APPENDIX B

HABITAT MAPPING 2020/2021 MEMORANDUM

Memorandum

Prepared by Nature Collective,
Moffatt & Nichol, AECOM, Merkel & Associates,
and Nordby Biological Consulting

To	Tim Stillinger, Nature Collective
Subject	San Elijo Lagoon Restoration Project Habitat Mapping – 2020/2021
From	Cindy Kinkade, AECOM
Date	July 2022

Introduction

The San Elijo Lagoon Restoration Project has been implemented by Nature Collective, San Diego Association of Governments, and California Department of Transportation (Caltrans) District 11 to enhance and restore the physical and biological functions and services of San Elijo Lagoon. These efforts included increasing hydraulic efficiency in the lagoon, improving pre-construction water quality impairments, and halting ongoing conversion of unvegetated wetland habitats (mudflat) to vegetated salt marsh with the goal of restoring a more connected gradient of balanced habitat types. Success of the restoration effort is being measured through the implementation of a monitoring program developed in coordination with various permitting and approval agencies, including California Coastal Commission, U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, and California Regional Water Quality Control Board.

This memorandum documents the results of habitat mapping completed throughout the project area in 2020 and 2021. The data below will provide information related to the habitat areas as part of the monitoring program as defined in *Wetland Habitat and Hydrology Monitoring Plan for the San Elijo Lagoon Restoration Project* (Monitoring Plan) (Nature Collective 2020).

Approach

As a result of design refinements coordinated with the regulatory and resource agencies during construction, as well as mapping refinements to avoid overlap with the ongoing improvements along Interstate 5, which are being constructed solely by Caltrans, several habitat types are slightly different than the planned habitats as delineated in the Monitoring Plan. Substantive design and mapping refinements are summarized below:

- Reduction to subtidal and mudflat habitats with the addition of mounds in the west basin;
- Overdredge (OD) pit size reduction, leading to shift of low marsh habitat from within the OD pit to outside of the OD pit;

- Reduction in overall length of main channel excavation in the east basin, leading to an increase of high marsh;
- Habitat corrections within the former California Department of Wildlife dike in the east basin, leading to a slight increase in transitional habitat; and
- Removal of habitats overlapping with the I-5 right-of-way, leading to changes in various habitat types (totaling approximately 38 acres).

Acreages associated with the refined habitat distribution are considered the final "Design" acreages (Table 1-1 and Figure 1-1). Vegetation mapping was completed throughout the project area by AECOM during the summer of 2020 and again in the summer of 2021. Habitats were classified based on the dominant and characteristic plant species, plant physiognomy, and soils in accordance with *Draft Vegetation Communities of San Diego County* (Oberbauer et al. 2008). Areas within the project OD pit that remain unvegetated but are anticipated to ultimately convert to vegetated marsh are identified separately and will be categorized as a specific habitat type as conversion occurs.

Results

During the mapping process for the post-construction final design habitat distribution, the following habitat types were merged together for consistency

- Subtidal Habitat and Eelgrass; Tidal Channels and Basins were combined into Tidal Channels and Basins, and
- Berms and Roads were combined with Developed as Berms and Roads.

Vegetation communities mapped within San Elijo Lagoon during 2020 and 2021 are presented in Table 1-1, and Figures 1-2 and 1-3, respectively.

Table 1-1. Habitat Distribution within San Elijo Lagoon

Habitat Type[1]	Design Habitat Distribution (acres)	2020 Habitat Distribution (acres)	2021 Habitat Distribution (acres)
Open Water/Freshwater Marsh	0.7	0.7	0.7
Tidal Channels and Basins[2,3]	62.0	61.1	61.1
Mudflat[2]	32.0	48.3	45.8
Unvegetated (inside of OD pit)[4]	N/A	15.3	11.9
Salt Marsh (Subtotal of low, mid-, and high salt marsh)[3]	308.0	286.3	292.3
Low Salt Marsh	*58.0*	*54.9*	*57.6*
Low Salt Marsh (inside of OD pit)	*15.0*	*0.1*	*3.4*
Mid- Salt Marsh	*110.0*	*99.3*	*99.3*
High Salt Marsh	*125.0*	*132.0*	*132.0*
Salt Panne	32.0	23.4	23.4
Freshwater/Brackish Marsh	97.2	96.8	96.8
Riparian	69.2	69.2	69.2
Transitional[3]	7.1	7.1	7.1
Avian Nesting Area	3.3	3.3	3.3
Coastal Strand	4.5	4.5	4.5
Beach	15.0	15.0	15.0
Upland & Other	271.6	271.6	271.6
Berms & Roads & Developed	19.4	19.4	19.4
Total	**922.0**	**922.1**	**922.1**

