, vehicle operation, material and equipment storage, and other surface-disturbing activities. In addition, hydrologic features (i.e., topographic depressions, roadside ditches, culverts, etc.) outside the BSA will not be manipulated (i.e., re-routed, dredged, filled, graded, etc.). This will reduce potential

impacts to wetlands outside of the BSA that may be hydrologically connected to wetlands within the BSA.

Implement Erosion control Measures and Storm Water Pollution Prevention Plans

In conformance with Caltrans' standards, Storm Water Pollution Prevention Plans (SWPPP) that includes erosion control best management practices (BMPs) will be developed to minimize any wind or water-related erosion. The SWPPP will provide guidance for design staff to include provisions in construction contracts to include measures to protect sensitive areas and to prevent and minimize storm water and non-storm water discharges. The Build Alternative will be constructed in a manner that avoids erosion and prevents accumulation of silt in drainage ways. This may be done through the use of erosion dams, temporary ground covers, and detention or settling structures. An erosion control plan will be incorporated into the SWPPP. Protective measures will include, at a minimum:

- No discharge of pollutants from vehicle and equipment cleaning will be allowed into the storm drain or water courses.
- Vehicle and equipment fueling and maintenance operations must be at least 100 feet from water courses, unless separated by a topographic or drainage barrier.
- Concrete waste will not be allowed into water courses and will be collected in washouts. Water from curing operations will be properly disposed of offsite.
- Dust control measures will be implemented, including the use of water trucks and the application of tackifiers to control dust in excavation and fill areas, rocking temporary access road entrances and exits, and covering temporary stockpiles when required.
- Coir rolls will be installed along or at the base of slopes during construction to capture sediment.
- Protection of graded areas from erosion will occur using a combination of silt fences, fiber rolls along toe of slopes or along edges of designated staging areas, and erosion control netting (such as jute or coir) as appropriate on sloped areas.
- Use of bio-filtration strips and swales to receive stormwater discharges from the adjacent roadway, or other impervious surfaces will be incorporated.

Restrictions on Construction Activities

The following restrictions on construction activities will be implemented to avoid or minimize effects on wetlands within the BSA:

- A speed limit of 15 miles per hour in unpaved areas of the BSA will be enforced to reduce dust and excessive soil disturbance.
- Construction staging, storage, and parking areas will be located within the existing right-of-way and outside of any prohibited work areas. Access routes and the number and size of staging and work areas will be limited to the minimum necessary to construct the proposed project. Routes and boundaries of roadwork will be clearly marked prior to initiating construction or grading.
- All food and food-related trash items will be enclosed in sealed trash containers and removed completely from the site at the end of each day.

- No pets from construction and project personnel will be allowed anywhere in the proposed project work area during construction.
- No firearms will be allowed on the project site except for those carried by authorized security personnel or local, state, or federal law enforcement officials.
- All equipment will be maintained to prevent leaks of automotive fluids such as gasoline, oils, or solvents. A Spill Response Plan will be prepared. Hazardous materials such as fuels, oils, solvents, etc. will be stored in sealable containers and designated locations at least 100 feet (30 m) from wetlands and aquatic habitats.
- Servicing of vehicles and construction equipment including fueling, cleaning, and maintenance will occur at least 100 feet (30 m) from any aquatic habitat, unless the activities are separated by topographic or drainage barrier or unless the activities are located at an already existing gas station. Staging areas may occur closer to the proposed project activities as required.
- Construction in inundated drainage will be conducted with coffer dams to isolate dewatered areas from active channel habitats.
- Use of herbicides will be restricted in the prohibited areas (i.e., tidal salt marsh habitat).

All slopes or unpaved areas temporarily affected by the project will be reseeded with native grasses and shrubs to stabilize the slopes and bare ground against erosion. Following construction, native (and non-native if appropriate) plant species will be planted at the disturbed area.

In-water Work Avoidance Construction Timeline

Work within Corte Madera Creek up to the mean higher high water line, or any inundated drainage or channel hydrologically connected to Corte Madera Creek, will be conducted outside the accepted salmon and steelhead migratory period of October 15 through June 15. This timeline also incorporates the standard avoidance timeline of the Central and Northern California rainy season of October 15 through April 15. In-water work during October 15 through June 15 will be avoided, but work may occur if prior authorizations from the permitting agencies with jurisdiction are obtained.

Work within upland areas (i.e., not in-water work) conducted during the rainy season will require the implementation of BMPs described in the SWPPP.

Restore Flows Following the Completion of Construction

Following the construction of the Build Alternative, all materials used to maintain flow and divert water from the BSA during the construction period, including coffer dams, pipes, filter fabric, fill material, and gravel, will be removed. All excess soil will be disposed at an approved upland site.

Mitigation Measure BIO-1: Restoration of Wetland Habitat

Caltrans shall coordinate with USACE, USFWS, and CDFG to establish mitigation measures to offset impacts to tidal salt marsh and designated waters of the U.S. in accordance with Section 404 and Section 401 of the CWA and Porter-Cologne Water Quality Control Act, Federal Endangered Species Act (FESA), and California Endangered Species Act (CESA). Permanent, direct impacts to waters of the U.S. shall be mitigated through the restoration or creation of wetland habitat. For this area, habitat shall be created, restored, or preserved at a proposed 1:1 ratio. Alternately, mitigation credits

may be purchased through an approved mitigation bank, if available. If no mitigation bank is available, mitigation may be accomplished through support of existing or planned conservation projects. This mitigation shall be implemented through coordination with the USACE, USFWS, CDFG, and RWQCB, and is subject to review and approval.

Mitigation Measure BIO-2: Replant/Re-Seed Salt Marsh Habitat

All salt marsh habitat along the banks of Corte Madera Creek temporarily affected by the Build Alternative shall be planted or re-seeded with native grasses and plant species to stabilize the slopes and bare ground against erosion. Examples include: saltgrass (*Distichlis spicata*), dwarf spikerush (*Eleocharis parvula*), alkali heath (*Frankenia salina*), marsh gumplant (*Grindelia stricta*), and pickleweed (*Salicornia pacifica*). This may include hydro seeding and shall occur after ground disturbing construction activities are completed. The plant selection and reseeding efforts shall be clearly identified in a project-specific mitigation and monitoring plan approved by the USACE and RWQCB.

2.4.3 Plant Species

2.4.3.1 Regulatory Setting

The United States Fish and Wildlife Service (USFWS) and California Department of Fish and Game (CDFG) have regulatory responsibility for the protection of special-status plant species. "Special-status" species are selected for protection because they are rare and/or subject to population and habitat declines. Special status is a general term for species that are afforded varying levels of regulatory protection. The highest level of protection is given to threatened and endangered species; these are species that are formally listed or proposed for listing as endangered or threatened under the Federal Endangered Species Act (FESA) and/or the California Endangered Species Act (CESA). Please see **Section 2.4.5, Threatened and Endangered Species,** for detailed information regarding these species.

This section of the document discusses all the other special-status plant species, including CDFG and species of special concern, USFWS candidate species, and California Native Plant Society (CNPS) rare and endangered plants.

The regulatory requirements for FESA can be found at United States Code (USC) 16, Section 1531, et. seq. See also 50 CFR Part 402. The regulatory requirements for CESA can be found at California Fish and Game Code, Section 2050, et. seq. Caltrans' projects are also subject to the Native Plant Protection Act, found at California Fish and Game Code, Section 1900-1913, and the California Environmental Quality Act, CEQA, Public Resources Code, Sections 2100-21177.

