NORTH CAMPUS OPEN SPACE RESTORATION PROJECT

Restoration Plan

Prepared for
University of California Santa Barbara
Office of Budget and Planning

December 2016

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Introduction

1.1 Project Location and Background

The NCOS Restoration Project is being undertaken by the University of California, Santa Barbara (UCSB) in collaboration with the Trust for Public Land (TPL), and multiple local, state and federal agencies (e.g. Land Trust for Santa Barbara County, County of Santa Barbara, State Coastal Conservancy, CalTrans, California Department of Water Resources, California Department of Fish and Wildlife, US Fish and Wildlife Service, and Ocean Protection Council). The project is designed to "enhance wetland and associated upland habitats characteristic of the Devereux Slough ecosystem" in accordance with the goals and objectives adopted by the NCOS Science Advisory Board (SAB), which was established in September 2013, after the land occupied by the former Ocean Meadows Golf Course (golf course) was purchased by TPL and donated to UCSB in April 2013.

This Restoration Plan is the result of a collaborative effort between UCSB's Cheadle Center for Biological Diversity and Ecological Restoration (CCBER) and a team of consultants lead by Environmental Science Associates (ESA). ESA conducted studies and prepared the design and construction documents for the earthwork to restore the landform of the project site to conditions suitable to support estuarine and transitional habitats, and to restore the South Parcel mesa to topography similar to its historic form. True Nature Design led the design of public access elements and designed the recycled water irrigation system to provide establishment irrigation to the restored native plant communities. Stantec provided civil engineering designs for the structural components of the project public access elements (crossing structures and finished trail surfaces). CCBER designed the plan for the matrix of aquatic, wetland, and upland habitats to be restored to the site, including species selection; planting methods; and habitat features to benefit wildlife. CCBER also lead the development of the maintenance and monitoring methods and adaptive management strategy.

The North Campus Open Space (NCOS, 136.4 acres) is part of the 652.3-acre Ellwood-Devereux Coast Open Space Joint Management Area, which was created in 2004. The project site is located in the south coast region of California, near the city of Goleta, at the downstream end of a 3.62-square mile watershed which includes Devereux Creek, El Encanto/Phelps Creek and several unnamed tributaries. The site includes portions of 3 parcels, each owned by UCSB (Figure 1): 'South Parcel' (68.9 acres), 'Whittier Parcel' (3.70 acres) and 'Ocean Meadows Golf Course' (63.8 acres).

The Whittier Parcel, located at the northeast corner of the project site, is an undeveloped property that contains marginal quality vernal pool and freshwater wetland habitats, which will be enhanced by the proposed project.

The Ocean Meadows Golf Course Parcel (golf course) is the site of a former nine-hole course. The golf course was constructed in 1966 by filling the historic northern extent of Devereux Slough on the site with soils removed from adjacent lands, including the South Parcel mesa. An aerial photo from 1967 shows the newly constructed golf course and the bare ground of adjacent lands from which soil was removed (Figure 2). The Ocean Meadows Golf Course has been closed since 2013, when the parcel was purchased by the Trust for Public Land and subsequently donated to UCSB. Current management of the property consists of occasional irrigation with reclaimed water and annual mowing. Devereux Creek traverses the golf course property, connecting to Devereux Slough on the Coil Oil Point Reserve (the lower Slough) at the southern golf course property boundary. The golf course is crossed by formal (cement golf cart paths) and informal trails (dirt tracks worn into the landscape), and is used by local residents, students, and the public for walking, cycling, and dog-walking at an average rate of 25 users per hour (CCBER 2015).

Lands of the golf course and Whittier parcels are generally relatively low lying and flat. Grades range from 0 to 10 percent, and elevations range from 5 to 15 feet above sea level.

The South Parcel is located at the western boundary of the UCSB North Campus Open Space, southwest of the golf course. The South Parcel consists of a mesa and surrounding lands, sloping generally to the southeast, and ranges in elevation from approximately 8 feet above sea level at the southwest corner to 72 feet above sea level along the southwest parcel boundary. Average slopes on the South Parcel range between 5 to 30 percent. Four east-west trending man-made drainage swales, confined by long, earthen berms, traverse the site, directing rainfall runoff to the eastern edge of the property, and eventually through a storm drain to Devereux Slough. A north-south trending eucalyptus windrow is present along the western boundary of the South Parcel, within the adjacent Ellwood Mesa area. The South Parcel is dominated by non-native annual grassland and weedy, non-native plants, with areas of eroded bare soil. Stands of coastal scrub and southern coastal bluff scrub are also present. Scattered, isolated, narrow strips of seasonal wetlands are present in the man-made swales and in depressed areas caused by historic grading, constructed dirt bicycle ramps, and vehicle ruts. The South Parcel currently is used for walking, jogging, and off-road bicycling, and is crossed by a network of informal dirt tracks.

The Coal Oil Point Reserve (COPR) is located immediately to the south of the project site, and Ellwood Mesa and undeveloped property in the City of Goleta's jurisdiction are located to the west. Venoco Road provides vehicle access along the southern site boundary.

SOURCE: Aerial (ESRI); Parcels (City of Goleta, UCSB); Project Site (ESA 2015)

UCSB NCOS Restoration Project . D140769.02

Figure 1

Project Site and Surrounding Area

UCSB NCOS Restoration Project D140769.02

SOURCE: UCSB

Figure 2
1967 Aerial Photo

1.2 Intent of the Restoration Plan

The intent of this Restoration Plan is to describe the methodology for post grading restoration, enhancement, monitoring, and management of native habitats within the North Campus Open Space (NCOS) Restoration Project. The primary goals for the NCOS Restoration Project were adopted by the NCOS Science Advisory Board (SAB) in the project planning process:

(1) Ecosystem Restoration: Enhance wetland and associated upland habitats characteristic of the Devereux Slough ecosystem. To do so will require expansion of wetland area, improved hydrological connectivity, control of invasive non-native species, re-introduction of native species, enhancement of habitats for threatened and endangered species, and improving resiliency of ecosystem structure and function.

(2) Provide Social Values: Maintain open space and develop opportunities for passive recreation, research, and educational use that are compatible with the environmentally sensitive resources of the area.

1.3 Description of the Proposed Project

The proposed restoration project will entail modifying the form of the golf course, Whittier Parcel, and South Parcel properties to restore the upper Devereux Slough and adjacent South Parcel mesa to a more natural geomorphic configuration, hydrologic regime, and habitat mosaic. The golf course fill will be removed and the site will be excavated to elevations of 3.5 to 10 feet NAVD to create a subtidal slough channel, surrounding mudflats and marsh plain (vegetated salt marsh and unvegetated sediments), and gradual transitional areas (marsh plain to high marsh to upland habitats). Approximately 350,000 cubic yards (CY) of earthen fill material will be generated by this excavation. The fill will be placed primarily on the South Parcel to re-form portions of the mesa uplands to topography similar to existing natural landforms in the vicinity.

The restoration area will be planted with appropriate native species to restore a diversity of wetland habitats characteristic of the Devereux Slough system, including estuarine and palustrine habitat types, and to provide enhanced habitat values and connections within the larger 652-acre Ellwood Devereux Coastal Open Space, which includes the project site. The design will preserve and expand estuarine, seasonal wetland, riparian, vernal pool, and native upland habitats, create conditions that may support special status species, including southern tarplant (*Centromadia parryi* ssp. *australis*), tidewater goby (*Eucyclogobius newberryi*), Belding's savannah sparrow (*Passerculus sandwichensis beldingi*), and western snowy plover (*Charadrius alexandrinus nivosus*), and maintain genetic integrity of native vegetation on the project site and adjacent Coal Oil Point Reserve. Public access and passive recreational opportunities will be provided with trails, interpretive signs, and regional trail connections.

Features of the proposed project design include the following:

- The design will produce conditions conducive to preservation and continued function of adjacent salt marsh and wetland habitats.

- A seasonally ponded feature will be created at the northern site boundary, west of the Phelps Creek tributary connection, with potential benefits to migratory shorebirds and other wildlife.
- At Phelps Creek, a grade control and backwater feature will be created to connect the creek to the restored upper Slough, targeting conditions that could provide suitable habitat for tidewater goby, should a population reenter the restored estuary system. This feature will also be designed to preserve freshwater expression to the grade control location, creating a fresh-to-saline water gradient within the project and maintaining conditions that support a riparian restoration project recently implemented on Phelps Creek immediately upstream of the project boundary.
- At the Whittier Parcel, the banks of a ditch carrying fresh water inflows will be graded back and planted to create expanded and enhanced riparian and wetland habitats, and a fresh to brackish ecotonal connection to the restored Slough.
- In the southeastern area of the site, a large extent (approximately 2.75 acres) of marsh plain elevation habitat will be graded and/or augmented with sand, and not revegetated, in order to provide conditions suitable for nesting snowy plovers. This design mimics conditions that occur in a 2- to 3-acre area of the lower Slough on the Coal Oil Point Reserve, located just across Venoco Road, which is currently used by snowy plovers as a nesting site.
- The project will remove the sheet pile sill just upstream of the Venoco Road Bridge to restore hydrologic connectivity between the lower and the restored upper Devereux Slough.
- Hydrologic connection with the lower Slough will support natural sediment transport dynamics through the riparian/estuarine/ beach system and contribute to longshore sand transport processes.
- The restored landscape will be planted with native salt marsh, fresh and/or brackish wetland, high marsh/transitional, seasonal wetland, vernal pool, riparian, back dune woodland/scrub, coastal sage scrub, native grassland, and sandy dune annual species, located within the site according to their physiological requirements, to create natural zonation and structural diversity within the restored habitat.
    - Salt marsh species will be planted on 70% of the marsh plain elevation, with the remainder of the marsh plain surface to be unvegetated sediments, representative of conditions found within the lower Slough on Coal Oil Point Reserve.
    - Riparian vegetation will be planted at the confluence of Phelps Creek with the restored upper Devereux Slough. Once established, riparian canopy will shade portions of the stream, lowering water temperatures and enhancing aquatic habitat conditions.
    - Existing canopy trees that currently serve as roosting, nesting, and forage sites for raptors and a variety of avian species will be preserved on site.
    - Plantings will include species such as toyon (*Heteromeles arbutifolias*) and blue elderberry (*Sambucus nigra* ssp. *caerulea*), which have cover and forage value for birds and other wildlife.
    - Plant materials will be salvaged from the site or collected and grown from local sources, in order to preserve local genotypic integrity.

- The restored project area will provide enhanced cover, resting, and forage areas and an enhanced corridor for wildlife, as well as enhanced aesthetic and recreational values for local residents.
- The project, as it evolves over time from construction through establishment and through adaptations with changes in climate and sea level rise, will provide rich opportunities for research and education.
- The project is designed to provide transgression space for salt marsh habitats through 3 feet of sea level rise to retain habitat diversity
- Excavation and wetland development will provide significant flood control benefits for the community and supports natural floodplain dynamics which will allow for natural dispersion of sediments and plant propagules across the marsh floodplain.
- The proposed design will include provision for substantial wildlife viewing opportunities, a hierarchy of networked trails to accommodate recreational use, and create varied experiences with near-trail plantings to enhance the sense of solitude and relaxation that many users desire.
    - Primary trails will be located at elevations above the projected 100-year flood water surface elevation, on the north and east sides of the project area, with connections to local trails adjacent to the site.

1.4 Responsible Party

UCSB is the owner of the North Campus Open Space property, and is the designated party responsible for implementation of this Restoration Plan and subsequent maintenance of the site. The UCSB Cheadle Center for Biodiversity and Ecological Restoration (CCBER), will implement, maintain, and monitor the restoration efforts described this Restoration Plan. Upon completion of the monitoring period, CCBER, or, in the event CCBER no longer is responsible for maintaining campus restoration areas, a successor entity responsible for such functions, will continue maintenance and management of the North Campus Open Space restoration areas in conjunction with normal UCSB facilities management activities.

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SECTION 2
Existing Conditions

2.1 Hydrology

The Devereux Slough system, which includes the project site and the lower Slough on Coal Oil Point Reserve, occupies what was once a more extensive slough, with north-south and east- west portions defined by underlying faults. Its hydrology and geomorphology are influenced by its geological setting, highly urbanized watershed, and intermittently tidal lagoon dynamics. Watershed inputs and coastal dynamics dictate the seasonal and long-term behavior of the site. Devereux and El Encanto/Phelps creeks are the dominant sources of freshwater to the system.

The Devereux Slough watershed is bounded to the north by the foothills of the Santa Ynez Mountains, to the west by Ellwood Canyon, and to the east by Isla Vista. Smaller unnamed tributaries enter the site under Storke and Whittier roads, and join Devereux Creek within the project site. Stormwater enters the project site from adjacent residential areas and through a number of swales and culverts that lead into Devereux Creek and its tributaries. The Devereux Slough watershed drains approximately 3.62 square miles. Approximately 0.98 square miles (27%) of the watershed is developed, impervious area, with the remaining approximately 2.64 square miles (73%) comprised of undeveloped or developed pervious area such as open space parks and lawns (MRLC, 2015 and NRCS, 2011). Much of the pervious area is located in the relatively steeper Goleta hills, in the upper portion of the watershed. Mean annual rainfall is approximately 16.8 inches. The two primary flow paths draining to the Slough are El Encanto Creek/Phelps Ditch, and Devereux Creek. El Encanto Creek/Phelps Ditch drains from the north, out of steep canyons in the upper part of the watershed, passes under Highway 101 in the City of Goleta, and terminates in Devereux Slough at the Pacific Ocean. Devereux Creek drains from the west out of the Sandpiper Golf Club to its confluence with El Encanto Creek/Phelps Ditch, approximately 2,000 feet upstream of Venoco Road. The watershed soils are typically sandy to clay loams with low infiltration rates.

At present, a sheet pile sill located just upstream of the bridge at Venoco Road forms a hydrologic separation between Devereux Creek on the project site and the lower Devereux Slough on the Coal Oil Point Reserve. Below the sill, the hydrology of the lower Slough more closely reflects the state of the slough mouth than seasonal variation in runoff (Ferren et al. 1987; Davis et al. 1990; Collins and Melack 2014). The mouth of the Slough is typically closed, but sometimes breaches after large rainfall events (Collins and Melack 2014). In wet years, the mouth tends to be open more often, such as in 1988 and 2005 (Davis et al. 1990; Collins and Melack 2014). In dry years, such as 2007, the mouth may remain closed throughout the year (Collins and Melack

2014). Ferren and Thomas (1995) suggest that increased runoff after 1938, (primarily related to an increase in impervious surfaces with development in the watershed), has led to more frequent mouth breaching than in the past.

The site is subject to fluvial flood events in the winter and spring months in most years. As much of the watershed is developed, rain storms lead to flashy hydrographs that tail off rapidly (Collins and Melack 2014). As the rainy season progresses and soil moisture increases, more runoff is produced for a given amount of rainfall (e.g. Beighley et al. 2003). Flooding of the project site is exacerbated in times when the lower Slough mouth is closed at the beach, which blocks outflows to the ocean. This local flooding reflects the fact that half of the wetland capacity of the site was eliminated when the upper Slough was filled to create the golf course. When the beach barrier at the mouth of Devereux Slough breaches, flows drain to the ocean, abating flooding on the project site.

2.2 Topography

The project area lies to the south of the Goleta Valley, a shallow, east-west trending valley between the Santa Ynez mountains and a low coastal plateau, or mesa, to the southwest. The project area includes a gently sloping marine terrace that has been uplifted by the More Mesa fault system. The marine terrace that forms the mesa is about 40 to 80 feet above sea level. The topography of the uplifted terrace surface is gently sloping but undulatory, and has been incised and is controlled by Devereux Creek and, to a lesser extent, smaller drainages. Devereux Creek trends east-west and forms a central valley between gently sloping hills. The location of the creek itself is likely fault controlled, as its course closely follows and parallels the trace of the North Branch of the More Ranch Fault. The uplift and warping of the terrace has also created vernal pools in several locations on the Ellwood and Isla Vista mesas to the south of the fault. Several steep ravines cut through the hills leading to Devereux Creek. The uplifted mesa (marine terrace) areas have been dissected by stream as well as shoreline erosion.

Many modifications to the natural topography have also been made as the result of human actions. Clearing of land for grazing and agriculture in the 1800s through the early 20th century have resulted in erosion and gullying of several areas. Paving of roads and parking lots has contributed to runoff and erosion. Removal of topsoil and infilling of wetlands at Devereux Slough for the golf course and for land development in many areas has occurred. Grading for roadways, beach access, and oil development activities have also resulted in a highly altered environment.

Slopes on the former Ocean Meadow Golf Course range from 0 to 10 percent, and elevations range from 5 to 15 feet above sea level. The South Parcel slopes generally to the east, and ranges in elevation from approximately15 feet above sea level along the eastern boundary and to 72 feet above sea level along the western boundary with Ellwood Mesa. Average slopes on the South Parcel range between 5 and 30 percent.

2.3 Soils

Soil mapping units located at the Ocean Meadows Golf Course and South Parcel include Aquents, fill areas (AC), and Xerothents, cut and fill areas (XA), respectively. Whittier Parcel soils are also characterized by the soil mapping unit XA (Figure 3). The Aquent soils of the historical northern extent of Devereux Slough consisted fine sandy loams with poor and very poor draining capacities. Ringing the slough were Conception soils on slopes ranging from 0-30% which were also comprised of fine sandy loams. Much of the soil surrounding the site today consists of cut and fill, while the soils of the lower Slough and adjacent lands remain relatively intact (Ferren and Thomas, 1995). To construct the golf course along Devereux Creek, parts of the adjoining uplands were cut and the lowlands of the upper Devereux Slough were filled. Maximum cuts were concentrated in the South Parcel uplands. The soils that remain on South Parcel are constituted of subsoils. The areas north of the golf course also were disturbed, either by leveling along or also by cutting to fill the golf course (Figure 2). The fill areas on the golf course have poorly developed and poorly drained soil with primarily clay or clay loam textures (URS 2004; ESA 2016x).

The primary action associated with the restoration of the upper Devereux Slough is the removal of a significant amount of fill that was placed in the wetland in the early 1960's to create the Ocean Meadow Golf Course. It is proposed that the bulk of the soil removed from the golf course will be placed on the South Parcel. This action will allow restoration of more natural estuarine habitat and hydrology in the area of the former slough system and restoration of drainage patterns and upland and seasonal wetland communities reminiscent of historic conditions on the South Parcel.

2.3.1 Golf Course Soils

Soils investigations were conducted on the golf course parcel by CCBER (Daumal 2013) and ESA (ESA 2016). Multiple samples were analyzed for texture, pH and conductivity (also commonly referred to as salinity) to obtain information about the soils that will form the basis of saltmarsh, transition, upland and seasonal wetland restoration and creation.

These studies led to the following general conclusions related to soil salinity:

1. The majority of soil in the former golf course has high salinity levels. Salt marsh plants are adapted to high salinity soils, but high salinity is generally not tolerated by upland plant species.
2. There is considerable variability in soil salinity between locations
3. Deeper soils tend to be saltier than soils closer to the surface, but this might be a seasonal effect that will not persist, or could even reverse, through the dry season
4. Approximately two-thirds of the soil in the golf course appears to be very clay-rich (*i.e.*, comprised of 40% or more clay). Soils with such high clay content (and low salinity) support vernal pools and can pond rainwater for months at a time. Heavy clay soils will generally not support coastal sage scrub habitat. Perennial grasslands can be established on heavy clay soils (with low salinity).

SOURCE: URS 2004

UCSB NCOS Restoration Project D140769.02

Figure 3
Soils Map

5. Some soils located on the perimeter areas of the former golf course property, in locations likely not within the historic Slough footprint, have low salinity levels and textures (loams) that will be favorable for use as substrate for establishment of the native upland and high marsh transitional habitats targeted for restoration.

The higher-than-expected salinity levels in the most of the former golf course soil means that selective grading (excavation and stockpiling of lower salinity, lower clay content soils for placement on the surface of the South Parcel fill and possibly marsh transitional areas) may be needed to attain habitat creation goals. Salt marsh plants to be installed in the restored Slough will tolerate high salinities once established, however temporary irrigation will be needed to control surface salinity and allow germination and establishment of these habitat areas.

2.3.2 South Parcel Soils

Most of the surface soil on the South Parcel is sub-soil that was exposed when the mesa was scraped and the former northern extent of the Slough was filled to build the golf course. As a result, this soil has very little structure and is likely not a good growing medium for most native plants. In addition, non-native invasive weeds have become established on the site and there is a significant weed seed bank on and near the soil surface. It will be favorable for establishment of native upland habitats that the surface soils be buried in the fill as part of restoration of the mesa topography.

The presence of localized pockets of very high sand content soils on the South Parcel fill site was identified as a potential opportunity for creation of high percolation zones within the fill to sustain and enhance the groundwater gradient that appears to support higher elevation freshwater wetlands on the South Parcel and former golf course. These soils also present opportunities for expansion of dune scrub/woodland habitat on the restored mesa (fill), contiguous to existing areas of this habitat to be preserved on the South Parcel.

2.4 Plant Communities

The habitats within the project area reflect those found within the south coast region of California. Previous disturbance from human activities related to recreation, vegetation and golf course construction and maintenance, adjacent residential development, and other land uses are reflected in the large proportion of non-native species found on the site. The project site is dominated by non-native grassland (turf grass), but also contains a variety of fragmented natural plant communities and habitat types including coastal freshwater marsh, seasonal wetlands, coastal salt marsh, southern riparian scrub, southern coastal bluff scrub, native grassland, and eroded/disturbed areas (Figure 4). Small areas of coastal bluff scrub and coastal dunes are present along the ocean bluff edge at the southwestern corner of the South Parcel property (outside the area that will be affected by the project), and scattered occurrences of escaped ornamental plants are also present on the site. Of the natural habitat types present, riparian scrub, coastal freshwater marsh, seasonal wetlands, and coastal salt marsh typically meet California Coastal Commission (CCC) wetland criteria, and native grasslands and large trees that provide nesting habitat for

raptors are often considered environmentally sensitive habitat areas (ESHAs). Additional information detailing exiting site habitats is provided in Appendix A.

2.4.1 Special Status Plants

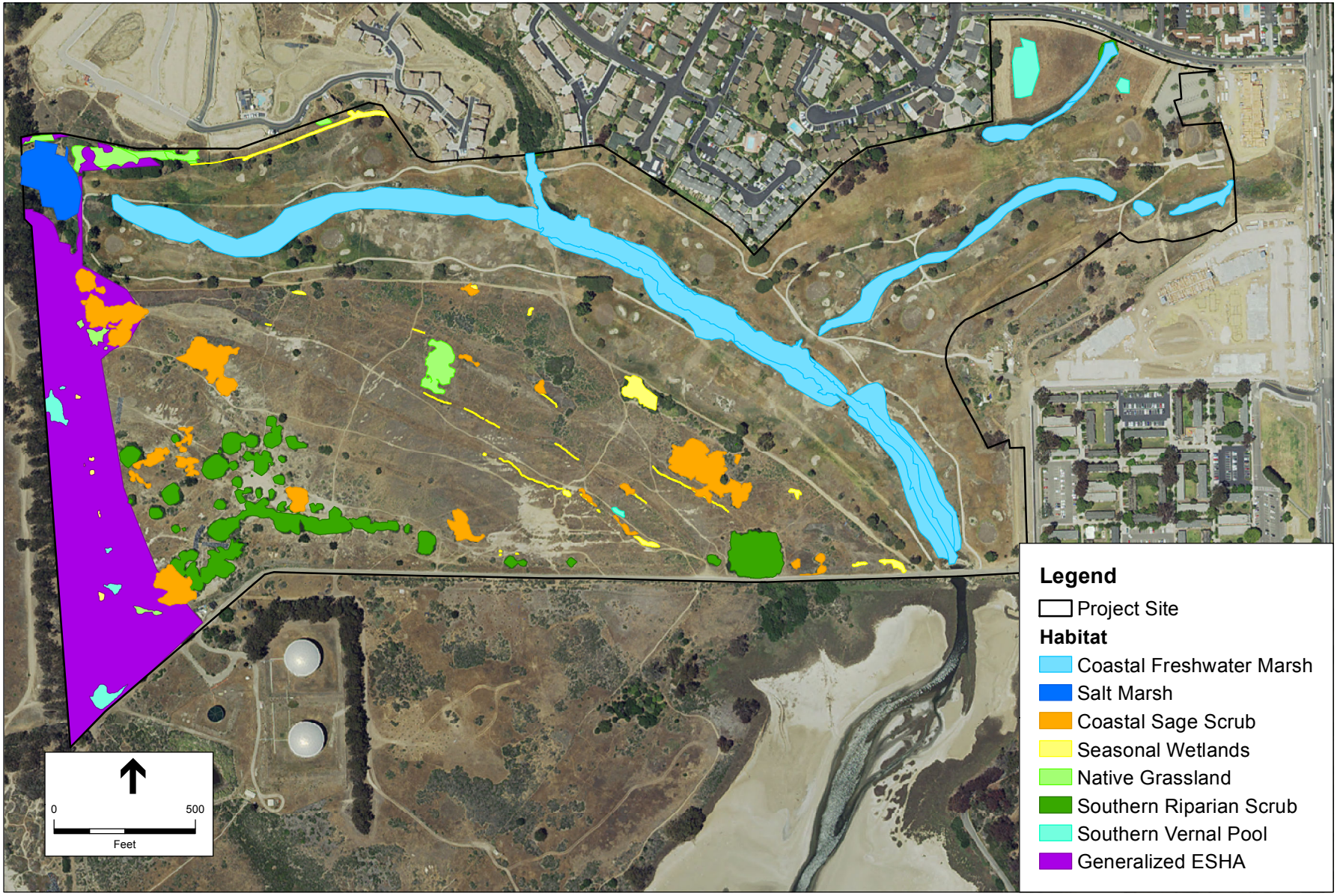
Two rare plants, Santa Barbara honeysuckle (*Lonicera subspicata* var. *subspicata*) and southern tarplant (*Centromadia parryi* var. *australis*) are known to occur within or adjacent to the project site (CCBER 2016a). Santa Barbara honeysuckle and southern tarplant both occur on the South Parcel in very infrequent and scattered locations. In 2016, only five individuals of Santa Barbara honeysuckle occurred in the proposed grading footprint. These individuals will be salvaged and replanted on the project site. Both species have a Rare Plant Rank of 1B, which means the plants are rare, threatened, or endangered in California and elsewhere.

2.5 Wildlife Communities

The project area supports a variety of wildlife species typical of coastal wetland and upland ecosystems. Wildlife habitats of the project area can be discussed in terms of habitats present and the animal species that typically inhabit or utilize those communities. However, many wildlife species are not restricted to a single habitat type and are likely to utilize various portions of the site as forage areas or migration corridors on a seasonal or infrequent basis.

Reptiles and amphibians are present in all vegetated habitats within the project area. The Baha California chorus frog (*Pseudacris hypochondriaca),* southern alligator lizard (*Gerrhonotus multicarinatus),* western skink (*Eumeces skiltonianus),* and western fence lizard (*Sceloporus occidentalis)* are commonly distributed throughout the habitats within the project area (Hunt, 1987, Storrer and Philbrick, 1998). California kingsnakes (*Lampropeltis getulus)* and gopher snakes (*Pituophis catenifer)* occur in grassland habitat (Hunt, 1987). Ring-necked snake (*Diadophis punctatus*) and California red-sided garter snake (*Thamnophis sirtalis infernalis*) have been observed on the project site. Western terrestrial garter snake (*Thamnophis elegans)* and western rattlesnakes (*Crotalus viridis)* have been found west of Devereux Slough (Hunt, 1987). Western pond turtle (*Actinemys marmorata*) is a California Species of Special Concern that potentially occurs in Devereux Creek on Ocean Meadows Golf Course. Results from a 2 year coverboard study that included 26 boards checked on a biweekly basis (2014) reflect a system with western fence lizards, observed in 20% of flipped boards and much lower, less than 3% frequency for alligator lizard. Snakes, skinks and salamanders were observed less than 1% of the time. Argentine ants and earwigs were seen frequently.

Common avian species found in upland habitats include black phoebe (*Sayornis nigricans),* Cassin's kingbird (*Tyrannus vociferans),* cliff swallow (*Petrochelidon pyrrhonota),* American crow (*Corvus brachyrhynchos),* California towhee (*Melozone crissalis*), and northern mockingbird (*Mimus polyglottos).* The patches of freshwater marsh in Devereux Creek provide habitat for marsh birds such as Bewick's wren (*Thryomanes bewickii),* house wren (*Troglodytes aedon),* warblers, and American goldfinch



SOURCE: Habitats (URS 2004, WRA 2006, Morro Group 2006, 2007), Project Site (ESA 2015), Aerial (NAIP 2014)

Figure 4

Distribution of Native Habitat within the Project Site

(*Carduelis tristis).* Riparian habitats and estuarine habitats within Devereux Slough provide foraging and breeding areas for a diversity of species, such as great blue heron (*Ardea herodias),* snowy egret (*Egretta thula),* and warblers. Although not restricted to this habitat, many raptor species such as turkey vulture (*Cathartes aura),* white tailed kites (*Elanus leucurus),* red-tailed hawk (*Buteo jamaicensis),* Cooper's hawk (*Accipiter cooperii*), American kestrel (*Falco sparverius),* barn owl (*Tyto alba),* and great horned owl (Bubo *virginianus)* forage within the grassland habitats in the project area (Storrer and Philbrick 1998).

Many species of waterbirds and shorebirds occur along the coastline within the vicinity of the project area. The western snowy plover (*Charadrius alexandrinus nivosus),*designated as federally threatened, over-winters and nests on the beach near the mouth of Devereux Slough and in salt flats within Devereux Slough, and California least tern (*Sterna antillarum browni)* has also been observed foraging near the mouth the Slough.

Common medium-sized and large mammal species known to occur throughout the project area include Virginia opossum (*Didelphis virginianus),* brush rabbit (*Sylvilagus bachmanii),* striped skunk (*Mephitis mephitis),* raccoon (*Procyon lotor),* as well as feral species, such as domestic cat (*Felis cattus)* (Storrer and Philbrick, 1998). Other large mammal species that occur within the project area include coyote (*Canis latrans),* red fox (*Vulpes vulpes*), and bobcat (*Lynx rufus*). Small mammal fauna occurring in all habitats, including the coastal bluffs and grasslands, includes Botta's pocket gopher (*Thomomys bottae),* California ground squirrel (*Spermophilus beecheyi),* western harvest mouse (*Reithrodontomys megalotis),* house mouse (*Mus musculus),* and California vole (*Microtus californicus)* (Ferren, 1980; Hunt, 1987; Storrer and Philbrick, 1998).

The three most abundant fish species caught during 2005-2007surveys in the Devereux Slough were native California killifish (*Fundulus parvipinnis*) and topsmelt (*Atherinops affinis*), and non-native mosquitofish (*Gambusia affinis*) (Goodman 2008). The endangered tidewater goby (*Eucyclogobius newberryi*) was also frequently captured during seining (Goodman 2008); however, tidewater goby has not been captured in surveys of Devereux Slough conducted by Kevin Lafferty in 2014, 2015, and 2016. An e-dna study in 2016 also found no indication of tidewater goby presence in the Slough or Devereux Creek. (Darwin Richardson, CCBER, personal communication, December 20, 2016) Other common fish species within Devereux Slough include arrow goby (*Clevelandia ios*), longjaw mudsucker (*Gillichthys mirabilis*), diamond turbot (*Hypsopsetta guttulata*), and Pacific staghorn sculpin (*Leptocottus armatus*).

SECTION 3
Target Habitats

The Project will restore, enhance, and preserve a mosaic of native habitats across the OMGC, Whittier Parcel and South Parcel. Descriptions of habitats targeted for establishment on the restored site are provided below. The overall habitat plan is shown in Figure 5. Post-grading site conditions may dictate some changes in the locations and extents of the target habitats. Methods of planting and species compositions may be adjusted in order to achieve the most sustainable outcomes that reflect the final soils and hydrologic conditions. Opportunities to maximize the extents of habitat ecotones and interconnections and to align the restored habitat mosaic with site conditions will be optimized.

3.1 Subtidal and Mudflat

Subtidal habitats will include restored slough channels and features which, at extreme low water in tidal conditions do not drain with the outgoing tides. The subtidal estuarine water regime results in permanently flooded habitats and permanent bodies of open water. These habitats are generally considered truly aquatic systems and are adjacent to and down-slope from estuarine wetlands. The "plants" of slough channels, both intertidal and subtidal, are generally nonvascular taxa, but under brackish conditions near tributary fluvial features, may include various aquatic bed and emergent vascular species. The non-vascular plants may include phytoplankton (e.g., diatoms) and macroalgae, which, along with the detritus from decomposed pickleweed (*Salicornia pacifica*), are often direct links in the estuarine food chain (i.e., are directly consumed by higher order consumers).

Fish use of subtidal habitats can be categorized by various functional groups or guilds including estuarine restricted fish species such as long-jawed mudsucker (*Gillichthys mirabilis*), that spend their entire life cycle in estuaries, and estuarine fish such as tidewater goby (*Eucyclobius newberryi*) that are restricted estuaries with brackish water, but that survive under marine conditions during floods, and return to estuaries under reduced runoff conditions.

Estuarine open water habitats such as those provided by permanently flooded conditions are important foraging areas for birds from other habitats. Of note is the endangered California least tern (*Sterna antillarum browni*), which breeds on sandy habitats adjacent to marine and estuarine wetlands and forages on small fish in the relatively shallow water of estuaries. Shallow water habitat also is important for foraging by wading birds , including snowy and great egrets (*Egretta thula*, *Casmerodias albus*) and green, black-crown night, and great blue herons (*Butorides virescens*, *Nycticorax nycticorax*, *Ardea herodias*); wading shore birds such as willets (*Catoptrophorus semipalmatus*); and diving birds including grebes, mergansers, and many ducks.

The endangered brown pelican (*Pelecanus occidentalis*) is a frequent forager in estuarine open water habitats such as those provided by permanently, semi-permanently flooded, and intertidal water regimes.

Low gradient intertidal mudflats and salt flats will form an important part of the continuum from upland to low marsh habitats within the project site. This habitat zone will alternate between flooded and drought conditions, which prevent most plants from occurring. The open flat offers shore birds a rare habitat that allows both feeding and refuge from predators.

Restored subtidal aquatic and mudflat areas will not be planted and are expected to remain mostly unvegetated; however, areas within these zones may eventually become partially vegetated with natural recruitment of aquatic vegetation or wetland plants. The project will create 4.15 acres of subtidal and 6.18 acres of mudflat/salt flat habitat.

3.2 Salt Marsh

Intermediate elevations will be created to support salt marsh and marsh plain habitat. Plant species that inhabit this elevation zone are adapted to occasional prolonged inundation. The dominant plant in the lower Devereux Slough on the Coal Oil Point Reserve, which served as the primary representative site for the estuarine wetlands design in the NCOS Restoration Project, is pickleweed (*Salicornia virginica*). Particularly in the lower elevation range within this zone. With increasing elevation, alkali heath (*Frankenia salina*), saltgrass (*Distichlis spicata*) and fleshy jaumea (*Jaumea carnosa*) are common in the mid to higher elevations of the marsh plain. An important feature of the marsh plain is its topographic heterogeneity, which includes slough channels, banks, and shallow depressions. The Slough and tributary creek channels provide habitat for fish such as longjaw mudsucker; tributary creek banks tend to support more plant species than the marshplain; and shallow depressions within the marsh plain tend to reduce biomass of pickleweed. Such micro topographic and habitat ‘edge’ conditions will be designed into the marsh plain zone to create increased habitat diversity and associated ecological richness.

The animals of the marsh plain are abundant and diverse. Algae and vascular plant detritus provide forage for ephydrid flies, amphipods, and snails such as the olive snail (*Melampus olivaceus*) in salt marsh vegetation and California horn snail (*Cerithidea californica*) in open flats and channels. A variety of birds forage in the mid-marsh, especially during periods when mudflats are under water, including willet, marbled godwit *(Limosa fedoa)*, long-billed curlew *(Numenius americanus)*, great blue heron, and great egret. The state endangered Belding’s savannah sparrow *(Passerculus sandwichensis beldingii)* inhabits the marsh plain, where it prefers to nest in pickleweed in mid and high marsh conditions.

HABITAT RESTORATION LEGEND - ENTIRE PROJECT

HABITAT TYPE	ACTIVE RESTORATION	PRESERVED ACRES	ENHANCED ACRES
AQUATIC / SUBTIDAL	4.15 ACRES	0 ACRES	0 ACRES
MUDFLAT / SALT FLAT	6.18 ACRES	0 ACRES	0 ACRES
SALT MARSH	12.92 ACRES	1.13 ACRES	0 ACRES
HIGH MARSH / TRANSITION	19.75 ACRES	0 ACRES	0.04 ACRES
RIPARIAN	.95 ACRES	0 ACRES	0 ACRES
NATIVE GRASSLAND	21.85 ACRES	1.84 ACRES	4.36 ACRES
COASTAL SAGE SCRUB	14.07 ACRES	3.18 ACRES	8.32 ACRES
SANDY DUNE ANNUAL	1.73 ACRES	2.08 ACRES	3.15 ACRES
BACK DUNE WOODLAND / SCRUB (SOUTHERN RIPARIAN SCRUB)	1.64 ACRES	3.75 ACRES	0 ACRES
SEASONAL / VERNAL POND	2.18 ACRES	1.16 ACRES	0 ACRES
PLOVER NESTING AREA	3.01 ACRES	0 ACRES	0 ACRES
UPLAND CLAY ANNUALS	0.25 ACRES	0 ACRES	0 ACRES
BIOSWALE	0.32 ACRES	0 ACRES	0 ACRES
FRESH - BRACKISH WETLAND	0.61 ACRES	1.51 ACRES	0 ACRES

EXISTING MAPPED HABITATS TO BE PRESERVED
Indicates habitats to be preserved, selectively weeded, and selectively planted.

EXISTING NON-NATIVE HABITAT TO BE ENHANCED
"Enhanced" indicates habitat to be actively weeded and planted.
Any existing native plant material to be preserved.

EXISTING MAPPED HABITATS TO REMAIN IN SITU
Indicates habitats to be preserved with minimal maintenance.

