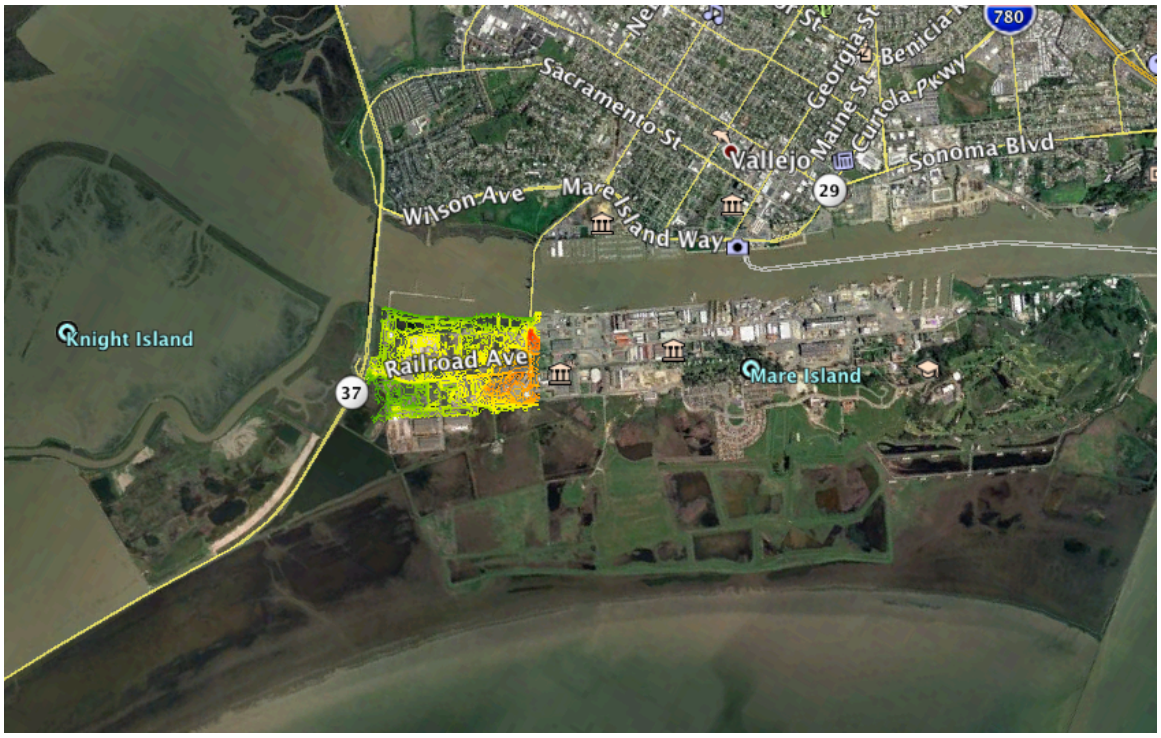
Biological Resources Assessment

Northeast Mare Island (Parcels XV-A (1, 2), XV-B (I), II)

Prepared by Swaim Biological, Inc./SBI



DECEMBER 2016

Prepared for Amec Foster Wheeler

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INTRODUCTION

BACKGROUND

Four contiguous parcels in northeast Mare Island are proposed for redevelopment: Parcel XV-A(1), Parcel XV-A(2), Parcel XV-B(I), and Parcel XV-B(II). The purpose of this report is to characterize the vegetation communities and species' habitats that occur on or adjacent to the 152.6-acre study area; identify special-status species that occur on the site or have a moderate potential to occur; and identify species that occur or have moderate potential to occur *adjacent* to the study area *with* the potential to be directly or indirectly impacted by redevelopment. The regulatory environment is introduced as a framework for understanding redevelopment constraints and responsibilities that are triggered when a protected biological resource and/or its habitat is present [or potentially present] on or adjacent to the site.

The identification of additional biological protections and regulations that may apply because of former military use of the site and stemming from hazardous materials and their cleanup is beyond the expertise of this author and is not addressed in this report.

SUMMARY RESULTS

Federal and state waters and wetlands occur in Reuse Area 1A, specifically on Parcel II bordering the Napa River. Napa River is a federal and state water paralleling the to the east. It, along with its shoreline Public Trust[1] marshes that border the , is jurisdictional to the federal agency U.S. Army Corps of Engineers (Corps), and to the state agencies California Department of Fish and Wildlife (CDFW), Regional Water Quality Control Board (RWQCB), and Bay Conservation and Development Commission (BCDC). A small isolated seasonal wetland occurs in the northeast quadrant of the . Present and past satellite imagery identifies numerous other seasonally-ponded areas throughout the . Some of these features support hydrophitic vegetation while others are unvegetated. Soil conditions were not examined; several attempts were made but the substrate was too compacted to dig below the top 2 inches. These areas do not meet Corps wetland criteria (isolated), do not provide habitat for special-status species under CDFW jurisdiction, (no cover) and are beyond the BCDC shoreline band. However, due to the "difficult to resolve" site conditions and their wide regulatory jurisdiction over surface waters in the State of California, the RWQCB may or may not assert regulatory jurisdiction over some or all of these isolated areas of ponded water. The reader is referred to the *Preliminary Delineation of Waters of the U.S.* (Attachment A) for further discussion.

The Public Trust marshes contain vegetation characteristic of the Pickleweed Mats Alliance, a Natural Community that is considered by the CDFW as a vegetation community that is at risk of extirpation and therefore subject to California Environmental Quality Act (CEQA) review and potential mitigation.

[1] It is the author's understanding that these marshes are held in public trust by the City of Vallejo. Thus, the term "Public Trust marshes" is used for the purpose of assigning a succinct nomenclature to this area, as it is referenced frequently throughout the report. However, the term should not be construed as an authoritative declaration of the legal status of the marshes.

Special-status plant and animal species are documented to occur in Public Trust marshes on Parcel II. Special-status species are also documented to occur in the Napa River, which has ecological connectivity to Reuse Area 1A via the marshes. Some species are restricted to the river or marshes, while others may be encountered on Reuse Area 1A. Species include those that are listed under federal and/or state Endangered Species Acts, and/or California Fish and Game Codes, and/or are designated by the CDFW as California Species of Special Concern (SSC), and/or are determined by the CDFW and California Native Plant Society (CNPS) to have a California Rare Plant Rank (CRPR) of 1 or 2. Species that are known to occur or have at least a moderate potential to occur on or near the study area include the following:

Plants

- soft bird's beak (FE[2], CA Rare, CRPR 1B.1)
- Mason's lilaeopsis (CRPR 1B.1)
- Delta tule pea (CRPR 1B.2)

Fish

- Delta smelt (FT, SE)
- Central California Coast steelhead (FE, ST)
- longfin smelt (FC, ST, SSC)
- Sacramento splittail (SSC)
- Fall-run Chinook salmon (SSC)
- white sturgeon (SSC)
- riffle sculpin (SSC)
- hardhead (SSC)
- Pacific lamprey (SSC)
- river lamprey (SSC)

Birds

- Ridgway's rail (formerly known as the California clapper rail; FE, SE)
- California black rail (ST, FP)
- white-tailed kite (CA FP)
- osprey [nesting] (SSC)
- great blue heron [rookery] (SSC)
- salt marsh common yellowthroat (SSC)
- San Pablo song sparrow (SSC)
- yellow-headed blackbird (SSC)

Mammals

- salt marsh harvest mouse (FE, SE)
- Townsend's big-eared bat (Candidate ST)
- Suisun shrew (SSC)
- pallid bat (SSC)

[2] FT = Federally Threatened, FE= Federally Endangered, SE= State Endangered, ST= State Threatened, SSC = California Species of Special Concern, FP= Fully-protected by CDFW.

METHODS

Prior to the site reconnaissance survey, the California Natural Diversity Data Base (CNDDB) and California Rare Plant Inventory were queried to identify documented sensitive species and habitats within the Mare Island U.S. Geological Survey 7.5-minute quadrangle. Mare Island is a peninsula abutting quadrangles in three other counties, but separated by water. Species reported in other quadrangles would not necessarily occur on Mare Island due to water separation, geographic range, and soil and habitat restrictions. However, a 9-quad search was also run for comparison and due diligence. Results presented in this report focus on species likely to occur in the study area and in Mare Island Strait (Napa River).

A general site assessment was conducted on August 25, 2016 by Swaim Biological, Inc. biologist Natasha Dvorak. Meandering transects were walked across all parcels, allowing visual coverage suitable to characterize vegetation communities; identify most vegetation to genus; determine the presence of permanent and seasonal wetlands; identify use of seasonal wetlands by wildlife species; assess the presence, size, and density of burrows; and identify obvious raptor nests.

To compile this Biological Resources Assessment, information from the CNDDB and Rare Plant Inventory was combined with a review of published data from area environmental studies, observations and field data collected during the site assessment, information from the *Preliminary Delineation of Waters of the U.S.* (**Attachment A**, Swaim Biological, 2016a), and results from the *Bat Habitat Assessment for Mare Island Parcels XV-A(1), XV-A(2), XV-B(I), and II* (**Attachment B**; Swaim Biological, 2016b).

REGULATORY DISCUSSION

The following discussion identifies federal, state, and local agencies and laws that could be applicable to redevelopment of Reuse Area 1A with regards to biological resources. Wildlife and botanical resources are governed at the federal level by the U.S. Fish and Wildlife Service (USFWS) and at the state level by the California Department of Fish and Wildlife (CDFW). Waters and wetlands are governed by a more complicated network of agencies and laws, with agencies differing in their wetland definitions and their corresponding jurisdictional reaches. The Corps, CDFW, RWQCB, and BCDC have varying jurisdiction over aquatic features in the study area.

Federal

National Environmental Policy Act

The National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. 1251 et seq. affects federally authorized projects and was established to ensure that federal projects or decisions incorporate considerations of environmental consequences into the decision making process. NEPA establishes a process for input by affected parties through public noticing and scoping. This input is considered when analyzing a reasonable range of alternatives in the Environmental Assessment (EA) or Environmental Impact Statement (EIS).

Waters

U.S. Army Corps of Engineers

Section 404 of the Clean Water Act

Section 404 of the Clean Water Act (CWA) establishes a permit program administered by the U.S. Army Corps of Engineers (Corps) that regulates discharge of dredged or fill materials into waters of the U.S., including wetlands. Guidelines for implementation are referred to as the Section 404(b)(1) Guidelines that were developed by the U.S. Environmental Protection Agency (EPA) in conjunction with the Corps (40 C.F.R. Part 230). The Guidelines allow the discharge of fill materials into aquatic systems only if there is no practicable alternative that would have fewer adverse impacts.

Section 10 of the Rivers and Harbors Act

Section 10 of the Rivers and Harbors Act (33 U.S.C. 401 et seq.), administered by the Corps, requires permits for all structures (e.g., riprap) and activities (e.g., dredging) within navigable waters of the U.S. Navigable waters are defined as those subject to the ebb and flow of the tide and susceptible to use as means of interstate transport or foreign commerce in their natural condition or by reasonable improvements. The Corps grants or denies permits based on the effects of navigation. Many activities covered under this act are also covered under Section 404 of the CWA.

Environmental Protection Agency

The U.S. Environmental Protection Agency (EPA) delegated responsibility for implementation of portions of the CWA, including water quality control planning and control programs, such as the National Pollutant Discharge Elimination System (NPDES) Program, to the State Water

Resources Control Board (SWRCB). Section 303(c)(2)(b) of the CWA requires states to adopt water quality standards for all surface waters of the United States based on the water body's designated beneficial use. Where multiple uses exist, water quality standards must protect the most sensitive use. Water quality standards applicable to the study area are listed in the *San Francisco Bay Basin (Region 2) Water Quality Control Plan* (RWQCB, 2007).

Plants and Wildlife

U.S. Fish and Wildlife Service

Endangered Species Act

The federal Endangered Species Act (ESA) of 1973 (16 United States Code [USC] 1531–1544) as amended protects plants, fish, and wildlife that are listed as endangered or threatened by the U.S. Fish and Wildlife Service or the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA Fisheries). Section 9 of the ESA prohibits the "take" of listed fish and wildlife, where "take" is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in such conduct" (50 Code of Federal Regulations [CFR] 17.3). For plants, this statute prohibits removing, possessing, maliciously damaging, or destroying any listed plant *under federal jurisdiction* and removing, cutting, digging up, damaging, or destroying any listed plant in knowing violation of state law (16 USC 1538).

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) of 1918 (16 USC Sections 703–711) protects all migratory birds, including active nests and eggs. Birds protected under the MBTA include all native waterfowl, shorebirds, hawks, eagles, owls, doves, and other common native and migratory birds (e.g. ravens, crows, sparrows, swallows) including their body parts (e.g. feathers and plumes), active nests, and eggs. A complete list of protected species can be found in 50 CFR 10.13. Enforcement of the provisions of the federal MBTA is the responsibility of USFWS.

National Marine Fisheries Service (NMFS)

Endangered Species Act

The federal Endangered Species Act (ESA) of 1973 (16 United States Code [USC] 1531–1544), as amended and enforced by the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS), protects fish and marine mammals that are listed as endangered or threatened by the Act. Section 9 of the ESA prohibits the "take" of listed fish and wildlife, where "take" is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in such conduct" (50 Code of Federal Regulations [CFR] 17.3).

Magnuson-Stevens Fishery and Conservation Act

This Act requires federal agencies to consult with NMFS on all proposed actions that are authorized, funded, or undertaken by the agency that may adversely affect essential fish habitat (EFH). EFH is defined as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. EFH is designated only for those species managed under a Federal Fisheries Management Plan (FMP).

State of California

California Environmental Quality Act

The California Environmental Quality Act (CEQA) contains requirements similar to NEPA and requires formal environmental review prior to implementation of applicable projects. CEQA requires significant impacts to be mitigated to a level of insignificance or to the maximum extent feasible. The state or local lead agency is responsible for CEQA compliance.

Waters

California Department of Fish and Wildlife

CDFW is empowered through provisions of the state Administrative Code to issue agreements for alteration of a river, stream, or lake where fish or wildlife resources may adversely be affected. Streams and rivers are defined by the presence of a channel bed and banks. CDFW regulates wetlands the extent that those wetlands are part of a river, stream, or lake, or when wetlands provide habitat for special-status species.

Regional Water Quality Control Board

The Porter-Cologne Water Quality Control Act established the State Water Resources Control Board and its regional boards as the principal agencies for coordinating and controlling water quality in California. Specifically, the Porter-Cologne Water Quality Control Act authorizes the State board to adopt, review, and revise policies for all waters of the State (including both surface and groundwaters) and directs the regional boards to develop regional Basin Plans.

Section 401 of the CWA requires that an applicant for a federal permit allowing activities that could result in a discharge to waters of the U.S. obtain a state certification that the discharge complies with other provisions of the CWA. The California Regional Water Quality Control Board (RWQCB) administers the certification program within California.

Bay Construction and Development Commission

The McAteer-Petris Act, first enacted in 1965, created the San Francisco BCDC to protect the Bay and shoreline and provide for appropriate development and public access. The McAteer-Petris Act directs the Commission to oversee permit approvals for placing fill and extracting materials, including dredged material, or changing the use of any land, water, or structure within its jurisdiction. BCDC jurisdiction includes the Bay, shoreline band, saltponds, managed wetlands, and certain waterways. The shoreline development aspect of the Act ensures that prime shoreline sites are reserved for priority uses, such as ports, water-related industry, airports, wildlife refuges, and water-related recreation. The Act also ensures that public access to the Bay is provided to the maximum extent feasible for each development project, and that shoreline development projects are designed in an attractive and safe manner.

Vegetation

Plants

California Department of Fish and Wildlife

Native Plant Protection Act of 1973 and California Rare Plant Ranks

The Native Plant Protection Act of 1973 (Fish and Game Code Sections 1900–1913) includes provisions that prohibit the taking of endangered or rare native plants. CDFW administers the Native Plant Protection Act of 1973 and generally regards as rare many plant species included on the California Rare Plant Rank (CRPR) List jointly produced by CDFW and the CNPS. Impacts to these species or their habitat must be analyzed during preparation of environmental documents relating to CEQA.

Natural (Vegetation) Communities

California Department of Fish and Wildlife

Since 1999, CDFW has undertaken the classification and mapping of vegetation throughout the state as part of their Vegetation Classification and Mapping Program (VegCAMP). Natural Communities are considered, along with plants and animals, part of the Natural Heritage Program's "conservation triad" of conservation significance. One purpose of the vegetation classification is to determine the level of rarity and imperilment of vegetation communities. Natural Communities have significance for conservation and CDFW directs that their presence be considered in the environmental review process along with occurrences of special-status plants and animals.

Wildlife

California Department of Fish and Wildlife

California Endangered Species Act

Sections 2050–2098 of the California Fish and Game Code (the California Endangered Species Act [CESA]) prohibit the take of state-listed endangered and threatened species unless specifically authorized by the CDFW. The state definition of "take" is to hunt, pursue, catch, capture, or kill a member of a listed species or attempt to do so. The CDFW administers the Act and authorizes take through permits or memorandums of understanding issued under Section 2081 of CESA, or through a consistency determination issued under section 2080.1. Section 2090 of CESA requires state agencies to comply with threatened and endangered species protection and recovery and to promote conservation of these species. Species that are formal candidates for listing under the Act are afforded the full protection of the Act.

Species of Special Concern

Species of Special Concern (SSC) is a category conferred by the CDFW to fish and wildlife species that (a) meet the state definition of threatened or endangered but have not been formally listed under the California Endangered Species Act; or (b) species that are considered at risk of qualifying for threatened or endangered status in the future based on current known threats.

Fully Protected Species

Fish and Game Code designates certain fish and wildlife species as "fully protected" under Sections 3511 (birds), 4700 (mammals), 5050 (reptiles and amphibians), and 5515 (fish). Fully

protected species may not be taken or possessed at any time, and no permits may be issued for incidental take of these species.

Birds of Prey

Fish and Game Code Section 3503 et seq. states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto. Section 3503.5 makes it unlawful to take, possess, or destroy any birds in the orders of Falconiformes or Strigiformes (birds of prey) or to take, possess, or destroy the nest or eggs of any such bird.

Local

City of Vallejo General Plan

An update to the City of Vallejo General Plan is underway, with the Draft General Plan Environmental Impact Report and the Draft General Plan released for public review in July 2016. The Draft General Plan prioritizes manufacturing development on North Mare Island in order to facilitate infrastructure investment and regional job creation.

Mare Island Specific Plan

The Mare Island Specific Plan was most recently amended in 2013. It calls for enhancing the growing mix of industrial, office, and retail uses within mapped "employment centers" that include the study area. "Mare Island's inventory of older industrial structures" are identified as providing "opportunities for adaptive reuse for a wide variety of commercial and industrial uses including production/distribution/repair uses, general manufacturing and assembly, artist spaces, green/clean tech, and more."

RESOURCE DISCUSSION

The study area is located in the City of Vallejo, California in the northeast corner of Mare Island (**Figure 1, Study Location**). The site occurs within the Central Coast Floristic Province, a subregion within the larger California Floristic Province. The Central Coast Floristic Province typically supports only truly coastal communities, including salt marshes, coastal prairie, and coastal-sage scrub. The study area is within the San Francisco Bay Watershed, located where the Napa River enters north San Pablo Bay adjacent to Highway 37. Immediately upstream of the study area are large contiguous expanses of native and restored marshland comprising the Napa/Sonoma Marsh Restoration Area, which provides habitat for endangered salt marsh species and essential fisheries, as shown in **Figure 2, Study Area Detail**.

North Mare Island is characterized by industrial and manufacturing businesses. According to the *Draft City of Vallejo General Plan*, Mare Island north of G Street is a major employment center home to industrial, light industrial, office/R&D, retail, and warehousing uses. The four parcels comprising the study area are owned by the City of Vallejo; the City also holds in public trust deed the shoreline salt marshes between the study area and the Napa River. Study area parcels do not currently support active commerce. Buildings and grounds are in a state of abandonment and decay decades after military base closure. Twenty-five structures occur in the study area among the four parcels; a twenty-sixth structure was destroyed in a recent fire. All structures occurring on Parcels XV-B(I) and XV-B(II) (eight in total) are owned by the U.S. Navy.

Landcover, Vegetation, and Wildlife Habitats

Vegetation within the study area was classified using California's expression of the National Vegetation Classification based on *A Manual of California Vegetation, Second Edition* (2009).

Developed

A majority of the study area was Developed land cover when it was an operational military facility. As such, much of the 152.6-acre site is comprised of a base layer of asphalt. However, over decades of neglect, it has experienced varying levels of decay from intact asphalt to compacted fill where asphalt has completed eroded away. Now, these formerly asphalted areas support varying amounts and types of vegetation growing through or atop the substrate. In such a state, the landcover is neither developed nor natural and is difficult to categorize. **Figure 3, Landcover Types** attempts to convey an accurate representation of current landcover conditions.

Twenty-five structures occur in the study area. A twenty-sixth structure burned completely in a recent fire. A bat habitat assessment found that these structures provide roosting habitat for bats (**Attachment B**; Swaim Biological, 2006b).

Service Layer Credits: USGS The National Map: National Boundaries Dataset, National Elevation Dataset, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; U.S. Census Bureau - TIGER/Line; HERE Road Data

Project Zeus
Mare Island - Vallejo, CA
Figure 1 - Study Area/USGS 7.5-minute Quadrangle

N

0 .5 1 2
Miles

Wetland Study Area

SBI
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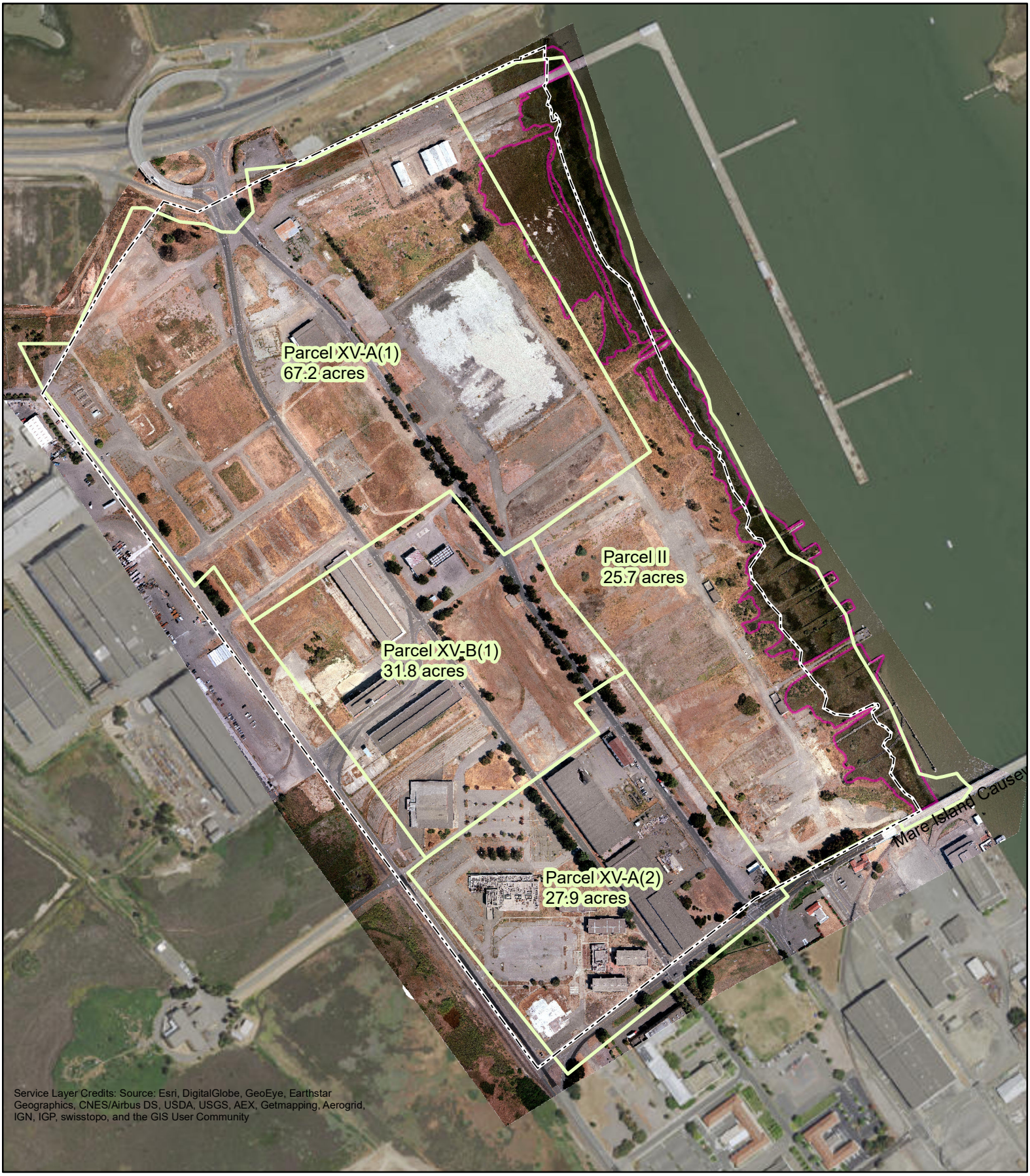

Reuse Area 1A Parcels
WetlandStudyArea
Napa River Adjacent Wetlands

N

0 250 500 1,000
Feet

Project Zeus
Mare Island - Vallejo, CA
Figure 2 - Study Area Detail

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Seasonally Ponded Areas
Study Area
All Other Areas: Asphalt over Fill (Bare to Vegetated)
Trees/ Shrubs/ Fennel
Pickleweed Mats Alliance
Established Dirt Roads
Ruderal Asphalt
Buildings
Paved Roads

N

0 295 590 1,180 Feet

Project Zeus
Mare Island - Vallejo, CA
Figure 3 - Landcover Types

SBI
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Upland Communities

Wild Oats Grassland, Upland Mustards, Annual Brome Grassland, Yellow Star-Thistle Fields, Knapweed and Purple-flowered Star-Thistle Fields, Fennel Patches, and Pampas Grass Patches

Most the 152.6-acre site is asphalt or compacted fill, and most often supports the growth of non-native upland vegetation. Upland plant communities grow through eroded asphalt and compacted ground, as well as in softer "fill" areas where a soil layer occurs over pavement. Compacted ground was present in a near-impermeable layer between 2 and 18 inches below the ground surface at all locations except within salt marshes. The upland species are a diverse hodge-podge that don't easily conform to the National Vegetation Classification, and would have been characterized as Ruderal or Non-native Grassland under previous classifications. Nonetheless, the community could be roughly characterized under the following classifications because these species are prevalent: Wild Oats Grassland (*Avena barbata, A. fatua*), Upland Mustards (*Brassica nigra* and other mustards), Annual Brome Grassland (*Bromus diandrus, B. hordeaceus*), Yellow Star-Thistle Fields (*Centaurea solstitialis, C. melitensis*), Knapweed and Purple-flowered Star-Thistle Fields (*Centaurea (virgata)*), Fennel Patches (*Foeniculum vulgare*), and Pampas Grass Patches (*Cortaderia (jubata, selloana*). Fennel Patches occur primarily along the upland boundary of the Public Trust marshes and in a dense field in the northeastern quadrant. Pampas Grass Patches occur primarily in the southeastern quadrant. The rest of the upland communities are broadly distributed across the study area.

Areas range from lightly to heavily vegetated, independent of ground surface material or soil depth. The following species were also observed within upland communities: *Acacia* species, Spanish lotus (*Acmispon americanus*), *Amaranthus* species, asparagus (*Asparagus officinalis*), Coyote brush (*Baccharis pilularis*), foxtail brome (*Bromus madritensis*), Italian thistle (*Carduus pycnocephalus*), purple star thistle (*Centaurea calcitrapa*), field bindweed (*Convolvulus arvensis*), turkey mullein (*Croton setigerus*), Bermuda grass (*Cynodon dactylon*), willowherb (*Epilobium ciliatum*), horseweed (*Erigeron* species), storksbill (*Erodium* species), blue-gum eucalyptus (*Eucalyptus globulus*), bristly ox-tongue (*Helminthotheca echiodies*), barley (*Hordeum marinum*), sharppoint fluvelin (*Kickxia elatine*), prickly lettuce (*Lactuca serriola*), burclover (*Medicago polymorpha*), *Phalaris* species, English plantain (*Plantago lanceolata*), knotweed (*Polygonum* species), dock (*Rumex* species), spiny sow thistle (*Sonchus asper*), vinegarweed (*Trichostemma lanceolatum*), and rose clover (*Trifolium hirtum*).

A Plant and Animal Species Compendium is included as **Attachment C**. Study area uplands were observed to support a variety of birds and the common mammals coyote (*Canis latrans*), opossum (*Didelphis virginiana*), feral cat (*Felis catus*), jackrabbit (*Lepus californicus*), California vole (*Microtus californicus*), mule deer (*Odocoileus hemionus*), raccoon (*Procyon lotor)*, brush rabbit (*Sylvilagus bachmani*), and grey fox (*Urocyon cinereoargenteus*). Special-status species observed using upland areas were white-tailed kite (*Elanus leucurus*), salt-marsh common yellowthroat (*Geothlypis trichas sinuosa*), San Pablo song sparrow (*Melospiza melodia samuelis*), and osprey (*Pandion haliaetus*).

Pickleweed Mats Alliance

Public Trust marshes bordering the Napa River along the eastern study area boundary contain dense native salt marsh vegetation characteristic of the *Sarcocornia pacifica*/*Salicornia depressa*

Pickleweed Mats Alliance, a CDFW-designated high-priority Natural Community formerly tracked by the CNDDB under the broader botanical designation of Northern Coastal Salt Marsh. Dominant vegetation within the marshes was pickleweed (*Sarcocornia pacifica*), Pacific cordgrass (*Spartina foliosa*), and fleshy jaumea (*Jaumea carnosa*), with lesser amounts of saltgrass (*Distichlis spicata*) and bulrush (*Schoenoplectus robustus*), and the least amounts of fat hen (*Atriplex prostrata*) and goosefoot (*Chenopodium album*). These marshes appear to be at least partially diked, resulting in some separation from tidal influence. However, the marshes are healthy and high-quality, supporting a dense robust cover of native salt marsh plants and no invasive plant species of note. In general, high-quality salt marshes in the North Bay provide habitat for the special-status California black rail (*Laterallus jamaicensis coturniculus*), Ridgway's rail (*Rallus obsoletus*), salt marsh harvest mouse (*Reithrodontomys raviventris halicoetes*), and Suisun shrew (*Sorex ornatus sinuosus*). The degree to which these marshes are influenced by tidal action may independently favor or disfavor each of these salt marsh species.

Wetlands and Aquatic Resources

Napa River

Napa River parallels Reuse Area 1A for a distance of approximately 0.67 mile, separated from Reuse Area 1A by the Public Trust marshes on Parcels II and XV-A(1). Napa River is an intrastate Traditional Navigable Waterway that is jurisdictional to the Corps, CDFW, RWQCB, and BCDC. Napa River is depicted most prominently in Figures 1 and 2.

Salt Marshes

Public Trust marshes occur on Parcels II and XV-A(1), and buffer the Napa River from Reuse Area 1A. Marshes are comprised of dense native salt marsh vegetation. Dominant vegetation consists of Pacific cordgrass (*Spartina foliosa*), pickleweed (*Sarcocornia pacifica*), and fleshy jaumea (*Jaumea carnosa*), with secondary species being bulrush (*Schoenoplectus robustus*), saltgrass (*Distichlis spicata*), fat hen (*Atriplex prostrata*) and goosefoot (*Chenopodium album*). These marshes, being situated adjacent to the Napa River, are "adjacent wetlands" jurisdictional to the Corps, CDFW, RWQCB, and BCDC. Approximately 18.6 acres of salt marsh occurs in the study area (Swaim Biological, 2016a).