2.4.3.2 Affected Environment

The following analysis is based on the NES completed in April 2012 (Caltrans, 2012b). The identification of special-status plant species with potential to occur in the region was based on a search of the USFWS Species List Database, the CNDDB, and the California Native Plant Society's (CNPS) Inventory of Rare and Endangered Plants for the San Rafael 7.5-minute quadrangle and seven surrounding maps (San Quentin, San Francisco North, Point Bonita, Bolinas, San Geronimo, Novato, and Petaluma Point).

The database searches identified nine special-status plant species that could potentially occur in the region (see Table 3-2 of the NES). Spring and summer botanical surveys were conducted in 2008 in order to identify any special-status plants with the potential to occur in the BSA. Focused salt marsh-specific surveys were conducted in June 2009. No special-status plants were identified during the surveys.

2.4.3.3 Environmental Consequences

Build Alternative

The majority of the BSA is composed of relatively disturbed land, which is either developed or is dominated by non-native species. Since there are no known special-status plant species occurrences within the BSA, there will be no adverse effects from the proposed Build Alternative.

No-Build Alternative

The No-Build Alternative will make no physical or operational improvements to US 101 or the connecting roadways within the BSA. Implementation of the currently planned and funded transportation projects outside the BSA but within Marin County will be subject to the same potential presence of special-status plant species as the Build Alternative, since they will occur in the same general region. These projects will be required to comply with the USFWS and CDFG requirements regarding protected plant species, should those species be identified within areas that will be directly or indirectly affected. The potential presence of special status plant species in areas outside of the BSA will be determined under separate environmental review.

2.4.3.4 Avoidance Minimization, and/or Mitigation Measures

No minimization or mitigation measures are required.

2.4.4 Animal Species

2.4.4.1 Regulatory Setting

Many state and federal laws regulate impacts to wildlife. The US Fish and Wildlife Service (USFWS), the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA Fisheries Service) and the California Department of Fish and Game (CDFG) are responsible for implementing these laws. This section discusses potential impacts and permit requirements associated with animals not listed or proposed for listing under the state or federal Endangered Species Act. Species listed or proposed for listing as threatened or endangered are discussed in **Section 2.4.5, Threatened and Endangered Species,** below. All other special-status animal species are discussed here, including CDFG fully protected species and species of special concern, and USFWS or NOAA Fisheries Service candidate species.

Federal laws and regulations pertaining to wildlife include the following:

- National Environmental Policy Act
- Migratory Bird Treaty Act
- Fish and Wildlife Coordination Act

State laws and regulations pertaining to wildlife include the following:

- California Environmental Quality Act
- Sections 1600 – 1603 of the Fish and Game Code
- Sections 3511 and 4700 of the Fish and Game Code
- Sections 4150 and 4152 of the Fish and Game Code

2.4.4.2 Affected Environment

The identification of special status animal species with potential to occur in the region was based on a search of the USFWS Species List Database, and the CNDDB for the eight USGS quadrangles within the BSA, as well as field reconnaissance surveys, habitat assessments, and the wetland delineation survey completed for the project. The results of these efforts are further discussed in the appropriate sections below, and are documented in the NES.

The database searches identified 154 special-status wildlife species that could potentially occur in the region. Appendix E of the NES lists each of these species and describes whether or not the species could occur in the BSA. Of these 154 species, 27 special-status wildlife species have the potential to occur in the BSA (see **Appendix E**). Nine of those species are listed as endangered or threatened under CESA or FESA and are described in **Section 2.4.5, Threatened and Endangered Species.** The remaining 17 special-status species are described in this section.

Fully Protected Animals

Four species with potential to occur in the BSA are designated as Fully Protected under Fish and Game code 3511 and 4700: California brown pelican (*Pelicanus occidentalis californicus*), California clapper rail (*Rallus longirostris obsoletus*), California black rail (*Laterallus jamaicensis coturniculus*), and salt marsh harvest mouse (*Reithrodontomys raviventris*). All but the California brown pelican are listed as threatened or endangered and are described in **Section 2.4.5, Threatened and Endangered Species**.

The California brown pelican was listed as federally endangered in 1970 and state endangered in 1971. Due to its recovery, it was classified as recovered and delisted from both the CESA and FESA in 2009; however it still remains listed as a California Fully Protected Animal. The California brown pelican is also considered a migratory bird and is protected accordingly. Pelicans breed in colonies on islands without mammal predators and build nests of sticks on the ground. In California, they feed on sardines, mackerels and anchovies. There is no breeding habitat located in the BSA; however Corte Madera Creek and the surrounding marsh habitat may be used as foraging habitat.

Migratory Birds

The Build Alternative will be located adjacent to the San Francisco Bay, which is part of the Pacific Flyway bi-annual waterfowl migration route. The marshes and mudflats of the San Francisco Bay, in the Town of Corte Madera, provide feeding and roosting habitat for many migratory birds. Several special-status birds may forage and/or nest in non-native grassland, riparian, or other vegetation communities within or adjacent to the BSA.

Approximately 831 trees, representing more than 20 different species are found throughout the BSA, which may be used by migratory birds for nesting.[1] Most, if not all, of the trees identified in the BSA have been planted as landscaping along roadways.[2] Dominant native tree species include coast live oak (*Quercus agrifolia*), coast redwood (*Sequoia sempervirens*), and western sycamore (*Platanus racemosa*). Dominant non-native tree species include Monterey pine (*Pinus radiata*), acacia/wattle (*Acacia sp*.), eucalyptus (*Eucalyptus sp*.), and cultivated landscape trees (New Zealand myoporum [*Myoporum laetum*], fruit trees [*Prunus sp*.], pepper tree [*Schinus molle*], and evergreen ash [*Fraxinus uhdei*]).

The Migratory Bird Treaty Act (16 USC 703) protects migratory birds, their occupied nests, and their eggs. The following special-status bird species have potential to occur in the BSA and are included in the Migratory Bird Treaty Act list of protected birds: California brown pelican, Great egret (*Ardea alba*), Great blue heron (*Ardea herodias*), Northern harrier (*Circus cyaneus*), snowy egret (*Egretta thula*), white-tailed kite (*Elanus leucurus*), saltmarsh common yellowthroat (*Geothlypis trichas sinuosa*), California black rail, Alameda song sparrow (*Melospiza melodia pusillula*), San Pablo song sparrow (*Melospiza melodia samuelis*), black-crowned night heron (*Nycticorax nycticorax*), double-crested cormorant (*Phalacrocovax auritus*), and California clapper.

Western Red Bat

The western red bat (*Lasiurus blossevillii*) is a state species of concern with marginal habitat available in the BSA. This species commonly roosts along the edges of streams or open fields, in orchards, and sometimes in urban areas. The railroad trestle and bridges in the BSA (north of Corte Madera Creek) may serve as roosting structures for this species. However, due to their sensitivity to disturbance, it is unlikely that these structures will provide suitable roosting habitat. There have been no reported occurrences of western red bat in Marin County. The closest and only reported occurrence in the region is 12 miles south of the BSA, in San Francisco. This species is inferred to be absent from the BSA due to lack of suitable habitat and is, therefore, not discussed further in this section.

Hoary Bat

The hoary bat (*Lasiurus cinereus*) is a state species of concern with marginal habitat available in the BSA. The hoary bat roosts in dense foliage of medium to large trees. Due to the highly disturbed nature of the BSA, this species is unlikely to roost in the trees within the area. In addition, the only reported occurrence of the species in the region was last reported in 1948, and is 3 miles west of the BSA. This species is inferred to be absent from the BSA, and is therefore not discussed further in this section.

