

Vegetation Map of Ballona Wetlands Ecological Reserve, Los Angeles County, California 2007

Abstract

The California Department of Fish and Game and GreenInfo Network have created a vegetation map of the Ballona Wetlands Ecological Reserve, Los Angeles County, California, under a grant from the California Coastal Conservancy to assist in restoration planning. Vegetation mapping classes are based on existing National Vegetation Classification standards to the extent possible. Mapping was based on a 1-foot pixel resolution ($\pm 1:16,800$) true color orthophoto taken June 13, 2006 by I.K. Curtis Aerial Photography under contract to the Coastal Conservancy, and on field work conducted in 2007.

Introduction

The project area includes approximately 600 acres owned by the California Department of Fish and Game (DFG) and the State Lands Commission along both sides of the Ballona Creek channel in Los Angeles County. Most of the Ecological Reserve has undergone significant disturbance and fragmentation, as described in this short history of the site:

During the past century, the historic Ballona wetlands have been dramatically altered by human activity. Active oil extraction on the wetlands caused significant alteration of the landscape. In the 1930s, Ballona Creek was channelized, straightened and deepened as part of a flood control project implemented by the federal government and the Los Angeles County Flood Control District. Construction of Marina del Rey in the 1950s converted coastal dunes and wetlands into a marina. Dredge spoils from marina construction were deposited on the undeveloped portions of the Ballona wetlands, which raised the elevation of the site and altered the soil profile. At the same time, Little League baseball fields were constructed on a portion of the site. Major infrastructure (Jefferson, Culver, Lincoln Boulevards, electricity, water, gas utility lines) transects the former wetlands, with significant impacts to hydrologic and habitat connectivity. In the early 1900s, the Pacific Electric Railroad was extended across the wetlands to Playa del Rey and the railroad levee is still visible on the site (Coastal Conservancy 2007)¹

This vegetation map is intended to assist in restoration planning for the Ballona Wetland Enhancement Project. The goals of the Project include restoring and enhancing native habitats on the site and providing public access and recreational opportunities.

Methods

DFG ecologists conducted reconnaissance of the site on May 11-12, 2006 to prepare a preliminary list of vegetation types present. Due to extensive hydrological and soil disturbance as described above, 23 of the 54 vegetation types identified do not conform to existing vegetation classifications done according to the National Vegetation Classification standards (USGS - NPS 2005) for other portions of the region, and so were identified as "mapping units." These are translated to higher-order group and macro-group categories in the National

¹ <http://www.coastalconservancy.ca.gov/Ballona/project.html>

Vegetation Classification (NVCS) (see crosswalk, below). Table 1 presents a list of the final vegetation map classification, included classes for unvegetated polygons.

Mapping codes in the 1000s indicate tree types; 2000s indicate shrub types; 3000s indicate herbaceous types; 4000s indicate miscellaneous non-native types; and 5000s indicate unvegetated types.