Seasonally Ponded Areas

A total of 36 seasonally ponded areas were observed on Google Earth site imagery. Imagery from 1993 to March 2016 showed some of the areas repeatedly pond water during wet years and seasons. Ground-truthing found that these areas vary widely in character from unvegetated ponded pavement to compacted fill supporting the growth of hydrophitic plants. Some are used by birds and mammals during seasonal ponding, evidenced by their preserved tracks in the dried mud. Two of the features have seasonal surface water connectivity to adjacent marshes, while the remaining 34 are isolated. Approximately 6.18 acres of seasonally ponded areas occur over the four parcels (Swaim Biological, 2016a).

Seasonal Wetland

A 0.31-acre seasonal wetland occurs on Parcel XV-A(1) along the access road to the dock (Swaim Biological, 2016a). This isolated feature exhibits wetland vegetation, hydric soils, and wetland hydrology.

Special-status Species

A number of special-status plants and animals occur or have potential to occur on or near the study area. **Table 1- Focused List of Special-status Species that Occur or Have the Potential to Occur On or Adjacent to the Study area**, provides a quick-reference table of the most likely species to be encountered. A discussion of these species follows.

Plants

The potential for rare plants to occur on the site is questionable due to the artificial construction of Mare Island, a century of additional dredge and fill, and potential environmental contamination from U.S. military activities. The most promising habitat occurs in the native Pickleweed Mat Alliance that forms the Public Trust marshes. To a lesser extent, potentially-suitable habitat exists in the ruderal vegetation communities, since these were constructed from Napa River dredge spoils atop historic salt marsh. Soils apparently retain a high saline content, based on observed salt scalds. The potential for native plants to occur or persist in the seed bank is unlikely due to the fill material that comprises Mare Island, but seeds or propagules could have blown or washed in from neighboring upstream natural areas (see Figure 2). The distribution of special-status plants within similar habitat within 2 miles of the study area is depicted in **Figure 4, Special-status Plants**.

Federal and State Listed Species

Soft Bird's Beak (FE/CA Rare/1B.1)

Chloropyron molle ssp. *molle*. Soft bird's beak is a plant listed as endangered under the Federal Endangered Species Act. It is also designated as California Rare and a CRPR 1B.1 species. Soft bird's beak is an annual herb that grows in coastal salt marshes and swamps. Its blooming period occurs between July and September. An historic observation of soft bird's beak is documented in the Public Trust marshes, but may be extirpated (CDFW, 2016). Surveys conducted in marshes south of Mare Island Causeway in 1986, 1993, and 1994 did not observe the species (CDFW, 2016).

California Rare Plant Rank Species

As described in the regulatory section, CRPR is a designation granted jointly by the CNPS and CDFW. Rank 1A plants are presumed extirpated in California and rare or extinct elsewhere; Rank 1B plants are rare, threatened, or endangered in California and elsewhere; Rank 2A plants are presumed extirpated in California, but common elsewhere; and Rank 2B plants are rare, threatened, or endangered in California, but more common elsewhere. All of the plants meeting these CRPRs are eligible for state listing under the definitions of the California Endangered Species Act of the California Department of Fish and Game Code.

Mason's Lilaeopsis (1B.1)

Lilaeopsis masonii. Mason's lilaeopsis is a perennial rhizomatous herb listed as CRPR 1B.1. It grows in brackish or freshwater marshes and swamps, and in riparian scrub. It has a blooming period between April and November. Populations can be ephemeral, exploiting newly deposited or exposed sediments. Mason's lilaeopsis is documented to occur in marshes along Mare Strait on the eastern shore of the Napa River across from the study area and along shores of southeastern Mare Island approximately 2 miles south. These populations were documented in the mid-1990s and are presumed extant. Based on the proximity of known extant populations and

Table 1. Focused List of Special-status Species that Occur or have the Potential to Occur On or Adjacent to the Study Area

Scientific Name	Common Name	Status				Habitat	Potential for Occurrence
		FESA	CESA	CDFW	CNPS		
Plants							
Pickleweed Mat Alliance	Northern Coastal Salt Marsh	-	-	*	-	*Pickleweed Mat Alliance is designated as a Sensitive Natural Community by CDFW.	Observed in the study area Public Trust marshes.
Chloropyron molle ssp. *molle*	Soft bird's beak	E			1B.1 rare	Coastal salt marshes and swamps.	Suitable habitat occurs in the study area. Historic record in Public Trust marshes. Moderate to high potential to occur.
Fritilaria liliacea	Fragrant fritillary	-	-	-	1B.2	Coastal prairie, coastal scrub, valley and foothill grassland, cismontane woodland.	No native soils are present. Low potential to occur in study area uplands.
Isocoma arguta	Carquinez goldenbush	-	-	-	1B.1	Valley and foothill alkaline grassland.	No native soils are present. Low potential to occur in study area uplands.
Lathyrus jepsonii var. jepsonii	Delta tule pea	-	-	-	1B.2	Brackish or freshwater marshes and swamps.	Potentially suitable habitat occurs. Moderate to high potential to occur in the Public Trust marshes.
Liliaeopsis masonii	Mason's liliaeopsis	-	-	-	1B.1	Brackish or freshwater marshes and swamps. Riparian scrub.	Potentially suitable habitat occurs. Moderate to high potential to occur in the Public Trust marshes.
Senecio aphanactis	Chaparral ragwort	-	-	-	1B.2	Coastal scrub, chaparral, cismontane woodland.	Very minimal coastal scrub occurs at the wetland-upland boundary. Low potential to occur in study area due to lack of habitat and native soils.
Invertebrates							
Danaus plexippus	Monarch butterfly	-	-	*		*Overwintering groves are protected by CDFW.	Overwintering groves are documented on Mare Island less than 1 mile from the study area. Numerous butterflies, including monarchs, were observed during the site assessment. However, conditions are dissimilar enough that trees on the study area are not likely to be used as overwintering groves.

Table 1. Focused List of Special-status Species that Occur or have the Potential to Occur On or Adjacent to the Study Area

Scientific Name	Common Name	Status				Habitat	Potential for Occurrence
		FESA	CESA	CDFW	CNPS		
Fish							
Acipenser transmontanus	White sturgeon	-	-	SSC		San Francisco Estuary	Present in Napa River Watershed; likely present in Mare Island Strait.
Cottus gulosus	Riffle sculpin	-	-	SSC		San Francisco Estuary	Present in Napa River Watershed; likely present in Mare Island Strait.
Entosphenus tridentatus	Pacific lamprey	-	-	SSC		San Francisco Estuary	Present in Napa River Watershed; likely present in Mare Island Strait.
Hypomesus transpacificus	Delta smelt	T	E	-		San Francisco Estuary	Present in Napa River/Mare Island Strait.
Lampetra ayresii	River lamprey	-	-	SSC		San Francisco Estuary	Present in Napa River Watershed; likely present in Mare Island Strait.
Mylopharadon conocephalus	Hardhead	-	-	SSC		San Francisco Estuary	Present in Napa River Watershed; likely present in Mare Island Strait.
Oncorhynchus mykiss irideus	Central California Coast steelhead	E	T			San Francisco Estuary	Present in Mare Island Strait, Napa River, Napa River East Branch, and Napa-Sonoma Marsh complex.
Oncorhynchus tshawytscha	Fall-run Chinoook Salmon	-	-	SSC		San Francisco Estuary	Present in Napa River Watershed; likely present in Mare Island Strait.
Pogonichthys macrolepidotus	Sacramento splittail	-	-	SSC		San Francisco Estuary	Present in Napa River Watershed; likely present in Mare Island Strait.
Spirinchus thaleichthys	Longfin smelt	C	T	SSC		San Francisco Estuary	Present in Mare Island Strait, Napa River, and North San Pablo Bay.
Birds							
Ardea herodius	Great blue heron (rookery)	-	-	CSC		Rookeries are found in large trees near marshland foraging habitat.	Rookeries occur on Mare Island. Rookeries were not observed in the study area.

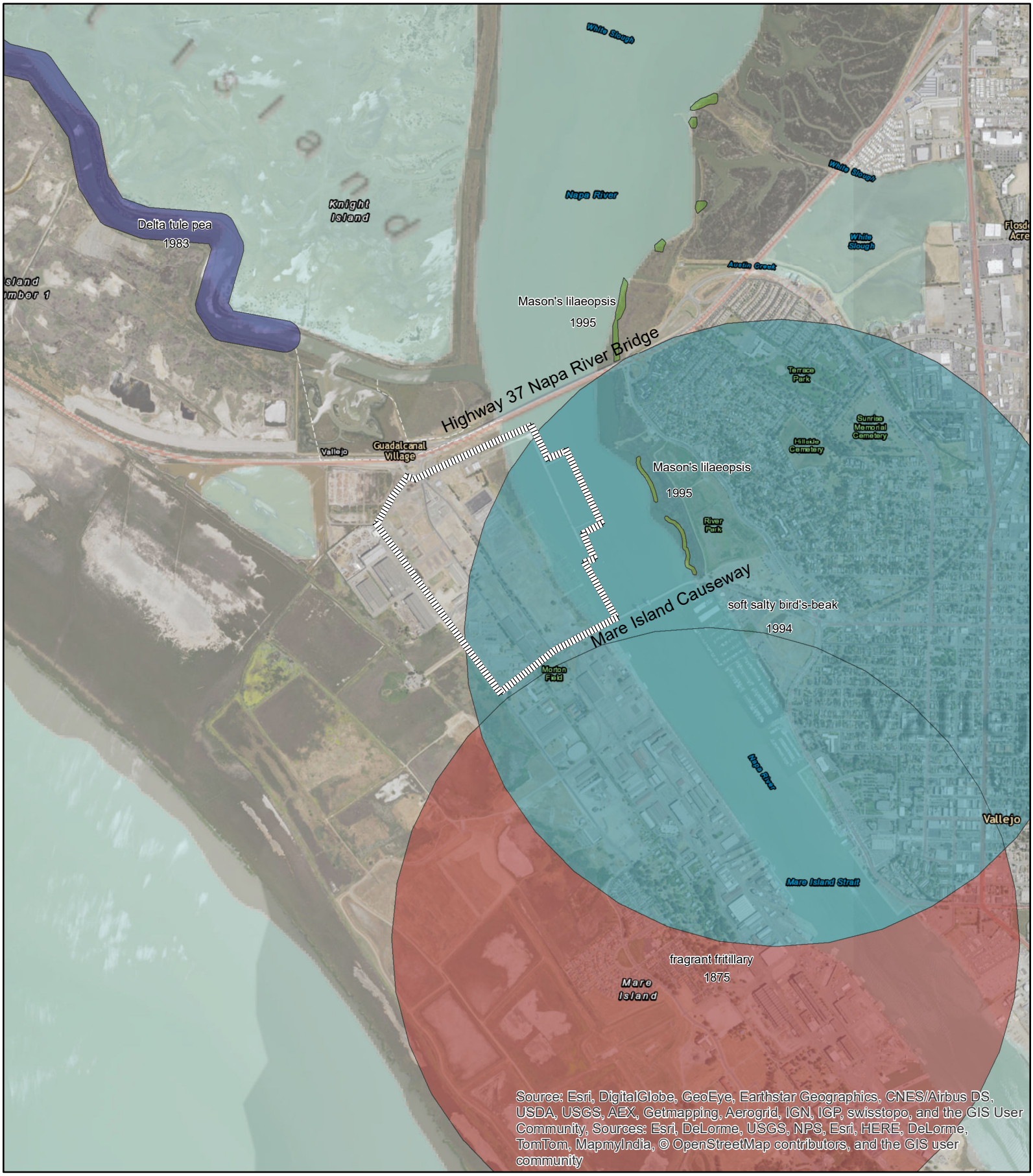
Table 1. Focused List of Special-status Species that Occur or have the Potential to Occur On or Adjacent to the Study Area

Scientific Name	Common Name	Status				Habitat	Potential for Occurrence
		FESA	CESA	CDFW	CNPS		
Geothlypis trichas sinuosa	Saltmarsh common yellowthroat	-	-	CSC		Resident of the San Francisco Bay region, in fresh and saltwater marshes. Requires thick, continuous cover down to water surface for foraging; tall grasses, tule patches, willows for nesting.	Present. Observed along the upland-wetland boundary during the site assessment.
Laterallus jamaicensis coturniculus	California black rail	-	T	FP		Inhabits freshwater marshes, wet meadows, and shallow margins of saltwater marshes bordering larger bays.	Present in marshes upstream and downstream of the study area. High potential to occur in the Public Trust marshes.
Melospiza melodia samuelis	San Pablo song sparrow	-	-	CSC		Resident of salt marshes along the north side of San Francisco and San Pablo Bays.	Present. Observed along the upland-wetland boundary during the site assessment.
Pandion haliaetus	Osprey (nesting)	-	-	CSC		San Francisco Bay Estuary.	Present. A nest platform, used this year by nesting ospreys, is located west of the Highway 37 off-ramp onto Walnut Ave.
Rallus obsoletus	Ridgway's rail (formerly California clapper rail)	E	E	-		Salt-water and brackish marshes traversed by tidal sloughs in the vicinity of San Francisco Bay.	Present in Pritchard's Marsh north of and contiguous with the Public Trust marshes, and in marshes upstream and downstream of the study area. High potential to occur in the Public Trust marshes.
Xanthocxephalus xanthocephalus	Yellow-headed blackbird	-	-	SSC		Sizeable freshwater marshes with dense cattails or bulrushes.	No suitable habitat.
Mammals							
Antrozous pallidus	Pallid bat	-	-	SSC		Forest and woodland habitats or habitat mosaics, with access to trees for cover & open areas or habitat edges for feeding.	Potentially present according to the results of the preliminary Bat Habitat Assessment.

Table 1. Focused List of Special-status Species that Occur or have the Potential to Occur On or Adjacent to the Study Area

Scientific Name	Common Name	Status				Habitat	Potential for Occurrence
		FESA	CESA	CDFW	CNPS		
Corynorhinus townsendii	Townsend's big-eared bat	-	CT	SSC		Throughout California in a wide variety of habitats. Most common in mesic sites. Roosts in the open, hanging from walls & ceilings. Roosting sites limiting. Extremely sensitive to human disturbance.	Potentially present according to the results of the preliminary Bat Habitat Assessment.
Reithrodontomys raviventris	Salt-marsh harvest mouse	E	E	FP		Saline emergent wetlands of San Francisco Bay and its tributaries.	Present in northern Public Trust marsh (per CNDDB).
Sorex ornatus sinuosus	Suisun shrew	-	-	SSC		Saline emergent wetlands of San Francisco Bay and its tributaries.	Suitable habitat occurs in the study area. Likely present in Public Trust marshes.

***Status: Federal Designations:** (E) Federally Endangered, (T) Federally Threatened, (CT) Candidate Threatened. **State Designations:** (E) State Endangered, (T) State Threatened, (CT) Candidate Threatened, (R) State Rare. **California Department of Fish and Wildlife (CDFW) Designations:**(SSC) Species of Special Concern, (FP) Fully Protected Species



Study Area

Special-status Plants within 2 Miles

- Delta tule pea
- Mason's lilaeopsis
- fragrant fritillary
- soft salty bird's-beak

N

0 .25 .5 1 Miles

Project Zeus
Mare Island - Vallejo, CA
Figure 4 - Special-status Plants within 2 Miles

SBI
Swaim Biological Inc.

the presence of potentially suitable habitat, Mason's lilaeopsis has a moderate to high potential to occur in the Public Trust marshes.

Delta Tule Pea (1B.2)

Lathyrus jepsonii var. *jepsonii.* Delta tule pea is a perennial herb listed as CRPR 1B.2. It grows in brackish or freshwater marshes and swamps. It has a blooming period between May and September. Most populations are small and threatened by erosion. Delta tule pea is documented to occur in the Cullinan Ranch/Dutchman Slough/South Slough area just upstream from the study area near Guadalcanal Village. The occurrence/s were documented in the late 1980s and is presumed extant. Based on the proximity of known extant populations and the presence of potentially suitable habitat, Delta tule pea has a moderate to high potential to occur in the Public Trust marshes.

Fragrant Fritillary (1B.2)

Fritillaria liliacea. Fragrant fritillary is a perennial bulbiferous herb listed as CRPR 1B.2. It grows in a variety of vegetation communities: coastal prairie, coastal scrub, valley and foothill grassland, and cismontane woodland. It is often associated with serpentine soils. It has a blooming period between February and April. An historic 1875 occurrence is documented on Mare Island. Fragrant fritillary has a low potential to occur in the ruderal upland habitat on the study area due to the lack of serpentine soils and large distance from extant occurrences.

Chaparral ragwort (1B.2)

Senecio aphanactis. Chaparral ragwort is an annual herb listed as CRPR 1B.2. It grows in coastal scrub, chaparral, and cismontane woodland, sometimes in alkaline soil. It has a blooming period between January and May. An historic 1874 occurrence is documented on Mare Island. Chaparral ragwort has a low potential to occur in uplands on the study area based on the large distance from extant occurrences and the historic and geographically vague location of the Mare Island occurrence.

Carquinez Goldenbush (1B.1)

Isocoma arguta. Carquinez goldenbush is a perennial shrub listed as CRPR 1B.2. It grows in valley and foothill alkaline grassland, and has a blooming period between August and December. It is a California endemic known only from Solano County. An undated historic occurrence is documented on both shorelines of the Carquinez Straights. Carquinez goldenbush has a low potential to occur in ruderal uplands on the study area based on the distance from extant occurrences and the historic and geographically-uncertain nature of the nearby occurrence.

Animals

Several special-status animals occur on or near the study area. **Figure 5, Special-status Animals by Taxonomy** depicts the locations of special-status species within 2 miles of study area by their life form: invertebrate, fish, amphibian or reptile, bird, and mammal. This is helpful due to mobility differences among the various taxa and their corresponding likelihood to be encountered in the study area: broadly speaking, plants are immobile, invertebrates don't range far, fish are restricted to rivers and sometimes adjacent marshes, mammals require movement corridors between patches of suitable habitat and small mammals don't range as far as large mammals, and birds exhibit relatively ubiquitous mobility. Special-status animals and their potential for occurrence in the study area are described below.

Federal and State Listed Species

Several species listed under the Federal Endangered Species Act, the California Endangered Species Act, or both, occur on or near the study area. **Figure 6, Special-status Animals by Listing Status**, depicts the locations of listed species and State Species of Special Concern within 2 miles of the study area. This is helpful in understanding the potential redevelopment constraints related to each species: generally speaking, species listed under federal and/or state Endangered Species Acts have more impact restrictions than State Species of Special Concern (e.g., design avoidance, habitat compensation, seasonal construction windows, biological monitoring during construction, post-project monitoring).

Delta Smelt (FT, SE)

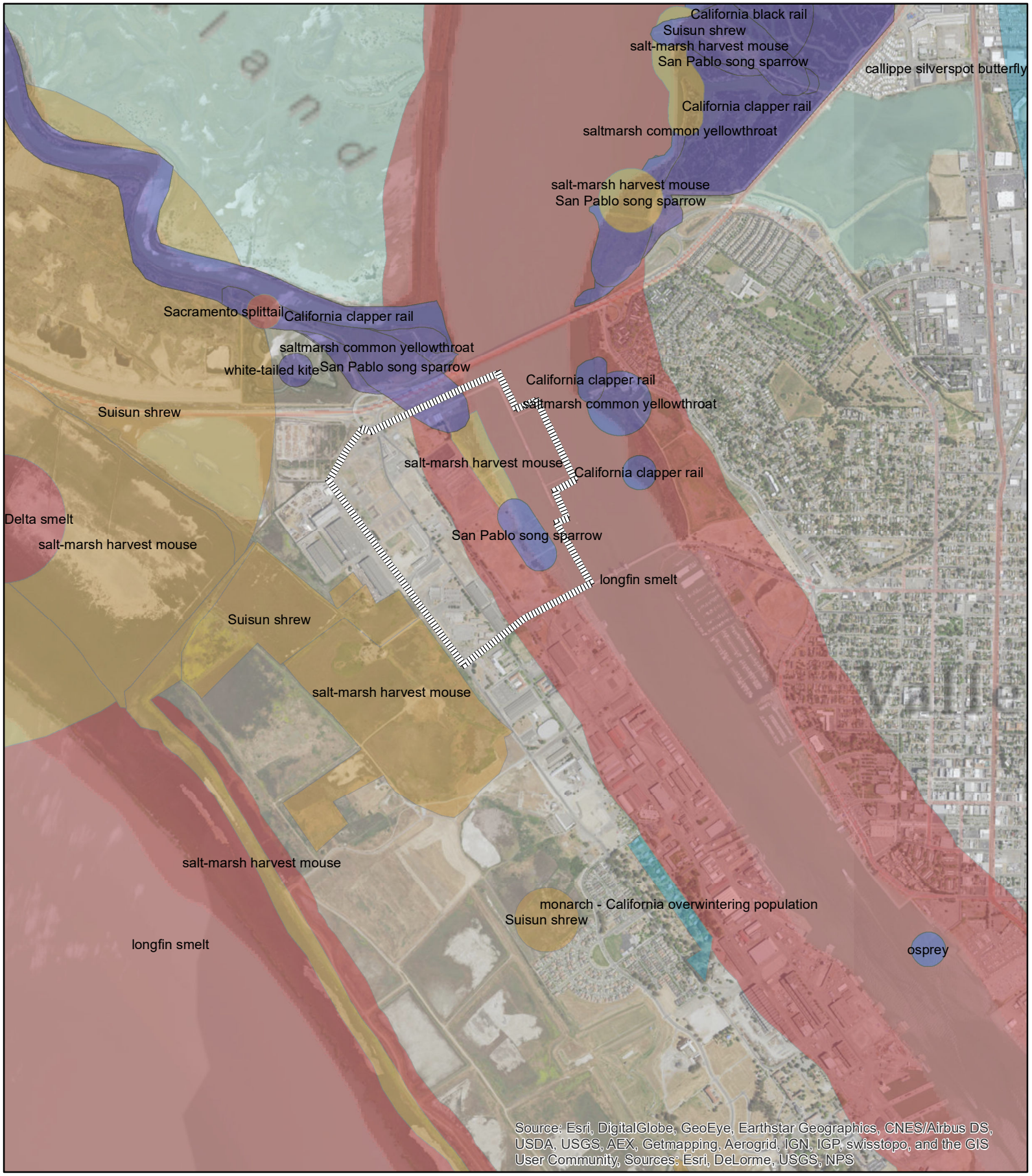
Hypomesus transpacificus. The Delta smelt is a small, slender-bodied fish approximately 2.0 to 2.8 inches long. It is endemic to the upper Sacramento-San Joaquin Estuary, with its historic western range encompassing San Pablo Bay including Mare Island Strait. It mainly inhabits the Estuary's freshwater-saltwater mixing zone in the open water column, except during spawning when it migrates upstream to fresh water. It functions as an indicator species for the overall health of the Estuary ecosystem, but is so critically endangered that it is considered possibly "functionally extinct" in the wild (SFEP, 2015). Delta smelt is documented to occur as a resident fish in Mare Strait, Napa River, and the Napa-Sonoma Marsh complex. The distribution of special-status fish documented to occur within 2 miles of the study area is depicted in **Figure 7, Special-Status Fishes within 2 Miles**.

Central California Coast Steelhead (FE/ST)

Oncorhynchus mykiss irideus. Central California Coast steelhead is documented to occur in Mare Island Strait, Napa River, Napa River East Branch, and the Napa-Sonoma Marsh complex. Steelhead from different parts of their range exhibit distinct ecological traits and genetic characteristics, forming Distinct Population Segments (DPSs) such as the Central California Coast DPS. The steelhead life cycle nvolves three main stages: adult spawning and larval development in freshwater or low-salinity streams and rivers; juvenile migration from natal streams to the ocean; and growth and maturation of adult oceanic steelhead. Typically, freshwater juvenile stages last up to two years and the entire life cycle up to five years.

Longfin Smelt (FC, ST, SSC)

Spirinchus thaleichthys. Longfin smelt is a small open water estuarine fish that spends its adult life in bays, estuaries, and nearshore coastal areas. They migrate into freshwater or low salinity rivers to spawn. Spawning typically occurs from January through March, after which most adults die at the end of a brief two-year lifespan. Larvae are able to swim vertically through the water column, and remain in freshwater-saltwater mixing zones. Longfin smelt is documented to occur in North San Pablo Bay including Mare Island Straight upstream to the Napa River.



Study Area

Special-status Animals (CNDDB) by Taxonomy

- Amphibian
- Bird
- Fish
- Invertebrate
- Mammal

N

0 .25 .5 1 Miles

Project Zeus
Mare Island - Vallejo, CA
Figure 5 - Special-Status Animals within 2 Miles (by Taxonomy)

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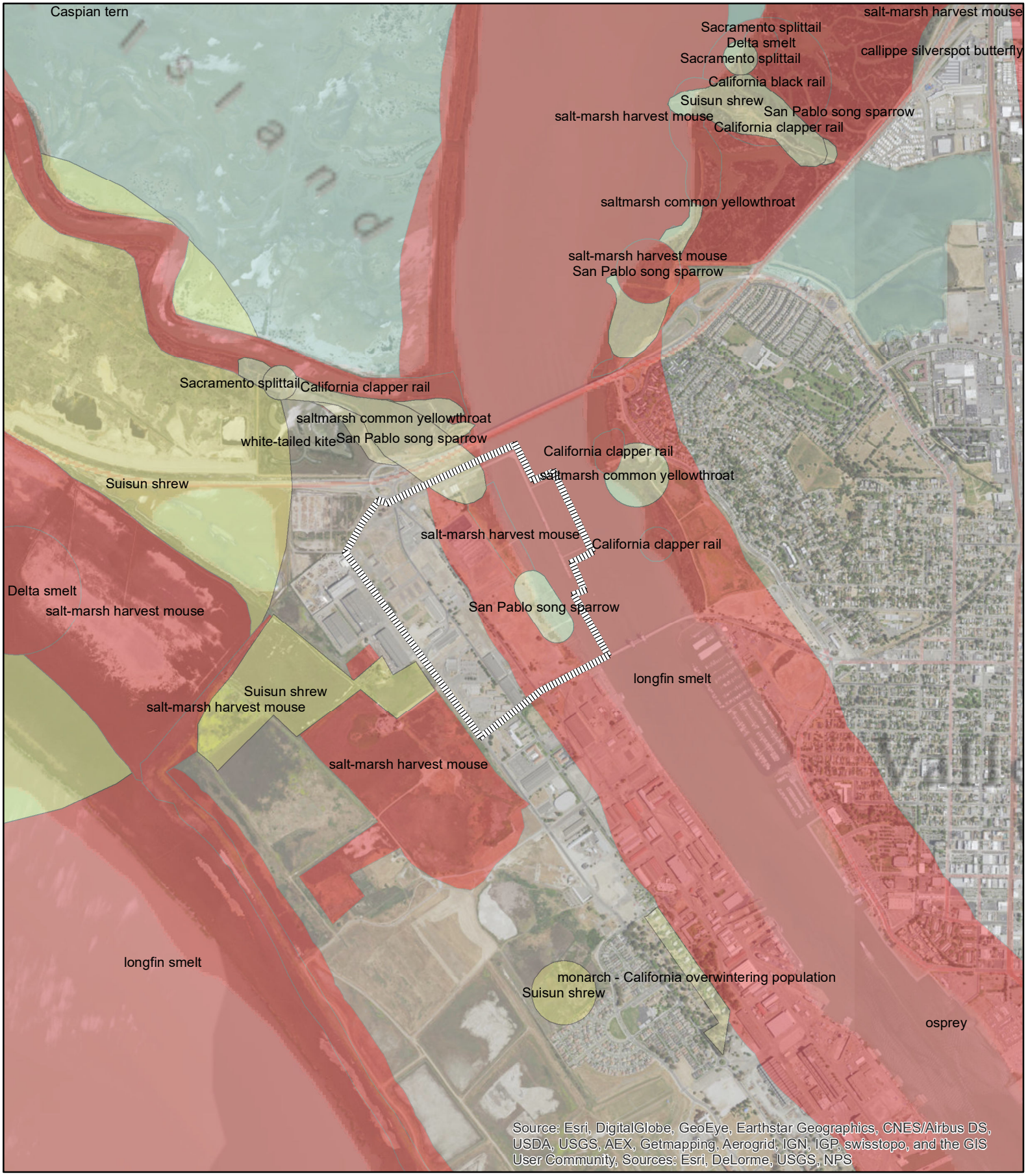

Project Zeus
Mare Island - Vallejo, CA
Figure 6 - Special-status Animals within 2 Miles (by Listing Status)

Study Area

Listing Status

- FESA/CESA Listed or Candidate Species
- CA Critically Imperiled Species
- CA Vulnerable Species

N

0 .25 .5 1 Miles

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Study Area

CNDDB Data

- Delta Smelt
- Sacramento Splittail
- Longfin Smelt
- Steelhead CCC DPS

NMFS Data

- Chinook Salmon (winter)
- Delta Smelt
- Steelhead

N

0 .25 .5 1 Miles

Project Zeus
Mare Island - Vallejo, CA
Figure 7 - Special-Status Fishes within 2 Miles

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Ridgway's Rail (FE, SE)

Rallus obsoletus. Until recently Ridgway's rail was considered a subspecies of clapper rail, but is now recognized as a closely related but separate species. They forage along the upper ecotone of mudflats and tidal sloughs, foraging on snails, worms, small fish, arthropods, mussels, clams, and occasionally small mammals. The presence of vegetative cover during high tide is required, usually found among emergent pickleweed and cordgrass. Breeding occurs from mid-March to August, peaking in June. Ridgway's rail is documented to occur in Pritchard's Marsh, which is just on the northwest side of the Highway 37 Napa River Bridge. Pritchard's Marsh is contiguous with onsite marshes, as Highway 37 is elevated above the marsh at this location. Ridgway's rail is also documented across Mare Island Strait directly across from the study area, in marshes between Napa River and River Park. Public Trust marshes, while being relatively narrow strips of habitat along the river, are similar in size, shape, and location to those marshes. Presumably, vegetative conditions are also similar. Ridgway's rail has a high potential to occur in the Public Trust marshes based on nearby occurrences and the presence of suitable habitat. The distribution of special-status salt marsh species documented to occur within 2 miles of the study area is depicted in **Figure 8, Special-status Salt Marsh Species**.