PREPARED BY: ESA

SHEET TITLE: HABITAT RESTORATION PLAN

PROJECT: NORTH CAMPUS OPEN SPACE RESTORATION PROJECT

PREPARED FOR: UNIVERSITY OF CALIFORNIA SANTA BARBARA SANTA BARBARA, CA 93106-1030

TRUE NATURE LANDSCAPE ARCHITECTURE

SUBMITTALS
6/27/2016 REVISED 100% DD
7/14/2016 REVISED 100% DD
12/20/2016 100% CD

REGISTERED LANDSCAPE ARCHITECT KIMBERLY J. TRUE NO. 5596 STATE OF CALIFORNIA

DESIGNED KJT
DRAWN KJT
INCHARGE KJT
CA LA Lic. No LA 5596 (Landscape arch)
SCALE AS NOTED
DATE 12/20/2016 100% CD
SHEET LH-1 OF 1

SOURCE: TRUE NATURE

UCSB NCOS Restoration Project D140769.02

Figure 5
Habitat Plan

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The high marsh transition zone represents that area where salt marsh vegetation overlaps with upland plant communities. Storm-surge high tides (in tidal conditions) and high storm flow events (in closed slough mouth conditions) may flood habitats transitional to upland habitats, including various palustrine wetlands adjacent to high marsh estuarine wetlands. At relatively undisturbed southern California estuaries, examples of estuarine scrub shrub wetland may occur in the transition zone and may include coast golden bush (*Isocoma menziesii*), Parish's glasswort (*Arthrocnemum subterminale*), and quail bush (*Atriplex lentiformis*). These overlap with the highest elevation salt marsh species including, saltgrass, alkali weed *(Cressa truxillensis),* and shoregrass *(Distichlis littoralis)*.

The animals of the higher elevations of the transition zone are primarily terrestrial species. Those associated with shrubby uplands such as portions of the transition zone include, for example, various species of snakes, lizards, small mammals and birds. Herpetofauna may include California kingsnake *(Lampropeltis getulus californiae),* San Diego gopher snake *(Pituophus melanoleucus annectens)* and side-blotched lizard *(Uta stansburiana)*. Common mammals of the shrub-dominated uplands include Western Harvest Mouse *(Reithrodontomys megalotis),* deer mouse *(Peromyscus maniculatus),* pocket gopher (*Thomomys* sp.), opossum *(Didelphis virginianus),* striped skunk (*Mephitis mephitis),* and California ground squirrel *(Spermophilus beechyi).* The small mammals are preyed upon by a variety of birds including short-eared owl *(Asio flammeus),* northern harrier *(Circus cyaneus),* and white tailed kite *(Elaneus caeruleus).*

The transition zone on the project site will also include nontidal palustrine habitats both salt influenced and non-saline types. Seeps from perched water tables on the western golf course and northern South Parcel currently support a variety of palustrine emergent and scrub-shrub types. Characteristic non-saline or slightly brackish species include shrubs such as Mule Fat (*Baccharis salicifolia*) and herbaceous species such as spiny-rush (*Juncus acutus*), willow-dock (*Rumex salicifolia),* and alkali ryegrass (*Leymus triticoides*). Seep fed wetlands and seasonal palustrine wetlands will be preserved and created within the project habitat matrix. Belding's Savannah Sparrows use the taller shrubs of this habitat during the non-nesting season.

A mix of marsh plain (low and mid-marsh) and high marsh transitional habitats will be created by the project, totaling12.92 and 19.75 acres respectively. The planting palette for salt marsh habitat is shown in Table 1. Planting methods will vary, depending on available access and location within the estuary system. Sprigs of pickleweed may be distributed, salvaged plants and soil from the former golf course containing pickleweed, salt grass, and alkali heath will be planted or disced into the graded marsh plain surface, and a combination of plugs and container plantings of a diversity of propagated species will be planted within the marsh plain and high marsh transitional zones, as appropriate relative to elevation and localized soil conditions and hydrology. A 1.13-acre area of remnant salt marsh will be preserved on site. This area will be enhanced through the closure of informal trails, weeding of rabbitsfoot grass (*Polypogon monospeliensis*) and other annual non-native grasses, and retention of the hydrology that has supported this habitat over the years.

TABLE 1
SALT MARSH PLANTING PALETTE

Scientific Name	Common Name	Spacing	Relative Percent Cover Goal
High Marsh			
Extriplex californica	California orach	1.5 ft O.C.	20
Distichlis spicata	Salt grass	1.5 ft O.C.	20
Elymus triticoides	Beardless wild rye	1.5 ft O.C.	20
Suaeda taxifolia	Wooly seablite	2.5 ft O.C.	10
Frankenia salina	Alkali heath	1.5 ft O.C.	5
Jaumea carnosa	Marsh jaumea	1.5 ft O.C.	5
Limonium californicum	California sealavender	1.5 ft O.C.	5
Distichlis littoralis	Shore grass	1.5 ft O.C.	5
Salicornia pacifica	Pickleweed	1.5 ft O.C.	5
Arthrocnemum subterminale	Parish's glasswort	1.5 ft O.C.	5
Low – and Mid -Marsh			
Salicornia pacifica	Pickleweed	1.5 ft O.C.	70
Frankenia salina	Alkali health	1.5 ft O.C.	10
Jaumea carnosa	Marsh jaumea	1.5 ft O.C.	10
Distichlis spicata	Salt grass	1.5 ft O.C.	2
Limonium californicum	California sealavender	1.5 ft O.C.	2
Extriplex californica	California orach	1.5 ft O.C.	1
Elymus triticoides	Beardless wild rye	1.5 ft O.C.	1
Suaeda taxifolia	Wooly seablite	2.5 ft O.C.	1
Distichlis littoralis	Shore grass	1.5 ft O.C.	1
Arthrocnemum subterminale	Parish's glasswort	1.5 ft O.C.	1
Spergularia marina	Salt marsh sand spurry	1.5 ft O.C./direct seed	0.5
Suaeda calceoliformis	Horned sea blite	1.5 ft O.C./direct seed	0.5

3.3 Fresh-Brackish Wetland

Sites where freshwater mixes with saline seawater produce brackish conditions with intermediate salinities. In southern California, brackish sites vary seasonally, with dilution during the wet season and concentration of salts during the dry season. Local influence from tributary creeks, seeps and springs and the seasonally impounded slough can produce brackish environments that support emergent vegetation characterized by salt marsh bulrush (*Bolboschoenus maritimus*) and southern cattail (*Typha domingensis*), and aquatic bed species such as ditchgrass (*Ruppia* spp.). Tidewater goby historically occurred in areas of Devereux Slough characterized by brackish water conditions.

Freshwater marshes occur in saturated soils. The dominant plants are generally emergent monocots such as cattails (*Typha* spp.), California and American bulrush (*Schoenoplectus*

californicus and *S. americanus*) and sturdy bulrush (*Bolboschoenus robustus*), although aquatic-bed species, such as pondweeds (*Potamegeton* spp.) may also be common. Redwing blackbirds (*Agelaius phoeniceus*) and marsh wrens (*Cistithorus palustris*) commonly breed in the tall, dense vegetation. Common mammals include raccoon (*Procyon lotor*), striped skunk and opossum. Creation and maintenance of freshwater marsh habitat is dependent upon a continual source of freshwater.

Fresh and brackish wetland habitats will be enhanced at the interface of the Whittier and Phelps Creek drainages and at locations influenced by a seep on the northern side of South Parcel. Approximately 0.61acre of freshwater to brackish wetland habitat will be created with the restoration, and 1.51 acres of existing fresh-brackish wetland habitat will be preserved on the project site. Goals for relative cover of plants will vary depending on the hydrology of each area. The banks of the Phelps Creek connection to the restored Slough and the stormwater channel on the Whittier Parcel will be graded to enhance wetland hydrology and planted with wetland species including California bulrush. The Devereux Creek channel in the western arm of the Slough will retain its vegetation matrix of sedges and salt marsh species, and the graded banks will naturally transition to brackish and saltmarsh vegetation including alkali bulrush (*Bolboschoenus maritimus*) and species listed in the table 2 below. The freshwater ponds along the eastern tributary will be largely undisturbed and the edges of these ponds will include vegetation as described in the table 2 and 3 below. The pond at the terminus of the Whittier drainage will be largely open water with a ring of sedges and rushes to provide habitat and cover for bird species using the habitat. Table 2 shows the planting palette for freshwater and brackish wetland zones.

TABLE 2
FRESH BRACKISH WETLAND PLANTING PALETTE

Scientific Name	Common Name	Spacing	Relative Percent Cover Goal[1]
Schoenoplectus californicus	California bulrush	2 ft O.C.	30
Schoenoplectus americanus	Chairmaker's bulrush	2 ft O.C.	20
Bolboschoenus maritimus	Alkali bulrush	seeded	10
Juncus textilis	Basket rush	2 ft O.C.	3
Juncus phaeocephalus	Brown headed rush	2 ft O.C.	2
Hordeum brachyantherum	Meadow barley	1 ft O.C.	5
Baccharis salicifolia	Mule fat	4 ft O.C.	3
Rosa californica	California wild rose	4 ft O.C.	5
Salix exigua	Narrowleaf willow	4 ft O.C.	5
Anemopsis californica	Yerba mansa	2 ft O.C.	5
Baccharis glutinosa	Salt marsh baccharis	2 ft O.C.	5

[1] Typha spp. are expected to volunteer in restored wetlands to form ~2% cover in these habitat areas

3.4 Riparian

Riparian habitats in site vicinity are characterized by dense broad-leafed, winter-deciduous riparian thickets dominated by several willow shrub and tree species (*Salix* spp.). Riparian trees

may also include scattered Fremont's cottonwood (*Populus fremontii*), and western sycamore (*Platanus racemosa*). Riparian habitats support a diverse assemblage of wildlife species, especially passerine bird species. The endangered southwestern willow flycatcher (*Epidonax traillii extimus*) as well as other sensitive species, such as yellow warbler (*Dendroica petechia brewsteri*) and yellow-breasted chat (*Icteria virens*) all depend on riparian habitats for breeding. Mammal assemblages are similar to those found in freshwater marsh habitats, as the two often intergrade. In an undisturbed estuarine system, willow scrub habitat would generally occur upstream of tidal influence as willows are very sensitive to salt. Like freshwater marsh, this habitat is dependent upon a constant source of freshwater.

Approximately 0.95 acres of riparian habitat will be restored along the Whittier drainage and at the connection of the restored Slough to Phelps Creek. Currently these areas are channelized ditches with steep banks that support a very narrow band of wetland and riparian habitat. The banks of the channels at these sites will be graded to restore more gradual slopes that will facilitate expansion and enhancement of the riparian habitat. Arroyo willow (*Salix lasiolepsis*) trees will be salvaged and reinstalled as poles and in biotechnical elements for revegetation and stabilization of the graded banks. Bulrush (*Schoenoplectus* spp.) will also be salvaged and replanted in the creek channels. Other riparian trees will be planted from 5- to 15- gallon container stock and understory species will be planted from 2-inch container stock. Table 3 shows the canopy and understory planting palette for the riparian zones.

TABLE 3
RIPARIAN PLANTING PALETTE

Scientific Name	Common Name	Spacing	Relative Percent Cover Goal
Canopy			
Salix lasiolepis	Arroyo willow	6 ft O.C.	50
Salix exigua	Narrowleaf willow	5 ft O.C.	10
Alnus rhombifolia	White alder	15 ft O.C.	10
Platanus racemosa	California sycamore	15 ft O.C.	10
Populus trichocarpa	Black cottonwood	15 ft O.C.	10
Quercus agrifolia	Coast live oak	20 ft O.C.	10
Understory			
Baccharis salicifolia	Mule fat	5 ft O.C.	10
Sambucus nigra ssp. *caerulea*	Blue elderberry	5 ft O.C.	10
Artemisia douglasiana	California mugwort	3 ft O.C.	10
Rubus ursinus	California blackberry	6 ft O.C.	10
Rosa californica	California wild rose	6 ft O.C.	10
Lonicera subspicata var. *subspicata*	Santa Barbara honeysuckle	6 ft O.C.	10
Schoenoplectus americanus	Chairmaker's bulrush	3 ft O.C.	10
Schoenoplectus californicus	California bulrush	3 ft O.C.	10
Symphoricarpos mollis	Creeping snowberry	3 ft O.C.	5
Keckiella cordifolia	Climbing penstemon	3 ft O.C.	5
Juncus patens	Common rush	3 ft O.C.	5
Juncus xiphoides	Iris leaved rush	3 ft O.C.	5

3.5 Upland

3.5.1 Bioswales

Approximately 0.32 acre of bioswale habitat will be created on the project site, at the interface between residential runoff points and larger wetlands. These swale features will be vegetated densely with a range of native species tolerant of intermittent flooding, and which provide soil stabilization and nutrient cycling functions. The planting palette for the bioswales is provided in Table 4. Upland landscape mounds between the bioswales will be vegetated in native grassland and/or coastal sage scrub plant species.

TABLE 4
BIOSWALE PLANTING PALETTE

Scientific Name	Common Name	Spacing	Relative Percent Cover Goal
Distichlis spicata	Salt grass	1.5 ft O.C.	30
Elymus triticoides	Beardless wild rye	1.5 ft O.C.	30
Hordeum brachyantherum ssp. *brachyantherum*	California barley	1.5 ft O.C.	20
Juncus occidentalis	Rush	2 ft O.C.	5
Juncus patens	Common rush	2 ft O.C.	5
Juncus mexicanus	Mexican rush	2 ft O.C.	5
Carex praegracilis	Field sedge	2 ft O.C.	5

3.5.2 Back Dune Woodland Scrub and Sandy Dune Annuals

Dune scrub and dune annual habitat represents a form of transition zone between the land and the sea. Coastal dune habitats have been largely lost due to development in southern California. Sandy habitats on South Parcel are largely the result of the exposure of historic dune fields when the surface soils were removed in 1965. The sandy zone is directly inland and down-wind from a large coastal dune field south of the site on Coal Oil Point Reserve. Water perched in these areas currently supports a matrix of non-riparian back dune willow scrub, including arroyo willow (*Salix lasiolepis*), black cottonwood (*Populus trichocarpa*), and coastal sagebrush (*Artemisia californica*);and nearly unvegetated sandy flats with low growing perennial herbaceous species, such as deerweed (*Acmispon glaber*), cudweed (*Pseudognaphalium beneolens*), and ladies' tobacco (*Pseudognaphalium californicum*); and native annuals, including American bird's foot trefoil (*Acmispon americanus*), sand pygmy weed (*Crassula connata*), Cleveland's cryptantha (*Cryptantha clevelandii*), and annual lupine (*Lupinus bicolor*) .

Back Dune Woodland Scrub

Back dune woodland scrub is planned for gentle swales that will be graded in an area of the South Parcel mesa where sandy soils will be placed over areas where the finish grade surface is near the water table. Approximately 1.64 acres of this habitat will be created with the restoration. The remnants of this habitat type (3.75 acres) will be preserved and enhanced by weeding a relatively dense population of young pampas grass seedlings and planting with understory species. The

majority of the pampas grass will be pulled, but some herbicide application may be necessary. Plant species will be a mix of species that inhabit the dry end of the moisture gradient in riparian communities and dune scrub species. The planting palette for back dune woodland scrub is provided in Table 5. Back dune woodland scrub habitat will be planted in patches that intergrade with sandy dune annuals.

TABLE 5
BACK DUNE WOODLAND SCRUB PLANTING PALETTE

Scientific Name	Common Name	Spacing	Relative Percent Cover Goal
Salix lasiolepis	Arroyo willow	10 ft O.C.	30
Populus trichocarpa	Black cottonwood	15 ft O.C.	20
Heteromeles arbutifolia	Toyon	15 ft O.C.	10
Sambucus nigra ssp. *caerulea*	Blue Elderberry	15 ft O.C.	10
Rhus integrifolia	Lemonade berry	15 ft O.C.	5
Baccharis salicifolia	Mule fat	5 ft O.C.	5
Rosa californica	California wild rose	5 ft O.C.	5
Artemisia californica	California sagebrush	5 ft O.C.	5
Rubus ursinus	Blackberry	8 ft O.C.	5
Clematis ligustifolia	Creek clematis	5 ft O.C.	3
Pseudognaphalium californicum	Ladies' tobacco	2 ft O.C.	2

Sandy Dune Annuals

Interdigitated with the back dune scrub and the restored grassland/vernal pool complex on the South Parcel mesa approximately 1.73 acres of sandy areas will be created. Approximately 2.08 acres of this habitat will be preserved and 3.15 acres will be enhanced to support low growing annual species. These areas will be largely bare, with intermittent populations of a variety of annual species, to be selected based upon localized conditions such as aspect/shading, soil, and available moisture. Native seeds from existing populations on sandy areas of the South Parcel that won't be disturbed by the project will be collected. The seeds will be spread in selected locations. Fragmented sandy dune annual habitat areas will be preserved and enhanced through weeding of invasive species and spreading of native seeds. The native species that will be used to seed the sandy dune annuals areas is provided in Table 6.

TABLE 6
SANDY DUNE ANNUAL SEEDING PALETTE

Scientific Name	Common Name
Camissoniopsis micrantha	Spencer primrose
Cryptantha clevelandii	Cleveland's cryptantha
Plantago erecta	California plantain
Lupinus bicolor	Annual lupine
Stebbinsoseris heterocarpa	Grassland stebbinsoseris
Cirsium occidentale	Cobweb thistle
Eschscholzia californica var.*maritima*	California poppy
Sanicula arguta	Sharp toothed sanicle
Acmispon americanus	American bird's foot trefoil
Pseudognaphalium beneolens	Cudweed

Hazardia squarrosa	Sawtooth goldenbush
Amsinckia intermedia	Common fiddleneck
Salvia columbariae	Chia sage
Calandrinia menziesii	Red maids

3.5.3 Native Grass Vernal Pool Complex

The approximately 4 to 6 acres of vernal pool complex restoration is included within the native grassland matrix on South Parcel, and will include approximately 1 acre of seasonally ponded vernal pool habitat, as well as approximately 3 to 5 acres of transitional upland native grassland habitat. The planting palette for the vernal pool complex is shown in Table 7.

Vernal pool depressions will be created in areas where heavy clay soils exist or are placed, and will be vegetated by spreading inoculum from local donor pools. The hydrology of the pools will be tested before inoculum is added to ensure hydrologic functionality. The inoculum will be collected by scraping several small areas (1 x 1 foot) of plant material and topsoil from the various donor pools in the dry dormant season. Installation of the inoculum will consist of roughening the pool soil surfaces then evenly spreading the inoculum throughout the pool, rolling it in with a sod roller and then lightly watering. Common spikerush (*Eleocharis macrostachya*) from 2 inch container nursery stock or material salvaged from the project site will also be planted in the deeper sections of the pools. Other species as listed below may also be planted to supplement inoculum.

TABLE 7
VERNAL POOL PLANTING PALETTE

Scientific Name	Common Name	Spacing	Relative Percent Cover Goal
Eleocharis macrostachya	Common spikerush	1 ft O.C.	20
Hordeum brachyantherum ssp. *brachyantherum*	California barley	1 ft O.C./seed	25
Eleocharis acicularis	Needle spikerush	1 ft O.C.	5
Juncus occidentalis	Slender juncus	1 ft O.C.	5
Brodiaea terrestris	Dwarf brodiaea	1 ft O.C./seed	5
Grindelia camporum	Common gumplant	1 ft O.C./seed	5
Castilleja densiflora	Dense flower owl's clover	1 ft O.C./seed	3
Centromadia parryi ssp. *australis*[1]	Southern tarplant	1 ft O.C./seed	3
Lysimachia minima	Chaffweed	1 ft O.C./seed	3
Crassula aquatica	Aquatic pygmy weed	1 ft O.C./seed	3
Elatine brachysperma	Shortseed waterwort	1 ft O.C./seed	3
Eryngium armatum	Coastal eryngo	1 ft O.C./seed	3
Eryngium vaseyi	Coyote thistle	1 ft O.C./seed	3
Plagiobothrys undulatus	Coast allocarya	1 ft O.C./seed	3
Psilocarphus brevissimus	Woolly marbles	1 ft O.C./seed	3
Alopecurus saccatus	Pacific foxtail	1 ft O.C./seed	2
Phalaris lemmonii	Lemmon's canarygrass	1 ft O.C./seed	1

1. This species has a Rare Plant Rank of 1B.1.

Southern tarplant (*Centromadia parryi* var. *australis*) is a special status species found in sites adjacent to the project site and a species that could be supported on the project site in areas with intermediate disturbance regimes such as the edges of vernal pools and areas with shallow perched water tables that preclude colonization by larger woody shrubs. This species is relatively easy to establish in disturbed areas from seed and produces abundant seed during its initial establishment. The ensuing seed bank includes both long and short-lived seeds which respond to intermediate disturbances such as small mammal use and hydrological regime patterns. Because the fill soils will have a high clay content, there will be places on site with shallow loamy soils over dense clays which are likely to provide conditions suitable for southern tarplant. Localized patches of suitable habitat will be selected and planted with this species to establish a population within the project site.

Preliminary testing of soils from the proposed excavation area (for restoration of the northern Devereux Slough) indicates that the fill soils to be placed to restore the South Parcel mesa may be of higher salinities than are suitable for supporting the above-listed vernal pool species. Further soils testing and formulation of strategies for selective grading and/or amendment of soils to improve their suitability are currently underway. However, in the event that establishment of the targeted extent of vernal pool habitat is not feasible, some areas may be established as haline seasonal wetlands as the alternative. Species that will be established in such higher salinity soils, if necessary, are listed in Table 8.

TABLE 8
HALINE SEASONAL WETLAND PLANTING PALETTE

Scientific Name	Common Name	Spacing	Relative Percent Cover Goal
Frankenia salina	Alkali heath	1.5 ft O.C.	30
Malvella leprosa	Alkali mallow	1 ft O.C.	20
Distichlis spicata	Salt grass	1.5 ft O.C.	20
Entriplex californica	California orach	1 ft O.C.	15
Hordeum brachyantherum ssp. *californicum*	California barley	1 ft O.C.	10
Juncus mexicanus	Mexican rush	2 ft O.C.	5

Upland Clay Annuals

Interdigitated with the restored grassland/vernal pool complex on the South Parcel mesa, approximately 0.25 acre of low growing annual species will be planted on soils with higher clay content. Similar the sandy annual patches, these areas will be largely bare or intermixed with native grassland plant species. Locations for these habitat patches will be selected based upon localized conditions such as aspect/shading, soil, and available moisture. Native seed from existing populations on areas of the South Parcel that won't be disturbed by the project will be collected. In areas where these species will be disturbed by project construction, soil will be salvaged. . The seed and salvaged soils will be spread in selected locations of the South Parcel Mesa in patches. The native species that will be used to seed the upland clay annuals areas is provided in Table 9.

TABLE 9
UPLAND CLAY ANNUALS SEEDING PALETTE

Scientific Name	Common Name
Camissoniopsis micrantha	Spencer primrose
Cryptantha clevelandii	Cleveland's cryptantha
Deinandra fasciculata	Clustered tarweed
Plantago erecta	California plantain
Zeltnera muehlenbergii	Muehlenberg's centaury
Lupinus bicolor	Annual lupine
Stebbinsoseris heterocarpa	Grassland stebbinsoseris

3.5.4 Native Grassland

Grasslands are likely to have occurred on alluvial deposits on the periphery of the coastal wetland ecosystem, mixed with various forms of coastal scrub. In the restored site, this vegetation will include native grass species and a diverse number of native herbaceous and sub-shrub species as noted above, with small colonies and scattered individuals of coastal scrub species to provide perches and shelter for animals that characterize grassland and adjacent scrub and wetland habitats. Native grasslands are important for maintenance of biodiversity and provide host plants for butterfly larvae including the wandering skipper monarch (*Danaus plexippus*) and habitat for herpetofauna, including lizards and snakes such as California king snake and gopher snake, native small mammals such as the California vole (*Microtus californicus*), mice, and moles and foraging habitat for raptors such as white-tailed kite and northern harrier and egrets and herons.

The restored grassland areas will be a mix of purple needle grass (*Stipa pulchra*) dominated habitat with some areas sparsely vegetated by annual forbs. The planting palette for grassland is shown in Table 10 and the seeding palette is shown in Table 11. In addition, 1.84 of existing native grassland habitat will be preserved and 4.36 acres enhanced with the project.

Approximately 2 acres of grassland will be established during the first construction phase of the project along the northern project boundary, and will be planted from two inch container stock grown from locally collected seed. These areas will also be direct seeded with annual forb species during early winter. Approximately 19.85 acres of grassland will be established on the South Parcel during the second construction phase, following fill placement and final grading. This grassland restoration will entail a variety of strategies that will likely include machinery assisted techniques such as drill seeding and/or plug planting of purple needle grass in the areas where final grade slopes are conducive. In areas where slopes will not allow large machinery, broadcast seeding and planting of two inch container stock will be implemented. The quantity of purple needle grass seed available will determine the extent to which broadcast seeding will be utilized, due to the high quantity of seed needed. Drill seeding is expected to occur at a rate of 10 lbs./acre and broadcast seeding at a rate of 20 lbs./acre.

TABLE 10
GRASSLAND PLANTING PALETTE

Scientific Name	Common Name	Spacing	Relative Percent Cover Goal
Stipa pulchra	Purple needle grass	1 ft O.C.	60
Distichlis spicata	Salt grass	1 ft O.C.	13
Bromus carinatus	California brome	1 ft O.C.	5
Hordeum brachyantherum ssp. *brachyantherum*	Meadow barley	1 ft O.C.	5
Elymus glaucus	Blue wildrye	1 ft O.C.	4
Hordeum brachyantherum ssp. *californicum*	California barley	1 ft O.C.	2
Asclepias fascicularis	Narrow leaf milkweed	1 ft O.C.	2
Juncus occidentalis	Western rush	1 ft O.C.	1
Corethrogyne filaginifolia	Common sandaster	1 ft O.C.	1
Hazardia squarrosa	Sawtooth goldenbush	1 ft O.C.	1
Native Perennial Herbs (see Table 11)		seed	5
Native Annual Herbs (see Table 9)		seed	1

TABLE 11
GRASSLAND SEEDING PALETTE

Scientific Name	Common Name
Perennial	
Bloomeria crocea	Golden star
Calystegia macrostegia ssp. cyclostegia	Coast morning glory
Dudleya lanceolata	Southern California dudleya
Sisyrinchium bellum	Western blue eyed grass
Chenopodium californicum	California goosefoot
Cirsium occidentale	Cobweb thistle
Dichelostemma capitatum	Blue dicks
Eschscholzia californica var.*maritima*	California poppy
Sanicula arguta	Sharp toothed sanicle
Asclepias fascicularis	Narrow leaf milkweed
Pseudognaphalium californicum	Ladies' tobacco
Centromadia parryi ssp. *australis*	Southern tarplant
Castilleja densiflora	Dense flower owl's clover

3.5.5 Coastal Sage Scrub

The general category "coastal sage scrub" includes a number of shrub-dominated plant communities in the context of a variety of land forms. Coyote brush (*Baccharis pilularis*) and California sage brush (*Artemisia californica*) form colonies on alluvial and disturbed soils and can occur within the context of grassland and other herbaceous vegetation. Upland scrub habitats adjacent to wetland forms of scrub habitats can be dominated by mulefat (*Baccharis salicifolia*). Coastal bluff scrub on local coastal bluffs includes salt tolerant species such as wooly sea-blite (*Suaeda taxifolia*) and quail bush (*Atriplex lentiformis*). Within the bluff community, sparsely-

vegetated areas or areas with low vegetation also can support a wide variety of herbaceous species, some of which are also associated with coastal dunes. Coastal dune scrub is discussed separately above. A variety of terrestrial animals, including amphibians, reptiles, mammals and birds are supported by coastal scrub habitat.

Approximately14.07 acres of coastal sage scrub will be restored on the project site, with 3.18 acres preserved and 8.32 acres enhanced. Restored areas will be seeded or planted with 2-inch container stock, grown from locally collected seed. The planting palette contains shrubs and herbs that tolerate clay soils and have been observed in soils with similar clay content at the North Parcel. The grassland and coastal sage scrub habitats will be interdigitated with each other along the upland slopes to create a mosaic of habitats that will maximize ecotones. Small fragments of coyote brush scrub will be retained on the south parcel. These patches will be enhanced with plantings from the species list below. In the event that coyote brush scrub takes over disturbed areas, female plants will be removed to reduce the spread and provide opportunities for less aggressive species to colonize and become established.. The planting palette for the restored coastal sage scrub habitats is shown in Table 12 below.

TABLE 12
COASTAL SAGE SCRUB PLANTING PALETTE

Scientific Name	Common Name	Spacing	Relative Percent Cover Goal
Artemesia californica	California sagebrush	2.5 ft O.C./seed	20
Epilobium canum	California fuchsia	2.5 ft O.C./seed	10
Isocoma menziesii	Menzies' goldenbush	2.5 ft O.C./seed	10
Lonicera subspicata var. *subspicata*[1]	Santa Barbara honeysuckle	2.5 ft O.C./seed	10
Atriplex lentiformis ssp. *breweri*	Quailbush	2.5 ft O.C./seed	5
Encelia californica	Bush sunflower	2.5 ft O.C./seed	5
Hazardia squarrosa	Saw toothed goldenbush	2.5 ft O.C./seed	5
Heteromeles arbutifolia	Toyon	5 ft O.C./seed	5
Elymus condensatus	Giant wild rye	2.5 ft O.C./seed	5
Malacothamnus fasciculatus	Chaparral mallow	5 ft O.C./seed	5
Rhus integrifolia	Lemonade berry	5 ft O.C./seed	5
Mimulus aurantiacus	Sticky monkey flower	2.5 ft O.C./seed	2
Verbena lasiostachys	Common verbena	2.5 ft O.C./seed	2
Eriophyllum confertiflorum	Golden yarrow	2.5 ft O.C./seed	2
Salvia leucophylla	San luis purple sage	2.5 ft O.C./seed	2
Salvia mellifera	Black sage	2.5 ft O.C./seed	1
Symphyotrichum chilense	California aster	2.5 ft O.C./seed	1
Acmispon glaber	Deerweed	2.5 ft O.C./seed	1
Eriogonum parvifolium	Sea cliff buckwheat	2.5 ft O.C/seed	1
Malacothrix saxatilis	Cliff aster	2.5 ft O.C/seed	1
Pseudognaphalium californicum	Ladies' tobacco	2.5 ft O.C./seed	1
Scrophularia californica	California bee plant	2.5 ft O.C./seed	1

1. This species has a Rare Plant Rank of 1B.2 and will be propagated from local seed sources, cuttings and salvaged plants.

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SECTION 4
Habitat Features to Benefit Wildlife

Habitat features will be created within the project to benefit special status and common fish and wildlife species. Anticipated locations of these features are shown on Figure 6.

4.1 Features to Benefit Reptiles and Amphibians

Physical features to create cover (composed of logs, wood and brush piles, rocks) and subterranean hibernacula/refugia with narrow entry ways will be created in restored upland and wetland transitional habitats. The cover and hibernacula will support native herpetofauna and protect them from temperature extremes and from predators such as hawks, owls, skunks, raccoons, and feral pets.

Restored native upland habitats and seasonal freshwater wetlands, vernal pools, and riparian areas with diverse native plantings will support insect diversity. Insects are a major food source for many reptiles and amphibians. Enhancement of the freshwater habitats in Phelps Creek, in the Whittier drainage and in the eastern tributary (Tributary 3) seasonal wetland and connection of these habitats to a larger area of restored native habitat will particularly benefit amphibians such as salamanders and frogs. Amphibians will also benefit directly from the delineation of specific public access ways, particularly creek/wetlands crossings (by focusing local walking and cycling traffic onto these areas. And thereby decreasing direct habitat impacts). Creation of buffers around wetlands with dense riparian and upland habitats will protect sensitive wetlands from opportunistic access by people and pets. This restoration will provide leaf litter inputs and shading, and will create important habitat for species which currently aren't supported by the steep, channelized banks and uncontrolled use of the open space by people. The effect of the restoration and delineation of trails will be to support amphibian use of wetlands and their buffer habitats, thus supporting the full life cycle.

4.2 Features to Benefit Mammals

Reestablishment of native plant communities on the restoration site and the creation and enhancement of a variety of freshwater resources in vernal pools and freshwater marsh habitats will provide cover, food (e.g. seeds) and water sources for small and large mammals. Logs, rocks, thatch and hibernacula will be incorporated into the site design to benefit small mammals.

SOURCE: Project Features (ESA and CCBER 2016)

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Figure 6

Habitat Features to Benefit Wildlife

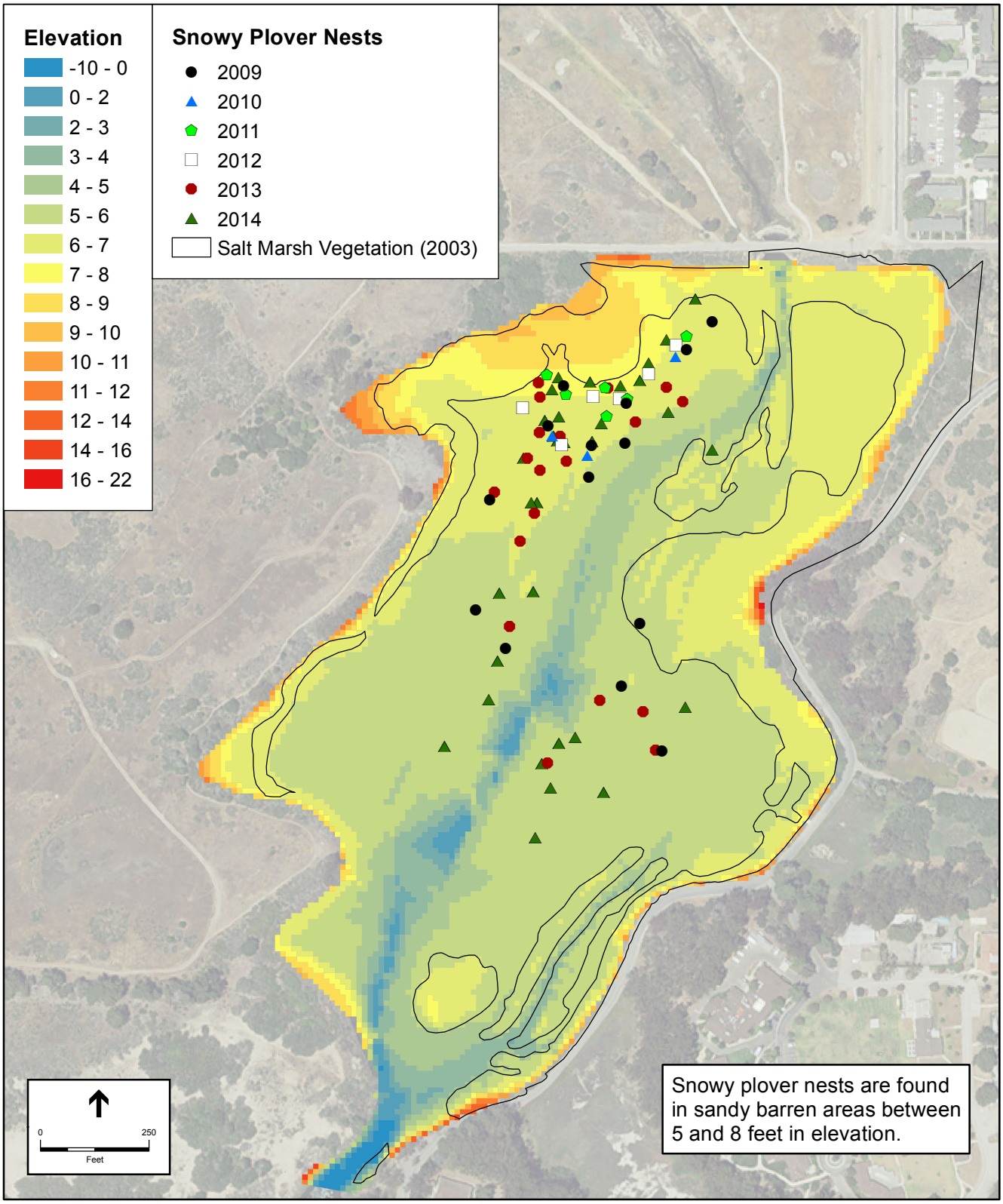
California myotis (*Myotis californicus)* is the only breeding bat likely to ocur at the project site. The restoration will support bat habitat through the associated production of insects with the greatly increased aerial extent of open water and otherwise enhanced wetland and upland habitats. The project will provide bat roosting habitat with retention of existing trees Southern tarplant (*Centromadia parryi* var. *australis*) is a special status species found in sites adjacent to the project site and a species that could be supported on the project site in areas with intermediate disturbance regimes such as the edges of vernal pools and areas with shallow perched water tables that preclude colonization by larger woody shrubs. This species is relatively easy to establish in disturbed areas from seed and produces abundant seed during its initial establishment. The ensuing seed bank includes both long and short-lived seeds which respond to intermediate disturbances such as small mammal use and hydrological regime patterns. Because the fill soils will have a high clay content, there will be places on site with shallow loamy soils over dense clays which are likely to provide conditions suitable for southern tarplant. Localized patches of suitable habitat will be selected and planted with this species to establish a population within the project site along north and east site boundaries and may also include installation of bat boxes adjacent to the wetlands.

4.3 Features to Benefit Birds

Retention of 46 large trees on the former golf course property and 54 trees on the South Parcel within the restoration site will benefit local birds including raptors. In addition, a number of existing dead trees will be retained on site as snags, and approximately 100 trees to be cut down will be retained to create vertical and horizontal roosts/habitat features. Raptors will benefit from establishment of native riparian trees, and restoration of low growing grasslands as well as the interspersion of annual-dominated, intermittently vegetated areas, which will be functional foraging grounds as restoration of these native habitats will create enhanced habitat for prey animals (rodents, smaller birds and reptiles). Increased productivity and food chain support, and the creation of more diverse habitats and habitat edges with restoration of the site will also enhance habitat for raptors and other bird species.

In restored, open, upland habitat areas such as the restored South Parcel mesa and eastern slope, artificial burrows will be incorporated to facilitate use by burrowing owls (*Athene cunicularia*).