Table 1. Vegetation Map Classification for Ballona Wetlands Ecological Reserve

Mapping Code	Vegetation Name
1001	<i>Eucalyptus</i> spp. mapping unit
2001	<i>Acacia</i> spp. mapping unit
2002	<i>Atriplex lentiformis</i> alliance
2003	<i>Atriplex semibaccata</i> mapping unit
2004	<i>Baccharis pilularis</i> - <i>Artemisia californica</i> association
2005	<i>Baccharis pilularis</i> / annual grass - herb association
2006	<i>Baccharis pilularis</i> alliance
2007	<i>Baccharis salicifolia</i> alliance
2008	<i>Clematis ligusticifolia</i> mapping unit
2009	<i>Myoporum laetum</i> mapping unit
2010	<i>Salix exigua</i> alliance
2011	<i>Salix lasiolepis</i> alliance
2012	<i>Artemisia californica</i> association
2013	<i>Malosma laurina</i> association
3001	<i>Ambrosia psilostachya</i> alliance
3002	<i>Anemopsis californica</i> alliance
3003	<i>Arundo donax</i> alliance
3004	<i>Bolboschoenus maritimus</i> alliance
3005	<i>Brassica nigra</i> mapping unit
3006	<i>Bromus diandrus</i> - mixed herb association
3007	California annual grassland alliance
3008	<i>Carpobrotus edulis</i> - <i>Baccharis pilularis</i> - <i>Chrysanthemum coronarium</i> mapping unit
3009	<i>Carpobrotus edulis</i> association
3010	<i>Centaurea diluta</i> mapping unit
3011	<i>Chrysanthemum coronarium</i> mapping unit
3012	<i>Cortaderia selloana</i> association
3013	<i>Cressa truxillensis</i> mapping unit
3014	<i>Distichlis spicata</i> - <i>Salicornia virginica</i> - <i>Jaumea carnosa</i> association
3015	<i>Distichlis spicata</i> alliance
3016	<i>Euphorbia terracina</i> mapping unit
3017	<i>Euthamia occidentalis</i> mapping unit
3018	<i>Frankenia salina</i> - <i>Distichlis spicata</i> association
3019	<i>Frankenia salina</i> mapping unit
3020	<i>Heterotheca grandiflora</i> mapping unit
3021	<i>Jaumea carnosa</i> mapping unit
3022	<i>Juncus balticus</i> - <i>Juncus mexicanus</i> alliance
3023	<i>Leymus triticoides</i> alliance
3024	<i>Lolium multiflorum</i> alliance
3025	<i>Lotus scoparius</i> - <i>Croton californicus</i> mapping unit

Mapping Code	Vegetation Name
3026	<i>Lotus scoparius</i> alliance
3027	<i>Lupinus chamissonis</i> mapping unit
3028	<i>Malva leprosa</i> mapping unit
3029	<i>Salicornia subterminalis</i> alliance
3030	<i>Salicornia virginica</i> - annual grass mapping unit
3031	<i>Salicornia virginica</i> - <i>Brassica nigra</i> association
3032	<i>Salicornia virginica</i> - <i>Distichlis spicata</i> association
3033	<i>Salicornia virginica</i> - <i>Salicornia subterminalis</i> association
3034	<i>Salicornia virginica</i> alliance
3035	<i>Schoenoplectus</i> (<i>S. californicus</i> , <i>S. americanus</i> , <i>Bulboschoenus maritimus</i>) mapping unit
3036	<i>Schoenoplectus americanus</i> alliance
3037	<i>Schoenoplectus californicus</i> alliance
3038	<i>Typha</i> spp. alliance
4001	Exotic landscaping mapping unit
4002	Exotic woody - mixed herb mapping unit
4003	Ruderal herbaceous (tall) mapping unit
4004	Ruderal herbaceous mapping unit
5001	Developed paved
5002	Developed unpaved
5003	Open water
5004	Unvegetated (cleared)
5005	Unvegetated (no vegetation this year)
5006	Unvegetated (salt scald)
5007	Unvegetated (unspecified)

Brad Henderson (DFG) drew polygons of homogeneous vegetation on mylar overlaying a print of the air photo, which were later digitized by GreenInfo Network to produce a draft map. Field crews used this draft map to verify polygon boundaries and to attribute each polygon during the period June 19-22, 2007, with one additional visit on October 24, 2007. Field work was completed primarily by Rachelle Boul, Brad Henderson, Diana Hickson, Todd Keeler-Wolf, Steve Newton-Reed (DFG), and Sean Bergquist (Santa Monica Bay Restoration Commission).

The minimum mapping unit is generally 0.25 acre, however, polygons of important or native vegetation types may be much smaller. No accuracy assessment of this map has been performed because ecologists visited every polygon in the field.

Each polygon was attributed with multiple characteristics as shown in Table 2. Field crews recorded the presence of eight exotic, invasive plants in polygons. These species were identified as noteworthy due to their potential for eradication during restoration activities. Each polygon is also attributed with included "habitat category" based on a classification by Wayne Ferren (2007)(Table 3). A crosswalk between the mapping classification, California Wildlife Habitat Relations (WHR) type (Mayer and Laudenslayer 1988), NVCS Group, NVCS Macrogroup, and Habitat Category is presented in Table 4.

Table 2. Map attributes.

