Environmental Constraints Study

North South Greenway Gap Closure (Southern Segment)

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Marin County, California

March 2015

GANDA

1. PROJECT DESCRIPTION

The Marin County Public Works Department (County) is currently evaluating potential trail alignments for the North/South Greenway Gap Closure (Southern Segment) Project. As part of the initial evaluation of alignment options, the County has retained Garcia and Associates (GANDA) to identify the biological constraints within a corridor approximately 3,200 feet long and 140 feet wide within the City of Larkspur (Figure 1). The project corridor runs parallel to Old Redwood Highway and northbound US 101; and lies east of the residential and commercial infrastructure and partially within the Shorebird Marsh/California Department of Fish and Wildlife's (CDFW) Corte Madera Ecological Reserve. Travelling north-south, the project corridor extends from approximately 250 feet south of Corte Madera Creek to Wornum Drive. For the purposes of this constraints analysis, the project corridor represents the Biological Study Area (BSA) described throughout this report.

Land uses within the BSA primarily consists of existing trails along marsh and grassland, adjacent to urban portions of the City of Larkspur that include a residential trailer park and commercial strip mall. The BSA consists of the following land-cover types: barren, coastal salt marsh, developed, landscaped/ruderal, potential wetlands, and water. The east side of the BSA is within the Corte Madera Ecological Reserve.

The construction methods and the proposed trail alignment are unknown at the time of this constraints analysis; however, optional alignments and potential construction methods that would present the least impact to the biological resources within the BSA are addressed. For the purpose of constraints analysis, all work activities are assumed to be occurring during daylight hours.

Figure 1. BSA of the environmental limits
North/South Greenway Gap Closure
(Southern Segment)

2. STUDY METHODS

2.1. Biological Study Area (BSA)

The BSA was selected by the project proponent to include all areas that may be either temporarily or permanently impacted by the normal implementation of construction-related activities. The BSA follows the alignment of several existing intersecting unpaved trails adjacent to the east of the residential and commercial properties along Old Redwood Highway, which includes small houses, RV trailers, and recreational vehicles; and commercial structures. The BSA runs parallel to Old Redwood Highway and northbound US 101; and lies east of the residential and commercial infrastructure and partially within the tidal salt marsh of Shorebird Marsh/Corte Madera Ecological Reserve. Travelling north-south, the project corridor extends from approximately 250 feet south of Corte Madera Creek to Wornum Drive. The BSA's total size is 13.85 acres.

An 8-quadrangle (USGS 7.5 minute quadrangle) database query was conducted for the project area, and extends beyond the BSA to a maximum distance of 18 miles (Figure 2). The typical 9-quadrangle database query was reduced to an 8-quadrangle due to the lack of a designated quad and land present within the remaining area.

2.2. Studies Required

A list of known or predicted biological resources within the region, including species of wildlife and plants, plant communities, and designated critical habitat, was compiled from the following sources:

- California Natural Diversity Database (CNDDB)
- United States Fish and Wildlife Service's (USFWS) Species List Generator
- USFWS Critical Habitat Portal
- California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants

A field reconnaissance survey was conducted on March 4, 2015, by Constance Ganong (Botanist) and Tiffany Ngo (Wildlife Biologist) to map habitat types, evaluate the existing habitat conditions, and to assess the potential for special-status species to occur in the BSA.

Figure 2. USGS Quadrangles Surrounding Project
North/South Greenway Gap Closure
(Southern Segment)

3. ENVIRONMENTAL SETTING

3.1. Existing Conditions of the BSA

The BSA runs parallel to Old Redwood Highway and northbound US 101; and lies east of the residential and commercial infrastructure and partially within the tidal salt marsh of Shorebird Marsh/Corte Madera Ecological Reserve. Travelling north-south, the project corridor extends from approximately 250 feet south of Corte Madera Creek to Wornum Drive. The BSA is located within unincorporated Marin County, partially overlapping with the Greenbrae Boardwalk community to the north. The city limits of the City of Larkspur are located adjacent to the west.

The area has relatively flat topography that rises slightly to the north. The BSA starts in the northeastern direction, and then bends north towards the Greenbrae Boardwalk and Corte Madera Creek. The San Pablo Bay and salt marsh generally occurs to the east of the trail alignment, and urbanized Larkspur to the west. The BSA is 3,200 feet long and 140 feet wide, consisting of 13.85 total acres.

An existing unimproved trail is located within the BSA, and consists of a constructed embankment that parallels the developed residential and commercial areas to the west. The embankment varies in height throughout the length of the BSA, from approximately 1 to 3 feet above ground level. Several areas adjacent to the trail consist of graded fill, and are vegetated with annual grasses. The BSA consists of both higher and lower elevations containing a mix of native and invasive plants as well as low areas inundated at high tide. The northern portion of the trail follows a soil-embedded railroad track that leads to a raised inactive and disconnected railroad bridge.

The start of the existing trail on the southern end of the BSA, at the intersection of Wornum Drive and Old Redwood Highway, consists of landscaped and ruderal vegetation along the body of water designated as the Corte Madera Shorebird Marsh, and then gradually transitions to salt marsh habitat dominated by hydrophytic vegetation such as pickleweed (*Salicornia pacifica*) and salt grass (*Distichlis spicata*) east of the trail (Harris 2008). Coastal salt marsh is present on the east side of the trail along the southern and northern portion, excluding the fenced area graded for trailer park and industrial uses at the bend of the trail at Industrial Way, mid-way north along the BSA. A large patch of non-native fennel (*Foeniculum vulgare*) is present immediately east of the trail where it intersects with Industrial Way.

Between Industrial Way and Wornum Drive, narrow drainage swales and pockets of marsh occur west of the existing trail alignment, between residential properties and the trail. All water

features present west of the trail on the southern portion of the BSA contained turbid ponded water approximately 6 inches in depth. The drainage swales release the impounded water through pipes under the trail to the Corte Madera Shorebird Marsh. Each drainage ditch is approximately 10 feet in length and varies in width between 1 and 5 feet. The banks of these swales and marshes were dominated by non-native ruderal vegetation.

A ditch is also present along the northern portion of the trail next to the chain link fence delineating the industrial property from the Corte Madera Ecological Reserve (Figure 3). The swale is vegetated with annual grasses and several hydrophytic coastal salt marsh species, including pickleweed, salt grass and alkali heath (*Frankenia salina*). The ditch did not contain water at the time of the site reconnaissance. Several depressions throughout the BSA contained hydrology indictors (water marks and sediment deposits) and hydrophytic vegetation, potentially indicative of wetland features. Drainage channels present along the trail may be tidally influenced through culverted drainages.

Several trees lined the boundary of the trailer park on the west side of the unpaved pathway at the south end of the trail. An acacia (*Acacia* sp.) tree is present at the bend of the trail at Industrial Way, east of the dirt pathway. The trees in the BSA are not naturally occurring, and were likely planted for the purpose of landscaping.

The east side of the BSA is located within CDFW's Corte Madera Marsh Ecological Reserve. The majority of the habitat within the Corte Madera Marsh Ecological Reserve consists of northern coastal salt marsh with stretches of ruderal grassland areas. The tidal marshland within and bordering the BSA is directly connected to San Pablo Bay through channels and pools. Corte Madera Creek is located approximately 250 feet north of the BSA limits. Corte Madera Creek is a major watershed in Marin County, formed at the confluence of San Anselmo and Ross Creeks. Spawning gravels located within these connected creeks historically allow for passage of anadromous fish into Corte Madera Creek.

3.2. Land-cover Types within the BSA

The existing conditions within the BSA include six (6) vegetation and land-cover types (Figure 3):

- Barren
- Northern Coastal Salt Marsh
- Developed
- Landscaped/Ruderal
- Potential Wetland
- Water

Table 1. Land-cover Types and Total Acreage within BSA

Vegetation Classification/Land-cover Type	Percentage of BSA	Total Area within BSA (Acres)
Barren	3.7%	0.51
Northern Coastal Salt Marsh	19.2%	2.66
Developed	43.6%	6.04
Landscaped/Ruderal	27.1%	3.76
Potential Wetland	0.5%	0.06
Water	5.9%	0.82
Total Acres of BSA		13.85

3.2.1. Barren

The term barren is used to describe the existing unpaved trail that runs north-south within the BSA. Barren areas do not contain habitat for species onsite due to the lack of resources in the area. For purposes of this constraints analysis, only the vegetation and aquatic communities that occur along the trail within the BSA – rather than the unpaved trail and developed surfaces – were considered when discussing the effects to the environment. Approximately 3.7% (0.51 acre) of the BSA is considered barren.

3.2.2. Northern Coastal Salt Marsh

Land-cover type designated as coastal salt marsh comprises 19.2% (2.66 acres) of the BSA. Coastal salt marsh is usually found along sheltered inland margins of bays, lagoons, and estuaries. These hydric soils are subject to regular tidal inundation by salt water for at least part of each year. Herbaceous and suffrutescent, salt-tolerant hydrophytes form moderate to dense cover within coastal salt marsh. Coastal salt marsh is usually segregated horizontally with California cordgrass *(Spartina foliosa)* nearer the open water, pickleweed (*Salicornia pacifica)* at mid-littoral elevations, and a richer mixture closer to high ground, such as alkali heath (*Frankenia salina*) and saltgrass (*Distichlis spicata*). All of these species are present within the BSA.

3.2.3. Developed

Developed areas comprise all types of urban development for residential, commercial, industrial, transportation, and recreational uses (e.g., sites with building structures, homes, and parking lots). Approximately 43.6% (6.04 acres) of the BSA is considered developed land cover.

3.2.4. Landscaped/Ruderal

Areas mapped with the landscaped/ruderal designation include urban development and landscaped areas (Figure 3). This land-cover type comprises 27.1% (3.76 acres) of the BSA.

Landscaped/ruderal areas have been impacted by grading, mowing, filling, and residential and commercial use. Eucalyptus (*Eucalyptus* sp.), acacia (*Acacia* sp.), Monterey pine (*Pinus radiata*), coast live oak (*Quercus agrifolia*), and iceplant (*Carpobrotus chilensis*) are typical landscape taxa in the BSA. Ruderal vegetation is vegetation composed primarily of weedy, non-native plants, such as wild fennel (*Foeniculum vulgare*), Italian thistle (*Carduus pycnocephalus*), and sourgrass (*Oxalis pes-caprae*). It also occurs within and adjacent to landscaped areas. Landscaped and ruderal vegetation are not natural vegetation types.

Ruderal and landscaped areas are capable of supporting a number of bird species associated with urban environments and tolerant of disturbance by human activities. In general, special-status species are not expected to occur in landscape ruderal areas. Common wildlife that could be expected to occur in urban areas include raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), and American crow (*Corvus brachyrhynchos*). Feral or free-roaming pets, such as dogs and cats, are also common.

3.2.5. Potential Wetland

The wetland vegetation community is typically characterized by colonial hydrophytic vegetation in areas that are perennially wet, or inundated to the point of creating anaerobic soils. At the time of the site reconnaissance, there were several depressions along the existing trail that contained hydrology and hydrophytic vegetation suggestive of wetland characteristics (0.06 acre total). These areas were located near the bend of the trail, adjacent to the fenced and developed residential and commercial areas. A formal wetland delineation is recommended for the area to determine the presence of jurisdictional wetlands in otherwise semi-barren areas.

3.2.6. Water

There are multiple water bodies varying in size and shape along the existing unpaved trail, equating to approximately 5.9% (0.82 acre) of the BSA. These include the Corte Madera Shorebird Marsh at the start of the trail, channels of ponded water that cut through the Corte

Madera Marsh Ecological Reserve within the remaining southern portion of the trail, and wider pools of water at the northern end. The water bodies within the BSA act as wildlife corridors for terrestrial, semi-aquatic, and aquatic species, connecting them from the Reserve to Corte Madera Creek to the north, San Clemente Creek on the southern end, and San Pablo Bay to the east. Corte Madera Shorebird Marsh is an important water body for both migrating and nesting waterfowl.

Figure 3. Vegetation Type Mapping
North/South Greenway Gap Closure
(Southern Segment)

RESULTS: BIOLOGICAL RESOURCES POTENTIALLY OCCURING IN THE PROJECT AREA, ENVIRONMENTAL CONSTRAINTS, AND AVOIDANCE

4.1. Natural Communities of Special Concern

4.1.1. Northern Coastal Salt Marsh

Northern Coastal Salt Marsh (NCSM) has a CNDDB rank of S3.2. The NCSM in the BSA contains California cordgrass *(Spartina foliosa)* near the open water, pickleweed (*Salicornia pacifica)* at mid-littoral elevations, and a richer mixture closer to high ground, such as alkali heath (*Frankenia salina*) and saltgrass (*Distichlis spicata*). Several sections of the NCSM are separated from the BSA by tall non-native vegetation such as fennel and iceplant.

An estimated 2.66 acres of northern coastal salt marsh is located along the east side of the BSA along the edge of San Pablo Bay.

The northern coastal salt marsh forms a natural drainage for the urban and disturbed ruderal areas west of the marsh. Runoff from impervious surfaces such as the Village Shopping Center parking lot and the trailer park adjacent to the existing trail likely flows into the strips of ruderal grassland parallel to the fenced property line, to be transferred through vegetated ditches and installed culverts into the marsh. The BSA is primarily surrounded by marsh habitat on the east side, excluding the trail bend, which contains mostly fill and has been graded for urban use. Construction is anticipated to result in direct impacts to the NCSM if it includes filling and widening of the existing trail embankment. This northern coastal salt marsh is subject to the jurisdiction of the Regional Water Quality Control Board (RWQCB), the U.S. Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act, and the CDFW under Section 1602 of California Fish and Game Code.

4.2. Critical Habitat

A search of the U.S. Fish and Wildlife Service (USFWS) critical habitat mapper (2015 USFWS Critical Habitat Portal) indicates that no designated critical habitat lies within the BSA.

Work within the BSA will result in no impacts to critical habitat.

4.3. Jurisdictional Waters and Wetlands

Modifications to the existing trail have the potential to reduce the area or quality of the aquatic features discussed below. To the extent practicable, these features should be avoided and should be protected during construction by sediment control fencing placed between active soil disturbance and existing waterways, wetland or salt marsh.

To the extent that avoidance of direct impact to waters and wetlands is not possible, permitting by appropriate regulatory agencies is required, including USACE, California Department of Fish and Wildlife (CDFW), USFWS, Bay Conservation and Development Commission (BCDC) and RWQCB. Mitigation for loss of wetland and/or wetlands as habitat for special-status species may be required by those regulatory agencies.