[1] Habitat descriptions are provided in Attachment 1.
[2] Tidal Channels and Basins has combined 2015 Subtidal Habitat and Tidal Channels and Basins. Up to 0.1 acre may occur within the overdredge (OD) pit to provide connection to other existing tidal channels.
[3] Habitats defined based on criteria identified in the San Dieguito Wetlands Restoration Project and tracked per California Coastal Commission requirements.
[4] Unvegetated area within the OD pit was not actively planted but is anticipated to convert over time per the Monitoring Plan; therefore, it is identified separately from other unvegetated flats within the lagoon (e.g. mudflat).

Discussion

The establishment and conversion of habitat are anticipated as the lagoon reaches equilibrium after the completion of restoration, and are expected to result in shifts in acreage between intertidal salt marsh, brackish marsh, and unvegetated flats. Unvegetated areas planned as vegetated salt marsh within the OD pit have not initially been mapped as habitat and will continue to be monitored until they can be characterized as a specific habitat type once they contain approximately 30% cover or can be confidently mapped as mudflat. Future mapping will continue to monitor habitat establishment and conversion within the lagoon.

References

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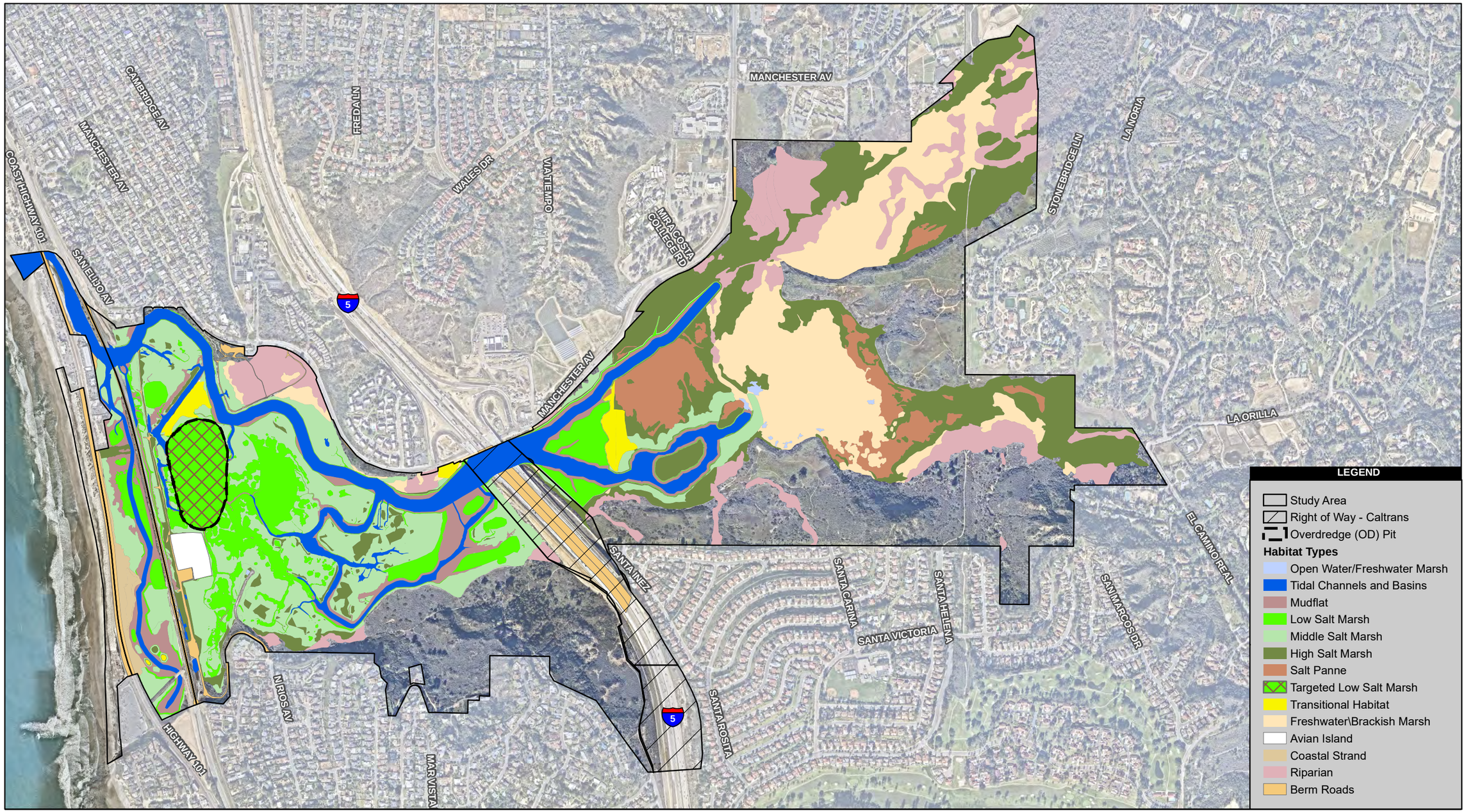