A 3.01-acre habitat feature will be created with project grading for the federally threatened western snowy plover (*Charadrius alexandrinus nivosus*). Early site studies identified an area of Devereux Slough on the Coal Oil Point Reserve where western snowy plover have been documented nesting and foraging. This area is located immediately south of the project site boundary, just south of the Venoco Road crossing, on the west side of the lower Slough channel. The area has been monitored by COPR, and its conditions were documented as a reference site for the restoration project. This feature exhibits very gently sloping, unvegetated sandy sediment flats, in the 5- to 8-feet NAVD elevation range, with access to shallow slough waters and a clear buffer from adjacent shrubs and trees that may harbor predators (Figure 7). Documentation of conditions favored by snowy plovers on the COPR provided an opportunity to include replication of such conditions with project design to provide additional plover nesting habitat. The project



SOURCE: Aerial (NAIP 2014); Salt Marsh (URS 2003);
Elevations (ESA 2015); SNPL nest locations (CCBER 2015)

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Figure 7

Snowy Plover Nests in Lower Devereux Slough 2009-2014

design includes a sandy area of similar elevation, extent and situational characteristics (lack of nearby trees and shrubs, wide, flat open with large extent of edge habitat adjacent to shallowly inundated mudflats) adjacent to the documented snowy plover nesting site on the Slough in Coal Oil Point Reserve. The sandy soils proposed for this site are similar to those in the reference site and reduce the chance that this slightly higher elevation area will be colonized by vegetation. The higher elevation provides more stable nesting habitat relative to average slough water levels and in the face of sea level rise that could impact the existing beach nesting area at Sands Beach. This will provide potential nesting habitat nearby to mudflat foraging areas. Other migratory shorebirds will also benefit from this wide, sandy feature, as well as from restored seasonally flooded wetlands and mudflats and from saltmarsh plain with vegetated "islands" and edge habitat to support insect production.

Restored intertidal habitat and an approximately .84-acre seasonally ponded wetland feature at the northern site boundary, west of the Phelps Creek tributary connection, will provide foraging areas for migratory shorebirds and wading birds. Wading birds will also benefit from restored riparian areas for roosting and from vegetated wetland edges for forage and cover. Wading birds will be protected from disturbance on the western half of the Slough because there will be no trail between or near the water and upland interface.

Dabbling ducks, geese and diving ducks will be supported by deeper sub-tidal areas and lower elevation (more frequently inundated) mudflat areas. Volunteer establishment of aquatic vegetation, such as ditch grass (*Ruppia* spp.), intermittent algal growth, and fish that will inhabit the restored aquatic habitat will provide foraging opportunities for these ducks. Ducks will also benefit from the reduced tree cover along western edge of wetland habitat.

4.4 Features to Benefit Fish

The restoration project will enhance fish habitat through expansion of subtidal habitat and with creation of specific habitat features such as eddy ponds within the restored Slough and Phelps Creek connection. Subtidal and intertidal areas will provide habitat suitable for the tidewater goby and other associated estuarine species such as top smelt, killifish, long jaw mudsucker, and mullet.

Eddy ponds, incorporated into the project design to provide conditions favorable for tidewater goby, will be approximately 2 feet deep and occur in areas upstream of islands and peninsulas of higher elevation habitat to create refuge during higher flow events, such as when the Slough mouth breaches (Figure 8). At the restored Slough connection to Phelps Creek, a series of two step-pool style grade control structures and an additional armored sill downstream of the new Phelps Creek Bridge will preserve freshwater conditions in Phelps Creek and provide a fresh to saline gradient at the confluence (Figure 9). This control will maintain brackish conditions at the restored Slough confluence, favored by tidewater goby, and preserve freshwater conditions in upstream reaches that currently support freshwater wetland and riparian habitat. Given the regular occurrence of hypersaline conditions in the larger Slough, this feature will provide an important brackish refuge for the goby, similar to ponds in Goleta Slough near Tecolotito Creek. This grade control feature will facilitate connectivity during the 8-10 foot water stage periods that occur with

most rain events and during periods when the Slough mouth is closed, and provide refuge from high velocity flows during storm events.

SOURCE: ESA 2016

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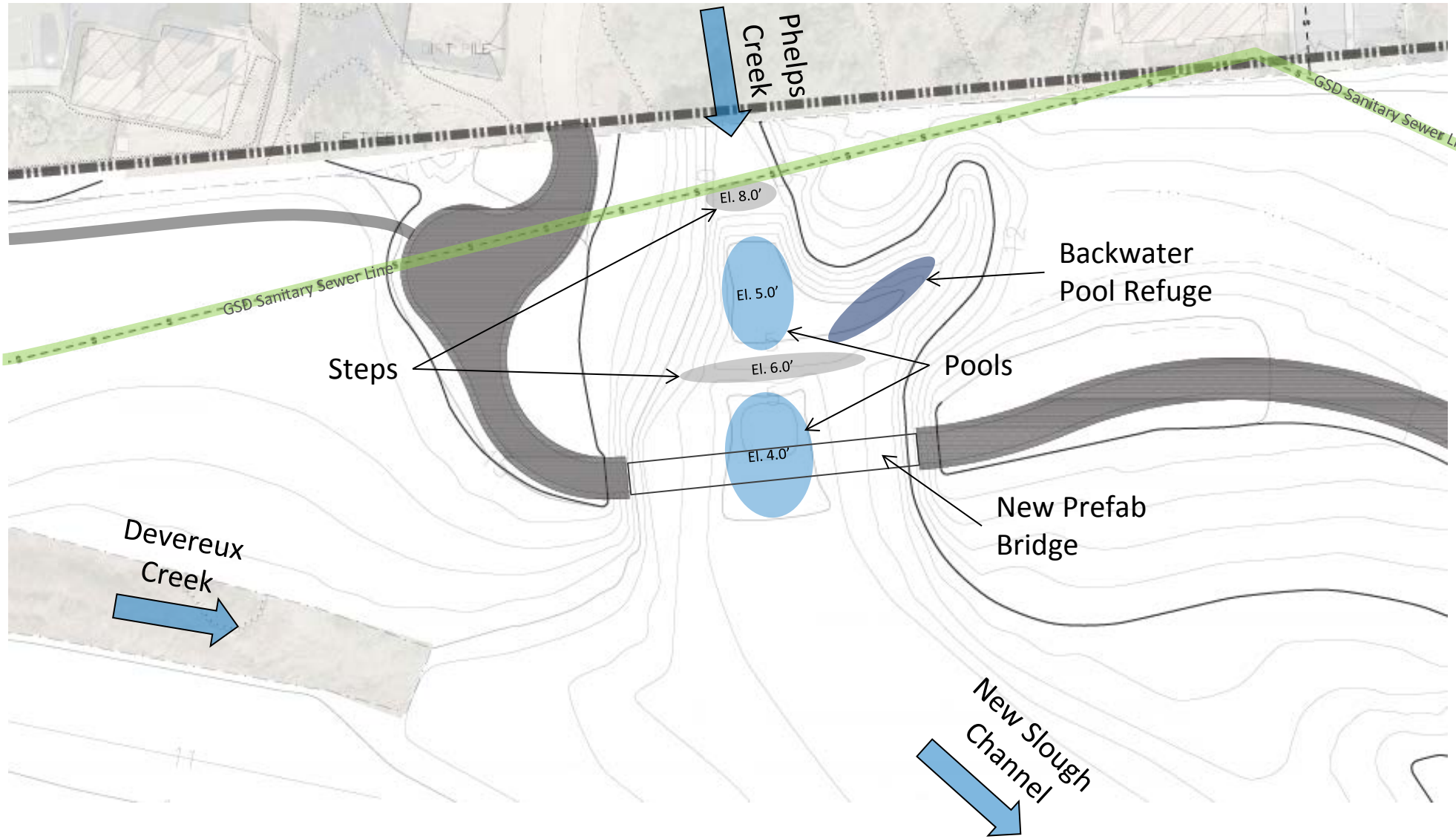
Figure 8

Goby Features

Sheltered Backwater Channels



SOURCE: ESA 2016

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Figure 9

Phelps Creek Connection

4.5 Features to Benefit Invertebrates

Monarch butterfly habitat will be preserved in the restored site with retention of the existing Eucalyptus windrow on the western South Parcel boundary and enhanced with planting of milkweed (*Aesclepias fascicularis*) throughout a restored mosaic of native grassland and coastal sage scrub habitats. A restoration program goal is to build up the population of milkweed over the years through propagation and planting of groupings of plants dispersed throughout the upland interface areas of the site. Habitat for invertebrates generally will be enhanced by the creation of ecotones, increased habitat diversity, an emphasis on local genera and increased native plant cover, the creation of wetlands, and the creation of cover and subterranean hibernacula. Habitat for invertebrates will also be enhanced by the maintenance of bare soil areas that could support ground nesting bees and incorporation of standing and prostrate dead wood for wood boring invertebrate species.

4.6 Features to Support a Diversity of Wildlife

Wildlife benefit from the provision of cover and shelter, perches, and roosts. Structures composed of wood provide substrates for boring insects, foraging birds, and cavity nesting birds and bats. Rock structures provide thermal and structural functions. The provision of these sorts of perches and structures will be important in this project, in which soil is moved en masse to restore historic topographic and hydrologic features.

All trees (dead and alive) to be removed from the project site to accommodate restoration of the Slough and adjoining habitats, (with the exception of palm trees), will be salvaged. Trees and other native vegetation on site will be salvaged for habitat purposes, as woodchips, small branches, and longer branches and trunks. Trunks will be repurposed as vertical and horizontal habitat features as perches and cover. Piles of branches will be placed in selected locations to create cover and refugia. Woodchips will be used as mulch and, where sufficiently composted, mixed into the upper soil layers as organic soil amendment.

At least 15 vertical structures will be placed in upland and transitional habitats using salvaged logs, especially older ones with wood suitable for cavity nesting, acorn graineries and perching or foraging for insects. In some areas no vertical structures will be located, in order to maintain safe cover zones for rodents, reptiles and amphibians, and burrowing owls. At least 60 horizontal logs and additional wood/branch piles will also be installed as habitat enhancement features.

Brush piles will be created from shrubs that are removed. The brush piles will be at least three feet in height. Brush piles will be placed as part of the initial restoration, and continue to be supplemented throughout the development of the open space area. These brush piles will provide foraging and refuge habitat for species such as brush rabbit and nesting habitat for California quail (*Callipepla californica*) during the upland habitat establishment period, when vegetative cover will likely be scarce. Existing lithic rocks, large and small, will be retained at the soil surface or nestled into these brush piles to the extent possible.

Hibernacula will be created in two sizes. Deeper holes (5 x 5 x 5 feet) will be filled with one-third mixed wood chips and soil, and carefully placed piles of ‘urbanite’ from cut up golf cart paths to create passageways and narrow entry ways in support of herpetofauna. Sticks and logs will be placed in and around these holes, and then the holes will be filled with uncompacted, mounded dirt, suitable for perches and burrowing. Shallower holes (3 x 3 x 3 feet) will also be created with similar structure. Approximately 5 deep and 5 shallow hibernacula will be placed per acre of upland habitat. Approximately 10 acres of upland habitat will be enhanced with these features for a total of approximately 100 hibernacula. These features will provide important support for insects, rodents as well as reptiles and amphibians and support the recolonization of the project area by these species from the adjacent open space areas which will help accelerate the pace of food web development. Approximate anticipated locations of these features are shown in Figure 6; however specific locations will be determined in the field following completion of mass grading.

SECTION 5
Implementation

5.1 Construction Phasing

Construction of the project will be sequenced into two contiguous seasons, called 'phases', starting in the late winter of 2017, with the option for a 3rd season of construction, if necessary. Construction sequencing is described in more detail in the sequencing document and on the construction drawings. The start date for construction will depend on the timing of permit approvals and receipt of grant funding. The project Construction Sequencing Memorandum (ESA, 2016) provides further detail on anticipated construction operations.

Grading operations will be conducted in segments of approximately 200- to 500- foot lengths, beginning at the upstream ends of Phelps Creek and Tributary 3 channels and progressing downstream along the lower Devereux Creek channel towards the Venoco Road Bridge. Construction in segments will allow for the careful control of sediment and water on the site, and will minimize potential downstream impacts. This sequencing will also allow local ambulatory wildlife to move progressively downstream with site disturbance, toward the open space to the south (COPR) and west (Ellwood Mesa) of the project site.

Phase 1 construction is anticipated to commence in the late winter 2017. In the first phase of construction, upland areas of the project site adjacent to residential developments along the north and east site perimeter will be improved. Phase 1 activities will consist of grading and revegetation of the area between the northern perimeter of the site and the project primary trail alignment and between the eastern project boundary and the primary trail alignment. Portions of the site interior will also be graded, but not revegetated in Phase 1. Excess fill generated in Phase 1 grading operations will be placed on a limited portion of the South Parcel. Staging areas and construction access routes will be created. In addition, all vegetation slated for removal within the project area will be cut and chipped for onsite placement, or removed from the site. Existing native vegetation appropriate to the restored site condition will be salvaged and stored for re-installation in Phases 1 and 2. Figure 10 shows the extent of Phase 1 construction activities. The Phase 1 grading plan is provided in Figure 11.

Phase 2, the first full season of construction, is expected to begin in the spring of 2017 and will include the bulk of the mass grading effort, as well as fine grading and construction of public access subgrades, foundations and structures, as time allows. Revegetation efforts may begin during Phase 2, once final grades are achieved and confirmed by survey. The Phase 2 grading plan is provided in Figure 12.

Construction tasks which may require a third season could include the removal of temporary water control structures, completion of the Slough channel grading, completion of public access features, including boardwalks and bridges, and revegetation of marsh, riparian and upland habitat areas.

5.2 Water Management

The Phase 1 grading plan has been developed to largely avoid grading and other project work in areas that may require special water management techniques, and in particular to avoid modifications within the floodway. Suitable erosion control measures will be implemented in all areas where the local groundcover is disturbed to stabilize the site during the rainy season between the first and second construction phases.

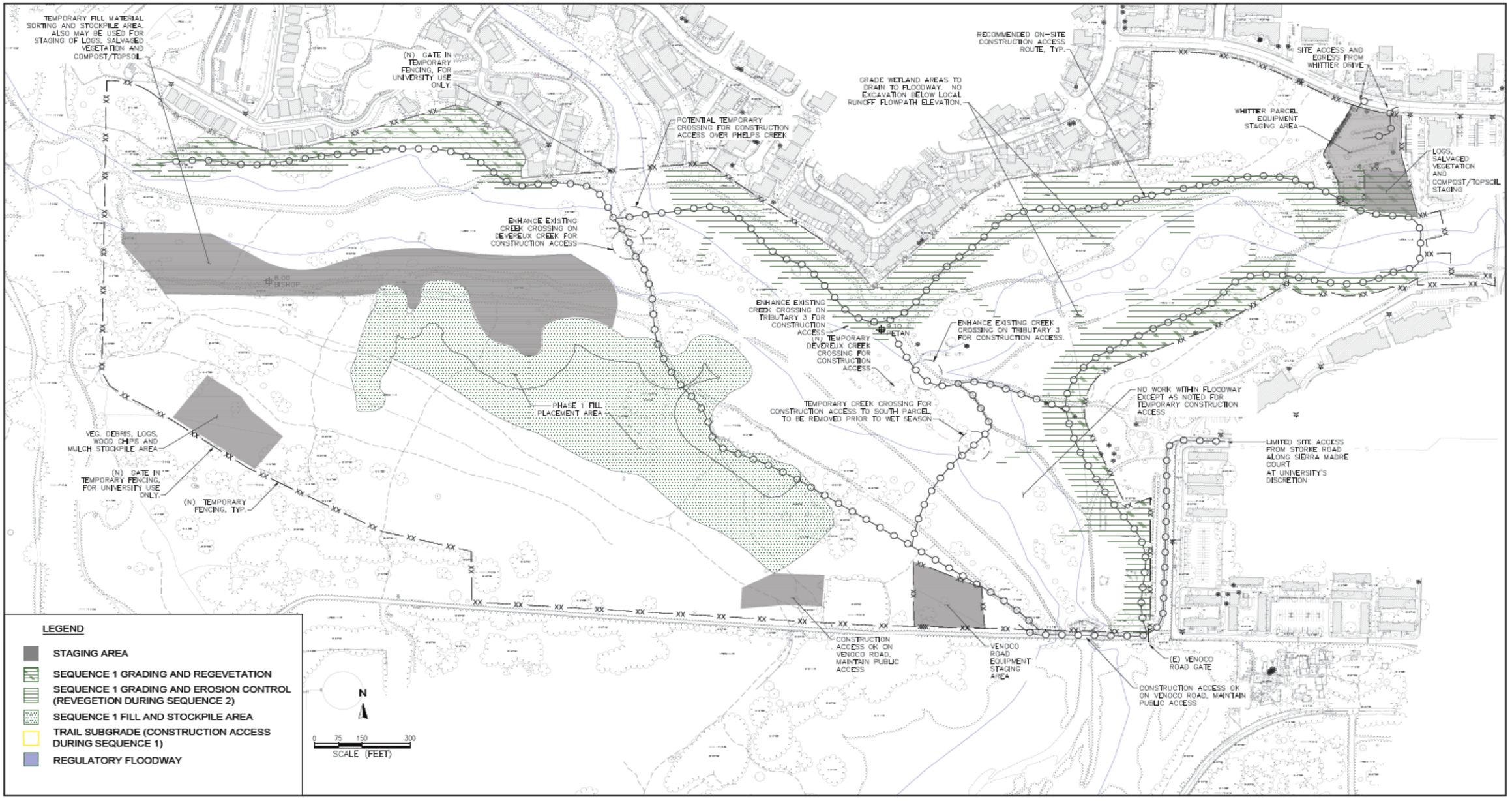
Phase 1 does include two temporary creek crossings, which may include limited fill placement in the Devereux and Phelps Creek channels. These creek crossings will incorporate culverts and/or temporary bridges of sufficient size to pass any construction period stream flows. Because these crossings will have the potential to reduce the flow capacity of the existing channels, the crossings will be designed so as to either 1) not reduce the conveyance of the creek channel (e.g. a temporary bridge that spans the existing channel) or 2) be able to be removed within 2-days' notice in the event that a major rain event is forecast during the construction period. It should be noted that there are multiple existing creek crossings associated with golf course cart paths. New temporary crossings will be needed at the Devereux Creek channel, between the existing bridges at Phelps and Venoco (Figure 13).

The Phase 2 grading includes excavation below the water table and work within existing ephemeral and perennial creek channels. This work is likely to involve excavation in saturated soils, and standing water may be encountered within the work area during some or all of the construction season depending on prevailing weather conditions. The following sections provide a preliminary description of anticipated construction measures intended to allow for the effective management of water and sediments on site during the construction process.

5.2.1 For Grading to Create Wetlands

The proposed wetland grading includes excavation of large volumes of soil to create new mud/salt flat, saltmarsh and transition habitats, ranging in elevation from approximately 5 to 9 feet NAVD[1]. The Phase 2 grading plan also includes excavation to restore Slough channels with bottom elevations at 3.5 feet NAVD.

[1] All project design elevations are relative to the North American Vertical Datum of 1988 (NAVD). Mean Higher High Water (MHHW) at the nearby Santa Barbara tide gage (NOAA Station # 9411340) is 5.27 ft NAVD.



SOURCE: ESA 2016

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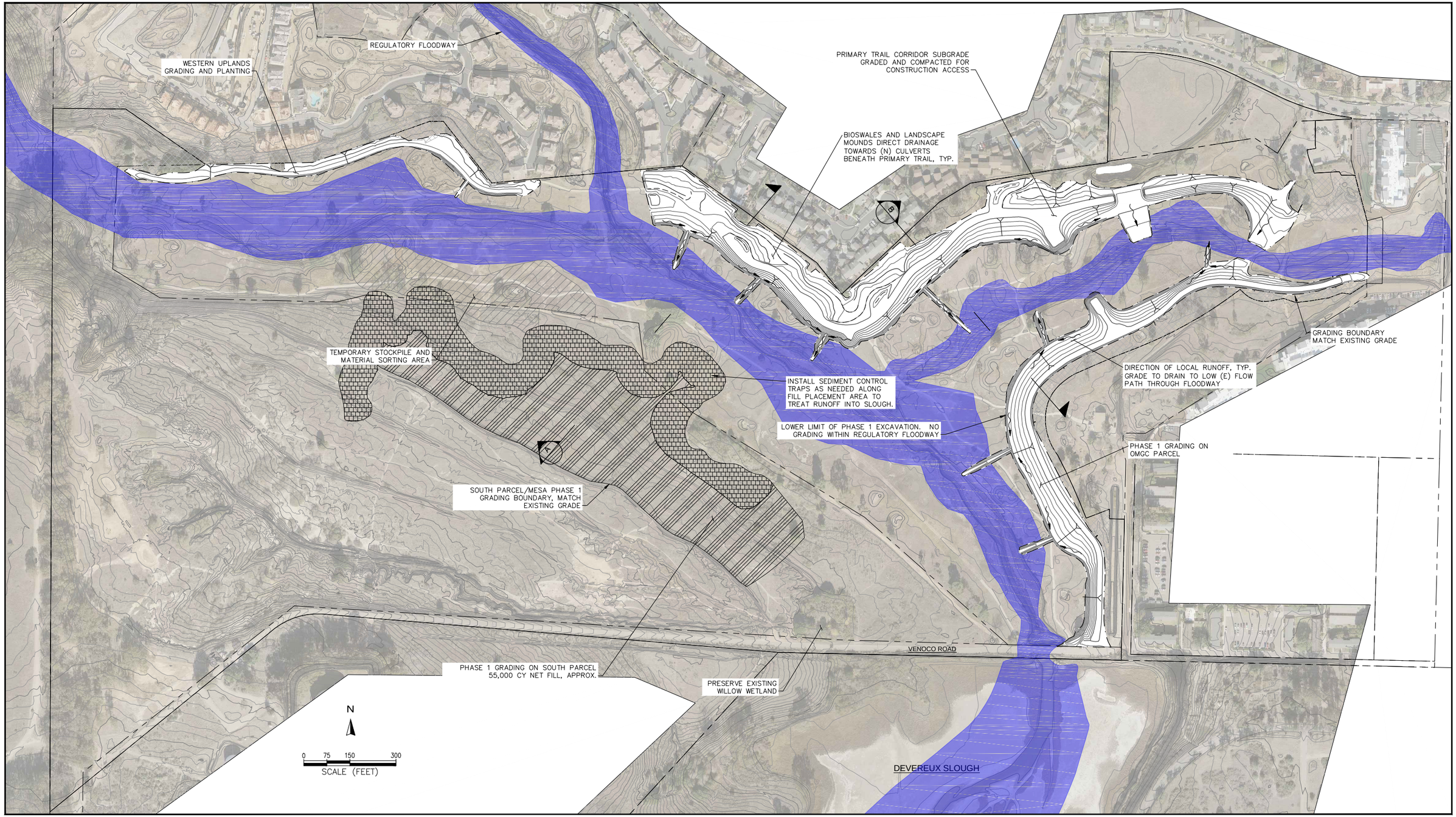
Figure 10

Phase 1 Construction Area



SOURCE: Aerial Photo: Stantec, 2015. Topography: Aerial Photogrametry by Stantec, November 2015. Regulatory Floodway: FEMA National Flood Hazard Layer, 2015

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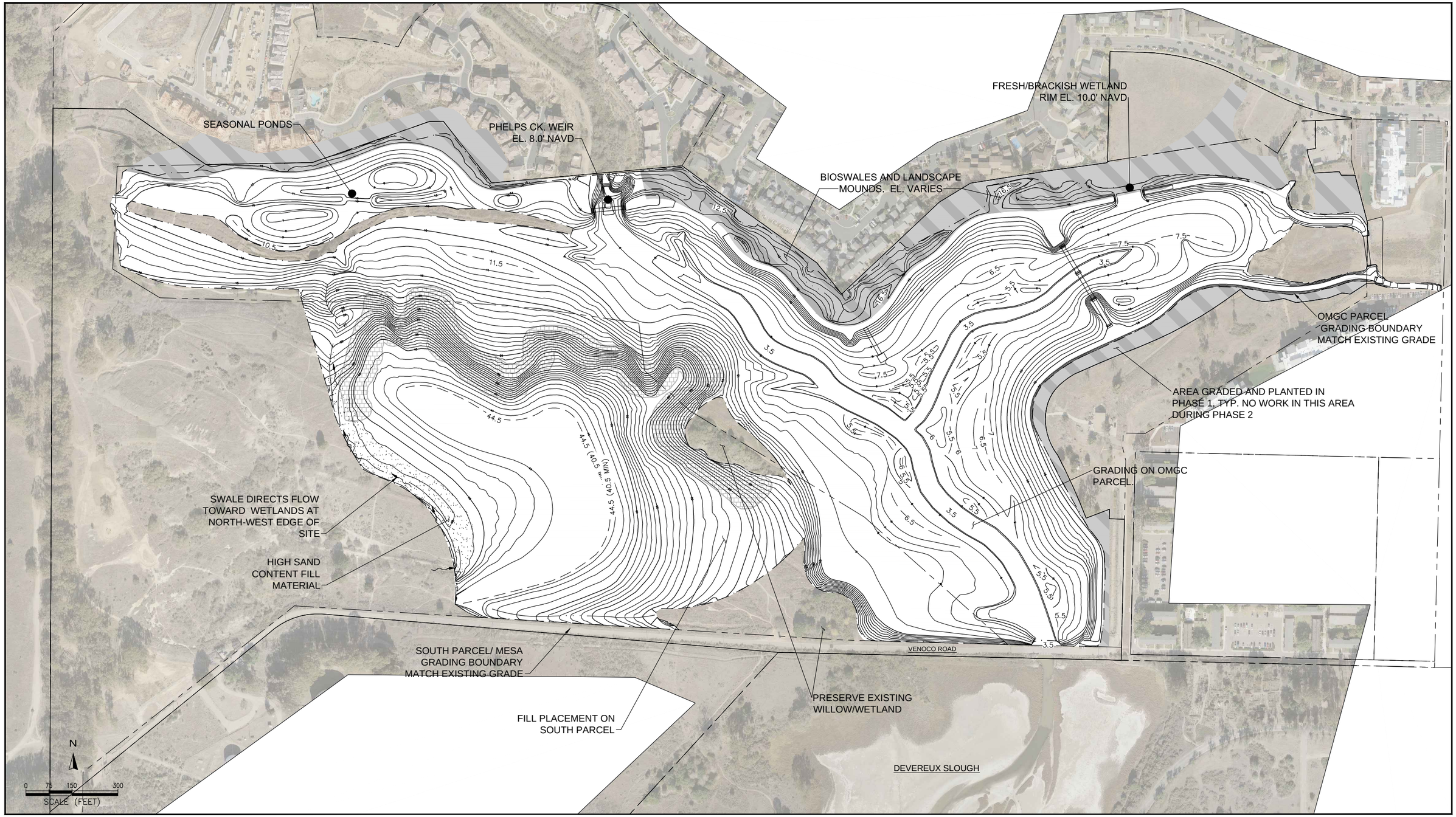
FIGURE 11

Project Grading Plan - Phase 1



SOURCE: Aerial Photo: Stantec, 2015. Topography: Aerial Photogrametry by Stantec, November 2015

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FIGURE 12

Project Grading Plan - Phase 2

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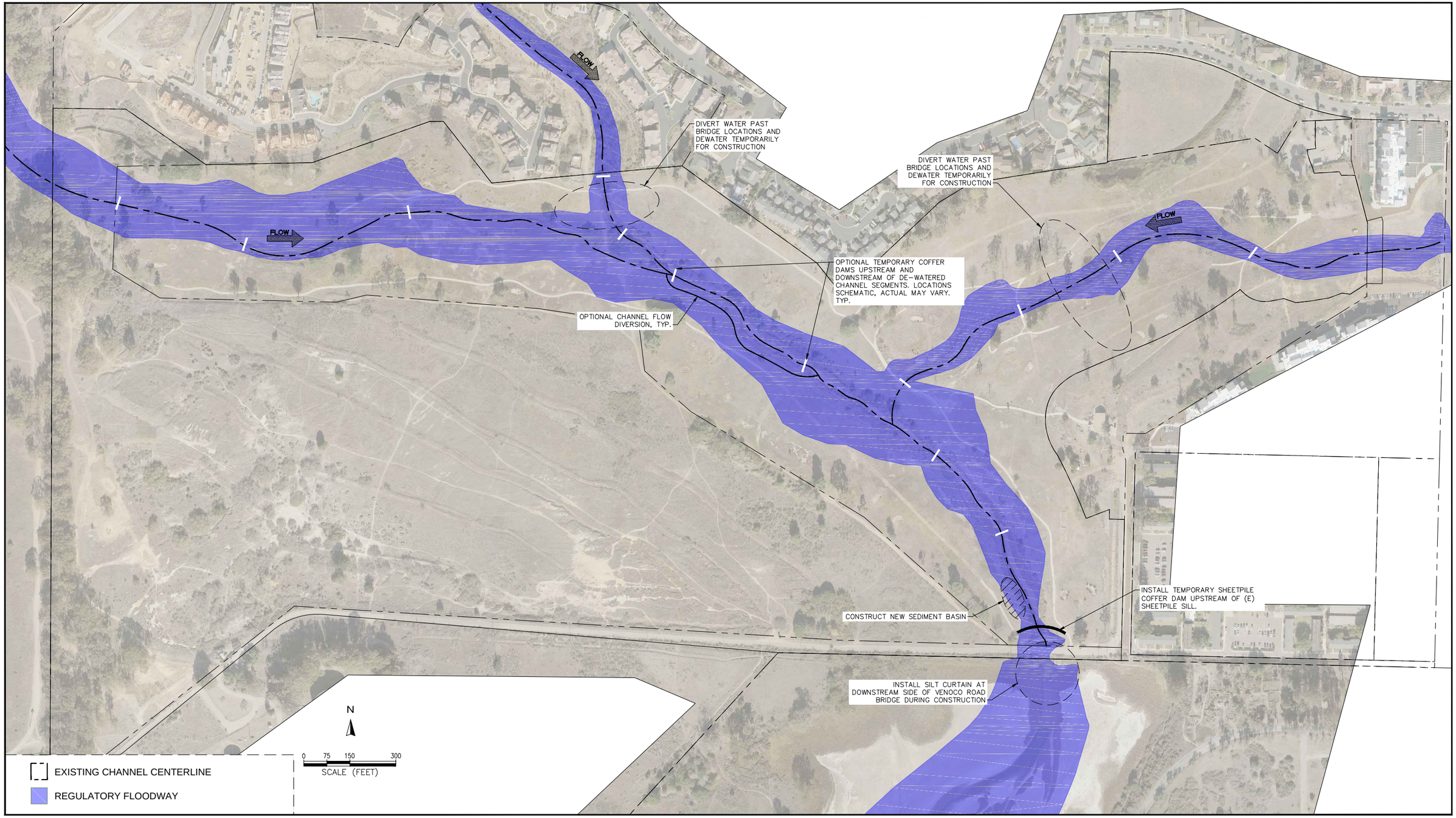

SOURCE: Aerial Photo: Stantec, 2015. Regulatory Floodway: FEMA National Flood Hazard Layer, 2015

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FIGURE 13

Water Management Plan

Groundwater levels in the project area vary seasonally and year-to-year. Monitoring wells at the project site show groundwater exceeding elevation 7 feet NAVD at some areas on the Ocean Meadows Golf Course Parcel, even during dry years. Three creek channels pass through the site. Flow and water levels within these channels vary seasonally, however flow rates generally recede quickly following the end of the rainy season, with minimal flow in the creek channels in the summer months. During the summer months, standing water is commonly observed along Phelps Creek and also on Devereux Creek downstream of the Phelps Creek confluence. In December 2015, water surface elevations in these channels ranged from elevation 6 feet NAVD immediately upstream of the sill at the Venoco Road Bridge to 8 feet NAVD at the Phelps Creek pedestrian bridge.

Based on these observations we anticipate that excavation below elevation 8 feet NAVD may require control of groundwater and management of surface flows to limit runoff and sediment mobilization. The groundwater elevation is expected to recede as the earthwork progresses and it may be possible to minimize the work in wet soils by excavating in shallow cuts (1'-2' deep) and allowing newly exposed soils to dry between subsequent excavations. As much as possible, work will be conducted from the primary trail alignment, which will have been filled to 15'NAVD elevation. Where work in soft ground/saturated environments is unavoidable, construction equipment designed for work in such environments, such as low ground pressure excavators and dump trucks, may be employed. Equipment and the construction methods that will be employed to carry out the various enhancements will be determined following further consultations with the selected contractor and any conditions specified in permits from regulatory/resource agencies.

5.2.2 For Channel Grading

The contractor will be responsible for controlling sediment and water on the site in accordance to the project permits. If surface water is present the contractor may install temporary cofferdams on the upstream and downstream ends of each channel segment to prevent the mobilization of disturbed sediments into downstream reaches of the channels and/or into the lower Devereux Slough. Depending on prevailing hydrologic conditions during construction, it may be necessary to bypass flow around some or all areas of channel excavation while active grading is occurring. Flow bypass can be achieved using a temporary pump and pipe system or by constructing a temporary bypass channel. Only minimal grading will occur within the western Devereux Creek channel in order to remove existing crossings and culverts.

A temporary coffer dam will be installed upstream of the existing sheetpile sill located upstream of the Venoco Road Bridge. This dam will allow the contractor to control the flow of surface water between the project area and the lower lagoon. A sedimentation basin will be constructed to capture any suspended sediments within the project area. The contractor may pump water from the project site into the lower lagoon provided this does not adversely impact downstream water quality. The contractor will not be allowed to de-water the work area downstream of the existing sheetpile sill. A silt curtain will be installed downstream of the Venoco Road Bridge to capture any incidental suspended sediment that escapes the project site, and to minimize water quality impacts related to the modification of the existing Venoco Road Bridge scour protection.

Additional temporary coffer dam and flow bypass systems will likely be required at the locations of the bridges that will be constructed to span Phelps Creek and the eastern Slough arm. These dams and bypass systems will likely need to be in place for the duration of bridge construction, in order to create de-watered conditions for construction of the bridge abutments, footings, support piles, and scour protection. De-watered conditions may also be needed for the installation of planned grade control structures on Phelps Creek.

5.3 Habitat and Species Protection

Habitat and species will be protected during project implementation and all conditions within project permits will be followed. Project permits were obtained from the California Coastal Commission, the California Department of Fish and Wildlife, the Regional Water Quality Control Board, and U.S. Army Corps of Engineers. Copies of project permits are provided in Appendix B. The relevant conditions to habitat and species protection within the permits are listed below.

5.3.1 General Construction Monitoring

CCBER will provide a qualified biologist or environmental resource specialist during Phase I and II of the project to direct and document all activities. All permit conditions for construction monitoring will be followed from project permits. General construction monitoring conditions include the following:

California Coastal Commission

1. The University shall retain the services of a qualified biologist or environmental resource specialist (hereinafter, "environmental resource specialist") to conduct sensitive species surveys (including aquatic species, birds, and terrestrial species) and monitor project operations associated with all construction activities, including grading, excavation, dewatering, and vegetation removal. At least 30 calendar days prior to commencement of any construction activities, the University shall submit the name and qualifications of the environmental resource specialist, for the review and approval of the Executive Director. The University shall have the environmental resource specialist ensure that all project construction and operations are carried out consistent with the following:

2. The University and environmental resource specialist shall hold a pre-construction meeting followed by weekly updates for all construction personnel about the environmental sensitivity of the site, the construction/BMPs requirements and reporting rules to avoid adverse impacts, and the particular species of concern.

3. The environmental resource specialist shall be present during all construction, grading, excavation, dewatering and vegetation removal activities within all wetland areas of the site including installation and removal of the coffer dam and other dewatering measures.

California Department of Fish and Wildlife

1. General Monitoring. A qualified wildlife biologist, having the appropriate permits, shall act as the biological monitor (monitor) for the project. The monitor shall be on site on a daily basis during the start of construction, during any water diversion activities, and if endangered or threatened listed species are present within 500 feet of any work. The monitor shall be on site at least twice a week during normal operations and shall survey for species prior to construction each day the monitor is present. If any non-listed species are

found in the path of construction, the monitor shall move the species out of harm's way to a safe location using the following protection measures implemented at the discretion of the monitor: 1) Utilize shovel, rake, or similar hand tool to gently re-direct the animal out of work area. 2) Install silt fence or other exclusionary fencing to prevent species from re-entering disturbance area. 3) Capture/relocate species to appropriate habitat outside the disturbance area. Any exclusionary devices installed shall be checked by the monitor on a daily basis to check/ensure continued exclusionary device effectiveness. The monitor shall have authority to temporarily stop construction activities until the species is determined to be out of harm's way. A biological monitor shall give tail-gate training to all contractors and explain all conditions, identify species, and ensure compliance prior to and during the construction.

Regional Water Quality Control Board

1. All personnel who engage in construction/restoration activities or their oversight at the project site (superintendent, construction manager, foreman, crew, contractor, restoration manager, biological monitor, etc.) must attend trainings on the conditions of this Certification and how to perform their duties in compliance with those conditions. Every person shall attend an initial training within five working days of their start date at the project site and follow-up trainings every six months until the project is completed. Trainings shall be conducted by a qualified individual with expertise in 401 Water Quality Certification conditions and compliance.

5.3.2 Environmentally Sensitive Habitat Protection

Environmental protection measures include fencing to both exclude sensitive wildlife species from entering the project site and to protect existing wetland and riparian habitats to remain within and adjacent to the site. Prior to the commencement of site preparation and earthwork, the construction boundary adjacent to existing habitats to be preserved will be clearly marked with fencing and flagged to prevent accidental maneuvering in these areas. Such fencing and flagging will extend a minimum of 15 feet outside the edge of habitat (in the case of riparian habitat on Phelps Creek and South Parcel this zone will be established 15 feet outside the dripline of riparian trees). Native plant materials to be salvaged from the site will be identified and marked off for protection prior to removal and relocation to a growing ground or planting site. Areas supporting native vegetation to be salvaged for the project will be fenced/flagged prior to construction, to protect then until salvage operations are initiated (in coordination with commencement of site preparation/clearing or grading work).

Construction equipment, debris, building materials, excess soil, and employee or other vehicles will not be parked or stored within 15 feet of any protected area. Construction plans and specifications will include fines to ensure that no damage is done to the habitat to be preserved within the construction area.

Specific protection measures are specified in permit conditions and include:

U.S. Fish and Wildlife Service

1. All refueling, maintenance, and staging of equipment and vehicles will occur at least 60 feet from aquatic or riparian habitat and not in a location where a spill would drain directly toward aquatic habitat (e.g., on a slope that drains away from the water). The monitor will

ensure contamination of habitat does not occur during such operations. Prior to the onset of work, UCSB will ensure that a plan is in place for prompt and effective response to any accidental spills. All workers will be informed of the importance of preventing spills and of the appropriate measures to take should a spill occur.