4.3.1 Wetland Inventory

A search of the USFWS Wetland Inventory mapper shows 30.46 acres of estuarine and marine wetland present south and east of the southern end of the BSA (south of the bend), and 82.76 acres east of the remaining portion of the BSA (north of the bend).

The wetlands within and surrounding the BSA may be impacted by the trail enhancement work if the existing trail is to be widened. Construction is anticipated to result in direct impacts to the jurisdictional waters and wetlands adjacent to the existing trail if impacted by filling, grading, and realignment of drainage from the existing conditions.

4.3.2 Waterways

Corte Madera Creek runs perpendicularly to the northern limits of the BSA, and east of the mapped estuarine and marine wetland is San Pablo Bay. A portion of the mapped wetland is present at the northern end of the BSA where the trail connects with the elevated railroad tracks that cross Corte Madera Creek.

Corte Madera Creek and San Pablo Bay are not expected to be impacted by the trail work associated with this project. It is assumes that Best Management Practices (BMP) associated with stormwater pollution prevention planning (SWPPP) would be utilized by the project as avoidance and minimization measures that will protect the creek and water quality.

4.3.3 Drainage Features

At the time of the site reconnaissance, there were several depressions along the trail that exhibited wetland characteristics. One depression is located along the fence line north of the trail bend, east of the disturbed residential and industrial area. The other potential wetland is further east at the bend of the trail, within a low area containing fill that was graded into a rectangular section of land. Both hydrology and hydrophytic plants were observed in these depressions. Further analysis of soil properties needs to be conducted to determine if these areas are considered wetlands. A formal wetland delineation is recommended for these areas.

4.4. Special-status Plant Species

An eight-quadrangle query was conducted with the CNDDB, the USFWS' Species List Generator, and the CNPS Inventory of Rare and Endangered Plants. These searches resulted in a total of 74 sensitive plant species that were evaluated for a potential to occur in the BSA. Thirteen (13) of those have CNDDB records within a two-mile radius of the BSA. The results of the eight-quadrangle query can be found in Table 3.

All special-status plant species listed in Table 3 have been designated with a California Rare Plant Rank (CRPR), a listing compiled and maintained by CNPS. Those species are categorized as either CRPR 1A (plants presumed extinct in CA); 1B (plants rare, threatened, or endangered in California and elsewhere); 2 (plants rare, threatened, or endangered in California, but more common elsewhere); or 3 (plant about which more information is needed). Those species meet the definitions of Sec. 1901, Chapter 10 (Native Plant Protection Act) or Secs. 2062 and 2067 (California Endangered Species Act) of the California Department of Fish and Game Code and are eligible for state listing and for consideration under the California Environmental Quality Act (CEQA). All but two of the species identified by the database queries were determined to have no or low potential to occur in the BSA because of incompatible habitat types when compared to those in the BSA.

The two sensitive plant species considered for a potential to occur in the BSA, namely Pt. Reyes salty bird's-beak (*Chloropyron maritimum* ssp. *palustre*) and Marin knotweed (*Polygonum marinense*) are known to occur in coastal salt marsh habitat (Table 2). These were determined to have a high and moderate potential to occur in the BSA due to the presence of Northern Coastal Salt Marsh, a suitable habitat type. Point Reyes salty bird's-beak has a CRPR of 1B.2, establishing the species as fairly endangered in the state of California. Marin knotweed is seriously endangered in California with a CRPR rating of 3.1. These species are not listed under State or Federal Endangered Species Acts, but are considered under CEQA. Impacts should be avoided to the degree feasible, but no State or federal permitting is required to address any potential impact by work in the habitat of those species.

Table 2. CNDDB occurrences of rare plant species within 2 miles of BSA.

Occurrence Number	Species	Location	Year	Distance From BSA
4	Point Reyes' salty bird's beak	Collected from a salt marsh in San Rafael. Considered extirpated as of 1996.	1863	1.25 miles
4	Marin knotweed	In 1987, 25 plants were seen in June and 2 were observed in July at the salt marsh along Corte Madera Creek.	1987	1.3 miles
6	Marin knotweed	Growing in small sporadic patches within the upper marsh between the ferry parking lot and the Corte Madera Creek mouth in Greenbrae.	1989	0.10 mile
60	Point Reyes' salty bird's beak	Between 100-200 plants observed within Corte Madera Ecological Reserve.	1987	0.10 mile
75	Point Reyes' salty bird's beak	Approximately 200 plants were seen on the north side of Doherty Drive, east of Hall Middle School. Fence adjacent to the road now protects the marsh area.	2011	0.75 mile

4.5. Special-status Wildlife Species

GANDA biologists utilized data from the CNDDB and the USFWS' Species List Generator to compile a comprehensive list of special-status wildlife species to evaluate for a potential to occur in the BSA (Table 3). The assessment area for this background research included the U.S. Geological Survey (USGS) quadrangle that includes the BSA for the North/South Greenway Gap Closure project and the seven surrounding quadrangles (San Rafael, San Geronimo, Novato, Petaluma, Bolinas, San Quentin, Point Bonita, and San Francisco North). Figure 4 shows the results of that CNDDB query that occur within a 2-mile radius of the BSA. The results included records for ten (10) wildlife species with special-status protection within a 2-mi. radius of the BSA. The results of the USFWS query can be found in Attachment 1, and those species are also included in Table 3.

The list of special-status wildlife (Table 3) includes species protected by either federal or California law or regulation. This includes species federally protected through listing or proposed listing under the Federal Endangered Species Act (FESA) and the Bald and Golden Eagle Protection Act (BGEPA). State-listed species include those described under the following California laws and regulations:

- California Endangered Species Act (CESA)
- California Fish and Game Code, Section 3503 (Migratory Birds) and 3503.5 (raptors)

- California Department of Fish and Wildlife (CDFW) Species of Special Concern List
- CDFW Watch List
- CDFW Special Animals List

The following sections describe the assessment results and potential impacts and avoidance and minimization measures for wildlife species listed in Table 3. Table 3, combining database query results, the USFWS species list for the project, and professional opinion, includes three (3) special-status wildlife species with an assessment of moderate or high potential to occur. Those species (or groups of species) are addressed below, and include Ridgeway's Rail, California black rail, and salt marsh harvest mouse.

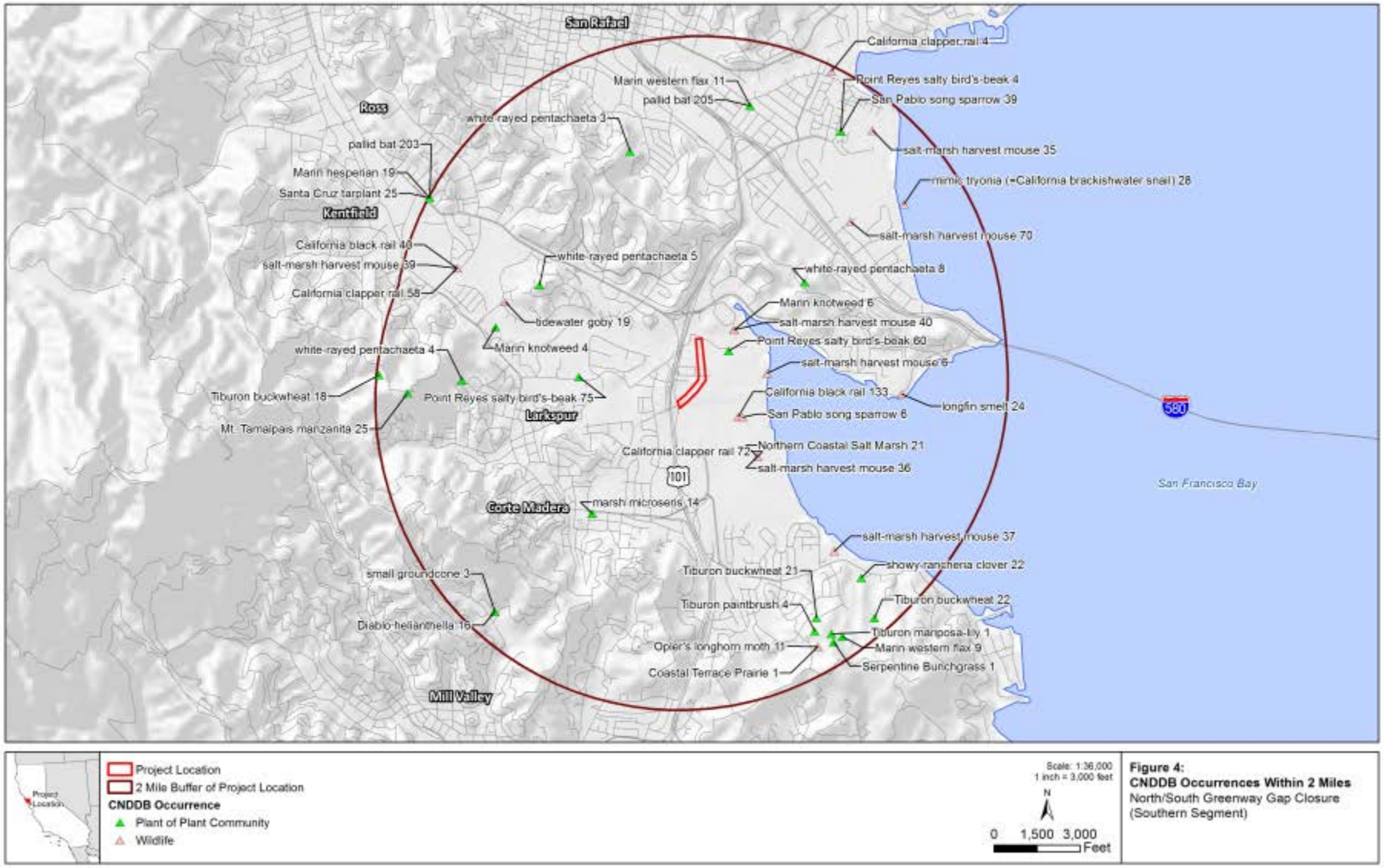

Figure 4:
CNDDB Occurrences Within 2 Miles
North/South Greenway Gap Closure
(Southern Segment)

Table 3. Special-status Wildlife and Plant Species Evaluated for a Potential to Occur in the BSA

Common Name	Scientific Name	Status (Federal/State)	Habitat Requirements	Potential to Occur in the BSA
Invertebrates				
Opler's longhorn moth	*Adela oplerella*	-- / SA	Serpentine habitats that support the host plant, cream cubs (*Platystemon californicus*).	**None.** No serpentine habitat in the BSA. Nearest current CNDDB occurrence is approximately 1.6 miles southeast of the BSA in San Rafael.
Tomales isopod	*Caecidotea tomalensis*	-- / SA	Known from various freshwater habitats: well, peat bogs, mill ponds, springs, coastal lakes with slightly brackish water. Associated with perennial, shallow lentic habitats.	**None.** No suitable fresh water features in the BSA.
Marin blind harvestman	*Calicina diminua*	-- / SA	Known from type locality: under serpentine on a grassland hillside. Occur in mesic habitats, but absent from saturated or periodically inundated soils. Under medium to large undisturbed rocks in contact with the soil.	**None.** No serpentine habitat in the BSA.
San Bruno elfin butterfly	*Callophrys mossii bayensis*	FE / SA Critical Habitat	Vernal pools and swales containing clear to highly turbid water. Pools commonly found in grass bottomed swales of unplowed grasslands. Some pools are mud-bottomed and highly turbid.	**None.** No vernal pool habitat in the BSA. No critical habitat exists in the BSA.
Marin elfin butterfly	*Callophrys mossii marinensis*	-- / SA	North-facing slopes within fogbelt where stonecrop (*Sedum spathulifolium*) grows. Stonecrop grows in coastal grassland and slow scrub on thin, rocky soils.	**None.** Larval host plant is not present in the BSA.
Sandy beach tiger beetle	*Cicindela hirticollis gravida*	-- / SA	Coastal dune habitat with diverse native vegetation.	**None.** No suitable habitat in the BSA. No dunes, and highly modified coastal zones in the BSA.
Monarch butterfly (winter roosting)	*Danaus plexippus*	– / SA	Winter roosting sites extend along the coast from northern Mendocino County south to San Diego County. Roosts are typically located in wind-protected tree groves within a half mile of the coast. Commonly found in eucalyptus, Monterey pine and/or cypress groves, with nectar and water sources in the vicinity. Larvae develop on milkweed (*Asclepias* spp.) throughout California.	**None.** No suitable wintering habitat in the BSA.

Common Name	Scientific Name	Status (Federal/State)	Habitat Requirements	Potential to Occur in the BSA
Bay checkerspot butterfly	*Euphydryas editha bayensis*	FT / SA	Serpentine areas in Santa Clara and San Mateo Counties where its host plant, dwarf plantain (*Plantago erecta*) is present.	**None.** No serpentine habitat in the BSA.
Black abalone	*Haliotes cracherodii*	FE / SA	Occupies Central Valley. Associated with the blue elderberry (*Sambucus mexicana*). Lays eggs on elderberries.	**None.** No suitable habitat in the BSA.
White abalone	*Haliotes sorenseni*	FE / SA	Serpentine areas in Santa Clara and San Mateo Counties where its host plant, dwarf plantain (*Plantago erecta*) is present.	**None.** No serpentine habitat in the BSA.
Ricksecker's water scavenger beetle	*Hydrochara ricksecker*i	-- / SA	Vernal pools, ponds, and seasonal wetlands in the Bay Area.	**None.** No suitable habitat in the BSA.
Mission blue butterfly	*Icaricia icarioides missionensis*	FE / --	Occupies coastal grasslands where its host plants (*Lupinus* spp.) are present. Populations are currently limited to Marin, San Mateo, and San Francisco Counties.	**None.** No suitable habitat in the BSA.
Bumblebee scarab beetle	*Lichnanthe ursina*	-- / SA	Found in Marin, San Francisco, San Mateo, and Sonoma counties. Habitat unknown.	The habitat is unknown, therefore there is potential for the habitat to be present in the BSA. Not discussed below.
Tiburon micro-blind harvestman	*Microcina tiburona*	-- / SA	Dry, nutrient-poor serpentine soil grasslands of the greater San Francisco Bay Area and adjacent foothills and valleys.	**None.** No serpentine habitat in the BSA.
robust walker	*Pomatiopsis binneyi*	-- / SA	Riparian associate semi-aquatic snail found in perennial seeps and rivulets, where it is protected from seasonal flushing in the rainy season. Also on shallow mud banks and marsh seepages leading into shallow streams.	**None.** No suitable freshwater habitat in the BSA.
Callippe silverspot butterfly	*Speyeria callippe callippe*	FE / SA	Occupies native grasslands and associated habitat. Host plant is *Viola pendunculata*. Limited known distribution to coastal scrub within the San Francisco peninsula.	**None.** No suitable habitat in the BSA.
Myrtle's silverspot butterfly	*Speyeria zerene myrtleae*	FE / SA	Inhabits coastal lagoons, estuaries and salt marshes, from Sonoma County south to San Diego County.	**Low.** Potentially suitable habitat in the BSA.