California Black Rail (ST, FP)

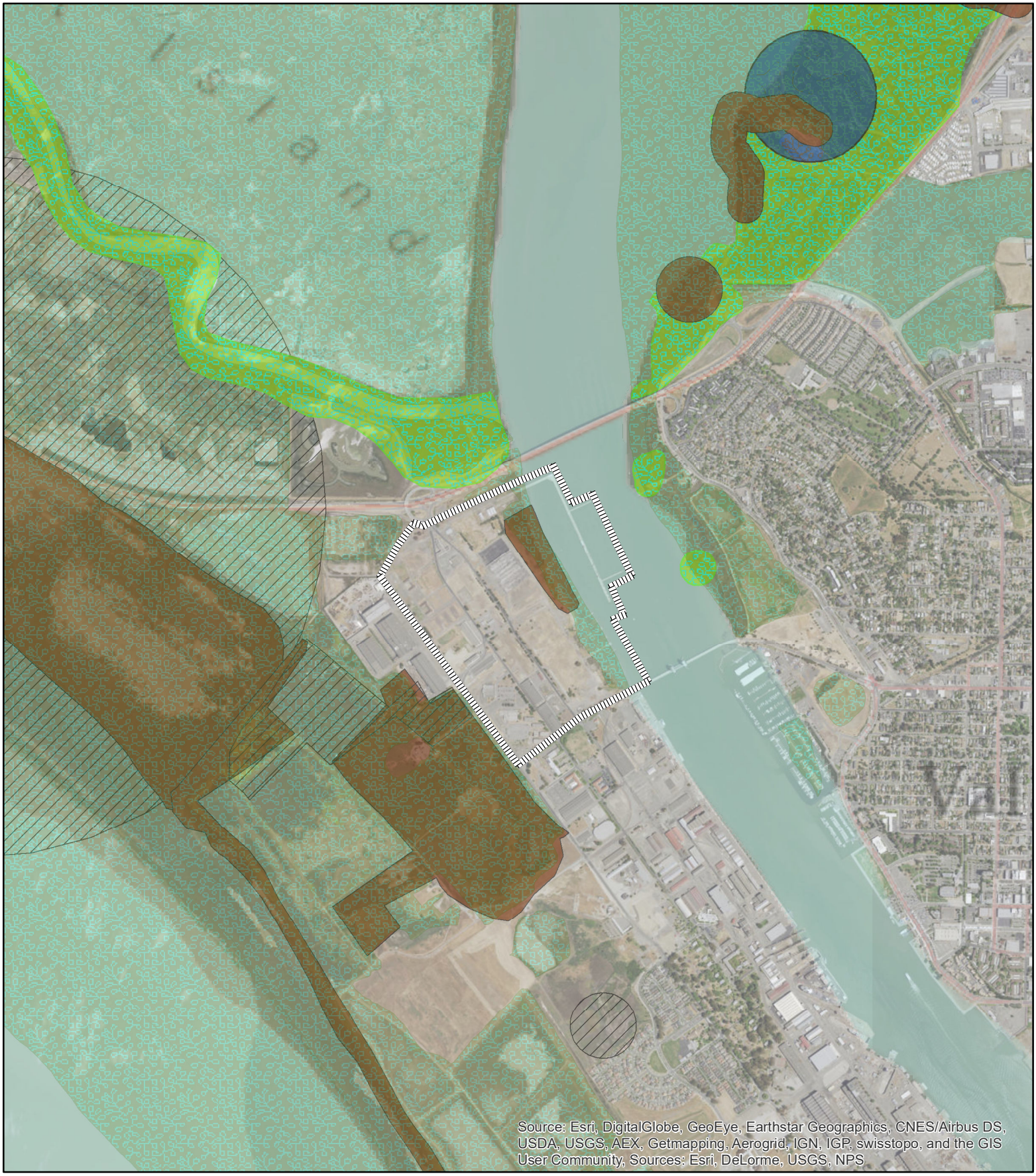
Laterallus jamaicensis coturniculus. California black rail is a small rail (the smallest in North America) usually found in salt marshes but occasionally in freshwater marshes. They feed primarily on tidal invertebrates but also on marsh plant seeds, and move furtively among dense vegetation. California black rail is documented to occur across Mare Island Strait a little over a mile northeast of the study area. California black rail often occurs in the same marshes as Ridgway's rail, with which they share many habitat preferences. California black rail has a high potential to occur in the Public Trust marshes based on the nearby occurrence and the presence of suitable habitat.

Salt Marsh Harvest Mouse (FE, SE, FP)

Reithrodontomys raviventris halicoetes. Salt marsh harvest mouse is endemic to San Francisco Bay Area salt marshes, with a northern and a southern subspecies. The northern subspecies inhabits the northern marshes of the bay and is said to be lighter in color. This nocturnal mouse is a competent swimmer, utilizes ground runways of other rodents, and is a skilled climber. It is tolerant of salt water in its diet, and the northern subspecies can survive solely on salt water. It eats seeds and plants, notably pickleweed, and will forage in uplands up to 300 feet from inhabited marshes. The presence of salt marsh harvest mouse in the northern (diked) Public Trust marsh was documented in 1992. It is unknown if only the northern marsh was surveyed in 1992, but the southern portion is undiked and thus subject to more direct wave action. **Figure 9, Salt Marsh Harvest Mouse Habitat** depicts the potential extent of suitable marsh and adjacent upland habitat in the study area.

Townsend's Big-eared Bat (Candidate State Threatened)

Corynorhinus townsendii. A bat habitat assessment was conducted to preliminarily evaluate all potential roosting and foraging habitat on the site (Swaim Biological, Inc., 2016b). The Public Trust marshes and expansive regional marshes provide ample foraging habitat for insectivorous bats. **Figure 10, Structures with Bat Sign**, identifies



Study Area

Coastal Wetlands

Rare Salt Marsh Animals

California Black Rail

Ridgway's Rail (=California Clapper Rail)

Suisun Shrew

Salt Marsh Harvest Mouse

N

0 .25 .5 1 Miles

Project Zeus

Mare Island - Vallejo, CA

Figure 8 - Special-Status Salt Marsh Species

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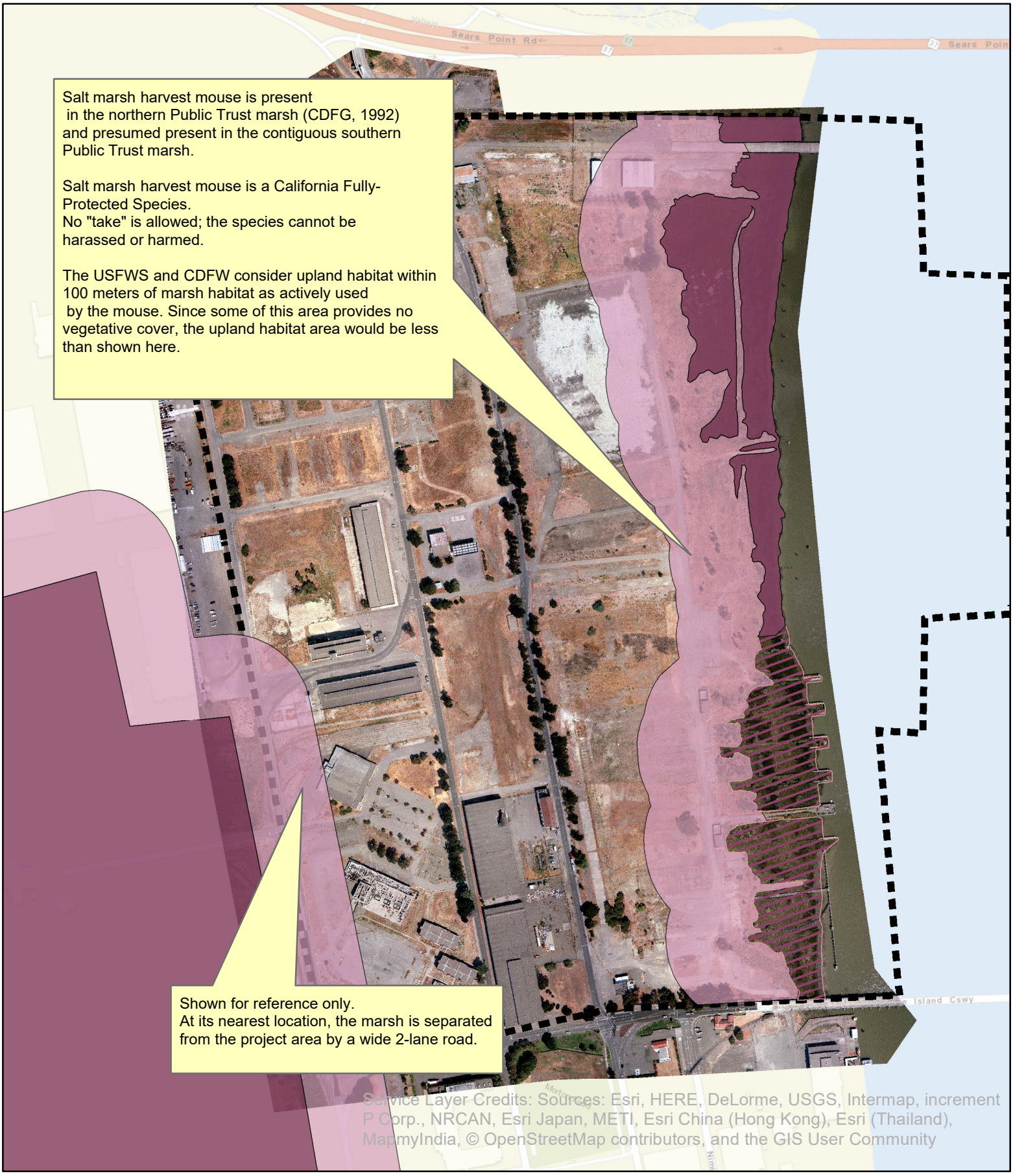

SMHM 100m Upland Buffer
Habitat Occupied by SMHM (CDFG, 1992)*
Habitat where SMHM is Presumed Present
Project Area

0 250 500 1,000
Feet

Project Zeus
Mare Island - Vallejo, CA
Figure 9- Salt Marsh Harvest Mouse Upland Habitat

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Buildings With Bat Sign Observed

499- Large guano piles.
503- Large guano piles.
571- Large guano piles.
577- Few guano pellets.
589- Few guano pellets.
593- Few guano pellets.
601- Large guano piles.
673- Some guano pellets.
791- Some guano pellets.
897- Large guano piles.
993- Few guano pellets.
995- Some guano pellets.
997- Some guano pellets.
1001- Some guano pellets.

Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Structures Assessed for Bat Habitat and Sign

Bat Sign Observed?

- No. No Additional Surveys Recommended.
- Yes. Recommend Acoustic Surveys and Guano-DNA Sampling.

N

0 250 500 1,000 Feet

Project Zeus
Mare Island - Vallejo, CA
Figure 10 - Structures with Bat Sign

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site structures containing bat sign (e.g. guano, urine staining) at the time of the assessment. Of the 25 structures, bat sign was observed in 15. Seven structures exhibited large piles of guano, indicating potential use as a maternal roost, day roost, or night roost. Guano inspection suggested the presence of multiple bat species and strong potential for the presence of Townsend's big-eared bat.

CDFW Special-status Species

Fully Protected

The Regulatory section describes CDFW's "Fully Protected" designation. The California black rail and salt marsh harvest mouse, both listed under Endangered Species Acts and previously described, are also California Fully Protected Species. No "take authorization" (permission to harass, pursue, or accidentally injure or kill while conducting an otherwise lawful activity [e.g., project construction]) can be granted for Fully Protected Species. This means that all reasonable and prudent measures suggested by CDFW must be implemented for protection of the species, and no individual animal can be injured or harmed as a result of project construction or operation. While protection does not extend to the species' habitats, compensation for affected habitat is expected.

White-tailed Kite (FP)

Elanus leucurus. White-tailed kite is another Fully Protected Species that has potential to occur on or near the study area. Many white-tailed kites are residents in the Bay Area, while others are migratory. They may regularly congregate each autumn in favored trees, comprising groups of tens of individuals. During the breeding season they choose to nest in the very tops of [usually] round-crowned trees, making nest observation especially challenging.

Species of Special Concern

Fishes

A number of Species of Special Concern fishes occur in the Napa River Watershed and could potentially be encountered in Mare Straight: Sacramento splittail (*Pogonichthys macrolepidotus*), Fall-run Chinook salmon (*Oncorhynchus tshawytscha*), white sturgeon (*Acipenser transmontanus*), riffle sculpin (*Cottus gulosus*), hardhead (*Mylopharadon conocephalus*), Pacific lamprey (*Entosphenus tridentatus*), and river lamprey (*Lampetra ayresii*). A subset of these fishes is found in shallow waters and sloughs, and could be encountered in tidal areas of the Public Trust marshes.

Osprey (nesting)

Pandion haliaetus. Osprey are designated by CDFW as a Species of Special Concern, and their nests are protected by federal and state laws. A constructed nest platform occurs on Parcel XV-A(1) west of the Highway 37 off-ramp onto Walnut Avenue, as shown on Figure 7. It was likely constructed to discourage osprey from nesting on nearby wooden utility poles. The nest is protected year-round.

Great Blue Heron (rookery)

Ardea herodias. Great blue heron are designated by CDFW as a Species of Special Concern, and their rookeries are protected by federal and state laws. A rookery is a group

nesting site, usually found in a large tree such as eucalyptus growing near wetland foraging habitat. Great blue heron rookeries are documented to occur on south Mare Island and across the Mare Island Strait, both at a distance of approximately 2.5 miles from the study area. No rookery was observed on the study area during the August 2016 site assessment.

Suisun Shrew

Sorex ornatus sinuosus. Suisun shrew is a nearly black shrew that is the darkest subspecies of ornate shrew, with *S. o. sinuousis* occupying salt marshes in the North Bay while other subspecies occupy South Bay salt marshes and upland habitats. The subspecies occurs in tidal and brackish marshes of North San Pablo Bay and Suisun Bay. Diet is thought to consist of invertebrates including insects, isopods, and amphipods. Suisun shrew is designated by CDFW as a Species of Special Concern. Due to similarities in habitat requirements to the salt marsh harvest mouse, marshes that support salt marsh harvest mouse also have a high potential to support the Suisun shrew. Suisun shrew is documented to occur in marshes bordering the east side of Reuse Area 1A, as shown in Figure 8, Special-Status Salt Marsh Species. It is unknown if surveys efforts have ever been performed in Pritchard's Marsh or Public Trust marshes, but the species is unlikely to originate from eastern marshes due to the lack of a suitably-vegetated movement corridor between habitats.

Pallid Bat

Antrozous pallidus. Pallid bats are relatively large bats, at a total body length of around 4.5 inches and a weight of up to 25 grams. They are often found in arid, semi-arid, and grassland habitats near water, choosing night roosts that are close to their foraging grounds. Buildings are often used during winter bouts of torpor. Pallid bats are insectivorous and conspicuous insect parts are often visible in guano piles. Mating occurs between October and February, with females birthing one or two pups in June. Pallid bat is designated by CDFW as a Species of Special Concern. A bat habitat assessment was conducted to preliminarily evaluate all potential roosting and foraging habitat on the site (Swaim Biological, Inc., 2016b). The Public Trust marshes and expansive regional marshes provide ample foraging habitat for insectivorous bats. Figure 11 identifies which of the 25 site structures contained bat sign (e.g. guano, urine staining) at the time of the assessment. Of the 25 structures, bat sign was observed in 15. Seven structures exhibited large piles of guano, indicating potential use as a maternal roost, day roost, or night roost. Guano inspection suggested the presence of multiple bat species and strong potential for the presence of pallid bat.

Salt Marsh Common Yellowthroat

Geothlypis trichas sinuosa. Despite its misleading common name, the salt marsh common yellowthroat is a vulnerable bird designated by CDFW as a Species of Special Concern. They forage and nest in salt marshes and adjacent uplands. Salt marsh common yellowthroat was observed during the site assessment as an individual foraged among fennel plants at the edge of the Public Trust marshes. Salt marsh common yellowthroat may be encountered anywhere on the study area.

San Pablo Song Sparrow

Melospiza melodia samuelis. San Pablo song sparrow is a vulnerable bird designated by CDFW as a Species of Special Concern. They forage and nest in salt marshes and adjacent uplands. San Pablo song sparrows were observed during the site assessment foraging among fennel and coyote brush at the edge of the Public Trust marshes. San Pablo song sparrow may be encountered anywhere on the study area. The discussion presented for salt marsh common yellowthroat is entirely applicable to San Pablo song sparrow.

Yellow-headed Blackbird

Xanthocephalus xanthocephalus. Yellow-headed blackbird is a vulnerable bird designated by CDFW as a Species of Special Concern. They nest in cattail and bulrush marshes. Yellow-headed blackbird was not observed during the site assessment. Due to the absence of expansive cattail or bulrush marshes favored by this species for nesting, this species is not likely to be encountered on the study area. However, if nesting yellow-headed blackbirds were encountered, the discussion presented for salt marsh common yellowthroat would be entirely applicable to yellow-headed blackbird.

Representative Photos

Representative Photos of Parcel XV-A (I). 67.2 acres.

Ruderal uplands growing through eroded asphalt.

Former baseball field. Ruderal upland with sporadic *Rumex*.

Ruderal upland with occasional *Salsola soda.* Highway 37 can be seen in the background.

Eroding asphalt areas with little to no vegetation growing through.

Ruderal uplands.

Mixed ruderal uplands and intermittent *Salsola soda* amid a deep layer of wood chips overlaid on old asphalt.

A matrix of ruderal uplands, eroded asphalt, bare ground, and saline scald. Water ponds in low spots.

A matrix of ruderal uplands, eroding asphalt, and bare ground. Water ponds in low spots.

Study area western boundary: Railroad Spur/Azuar Drive, view to the west of Parcel XV-A(1).

Representative Photos of Parcel XV-A (2). 27.9 acres.

This parcel is the most developed. Some ruderal upland vegetation grows through asphalt.

This parcel has extensive asphalt.

This parcel has extensive asphalt and some trees.

This is the only notable vegetated area on this parcel. Water ponds in the low spot visible in upper right.

Representative Photos of Parcel XV-B (I). 31.8 acres.

This is characteristic of areas between Walnut Ave and Railroad Ave, a matrix of ruderal uplands, bare ground, seasonally ponded low spots with hydrophitic annual vegetation, and extremely compacted fill.

Same as above.

This area seasonally ponds water and supports hydrophitic annual vegetation; *Juncus bufonius* and *Cressa truxilensis*, both facultative wetland plants, were observed in their dry states.

Extensive eroding asphalt with some ruderal upland vegetation growing through.

Extensive eroding asphalt with some ruderal upland vegetation growing through.

Representative Photos of Parcel II. 25.7 acres.

This parcel most intimately borders the adjacent Public Trust marshes. The parcel is ruderal uplands.

Ruderal uplands with an asphalt underlay in many locations; the green area is invasive Bermuda grass.

Watch your step! Several structures provide access to the groundwater table. Note bare ground and scalds.

A matrix of eroded asphalt, bare ground, and ruderal upland vegetation.

A matrix of eroded asphalt, bare ground, and ruderal upland vegetation.

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Attachments

A. Preliminary Delineation of Waters of the U.S.

B. Bat Habitat Assessment for Mare Island Parcels XV-A(1), XV-A(2), XV-B(I), and II.

C. Plant and Animal Species Compendium

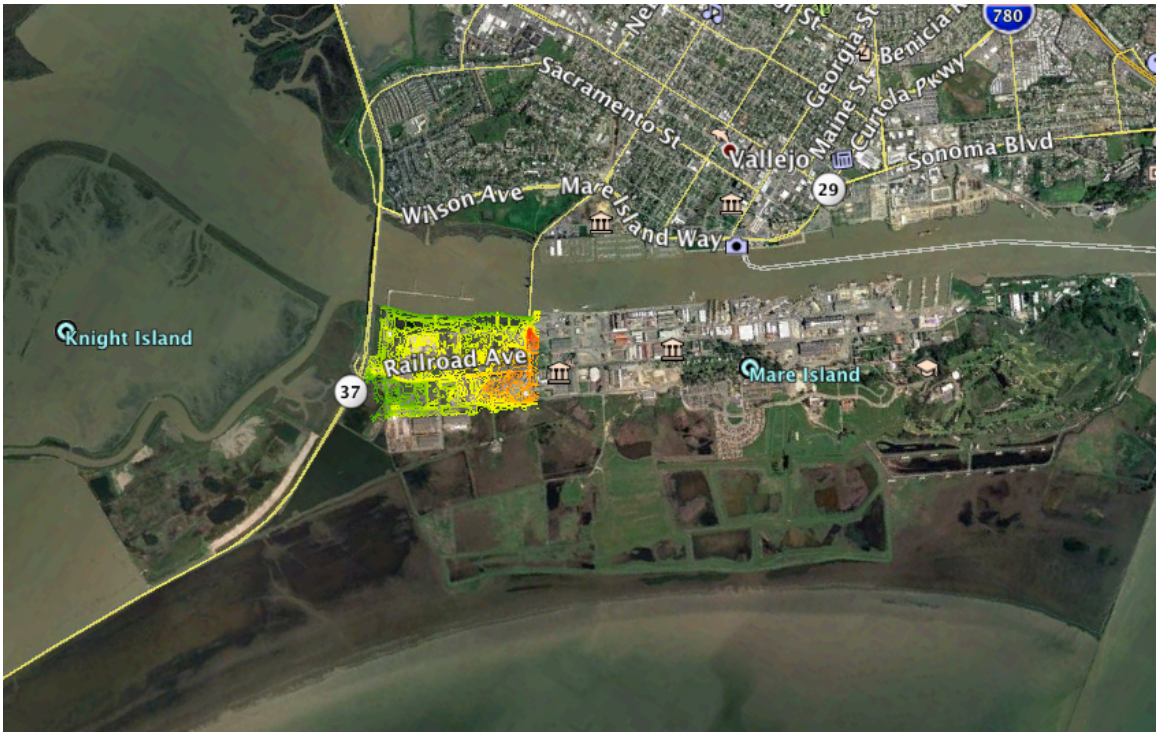
D. California Natural Diversity Database Query Results for the Mare Island Quadrangle and Surrounding Quadrangles (9-Quad Search)

E. California Rare Plant Inventory Database Query Results for the Mare Island Quadrangle and Surrounding Quadrangles (9-Quad Search)

Preliminary Delineation of Waters of the U.S.

Northeast Mare Island (Parcels XV-A (1, 2), XV-B (I), and II)

Prepared by Swaim Biological, Inc./SBI



DECEMBER 2016

Prepared for Amec Foster Wheeler

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INTRODUCTION

OBJECTIVE

Four contiguous parcels in northeast Mare Island are proposed for redevelopment: Parcel XV-A(1), Parcel XV-A(2), Parcel XV-B(I), and Parcel II. Together these parcels comprise part or all of Reuse Area 1A. The field delineation objectives were twofold: (1) to determine the upland-wetland boundary of the adjacent Public Trust marshes on the east so that future project design can avoid sensitive aquatic areas to the extent feasible; and (2) to confirm the presupposed absence of other wetland features across the 152.6-acre project site.

SUMMARY RESULTS

A total of 18.6 acres of brackish wetland marsh occurs between Reuse Area 1A and the Napa River. Napa River and adjacent wetlands are "Waters of the U.S." jurisdictional to the U.S. Army Corps of Engineers (Corps). They are also "Waters of the State" jurisdictional to California Department of Fish and Wildlife (CDFW), Regional Water Quality Control Board (RWQCB), and Bay Conservation and Development Commission (BCDC). The upland-wetland boundary of these marshes was delineated in the field and is mapped in this report.

A comprehensive site walk and subsequent review of current and past satellite imagery identified 36 seasonally-ponded areas scattered among the four parcels. For the following reasons they are not jurisdictional to the Corps, CDFW, and BCDC: (1) all but two are isolated; (2) none provide habitat for special-status species; (3) none occur within the BCDC shoreline band; and (4) the two ponded areas with a nexus to federally-jurisdictional waters or wetlands do not have hydric soils[1]. Some or all of the seasonally ponded areas may be jurisdictional to the RWQCB, and both agency guidance and further investigation of the features is recommended. Features are described and preliminarily mapped in this report.

PROJECT DESCRIPTION

The redevelopment of four contiguous parcels on northeast Mare Island would include demolition of 25 buildings and removal of various other foundations and constructions. The footprint for new construction is unknown but would generally avoid[2] Public Trust marshes along the eastern project boundary. The U.S. Navy would retain ownership of the shipping dock while providing access and use of the dock during project operation.

[1] At one feature, the ground was too compacted to obtain a soil sample but it is also unvegetated.

[2] A stormwater outfall in the marsh has been identified for repair, and other improvements may arise during project design.

Setting

STUDY AREA

The study area is in the City of Vallejo, California in the northeast corner of Mare Island (**Figure 1, Study Area**). The site occurs within the Central Coast Floristic Province, a subregion within the larger California Floristic Province. The Central Coast Floristic Province typically supports only truly coastal communities, including salt marshes, coastal prairie, and coastal-sage scrub. The project site is within the San Francisco Bay Watershed, located where the Napa River enters north San Pablo Bay adjacent to Highway 37. Immediately upstream of the project area are large contiguous expanses of native and restored marshland comprising the Napa/Sonoma Marsh Restoration Area, which provides habitat for endangered salt marsh species and essential fisheries.

North Mare Island is characterized by industrial and manufacturing businesses. Mare Island north of G Street is a major employment center home to industrial, light industrial, office/R&D, retail, and warehousing uses. As shown in **Figure 2, Study Area Detail**, four parcels in Reuse Area 1A comprise the project site: Parcel XV-A(1), Parcel XV-A(2), Parcel XV-B(I), and Parcel II. These are presently owned by the City of Vallejo. It is the author's understanding that the City also holds in public trust the adjacent marshes between Reuse Area 1A and the Napa River. For the purpose of having a convenient nomenclature for reference and discussion, they are referred to in this report as *Public Trust marshes*; the reader is cautioned this may not be an accurate representation of legal title. Buildings and grounds are in a state of abandonment and decay after 30 years since military base closure. The four site parcels do not support active commerce now. Twenty-five unused structures occur on the project site; a twenty-sixth structure burned in a recent fire and reduced it to rubble. Structures occurring on Parcels XV-B(I) and XV-B(II) (8 in total) are owned by the U.S. Navy.

CLIMATE AND TOPOGRAPHY

The overall California climate is characterized as Mediterranean, with most precipitation occurring as rain in the winter months, and generally mild temperatures year round. The annual average rainfall in the study area is 14.95 inches at the Vallejo Station, based on 12 years of annual rainfall totals from 1998 through 2007, and 2015 through October 2016 (AgACIS, 2016). Per the Fairfield, California WETS[3] station data, the nearest station with sufficient data to provide historic climatic data and growing season lengths, average annual rainfall from 1950 to

[3] The NRCS Wetlands Determination Tables (WETS) give a month-by-month summary and probability analysis of temperature and precipitation. The tables also provide average length of growing season using three index temperatures (32, 28, and 24 degrees Fahrenheit) at 50% and 70% probabilities.

Service Layer Credits: USGS The National Map: National Boundaries Dataset, National Elevation Dataset, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; U.S. Census Bureau - TIGER/Line; HERE Road Data

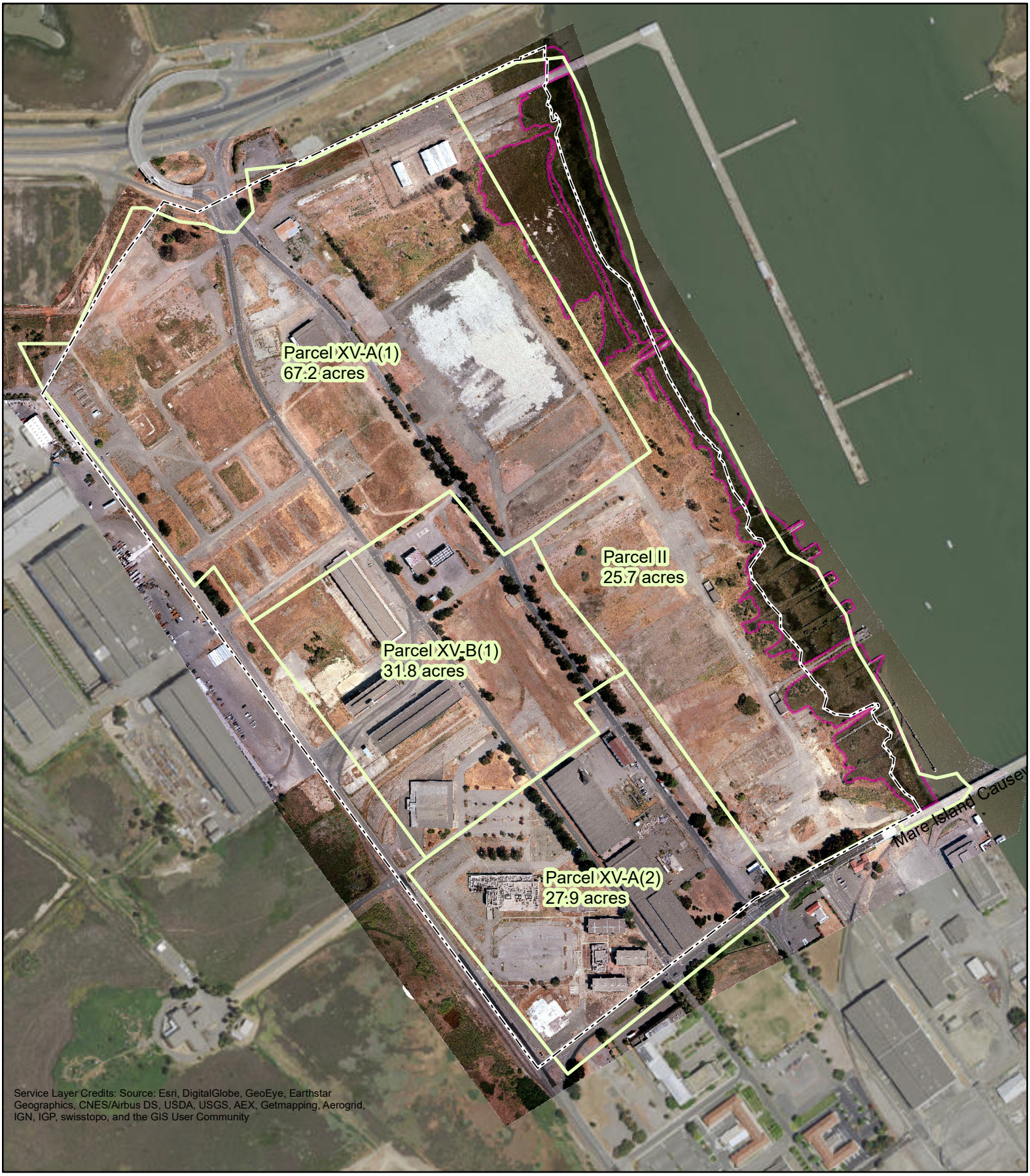
Project Zeus
Mare Island - Vallejo, CA
Figure 1 - Study Area/USGS 7.5-minute Quadrangle

N

0 .5 1 2
Miles

Wetland Study Area

SBI
Swaim Biological Inc.



Reuse Area 1A Parcels
WetlandStudyArea
Napa River Adjacent Wetlands

N

0 250 500 1,000
Feet

Project Zeus
Mare Island - Vallejo, CA
Figure 2 - Study Area Detail

SBI
Swaim Biological Inc.

present was 21.86 inches, and the median length of the growing season was approximately 300 to 320 days (AgACIS, 2016). The project site is located on northeastern Mare Island between Napa River and San Pablo Bay, with elevations ranging from 2 feet to 18 feet. Topography is basically flat, with microdepressions throughout the 152.6 acres. Project topography confines most surface waters to the site.

SOILS

The NRCS Web Soil Survey (USDA, 2016) was consulted to determine the soil types occurring within the study area. A map depicting soil types within the study area followed by a description of mapped soil series is presented in Appendix D. The first 18 inches of a soil series is most pertinent when conducting wetland delineations, therefore background research for soil series is limited to the layers and/or horizons encompassing the first 18 inches.

Mapped soils within the study area:

- Made Land

Made Land

Made Land is comprised of mine spoils, trash, earthy fill, or a combination of these. It has no independent native soil properties or qualities, and the typical soil profile is only that it consists of a single, highly variable soil horizon extending from 0 to 60 inches below the soil surface. The study area is mapped as Made Land. Per the Web Soil Survey, Made Land is not considered hydric, although it may have minor hydric components (5 percent or less) when part of an alluvial fan landform (USDA, 2016).

HYDROLOGY

Surface Waters

The study area is located within the San Francisco Bay Hydrologic Region, Napa River Sub-area, at the head of Mare Island Strait. Downstream, the Strait discharges into San Pablo Bay at its confluence with Carquinez Strait. It is within the lower, tidally-influenced reaches of the Napa River Watershed. Site topographic maps do not indicate the presence of blue-line drainages in Reuse Area 1A parcels, and none were observed during field surveys. Brackish marshes along the Napa River border Reuse Area 1A.

Groundwater

The San Francisco Bay RWQCB identifies Mare Island as part of the San Pablo Hydrologic Planning Area, Napa-Sonoma Valley Groundwater Basin, and Napa-Sonoma Lowlands Sub-basin (Basin ID 2-2.03) (RWQCB, 2015). Groundwater in the basin is identified as a water supply resource. Mare Island is also noted as a distinct Basin/Marsh Area supporting saline wetlands that provide wildlife habitat, estuarine and migratory habitat for aquatic life and rare species; and human commercial, navigational, and recreational uses. Several manmade structures in Reuse Area 1A provide direct visual access to groundwater: an open manhole shown in Appendix F – Representative Photographs; a concrete pad approximately 2’ above ground with

open “windows” at ground level where a large underground vault is deeply filled with groundwater; and ISPA-31, which is drained through a ~2’X2’ grate into an underground system.