Suisun Shrew, Salt-Marsh Wandering Shrew, and San Pablo Vole

The Suisun shrew (*Sorex ornatus sinuosus*), the salt-marsh wandering shrew (*Sorex vagrans halicoetes*), and the San Pablo vole (*Microtus californicus sanpabloensis*) are state species of concern with marginal

[1] Trees in the BSA were identified and mapped if they met the following criteria: 1) Native trees with a diameter breast height (DBH) of 4 inches, or greater; 2) Non-native trees with a DBH of 10 inches, or greater; or 3) Multi-trunk native or non-native trees with trunks smaller than 4 inches DBH and 10 inches DBH respectively, if all trunks combined equaled at least 4 inches or 10 inches DBH. The species, location, number, and size (diameter at breast height [DBH]) were recorded and are included in Appendix B of the NES.

[2] There are no trees proposed for removal within CDFG's Section 1600 jurisdiction.

habitat available in the BSA. These species inhabit salt and brackish marshes. The Suisun shrew is known to inhabit marshes along the north shore of San Pablo and Suisun bays, which is approximately 12 to 14 miles north of the BSA. The saltmarsh wandering shrew and the San Pablo vole are known to inhabit the salt marshes of San Pablo Creek and along the eastern shore of San Pablo Bay, located 6 miles east of the BSA, across the San Francisco Bay. All three species are dependent upon dense cover of pickleweed and upland refuge areas to escape the tides. According to the CNDDB, there are no reported occurrences of these species within Marin County or the San Rafael Quadrangle. In addition, there are no adequate upland refuge areas available in the BSA. These species are inferred to be absent from the BSA because of the extreme habitat fragmentation and lack of suitable upland refuge areas. Additionally, the BSA is outside of the species' reported ranges. Therefore, these species are not discussed further in this section.

2.4.4.3 Environmental Consequences

Build Alternative

Migratory Birds

The BSA contains tidal salt marsh, trees, and shrubs that may be used by migratory birds for nesting and foraging. Direct impacts to migratory bird habitat is anticipated due to tree trimming and removal, temporary construction activities (i.e., noise disturbance, ground vibrations, and dust generated from use of heavy equipment within the BSA), and placement of permanent structures throughout the BSA. Additionally, a small amount of NCSM that may be potentially suitable migratory bird foraging habitat may be impacted by the construction of the SB US 101/Sir Francis Drake Boulevard on-ramp. Impacts to migratory birds are described in **Table 2.4-4**.

Table 2.4-4: Temporary and Permanent Impacts to Migratory Birds and Their Habitat

<table>
<tr><th colspan="2">Permanent Impacts</th><th colspan="2">Temporary Impacts</th></tr>
<tr><th>Direct Impacts</th><th>Indirect Impacts</th><th>Direct Impacts</th><th>Indirect Impacts</th></tr>
<tr><td>Permanent removal of potential foraging habitat of <0.02 ac (776 ft^2) of NCSM vegetation</td><td>Increased shading of <0.02 ac (879 ft^2) over potential NCSM foraging habitat</td><td rowspan="3">Potential noise disturbances from general construction and impact pile driving</td><td rowspan="3">N/A</td></tr>
<tr><td>254 Trees removed</td><td rowspan="2">Increased shading of 0.31 ac (13,638 ft^2) over Corte Madera Creek</td></tr>
<tr><td>7.8 ac (339,768 ft^2) of total landscaping (trees, shrubs, groundcover) removal. Approximately 5.8 acres fall within the Caltrans right-of-way.</td></tr>
</table>

An estimated 254 trees may be impacted by construction of the proposed Build Alternative. This number may change depending on final design approval. **Figures 2-11a** through **2-11c** in **Section 2.2.6, Visual/Aesthetics,** depict the location of the trees that may be impacted by construction of the Build Alternative. The impacted trees include 172 trees located within Caltrans right-of-way (covering approximately 1.4 acres), 70 trees located in Corte Madera, one tree located in unincorporated Marin

County (Greenbrae), and 11 trees located in the City of Larkspur. Of the trees impacted, it is estimated that two trees may potentially qualify as Larkspur heritage trees. **Table 2.4-5** summarizes Build Alternative's potential permanent impacts to trees.

Most, if not all, of the trees identified in the BSA have been planted as landscaping along the roadways, and do not serve as prime habitat for migratory bird species. Approximately 61 percent of the impacted trees are non-native species and 39 percent are native landscaped species. Dominant native tree species include coast live oak and coast redwood, while non-native tree species include Monterey pine, acacia/wattle, eucalyptus, New Zealand myoporum, fruit trees, pepper tree, and evergreen ash. For a complete list of affected tree species, location, number, and size, refer to Appendix B in the NES.

Large stands of mature trees are located in less disturbed areas in the vicinity of US 101 that provide more suitable habitat for migratory bird species than the trees located within the BSA. Due to the low quality-habitat function of the landscape trees within the BSA, and the large amount of suitable tree habitat located in close proximity to the BSA, impacts to bird species from the removal of the landscape trees are anticipated to be minimal. Impacts to migratory bird species will be avoided to the extent feasible through the implementation of avoidance measures identified in **Section 2.4.4.4** below, as well as through compliance with the local tree ordinances that stipulate which trees need to be replaced outside of Caltrans right-of-way (see **Section 2.2.6, Visual/Aesthetics, Mitigation Measure VIS-1**).

Table 2.4-5: Potential Permanent Impacts to Trees within the BSA

Trees	Permanent and Direct Impacts		
	Within Existing Caltrans Right-of-Way	Outside of Existing Caltrans Right-of-Way	Total Trees Impacted
Native Species (landscaped)	76	22	98
Non-native Species (landscaped)	96	60	156
Total Trees Impacted	172	82	254

No-Build Alternative

The No-Build Alternative will make no physical or operational improvements to US 101 or the connecting roadways within the BSA. Implementation of the currently planned and funded transportation projects outside the BSA but within Marin County will be subject to the same potential presence of special-status wildlife species as the Build Alternative, since they will occur in the same general region. These projects will be required to comply with the USFWS and CDFG requirements regarding protected wildlife species, should those species be identified within areas that will be directly or indirectly affected. The potential presence of special status animal species in areas outside of the BSA will be determined under separate environmental review.

2.4.4.4 Avoidance Minimization, and/or Mitigation Measures

To reduce potentially adverse effects of the Build Alternative on protected wildlife within the BSA, the following measures will be implemented.

Construction Activities Conducted Outside of Migratory Bird Nesting Season

Shrub and tree trimming and/or removal activities associated with the Build Alternative will be conducted outside the nesting season (generally between February 1 and August 31). If shrub and tree removal is scheduled to occur during the nesting season, a qualified wildlife biologist, familiar with the species and habitats in the BSA, will conduct preconstruction surveys for nesting birds with suitable nesting habitat in the BSA as described below.

Conduct Pre-construction Surveys for Nesting Birds

Surveys for nesting birds with suitable nesting habitat in the BSA will be conducted within one week prior to the initiation of construction activities within those habitats. If no active nests are detected during surveys, construction may proceed. If active nests are detected then buffer areas around the nest sites will be established, as described below.

Establish Buffer Area around Nest Sites

A no-disturbance buffer will be established around nests identified during preconstruction surveys. A 300-foot buffer for raptors and a 50-foot buffer for non-raptors will be established around nests, unless a qualified wildlife biologist determines that the level of noise or construction disturbance, line of sight between the nest and the disturbance, ambient levels of noise, and other topographic or artificial barriers require a larger buffer area or allow for a smaller buffer size. The purpose of the buffer is to avoid disturbance or destruction of the nest until after the breeding season, or until a wildlife biologist determines the young have fledged (usually late-June to mid-July). Within this buffer, all non-essential construction activities (e.g., equipment storage, meetings) will be avoided. However, construction activities can proceed if the biological monitor determines the individual is not likely to abandon the nest during construction.