Common Name	Scientific Name	Status (Federal/State)	Habitat Requirements	Potential to Occur in the BSA
California freshwater shrimp	*Syncaris pacifica*	FE / SE	Within submerged undercut banks, overhanging plants such as blackberry, woody debris, and the exposed live root systems of willow or alder within low elevation-low gradient streams. In the winter, the shrimp find protection under exposed roots or dense, overhanging vegetation, in the summer; they retreat to isolated pools with minimal cover but more opaque water. Optimal stream depth is 1-3 feet.	**None.** No suitable habitat in the BSA.
Ubick's gnaphosid spider	*Talanites ubicki*	-- / SA	Known from type locality, Mount Burdell, Novato, Marin County. Serpentine outcrops.	**None.** No serpentine habitat in the BSA.
San Francisco Bay Area leaf-cutter bee	*Trachusa gummifera*	-- / SA	Habitat unknown. Records exist from Marin County but possibly extirpated.	The habitat is unknown, therefore there is potential for the habitat to be present in the BSA. Not discussed below.
mimic tryonia (=California brackishwater snail)	*Tryonia imitator*	– / SA	Inhabits coastal lagoons, estuaries and salt marshes, from Sonoma County south to San Diego County.	**Moderate.** Potentially suitable habitat is present in Corte Madera Creek. Nearest current CNDDB occurrence is approximately 1.5 miles northeast of the BSA in San Rafael. Not discussed below.
Marin hesperian	*Vespericola marinensis Marin hesperian*	-- / SA	Terrestrial snail that requires moisture for respiration and hatching of eggs. Greatest richness of species is among carbonate cliff habitats associated with calcareous substrates.	**Low.** Potentially suitable habitat in the BSA. Nearest current CNDDB occurrence is approximately 2 miles northwest of the BSA in San Rafael.
Fish				
Green sturgeon – southern DPS	*Acipenser medirostris*	FT / SSC	Spawn in deep pools or "holes" in large, turbulent, freshwater river main-stems. Adults live in oceanic waters, bays, and estuaries when not spawning.	**Low.** Suitable breeding (spawning habitat is not present in the BSA, but species may accidentally enter sloughs and channels with connectivity to San Pablo Bay. Corte Madera Creek may serve as foraging habitat, but project is not expected to include the creek.
Pacific lamprey	*Entosphenus tridentatus*	-- / SA	Freshwater streams and rivers, muddy bottoms, backwaters, gravel beds, bedrock.	**None.** No suitable habitat in the BSA.
Tidewater goby	*Eucyclogobius*	FE / SSC	Benthic species that occupies brackish water in	**None.** One historical occurrence

Common Name	Scientific Name	Status (Federal/State)	Habitat Requirements	Potential to Occur in the BSA
	newberryi	Critical Habitat	shallow coastal lagoons or lower stream reaches.	from Corte Madera Creek within two miles of the project area (0.19 mile west of the BSA). Species is considered locally extirpated. No Critical Habitat exists in the BSA.
Delta smelt	*Hypomesus transpacificus*	FT / SE	Found in the Sacramento-San Joaquin delta, seasonally in Suisun Bay, Carquinez Strait and San Pablo Bay. Seldom found at salinities > 10 ppt. Most often occurs at salinities < 2ppt.	**None.** Corte Madera Creek is outside species' typical range, and there is no suitable habitat in BSA, which does not include bay or creek.
Tomales roach	*Lavinia symmetricus ssp.*	-- / SSC	Predominately found in small warm streams but are capable of thriving in larger colder streams with diverse conditions. May occupy several different types within a single drainage. Spawns between March and early July, breeds in gravel beds or riffles where groups of females lay eggs on and into substrate.	**None.** No suitable habitat in the BSA.
Coho salmon – Central CA Coast	*Oncorhynchus kisutch*	FE / SE	Spawning habitat is small streams with stable gravel substrates. The remainder of the life cycle is spent foraging in estuarine and marine waters of the Pacific Ocean.	**Low.** Suitable breeding (spawning) habitat is not present in the BSA. Species is considered locally extirpated. No Critical Habitat exists in the BSA.
Steelhead – Central Valley DPS	*Oncorhynchus mykiss irideus*	FT / SA Critical Habitat	Anadromous. Spawn and rear in mid and high elevation coastal streams. Juveniles typically migrate to the ocean to mature during their third year, and return to spawn as adults in their fourth year. Adult steelhead may spawn more than once. This DPS includes spawning populations from the Sacramento and San Joaquin River systems, including their migration route through San Francisco Bay.	**Low.** Suitable breeding (spawning) habitat is not present in the BSA, but species may accidentally enter sloughs and channels with connectivity to San Pablo Bay. No critical habitat exists in the BSA.
Steelhead – Central CA Coast DPS	*Oncorhynchus mykiss irideus*	FT / SA	Anadromous. Spawn and rear in mid and high elevation coastal streams. Juveniles typically migrate to the ocean to mature during their third year, and return to spawn as adults in their fourth year. Adult	**Low.** Suitable breeding (spawning) habitat is not present in the BSA, but species may accidentally enter sloughs and channels with

Common Name	Scientific Name	Status (Federal/State)	Habitat Requirements	Potential to Occur in the BSA
		Critical Habitat Critical Habitat	steelhead may spawn more than once. This DPS includes spawning populations from Redwood Creek in Humboldt County to and including Gualala River in Mendocino County.	connectivity to San Pablo Bay. No Critical Habitat exists in the BSA.
Chinook salmon – CA Coast	*Oncorhynchus tshawytscha*	FT / --	Anadromous. Occupy south of the Klamath River to the Russian River. Juveniles typically reside in fresh water for 3-15 months before emigrating. Adults return in the spring, and reside in large, deep main-stem pools throughout the summer, and spawn in late summer or early fall.	**Low.** Suitable breeding (spawning) habitat is not present in the BSA, but species may accidentally enter sloughs and channels with connectivity to San Pablo Bay.
Chinook salmon – Central Valley spring-run	*Oncorhynchus tshawytscha*	FT / ST	Anadromous. Occupy the highest accessible reaches of the major tributaries of the Sacramento and San Joaquin rivers. Juveniles typically reside in fresh water for 3-15 months before emigrating. Adults return in the spring, and reside in large, deep main-stem pools throughout the summer, and spawn in late summer or early fall.	**Low.** Suitable breeding (spawning) habitat is not present in the BSA, but species may accidentally enter sloughs and channels with connectivity to San Pablo Bay.
Chinook salmon – Sacramento River winter-run ESU	*Oncorhynchus tshawytscha*	FE / SE Critical Habitat	Anadromous. Historically endemic to the upper tributaries of the Sacramento River, especially the McCloud River. Now limited to the upper portion of the Sacramento River below Shasta Dam. Juveniles typically reside in fresh water for 5-10 months before emigrating. Adults return in March, and reside in large, deep main-stem pools and spawn in early summer.	**Low.** Suitable breeding (spawning) habitat is not present in the BSA, but species may accidentally enter sloughs and channels with connectivity to San Pablo Bay. No Critical Habitat exists in the BSA.
Sacramento splittail	*Pogonichthys macrolepidotus*	-- / SSC	Endemic to the lakes and river of the Central Valley, but now confined to the Delta, Suisun Bay, and associated marshes. Slow-moving river sections, dead end sloughs. Require flooded vegetation for spawning and foraging for young.	**None.** Outside species' range.

Common Name	Scientific Name	Status (Federal/State)	Habitat Requirements	Potential to Occur in the BSA
Longfin smelt	*Spirinchus thaleichthys*	FC / ST / SSC	Occurs in bays and estuaries from Monterey Bay to the Smith River. Enters lower tidal portions of larger streams to spawn, not typically found in non-tidal sections of small streams.	**Low.** Suitable habitat may be present in the BSA. Nearest current CNDDB occurrence is approximately 0.3 mile east of the BSA in San Rafael.
eulachon	*Thaleichthys pacificus*	FT / -- / SSC	Endemic from northern California to southwest Alaska and southeastern Bering Sea; most originate in the Columbia River Basin but have been documented in California and Oregon rivers, and in Puget Sound, Washington. Occurs in nearshore ocean waters and to 1,000 feet in depth, except for the brief spawning runs into their natal streams, lower reaches of larger snowmelt-fed rivers.	**None.** No suitable habitat in the BSA.
Amphibians				
Foothill yellow-legged frog	*Rana boylii*	-- / SSC	Partly-shaded, shallow streams and riffles with a rocky substrate. Needs at least some cobble-sized substrate for egg laying. Need at least 15 weeks of water to attain metamorphosis.	**None.** No suitable habitat within the BSA.
California red-legged frog	*Rana draytonii*	FT / SSC	Breeds in ponds and pools in slow-moving streams with emergent vegetation; adjacent upland habitats are often used for temporary refuges or dispersal movements.	**None.** No suitable habitat within the BSA.
Coast Range newt	*Taricha torosa*	-- / SSC	Found in wet forests, oak forests, chaparral, and rolling grasslands. Along coast and coast range mountains from Mendocino county south to San Diego County.	**None.** No suitable habitat within the BSA.
Reptiles				
Loggerhead turtle	*Caretta caretta*	FT / --	Occupies three different ecosystems during their lives: beaches (terrestrial), water (oceanic), nearshore coastal areas (neritic). Nest on beaches, spend time in ocean, and then migrate to nearshore coastal areas until adulthood.	**None.** No suitable habitat within the BSA, and outside of typical range
Green turtle	*Chelonia mydas (incl. agassizii)*	FT / SA	Shallow waters of lagoons, bays, estuaries, mangroves, eelgrass and seaweed beds. Prefers areas with abundant aquatic vegetation, such as pastures of sea grasses and algae in shallow protected water.	**None.** No suitable habitat within the BSA, and outside of typical range.

Common Name	Scientific Name	Status (Federal/State)	Habitat Requirements	Potential to Occur in the BSA
Leatherback turtle	*Dermochelys coriacea*	FE / --	Open ocean and coastal waters. Mate in waters adjacent to nesting beaches and along migratory corridors.	**None.** No suitable habitat within the BSA, and outside of typical range.
Western pond turtle	*Emys marmorata*	-- / SSC	A thoroughly aquatic turtle of ponds, marshes, river, streams, and irrigation ditches with aquatic vegetation. Need basking sites and suitable (sandy banks or grassy open fields) upland habitat for egg laying.	**Low.** No suitable aquatic habitat within the BSA, which is generally too brackish. Drainage ditches do not provide suitable freshwater habitat
Olive (Pacific) ridley sea turtle	*Lepidochelys olivacea*	FT / --	Mainly pelagic, but also inhabits coastal areas such as bays and estuaries. Annual migration consisting of pelagic foraging, coastal breeding and nesting grounds, pelagic foraging again.	**None.** No suitable habitat within the BSA.
Birds				
Tricolored blackbird (nesting colony)	*Agelaius tricolor*	-- / SE / SSC	Highly colonial species that typically nests in freshwater marshes containing emergent vegetation such as cattail and bulrush, but will also use blackberry thickets and dense patches of ruderal vegetation such as thistles and mustard adjacent to marshes or wetlands.	**Low.** Suitable foraging and nesting habitat is present in the BSA, but the species is uncommon and does not typically use brackish habitats.
Great egret (rookery)	*Ardea alba*	-- / SA	Freshwater, brackish, and marine wetlands. Lives in colonies in trees or shrubs with other waterbirds. Colonies are located on lakes, ponds, marshes, estuaries, impoundments, and islands. Uses similar habitats for migration stopover sites and wintering grounds.	**Low.** Suitable foraging habitat is present in the BSA, but a lack of tall trees in the BSA results in low potential for a rookery.
Great blue heron (rookery)	*Ardea herodias*	-- / SA	Variety of habitats close to bodies of water including fresh and saltwater marshes, wet meadows, lake edges and shorelines. Nests colonially in tall trees, cliff sides, and sequestered spots on marshes.	**Low.** Suitable foraging habitat is present in the BSA, but a lack of tall trees in the BSA results in low potential for a rookery.
Marbled murrelet (nesting)	*Brachyramphus marmoratus*	FT / SE	Found foraging within near shore areas, estuaries, and sounds. Feeds mostly on fish and invertebrates. Generally require large intact stands of old growth forest for nesting but will nest in areas with a few remaining large trees.	**Low.** No suitable foraging or nesting habitat is present in the BSA. Critical Habitat is present west of the BSA.