VEGETATION

Vegetation within the study area was classified using California’s expression of the National Vegetation Classification based on *A Manual of California Vegetation, Second Edition* (2009). Upland communities are described below. Wetland communities are described in *Results*.

Upland Communities from the National Vegetation Classification

Wild Oats Grassland, Upland Mustards, Annual Brome Grassland, Yellow Star-Thistle Fields, Knapweed and Purple-flowered Star-Thistle Fields, Fennel Patches, and Pampas Grass Patches

Most the 152.6-acre site is hardscaped or consists of non-native upland vegetation. Upland plant communities grow through eroded asphalt and compacted ground, as well as in softer “fill” areas where a soil layer occurs over pavement. Compacted ground was present in a near-impermeable layer between 2 and 18 inches below the ground surface at all locations except within salt marshes. The upland species are a diverse hodge-podge that don’t easily conform to the National Vegetation Classification, and would have been characterized as Ruderal or Non-native Grassland under previous classifications. Nonetheless, the community could be roughly characterized under the following classifications because these species are prevalent: Wild Oats Grassland (*Avena barbata, A. fatua*), Upland Mustards (*Brassica nigra* and other mustards), Annual Brome Grassland (*Bromus diandrus, B. hordeaceus*), Yellow Star-Thistle Fields (*Centaurea solstitialis, C. melitensis*), Knapweed and Purple-flowered Star-Thistle Fields (*Centaurea (virgata)*), Fennel Patches (*Foeniculum vulgare*), and Pampas Grass Patches (*Cortaderia (jubata, selloana*). Fennel Patches occur primarily along the upland boundary of the Public Trust marshes and in a dense field in the northeastern quadrant. Pampas Grass Patches occur primarily in the southeastern quadrant. The rest of the upland communities are broadly distributed across the project site.

Areas range from lightly to heavily vegetated, independent of ground surface material or soil depth. The following species were also observed within upland communities: *Acacia* species, Spanish lotus (*Acmispon americanus*), *Amaranthus* species, asparagus (*Asparagus officinalis*), Coyote brush (*Baccharis pilularis*), foxtail brome (*Bromus madritensis*), Italian thistle (*Carduus pycnocephalus*), purple star thistle (*Centaurea calcitrapa*), field bindweed (*Convolvulus arvensis*), turkey mullein (*Croton setigerus*), Bermuda grass (*Cynodon dactylon*), willowherb (*Epilobium ciliatum*), horseweed (*Erigeron* species), storksbill (*Erodium* species), blue-gum eucalyptus (*Eucalyptus globulus*), bristly ox-tongue (*Helminthotheca echiodies*), barley (*Hordeum marinum*), sharppoint fluvelin (*Kickxia elatine*), prickly lettuce (*Lactuca serriola*), burclover (*Medicago polymorpha*), *Phalaris* species, English plantain (*Plantago lanceolata*), knotweed (*Polygonum* species), dock (*Rumex* species), spiny sow thistle (*Sonchus asper*), vinegarweed (*Trichostemma lanceolatum*), and rose clover (*Trifolium hirtum*).

REGULATORY FRAMEWORK

Wetlands and other waters (e.g., rivers, streams, and natural ponds) are a subset of waters of the U.S. and waters of the State. They receive protection under Section 404 of the Clean Water Act (CWA), Section 10 of the Rivers and Harbors Act, California Fish and Game Code §1600 *et seq.*, Porter-Cologne Water Quality Control Act, and the McAteer-Petris Act.

U.S. Army Corps of Engineers (Corps or USACE)

Section 404 of the Clean Water Act

The CWA establishes a permit program administered by the U.S. Army Corps of Engineers (Corps) that regulates discharge of dredged or fill materials into waters of the U.S., including wetlands. Guidelines for implementation are referred to as the Section 404(b)(1) Guidelines, developed by the U.S. Environmental Protection Agency (EPA) in conjunction with the Corps (40 C.F.R. Part 230). The Corps requires a permit if a project proposes placement of structures within navigable waters and/or alterations of waters of the U.S. The EPA has the ultimate authority under the CWA and can veto the Corps' issuance of a permit to fill jurisdictional waters.

Several U.S. Supreme Court cases have challenged the scope and extent of the Corps' jurisdiction over waters of the United States and led to reinterpretations of that authority. *Solid Waste Agency of Northern Cook County (SWANCC) v. Army Corps of Engineers* (January 9, 2001) decision found that jurisdiction over non-navigable, isolated, intrastate waters could not be based solely on the use of such waters by migratory birds. This reasoning could be extended to suggest that waters need a demonstrable connection with a 'navigable water' to be protected under the CWA. The introduction of the term 'isolated' led to the consideration of the relative connectivity between waters and wetlands as a jurisdictionally-relevant factor. *Rapanos v. United States* (June 2006) further questioned the definition of "waters of the U.S." and the scope of federal regulatory jurisdiction over such waters; the case resulted in a split decision that agreed upon the need for a 'significant nexus' with traditional navigable waters.

EPA and the Corps have defined the significant nexus standard as follows:

> A significant nexus analysis assesses the flow characteristics and functions of the tributary itself and the functions performed by all wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of downstream traditional navigable waters.

Significant nexus analysis includes consideration of hydrologic and ecologic factors including: volume, duration, and frequency of flow; proximity to a traditional navigable water; size of watershed; average annual rainfall; average annual winter snow peak; potential of tributaries to carry pollutants and flood waters to traditional navigable waters; provision of aquatic habitat that supports a traditional navigable water; potential of wetlands to trap and filter pollutants or store flood waters; and maintenance of water quality in traditional navigable waters.

The Corps released guidance in 2007 stating that they and the EPA will take jurisdiction over wetlands adjacent to traditional navigable waters even when they do not have a continuous surface connection to traditional navigable waters. However, they generally do not assert jurisdiction over swales or ditches that drain only uplands and do not carry a relatively permanent flow of water.

Section 10 of the Rivers and Harbors Act

Section 10 of the Rivers and Harbors Act (33 U.S.C. 401 et seq.), administered by the Corps, requires permits for all structures (e.g., riprap) and activities (e.g., dredging) within navigable waters of the U.S. (those subject to the ebb and flow of the tide and susceptible to use as means of interstate transport or foreign commerce in their natural condition or by reasonable improvements). The Corps grants or denies permits based on the effects of navigation. Many activities covered under this act are also covered under Section 404 of the CWA.

California Department of Fish and Wildlife (CDFW)

CDFW is empowered via provisions of the state Administrative Code through California Fish and Game Code §1600 *et seq.* to issue agreements for alteration of a river, stream, or lake where fish or wildlife resources may adversely be affected. Streams and rivers are defined by the presence of a channel, bed, and banks. CDFW regulates wetlands to the extent that those wetlands are part of a river, stream, or lake, or when wetlands provide habitat for special-status species.

Regional Water Quality Control Board (RWQCB)

The U.S. Environmental Protection Agency (EPA) delegated responsibility for implementation of portions of the CWA, including water quality control planning and control programs, such as the National Pollutant Discharge Elimination System (NPDES) Program, to the State Water Resources Control Board. Section 303(c)(2)(b) of the CWA requires states to adopt water quality standards for all surface waters of the United States based on the water body's designated beneficial use. Where multiple uses exist, water quality standards must protect the most sensitive use. The Porter-Cologne Water Quality Control Act established the State Water Resources Control Board and its regional boards as the principal agencies for coordinating and controlling water quality in California. Specifically, the Porter-Cologne Water Quality Control Act authorizes the State board to adopt, review, and revise policies for all waters of the State (including both surface and groundwaters) and directs the regional boards to develop regional Basin Plans.

Waters of the State are defined as any surface water or groundwater, including saline waters, within the boundaries of the state. Examples include, but are not limited to, rivers, streams, lakes, bays, marshes, mudflats, unvegetated seasonally ponded areas, drainage swales, sloughs, wet meadows, natural ponds, vernal pools, diked baylands, seasonal wetlands, and riparian woodlands. Water quality standards applicable to the proposed project are listed in the *San Francisco Bay Basin (Region 2) Water Quality Control Plan* (RWQCB, 2007).

Bay Conservation and Development Commission (BCDC)

The McAteer-Petris Act, first enacted in 1965, created the San Francisco BCDC to protect the Bay and shoreline and provide for appropriate development and public access. The McAteer-Petris Act directs the Commission to oversee permit approvals for placing fill and extracting materials, including dredged material, or changing the use of any land, water, or structure within its jurisdiction. BCDC jurisdiction includes the Bay, shoreline band, saltponds, managed wetlands, and certain waterways. The shoreline development aspect of the Act ensures that prime shoreline sites are reserved for priority uses, such as ports, water-related industry, airports, wildlife refuges, and water-related recreation. The Act also ensures that public access to the Bay is provided to the maximum extent feasible for each development project, and that shoreline development projects are designed in an attractive and safe manner.

Mean BCDC jurisdiction extends from the Napa River (an area subject to tidal action) landward to encompass all marshlands between five feet above mean sea level and mean high tide, and farther inland to encompass a shoreline band 100 feet inland from mean high tide. Their jurisdiction includes marshes that are diked and have partial or total interruption from tidal influence. The Mean High High Water (MHHW) line, determined by the National Oceanic and Atmospheric Administration (NOAA) for the San Francisco Bay from long-term aggregated tidal monitoring data and publicly released as a GIS dataset, was used to delineate mean high tide.

METHODS

OFFICE PREPARATION

Literature Review

SBI reviewed the following information relevant to this delineation:

- *The Jepson Manual: Higher Plants of California* (Hickman, 1993)
- High resolution aerial photographs and satellite imagery of the site
- NRCS Web Soil Survey for Mare Island (online web application)
- *National List of Plant Species that Occur in Wetlands* (Lichvar, 2016)
- National Wetlands Inventory for Mare Island (online web application)

Desktop Review of Site Imagery

Field preparation included review of a recent high-resolution aerial photo of the site and of satellite imagery available on Google Earth. Satellite imagery was reviewed for the period 1993 to present to understand past land uses, explore historical wetland features, and identify areas of current ponding.

FIELD SURVEY METHODS

Dates

A general site assessment was conducted on August 25, 2016 by Swaim Biological, Inc. (SBI) biologist Natasha Dvorak. Meandering transects were walked across all parcels, allowing visual coverage suitable to characterize vegetation communities; identify most vegetation to genus; determine the presence of permanent and seasonal wetlands; and identify use of seasonal wetlands by wildlife species. Field delineations were conducted on August 31, 2016 by SBI biologists Natasha Dvorak, Sarah Willbrand, and Adam Chasey, and on September 22, 2016 by SBI biologists Natasha Dvorak and Sarah Willbrand.

A delineation conducted on August 31, 2016 determined the upland-wetland boundary of adjacent Public Trust marshes. A delineation performed on September 22, 2016 investigated an area extending the length of the northern dock to the Napa River shoreline, and assessed 36 seasonally-ponded areas on the 152.6-acre site.

Field Delineation

The upland-wetland boundary of the Public Trust marshes was delineated in the field and mapped in this report. Data were collected at 8 points within the study area (see Appendix A, Preliminary Delineation Map 1). In accordance with Corp's S.F. District guidance, data points were taken at sites representative of the vegetation, hydrology, and physical characteristics for the length of the feature and corresponding upland areas. Results were extrapolated for the length of the boundary based on similar vegetation and hydrologic conditions. Arid West data sheets were used to record information at each data point.

Areas where wetland and drainage signatures were visible on site imagery, and where wetlands are mapped on U.S. Geological Survey topographic maps, were visited in the field. The study area was walked such that visual coverage was 100%.

Determination of Hydrophytic Vegetation

At each data point, vegetation was analyzed within a 15-foot radius for herbaceous species, shrubs, and trees. Shrubs and trees were only recorded if they were rooted within the study plot. All species observed within the study plots were recorded on the data sheets. The indicator status of each species was confirmed in the field, to the extent feasible, with the *Arid West 2016 Regional Wetland Plant List* (Lichvar *et al*., 2016) and dominance and/or prevalence calculations were generally performed in the field as well. When the vegetation passed either the dominance or prevalence test, the point was considered to have hydrophytic vegetation.

Determination of Hydric Soils

Soils at delineation data points were analyzed in accordance with the Corps' *Arid West Manual* (2008). Soil pits were excavated to the maximum depth feasible and soil color was matched against a standard color chart (Munsell Color, 2009). Soils were inspected for redoximorphic features and soil texture was determined.

Determination of Wetland Hydrology

Hydrology was assessed using the Corps' 2008 *Arid West Manual's* revised wetland hydrology indicators.

Mapping and Acreage Calculations

The upland-wetland boundary of adjacent Public Trust marshes was determined through survey plots and soil test pits, and extrapolated for the length of the feature based on the identified vegetative break. Coordinates were recorded using a Trimble GPS unit with sub-meter accuracy (after post-processing differential correction). Extrapolated boundaries were mapped by hand in ArcMap 10.3 using field maps in concert with high-resolution imagery and 1-foot elevation contours derived from project-specific CAD data. The Napa River open-water line was mapped using high-resolution imagery from NOAA and 1-foot elevation contours.

Results

Field delineation results are presented below. Delineation maps (including site topography and elevation maps), datasheets, the jurisdictional determination analysis, NRCS Web Soil Survey, and representative photographs for the wetland study area are presented in Appendices A through F.

PRELIMINARY JURISDICTIONAL DETERMINATIONS

Napa River and Public Trust marshes are jurisdictional "Waters of the U.S." Napa River parallels the project site for a distance of approximately 0.67 mile. Public Trust marshes form "adjacent wetlands" to the Napa River. They total 18.6 acres and border Reuse Area 1A for an "interior shoreline" distance of 6,004 linear feet. Napa River and Public Trust marshes are jurisdictional to the Corps, CDFW, RWQCB, and BCDC.

BCDC jurisdiction includes the 18.6 acres of Public Trust marshes and extends inland to encompass an additional 3.7 acres of "shoreline band". Total BCDC jurisdictional acreage is 22.3 acres.

A total of 36 seasonally ponded areas (SPAs) occur across the four site parcels. All but two are isolated: SPA-29 has seasonal surface connectivity to the Napa River and wetland hydrology and wetland vegetation, but lacks hydric soil indicators; SPA-35 has seasonal surface connectivity to presumed-jurisdictional marshes at the parcel boundary, but is unvegetated and forms over eroded asphalt and is therefore presumed to lack hydric soils. These features do not meet Corps, CDFW, or BCDC jurisdictional criteria. These features could be jurisdictional to the RWQCB. The remaining 34 seasonally ponded areas are isolated (ISPAs). None of the 36 seasonally ponded areas are jurisdictional to the Corps, CDFW, or BCDC. Some or all of the ponded areas may be jurisdictional to the RWQCB, and delineation of these features would benefit from agency guidance and further wetland investigation.

A table summary of features documented within the study area is presented in **Table 1, Preliminary Delineation of Waters of the U.S.**; **Table 2, Preliminary Delineation of State Waters (CDFW, BCDC, and RWQCB Jurisdiction)**; and **Table 3, Seasonally Ponded Areas Not Meeting Corps Jurisdictional Criteria.** Delineation maps are presented in Appendix A.

Table 1
Preliminary Delineation of Waters of the U.S.

Feature Type	Feature	Linear ft.	Area (ac)	Datapoint	Map #
Waters					
River[4]	Napa River	(~0.67 mile)	n/a	n/a	1
Adjacent Wetlands	Public Trust marshes	6,004	18.6	Wet 1a/1b OHWM1 Wet 2a/2b OHWM2 Exploratory Wet 3a/b	1
	Total Waters	***6,004***	***18.6***		
	Total Waters of the U.S.	**6,004**	**18.6**		**1**

[4] Napa River is identified only to provide a practical context for the "Adjacent Wetlands".

Table 2
Preliminary Delineation of State Waters
(CDFW, BCDC, and RWQCB Jurisdiction)

Feature Type	Feature	Linear ft.	Area (ac)	Map #	Agency
Waters/Wetlands					
River[5]	Napa River	(~0.67 mile)	n/a	1	CDFW BCDC RWQCB
Adjacent Wetlands	Public Trust marshes	6,004	18.6	1	CDFW BCDC RWQCB
Subtotal		**6,004**	**18.6**		
BCDC Shoreline Band (MHHM + 100 feet minus Public Trust Marshes)	BCDC Shoreline Band	6,004[6]	3.7	1	BCDC
Subtotal		**6,004**	**3.7**		
Isolated Seasonal Wetland	SWL-13	na	0.31 ac	2 (WET-4a/b)	RWQCB
Subtotal		**na**	**0.31 ac**	2	
Total Waters of the State — CDFW		**6,004**	**18.6**		**CDFW**
Total Waters of the State — BCDC		**6,004**	**22.3**		**BCDC**
Total Waters of the State — RWQCB		**6,004**	**18.91**		**RWQCB**

[5] Napa River is identified only to provide a practical context for "Adjacent Wetlands".
[6] The "interior shoreline" distance calculated for CDFW is used here. It reflects a more detailed polyline representing a more complex feature (the marsh shoreline). It is greater than the distance calculated strictly from a 100-foot buffer from the MHHW line; that distance would be only 3,004 linear feet and reflects a much simpler (straighter) polyline.

Table 3
Seasonally Ponded Areas Not Meeting Corps Jurisdictional Criteria

Feature Type	Feature	Area (ac)	Map #
Seasonally Ponded Areas			
Seasonally Ponded Areas with Surface Connectivity to Jurisdictional Wetlands	SPA-29	0.07	1
	SPA-35	1.11	3
Subtotal with Surface Connectivity		**1.18**	
Isolated Seasonally Ponded Areas	ISPA-9	0.02	2
	ISPA-10	0.01	2
	ISPA-12	0.18	2
	SWL-13[7]	0.31	2
	ISPA-25	0.02	2
	ISPA-26	0.13	2
	ISPA-27	0.02	2
	ISPA-30	0.02	2
	ISPA-33[8]	0.49	2
	ISPA-8	0.09	3
	ISPA-11	0.29	3
	ISPA-14	0.12	3
	ISPA-16	0.01	3
	ISPA-18	0.10	3
	ISPA-21	0.04	3
	ISPA-23	0.02	3
	ISPA-35	1.11	3

[7] Feature acreage is omitted from the total because it is included in State Waters, Table 2.
[8] Feature acreage is omitted from the total. As described in the report, this area is isolated ponded pavement with no connectivity to other features.

Table 3
Seasonally Ponded Areas Not Meeting Corps Jurisdictional Criteria

Feature Type	Feature	Area (ac)	Map #
Seasonally Ponded Areas			
Isolated Seasonally Ponded Areas	ISPA-4	0.14	4
	ISPA-5	0.71	4
	ISPA-24	0.11	4
	ISPA-0	0.16	5
	ISPA-17[9]	0.02	5
	ISPA-19	0.08	5
	ISPA-20	0.56	5
	ISPA-31	0.42	5
	ISPA-32	0.12	5
	ISPA-1	0.10	6
	ISPA-2	0.04	6
	ISPA-3	0.04	6
	ISPA-6	0.07	6
	ISPA-7	0.14	6
	ISPA-15	0.04	6
	ISPA-34	0.09	6
Subtotal Isolated		**5.00**	
Total Seasonally Ponded Areas		**6.18**	

[9] Feature acreage is omitted from the total. As described in the report, this area is isolated ponded pavement with no connectivity to other features.

WATERS

Napa River

Napa River parallels the project site for a length of approximately 0.67 mile. Napa River is an intra-state Traditional Navigable Water used or susceptible to use in interstate or foreign commerce. As such, it is a "Waters of the U.S." and jurisdictional to the Corps.

Napa River has a channel, bed, and banks, and provides habitat for fish and wildlife resources. As such, it is jurisdictional to CDFW.

As a surface water within the boundaries of California, Napa River is a 'Waters of the State' and jurisdictional to the RWQCB.

The study area contains marshes that are located within a lower reach of Napa River that is subject to tidal action, and thus jurisdictional to BCDC.

Public Trust Marshes

Public Trust marshes are saline marshes subject to the ebb and flow of the tide. The northern marsh appears to be at least partially diked, resulting in some separation from tidal influence. However, the marshes appear healthy, supporting a dense, robust cover of native salt marsh plants and no invasive plant species of note. Dominant vegetation is comprised of the wetland-obligate species Pacific cordgrass (*Spartina foliosa*), pickleweed (*Sarcocornia pacifica*), and fleshy jaumea (*Jaumea carnosa*). Secondary species are bulrush (*Schoenoplectus robustus*, OBL) and saltgrass (*Distichlis spicata*, FAC). Tertiary species are fat hen (*Atriplex prostrata*, FACW) and goosefoot (*Chenopodium album*, FACW). These are all wetland indicator species, with obligate and facultative-wetland being the most strongly associated with wetlands.

Public Trust marshes total 18.6 acres and border the redevelopment area for 6,004 linear feet of interior shoreline. Public Trust marshes are "wetlands adjacent to waters [of the U.S.]" and thus meet criteria (7) of the definition of a "Waters of the U.S." discussed in the *Methods* section of this report. As such, they are a "Waters of the U.S." jurisdictional to the Corps.

CDFW regulates wetlands that are part of a river, stream, or lake, *or* [sic] when wetlands provide habitat for special-status species. Public Trust marshes are part of the Napa River, subject to CDFW jurisdiction through the Lake and Streambed Alteration Program. They also provide habitat for special-status species.

Public Trust marshes are sloughs within the boundaries of California. As such, they are 'Waters of the State' and jurisdictional to the RWQCB.

SEASONALLY PONDED FEATURES NOT MEETING CORPS JURISDICTIONAL CRITERIA

This section describes the September 2016 verified field conditions of 36 seasonally ponded features observed on Google Earth site imagery. None of the features meet all combined Corps

jurisdictional criteria: (1) nexus with a Traditional Navigable Waterway; (2) wetland vegetation; (3) hydric soils; and (4) wetland hydrology. None of the features are located within the geographical extent of BCDC's shoreline band jurisdiction. None of the features meet CDFW's jurisdictional requirements because (1) they do not provide habitat for special-status species and (2) are not wetlands adjacent to rivers or streams. Thus, these features are determined to be *not jurisdictional* to the Corps, CDFW, and BCDC.

Unless further investigated or until the RWQCB finalizes their draft wetland definition based on the Corps' 3-parameter approach (RWQCB, 2013), features are presumed to be jurisdictional to the RWQCB. Under the broad reach of the Clean Water Act, the RWQCB has jurisdiction over all surface water or groundwater, including saline waters, within the boundaries of the state. Factors tending toward RWQCB claiming broad jurisdiction in the present case are the large number of seasonally ponded surface water locations on the site (36 features totaling 6.18 acres) seeming to echo the site's former condition as an intact marsh and possibly still providing cumulative ecosystem functions; the site's historical condition as a saline marsh and its present low-lying topography (especially at the northwest section of the parcel where elevations are as low or lower than the adjacent marshes); site abandonment since military base closure in 1986 and associated erosion and/or vegetative reclamation of formerly paved or asphalted areas that now seasonally pond water; repeated annual ponding of the same areas despite absence of hydric soils and vegetation; and seasonal use of some features by birds and animals. On the other hand, multiple draft RWQCB policies made available for public information since at least 2012 have proposed a wetland definition that is modeled on the USACE's three-parameter approach to delineating wetlands: hydrophitic vegetation *and* hydric soils *and* wetland hydrology must be present (RWQCB, 2012, 2013, 2016). Factors tending toward RWQCB observing a jurisdiction limited to three-parameter wetlands in the present case are their own draft policies made publicly available for review; the site's long history of development; seasonal ponding over compacted ground, much of which is eroding or eroded asphalt; the presumed or actual absence of hydric soils in these features based on rock-hard ground compaction; and the lack of dominant cover by hydrophitic vegetation observed during the dry season.

These site conditions are difficult to resolve, and were beyond the scope of a single-day dry season delineation. Mare Island was created in the late 1800s by filling the marsh with material dredged from the Napa River. Over the 100 subsequent years of military occupation new normal [developed non-wetland] conditions were established. Circumstances were altered again in 1986 when the naval base closed; across 30 years of parcel abandonment, nature has reclaimed the site to varying degrees. Fill material and ground compaction, or even the potential presence of military chemical waste, may be affecting processes that would have otherwise formed hydric soils and vegetation in these annually ponded areas. Considered cumulatively, the 36 seasonally ponded areas may be performing watershed functions. Agency guidance is recommended. Further jurisdictional exploration of these features could include assessments conducted during the wet season, hydroperiod monitoring, and use of mechanized equipment to obtain soil samples of a sufficient depth to assess the presence of hydric soil indicators.

Areas of seasonal ponding were identified using Google Earth imagery from 1993 to March 2016. Waterlines were traced by hand in Google Earth to create wetland polygons. March 16, 2016 imagery was used because it demonstrated recent significant ponding during an appropriate season and provided a relatively crisp image from which to digitize polygons. Polygons were imported into ArcMap 10.3 for further analysis relative to elevation and drainage. It is important to note that, based on the rainfall pattern preceding the imagery from which ponded-area polygons were digitized, these polygons represent maximum ponding and probably overestimate areas that would pond for a 7-to-14 day hydroperiod.[10]

Seasonally Ponded Areas with Surface Connectivity to Adjacent Wetlands (2)

There are two ponded areas with surface connectivity to adjacent wetlands: SPA-29 (0.07 acre) and SPA-35 (1.11 acre), identified in Appendix A Wetland Delineation Maps 1 and 3, respectively. These areas are the lowest-elevation areas in Reuse Area 1A. The mapped extent of these features is derived from maximum inundation visible on March 2016 Google Earth satellite imagery.

SPA-29 is located in the far northeastern corner of the study area next to the dock. It appears to have historically been part of the shoreline marsh but is now just a low-lying area on an old boat ramp. It retains a high saline content in the soil and depending on microtopography varies from unvegetated areas of bare salt scalds to dense saltgrass. A soil test pit was dug in the lowest-elevation area where there is about 30% coverage of saltgrass (FAC), 20% coverage by a small unidentified grass presumed to be native and at least FAC, and 1% coverage of pickleweed (OBL). Soils had 1% or less of redox concentrations in the soil matrix, which was a sand and pebble fill over an asphalt base, and therefore did not meet federal wetland criteria. Vegetation provides no cover for special-status species. It is also outside of the BCDC shoreline band. However, this feature has seasonal surface connectivity to the Napa River and at minimum functions as an “aquatic support area” (SFEI, 2012).

SPA-35 is located in the far northwestern corner of the project area. It appears to have historically been part of the regional salt marsh but is now just an expansive low-lying area over former asphalt that has eroded away. The feature is unvegetated and the ground was too compacted to dig a soil pit. Based on the ground compaction and the condition of being formerly asphalted, it is presumed that hydric soils are absent. This unvegetated feature does not provided habitat for special-status species. It is also outside of the BCDC shoreline band. However, it is a large feature (1.1 acres) with seasonal surface connectivity to the adjacent salt marsh at the parcel boundary, and at minimum functions as an “aquatic support area” (SFEI, 2012).

Isolated Seasonally Ponded Areas (34)

The 34 isolated seasonally ponded areas are described in order of map appearance.

[10] In hard-to-resolve situations, hydric soils are sometimes inferred from 7-day or 14-day hydroperiods when a predominance of wetland vegetation is also present. Unlike the others, Feature SWL-13 was delineated through survey plots and soil test pits.

Map 2

ISPA-10. This isolated feature measures 0.01 acre in size and occurs in a low-lying area north of an aged paved road. No wetland vegetation was observed during the dry season survey, and, excepting Indicator B7: *Inundation Visible on Aerial Imagery*, no indicators of wetland hydrology were observed (i.e., no soil surface cracks, no algal mats, etc.). The ground was compacted, and a "turn of the shovel" penetrated only the top two inches of soil, in which no redoximorphic features were observed.

ISPA-9. This isolated feature measures 0.02 acre in size and occurs in a low-lying area north of an aged paved road. A quick visual assessment of vegetative coverage over the low-lying area determined that alkali mallow (*Malvella leprosa,* FACU) was prevalent and salt grass (*Distichlis spicata*, FAC) was present, resulting in a Vegetative Prevalence Index less than 3.0. Except Indicator B7: *Inundation Visible on Aerial Imagery*, no indicators of wetland hydrology were observed. Soil was not explored, and it was presumed results would be as for nearby ISPA-12, described below.

ISPA-12. This isolated feature measures 0.18 acre in size and occurs in a low-lying area north of an aged paved road. A quick visual assessment of vegetative coverage over the low-lying area determined that alkali mallow (*Malvella leprosa,* FACU) was prevalent and salt grass (*Distichlis spicata*, FAC) was present, resulting in a Vegetative Prevalence Index less than 3.0. Except Indicator B7: *Inundation Visible on Aerial Imagery*, no indicators of wetland hydrology were observed. The ground was compacted, and a "turn of the shovel" penetrated only the top two inches of soil, in which no redoximorphic features were observed.

SWL-13. This isolated feature measures 0.31 acre in size and occurs in a low-lying area south of an aged paved road. Indicator B7 was especially strong for this feature, and during field verification it exhibited surface soil cracks, biotic crust, and algal matting during the dry season, along with bird and mammal tracks preserved in the dried mud. It had a relatively dense cover (40%) of alkali tumbleweed (*Salsola soda*, FACW), and the delineation process determined a dominance of hydrophitic vegetation. A soil pit was dug in the lowest midpoint, in which a 3% concentration of redoximorphic features was observed in the upper four inches of the soil matrix, which had much organic material. The soil pit was dug to a depth of 8", with the 4" to 8" horizon being very compacted and rocky, with no roots, no organic material, and no redoximorphic features observed. Below 8" was a restrictive layer of impenetrable rock fill. Due to the amount of organic matter in the 0" to 4" horizon, the soil was not reliably colored; however, it differed from the adjacent higher elevations where the soil exhibited no redoximorphic features at all. For this reason, combined with strong wetland hydrology indicators and wetland vegetation, the feature was determined to have hydric soil despite problematic indicators.

ISPA-28. This isolated features measures 0.13 acre in size and occurs where vegetation has reclaimed a former baseball field. The area overall contains an abundance of crabgrass (*Digitaria didactyla*, NL=UPL). There was no apparent area of seasonal ponding or accumulated

hydrophitic vegetation, and this feature could not be discerned from the surroundings during the dry season visit. Soil was not evaluated.

ISPA-25. This isolated features measures 0.02 acre in size and occurs in an area of deep hummocky grass that has reclaimed a former baseball field. While the area overall contains a fair amount of *Rumex* species (FAC to FACW) and *Phalaris* species (often FACW), it also contains an abundance of crabgrass and other upland species There was no apparent area of seasonal ponding or accumulated hydrophitic vegetation, and this feature could not be discerned from the surroundings during the dry season visit. Soil was not evaluated.

ISPA-33. This isolated feature measures 0.49 acre in size and occurs over an unvegetated area of existing pavement and eroded asphalt. The seasonal surface water has no connectivity to other seasonal features.

ISPA-27. This isolated features measures 0.02 acre in size and occurs in a patch of ruderal vegetation. There was no apparent area of seasonal ponding or accumulated hydrophitic vegetation, and this feature could not be discerned from the surroundings during the dry season visit. Soil was not evaluated.

ISPA-26. This isolated features measures 0.13 acre in size and occurs in an area of deep hummocky grass that has reclaimed a former baseball field. While the area overall contains a fair amount of *Rumex* species (FAC to FACW) and *Phalaris* species (often FACW), it also contains an abundance of crabgrass and other upland species There was no apparent area of seasonal ponding or accumulated hydrophitic vegetation, and this feature could not be discerned from the surroundings during the dry season visit. Soil was not evaluated.

