4576 Paradise Drive
Tiburon, CA

Biological Constraints Analysis

Prepared for:
Eric Crandall
4576 Paradise Drive
Tiburon, California 94920

Prepared by:
MIG
2055 Junction Avenue, Suite 205
San José, CA 95134
(650) 400-5767

September 2022

Table of Contents

1 Introduction

A biological assessment of 4576 Paradise Drive (APN 038-142-02) is required by the Town of Tiburon prior to future development within the parcel. A biological constraints analysis will meet the Town's requirements of a biological assessment and is suitable for use during project planning and environmental review. The purpose of this biological constraints analysis is to describe sensitive biological resources with potential to occur in the parcel.

Biological resources that were considered for this analysis are the following:

- Sensitive and regulated habitats.
- California species of special concern or species listed on California Native Plant Society (CNPS) or California Natural Diversity Database (CNDDB) lists of rare plants.
- Species listed as threatened or endangered under the Federal Endangered Species Act (FESA).
- Species listed as threatened or endangered under the California Endangered Species Act (CESA).
- Nesting birds or other non-special-status species that are protected by law that could be impacted by a project.
- The removal of trees as defined in the Town's Municipal Code.

2 Methods

This section describes the methods used to complete the biological constraints analysis. Methods include a database and literature review, field survey, an assessment of plant communities and wildlife habitats and corridors, an assessment of sensitive habitats and aquatic features, and a habitat evaluation for special-status species.

2.1 Background Review

Available background information pertaining to the biological resources on and near the parcel was reviewed prior to conducting field surveys. Information was compiled and subsequently compared against site conditions during the field survey. The following sources were consulted:

- CNDDB record search for 9-quadrangles including: *San Quentin*, *Novato*, *Petaluma Point, Mare Island*, *Richmond*, *Oakland West*, *San Francisco North*, *Point Bonita*, and *San Rafael* (CNDDB 2022).
- CNPS Rare Plant Program *Inventory of Rare and Endangered Plants of California* record 9-quadrangle search, including *San Quentin*, *Novato*, *Petaluma Point, Mare Island*, *Richmond*, *Oakland West*, *San Francisco North*, *Point Bonita*, and *San Rafael* (CNPS 2022). Quadrangle-level results are not maintained for California Rare Plant Rank (CRPR) 3 and 4 species, so we also conducted a search of the CNPS Inventory records for these species occurring in Marin County (CNPS 2022).
- California Department of Fish and Wildlife (CDFW) CNDDB for natural communities of special concern that occur within the parcel region (CNDDB 2022).

- U. S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) tool (USFWS 2022).
- USFWS National Wetland Inventory (NWI) (NWI 2022).
- United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Web Soil Survey and National Hydric Soils List (NRCS 2022a, 2022b).
- eBird Database – Information on Distribution of Birds (Cornell Lab of Ornithology 2022).
- Other relevant scientific literature, technical databases, resource agency reports, and Federal Register notices and other information published by USFWS and National Marine Fisheries Service (NMFS) to assess the current distribution of special-status plants and animals in the parcel vicinity.

2.2 Field Survey

A field survey of the parcel was conducted by MIG Senior Biologist David Gallagher, M.S. on July 13, 2022. The survey was conducted to (1) assess and map existing biotic habitats in the parcel and (2) assess the parcel for its potential to support special-status species and their habitats. A technical delineation of wetlands and waters was conducted in the parcel on August 25, 2022 to identify and map potential waters of the U.S./state and other potential jurisdictional habitats (Appendix C).

3 Existing Conditions

3.1 General Description of the Parcel

The approximately 9.12-acre parcel is located in Tiburon, Marin County, California (Appendix A, Figure 1). The parcel is situated between Paradise Drive and San Francisco Bay and is surrounded by suburban development and is zoned as *RPD Residential Planned Development*. Paradise Cay, an unincorporated area of Marin County, is located to the north and east of the parcel and Ring Mountain Preserve is approximately 0.2 miles to the east of the parcel. The parcel slopes downward from Paradise Drive to the San Francisco Bay with elevations ranging from approximately 95 to 3 feet (NAVD88) above sea level (Google Inc. 2022).

The site is underlain by one soil type, Los Osos-Bonnydoon complex, 15 to 30 percent slopes (NRCS 2022a). The Bonnydoon series consists of shallow, somewhat excessively drained soils that formed in material weathered from sandstone and shale. Bonnydoon soils are on uplands and have slopes of 5 to 85%. This soil map unit is classified as “well-drained” and is not listed as hydric in Marin County on the National Hydric Soils List (NRCS 2022b).

3.2 Existing Land Cover Types, Habitats, and Natural Communities

The parcel is located within the San Francisco Bay Area Subregion of the Central Western Californian Region, both of which are contained within the larger California Floristic Province (Baldwin et al. 2012). Where applicable, vegetation communities were mapped using CDFW’s Vegetation Classification and Mapping Program’s (VegCAMP) currently accepted list of vegetation alliances and associations (CDFW 2022). The reconnaissance-level field survey

identified six natural communities, habitats, and land cover types in the parcel: (1) Rural-residential (2) *Coast Live Oak Woodland and Forest Alliance*, (3) *Eucalyptus – Tree of Heaven – Black Locust Groves Semi-natural Alliance*, (4) *Coyote Brush Scrub Alliance*, (5) *Arroyo Willow Thickets Alliance*, and (6) ephemeral stream. Existing natural communities and land cover types in the parcel are summarized in Table 1, and their distribution within the parcel is depicted in Appendix A, Figure 2.

Table 1. Summary of Existing Land Cover Types, Habitats, and Natural Communities

Land Cover Types, Habitats, Natural Communities	Area (acres)
Rural-residential	4.46
Coast Live Oak Woodland and Forest Alliance	1.92
Eucalyptus – Tree of Heaven – Black Locust Groves Semi-Natural Alliance	1.06
Coyote Brush Scrub Alliance	0.63
Arroyo Willow Thickets Alliance	0.51
Ephemeral Stream (up to top of bank)	0.54
Total	9.12

Rural-residential. The rural residential land cover within the parcel consists of disturbed open areas, buildings, a single-family home, unpaved access roads, gardens, a chicken coop, and grazing pens (Appendix B, Photo 1). Woody vegetation is dominated by non-native trees and shrubs, and the understory is dominated by non-native herbaceous plants, The understory vegetation is regularly subject to disturbance, including mowing and/or grazing, which precludes the establishment of native vegetation and wildlife habitat. Two rocky outcroppings were mapped within this land cover type (Appendix B, Photo 2). Trees and shrubs observed included the non-native species, blue gum eucalyptus (*Eucalyptus globulus*), cherry plum (*Prunus cerasifera*), cotoneaster (*Cotoneaster* sp.), olive (*Olea europaea*), the invasive French broom (*Genista monspessulana*), the invasive pampas grass (*Cortaderia jubata*), and silver wattle (*Acacia dealbata*). Herbaceous species observed included the non-native species, foxtail barley (*Hordeum murinum*), Italian thistle (*Carduus pycnocephalus*), Jersey cudweed (*Pseudognaphalium luteoalbum*), panic veldtgrass (*Ehrharta erecta*), soft brome (*Bromus hordeaceus*), and slender oat (*Avena barbata*).

Due to the scarcity of vegetation and regular disturbance of these areas, the rural residential areas of the parcel provide relatively low-quality habitat for wildlife species. However, many of the wildlife species that occur in the adjacent oak woodland, coyote brush scrub, Eucalyptus grove, and willow thickets communities likely move through the rural-residential areas en route to other neighboring habitats. Additionally, the structures within the rural residential land cover may provide nesting sites for several bird species including black phoebe (*Sayornis nigricans*), Bewick's wren (*Thryomanes bewickii*), and mourning dove (*Zenaida macroura*). Several other common native species may also occupy this landcover type, including black-tail deer (*Odocoileus hemionus columbianus*), raccoon (*Procyon lotor*), dark-eyed junco (*Junco*

hyemalis), house finch (*Haemorhous mexicanus*), and California towhee (*Melozone crissalis*), among other species.

Coast Live Oak Woodland and Forest Alliance. The *Coast Live Oak Woodland and Forest Alliance* natural vegetation community forms a nearly continuous canopy in the southern portion of the parcel (Appendix B, Photo 3). This vegetation community is dominated by mature coast live oak trees (*Quercus agrifolia*). Other trees present included toyon (*Heteromeles arbutifolia*), Monterey pine (*Pinus radiata*), and the non-native Ngaio tree (*Myoporum laetum*). The understory is vegetated with a variety of native and non-native shrubs including California sage brush (*Artemisia californica*), coyote brush (*Baccharis pilularis*) and French broom. Understory herbaceous vegetation observed included American bird's foot trefoil (*Acmispon americanus*), blue wild rye (*Elymus glaucus*), California wood fern (*Dryopteris arguta*), common Pacific pea (*Lathyrus vestitus*), Italian thistle, ladies' tobacco (*Pseudognaphalium californicum*), pink honeysuckle (*Lonicera hispidula*), slender oat, and sticky monkeyflower (*Diplacus aurantiacus*).

Despite the suburban surroundings, the *Coast Live Oak Woodland and Forest Alliance* within the parcel likely supports many common wildlife species acclimatized to suburban and/or disturbed environments. Leaf litter, downed tree branches, low-growing forbs, and fallen logs provide cover for amphibians and reptiles, including California slender salamander (*Batrachoseps attenuatus*), western fence lizard (*Sceloporus occidentalis*), and the southern alligator lizard (*Elgaria multicarinata*). Common avian species that are resident in this habitat include Anna's hummingbird (*Calypte anna*), Bewick's wren, bushtit (*Psaltriparus minimus*), California towhee, chestnut-backed chickadee (*Poecile rufescens*), dark-eyed junco (*Junco hyemalis*), house finch (*Haemorhous mexicanus*), oak titmouse (*Baeolophus inornatus*), and white-breasted nuthatch (*Sitta carolinensis*). Small mammals such as California mice (*Peromyscus californicus*), deer mice (*Peromyscus maniculatus*), and non-native eastern grey squirrel (*Sciurus carolinensis*) may be present. Several mature trees provide suitable nesting habitat for Cooper's hawk (*Accipiter cooperii*) and red-tailed hawk (*Buteo jamaicensis*). Bats such as the Mexican free-tailed bat (*Tadarida brasiliensis*) and Yuma myotis (*Myotis yumanensis*) may day roost in suitable cavities and crevices on trees.

Eucalyptus – Tree of Heaven – Black Locust Groves Semi-natural Alliance. The *Eucalyptus – Tree of Heaven – Black Locust Groves Semi-natural Alliance* forms a nearly continuous canopy in the southwestern portion of the parcel (Appendix B, Photo 4). This semi-natural vegetation community is dominated by mature blue gum trees. The understory is sparse and is dominated by non-native vegetation, including cotoneaster, French broom, and panic veldtgrass. Many of the same wildlife species that may be found in the other vegetation communities, land cover types, and habitats in the parcel may also use or pass through this semi-natural vegetation community

Coyote Brush Scrub Alliance. The *Coyote Brush Scrub Alliance* natural vegetation community forms a dense stand on a steep hillside in the northeastern portion of the parcel (Appendix B, Photo 5). This community is dominated by coyote brush. Other species observed included toyon and California sage brush. Understory species observed included slender oat, sticky monkey flower, and Italian thistle. Many of the same wildlife species that may be found in the other

vegetation communities, land cover types, and habitats in the parcel may also use or pass through this vegetation community.