California Coastal Commission

1. Protective fencing shall be used around all ESHA, wetland areas, and their associated buffers that may be disturbed during construction activities.
2. Construction equipment, materials, or activity shall not be placed/occur within any ESHA, wetlands or their buffers, or in any location which would result in impacts to wetlands or other sensitive habitat.
3. No grading, stockpiling or heavy equipment shall occur within ESHA, wetlands or their designated buffers, except for restoration activities as approved through this notice of impending development and coastal development permit.
4. No construction materials, debris, or waste shall be placed or stored where it may enter sensitive habitats or wetlands, storm drain, receiving waters, or be subject to wind erosion and dispersion;
5. The plan shall include, at a minimum, a site plan that depicts the following components: limits of the staging area(s); construction corridor(s); construction site; location of construction fencing and temporary job trailers with respect to existing wetlands and sensitive habitat; and public access route through/around the site.
6. The plan shall indicate that construction equipment, materials or activity shall not occur outside the designated staging area(s), construction zone, or corridors identified on the site plan required by this condition.
7. The plan shall indicate the condition and timing for removal/restoration of designated staging areas, construction zones, and corridors for each phase of construction.
8. The above requirements shall not be interpreted to exclude approved restoration activities.

USACE

1. The Permittee shall clearly mark the limits of the workspace with flagging or similar means to ensure mechanized equipment does not enter preserved waters of the U.S. and riparian wetland/habitat areas in Devereux Slough and Devereux Creek. Adverse impacts to waters of the U.S. beyond the Corps-approved construction footprint are not authorized. Such impacts could result in permit suspension and revocation, administrative, civil or criminal penalties, and/or substantial, additional, compensatory mitigation requirements.

5.3.3 Wildlife and Plant Protection Measures

Trees

Prior to the commencement of construction activities, the construction boundary adjacent to existing native trees, wetlands and sensitive habitats to be preserved will be clearly marked with fencing ("Safety Guard" high-visibility orange plastic temporary fencing) and flagged to prevent accidental maneuvering in these areas. Such fencing and flagging will extend a minimum of 15 feet outside the dripline of trees, and outside of wetlands and sensitive habitat buffer zones as determined by the appointed biological monitor.

Construction equipment, debris, building materials, excess soil, and employee or other vehicles will not be parked or stored within protected trees or habitat zones. Construction specifications will include fines to ensure that no damage is done to the habitat to be preserved within the construction area.

No native tree to be preserved within the project reach will be pruned in any manner, except as absolutely necessary to ensure safety of construction crews or the public, or to preserve a damaged tree. All pruning cuts should be made to lateral branches or at the base of the branch at the shoulder rings; stubbing or dehorning will not be permitted. All pruning will be performed by a licensed arborist, experienced in the care and management of native trees.

Except in situations where public safety or flood protection concerns prohibit, dead or dying trees will be retained in place, as they serve important habitat functions in providing nesting and breeding habitat areas for wildlife. This policy will be followed during construction, maintenance, and long-term management of the restoration site.

The project will also adhere to the following tree protection conditions:

California Coastal Commission

1. The removal of any tree shall require mitigation in the form of replacement planting at the mitigation ratios as follows: (1) the removal of any native tree requires 3:1 replacement with native trees; (2) the removal of any ornamental tree requires 1:1 replacement with a native tree; and (3) the removal of any oak tree requires at least 10 replacement oak seedlings, less than one year old, grown from acorns collected in the area, and shall be planted on-site, or if not feasible due to site constraints, shall be planted in ESHA or Open Spaces areas near the project site. Oak tree planting shall be supplemented with a mycorrhizal inoculant, preferable oak leaf mulch or from clippings of locally-indigenous species lawfully removed from the site or from sites within the vicinity of the planting site, at the time of planting to help establish plants.
2. Prior to the issuance of the coastal development permit and prior to commencement of the development subject to the notice of impending development, the University shall submit for the review and approval by the Executive Director, a tree replacement planting plan in substantial conformance with the proposed project plans depicting restoration and tree planting. The tree replacement planting plan shall be prepared by a qualified biologist, arborist, or other resource specialist. The tree replacement planting plan shall include the following: (1) replacement tree locations, (2) tree or seedling size planting specifications; and (3) a five-year monitoring program with specific performance standards to commence implementation of the approved tree replacement planting program concurrently in areas outside the construction footprint and upon construction completion for areas within the construction footprint. An annual monitoring report on the replacement trees shall be submitted for the review and approval of the Executive Director for each of the five years, If monitoring indicates the replacement tree(s) are not in conformance with or has(have) failed to meet the performance standards specified in the monitoring program approved pursuant to this notice of impending development, the University shall submit a revised or supplemental planting plan for the review and approval of the Executive Director. The revised planting plan shall specify measures to remediate those portions of the original plan that have failed or are not in conformance with the original approved plan.

California Department of Fish and Wildlife

1. Minimize Vehicle Parking. Vehicles may enter and exit the work area as necessary for project activities, but may not be parked overnight in areas other than the staging area, existing parking lots or driveways within ten (10) feet of the drip line of any trees; nor shall vehicles be parked where mechanical fluid leaks may potentially enter the waters of the State.

Tidewater Goby

Several project permits specify conditions for the endangered tidewater goby. All conditions within the project permits will be followed prior to, during, and after project implementation to ensure that no take will result from the project. The project's Tidewater Goby Species Protection Plan will also be followed (CCBER 2016b).

Protection measures for tidewater goby include:

USFWS

1. Prior to conducting any work or activities in the project area creeks and drainages, Service-approved biologist(s) will survey for tidewater gobies prior to each of those activities and relocate any individuals that could be killed or injured to a Service-approved relocation area.

2. Only Service-approved biologists may capture, handle, and monitor the tidewater goby. Caltrans or UCSB will provide the qualifications of individuals that would be conducting these activities to the Service at least 15 days prior to project activities within the vicinity of the species' habitat. No project activities will begin in areas that could support tidewater gobies until Caltrans and UCSB have received approval from the Service that the biologist(s) are qualified to conduct the work. Possession of a Section 1 0(a)(1)(A) permit for the tidewater goby will not substitute for the implementation of this measure. Authorization of Service-approved biologist(s) will be valid for this project only.

3. The Service-approved biologist(s) will record all pertinent information when relocating tidewater gobies including the number of individuals captured, site of capture, site of relocation, habitat at capture, and habitat at relocation site.

4. When capturing and removing tidewater gobies from the work area, the Service-approved biologist(s) will minimize the amount of time tidewater gobies are held in captivity. During this time, they will be maintained in a manner that does not expose them to temperatures or any other environmental conditions that could cause injury or undue stress. Tidewater gobies will be captured by seine, minnow trap, or dip net, transported in buckets, and released elsewhere in Devereux Slough.

5. The Service-approved biologist(s) will conduct a training session for all project personnel prior to any project activities. At a minimum, the training will include a description of the tidewater goby and its habitat; the general provisions and necessity for adhering to the Act; the penalties associated with violating the provisions of the Act; the specific measures that are being implemented to conserve the tidewater goby while this project is being conducted; and the boundaries within which the project may be accomplished. The program will also cover the restrictions and guidelines that will be followed by all construction personnel to reduce or avoid effects on this species during project implementation. The project foreman will be responsible for ensuring that crew members

adhere to the guidelines and restrictions. Due to the duration of the project, multiple education programs will be conducted as needed to inform new personnel on the job site.

6. During initial project activities that disturb or dewater any of the creeks and drainages in the BSA, the Service-approved biologist(s) will be onsite and continuously monitoring project activities, (i.e. the placement and removal of any required water diversions, the status of the water diversion). The Service-approved biologist will capture any stranded tidewater gobies or other native fish species and relocate them to suitable habitat within Phelps Creek or Devereux Slough, as appropriate. The Service-approved biologist will note the number of all fish (including tidewater goby, other native and non-native species) observed in the affected area, the number of fish relocated, the date and time of the collection and relocation, habitat conditions at the capture and relocation sites, and the numbers of tidewater gobies at the relocation site (if feasible) before release of the captured individuals.

California Coastal Commission

The Final Dewatering Plans shall incorporate measures to protect tidewater goby and other sensitive aquatic species if found including the following requirements:

1. The University shall retain the services of a qualified biologist or environmental resource specialist with experience handling tidewater gobies or other sensitive aquatic species and with experience in the application of standard survey, capture, and handling methods for tidewater gobies and other sensitive aquatic species. At least 30 days prior to commencement of any onset of work, the University shall submit the name and qualifications of the qualified biologist or environmental resources specialist, for the review and approval of the Executive Director.

    a. The qualified biologist or environmental resource specialist retained by the University shall conduct a training session for all construction personnel prior to the onset of work. The training shall include a description of the tidewater goby and other sensitive aquatic species, their habitats; the specific measures that are being implemented to protect sensitive aquatic species during construction; and the project limits.

    b. The qualified biologist or environmental resource specialist and a crew working under his/her direction shall clear all fish from the area to be dewatered prior to construction. The capture, handling, exclusion, and relocation activities identified by the qualified biologist will be completed no earlier than 48 hours before construction begins to minimize the probability that species will recolonize the affected areas.

    c. The qualified biologist or environmental resource specialist and a crew working under his/her direction shall inspect the dewatered areas and construction site regularly to detect whether any tidewater gobies or other fish are passing through the berm and/or cofferdam and investigate whether sensitive aquatic species protection measures are being implemented.

    d. The qualified biologist or environmental resource specialist and a crew working under his/her direction shall be present when the berms and/or cofferdams are removed and the construction area refilled with water to relocate any fish present in the construction area before completion of removal operations and to ensure successful reintroduction of aquatic habitat in the construction area.

e. Following construction, the qualified biologist or environmental resource specialist shall complete post-construction surveys for tidewater gobies and other sensitive aquatic species.

2. The qualified biologist or environmental resource specialist shall prepare a post-project monitoring report documenting the efforts to protect the tidewater goby and other sensitive aquatic species and the results. In the event that monitoring shows a significant decrease in tidewater goby or other sensitive aquatic species that cannot be readily explained by natural factors or is clearly linked to the restoration, the qualified biologist, in consultation with the USFWS and other experts, shall recommend a course of action to address the problem, and the University shall carry out that recommended action.

California Department of Fish and Wildlife

1. Fish Surveys. If flowing or ponded water is within the proposed work limits, Permittee shall have a qualified fisheries biologist with required federal permits survey the proposed work area to verify presence/absence of any sensitive fish species such as tidewater goby, and any other fish species of special concern which may occur within the area. Survey methods shall conform to the current U. S. National Marines Fisheries Service, USFWS, and CDFW. If any threatened or endangered species are found, Permittee shall cease all work within a ¼ mile radius of the sighting and in all water (flowing or impounded), and shall contact CDFW within 24 hours of the sighting and shall request an onsite inspection by a CDFW representative (to be done at the discretion of CDFW) to determine if work shall proceed. The results of the surveys shall be provided to CDFW, along with copies of all field notes, prior to the completion of work or as otherwise specified.

California Red-legged Frog

All conditions within the project permits will be followed prior to, during, and after project implementation to ensure that no take of California red-legged frog will result from the project. Although only marginal California red legged frog habitat exists on the project site, mitigation measures will be implemented to avoid and mitigate for any potential impacts to this species.

Protection measures for California red-legged frog include:

U.S. Fish and Wildlife Service

1. Based on any take authorization and approvals issued by the Service, prior to commencement of any ground disturbing or dewatering activities, in order to avoid and minimize impacts on the California red-legged frog, UCSB will develop and implement a salvage and relocation plan for the California red-legged frog.

2. A Service-approved biologist will survey the project site no more than 48 hours before the onset of work activities. If any life stages of the California red-legged frog are found and are likely to be killed or injured by work activities, the Service-approved biologist will be allowed sufficient time to move them from the site before work begins. The Service-approved biologist will relocate the California red-legged frogs the shortest distance possible to a location that contains suitable habitat and that will not be affected by activities associated with the proposed project. The relocation site will be in the same drainage to the extent practicable. UCSB will coordinate with the Service on the relocation site prior to the capture of any California red-legged frogs.

3. The Service-approved biologist(s) must conduct a training session for all project personnel prior to any project activities. At a minimum, the training will include a description of the

California red-legged frog and its habitat; the general provisions and necessity for adhering to the Act; the penalties associated with violating the provisions of the Act; the specific measures that are being implemented to conserve the California red-legged frog while this project is being conducted; and the boundaries within which the project may be accomplished. The program will also cover the restrictions and guidelines that will be followed by all construction personnel to reduce or avoid effects on this species during project implementation. The project foreman will be responsible for ensuring that crew members adhere to the guidelines and restrictions. Due to the duration of the project, multiple education programs will be conducted as needed to inform new personnel on the job site.

4. A Service-approved biologist will be present at the work site until all California red legged frogs have been relocated out of harm's way, workers have been instructed, and disturbance of habitat has been completed. After this time, UCSB will designate a person to monitor on-site compliance with all minimization measures. UCSB will either resolve the situation by eliminating the adverse effect immediately or require that all actions causing these effects be halted, and WSFR and Caltrans will be notified. Work will remain halted until the Service approves any new measures to conserve the California red-legged frog, and approves the commencement of work.

5. UCSB will attempt to schedule work activities for times of the year when impacts to the California red-legged frog would be minimal to the extent feasible. For example, work that would affect large pools that may support breeding will be avoided, to the maximum degree practicable, during the breeding season (November through May). Isolated pools that are important to maintain California red-legged frogs through the driest portions of the year will be avoided, to the maximum degree practicable, during the late summer and early fall. Habitat assessments, surveys, and coordination with the Service during project planning will be used to assist in scheduling work activities to avoid sensitive habitats during key times of the year.

6. If a work site is to be temporarily dewatered by pumping, the intake will be screened with wire mesh no larger than 0.2 inch to prevent any California red-legged frogs not initially detected from entering the pump system. If California red-legged frogs are detected during dewatering, and adverse effects to California red-legged frogs cannot be avoided, construction activities will remain suspended until Caltrans and WSFR complete the appropriate level of consultation.

7. Unless approved by the Service, water will not be impounded in a manner that may attract California red-legged frogs.

8. A Service-approved biologist will permanently remove any individuals of exotic species, such as bullfrogs (*Rana catesbeiana*), crayfish, and centrarchid fishes from the project area, to the maximum extent possible. The biologist will be responsible for ensuring his or her activities are in compliance with the California Fish and Game Code.

9. To ensure that diseases are not conveyed between work sites by the Service-approved biologist, the fieldwork code of practice developed by the Declining Amphibian Populations Task force will be followed at all times. Available on line at: https://www.fws.gov/venturaldocs/species/protocols/DAFTA.pdf.

California Department of Fish and Wildlife

1. California red-legged frog – Pre-Project Survey. Potential of California red-legged frog to occur on the project site is low and previous protocol-level surveys have produced negative

results. However, because there is still potential for occurrence prior to the onset of any project-related activities, a biological monitor qualified to survey and handle red-legged from shall inspect the project work area and areas adjacent to the project area for California red-legged frog adults, tadpoles, and egg masses. At this time, the qualified biological monitor shall identify appropriate areas to contain California red-legged from adults and tadpoles taken from the project areas. These areas shall be in proximity to the capture site, contain suitable habitat, not be affected by project activities, and be free of exotic predatory species (i.e. bullfrogs, crayfish) to the best of the approved biologist's knowledge. Movement of frogs shall only be performed by the qualified biological monitor. In the rare case that egg masses are found after July 1st, Permittee shall make every attempt to wait until the egg masses hatch to transport them.

2. California red-legged frog – Exclusion Fencing and Protection. Exclusion fencing shall be installed around the project area and staging area. After installation of the fence barrier, a biological monitor with appropriate permits to survey and handle California red-legged frogs shall daily inspect the project work area prior to the commencement of activities. If the biological monitor determines that sensitive species are not within the work area, equipment or materials may be moved onto the work site under the observation of the biological monitor. In the event California red-legged frogs are found in the project area, the biological monitor shall have the authority to halt work activities that may affect California red-legged frog adults, tadpoles, or egg masses until they can be moved out of harm's way. The biological monitor shall then direct and inspect all vegetation and sediment removal activities for the presence of frog adults, tadpoles, or egg masses. Vegetation removed shall be placed directly into a disposal vehicle and removed from the site. Vegetation shall not be piled on the ground unless it is later transferred under the direct supervision of the biological monitor or qualified biologist.

Western Pond Turtle

Western pond turtle is a California species of special concern that has potential to occur within the project area and one specific permit condition applies for this species.

California Department of Fish and Wildlife

1. Presence/Absence Surveys for California Species of Special Concern. Permittee shall have a qualified wildlife biologist conduct a pre-construction survey of the project area no earlier than two (2) weeks prior to the onset of project construction activities as specified in the project description above to confirm the presence/absence of western pond turtle and/or other species of special concern likely to be found in the area or using the area during the proposed operations. Survey limits shall be determined by the qualified wildlife biologist and shall include all areas within the project footprint. Survey results, including negative findings, analysis, and recommendations, along with the field notes, shall be provided to CDFW prior to commencing construction or within two weeks of completion of field surveys, whichever is earlier. Should any sensitive species be found during pre-project surveys and/or work must be done in identified areas during biologically sensitive periods for these species, Permittee shall implement a plan to move species out of harm's way as described in measure 2.3 below.

Birds

Nesting birds will be protected during construction to avoid disturbance or loss of active bird nests during construction, any removal of trees that provide nesting habitat for birds, or

disturbance of natural grassland areas shall be conducted between September 15 and February 1, outside of the typical nesting season.

If tree removals or disturbance of natural grassland areas are determined to be necessary during the typical nesting season (February 1 to September 15), nesting bird surveys shall be conducted by a qualified biologist immediately prior to the proposed action. Surveys shall follow standard protocols as established by CDFG and/or CCC. If the biologist determines that a tree or natural grassland area is being used for nesting at that time, disturbance shall be avoided until after the young have fledged from the nest and achieved independence. If no nesting is found to occur, necessary tree removal or grassland disturbance may then proceed.

To avoid indirect disturbance of active bird nests by project construction occurring within the typical nesting season, a qualified biologist shall be retained to conduct one or more pre-construction surveys per standard protocols approximately 1 week prior to construction, to determine presence/absence of active nests adjacent to the project site. If no breeding or nesting activities are detected within 200 feet of the proposed work area, noise-producing construction activities may proceed. If breeding/nesting activity is confirmed, work activities within 200 feet of the active nest shall be delayed until the young birds have fledged and left the nest.

California Coastal Commission

1. If an active nest of a federally or state-listed threatened or endangered species, bird species of special concern, or any species of raptor or heron is found, the University shall notify the appropriate State and Federal agencies within 24 hours, and shall develop an appropriate action specific to each incident. The University shall notify the California Coastal Commission in writing by facsimile or e-mail within 24 hours and consult with the Commission regarding determinations of State and Federal agencies.

2. If an active nest of any federally or state listed threatened or endangered species, species of special concern, or any species of raptor, song bird, or heron is found within 300 feet of construction activities (500 feet for raptors), the University shall retain the services of an environmental resource specialist with experience conducting bird and noise surveys, to monitor bird behavior and construction noise levels. The environmental resources specialist shall be present at all relevant construction meetings and during all significant construction activities (those with potential noise impacts) to ensure that nesting birds are not disturbed by construction related noise. The environmental resource specialist shall monitor birds and noise every day at the beginning of the project and during all periods of significant construction activities. Construction activities may occur only if construction noise levels are at or below a peak of 65 dB at the nest(s) site. If construction noise exceeds a peak level of 65 dB at the nest(s) site, sound mitigation measures such as sound shields, blankets around smaller equipment, mixing concrete batches off-site, use of mufflers, and minimizing the use of back-up alarms shall be employed. If these sound mitigation measures do not reduce noise levels, construction within 300 ft. (500 ft. for raptors) of the nesting trees/areas shall cease and shall not recommence until either new sound mitigation can be employed or nesting is complete.

California Department of Fish and Wildlife

1. White-Tailed Kite. Suitable habitat exists onsite for the white-tailed kite. The white-tailed kite is considered a fully protected species (Fish & Game Code § 3511) and has potential to

forage onsite. CDFW shall not authorize take of this species. In areas where white-tailed kite are expected to forage during the time period of January 1st to July 15th, the recognized nesting season of the white-tailed kite, vegetation removal activities shall be completed in sections to allow for foraging habitat to always be present at any given time. This will help to avoid unauthorized and/or accidental take of the species.

2. White-Tailed Kite Foraging Habitat. Restoration activities shall include creation of foraging habitat for the white-tailed kite such that there is no net loss of white-tailed kite foraging habitat resulting from project activities.

3. Nesting and/or Breeding Bird Surveys. Permittee shall not remove or otherwise disturb vegetation on the project site from February 1st to September 1st to avoid impacts to breeding/nesting birds. If vegetation removal activities are scheduled during the nesting season, a focused survey for nests of such birds shall be conducted by a qualified avian biologist no earlier than 3 days prior to the beginning of project-related activities. The results of the survey shall be e-mailed to R5LSACompliance@wildlife.ca.gov prior to commencement of work. Refer to Notification Number 1600-2016-0177-R5 when submitting the survey to CDFW. If any nests are found, Permittee shall consult with the CDFW regarding appropriate action. If a lapse in project-related work of 5 days or longer occurs, another survey and if required, consultation with CDFW, shall be required before project work can be reinitiated.

4. Active Breeding and/or Nesting. If construction occurs during the breeding season and breeding activities and/or a bird nest is located, Permittee shall do one of the following to avoid and minimize impacts to nesting birds:

    a. Implement default 300 foot minimum avoidance buffers for all passerine birds and 500 foot minimum avoidance buffer for all raptor species. The breeding habitat/nest site shall be fenced and/or flagged in all directions, and this area shall not be disturbed until the nest becomes inactive, the young have fledged, the young are no longer being fed by the parents, the young have left the area, and the young will no longer be impacted by the project.

    b. Develop a project-specific Nesting Bird Management Plan. The site-specific nest protection plan shall be submitted to CDFW for review and comment. The Plan should include detailed methodologies and definitions to enable a CDFW qualified avian biologist to monitor and implement nest-specific buffers based on topography, vegetation, species, and individual bird behavior. This Nesting Bird Management Plan shall be supported by a Nest Log which tracks each nest and its outcome. The Nest Log will be submitted to CDFW at the end of each week.

    c. Permittee may propose an alternative plan for avoidance of nesting birds for CDFW concurrence.

5. Qualified Wildlife and Avian Biologist. A qualified wildlife biologist is an individual experienced with construction level biological monitoring and who is able to recognize species in the project area and who is familiar with the habits and behavior of those species. Qualified wildlife biologists shall have academic and professional experience in biological sciences and related resource management activities as it pertains to this project. All qualified wildlife biologists for the project shall be approved by CDFW prior to commencement of covered activities. Permittee shall submit resumes to CDFW for approval of the qualified wildlife biologists. For the purpose of nesting bird surveys a qualified avian biologist must have at least 3 years of field experience directly related to

finding nests and monitoring them for the specific purpose of determining breeding status, egg incubation, chick maturity, and estimating fledge date.

Other General Sensitive Plant and Wildlife Protection Measures

California Coastal Commission

1. The environmental resource specialist shall conduct surveys 30 calendar days prior to commencement, or recommencement, of the approved construction activities to detect any active sensitive species, reproductive behavior, and active nests within 500 feet of the project site. Follow-up surveys must be conducted one week prior to the initiation of construction and nest surveys must continue on a monthly basis throughout the nesting season or until the project is completed, whichever comes first.

2. In the event that any sensitive species are present in or adjacent to the construction area but do not exhibit reproductive behavior and are not within the estimated breeding/reproductive cycle of the subject species, the qualified biologist shall either: (1) initiate a salvage and relocation program prior to any construction activities to move sensitive species by hand to safe locations elsewhere along the project reach or (2) as appropriate, implement a resource avoidance program with sufficient buffer areas to ensure adverse impacts to such resources are avoided. The environmental resource specialist must have the requisite permits for working with/handling the respective sensitive species. The University shall immediately notify the Executive Director of the presence of such species and which of the above actions are being taken. If the presence of any such sensitive species requires review by the United States Fish and Wildlife Service and/or the California Department of Fish and Wildlife, then no development activities shall be allowed or continue until any such review and authorizations to proceed are received, subject to the approval of the Executive Director.

3. The environmental resource specialist shall require the University to cease work should any breach in permit compliance occur, or if any unforeseen sensitive habitat issues arise. If significant impacts or damage occur to sensitive habitats or to wildlife species, the University shall be required to submit a revised or supplemental program to adequately mitigate such impacts. The revised, or supplemental, program shall be processed as a new notice of impending development or coastal development permit.

California Department of Fish and Wildlife

1. Plan for Movement Out of Harm's Way. Permittee shall develop and submit an Out of Harm's Way Plan for review and approval for sensitive and/or threatened or endangered species. The plan should consider the various life cycles of the species, species' needs for foraging, habitat, threats of predation, etc. The plan should also include a minimum of two sites available for moving individual species to. This plan shall be approved by CDFW prior to commencing work.

2. Incidental Take Permit for Rare, Threatened, or Endangered Species. Permittee shall notify CDFW in the event of the discovery of any rare, threatened, or endangered species prior to commencement of construction; work may not proceed unless either: 1) CDFW concurs in writing that take of California Endangered Species Act (CESA)-listed species is unlikely; or 2) an Incidental Take permit pursuant to Fish and Game Code section 2081 is acquired.

3. Notification to the California Natural Diversity Database (CNDDB). If any special status species are observed in project surveys, Permittee or designated representative shall submit CNDDB forms to the CNDDB for all preconstruction survey data within five (5) working

days of the sightings, and provide to the CDFW's Regional office digital copies of the CNDDB forms and survey maps.

4. Screened Water Pump. Any pump used to pump water shall be fitted with a 1/8-inch or smaller mesh screen to prevent aquatic organism from getting killed. The screen area shall be monitored daily for fish that may be trapped by the screen.

U.S. Army Corps of Engineers

1. Incidents where any individuals of federally managed fishery species (Coastal Pelagics or Pacific Groundfish), or southern California steelhead (*Oncorhynchus mykiss*) listed by NOAA Fisheries under the Endangered Species Act appear to be injured or killed as a result of discharges of dredged or fill material into waters of the United States or structures or work in navigable waters of the United States authorized by this permit shall be reported to NOAA Fisheries, Office of Protected Resources at (301) 713-1401 and the Regulatory Office of the Los Angeles District of the U.S. Army Corps of Engineers at (805) 585-2146. The finder should leave the plant or animal alone, make note of any circumstances likely causing the death or injury, note the location and number of individuals involved and, if possible, take photographs. Adult animals should not be disturbed unless circumstances arise where they are obviously injured or killed by discharge exposure, or some unnatural cause. The finder may be asked to carry out instructions provided by NOAA Fisheries, Office of Protected Resources, to collect specimens or take other measures to ensure that evidence intrinsic to the specimen is preserved.

Construction Monitoring Reporting

Regional Water Quality Control Board

1. Annual Project Status Report – The Applicant shall submit to the Central Coast Water Board an Annual Project Status Report by May 31 of each year following the issuance of this Certification, regardless of whether project construction has started or not. The Applicant shall submit Annual Project Status Reports until the Applicant has conducted all required monitoring and compensatory mitigation has achieved all restoration objectives. The final Annual Project Status Report is due on or before the May 31 following the achievement of all compensatory mitigation restoration objectives. Each Annual Project Status Report shall include at a minimum:

    a. The status of the project: construction/restoration not started, construction/restoration started, or construction/restoration complete.

    b. The date of construction/restoration initiation, if applicable.

    c. The date of construction/restoration completion, if applicable.

    d. If project construction/restoration is complete:

        i. A summary of daily activities, monitoring and inspection observations, and problems incurred and actions taken;

        ii. Identification of when site personnel trainings occurred, description of the topics covered during trainings, and confirmation that every person that engaged in construction/restoration activities or their oversight at the project site was trained initially and every six months thereafter.

U.S. Fish and Wildlife Service

1. By January 30 of each year the project is in effect, the proponents must submit to the Ventura fish and Wildlife Office a report containing the following information:
    a. The activities that took place and where within the action area;
    b. Any listed species encountered during monitoring; and
    c. Actions taken to protect listed species from impacts due to site preparation, including numbers capture/relocated, relocation destinations, injuries or mortalities that occurred as a result of handling, and any follow-up monitoring of relocated animals that occurs.
2. Any injury or mortality of tidewater gobies or California red-legged frogs that occur must be reported to the Ventura fish and Wildlife Office immediately.
3. A final project report must be submitted to the Service that describes the project activities, any effects to listed species (including improvement in status), and the success or failure of restoration efforts.

Overall, restoration and enhancement of the riparian and wetland vegetation in the Phelps creek, Whitter drainage and seasonal ponds connections to the restored Slough will serve to enhance the site's function as potential habitat for the California red-legged frog, western pond turtle and other wildlife species. Restoration of estuarine aquatic habitat upstream of Venoco Road will enhance habitat conditions for tidewater goby and other aquatic species.

5.4 Collection and Propagation of On-site Plant Material

To the extent feasible, seeds, rooted cuttings, and container plants for the restoration area will be obtained on or near the project site. These materials, as well as any materials not available from the project site, will be collected and grown by CCBER and/or a contract grower with qualifications and experience in the propagation of native plants.

Seeds and cuttings will be collected during the appropriate seasons, and propagated or stored for later installation on the restoration site. Live cuttings for wattles and pole plantings in riparian areas will be collected immediately prior to installation. The timing of collection and preparation of plants to be salvaged will be determined based on detailed construction plans and by cultural requirements of each species. Seed will be collected from as many on-site species and as many individuals as feasible. Seed from individual species will be cleaned and stored separately until planting. Purchased seed, if any, will be from local or similar ecotypic sources, or sterile grasses for use in erosion control. The resulting variety of plant propagules will allow for the development of habitats with more immediate natural diversity and genetic integrity.

Seeds, rooted cuttings, and container plants for the restoration area will be obtained on or near the project site. These materials, as well as any materials not available from the project site, will be collected and grown by CCBER and/or a contract grower with qualifications and experience in

the propagation of native plants. Native plants that can be salvaged from the project site, such as salt grass will be collected and prepared for replanting.

In anticipation of project implementation, CCBER has been collecting seed since December 2014, and has established a contract with a local grower for 300,000 salt marsh, grassland and coastal sage scrub plantings to be ready by December 2016. CCBER began growing plants for this project in December 2015, and is planning for an additional contract with the grower for a second round of plants to be ready for installation in March 2017. A seed production field for purple needle grass (*Stipa pulchra*) collected on and adjacent to the project site was be established in the fall of 2016, with an anticipated production of more than 300 pounds of seed for drill seeding and plant production in the summer of 2017.

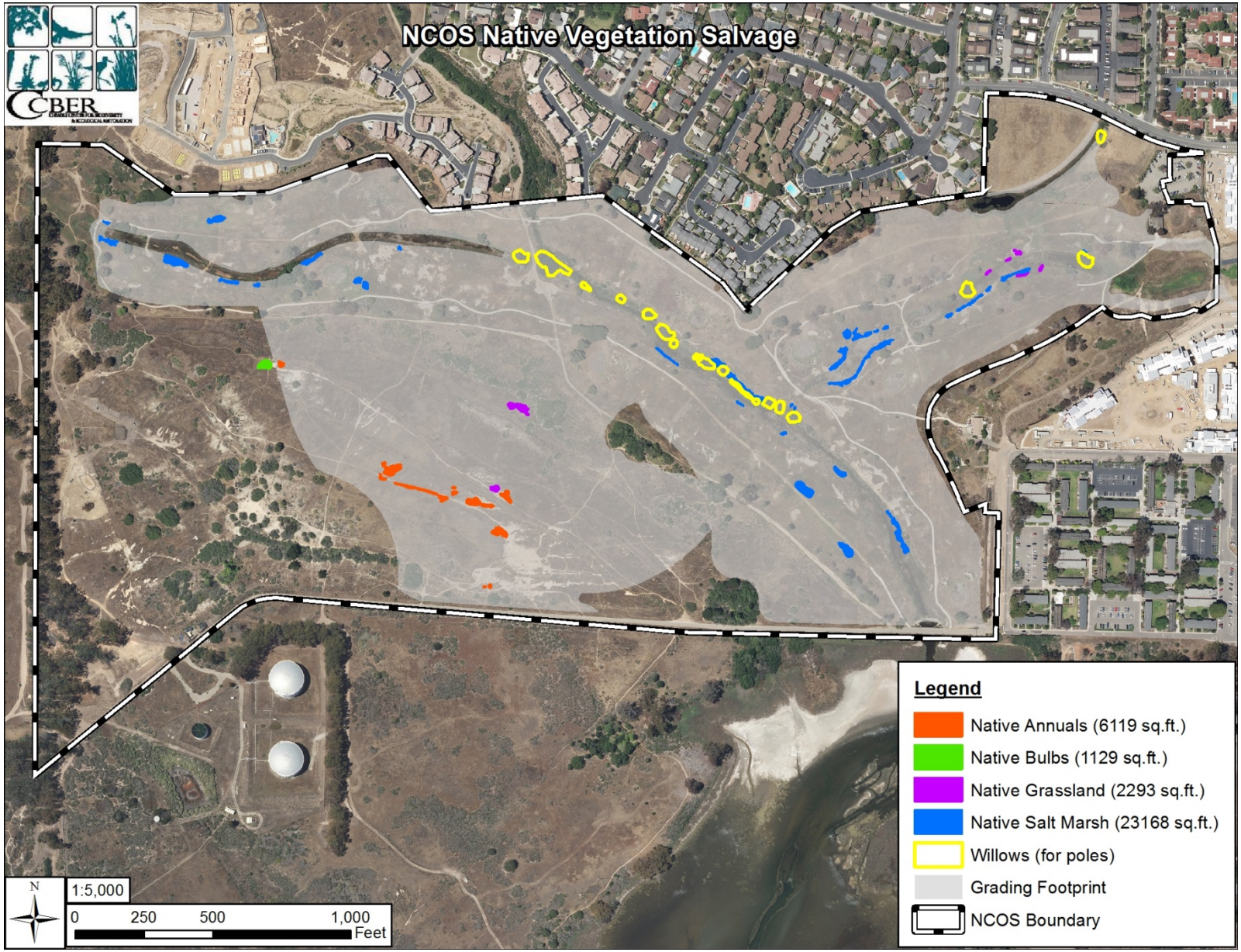
5.4.1 Native Plant Salvage

Selected areas within the project that are dominated by native plants will be salvaged and stockpiled prior to disturbance for reintroduction after final grading (Figure 14). These areas include portions of the former golf course that are supporting salt marsh species such as saltgrass, riparian species in the Whittier drainage such as willows (*Salix* spp.) and bulrush (*Schoenoplectus* spp.), as well as small portions of the South Parcel that are supporting native annual species such as California plantain, strigose lotus (*Acmispon strigosus*), grassland stebbinsoseris (*Stebbinsoseris heterocarpa*), and dense flower owl's clover (*Castilleja densiflora*). CCBER staff will oversee excavation and transport of the native plant materials to be salvaged from the site.

Salvage areas in the old golf course containing salt marsh species (e.g. salt grass, pickleweed, alkali heath) will be excavated to a depth of 40 cm as blocks of 'sod' to be stored on site in shallow holding ponds lined with plastic sheeting. Salvage material held for more than a short period of time will require occasional additions of salt water to maintain higher salinities in order to reduce growth of exotic and freshwater species that may be in the soil seed bank. When possible, blocks will be directly placed into prepared planting areas, where they will be cut into smaller blocks (approx. 10x10x30cm deep) and replanted into the newly excavated marsh plain. Pickleweed areas may be salvaged with three inches of soil and piled on stockpile site and then disced in to salt marsh zone after grading has occurred.

Salvage areas on the South Parcel containing dense populations of native annuals or bulbs (e.g. plantain, stebbinsosaris, brodieae) will be excavated to a depth of 20-30 cm to capture the dormant seed bank, and this soil material will be placed as topsoil in fill areas where native annual complex is the target habitat. If this soil material is not to be directly placed in final grade location immediately after excavation, it will be stored in staging areas on plastic sheets which will be covered to reduce introduction of exotic seed and prevent germination prior to final placement.

Salvage areas on the South Parcel containing native perennial species (e.g. purple needle grass, blue-eyed grass) will be excavated to a depth of 20 cm, and will be either directly planted in final locations or, if storage is necessary, individual plants will be divided and they will placed in 1 or 5 gallon pots in staging areas.



SOURCE: CCBER 2016

UCSB NCOS Restoration Project D140769.02

Figure 14

Native Plant Salvage Areas

5.5 Debris Removal and Weed Control

It is expected that extensive weed control efforts will not be required in the cut or fill areas prior to planting, due to planned removal the top 4 to 6 inches of soil that hold the majority of the seed bank, which is primarily dominated by invasive species.

Debris has been dumped or left at various locations within the project site and includes concrete rubble, metal posts, and trash. Where rubble exists in portions of the site to be filled, it may be buried in place, as deemed appropriate by the project engineer. All debris which may affect water or soil quality, or is hazardous, such as asphalt, or auto parts, will be removed from the site. Some organic debris, such as thatch from dead exotic vegetation (e.g. pampas grass), may be removed and disposed of off-site, to avoid further invasion of the site by seed or propagules of undesirable vegetation. All debris not incorporated into the project design will be removed and disposed of properly in a landfill or other approved receiving site.

5.6 Infrastructure Removal

A 6-foot wide concrete golf cart path remains within the golf course portion of the project site. This path will be removed and approximately 25 cy of this material will be re-used to create habitat features with the remainder buried in the project fill. Portions of the existing buried irrigation system that lie within the excavation area will also be removed and disposed of off-site.

The existing golf cart path crosses Devereux Creek seven times within the project area with culverts. These culvert crossings will be removed, and the associated piping and concrete debris will be disposed of off-site. In addition, the existing timber bridge across Phelps Creek in the central, northern portion of the golf course portion of the site will be removed and disposed of off-site.

5.7 Stream Stabilization and Scour Protection

Excavation and grading of the restored Slough and channel could result in erosion and incision along the Phelps Creek profile where it will join the restored (lowered) Slough. In order to transition from the higher existing grade in the Phelps Creek channel to the lower design grade of the restored Slough, three in-grade control structures (rock ramps) will be installed in Phelps Creek. Live willow stakes and native seed will be incorporated into the bank stabilization and scour protection features.