Common Name	Scientific Name	Status (Federal/State)	Habitat Requirements	Potential to Occur in the BSA
Vaux's swift (nesting)	*Chaetura vauxi*	-- / SSC	Nests in redwood, Douglas fir, and other coniferous forest. Nest in large hollow trees and snags. Often nest in flocks. Forages over most terrains and habitats but shows a preference for foraging over rivers and lakes.	**Low.** Marginally suitable foraging habitat is present in the BSA, but breeding habitat not present.
Western snowy plover (nesting)	*Charadrius alexandrinus nivosus*	FT / SSC	Found on sandy beaches, salt pond levees & shores of large alkali lakes. Requires sandy, gravelly or friable soils for nesting.	**None.** No suitable sandy beach or shoreline habitat in the BSA.
Northern harrier (nesting)	*Circus cyaneus*	-- / SSC	Wet and dry open country such as marshes and grasslands with good ground cover. Nests on the ground among tall vegetation.	**Moderate.** Suitable foraging and nesting habitat is present in the BSA.
Western yellow-billed cuckoo (nesting)	*Coccyzus americanus occidentalis*	FT / SE	Prefers young rapidly growing riparian system stands with healthy hydraulics constantly eroding and depositing for nest sites due to high productivity of invertebrate prey and lower prevalence of predators.	**None.** No suitable forested riparian system habitat in the BSA.
Black swift (nesting)	*Cypseloides niger*	-- / SSC	Nesting habitat consists of forested areas near rivers. Nests are often located behind waterfalls or on damp cliffs, where the environment is dark, wet, steep, and inaccessible to predators, and which provides the swifts with an unobstructed flyway to approach the nest. They are seen foraging in the open sky over mountainous areas and on coastal cliffs.	**None.** No suitable nesting or foraging habitat within the BSA.
Snowy egret (rookery)	*Egretta thula*	-- / SA	Colonial nester, with nest sites situated in trees and protected beds of dense bulrush. Rookery sites situated close to foraging areas: marshes, tidal-flats, streams, wet meadows, and borders of lakes.	**Low.** Suitable foraging habitat is present in the BSA, but a lack of tall trees in the BSA results in low potential for a rookery.
White-tailed kite (nesting)	*Elanus leucurus*	-- / FP	Nests in oak, willow or other trees and forages over open grasslands.	**None.** No nesting habitat within the BSA because of a lack of tall trees.
Saltmarsh common yellowthroat	*Geothlypis trichas sinuosa*	-- / SSC	Resident of fresh and salt water marshes fringing the San Francisco Bay region. Requires thick, continuous cover down to water's surface for foraging, and tall grasses, bulrush patches, or willows for nesting.	**Moderate.** Suitable foraging and nesting habitat is present in the BSA.

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Bald eagle (nesting and wintering)	*Haliaeetus leucocephalus*	-- / CE, FP	Nests and winters along ocean shore, lake margins, and rivers. Most nests are within 1 mile of water. Nests in large old growth or dominant live tree with open branches. Especially ponderosa pine. Roosts communally in winter.	**None.** No suitable foraging or nesting habitat within the BSA.
Caspian tern (nesting colony)	*Hydroprogne caspia*	-- / SA	Breeds in wide variety of habitats along water such as salt marshes, barrier islands, dredge spoil islands, freshwater lake islands, river islands. Otherwise found along coastlines, large rivers and lakes. Roosts on islands and isolated spits.	**Moderate.** Suitable nesting habitat is present in the BSA, but is not isolated from potential predators, so is unlikely to be utilized.
California black rail	*Laterallus jamaicensis coturniculus*	-- / ST, FP	Found in freshwater marshes, wet meadows and shallow margins of saltwater marshes bordering larger bays. Requires water depths of about one inch that does not fluctuate during the year & dense vegetation for nesting habitat.	**Moderate.** Suitable foraging and nesting habitat is present in the BSA. Nearest current CNDDB occurrence is within the BSA in San Rafael.
Suisun song sparrow	*Melospiza melodia maxillaris*	-- / SSC	Resident of brackish-water marshes surrounding Suisun Bay. Inhabits cattails, tules and other sedges, and *Salicornia*; also known to frequent tangles bordering sloughs.	**None.** Outside of species' range.
Alameda song sparrow	*Melospiza melodia pusillula*	-- / SSC	Resident of salt marshes bordering south arm of San Francisco Bay. Inhabits pickleweed (*Salicornia* spp.) marshes; nests low in pickleweed and gumweed (*Grindelia* spp.) bushes, but high enough to escape high tides.	**None.** Outside of species' range.
San Pablo song sparrow	*Melospiza melodia samuelis*	-- / SSC	Resident of salt marshes bordering south along the north side of San Francisco and San Pablo Bays. Inhabits tidal sloughs in the *Salicornia* marshes; nest in *Grindelia* bordering slough channels.	**Moderate.** Suitable foraging and nesting habitat is present in the BSA. Nearest current CNDDB occurrence is approximately 0.08 mile east of the BSA in San Rafael.
Black-crowned night heron (rookery)	*Nycticorax*	-- / SA	Rookery sites located adjacent to foraging areas: lake margins, mud-bordered bays, marshy spots.	**Low.** Suitable foraging habitat is located in the BSA, but a lack of tall trees in the BSA results in low potential for a rookery.

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California brown pelican (nesting colony and communal roosts)	*Pelecanus occidentalis californicus*	-- / FP	Colonial nester on coastal islands just outside of the surf line. Nest on coastal islands of small to moderate size that afford immunity from attack by ground dwelling predators.	**Low.** No suitable foraging or roosting habitat within the BSA, although the Corte Madera Shorebird Marsh may provide roosting habitat immediately to the south.
Short-tailed albatross	*Phoebastria albatrus*	FE / -- / SSC	Nest on sloping grassy terraces on isolated windswept islands in Japan. After breeding, short-tailed albatrosses move to feeding areas in the North Pacfiic.	**None.** No suitable foraging or nesting habitat within the BSA.
Ridgeway's rail (= California clapper rail)	*Rallus longirostris obsoletus*	FE / SE, FP	Salt-water & brackish marshes traversed by tidal sloughs in the vicinity of San Francisco Bay.	**Moderate.** Suitable foraging and nesting habitat is present in the BSA. Nearest current CNDDB occurrence is within the BSA.
Bank swallow (nesting)	*Riparia riparia*	-- / ST	Nests colonially in vertical banks of sand or dirt along rivers, lake shores, road cuts, or similar sites. Nests primarily in riparian and other lowland habitats in central and northern California. Has not been confirmed breeding in Alameda County since 1929.	**None.** No suitable nesting habitat within the BSA.
Rufous hummingbird (nesting)	*Selasphorus rufus*	-- / SA	Chaparral and riparian woodlands, mixed evergreen, riparian woodlands, eucalyptus and cypress groves, oak woodlands, and coastal scrub areas. Can also be found in riparian habitats with large cottonwoods.	**Low.** No high quality foraging or nesting habitat within the BSA.
Allen's hummingbird (nesting)	*Selasphorus sasin*	-- / SA	Potentially suitable habitat within project area includes riparian and urban settings.	**Low.** No high quality foraging or nesting habitat within the BSA.
California least tern (nesting colony)	*Sternula antillarum browni*	FE / SE, FP	Nest colonially on the ground in sandy or gravelly beaches. Forage over open water in coastal regions, including within San Francisco Bay.	**None.** No sandy or gravelly beach habitat in the BSA.
Northern spotted owl	*Strix occidentalis caurina*	FT / CT / SSC	Generally inhabit older forested habitats that have moderate to high canopy closure with multi-species canopies of several tree species of varying size and age. Large overstory trees, standing and fallen trees and sufficient open space among lower branches.	**None.** No suitable foraging or nesting habitat within the BSA. Critical Habitat is present west of the BSA.
California spotted owl	*Strix occidentalis occidentalis*	-- / SSC	Mixed-conifer and oak woodland forests of the western Sierra Nevada and the southern coast range of California.	**None.** No suitable foraging or nesting habitat within the BSA.

Common Name	Scientific Name	Status (Federal/State)	Habitat Requirements	Potential to Occur in the BSA
Mammals				
Pallid bat	*Antrozous pallidus*	– / SSC	Occurs throughout California and most abundant in grasslands, shrublands, and woodlands. Roosts in crevices and cavities of buildings, bridges, tunnels, rocks, cliffs, and trees.	**Low.** Marginally suitable habitat present in the BSA. Nearest current CNDDB occurrence is approximately 1.1 miles north of the BSA in San Rafael. Buildings adjacent to the BSA may contain suitable roosting habitat.
Point Reyes mountain beaver	*Aplodontia rufa phaea*	-- / SSC	Only known to occur in western Marin County, almost entirely within Point Reyes National Seashore on cool, moist, north-facing slopes in moderately dense coastal scrub. Scrub vegetation in the area typically includes coyote brush, sword fern, bracken fern, poison oak, California nettle, and cow parsnip.	**None.** Outside of species' range.
Guadalupe fur seal	*Arctocephalus townsendi*	FT / ST, FP	Majority of the population is centered on Guadalupe Island. Females select male territories that provide cover and shade, and are fronted by water including tidal pools. Most animals breed in small caves, grottos, and cliff and boulder areas on the rugged east coast of the island.	**None.** Outside of species' range.
Sei whale	*Balaenoptera borealis*	FE / --	Prefer subtropical to subpolar waters on the continental shelf edge and slope worldwide. Usually observed in deeper waters of oceanic areas far from the coastline.	**None.** No suitable habitat within the BSA.
Blue whale	*Balaenoptera musculus*	FE / --	Open ocean where they feed both at the surface and also at depth. Found in all oceans except he Artic, but absent from some regional seas such as the Mediterranean, Okhotsk, and Bering seas.	**None.** No suitable habitat within the BSA.
Finback (=fin) whale	*Balaenoptera physallus*	FE / --	Occurs mainly worldwide in open ocean but not exclusively in offshore waters. Rare in the tropics except in cool-water areas.	**None.** No suitable habitat within the BSA.

Common Name	Scientific Name	Status (Federal/State)	Habitat Requirements	Potential to Occur in the BSA
Townsend's big-eared bat	*Corynorhinus townsendii*	-- / CT / SSC	Humid coastal regions of Northern and Central California. Roost in limestone caves, lava tubes, mines, buildings, etc. Will only roost in the open, hanging from walls and ceilings. Roosting site limiting. Extremely sensitive to disturbance.	**Low.** Marginally suitable habitat present in the BSA, but area is subject to frequent disturbance.
Southern sea otter	*Enhydra lutris nereis*	FT / FP	Occurs on exposed and protected rocky and sandy shore bays, estuaries, and kelp forests. Ranges from Half Moon Bay to Santa Barbara and San Nicholas Island.	**None.** No suitable habitat within the BSA.
Right whale	*Eubalaena (=Balaena) glacialis*	FE / --	Feeds along or below the surface of open sea. Occurs on Northwest and Northeast Atlantic.	**None.** No suitable habitat within the BSA.
Steller (=northern) sea-lion	*Eumetopias jubatus*	-- / SA Critical Habitat	Prefers colder temperate to sub-arctic waters of the North Pacific Ocean. Haul outs and rookeries consist of beaches of gravel, rock, or sand; ledges, and rocky reefs. Critical habitat is defined as a 20 nautical mile buffer around all major haul-outs, rookeries, as well as associated terrestrial, air and aquatic zones, and three large offshore foraging areas.	**None.** No suitable habitat within the BSA. No Critical Habitat exists in the BSA.
Western red bat	*Lasiurus blossevillii*	-- / SSC	Roosts primarily in trees, 2-40 ft. above ground, from sea level up through mixed conifer forests. Prefers habitat edges and mosaics with trees that are protected from above and open below with open areas for foraging.	**None.** No suitable habitat within the BSA.
Hoary bat	*Lasiurus cinereus*	– / SA	Occurs throughout California, primarily in habitat mosaics with cover and open areas or habitat edges for feeding. Roosts singly or in small groups in shrub and tree foliage of riparian, woodland, and forest habitats.	**None.** No suitable roosting habitat within the BSA.
Silver-haired bat	*Lasionycteris noctivagans*	-- / SA	Primarily a coastal and montane forest dweller feeding over streams, ponds, and open brushy areas. Roosts in hollow trees, beneath exfoliating bark, abandoned woodpecker holes and rarely under rocks. Needs drinking water.	**None.** No suitable roosting habitat within the BSA.

Common Name	Scientific Name	Status (Federal/State)	Habitat Requirements	Potential to Occur in the BSA
San Pablo vole	*Microtus californicus sanpabloensis*	-- / SSC	Salt marshes of San Pablo Creek, on the south shore of San Pablo Bay. Constructs burrow in soft soil.	**Moderate.** Suitable habitat present in the BSA.
fringed myotis	*Myotis thysanodes*	-- / SA	Wide variety of habitats, optimal habitats are pinyon-juniper, valley foothill hardwood, and hardwood-conifer.	**None.** No suitable roosting habitat within the BSA.
long-legged myotis	*Myotis volans*	-- / SA	Most common in woodland and forest habitats above 5,700 feet. Trees are important day roosts; caves and mines are night roosts.	**None.** No suitable roosting habitat within the BSA.
Yuma myotis	*Myotis yumanensis*	-- / SA	Optimal habitats are open forests and woodlands with sources of water over which to feed. Distribution is closely tied to bodies of water. Maternity colonies in caves, mines, buildings, or crevices.	**None.** No suitable roosting habitat within the BSA.
Sperm whale	*Physeter catodon (=microcephalus)*	FE / --	Found in almost all marine waters deeper than 1,000 meters that are not covered by ice, except in the Black Sea and possibly Red Sea. In North Atlantic, sperm whales (especially males) can occur in shallower waters. Generally more numerous in areas of relatively high primary productivity.	**None.** No suitable habitat within the BSA.
Salt-marsh harvest mouse	*Reithrodontomys raviventris*	FE / SE, FP	Only in the saline emergent wetlands of San Francisco bay and its tributaries. Pickleweed (*Salicornia* sp.) is primary habitat. Builds loosely organized nests and requires higher areas to escape high tides.	**High.** Suitable saltmarsh habitat present within the BSA. Nearest current CNDDB occurrence is within the BSA in San Rafael.
Angel Island mole	*Scapanus latimanus insularis*	-- / SA	Endemic to Angel Island. Mole mounds and surface ridges occur across the island on the north side in moist soil under chaparral.	**None.** Outside of species' range.
Suisun shrew	*Sorex ornatus sinuosus*	-- / SSC	Tidal marshes of the northern shores of San Pablo and Suisun bay. Require dense low-lying cover and driftweed and other litter above the mean high tide line for nesting and foraging.	**None.** Outside of species' range.