Arroyo Willow Thickets Alliance. The *Arroyo Willow Thickets Alliance* natural vegetation community forms a narrow band along the eastern portion of the parcel that borders the San Francisco Bay (Appendix B, Photo 6). This community is dominated by mature arroyo willows (*Salix lasiolepis*). Other trees present include California bay laurel (*Umbellularia californica*). Understory species observed included the invasive non-native species, Cape ivy (*Delairea odorata*), giant reed (*Arundo donax*), and French broom. Many of the same wildlife species that may be found in the other vegetation communities, land cover types, and habitats in the parcel may also use or pass through this natural vegetation community

Ephemeral Stream. A technical delineation of wetlands and waters of the parcel identified two ephemeral streams (drainages) within the parcel. Also, small seasonal wetlands were mapped within each of the ephemeral drainages. The delineation of wetland and waters report is attached as Appendix C. Both drainages receive runoff from surrounding upland areas and Paradise Drive. No flowing or standing water was observed during the site visit (Appendix B, Photo 6). The NWI maps the two ephemeral drainages as intermittent riverine streams (NWI 2022). An ephemeral drainage generally only flows during or immediately after a rain event. During dry periods, ephemeral drainages do not have flowing surface water. Vegetation observed growing in the drainages included bristly ox-tongue (*Helminthotheca echioides*), curly dock (*Rumex crispus*), Fremont cottonwood saplings (*Populus fremontii*), Harding grass (*Phalaris aquatica*), Himalayan blackberry (*Rubus armeniacus*), little rattlesnake grass (*Briza minor*), rabbitsfoot grass (*Polypogon monspeliensis*), and slender oat.

Due to the lack of persistent flows, the drainages have limited value to aquatic wildlife. However, when water is present, the drainages may provide habitat for native amphibians such as Sierran treefrog (*Pseudacris sierra*). Many of the same wildlife species that may be found in the other vegetation communities, land cover types, and habitats in the parcel may also use or pass through this habitat.

4 Potential Biological Constraints

This section evaluates the biological resources that may be impacted significantly by future development within the parcel, as defined by the California Environmental Quality Act (CEQA), and/or for which regulatory agency approvals may be required. For informational purposes, this section also includes an overview of some of the general issues that might impose lesser constraints on development within the parcel (e.g., compliance with the Migratory Bird Treaty Act [MBTA] and California Fish and Game Code).

4.1 Sensitive and Regulated Habitats

Waters of the U.S./State and California Department of Fish and Wildlife Regulated Habitats. The U.S. Army Corps of Engineers (USACE) regulates waters of the U.S. under Section 404 of the Clean Water Act (CWA) and the Regional Water Quality Control Board (RWQCB) regulates waters of the state under Section 401 of the CWA and the Porter Cologne

Water Quality Control Act. Waters of the U.S/state include wetlands, bays, lakes, slough channels, seasonal ponds, tributary waters, non-wetland linear drainages, and salt ponds. Within the parcel, the two ephemeral drainages, including the seasonal wetlands, and Bay waters meet the definition of waters of the U.S/state and any impacts to these habitats may be subject to jurisdiction by the USACE and RWQCB.

USFWS Definition of Wetlands. The Town of Tiburon uses the U.S. Fish and Wildlife Service's definition of a wetland (United States Fish and Wildlife Service Manual, Part 660 FW 2 (June 21, 1993)). The USFWS definition of a wetland is:

> *Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this classification, wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports predominantly hydrophytes (plants specifically adapted to live in wetlands); (2) the substrate is predominantly undrained hydric (wetland) soil; and (3) the substrate is non-soil and is saturated with water or covered by shallow water at some time during the growing season of each year.*

The two ephemeral drainages, including the seasonal wetlands do not meet the USFWS's definition of a wetland due to lack of a high-water table or shallow water.

The California Fish and Game Code includes regulations governing the use of, or impacts to, many of the state's fish, wildlife, and sensitive habitats, including the bed and banks of rivers, lakes, and streams. The ephemeral streams and associated riparian vegetation are subject to CDFW jurisdiction under Section 1600 et seq. of the California Fish and Game Code. Also, CDFW regulates and tracks sensitive natural communities and ranks vegetation alliances (CDFW 2022). The *Willow Thickets Alliance* is ranked as a sensitive vegetation community and may be subject to CDFW jurisdiction (CDFW 2022).

Potential CEQA and Regulatory Considerations. If development within the parcel includes design features that would encroach within the ephemeral streams, the *Willow Thickets Alliance*, and Bay waters (e.g., culverts, piers, structures, vegetation removal, etc.) the impacts would likely be considered significant under CEQA and require mitigation. Additionally, if development within the parcel includes any new impervious surfaces that would create stormwater runoff into the ephemeral streams or directly into the San Francisco Bay, there is potential for the project to impact water quality which may adversely affect water quality and wildlife. Such impacts to water quality would also be considered significant under CEQA. Impacts to waters of the U.S./state or other regulated habitats would require authorization from USACE, RWQCB, and CDFW.

Potential Mitigation Requirements. If USACE, RWQCB, and/or CDFW authorization is required for the project, additional conservation and/or mitigation measures for impacts to Waters of the U.S./state or other regulated habitats may be required. This may include Best Management Practices (BMPs) to minimize impacts and, if necessary, compensatory mitigation for permanent loss of stream habitat. Also, depending on the amount of any new impervious surface, BMPs and Low Impact Development practices may need to be incorporated into the project design to prevent stormwater runoff pollution, promote infiltration, and hold/slow down

the volume of stormwater runoff coming from a site (e.g., green roofs, bioretention and/or detention basins, among other on-site treatment controls).

4.2 Special-Status Plants

The CNPS (2022) and CNDDB (2022) identify 111 special-status plant species as potentially occurring in the nine 7.5-minute quadrangles containing and/or surrounding the parcel. All 111 of those potentially occurring special-status plant species were determined to be absent from the parcel for at least one of the following reasons: (1) a lack of specific habitat for the species in question (e.g., freshwater marsh) and/or edaphic requirements (e.g., serpentine or volcanic soils), (2) the geographic range of the species does not overlap the parcel, (3) the species is known to be extirpated from the parcel vicinity, and/or (4) the habitats within the parcel are too degraded to reasonably expect any special-status species to occur there.

Several special-status species are known to occur at nearby Ring Mountain Preserve. However, these species are serpentine endemics. Because serpentine substrate was not observed within the parcel and the habitat is substantially degraded, these special-status species were determined to be absent from the parcel.

Potential CEQA and Regulatory Considerations. Because there is no potential for special-status plant species to occur within the parcel, there are no CEQA or regulatory considerations for development within the parcel. Additionally, no mitigation measures are required to address special-status plants.

4.3 Special-Status Animals

Based on a review of the USFWS and CNDDB databases (IPaC 2022, CNDDB 2022) and other data sources, and an assessment of the habitats within the parcel, no special-status species are expected occur within the parcel. However, two of those species, longfin smelt (*Spirinchus thaleichthys*), listed as Threatened under CESA and the North American green sturgeon (*Acipenser medirostris*), southern Distinct Population Segment (DPS), listed as Threatened under FESA and a California Species of Special Concern (CSSC), have some potential to occur in Bay waters adjacent to the parcel. Most of the species that were considered in this analysis are not expected to occur within or near the parcel due to the lack of suitable habitat (e.g., perennial stream, marsh, serpentine grassland), the parcel is outside the range of the species, and/or it is isolated from the nearest known extant population by development or otherwise unsuitable habitat.

Longfin Smelt. This southernmost population of longfin smelt is found as far north as Prince William Sound, Alaska, and this species occurs in the San Francisco Bay. The longfin smelt was declared a threatened species under the CESA in March 2009 and has been petitioned for listing as endangered under the FESA (USFWS 2008).

Longfin smelt are anadromous fish that spawn in fresh waters and disperse to more saline estuarine and marine waters when mature (Moyle 2002). Although little is known about the breeding biology of longfin smelt in the San Francisco Bay, the species is thought to spawn at

the interface between fresh and brackish water in tidal portions of San Francisco Bay tributaries (Robinson and Greenfield 2011). Spawning in the Bay is thought to occur mainly below Medford Island in the San Joaquin River and below Rio Vista on the Sacramento River, while the lower end of spawning habitat seems to be upper Suisun Bay around Pittsburg and Montezuma Slough, in Suisun Marsh. Winter sampling conducted in 2010 found high numbers of longfin smelt in Coyote Creek and Alviso Slough in the South Bay, and study data from 1982 and 1983 show use of Coyote Creek by spawning adults and larvae (Robinson and Greenfield 2011). The distribution of larvae is strongly influenced by freshwater outflow to the Delta (Baxter 1999, Dege and Brown 2004). In dry years, larvae are concentrated primarily in the West Delta and Suisun Bay, and in wet years, larvae are found throughout the San Francisco Estuary, including the South Bay, with the greatest concentrations in San Pablo and Suisun Bay early in the season and into the Central Bay later in the season (Rosenfield 2009). Within these areas, spawning may occur from November to June, with the peak of spawning activity likely occurring from February to April (Moyle 2002).

Nonbreeding longfin smelt can potentially be present in any fully tidal waters in the Bay as long as water temperatures do not exceed 22 °C. Thus, occasional individuals may forage in the open water adjacent to the parcel. Based on this species life history and habitat use there is a potential for longfin smelt to occur in Bay waters adjacent to the parcel from late fall to early spring (i.e., November to April). However, due to the absence of suitable brackish/freshwater spawning habitat in the parcel area, this species is not expected to spawn there, and thus they are not expected to be present from late spring to mid-fall.

North American Green Sturgeon. Southern DPS. The Southern Distinct Population Segment (DPS) of the North American green sturgeon was federally listed as threatened on April 7, 2006 (NMFS 2006). Critical habitat for the Southern green sturgeon was designated on October 9, 2009 and includes all tidally influenced waters of the San Francisco Bay and coastal waters of Northern California, south to Monterey Bay to a depth of 360 feet (NMFS 2009).

Green sturgeon are the most broadly distributed and wide-ranging species of the sturgeon family, occurring in ocean waters from Ensenada, Mexico to the Bering Sea, and they commonly occur in coastal waters from San Francisco Bay to Canada (Erickson and Hightower 2007). The historical and current distribution of where this species spawns is unclear because the original spawning distribution may have been reduced due to harvest and other anthropogenic effects, and because they make non-spawning movements into estuaries during summer and fall (Lindley et al. 2008). Spawning has been documented in the Rogue (Erickson et al. 2002), Klamath (Scheiff et al. 2001), Trinity (Scheiff et al. 2001), Sacramento, and Eel (Lindley et al. 2008) rivers.

Green sturgeon are long-lived, slow-growing fish and the most marine-oriented of the sturgeon species. Green sturgeon exhibit delayed sexual maturity, somewhere between 13 and 20 years, and spawn every 2 to 5 years (Moyle 2002). They live to a maximum age of 60 to 70 years (Moyle 2002).

Juveniles reside in fresh water, with adults returning to freshwater to spawn when they are more than 15 years of age and more than 4 feet in size. Spawning is believed to occur every 2 to 5

years (Moyle 2002). In the Sacramento River, green sturgeon spawn in late spring and early summer (NMFS 2003). Adults typically migrate into fresh water beginning in late February; spawning occurs March-July, with peak activity in April-June (Moyle et al. 1995). Juveniles spend 1 to 4 years in fresh and estuarine waters before migrating to the ocean (Beamesderfer and Webb 2002).