Attribute (Field name if different)	Description
Polygon ID	Unit polygon identifier
Vegetation Code (VegCode)	Vegetation code as shown in Table 1
Vegetation Name (VegName)	Vegetation name as shown in Table 1
Heterogeneity (Heterogen)	Assessed heterogeneity of the polygon: 1: Low, < 5% heterogeneous 2: Moderate, 5-40% heterogeneous 3: High, >40% heterogeneous
Height	Overall height of vegetation: 1: <1 2: 1-5m 3: 5-20m 4: 20-50m 5: > 50m
Conifer Cover (ConifCov)	Cover of tree conifers in polygon 1: <2% 2: 2-9% 3: 10-39% 4: 40-59% 5: 60-100% 0: none
Hardwood Cover (HdwdCov)	Cover of tree hardwoods in polygon per the same scale
Tree Cover (TreeCov)	Cover of all trees in polygon per the same scale
Shrub Cover (ShrubCov)	Cover of shrubs in polygon per the same scale
Herbaceous Cover (HerbCov)	Cover of herbaceous species in polygon per the same scale
Impact (Impact1, 2, 3, 4)	Impact within polygon (note these are standard impact types used by the California Natural Diversity Database): 1: Development 2: OHV activity 3: Exotics 4: Roads/trails 5: Erosion/runoff 6: Disking/grading 7: Grazing (not used) 8: Riparian modification
Intensity (Intensity1, 2, 3, 4)	Subjective evaluation of the intensity of the impact noted L: Low M: Medium H: High
Site Quality (SiteQuality)	Evaluation of the quality of the vegetation within the polygon: 1: High 2: Moderate 3: Low 4: Unknown

Attribute (Field name if different)	Description
Habitat Category (HabType)	<p>Habitat categories (described in Table 3)</p> <p>0: Unspecified</p> <p>1: Estuarine Vegetated_Low Marsh</p> <p>2: Estuarine Vegetated_Middle Marsh</p> <p>3: Estuarine Vegetated_High Marsh</p> <p>4: Estuarine Vegetated_Euryhaline habitats</p> <p>5: Estuarine Vegetated_Brackish Marsh</p> <p>6: Estuarine Non-vegetated_Mudflats</p> <p>7: Estuarine Non-vegetated_Hyperhaline saltflats</p> <p>8: Estuarine Open Water Habs. And Flooded subs._Subtidal channels</p> <p>9: Estuarine Open Water Habs. And Flooded subs._Intertidal channels, beds, banks, and benches</p> <p>10: Estuarine Open Water Habs. And Flooded subs._Intertidal channels (cobble and riprap subs.)</p> <p>11: Palustrine Wetlands_Transitional emergent wetlands</p> <p>12: Palustrine Wetlands_Freshwater emergent wetlands</p> <p>13: Palustrine Wetlands_Seasonal wetlands</p> <p>14: Palustrine Wetlands_Scrub/Shrub wetlands</p> <p>15: Palustrine Wetlands_Forested wetlands</p> <p>16: Upland Habitats_Grasslands</p> <p>17: Upland Habitats_Coastal Scrub</p> <p>18: Upland Habitats_Dune scrub and herbs</p> <p>19: Upland Habitats</p>
Fill / Native (Soil)	<p>Field determination if soil is fill or native:</p> <p>1: Native</p> <p>2: Fill</p> <p>3: Unspecified (in field)</p>
Tidal / Non-tidal	<p>Field determination if polygon is subject to tidal influence:</p> <p>1: Tidal</p> <p>2: Non-tidal</p> <p>3: Unspecified</p>
Comments	Field comments regarding vegetation in the polygon.
Acacia sp	<p>Presence of Acacia in the polygon:</p> <p>-1: present</p> <p>0: not observed</p>
Arundo donax	See above
Cortaderia selloana	See above
Euphorbia terracina	See above
Myoporum laetum	See above
Pennisetum setaceum	See above
Ricinus communis	See above
Schinus terebinthifolius	See above
Date	Date of attribute data entry

Table 3. Habitat Categories (Description adapted from Ferren 2007)