Common Name	Scientific Name	Status (Federal/State)	Habitat Requirements	Potential to Occur in the BSA
Salt-marsh wandering shrew	*Sorex vagrans halicoetes*	-- / SSC	Salt marshes of the south arm of San Francisco Bay.	**Low.** Marginally suitable saltmarsh habitat present within the BSA.
American badger	*Taxidea taxus*	-- / SSC	Most abundant in drier open stages of most shrub, forest, and herbaceous habitats, with friable soils. Needs sufficient food, friable soils and open, uncultivated ground. Preys on burrowing rodents. Digs burrows.	**None.** No suitable habitat within the BSA.
Point Reyes jumping mouse	*Zapus trinotatus orarius*	-- / SSC	In California, occurs in wet, marshy coastal meadows in loose, humus-filled dark soils associated with coast redwood forests, thickets of deciduous woody vegetation along streams and seepage areas. Less frequently found in grassy areas beneath open-canopied coniferous forests. Habitats include bunch grass marshes on uplands of Point Reyes Peninsula, meadows or marshlands with sedges or rushes, and occasionally with low-growing chaparral. Moist areas must be safe from inundation.	**None.** Outside of species' range.
Communities				
Coastal Brackish Marsh		-	Dominated by perennial, emergent, herbaceous monocots up to 2 meters tall with complete and dense cover. Brackish from freshwater input; salinity varies at high tide or during seasons of low freshwater runoff or both.	**None.** For this constraints analysis, salt marsh habitat was classified as Northern Coastal Salt Marsh, below.
Coastal Terrace Prairie		-	California native grassland consisting of annual wildflowers and grasses. Dominant native grasses consist of purple needle grass (*Nassella pulchra*) and California oat grass (*Danthonia californica*).	**None.** Coastal terrace prairie habitat is not present in the BSA. Nearest current CNDDB occurrence is approximately 1.5 miles southeast of the BSA in San Rafael.

Common Name	Scientific Name	Status (Federal/State)	Habitat Requirements	Potential to Occur in the BSA
Northern Coastal Salt Marsh		-	Herbaceous and suffructescent, salt-tolerant hydrophytes forming moderate to dense cover and up to 1 meter tall. Usually segregated horizontally with *Spartina* sp. Nearer the open water, *Salicornia* at mid-littoral elevations, and a richer mixture closer to high ground.	**Present.** Northern Coastal Salt Marsh is present in the BSA.
Serpentine Bunchgrass		-	Vegetation dependent upon deeper serpentine soil, which is low in calcium and nutrients and high in iron and magnesium. Serpentine reed grass (*Calamagrostis ophitidi*), blue wildrye (*Elymus glaucus*), and blue fescue (*Festuca idahoensis*) are several species associated with serpentine bunchgrass habitat.	**None.** Serpentine bunchgrass habitat is not present in the BSA. Nearest current CNDDB occurrence is approximately1.7 miles southeast of the BSA in San Rafael.
Plants				
Sonoma alopecurus	*Alopecurus aequalis* var. *sonomensis*	FE/-/1B.1	Marshes and swamps (freshwater) and riparian scrub. Elevation 16 – 1,197 feet.	**None.** No suitable freshwater marsh or riparian scrub in the BSA.
Napa false indigo	*Amorpha californica* var. *napensis*	-/-/1B.2	Broadleafed upland forest (openings), chaparral, and cismontane woodland. Elevation 394 – 6,562 feet.	**None.** No suitable habitat in the BSA.
Franciscan manzanita	*Arctostaphylos franciscana*	FE/-/1B.1	Coastal scrub (serpentinite). Elevation 200 – 990 feet.	**None.** No suitable serpentine habitat in the BSA.
Mt. Tamalpais manzanita	*Arctostaphylos montana* ssp. *montana*	-/-/1B.3	Serpentinite, rocky. Chaparral and valley and foothill grassland. Elevation 525 – 2,493 feet.	**None.** No suitable serpentine habitat in the BSA.
Presidio manzanita	*Arctostaphylos montana* ssp. *ravenii*	FE/SE/1B.1	Serpentinite outcrop. Chaparral, coastal prairie, and coastal scrub. Elevation 150 – 710 feet.	**None.** No suitable serpentine habitat in the BSA.

Common Name	Scientific Name	Status (Federal/State)	Habitat Requirements	Potential to Occur in the BSA
Alkali milk-vetch	*Astragalus tener* var. *tener*	-/-/1B.2	Alkaline. Playas, valley and foothill grassland (adobe clay), and vernal pools. Elevation 7 – 246 feet.	**None.** Not known to ever occur in Marin County. Current distribution only includes Alameda, Merced, Napa, Solano, and Yolo Counties. Presume extirpated in many formerly occurring counties. Nearest current CNDDB occurrence approximately 20 miles northeast of the BSA in Solano County.
Marin manzanita	*Arctostaphylos virgata*	-/-/1B.2	Sandstone or granitic. Broadleafed upland forest, closed-cone coniferous forest, chaparral, and North Coast coniferous forest. Elevation 198 – 2,310 feet.	**None.** No suitable habitat in the BSA.
Marsh sandwort	*Arenaria paludicola*	FE/SE/1B.1	Sandy, openings. Marshes and swamps (freshwater or brackish). Elevation 10 – 560 feet.	**None.** Not known to ever occur in Marin County. Current distribution is considered only Los Angeles and San Luis Obispo Counties. Presumed extirpated in San Francisco County. As of 2008, there was only one known, extant wild population, at Oso Flaco Lake and one, extant, introduced population, at Sweet Springs Marsh at Morro Bay, San Luis Obispo County (USFWS 2008).
Coastal marsh milk-vetch	*Astragalus pycnostachyus* var. *pycnostachyus*	-/-/1B.2	Coastal dunes (mesic), coastal scrub, and marshes and swamps (coastal salt, streamsides). Elevation 0 – 100 feet.	**Low.** Coastal salt marsh within the BSA; however, the species is not known to occur in San Rafael quad. Nearest current CNDDB occurrences are approximately 20 miles west of the BSA at Pt. Reyes National Seashore.

Common Name	Scientific Name	Status (Federal/State)	Habitat Requirements	Potential to Occur in the BSA
Bent-flowered fiddleneck	*Amsinckia lunaris*	-/-/1B.2	Coastal bluff scrub, cismontane woodland, and valley and foothill grassland. Elevation 10 – 1,640 feet.	**Low.** Limited ruderal grassland habitat in the project area. The species is not known to occur in San Rafael quad. Nearest current CNDDB occurrences are approximately 14.0 miles east of the BSA in the Berkeley Hills, Alameda County.
Tiburon mariposa lily	*Calochortus tiburonensis*	FT/ST/1B.1	Valley and foothill grassland (serpentinite). Elevation 165 – 500 feet.	**None.** No suitable serpentine habitat in the BSA.
Seaside bittercress	*Cardamine angulata*	-/-/2.1	Wet areas, streambanks. Lower montane coniferous forest and North Coast coniferous forest. Elevation 215 – 3020 feet.	**None.** No suitable habitat in the BSA.
Bristly sedge	*Carex comosa*	-/-/2B.1	Coastal prairie, marshes and swamps (lake margins), and valley and foothill grassland. Elevation 0 – 2,065 feet.	**None.** Not known to ever occur in Marin County. Nearest current CNDDB occurrence is approximately 40 miles northwest at the mouth of Salmon Creek, Sonoma County.
Lyngbye's sedge	*Carex lyngbyei*	-/-/2B.2	Marshes and swamps (brackish or freshwater). Elevation 0 – 35 feet.	**Low.** Brackish marsh occurs within the BSA; however not known to occur in San Rafael quad. Nearest current CNDDB occurrence is approximately 19 miles northwest of the BSA within Pt. Reyes National Seashore.
Tiberon paintbrush	*Castilleja affinis* ssp. *neglecta*	FE/ST/1B.2	Valley and foothill grassland (serpentinite). Elevation 197 – 1,312 feet.	**None.** No suitable serpentine habitat in the BSA.
Mason's ceanothus	*Ceanothus masonii*	-/SR/1B.2	Chaparral (openings, rocky, serpentinite). Elevation 760 – 1,650 feet.	**None.** No suitable serpentine habitat in the BSA.

Common Name	Scientific Name	Status (Federal/State)	Habitat Requirements	Potential to Occur in the BSA
San Francisco Bay spineflower	*Chorizanthe cuspidata* var. *cuspidata*	-/-/1B.2	Sandy. Coastal bluff scrub, coastal dunes, coastal prairie, and coastal scrub. Elevation 10 – 710 feet.	**None.** No suitable habitat in the BSA.
Sonoma spineflower	*Chorizanthe valida*	-/-/1B.1	Coastal prairie (sandy). Elevation 33 – 1,000 feet.	**None.** No suitable habitat in the BSA.
Franciscan thistle	*Cirsium andrewsii*	-/-/1B.2	Mesic, sometimes serpentinite. Broadleafed upland forest, coastal bluff scrub, coastal prairie, and coastal scrub. Elevation 0 – 500 feet.	**None.** No suitable habitat in the BSA.
Mt. Tamalpais thistle	*Cirsium hydrophilum* var. *vaseyi*	-/-/1B.2	Serpentinite seeps. Broadleafed upland forest, chaparral, and meadows and seeps. Elevation 792 – 2,046 feet.	**None.** No suitable serpentine habitat in the BSA.
Presidio clarkia	*Clarkia franciscana*	FE/SE/1B.1	Coastal scrub and valley and foothill grassland (serpentinite). Elevation 85 – 1,105 feet.	**None.** No suitable coastal scrub or serpentine habitat in the BSA.
Point Reyes salty bird's-beak	*Chloropyron maritimum* ssp. *palustre*	-/-/1B.2	Marshes and swamps (coastal salt). Elevation 0 – 33 feet.	**High.** Suitable coastal salt marsh habitat occurs within the BSA. Nearest CNDDB occurrence is within 700 feet of the BSA within Corte Madera Marsh Ecological Reserve.
Round-headed Chinese-houses	*Collinsia corymbosa*	-/-/1B.2	Coastal dunes. Elevation 0 – 65 feet.	**None.** No suitable habitat in the BSA.
San Francisco collinsia	*Collinsia multicolor*	-/-/1B.2	Sometimes serpentinite. Closed-cone coniferous forest and coastal scrub. Elevation 100 – 825 feet.	**None.** No suitable habitat in the BSA
Western leatherwood	*Dirca occidentalis*	-/-/1B.2	Mesic. Broadleafed upland forest, closed-cone coniferous forest, chaparral, cismontane woodland, North Coast coniferous forest, riparian forest, and riparian woodland. Elevation 83 – 1,043feet.	**None.** No suitable habitat in the BSA.

Common Name	Scientific Name	Status (Federal/State)	Habitat Requirements	Potential to Occur in the BSA
Koch's cord moss	*Entosthodon kochii*	-/-/1B.3	Cismontane woodland (soil). Elevation 594 -3,300 feet.	**None.** No suitable habitat in the BSA.
Tiburon buckwheat	*Eriogonum luteolum* var. *caninum*	-/-/1B.2	Serpentinite, sandy to gravelly. Chaparral, cismontane woodland, coastal prairie, and valley and foothill grassland. Elevation 0 – 2,297 feet.	**None.** No suitable serpentine habitat in the BSA.
Minute pocket moss	*Fissidens pauperculus*	-/-/1B.2	North Coast coniferous forest (damp coastal soil). Elevation 100 – 3,380 feet.	**None.** No suitable habitat in BSA.
Marin checker lily	*Fritillaria lanceolata* var. *tristulis*	-/-/1B.1	Coastal bluff scrub, coastal prairie, and coastal scrub. Elevation 50 – 495 feet.	**None.** No suitable habitat in the BSA.
Fragrant fritillary	*Fritillaria liliacea*	-/-/1B.2	Often serpentinite. Cismontane woodland, coastal prairie, coastal scrub, and valley and foothill grassland. Elevation 10 – 1,345 feet.	**Low.** Limited ruderal grassland habitat in the BSA. Not known to occur in the San Rafael quad. Nearest current CNDDB occurrence is approximately 13 miles northwest of the BSA.
Blue coast gilia	*Gilia capitata* ssp. *chamissonis*	-/-/1B.1	Coastal dunes and coastal scrub. Elevation 10 – 660 feet.	**None.** No suitable habitat in the BSA.
Woolly-headed gilia	*Gilia capitata* ssp. *tomentosa*	-/-/1B.1	Serpentinite, rocky, outcrops. Coastal bluff scrub and valley and foothill grassland. Elevation 100 -730 feet.	**None.** No suitable serpentine habitat in the BSA.
Dark-eyed gilia	*Gilia millefoliata*	-/-/1B.2	Coastal dunes. Elevation 10 – 100 feet.	**None.** No suitable habitat in the BSA.

Common Name	Scientific Name	Status (Federal/State)	Habitat Requirements	Potential to Occur in the BSA
San Francisco gumplant	*Grindelia hirsutula* var. *maritima*	-/-/3.2	Sandy or serpentinite. Coastal bluff scrub, coastal scrub, and Valley and foothill grassland. Elevation 50 – 1,320 feet.	**Low.** Limited suitable ruderal grassland habitat in the BSA. The nearest current CNDDB occurrence is approximately 9.5 miles south of the BSA in the Presidio, San Francisco County.
Diablo helianthella	*Helianthella castanea*	-/-/1B.2	Broadleafed upland forest, chaparral, cismontane woodland, coastal scrub, riparian woodland, and valley and foothill grassland. Elevation 200 – 4,290 feet.	**None.** Presumed extirpated in Marin and San Francisco Counties. Nearest current extant CNDDB occurrence approximately 14 miles east of the BSA in the Berkeley Hills, Alameda County.
White seaside tarplant	*Hemizonia congesta* ssp. *congesta*	-/-/1B.2	Sometimes roadsides. Valley and foothill grassland. Elevation 65 – 1,837 feet.	**Low.** Limited ruderal grassland habitat in the BSA. Nearest current CNDDB occurrence is approximately 6 miles north of the BSA in San Rafael.
Marin dwarf flax	*Hesperolinon congestum*	FT/ST/1B.1	Serpentinite. Chaparral and valley and foothill grassland. Elevation 16 – 1,214 feet.	**None.** No suitable serpentine habitat in the BSA.
Water star-grass	*Heteranthera dubia*	-/-/2B.2	Requires a pH of 7 or higher, usually in slightly eutrophic waters. Marshes and swamps (alkaline, still or slow-moving water). Elevation 100 – 4,935 feet.	**Low.** Salt marsh in the BSA; however not known to occur in San Rafael quad. Many occurrences historical and some possibly extirpated. Nearest current CNDDB occurrence is approximately 19 miles north of the BSA near Inverness.
Santa Cruz tarplant	*Holocarpha macradenia*	FT/SE/1B.1	Often clay, sandy. Coastal terrace prairie and grassland. Elevation 100 -730 feet.	**None.** No suitable habitat in the BSA. Natural populations are restricted to coastal terrace prairie habitat within Santa Cruz and Monterey Counties (USFWS 2014). Presumed extirpated in Marin County.