Green sturgeon spend the majority of their lives in nearshore oceanic waters, bays, and estuaries. In summer and fall, they commonly occur in estuaries where there has been no known spawning activity and where there are no records of their occurrence farther up the river system (Adams et al. 2007), suggesting that the species may wander widely in accessible estuarine habitat. Studies in the Sacramento-San Joaquin Delta found that juveniles feed on opossum shrimp (Mysidacea) and amphipods (Radtke 1966) and adults feed on benthic invertebrates and even small fish (Moyle et al. 1995).

Green sturgeon spawn in deep pools or “holes” in large, turbulent, freshwater rivers (Moyle et al. 1995). Specific spawning habitat preferences are unclear, but it is likely that cold, clean water and suitable substrate (large cobble, but also clean sand and bedrock) are important for spawning and embryonic development (Moyle et al. 1995).

There is the potential for green sturgeon to be present year-round as non-breeders in the Bay waters adjacent to the parcel. However, there is no suitable breeding habitat within or nearby the parcel.

Potential CEQA and Regulatory Considerations. Project activities within or adjacent to Bay waters may indirectly impact special-status fish through the degradation of surface or ground water quality due to erosion and transport of fine sediments, unintentional release of contaminants, and soil compaction from access and equipment in tidal areas. If work takes place in Bay waters, individuals of green sturgeon and longfin smelt may also be directly impacted if they are present in Bay waters because they could be crushed or injured by personnel or equipment working in the water. Such impacts would be considered significant under CEQA. Additionally, work within Bay waters would require permits from the USACE and RWQCB. Work adjacent to Bay waters may also trigger a permit requirement, depending on the location of the proposed activity.

Potential Mitigation Requirements. Depending on future project activities**,** mitigation measures for potential impacts on longfin smelt and green sturgeon may include dewatering work areas, relocation of stranded fish (for work within tidal waters), erosion control measures to protect water quality, worker environmental awareness training, and biological monitoring by a qualified biologist. Compensatory mitigation may be required for permanent loss of habitat for these species.

4.4 Animals Protected by the Migratory Bird Treaty Act and California Fish and Game Code

Nesting Birds. The U.S. Migratory Bird Treaty Act (MBTA; 16 USC §§ 703 et seq., Title 50 Code of Federal Regulations [CFR] Part 10) protects all native bird species. Under the MBTA it is illegal to disturb a nest that is in active use, since this could result in killing a bird, destroying a

nest, or destroying an egg. The USFWS enforces MBTA. The MBTA does not protect some birds that are non-native or human-introduced or that belong to families that are not covered by any of the conventions implemented by MBTA. In addition, all native bird species that occur in the parcel are protected by the California Fish and Game Code (§§3503, 2513, and 3800). Specifically, the Code protects native birds, including their nests and eggs, from all forms of take. Disturbance that causes nest abandonment and/or loss of reproductive effort is considered "*take*" by the CDFW. Raptors (i.e., eagles, falcons, hawks, and owls) and their nests are specifically protected in California under Fish and Game Code §3503.5. Section 3503.5 states that it is "*unlawful to take, possess, or destroy any birds in the order Falconiformes or Strigiformes (birds of prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto*."

A variety of common native bird species occupy the parcel and may nest within vegetated (e.g., trees, shrubs, grasses) and the rural residential areas within the parcel (see Section 3.2 above). The nesting bird season is generally February 1 to September 15 in Marin County.

Potential CEQA and Regulatory Considerations. The removal of vegetation or structures supporting active nests can potentially cause the direct loss of eggs or young and project-related activities located near an active nest may cause adults to abandon their eggs or young. Impacts on active nests would be considered significant under CEQA as all native birds and their nests are protected by the MBTA and California Fish and Game Code.

Potential Mitigation Requirements. Because impacts on nesting birds would be considered significant under CEQA and could violate the MBTA and California Fish and Game Code, the following avoidance and minimization measures are warranted:

- Avoid initiating project activities during the nesting bird season (generally February 1 to September 15 in Marin County) to the extent feasible.
- Remove potential nesting substrate (trees, shrubs, structures) as required for a future project outside of the nesting bird season to preclude impacts to nesting birds.
- Conduct pre-construction surveys within 5 days of disturbance, and if active nests are identified then appropriate disturbance-free buffers should be established. Typical disturbance-free buffers are 300 feet for raptors and 100 feet for other species.
- If CDFW authorization is required for the project, additional protections such as active nest monitoring may be required.

Common Roosting Bats. Bats and other non-game mammals are protected by California Fish and Game Code Section 4150, which states that all non-game mammals or parts thereof may not be taken or possessed except as provided otherwise in the code or in accordance with regulations adopted by the commission. Activities resulting in mortality of non-game mammals (e.g., destruction of an occupied nonbreeding bat roost, resulting in the death of bats), or disturbance that causes the loss of a maternity colony of bats (resulting in the death of young), may be considered "*take*" by the CDFW.

Cavities, crevices and exfoliating bark in trees within the parcel potentially provide suitable roosting habitat for common colonially roosting bat species, . Many of the trees within the parcel

do not support habitat suitable to support large maternity colonies, but smaller cavities and crevices may support small numbers of roosting bats.

Potential CEQA and Regulatory Considerations. Increased noise and other disturbance from project activities could temporarily alter foraging and roosting behavior, potentially resulting in the abandonment of maternity or day roosts. Additionally, removal of trees or structures could result in injury or mortality of individuals or result in the loss of a maternity colony. Such impacts would be considered significant under CEQA.

Potential Mitigation Requirements. Typical measures to avoid impacts on roosting bats may include pre-construction surveys of potential roost habitat, avoidance of removal of trees or structures containing roost sites during the time of year when bats are inactive (generally mid-October to late March), exclusion or deterrence of non-reproductive bat colonies during the time of year when bats are most active (generally April to mid-October), avoidance of active maternity roost sites during the maternity season (April 1 – August 31), worker environmental awareness training, and establishment of disturbance-free buffer zones (typically 100 feet) around active maternity roost sites. If CDFW authorization is required for the project, additional measures may be required, such as replacement of roosting habitat when significant roost sites (e.g., roosts with >50 individuals) are impacted.

4.5 Local Ordinances

Removal of Trees. Removal or alteration of any tree located in the RPD zoning district is prohibited without the prior issuance of a permit from the Town. The Town's ordinance defines a tree as a **"***woody perennial plant that has a trunk circumference of twenty inches measured at twenty-four inches above the ground surface; or a woody perennial plant at least fifteen feet in height that usually, but not necessarily, has a single trunk*.". The Town's ordinance defines alteration as "*any action which would significantly damage the health or appearance of any tree, whether by: (1) Cutting of its trunk or branches; (2) Filling or surfacing or changing the drainage of the soil within the dripline of the tree; or (3) Performing other damaging acts*.".

Potential CEQA and Regulatory Considerations. The Town provides tree protection under Title IV, Chapter 15A – Trees. The ordinance regulates the removal, alteration, and planting of trees. The removal of one or more trees may be a significant impact under CEQA. Additionally, tree or vegetation removal in the *Willow Thickets Alliance* would likely require CDFW authorization.

Potential Mitigation Requirements. Removal or alteration of trees covered by the ordinance would require a tree removal permit prior to the start of project activities. The planning director may also require the replacement of removed trees up to a 3:1 replacement to removal ratio. This permit process may also require tree protection measures for trees that will be preserved. Typical tree protection measures include implementation of tree protection zones (i.e., protecting trees that are intended to remain on the site from incidental project disturbance) and development of a tree protection plan by a certified arborist. If CDFW authorization is required for the project, additional conservation and/or mitigation measures may be required (e.g., a higher replacement to removal ratio for any trees removed).

5 References

Adams, P.B., C. Grimes, J.E. Hightower, S.T. Lindley, M.L. Moser, and M.J. Parsley. 2007. Population status of North American green sturgeon, *Acipenser medirostris*. Environmental Biology of Fishes 79:339-356.

Baldwin, B.G., D.H. Goldman, D. J. Keil, R. Patterson, T.J. Rosatti, and D.H. Wilken, editors. 2012. The Jepson Manual: Vascular plants of California, second edition. University of California Press, Berkeley.

Baxter, R. D. 1999. Osmeridae. Page 501 in J. J. Orsi, editor, Report on the 1980–1995 Fish, Shrimp, and Crab Sampling in the San Francisco Estuary, California. The Interagency Ecological Program for the Sacramento-San Joaquin Estuary (IEP), Sacramento, California.

Beamesderfer, R.C.P. and M.A.H. Webb. 2002. Green Sturgeon Status Review Information. S. P. Cramer and Associates, Gresham, Oregon.

[CDFW] California Department of Fish and Wildlife. 2022. VegCAMP Natural Communities Lists. Accessed July 2022 from https://www.wildlife.ca.gov/data/vegcamp/natural-communities.

[CNDDB] California Natural Diversity Data Base. 2022. Results of electronic records search. Rarefind 5. California Department of Fish and Wildlife, Biogeographic Data Branch. Accessed July 2022 from http://www.dfg.ca.gov/biogeodata/cnddb/mapsanddata.asp.

[CNPS] California Native Plant Society. 2022. Inventory of Rare, Threatened, and Endangered Plants of California. Version 8-02. Accessed July 2022 from http://www.rareplants.cnps.org/advanced.html.

Cornell Lab of Ornithology. 2022. eBird. http://www.ebird.org/. Accessed July 2022.

Dege, M., and L. R. Brown. 2004. Effect of outflow on spring and summertime distribution and abundance of larval and juvenile fishes in the upper San Francisco Estuary. Pages 49–65 in L. R. B. Feyrer, R. L. Brown, and J. J. Orsi, editors, Early Life History of Fishes in the San Francisco Estuary and Watershed. American Fisheries Society, Bethesda, Maryland.

Erickson, D.L., J.A. North, J.E. Hightower, J. Weber, and L. Lauck. 2002. Movement and habitat use of green sturgeon *Acipenser medirostris* in the Rogue River, Oregon, USA. Journal of Applied Ichthyology 18:565-569.

Erickson, D.L., and J.E. Hightower. 2007. Oceanic distribution and behavior of green sturgeon. American Fisheries Society Symposium 56:197-211.

Google Inc. 2022. Google Earth Pro (Version 7.1.5.1557) [Software]. Available from earth.google.com.

Holland, R. F. 1986. Preliminary descriptions of the terrestrial natural communities of California. Unpublished report. California Department of Fish and Game, Natural Heritage Division, Sacramento, CA.

Lindley, S.T., M.L. Moser, D.L. Erickson, M. Belchik, D.W. Welch, E. Rechisky, J.T. Kelly, J. Heublein, and A.P. Klimley. 2008. Marine migration of North American green sturgeon. Transactions of the American Fisheries Society 137:182-194.

Moyle, P.B., R.M. Yoshiyama, J.E. Williams, and E.D. Wikramanayake. 1995. Fish Species of Special Concern in California. 2nd ed. California Department of Fish and Game, Rancho Cordova, California. Final Report for Contract No. 21281F.

Moyle, P. 2002. Inland Fishes of California, 2nd Edition, Berkeley, University of California Press.

[NMFS] National Marine Fisheries Service. 2003. Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition to List North American Green Sturgeon as a Threatened or Endangered Species. Federal Register 68:4433-4441.

[NMFS] National Marine Fisheries Service. 2006b. Endangered and Threatened Wildlife and Plants; Threatened status for Southern Distinct Population Segment of North American Green Sturgeon. Federal Register 67:17757-17766.

[NMFS] National Marine Fisheries Service. 2009. Endangered and threatened wildlife and plants: final rulemaking to designate critical habitat for the threatened southern distinct population segment of North American green sturgeon: Final Rule. Federal Register 74:52300-52351.