Source: SANDAG 2012; MoffattNichol 2020; AECOM.

1,100 550 0 1,100 Feet

Scale: 1:13,200; 1 inch = 1,100 feet

Figure 1-1
Design Habitat Distribution

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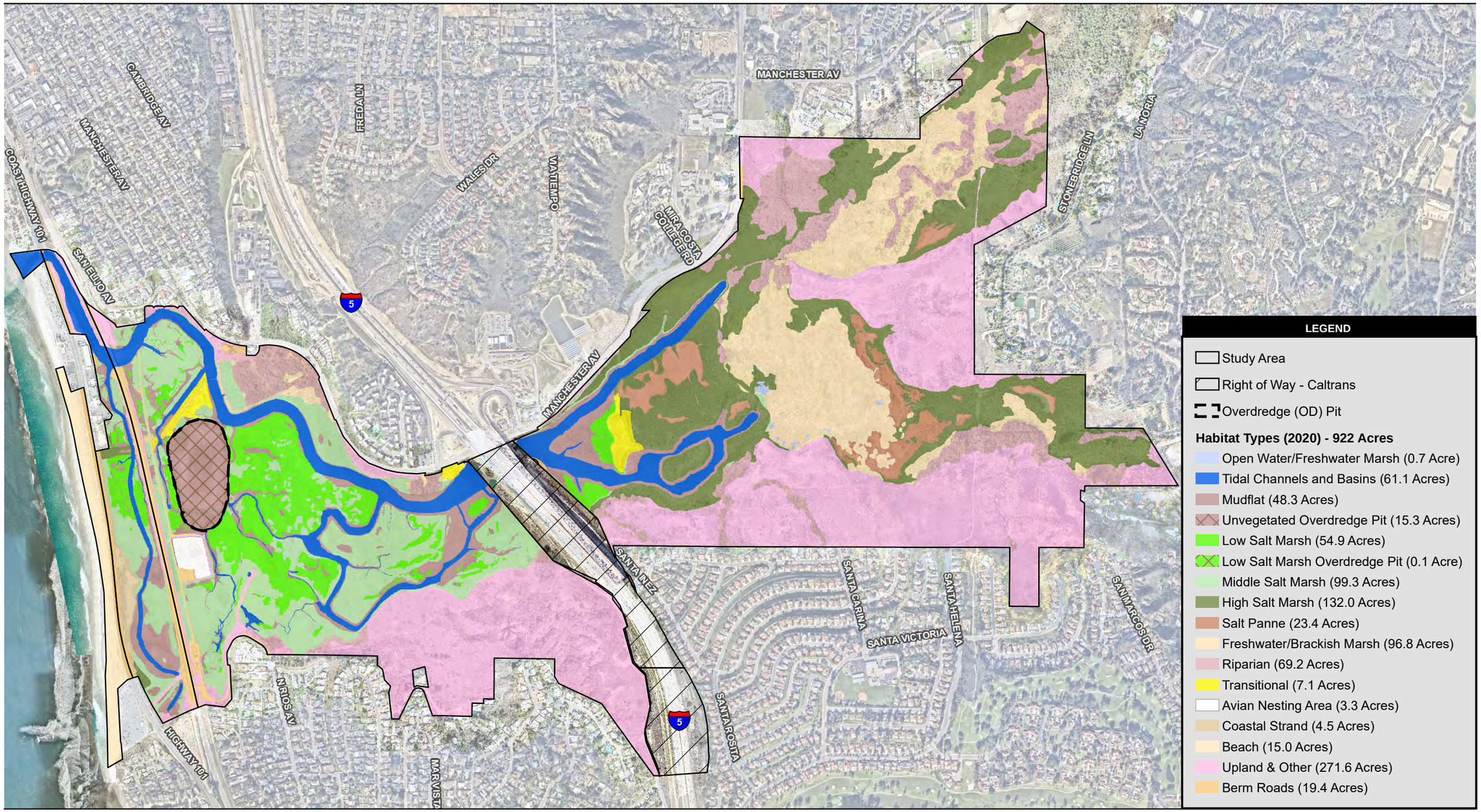