Landscape Plan and Replanting Areas

As part of the Build Alternative, approximately 1.4 acres of native trees will be replaced within Caltrans right-of-way where trees will not affect traveler safety and where growing conditions are favorable.[3] A landscape plan will be developed and replanting areas shall be refined during the final design phase. The replanting palette will include species native to Marin County and appropriate for the location and landscape function, and may include coast live oak, blue blossom (*Ceanothus thyrsiflorus*), toyon (*Heteromeles arbutifolia*), redwood, and Douglas fir.

As discussed in **Section 2.2.6, Visual/Aesthetics**, **Mitigation Measure VIS-1** stipulates that work conducted outside of Caltrans right-of-way shall conform to local tree ordinances for construction projects. The specific tree replacement ratio shall be determined during the permit review process. Compliance with local tree replacement ordinances, as well as implementation of the construction restrictions outlined above, will reduce potential adverse effects to migratory birds.

[3] The 172 potentially impacted trees within the Caltrans right-of-way are equal to roughly 1.4 acres of tree canopy and crown cover.

2.4.5 Threatened and Endangered Species

2.4.5.1 Regulatory Setting

The primary federal law protecting threatened and endangered species is the Federal Endangered Species Act (FESA): 16 United States Code (USC) Section 1531, et seq. See also 50 Code of Federal Regulations (CFR) Part 402. This act and subsequent amendments provide for the conservation of endangered and threatened species and the ecosystems upon which they depend. Under Section 7 of this act, federal agencies, such as the Federal Highway Administration (FHWA), are required to consult with the U.S. Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA Fisheries Service) to ensure that they are not undertaking, funding, permitting or authorizing actions likely to jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat. Critical habitat is defined as geographic locations critical to the existence of a threatened or endangered species. The outcome of consultation under Section 7 may include a Biological Opinion with an Incidental Take statement, a Letter of Concurrence and/or documentation of a no effect finding. Section 3 of FESA defines take as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect or any attempt at such conduct."

California has enacted a similar law at the state level, the California Endangered Species Act (CESA), California Fish and Game Code, Section 2050, et seq. CESA emphasizes early consultation to avoid potential impacts to rare, endangered, and threatened species and to develop appropriate planning to offset project caused losses of listed species populations and their essential habitats. The California Department of Fish and Game (CDFG) is the agency responsible for implementing CESA. Section 2081 of the Fish and Game Code prohibits "take" of any species determined to be an endangered species or a threatened species. Take is defined in Section 86 of the Fish and Game Code as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." CESA allows for take incidental to otherwise lawful development projects; for these actions an incidental take permit is issued by CDFG. For species listed under both FESA and CESA requiring a Biological Opinion under Section 7 of the FESA, CDFG may also authorize impacts to CESA species by issuing a Consistency Determination under Section 2080.1 of the California Fish and Game Code.

Another federal law, the Magnuson-Stevens Fishery Conservation and Management Act of 1976, was established to conserve and manage fishery resources found off the coast, as well as anadromous species and Continental Shelf fishery resources of the United States, by exercising (A) sovereign rights for the purposes of exploring, exploiting, conserving, and managing all fish within the exclusive economic zone established by Presidential Proclamation 5030, dated March 10, 1983, and (B) exclusive fishery management authority beyond the exclusive economic zone over such anadromous species, Continental Shelf fishery resources, and fishery resources in special areas.

2.4.5.2 Affected Environment

Biological Assessment

A Biological Assessment (BA) is currently being prepared as part of the consultation process with the USFWS to determine whether the Build Alternative will affect any threatened or endangered species or their critical habitat and/or essential fish habitat. Consultation with the USFWS and NOAA has been

initiated to ensure that the Build Alternative will not cause adverse effects to federally listed species. **Chapter 3, Comments and Coordination,** includes the correspondence with USFWS to date.

As previously discussed in **Section 2.4.4, Animal Species,** above, nine species listed as endangered or threatened under CESA or FESA have the potential to occur within the BSA (see **Figure 2-17)**:

- Central California Coast steelhead [CCCS] (*Oncorhynchus mykiss*)
- Central California Coast coho salmon [CCC coho] (*Oncorhynchus kisutch*)
- North American green sturgeon [NAGS] (*Acipenser medirostris*)
- Longfin smelt [LFS] (Spirinchus thaleichthys)
- Central Valley (Sacramento River winter-run) chinook salmon [CVCH] (*Oncorhynchus tshawytscha*)
- Tidewater goby [TWG] (*Eucyclogobius newberryi*)
- California clapper rail [CCR] (*Rallus longirostris obsoletus*)
- California black rail [CBR] (Laterallus jamaicensis coturniculus)
- Salt marsh harvest mouse [SMHM] (*Reithrodontomys raviventris*)

Central California Coast Steelhead

Central California Coast steelhead was federally listed as a threatened species under FESA in 1997, and re-affirmed as a threatened species in 2006. Corte Madera Creek has been designated as critical habitat for the Central California Coast steelhead population that includes all naturally spawned populations from the Russian River in Sonoma County through and including Soquel Creek in Santa Cruz County. This includes all steelhead in San Pablo and San Francisco Bays. The limits of the designated critical habitat include the open waters of Corte Madera Creek and the tidal channels up to the mean high tide line.

Central California Coast Coho Salmon

Central California Coast coho salmon was federally listed as endangered under FESA in 1996 and state listed as endangered in 2005. Critical habitat for the Central California Coast coho salmon encompasses accessible reaches of all rivers between Punta Gorda and the San Lorenzo River in California, including two streams that enter San Francisco Bay, the Arroyo Corte Madera Del Presidio, and Corte Madera Creek. Corte Madera Creek has also been designated as essential fish habitat for this species. For the purposes of this analysis, the limits of the designated critical habitat and essential fish habitat include the open waters of Corte Madera Creek and the tidal channels up to the mean high tide line.

North American Green Sturgeon

North American green sturgeon was federally listed as a threatened species under FESA in 2006. Critical habitat for the southern distinct population segment of North American green sturgeon encompasses all tidally influenced areas of San Francisco Bay, San Pablo Bay, and Suisun Bay up to the elevation of mean higher high water. The parts of Corte Madera Creek that are tidally influenced within the BSA are considered critical habitat to this species.

Longfin Smelt

Longfin smelt was state listed as threatened under CESA in 2009, and was added to the waiting list of FESA candidate species in April 2012. Longfin smelt spend their adult life in bays, estuaries, and nearshore coastal areas, and migrate into freshwater rivers to spawn, with most spawning occurring between January and March. These fish are typically found in deeper waters of the San Francisco and San Pablo Bays; however, they have been seen in coastal rivers and tributary streams such as the Petaluma River and Sonoma creek. According to conversations with CDFG, there is a small chance that longfin smelt may be found in Corte Madera Creek; however, there have been no surveys in the creek to determine species presence or absence. The BSA may provide habitat for longfin smelt.

Central Valley (Sacramento River Winter-Run) Chinook Salmon

Central Valley (Sacramento River winter-run) Chinook salmon state listed as endangered on September 22, 1989 and was federally listed as endangered under the FESA in 1994 and reaffirmed in 2005. Critical habitat for Central Valley (Sacramento River winter-run) Chinook Salmon was designated on June 16, 1993. Corte Madera Creek has not been designated as critical habitat for this species. Corte Madera Creek has been designated as essential fish habitat for this species. For the purposes of this analysis, the limits of the designated essential fish habitat include the open waters of Corte Madera Creek and the tidal channels up to the mean high tide line.