Habitat Category	Description
Estuarine Vegetated_Low Marsh	1: Low salt marsh is regularly and daily inundated by tides.
Estuarine Vegetated_Middle Marsh	2: Intermediate elevations within the salt marsh are inundated irregularly by tides but at a greater frequency than higher elevations.
Estuarine Vegetated_High Marsh	3: High marsh habitats are irregularly to intermittently inundated by tidal water and generally range from saline to hypersaline conditions.
Estuarine Vegetated_Euryhaline habitats	4: This is a transitions zone that represents the area where the halophytic and hydrophytic salt marsh vegetation overlaps with the upland communities.
Estuarine Vegetated_Brackish Marsh	5: Sites where freshwater mixes with saline seawater produce brackish conditions with intermediate salinities.
Estuarine Non-vegetated_Mudflats	6: Sites that are below the marsh plain where continual inundation by tides prevents vascular plant growth.
Estuarine Non-vegetated_Hyperhaline saltflats	7: Shallow depressions of upper marsh plains that are irregularly flooded by tides (<20% of tides) and that have a salinity of 200 parts per thousand or more.
Estuarine Open Water Habs. And Flooded subs._Subtidal channels	8: Subtidal deepwater habitats include channels, bays, basins, and other features, which at extreme low water do not drain with the outgoing tides. This results in permanently flooded habitats and permanent open water bodies.
Estuarine Open Water Habs. And Flooded subs._Intertidal channels, beds, banks, and benches	9: Open water habitats and flooded substrates, Intertidal channels, beds, banks, and benches (mud and sand substrates)
Estuarine Open Water Habs. And Flooded subs._Intertidal channels (cobble and riprap subs.)	10: Open water habitats and flooded substrates, Intertidal channels (cobble and riprap substrates)
Palustrine Wetlands_Transitional emergent wetlands	11: Transitional emergent wetlands (delta distributaries and margins of estuaries). Seasonally saturated, temporarily flooded.
Palustrine Wetlands_Freshwater emergent wetlands	12: Freshwater emergent wetlands (including seeps and springs). Frequently flooded.
Palustrine Wetlands_Seasonal wetlands	13: Seasonal wetlands (including haline vernal wetlands). Non-tidal wetlands and transitional habitats that are flooded to varying degrees by seasonal rainfall and runoff.
Palustrine Wetlands_Scrub/Shrub wetlands	14: Willow scrub is characterized by dense broadleaf, winter deciduous riparian thickets dominated by several willow shrub and tree species.
Palustrine Wetlands_Forested wetlands	15:
Upland Habitats_Grasslands	16: Upland grassland habitats
Upland Habitats_Coastal Scrub	17: Coastal sage scrub can be described as low, soft

Habitat Category	Description
	to woody shrubs and subshrubs that occur in a variety of situations. Including types that are influenced by salt spray
Upland Habitats_Dune scrub and herbs	18: Dune habitats represent a form of transition zone between the land and the sea.
Upland Habitats	19: Unspecified upland habitats

Table 4: Crosswalk between map unit names and WHR, NVCS Group and Macrogroup levels, and Habitat Categories as defined in Table 3:

VegCode	VegName	LifeForm	WHR type	NVCS Group	NVCS Macrogroup	Habitat Category (HabType)
2001	Acacia spp. mu	S	URBAN	no subdivision [at group level]	Introduced North American Mediterranean woodland and forest	Upland Habitats
3001	Ambrosia psilostachya alliance	H	Perennial Grassland	no group subdivision	North American ruderal grassland and forbland (Ambrosia psilostachya-Xanthium strumarium macrogroup)	Upland Habitats_Dune scrub and herbs
3002	Anemopsis californica alliance	H	SALINE EMERGENT WETLAND	SW NA alkali marsh/seep vegetation (Anemopsis californica, Juncus cooperi group)	Western North America alkaline and saline wetland (Allenrolfea occidentalis Schoenoplectus americanus, Sporobolus airoides MG)	Palustrine Wetlands_Freshwater emergent wetlands
3003	Arundo donax alliance	H	Fresh Emergent Wetland	no group subdivision	Naturalized warm-temperate riparian and wetland group (Tamarix, Arundo	Palustrine Wetlands_Freshwater emergent wetlands