MoffattNichol (2015-18); AECOM (2018-2021), SanGIS (2018).

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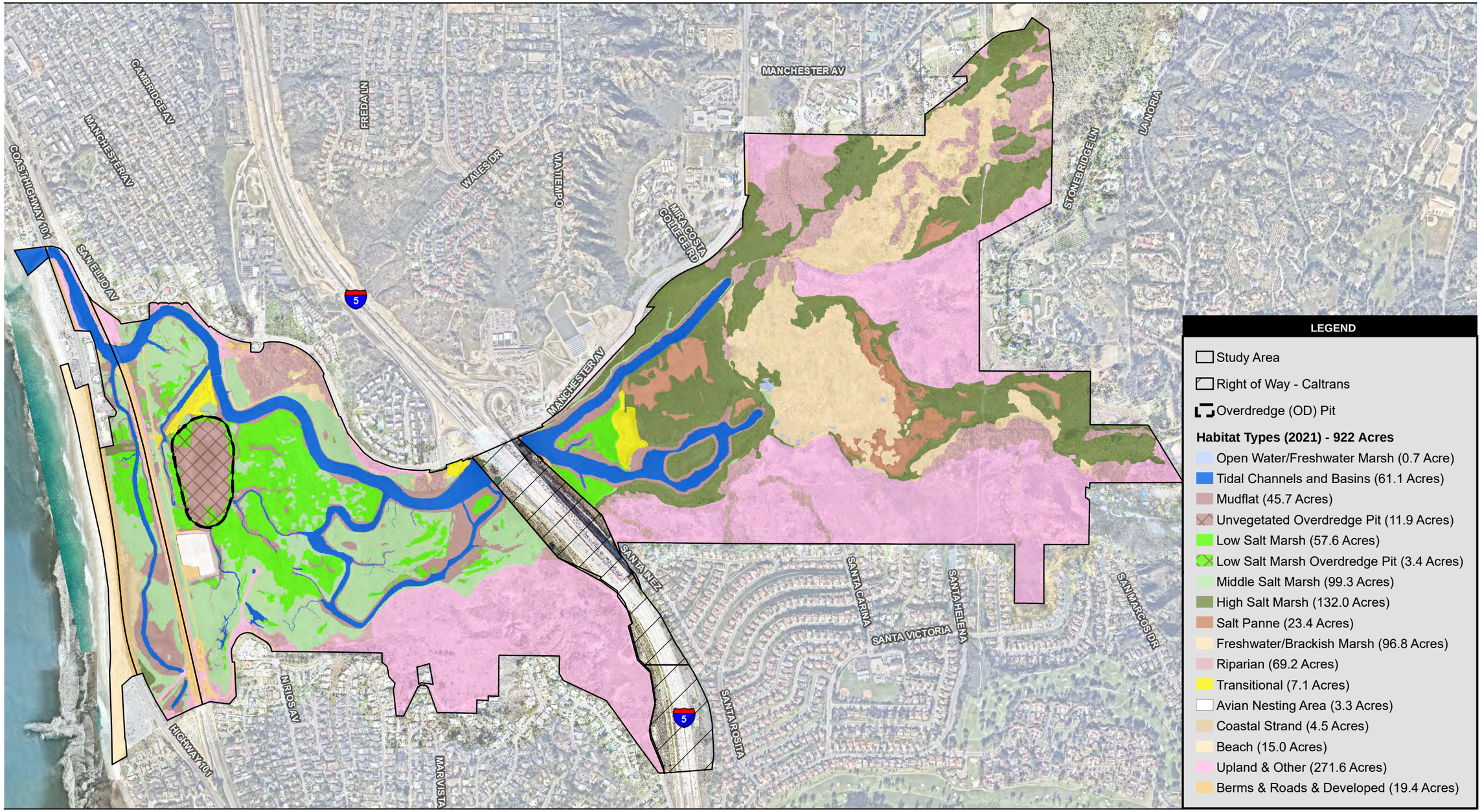
Scale: 1:13,200; 1 inch = 1,100 feet