Chinook are anadromous and originate in freshwater, grow to adulthood in the ocean, return to freshwater to spawn, and then die after spawning once. Chinook salmon in the Sacramento River are typically characterized according to the time adults enter freshwater to begin their spawning migration (i.e., winter, spring-, fall-run, or late-fall-run). Adult winter-run Chinook return to fresh water during the winter but do not spawn until the following spring and summer. Juveniles spend about five to nine months in freshwater habitats (rivers and estuaries) before entering the ocean. Central Valley (Sacramento River winter-run) Chinook salmon have been reported in Corte Madera Creek within the past five years. The BSA does not include appropriate habitat for spawning and rearing, but it may be used for foraging.

Tidewater Goby

Tidewater goby was federally listed as an endangered species under the FESA in 1994. Critical habitat was designated for the tidewater goby in 1999. Tidewater goby are endemic to California and are found primarily in waters of coastal lagoons, estuaries, and marshes where the water is relatively still but not stagnant. The tidewater goby prefers a sandy substrate for breeding, but it can also be found on rocky, mud, and silt substrates as well. Spawning peaks from late August through November at 13.5 to 21 C (56 to 70 F) in San Francisco Bay area streams. Vegetation within this species preferred habitat is generally sparse and consists of submerged and emergent aquatic plants. The edges of dense vegetation may be used to escape predation. However, breeding sites are mostly in open unvegetated sand or silt substrates.

The open water of Corte Madera Creek in the BSA may provide suitable migratory habitat for tidewater goby. However, this species is considered to be locally extinct from the area, and their latest reported occurrence in Corte Madera Creek was in 1961.

California Clapper Rail

The California clapper rail was federally listed as endangered under the FESA on in 1970. California clapper rail is currently restricted almost entirely to the marshes of the San Francisco estuary. In south San Francisco Bay, there are populations in all of the larger tidal marshes. Distribution in the North Bay is patchy and discontinuous, primarily in small, isolated habitat fragments. Small populations are widely distributed throughout San Pablo Bay. California clapper rails are present sporadically and in low numbers at various locations throughout the Suisun Marsh Area. The Corte Madera Marsh Ecological Preserve, which is located east of the BSA, is one of the primary areas that provides habitat for breeding clapper rails in the Central Bay area. Surveys conducted in 2007 confirmed the presence of California clapper rail in the preserve. Refer to Figures 3-2 and 3-3 in the NES for an illustration of the potential sensitive natural communities outside of the BSA.

California Black Rail

The California black rail was state listed as threatened in 1971. The majority of California black rail are found in the tidal salt marshes of the northern San Francisco Bay region, primarily in San Pablo and Suisun Bays. Smaller populations occur in San Francisco Bay, the outer coast of Marin County, freshwater marshes in the foothills of the Sierra Nevada, and the Colorado River Area. The tidal salt marsh habitat is not considered to be breeding habitat, but it may provide habitat that serves as a dispersal corridor. Refer to Figures 3-2 and 3-3 in the NES for an illustration of the potential sensitive natural communities outside of the BSA.

Salt Marsh Harvest Mouse

The salt marsh harvest mouse was federally listed as endangered under the FESA in 1970. This species is found only around the San Francisco, San Pablo, and Suisun bays. The water in the wetlands and marshes of the Sacramento-San Joaquin Delta is probably not salty enough to support the mice; therefore, the Collinsville-Antioch area is the eastern limit of their distribution. Salt marsh harvest mouse are critically dependent on dense cover and their preferred habitat is pickleweed, but they are sometimes found in cordgrass or alkali bulrush. Upland refuge areas are also needed to escape the rising water of the tides. Although salt marsh harvest mouse are active mainly at night, they are sometimes active during daylight hours. The tidal salt marsh areas within the BSA provides only marginally suitable habitat for the salt marsh harvest mouse because there are very little upland refuge areas during high tides and the habitat is extremely fragmented. Refer to Figures 3-2 and 3-3 in the NES for an illustration of the potential sensitive natural communities outside of the BSA.

2.4.5.3 Environmental Consequences

Build Alternative

Direct Impacts

The proposed widening of the SB US 101/Sir Francis Drake Boulevard on-ramp may result in permanent and temporary impacts to Corte Madera Creek due to the placement of support pilings within the waterway. The on-ramp improvements will also require temporary scaffolding to support construction equipment and workers. Approximately 45 permanent, cast-in-shell-steel piles, estimated to be 16 inches in diameter, will be placed in Corte Madera Creek to support the widened bridge. This will result in

approximately 0.001 acres (63 square feet) of permanent impacts to the creek habitat. Approximately 228 temporary steel scaffolding piles, estimated to be 24 inches in diameter, will be placed in and around Corte Madera Creek to support the construction scaffolding. The placement of scaffolding support pilings for construction in this area will result in less than 0.02 acres (715 square feet) of direct, permanent impacts to the Corte Madera Creek. Impacts to the NCSM habitat associated with the placement of piles on the south side of Corte Madera Creek could also impact California clapper rail and California black rail dispersal habitat and the salt marsh harvest mouse habitat.

Direct impacts to fish may occur as a result of distress from underwater noise created by impact pile driving. In addition to the pile driving in the creek, pile driving on land will be necessary for the construction of the NB US 101/Sir Francis Drake Boulevard off-ramp. Due to its proximity to the creek, pile driving in this area, although on land, is anticipated to impact fish. Temporary impacts to California clapper rail and California black rail may also result from construction related noise, specifically impact pile driving.

With regards to the preliminary Section 7 determination, the Build Alternative may affect, and is likely to adversely affect the salt marsh harvest mouse and California clapper rail. The Build Alternative is also likely to affect, but not adversely affect the federally protected fish species with in Corte Madera Creek. **Table 2.4-6** includes the preliminary Section 7 determination statements for each protected species likely to be incorporated into the BA as part of the consultation process with USFWS and NOAA.

As stated in section 2.4.5.1, take under CESA is defined as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." CESA allows for take incidental to otherwise lawful development projects. For the Build Alternative, a “take” under CESA may occur as a result of work in Corte Madera Creek. Although the fish species are mobile and can swim away from the disturbance, dewatering and/or pile driving may require capture and relocation of fish species. The Build Alternative may incidentally take Central California Coast steelhead, Central California Coast coho salmon, North American green sturgeon, longfin smelt, or Central Valley (Sacramento River winter-run) chinook salmon. Avoidance and minimization measures discussed in **Section 2.4.5.4** will be implemented to reduce the potential for take of these species.

Indirect Impacts

Indirect impacts from the widening of both the SB US 101/Sir Francis Drake Boulevard on-ramp and the NB US 101/Sir Francis Drake Boulevard off-ramp bridges may result from additional shading over Corte Madera Creek. Additional shading is anticipated to be approximately 0.09 acres (3,800 square feet) for the northbound off-ramp, and 0.23 acres (9,838 square feet) for the southbound on-ramp, totaling 0.31 acres (13,638 square feet). Impacts to each species’ critical habitat and essential fish habitat are described in **Table 2.4-6**.