VegCode	VegName	LifeForm	WHR type	NVCS Group	NVCS Macrogroup	Habitat Category (HabType)
					macrogroup)	
2002	Atriplex lentiformis alliance	S	Coastal Scrub (Alkali Desert Scrub)	SW NA salt basin and high marsh group (Allenrolfea occidentalis, Suaeda moquinii group)	Western North America alkaline and saline wetland (Allenrolfea occidentalis Schoenoplectus americanus, Sporobolus airoides MG)	Upland Habitats_Coastal Scrub
2003	Atriplex semibaccata mu	S	Coastal Scrub	introduced disturbed salt and alkali marsh	introduced saline vegetation	Upland Habitats_Coastal Scrub
2004	Baccharis pilularis - Artemisia californica association	S	Coastal Scrub	evergreen coastal scrub (Baccharis pilularis, Lupinus arboreus Group)	Californian Evergreen Coastal Scrub (Frangula californica, Baccharis pilularis, Ericameria ericoides MG)	Upland Habitats_Coastal Scrub

VegCode	VegName	LifeForm	WHR type	NVCS Group	NVCS Macrogroup	Habitat Category (HabType)
2005	Baccharis pilularis / annual grass - herb association	S	Coastal Scrub	evergreen coastal scrub (Baccharis pilularis, Lupinus arboreus Group)	Californian Evergreen Coastal Scrub (Frangula californica, Baccharis pilularis, Ericameria ericoides MG)	Upland Habitats_Coastal Scrub
2006	Baccharis pilularis alliance	S	Coastal Scrub	evergreen coastal scrub (Baccharis pilularis, Lupinus arboreus Group)	Californian Evergreen Coastal Scrub (Frangula californica, Baccharis pilularis, Ericameria ericoides MG)	Upland Habitats_Coastal Scrub
2007	Baccharis salicifolia alliance	S	Valley-Foothill Riparian	Madrean warm-temperate riparian/wash scrub (Baccharis salicifolia, B. sergilloides, Salix exigua group)	Western Cordillarian warm temperate riparian scrub (Baccharis sergilloides, Salix exigua, Sambucus mexicana MG)	Palustrine Wetlands_Scrub/Shrub wetlands
3005	Brassica nigra mu	H	Annual Grassland	no group subdivision	Mediterranean California Naturalized Annual and Perennial Grassland and	Upland Habitats

VegCode	VegName	LifeForm	WHR type	NVCS Group	NVCS Macrogroup	Habitat Category (HabType)
					Meadow	
3006	Bromus diandrus - mixed herb association	H	Annual Grassland	no group subdivision	Mediterranean California Naturalized Annual and Perennial Grassland and Meadow	Upland Habitats
3004	Bolboschoenus maritimus alliance	H	SALINE EMERGENT WETLAND	Western North American tidal saltmarsh (Salicornia depressa, Spartina foliosa group)	North American coastal salt marsh/ alkaline meadow grassland (Spartina spp. Schoenoplectus maritimus MG)	Estuarine Vegetated_Brackish Marsh
3007	California annual grassland alliance	H	Annual Grassland	no group subdivision	Mediterranean California Naturalized Annual and Perennial Grassland and Meadow	Upland Habitats_Grasslands
3008	Carpobrotus edulis - Baccharis pilularis - Chrysanthemum coronarium mu	H	Coastal Scrub	no group subdivision	Pacific coast introduced dune and bluff vegetation	Upland Habitats_Coastal Scrub

VegCode	VegName	LifeForm	WHR type	NVCS Group	NVCS Macrogroup	Habitat Category (HabType)
3009	Carpobrotus edulis association	H	Coastal Scrub	no group subdivision	Pacific coast introduced dune and bluff vegetation	Upland Habitats_Coastal Scrub
3010	Centaurea diluta mu	H	Annual Grassland	no group subdivision	Mediterranean California Naturalized Annual and Perennial Grassland and Meadow	Upland Habitats
3011	Chrysanthemum coronarium mu	H	Annual Grassland	no group subdivision	Mediterranean California Naturalized Annual and Perennial Grassland and Meadow	Upland Habitats
2008	Clematis ligusticifolia mu	S		no group subdivision	plant species mapping unit	Palustrine Wetlands_Scrub/Shrub wetlands
3012	Cortaderia selloana association	H	Perennial Grassland	no group subdivision	Mediterranean California Naturalized Annual and Perennial Grassland and Meadow	Upland Habitats_Grasslands