[NRCS] Natural Resources Conservation Service. 2022a. Web Soil Survey. U.S. Department of Agriculture. Accessed July 2022 from http://websoilsurvey.nrcs.usda.gov.

[NRCS] National Resource Conservation Service. 2022b. National Hydric Soils List. Accessed July 2022 from http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/use/hydric/.

[NWI] National Wetlands Inventory. 2022. Wetlands Mapper. U.S. Fish and Wildlife Service Accessed July 2022 from http://www.fws.gov/wetlands/Wetlands-Mapper.html.

Radtke, L.C. 1966. Distribution of smelt juvenile sturgeon and starry flounder in the Sacramento – San Joaquin Delta. In S.L. Turner and D.W. Kelley, editors. Ecological studies of the Sacramento - San Joaquin Delta, Part II. p 115-119. California Department of Fish and Game, Fish Bulletin 136.

Robinson, A., and B. K. Greenfield. 2011. LTMS Longfin Smelt Literature Review and Study Plan. San Francisco Estuary Institute, Richmond, California. Prepared for Long-Term Management Strategy for Dredged Materials in San Francisco Bay.

Scheiff, A.J., J.S. Lang, and W.D. Pinnix. 2001. Juvenile salmonid monitoring on the mainstem Klamath River at Big Bar and mainstem Trinity River at Willow Creek, 1997-2000. U.S.

[USFWS] U.S. Fish and Wildlife Service. 2008. Endangered and threatened wildlife and plants; petition to list the San Francisco-Bay Delta population of the longfin smelt (*Spirinchus thaleichthys*) as endangered; notice of 90-day petition finding and initiation of status review. Federal Register 73:24911–24915.

[USFWS] U.S. Fish and Wildlife Service. 2022. IPaC Information for Planning and Conservation. Accessed July 2022 from https://ecos.fws.gov/ipac/t69.

Zeiner, D.C., W.F. Laudenslayer Jr., K.E. Mayer, and M. White, editors. 1990. California's Wildlife. Volume III: Mammals. California Department of Fish and Game, Sacramento, California.

Appendix A Figures

Source: Google Earth 9/27/2021

0 0.075 0.15 0.3 Miles

Parcel Boundary

Figure 1 Parcel Location Map

4576 Paradise Drive, Tiburon, CA Biological Constraints Analysis

Source: Google Earth 9/27/2021

- Parcel Boundary
- Coast Live Oak Woodland and Forest Alliance
- Coyote Brush Scrub Alliance
- Eucalyptus-Tree of Heaven- Black Locust Groves Semi-Natural Alliance
- Seasonal Wetland
- Rural-residential
- Willow Thickets Alliance
- Swale
- Ephemeral Stream

Figure 2 Land Cover Types, Habitats, and Natural Communities

4576 Paradise Drive, Tiburon, CA Biological Constraints Analysis

Appendix B Photographs

Photo 1. Rural-residential land cover in the parcel.

Photo 2. Rocky outcrop within the rural-residential land cover.

Photo 3. *Coast Live Oak Woodland and Forest Alliance* in the parcel.

Photo 4. *Eucalyptus – Tree of Heaven – Black Locust Groves Semi-natural Alliance* in the parcel.

Photo 5. Coyote Brush Scrub Alliance in the parcel.

Photo 6. Ephemeral drainage with Arroyo *Willow Thickets Alliance* and San Francisco Bay in the background.

Appendix C Delineation of Wetlands and Waters Report

4576 Paradise Drive

Tiburon, California

Delineation of Wetlands and Other Waters

Prepared for:
Eric Crandall
4576 Paradise Drive
Tiburon, California 94920

Prepared by:
MIG
2055 Junction Avenue
Suite 205
San Jose, CA 95131
(650) 327-0429

September 2022

1. Introduction

The purpose of this delineation is to identify the extent and distribution of wetlands and other waters occurring at 4576 Paradise Drive in Tiburon, Marin County, California (APN 038-142-02) under conditions existing at the time of the August 2022 survey. The size of the parcel is approximately 9.12 acres (Figures 1 to 3).

Within the parcel, two ephemeral drainages and one swale were identified in a biological constraints analysis prepared for the parcel by MIG in August 2022. To determine if these drainages and swale are potential waters of the U.S. and/or state, a formal technical delineation was completed in accordance with the U.S. Army Corps of Engineers (USACE) methodology. The USACE methodology includes collection of technical data on soils, vegetation, and hydrology, which are used to identify wetlands and other waters. The USACE methodology is accepted by both federal and state regulatory agencies.

The climate in the region is coastal Mediterranean, with most rain falling in the winter and spring. Mild cool temperatures are common in the winter. Hot to mild temperatures are common in the summer. Climate conditions in the project area include a 30-year average of approximately 43.8 inches of annual precipitation with an average minimum daily temperature of 48ºF and an average maximum daily temperature of 71ºF (Deters 2022).

The site is underlain by one soil type, Los Osos-Bonnydoon complex, 15 to 30 percent slopes (NRCS 2022a) (Figure 4). The Bonnydoon series consists of shallow, somewhat excessively drained soils that formed in material weathered from sandstone and shale. Bonnydoon soils are on uplands and have slopes of 5 to 85%. This soil map unit is classified as “well-drained” and is not listed as hydric in Marin County on the National Hydric Soils List (NRCS 2022b). A detailed description of this soil type can be found in Appendix A.

The U.S. Fish and Wildlife Service’s National Wetlands Inventory (NWI) map of the parcel is depicted in Figure 5. The NWI identified two temporarily flooded intermittent riverine systems within the parcel (R4SBA) (NWI 2022). NWI maps are based on interpretation of aerial photography, limited verification of mapped units, and/or classification of wetland types using the classification system developed by Cowardin et al. (1979). These data are available for general reference purposes and do not necessarily correspond to the presence or absence of jurisdictional waters.

2. Survey Methods

Before the delineation surveys were conducted, topographic maps and aerial photos of the study area were obtained and reviewed from several sources, such as the U.S. Geological Survey (USGS) (Figure 3), Natural Resources Conservation Service (NRCS) (Figure 4), NWI (Figure 5), and Google Earth software (Google Inc. 2022).

On August 25, 2022, MIG Senior Biologist David Gallagher performed a technical delineation of

wetlands and other waters in the parcel, in accordance with the *Corps of Engineers 1987 Wetlands Delineation Manual* (Corps Manual; Environmental Laboratory 1987). Additionally, the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West (Version 2.0)* (Regional Supplement) (USACE 2008a) and *A Field Guide to the Identification of the Ordinary High-Water Mark (OHWM) in the Arid West Region of the Western United States* (USACE 2008b) were followed to document site conditions relative to hydrophytic vegetation, hydric soils, and wetland hydrology. Mr. Gallagher performed preliminary mapping of the extent and distribution of wetlands and other waters of the U.S. that may be subject to regulation under Section 404 of the Clean Water Act (CWA); and waters of the state that may be subject to regulation under the Porter Cologne Water Quality Control Act, which is administered by the Regional Water Quality Control Board (RWQCB). Mr. Gallagher also surveyed for aquatic and riparian habitat that may be subject to regulation under Sections 1600-1607 of the California Fish and Game Code, which is administered by California Department of Fish and Wildlife (CDFW).

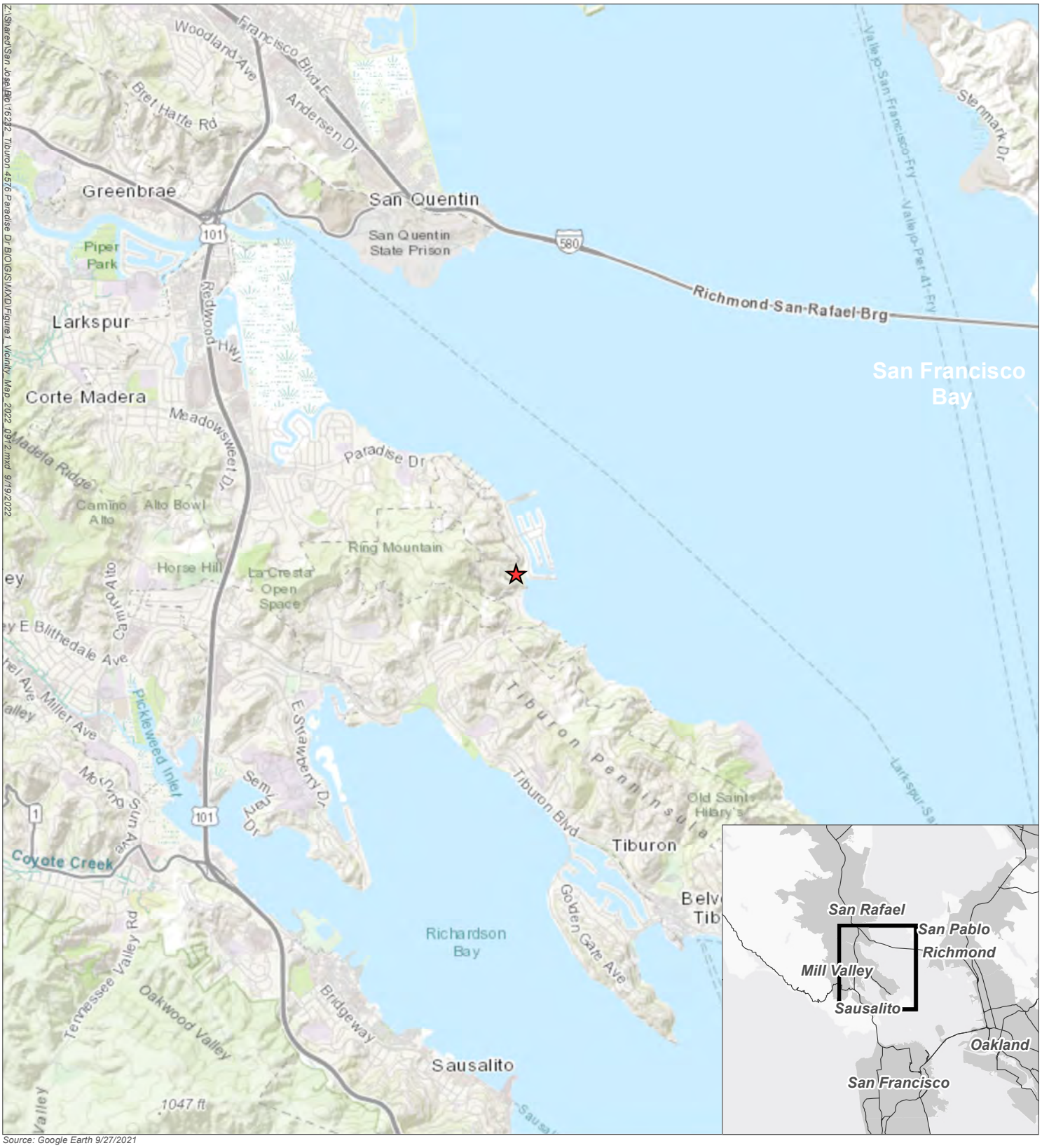
2.1 Identification of Jurisdictional Waters

The vegetation, soils, and hydrology in the project area were mapped according to the Routine Determination Method outlined in the Corps Manual (Environmental Laboratory 1987), using updated data forms, vegetation sampling methods, and hydric soil and hydrology indicators developed for the Regional Supplement (USACE 2008a). This three-parameter approach to identifying wetlands is based on the presence of a prevalence or dominance of hydrophytic vegetation, hydric soils, and wetland hydrology.