ISPA-30. This feature measures 0.02 acre in size and occurs over an unvegetated area of existing pavement. The seasonal surface water has connectivity to isolated feature SWL-13, which exhibits wetland vegetation, soils, and hydrology.

Map 3

ISPA-18. This isolated feature measures 0.10 acre in size and occurs in a reclaimed (by nature) area of eroding asphalt adjacent or “roadside” to drivable pavement. The general area was covered in tall upland vegetation during the dry season visit, but the specific feature area exhibited reduced vegetation and soil surface cracks. No wetland vegetation was observed. Soil was not evaluated.

ISPA-14. This isolated feature measures 0.12 acre in size and occurs in a reclaimed (by nature) area of eroding asphalt adjacent or “roadside” to drivable pavement. The specific feature area exhibited a few pockets of rabbitsfoot grass (*Polypogon monspeliensis,* FACW) and a narrow ~8” unvegetated erosional channel along its length and soil surface cracking in the channel bed. Most of the vegetation was upland. Soil was not evaluated.

ISPA-23. This isolated feature measures 0.02 acre in size and occurs in a reclaimed (by nature) area of eroding asphalt adjacent or “roadside” to drivable pavement. The specific feature area

exhibited unvegetated soil and surface cracking. No wetland vegetation was observed. Soil was not evaluated.

ISPA-21. This isolated feature measures 0.04 acre in size and occurs in a reclaimed (by nature) area of eroding asphalt adjacent or "roadside" to drivable pavement. This feature was not discerned during the dry season visit; no unvegetated areas or wetland vegetation was observed. Soil was not evaluated.

ISPA-8. This isolated feature measures 0.09 acre in size and occurs in a reclaimed (by nature) area of eroding asphalt adjacent or "roadside" to drivable pavement. This feature was not discerned during the dry season visit; excepting willowherb (*Epilobium ciliatum,* FACW) which is widespread in low density across the parcel shown in Map 3, no wetland vegetation was observed at this feature location. Soil was not evaluated.

ISPA-11. This isolated feature measures 0.29 acre in size and occurs in a reclaimed (by nature) area of eroding asphalt adjacent or "roadside" to drivable pavement. This feature was not discerned during the dry season visit; excepting willowherb, which is widespread in low density across the parcel shown in Map 3, no wetland vegetation was observed at this feature location. There were a few unvegetated pockets among the fennel (*Foeniculum vulgare*, FACU) and bull thistle (*Cirsium vulgare*, FACU) understory. Soil was not evaluated.

ISPA-16. This isolated feature measures 0.01 acre in size and occurs in a reclaimed (by nature) area of eroding asphalt adjacent or "roadside" to drivable pavement. This feature is largely unvegetated and exhibits soil surface cracking as well as bird and mammal tracks preserved in the dried mud. No wetland vegetation was observed. Soil was not evaluated.

Map 4

ISPA-5. This isolated feature measures 0.71 acre in size and occurs in an area of fairly thin low-lying vegetative cover. The ground is densely compacted and may have formerly been asphalted. No wetland vegetation was observed. Tire tracks cover the area extensively and appear to have been formed when the soil was wet, with the peaks dried and crisply evident. This feature was not discerned from the surrounding area during the dry season visit.

ISPA-24. This isolated feature measures 0.11 acre in size and occurs in an area of eroding asphalt. No wetland vegetation was observed. This feature was not discerned from the surrounding area during the dry season visit.

ISPA-4. This isolated feature measures 0.14 acre in size and occurs in an area of fairly thin low-lying vegetative cover. The ground is densely compacted and may have formerly been asphalted. No wetland vegetation was observed. Tire tracks cover the area extensively and appear to have been formed when the soil was wet, with the peaks dried and crisply evident. This feature was not discerned from the surrounding area during the dry season visit.

Map 5

ISPA-31. This feature measures 0.42 acre in size and is a concrete basin with a drainage grate at the low point. A small patch of cattails (*Typha* species, OBL) grows through the approximately 2' x 2' drainage grate from a subsurface location. Peering through the grate, it appears to be a storage tank or otherwise connect to a groundwater drainage system. This feature may not be strictly isolated, but is grouped with the other "isolated" ponding areas for several reasons: the feature is a manmade concrete basin; surface waters have connectivity to groundwater as opposed to connectivity to other surface waters; the feature is not jurisdictional to the Corps, CDFW, or BCDC for the reasons just stated; and the author has no knowledge of the groundwater system below the grate.

ISPA-32. This isolated feature measures 0.12 acre in size and occurs in a layer of sand over eroding asphalt. No wetland vegetation was observed. Soil was not evaluated and hydric soils are presumably absent due to the asphalt layer. This feature is described because it has seasonal surface connectivity to ISPA-0 and could be considered an "aquatic support area" (SFEI, 2012).

ISPA-0. This isolated feature measures 0.16 acre in size and occurs in a sandy substrate. Vegetation is sparse and patchy, containing wetland vegetation such as spreading alkali weed (*Cressa truxilensis*, FACW), media sandspurry (*Spergularia maritime,* FACW), toad rush (*Juncus bufonius,* FACW), rabbitsfoot grass (FACW), willowherb (FACW), slender-leaved iceplant (*Mesembryanthemum nodiflorum*, FAC), alkali tumbleweed (FACW), and sickle grass (*Parapholis incurva*, FAC). Surface soil cracks are pervasive. Bird and mammal tracks are preserved in dried silt. Soil was not evaluated.

ISPA-20. This isolated feature measures 0.56 acre in size and occurs in a low hill of sandy substrate. Vegetation is more dense than ISPA-0, containing similar wetland vegetation (alkali weed (FACW), media sandspurry (FACW), toad rush (FACW), rabbitsfoot grass (FACW), willowherb (FACW), slender-leaved iceplant (FAC), alkali tumbleweed (FACW), and sickle grass (FAC)). Surface soil cracks are pervasive. Bird and mammal tracks are preserved in dried silt. Soil was not evaluated.

ISPA-17. This isolated feature measures 0.02 acre in size and occurs over an unvegetated area of eroding asphalt. The seasonal surface water has no connectivity to other seasonal features.

ISPA-19. This isolated feature measures 0.19 acre in size and occurs in a field of tall fennel and upland grasses growing thickly through asphalt. No wetland vegetation was observed. This feature was not discerned from the surrounding area during the dry season visit.

Map 6

ISPA-6. This isolated feature measures 0.07 acre in size and occurs in a reclaimed (by nature) area of eroding asphalt. No wetland vegetation was observed. This feature was not discerned during the dry season visit.

ISPA-7. This isolated feature measures 0.14 acre in size and occurs in a reclaimed (by nature) area of eroding asphalt. No wetland vegetation was observed. This feature was not discerned during the dry season visit.

ISPA-1. This isolated feature measures 0.10 acre in size and occurs in an area of fairly thin low-lying upland vegetative cover. The ground is densely compacted and may have formerly been asphalted. A few tufts of rabbitsfoot grass (FACW) and toad rush (FACW) were observed during the dry season visit. There was ever-so-slightly less vegetative cover in the feature area than in adjacent areas. Soil was not evaluated.

ISPA-3. This isolated feature measures 0.10 acre in size and occurs in an area of fairly thin low-lying upland vegetative cover. The ground is densely compacted and may have formerly been asphalted. There was less vegetative cover and more bare ground in the feature area than adjacent areas. No wetland vegetation was observed. Soil was not evaluated.

ISPA-15. This isolated feature measures 0.10 acre in size and occurs in an area of fairly thin low-lying upland vegetative cover. The ground is densely compacted and may have formerly been asphalted. There was less vegetative cover and more bare ground in the feature area than adjacent areas. No wetland vegetation was observed. Soil was not evaluated.

ISPA-34. This isolated feature measures 0.09 acre in size and occurs in an area of fairly thin low-lying vegetative cover. A noticeable amount of dried toad rush (FACW) was observed so delineation was attempted. A slight hummock interrupts the feature, and while the southern portion of the feature was dominated by toad rush, the northern portion of the feature contained dried spreading alkaliweed (FACW). The site also contained a small dried unidentified plant that, by its association with toad rush and alkaliweed, was presumed to also be FACW. Stinkwort (*Dittrichia graveolens*, UPL) and soft brome (*Bromus hordeaceous*, UPL) were also present in sizeable amounts. The Prevalence Index reflecting dry season conditions was 2.92, meeting the “less than or equal to 3.0” criterion to claim the presence of wetland vegetation. Several attempts were made to dig a soil pit, but the ground was too compacted to scratch below the top 1” of soil. No redoximorphic features were observed in the top inch, either in the soil or along dried roots; roots appeared to be limited to this extremely shallow depth.

ISPA-2. This isolated feature measures 0.04 acre in size and occurs in an area of sparse low-lying vegetative cover over former asphalt. This feature was not discerned from the surrounding area during the dry season visit. No wetland vegetation was observed and, excepting Indicator B7*: Inundation Visible on Aerial Imagery* no indicators of wetland hydrology were observed.

CLEAN WATER ACT ANALYSIS

Napa River is a Traditional Navigable Water and Public Trust marshes are “adjacent wetlands”.

Seasonal wetlands SPA-29 and SPA-35, though themselves lacking hydric soils, have seasonal surface water connectivity to jurisdictional wetlands.

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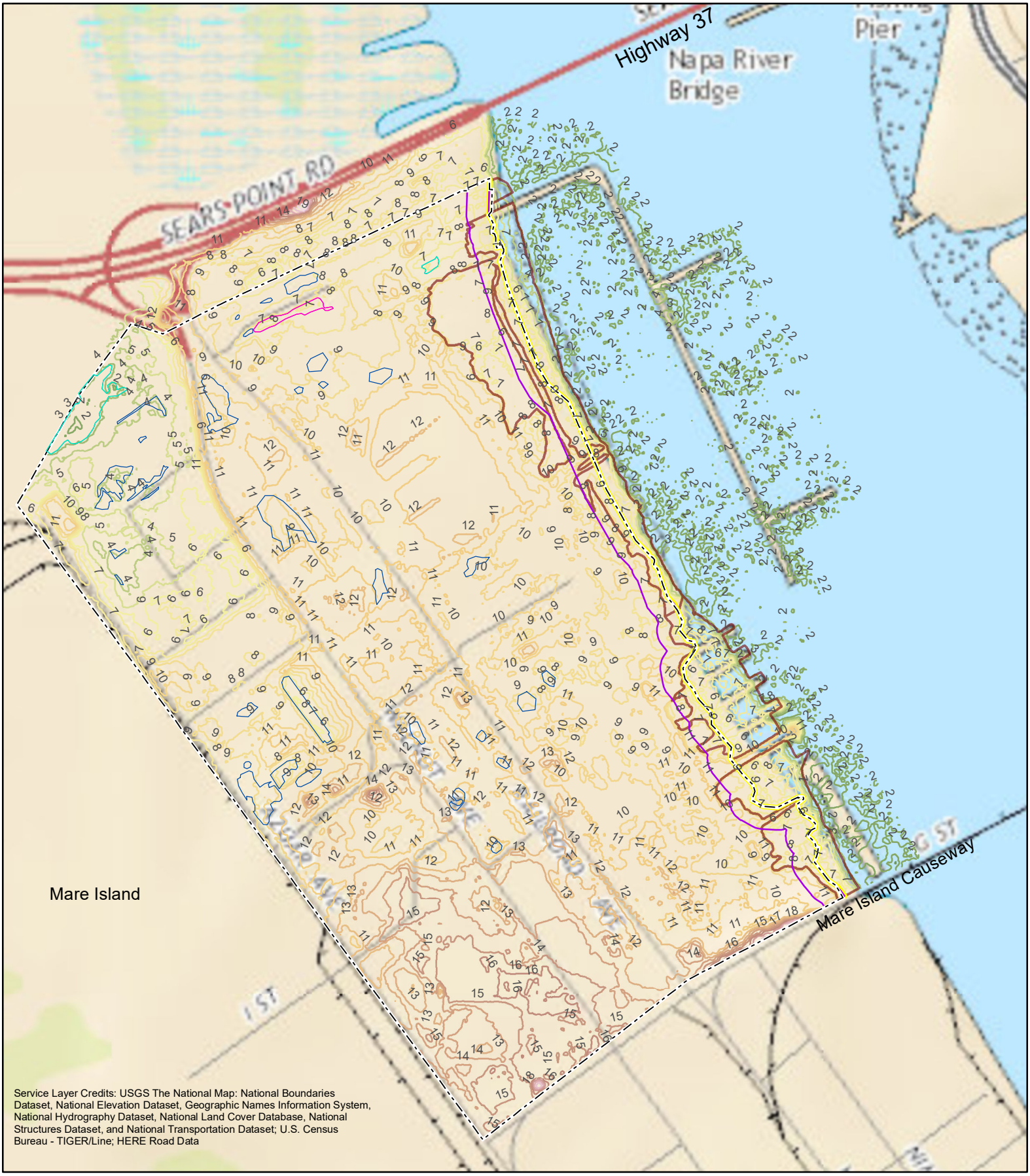
Appendices



Service Layer Credits: USGS The National Map: National Boundaries Dataset, National Elevation Dataset, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; U.S. Census Bureau - TIGER/Line; HERE Road Data

- WetlandStudyArea
- Seasonally Ponded Areas with Surface Connectivity (1.18 acres)
- Isolated Seasonally Ponded Areas (5.00 acres)
- Isolated Seasonally Ponded Areas
- SWL-13 (0.31 acre out of 5.00)
- BCDC Shoreline Band (3.7 additional upland acres)
- MHHW (NOAA GIS data/Elev not provided/Approx 6.5')
- Napa River Adjacent Wetlands (18.6 acres)

N

0 250 500 1,000 Feet

Project Zeus
Mare Island - Vallejo, CA
Appendix A - Site Elevation Map

SBI Swaim Biological Inc.

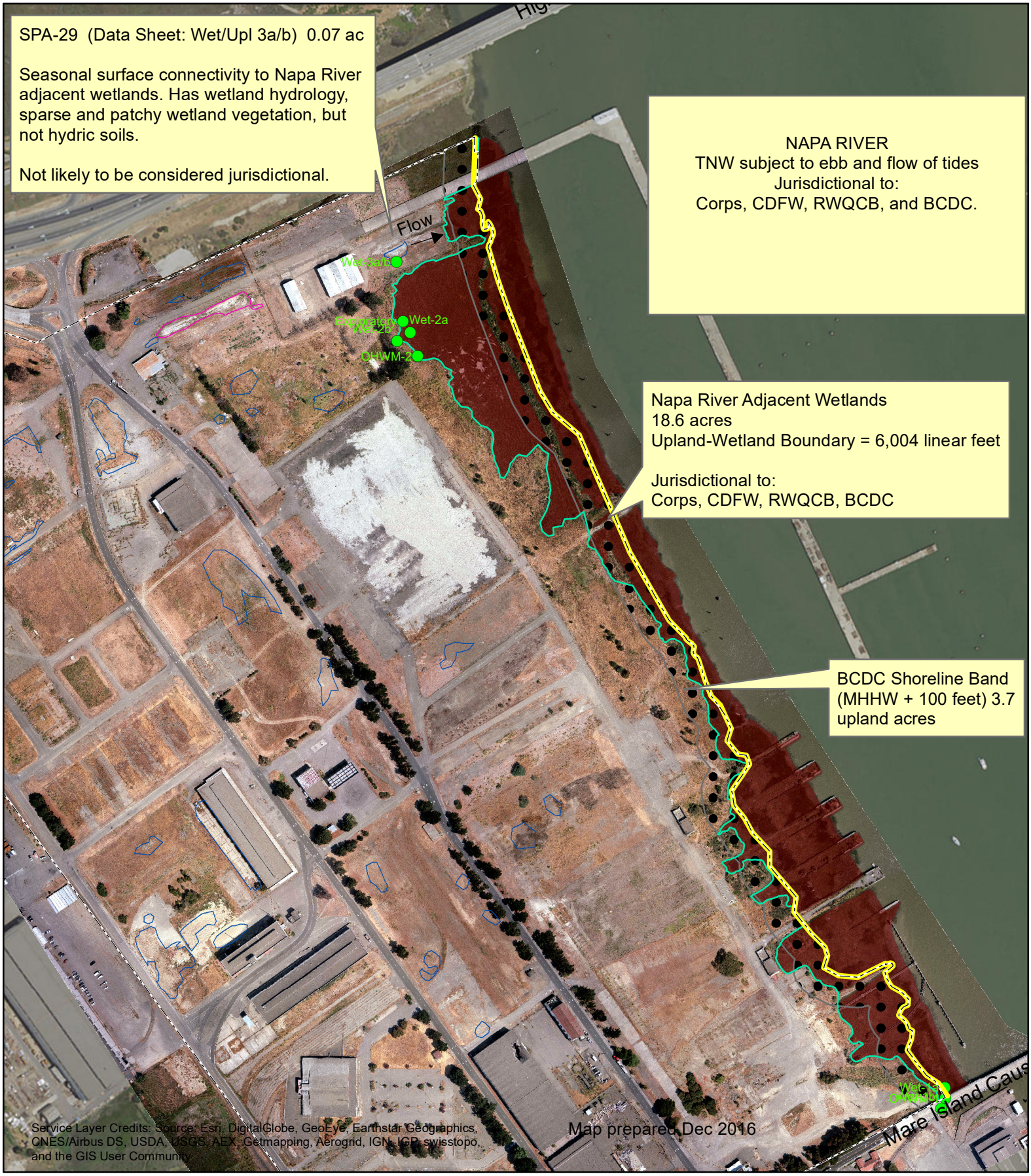
Wetland Study Area
Wetland Data Points
MHHW (NOAA GIS data/No elev provided/Approx. 6.5')
Upland-Wetland Boundary (6,004 lf)
BCDC Shoreline Band (3.7 additional upland acres)
Napa River Adjacent Wetlands (18.6 acres)
Seasonally Ponded Areas with Surface Connectivity (1.18 acres)
Isolated Seasonally Ponded Areas (5.00 acres)
Isolated Seasonally Ponded Areas
SWL-13 (0.31 acre out of 5.00)

N

0 250 500 1,000 Feet

Project Zeus
Mare Island - Vallejo, CA
Appendix A - Map Guide

SBI Swaim Biological Inc.



- Wetland Study Area
- Wetland Data Points
- Napa River Adjacent Wetlands (18.6 acres)
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Isolated Seasonally Ponded Areas (5.00 acres)

- Isolated Seasonally Ponded Areas
- SWL-13 (0.31 acre out of 5.00)

N

0 250 500 1,000 Feet

Project Zeus
Mare Island - Vallejo, CA
Appendix A - Map 1 of 6
Preliminary Delineation of Waters of the U.S.

SBI Swaim Biological Inc.

Wetland Data Points

Seasonally Ponded Areas with Surface Connectivity (1.18 acres)

Isolated Seasonally Ponded Areas (5.00 acres)

Isolated Seasonally Ponded Areas

SWL-13 (0.31 acre out of 5.00)

N

0 62.5 125 250

Feet

Project Zeus
Mare Island - Vallejo, CA
Appendix A - Map 2 of 6

SBI
Swaim Biological Inc.

Seasonally Ponded Areas with Surface Connectivity (1.18 acres)

Isolated Seasonally Ponded Areas (5.00 acres)

Isolated Seasonally Ponded Areas

SWL-13 (0.31 acre out of 5.00)

N

0 62.5 125 250

Feet

Project Zeus
Mare Island - Vallejo, CA
Appendix A - Map 3 of 6

SBI
Swaim Biological Inc.

Project Zeus
Mare Island - Vallejo, CA
Appendix A - Map 4 of 6

Isolated Seasonally Ponded Areas (5.00 acres)

Isolated Seasonally Ponded Areas

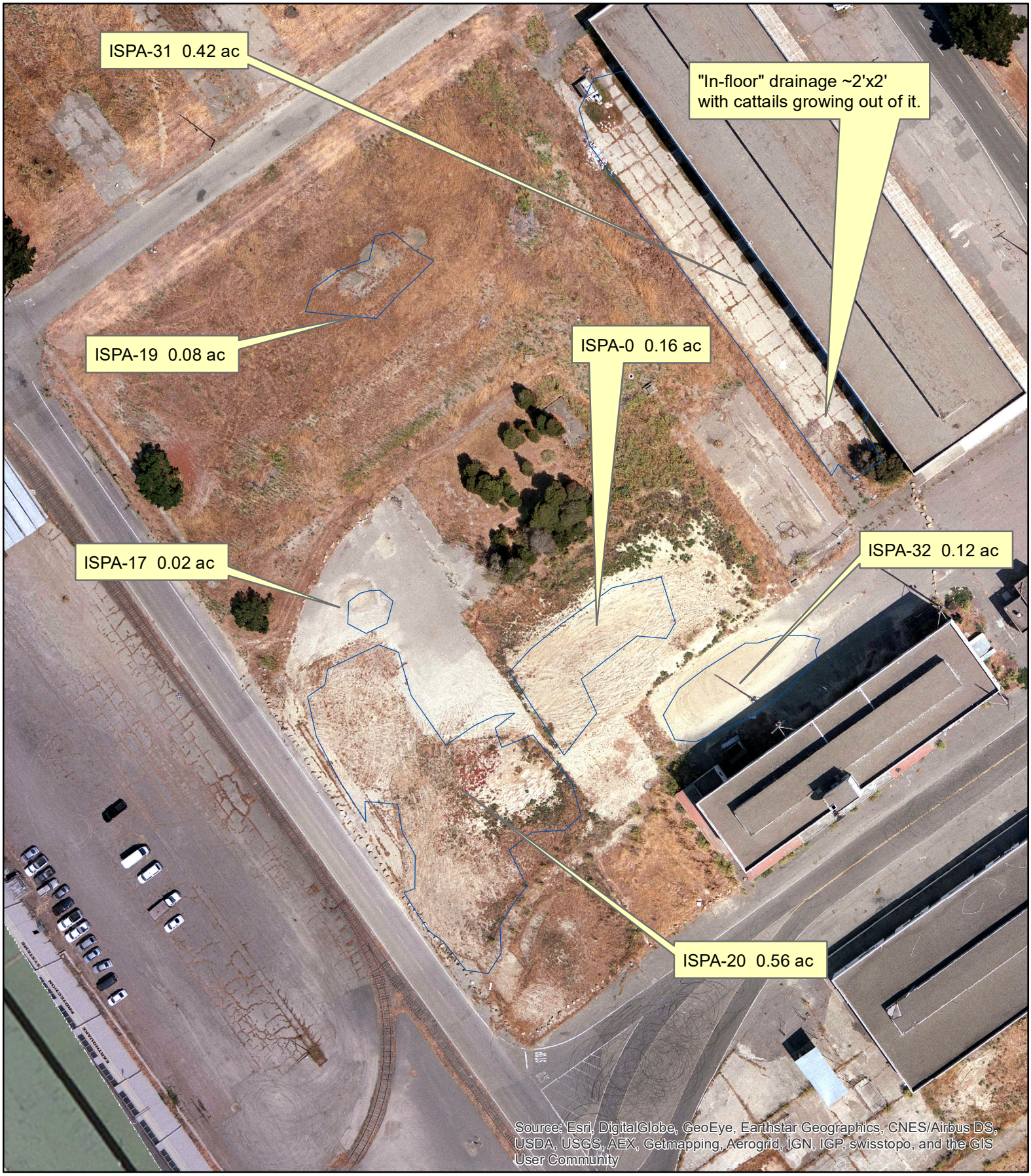
SWL-13 (0.31 acre out of 5.00)

N

0 62.5 125 250

Feet

SBI
Swaim Biological Inc.



Isolated Seasonally Ponded Areas (5.00 acres)

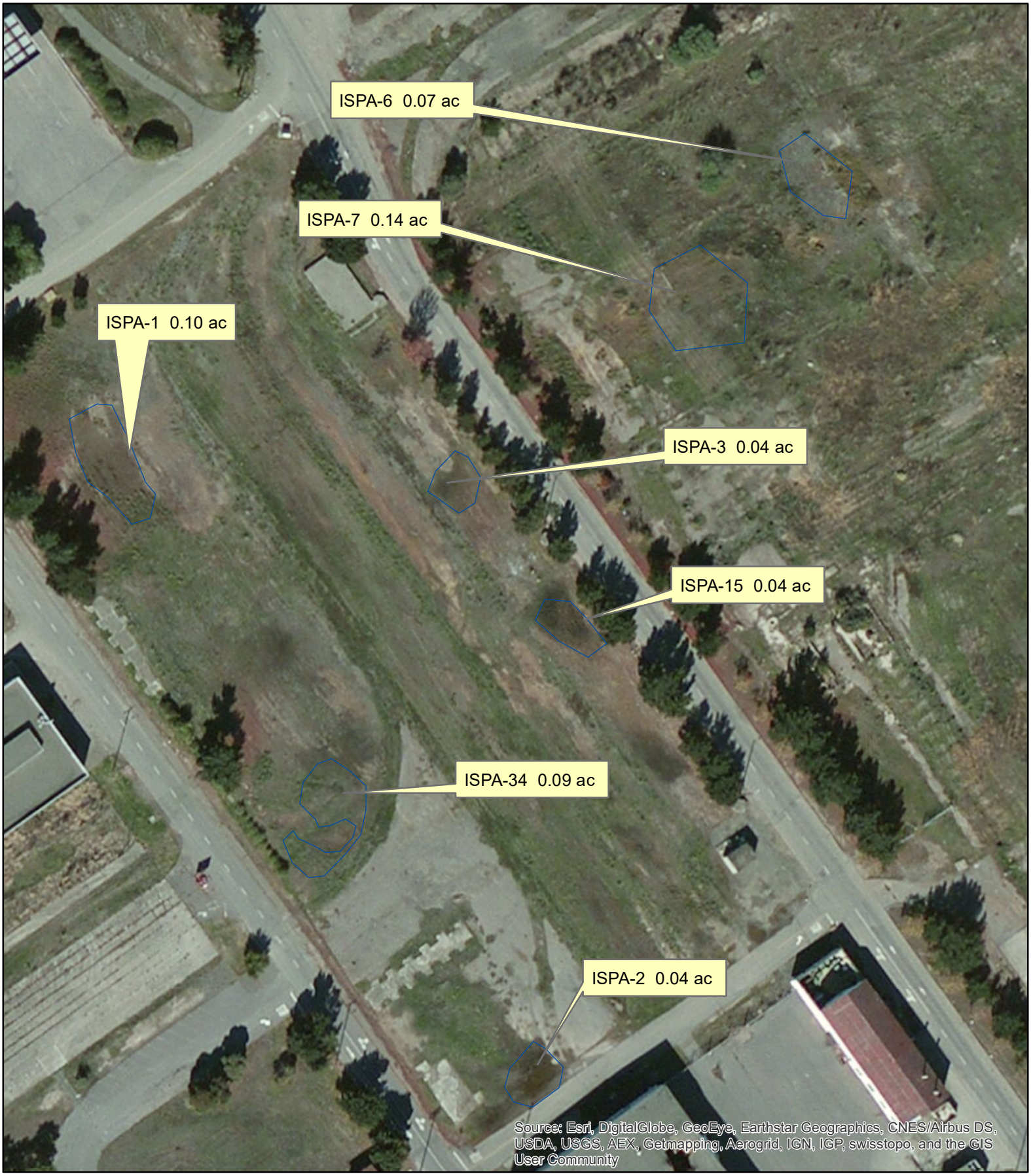
- Isolated Seasonally Ponded Areas
- SWL-13 (0.31 acre out of 5.00)

N

0 62.5 125 250 Fee

Project Zeus
Mare Island - Vallejo, CA
Appendix A - Map 5 of 6

SBI Swaim Biological Inc.



Isolated Seasonally Ponded Areas (5.00 acres)

- Isolated Seasonally Ponded Areas
- SWL-13 (0.31 acre out of 5.00)

N

0 62.5 125 250 Feet

Project Zeus
Mare Island - Vallejo, CA
Appendix A - Map 6 of 6

SBI Swaim Biological Inc.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Mare Island City/County: Solano Sampling Date: 8-31-16

Applicant/Owner: City of Vallejo State: CA Sampling Point: Vet-1a (wetland

Investigator(s): S. Willbrand, A. Chasey Section, Township, Range: unsurveyed

Landform (hillslope, terrace, etc.): riverbank marsh Local relief (concave, convex, none): none Slope (%): ~1%

Subregion (LRR): LRRC Lat: 38.109907 Long: -122.277537 Datum: NAD83

Soil Map Unit Name: Ma - Made land NWI classification: N/A

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:

Napa River adjacent wetlands subject to tidal influence.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 15 ft)			
1. Sarcocornia pacifica	85	Y	OBL
2. Jaumea carnosa	10		OBL
3. Schoenoplectus robustus	2		OBL
4.			
5.			
6.			
7.			
8.			
	97 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 3 % Cover of Biotic Crust 0

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 97	x 1 =	97
FACW species _____	x 2 =	_____
FAC species _____	x 3 =	_____
FACU species _____	x 4 =	_____
UPL species _____	x 5 =	_____
Column Totals: 97 (A)		97 (B)

Prevalence Index = B/A = 1

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:

Marshland, mostly pickleweed and jaumea. Inundated at high tide only.

SOIL

Sampling Point: pt-1a (wetla

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
0-13	5YR 3/1	85	5YR 4/6	15	C	M	silty clay	Redox features in the matrix at 15%; also occured on plastic trash in the sample pit at >80%

[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:

Sample pit is located within a tidally-influenced area of Napa River adjacent wetlands. Substrate is sticky, lacking recognizable fine organic material. Redox features were observed in the soil matrix at 15%. A plastic bag was present in the soil pit, with redox observed on the plastic bag at >80%. The capillary fringe went to the surface; soil was saturated.

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 Visible 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): 4

Saturation Present? (includes capillary fringe) Yes ✔ No ___ Depth (inches): 0

Wetland Hydrology Present? Yes ✔ No ___

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

Remarks:

Inundated only during high tide. Soil saturated to surface.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Mare Island City/County: Solano Sampling Date: 8-31-16

Applicant/Owner: City of Vallejo State: CA Sampling Point: Vet-1a (wetland

Investigator(s): S. Willbrand, A. Chasey Section, Township, Range: unsurveyed

Landform (hillslope, terrace, etc.): riverbank marsh Local relief (concave, convex, none): none Slope (%): ~1%

Subregion (LRR): LRRC Lat: 38.109907 Long: -122.277537 Datum: NAD83

Soil Map Unit Name: Ma - Made land NWI classification: N/A

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:

Napa River adjacent wetlands subject to tidal influence.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 15 ft)			
1. Sarcocornia pacifica	85	Y	OBL
2. Jaumea carnosa	10		OBL
3. Schoenoplectus robustus	2		OBL
4.			
5.			
6.			
7.			
8.			
	97 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 3 % Cover of Biotic Crust 0

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:	
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FACW species _____	x 2 =	_____
FAC species _____	x 3 =	_____
FACU species _____	x 4 =	_____
UPL species _____	x 5 =	_____
Column Totals: 97 (A)		97 (B)

Prevalence Index = B/A = 1

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:

Marshland, mostly pickleweed and jaumea. Inundated at high tide only.

SOIL

Sampling Point: pt-1a (wetla

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
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- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

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- ✔ 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.