Table 2.4-6: Temporary and Permanent Impacts to Threatened and Endangered Species

Species	Preliminary Section 7 Determination[a]	Permanent Impacts		Temporary Impacts	
		Direct Impacts	Indirect Impacts	Direct Impacts	Indirect Impacts
Critical habitat: *CCCS, CCC Coho, and NAGS* Essential Fish Habitat: *CCC Coho and CVCH*	May affect, but is not likely to adversely affect	45 Permanent Piles placed into Corte Madera Creek for a 0.001 ac (63 ft^2) fill into a WUS	Increased shading of 0.31 ac (13,638 ft^2) over Corte Madera Creek	228 temporary trestle piles placed into Corte Madera Creek for a 0.02 ac (715 ft^2) temporary fill in a WUS	Increased shading of 0.5 ac (21,780 ft^2) due to temporary construction trestle
LFS, CCCS, CCC Coho, CVCH, NAGS	May affect, but is not likely to adversely affect. Section 7 determination is not applicable to LFS because it is not a federally listed species.	45 Permanent Piles placed into Corte Madera Creek for a 0.001 ac (63 ft^2) fill into a WUS	Increased shading of 0.31 ac (13,638 ft^2) over Corte Madera Creek	187 dB Injury threshold exceeded during impact pile driving for fish >2grams in weight within 1,900 ft (579 m) (largest area of affect without attenuation). 183 db injury threshold exceed during impact pile driving for fish <2 grams (LFS only) within 2,415 ft (736 m) of the pile.[b] 228 temporary trestle piles placed into Corte Madera Creek for a 0.02 ac (715 ft^2) temporary fill in a WUS	Increased shading of 0.5 ac (21,780 ft^2) due to temporary construction trestle
CCR	May affect and is likely to adversely affect	Permanent removal of <0.02 ac (776 ft^2) of NCSM vegetation.	Increased shading of <0.02 ac (657 ft^2) over potential CCR dispersal habitat	Potential noise disturbances from general construction and impact pile driving	N/A
CBR	N/A. Not a federally listed species, therefore no Section 7 determination is required.	Permanent removal of <0.02 ac (776 ft^2) of NCSM vegetation.	Increased shading of <0.02 ac (657 ft^2) over potential CBR dispersal habitat.	Potential noise disturbances from general construction and impact pile driving	N/A
SMHM	May affect and is likely to adversely affect	Permanent removal of <0.02 ac (776 ft^2) NCSM vegetation.	Increased shading of <0.02 ac (657 ft^2) over potential SMHM habitat.	Potential noise disturbances from general construction and impact pile driving	N/A

Notes: CBR: California black rail; CCC Coho: Central California Coast coho salmon; CCCS: Central California Coast steelhead; CCR: California clapper rail; CVCH: Central Valley (Sacramento River winter-run) chinook salmon; LFS: Longfin smelt; NAGS: North American green sturgeon; NCSM: Northern-coastal salt marsh; SMHM: salt marsh harvest mouse; WUS: Waters of the United States. [a] Subject to approval by the USFWS and NOAA as part of the BA consultation process.[b.] Attenuation measures will be incorporated to reduce the area of affect. See "Fish Pile Driving Attenuation Requirements" in **Section 2.4.5.4**

No-Build Alternative

The No-Build Alternative will make no physical or operational improvements to US 101 or the connecting roadways within the BSA. Implementation of the currently planned and funded transportation projects outside the BSA but within Marin County will be subject to the same potential presence of special-status species as the Build Alternative, since they will occur in the same general region. These projects will be required to comply with the USFWS and CDFG requirements regarding protected species, should those species be identified within areas that will be directly or indirectly affected. The potential presence of special status species in areas outside of the BSA will be determined under separate environmental review.

2.4.5.4 Avoidance Minimization, and/or Mitigation Measures

Corte Madera Creek is a highly urbanized and developed creek, which has been significantly hydrologically-altered upstream. With the implementation of the recommended measures listed below, the Build Alternative will likely affect, but is not likely to adversely affect critical habitat or essential fish habitat associated with Corte Madera Creek.

Fish Passage

The project contractor(s) will allow adequate fish passage upstream and downstream of the proposed improvements along Corte Madera Creek. Adequate water depth and channel width must be maintained at all times for fish passage. If the workspace is isolated from flowing water (i.e. use of a cofferdam[4]), the diversion will remain in place during construction and be removed immediately after work is completed in a manner that will allow flow to resume with the least disturbance to the substrate.

Dewatering

If dewatering within the open waters of Corte Madera Creek is required, either a pump will remove water to an upland disposal site, or a filtering system will be used to collect the water. Water returned to the creek must meet the water quality objectives outlined by the San Francisco Bay RWQCB's Basin Plan, including but not limited to the following:

- Waters will be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. Increases from normal background light penetration or turbidity relatable to waste discharge will not be greater than 10 percent in areas where natural turbidity is greater than 50 Nephelometric Turbidity Units (NTU).
- The pH will not be depressed below 6.5 nor raised above 8.5. This encompasses the pH range usually found in waters within the basin. Controllable water quality factors will not cause changes greater than 0.5 units in normal ambient pH levels.
- The temperature of any cold or warm freshwater habitat will not be increased by more than 5 degrees Fahrenheit (2.8 degrees Celsius) above natural receiving water temperature.

[4] A cofferdam is a temporary structure designed to keep water and/or soil out of the construction workspace in order to provide a dry work environment.

The pump intake will be fitted with a fish exclusion device that meets the National Marine Fisheries Service fish screening criteria. This includes openings that are no bigger than either 3/32-inch or 1/4-inch depending on the presence of fry or fingerling salmon species.

Presence of Biologist during Dewatering

During dewatering activities, a fisheries biologist approved by USFWS, CDFG, and/or NMFS will be present to salvage individual fish, should they be present. Fish will be netted, placed in a bucket of water, and immediately moved to a downstream portion of the creek. Records of species, relative size, and number of individuals will be kept. If a federal or state-listed fish species is identified, the biologist will notify the resident engineer who will then contact CDFG and/or NMFS immediately to report the finding. Periodic checks of the work area will occur to ensure that fish have not re-entered the work area.

Placement of Non-toxic Structures in Streams

All materials placed in the creek such as pilings and retaining walls, will be non-toxic. Any combination of wood, plastic, cured concrete, steel pilings, or other materials used for in-channel structures will not contain coatings, treatments, or consist of substances deleterious to aquatic organisms that may leach into the surrounding environment in amounts harmful to aquatic organisms.

Minimize Disturbance from Construction Access

Disturbance to existing grades and vegetation will be limited to the actual site of the proposed project improvements and necessary construction access routes. Placement of all roads, staging areas, and other facilities will avoid and limit disturbance to streambank or stream channel habitat to the minimum area necessary to complete the work. When possible, existing ingress or egress points will be used, and/or work will be performed from the top of the creek banks. Obvious barriers to fish passages will be removed to facilitate upstream movement.

Erosion Control

Erosion control and sediment detention devices (e.g., well-anchored sandbag coffer dams, straw bales, "Aqua Dam"[5], or silt fences) will be incorporated into the project design and implemented at the time of construction. These devices will be in place during construction activities. If necessary, these devices will be in place after construction for the purposes of minimizing fine sediment and sediment/water slurry input into flowing water and for detaining sediment laden water on site. These devices will be placed at all locations where the likelihood of sediment input exists. A supply of erosion control materials will be kept on hand to cover small sites that may become bare and to respond to sediment emergencies.

Fish Impact Pile Driving Avoidance Timeline

Impact pile driving activities located within Corte Madera Creek, up to the mean higher high water line, and on land at the NB US 101/Sir Francis Drake Boulevard off-ramp location will be restricted to June 15 through October 15 to reduce potential adverse effects to protected fish. Pile driving will occur only during daylight hours from one hour after sunrise to one hour before sunset. This is to ensure that pile driving does not occur at dawn or dusk, during peak salmon migration and feeding times.

[5] Aqua Dams are temporary water-filled portable dams or barrier structures that can be positioned to contain or divert the flow of water.

Fish Pile Driving Attenuation Requirements

Piles will be installed using a vibratory hammer to the extent practicable, to minimize impact pile driving. If pile driving is required, sound attenuation devices may be used to reduce impacts to fish species. Attenuation devices will include a minimum of one, or a combination, of the following: Air bubble curtains, cofferdams, isolation casings, and/or cushion blocks. The number of piles driven per day will be limited, and hyrdroacoustic monitoring will be conducted to avoid exceeding the 187 dB accumulated sound energy level (SEL) for fish weighing 2 grams or greater and the 183 dB accumulated SEL for fish weighing less than 2 grams. Sound pressure levels (SPL) may not exceed 206 dB peak.