In addition to applying these survey methods, Mr. Gallagher compiled this report in accordance with guidance provided in *Updated Map and Drawing Standards for the South Pacific Division Regulatory Program* (USACE 2016a) and *Information Requested for Verification of Corps Jurisdiction* (USACE 2016b). These documents list the information that must be submitted as part of a request for a jurisdictional determination, including:

- Vicinity map (Figure 1)
- Parcel or study area map (Figure 2)
- USGS quadrangle sheet (Figure 3)
- Soils map (Figure 4)
- National Wetlands Inventory map (Figure 5)
- Vegetation communities map (Figure 6)
- Delineation map (Figure 7)
- Current soil survey report (Appendix A)
- Plant species observed (Appendix B)
- Arid West Wetland Determination Data Forms (Appendix C)
- Written rationale for sample point choice (Section 3.2)
- Color photos (Appendix D)
- Aquatic resources table (Appendix E)

During the survey, the parcel was examined for topographic features, drainages, alterations to hydrology or vegetation, and recent significant disturbance. A determination was then made as



Source: Google Earth 9/27/2021

0 0.75 1.5 3 Miles

N

Project Location

Figure 1 Project Vicinity

4576 Paradise Drive Delineation of Wetlands and Other Waters

Source: Google Earth 9/27/2021

0 0.075 0.15 0.3 Miles

N

Parcel Boundary

Figure 2 Parcel Map

4576 Paradise Drive Delineation of Wetlands and Other Waters

Source: Google Earth 9/27/2021

0 0.25 0.5 1 Miles

Parcel Boundary

Figure 3 USGS Topo Map

4576 Paradise Drive Delineation of Wetlands and Other Waters

Source: Google Earth 9/27/2021; USDA 2022

NRCS Soils

- Henneke stony clay loam, 15 to 50 percent slopes
- Los Osos-Bonnydoon complex, 15 to 30 percent slopes
- Los Osos-Bonnydoon complex, 30 to 50 percent slopes
- Tocaloma-Saurin association, very steep
- Xerorthents-Urban land complex, 0 to 9 percent slopes
- Water
- Parcel Boundary

Figure 4 Soil Map

4576 Paradise Drive Delineation of Wetlands and Other Waters

Source: Google Earth 9/27/2021; NWI 2022

Wetland Type

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Pond
- Riverine

Parcel Boundary

Figure 5 National Wetlands Inventory Map

4576 Paradise Drive Delineation of Wetlands and Other Waters

to whether normal environmental conditions were present at the time of the field survey. In the field, the techniques used to identify wetlands included observing the vegetation growing near the soil sample points and characterizing the current surface and subsurface hydrologic features present near the sample points through both observation of indicators and direct observation of hydrology. Features meeting wetland vegetation, soil, and hydrology criteria were then mapped in the field. Geospatial data were collected using a tablet with an Arrow 100 sub-meter GPS receiver and a geo-spatial mobile-device application.

2.2 Identification of Section 404 Jurisdictional Wetlands

Where wetland field characteristics were present, Mr. Gallagher examined vegetation, soils, and hydrology using the Routine Determination Method outlined in the Corps Manual (Environmental Laboratory 1987) and the updated data forms, vegetation sampling methods, and hydric soil and hydrology indicators developed for the Regional Supplement (USACE 2008a).

Hydrophytic Vegetation. Plants that can grow in soils that are saturated or inundated for long periods of time, which contain little or no oxygen when wetted, are considered adapted to those soils and are called hydrophytic. There are different levels of adaptation, as summarized in Table 2. Some plants can only grow in soils saturated with water (and depleted of oxygen), some are mostly found in this condition, and some are found equally in wet soils and in dry soils. Plants observed at each of the sample study areas were identified to species, where possible, using *The Jepson Manual, Vascular Plans of California, Second Edition* (Baldwin et al. 2012). The wetland indicator status of each species was obtained from the *Arid West 2020 Regional Wetland Plant List* (USACE 2020). Wetland indicator species are designated according to their frequency of occurrence in wetlands. For instance, a species with a presumed frequency of occurrence of 67 to 99 percent in wetlands is designated a facultative wetland indicator species. The wetland indicator groups, indicator symbol, and the frequency of occurrence of species, provided as a percentage, within wetlands are shown in Table 1.

Table 1. Wetland Indicator Status Categories for Vascular Plants

Indicator Category	Symbol	Frequency (Percent) of Occurrence in Wetlands[1]
Obligate	OBL	>99 (Almost always is a hydrophyte, rarely in uplands)
Facultative wetland	FACW	67 – 99 (Usually a hydrophyte but occasionally found in uplands)
Facultative	FAC	34 – 66 (Commonly occurs as either a hydrophyte or non-hydrophyte)
Facultative upland	FACU	1 – 33 (Occasionally is a hydrophyte, but usually occurs in uplands)
Upland[2]	UPL	<1% (Rarely is a hydrophyte, almost always in uplands)
Not included[2]	NI	Considered to be an upland species

Obligate and facultative wetland indicator species are hydrophytes that occur “in areas where the frequency and duration of inundation or soil saturation produce permanently or periodically

[1]Based on information contained in the Corps Manual.
[2]Plant species that are not listed in the *Arid West 2020 Regional Wetland Plant List* (USACE 2020) are considered UPL species

saturated soils of sufficient duration to exert a controlling influence on the plant species present" (Environmental Laboratory 1987). Facultative indicator species may be considered wetland indicators when found growing in hydric soils that experience periodic saturation. Plant species that are not on the regional list of wetland indicator species are considered upland species. A complete list of the vascular plants observed in the parcel including their current indicator statuses, is provided in Appendix B.

Hydric Soils. Up to 12 inches of the soil profile were examined for hydric soil indicators. The National Technical Committee for Hydric Soils (NTCHS) defines a hydric soil as one formed under conditions of saturation, flooding or ponding long enough during the growing season to develop anaerobic conditions in the upper 12 inches of soil (NRCS 2010). Hydric soils include soils developed under sufficiently wet conditions to support the growth and regeneration of hydrophytic vegetation. In general, evidence of a hydric soil includes characteristics such as organic soils (histosols), reducing soil conditions, gleyed soils, soils with bright mottles and/or low matrix chroma, soils listed as hydric by the U.S. Department of Agriculture (USDA) on the National Hydric Soils List (NRCS 2022b), and iron and manganese concretions. Reducing soil conditions can also include circumstances where there is evidence of frequent ponding for long or very long duration. A long duration is defined as a period of inundation for a single event that ranges from 7 days to a month and very long is greater than one month (Environmental Laboratory 1987).

Munsell Soil Notations (Munsell 2009) were recorded for the soil matrix of each soil sample. The Munsell color system is based on three color properties: hue, value, and chroma. A brief description of each component of the system is described below, in the order they are used in describing soil color (i.e., hue/value/chroma):

1. **Hue.** The Munsell Soil Color Chart is divided into five principal hues: yellow (Y), green (G), purple (P), blue (B), and red (R), along with intermediate hues such as yellow-red (YR) and green-yellow (GY). Example of commonly encountered hue numbers include 2.5YR, 10YR, and 5Y.
2. **Value.** *Value* refers to lightness, ranging from white to grey to black. Common numerical values for value in the Munsell Soil Color Chart range from 2 for saturated soils to 8 for faded or light colors. Hydric soils often show low-value colors when soils have accumulated sufficient organic material to indicate development under wetland conditions but can show high-value colors when iron depletion has occurred, removing color value from the soil matrix. Value numbers are commonly reported as 8/, 2.5/, and 6/.
3. **Chroma.** *Chroma* describes the purity of the color, from "true" or "pure" colors to "pastel" or "washed out" colors. Chromas commonly range from 1 to 8 but can be higher for gleys. Soil matrix chroma values that are 1 or less, or 2 or less when mottling is present, are typical of soils that have developed under anaerobic conditions. Chroma numbers are listed, for example, as /1, /5, and /8.

The NRCS Web Soil Survey (NRCS 2022a) was consulted to determine which soil types have been mapped in the parcel (Figure 4). Detailed descriptions of these soil types are provided in

Appendix A.

Wetland Hydrology. Wetland hydrology is defined as an area that is inundated either permanently or periodically at mean water depths less than 6.6 feet, or where the soil is saturated at the surface at some time during the growing season of the prevalent vegetation. The period of inundation or soil saturation varies according to the hydrologic/soil moisture regime and occurs in both tidal and non-tidal situations.

Wetland hydrology encompasses all hydrologic characteristics of areas that are periodically inundated or have soils saturated to the surface at some time during the growing season. Wetland hydrology indicators provide evidence that the study area has a continuing wetland hydrologic regime. Primary indicators might include visual observation of surface water (A1), high water table (A2), soil saturation (B1), water-stained leaves (B9), and hydrogen sulfide odor (C1). Secondary indicators might include riverine drift deposits (B3), drainage patterns (B10), and passing score for the FAC-neutral test (D5). Each of the sample points was examined for positive field indicators (primary and secondary) of wetland hydrology, following the guidance provided in the Regional Supplement.

Potential jurisdictional wetlands were identified within the parcel.

2.3 Identification of Section 404 Jurisdictional Other Waters

"Other waters" includes lakes, slough channels, seasonal ponds, tributary waters, non-wetland linear drainages, and salt ponds. Such areas are identified by the (seasonal or perennial) presence of standing or running water and generally lack hydrophytic vegetation. In non-tidal or muted tidal waters USACE jurisdiction extends to the ordinary high water mark (OHWM) which is defined in 33 CFR Part 328.3 as "the line on the shore established by the fluctuations of water and indicated by physical characteristics, such as a clear, natural line impressed on the bank, shelving, changes in the character of the soil, destruction of terrestrial vegetation or the presence of litter and debris." In tidal waters, USACE jurisdiction extends to the landward extent of vegetation associated with salt or brackish water or the high tide line (HTL) (see 33 CFR, Part 328.4). The HTL is defined in 33 CFR, Part 328.3 as "the line of intersection of the land with the water's surface at the maximum height reached by a rising tide. The HTL may be determined, in the absence of actual data, by a line of oil or scum along shore objects, a more or less continuous deposit of fine shell or debris on the foreshore or berm, other physical markings or characteristics, vegetation lines, tidal gauges, or other suitable means that delineate the general height reached by a rising tide. The line encompasses spring high tides and other tides that occur with periodic frequency but does not include storm surges in which there is a departure from the normal or predicted reach of the tide due to the piling up of water against a coast by strong winds such as those accompanying a hurricane or other intense storm."

Potential jurisdictional "other waters" were identified within the parcel.

2.4 Identification of Waters of the State

The Porter-Cologne Water Quality Control Act (PWQCA) broadly defines waters of the state as "any surface water or groundwater, including saline waters, within the boundaries of the state." Because PWQCA applies to any water, whereas the CWA applies only to certain waters,

California's jurisdictional reach overlaps and may exceed the boundaries of waters of the U.S. For example, Water Quality Order No. 2004-0004-DWQ states that "shallow" waters of the state include headwaters, wetlands, and riparian areas. Where forested habitat occurs, the outer canopy of any riparian trees rooted within top of bank (TOB) may be considered jurisdictional as these trees can provide allochthonous[3] input to the channel below.

Potential waters of the state were identified within the parcel.