VegCode	VegName	LifeForm	WHR type	NVCS Group	NVCS Macrogroup	Habitat Category (HabType)
3013	Cressa truxillensis mu	H	SALINE EMERGENT WETLAND	SW NA salt basin and high marsh group (Allenrolfea occidentalis, Suaeda moquinii group)	Western North America alkaline and saline wetland (Allenrolfea occidentalis Schoenoplectus americanus, Sporobolus airoides MG)	Estuarine Vegetated_High Marsh
3014	Distichlis spicata - Salicornia virginica - Jaumea carnosa association	H	SALINE EMERGENT WETLAND	Western North American tidal saltmarsh (Salicornia depressa, Spartina foliosa group)	North American coastal salt marsh/ alkaline meadow grassland (Spartina spp. Schoenoplectus maritimus MG)	Estuarine Vegetated_Middle Marsh
3015	Distichlis spicata alliance	H	SALINE EMERGENT WETLAND	no group subdivision	no macrogrp for Distichlis, North American salt/alkaline marsh	Estuarine Vegetated_High Marsh
1001	Eucalyptus spp. mu	T	EUCALYPTUS	no subdivision [at group level]	Introduced North American Mediterranean woodland and forest	Upland Habitats
3016	Euphorbia terracina mu	H	Annual Grassland	no group subdivision	Mediterranean California Naturalized Annual and Perennial Grassland and	Upland Habitats

VegCode	VegName	LifeForm	WHR type	NVCS Group	NVCS Macrogroup	Habitat Category (HabType)
					Meadow	
3017	Euthamia occidentalis mu	H		no group subdivision	Vancouverian coastal/tidal grassland (Carex obnupta, Juncus lesueurii MG)	Palustrine Wetlands_Freshwater emergent wetlands
4001	Exotic landscaping mu	E	URBAN	no group subdivision	Introduced North American Mediterranean woodland and forest	Upland Habitats
4002	Exotic woody - mixed herb mu	E	URBAN	no group subdivision	Introduced North American Mediterranean woodland and forest	Upland Habitats
3018	Frankenia salina - Distichlis spicata association	H	SALINE EMERGENT WETLAND	SW NA salt basin and high marsh group (Allenrolfea occidentalis, Suaeda moquinii group)	Western North America alkaline and saline wetland (Allenrolfea occidentalis Schoenoplectus americanus, Sporobolus airoides MG)	Estuarine Vegetated_High Marsh

VegCode	VegName	LifeForm	WHR type	NVCS Group	NVCS Macrogroup	Habitat Category (HabType)
3019	Frankenia salina mu	H	SALINE EMERGENT WETLAND	SW NA salt basin and high marsh group (Allenrolfea occidentalis, Suaeda moquinii group)	Western North America alkaline and saline wetland (Allenrolfea occidentalis Schoenoplectus americanus, Sporobolus airoides MG)	Estuarine Vegetated_High Marsh
3020	Heterotheca grandiflora mu	H	Annual Grassland	California annual herb/grass group (Amsinckia menziesii, tessellata, Lasthenia californica group)	Californian Mixed Perennial and Annual Grassland & Meadow (Nassella pulchra, Vulpia microstachys, Plantago erecta, Lotus purshianus. MG)	Upland Habitats
3021	Jaumea carnosa mu	H	SALINE EMERGENT WETLAND	Western North American tidal saltmarsh (Salicornia depressa, Spartina foliosa group)	North American coastal salt marsh/ alkaline meadow grassland (Spartina spp. Schoenoplectus maritimus MG)	Estuarine Vegetated_Low Marsh