At the Venoco Road Bridge, the existing sheet pile sill and armoring will be removed to provide improved tidal connection to the site. Existing armotec protection will be retained to support existing pile supports of the bridge.

5.8 Stormwater Drainage Improvements

A shallow drainage swale exists along the north-eastern boundary of the golf course portion of the project site, adjacent to the housing development. Bioswales and mounds will be created in

this area to continue to provide the existing drainage function while also improving habitat. Nine culverts will be installed along this area to facilitate drainage under the public access trail to the restored Slough.

5.9 Public Access

Following the bulk earthwork and fine grading, public access components will be installed at the site. Public access components include installation of the following:

- Primary Trail – 1.13 -mile long, 10- to 12-foot wide trail surfaced with Class 2 road base
- Secondary Trail – 1.15-mile long, 6-foot wide trail surfaced with Class 2 road base along south side of North Campus Housing and near creek crossing in southwestern portion of site .
- Tertiary Trail – 0.28-mile long, 4-foot wide trail surfaced with native soils
- Crossing A – a raised 6" thick, concrete (slab-on-grade) surface, with approximate dimensions of 12' wide by 100' long. The crossing is designed to support pedestrian and bicycle traffic, or a light vehicle load. In the center of this crossing, five drainage culverts, consisting of 2'x2' slots, run perpendicular to the path of travel of the trail to allow runoff to pass between the upstream and downstream wetlands in flow events. These slots may be partially backfilled with native soils to mimic a natural channel bed. The slotted culverts will have removable grates to facilitate cleaning. Rock riprap scour protection will be placed on both the upstream and downstream side of the slot drains.
- Crossing B – an above grade, timber boardwalk-style structure that is approximately 12' wide by 100' long. The crossing is rated for pedestrian loads and bicycles, but not for vehicular access. The boardwalk is supported on top of cross beams every 10'along its length. The beams are supported by concrete piles that are embedded in the ground.
- Crossing C – a steel bridge, supported on concrete abutments and several intermediate concrete supports. The bridge crossing is composed of two spans, each currently estimated at 12' wide by 100' long, for a total length of 200 feet. The crossing is designed to support pedestrian and bicycle traffic, or a light vehicle load,. A prefabricated deck structures will be placed upon concrete abutments and supports that are founded on cast-in-drilled-hole (CIDH) concrete piles and concrete pile cap.
- Crossing D – is a steel bridge structure, estimated to be 12' wide by 100' long and supported on concrete abutments. The crossing is designed to support pedestrian and bicycle traffic, or a light vehicle load. A prefabricated structure will be placed upon concrete abutments that are founded on CIDH concrete piles and concrete pile cap.

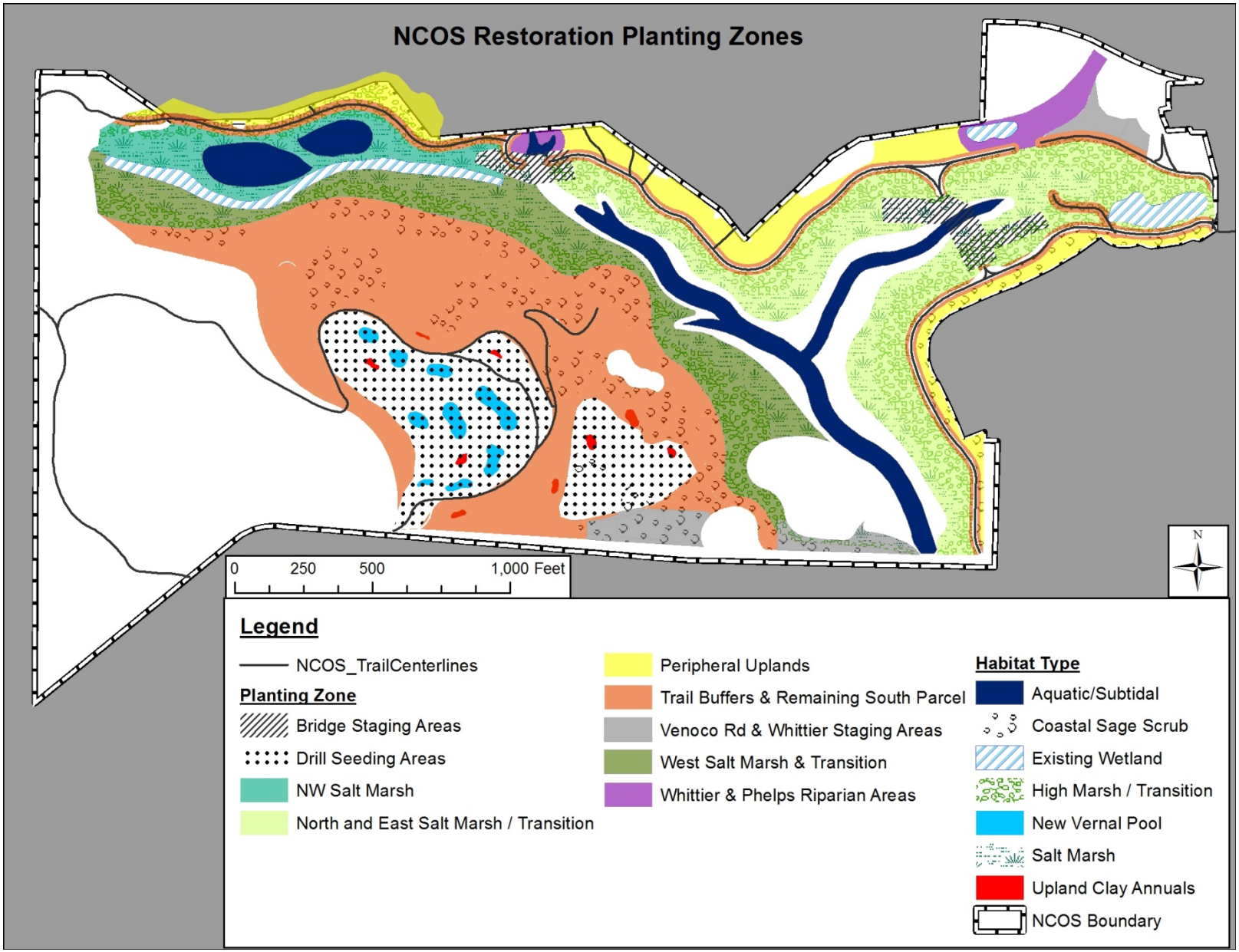
5.10 Restoration Planting

The habitat concept presented in Figure 5 is based upon plant species composition and distribution observed in local habitats exhibiting similar conditions to those which will result from the restoration of the Upper Devereux Slough and South Parcel mesa. The restoration area will be planted in native species, as described in section 3.2, in accordance with their physical requirements. Actions will include spreading of soil amendments, planting, seeding, irrigating,

and installation of habitat features. Graded areas will be planted as rapidly after construction as feasible, in order to reduce the area of the site where hydroseeding with sterile wheat will be necessary to stabilize the newly graded soil. Areas not planted with salvaged plants, container stock, cuttings, and/or willow wattles will be drill seeded, broadcast seeded, or hydroseeded with either locally collected seed or sterile seed to reduce erosion, enhance water infiltration and to integrated organic matter on to the site and reduce salinity levels. Areas seeded with methods other than hydroseeding will be covered with straw mulch, tacked down and monitored throughout the first rainy season. Areas seeded before November 15, will be irrigated such that vegetation is sufficiently established to protect against erosion by the onset of winter rains.

Soil amendments, if deemed necessary may include one or more of the following: mulch generated from trees and shrubs/organic material chipped and composted onsite, sifted mulch, humate and/or biochar and/or gypsum. Amendments will be worked into the top six inches of soil throughout the fill placement area and/or the upland to assist soil recovery and upland plant establishment. This will not include areas planned for salt marsh or sparsely vegetated annual habitat, as poorer or clay-rich soils may be beneficial in these locations.

All planting on the restoration site will be supervised by a restoration ecologist having demonstrated knowledge and experience in native plant revegetation. Planting will occur over three years in phases as detailed in Figure 15 and Table 13, below



SOURCE: CCBER 2016

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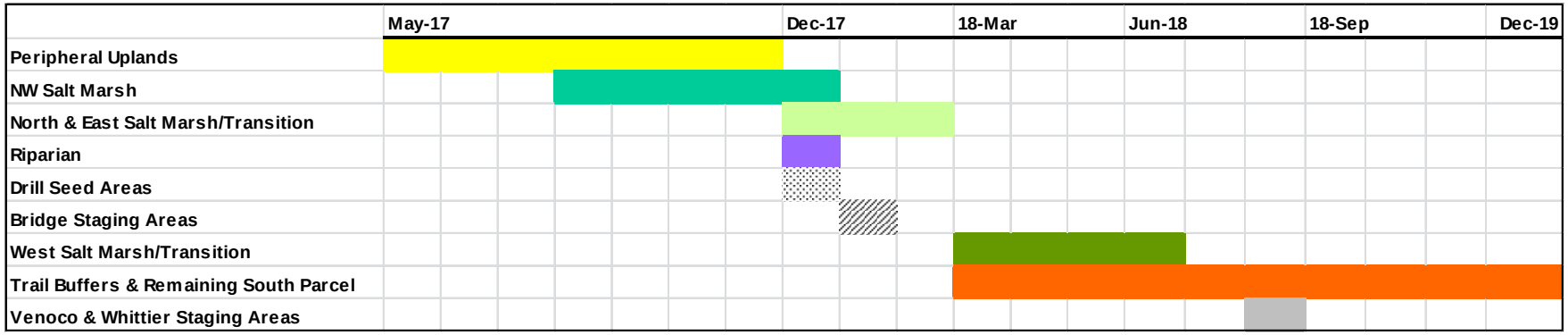
Figure 15
Planting Zones

TABLE 13
PLANTING SCHEDULE



SECTION 6

Temporary Fencing and Signage

The perimeter of the project site (approximately 10,000 linear feet) will be fenced with construction fencing (6-foot chain link, primarily, and possibly plastic construction fence on portions of South Parcel where topography dictates an alternative) to limit access to the construction area during both Phase 1 and Phase 2 of construction. For added security, temporary 6-foot tall chain link fencing will also be installed around the perimeters of the two equipment staging areas, located at the Whittier Parcel parking lot and west of the Venoco Road Bridge. Signage will be installed to indicate no public access on the project site during the construction period. Fencing to exclude sensitive wildlife species from entering the project site and fencing to protect existing habitats to remain within and adjacent to the project site is detailed ion section 5.3.2.

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SECTION 7
Maintenance

Periodic maintenance will be required during the establishment of the restoration area. Maintenance will be performed by qualified personnel having demonstrated experience in maintenance of natural habitat areas and of native revegetation projects. CCBER will provide oversight of maintenance operations to ensure high quality project maintenance, which conforms to standards established in the Restoration Plan, and to immediately address any unanticipated problems. Maintenance visits will be performed weekly for the first three months of the establishment period; and every two weeks thereafter for the first year. The maintenance schedule for the remainder of the establishment period will be determined in coordination with the project monitor, based upon the level of success achieved after completion of the first year. At a minimum, maintenance will be performed monthly for the second year and quarterly thereafter, for the duration of the 5- year monitoring period.

At a minimum, maintenance visits will consist of a thorough walk-through of the entire restoration site, inspection of the condition of all plantings and seeded areas, irrigation system function checks (see section 3.6.1 below) and checks for proper irrigation coverage, weed control, and replanting, as necessary. Maintenance personnel will communicate directly with the project monitor to ensure prompt and appropriate response to any problems or unanticipated conditions encountered.

7.1 Plantings and Invasive Species Management

Any unsuccessful plantings will be replaced as needed to bring the restoration site into compliance with the minimum success criteria. Restored areas will be closely monitored and recruiting invasive species will be controlled by mechanical or manual methods or by using herbicide. Mechanical methods may include discing, and use of machinery such as string trimmers, brush cutters, mowers, and other similar equipment. Flame weeding may also be used as a tool to scorch monocultures of young seedlings. This technique will be used responsibly in conjunction with available water and during the proper environmental conditions.

Areas within the project that will retain existing vegetation (areas of enhanced and preserved native habitats) will have invasive species cleared by construction machinery, where feasible, in order to remove large root mass of species such as pampas grass (*Cortaderia jubata/selloana*), harding grass (*Phalaris aquatica*) and other invasive species. These areas will be closely monitored and any re-colonization will be controlled manually, mechanically, or by use of herbicide.

All invasive species control efforts will prioritize removal/control of invasive plants prior to seed set and any invasive seed material will be discarded off site to a county green waste or refuse collection area. Herbicide will be used only when manual or mechanical methods are not feasible or effective and will be restricted to very low toxicity herbicides such as glysophate. Herbicide may be used for species such as rhizomatous grasses and cut stump methods for fennel and other woody species. When herbicides will be used near wetlands, only a wetland approved herbicide will be used. Herbicide manufacturer's directions will be strictly followed and no application will occur within 48 hours of any rain event or when wind speed is over 5 miles per hour. In the event that rain does occur, herbicide application will not resume again until 72 hours after rain. To the extent feasible, herbicide will not be used during the rainy season (November through March). Applicators of herbicide will be trained in proper use and under a licensed applicator permit.

7.2 Irrigation

Temporary irrigation will be provided to restored areas for approximately one year, to help ensure successful establishment of the restoration plantings. Irrigation rates will be determined based upon individual species requirements and zonation of ecotypes, and will be adjusted to provide the minimum necessary for rapid, healthy growth. In order to limit the growth of invasive, weedy species, seeded areas will receive the minimum amount of irrigation that is required to establish the target species.

The irrigation system will consist of a combination of low-pressure, low-volume drip components, with flexible lateral and feeder lines and impact spray heads. Periodic maintenance will be required to inspect and repair any problems with the system and its components. Irrigation system checks will consist of separate operation of each valve and verification of functioning condition of each irrigation head and emitter. Remedial measures required to correct irrigation system malfunctions will be performed immediately upon detection.

During the last 6 months of the (one-year) establishment period, irrigation will be gradually curtailed so that vegetation may adapt to a natural precipitation regime. If drought stress is detected in the plantings or in areas of the restoration site following this "weaning" process, irrigation will be continued to affected portions of the site for an additional year. If irrigation is required beyond two years, then site monitoring will be extended for each additional year irrigation is used on the project site.

SECTION 8
Monitoring and Adaptive Management

Immediately following project construction, a monitoring program will commence. Monitoring will be performed for a period of at least five years, and may be extended if contingency measures are required beyond the third year, and/or if the final success criteria are not met at the end of five years. In this event, monitoring will continue until such time as all disturbed areas and restoration plantings are established and the long-term viability of the target replacement habitat is assured, as determined in consultation with permitting agencies.

8.1 Monitoring Methods

Monitoring will be performed by a qualified personnel with appropriate credentials and demonstrated experience as approved by CCBER. CCBER will provide oversight of monitoring to ensure conformance with standards established in this Restoration Plan, and as required by permitting agencies. The monitoring protocols may be modified, subject to review and approval of regulatory stakeholders and permitting agencies. Monitoring methods for the Project site are outlined below.

8.1.1 Record As-Built Conditions

Following completion of project grading, accurate plans will be prepared depicting the finished grades, locations of any grade control or hydraulic structures, drainage flows, crossings, and erosion control measures. Methods of construction, as well as any significant problems or unexpected conditions encountered, will also be recorded. As-built plans will include a minimum of six surveyed cross-sections of the restored Slough, and at least two cross sections in the Phelps Creek channel. These cross-section locations will be permanently marked in the field. A longitudinal profile of the restored Slough channels will also be surveyed and included in the as-built plans. Permanent photo stations will be established and depicted on the as-built plans.

As-built conditions of the restored project habitats will also be recorded. The as-built habitat conditions shall be assessed and reported by a qualified biologist who is independent of the installation contractor (CCBER). The independent biologist shall prepare habitat maps on an annual basis during the period of restoration implementation. A final as-built habitat map will be prepared on conclusion of the five-year monitoring period. Baseline information will be incorporated into a written report describing the as-built status of the restoration project each year, and submitted with the as-built drawings to the CCC and other appropriate agencies within 30 days of completion of restoration activities.

8.1.2 Monitoring Schedule

Table 14 provides a summary of the monitoring activities planned for the project site. The monitoring schedule in Table 14 is consistent with the frequencies specified by the regulatory agencies in the permits. The temporal scales of the system responses were main considerations in determining frequency and timing of monitoring. It should also be noted that the monitoring schedule described is adaptable based upon implementation of adaptive management measures as described in section 8.2.

TABLE 14
SUMMARY OF MONITORING SCHEDULE

Category	Aspect	Location	Monitoring Parameter	Time of Year
Hydrology	Water Levels	Install pressure transducer: • West arm of Devereux Slough • East arm of Devereux Slough at bridge crossing • Confluence of Phelps Creek and Devereux Slough Existing pressure transducer: • Phelps Creek upstream of bridge • Lower Devereux Slough Measure by staff gauge: • Seasonal ponds	Water level	Summer and winter, winter and spring for seasonal ponds
	Salinity	Install pressure transducer with salinity gauge: • East arm of Devereux Slough at bridge crossing • Confluence of Phelps Creek and Devereux Slough • Upstream face of Venoco bridge Measure by refractometer: • Seasonal ponds	Water salinity	Quarterly, seasonal ponds measured only when they contain water
	Water Quality	• Upstream face of Venoco Bridge • Lower Devereux Slough – 1 foot intervals at the entire water column once a month for the 1st year and frequency to be determined thereafter dependent on results – minimum annually	temperature, salinity, dissolved oxygen, and pH at Lower Devereux Slough – measurements at 1 foot intervals along the entire water column	Monthly for the 1st year, frequency determined thereafter dependent on results, minimum annually
Geomorphology	Tidal Wetland and Channel and Saline Emergent Wetland Development – Cross-Sections	Cross Sections: • West arm of Devereux Slough • East arm of Devereux Slough • Confluence of Phelps Creek and Devereux Slough • Main channel (central and south) • 100 feet downstream of Venoco bridge in lower Devereux Slough	Elevation	Annual, in Summer
	Channel Development - Thalweg	West arm of Devereux Slough, East Arm of Devereux Slough, main channel of Devereux Slough, and continued under Venoco Bridge into lower Devereux Slough 100 feet	Elevation	Annual
	Photo-Documentation	• Tidal wetlands • Seasonal wetlands • Transitional and Upland Habitats	Photo-documentation	Late summer

TABLE 14 (Continued)
SUMMARY OF MONITORING SCHEDULE

Category	Aspect	Location	Monitoring Parameter	Time of Year
Biology	Vegetation Succession – Tidal Wetlands	Tidal wetlands	Vegetation succession transects	Late summer
	Vegetation Succession	Seasonal wetlands	Vegetation transects	
	Invasive Plants – Tidal Wetlands Invasive Plants – Seasonal Wetlands Invasive Plants – Transitional and Upland Habitat	Tidal & Seasonal wetlands, Transitional and Upland	Invasive plants	Late summer
	Bird Use (Include reference areas)	Tidal wetlands	Birds	Seasonal
	Bird Use (Include reference areas)	Seasonal wetlands	Birds	Seasonal

8.1.3 Monitoring Protocol

During the monitoring visits, detailed records will be made of the conditions existing at the restoration site. In order to maintain continuity and ensure comparable assessments, standardized data sheets will be used to record monitoring data. Sample channel cross-sections, quadrats, and photo stations will be permanently marked in the field. Figure 16 shows anticipated locations for permanent monitoring stations on the project site.

Slough and channel cross-sections and profile will be surveyed in the field annually to record the condition of the channels and banks, and any changes occurring as a result of natural geomorphic adjustment or other causes (e.g. possible vandalism, or human activity in the channel, wildlife trails/laydown areas, etc.).

Quadrat sampling methods will be used to record data for selected areas of the restoration site. Required monitoring data will include:

- Percent survival and vigor (High, medium, low) of all trees planted (with the exception of willows, which will be evaluated based upon aerial cover);
- Overall cover, percent cover by species (dominant as well as incidental species present will be recorded), and natural recruitment of native and invasive species;
- Mortality and other problems such as insect damage, erosion, or other soil problems will be noted and documented with photographs; and
- General health, growth, vigor, and signs of reproduction of restoration plantings.

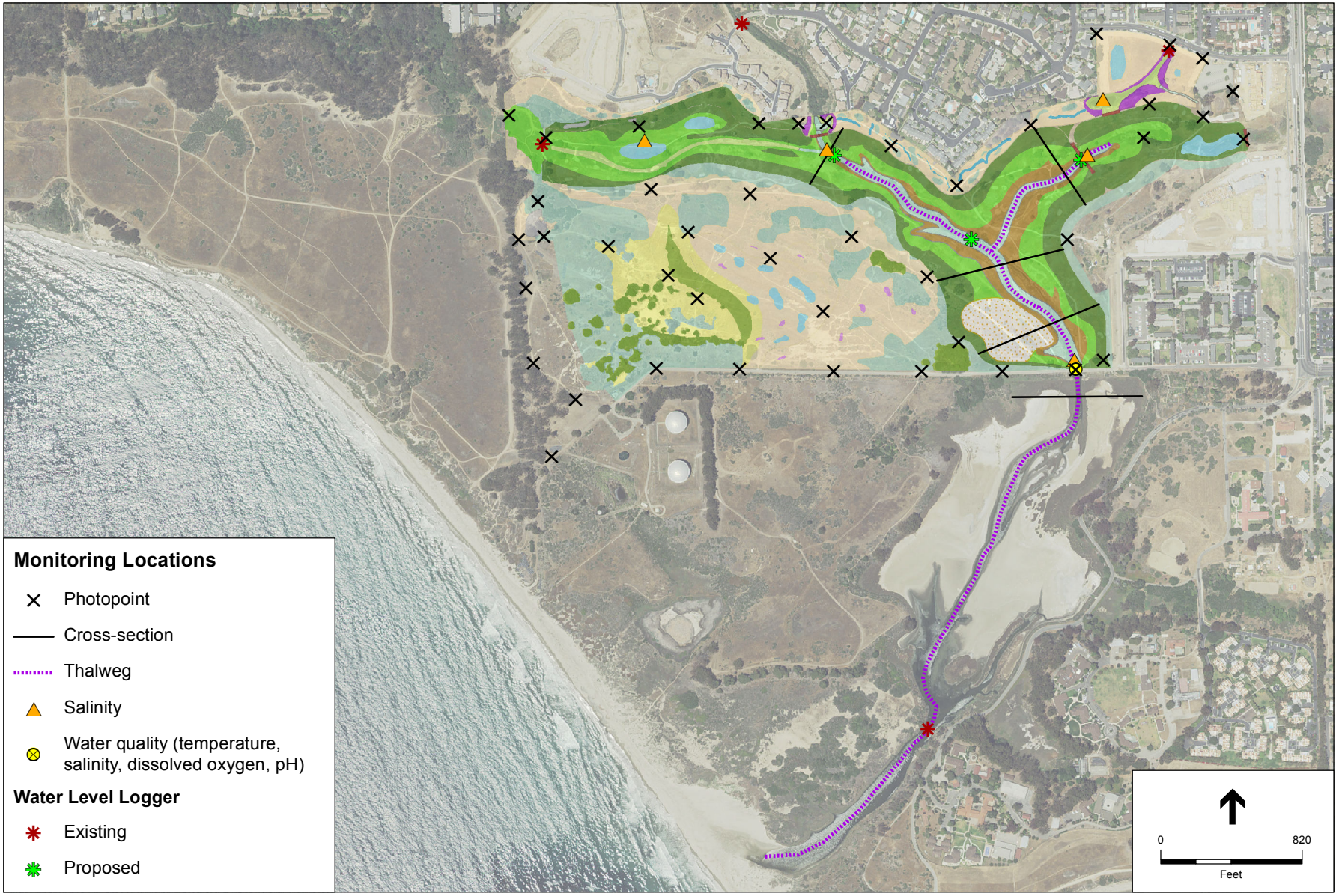
Photographs showing overall views of the restoration site will be taken at established photopoints during each visit. The photopoints should be representative of different habitat areas and taken from vantage points to be able to identify changes in size and cover of vegetation.

The following is a description of specific monitoring data to be collected for the restoration site.

Vegetation

Salt Marsh

Salt marsh includes areas with dense salt marsh, unvegetated marsh plain, and transitional salt marsh habitat. Densely vegetated areas are expected to have high percent native cover measured with line transects and quadrats. Within salt marsh areas at least ten 50-meter transects will be developed and 1 meter quadrats will be used every other meter along each transect to monitor vegetation. Monitoring and success criteria were developed using Devereux Slough as a reference site. It is expected that some quadrats will capture bare mud or salt flats while others will capture dense salt marsh and transitional marsh vegetation at a ratio of approximately 35% bare to 65% vegetated.



SOURCE: Project Features and Monitoring Locations (ESA and CCBER 2016)

UCSB NCOS Restoration Project . D140769.02

Figure 16
Monitoring Locations

Fresh/Brackish Marsh

Fresh and brackish marsh areas will be monitored in the late summer, when they are likely to be drier, with cross-habitat transects and meter square quadrats sampled every other meter. Reference sites include the Coal Oil Point Dune Pond and habitat along the western boundary of the narrow channel at the southern end of Devereux Slough. Open water areas of these habitats will likely be bare or covered with dried algae.

Riparian

The goal for restored riparian areas is multi-level, structurally complex habitat with at least three layers developing in the mature stages – herbaceous, willow-shrub and tree canopy levels. Monitoring will measure 20 random points, where vegetation cover will be characterized at all levels, using both quantitative and qualitative descriptors. Monitoring and success criteria were developed with reference to the Phelps Creek riparian restoration site.

Back Dune Woodland Scrub

Back Dune woodland scrub habitats currently existing on South Parcel are dominated by arroyo willow and cottonwoods, and are colonized by invasive pampas grass in some areas. Depending on the depth to the water table, additional woody and herbaceous species typical of those found near Oso Flaco Lake may also be planted or become established via native recruitment, including mule fat, native blackberry and bird-dispersed species such as coffee berry, lemonadeberry, elderberry and snowberry. Vegetation will be monitored using qualitative and quantitative metrics as for riparian vegetation, with 20 randomly assigned points and interception heights noted for all species. Performance criteria are based on creating a native dominated woody shrub habitat with resources that serve a variety of avifauna.

Annual Areas

The goal for annual areas is to establish on sandy and clay soils low growing annual vegetation with a relatively high percentage of non-vegetated areas. Bare areas provide habitat for reptiles, forage areas for birds, open space for ground nesting solitary bees and a diversity of other arthropods. In addition, bare areas are important for the support they provide to annual wildflower species that may otherwise be out competed by annual grasses. Low nutrient soils play an important role in supporting these fragile species.

Annual areas will be interdigitated with other habitat types. Percent cover and plant diversity will be measured in spring with randomly assigned quadrats in conjunction with monitoring of the grassland areas. The reference sites for this habitat type are annual areas existing on the South Parcel and areas adjacent to salt marsh at the Sierra Madre site that support plants such as California plantain (*Plantago erecta),* lupine (*Lupinus* spp.), owl's clover (*Castilleja* spp.), strigose lotus, and alkali weed (*Cressa truxilensis*).

Vernal Pools

Vernal pool areas will be measured with permanent transects and vegetation sampled in one meter square quadrats every other meter along each transect at five different ponds. The length of

each transect will be determined by the size of the pond to be measured. Topography will be measured along each transect with data points taken every 15 cm along the transect. Topography will be measured the first and fifth year of monitoring to ensure pond stability. Hydrology will be measured with permanently installed measuring rods that will record weekly during inundation periods. Hydrologic monitoring will be conducted weekly during the wet season. Methodology and reference sites are based on successful vernal pool restoration areas at Manzanita Village Restoration Area and remnant, enhanced pools at Camino Corto Reserve in Isla Vista.

Grassland

Grassland areas will be monitored by using random one meter square plots defined by GPS randomization within grassland polygons. Ten quadrats will be sampled per acre of grassland. Success criteria for grassland, shown in Table 15, are based on reference sites of perennial native grasslands at Ellwood Mesa, located just west of the project site. Ellwood Mesa contains approximately 70 percent native grass cover and 30 percent non-native annuals or bare ground.

Coastal Sage Scrub

Coastal sage scrub will be monitored by using transect lines with sampling points taken every 50 centimeters. All species that are intercepted at each sampling point will be identified. A total of 10 transects, each 50 meters long, will be sampled within the coastal sage scrub habitat. Success criteria for coastal sage scrub (Table 15) were determined based on a restored coastal sage scrub reference site, which occurs adjacent to the Campus Lagoon.

Southern Tarplant

Tarplant is a species that responds to disturbance, and with sufficient seeding can be sustained across a landscape that includes a range of disturbance factors from rodents to intermittent flooding. Tarplant populations will be established from seed along the edges of wetlands and in clays soil areas. The populations will be mapped in the fall during peak flowering with a GPS unit to capture the variation in cover and location of the population and health of the seed bank to be established through hand seed dispersal. The field mapping data will be illustrated using ArcGIS. This form of monitoring will best show the habits and preferences of this rare, yet very mobile, annual herb.

Ventura Marsh Milk Vetch

The Ventura marsh milk vetch (*Astragalus pycnostachyus* var. *lanosissimus*) is listed as federally and State endangered and a list 1B.1 plant. The Ventura marsh milk vetch is thought to be extirpated, but has been reintroduced by CDFW in some locations near to the project site. CCBER will work with CDFW to design a reintroduction program within suitable habitat at the project site and to formulate an appropriate monitoring protocol. Monitoring will likely include establishment of index wells or soil profile moisture sampling regimes. Individual plants will be tagged and monitored. Seed production and likely cause of mortality will be documented. Snails, dry and wet conditions, as well as over-crowding by rhizomatous species can all be threats to the establishment of this species.

Invasive Plants

Monitoring for non-native plant species over the 5 year monitoring period will form part of the vegetation surveys described above. Infestations (more than 100 m^2) will be immediately eradicated once detected. Non-native invasive species identified in restoration site monitoring will be maintained in the acceptable range of 0-5% absolute cover. CCBER will implement invasive plant control measures as described in section 7.1 in order to reduce competition for natives, allowing them to establish more successfully.

Hydrology, Water Quality, and Geomorphology

Cross sections to measure channel and marsh development will occur at six locations: one cross-section on each arm of the restored Slough channel, two on the main channel, and one of the Phelps Creek connection to Devereux Slough. These cross-sections will be surveyed and monumented after construction has been completed. The locations of these cross-sections will be depicted on the as-built plans and permanently marked in the field. A channel thalweg longitudinal profile survey will also be completed along the channel bottom along each arm of the restored Slough, the main channel, and continue under the Venoco bridge 100 feet into lower Devereux Slough.

Documentation of the hydrologic/geomorphic characteristics of the restoration area will be accomplished by re-surveying and taking photos at each established cross-section on an annual basis. Photos will be shot upstream and downstream from permanent photo points, for a total of 4 photos per cross-section. Panoramic photos will be taken from the same high points at top of bank, and additional photos will be taken as necessary to document conditions in the bed and banks of the channels. Survey data and panoramic and documentary photographs or color photocopies will be submitted as a component of the annual monitoring reports.

Three pressure transducers will be deployed to monitor water levels to inform our understanding of flood levels, tidal prisms, and flow rates. The three pressure transducers will be deployed at the west and east arms of Devereux Slough and at the confluence of Phelps Creek and Devereux Slough. Two of the three pressure transducers will also measure water salinity. Two pressure transducers will remain operational that are currently deployed in Phelps Creek upstream of the project boundary and in Lower Devereux Slough. Water quality including temperature, salinity, dissolved oxygen, and pH will be monitored with one deployed YSI data sonde at the upstream face of the Venoco Bridge. More robust water quality measurements will also take place within Lower Devereux Slough at one foot intervals within the entire water column. This monitoring will occur monthly for the first year following completion of project construction and at least annually thereafter; with frequency and duration of such water quality monitoring to be determined based upon results of the initial monitoring effort.

Focused study on nutrient levels at storm drain outfalls and in the channel between upper and lower Slough may be conducted in year 3, to compare with documented pre-project conditions, pending funding.

Water level gauges will be used to measure water level fluctuations in seasonal ponds. Data analysis will focus on water level elevations, flooding duration and depth, and rates of seepage into the soils. Gauges will be in operation over the seasonal duration of ponding. Salinity in pond water (when present) will be measured using a hand-held salinity refractometer. Any accumulated water will be tested in the field for salinity. Sampling will occur at a minimum frequency of at least seasonal intervals.

Groundwater monitoring wells will be installed in the western arm of the project site and near seep fed wetlands.

Wildlife

Many non-regulatory studies on invertebrates, reptiles, and amphibians will be implemented on the project site by students with CCBER supervision. Other more specific wildlife monitoring is described below.

Fish surveys

Seine net surveys will occur twice a year in three zones of the restored Slough and two zones of the lower Slough operating under a permitted biologist, (e.g. Kevin Lafferty). It is anticipated that the restored upper Slough will have findings similar to those in the lower Slough in terms of presence and absence of the tidewater goby.

California red-legged frog

Night time survey and/or audio surveys of riparian areas will be completed annually in March for presence of California red-legged frog. There is no expectation for actual introduction of California red-legged frog to the project site, however it is possible the species may migrate to the project site after habitat enhancement occurs. There will be no success criteria attached to monitoring for California red-legged frog.

Birds

Quarterly bird surveys will take place at the project site. Nesting surveys will be conducted in the area of the project nesting feature created for western snowy plover. Western snowy plover surveys are conducted biweekly on Coal Oil Point Reserve during the nesting season and will be used a reference area to compare to surveys conducted on the project site. Surveys will help inform management practices through feedback between bird use and habitat and human use management observations and actions. There will be no specific success criteria set for birds.

Human Use and Impacts

The primary potential human use impact is from dogs off leash and bikes off trail. Ongoing management will enforce these two priorities, but a survey of behavior and use of the site will be conducted each spring by students over a 2 week period in a way that captures multiple times of day and days of the week.

If the surveys show people aren't respecting trail limits, then a low, wildlife permeable fence such as post and cable may be added to trail edges. If people aren't respecting the dogs on leash rule then UCSB will focus on a concentrated effort for enforcement and education related to this topic.

Vector Control

While not part of the NCOS Restoration Project monitoring protocol, Santa Barbara County Vector Control District will monitor mosquito populations on the restored site.

8.1.4 Success Criteria

Vegetation Success Criteria

Table 15 provides proposed minimum success criteria for the vegetation types to be restored within the project site. Success criteria presented below may be modified, subject to review and approval of regulatory stakeholders and permitting agencies. Plantings in the restoration site will be considered successful if, at the end of the 5-year monitoring period, the final criteria have been met. To measure these success criteria, invasive plants are defined as those species having a "high" rating by the California Invasive Plant Council (Cal-IPC). Maintenance and/or replanting will be performed as necessary to achieve the standards shown in Table 15. If significant numbers of replacement plantings are required after the third year, CCBER will consult with the permitting agencies to determine whether the monitoring period should be extended beyond the 5-year period.

Hydrology Success Criteria

Hydrologic function in the restoration site will be considered successful if, at the end of the 5-year monitoring period, the restored Slough and Phelps Creek channel has the following features/characteristics:

1. A relatively stable channel or channels as reflected in zones where head cutting could occur;
2. Stable mud flats and vegetated marsh plain with a matrix of vegetated and unvegetated polygons that support significant edge habitat
3. Stable Phelps Creek channel banks which support healthy riparian trees and shrubs (as defined by vegetative success criteria described above).
4. After five years post-breach the water elevations within the seasonal wetlands will be sufficient to inundate all ponds during wet winters. The hydroperiod of the standing waters will be sufficient to control (either inhibition or promotion) the growth of target plant species, to the extent feasible.
5. Vector control: There will be no significant mosquito nuisance (e.g. public health, nuisance to neighbors).

TABLE 15
VEGETATION SUCCESS CRITERIA

	Year 1	Year 2	Year 3	Year 4	Year 5
Grassland					
% Total cover	35	45	60	70	80
% Native Relative Cover	50	60	70	70	70
% Invasive Relative Cover	<5	<5	<5	<5	<5
Diversity (Native Species)	3	4	6	7	7
Coastal Sage Scrub					
% Total cover	30	40	50	60	65
% Native Relative Cover	50	60	65	70	80
% Invasive Relative Cover	<5	<5	<5	<5	<5
Diversity (Native Species)	8	8	10	12	15
Sandy Dune and Clay Annual Areas					
% Total cover (variable by season)	20	25	30	35	40
% Native Relative Cover	50	60	70	70	80
% Invasive Relative Cover	<5	<5	<5	<5	<5
Diversity (Native Species)	3	3	4	5	5
Salt Marsh					
% Total cover	30	40	60	70	70
% Native Relative Cover	70	80	80	80	90
% Invasive Relative Cover	<5	<5	<5	<5	<5
Diversity (Native Species)	4	6	7	7	8
Riparian/Back Dune Swale/Fresh Brackish Marsh					
% Total cover	50	50	60	70	80
% Native Relative Cover	70	70	70	80	80
% Invasive Relative Cover	<5	<5	<5	<5	<5
Diversity (Native Species)	7	7	10	12	14
Vernal Pools					
% Total cover	30	40	40	45	50
% Native Relative Cover	70	70	70	80	80
% Invasive Relative Cover	<5	<5	<5	<5	<5
Diversity (Native Species)	7	7	10	12	15

8.2 Adaptive Management

CCBER will complete regular assessments to evaluate project performance. The assessments will compare monitoring results with performance criteria to determine whether any adjustments to the project are needed. CCBER will consult with the SAB and/or identified experts to conduct and/or evaluate the assessments to inform CCBER decision making. This section defines the assessment process, the frequency and timing of assessments, and assessment documentation.

8.2.1 Assessment Process

The assessment process will consist of comparing the results of monitoring and ongoing inspections by the CCBER or, in the event CCBER no longer is responsible for managing campus restoration areas, a successor entity responsible for such functions, to management thresholds that indicate how well the project is progressing toward the restoration objectives, and evaluation of whether any adaptive management action(s) are warranted.

Each management threshold would be assessed regularly by analyzing the monitoring data. CCBER, in consultation with the SAB (and/or regulatory agencies, as appropriate), will identify methods for comparing the restoration performance criteria with monitoring data. These methods will include appropriate statistical comparisons as needed for assessment. The results of these assessments will be documented and stored in a monitoring database.