Common Name	Scientific Name	Status (Federal/State)	Habitat Requirements	Potential to Occur in the BSA
Kellogg's horkelia	*Horkelia cuneata* var. *sericea*	-/-/1B.1	Sandy or gravelly, openings. Closed-cone coniferous forest, chaparral (maritime), coastal dunes, and coastal scrub. Elevation 100 – 660 feet.	**None.** No suitable habitat in the BSA.
Thin-lobed horkelia	*Horkelia tenuiloba*	-/-/1B.2	Mesic openings, sandy. Broadleafed upland forest, chaparral, and valley and foothill grassland. Elevation 165 –1,650 feet.	**Low.** Limited ruderal grassland habitat in the BSA. The nearest current CNDDB occurrence is approximately 3.5 miles southwest of the BSA.
Small groundcone	*Kopsiopsis hookeri*	-/-/2B.3	North Coast coniferous forest. Elevation 300 – 2,910 feet.	**None.** No suitable habitat in the BSA.
Beach layia	*Layia carnosa*	FE/SE/1B.1	Coastal dunes and coastal scrub (sandy). Elevation 0 – 200 feet.	**None.** No suitable habitat in the BSA.
Coast yellow leptosiphon	*Leptosiphon croceus*	-/-/1B.1	Coastal bluff scrub and coastal prairie. Elevation 100 – 500 feet.	**None.** No suitable habitat in the BSA.
Rose leptosiphon	*Leptosiphon rosaceus*	-/-/1B.1	Coastal bluff scrub. Elevation 0 – 330 feet.	**None.** No suitable habitat in the BSA.
San Francisco lessingia	*Lessingia germanorum*	FE/SE/1B.1	Coastal scrub (remnant dunes). Elevation 85 – 365 feet.	**None.** No suitable habitat in the BSA.
Woolly-headed lessingia	*Lessingia hololeuca*	-/-/3	Clay, serpentinite. Broadleafed upland forest, coastal scrub, lower montane coniferous forest, and valley and foothill grassland. Elevation 50 – 1010 feet.	**None.** No suitable serpentine habitat in the BSA.

Common Name	Scientific Name	Status (Federal/State)	Habitat Requirements	Potential to Occur in the BSA
Tamalpais lessingia	*Lessingia micradenia* var. *micradenia*	-/-/1B.2	Usually serpentinite, often roadsides. Chaparral and valley and foothill grassland. Elevation 330 – 1,650 feet.	**None.** Known from only four occurrences in the Mt. Tamalpais area in serpentine grassland and chaparral. There is no serpentine habitat in the BSA. Nearest current extant CNDDB occurrence is approximately 5.5 miles northwest of the BSA on Mt. Tamalpais.
Mt. Diablo cottonweed	*Micropus amphibolus*	-/-/3.2	Rocky. Broadleafed upland forest, chaparral, cismontane woodland, and valley and foothill grassland. Elevation 149 – 2725 feet.	**None.** No suitable rocky habitat within the BSA. Limited ruderal grassland habitat in the BSA.
Marsh microseris	*Microseris paludosa*	-/-/1B.2	Closed-cone coniferous forest, cismontane woodland, coastal scrub, and valley and foothill grassland. Elevation 20 – 990 feet.	**Low.** Limited ruderal grassland habitat in the BSA. Nearest current extant CNDDB occurrences are approximately 24 miles northwest of the BSA at Pt. Reyes National Seashore.
Elongate copper moss	*Mielichhoferia elongata*	-/-/2B.2	Cismontane woodland (metamorphic, rock, usually vernally mesic). Elevation 1,650 – 4,290 feet.	**None.** No suitable habitat in the BSA.
Baker's navarretia	*Navarretia leucocephala* ssp. *bakeri*	-/-/1B.1	Mesic. Cismontane woodland, lower montane coniferous forest, meadows and seeps, valley and foothill grassland, and vernal pools. Elevation 16 – 5,708 feet.	**Low.** Limited ruderal grassland habitat in the project area. Nearest current CNDDB occurrence is at Mt. Burdell Open Space approximately 19 miles north of BSA.
Marin County navarretia	*Navarretia rosulata*	-/-/1B.2	Serpentinite, rocky. Closed-cone coniferous forest and chaparral. Elevation 660 – 2,096 feet.	**None.** No suitable serpentine habitat in the BSA.
White-rayed pentachaeta	*Pentachaeta bellidiflora*	FE/SE/1B.1	Cismontane woodland and valley and foothill grassland (often serpentinite). Elevation 115 – 2,045 feet.	**None.** Presumed extirpated in Marin and Santa Cruz Counties. Current distribution is limited to San Mateo County, primarily within Eastwood Regional Park (USFWS 2010).

Common Name	Scientific Name	Status (Federal/State)	Habitat Requirements	Potential to Occur in the BSA
Choris' popcorn-flower	*Plagiobothrys chorisianus* var. *chorisianus*	-/-/1B.2	Mesic. Chaparral, coastal prairie, and coastal scrub. Elevation 50 – 530 feet.	**None.** No suitable habitat in the BSA.
San Francisco popcorn-flower	*Plagiobothrys diffusus*	-/SE/1B.1	Coastal prairie and valley and foothill grassland. Elevation 200 – 1,190 feet.	**None.** Not known to ever occur in Marin County.
Hairless popcorn-flower	*Plagiobothrys glaber*	-/-/1A	Meadows and seeps (alkaline) and marshes and swamps (coastal salt). Elevation 50 – 595 feet.	**None.** Presume extirpated. Last confirmed sighting in 1954. Possibly relocated near Antioch, Contra Costa County, CA.
North Coast semaphore grass	*Pleuropogon hooverianus*	-/ST/1B.1	Open areas, mesic. Broadleafed upland forest, meadows and seeps, and North Coast coniferous forest. Elevation 33 – 2,201 feet.	**None.** No suitable habitat in the BSA. .
Oregon polemonium	*Polemonium carneum*	-/-/2B.2	Coastal prairie, coastal scrub, and lower montane coniferous forest. Elevation 0 – 6,040 feet.	**None.** No suitable habitat in the BSA.
Marin knotweed	*Polygonum marinense*	-/-/3.1	Marshes and swamps (coastal salt or brackish). Elevation 0 – 33 feet.	**Moderate.** Suitable coastal salt marsh in the BSA. Nearest current CNDDB occurrence is approximately .25 mile north of the BSA at the marsh along the north side of Corte Madera Creek.
Tamalpais oak	*Quercus parvula* var. *tamalpaisensis*	-/-/1B.3	Lower montane coniferous forest. Elevation 330 - 2,475 feet.	**None.** No suitable habitat in the BSA.
Point Reyes checkerbloom	*Sidalcea calycosa* ssp. *rhizomata*	-/-/1B.2	Marshes and swamps (freshwater, near coast). Elevation 10 – 246 feet.	**None.** No suitable freshwater marsh habitat in the BSA.
Adobe sanicle	*Sanicula maritima*	-/SR/1B.1	Clay, serpentinite. Chaparral, coastal prairie, meadows and seeps, and valley and foothill grassland. Elevation 30-240 m	**None.** No suitable serpentine habitat in the BSA.

Common Name	Scientific Name	Status (Federal/State)	Habitat Requirements	Potential to Occur in the BSA
Marin checkerbloom	*Sidalcea hickmanii* ssp. *viridis*	-/-/1B.3	Chaparral (serpentinite). Elevation 50-430 m	**None.** No suitable serpentine habitat in the BSA.
San Francisco campion	*Silene verecunda* ssp. *verecunda*	-/-/1B.2	Sandy. Coastal bluff scrub, chaparral, coastal prairie, coastal scrub, and valley and foothill grassland. Elevation 100 – 795 feet.	**None.** Not known to ever occur in Marin County.
Santa Cruz microseris	*Stebbinsoseris decipiens*	1B.2	Open areas, sometimes serpentinite. Broadleafed upland forest, closed-cone coniferous forest, chaparral, coastal prairie, coastal scrub, and valley and foothill grassland. Elevation 35 – 1,650 feet.	**Low.** Limited ruderal grassland habitat in the project area. Known from fewer than twenty occurrences. Nearest current CNDDB occurrence is approximately 4.5 miles west of the BSA on Mt. Tamalpais.
Tamalpais jewel-flower	*Streptanthus batrachopus*	-/-/1B.2	Serpentinite. Closed-cone coniferous forest and chaparral. Elevation 1007 – 2,145feet.	**None.** No suitable serpentine habitat in the BSA.
Tiburon jewel-flower	*Streptanthus glandulosus* ssp. *niger*	FE/SE/1B.1	Valley and foothill grassland (serpentinite). Elevation 100 – 495 feet.	**None.** No suitable serpentine habitat in the BSA.
Mt. Tamalpais bristly jewel-flower	*Streptanthus glandulosus* ssp. *pulchellus*	-/-/1B.2	Serpentinite. Chaparral and valley and foothill grassland. Elevation 495 – 2,640 feet.	**None.** No suitable serpentine habitat in the BSA.
Suisun Marsh aster	*Symphyotrichum lentum*	-/-/1B.2	Marshes and swamps (brackish and freshwater). Elevation 0 – 10 feet.	**None.** Not known to ever occur in Marin County.
Showy rancheria clover	*Trifolium amoenum*	FE/-/1B.1	Coastal bluff scrub and valley and foothill grassland (sometimes serpentinite). Elevation 0 - 985 feet.	**None.** It is reduced to 1 natural population in Marin County and 2 experimental populations at Pt. Reyes National Seashore, Marin County (USFWS 2012).
Saline clover	*Trifolium hydrophilum*	-/-/1B.2	Marshes and swamps, valley and foothill grassland (mesic, alkaline), and vernal pools. Elevation 0 – 990 feet.	**None.** Not known to ever occur in Marin County.

Common Name	Scientific Name	Status (Federal/State)	Habitat Requirements	Potential to Occur in the BSA
San Francisco owl's-clover	*Triphysaria floribunda*	-/-/1B.2	Usually serpentinite. Coastal prairie, coastal scrub, and valley and foothill grassland. Elevation 100 – 530 feet.	**Low.** Limited ruderal grassland habitat in the BSA. No serpentine habitat in the BSA. Nearest current CNDDB occurrence is approximately 9.5 miles south of the BSA in the Presidio, San Francisco County.
Coastal triquetrella	*Triquetrella californica*	1B.2	Soil. Coastal bluff scrub and coastal scrub. Elevation 100 – 330 feet.	**None.** No suitable habitat in the BSA. Known in CA from fewer than ten small coastal occurrences,

Federal Status Designations:

FE Listed as Endangered under the federal Endangered Species Act
FT Listed as Threatened under the federal Endangered Species Act
FC Candidate for listing under the federal Endangered Species Act
FD Delisted; was formerly listed as Threatened or Endangered
PE Proposed for listing as Endangered
PT Proposed for listing as Threatened
– No federal status

State of California Status Designations:

SE Listed as Endangered under the California Endangered Species Act
ST Listed as Threatened under the California Endangered Species Act
SD Delisted; was formerly listed as Threatened or Endangered
FP Fully Protected Species under California Fish and Game Code
SSC California Department of Fish and Wildlife Species of Special Concern
SA Included on the California Department of Fish and Wildlife's Special Animals List
WL California Department of Fish and Wildlife's Watch List
– No state status

1. Scientific nomenclature based on Baldwin et al. (2012) and Jepson Online Interchange (2015); common names from Baldwin et al. (2012), CalFlora (2015) and other sources.

2. Conservation status definitions are as follows:

U.S. Fish and Wildlife Service designations:
FE Endangered: Any species in danger of extinction throughout all or a significant portion of its range.
FT Threatened: Any species likely to become endangered within the foreseeable future.

California Department of Fish and Wildlife designations:
SE: Endangered: Any species at risk of becoming extinct in all or a significant portion of its range.
ST: Threatened: Any species likely to become endangered within the foreseeable future.
SR: Any species not currently threatened with extinction, but in such small numbers throughout its range that it may become endangered if its present environment worsens.

California Rare Plant Ranks:
1B Plants rare, threatened or endangered in California and elsewhere.

2 Plants rare, threatened or endangered in California, but more common elsewhere.
3 Plants for which more information is needed – a review list.
4 Plants of limited distribution – a watch list.

Threat Categories:

.1 Seriously endangered in California.
.2 Fairly endangered in California.
.3 Not very endangered in California.

3. Information on known locations in the vicinity of the project area was compiled from CalFlora (2015), CDFW (2015), CNPS (2015), and other cited references.

4. Low**:** Habitat within the BSA and/or project vicinity satisfies very few of the species' requirements and/or the range of the species overlaps with the vicinity of the BSA, but not with the BSA itself. The species' presence within the study area is unlikely.

4.5.1. California black rail

The California black rail (*Laterallus jamaicensis coturniculus*) is a state threatened and fully protected species. Although this species prefers pickleweed-dominated marsh habitat, it can be found in freshwater and brackish marshes as well (Evans et al. 1991). Black rails can colonize isolated marshes, including created ones, suggesting that large, contiguous marshes are not a requirement for occupancy. Nests are typically concealed in dense vegetation, often pickleweed and tall grasses, near the upper limits of tidal flooding zones.

California black rail occurs at a number of sites in the San Francisco Bay Area, although they are more concentrated in the northern part of the region (Evans et al. 1991). In South San Francisco Bay, black rails occur more frequently in fall and winter months than in spring or summer months. The reason for this may be due to lower elevation marsh communities with less transitional upland habitat and the small, fragmented nature of these marsh systems (Eddleman et al. 1994). California black rails appear to prefer tidal salt marshes with a heavy canopy of pickleweed and an open structure below the canopy for nesting and ease of movement (Evans et al. 1991). In freshwater marshes, rails are usually found in areas with dense stands of bulrush, cattail, and/or saltgrass. Along the Pacific coast, black rails appear to tolerate tidal marsh communities with higher flooding potential provided there is suitable upper wetland zones or adjacent upland vegetation for refugia (Eddleman et al. 1994).

There are two CNDDB occurrences of California black rails within two miles of the BSA (Table 4, Figure 4). One record (#40) is a historic collection record from 1932 at Corte Madera Creek. Another record from 2005 (#133) of a black rail occurred in the Corte Madera Marsh Ecological Reserve, located adjacent to the BSA. Coastal salt marsh habitat dominates the landscape east of the BSA, between the existing trail and San Pablo Bay. Intertidal areas here are dominated by open mud flats and large areas of marsh vegetation. There is a moderate potential for black rails to move through the BSA during foraging activities, or in search of more suitable habitat. Suitable nesting habitat for black rails occurs within the BSA.