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Type: _____

Depth (inches): _____

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Remarks:

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- ___ Oxidized Rhizospheres along Living Roots (C3)
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- ___ Other (Explain in Remarks)

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- ___ Drift Deposits (B3) (**Riverine**)
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- ___ 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): 4

Saturation Present? (includes capillary fringe) Yes ✔ No ___ Depth (inches): 0

Wetland Hydrology Present? Yes ✔ No ___

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

Remarks:

Inundated only during high tide. Soil saturated to surface.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Mare Island City/County: Solano Sampling Date: 8-31-16

Applicant/Owner: City of Vallejo State: CA Sampling Point: Vet-1a (wetland

Investigator(s): S. Willbrand, A. Chasey Section, Township, Range: unsurveyed

Landform (hillslope, terrace, etc.): riverbank marsh Local relief (concave, convex, none): none Slope (%): ~1%

Subregion (LRR): LRRC Lat: 38.109907 Long: -122.277537 Datum: NAD83

Soil Map Unit Name: Ma - Made land NWI classification: N/A

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:

Napa River adjacent wetlands subject to tidal influence.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 15 ft)			
1. Sarcocornia pacifica	85	Y	OBL
2. Jaumea carnosa	10		OBL
3. Schoenoplectus robustus	2		OBL
4.			
5.			
6.			
7.			
8.			
	97 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 3 % Cover of Biotic Crust 0

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 97	x 1 =	97
FACW species _____	x 2 =	_____
FAC species _____	x 3 =	_____
FACU species _____	x 4 =	_____
UPL species _____	x 5 =	_____
Column Totals: 97 (A)		97 (B)

Prevalence Index = B/A = 1

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:

Marshland, mostly pickleweed and jaumea. Inundated at high tide only.

SOIL

Sampling Point: pt-1a (wetla

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
0-13	5YR 3/1	85	5YR 4/6	15	C	M	silty clay	Redox features in the matrix at 15%; also occured on plastic trash in the sample pit at >80%

[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:

Sample pit is located within a tidally-influenced area of Napa River adjacent wetlands. Substrate is sticky, lacking recognizable fine organic material. Redox features were observed in the soil matrix at 15%. A plastic bag was present in the soil pit, with redox observed on the plastic bag at >80%. The capillary fringe went to the surface; soil was saturated.

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 Visible 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): 4

Saturation Present? (includes capillary fringe) Yes ✔ No ___ Depth (inches): 0

Wetland Hydrology Present? Yes ✔ No ___

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

Remarks:

Inundated only during high tide. Soil saturated to surface.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Mare Island City/County: Solano Sampling Date: 8-31-16

Applicant/Owner: City of Vallejo State: CA Sampling Point: Vet-1a (wetland

Investigator(s): S. Willbrand, A. Chasey Section, Township, Range: unsurveyed

Landform (hillslope, terrace, etc.): riverbank marsh Local relief (concave, convex, none): none Slope (%): ~1%

Subregion (LRR): LRRC Lat: 38.109907 Long: -122.277537 Datum: NAD83

Soil Map Unit Name: Ma - Made land NWI classification: N/A

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:

Napa River adjacent wetlands subject to tidal influence.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 15 ft)			
1. Sarcocornia pacifica	85	Y	OBL
2. Jaumea carnosa	10		OBL
3. Schoenoplectus robustus	2		OBL
4.			
5.			
6.			
7.			
8.			
	97 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 3 % Cover of Biotic Crust 0

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 97	x 1 =	97
FACW species _____	x 2 =	_____
FAC species _____	x 3 =	_____
FACU species _____	x 4 =	_____
UPL species _____	x 5 =	_____
Column Totals: 97 (A)		97 (B)

Prevalence Index = B/A = 1

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:

Marshland, mostly pickleweed and jaumea. Inundated at high tide only.

SOIL

Sampling Point: pt-1a (wetla

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
0-13	5YR 3/1	85	5YR 4/6	15	C	M	silty clay	Redox features in the matrix at 15%; also occured on plastic trash in the sample pit at >80%

[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:

Sample pit is located within a tidally-influenced area of Napa River adjacent wetlands. Substrate is sticky, lacking recognizable fine organic material. Redox features were observed in the soil matrix at 15%. A plastic bag was present in the soil pit, with redox observed on the plastic bag at >80%. The capillary fringe went to the surface; soil was saturated.

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 Visible 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): 4

Saturation Present? (includes capillary fringe) Yes ✔ No ___ Depth (inches): 0

Wetland Hydrology Present? Yes ✔ No ___

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

Remarks:

Inundated only during high tide. Soil saturated to surface.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Mare Island City/County: Solano Sampling Date: 8-31-16

Applicant/Owner: City of Vallejo State: CA Sampling Point: Vet-1a (wetland

Investigator(s): S. Willbrand, A. Chasey Section, Township, Range: unsurveyed

Landform (hillslope, terrace, etc.): riverbank marsh Local relief (concave, convex, none): none Slope (%): ~1%

Subregion (LRR): LRRC Lat: 38.109907 Long: -122.277537 Datum: NAD83

Soil Map Unit Name: Ma - Made land NWI classification: N/A

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:

Napa River adjacent wetlands subject to tidal influence.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 15 ft)			
1. Sarcocornia pacifica	85	Y	OBL
2. Jaumea carnosa	10		OBL
3. Schoenoplectus robustus	2		OBL
4.			
5.			
6.			
7.			
8.			
	97 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 3 % Cover of Biotic Crust 0

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 97	x 1 =	97
FACW species _____	x 2 =	_____
FAC species _____	x 3 =	_____
FACU species _____	x 4 =	_____
UPL species _____	x 5 =	_____
Column Totals: 97 (A)		97 (B)

Prevalence Index = B/A = 1

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:

Marshland, mostly pickleweed and jaumea. Inundated at high tide only.

SOIL

Sampling Point: pt-1a (wetla

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
0-13	5YR 3/1	85	5YR 4/6	15	C	M	silty clay	Redox features in the matrix at 15%; also occured on plastic trash in the sample pit at >80%

[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:

Sample pit is located within a tidally-influenced area of Napa River adjacent wetlands. Substrate is sticky, lacking recognizable fine organic material. Redox features were observed in the soil matrix at 15%. A plastic bag was present in the soil pit, with redox observed on the plastic bag at >80%. The capillary fringe went to the surface; soil was saturated.

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 Visible 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): 4

Saturation Present? (includes capillary fringe) Yes ✔ No ___ Depth (inches): 0

Wetland Hydrology Present? Yes ✔ No ___

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

Remarks:

Inundated only during high tide. Soil saturated to surface.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Mare Island City/County: Solano Sampling Date: 8-31-16

Applicant/Owner: City of Vallejo State: CA Sampling Point: Vet-1a (wetland

Investigator(s): S. Willbrand, A. Chasey Section, Township, Range: unsurveyed

Landform (hillslope, terrace, etc.): riverbank marsh Local relief (concave, convex, none): none Slope (%): ~1%

Subregion (LRR): LRRC Lat: 38.109907 Long: -122.277537 Datum: NAD83

Soil Map Unit Name: Ma - Made land NWI classification: N/A

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:

Napa River adjacent wetlands subject to tidal influence.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
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5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 15 ft)			
1. Sarcocornia pacifica	85	Y	OBL
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3. Schoenoplectus robustus	2		OBL
4.			
5.			
6.			
7.			
8.			
	97 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 3 % Cover of Biotic Crust 0

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 97	x 1 =	97
FACW species _____	x 2 =	_____
FAC species _____	x 3 =	_____
FACU species _____	x 4 =	_____
UPL species _____	x 5 =	_____
Column Totals: 97 (A)		97 (B)

Prevalence Index = B/A = 1

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:

Marshland, mostly pickleweed and jaumea. Inundated at high tide only.

SOIL

Sampling Point: pt-1a (wetla

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
0-13	5YR 3/1	85	5YR 4/6	15	C	M	silty clay	Redox features in the matrix at 15%; also occured on plastic trash in the sample pit at >80%

[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:

Sample pit is located within a tidally-influenced area of Napa River adjacent wetlands. Substrate is sticky, lacking recognizable fine organic material. Redox features were observed in the soil matrix at 15%. A plastic bag was present in the soil pit, with redox observed on the plastic bag at >80%. The capillary fringe went to the surface; soil was saturated.

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 Visible 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): 4

Saturation Present? (includes capillary fringe) Yes ✔ No ___ Depth (inches): 0

Wetland Hydrology Present? Yes ✔ No ___

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

Remarks:

Inundated only during high tide. Soil saturated to surface.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Mare Island City/County: Solano Sampling Date: 8-31-16

Applicant/Owner: City of Vallejo State: CA Sampling Point: Vet-1a (wetland

Investigator(s): S. Willbrand, A. Chasey Section, Township, Range: unsurveyed

Landform (hillslope, terrace, etc.): riverbank marsh Local relief (concave, convex, none): none Slope (%): ~1%

Subregion (LRR): LRRC Lat: 38.109907 Long: -122.277537 Datum: NAD83

Soil Map Unit Name: Ma - Made land NWI classification: N/A

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:

Napa River adjacent wetlands subject to tidal influence.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 15 ft)			
1. Sarcocornia pacifica	85	Y	OBL
2. Jaumea carnosa	10		OBL
3. Schoenoplectus robustus	2		OBL
4.			
5.			
6.			
7.			
8.			
	97 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 3 % Cover of Biotic Crust 0

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 97	x 1 =	97
FACW species _____	x 2 =	_____
FAC species _____	x 3 =	_____
FACU species _____	x 4 =	_____
UPL species _____	x 5 =	_____
Column Totals: 97 (A)		97 (B)

Prevalence Index = B/A = 1

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:

Marshland, mostly pickleweed and jaumea. Inundated at high tide only.

SOIL

Sampling Point: pt-1a (wetla

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
0-13	5YR 3/1	85	5YR 4/6	15	C	M	silty clay	Redox features in the matrix at 15%; also occured on plastic trash in the sample pit at >80%

[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:

Sample pit is located within a tidally-influenced area of Napa River adjacent wetlands. Substrate is sticky, lacking recognizable fine organic material. Redox features were observed in the soil matrix at 15%. A plastic bag was present in the soil pit, with redox observed on the plastic bag at >80%. The capillary fringe went to the surface; soil was saturated.

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 Visible 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): 4

Saturation Present? (includes capillary fringe) Yes ✔ No ___ Depth (inches): 0

Wetland Hydrology Present? Yes ✔ No ___

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

Remarks:

Inundated only during high tide. Soil saturated to surface.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Mare Island City/County: Solano Sampling Date: 8-31-16

Applicant/Owner: City of Vallejo State: CA Sampling Point: Vet-1a (wetland

Investigator(s): S. Willbrand, A. Chasey Section, Township, Range: unsurveyed

Landform (hillslope, terrace, etc.): riverbank marsh Local relief (concave, convex, none): none Slope (%): ~1%

Subregion (LRR): LRRC Lat: 38.109907 Long: -122.277537 Datum: NAD83

Soil Map Unit Name: Ma - Made land NWI classification: N/A

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:

Napa River adjacent wetlands subject to tidal influence.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 15 ft)			
1. Sarcocornia pacifica	85	Y	OBL
2. Jaumea carnosa	10		OBL
3. Schoenoplectus robustus	2		OBL
4.			
5.			
6.			
7.			
8.			
	97 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 3 % Cover of Biotic Crust 0

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 97	x 1 =	97
FACW species _____	x 2 =	_____
FAC species _____	x 3 =	_____
FACU species _____	x 4 =	_____
UPL species _____	x 5 =	_____
Column Totals: 97 (A)		97 (B)

Prevalence Index = B/A = 1

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:

Marshland, mostly pickleweed and jaumea. Inundated at high tide only.

SOIL

Sampling Point: pt-1a (wetla

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
0-13	5YR 3/1	85	5YR 4/6	15	C	M	silty clay	Redox features in the matrix at 15%; also occured on plastic trash in the sample pit at >80%

[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:

Sample pit is located within a tidally-influenced area of Napa River adjacent wetlands. Substrate is sticky, lacking recognizable fine organic material. Redox features were observed in the soil matrix at 15%. A plastic bag was present in the soil pit, with redox observed on the plastic bag at >80%. The capillary fringe went to the surface; soil was saturated.

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 Visible 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): 4

Saturation Present? (includes capillary fringe) Yes ✔ No ___ Depth (inches): 0

Wetland Hydrology Present? Yes ✔ No ___

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

Remarks:

Inundated only during high tide. Soil saturated to surface.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Mare Island City/County: Solano Sampling Date: 8-31-16

Applicant/Owner: City of Vallejo State: CA Sampling Point: Vet-1a (wetland

Investigator(s): S. Willbrand, A. Chasey Section, Township, Range: unsurveyed

Landform (hillslope, terrace, etc.): riverbank marsh Local relief (concave, convex, none): none Slope (%): ~1%

Subregion (LRR): LRRC Lat: 38.109907 Long: -122.277537 Datum: NAD83

Soil Map Unit Name: Ma - Made land NWI classification: N/A

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:

Napa River adjacent wetlands subject to tidal influence.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 15 ft)			
1. Sarcocornia pacifica	85	Y	OBL
2. Jaumea carnosa	10		OBL
3. Schoenoplectus robustus	2		OBL
4.			
5.			
6.			
7.			
8.			
	97 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 3 % Cover of Biotic Crust 0

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 97	x 1 =	97
FACW species _____	x 2 =	_____
FAC species _____	x 3 =	_____
FACU species _____	x 4 =	_____
UPL species _____	x 5 =	_____
Column Totals: 97 (A)		97 (B)

Prevalence Index = B/A = 1

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:

Marshland, mostly pickleweed and jaumea. Inundated at high tide only.

SOIL

Sampling Point: pt-1a (wetla

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
0-13	5YR 3/1	85	5YR 4/6	15	C	M	silty clay	Redox features in the matrix at 15%; also occured on plastic trash in the sample pit at >80%

[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:

Sample pit is located within a tidally-influenced area of Napa River adjacent wetlands. Substrate is sticky, lacking recognizable fine organic material. Redox features were observed in the soil matrix at 15%. A plastic bag was present in the soil pit, with redox observed on the plastic bag at >80%. The capillary fringe went to the surface; soil was saturated.

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 Visible 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): 4

Saturation Present? (includes capillary fringe) Yes ✔ No ___ Depth (inches): 0

Wetland Hydrology Present? Yes ✔ No ___

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

Remarks:

Inundated only during high tide. Soil saturated to surface.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Mare Island City/County: Solano Sampling Date: 8-31-16

Applicant/Owner: City of Vallejo State: CA Sampling Point: Vet-1a (wetland

Investigator(s): S. Willbrand, A. Chasey Section, Township, Range: unsurveyed

Landform (hillslope, terrace, etc.): riverbank marsh Local relief (concave, convex, none): none Slope (%): ~1%

Subregion (LRR): LRRC Lat: 38.109907 Long: -122.277537 Datum: NAD83

Soil Map Unit Name: Ma - Made land NWI classification: N/A

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:

Napa River adjacent wetlands subject to tidal influence.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 15 ft)			
1. Sarcocornia pacifica	85	Y	OBL
2. Jaumea carnosa	10		OBL
3. Schoenoplectus robustus	2		OBL
4.			
5.			
6.			
7.			
8.			
	97 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 3 % Cover of Biotic Crust 0

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 97	x 1 =	97
FACW species _____	x 2 =	_____
FAC species _____	x 3 =	_____
FACU species _____	x 4 =	_____
UPL species _____	x 5 =	_____
Column Totals: 97 (A)		97 (B)

Prevalence Index = B/A = 1

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:

Marshland, mostly pickleweed and jaumea. Inundated at high tide only.

SOIL

Sampling Point: pt-1a (wetla

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
0-13	5YR 3/1	85	5YR 4/6	15	C	M	silty clay	Redox features in the matrix at 15%; also occured on plastic trash in the sample pit at >80%

[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:

Sample pit is located within a tidally-influenced area of Napa River adjacent wetlands. Substrate is sticky, lacking recognizable fine organic material. Redox features were observed in the soil matrix at 15%. A plastic bag was present in the soil pit, with redox observed on the plastic bag at >80%. The capillary fringe went to the surface; soil was saturated.

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 Visible 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): 4

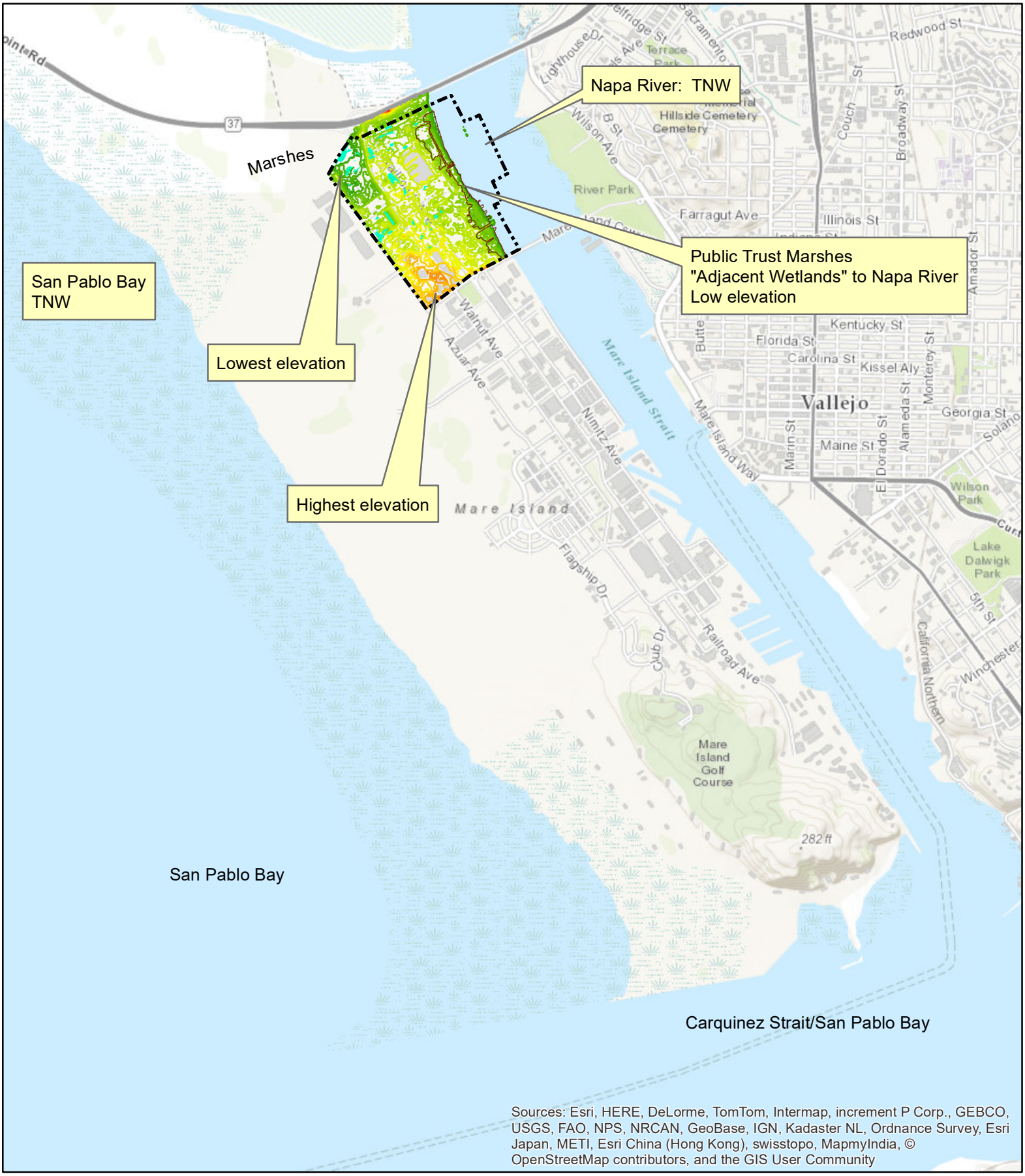
Saturation Present? (includes capillary fringe) Yes ✔ No ___ Depth (inches): 0

Wetland Hydrology Present? Yes ✔ No ___

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

Remarks:

Inundated only during high tide. Soil saturated to surface.



Elevation (ft)

- 4-7
- 8-12
- 13-15
- 16+

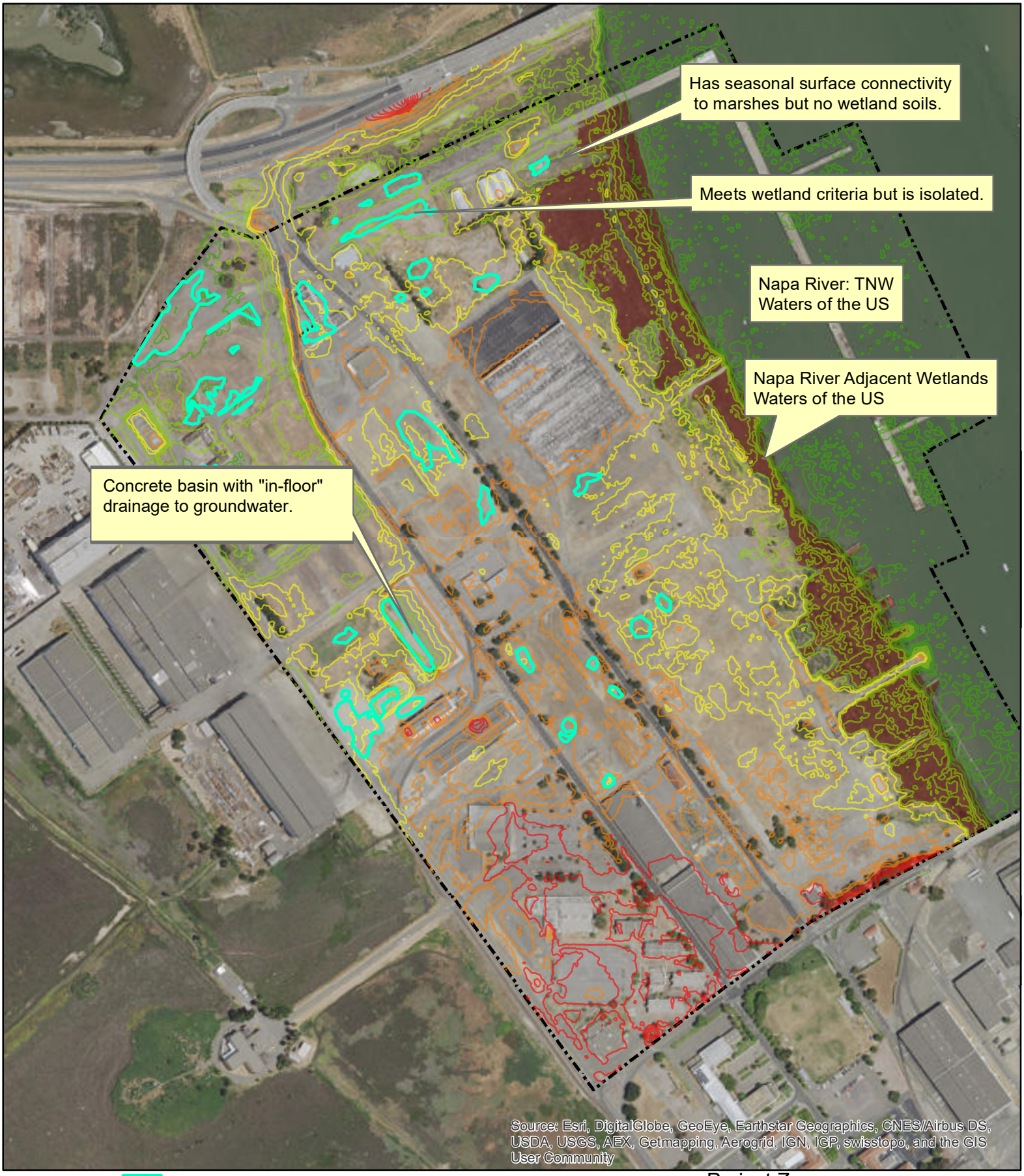
- Ponded Areas
- Napa River Adjacent Wetlands
- Study Area

N

0 .25 .5 1 Miles

Project Zeus
Mare Island - Vallejo, CA
Figure C-1 - Jurisdictional Determination Analysis Map:
Connection to TNW

SBI Swaim Biological Inc.



Elevation (ft)

- 1 - 4
- 5 - 8
- 9 - 10
- 11 - 13
- 14 - 21

Ponded Areas

Napa River Adjacent Wetlands

Study Area

N

0 250 500 1,000 Feet

Project Zeus
Mare Island - Vallejo, CA
Figure C-2 - Corps Jurisdictional Determination Analysis Map

SBI Swaim Biological Inc.

Elevation (ft)

- 1 - 4
- 5 - 8
- 9 - 10
- 11 - 13
- 14 - 21

Ponded Areas

Napa River Adjacent Wetlands

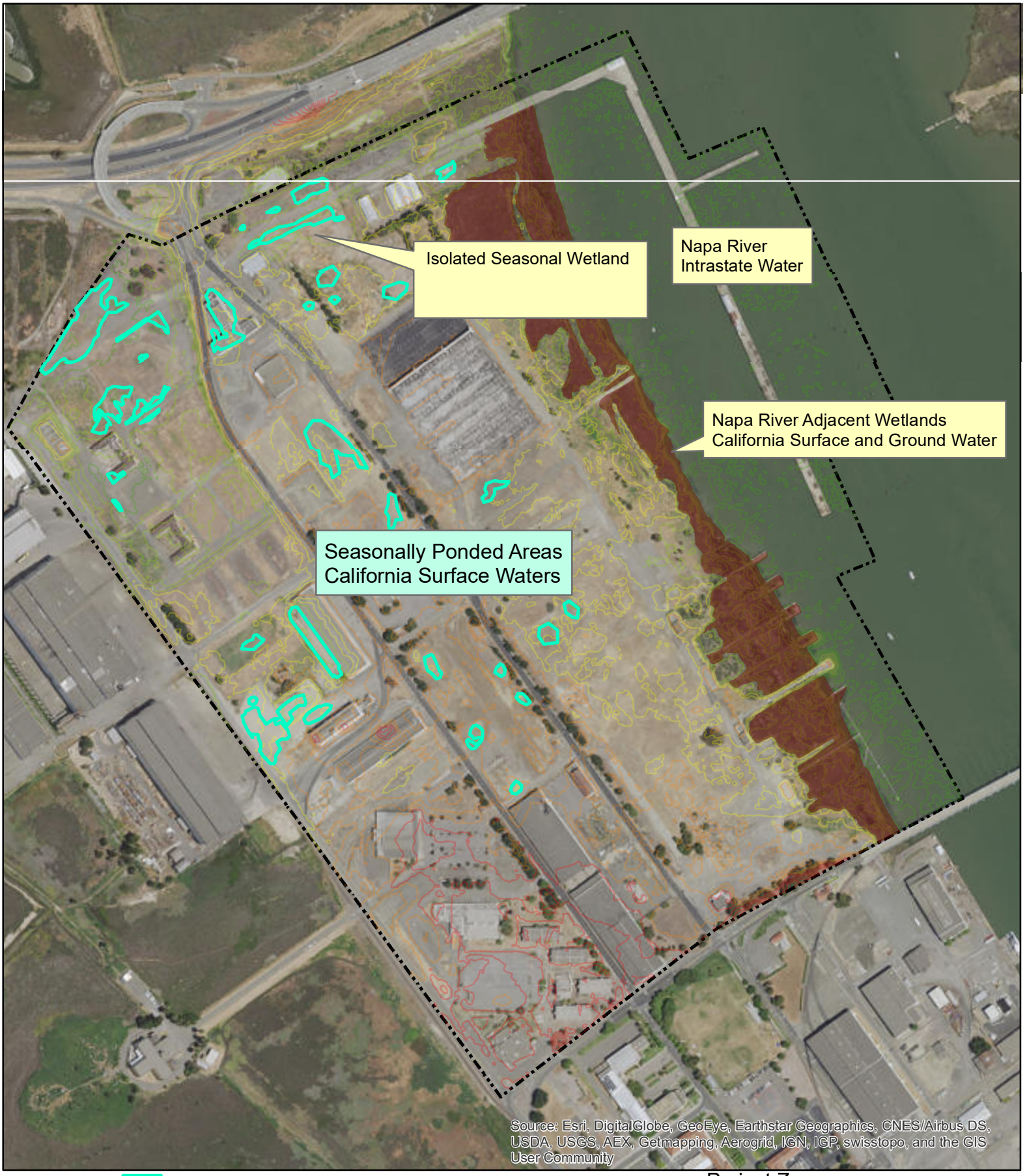
Study Area

N

0 250 500 1,000 Feet

Project Zeus
Mare Island - Vallejo, CA
Figure C-3 - CDFW Jurisdictional Determination Analysis Map

SBI
Swaim Biological Inc.



Elevation (ft)

- 1 - 4
- 5 - 8
- 9 - 10
- 11 - 13
- 14 - 21

Ponded Areas

Napa River Adjacent Wetlands

Study Area

N

0 250 500 1,000 Feet

Project Zeus
Mare Island - Vallejo, CA
Figure C-4 - RWQCB Jurisdictional Determination Analysis Map

SBI
Swaim Biological Inc.

Mean High High Water (MHHW)
Shoreline Band 100' inland from MHHW
Napa River Adjacent Wetlands
Study Area

N

0 250 500 1,000
Feet

Project Zeus
Mare Island - Vallejo, CA
Figure C-5 - BCDC Jurisdictional Determination Analysis Map

SBI
Swaim Biological Inc.

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 Solano County, California

Mare Island Project Site

August 24, 2016

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 (http://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.

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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.

Custom Soil Resource Report
Soil Map

Map Scale: 1:9,280 if printed on A portrait (8.5" x 11") sheet.

N

0 100 200 400 600 Meters

0 450 900 1800 2700 Feet

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: http://websoilsurvey.nrcs.usda.gov
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: Solano County, California
Survey Area Data: Version 9, Sep 23, 2015

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

Date(s) aerial images were photographed: Nov 2, 2010—Jun 17, 2015

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

Solano County, California (CA095)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
Ma	Made land	187.3	100.0%
Totals for Area of Interest		**187.3**	**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.

Solano County, California

Ma—Made land

Map Unit Setting

National map unit symbol: h9ln
Elevation: 0 to 2,500 feet
Farmland classification: Not prime farmland

Map Unit Composition

Made land: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Made Land

Setting

Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mine spoil or earthy fill

Typical profile

H1 - 0 to 60 inches: variable

Interpretive groups

Land capability classification (irrigated): 8
Land capability classification (nonirrigated): 8
Hydric soil rating: No

Minor Components

Valdez

Percent of map unit: 5 percent
Landform: Alluvial fans
Hydric soil rating: Yes

Unnamed

Percent of map unit: 5 percent
Hydric soil rating: No

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USDA Field Office Climate Data

WETS Station : VALLEJO, CA9219 Creation Date: 10/20/2016
Latitude: 3806 Longitude: 12211 Elevation: 00341
State FIPS/County(FIPS): 06095 County Name: Solano
Start yr. - 1971 End yr. - 2000

Month	Temperature (Degrees F.) avg daily max	avg daily min	avg	Precipitation (Inches) avg	30% chance will have less than	30% chance will have more than	avg # of days w/.1 or more	avg total snow fall
January							10	0.0
February							14	0.0
March							8	0.0
April							3	0.0
May							3	0.0
June							0	0.0
July							0	0.0
August							0	0.0
September							0	0.0
October							2	0.0
November							6	0.0
December							3	0.0
Annual	-----	-----	-----	------			--	----
Average				------	------	------	--	----
Average	-----	-----	-----		------	------	46	0.0

GROWING SEASON DATES

Probability	Temperature 24 F or higher	28 F or higher	32 F or higher
	Beginning and Ending Dates Growing Season Length		
50 percent *			
70 percent *			

---

* Percent chance of the growing season occurring between the Beginning and Ending dates.

total 1998-2016 prcp

Station : CA9219, VALLEJO
------- Unit = inches

yr	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec	annl
98		13.21	2.52	1.57	M3.03	0.00	0.00	0.00	0.05	0.66	M4.43	0.91	26.38
99	2.26	M6.65	1.94	M2.35	M0.20	0.00	0.00	0.00	0.00	M0.60	2.37	M1.78	18.15
0	7.03	9.73	3.19	0.94	M0.82	0.25	0.00	0.04	0.10	M2.25	M2.13	0.95	27.43
1	M3.18	2.50	M1.17	1.00	M0.00	M0.00	0.00	0.00	0.40	0.43	M2.02	M7.11	17.81
2	M1.95	M1.39	M1.62	M0.72	M1.27	0.00	0.00	0.00	0.00	0.00	2.10	M3.58	12.63
3	2.26	M1.54	M1.66	3.98	M0.95	0.00	0.00	0.00	0.00	0.00	M1.26	M2.15	13.80
4	M1.07	M5.28	0.69	0.13	0.01	M0.00	0.00	0.00	0.00	M0.92	M2.59	M0.50	11.19
5	M2.38	2.28	M4.59	1.46	3.02	0.06	0.00	0.00	M0.00	M0.00	M0.00	M3.36	17.15
6	M0.21	M3.19	M8.99	M2.51	M0.00	0.00	0.00	0.00	M0.00			M0.00	14.90
7	M0.00	M0.55	M0.00	M0.00	M0.00	M0.00	M0.00						0.55
8													
9													
10													
11													
12													
13													
14													
15			0.08	1.08	M0.00	M0.06	0.01	0.00	M0.06	M0.11	1.35	M2.73	5.48
16	M5.99	M0.81	M4.95	0.99	M0.35	M0.00	0.00	M0.00	M0.00	M0.83			13.92

Product generated by ACIS - NOAA Regional Climate Centers.