Figure 1-2
SELRP Habitats 2020

Path: L:\DCS\Projects_6058\60582908_SELRP_ConPh2\900-CAD-GIS\920 GIS\map_docs\mxd\Report\Annual\Habitat_Mapping_Memo\Annual_Report_Habitat_Types_2020_11x17.mxd, 7/19/2022, paul.moreno



MoffattNichol (2015-18); AECOM (2018-2021), SanGIS (2018).

1,100 550 0 1,100 Feet

Scale: 1:13,200; 1 inch = 1,100 feet

Figure 1-3
SELRP Habitats 2021

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Attachment 1

Habitat Descriptions

Habitat Descriptions based on Holland and Oberbauer

Habitats descriptions based on the dominant and characteristic plant species, plant physiognomy, and soils in accordance with the Draft Vegetation Communities of San Diego County (Oberbauer et al. 2008), based on the Preliminary Descriptions of the Terrestrial Natural Communities of California (Holland 1986).

Tidal Mudflat

Tidal mudflats are coastal wetlands that form when mud is deposited by tides or rivers. Most of the sediment within a mudflat is within the intertidal zone, and thus the flat is submerged and exposed approximately twice daily. Mudflats are typically important regions for wildlife, including invertebrates and migratory birds.

Coastal Salt Marsh (Low, Mid-, and High Salt Marsh)

Southern coastal salt marsh is an association of herbaceous and suffrutescent, salt-tolerant hydrophytes that form a moderate to dense cover and can reach a height of 1 m (3 feet). Most species are active in summer and dormant in winter (Holland 1986). Coastal salt marsh plants are distributed along distinct zones depending upon such environmental factors as frequency and length of tidal inundation, salinity levels, and nutrient status (MacDonald 1977). In the higher littoral zone, there is much less tidal inflow, resulting in lower salinity levels, while soil salinity in the lower littoral zone is fairly constant due to everyday annual tidal flow (Adam 1990).

Within the different littoral zones, species can be segregated with California cordgrass (*Spartina foliosa*) nearest the open water in the low-littoral zone (low salt marsh); Pacific pickleweed and saltwort (*Batis maritima*) in the mid-littoral zones (middle salt marsh); and a richer mixture of species, including alkali-heath and Parish's pickleweed, in the higher littoral zone (high salt marsh) (Holland 1986). Other characteristic species include coastal saltgrass (*Distichlis spicata*), alkali weed (*Cressa truxillensis*), and salty susan.