8.2.2 Frequency of Assessments

Table 14 provides a summary of the monitoring activities planned for the NCOS Restoration site. It should also be noted that the monitoring schedule described is adaptable based upon adaptive management assessments and review of CCBER and the SAB.

CCBER and the SAB will meet every year to discuss monitoring and research findings, compare these finding with management thresholds, and discuss implications for adaptive management. Assessments may be more frequent, depending on the relevant physical or ecological scale of each restoration target.

8.2.3 Decision-making and Adaptive Management Actions

This section describes the decision-making process for implementing any management actions required to keep the project on track. The decision-making process goes into effect if the assessment process finds that a management trigger has been reached, indicating that the system is not performing well. If CCBER decides that small management actions need to happen, they would implement those immediately. If a larger change to the project approach or a substantial action is necessary, the SAB will be consulted as per the process described above. CCBER may conduct additional studies and would vet this change or action through the SAB, outside scientists, or the regulatory agencies, as needed, depending on permit conditions and the scale and type of issue.

If a management threshold is reached, this prompts CCBER and SAB review for possible management action. When the cause for triggering of a management threshold and the appropriate corrective management actions are clear, then CCBER will implement the management actions. When the cause for triggering a management threshold or the appropriate response is not readily apparent, then studies and/or additional monitoring would be conducted to better understand what caused the system to respond differently than predicted. Once adaptive management actions are implemented, subsequent monitoring may be used to evaluate the effectiveness of these actions.

8.3 Reporting

Annual monitoring reports will be submitted by UCSB to the Corps, CDFW, CCC, RWQCB and other agencies, as appropriate. The first annual report will be delivered by December 31 of the year following the first growing season after planting, and by December 31 of each year thereafter.

Monitoring reports will provide details of the monitoring methods, report all monitoring data collected (including water-level data, survey transects, sedimentation data, biological data, and photographs) and provide discussion of the implications of monitoring data for site evolution, and comparison to the success criteria. The reports will include summaries of biological monitoring including species diversity and cover estimates, observations, and data summaries regarding the health and vigor of vegetation and plant survival. The reports will include analyses of all quantitative monitoring data, prints of monitoring photographs, and maps identifying monitoring transects and/or quadrats, monitoring photo points, and restoration plantings by vegetation type and height class. The report will also include the aerial extent of habitats mapped in year 1 and year 4 of the restoration, to show horizontal heterogeneity and complexity of habitat types. The monitoring reports will also detail the invasive plant species eradication efforts conducted on the site. The results of the wildlife monitoring will also be summarized. The monitoring reports will include an executive summary which summarizes all of the relevant data, discusses any problems and successes encountered, any replacement planting or other remedial measures taken, and summarizes any changes or recommendations for adaptive management of the site.

SECTION 9
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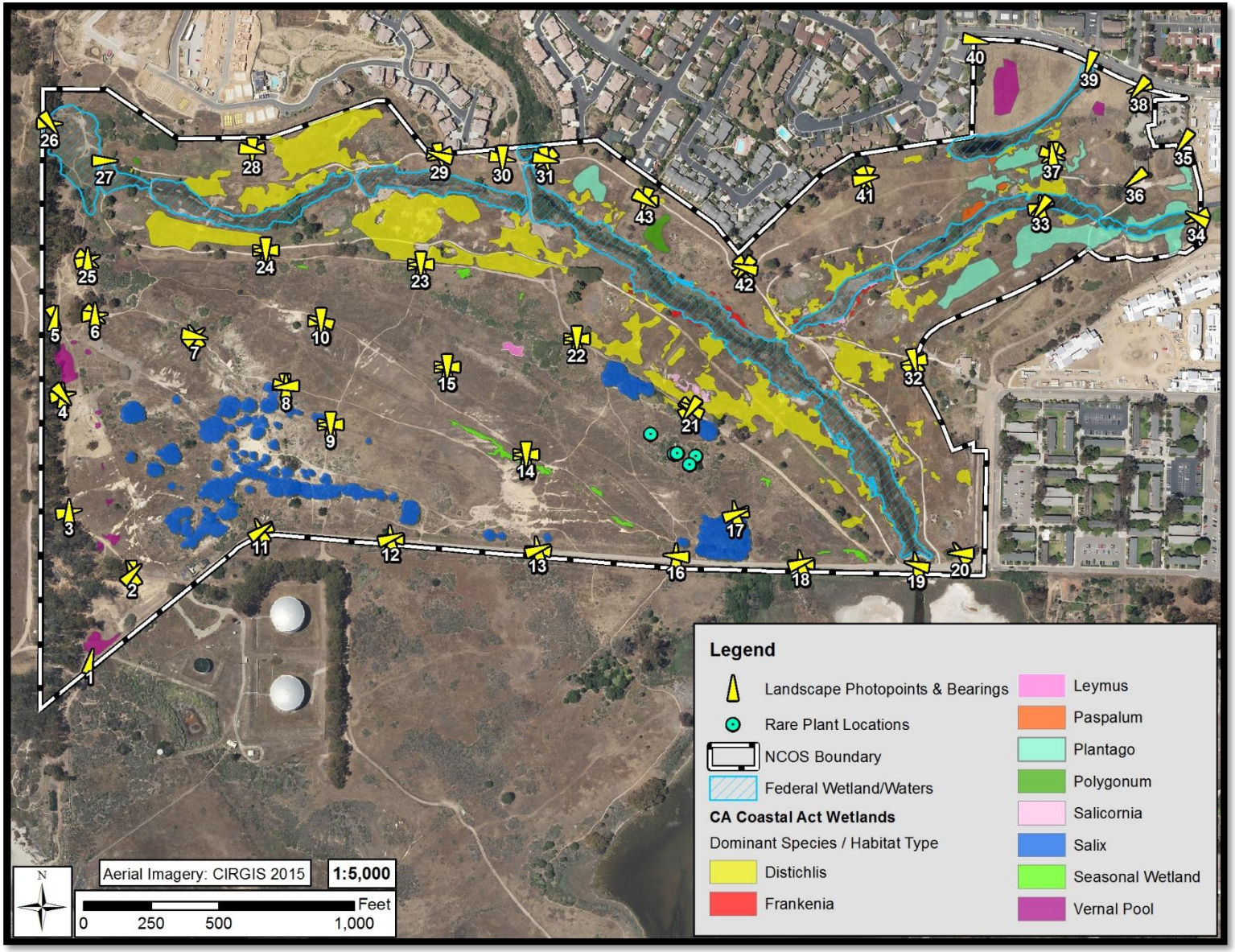
UCSB NORTH CAMPUS OPEN SPACE RESTORATION PLAN

Appendix A: NCOS Restoration Site Baseline Vegetation Conditions



Map of baseline conditions of NCOS, including wetland vegetation mapped as part of the Jurisdictional Determination report, locations of the special status plant, *Lonicera subspicata var. subspicata*, observed as part of a rare plant survey, and the locations and bearings of annual landscape photo monitoring points.

North Campus Open Space Landscape Photo Monitoring: Baseline Photos (pre-construction/restoration), December 2016

Photo Naming Protocol: "[Location Code (e.g. NCOS)]_[Photo Point Number]_[Bearing]_[Date in YearMonthDay]"

NCOS_1_15_20161205

NCOS_2_45_20161205

NCOS_2_175_20161205

NCOS_2_335_20161205

Note: Photo name components include: "NCOS_[Photo Point Number]_[Bearing]_[Date of Photo]"

NCOS_3_0_20161205

NCOS_3_80_20161205

NCOS_4_0_20161205

NCOS_4_80_20161205

Note: Photo name components include: "NCOS_[Photo Point Number]_[Bearing]_[Date of Photo]"

NCOS_4_140_20161205

NCOS_5_10_20161205

NCOS_5_155_20161205

NCOS_6_0_20161205

Note: Photo name components include: "NCOS_[Photo Point Number]_[Bearing]_[Date of Photo]"

NCOS_6_85_20161205

NCOS_6_130_20161205

NCOS_7_50_20161205

NCOS_7_100_20161205

Note: Photo name components include: "NCOS_[Photo Point Number]_[Bearing]_[Date of Photo]"

NCOS_7_330_20161205

NCOS_8_0_20161205

NCOS_8_100_20161205

NCOS_8_175_20161205

Note: Photo name components include: "NCOS_[Photo Point Number]_[Bearing]_[Date of Photo]"

NCOS_8_265_20161205

NCOS_9_0_20161205

NCOS_9_90_20161205

NCOS_9_180_20161205

Note: Photo name components include: "NCOS_[Photo Point Number]_[Bearing]_[Date of Photo]"

NCOS_9_270_20161205

NCOS_10_0_20161205

NCOS_10_90_20161205

NCOS_10_180_20161205

Note: Photo name components include: "NCOS_[Photo Point Number]_[Bearing]_[Date of Photo]"

NCOS_10_290_20161205

NCOS_11_55_20161205

NCOS_11_250_20161205

NCOS_11_335_20161205

Note: Photo name components include: "NCOS_[Photo Point Number]_[Bearing]_[Date of Photo]"

NCOS_12_70_20161205

NCOS_12_275_20161205

NCOS_12_355_20161205

NCOS_13_70_20161205

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NCOS_13_350_20161205

NCOS_14_0_20161205

NCOS_14_90_20161205

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NCOS_14_270_20161205

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NCOS_15_270_20161205

NCOS_16_0_20161205

NCOS_16_275_20161205

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NCOS_17_350_20161205

NCOS_18_70_20161205

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NCOS_18_350_20161205

NCOS_19_285_20161205

NCOS_19_350_20161205

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NCOS_21_60_20161205

NCOS_21_130_20161205

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NCOS_28_260_20161205

NCOS_29_100_20161205

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NCOS_29_290_20161205

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NCOS_31_230_20161205

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NCOS_32_330_20161205

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NCOS_33_355_20161206

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NCOS_34_300_20161206

NCOS_35_215_20161206

NCOS_36_230_20161206

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NCOS_37_185_20161206

NCOS_37_235_20161206

NCOS_37_355_20161206

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NCOS_39_200_20161206

NCOS_40_100_20161206

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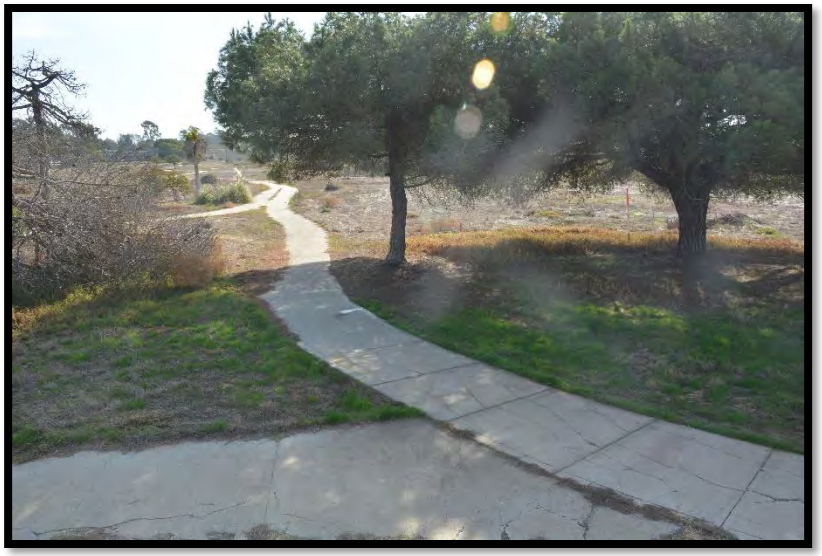

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NCOS_43_200_20161206

NCOS_43_275_20161206

Note: Photo name components include: "NCOS_[Photo Point Number]_[Bearing]_[Date of Photo]"

UNIVERSITY OF CALIFORNIA AT SANTA BARBARA

NORTH CAMPUS OPEN SPACE RESTORATION PROJECT

JURISDICTIONAL DETERMINATION

Prepared for:

UNIVERSITY OF CALIFORNIA AT SANTA BARBARA
&
RODRIGUEZ CONSULTING

DECEMBER 8, 2015

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APPENDICES

1.0 INTRODUCTION AND PURPOSE

The University of California at Santa Barbara (UCSB) North Campus Open Space Restoration Project (project) is located west of Storke Road near Whittier Drive in Goleta, California (Figures 1 and 2). The project would primarily return the former Ocean Meadows Golf Course to preexisting conditions that would include broad floodplains of tidal influenced mud flat and salt marsh habitats along the drainageways that run through the site. An upland, riparian, and vernal pool creation/restoration component is also included in the project. The uplands, wetlands, and drainageways within the study area are highly disturbed from construction of the golf course in 1965 and 48 years of vegetation management for golf up to its closure in 2013. In addition, regular tidal influence has been eliminated with the installation of the sheet pile sill at the Devereux Slough bridge, and initial construction of the oil field road back in the 1920's (Revell Coastal, 2015). The site is in a transitional state from the cessation of golf course turf management along with continued sprinkler irrigation (with reclaimed water) and mowing of the former fairways to satisfy neighboring resident's request to maintain some form of "green" to the landscape. As a result of past and ongoing manipulation of site conditions, this jurisdictional determination represents the current fall season 2015 snapshot in time of significantly disturbed conditions of vegetation, soils, and hydrology.

Several studies have been conducted before and after golf course closure that provided mapped locations of a variety of wetland habitat types throughout the study area that were reviewed and evaluated for including in this jurisdictional determination. The purpose of this wetland delineation and preliminary jurisdictional determination is to document the methods and results for delineating the location and extent of potential jurisdictional wetlands and other waters of the U.S., and waters subject to California Fish and Game Code 1600 *et.seq.* streamzone jurisdiction, and areas that meet the California Coastal Act one parameter definition of wetlands (vegetation, soils, and/or hydrology) within the project area.

2.0 METHODS

Sage Institute, Inc. (SII) Principal Ecologist and wetland specialist David Wolff, and SII Principal Biologist Jason Kirschenstein collected and reviewed available background information and conducted wetland delineation field reconnaissance surveys of the study area on September 21, 22, 29, 30, and November 20, 2015. Available background information included multiple years of available aerial photography during active golf and after closure, soils survey, and information provided by UCSB. Key information used in the formation of this jurisdictional determination includes:

- North Campus Open Space Restoration Project Detailed Project Program (DPP) and Appendices (ESA, September 25, 2015)
- Native Habitat of OMGC (Cheadle Center for Biodiversity & Ecological Restoration, February 2015)
- *Wetlands Delineation Subject to the California Coastal Act, UCSB South Parcel Santa Barbara County, California* (WRA Environmental Consultants, September 1, 2006)
- *Wetland Delineation Report, Ocean Meadow Golf Course, Goleta, California* (Watershed Environmental, July 10, 2003)

The routine and problem areas methodology detailed in the 1987 *U.S. Army Corps of Engineers Wetland Delineation Manual* (Corps Manual) were used as the basis to delineate waters of the U.S. including wetlands on the site. The basis of determining and recording indicators for hydrophytic vegetation,

hydric soils, and wetland hydrology was the 2008 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* (Arid West Supplement). Both the Corps Manual (Section G – Problem Areas) and Arid West Supplement (Chapter 5 – Difficult Wetland Situations in the Arid West) were used for the determination and evaluation of normal circumstances, atypical situations, and problem area wetlands as needed.

The U.S. Army Corps of Engineers (Corps) Ordinary High Water Mark (OHWM) jurisdiction was determined based on the 2008 *U.S. Army Corps of Engineers: A Field Guide to the Identification of the Ordinary High Water Mark (OHWM)*. The OHWM was determined by the physical characteristics of the active floodplain observed in the field including recent bank erosion, an incised channel, drift lines of debris and sediment, matted vegetation, and/or a clear natural scour line impressed on the bank or active channel. Field observation data were collected on vegetation, soils, and hydrology at representative locations on the project site in both potential wetland and upland areas. Data were recorded on the Arid West Data Observation Form at seven data observation points. Each data point included excavating a shallow soils test pit to a minimum of 12 inches deep to record soil texture, color, and any redoxomorphic field indicators of hydric soils. To meet the wetland vegetation criteria, an area needs to support greater than 50 percent absolute cover of dominant plant species designated as obligate (OBL), facultative wetland (FACW), and/or facultative (FAC) plants. Primary and/or secondary field indicators of wetland hydrology if evident were recorded. To be considered a jurisdictional wetland under the Federal definition it must meet all three parameters of wetland vegetation, hydric soils, and wetland hydrology.

Plant species wetland indicator status was based on the U.S. Army Corps of Engineers, State of California 2014 Wetland Plant List with indicators defined as:

> **Obligate Wetland Plants (OBL):** Plants that occur almost always in wetlands (estimated probability >99%).
>
> **Facultative Wetland Plants (FACW):** Plants that occur usually in wetlands (estimated probability >67% to 99%), but also occur in non-wetlands (estimated probability 1% to 33%).
>
> **Facultative Plants (FAC):** Plants with a similar likelihood of occurring in both wetlands and non-wetlands (estimated probability 33% to 67%).
>
> **Facultative Upland Plants (FACU):** Plants that occur sometimes in wetlands (estimated probability 1% to <33%), but occur more often in non-wetlands (estimated probability >67% to 99%).
>
> **Obligate Upland Plants (UPL):** Plants that occur in wetlands rarely (estimated probability <1%), but occur almost always in non-wetlands (estimated probability >99%).

The California Department of Fish and Wildlife (CDFW) 1600 streamzone jurisdictional limits were determined in the field by topographic evidence of a clear bed, bank, and channel delineated by a top of bank line or the outside edge of riparian vegetation whichever was greater.

The California Coastal Act regulations define wetlands as land where the water table is at, near, or above the land surface long enough to promote the formation of hydric soils or to support the growth of hydrophytes, and shall also include those types of wetlands where vegetation is lacking and soil is poorly developed or absent as a result of frequent and drastic fluctuations of surface water levels, wave action,

water flow, turbidity or high concentrations of salts or other substances in the substrate. The California Coastal Act wetlands are determined based on the presence of any one of the three federal wetland parameters, wetland vegetation, hydric soils, or wetland hydrology. The criteria used for each parameter is the federal methodology described above as the California Coastal Act does not set criteria for these wetland parameters. Given the highly modified, manipulated, disturbed, and transitional site conditions, a qualitative functional assessment based on the Environmental Protection Agency (EPA) metrics for the Index of Biological Integrity (IBI) and Functional Assessment Hydrogeomorphic Approach (HGM) were evaluated for the areas delineated as one parameter coastal wetlands (see Section 4.1 below).

3.0 RESULTS AND JURISDICTIONAL DETERMINATIONS

3.1 SETTING AND EXISTING CONDITIONS

The project study area includes the former Ocean Meadows Golf Course, the South Parcel that extends to the eucalyptus windrow along the Ellwood Mesa to the west, Venoco Road on the South (not open to public traffic), and residential and commercial development to the east and north (Figure 2). The undeveloped Whittier Parcel is located at the northeast corner of the project site bordered by the former golf course, Whittier Drive, and residential development.

The Ocean Meadows Golf Course parcel is the location of the former nine-hole golf course created in 1965 by filling the historic northern extent of Devereux Slough with soils removed from adjacent lands, including substantial borrow and disturbance on the South Parcel. Elevations for the golf course were raised six to ten feet confining the creeks and drainages to narrow drainage corridors. The golf course has been closed since 2013 with current management consisting of occasional irrigation with reclaimed water and annual mowing. The golf course is crossed by the remains of golf cart paths, informal trails (dirt tracks worn into the landscape), and is used by local residents, students and the public for walking, cycling, and dog-walking.

The South Parcel is located southwest of the golf course and abuts the Coal Oil Point Reserve (COPR), and Ellwood Mesa, an undeveloped property in the city of Goleta's jurisdiction to the west. Four east-west trending, man-made earthen berms that developed drainage swales/ditches direct rainfall runoff to the eastern edge of the property and eventually to Devereux Slough through a culvert under Venoco Road. Stands of willows have formed along with small pockets of seasonal herbaceous wetlands in low-lying areas within the swales/ditches. The South Parcel contains numerous dirt trails, eroded areas, and dirt bicycle jumps, and currently is used for walking, jogging, off-road bicycling, and beach access.

The vegetation of the former Ocean Meadows Golf Course consists primarily of non-native turf grasses, with non-native landscape trees, annual non-native weeds, native wetland and riparian plants, and bare ground. Devereux Creek, Phelps Creek, and the drainages onsite support a mix of robust emergent wetland plants (cattail/bulrush) within the confined drainage channels with a variable fringe of adjacent salt marsh plants along and above the top of bank. Alkali sea-heath, pickleweed, salt grass, and quailbush dominate the vegetated fringe of the drainages in variable compositions and densities. Small stands of willow are scattered along the drainages. The golf course fairways that have been irrigated and mowed since its closure have widely scattered patches of alkali sea-heath, large swaths of salt grass, large swaths of the non-native buck-horn plantain, Bermuda grass, yard knotweed, patches of the mat forming non-native Australian saltbush, and clumps of dallis grass (in moist areas). The South Parcel

supports mostly a non-native annual grasses, large patches of fennel, and scattered willows that follow the erosion gullies and ditches created by the golf course borrow operation. Small patches of seasonal wetland plants that have been mapped and recorded by others in the ditches along the berms on the South Parcel include Mediterranean barley, ryegrass, curly dock, and spikerush. Table 1 provides a list of plant species observed with scientific and common names, and wetland indicator status.

Soils within the study area are mapped by the Natural Resources Conservation Service soil survey as Aquents (fill areas) on the golf course, and Xerothernts (cut and fill areas) on the South Parcel reflecting the significant disturbance to the natural soil profile from golf course construction in 1965. See Figure 3.

Hydrologic input into the study area is primarily from Devereux Creek that traverses the golf course property joined approximately midway by Phelps Creek, and two unnamed tributaries receiving stormwater from the surrounding development. It then connects to Devereux Slough on the Coal Oil Point Reserve at the southern golf course property boundary. The hydrologic connection between Devereux Creek and the lower Devereux Slough is limited by a sheet pile sill located just upstream of the Devereux Creek bridge crossing. Evaluation of the historic extent of tidal wetlands by David Revell, Ph.D., for the project shows significant modification to the project area by agriculture, oil development, and the golf course construction. Most importantly for this jurisdictional determination, the historic extent of tidal wetlands covers almost all of the golf course footprint that has been filled (see Figure 4 included from Revell 2015 excerpts on historic conditions report). While the creek channels are now confined to narrow channels by the golf course fill, and tidal influence has been limited by the sheet pile sill, portions of the golf course have flooded during large rainfall events and combined tidal influence, or at least hydrologic connection with Devereux Slough over the sill may occur when high tides coincide with large rainfall events.

Based on the above description of a highly modified study area, transition from the active to abandoned golf course with continued mowing and irrigation, normal circumstances are not present. Furthermore, the human induced changes along with recent prolonged drought and conducting this jurisdictional determination study at the end of the growing season suggests that this is an atypical situation. As such, the problem area and difficult wetland situation methodologies have been applied to this study to document the location and extent of jurisdictional wetlands and other waters for the project site.

TABLE 1
DOMINANT WETLAND PLANT SPECIES OBSERVED
(* DENOTES NON-NATIVE SPECIES)

SCIENTIFIC NAME	COMMON NAME	ARID WEST WETLAND INDICATOR STATUS
Atriplex lentiformis	quailbush	FAC
*Atriplex semibaccata**	Australian saltbush	FAC
*Cynodon dactylon**	Bermuda grass	FACU
Distichlis spicata	salt grass	FAC
Eleocharis macrostachya (pulustris)	common spikerush	OBL
Frankenia salina	alkali sea-heath	FACW
Leymus triticoides	beardless lyme grass	FAC
*Lolium perenne**	ryegrass	FAC
*Paspalum dilatatum**	golden crown grass	FAC

*Plantago coronopus**	buck-horn plantain	FACW
*Polygonum aviculare**	yard knotweed	FACW
*Polypogon monspeliensis**	annual rabbit's-foot grass	FACW
*Rumex crispus**	curly dock	FAC
Salicornia (Sarcocornia) pacifica	pickleweed	OBL
Salix lasiolepus	arroyo willow	FACW
Schoenoplectus sp.	club-rush (bulrush)	OBL
Typha latifolia	cattail	OBL

3.2 FEDERAL JURISDICTIONAL WETLAND WATERS OF THE U.S.

Devereux Creek and Phelps Creek exhibit a well-defined channel with steep banks that represent a distinct Ordinary High Water Mark (OHWM) through most of the reach of creeks through the project area. Within the channel below the OHWM are dense patches of robust emergent wetland vegetation primarily stands of bulrush along with small patches of arroyo willow. Areas of ponded water are often present in this reach of the creek. Similar conditions of a distinct channel and dense robust emergent wetland vegetation occurs along the unnamed tributaries off of Whittier Drive, and the east to west flowing drainage off of Storke Road. As such, hydric soils and wetland hydrology are presumed and these are considered to be wetland waters of the U.S. based on the presence of dominant wetland vegetation below the OHWM.

A wetland fringe directly adjacent to Devereux Creek, Phelps Creek, and the two tributary drainages was identified and mapped based on the observation of greater than 50 percent cover and greater than 50 percent composition of wetland indicator plant species (OBL, FACW, or FAC). Dominant wetland indicator plants were primarily salt marsh associated species salt grass, alkali sea-heath, pickleweed, and quailbush. Much of the wetland fringe has likely developed from cessation of golf course maintenance activities and Santa Barbara Flood Control re-contour and restoration work along the drainages in 2003. The limits of federal jurisdiction of the adjacent wetland fringe presumes there are hydric soils from sufficient soil moisture from the drainages (wetland hydrology) to support the dominance of wetland indicator species. The limits of the adjacent fringe wetlands were mapped in the field walking with a GPS unit to capture the areas meeting the wetland vegetation criteria. A remnant undisturbed patch of salt marsh habitat along Devereux Creek occurs west of the golf course limits that is included in the wetland waters of the U.S. mapping within the study area. The mapped location and extent of federal jurisdictional wetland waters of the U.S. that meet the three parameter wetland definition are provided over recent aerial photographs and over golf course aerial photographs as Index Map JD-(a) and Figures JD-(a-1 to a-10), and Index Map JD-(b) and Figures JD-(b-1 to b-10) in Appendix A respectively. Approximately 10.31 acres of wetland waters of the U.S. occur on the project site within and along the onsite creeks and drainages that are tributary to Devereux Slough and the Pacific Ocean.

The former golf course fairways, likely from continued irrigation after closure, have manifested large expressions of salt grass (FAC), buck-horn plantain (FACW) with greater than 50 percent absolute cover. There are also lesser amounts of widely scattered alkali sea-heath (FACW), pickleweed (OBL), yard knotweed (FACW), and the mat forming Australian saltbush (FAC). Given the artificial irrigation and lack of any primary or secondary indicators of wetland hydrology, and no field indicators hydric soils, or soils are inconclusive given the past disturbance/fill for the golf course, these areas do not meet the federal three-parameter criteria and are not considered federal jurisdictional wetlands. Wetland determination

data forms characterizing the non-federal wetland determination for these expressions of wetland indicator plants are provided in Appendix B.

The south parcel that was highly disturbed as a borrow site for the golf course, has four west to east trending berms likely created as an erosion control measures across the slopes for the golf course construction borrow operation. Ditches on the uphill side of the berms were either formed with the berms or created from localized runoff from the surrounding uplands. Several small pockets of seasonal wetlands have been mapped by others within the ditches because of the presence of wetland indicator plants including Mediterranean barley (FAC), common spikerush (OBL), ryegrass (FAC), beardless lyme grass (FAC), and curly dock (FAC). Willow trees have become established along portions of the ditches or otherwise established on the South Parcel. The Rapanos Guidance states that ditches excavated wholly in and draining only uplands and that do not carry a relatively permanent flow of water (three months or more) are generally not considered waters of the U.S. under federal jurisdiction. Based on the existing conditions and the Rapanos guidance, the ditches and small patches of wetland plants within the ditches are not considered federal jurisdictional wetlands or other waters of the U.S.

Vernal pools have been mapped by others on Ellwood Mesa and the western edge of South Parcel (east of Eucalyptus trees), and on the Whittier Parcel. The South Parcel vernal pools along the windrow are outside the project area and have been created/enhanced and are undergoing continued enhancement. There are two vernal pools mapped on the Whittier Parcel that are barely distinguishable topographic depressions. Vernal pool vegetation was not evident during SII field surveys as they have been mowed and from the late growing season survey so the prior mapping effort was used as the extent of these two vernal pools. Given these two vernal pools are in close proximity to the onsite creeks/drainages, a significant nexus is presumed and they are considered to be federal jurisdictional wetlands.

3.3 CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE STREAM ZONE JURISDICTION

The lateral extent of the CDFW stream zone jurisdiction was determined based on Devereux Creek, Phelps Creek, and drainages with a well-defined bed, steep banks, and channel that run through the project area. Within the channel banks are dense patches of robust emergent wetland vegetation primarily stands of bulrush along with small patches of arroyo willow. The limits of CDFW stream zone includes the wetland fringe directly adjacent to Devereux Creek, Phelps Creek, and the two tributary drainages that are dominated primarily by salt marsh associated species salt grass, alkali sea-heath, pickleweed, and quailbush that are considered in this case to constitute the outward extent of riparian habitat. Approximately 10.31 acres of creeks/drainages and fringe of riparian habitat under CDFW jurisdiction occur within the project area.

The CDFW stream zone jurisdiction does not extend to the patches of wetland indicator plants scattered in the former fairways, the seasonal wetlands mapped along the South Parcel artificial ditches, or the mapped vernal pools. Furthermore, the scattered willows on the south parcel within or away from the human made berms, ditches, and erosion gullies, are not in a natural stream context and are not considered to be under CDFW jurisdiction within a stream zone or riparian habitat.

3.4 CALIFORNIA COASTAL ACT JURISDICTION AND ONE PARAMETER WETLANDS

The location and extent of California Coastal Act wetlands includes the entirety of the 10.31 acres of the federal three parameter jurisdictional wetland limits along Devereux Creek, Phelps Creek, and the unnamed tributaries off of Whittier Drive and the east to west flowing drainage off of Storke Road.

The former golf course fairways that have manifested large expressions of mostly salt grass (FAC) and buck-horn plantain (FACW), along with other patches of wetland indicator species with greater than 50 percent absolute cover, are considered to meet the one parameter California Coastal Act wetland definition. While the origins of the buck-horn plantain is unknown, the expressions are likely a result of the ongoing irrigation and not any natural hydrology. Limited research suggests the non-native buck-horn plantain seeds are cultivated for salad greens and may have been inadvertently included in golf course grass seed mixes from contaminated pastures. The California Invasive Plant Council (Cal IPC) has included the buck-horn plantain on their invasive species watch list as it has been reported spreading in California.

The salt grass may well be a relic of the former extent of slough that became part of the mowed turf grass mixed with the very similar growth form of the Bermuda grass. The dense well established mats of salt grass suggest being a part of the fairway turf as opposed to recent growth over the past two years. The location and extent of these occurrences are shown over recent aerial photographs and over golf course aerial photographs as Index Map JD-(a) and Figures JD-(a-1 to a-10), and Index Map JD-(b) and Figures JD-(b-1 to b-10) in Appendix A respectively. There are also lesser amounts of widely scattered alkali sea-heath (FACW), pickleweed (OBL), and yard knotweed (FACW) that would meet the one-parameter criteria. Areas of the mat forming Australian saltbush did not occur in densities of greater than 50 percent absolute cover so did not meet the basic wetland vegetation criteria to be considered a one-parameter wetland.

The small pockets of seasonal wetlands mapped by others within the ditches on the South Parcel are considered one-parameter wetlands under California Coastal Act definition because of the presence of wetland indicator plants including Mediterranean barley (FAC), common spikerush (OBL), ryegrass (FAC), and curly dock (FAC). In addition, the willow trees established along portions of the ditches or otherwise established on the South Parcel also fall within the one-parameter wetland criteria. The mapped vernal pools would also presumably meet at least one wetland parameter and are included as wetlands under the California Coastal Act definition. Table 2 provides the acreage extent of the one-parameter wetlands by species dominance that are also shown on the JD figures in Appendix A.

TABLE 2
WETLAND TYPES AND JURISDICTIONAL ACREAGES

WETLAND TYPE	FEDERAL WETLANDS	CDFW	CALIFORNIA COASTAL ACT
Creeks and Drainages	10.31	10.31	10.31
Distichlis (salt grass)	0	0	10.64
Frankenia (alkali sea-heath)	0	0	0.22
Leymus (creeping wild rye)	0	0	0.06
Paspalum)golden-crown grass)	0	0	0.15
Plantago (buck-horn plantain)	0	0	2.55
Polygonum (yard knotweed)	0	0	0.18
Salicornia (pickleweed)	0	0	0.19
Salix (willow)	0	0	4.22
Seasonal Wetland	0	0	0.34
Vernal Pools	0.78	0	0.78
AGENCY TOTALS	**11.09**	**10.31**	**29.64**

4.0 SUMMARY AND CONCLUSIONS

The review of available background information for the project, previous wetlands studies, and SII wetland delineation field surveys in September, October, and November 2015 were used to establish the 2015 existing conditions of the former Ocean Meadows Golf Course, South Parcel, and Whittier Parcel project areas. Given the past disturbance from golf course construction and operation, and current irrigation and mowing practices, the problem area and difficult wetland situations methodologies were used to delineate approximately 10.31 acres of federal jurisdictional waters of the U.S. and adjacent wetland fringe along the onsite creeks and drainages. Approximately 0.78 acres of vernal pools mapped by others are also presumed to be federal jurisdictional wetlands with a significant nexus to the onsite drainages. The preponderance of patches of mostly FAC wetland indicator plant species in and along the former golf course fairways and rough (still being irrigated) that only met the wetland vegetation parameter, are not considered to be wetlands or other waters of the U.S. under federal jurisdiction.

The lateral extent of the CDFW stream zone jurisdiction was determined based on Devereux Creek, Phelps Creek, and drainages with a well-defined bed, steep banks, and channel that run through the project area. Approximately 10.31 acres of creeks/drainages and fringe of riparian habitat under CDFW jurisdiction occur within the project area. The CDFW jurisdiction is the same as the federal waters of the U.S./wetlands.

The location and extent of California Coastal Act wetlands includes the entirety of the 10.31 acres of the federal three parameter jurisdictional wetland limits and the CDFW stream zone jurisdiction along Devereux Creek, Phelps Creek, and the unnamed tributaries off of Whittier Drive and the east to west flowing drainage off of Storke Road. The California Coastal Act wetland limits also extend to the 0.78 acre of vernal pools mapped by others, and the patches of the one parameter wetland indicator species in the abandoned but irrigated fairways/roughs (13.99 acres), the 0.34 acre of seasonal wetland mapped by others on the South Parcel, and the 4.22 acres of scattered willow patches also on the South Parcel.

4.1 QUALITATIVE FUNCTIONAL ASSESSMENT OF ONE PARAMETER WETLANDS

The definition of wetlands under the California Coastal Act is met with occurrence of any one or more of the three wetland parameters (vegetation, soils, and/or hydrology). As described above the former golf course fairways that have manifested large expressions of mostly FAC wetland indicator species are considered to meet the vegetation parameter of the California Coastal Act wetland definition. Soils and hydrology are absent from these patches of wetland indicator species in accordance with the federal wetland delineation criteria.

The EPA IBI and HGM wetland monitoring and assessment tools provide a framework for this qualitative functional assessment California Coastal Act one parameter wetlands within the project site. While these approaches typically require intact reference sites and the collection of quantitative data over time, the following metrics are being used in this qualitative wetland functional assessment:

- Comparison to intact minimally disturbed similar habitat presumed in the region.
- Degradation by any chemical, physical, or biological stressors causing damage, intermittent stressors, or cumulative effect of multiple stressors.

- Taxa richness
- Macroinvertebrates
- Changes in gradient of human influence:
  - Hydrologic (storage of surface water)
  - Biogeochemical (removal of elements and compounds)
  - Physical habitat (topography, depth of water, number and size of trees)

Presumably a reference site would be an intact salt marsh subject to tidal influence and freshwater input providing the necessary hydrology to support salt marsh wetland plants. The only apparent hydrology for the one parameter wetlands within the former fairways is the ongoing irrigation after golf course closure. The greatest extent are FAC species that have wide ranging wet/dry tolerances with an equal chance of occurring in wetlands or uplands. The salt grass forms dense rhizotomous mats able to tolerate dry conditions and the buck-horn plantain is an annual species that likely took advantage of the ongoing irrigation for the current expression observed in 2015. The salt marsh plants scattered in the fairways do not represent a functional salt marsh but also are likely a result of a remnant seed bank and the ongoing irrigation and are not a tidally influenced habitat. These areas have obviously been subject to physical and biological stressors from the original golf course fill and ongoing turf management, along with the transitional state subject to artificial hydrology (irrigation).

The mapped areas of one-parameter wetlands are mostly monocultures with little taxa richness as compared to an intact salt marsh. Further the mostly flat areas have no capacity (or basin topography) to hold surface water to support aquatic macroinvertebrates or other aquatic fauna. As such, there is no functional aquatic habitat or aquatic biological integrity associated with the patches of one-parameter wetlands. At best, it is more of an upland patchwork of vegetative cover over the remnant level lands of the golf course with artificial irrigation lacking ongoing tidal influence.

Probably the most significant factors in limiting any functions typically associated with wetlands are the changes caused by the gradient in human influence. As well established in this report and the project background analysis, the site has been significantly modified from any natural salt marsh habitat. From placement of fill from golf course construction, 50 years of golf course vegetation management, to closure with continued irrigation, the one-parameter wetlands do not support any ongoing wetland functions. The one-parameter wetlands do not store surface water to provide any biochemical water quality benefits. Finally, they do not provide any physical wetland habitat to support aquatic fauna or represent a species rich and structurally diverse wetland habitat.