USDA Field Office Climate Data

WETS Station : FAIRFIELD, CA2934 Creation Date: 10/21/2016
Latitude: 3816 Longitude: 12204 Elevation: 00040
State FIPS/County(FIPS): 06095 County Name: Solano
Start yr. - 1971 End yr. - 2000

Month	Temperature (Degrees F.) avg daily max	avg daily min	avg	Precipitation (Inches) avg	30% chance will have less than	more than	avg # of days w/.1 or more	avg total snow fall
January	54.7	37.5	46.1	5.04	2.11	6.13	8	0.0
February	61.2	40.9	51.1	4.57	1.64	5.50	7	0.0
March	65.6	43.9	54.8	3.59	1.55	4.37	7	0.0
April	71.4	46.3	58.9	1.12	0.43	1.35	3	0.0
May	78.1	50.6	64.4	0.64	0.05	0.67	1	0.0
June	84.7	54.1	69.4	0.16	0.00	0.10	0	0.0
July	88.8	56.4	72.6	0.03	NA	NA	0	0.0
August	88.7	56.5	72.6	0.05	0.00	0.00	0	0.0
September	86.3	54.5	70.4	0.30	0.00	0.33	1	0.0
October	78.3	49.9	64.1	1.24	0.42	1.51	2	0.0
November	64.8	42.9	53.9	3.08	1.03	3.68	5	0.0
December	55.6	36.9	46.3	3.64	1.63	4.49	6	0.1
Annual	-----	-----	-----	------	17.80	27.29	--	----
Average	73.2	47.5	60.4	------	------	------	--	----
Average	-----	-----	-----	23.46	------	------	41	0.1

GROWING SEASON DATES

Probability	Temperature 24 F or higher	28 F or higher	32 F or higher
	Beginning and Ending Dates Growing Season Length		
50 percent *			2/ 9 to 12/ 6 300 days
70 percent *			1/30 to 12/16 320 days

* Percent chance of the growing season occurring between the Beginning and Ending dates.

total 1950-2016 prcp

Station : CA2934, FAIRFIELD
------- Unit = inches

yr	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec	annl
50												M3.86	3.86
51	3.40	2.10	2.19	0.98	M0.83	0.00	0.00	0.00	M0.00	M1.28	4.84	8.25	23.87
52	9.00	M1.31	2.68	0.77	0.27	0.40	M0.00	0.00	M0.00	M0.00	M2.08	M7.79	24.30
53	4.31	0.00	M2.26	M2.58	M0.35	M0.38	0.00	0.04	M0.00	M0.00	M2.93	0.72	13.57
54	M3.02	2.94	M2.76	1.97	0.17	M0.00	M0.00	M0.00	0.00	M0.00	M0.00	M4.96	15.82
55	3.16	M1.61	0.53	2.21	0.32	M0.00	M0.00	0.00	0.28	M0.05	2.06	13.66	23.88
56	7.89	2.11	M0.32	1.10	M0.08	0.04	0.00	0.00	0.55	M0.41	0.12	M0.33	12.95
57	M2.48	4.46	M1.69	1.61	M0.73	0.00	M0.00	M0.00	M0.41	3.66	0.37	2.73	18.14
58	M4.22	9.55	6.02	4.33	0.64	0.33	0.15	0.07	0.04	0.13	0.08	1.10	26.66
59	5.19	5.59	1.05	0.19	0.00	0.00	0.00	0.00	2.49	0.00	0.00	2.34	16.85
60	3.11	4.79	2.21	1.05	0.74	0.00	0.00	0.00	0.00	0.13	M3.01	1.55	16.59
61	4.06	0.96	1.92	0.71	0.20	0.04	0.00	0.05	0.15	M0.18	4.01	2.34	14.62
62	0.80	6.25	3.05	0.22	0.00	0.00	0.00	0.00	0.00	7.85	0.16	2.58	20.91
63	5.32	2.67	3.59	5.49	0.45	0.09	0.00	0.00	0.40	1.77	2.80	0.48	23.06
64	3.22	0.00	1.91	0.12	0.22	0.93	0.04	0.05	0.00	2.23	2.85	5.01	16.58
65	4.34	0.00	1.35	2.94	0.12	0.00	0.00	0.43	0.00	0.00	M4.94	M2.63	16.75
66	4.46	2.49	0.26	0.34	0.45	0.00	0.08	0.18	0.37	0.00	5.68	4.39	18.70
67	9.90	0.31	4.17	4.78	0.12	1.45	0.00	0.00	0.05	0.36	1.36	1.75	24.25
68	4.93	3.11	2.31	0.29	0.40	0.00	0.00	1.18	0.00	0.75	3.55	4.44	20.96
69	9.80	7.04	1.95	1.25	0.00	0.10	0.00	0.00	0.00	2.12	0.46	6.16	28.88
70	11.75	1.36	1.86	0.16	0.00	0.39	0.00	0.00	0.00	0.76	5.94	6.00	28.22
71	1.86	0.26	2.72	0.22	0.69	0.00	0.00	0.00	0.15	0.06	2.20	4.16	12.32
72	1.30	1.54	0.19	1.00	0.02	0.20	0.00	0.00	0.98	4.60	6.73	1.67	18.23
73	11.54	5.62	2.71	0.19	0.14	0.00	0.00	0.00	0.35	1.66	7.20	4.73	34.14
74	3.64	1.06	4.61	1.80	0.11	0.00	0.60	0.00	0.00	1.29	0.88	3.79	17.78
75	1.16	7.03	5.58	1.13	0.07	0.10	0.06	0.14	0.03	3.50	0.44	0.30	19.54
76	0.52	1.31	1.89	0.86	0.00	0.01	0.00	0.66		0.33	1.02	1.26	7.86
77	1.89	1.06	2.13	0.14	0.81	0.00	0.00	0.00	1.08	0.42	5.44	5.51	18.48
78	9.73	5.25	5.12	2.02	0.05	0.05	0.00	0.00	0.23	0.00	1.67	0.84	24.96
79	9.13	4.31	1.93	1.19	0.59	0.00	0.00	0.00	0.00	2.38	2.47	6.58	28.58
80	6.94	10.33	3.58	1.24	0.34	0.01	0.13	0.00	0.00	0.20	0.08	M2.67	25.52
81	M5.14	1.11	3.74	0.36	0.04	0.00	0.00	0.00	0.19	1.40	5.91	5.72	23.61
82	8.12	3.82	6.14	5.05	0.00	0.01	0.00	0.00	1.11	2.79	4.32	2.51	33.87
83	5.78	8.72	10.89	3.06	0.79	M0.00	0.00	0.01	0.74	0.30	6.51	7.48	44.28
84	0.30	1.49	1.17	0.80	0.00	0.08	0.00	0.17	0.10	1.96	6.52	1.26	13.85
85	0.68	1.95	4.14	0.06	0.06	0.02	0.00	0.00	0.30	0.65	4.32	3.05	15.23
86	4.57	11.30	5.61	0.99	0.19	0.00	0.00	0.00	1.09	0.38	0.10	1.14	25.37
87	3.02	4.12	3.14	0.08	0.07	0.00	0.00	0.00	0.00	0.95	2.97	5.63	19.98
88	5.62	0.39	0.26	1.49	0.68	0.36	0.00	0.00	0.00	0.17	3.86	3.93	16.76
89	1.05	1.82	5.23	0.37	0.01	0.21	0.00	0.00	1.37	1.59	1.66	0.00	13.31
90	4.26	2.44	0.80	0.24	3.25	0.00	0.00	0.00	0.26	0.23	0.35	1.00	12.83
91	0.47	3.21	9.17	0.31	0.09	0.02	0.00	0.02	0.00	1.99	0.67	2.42	18.37
92	2.18	7.09	4.14	0.63	0.00	0.49	0.00	0.00	0.00	3.17	0.26	9.55	27.51
93	10.57	5.79	3.54	M0.55	M0.86	M0.96	0.00	0.00	0.00	0.59	2.65	2.39	27.90
94	2.71	4.48	0.14	M1.19	1.26	0.00	0.00	0.00	0.02	0.28	5.30	4.49	19.87
95	12.47	0.14	9.21	0.88	1.21	1.83	0.00	0.00	0.00	0.07	0.01	10.02	35.84
96	8.65	8.34	2.32	2.18	M3.03	0.00	0.00	0.00	0.00	1.61	3.58	11.67	41.38
97	11.07	0.28	0.52	0.20	M0.47	0.27	0.00	0.41	0.00	0.81	6.73	2.30	23.06
98	8.95	14.71	2.35	2.30	3.29	0.00	0.00	0.00	0.34	0.71	4.29	1.57	38.51
99	2.11	6.97	2.85	1.73	0.03	0.00	0.00	0.00	0.04	0.56	2.91	0.52	17.72

0	5.98	11.25	2.87	1.29	0.98	0.17	0.00	0.00	0.08	2.54	1.15	1.13	27.44
1	3.36	6.35	1.37	0.62	0.00	0.08	0.00	0.00	0.20	0.50	4.47	10.23	27.18
2	3.10	1.37	1.95	0.10	1.33	0.00	0.00	0.00	0.00	0.00	3.80	13.86	25.51
3	2.42	1.53	2.00	2.92	1.02	0.00	0.00	0.33	0.00	0.00	1.08	M6.72	18.02
4	2.84	7.68	0.91	0.16	0.05	0.00	0.00	0.00	0.04	2.30	3.30	6.66	23.94
5	5.52	4.24	4.28	1.43	1.46	0.28	0.00	0.00	0.01	0.24	2.16	16.69	36.31
6	4.13	4.02	8.87	4.96	0.60	0.00	0.00	0.00	0.00	0.12	2.55	3.41	28.66
7	0.20	4.38	0.11	2.05	0.55	0.00	0.00	0.00	0.38	2.22	0.92	4.35	15.16
8	7.80	3.96	0.46	0.05	0.00	0.00	0.00	0.00	0.00	0.45	2.67	2.87	18.26
9	1.55	9.31	2.39	1.10	1.13	0.00	0.00	0.00	0.04	5.71	0.69	2.13	24.05
10	8.29	4.14	1.66	3.43	0.98	0.00	0.00	0.00	0.03	2.38	2.50	7.13	30.54
11	0.55	4.26	5.05	0.39	0.96	1.21	0.00	0.00	0.00	1.65	1.25	0.23	15.55
12	0.55	1.04	6.77	M2.31	M0.04	0.03	M0.00	M0.00	0.00	1.48	M4.75	7.73	24.70
13	0.60	M0.11	1.07	1.41	M0.37	M0.00	M0.00	M0.00	M1.10	M0.00	M1.28	0.74	6.68
14	M0.26	9.58	2.66	M2.39	0.00	0.00	0.00	0.05	0.82	0.78	2.29	M10.44	29.27
15	0.01	1.99	0.16	1.26	0.00	0.16	0.04	0.00	M0.00	0.12	2.08	4.01	9.83
16	9.25	0.59	6.92	0.59	0.35	0.00	0.00	0.00	0.00				17.70

Product generated by ACIS - NOAA Regional Climate Centers.

Representative Photos

Map 1. Features: Napa River, Public Trust Marshes, BCDC Shoreline, Wet-1a/b, Wet-2a/b, Wet-3a/b.

Wet-1a WET.

Wet-1b UPL.

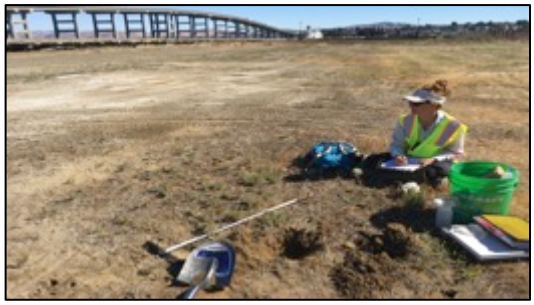
Wet-1 OHWM.

Wet-1 Vegetative break, evident along the entire feature, is indicated primarily by fennel.

Wet-2a WET.

Wet-2b UPL.

Wet-2 OHWM.



Wet-3a/b. No wetland soils. Looking towards Napa River; view looking south to Wet-2 (across fence).

Wet-3a/b. View looking away from Napa River; vegetated area to the left can be seen in photo above.

Map 2. Features: SWL-9, SWL-10, SWL-12, SWL-13, SWL-25, SWL-26, SWL-27, SWL-28, SWL-30.

SWL-9, 10, and 12 are located in the vegetated area to the left. Plants are alkali mallow and upland species.

SWL-13 (Data points Wet-4a/b). Panoramic photo distorts the landscape, but feature can be clearly seen.

Panoramic photo, area of SWL-25, 26, and 28.

Area of SWL 25, 26. Some *Rumex* and *Phalaris* among upland grasses & forbs; area of dense hummocks.

SWL-27. No photo.
SWL-33. No photo.

Map 3. Features SWL-8, SWL-11, SWL-14, SWL-16, SWL-18, SWL-21, SWL-23, SWL-35.

Panoramic photo of the area containing SWL-8 and SWL-11. **Veg is upland grasses, *Ditrichia*, *Foeniculum*, *Heterotheca.***

SWL-11. *Rumex* amid upland grasses and forbs.

SWL-14. There is some evidence of a seasonal drainage channel (~12" width) in the grasses.

SWL-16. Evidence of prolonged ponding; soil surface cracks and dried animal footprints.

General area of SWL-18. Wood chips over fill and asphalt.

General area of SWL-35. The hardscape/pavement ponds over a large area, and maintains continuous surface connectivity with the adjacent salt marsh. This is the lowest elevation on the study site (~4 feet) and the only area on the study site that drains to westward marsh features.

Map 4. Features SWL-4, SWL-5, SWL-24.

Area of SWL-4 and SWL-5. Mostly unvegetated. Tire tracks in dried mud may be evidence of prolonged ponding.

SWL-4. Minor soil surface cracking can be seen in the photo, evidence of ponding.

Representative photo of the general area containing SWL-24.

Map 5. Features SWL-0, SWL-17, SWL-19, SWL-20, SWL-31, SWL-32.

SWL-0. The panoramic photo distorts the feature. It supports hydrophitic vegetation, and surface soil cracking suggests a prolonged hydroperiod.

SWL-17. Isolated, ponded hardscape over pavement. Recommend discounting this area.

SWL-19. No picture. Ponded area in fennel field, not located.

SWL-20. Similar to SWL-0, and probably seasonally connected with surface flow. Supports hydrophitic vegetation.

SWL-31. Ponded concrete basin that has "in-floor" ~2'x2' drainage grate with cattails growing out of it.

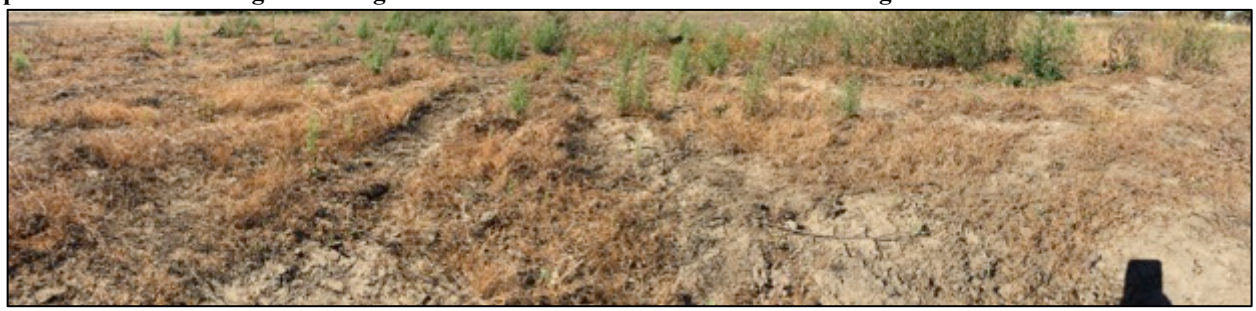
SWL-32. No picture. Ponded hardscape/pavement with surface connectivity to SWL-0.

Map 6. Features SWL-1, SWL-2, SWL-3, SWL-6, SWL-7, SWL-15, SWL-34.

SWL-1. Lightly discernible in the field via tire tracks and tiny patches of rabbitsfoot grass.
SWL-2. No picture. Unvegetated area typical of others in this field.

Generalized area of uplands containing SWL-1, SWL-3, SWL-15, SWL-34.

Approximate location of SWL-6 and SWL-7. No wetland features were evident. Lack of vegetation could be due to asphalt. The area also appears burned- either via heat or chemicals; the fire department was using this parcel for drills during the Biological Resources Assessment conducted in August 2016.



SWL-34. Toad rush and a small, unidentified annual grass presumed to be FACW are dominant in this area of SWL-34.

SWL-34. This area of SWL-34 has about 10% cover of *Cressa truxilensis*.

Swaim Biological Incorporated
4435 First Street
Livermore, CA 94551

To: Kristina Tierney
AMEC Foster Wheeler

From: Natasha Dvorak and Ryan Byrnes
Swaim Biological, Incorporated

Date: September 2, 2016

Re: Bat Habitat Assessment for Parcels XV-A(1), XV-A(2), XV-B(I) and XV-B(II), Mare Island, CA.

Swaim Biological, Inc. biologist Ryan Byrnes performed a Bat Habitat Assessment over the course of three days to assess conditions on the four Mare Island parcels. Bat sign was observed during the assessment, along with suitable day roost and night roost habitat.

Background

Parcels XV-A(1), XV-A(2), XV-B(I) and XV-B(II) on northeastern Mare Island are proposed for redevelopment. There are 25 abandoned buildings located among the four parcels. These abandoned buildings provide potentially suitable habitat for roosting bats. The buildings are also located near abundant foraging habitat for insectivorous bats within a matrix of ruderal uplands and salt marshes on Mare Island, and the expansive upriver Napa-Sonoma Marsh Complex. These buildings are proposed for demolition as part of the redevelopment project.

In general, three categories comprise bat roost habitat: foliage (tree), crevasse (cracks, nooks and crannies), and cavernous (open structures). This assessment focused on crevasse and cavernous habitat in the 25 abandoned buildings. Bats may use crevasse and cavernous habitats as day roosts, as night roosts, and as maternal roosts. Use may vary by season.

Methods

The daytime Bat Habitat Assessment was conducted on August 22, 2016 (8:00 am to 6:00 pm), August 23, 2016 (8:00 am to 6:00 pm), and September 2, 2016 (8:00 am to 12:00 noon). Each building was visually inspected for potential habitat, and suitable habitat was further inspected for guano, urine spots, and presence of bats.

Results

No bats were observed during the survey. However, suitable crevasse and cavernous roost habitat was identified. **Table 1, Survey Results** lists the 25 buildings that were visually surveyed and their corresponding findings. **Figure 1, Structures with Bat Sign**

shows the building locations, describes the buildings by number, and identifies the structures where bat sign was observed.

Table 1 — Survey Results

Parcel No.	Owner	Building Number	Comments
XV-B (1)	Navy	499	Guano observed - some larger piles.
XV-B (1)	Navy	503	Guano observed - large piles in office rooms
XV-B (1)	Navy	517	No bat sign observed
XV-A (2)		571	Guano observed - larger piles observed in northwest structure. Smaller ammounts in southeast building.
XV-A (2)		577	Few guano pellets observed
II		589	Few guano pellets observed
-		593	Few guano pellets observed
XV-B (1)	Navy	601	Guano observed - some larger piles.
II		641	No bat sign observed
XV-A (1)		653	No bat sign observed
XV-B (1)	Navy	663	No bat sign observed
XV-A (1)		673	Guano observed - no large piles
XV-A (1)		777	No bat sign observed
XV-A (1)		791	Guano observed - no large piles
XV-A (1)		793	No bat sign observed
XV-B (1)	Navy	857	No bat sign observed
XV-A (2)		897	Guano observed - large piles on south side of building
XV-A (1)		989	Recent fire, but still standing - No guano observed
XV-A (2)		991	Destroyed by fire; rubble remains only
XV-B (1)	Navy	993	Few guano pellets observed
XV-A (2)		995	Guano observed - almost in every bathroom
XV-A (2)		997	Guano observed - almost in some bathrooms
XV-A (2)		999	No bat sign observed
XV-B (1)	Navy	1001	Guano observed - no large piles
XV-A (2)		1013	No bat sign observed
XV-A (2)		1015	No bat sign observed

Buildings With Bat Sign Observed

499- Large guano piles.
503- Large guano piles.
571- Large guano piles.
577- Few guano pellets.
589- Few guano pellets.
593- Few guano pellets.
601- Large guano piles.
673- Some guano pellets.
791- Some guano pellets.
897- Large guano piles.
993- Few guano pellets.
995- Some guano pellets.
997- Some guano pellets.
1001- Some guano pellets.

Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Structures Assessed for Bat Habitat and Sign

Bat Sign Observed?

- No. No Additional Surveys Recommended.
- Yes. Recommend Acoustic Surveys and Guano-DNA Sampling.

N

0 250 500 1,000 Feet

Project Zeus
Mare Island - Vallejo, CA
Figure 1 - Structures with Bat Sign

SBI Swaim Biological Inc.

Surveyed buildings varied in size, building material, and structural complexity. As shown in the example photos at the end of this report, they varied from small, open, single-story concrete or wooden buildings to 4-story buildings with vaulted ceilings, multiple rooms, and small nooks and crannies throughout. Bat sign was observed in multiple buildings and was independent of building size, material, or structural complexity. Specifically, guano was observed in 15 buildings. Potential day roost or maternal roost guano piles were observed in 5 buildings. Based on the guano pellets observed, multiple species of bats are present and 2 special-status bats may be present: Townsend's big-eared bat (*Corynorhinus townsendii*) and pallid bat (*Antrozous pallidus*). In addition, based on the amount of guano observed, it is possible bats are using the buildings for maternal roosts.

Discussion

Bats are highly variable in their habitat preferences and natural history. California is home to 27 species of bats. Eighteen of these species are on California Department of Fish and Wildlife's 2016 Special Animals List, with one of them being Federally Endangered, one being a Candidate State Threatened species, and 12 of them being California Species of Special Concern. Different bat species may use the onsite habitat for different reasons during different seasons. Winter habitats provide some bat species with hibernation roosts, while summer habitats provide maternal (breeding) roosts. The community of bat species using a roost habitat may change depending on the season, temperature shifts, prey availability, species migration, etc.

The intensity of CEQA review and need for consultation with the U.S. Fish and Wildlife Service and/or California Department of Fish and Wildlife depends on which of the 27 species are using the onsite habitat and how they are using it. For example, on the lowest-impact end of the spectrum, a common bat species using the habitat for a night roost would likely require CEQA avoidance and minimization measures prior to building demolition, while on the highest-impact end of the spectrum[1], if the Candidate State Threatened species Townsend's big-eared bat was found to use the onsite habitat as a maternal roost, both CEQA review and California Endangered Species Act consultation with the California Department of Fish and Wildlife would be required, and it is likely that building demolition would be prohibited.

[1] The Federally-endangered lesser long-nosed bat (*Leptonycteris yerbabuenae*) is not likely to occur on Mare Island. Their range is southeastern Arizona south to Honduras, though they can occasionally occur in California.

Recommendations for Acoustic Surveys, Guano-DNA Sampling, Winter Roost Surveys, and Maternal Roost Surveys

Following the above discussion, it is critical to determine which bat species are using the habitat, and when and how they are using it, in order to assess project impacts and identify appropriate avoidance and minimization measures to implement before and during construction, and compensation measures to mitigate for permanent loss of habitat.

Acoustic surveys and guano-DNA sampling tests are recommended to determine what bats are using the buildings. Winter-roost surveys and maternal-roost surveys are recommended to determine when and how bats are using the buildings throughout the year. Though there are some limitations, acoustics can be used to survey multiple days over multiple seasons and provide a confident method for species identification. Acoustic surveys can present logistical challenges, with some species of bats being easier to record and classify than others: for example, the call of a spotted bat (*Euderma maculatum*) is very loud and audible to humans, while Townsend's big-eared bat is a "whisper" bat with a call both inaudible to humans and challenging to detect acoustically. To this end, guano-DNA sampling provides reliable concurrent species identification and should be used in conjunction with acoustic surveys to determine the presence or absence of Townsend's big-eared bat, despite a sampling bias towards larger (more easily detected) guano pellets and time for lab processing. Roost emergent surveys, performed at dusk, are helpful for estimating the number of bats using each building; these surveys should be repeated during the maternal season. An emergent survey can be conducted simultaneously with acoustic sampling in order to determine species along with numerical estimates, or after previous acoustic sampling has already determined the species. To some extent, emergent surveys would be limited by site access and safety concerns. Due to challenges and limitations with all survey methods, our recommendation is to use multiple survey techniques and conduct several surveys throughout the year in order to confidently determine what bats are present, and when and how they are using onsite habitat.

Representative Photos

Examples of roost habitat observed during the assessment.

Photo 1: Cavernous roost habitat

Photo 2: One of many buildings available for use by bats.

Photo 3: Example of large guano pile observed during habitat assessment.

	PLANTS OBSERVED DURING SURVEYS			
Native (N) or Introduced (I)	**Scientific Name**	**Common Name**	**Family**	**Wetland Indicator Status (2016 AW)**
I	*Acacia dealbata*	silverleaf wattle	Fabaceae	NL
I	*Acacia longifolia*	golden wattle	Fabaceae	NL
N	*Acmispon americanus*	Spanish lotus	Fabaceae	UPL
N	*Acmispon glaber*	Deerweed	Fabaceae	NL
N	*Agrostis avenacea*	Pacific bentgrass	Poaceae	NL
I	*Aira caryophylla*	Silvery hairgrass	Poaceae	FACU
I	*Albizia lophantha?*	stinkbean	Fabaceae	NL
	Amaranthus sp.	Pigweed	Amaranthaceae	FACU-FAC-FACW
I	*Asparagus officinalis*	asparagus	Asparagaceae	FACU
I	*Atriplex prostrata*	fat hen	Chenopodiaceae	FACW
I	*Avena barbata*	slender wild oat	Poaceae	NL
I	*Avena fatua*	wild oat	Poaceae	NL
N	*Baccharis pilularis*	coyote brush	Asteraceae	NL
I	*Bellardia trixago*	Mediterranean lineseed	Orobonchaceae	NL
N	*Bolboschoenus robustus*	sturdy bulrush	Cyperaceae	OBL
I	*Brassica nigra? Or rapa?*	black mustard	Brassicaceae	NL or FACU
I	*Briza minor*	little quaking grass	Poaceae	FAC
	Bromus californicus?	California brome	Poaceae	NL
I	*Bromus caroli-henrici*	weedy brome	Poaceae	NL
I	*Bromus diandrus*	ripgut	Poaceae	NL
I	*Bromus hordeaceus*	soft chess	Poaceae	FACU
I	*Bromus madritensis*	foxtail brome	Poaceae	UPL
	Calystegia purpurata?	smooth western morning glory	Convolvulaceae	NL
I	*Carduus pycnocephalus*	Italian thistle	Asteraceae	NL
I		cedar		NL
I	*Centaurea solstitialis*	yellow star thistle	Asteraceae	NL
I	*Centaurea calcitrapa*	purple star thistle	Asteraceae	NL
I	*Chenopodium murale*	Nettle leaf goosefoot	Chenopodiaceae	FACU
I	*Chenopodium album*	White goosefoot	Chenopodiaceae	FACU
I	*Cichorium intybus*	chicory	Asteraceae	
I	*Cirsium arvense*	Canadian thistle	Asteraceae	FACU
I	*Cirsium vulgare*	bull thistle	Asteraceae	
I	*Convolvulus arvensis*	field bindweed	Convolvulaceae	NL
I	*Cotoneaster ponnosus*	woolly cotoneaster	Roseaceae	NL
I	*Cortaderia jubata*	pampas grass	Poaceae	FACU
N	*Cressa truxillensis*	alkali weed	Convolvulaceae	FACW
N	*Croton setigerus*	turkey mullein	Euphorbiaceae	NL
I	*Crypsis schoenoides*	swamp grass	Poaceae	FACW
	Cupressa	cypress	Cupressaceae	NL
I	*Cynara cardunculus*	cardoon	Asteraceae	NL
I	*Cynodon dactylon*	Bermuda grass	Poaceae	FACU
N	*Cyperus eragrostis*	nutgrass	Cyperaceae	FACW
I	*Digitaria sanguinalis*	crabgrass	Poaceae	FACU
N	*Distichlis spicata*	saltgrass	Poaceae	FAC
I	*Dittrichia graveolens*	stinkwort	Asteraceae	
I	*Elymus caput-medusae*	madusahead	Poaceae	NL
I	*Elymus hispidus*	intermediate wheatgrass	Poaceae	NL
N	*Epilobium ciliatum*	willowherb	Onagraceae	FACW
I	*Erigeron bonarensis*	flax-leaved horseweed	Asteraceae	FACU
N	*Erigeron canadensis*	Canada horseweed	Asteraceae	FACU
I	*Erodium botrys*	Big heron bill	Geraniaceae	NL
I	*Erodium sp*		Geraniaceae	NL
I	*Eucalyptus globulus*	Bluegum eucalyptus	Myrtaceae	NL
I	*Eucalyptus tereticonrnis?*	Forest red gum	Myrtaceae	NL
I	*Euphorbia maculata*	Spotted spurge	Euphorbiaceae	UPL
I	*Festuca perennis*	Italian rye grass	Poaceae	NL