2.5 Identification of CDFW Jurisdiction

Ephemeral and intermittent streams, rivers, creeks, dry washes, sloughs, blue line streams on USGS maps, and watercourses with subsurface flows fall under California Department of Fish and Wildlife (CDFW) jurisdiction. Canals, aqueducts, irrigation ditches, and other means of water conveyance may also be considered streams if they support aquatic life, riparian vegetation, or stream-dependent terrestrial wildlife. A stream is defined in Title 14, California Code of Regulations §1.72, as "a body of water that follows at least periodically or intermittently through a bed or channel having banks and that supports fish and other aquatic life. Jurisdiction does not include tidal areas such as tidal sloughs unless there is freshwater input. This includes watercourses having surface or subsurface flow that supports or has supported riparian vegetation." Using this definition, CDFW extends its jurisdiction to encompass riparian habitats that function as a part of a watercourse. California Fish and Game Code §2786 defines riparian habitat as "lands which contain habitat which grows close to, and which depends upon soil moisture from a nearby freshwater source."

The lateral extent of a stream and associated riparian habitat that would fall under the jurisdiction of CDFW can be measured in several ways, depending on the situation and the type of fish or wildlife at risk. At a minimum, CDFW would claim jurisdiction over a stream's bed and bank. Where riparian habitat is present, the outer edge of riparian vegetation is generally used as the line of demarcation between riparian and upland habitats.

CDFW jurisdictional habitats were identified within the parcel.

3. Survey Results and Discussion

A total of nine sample points (SP1 to SP5 and OHWM1a/b to OHWM 4a/b) were examined to identify jurisdictional features (Appendix C; Figure 7). In the parcel, 0.54 acres and 1,103 linear feet of ephemeral streams up to TOB, 0.027 acres of seasonal wetlands, and 0.51 acres of riparian habitat outside of TOB (*Arroyo Willow Thickets*) potentially regulated by USACE, RWQCB, and CDFW were identified. The results of the August 2022 delineation are described below and summarized in Table 2.

The parcel is located within the Central Coast/San Francisco Bay Area Subregions of the

[3]Allochthonous is a term used describe nutrients and carbon that come from outside the aquatic system.

Central Western Californian Region, both of which are contained within the larger California Floristic Province (Baldwin et al. 2012). Where applicable, vegetation communities were mapped using CDFW's Vegetation Classification and Mapping Program's (VegCAMP) currently accepted list of vegetation alliances and associations (CDFW 2022). Five natural communities and land cover types were identified in the parcel: (1) Rural-residential (2) *Coast Live Oak Woodland and Forest Alliance*, (3) *Eucalyptus – Tree of Heaven – Black Locust Groves Semi-natural Alliance*, (4) *Coyote Brush Scrub Alliance*, and (5) *Arroyo Willow Thickets Alliance* (Figure 6).

Table 2. Summary of Potentially Jurisdictional Waters and Habitats within the Parcel

Potentially Jurisdictional Waters	Acres[1]
USACE Jurisdictional Total	0.25
Ephemeral Streams (ES1 & ES2) (up to OHWM)	0.22
Seasonal Wetlands (SW1 & SW2)	0.027
RWQCB Jurisdiction Total	0.54
Ephemeral Stream (ES1 & ES2) (up to TOB)	0.51
Seasonal Wetlands (SW1 & SW2)	0.027
CDFW Jurisdiction Total	1.05
Ephemeral Stream (ES1 & ES2) (up to TOB)	0.51
Seasonal Wetlands (SW1 & SW2)	0.027
Arroyo Willow Thickets (riparian habitat) – outside TOB	0.51

[1]Note: Values are approximate due to rounding.

3.1 Precipitation Data

The survey took place during the dry season. Total estimated precipitation at the project area from February 2022 to July 2022 was 3.7 inches, which was approximately 20% of 30-year average (1986-2015) for the same period, which was *drier than normal* to *normal* conditions (Deters 2022). The region was experiencing an *extreme* to *moderate drought* as estimated by the Palmer Drought Severity Index (PDSI). The *drier than normal* to *normal* conditions were considered when assessing the biotic habitats present in the parcel. The boundaries of waters remained clear owing to the presence of hydrology indicators and hydrophytic vegetation.

3.2 Rationale for Sample Point Choice

OHWM1a/b and OHWM2a/b were selected to delineate the OHWM in the lower and upper reaches of ephemeral drainage ES1 (Figure 7; Photos 1 and 2 in Appendix D). Most of ES1 is within the rural-residential land cover and no riparian habitat is present beyond the channel at its outlet, which is within the *Willow Thickets Alliance* (Figure 7). Geomorphic field indicators of the OHWM included exposed root hairs and roots below an intact soil layer, break in bank slope, natural line impressed on the bank, and drift (organic and non-organic debris). Vegetative field indicators of the OHWM included vegetation stripped from active areas of the channel, vegetation below OHWM that starts to thicken above OHWM due to lack of disturbance from

Source: Google Earth 9/27/2021

- Parcel Boundary
- Coast Live Oak Woodland and Forest Alliance
- Coyote Brush Scrub Alliance
- Eucalyptus-Tree of Heaven- Black Locust Groves Semi-Natural Alliance
- Seasonal Wetland
- Rural-residential
- Willow Thickets Alliance
- Swale
- Ephemeral Stream

Figure 6 Vegetation Communities Map

4576 Paradise Drive Delineation of Wetlands and Other Waters

Parcel Boundary
Coast Live Oak Woodland and Forest Alliance
Coyote Brush Scrub Alliance
Eucalyptus-Tree of Heaven- Black Locust Groves Semi-Natural Alliance
Rural-residential
Seasonal Wetland
Willow Thickets Alliance
High Tide Line
OrdinaryHigh Water Mark (OHWM)
Top of Bank
Swale
OHWM Sample Point
PP- Photo Point
SP- Wetland Sample Point
Culvert

Figure 7 Preliminary Identification of Waters of the U.S./State

4576 Paradise Drive Delineation of Wetlands and Other Waters

moderate events, and areas above the OHWM fully vegetated due to lack of disturbance by moderate events.

OHWM3a/b and OHWM4a/b were selected to delineate the OHWM in the lower and upper reaches of ephemeral drainage ES2 (Figure 7; Photos 3 and 4 in Appendix D). The banks and channel of ES2 within the *Eucalyptus – Tree of Heaven – Black Locust Groves Semi-natural Alliance* were generally devoid of understory vegetation due to a thick layer of bark litter and the shading of the mature eucalyptus trees. The channel was generally sparsely vegetated except near OHWM3. No riparian habitat is present beyond the channel except near its outlet, which is adjacent to the *Willow Thickets Alliance* (Figure 7). Geomorphic field indicators of the OHWM included exposed root hairs and roots below an intact soil layer, break in bank slope, and drift (organic and non-organic debris). Vegetative field indicators of the OHWM included vegetation stripped from active areas of the channel, vegetation below OHWM that starts to thicken above OHWM due to lack of disturbance from moderate events, and areas above the OHWM fully vegetated due to lack of disturbance by moderate events.

SP1 was selected to examine the section of ephemeral drainage ES1 dominated by hydrophytic vegetation (Figure 7; Appendix C). Vegetation present included Italian rye grass (*Festuca perennis*; FAC), rabbitsfoot grass (*Polypogon monspeliensis*; FACW), slender rush (*Juncus tenuis*; FACW), and tall flatsedge (*Cyperus eragrostis*; FACW). Hydric soil indictors observed included redox depressions in the matrix and pore linings. Hydrological indicators, including drainage patterns and the FAC-Neutral Test were observed.

SP2 was selected to examine the section of ephemeral drainage ES1 where hydrophytic vegetation is intermixed with upland vegetation downstream of SP1 (Figure 7; Appendix C). Vegetation present included little rattlesnake grass (*Briza minor*), Italian rye grass, and ripgut brome (*Bromus diandrus*; UPL). Hydric soil indicators observed included redox depressions but did not meet the threshold for classification of a hydric soil. Hydrological indicators, drainage patterns and sediment deposits were observed.

SP3 was selected to examine the upland area adjacent to ES1 (Figure 7; Appendix C). Vegetation present included little rattlesnake grass and slender oat (*Avena barbata*; UPL). No hydric soil or hydrological indicators were observed at this sample point.

SP4 was selected to examine the swale below culvert C1 (Figure 7; Appendix C). Vegetation present included little rattlesnake grass and slender oat. No hydric soil or hydrological indicators were observed at this sample point.

SP5 was selected to investigate where ephemeral drainage ES2 empties onto the beach just above the HTL (Figure 7; Appendix C). Vegetation present included Italian thistle (*Carduus pycnocephalus*; UPL), pennyroyal (*Mentha pulegium*; OBL), and spiny sowthistle (*Sonchus asper*; FAC). Hydric soils were not observed but the substrate was composed of rocky material and sand (riverwash) likely transported by movement of water in the stream. Hydrological indicators observed included drainage patterns, the FAC-Neutral Test, and sediment deposits.

3.3 Project Area Conditions and Observations

This preliminary delineation assumes that normal circumstances prevailed at the time of the August 2022 delineation, and the results are based upon the conditions present. The survey was performed using the "Routine Method of Determination" using three parameters, as outlined in the Regional Supplement.

The parcel is situated on a moderately sloping hillside with several swales. Some of these swales may convey flows during or immediately after rain events due to their low topographic positions. However, these swales did not have a well-defined bed, bank, and channel, indicating ephemeral and low volume flow patterns. However, they were mapped to illustrate possible flow patterns within the parcel (Figure 7; Photo 5 in Appendix D).

Culvert C1 likely collects runoff from Paradise Drive and residential development upslope of the parcel into the swales just downslope of the culvert as well as down the dirt access road into the ephemeral drainage ES1 (Figure 7). Culverts C2, C3, and C4 likely collect runoff from Paradise Drive, up-slope residential development, and surrounding open space areas west of the parcel.

The HTL was delineated to indicate the jurisdictional limit of tidal waters in the parcel. The HTL was identified in the field by the wrack line, presence of hydrophytic vegetation, elevation, and limits of bank erosion. The wrack consisted of organic and non-organic materials, crustacean shells, and litter (Figure 7; Photo 8 in Appendix D). In some areas along the shoreline, the HTL corresponded to the limit of coastal marsh vegetation (Photo 9 in Appendix D). Vegetation included coastal gumweed (*Grindelia stricta*; FACW), cordgrass (*Spartina* sp.; OBL), fat hen (*Atriplex prostrata*; FACW), perennial pepperweed (*Lepidium latifolium*; FAC), pickleweed (*Salicornia pacifica*; OBL), and saltgrass (*Distichlis spicata*; FAC). The HTL was not delineated along the southern section of the shoreline due to the presence of vertical cliffs.

3.4 Photo Points

Photo point labels, coordinates, and rationale for the photos are include in Table 3. Photos are included in Appendix D.

Table 3. Coordinates and Rationale for Photo Points

Label	Latitude	Longitude	Rationale
Photo 1	37.909090°	-122.476945°	OHWM1
Photo 2	37.909295°	-122.477961°	OHWM2
Photo 3	37.908269°	-122.477023°	OHWM3
Photo 4	37.908650°	-122.478451°	OHWM4
Photo 5	37.909796°	-122.477258°	Swale topography
Photo 6	37.908342°	-122.477243°	Ephemeral drainage ES2, SW2, and *Arroyo Willow Thickets*
Photo 7	37.909244°	-122.477883°	Ephemeral drainage ES1 and SW1
Photo 8	37.908321°	-122.476750°	HTL
Photo 9	37.909087°	-122.476787°	Coastal salt marsh

3.5 Identification of Section 404 Potentially Jurisdictional Waters

Approximately 0.22 acres (ES1 and ES2) and 1,103 linear feet (0.05 aces and 328 feet for ES1 and 0.17 acres and 775 feet for ES2) of Section 404 other waters (ephemeral stream) were mapped in the parcel up to the OHWM (Figure 7; Photos 6 and 7, Appendix D).