Transitional

Supratidal transition zone habitat occurs between the range of the highest high tides and non-tidal supratidal uplands, from approximately +4.2 ft to + 5.2 ft NGVD in 2015. These areas represent a transition from the highest salt marsh plant species to upland plant species with both plant assemblages occurring within this relatively narrow elevation band. High soil salinities prevent upland species from invading the lower transition zone while upland species out compete salt tolerant species at the higher transition zone elevations.

Transition zone habitat is very rare in southern California coastal wetlands where development has encroached upon the edges of tidal lagoons and estuaries. As a result, this habitat is perhaps the least understood of all wetland-associated habitats. What is known is that these habitats provide refugia for salt marsh species, such as the light-footed Ridgway's rail, during extreme

weather and tides, as well as additional foraging habitat. It has been postulated that important plant pollinators, such as ground dwelling bees, occur in the transition zone.

The transition zone is also important in terms of climate change and predicted sea level rise. Should sea level rise as predicted, areas of low and mid-high salt marsh will be inundated more frequently and by increasingly deeper water, ultimately converting to subtidal habitat. Under this scenario, transition zone will convert to intertidal salt marsh. Thus, inclusion of transition zone in restoration alternatives provides a potential mechanism for maintaining the biological diversity of the lagoon in the future.

Saltpan

Saltpans are unvegetated to sparsely vegetated flat, alkaline areas near the coast that are subject to tidal influence. In coastal areas, saltpans are most often associated with salt marsh habitat. While saltpans can cover relatively large areas, they often occur in a mosaic pattern with more densely vegetated areas within the salt marsh. The paucity of vegetation on saltpans is apparently due to seasonally high soil salinity levels that prevent colonization by perennial salt marsh species. However, the open substrate associated with saltpans is available for colonization by short-lived annual species after winter rains temporarily reduce salinity levels (Ferren et al. 1987).

Coastal Brackish Marsh (Freshwater/Brackish Marsh)

Coastal brackish marsh is dominated by perennial, emergent, herbaceous monocots to 2 m tall (6 feet). Coastal brackish marsh is similar to both freshwater marsh and salt marsh, with some plants characteristic of each. Salinity may vary considerably and may increase at high tide or during seasons of low freshwater runoff or both (Holland 1986).

Dominant plants within this community include California bulrush (*Schoenoplectus californicus*) and Olney's bulrush (*Schoenoplectus americanus*), with these species forming pure stands more characteristic of freshwater marsh in some areas. However, salt marsh species, such as Pacific pickleweed (*Sarcocornia pacifica*), alkali-heath (*Frankenia salina*), Parish's pickleweed (*Arthrocnemum subterminale*), and salty susan (*Jaumea carnosa*) are dispersed throughout the coastal brackish marsh in varying degrees of abundance.

Open Water (Tidal Channels and Basins)

This habitat type consists of any open water body including lakes, reservoirs, bays, flowing water within a river channel, and small ponds along stream courses. Open water bodies provide important habitat for a variety of aquatic organisms and waterfowl.

Riparian (Disturbed Wetland, Sandbar Willow Scrub, and Southern Willow Scrub)

Disturbed wetlands are communities dominated by exotic wetland species. These species have invaded sites that had been previously disturbed or are periodically disturbed.

Sandbar Willow Scrub relate to areas being colonized by sandbar (= thin-leaved) willow (*Salix exigua*) and arroyo willow (*Salix lasiolepis*). Left unaltered, this community may eventually mature into southern willow scrub.

Southern willow scrub is a densely vegetated riparian thicket, dominated by several willow species (*Salix* spp.), with scattered emergent western cottonwood (*Populus fremontii* ssp. *fremontii*) and western sycamore (*Platanus racemosa*). This community is generally greater than 6 m (20 feet) high and occupies drainages and floodplains supporting perennially wet streams. Understory species such as mulefat (*Baccharis salicifolia*), Douglas mugwort (*Artemisia douglasiana*), and hoary nettle (*Urtica dioica* ssp. *holosericea*), may also be present (Holland 1986).