	PLANTS OBSERVED DURING SURVEYS			
Native (N) or Introduced (I)	**Scientific Name**	**Common Name**	**Family**	**Wetland Indicator Status (2016 AW)**
I	*Ficus caricata*	common fig	Moraceae	FACU
I	*Foeniculum vulgare*	fennel	Apiaceae	NL
N	*Gamochaeta ustulata*	featherweed	Asteraceae	FACU
	Gnaphalium sp.		Asteraceae	????
N	*Grindelia stricta*	Coastal gumplant	Asteraceae	FACW
I	*Hedera helix*	English ivy	Araliaceae	FACU
I	*Helminthotheca echioides*	bristly ox-tongue	Asteraceae	FAC
N	*Heterotheca grandiflora*	telegraph weed	Asteraceae	
I	*Hordeum marinum*	barley	Poaceae	FAC
I	*Hypochaeris radicata*	hairy cat's ear	Asteraceae	FACU
N	*Jaumea carnosa*	Fleshy jaumea	Asteraceae	OBL
N	*Juncus bufonias*	toad rush	Juncaceae	FACW
I	*Kickxia elantine*	sharp-leaved fluellin	Plantaginaceae	
I	*Lactuca serriola*	prickly lettuce	Asteraceae	FACU
I	*Lactuca virosa*	bitter lettuce	Asteraceae	NL
I	*Lepidium latifolium*	perennial pepperweed	Brassicaceae	FAC
I	*Logfia gallica*	narrowleaf cottonrose	Asteraceae	NL
I	*Lotus corniculatus*	bird's foot trefoil	Fabaceae	FAC
	Lupinus sp. Albifrons? Formosus?		Fabaceae	NL (neither)
I	*Lysimachia arvensis*	scarlet pimpernel	Myrsinaceae	FAC
I	*Malva nicaeensis?*	bull mallow	Malvaceae	NL
N	*Malvella leprosa*	alkali mallow	Malvaceae	FACU
I	*Medicago polymorpha*	California burclover	Fabaceae	FACU
I	*Medicago sativa*	alfalfa	Fabaceae	UPL
I	*Melilotus albus*	white sweet clover	Fabaceae	NL
I	*Melilotus indicus*	annual yellow sweetclover	Fabaceae	FACU
I	*Mesembryanthemum nodiflorum*	slender-leaved iceplant	Aizoaceae	FAC
N	*Myrica californica*	Pacific wax myrtle		NL
I	*Nerium oleander*	Oleander	Apocynaceae	NL
I	*Paspalum dilatatum*	Dallis grass	Poaceae	FAC
I	*Phalaris aquatica*	Harding grass	Poaceae	FACU
I	*Phalaris minor*	canarygrass	Poaceae	NL
I	*Phoenix canariensis*	Canary Island palm	Arecaceae	NL
N	*Phyla nodiflora*	turkey-tangle fog fruit	Verbenaceae	FACW
I	*Pinus halepensis?*	Aleppo pine	Pinaceae	NL
I	*Pittosporum undulatum*	Victorian box	Pittosporaceae	NL
I	*Plantago lanceolata*	English plantain	Plantaginaceae	FAC
N	*Platanus racemosa*	California sycamore	Platanaceae	FAC
I	*Polygonum aviculare ssp. depressum?*	prostrate knotweed	Polygonaceae	FAC
I	*Polygonum argyrocoleon?*	silver sheath knotweed	Polygonaceae	FAC
I	*Polypogon monspeliensis*	rabbitsfoot grass	Poaceae	FACW
N	*Pseudognaphalium stramineum?*	cotton batting plant	Asteraceae	FAC
N	*Quercus agrifolia*	coast live oak	Fagaceae	NL
I	*Raphanus sativus*	jointed charlock	Brassicaceae	NL
I	*Rubus armeniacus*	Himalayan blackberry	Roseaceae	FAC
I	*Rumex acetosella*	sheep sorrel	Polygonaceae	FACU
I	*Rumex crispus*	curly dock	Polygonaceae	FAC
I	*Rumex dentatus*	toothed dock	Polygonaceae	FACW
I	*Rumex pulcher*	fiddle dock	Polygonaceae	FAC
N	*Salicornia pacifica (Sarcocornia)*	Pacific pickleweed	Chenopodiaceae	OBL
N	*Salix exigua*	narrowleaf willow	Salicaceae	FACW
N	*Salix laevigata*	red willow	Salicaceae	FACW

	PLANTS OBSERVED DURING SURVEYS			
Native (N) or Introduced (I)	**Scientific Name**	**Common Name**	**Family**	**Wetland Indicator Status (2016 AW)**
N	*Salix lasiandra*	Pacific willow	Salicaceae	FACW
N	*Salix lasiolepis*	arroyo willow	Salicaceae	FACW
I	*Salsola soda*	alkali Russian thistle	Chenopodiaceae	FACW
I	*Salsola tragus*	Russian thistle	Chenopodiaceae	FACU
N	*Sarcocornia pacifica*	Pickleweed	Chenopodiaceae	OBL
	Solanum sp.	nightshade	Solanaceae	FACU-FAC
I	*Sonchus asper*	spiny sow thistle	Asteraceae	FAC
N	*Spartina foliosa*	California cordgrass	Poaceae	OBL
	Spergularia sp.	sand spurry	Caryophyllaceae	FAC to OBL
N	*Spergularia marina*	salt marsh sand spurry	Caryophyllaceae	OBL
I	*Stipa miliacea*	Smilo grass	Poaceae	NL
N	*Trichostema lanceolatum*	vinegarweed	Lamiaceae	FACU
I	*Trifolium aureum*	gold clover	Fabaceae	NL
I	*Trifolium hirtum*	rose clover	Fabaceae	NL
I	*Trifolium tomentosum*	woolly head clover	Fabaceae	NL
N	*Typha latifolia*	broadleaf cattail	Typhaceae	OBL
I	*Vicia vellosa*	hairy vetch	Fabaceae	NL
N	*Washingtonia sp.*	Washington palm	Arecaceae	NL
N	*Xanthium spinosum?*	spiny cocklebur	Asteraceae	FACU

ANIMALS OBSERVED DURING SURVEYS

Taxonomy	*Scientific Name*	Common Name
Invertebrate	Acridoidea Family	grasshopper
	Colias or *Phoebis* Genus	sulphur butterfly
	Danaus plexippus	monarch butterfly
	Odonata Family	dragonfly
	Papilio rutulus	western tiger swallowtail
	Plebejus acmon	Acmon blue butterfly
	Sphecidae or Crabronidae Family	mud dauber
	Stagmomantis californica	California mantis
Reptile	*Sceloperus occidentalis*	western fence lizard
Bird	*Ardea alba*	great egret
	Ardea herodias	great blue heron
	Buteo jamaicensis	red-tailed hawk
	Cathartes aura	turkey vulture
	Charadrius vociferus	killdeer
	Columbia livia	rock dove
	Corvus brachyrhynchos	American crow
	Egretta thula	snowy egret
	Elanus leucurus	white-tailed kite
	Euphagus cyanocephalus	Brewer's blackbird
	Falco sparverius	American kestrel
	Geothlypis trichas sinuosa	salt marsh common yellowthroat
	Haemorhous purpureus	purple finch
	Hirundo rustica	barn swallow
	Larus occidentalis	western gull
	Meleagris gallopavo	wild turkey
	Melospiza melodia samuelis	San Pablo song sparrow
	Pandion haliaetus	osprey
	Patagioenas fasciata	band-tailed pigeon
	Sayornis nigricans	black phoebe
	Sialia mexicana	western bluebird
	Zenaida macroura	mourning dove
	Lepus californicus	black-tailed jackrabbit
Mammal	*Canis familiaris*	domestic dog
	Didelphus virginiana	opossum
	Felis catus	feral cat
	Mephitis mephitis	striped skunk
	Procyon lotor	raccoon
	Sylvilagus bachmanii	brush rabbit

Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad IS (Mare Island (3812213))

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Antrozous pallidus pallid bat	AMACC10010	None	None	G5	S3	SSC
Ardea herodias great blue heron	ABNGA04010	None	None	G5	S4	
Bombus occidentalis western bumble bee	IIHYM24250	None	None	G2G3	S1	
Chloropyron molle ssp. molle soft salty bird's-beak	PDSCR0J0D2	Endangered	Rare	G2T1	S1	1B.2
Danaus plexippus pop. 1 monarch - California overwintering population	IILEPP2012	None	None	G4T2T3	S2S3	
Elanus leucurus white-tailed kite	ABNKC06010	None	None	G5	S3S4	FP
Fritillaria liliacea fragrant fritillary	PMLIL0V0C0	None	None	G2	S2	1B.2
Geothlypis trichas sinuosa saltmarsh common yellowthroat	ABPBX1201A	None	None	G5T3	S3	SSC
Hypomesus transpacificus Delta smelt	AFCHB01040	Threatened	Endangered	G1	S1	
Isocoma arguta Carquinez goldenbush	PDAST57050	None	None	G1	S1	1B.1
Laterallus jamaicensis coturniculus California black rail	ABNME03041	None	Threatened	G3G4T1	S1	FP
Lathyrus jepsonii var. jepsonii Delta tule pea	PDFAB250D2	None	None	G5T2	S2	1B.2
Lilaeopsis masonii Mason's lilaeopsis	PDAPI19030	None	Rare	G2	S2	1B.1
Melospiza melodia samuelis San Pablo song sparrow	ABPBXA301W	None	None	G5T2?	S2?	SSC
Northern Coastal Salt Marsh Northern Coastal Salt Marsh	CTT52110CA	None	None	G3	S3.2	
Pandion haliaetus osprey	ABNKC01010	None	None	G5	S4	WL
Pogonichthys macrolepidotus Sacramento splittail	AFCJB34020	None	None	GNR	S3	SSC
Rallus longirostris obsoletus California clapper rail	ABNME05016	Endangered	Endangered	G5T1	S1	FP
Rana draytonii California red-legged frog	AAABH01022	Threatened	None	G2G3	S2S3	SSC
Reithrodontomys raviventris salt-marsh harvest mouse	AMAFF02040	Endangered	Endangered	G1G2	S1S2	FP

Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Senecio aphanactis chaparral ragwort	PDAST8H060	None	None	G3	S2	2B.2
Sorex ornatus sinuosus Suisun shrew	AMABA01103	None	None	G5T1T2Q	S1S2	SSC
Speyeria callippe callippe callippe silverspot butterfly	IILEPJ6091	Endangered	None	G5T1	S1	
Spirinchus thaleichthys longfin smelt	AFCHB03010	Candidate	Threatened	G5	S1	SSC
Xanthocephalus xanthocephalus yellow-headed blackbird	ABPBXB3010	None	None	G5	S3	SSC

Record Count: 25

Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad IS (Benicia (3812212) OR Mare Island (3812213) OR Richmond (3712283))

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Accipiter cooperii Cooper's hawk	ABNKC12040	None	None	G5	S4	WL
Agelaius tricolor tricolored blackbird	ABPBXB0020	None	None	G2G3	S1S2	SSC
Amsinckia lunaris bent-flowered fiddleneck	PDBOR01070	None	None	G2?	S2?	1B.2
Antrozous pallidus pallid bat	AMACC10010	None	None	G5	S3	SSC
Aquila chrysaetos golden eagle	ABNKC22010	None	None	G5	S3	FP
Archoplites interruptus Sacramento perch	AFCQB07010	None	None	G2G3	S1	SSC
Arctostaphylos pallida pallid manzanita	PDERI04110	Threatened	Endangered	G1	S1	1B.1
Ardea herodias great blue heron	ABNGA04010	None	None	G5	S4	
Astragalus tener var. tener alkali milk-vetch	PDFAB0F8R1	None	None	G2T2	S2	1B.2
Athene cunicularia burrowing owl	ABNSB10010	None	None	G4	S3	SSC
Blepharizonia plumosa big tarplant	PDAST1C011	None	None	G2	S2	1B.1
Bombus caliginosus obscure bumble bee	IIHYM24380	None	None	G4?	S1S2	
Bombus occidentalis western bumble bee	IIHYM24250	None	None	G2G3	S1	
California macrophylla round-leaved filaree	PDGER01070	None	None	G3?	S3?	1B.2
Calochortus pulchellus Mt. Diablo fairy-lantern	PMLIL0D160	None	None	G2	S2	1B.2
Calystegia purpurata ssp. saxicola coastal bluff morning-glory	PDCON040D2	None	None	G4T2T3	S2S3	1B.2
Centromadia parryi ssp. congdonii Congdon's tarplant	PDAST4R0P1	None	None	G3T2	S2	1B.1
Chloropyron maritimum ssp. palustre Point Reyes salty bird's-beak	PDSCR0J0C3	None	None	G4?T2	S2	1B.2
Chloropyron molle ssp. molle soft salty bird's-beak	PDSCR0J0D2	Endangered	Rare	G2T1	S1	1B.2

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Cicuta maculata var. bolanderi Bolander's water-hemlock	PDAPI0M051	None	None	G5T4	S2	2B.1
Circus cyaneus northern harrier	ABNKC11010	None	None	G5	S3	SSC
Coastal Brackish Marsh Coastal Brackish Marsh	CTT52200CA	None	None	G2	S2.1	
Corynorhinus townsendii Townsend's big-eared bat	AMACC08010	None	Candidate Threatened	G3G4	S2	SSC
Danaus plexippus pop. 1 monarch - California overwintering population	IILEPP2012	None	None	G4T2T3	S2S3	
Dirca occidentalis western leatherwood	PDTHY03010	None	None	G2	S2	1B.2
Egretta thula snowy egret	ABNGA06030	None	None	G5	S4	
Elanus leucurus white-tailed kite	ABNKC06010	None	None	G5	S3S4	FP
Emys marmorata western pond turtle	ARAAD02030	None	None	G3G4	S3	SSC
Falco peregrinus anatum American peregrine falcon	ABNKD06071	Delisted	Delisted	G4T4	S3S4	FP
Fritillaria liliacea fragrant fritillary	PMLIL0V0C0	None	None	G2	S2	1B.2
Geothlypis trichas sinuosa saltmarsh common yellowthroat	ABPBX1201A	None	None	G5T3	S3	SSC
Helianthella castanea Diablo helianthella	PDAST4M020	None	None	G2	S2	1B.2
Helminthoglypta nickliniana bridgesi Bridges' coast range shoulderband	IMGASC2362	None	None	G3T1	S1S2	
Hoita strobilina Loma Prieta hoita	PDFAB5Z030	None	None	G2	S2	1B.1
Holocarpha macradenia Santa Cruz tarplant	PDAST4X020	Threatened	Endangered	G1	S1	1B.1
Hydroprogne caspia Caspian tern	ABNNM08020	None	None	G5	S4	
Hypomesus transpacificus Delta smelt	AFCHB01040	Threatened	Endangered	G1	S1	
Isocoma arguta Carquinez goldenbush	PDAST57050	None	None	G1	S1	1B.1
Lasionycteris noctivagans silver-haired bat	AMACC02010	None	None	G5	S3S4	
Lasiurus cinereus hoary bat	AMACC05030	None	None	G5	S4	

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Lasthenia conjugens Contra Costa goldfields	PDAST5L040	Endangered	None	G1	S1	1B.1
Laterallus jamaicensis coturniculus California black rail	ABNME03041	None	Threatened	G3G4T1	S1	FP
Lathyrus jepsonii var. jepsonii Delta tule pea	PDFAB250D2	None	None	G5T2	S2	1B.2
Lilaeopsis masonii Mason's lilaeopsis	PDAPI19030	None	Rare	G2	S2	1B.1
Masticophis lateralis euryxanthus Alameda whipsnake	ARADB21031	Threatened	Threatened	G4T2	S2	
Melospiza melodia maxillaris Suisun song sparrow	ABPBXA301K	None	None	G5T3	S3	SSC
Melospiza melodia pusillula Alameda song sparrow	ABPBXA301S	None	None	G5T2?	S2S3	SSC
Melospiza melodia samuelis San Pablo song sparrow	ABPBXA301W	None	None	G5T2?	S2?	SSC
Microcina leei Lee's micro-blind harvestman	ILARA47040	None	None	G1	S1	
Microtus californicus sanpabloensis San Pablo vole	AMAFF11034	None	None	G5T1T2	S1S2	SSC
Northern Coastal Salt Marsh Northern Coastal Salt Marsh	CTT52110CA	None	None	G3	S3.2	
Northern Maritime Chaparral Northern Maritime Chaparral	CTT37C10CA	None	None	G1	S1.2	
Nycticorax nycticorax black-crowned night heron	ABNGA11010	None	None	G5	S4	
Nyctinomops macrotis big free-tailed bat	AMACD04020	None	None	G5	S3	SSC
Pandion haliaetus osprey	ABNKC01010	None	None	G5	S4	WL
Pogonichthys macrolepidotus Sacramento splittail	AFCJB34020	None	None	GNR	S3	SSC
Polygonum marinense Marin knotweed	PDPGN0L1C0	None	None	G2Q	S2	3.1
Rallus longirostris obsoletus California clapper rail	ABNME05016	Endangered	Endangered	G5T1	S1	FP
Rana draytonii California red-legged frog	AAABH01022	Threatened	None	G2G3	S2S3	SSC
Reithrodontomys raviventris salt-marsh harvest mouse	AMAFF02040	Endangered	Endangered	G1G2	S1S2	FP
Senecio aphanactis chaparral ragwort	PDAST8H060	None	None	G3	S2	2B.2

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Sorex ornatus sinuosus Suisun shrew	AMABA01103	None	None	G5T1T2Q	S1S2	SSC
Sorex vagrans halicoetes salt-marsh wandering shrew	AMABA01071	None	None	G5T1	S1	SSC
Speyeria callippe callippe callippe silverspot butterfly	IILEPJ6091	Endangered	None	G5T1	S1	
Spirinchus thaleichthys longfin smelt	AFCHB03010	Candidate	Threatened	G5	S1	SSC
Suaeda californica California seablite	PDCHE0P020	Endangered	None	G1	S1	1B.1
Symphyotrichum lentum Suisun Marsh aster	PDASTE8470	None	None	G2	S2	1B.2
Trifolium hydrophilum saline clover	PDFAB400R5	None	None	G2	S2	1B.2
Valley Needlegrass Grassland Valley Needlegrass Grassland	CTT42110CA	None	None	G3	S3.1	
Xanthocephalus xanthocephalus yellow-headed blackbird	ABPBXB3010	None	None	G5	S3	SSC

Record Count: 70

Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad IS (Benicia (3812212) OR Briones Valley (3712282) OR Cordelia (3812222) OR Cuttings Wharf (3812223) OR Mare Island (3812213) OR Petaluma Point (3812214) OR Richmond (3712283) OR San Quentin (3712284) OR Sears Point (3812224))

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Accipiter cooperii Cooper's hawk	ABNKC12040	None	None	G5	S4	WL
Adela oplerella Opler's longhorn moth	IILEE0G040	None	None	G2	S2	
Agelaius tricolor tricolored blackbird	ABPBXB0020	None	None	G2G3	S1S2	SSC
Amorpha californica var. napensis Napa false indigo	PDFAB08012	None	None	G4T2	S2	1B.2
Amsinckia lunaris bent-flowered fiddleneck	PDBOR01070	None	None	G2?	S2?	1B.2
Andrena blennospermatis Blennosperma vernal pool andrenid bee	IIHYM35030	None	None	G2	S2	
Antrozous pallidus pallid bat	AMACC10010	None	None	G5	S3	SSC
Aquila chrysaetos golden eagle	ABNKC22010	None	None	G5	S3	FP
Archoplites interruptus Sacramento perch	AFCQB07010	None	None	G2G3	S1	SSC
Arctostaphylos pallida pallid manzanita	PDERI04110	Threatened	Endangered	G1	S1	1B.1
Ardea alba great egret	ABNGA04040	None	None	G5	S4	
Ardea herodias great blue heron	ABNGA04010	None	None	G5	S4	
Asio flammeus short-eared owl	ABNSB13040	None	None	G5	S3	SSC
Astragalus tener var. tener alkali milk-vetch	PDFAB0F8R1	None	None	G2T2	S2	1B.2
Athene cunicularia burrowing owl	ABNSB10010	None	None	G4	S3	SSC
Balsamorhiza macrolepis big-scale balsamroot	PDAST11061	None	None	G2	S2	1B.2
Blennosperma bakeri Sonoma sunshine	PDAST1A010	Endangered	Endangered	G1	S1	1B.1
Blepharizonia plumosa big tarplant	PDAST1C011	None	None	G2	S2	1B.1

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Bombus caliginosus obscure bumble bee	IIHYM24380	None	None	G4?	S1S2	
Bombus occidentalis western bumble bee	IIHYM24250	None	None	G2G3	S1	
Branchinecta lynchi vernal pool fairy shrimp	ICBRA03030	Threatened	None	G3	S3	
Branta hutchinsii leucopareia cackling (=Aleutian Canada) goose	ABNJB05035	Delisted	None	G5T3	S3	
Buteo regalis ferruginous hawk	ABNKC19120	None	None	G4	S3S4	WL
Buteo swainsoni Swainson's hawk	ABNKC19070	None	Threatened	G5	S3	
California macrophylla round-leaved filaree	PDGER01070	None	None	G3?	S3?	1B.2
Calochortus pulchellus Mt. Diablo fairy-lantern	PMLIL0D160	None	None	G2	S2	1B.2
Calochortus tiburonensis Tiburon mariposa-lily	PMLIL0D1C0	Threatened	Threatened	G1	S1	1B.1
Calystegia purpurata ssp. saxicola coastal bluff morning-glory	PDCON040D2	None	None	G4T2T3	S2S3	1B.2
Carex lyngbyei Lyngbye's sedge	PMCYP037Y0	None	None	G5	S3	2B.2
Castilleja affinis var. neglecta Tiburon paintbrush	PDSCR0D013	Endangered	Threatened	G4G5T1T2	S1S2	1B.2
Centromadia parryi ssp. congdonii Congdon's tarplant	PDAST4R0P1	None	None	G3T2	S2	1B.1
Centromadia parryi ssp. parryi pappose tarplant	PDAST4R0P2	None	None	G3T2	S2	1B.2
Charadrius alexandrinus nivosus western snowy plover	ABNNB03031	Threatened	None	G3T3	S2S3	SSC
Chloropyron maritimum ssp. palustre Point Reyes salty bird's-beak	PDSCR0J0C3	None	None	G4?T2	S2	1B.2
Chloropyron molle ssp. molle soft salty bird's-beak	PDSCR0J0D2	Endangered	Rare	G2T1	S1	1B.2
Cicuta maculata var. bolanderi Bolander's water-hemlock	PDAPI0M051	None	None	G5T4	S2	2B.1
Circus cyaneus northern harrier	ABNKC11010	None	None	G5	S3	SSC
Cirsium andrewsii Franciscan thistle	PDAST2E050	None	None	G3	S3	1B.2
Coastal Brackish Marsh Coastal Brackish Marsh	CTT52200CA	None	None	G2	S2.1	

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Coastal Terrace Prairie Coastal Terrace Prairie	CTT41100CA	None	None	G2	S2.1	
Corynorhinus townsendii Townsend's big-eared bat	AMACC08010	None	Candidate Threatened	G3G4	S2	SSC
Danaus plexippus pop. 1 monarch - California overwintering population	IILEPP2012	None	None	G4T2T3	S2S3	
Desmocerus californicus dimorphus valley elderberry longhorn beetle	IICOL48011	Threatened	None	G3T2	S2	
Dipodomys heermanni berkeleyensis Berkeley kangaroo rat	AMAFD03061	None	None	G3G4T1	S1	
Dirca occidentalis western leatherwood	PDTHY03010	None	None	G2	S2	1B.2
Downingia pusilla dwarf downingia	PDCAM060C0	None	None	GU	S2	2B.2
Egretta thula snowy egret	ABNGA06030	None	None	G5	S4	
Elanus leucurus white-tailed kite	ABNKC06010	None	None	G5	S3S4	FP
Emys marmorata western pond turtle	ARAAD02030	None	None	G3G4	S3	SSC
Eriogonum luteolum var. caninum Tiburon buckwheat	PDPGN083S1	None	None	G5T2	S2	1B.2
Extriplex joaquinana San Joaquin spearscale	PDCHE041F3	None	None	G2	S2	1B.2
Falco peregrinus anatum American peregrine falcon	ABNKD06071	Delisted	Delisted	G4T4	S3S4	FP
Fissidens pauperculus minute pocket moss	NBMUS2W0U0	None	None	G3?	S2	1B.2
Fritillaria liliacea fragrant fritillary	PMLIL0V0C0	None	None	G2	S2	1B.2
Geothlypis trichas sinuosa saltmarsh common yellowthroat	ABPBX1201A	None	None	G5T3	S3	SSC
Haliaeetus leucocephalus bald eagle	ABNKC10010	Delisted	Endangered	G5	S3	FP
Helianthella castanea Diablo helianthella	PDAST4M020	None	None	G2	S2	1B.2
Helminthoglypta nickliniana bridgesi Bridges' coast range shoulderband	IMGASC2362	None	None	G3T1	S1S2	
Hesperolinon congestum Marin western flax	PDLIN01060	Threatened	Threatened	G1	S1	1B.1
Hoita strobilina Loma Prieta hoita	PDFAB5Z030	None	None	G2	S2	1B.1

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Holocarpha macradenia Santa Cruz tarplant	PDAST4X020	Threatened	Endangered	G1	S1	1B.1
Hydroprogne caspia Caspian tern	ABNNM08020	None	None	G5	S4	
Hypomesus transpacificus Delta smelt	AFCHB01040	Threatened	Endangered	G1	S1	
Isocoma arguta Carquinez goldenbush	PDAST57050	None	None	G1	S1	1B.1
Lasionycteris noctivagans silver-haired bat	AMACC02010	None	None	G5	S3S4	
Lasiurus cinereus hoary bat	AMACC05030	None	None	G5	S4	
Lasthenia conjugens Contra Costa goldfields	PDAST5L040	Endangered	None	G1	S1	1B.1
Laterallus jamaicensis coturniculus California black rail	ABNME03041	None	Threatened	G3G4T1	S1	FP
Lathyrus jepsonii var. jepsonii Delta tule pea	PDFAB250D2	None	None	G5T2	S2	1B.2
Legenere limosa legenere	PDCAM0C010	None	None	G2	S2	1B.1
Lilaeopsis masonii Mason's lilaeopsis	PDAPI19030	None	Rare	G2	S2	1B.1
Masticophis lateralis euryxanthus Alameda whipsnake	ARADB21031	Threatened	Threatened	G4T2	S2	
Meconella oregana Oregon meconella	PDPAP0G030	None	None	G2G3	S1	1B.1
Melospiza melodia maxillaris Suisun song sparrow	ABPBXA301K	None	None	G5T3	S3	SSC
Melospiza melodia pusillula Alameda song sparrow	ABPBXA301S	None	None	G5T2?	S2S3	SSC
Melospiza melodia samuelis San Pablo song sparrow	ABPBXA301W	None	None	G5T2?	S2?	SSC
Microcina leei Lee's micro-blind harvestman	ILARA47040	None	None	G1	S1	
Microcina tiburona Tiburon micro-blind harvestman	ILARA47060	None	None	G1	S1	
Microtus californicus sanpabloensis San Pablo vole	AMAFF11034	None	None	G5T1T2	S1S2	SSC
Northern Coastal Salt Marsh Northern Coastal Salt Marsh	CTT52110CA	None	None	G3	S3.2	
Northern Maritime Chaparral Northern Maritime Chaparral	CTT37C10CA	None	None	G1	S1.2	

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Northern Vernal Pool	CTT44100CA	None	None	G2	S2.1	
Northern Vernal Pool						
Nycticorax nycticorax	ABNGA11010	None	None	G5	S4	
black-crowned night heron						
Nyctinomops macrotis	AMACD04020	None	None	G5	S3	SSC
big free-tailed bat						
Oncorhynchus mykiss irideus	AFCHA0209G	Threatened	None	G5T2T3Q	S2S3	
steelhead - central California coast DPS						
Pandion haliaetus	ABNKC01010	None	None	G5	S4	WL
osprey						
Pentachaeta bellidiflora	PDAST6X030	Endangered	Endangered	G1	S1	1B.1
white-rayed pentachaeta						
Phalacrocorax auritus	ABNFD01020	None	None	G5	S4	WL
double-crested cormorant						
Plagiobothrys glaber	PDBOR0V0B0	None	None	GH	SH	1A
hairless popcornflower						
Pogonichthys macrolepidotus	AFCJB34020	None	None	GNR	S3	SSC
Sacramento splittail						
Polygonum marinense	PDPGN0L1C0	None	None	G2Q	S2	3.1
Marin knotweed						
Rallus longirostris obsoletus	ABNME05016	Endangered	Endangered	G5T1	S1	FP
California clapper rail						
Rana draytonii	AAABH01022	Threatened	None	G2G3	S2S3	SSC
California red-legged frog						
Reithrodontomys raviventris	AMAFF02040	Endangered	Endangered	G1G2	S1S2	FP
salt-marsh harvest mouse						
Riparia riparia	ABPAU08010	None	Threatened	G5	S2	
bank swallow						
Senecio aphanactis	PDAST8H060	None	None	G3	S2	2B.2
chaparral ragwort						
Serpentine Bunchgrass	CTT42130CA	None	None	G2	S2.2	
Serpentine Bunchgrass						
Sorex ornatus sinuosus	AMABA01103	None	None	G5T1T2Q	S1S2	SSC
Suisun shrew						
Sorex vagrans halicoetes	AMABA01071	None	None	G5T1	S1	SSC
salt-marsh wandering shrew						
Speyeria callippe callippe	IILEPJ6091	Endangered	None	G5T1	S1	
callippe silverspot butterfly						
Speyeria zerene sonomensis	IILEPJ6083	None	None	G5T1	S1	
Sonoma zerene fritillary						
Spirinchus thaleichthys	AFCHB03010	Candidate	Threatened	G5	S1	SSC
longfin smelt						

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Streptanthus glandulosus ssp. niger Tiburon jewelflower	PDBRA2G0T0	Endangered	Endangered	G4T1	S1	1B.1
Suaeda californica California seablite	PDCHE0P020	Endangered	None	G1	S1	1B.1
Symphyotrichum lentum Suisun Marsh aster	PDASTE8470	None	None	G2	S2	1B.2
Syncaris pacifica California freshwater shrimp	ICMAL27010	Endangered	Endangered	G1	S1	
Taxidea taxus American badger	AMAJF04010	None	None	G5	S3	SSC
Thaleichthys pacificus eulachon	AFCHB04010	Threatened	None	G5	S3	
Trifolium amoenum two-fork clover	PDFAB40040	Endangered	None	G1	S1	1B.1
Trifolium hydrophilum saline clover	PDFAB400R5	None	None	G2	S2	1B.2
Triquetrella californica coastal triquetrella	NBMUS7S010	None	None	G2	S2	1B.2
Tryonia imitator mimic tryonia (=California brackishwater snail)	IMGASJ7040	None	None	G2	S2	
Valley Needlegrass Grassland Valley Needlegrass Grassland	CTT42110CA	None	None	G3	S3.1	
Viburnum ellipticum oval-leaved viburnum	PDCPR07080	None	None	G4G5	S3?	2B.3
Xanthocephalus xanthocephalus yellow-headed blackbird	ABPBXB3010	None	None	G5	S3	SSC

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Rare Plant Rank is one of [1A, 1B, 2A, 2B, 3, 4], FESA is one of [Endangered, Threatened, Species of Concern], CESA is one of [Endangered, Threatened, Rare], Found in Quad 38122A3

Scientific Name	Common Name	Family	Lifeform	Rare Plant Rank	State Rank	Global Rank
Chloropyron molle ssp. molle	soft bird's-beak	Orobanchaceae	annual herb (hemiparasitic)	1B.2	S1	G2T1
Holocarpha macradenia	Santa Cruz tarplant	Asteraceae	annual herb	1B.1	S1	G1

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Rare Plant Rank is one of [1A, 1B, 2A, 2B, 3, 4], FESA is one of [Endangered, Threatened, Species of Concern], CESA is one of [Endangered, Threatened, Rare], Found in 9 Quads around 38122A3

Scientific Name	Common Name	Family	Lifeform	Rare Plant Rank	State Rank	Global Rank
Arctostaphylos pallida	pallid manzanita	Ericaceae	perennial evergreen shrub	1B.1	S1	G1
Blennosperma bakeri	Sonoma sunshine	Asteraceae	annual herb	1B.1	S1	G1
Calochortus tiburonensis	Tiburon mariposa lily	Liliaceae	perennial bulbiferous herb	1B.1	S1	G1
Castilleja affinis var. neglecta	Tiburon paintbrush	Orobanchaceae	perennial herb (hemiparasitic)	1B.2	S1S2	G4G5T1T2
Chloropyron molle ssp. molle	soft bird's-beak	Orobanchaceae	annual herb (hemiparasitic)	1B.2	S1	G2T1
Hesperolinon congestum	Marin western flax	Linaceae	annual herb	1B.1	S1	G1
Holocarpha macradenia	Santa Cruz tarplant	Asteraceae	annual herb	1B.1	S1	G1
Pentachaeta bellidiflora	white-rayed pentachaeta	Asteraceae	annual herb	1B.1	S1	G1
Streptanthus glandulosus ssp. niger	Tiburon jewelflower	Brassicaceae	annual herb	1B.1	S1	G4T1

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