Ephemeral Stream (ES1 and ES2). Both ephemeral streams flow in a west to east direction and empty into San Francisco Bay. No water was observed in the streams at the time of the delineation, but evidence of recurrent water flow through the stream was observed in the form of a defined bed and bank. Ephemeral streams only flow during or immediately after rain events and both streams receive runoff from swales and sheet flow from surrounding upland areas Sections of the ephemeral streams may retain moisture longer than the surrounding upland areas and some areas may be mesic, especially in spring.

At the time of the survey, no evidence of tidal action was observed within both streams. At the confluence of the streams and San Francisco Bay, both channels are above the HTL due to significant difference in elevation. Therefore, it is likely that both streams are not subject to regular tidal action. However, storm surge along with a king tide may result in temporary tidal inundation of both streams.

3.6 Identification of Section 404 Potentially Jurisdictional Wetlands

Approximately 0.027 acres of Section 404 wetlands (seasonal wetlands, SW1 (0.023 acres) and SW2 (0.004 acres) were observed within the ephemeral streams: SW1 was located within the OHWM of ES1 and SW2 was located within the OHWM of SW2 (Figure 7; Photos 6 and 7, Appendix D).

Seasonal Wetland (SW1 and SW2). Seasonal wetlands are generally inundated by shallow water, or have high groundwater levels, for variable periods from winter to spring, but they may be completely dry for most of the summer and fall. Dominant vegetation can include strongly

hydrophytic vegetation when the wetland is inundated or saturated and non-hydrophytic, upland species after the wetland dries out.

3.7 Identification of Potentially Jurisdictional Waters of the State

The extent of Section 401 waters of the state (RWQCB jurisdiction) in the project area includes a total of 0.54 acres, including 0.25 acres within Section 404 jurisdiction as described above and an additional 0.29 acres of habitat up to the TOB of ES1 and ES2, including 0.20 acres of *Eucalyptus – Tree of Heaven – Black Locust Groves Semi-natural Alliance*, 0.053 acres of rural-residential, 0.029 acres of Arroyo Willow Thickets, and 0.013 acres of *Coast Live Oak Woodland and Forest Alliance* (Figure 7; Photos 6 and 7, Appendix D). Characteristics of waters of the U.S are described above in Sections 3.5 and 3.6. In the field, TOB was identified as the first distinct break in the bank slope above the active flood plain of the stream. The active floodplain is the area (e.g., bank or terrace) adjacent to and receiving frequent over-bank flow from the low-flow channel. The limits of the active flood plain were determined by evidence of scour along the stream banks, break in slope, a textural change in substrate (e.g., from cobble to a finer-grained matrix), and an increase in vegetative cover and maturity above the active flood plain. The current practice of the San Francisco RWQCB is to claim all areas up to the top of bank, but it may also claim riparian habitat that extends beyond the top of bank and areas within the 100-year flood plain.

3.8 Identification of CDFW Potentially Jurisdictional Habitats

The parcel contains two ephemeral streams with defined bed and bank topography along with associated riparian habitat, as defined by CDFW. Riparian habitat was mapped by the dripline of trees at the outer extent of riparian vegetation. Streambed features were mapped by the top of bank (which can extend beyond the OHWM that is used to measure the extent of waters of the U.S.). The extent of CDFW jurisdiction includes all waters of the state (0.54 acres) as described in Section 3.7 above and an additional 0.51 acres of *Arroyo Willow Thickets* that extend beyond the TOB of the ephemeral streams. The extent of riparian habitat beyond the TOB was determined by the outer dripline of riparian vegetation (Figure 7; Photo 6, Appendix D).

4. References

Baldwin, Goldman, Keil, Patterson, Ronatti, and Wilkin (eds.) 2012. The Jepson Manual: Vascular Plants of California. 2nd Edition. University of California Press, Berkeley, California.

[CDFW] California Department of Fish and Wildlife. 2022. VegCAMP Natural Communities Lists. Accessed August 2022 from https://www.wildlife.ca.gov/data/vegcamp/natural-communities.

Cowardin, L. M., V. Carter, F. C. Golet, and E. T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U. S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. Jamestown, ND: Northern Prairie Wildlife Research Center Home Page. (Version 04DEC98).

Deters, J. 2022. Antecedent Precipitation Tool (Version 1.0). U.S. Army Corps of Engineers Regulatory Program.

Environmental Laboratory. 1987. U.S. Corps of Engineers Wetlands Delineation Manual. Department of the Army.

Google Inc. 2022. Google Earth Pro (Version 7.1.5.1557) [Software]. Available from earth.google.com.

Munsell. 2009. Soil Color Charts, Munsell Color X-rite. Grand Rapids, Michigan.

[NRCS] Natural Resources Conservation Service. 2010. Field Indicators of Hydric Soils in the U.S.: A Guide for Identifying and Delineating Hydric Soils (Version 7.0). U.S. Department of Agriculture. Prepared with the National Technical Committee for Hydric Soils.

[NRCS] Natural Resources Conservation Service. 2022a. Web Soil Survey. U.S. Department of Agriculture. Accessed September 022 from http://websoilsurvey.nrcs.usda.gov.

[NRCS] National Resource Conservation Service. 2022b. National Hydric Soils List. Accessed September 2022 from http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/use/hydric/.

[NWI] National Wetlands Inventory. 2022. Wetlands Mapper. U.S. Fish and Wildlife Service Accessed September 2022 from http://www.fws.gov/wetlands/Wetlands-Mapper.html.

[USACE] U.S. Army Corps of Engineers. 2008a. U.S. Army Corps of Engineers. 2008. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0), ed. J. S. Wakeley, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-08-28. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

[USACE] U.S. Army Corps of Engineers. 2008b. A Field Guide to the Identification of the Ordinary High-Water Mark (OHWM) in the Arid West Region of the Western United States. August 2008. U.S. Army Engineer Research and Development Center.

USACE] U.S. Army Corps of Engineers. 2016a. Updated Map and Drawing Standards for the South Pacific Division Regulatory Program.

[USACE] U.S. Army Corps of Engineers. 2016b. Information Needed for Verification of Corps Jurisdiction, San Francisco District. Revised April 2016. https://www.spn.usace.army.mil/Portals/68/docs/regulatory/2%20-%20Info%20Req.pdf

[USACE] U.S. Army Corps of Engineers 2020. National Wetland Plant List, version 3.5. Accessed August 2022 from http://wetland-plants.usace.army.mil/. U.S. Army Corps of Engineers Engineer Research and Development Center Cold Regions Research and Engineering Laboratory, Hanover, NH.

Appendix A: Soil Survey Report

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Marin County, California

4576 Paradise Drive Tiburon CA

August 30, 2022

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Map Scale: 1:1,820 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 25 50 100 150

Feet
0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Marin County, California
Survey Area Data: Version 15, Sep 9, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 7, 2021—Mar 31, 2021

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
141	Los Osos-Bonnydoon complex, 15 to 30 percent slopes	9.1	100.0%
Totals for Area of Interest		**9.1**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Marin County, California

141—Los Osos-Bonnydoon complex, 15 to 30 percent slopes

Map Unit Setting

National map unit symbol: hf2f
Elevation: 50 to 1,500 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 59 to 63 degrees F
Frost-free period: 270 to 320 days
Farmland classification: Not prime farmland

Map Unit Composition

Los osos and similar soils: 60 percent
Bonnydoon and similar soils: 20 percent
Minor components: 17 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Los Osos

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Residuum weathered from sandstone and shale

Typical profile

H1 - 0 to 18 inches: loam
H2 - 18 to 38 inches: clay
H3 - 38 to 42 inches: bedrock

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.7 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: R015XC032CA - FINE LOAMY CLAYPAN
Hydric soil rating: No

Description of Bonnydoon

Setting

Landform: Hills

Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Residuum weathered from shale, or sandstone

Typical profile

H1 - 0 to 15 inches: gravelly loam
H2 - 15 to 19 inches: bedrock

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.9 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R015XC037CA - SHALLOW GRAVELLY LOAM
Hydric soil rating: No

Minor Components

Tocaloma

Percent of map unit: 2 percent
Hydric soil rating: No

Slumps

Percent of map unit: 2 percent
Hydric soil rating: No

Slopes less than 15 percent

Percent of map unit: 2 percent
Hydric soil rating: No

Yorkville

Percent of map unit: 2 percent
Hydric soil rating: No

Unnamed, deep

Percent of map unit: 2 percent
Hydric soil rating: No

Unnamed, shallow

Percent of map unit: 2 percent
Hydric soil rating: No

Unnamed, gravelly

Percent of map unit: 2 percent
Hydric soil rating: No

Saurin

Percent of map unit: 2 percent
Hydric soil rating: No

Unnamed

Percent of map unit: 1 percent
Landform: Depressions
Hydric soil rating: Yes

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

Appendix B: Plant Species Observed

Common Name	Scientific Name	Wetland Indicator Status[1]
Arroyo willow	*Salix lasiolepis*	FACW
Bird's foot trefoil	*Lotus corniculatus*	FAC
Blue gum	*Eucalyptus globulus*	NI
Blue wild rye	*Elymus glaucus*	FACU
Bog rush	*Juncus effusus*	FACW
Bristly ox-tongue	*Helminthotheca echioides*	FAC
California bay laurel	*Umbellularia californica*	FAC
California bee plant	*Scrophularia californica*	FAC
California sagebrush	*Artemisia californica*	NI
California wood fern	*Dryopteris arguta*	NI
Cape ivy	*Delairea odorata*	FAC
Cherry plum	*Prunus cerasifera*	NI
Coast live oak	*Quercus agrifolia*	NI
Coastal gumweed	*Grindelia stricta*	FACW
Common rush	*Juncus patens*	FACW
Common Pacific pea	*Lathyrus vestitus*	NI
Common velvetgrass	*Holcus lanatus*	FAC
Common verbena	*Verbena lasiostachys*	FAC
Common yarrow	*Achillea millefolium*	NI
Cordgrass	*Spartina* sp.	OBL
Cotoneaster	*Cotoneaster* sp.	NI
Coyote brush	*Baccharis pilularis*	NI
Curly dock	*Rumix crispus*	FAC
English ivy	*Hedera helix*	FACU
English plantain	*Plantago lanceolata*	FAC
Fat-hen	*Atriplex prostrata*	FACW
Field bindweed	*Convolvulus arvensis*	NI
Foxtail barley	*Hordeum murinum*	FACU
French broom	*Genista monspessulana*	UPL
Fremont cottonwood	*Populus fremontii*	NI
Fringed willowherb	*Epilobium ciliatum*	FACW
Giant reed	*Arundo donax*	FACW
Harding grass	*Phalaris aquatica*	FACU
Himalayan blackberry	*Rubus armeniacus*	FAC
Italian rye grass	*Festuca (Lolium) perennis*	FAC
Italian thistle	*Carduus pycnocephalus*	NI