VegCode	VegName	LifeForm	WHR type	NVCS Group	NVCS Macrogroup	Habitat Category (HabType)
3022	Juncus balticus - Juncus mexianus alliance	H	Fresh Emergent Wetland	Californian warm temperate marsh/seep (Carex barbarae, Muhlenbergia rigens group)	Western North American temperate marsh and wet meadow (Juncus balticus-J. mexicanus-J. xiphioides MG)	Palustrine Wetlands_Freshwater emergent wetlands
3023	Leymus triticoides alliance	H	Perennial Grassland	Californian warm temperate marsh/seep (Carex barbarae, Muhlenbergia rigens group)	Western North American temperate marsh and wet meadow (Juncus balticus-J. mexicanus-J. xiphioides MG)	Estuarine Vegetated_Euryhaline habitats
3024	Lolium multiflorum alliance	H	Annual Grassland	no group subdivision	Mediterranean California Naturalized Annual and Perennial Grassland and Meadow	Upland Habitats_Grasslands
3025	Lotus scoparius - Croton californicus mu	H	coastal scrub	Interior Californian facultatively drought deciduous group (Lupinus albifrons; Dendromecon group)	Californian Facultatively Drought-Deciduous Scrub (Lupinus albifrons, Lotus scoparius macrogroup)	Upland Habitats_Dune scrub and herbs

VegCode	VegName	LifeForm	WHR type	NVCS Group	NVCS Macrogroup	Habitat Category (HabType)
3026	Lotus scoparius alliance	H	coastal scrub	Interior Californian facultatively drought deciduous group (Lupinus albifrons; Dendromecon group)	Californian Facultatively Drought-Deciduous Scrub (Lupinus albifrons, Lotus scoparius macrogroup)	Upland Habitats_Coastal Scrub
3027	Lupinus chamissonis mu	H	coastal scrub	evergreen coastal scrub (Baccharis pilularis, Lupinus arboreus Group)	Californian Evergreen Coastal Scrub (Frangula californica, Baccharis pilularis, Ericameria ericoides MG)	Upland Habitats_Dune scrub and herbs
3028	Malvella leprosa mu	H	SALINE EMERGENT WETLAND	SW NA salt basin and high marsh group (Allenrolfea occidentalis, Suaeda moquinii group)	Western North America alkaline and saline wetland (Allenrolfea occidentalis Schoenoplectus americanus, Sporobolus airoides MG)	Palustrine Wetlands_Seasonal wetlands
2009	Myoporum laetum mu	S	URBAN	no subdivision [at group level]	Introduced North American Mediterranean woodland and forest	Upland Habitats

VegCode	VegName	LifeForm	WHR type	NVCS Group	NVCS Macrogroup	Habitat Category (HabType)
4003	Ruderal herbaceous (tall) mu	E	Annual Grassland	no group subdivision	Mediterranean California Naturalized Annual and Perennial Grassland and Meadow	Upland Habitats
4004	Ruderal herbaceous mu	E	Annual Grassland	no group subdivision	Mediterranean California Naturalized Annual and Perennial Grassland and Meadow	Upland Habitats
3029	Salicornia (Arthrocnemum) subterminalis alliance	H	Saline Emergent Wetland	SW NA salt basin and high marsh group (Allenrolfea occidentalis, Suaeda moquinii group)	Western North America alkaline and saline wetland (Allenrolfea occidentalis Schoenoplectus americanus, Sporobolus airoides MG)	Estuarine Vegetated_High Marsh
3030	Salicornia virginica - annual grass mu	H	Saline Emergent Wetland	Western North American tidal saltmarsh (Salicornia depressa, Spartina foliosa group)	North American coastal salt marsh/ alkaline meadow grassland (Spartina spp. Schoenoplectus maritimus MG)	Estuarine Vegetated_Middle Marsh