Provide Environmental Awareness Training

Before the onset of construction activities, a qualified biologist will conduct an educational program for all construction personnel. At a minimum the training will include:

- A description of potential special-status species' within the BSA and their respective habitats.
- The occurrence of these species within the BSA, an explanation of the status of these species, and the species' protection under the FESA and CESA.
- The measures that are being implemented to conserve the species and their habitats as they relate to the work site, and the work site boundaries within which construction may occur.
- A fact sheet conveying this information for distribution to the construction personnel and other personnel who may enter the site.

Upon completion of the program, all personnel will sign a form stating that they have attended the program and understand all the avoidance and minimization measures and implications of the FESA and CESA.

USFWS-approved Biologist

Caltrans will consult with the USFWS to designate an approved biologist that will be on-site during all construction activities that occur within the BSA. Qualifications of the biologist(s) must be presented to the USFWS for review and written approval prior to groundbreaking. The biologist will perform preconstruction surveys and project monitoring. The biologist's findings will be presented to Caltrans for any necessary consultation and compliance with USFWS (or other agencies) requirements. The Department will consult with federal and/or state agencies as necessary.

Post Construction Compliance Form

A post-construction compliance report will be prepared by the on-call biologist, which will be provided to the USFWS within forty (40) working days following project completion or within sixty (60) calendar days of any break in construction activity lasting more than forty (40) working days. Any compliance forms prepared by the biologist will be provided to Caltrans for consultation with the USFWS, as required for compliance with federal mandates.

Implementation of the avoidance measures and **Mitigation Measure BIO-1** and **BIO-2** would indirectly reduce the potentially adverse effects impacts of the Build Alternative on those special status species with habitat in the wetlands and other waters, including northern coastal salt marsh. Additionally, the

following measures will be implemented to reduce impacts to the salt marsh harvest mouse, California clapper rail, and the California black rail.

California Clapper Rail Impact Pile Driving Avoidance Timeline

Impact pile driving activities located within 800 feet of the Corte Madera Marsh Ecological Preserve, or any other known active California clapper rail breeding habitat, will occur between September 1 and January 31 to reduce potential impacts to this species. If impact pile driving must occur during the period from February 1 to August 31, then full protocol-level surveys will be conducted during the breading season within the year construction activities are proposed. These surveys will be initiated in middle/late January following a minimum two-week cessation of any on-going construction work. Construction will not be allowed to continue until the protocol-level surveys have been completed and the USFWS and CDFG have reviewed the results and given approval for impact pile driving to continue. If the USFWS or CDFG determines that, based on the protocol-level surveys, impact pile driving may disturb nesting clapper rails, then construction will not be allowed to begin until September 1. If impact pile driving is to occur during the clapper rail breeding season in the following year, then protocol-level surveys and the mandatory construction cessation period must be implemented the following year, as well.

Halt Work if Special-status Species Observed in Work Area

In the event a California clapper rail or salt marsh harvest mouse enters the construction zone, work in the immediate vicinity of the California clapper rail or salt marsh harvest mouse will halt and the USFWS-approved biologist, USFWS, and CDFG will be contacted immediately. All construction activities in the immediate vicinity of these species will be suspended until the special-status species leaves the site voluntarily.

Take Reporting

Any contractor, employee, or agency personnel who inadvertently kills or injures a special-status species will immediately report the incident to the on-site biologist. The on-site biologist will contact Caltrans who will then contact the USFWS or CDFG, depending on the special-status species, to report the dead or injured animal via electronic mail and telephone within one working day.

Construction and Seasonal Avoidance

The breeding seasons for the California clapper rail and California black rail are from February 1 to August 31 and from February 1 to June 30, respectively. The restricted work window for migratory salmon and steelhead (Central California Coast steelhead, Central California Coast coho, and Central Valley Chinook salmon) is from October 15 through June 15. Additionally, the northern California rainy season occurs from October 15 through April 15. Therefore, it is not feasible to construct the proposed project and avoid the breeding, migration, and rainy seasons. To accommodate construction and minimize impacts to special-status species, construction may occur during the California clapper rail and California black rail breeding seasons, but construction must adhere to the conditions described in the construction avoidance and minimization measures for the California clapper rail, California black rail, and salt marsh harvest mouse. These conditions involve conducting pre-construction surveys and procedures to follow in the event that an individual species is identified during those surveys. If no individuals are observed during the pre-construction surveys, then construction may proceed. However, if

individuals are observed, then USFWS and CDFG will be notified, and work will not proceed until authorization is obtained.

Work may occur during the rainy season in the upland areas (i.e., out of water) and must adhere to the erosion control measures and SWPPP as identified in the avoidance and minimization measures above. In-water work during October 15 through June 15 will be avoided, but work may occur if prior authorizations from the permitting agencies with jurisdiction are obtained.

Pre-construction Surveys for Salt Marsh Harvest Mouse

A Service-approved biologist, with previous salt marsh harvest mouse experience, will conduct preconstruction surveys for the salt marsh harvest mouse prior to project initiation.

Use of Hand Tools to Remove Salt Marsh Vegetation

Where vegetation removal is required near the salt marsh, work will be conducted using hand-held tools to enable wildlife to escape. If any areas with pickleweed or vegetation within 50 feet from the edge of pickleweed need to be cleared for project activities, vegetation will be removed only with non-mechanized hand tools (i.e. trowel, hoe, rake, and shovel). No motorized equipment, including weed wackers or lawn mowers, will be used to remove this vegetation. Vegetation will be removed to bare ground or stubble no higher than 1 inch. Breaks in the exclusion fencing may be left to allow mice to escape the devegetation area. The area will then be sealed off completely after all of the vegetation has been removed. Vegetation will be removed under the supervision of the Service-approved biologist. If a mouse of any species is observed within the areas being removed of vegetation, the Service will be notified. Vegetation removal may begin when no mice are observed and will start at the edge farthest from the salt marsh or the poorest habitat and work its way towards the salt marsh or the better salt marsh habitat.

Install Temporary Exclusion Fencing

To prevent salt marsh harvest mice from moving through the project site during construction, temporary exclusion fencing will be placed around a defined work area prior to the start of construction activities and immediately after the vegetation removal 2 feet inside the vegetation clearing perimeter. The fence will be made of a heavy plastic sheeting material or metal that does not allow salt marsh harvest mice to pass through or climb, and the bottom should be buried to a depth of 2 inches so that these species cannot crawl under the fence. Fence height will be at least 12 inches higher than the highest adjacent vegetation with a maximum height of 4 feet. All supports for the exclusion fencing must be placed on the inside of the BSA.

Habitat Mitigation and Monitoring Plan

A habitat mitigation and monitoring plan for the disturbed NCSM habitat will be developed for USACE and RWQCB review and approval prior to construction. Pickleweed, saltgrass and other native salt marsh species will be planted in the disturbed area and there will be three years of monitoring to ensure the successful establishment of these plantings. Success criteria for monitoring will be a minimum of 50 percent cover of native salt marsh plant species at the end of three years, with growth and survival rates that indicate a trend toward continued spread and growth of native salt marsh vegetation. During the monitoring visits, the qualified biologist will estimate the success rate of establishment of these native salt

marsh species. A monitoring report will be provided to the USACE and RWQCB on November 30th of the first year following construction. This letter report will document the results of the monitoring.