5.0 REFERENCES

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APPENDIX A

FIGURES

sage institute

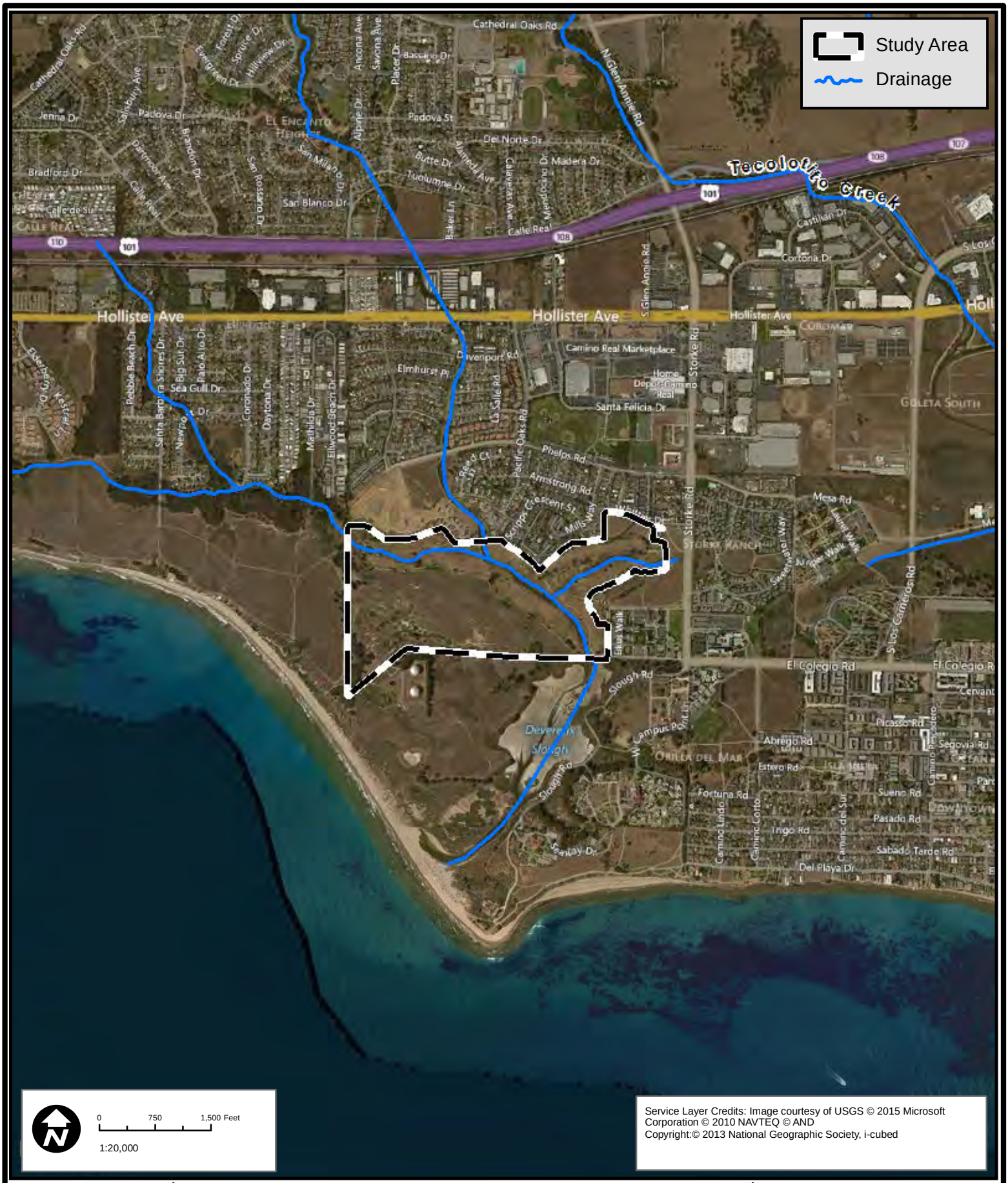
October 21, 2015

University of California at Santa Barbara

North Campus Open Space Restoration Project

Figure 1

Regional Location



sage institute

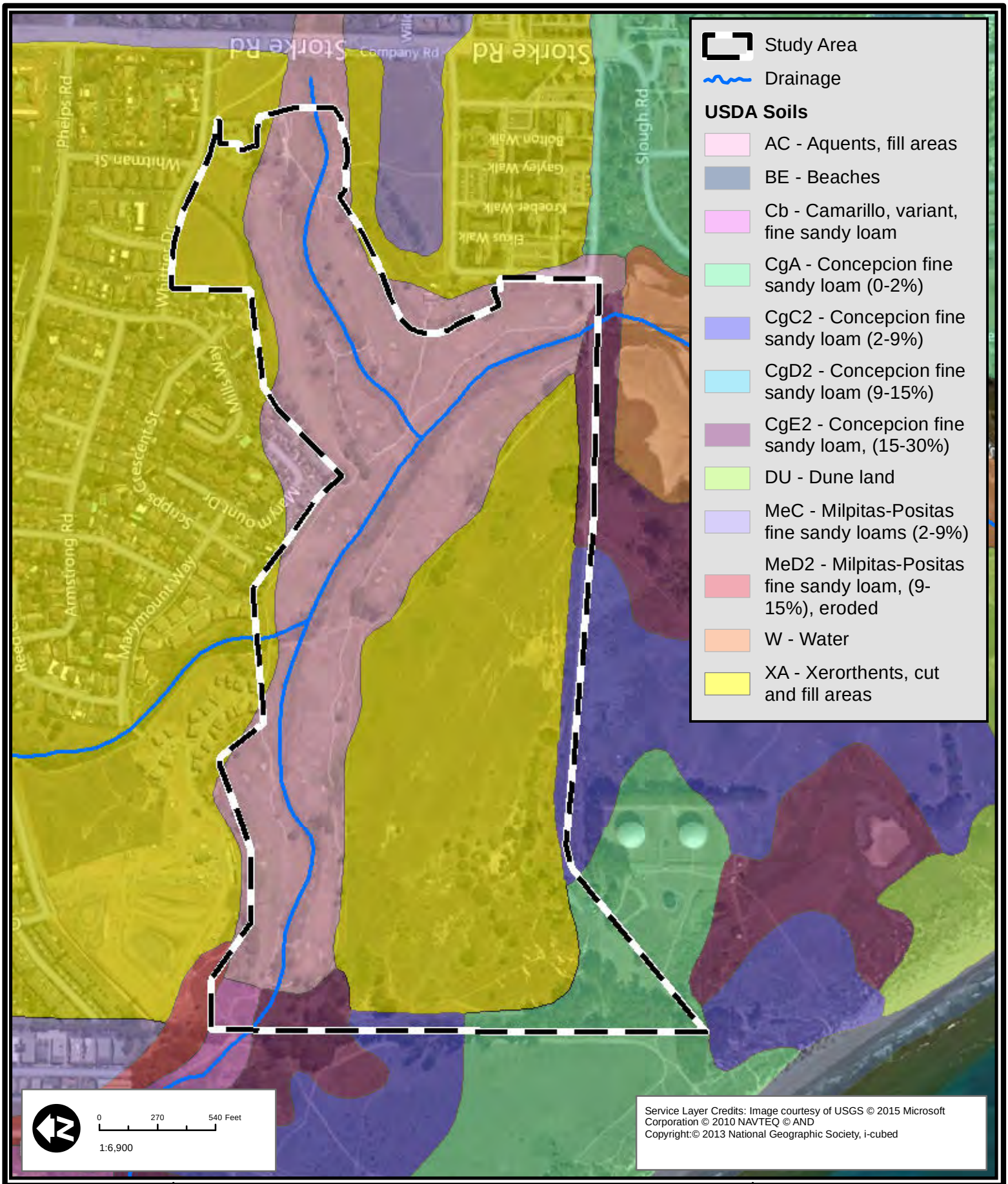
October 21, 2015

University of California at Santa Barbara

North Campus Open Space Restoration Project

Figure 2

Vicinity Location Map



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October 21, 2015

University of California at Santa Barbara

North Campus Open Space Restoration Project

Figure 3

Soils Map

Figure 4
From Revell Coastal 2015, excerpts from Historic Habitat, Land Use, Beach, and Shoreline Changes around Devereux Slough

Figure 7. The extent of the golf course compared to the historic extent of the tidal wetland in 1871 over a 2001 rectified air photo.

Photo 1: DP-1 view west at salt grass patch along Whittier Parcel drainage channel. **9/22/2015**

Photo 2: DP-2 view south at salt grass and alkali heath dominant patch along Whittier Parcel drainage channel**. 9/22/2015**

Photo 3: DP-3 view east at buck-horn plantain expression in fairway. **9/22/2015**

Photo 4: DP-4 view east at salt grass flat in fairway rough along Storke Road drainage channel. **9/22/2015**

Photo 5: DP-5 view east at salt grass flat along Devereux Creek. **9/22/2015**

Photo 6: DP-6 view east at salt grass flat along Devereux Creek. **11/20/2015**

Photo 7: DP-7 view west at yard knotweed patch in fairway along Devereux Creek. **11/20/2015**

Photo 8: View west at salt marsh flat of Devereux Creek in northwest corner of study area outside of former golf course area. **11/20/2015**

Photo 9: View west at larger Whittier Parcel vernal pool (arrow)**. 9/22/2015**

Photo 10: View west at smaller Whittier Parcel vernal pool (arrow)**. 9/22/2015**

Photo 11: View northwest at example salt grass expression in fairway. **9/30/2015**

Photo 12: View west at example of varied species patchwork mosaic in transitioning golf course fairway. **9/30/2015**

Photo 13: View west at confined Devereux Creek and robust wetland vegetation bisecting transitioning golf course fairways. **9/30/2015**

Photo 14: View east at confined Devereux Creek and robust wetland vegetation and willows bisecting transitioning golf course fairways. **9/30/2015**

Photo 15: View southeast at Devereux Creek incised confined channel and robust wetland vegetation and willows. **9/30/2015**

Photo 16: View east at Phelps Creek bridge crossing and confined channel. **9/30/2015**

Photo 17: View north at Devereux Creek and example adjacent wetland fringe of quail bush, alkali heath, and pickleweed. **11/20/2015**

Photo 18: View west at transitioning fairway with scattered mat forming Australian saltbush (green mats). **11/20/2015**

Photo 19: View southwest from demolish clubhouse at drainge channel wetlands from Storke Road (arrow). **11/20/2015**

Photo 20: View north at Devereux Creek sheet pile sill separation from Devereux Slough tidal influence. **11/20/2015**

Photo 21: View northwest at South Parcel ditch seasonal wetland along created berm from golf course construction borrow operation. **9/29/2015**

Photo 22: View west at South Parcel ditch seasonal wetland along created berm from golf course construction borrow operation. **9/29/2015**

Photo 23: View west at South Parcel ditch seasonal wetland along created berm from golf course construction borrow operation. **9/29/2015**

Photo 24: View north at salt grass seasonal wetland mapped on South Parcel. **9/29/2015**

JD - 1
JD - 2
JD - 3
DP-7
DP-5
JD - 4
DP-1
JD - 5
DP-2
DP-3
DP-4
DP-6
JD - 6
JD - 7
JD - 8
JD - 9
JD - 10

Service Layer Credits:

Map Index
Study Area
SII Soil Data Pit
Wetland/Waters (Federal CWA 404/401, CDFW 1600, CA Coastal Act)

CA Coastal Act Wetlands
Dominant Species / Habitat Type
Distichlis
Frankenia
Leymus
Paspalum
Plantago
Polygonum
Salicornia
Salix
Seasonal Wetland
Vernal Pool

sage institute
December 3, 2015

Source(s): Sage Institute Field Notes, 2015.

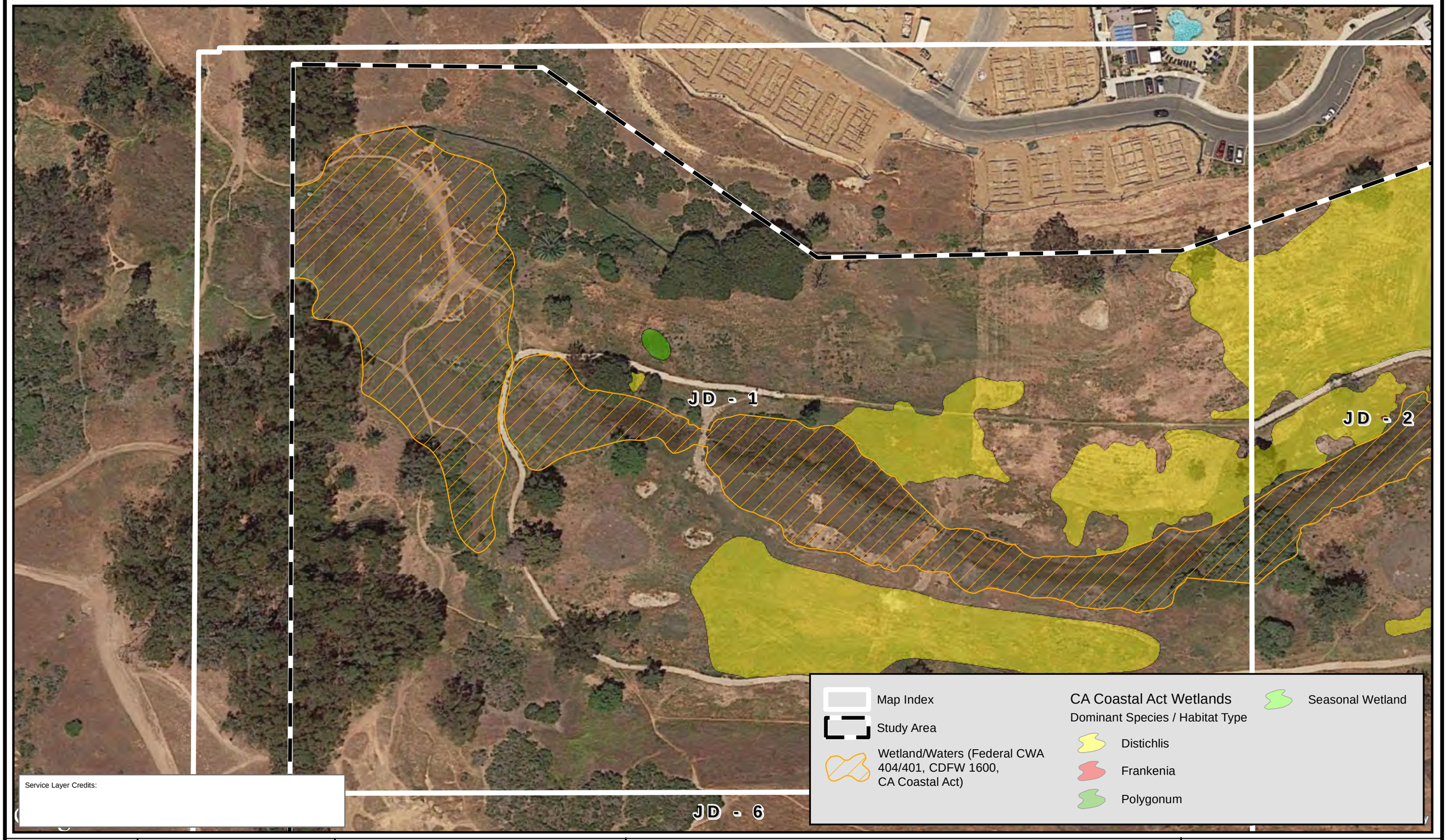
1:3,650
0 290 580 Feet

University of California at Santa Barbara

North Campus Open Space Restoration Project

JD - Index Map (a)

Jurisdictional Determination



sage institute

December 3, 2015

Source(s): Sage Institute Field Notes, 2015.

1:1,000

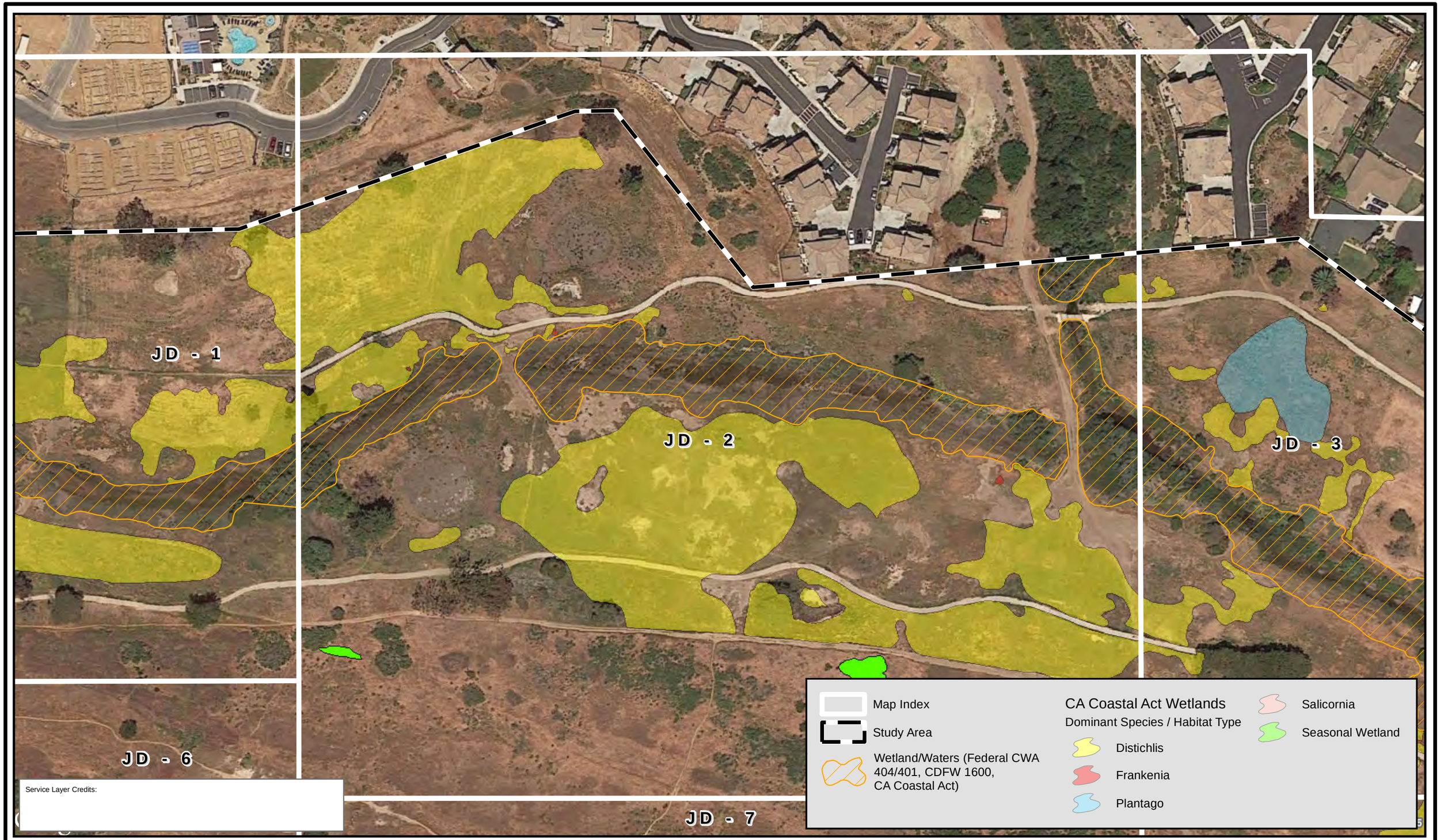
0 75 150 Feet

University of California at Santa Barbara

North Campus Open Space Restoration Project

JD - 1 (a)

Jurisdictional Determination



sage institute
December 3, 2015

Source(s): Sage Institute Field Notes, 2015.

1:1,190
0 90 180 Feet

University of California at Santa Barbara

North Campus Open Space Restoration Project

JD - 2 (a)

Jurisdictional Determination

sage institute
December 3, 2015

Source(s): Sage Institute Field Notes, 2015.

1:1,190

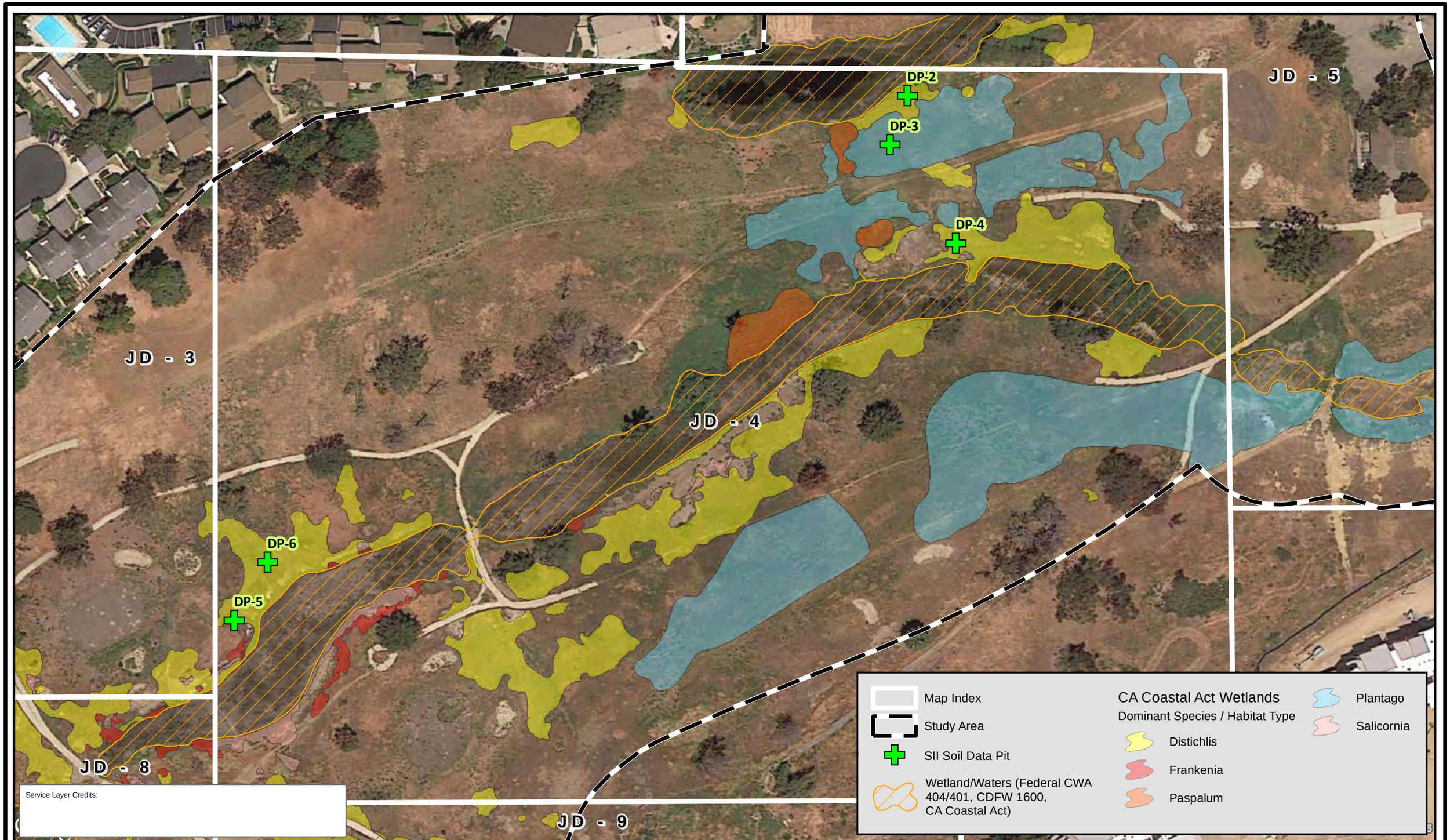
0 90 180 Feet

University of California at Santa Barbara

North Campus Open Space Restoration Project

JD - 3 (a)

Jurisdictional Determination



sage institute

December 3, 2015

Source(s): Sage Institute Field Notes, 2015.

1:1,050

0 80 160 Feet

University of California at Santa Barbara

North Campus Open Space Restoration Project

JD - 4 (a)

Jurisdictional Determination

sage institute
December 3, 2015

Source(s): Sage Institute Field Notes, 2015.

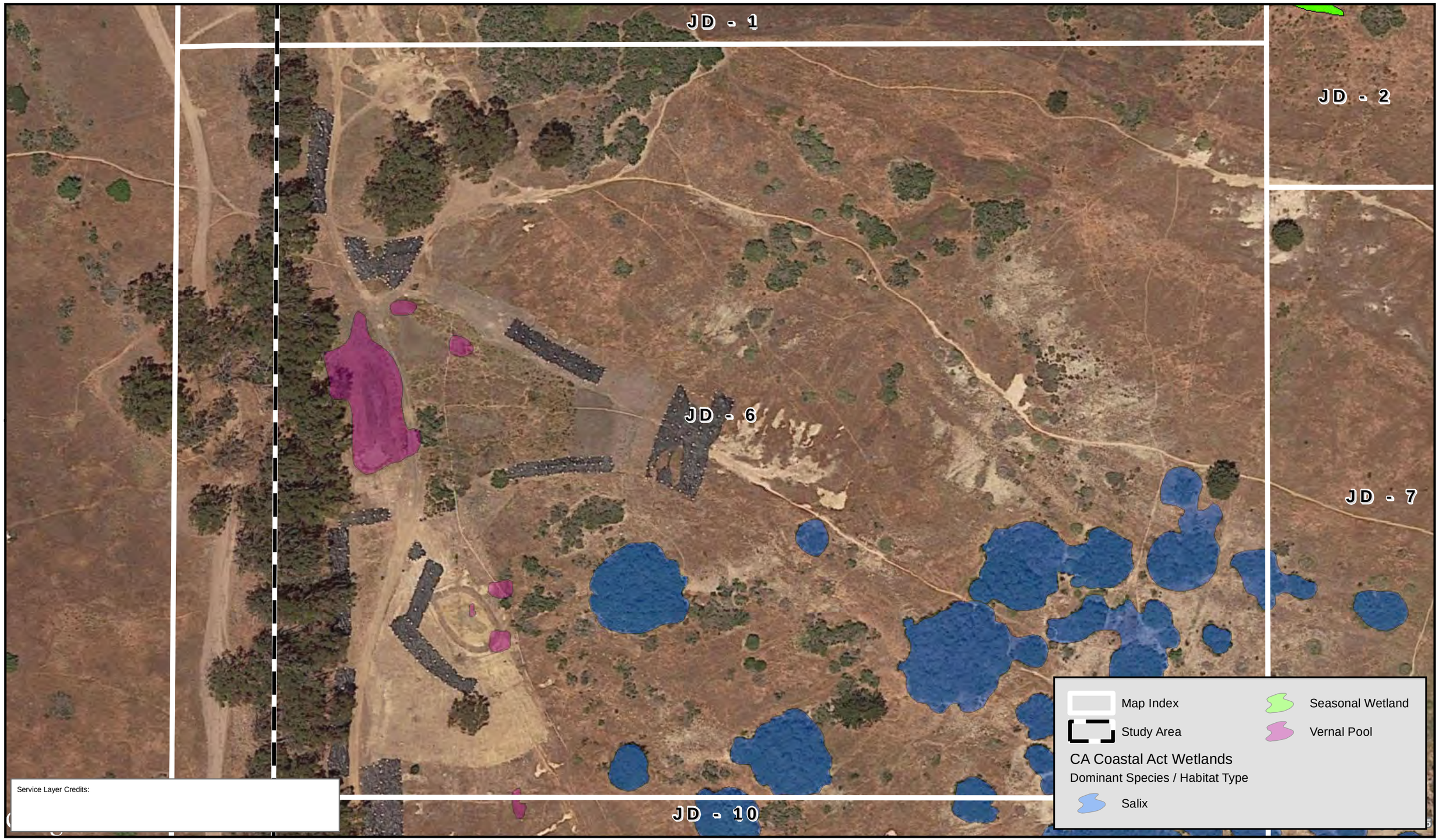
1:1,240
0 90 180 Feet

University of California at Santa Barbara

North Campus Open Space Restoration Project

JD - 5 (a)

Jurisdictional Determination



sage institute

December 3, 2015

Source(s): Sage Institute Field Notes, 2015.

1:980

0 75 150 Feet

University of California at Santa Barbara

North Campus Open Space Restoration Project

JD - 6 (a)

Jurisdictional Determination

JD - 2

JD - 3

JD - 6

JD - 7

JD - 8

JD - 10

Service Layer Credits:

Map Index

Study Area

CA Coastal Act Wetlands

Dominant Species / Habitat Type

Distichlis

Leymus

Salix

Seasonal Wetland

sage institute

December 3, 2015

Source(s): Sage Institute Field Notes, 2015.

1:1,310

0 100 200 Feet

University of California at Santa Barbara

North Campus Open Space Restoration Project

JD - 7 (a)

Jurisdictional Determination

JD - 2

JD - 3

JD - 4

JD - 7

JD - 8

JD - 9

Service Layer Credits:

Map Index

Study Area

Wetland/Waters (Federal CWA 404/401, CDFW 1600, CA Coastal Act)

CA Coastal Act Wetlands
Dominant Species / Habitat Type

Distichlis

Frankenia

Leymus

Salicornia

Salix

Seasonal Wetland

sage institute

December 3, 2015

Source(s): Sage Institute Field Notes, 2015.

1:1,360

0 100 200 Feet

University of California at Santa Barbara

North Campus Open Space Restoration Project

JD - 8 (a)

Jurisdictional Determination

JD - 4

JD - 8

JD - 9

Service Layer Credits:

Map Index

Study Area

Wetland/Waters (Federal CWA 404/401, CDFW 1600, CA Coastal Act)

CA Coastal Act Wetlands

Dominant Species / Habitat Type

Distichlis

Frankenia

Salicornia

Salix

Seasonal Wetland

sage institute

December 3, 2015

Source(s): Sage Institute Field Notes, 2015.

1:1,220

0 90 180 Feet

University of California at Santa Barbara

North Campus Open Space Restoration Project

JD - 9 (a)

Jurisdictional Determination

JD - 6

JD - 7

JD - 10

Service Layer Credits:

Map Index

Study Area

Seasonal Wetland

Vernal Pool

CA Coastal Act Wetlands

Dominant Species / Habitat Type

Salix

sage institute

December 3, 2015

Source(s): Sage Institute Field Notes, 2015.

1:1,180

0 90 180 Feet

University of California at Santa Barbara

North Campus Open Space Restoration Project

JD - 10 (a)

Jurisdictional Determination

JD - 1
JD - 2
JD - 3
DP-7
DP-5
DP-6
JD - 4
DP-1
DP-2
DP-3
DP-4
JD - 5
JD - 6
JD - 7
JD - 8
JD - 9
JD - 10

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Map Index
Study Area
SII Soil Data Pit
Wetland/Waters (Federal CWA 404/401, CDFW 1600, CA Coastal Act)

CA Coastal Act Wetlands
Dominant Species / Habitat Type

Distichlis
Frankenia
Leymus
Paspalum
Plantago
Polygonum
Salicornia
Salix
Seasonal Wetland
Vernal Pool

sage institute
December 3, 2015

Source(s): Sage Institute Field Notes, 2015.

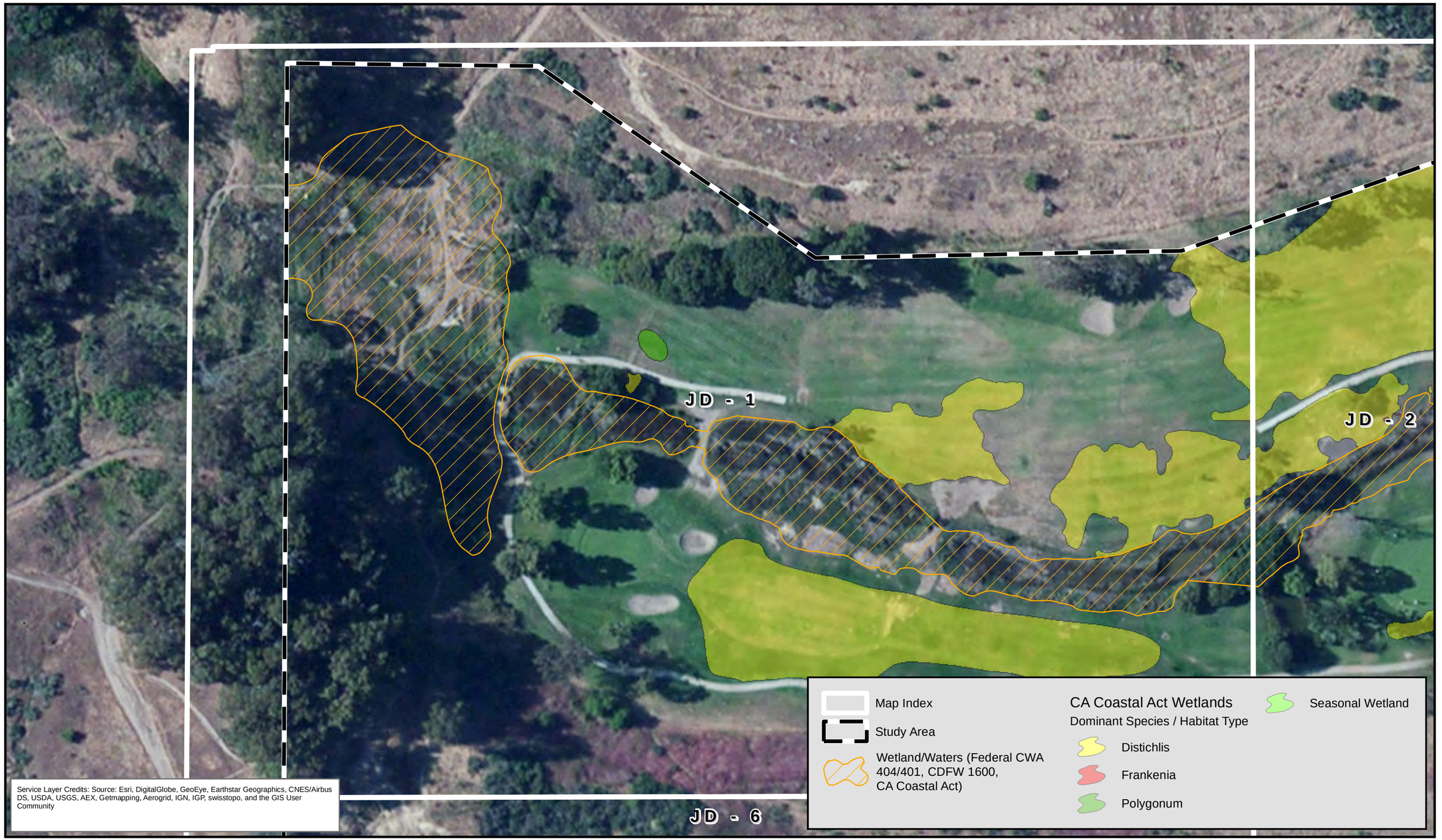
1:3,650
0 290 580 Feet

University of California at Santa Barbara

North Campus Open Space Restoration Project

JD - Index Map (b)

Jurisdictional Determination



sage institute
December 3, 2015

Source(s): Sage Institute Field Notes, 2015.

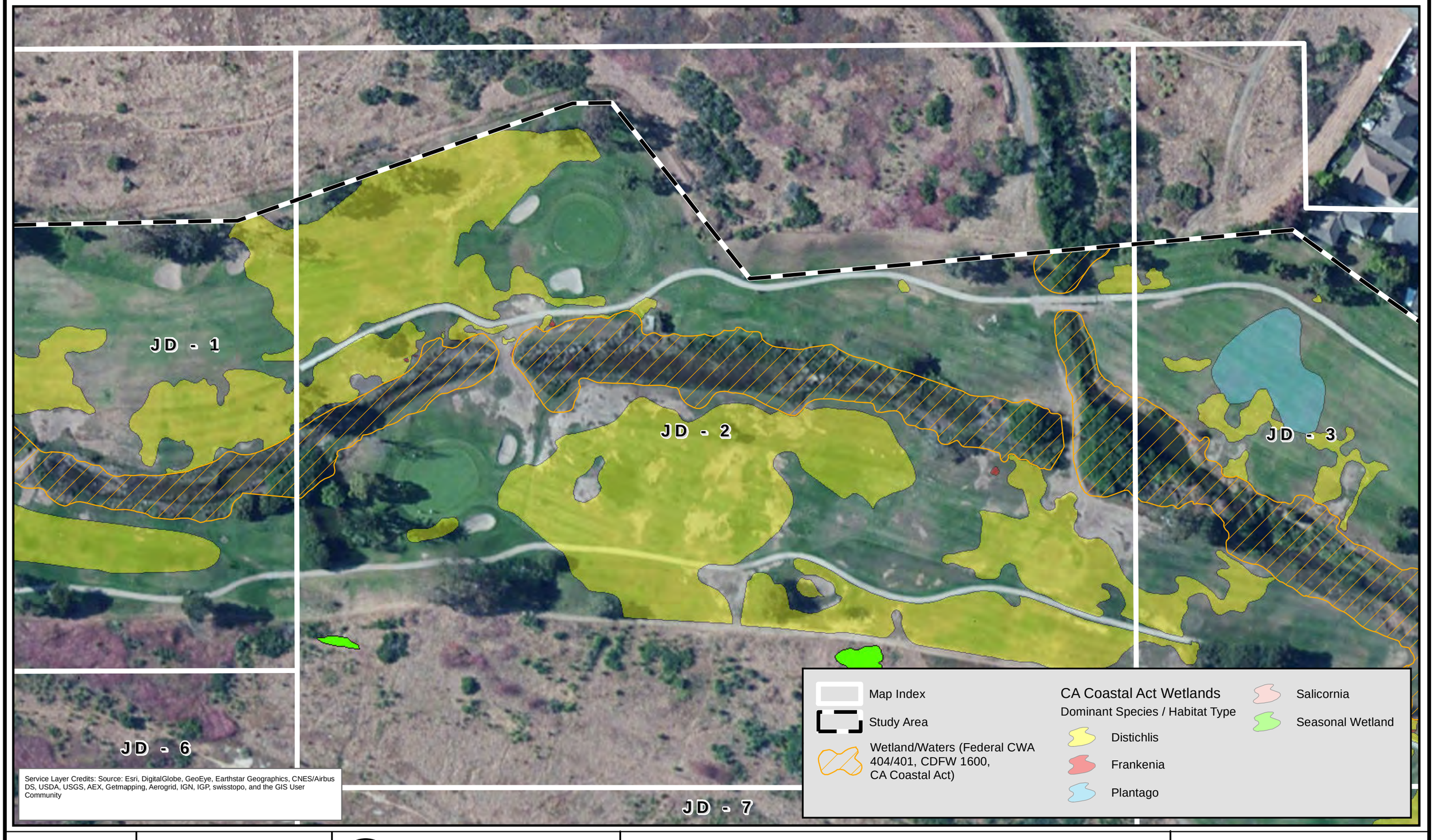
1:1,000
0 75 150 Feet

University of California at Santa Barbara

North Campus Open Space Restoration Project

JD - 1 (b)

Jurisdictional Determination



sage institute
December 3, 2015

Source(s): Sage Institute Field Notes, 2015.