Coastal Strand

Coastal strand is an area of loose to partially stabilized sand that forms near the shore above the high tide line. The plants found in this community are able to tolerate harsh conditions, such as high winds, salt, and a low nutrient supply. Many of the plants in this community have deep taproots and/or a prostrate growth form to help stabilize them in the loose sand. Dominant plants within the coastal strand community include arrow weed (*Pluchea sericea*), beach evening-primrose (*Camissonia cheiranthifolia* ssp. *suffruticosa*), beach sand-verbena (*Abronia umbellata* var. *umbellata*), Nuttall's lotus (*Lotus nuttallianus*), and coast woolly-heads (*Nemacaulis denudata* var. *denudata*).

Upland and Others (Coyote Brush Scrub, Diegan Coastal Sage Scrub-Coastal Form, Diegan Coastal Sage Scrub/Chaparral, Eucalyptus Woodland, Nonnative Grassland)

Coyote brush scrub is typically found on disturbed sites or those with nutrient-poor soils (Oberbauer 2008).

Diegan coastal sage scrub may be dominated by a variety of different species depending upon site-specific topographic, geographic, and edaphic conditions. California sagebrush (*Artemisia californica*) is more dominant in coastal forms (Oberbauer 2008), but it often occurs with various codominant species. There are several recognized subassociations of Diegan coastal sage scrub based upon the dominant species. Typical Diegan coastal sage scrub dominants include California sagebrush, California buckwheat (*Eriogonum fasciculatum*), laurel sumac (*Malosma laurina*), black sage (*Salvia mellifera*), lemonadeberry (*Rhus integrifolia*), and California encelia (*Encelia californica*).

Diegan coastal sage scrub/chaparral is a mix of chaparral and sage scrub species. Chamise (*Adenostoma fasciculata*) and coastal sagebrush are dominant and relatively equal in cover. Generally, laurel sumac, black sage, and lemonadeberry are more common in coastal sage scrub, while lilac (*Ceanothus* spp.), scrub oak (*Quercus* spp.), and mission manzanita (*Xylococcus bicolor*) are more common in chaparrals (Oberbauer 2008).

Eucalyptus woodland is dominated by several species of eucalyptus (*Eucalyptus* spp.). These introduced species produce large amounts of leaf and bark litter, the chemical composition of which may inhibit the establishment and growth of other species, especially natives, in the

understory. Generally, these species were planted for aesthetic and horticultural purposes, but many species of eucalyptus have become naturalized and have been quite successful in invading riparian areas.

Nonnative grassland generally occurs on fine-textured loam or clay soils that are moist or even waterlogged during the winter rainy season and very dry during the summer and fall. It is characterized by a dense to sparse cover of annual grasses, often with native and nonnative annual forbs (Holland 1986). Typical grasses within the region include ripgut grass (*Bromus diandrus*), red brome (*Bromus madritensis* ssp. *rubens*), soft chess (*Bromus hordeaceus*), wild oats (*Avena* spp.), and fescue (*Vulpia myuros*). Nonnative disturbance-related annuals, such as red stem filaree (*Erodium cicutarium*) and horseweed (*Conyza canadensis*), are common to this community. Though named as a nonnative community, nonnative grassland often has significant biological value since it typically supports native grassland species, such as tarweed (*Deinandra* spp.), common goldfields (*Lasthenia gracilis*), blue dicks (*Dichelostemma capitatum* ssp. *capitatum*), and purple owl's-clover (*Castilleja exserta* ssp. *exserta*); provides foraging habitat for raptors; and often supports sensitive wildlife species.

Beach

Beach habitat is the flat, sandy area along the immediate coastline that occurs between mean tide and the foredune, or to the farthest inland reach of storm waves. This habitat is characterized by high exposure to salt spray and sand blast, and sandy substrate with a low organic content and water-holding capacity (Barbour and Johnson 1977). The lower portions of beaches are unvegetated, while the upper beach sometimes supports a sparse herbaceous cover, especially in areas where foredunes are present.

Berms and Roads and Developed

Berms and roads and developed habitats include areas that have been constructed upon or otherwise physically altered to an extent that native vegetation is no longer supported. Developed land is characterized by permanent or semi-permanent structures, pavement or hardscape, and landscaped areas that often require irrigation. Typically unvegetated or landscaped with a variety of ornamental (usually non-native) plants.

References

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