Prevention of Entrapment of Salt Marsh Harvest Mice

To prevent potential entrapment of salt marsh harvest mice in work equipment, any pipes or similar objects located in salt marsh harvest mice habitat will be capped prior to the end of the work day or inspected by the USFWS approved biologist prior to commencement of work activities the following day.

Avoidance of Extreme High Tides

Work near the salt marsh will be scheduled to avoid extreme high tides (i.e., no work will occur near the salt marsh within two hours before or after extreme high tides, 6.0 feet National Geodetic Vertical Datum (NGVD) or above, as measured at the Golden Gate Bridge, or adjusted to the timing of local extreme high tide events in which the marsh plain is flooded, because protective cover for salt marsh harvest mouse and California clapper rail is limited, and activities could prevent them from reaching available cover. All equipment will be staged on paved roadways or shoulders and pullouts, away from the project site when not in use.

Construction Monitoring

A biologist approved by the USFWS and/or NMFS will monitor all construction activities within salt marsh habitat daily during initial ground disturbance and site preparation. The biological monitor will look for listed species during all excavation activities. If a salt marsh harvest mouse, or any mouse that construction personnel may believe is this species, is encountered during project construction, all work that could result in direct injury, disturbance, or harassment of the individual animal will immediately cease, the Resident Engineer and USFWS and/or NMFS approved biologist will be immediately notified. The biologist will monitor it until he/she determines that the animal(s) is not imperiled by predators or other dangers. The biologist will notify the Caltrans within one working day following any encounters with a potential salt marsh harvest mouse during construction via electronic mail and telephone.

Prior to the start of daily construction activities during initial ground disturbance, the USFWS and/or NMFS approved biological monitor will inspect the salt marsh harvest mouse proof boundary fence to ensure that it is neither ripped nor has holes and that the base is still buried. The fenced area will also be inspected to ensure that no mice are trapped in it. Any mice found along and outside the fence will be closely monitored until they move away from the construction area.

2.4.6 Invasive Species

2.4.6.1 Regulatory Setting

On February 3, 1999, President Clinton signed Executive Order 13112 requiring federal agencies to combat the introduction or spread of invasive species in the United States (U.S.). The order defines invasive species as “any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem whose introduction does or is likely to cause economic or environmental harm or harm to human health." Federal Highway Administration guidance issued August 10, 1999 directs the use of the State’s invasive species list currently maintained by the

California Invasive Species Council to define the invasive species that must be considered as part of the NEPA analysis for a proposed project.

2.4.6.2 Affected Environment

Botanists have identified the presence of non-native invasive plants during botanical surveys within the BSA. High priority and common invasive plant species within the BSA are identified in **Table 2.4-7.**

Table 2.4-7: Common and High-Priority Invasive Plant Species Present within the BSA

Scientific Name	Common Name	Cal-IPC	CDFA
High Priority Noxious Weeds[1]			
Bromus madritensis ssp. Rubens	red brome	High	NL
Carpobrotus edulis	Iceplant	High	NL
Centaurea solstitialis	yellow starthistle	High	C
Cortaderia selloana	pampas grass	High	NL
Foeniculum vulgare	wild fennel	High	NL
Genista monspessulana	French broom	High	C
High Priority Noxious Weeds[1], continued.			
Hedera helix	English ivy	High	NL
Lepidium latifolium	broad-leaf pepper grass	High	B
Spartina densiflora	dense-flowered cordgrass	High	NL
Common Noxious Weeds[2]			
Avena barbata	slender wild oat	Moderate	NL
Avena fatua	wild oats	Moderate	NL
Brassica nigra	black mustard	Moderate	NL
Bromus diandrus	ripgut brome	Moderate	NL
Carduus pycnocephalus	Italian thistle	Moderate	C
Cotoneaster pannosus	silverleaf cotoneaster	Moderate	NL
Dipsacus sativus	Fuller's teasel	Moderate	NL
Eucalyptus globulus	Tasmanian blue gum	Moderate	NL
Geranium dissectum	cut-leaf geranium	Moderate	NL
Hordeum marinum ssp. gussoneanum	Mediterranean barley	Moderate	NL
Hordeum murinum ssp. leporinum	hare barley	Moderate	NL
Hypochaeris radicata	rough cat's ear	Moderate	NL
Festuca perennis	annual ryegrass	Moderate	NL
Mentha pulegium	pennyroyal	Moderate	NL

Scientific Name	Common Name	Cal-IPC	CDFA
Myoporum laetum	myoporum	Moderate	NL
Pennisetum setaceum	crimson fountaingrass	Moderate	NL
Phalaris aquatica	harding grass	Moderate	NL
Salsola soda	Russian thistle	Moderate	NL
Vinca major	big periwinkle	Moderate	NL
Acacia melanoxylon	black acacia	Limited	NL
Brassica rapa	field mustard	Limited	NL
Bellardia trixago	bellardia	Limited	NL
Briza maxima	rattlesnake grass	Limited	NL
Bromus hordeaceus	soft chess	Limited	NL
Cotula coronopifolia	brassbuttons	Limited	NL
Erodium cicutarium	redstem filaree	Limited	NL
Hypochaeris glabra	smooth catsear	Limited	NL
Medicago polymorpha	bur clover	Limited	NL
Continued			
Olea europaea	olive	Limited	NL
Phoenix canariensis	Canary Island date palm	Limited	NL
Helminthotheca echioides	bristly ox-tongue	Limited	NL
Plantago lanceolata	narrowleaf plantain	Limited	NL
Polypogon monspeliensis	rabbitfoot grass	Limited	NL
Rhaphanus sativus	wild radish	Limited	NL
Rumex crispus	curly dock	Limited	NL
Schinus molle	Peruvian peppertree	Limited	NL
Convolvulus arvensis	bindweed	NR	C
Erodium bothrys	broadleaf filaree	NR	NL
Lactuca serriola	prickly lettuce	NR	NL
Nerium oleander	oleander	NR	NL
Sonchus asper	prickly sowthistle	NR	NL

Notes: NL: Not listed, NR: This species is listed, but has not yet been rated.

[1] High priority noxious weeds to be mitigated for

[2] Moderate and Limited noxious weeds – common throughout California, no mitigation necessary

2.4.6.3 Environmental Consequences

Build Alternative

Invasive plant species may be dispersed via equipment and personnel during construction activities. If noxious weeds or additional weeds become established on or near the BSA, these populations may invade areas where native plants and wildlife are prominent. This may potentially degrade existing habitat for special-status plant and animal species. The spread of invasive plant species could result in a reduction or elimination of species diversity or abundance in adjacent areas.

No-Build Alternative

The No-Build Alternative will make no physical or operational improvements to US 101 or the connecting roadways within the BSA. Implementation of the currently planned and funded projects outside the BSA but within Marin County will have the same potential to introduce or spread invasive species into currently un-infested areas. Transportation projects will be subject to the same avoidance measures prescribed by Caltrans and EO 13112, thereby reducing potential adverse effects related to the spread of invasives.

2.4.6.4 Avoidance Minimization, and/or Mitigation Measures

Prior to construction, surveys will be conducted within the BSA for high priority noxious weeds, as defined in **Table 2.4-7** above. Any populations of these species observed during the preconstruction weed surveys will be mapped. The disposal of soil and plant materials from any of these mapped areas into natural habitats, such as coast live oak woodland or wetlands and waters, will be prohibited.

In compliance with the EO 13112, and subsequent guidance from the FHWA, the landscaping and erosion control included in the project will not use species listed as invasive. Erosion control species will be certified “weed free” to reduce the chances of introducing a new invasive species to the area.

If invasive species are found in or adjacent to the construction areas, or another invasive habitat threat is identified (e.g., such as the sudden oak death fungal pathogen), construction equipment will be inspected and pressure washed prior to initial entry into the project limits.

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