1:1,190

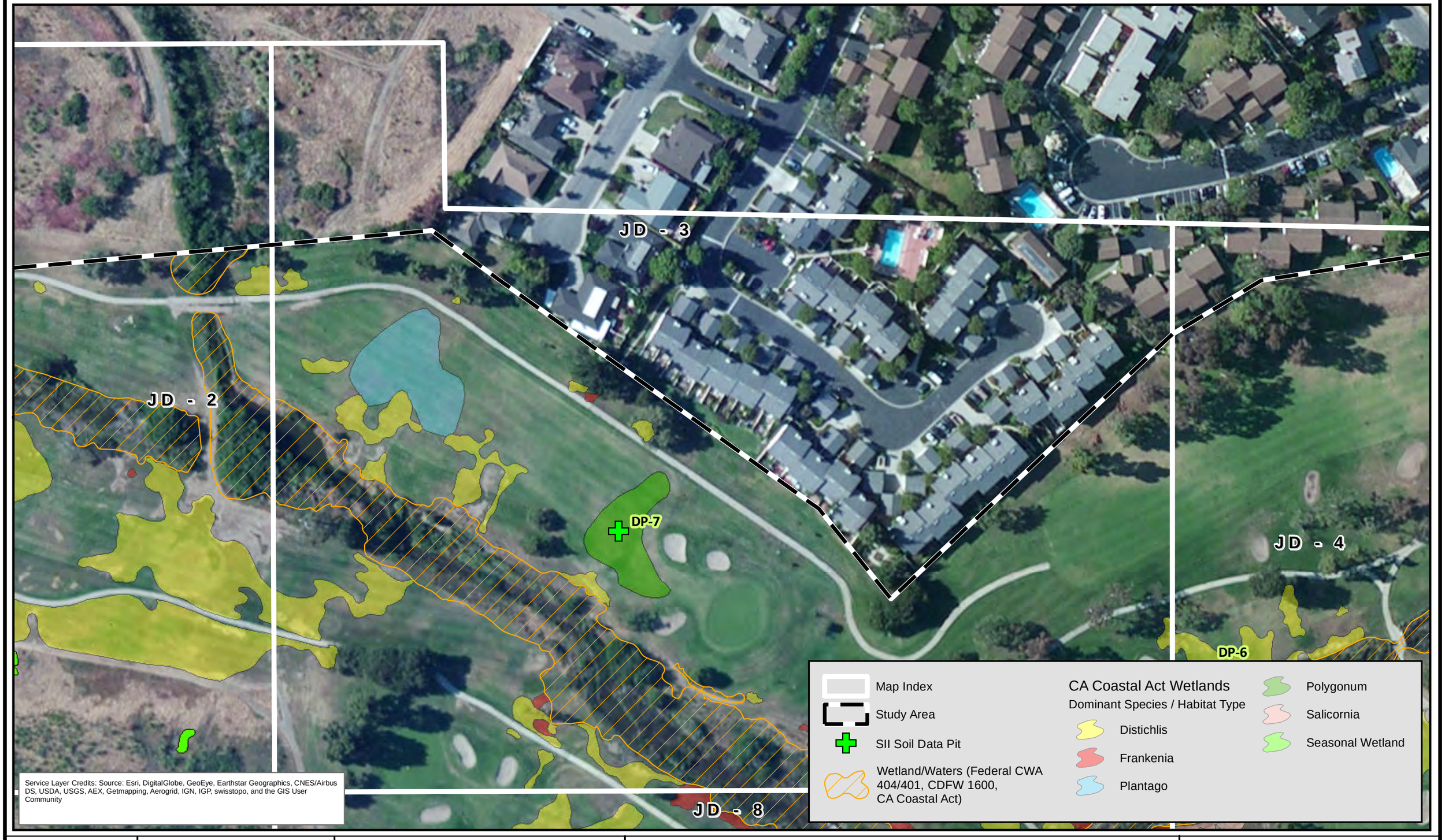
0 90 180 Feet

University of California at Santa Barbara

North Campus Open Space Restoration Project

JD - 2 (b)

Jurisdictional Determination



sage institute
December 3, 2015

Source(s): Sage Institute Field Notes, 2015.

1:1,190
0 90 180 Feet

University of California at Santa Barbara

North Campus Open Space Restoration Project

JD - 3 (b)

Jurisdictional Determination

sage institute
December 3, 2015

Source(s): Sage Institute Field Notes, 2015.

1:1,050
0 80 160 Feet

University of California at Santa Barbara

North Campus Open Space Restoration Project

JD - 4 (b)

Jurisdictional Determination

DP-1

DP-2

DP-3

DP-4

JD - 5

JD - 4

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Map Index

Study Area

SII Soil Data Pit

Wetland/Waters (Federal CWA 404/401, CDFW 1600, CA Coastal Act)

CA Coastal Act Wetlands

Dominant Species / Habitat Type

Distichlis

Frankenia

Paspalum

Plantago

Salicornia

Vernal Pool

sage institute

December 3, 2015

Source(s): Sage Institute Field Notes, 2015.

1:1,240

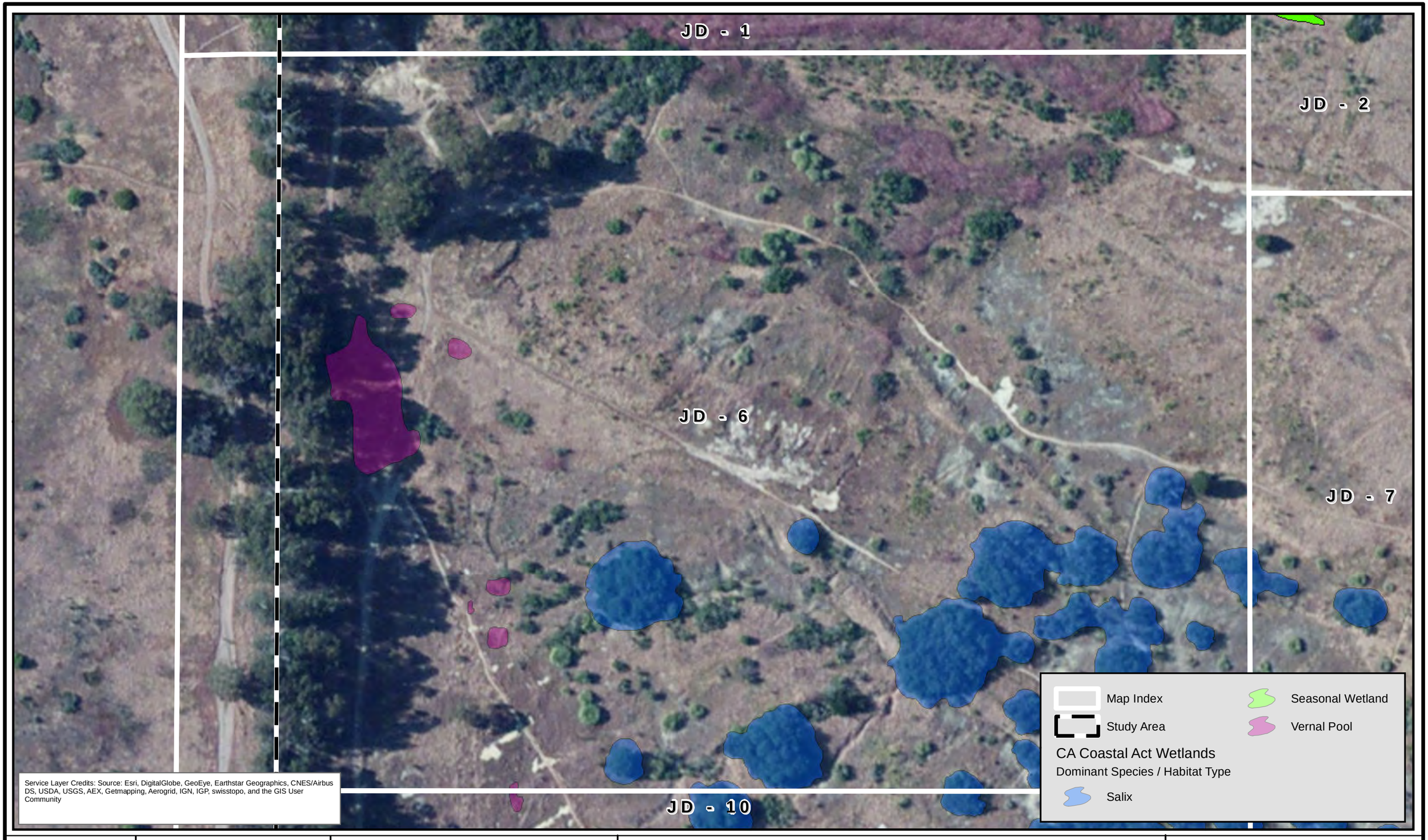
0 90 180 Feet

University of California at Santa Barbara

North Campus Open Space Restoration Project

JD - 5 (b)

Jurisdictional Determination



sage institute

December 3, 2015

Source(s): Sage Institute Field Notes, 2015.

1:980

0 75 150 Feet

University of California at Santa Barbara

North Campus Open Space Restoration Project

JD - 6 (b)

Jurisdictional Determination

sage institute
December 3, 2015

Source(s): Sage Institute Field Notes, 2015.

1:1,310
0 100 200 Feet

University of California at Santa Barbara

North Campus Open Space Restoration Project

JD - 7 (b)

Jurisdictional Determination

JD - 2

JD - 3

JD - 4

JD - 7

JD - 8

JD - 9

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

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Study Area

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Seasonal Wetland

sage institute

December 3, 2015

Source(s): Sage Institute Field Notes, 2015.

1:1,360

0 100 200 Feet

University of California at Santa Barbara

North Campus Open Space Restoration Project

JD - 8 (b)

Jurisdictional Determination

sage institute
December 3, 2015

Source(s): Sage Institute Field Notes, 2015.

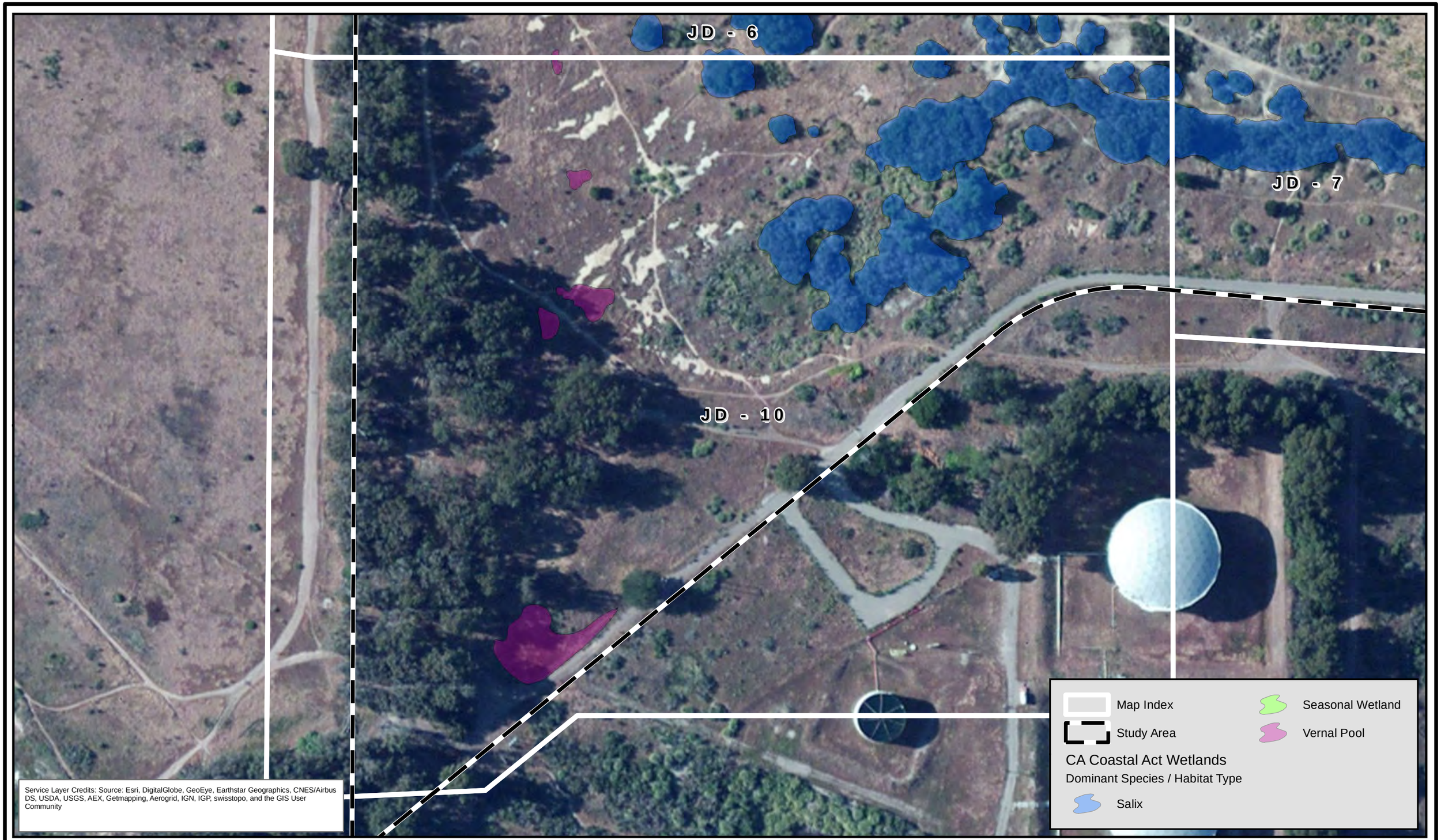
1:1,220
0 90 180 Feet

University of California at Santa Barbara

North Campus Open Space Restoration Project

JD - 9 (b)

Jurisdictional Determination



sage institute
December 3, 2015

Source(s): Sage Institute Field Notes, 2015.

1:1,180

0 90 180 Feet

University of California at Santa Barbara

North Campus Open Space Restoration Project

JD - 10 (b)

Jurisdictional Determination

APPENDIX B

WETLAND DELINEATION DATA FORMS

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: UCSB North Campus Open Space Restoration Prj City/County: Santa Barbara County Sampling Date: 9/22/2015

Applicant/Owner: Univerity of California Santa Barbara State: CA Sampling Point: DP-1

Investigator(s): David Wolff, Jason Kirschenstein Section, Township, Range:

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): level lowlands Slope (%): 0-3%

Subregion (LRR): LRRC Lat: 34.42205 Long: -119.872489 Datum: NAD 83

Soil Map Unit Name: Aquents, fill areas (AC) NWI classification:

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

Are Vegetation ✓, Soil ✓, or Hydrology ✓ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓

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

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

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

Remarks:

Former golf course constructed with fill material, closed in 2013, still periodically sprinkler irrigated and mowed. Data point characterizes Distichlis spicata/Plantago coronopus dominant area near drainage channel.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: 500 sq ft)			
1. Distichlis spicata	90%	yes	FAC
2. Plantago coronopus	20%	yes	FACW
3. Lolium perenne	10%	no	FAC
4. Bromus diandrus	5%	no	UPL
5. Foeniculum vulgare	5%	no	UPL
6.			
7.			
8.			
	130% = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

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

Prevalence Index = B/A = ____

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:

Dense mostly Distichlis spicata patch in former fairway rough.

SOIL

Sampling Point: DP-1

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-3"								Root Zone
3"-10"	10YR 4/3	90%	NONE				clay/loam	
10"-12"	10YR 5/6	75%	NONE				clay/loam	

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

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

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

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

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

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation 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): _____

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

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

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

Remarks:

No indicators of wetland hydrology in level former golf course fairway rough. Periodically sprinkler irrigated.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: UCSB North Campus Open Space Restoration Prj City/County: Santa Barbara County Sampling Date: 9/22/2015

Applicant/Owner: Univerity of California Santa Barbara State: CA Sampling Point: DP-2

Investigator(s): David Wolff, Jason Kirschenstein Section, Township, Range:

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): level lowlands Slope (%): 0-3%

Subregion (LRR): LRRC Lat: 34.421776 Long: -119.873066 Datum: NAD 83

Soil Map Unit Name: Aquents, fill areas (AC) NWI classification:

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

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

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

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

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

Remarks:

Former golf course constructed with fill material, closed in 2013, still periodically irrigated and mowed.
Data point characterizes Distichlis spicata/Frankenia salina dominant former fairway area near drainage channel.

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: 500 sq ft)			
1. Distichlis spicata	50%	yes	FAC
2. Frankenia salina	30%	yes	FACW
3. Lolium perenne	20%	yes	FAC
4. Atriplex lentiformis	10%	no	FAC
5. Rumex crispus	5%	no	FAC
6.			
7.			
8.			
	115% = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

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

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

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

Prevalence Index worksheet:

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

Prevalence Index = B/A = _____

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:

Dense mostly Distichlis spicata and Frankenia salina patch in former fairway.

SOIL

Sampling Point: DP-2

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-4"								Root Zone
4"-10"	10YR 2/2	90%	NONE				clay	
10"-15"	10YR 2/2	75%	NONE				clay	

[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:

Chroma of 2 with no redox features.

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): _____

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

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

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

Remarks:

No indicators of wetland hydrology in level former golf course fairway. Periodically sprinkler irrigated.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: UCSB North Campus Open Space Restoration Prj City/County: Santa Barbara County Sampling Date: 9/22/2015

Applicant/Owner: Univerity of California Santa Barbara State: CA Sampling Point: DP-3

Investigator(s): David Wolff, Jason Kirschenstein Section, Township, Range:

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): level lowlands Slope (%): 0-3%

Subregion (LRR): LRRC Lat: 34.421776 Long: -119.873066 Datum: NAD 83

Soil Map Unit Name: Aquents, fill areas (AC) NWI classification:

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

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

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

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

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

Remarks:

Former golf course constructed with fill material, closed in 2013, still periodically irrigated and mowed. Data point characterizes Plantago coronopus dominant former fairway.

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: 500 sq ft)			
1. Plantago coronopus	90%	yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	90% = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 10% % Cover of Biotic Crust _____

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

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

Prevalence Index = B/A = _____

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:

Patch of Plantago coronopus in former fairway.

SOIL

Sampling Point: DP-3

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-3"								Root Zone
3"-8"	10YR 2/2	90%	NONE				clay	
8"-12"	10YR 2/2	90%	NONE				clay	

[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:

Chroma of 2 with no redox features.

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): _____

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

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

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

Remarks:

No indicators of wetland hydrology in level former golf course fairway. Periodically sprinkler irrigated.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: UCSB North Campus Open Space Restoration Prj City/County: Santa Barbara County Sampling Date: 9/22/2015

Applicant/Owner: Univerity of California Santa Barbara State: CA Sampling Point: DP-4

Investigator(s): David Wolff, Jason Kirschenstein Section, Township, Range:

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): level lowlands Slope (%): 0-3%

Subregion (LRR): LRRC Lat: 34.421374 Long: -119.872896 Datum: NAD 83

Soil Map Unit Name: Aquents, fill areas (AC) NWI classification:

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

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

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

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

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

Remarks:

Former golf course constructed with fill material, closed in 2013, still periodically sprinkler irrigated and mowed. Data point characterizes Distichlis spicata dominant area on low flat of former fairway rough along drainage channel.

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: 500 sq ft)			
1. Distichlis spicata	100%	yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	100% = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

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

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

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

Prevalence Index = B/A = _____

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:

Dense Distichlis spicata patch in former fairway rough.

SOIL

Sampling Point: DP-4

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
0-3"								Root Zone
3"-8"	10YR 4/2	95%	5YR 4/6	5%	C	M	clay/loam	
8"-12"	10YR 4/2	95%	5YR 4/6	5%	C	M	clay/loam	

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

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

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

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

Matrix value of 4 with redox features does not meet hydric soil F6 criteria.

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): _____

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

Wetland Hydrology Present? Yes _____ No ✓

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

Remarks:

No indicators of wetland hydrology in level former golf course fairway rough. Periodically sprinkler irrigated.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: UCSB North Campus Open Space Restoration Prj City/County: Santa Barbara County Sampling Date: 9/22/2015

Applicant/Owner: Univerity of California Santa Barbara State: CA Sampling Point: DP-5

Investigator(s): David Wolff, Jason Kirschenstein Section, Township, Range:

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): level lowlands Slope (%): 0-3%

Subregion (LRR): LRRC Lat: 34.420305 Long: -119.875256 Datum: NAD 83

Soil Map Unit Name: Aquents, fill areas (AC) NWI classification:

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

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

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

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

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

Remarks:

Former golf course constructed with fill material, closed in 2013, still periodically sprinkler irrigated and mowed.
Data point characterizes Distichlis spicata and Sarcocornia pacifica dominant area on low flat of former fairway along drainage channel.

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: 500 sq ft)			
1. Distichlis spicata	80%	yes	FAC
2. Sarcocornia pacifica	20%	yes	OBL
3. Atriplex semibaccata	10%	no	FAC
4.			
5.			
6.			
7.			
8.			
	100% = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

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

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

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

Prevalence Index = B/A = _____

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:

Dense Distichlis spicata patch with spreading Sarcocornia pacifica in former fairway .

SOIL

Sampling Point: DP-5

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
0-2"								Root Zone
2"-8"	10YR 4/2	80%	2.5Y 3/6	20%	C	M	clay	deep cracks to 10"
8"-12"	2.5Y 5/6	80%	5YR 5/8	20%	C	M	clay	deep cracks to 10"

[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:

Matrix value of 4 & 5 with redox features does not meet hydric soil F6 criteria. Compacted fill material with long term irrigation likely produced redox features

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): _____

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

Wetland Hydrology Present? Yes _____ No ✓

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

Remarks:

No indicators of wetland hydrology in level former golf course fairway. Periodically sprinkler irrigated.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: UCSB North Campus Open Space Restoration Prj City/County: Santa Barbara County Sampling Date: 11/20/2015

Applicant/Owner: Univerity of California Santa Barbara State: CA Sampling Point: DP-6

Investigator(s): David Wolff, Jason Kirschenstein Section, Township, Range:

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): level lowlands Slope (%): 0-3%

Subregion (LRR): LRRC Lat: 34.420466 Long: -119.875149 Datum: NAD 83

Soil Map Unit Name: Aquents, fill areas (AC) NWI classification:

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

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

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

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

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

Remarks:

Former golf course constructed with fill material, closed in 2013, still periodically sprinkler irrigated and mowed. Data point characterizes dense Distichlis spicata dominant area on former fairway.

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: 500 sq ft)			
1. Distichlis spicata	100%	yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	100% = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

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

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

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

Prevalence Index = B/A = _____

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:

Dense Distichlis spicata patch in former fairway.

SOIL

Sampling Point: DP-6

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6"	2.5Y 3/1	100%	NONE				clay/loam	Root Zone
6"-10"	2.5Y 5/3	80%	5Y 4/6	20%	C	M	clay	

[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:

Matrix value of 5 with redox features does not meet hydric soil F6 criteria. Compacted fill material with long term irrigation likely produced redox features

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): _____

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

Wetland Hydrology Present? Yes _____ No ✓

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

Remarks:

No indicators of wetland hydrology in level former golf course fairway. Periodically sprinkler irrigated.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: UCSB North Campus Open Space Restoration Prj City/County: Santa Barbara County Sampling Date: 11/20/2015

Applicant/Owner: Univerity of California Santa Barbara State: CA Sampling Point: DP-7

Investigator(s): David Wolff, Jason Kirschenstein Section, Township, Range:

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): level lowlands Slope (%): 0-3%

Subregion (LRR): LRRC Lat: 34.420866 Long: -119.877412 Datum: NAD 83

Soil Map Unit Name: Aquents, fill areas (AC) NWI classification:

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

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

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

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

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

Remarks:

Former golf course constructed with fill material, closed in 2013, still periodically sprinkler irrigated and mowed. Data point characterizes patch of Polygonum aviculare dominant area on former fairway.

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: 500 sq ft)			
1. Polygonum aviculare	80%	yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	100% = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 20% % Cover of Biotic Crust _____

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

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

Prevalence Index = B/A = _____

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:

Polygonum aviculare patch in former fairway.

SOIL

Sampling Point: DP-7

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-3"								Root Zone
3"-6"	2.5Y 3/3	100%	NONE				sandy clay	blocky
6"-12"	2.5Y 3/2	100%	NONE				sandy clay	blocky

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

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

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

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

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

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation 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): _____

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

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

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

Remarks:

No indicators of wetland hydrology in level former golf course fairway. Periodically sprinkler irrigated.

CHEADLE CENTER FOR BIODIVERSITY AND
ECOLOGICAL RESTORATION

NCOS SPECIAL-STATUS PLANT SURVEY

JUNE 2016

UNIVERSITY OF CALIFORNIA
SANTA BARBARA
HARDER SOUTH, BUILDING 578
SANTA BARBARA CA 93106-9615

PROJECT DESCRIPTION AND LOCATION

The University of California at Santa Barbara (UCSB) is proposing to restore the upper reaches of Devereux Slough and the confluences of Devereux Creek, Phelps Ditch, and an un-named drainage feature with Devereux Slough. This 136-acre site is known as the North Campus Open Space (NCOS) and is comprised of the former Ocean Meadows Golf Course (OMGC), South Parcel and Whittier Parcel. Residential areas primarily border the site to the north and east; Coal Oil Point Reserve and the Ellwood Mesa border the site to the south and west respectively.

A rare plant survey was conducted to determine potential impacts to any special-status plant species within the NCOS project impact area. The NCOS area and project impact boundaries are shown in Fig. 1.

This survey was intended to determine presence of any special-status plant species within the NCOS project impact area.

In this report, special-status plants are species that meet any of the following criteria:

- Listed or proposed for listing as threatened or endangered under ESA
- Listed or candidate for listing by the State of California as threatened or endangered under CESA
- Listed as rare under the California Native Plant Protection Act
- Meet the definition of rare or endangered under CEQA:
    - Species considered by the California Native Plant Society (CNPS) to be "rare threatened or endangered" (Lists 1A, 1B and 2)
    - Some species included on the California Natural Diversity Database's (CNDDB) Special Plants, Bryophytes, and Lichens List

The Faculty and Family Student Housing, Open Space Plan & LRDP Amendment Final Environmental Impact Report (EIP associates and URS Corporation 2004) indicates that two populations of southern tarplant (*Centromadia parryi ssp. australis*, CNPS listed 1B.1) were found in 1997 on portions of the Storke-Whittier parcel that are within the NCOS project. Table 1 indicates the special-status plant species that have been documented on the CNDDB within a 5-mile radius of the NCOS project area.

The NCOS area vegetation is dominated primarily by turf grass and a central riparian drainage corridor (Devereux Creek and Phelps Ditch) on the previous OMGC. Since course maintenance has stopped the site has been colonized primarily by non-native annual species and some native salt marsh species. The area previously known as Whittier Parcel, is primarily dominated by non-native annual grassland, a riparian drainage channel and low grade vernal pools. The area previously known as South Parcel, within the project site, is primarily dominated by invasive species such as fennel and mustard and non-native annual grassland with scattered areas of coastal scrub, riparian scrub, bare areas and some small areas of native grassland, annuals and seasonal wetlands.

Figure 1: Map of North Campus Open Space showing locations of the special status plant, Lonicera subspicata var. subspicata, within the projected restoration zone.

Table 1: NCOS CNDDB special-status plants 5-mile radius query

Common Name	*Scientific Name*	Federal	State	CNPS
black-flowered figwort	*Scrophularia atrata*	None	None	1B.2
Coulter's goldfields	*Lasthenia glabrata* ssp. *coulteri*	None	None	1B.1
Coulter's saltbush	*Atriplex coulteri*	None	None	1B.2
Davidson's saltscale	*Atriplex serenana* var. *davidsonii*	None	None	1B.2
estuary seablite	*Suaeda esteroa*	None	None	1B.2
late-flowered mariposa-lily	*Calochortus fimbriatus*	None	None	1B.2
mesa horkelia	*Horkelia cuneata* var. *puberula*	None	None	1B.1
Nuttall's scrub oak	*Quercus dumosa*	None	None	1B.1
Ojai fritillary	*Fritillaria ojaiensis*	None	None	1B.2
pale-yellow layia	*Layia heterotricha*	None	None	1B.1
Refugio manzanita	*Arctostaphylos refugioensis*	None	None	1B.2
Santa Barbara honeysuckle	*Lonicera subspicata* var. *subspicata*	None	None	1B.2
Santa Barbara morning-glory	*Calystegia sepium* ssp. *binghamiae*	None	None	1A
Santa Lucia dwarf rush	*Juncus luciensis*	None	None	1B.2
Santa Ynez false lupine	*Thermopsis macrophylla*	None	Rare	1B.3
Sonoran maiden fern	*Thelypteris puberula* var. *sonorensis*	None	None	2B.2
southern tarplant	*Centromadia parryi* ssp. *australis*	None	None	1B.1
Ventura salt marsh milkvetch	*Astragalus pycnostachys var. lanosissimus*	FE	SE	1B
umbrella larkspur	*Delphinium umbraculorum*	None	None	1B.3
white-veined monardella	*Monardella hypoleuca* ssp. *hypoleuca*	None	None	1B.3

METHODS AND RESULTS

Rare plant surveys were conducted on three separate occasions in spring of 2016 (March 25, April 29 and June 2) to capture early and later blooming plant species. Most plant species that bloom after the last survey date are perennial species that are identifiable prior to bloom. Surveys were conducted by CCBER restoration ecologist Darwin Richardson and entailed systematically walking the entire NCOS project site. All species found within the survey area were identified and noted with the exception of some ornamental species adjacent to residential structures. Plant species found during the surveys are listed in table 2. Species found in areas of NCOS where restoration is already underway and will not be impacted by the proposed project are not included. The far southwestern portion of NCOS, outside the proposed project area where restoration is underway has some scattered populations of southern tarplant (*Centromadia parryi ssp. Australis*).

The surveys found five individuals of the Santa Barbara honeysuckle (*Lonicera subspicata var. subspicata*) in the project area, as shown in fig. 1. This species is on CNPS list 1B: species that are rare threatened or endangered in California. No other special status species were found in the project area. The June survey was primarily focused on southern tarplant, which typically blooms in May/June and had been found in the project area in 1997, but no populations were found in the project area during these surveys.

Table 2. NCOS plant list compiled from surveys on 3/25/16, 4/29/16, and 6/2/16
Notes: Species in red = non-native

Genus species	Common name	Rare plant status
Acacia longifolia	Sydney golden wattle	
Acmispon americanus	Spanish lotus	
Acmispon strigosus	Strigose lotus	
Aegilops cylindrica	Jointed goatgrass	
Amaranthus deflexus	Large fruit amaranth	
Ambrosia psilostachya	Western ragweed	
Artemisia californica	California sagebrush	
Asclepias fascicularis	Narrow leaf milkweed	
Atriple prostrata	Fat hen	
Atriplex lentiformis	Big saltbush	
Atriplex semibaccata	Australian saltbush	
Avena barbata	Slender oat	
Avena fatua	Wild oat	
Baccharis pilularis	Coyote brush	
Bassia hyssopifolia	Fivehook bassia	
Beta vulgaris	Common beet	
Bloomeria crocea	Common goldenstar	
Brachypodium distachyon	False brome	
Brassica nigra	Black mustard	
Brassica rapa	Field mustard	
Brodiaea jolonensis var. terrestris	Dwarf brodiaea	
Bromus catharticus	Rescue grass	
Bromus diandrus	Ripgut brome	
Bromus hordeaceus	Soft chess	
Bromus madritensis	Red Brome	
Calystegia macrostegia ssp. cyclostegia	Coast morning glory	
Camissoniopsis micrantha	Spencer primrose	
Capsella bursa-pastoris	Shepherd's purse	
Carduus pycnocephalus	Italian thistle	
Castilleja densiflora	Owl's clover	
Chenopodium album	White goosefoot	
Chenopodium murale	Nettle leaf goosefoot	
Conium maculatum	Pooison Hemlock	
Convolvulus arvensis	Field bindweed	
Cortaderia selloana	Uruguayan pampas grass	
Cotoneaster pannosus	Cotoneaster	
Cotula coronopifolia	Brass buttons	
Crassula connata	Sand pygmy weed	
Cressa truxillensis	Alkali weed	

Genus species	Common name	Rare plant status
Cryptantha clevelandii	Cleveland's cryptantha	
Cynodon dactylon	Bermuda grass	
Cyperus eragrostis	Tall cyperus	
Deinandra fasciculata	Clustered tarweed	
Dichelostemma capitatum	Blue dicks	
Distichlis spicata	Saltgrass	
Eleocharis acicularis	Needle spike rush	
Eleocharis macrostachya	Common spikerush	
Elymus triticoides	Beardless wild rye	
Epilobium brachycarpum	Annual fireweed	
Epilobium ciliatum	Fringed willowherb	
Erigeron bonariensis	Flax-leaved horseweed	
Erigeron canadensis	Canada horseweed	
Eriogonum fasciculatum	California buckwheat	
Erodium botrys	Broad leaf filaree	
Erodium cicutarium	Red stemmed filaree	
Eschscholzia californica	California poppy	
Eucalyptus globulus	Tasmanian bluegum	
Eucalyptus spp.	Eucalyptus tree	
Festuca perennis	Italian rye grass	
Foeniculum vulgare	Sweet fennel	
Frankenia salina	Alkali heath	
Gazania linearis	Gazania	
Geranium dissectum	Cut leaved geranium	
Hazardia squarrosa	Sawtooth goldenbush	
Helminthotheca echioides	Bristly ox-tongue	
Heteromeles arbutifolia	Toyon	
Heterotheca grandiflora	Telegraphweed	
Hirschfeldia incana	Wild mustard	
Hordeum brachyantherum ssp. brachyantherum	Meadow barley	
Hordeum brachyantherum ssp. californicum	California barley	
Hordeum marinum	Seaside barley	
Hordeum murinum	Foxtail barley	
Hypochaeris glabra	Smooth cat's ear	
Iris pseudacorus	Horticultural iris	
Isocoma menziesii	Menzies' goldenbush	
Isocoma menziesii var. sedoides	Prostrate coastal goldenbush	

Genus species	Common name	Rare plant status
Lactuca serriola	Prickly lettuce	
Lamarkia aurea	Goldentop grass	
Lepidium didymum	Lesser swine cress	
Lepidium nitidum	Peppergrass	
Logfia gallica	Narrowleaf cottonrose	
Lonicera subspicata var. subspicata	Southern honeysuckle	**CNPS 1B.2**
Lupinus bicolor	Miniature lupine	
Lupinus succulentus	Succulent lupine	
Lysimachia arvensis	Scarlet pimpernel	
Lythrum hyssopifolia	Hyssop loosestrife	
Madia sativa	Coastal tarweed	
Malva parviflora	Cheeseweed mallow	
Malvella leprosa	Alkali mallow	
Matricaria discoidea	Pineapple weed	
Medicago polymorpha	Bur clover	
Melilotus albus	White sweetclover	
Melilotus indicus	Annual yellow sweetclover	
Myoporum laetum	Lollypop tree	
Oxalis pes-caprae	Sourgrass	
Parapholis incurva	Sickle grass	
Paspalum dilatatum	Dallis grass	
Pennisetum clandestinum	Kikuyu grass	
Persicaria lapathifolia	Common knotweed	
Phalaris aquatica	Harding grass	
Pinus pinea	Italian stone pine	
Plantago coronopus	Cut leaf plantain	
Plantago erecta	California plantain	
Plantago lanceolata	English plantain	
Poa annua	Annual bluegrass	
Polygonum aviculare ssp. depressum	Prostrate knotweed	
Polypogon interruptus	Ditch rabbitsfoot grass	
Polypogon monspeliensis	Rabbitsfoot grass	
Populus trichocarpa	Black cottonwood	
Pseudognaphalium beneolens	Cudweed	
Pseudognaphalium luteoalbum	Jersey cudweed	
Quercus agrifolia	Coast live oak	
Raphanus sativus	Wild radish	
Ricinus communis	Castor bean	
Rosa californica	California Rose	

Genus species	Common name	Rare plant status
Rubus ulmifolius inermis	Thornless blackberry	
Rubus ursinus	California blackberry	
Rumex acetosella	Common sheep sorrel	
Rumex crispus	Curly dock	
Salicornia pacifica	Pickleweed	
Salix baylonica	weeping willow	
Salix exigua	Sandbar willow	
Salix lasiandra var. lasiandra	Pacific willow	
Salix lasiolepis	Arroyo willow	
Salsola tragus	Prickly russian thistle	
Sanicula arguta	Sharp toothed sanicle	
Schinus molle	Pepper tree	
Schoenoplectus californicus	California bulrush	
Senecio vulgaris	Common groundsel	
Sequioa sempirvirens	Coast Redwood	
Silene gallica	Windmill pink	
Sisyrinchium bellum	Western blue eyed grass	
Sonchus asper	Spiny sowthistle	
Sonchus oleraceus	Common sow thistle	
Spergula arvensis	Corn spurry	
Spergularia bocconi	Boccone's sand spurry	
Spergularia villosa	Hairy sand spurrey	
Stebbinsoseris heterocarpa	Grassland stebbinsoseris	
Stipa miliacea	Smilo grass	
Stipa pulchra	Purple needle grass	
Stipa tenuissima	Mexican feather grass	
Taraxacum officinale	Common dandelion	
Tragopogon porrifolius	Purple salsify	
Trifolium hirtum	Rose clover	
Typha latifolia	Common cattail	
Urtica holosericea	Stinging nettle	
Vicia benghalensis	Purple vetch	
Vicia sativa	Spring vetch	
Washingtonia robusta	Washington fan palm	
Xanthium strumarium	Rough cocklebur	

CONCLUSION

Five individuals of the special-status plant Santa Barbara honeysuckle were found in the NCOS project area during the surveys. This species has been successfully salvaged and relocated in other restoration efforts in adjacent lands by UCSB's Cheadle Center for Biodiversity and Ecological Restoration (CCBER) projects. The locations of these individuals should be provided to the construction contractor and they should be instructed to have CCBER staff present prior to working in the area. CCBER staff should direct the contractor on salvage and relocation efforts.

Southern tarplant was not found on these surveys within the project area, if construction occurs after the 2017 bloom period, a follow up survey should be performed. No other special-status plants species were found on the surveys.

UCSB NORTH CAMPUS OPEN SPACE RESTORATION PLAN

Appendix B: Project Permits

Appendix B Placeholder - UCSB to Insert Permits