There may be effects to black rails if work on the trail occurs within marsh areas immediately adjacent. Where work may occur along the trail directly adjacent to the marsh, avoidance and minimization measures will be required to prevent indirect effects to black rails. Appropriate measures include pre-construction call count surveys, implementation of water quality BMPs, worker environmental awareness training, and development of a SWPPP. Effects to black rails can be avoided by restricting work during king tides or high tides and after storms, as the high water reduces the amount of refugia habitat (Marin County Flood Control and Water

Conservation District 2014). Limitations should be placed on pile driving activity to minimize disturbance (CDFW 2013).

Coordination with the CDFW is recommended, to confirm that adequate avoidance and minimization measures will be included in the Project.

Table 4. CNDDB occurrences of California black rail within 2 miles of BSA.

Occurrence Number	Location	Year	Distance From BSA
40	One specimen was collected from the Corte Madera Creek.	1932	1.3 miles
133	One rail was detected for 11 days in winter 1981-1983; approximately 0.6-2.12 rails/hectare in were observed in 2001, and 1 was detected in 2004 and 2005.	1981-2005	Within BSA

4.5.2. Ridgway's rail

Ridgway's rail (formerly California clapper rail; *Rallus longirostris obsoletus*) was listed as an endangered species by the USFWS in October 1970. No critical habitat has been designated for the Ridgway's rail (USFWS 2010a). Ridgway's rails are year-round (non-migratory) San Francisco Bay residents that occur primarily in the emergent salt and brackish wetlands that also provide salt marsh harvest mouse habitat. Loss of the coastal salt marsh foraging habitat was the primary reason for its FESA listing (USFWS 2010a). Additionally, the suitability of many marshes for Ridgway's rails is further limited by their small size, fragmentation, lack of tidal channel systems and other habitat features (USFWS 2010b). Many marshes are completely submerged during high tides and lack refugia habitat.

In southern and central San Francisco Bay and along the perimeter of San Pablo Bay, Ridgway's rails typically inhabit salt marshes dominated by pickleweed and Pacific cordgrass. Pacific cordgrass dominates the middle marsh zone throughout the southern and central bay (USFWS 2010a). Use of brackish marshes by Ridgway's rails is largely restricted to major sloughs and rivers of San Pablo Bay and Suisun Marsh, and along Coyote Creek in south San Francisco Bay (USFWS 2010a). Individuals have rarely been documented in nontidal marsh areas.

Ridgway's rails are secretive and difficult to observe in dense vegetation but once flushed, they can frequently be approached. They prefer to walk or run over other forms of locomotion. When flushed, they normally fly only a short distance before landing. They can swim well although swimming is used only to cross sloughs or escape immediate threats at high tide. Ridgway's

rails are most active in early morning and late evening when they forage in marsh vegetation in and along creeks and mudflat edges. They often roost at high tide during the day (USFWS 2010a), relying on the surrounding wetland mud and water for protection and isolation from predators. Ridgway's rails have historically used Pacific cordgrass stands as nesting habitat. They lay their eggs on the ground in a shallow nest and build a canopy using dead marsh vegetation. Breeding season for the Ridgway's rails is typically March through July.

There are three CNDDB occurrences of Ridgway's rail within two miles of the BSA (Table 5, Figure 4). One record is recent and located within the BSA. The most recently recorded observation was from 2009, in which the rail was observed within the southeastern portion of the marsh surrounding the BSA. Coastal salt marsh habitat dominates the landscape east of the BSA, between the existing trail and San Pablo Bay. Intertidal areas here are dominated by open mud flats and large areas of marsh vegetation. There is a moderate potential for Ridgeway's rails to move through the BSA during foraging activities, or in search of more suitable habitat. Suitable nesting habitat for Ridgeway's rails does occur within the BSA.

There may be effects to Ridgeway's rails if work on the trail occurs within marsh areas immediately adjacent. Where work may occur along the trail directly adjacent to the marsh, avoidance and minimization measures would be required to prevent indirect effects to Ridgeway's rails. Appropriate measures include pre-construction call count surveys, implementation of water quality BMPs, worker environmental awareness training, and development of a SWPPP. King tides or high tides may cause Ridgeway's rails to move towards elevated areas subject to construction activity. Effects to Ridgeway's rails can be avoided by restricting work during king tides or high tides and after storms, as the high water reduces the amount of refugia habitat (Marin County Flood Control and Water Conservation District 2014). Limitations should be placed on pile driving activity to minimize disturbance (CDFW 2013).

Coordination with the USFWS is recommended, preferably through a Section 7 consultation process, to confirm that adequate avoidance and minimization measures will be included in the Project. A Biological Assessment may be required to evaluate the construction methods and specific design features of the Project, and if there is a potential for *take* (impact to a special-status species) a Biological Opinion may be issued by that agency.

Table 5. CNDDB occurrences of Ridgway's rail within 2 miles of BSA.

Occurrence Number	Location	Year	Distance From BSA
4	Small numbers of rails were observed approximately 0.6 mile upstream of San Rafael Creek.	1975	1.9 miles
58	A breeding population or pair was observed within the marsh of Corte Madera Creek.	1931	1.3 miles
72	Between the years 1972 and 2009, rails were observed at the Corte Madera Creek mouth to highway 101, the northern marsh, middle marsh, southwest creek, south-central marsh, and southeast marsh.	1972-2009	Within BSA

4.5.3. Salt-marsh harvest mouse

The salt marsh harvest mouse (*Reithrodontomys raviventris*) was listed as an endangered species by the USFWS in October 1970. It is also a California state fully protected species. The reason for listing was the loss of suitable salt marsh foraging habitat. Additionally, suitability of many marsh systems for salt marsh harvest mice is reduced by small size, fragmentation from other marshes, and a lack of escape cover (USFWS 2010a). There are two subspecies of salt marsh harvest mice; the northern salt marsh harvest mouse (*R. r. halicoetes*), which occupies marshes of the San Pablo and Suisun Bays, and the salt marsh harvest mouse (*R. r. raviventris*), which occupies marshes of Corte Madera, Richmond and South San Francisco Bay (USFWS 2010c). Large tracts of high quality marsh habitat generally are required to maintain stable populations (USFWS 2010c). No critical habitat has been designated for the salt marsh harvest mouse (USFWS 2010c).

Unlike most rodents, salt marsh harvest mice do not reproduce quickly. Males typically are sexually active from April – September, while females of the southern subspecies can breed from May – November (USFWS 2010c). Salt marsh harvest mice are thought to feed on seed, grass, and forbs, including pickleweed and saltgrass. In winter, they are known to consume fresh green grasses (California Coastal Conservancy 2013). The salt marsh harvest mouse is adapted to tolerate high concentrations of salt in food and water. Mice have been known to drink and survive on saltwater or brackish water for long periods (USFWS 2010c).

Salt marsh harvest mice are cover-dependent species that inhabit tidal and diked salt marshes characterized by dense stands of pickleweed or peripheral halophytes (e.g., salt tolerant plants). Marshes without transitional zones (i.e., higher marsh or adjacent uplands) typically do not have mice, as escape cover is missing, and predation risk is high. Whether large areas of open, or unvegetated, space represent movement barriers to salt marsh harvest mice remains unclear. One study reported movements through open habitats were not "rare or extraordinary" but another

indicated that mice generally did not cross large areas of open space (USFWS 2010c). Salt marsh harvest mice have been found seasonally using grasslands over 100 meters from any wetland edge, with this use highest in late spring and early summer (USFWS 2010c). However, the amount of vegetative cover within these grasslands likely determines suitability with greater cover providing more protection.

There are seven CNDDB occurrences of salt-marsh harvest mice within two miles of the BSA (Table 6; Figure 4). Coastal salt marsh habitat dominates the landscape east of the BSA, between the existing trail and San Pablo Bay. Intertidal areas here are dominated by open mud flats and large areas of marsh vegetation. There is a high potential for salt-marsh harvest mouse to move through the BSA during foraging activities, or in search of more suitable habitat.

There may be effects to salt-marsh harvest mouse if work occurs within marsh areas immediately adjacent to the existing trail. Where work may occur along the trail directly adjacent to the marsh, avoidance and minimization measures will be required to prevent indirect effects to salt-marsh harvest mice. Appropriate measures include pre-construction surveys, implementation of water quality BMPs, worker environmental awareness training, and development of a SWPPP. King tides or high tides may cause salt-marsh harvest mice to move towards elevated areas subject to construction activity. Effects to salt-marsh harvest mice can be avoided by restricting work during king tides or high tides and after storms, as the high water reduces the amount of refugia habitat (Marin County Flood Control and Water Conservation District 2014).

Coordination with the USFWS is recommended, preferably through a Section 7 consultation process, to confirm that adequate avoidance and minimization measures will be included in the Project. A Biological Assessment may be required to evaluate the construction methods and specific design features of the Project, and if there is a potential for *take* (impact to a special-status species) a Biological Opinion may be issued by that agency.

Table 6. CNDDB occurrences of salt-marsh harvest mouse within 2 miles of BSA.

Occurrence Number	Location	Year	Distance From BSA
6	Three individuals were captured in 1971, and two were recaptured. No further positive trapping results were retrieved despite several trapping efforts in the late 1970's and early 1980's.	1971-1990	0.2 mile
35	Two individuals were collected in 1950 from Spinnaker Lagoon, 11 were trapped in 1990, 2 adults and 2 juveniles were trapped in 1992, 13 were trapped in 1993, and 11 adults, 4 juveniles, and 2 unknown individuals were trapped in 1995.	1950-1995	1.6 miles

Occurrence Number	Location	Year	Distance From BSA
36	Three were captured and 2 recaptured in 1971, and one was captured in Martas Marsh Area in 1990.	1971-1990	1.3 miles
37	Species observed 2 miles ESE of Corte Madera.	1938	1.2 miles
39	Individual seen at Corte Madera Creek Marsh in Larkspur.	1944-1959	1.25 miles
40	Collected in 1945 at the north bank of Corte Madera Creek mouth, 1500 meters east of where 101 crosses the creek. None were found in 1988.	1945	0.12 mile
70	Observed at Holiday Magic (Canalways) Marsh in San Rafael.	1982	1 mile

4.5.4. Nesting Birds

All migratory birds are protected under the Migratory Bird Treaty Act and California Fish and Game Code sections 3503, 3511, or 3513, which protects individuals and active nests. The BSA includes trees and vegetation that are suitable for nesting birds. Landscape vegetation and annual grasslands along the berm and around the coastal salt marsh are suitable nesting sites for birds.

Bird species with further protections in addition to the MBTA, located within the search query area include northern harrier *(Circus cyaneus)*, and tricolored blackbird (*Agelaius tricolor)*, marbled murrelet (*Brachyramphus marmoratus*), western snowy plover (*Charadrius alexandrinus nivosus*), western yellow-billed cuckoo (*Coccyzus americanus occidentalis*), short-tailed albatross (*Diomedea albatrus*), white-tailed kite (*Elanus leucurus*), bald eagle (*Haliaeetus leucocephalus*), California brown pelican (*Pelecanus occidentalis californicus*),bank swallow (*Riparia riparia*), California least tern (*Sternula antillarum browni*), and Northern spotted owl (*Strix occidentalis caurina*). Due to limitations in habitat or range, most of these species are not expected to occur within the BSA.

Recommended avoidance and minimization measures for nesting birds are outlined below:

- To avoid or minimize potential impacts to nesting birds, project construction activities such as tree removal and/or tree trimming, excavation, grading, and the operation of heavy equipment will occur between September 1 and January 31, outside of the nesting season, to the extent feasible.

- If project construction activities must occur during the period from February 1 to August 31, a qualified wildlife biologist shall conduct pre-construction surveys for nesting birds. During

the surveys, the qualified biologist shall carefully search for active nests/burrows within the work zone and a surrounding buffer zone.

- If an active nest is found during the pre-construction survey, the bird species shall be identified and the approximate distance from the closest work site to the nest shall be estimated. Appropriate buffer distances shall be established by a qualified biologist. If active nests are closer than the appropriate buffer distance to the nearest work site then the active nest(s) shall be monitored for signs of disturbance. Disturbance of active nests will be avoided until it is determined that nesting is complete and the young have fledged.

4.6. Wildlife Corridors

The Corte Madera Ecological Reserve bordering the east side of the BSA acts as a wildlife corridor for aquatic, semi-aquatic, and terrestrial species. The northern coastal salt marsh allows for species to enter San Pablo Bay and surrounding waterways such as Corte Madera Creek and San Clemente Creek. Channels within the slough direct species from the edge of the BSA through to the bay. Corte Madera Shorebird Marsh, located south of the BSA, may also play a significant role for migrating or nesting birds.

Species are not expected to enter the Corte Madera Ecological Reserve through the developed areas. As the existing trail within the BSA runs along urban land-use areas to the west, work to improve the trail conditions is not expected to affect the wildlife corridor value of the salt marsh habitat.

4.7 General Avoidance and Minimization Measures

General avoidance and minimization measures for special-status species, modified from the Stream Maintenance Program Manual (draft) (Marin County Flood Control and Water Conservation District 2014) include:

- A qualified biologist shall walk the site each day before construction activities commence to locate wildlife; if any special-status wildlife species are noted, work will not commence until all individuals have left the work site on their own and/or it has been determined that they are not nesting within the project site.

- To avoid impacts to special-status species, the construction activities carried out shall typically occur during the summer low flow season. In addition, species-specific work windows shall be followed to avoid impacts.

- Within 30 days prior to the start of ground disturbing activities, call count surveys shall be conducted within 1,500 feet of the project site to determine if active black and/or Ridgeway's rail nests, broods and calling centers are present within the Project site. Call count surveys shall be conducted monthly thereafter throughout the duration of construction during the nesting season which occurs from February 1 to September 30. Surveys shall follow the USFWS survey protocol.

- When maintenance activities require dewatering, a qualified fisheries biologist with appropriate permits shall be on-site to move fish.

- At sites where vegetation may be modified (such as mowing, clearing, or ground-breaking), and where special-status plant species may potentially occur, a qualified biologist shall conduct a habitat assessment during blooming periods to determine the presence of suitable habitat. If no potentially suitable habitat is identified during the habitat assessment, then avoidance has been accomplished and no further actions are necessary.

- If suitable habitat is determined to be present within the maintenance site, botanical surveys shall be conducted before activities commence to determine whether any special-status plant species are present. Rare plant surveys, if necessary, shall be conducted following the CNPS Botanical Survey Guidelines (CNPS 2001), Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities (CDFW 2009b) and Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants (USFWS 2000).