Jersey cudweed	*Pseudognaphalium luteoalbum*	FACW
Ladies' tobacco	*Pseudognaphalium californicum*	NI
Little rattlesnake grass	*Briza minor*	FAC
Ngaio tree	*Myoporum laetum*	FACU
Monterey pine	*Pinus radiata*	NI
Olive	*Olea europaea*	NI
Pampass grass	*Cortaderia jubata*	FACU
Panic veldtgrass	*Ehrharta erecta*	NI
Pennyroyal	*Mentha pulegium*	OBL
Perennial pepperweed	*Lepidium latifolium*	FAC
Picklweed	*Salicornia pacifica*	OBL
Pink honeysuckle	*Lonicera hispidula*	FACU
Poison oak	*Toxicodendron diversilobum*	FAC
Rabbitsfoot grass	*Polypogon monspeliensis*	FACW
Ripgut brome	*Bromus diandrus*	NI
Saltgrass	*Distichlis spicata*	FAC
Scarlet pimpernel	*Lysimachia arvensis*	FAC
Silver wattle	*Acacia dealbata*	NI
Slender oat	*Avena barbata*	NI
Slender rush	*Juncus tenuis*	FACW
Soft brome	*Bromus hordeaceus*	FACU
Spiny sowthistle	*Sonchus asper*	FAC
Sticky monkeyflower	*Diplacus aurantiacus*	FACU
Tall flatsedge	*Cyperus eragrostis*	FACW
Toyon	*Heteromeles arbutifolia*	NI
Western sword fern	*Polystichum munitum*	FACU

NI – Not included in the *Arid West 2020 Regional Wetland Plant List* (USACE 2020)

Appendix C: Arid West Data Forms

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: 4576 Paradise Drive-Tiburon City/County: Tiburon/Marin County Sampling Date: 2022-08-25

Applicant/Owner: Eric Crandall State: California Sampling Point: SP1

Investigator(s): DWG Section, Township, Range:

Landform (hillslope, terrace, etc.): Ephemeral Stream Local relief (concave, convex, none): Concave Slope (%): 3

Subregion (LRR): C 14 Lat: 37.9091498 Long: -122.4775843 Datum: WGS 84

Soil Map Unit Name: Los Osos-Bonnydoon complex, 15 to 30 percent slopes NWI classification: R4SB7

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No _____	**Is the Sampled Area within a Wetland?** Yes ✔ No _____
Hydric Soil Present?	Yes ✔	No _____	
Wetland Hydrology Present?	Yes ✔	No _____	

Remarks:

Wetland with drainage

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 5 ft r)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5 ft r)			
1. Lolium perenne	25	✔	FAC
2. Juncus tenuis	20	✔	FACW
3. Cyperus eragrostis	10		FACW
4. Polypogon monspeliensis	10		FACW
5.			
6.			
7.			
8.			
	65% = Total Cover		
Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 35.0 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	40	x 2 =	80
FAC species	25	x 3 =	75
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	65 (A)		155 (B)

Prevalence Index = B/A = 2.4

Hydrophytic Vegetation Indicators:

✔ Dominance Test is >50%

✔ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✔ No _____

Remarks:

SOIL

Sampling Point: SP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 12	10YR 3/2	85	5YR 3/4	15	C	PL / M	Sandy Clay Loam	
-								
-								
-								
-								
-								
-								
-								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ✔ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✔ **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Vis ble on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ✔ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ✔ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✔ Depth (inches): _____

Water Table Present? Yes ___ No ✔ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No ✔ Depth (inches): _____

Wetland Hydrology Present? Yes ✔ **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: 4576 Paradise Drive-Tiburon City/County: Tiburon/Marin County Sampling Date: 2022-08-25

Applicant/Owner: Eric Crandall State: California Sampling Point: SP2

Investigator(s): DWG Section, Township, Range:

Landform (hillslope, terrace, etc.): Ephemeral Stream Local relief (concave, convex, none): Concave Slope (%): 3

Subregion (LRR): C 14 Lat: 37.9091872 Long: -122.4773295 Datum: WGS 84

Soil Map Unit Name: Los Osos-Bonnydoon complex, 15 to 30 percent slopes NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✔	**Is the Sampled Area within a Wetland?** Yes _____ No ✔
Hydric Soil Present?	Yes _____	No ✔	
Wetland Hydrology Present?	Yes ✔	No _____	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 5 ft r)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5 ft r)			
1. Bromus diandrus	15	✔	UPL
2. Lolium perenne	10	✔	FAC
3. Briza minor	5		FAC
4.			
5.			
6.			
7.			
8.			
	30% = Total Cover		
Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 70.0 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	15	x 3 =	45
FACU species	0	x 4 =	0
UPL species	15	x 5 =	75
Column Totals:	30 (A)		120 (B)

Prevalence Index = B/A = 4.0

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✔

Remarks:

SOIL

Sampling Point: SP2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 12	10YR 3/1	99	5YR 5/6	1	C	M	Sandy Clay Loam	
-								
-								
-								
-								
-								
-								
-								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✔

Remarks:

Does not meet redox dark surface since redox is less than 1%

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Vis ble on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ✔ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ✔ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✔ Depth (inches): _____

Water Table Present? Yes _____ No ✔ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✔ Depth (inches): _____

Wetland Hydrology Present? **Yes** ✔ **No** _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: 4576 Paradise Drive-Tiburon City/County: Tiburon/Marin County Sampling Date: 2022-08-25

Applicant/Owner: Eric Crandall State: California Sampling Point: SP3

Investigator(s): DWG Section, Township, Range:

Landform (hillslope, terrace, etc.): Upland Local relief (concave, convex, none): Undulating Slope (%): 5

Subregion (LRR): C 14 Lat: 37.9093578 Long: -122.4776858 Datum: WGS 84

Soil Map Unit Name: Los Osos-Bonnydoon complex, 15 to 30 percent slopes NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✔	**Is the Sampled Area within a Wetland?** Yes _____ No ✔
Hydric Soil Present?	Yes _____	No ✔	
Wetland Hydrology Present?	Yes _____	No ✔	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 5 ft r)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5 ft r)			
1. Briza minor	50	✔	FAC
2. Avena barbata	30	✔	UPL
3.			
4.			
5.			
6.			
7.			
8.			
	80% = Total Cover		
Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 20.0 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	50	x 3 =	150
FACU species	0	x 4 =	0
UPL species	30	x 5 =	150
Column Totals:	80 (A)		300 (B)

Prevalence Index = B/A = 3.8

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✔

Remarks:

SOIL

Sampling Point: SP3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 12	10YR 5/4	100					Sandy Clay Loam	
-								
-								
-								
-								
-								
-								
-								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✔

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Vis ble on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✔ Depth (inches): _____

Water Table Present? Yes _____ No ✔ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✔ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Upland grassland

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: 4576 Paradise Drive-Tiburon City/County: Tiburon/Marin County Sampling Date: 2022-08-25

Applicant/Owner: Eric Crandall State: California Sampling Point: SP4

Investigator(s): DWG Section, Township, Range:

Landform (hillslope, terrace, etc.): Swale Local relief (concave, convex, none): Concave Slope (%): 7

Subregion (LRR): C 14 Lat: 37.9097359 Long: -122.4771285 Datum: WGS 84

Soil Map Unit Name: Los Osos-Bonnydoon complex, 15 to 30 percent slopes NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✔	**Is the Sampled Area within a Wetland?** Yes _____ No ✔
Hydric Soil Present?	Yes _____	No ✔	
Wetland Hydrology Present?	Yes _____	No ✔	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 5 ft r)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5 ft r)			
1. Briza minor	50	✔	FAC
2. Avena barbata	40	✔	UPL
3.			
4.			
5.			
6.			
7.			
8.			
	90% = Total Cover		
Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 10.0 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	50	x 3 =	150
FACU species	0	x 4 =	0
UPL species	40	x 5 =	200
Column Totals:	90 (A)		350 (B)

Prevalence Index = B/A = 3.9

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✔

Remarks:

SOIL

Sampling Point: SP4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 10	10YR 5/4	100					Sandy Clay Loam	
-								
-								
-								
-								
-								
-								
-								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✔

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Vis ble on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ✔ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✔ Depth (inches): _____

Water Table Present? Yes _____ No ✔ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✔ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Sample point in swale

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: 4576 Paradise Drive-Tiburon City/County: Tiburon/Marin County Sampling Date: 2022-08-25

Applicant/Owner: Eric Crandall State: California Sampling Point: SP5

Investigator(s): DWG Section, Township, Range:

Landform (hillslope, terrace, etc.): Ephemeral Stream Local relief (concave, convex, none): Concave Slope (%): 2

Subregion (LRR): C 14 Lat: 37.9082845 Long: -122.4768189 Datum: WGS 84

Soil Map Unit Name: Los Osos-Bonnydoon complex, 15 to 30 perecent slopes NWI classification: R4SB7

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔ No _____	**Is the Sampled Area within a Wetland?** Yes ✔ No _____
Hydric Soil Present?	Yes ✔ No _____	
Wetland Hydrology Present?	Yes ✔ No _____	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 5 ft r)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5 ft r)			
1. Mentha pulegium	25	✔	OBL
2. Carduus pycnocephalus	5		UPL
3. Sonchus asper	5		FAC
4.			
5.			
6.			
7.			
8.			
	35% = Total Cover		
Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 65.0 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	25	x 1 =	25
FACW species	0	x 2 =	0
FAC species	5	x 3 =	15
FACU species	0	x 4 =	0
UPL species	5	x 5 =	25
Column Totals:	35 (A)		65 (B)

Prevalence Index = B/A = 1.9

Hydrophytic Vegetation Indicators:

✔ Dominance Test is >50%

✔ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✔ No _____

Remarks:

SOIL

Sampling Point: SP5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 6								Very Rocky and Sandy, very little soil substrate
-								
-								
-								
-								
-								
-								
-								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ✔ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✔ **No** _____

Remarks:

Riverwash material, assumed hydric

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Vis ble on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ✔ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ✔ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ✔ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✔ Depth (inches): _____

Water Table Present? Yes _____ No ✔ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✔ Depth (inches): _____

Wetland Hydrology Present? **Yes** ✔ **No** _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SP1

SP2

SP3

SP4

SP5

Appendix D: Photographs

Photo 1. OHWM1 sampling point in ephemeral drainage ES1. OWHM indicators observed included exposed root hairs and roots below an intact soil layer and break in bank slope.

Photo 2. OHWM2 sampling point in ephemeral drainage ES1. OHWM indicators observed included break in bank slope and vegetation stripped from active areas of the channel.

Photo 3. OHWM3 sampling point in ephemeral drainage ES2. OHWM indicators observed included exposed root hairs and roots below an intact soil layer and break in bank. Notice that the drainage is less than 2 feet across at this point.

Photo 4. OHWM4 sampling point in ephemeral drainage ES2. OHWM indicators observed included exposed root hairs and roots below an intact soil layer and break in bank.

Photo 5. Swale downslope of culvert C1. Note the lack of a well-defined bed, bank, and channel indicating infrequent and low volume flows.

Photo 6. Ephemeral drainage ES2 and seasonal wetland SW2 with Arroyo *Willow Thickets Alliance* and San Francisco Bay in the background.

Photo 7. Ephemeral drainage ES2, seasonal wetland SW1 within the rural-residential land cover.

Photo 8. The HTL was delineated in the field using the limits of bank erosion and wrack line.

Photo 9. Coastal salt marsh within the parcel. The HTL corresponded to the limit of marsh vegetation.

Appendix E: Aquatic Resources Table

Waters Name	State	Cowardin Code	HGM Code	Measurement Type	Amount	Units	Water Type	Latitude	Longitude	Local Waterway
ES1	CA	R4SB3	Riverine	Area	0.05	Acres	A2TRIBINT	37.909244°	-122.477883°	San Francisco Bay
ES2	CA	R4SB3	Riverine	Area	0.17	Acres	A2TRIBINT	37.908342°	-122.477243°	San Francisco Bay
SW1	CA	R4SB7	Riverine	Area	0.023	Acres	A2TRIBINT	37.909149°	-122.477584°	San Francisco Bay
SW2	CA	R4SB7	Riverine	Area	0.004	Acers	A2TRIBINT	37.908284°	-122.476818°	San Francisco Bay