- Surveys shall be conducted in the field when species are both evident and identifiable, normally during flowering or fruiting. Multiple visits to a site may be necessary to capture the floristic diversity present at the site. If listed species are observed or presumed present, then the qualified biologist shall take such action as is necessary to protect the plants, using fencing, buffers, etc. If possible and practicable, the project shall be redesigned to avoid listed plant species. The qualified biologist shall ensure that the Project Foreman is aware of these site-specific conditions, and will inspect the work site before, during, and after completion of the construction activities.

- Vegetation removal will be minimized to the maximum extent possible. Vegetation will be cut above the soil level except in areas that will be excavated. This will allow plants that reproduce vegetatively to resprout after construction. A qualified biologist will be present during all vegetation clearing and grubbing activities and will thoroughly inspect all areas

immediately prior to vegetation clearing. All clearing and grubbing of pickleweed will occur by hand, all other vegetation will be cleared either by hand or light construction equipment.

- Immediately prior to the initiation of any ground disturbing activities including staging of equipment or materials, the qualified biologist will conduct a clearance survey to ensure no listed species are present within the area to be disturbed. If a listed species is observed, all project work will cease and the agencies will be contacted to determine how to proceed.

- Employees and contractors performing construction activities will receive environmental sensitivity training. Training will include review of environmental laws and avoidance and minimization measures (AMMs) that must be followed by all personnel to reduce or avoid effects on covered species during construction activities. They will also include a brief review of the biology of the covered species and guidelines that must be followed by all personnel to reduce or avoid negative effects to these species during construction activities. Directors, managers, superintendents, and the crew foremen and forewomen will be responsible for ensuring that crewmembers comply with the guidelines.

- Contracts with contractors, construction management firms, and subcontractors will obligate all contractors to comply with these requirements, AMMs.

- The following will not be allowed at or near work sites for covered activities: trash dumping, firearms, open fires (such as barbecues) not required by the activity, hunting, and pets.

- Vehicles and equipment will be parked on pavement, existing roads, and previously disturbed areas to the extent practicable.

- Off-road vehicle travel will be minimized.

- Vehicles will not exceed a speed limit of 15 mph on unpaved roads within natural land-cover types, or during off-road travel.

- Vehicles or equipment will not be refueled within 100 feet of a wetland, stream, or other waterway unless a bermed and lined refueling area is constructed.

- Vehicles shall be washed only at approved areas. No washing of vehicles shall occur at job sites.

- To discourage the introduction and establishment of invasive plant species, seed mixtures/straw used within natural vegetation will be either rice straw or weed-free straw.

- The qualified biologist shall ensure that the spread or introduction of invasive exotic plants shall be avoided to the maximum extent possible. When practicable, invasive exotic plants at the work site shall be removed.

- For all activities in creeks and bay, as a precaution against invasive quagga and zebra mussels, all gear exposed to water shall be allowed to dry for three days before being used again at another location. Some disinfectants are acceptable for use per CDFW and USFWS.

- Pipes, culverts and similar materials greater than 4 in. in diameter, will be stored so as to prevent special-status wildlife species, particularly the salt marsh harvest mouse, from using these as temporary refuges, and these materials will be inspected each morning for the presence of animals prior to being moved.

- Erosion control measures will be implemented to reduce sedimentation in wetland habitat occupied by covered animal and plant species when activities are the source of potential erosion problems. Plastic mono-filament netting (erosion control matting) or similar material containing netting shall not be used at the project. Acceptable substitutes include coconut coir matting or tackified hydroseeding compounds.

- Stockpiling of material will occur such that direct effects to covered species are avoided. Stockpiling of material in marsh areas will occur outside of the top of bank, and will not exceed 30 days.

- Grading will be restricted to the minimum area necessary.

- Prior to ground disturbing activities in sensitive habitats, project construction boundaries and access areas will be flagged and temporarily fenced during construction to reduce the potential for vehicles and equipment to stray into adjacent habitats.

- Earth moving-activities will not be conducted in or adjacent to salt marsh within 24 hours of predicted storms, after major storms (defined as 1 inch of rain or more), or within one tidal cycle of a king tide.

- Trenches will be backfilled as soon as possible. Open trenches will be searched each day prior to construction to ensure no special-status species are trapped. Earthen escape ramps will be installed at intervals prescribed by a qualified biologist.

5. Conclusions and Summary of Constraints

The North South Greenway Gap Closure (Southern Section) biological study area is bordered on the west side by developed residential and commercial areas, and by Corte Madera Ecological Reserve on the east side. The Reserve primarily consists of a sensitive habitat type, northern coastal salt marsh, which contains hydrological features and vegetation suitable for sensitive plant and wildlife species such as the Point Reyes' salty bird's beak, Marin knotweed, black rail, Ridgeway's Rail, and salt-marsh harvest mouse. These species have a moderate to high potential of occurring within that habitat type during the associated North South Greenway Gap Closure (Southern Section) work.

Although the surrounding area is considered wildlife habitat and a wildlife corridor for many terrestrial, semi-aquatic, and aquatic species, the BSA itself does not encompass a large portion of the sensitive habitat. Work associated with the North South Greenway Gap Closure (Southern Section) should avoid impact to special-status species by avoiding direct impact to northern coastal salt marsh, and by including avoidance and minimization measures during construction. Special attention should be given to reducing the amount of area and impact to the Reserve by delineating the project area and restricting access to adjacent habitat.

The wetlands that exist on the west side of the trail will need to be permitted if impact the those features is required as part of the trail design, and the potential wetlands north of and at the bend of the existing unpaved trail will need to be delineated in order to determine whether they are considered jurisdictional wetlands.

Additional permitting and mitigation is required in order to conduct work on established wetlands, which may impact the cost and schedule of the proposed trail enhancement work. Increasing the project impact area through construction of additional embankment will result in exponentially greater costs to permit and mitigate the activity. Outside of the area already supported on the existing embankment of fill material, any fill of wetlands, or modification of hydrology, should be avoided for areas to the south and east of the BSA. As the west side of the existing trail consists predominantly of disturbed and developed areas, staging, access, and additional impacts should be concentrated in these areas.

The potential to encounter a special-status species plants or wildlife is significantly increased within Corte Madera Ecological Reserve and the coastal salt marsh habitat. Avoidance of impacts to these species can be reduced or avoided by constraining the alignment of the trail improvements to the existing embankment, and by implementing avoidance and minimization measures during the project.

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Attachment 1. USFWS Species List

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825

February 17, 2015

Document Number: 150217123927

Jason Minton
Garcia and Associates
1512 Franklin Street
Suite 100
Oakland, CA 94612

Subject: Not specified

Dear: Interested party

We are sending this official species list in response to your February 17, 2015 request for information about endangered and threatened species. The list covers the California counties and/or U.S. Geological Survey 7½ minute quad or quads you requested.

Our database was developed primarily to assist Federal agencies that are consulting with us. Therefore, our lists include all of the sensitive species that have been found in a certain area *and also ones that may be affected by projects in the area*. For example, a fish may be on the list for a quad if it lives somewhere downstream from that quad. Birds are included even if they only migrate through an area. In other words, we include all of the species we want people to consider when they do something that affects the environment.

Please read Important Information About Your Species List (below). It explains how we made the list and describes your responsibilities under the Endangered Species Act.

Our database is constantly updated as species are proposed, listed and delisted. If you address proposed and candidate species in your planning, this should not be a problem. However, we recommend that you get an updated list every 90 days. That would be May 18, 2015.

Please contact us if your project may affect endangered or threatened species or if you have any questions about the attached list or your responsibilities under the Endangered Species Act. A list of Endangered Species Program contacts can be found http://www.fws.gov/sacramento/es/Branch-Contacts/es_branch-contacts.htm.

Endangered Species Division

TAKE PRIDE IN AMERICA

U.S. Fish & Wildlife Service

Sacramento Fish & Wildlife Office

Federal Endangered and Threatened Species that Occur in or may be Affected by Projects in the Counties and/or U.S.G.S. 7 1/2 Minute Quads you requested

Document Number: 150217123927

Current as of: February 17, 2015

Quad Lists

Listed Species

Invertebrates

- Haliotes cracherodii
  - black abalone (E) (NMFS)
- Haliotes sorenseni
  - white abalone (E) (NMFS)
- Icaricia icarioides missionensis
  - mission blue butterfly (E)
- Incisalia mossii bayensis
  - San Bruno elfin butterfly (E)
- Speyeria callippe callippe
  - callippe silverspot butterfly (E)
- Speyeria zerene myrtleae
  - Myrtle's silverspot butterfly (E)
- Syncaris pacifica
  - California freshwater shrimp (E)

Fish

- Acipenser medirostris
  - green sturgeon (T) (NMFS)
- Eucyclogobius newberryi

    - critical habitat, tidewater goby (X)
    - tidewater goby (E)

- Hypomesus transpacificus
    - delta smelt (T)

- Oncorhynchus kisutch
    - coho salmon - central CA coast (E) (NMFS)
    - Critical habitat, coho salmon - central CA coast (X) (NMFS)

- Oncorhynchus mykiss
    - Central California Coastal steelhead (T) (NMFS)
    - Central Valley steelhead (T) (NMFS)
    - Critical habitat, Central California coastal steelhead (X) (NMFS)
    - Critical habitat, Central Valley steelhead (X) (NMFS)

- Oncorhynchus tshawytscha
    - California coastal chinook salmon (T) (NMFS)
    - Central Valley spring-run chinook salmon (T) (NMFS)
    - Critical habitat, winter-run chinook salmon (X) (NMFS)
    - winter-run chinook salmon, Sacramento River (E) (NMFS)

Amphibians

- Rana draytonii
    - California red-legged frog (T)

Reptiles

- Caretta caretta
    - loggerhead turtle (T) (NMFS)

- Chelonia mydas (incl. agassizi)
    - green turtle (T) (NMFS)

- Dermochelys coriacea
    - leatherback turtle (E) (NMFS)

- Lepidochelys olivacea
    - olive (=Pacific) ridley sea turtle (T) (NMFS)

Birds

- Brachyramphus marmoratus
    - Critical habitat, marbled murrelet (X)
    - marbled murrelet (T)

- Charadrius alexandrinus nivosus
    - western snowy plover (T)

- Coccyzus americanus occidentalis
    - Western yellow-billed cuckoo (T)

- Diomedea albatrus
    - short-tailed albatross (E)

- Pelecanus occidentalis californicus
    - California brown pelican (E)

- Rallus longirostris obsoletus
    - California clapper rail (E)

- Sternula antillarum (=Sterna, =albifrons) browni
    - California least tern (E)

- Strix occidentalis caurina
    - northern spotted owl (T)

Mammals

- Arctocephalus townsendi
    - Guadalupe fur seal (T) (NMFS)

- Balaenoptera borealis
    - sei whale (E) (NMFS)

- Balaenoptera musculus
    - blue whale (E) (NMFS)

- Balaenoptera physalus
    - finback (=fin) whale (E) (NMFS)

- Enhydra lutris nereis
    - southern sea otter (T)

- Eubalaena (=Balaena) glacialis
    - right whale (E) (NMFS)

- Eumetopias jubatus
    - Critical Habitat, Steller (=northern) sea-lion (X) (NMFS)
    - Steller (=northern) sea-lion (T) (NMFS)

- Physeter catodon (=macrocephalus)
    - sperm whale (E) (NMFS)

- Reithrodontomys raviventris
    - salt marsh harvest mouse (E)

Plants

- Alopecurus aequalis var. sonomensis
    - Sonoma alopecurus (E)
- Arctostaphylos hookeri ssp. ravenii
    - Presidio (=Raven's) manzanita (E)
- Arenaria paludicola
    - marsh sandwort (E)
- Calochortus tiburonensis
    - Tiburon mariposa lily (T)
- Castilleja affinis ssp. neglecta
    - Tiburon paintbrush (E)
- Clarkia franciscana
    - Presidio clarkia (E)
- Hesperolinon congestum
    - Marin dwarf-flax (=western flax) (T)
- Holocarpha macradenia
    - Santa Cruz tarplant (T)
- Layia carnosa
    - beach layia (E)
- Lessingia germanorum
    - San Francisco lessingia (E)
- Pentachaeta bellidiflora
    - white-rayed pentachaeta (E)
- Streptanthus niger
    - Tiburon jewelflower (E)
- Trifolium amoenum
    - showy Indian clover (E)

Proposed Species

Plants

- Arctostaphylos Franciscana
    - Critical Habitat, Franciscan Manzanita (X)

Quads Containing Listed, Proposed or Candidate Species:

SAN QUENTIN (466B)

SAN FRANCISCO NORTH (466C)

SAN RAFAEL (467A)

BOLINAS (467B)

POINT BONITA (467D)

PETALUMA POINT (483C)

SAN GERONIMO (484C)

NOVATO (484D)

Attachment 2. Photographs of the BSA.

Photo 1. Entrance to existing trail on south end of BSA. Landscaped and ruderal vegetation present along both east and west sides of the trail. Photo facing northeast.

Photo 2. Corte Madera Shorebird Marsh on the southeast side of the BSA, along the existing trail. Photo facing south.

Photo 3. Filled in trail with ruderal vegetation next to coastal salt marsh on the south side of the BSA. Pickleweed and salt grass are the predominant plants present within the photo. Photo facing northeast.

Photo 4. Ponded water present within parallel ditches on the west side of the trail. Ruderal vegetation is present on the banks. Photo facing northwest.

Photo 5. Channels of water cutting through the slough along the existing trail. Photo facing southeast.

Photo 6. Wetlands present on both side of the trail behind the shopping complex. Photo facing southwest.

Photo 7. Acacia trees located at the bend of the trail, approximately 30 feet east of the trail. Photo facing south.

Photo 8. Corte Madera marshland adjacent to the trail bend surrounded by annual grassland banks. Photo facing east.

Photo 9. Disturbed area previously filled and flattened at the bend of the trail. Photo facing east.

Photo 10. Ruderal vegetation present within the northern section of the trail. Photo facing south.

Photo 11. Depression within area north of the bend exhibiting wetland characteristics. Photo facing northeast.

Photo 12. Soil-embedded rail road tracks between developed and coastal salt marsh areas on the northern portion of the BSA. Photo facing north.

Photo 13. Elevated and inactive rail road track above coastal salt marsh within the north end of the trail. Photo facing north.