VegCode	VegName	LifeForm	WHR type	NVCS Group	NVCS Macrogroup	Habitat Category (HabType)
3031	Salicornia virginica - Brassica nigra association	H	Saline Emergent Wetland	Western North American tidal saltmarsh (Salicornia depressa, Spartina foliosa group)	North American coastal salt marsh/ alkaline meadow grassland (Spartina spp. Schoenoplectus maritimus MG)	Estuarine Vegetated_Middle Marsh
3032	Salicornia virginica - Distichlis spicata association	H	Saline Emergent Wetland	Western North American tidal saltmarsh (Salicornia depressa, Spartina foliosa group)	North American coastal salt marsh/ alkaline meadow grassland (Spartina spp. Schoenoplectus maritimus MG)	Estuarine Vegetated_Middle Marsh
3033	Salicornia virginica - Salicornia subterminalis association	H	Saline Emergent Wetland	Western North American tidal saltmarsh (Salicornia depressa, Spartina foliosa group)	North American coastal salt marsh/ alkaline meadow grassland (Spartina spp. Schoenoplectus maritimus MG)	Estuarine Vegetated_High Marsh
3034	Salicornia virginica alliance	H	Saline Emergent Wetland	Western North American tidal saltmarsh (Salicornia depressa, Spartina foliosa group)	North American coastal salt marsh/ alkaline meadow grassland (Spartina spp. Schoenoplectus maritimus MG)	Estuarine Vegetated_Low Marsh

VegCode	VegName	LifeForm	WHR type	NVCS Group	NVCS Macrogroup	Habitat Category (HabType)
2010	Salix exigua alliance	S	Valley-Foothill Riparian	Madrean warm-temperate riparian/wash scrub (Baccharis salicifolia, B. sergilloides, Salix exigua group)	Western Cordillarian warm temperate riparian scrub (Baccharis sergilloides, Salix exigua, Sambucus mexicana MG)	Palustrine Wetlands_Scrub/Shrub wetlands
2011	Salix lasiolepis alliance	S	Valley-Foothill Riparian	Madrean warm-temperate riparian/wash scrub (Baccharis salicifolia, B. sergilloides, Salix exigua group)	Western Cordillarian warm temperate riparian scrub (Baccharis sergilloides, Salix exigua, Sambucus mexicana MG)	Palustrine Wetlands_Scrub/Shrub wetlands
3035	Schoenoplectus (S. californicus, S. americanus, Bulboschoenus maritimus) mapping unit	H	Saline Emergent Wetland	SW NA alkali marsh/seep vegetation (Anemopsis californica, Juncus cooperi group)	Western North America alkaline and saline wetland (Allenrolfea occidentalis Schoenoplectus americanus, Sporobolus airoides MG)	Estuarine Vegetated_Brackish Marsh

VegCode	VegName	LifeForm	WHR type	NVCS Group	NVCS Macrogroup	Habitat Category (HabType)
3036	Schoenoplectus americanus alliance	H	Saline Emergent Wetland	SW NA alkali marsh/seep vegetation (Anemopsis californica, Juncus cooperi group)	Western North America alkaline and saline wetland (Allenrolfea occidentalis Schoenoplectus americanus, Sporobolus airoides MG)	Estuarine Vegetated_Brackish Marsh
3037	Schoenoplectus californicus alliance	H	Fresh Emergent Wetland	no group?	North American Arid West Freshwater Marsh (Typha angustifolia, Schoenoplectus acutus, S. californica MG)	Palustrine Wetlands_Freshwater emergent wetlands
3038	Typha spp. alliance	H	Fresh Emergent Wetland	no group?	North American Arid West Freshwater Marsh (Typha angustifolia, Schoenoplectus acutus, S. californica MG)	Palustrine Wetlands_Freshwater emergent wetlands
5004	Unvegetated (cleared)	U	BARREN	no group	no macrogroup	Upland Habitats
5005	Unvegetated (no vegetation this year)	U	BARREN	no group	no macrogroup	Upland Habitats
5006	Unvegetated (salt scald)	U	BARREN	no group	no macrogroup	Estuarine Non-vegetated_Hyperhaline saltflats

VegCode	VegName	LifeForm	WHR type	NVCS Group	NVCS Macrogroup	Habitat Category (HabType)
5007	Unvegetated (unspecified)	U	BARREN	no group	no macrogroup	Upland Habitats
5001	Developed paved	U	URBAN	no group	no macrogroup	Upland Habitats
5002	Developed unpaved	U	BARREN	no group	no macrogroup	Upland Habitats
5003	Open water	U	ESTUARINE	no group	no macrogroup	combination of 8, 9, and 10
2012	Artemisia californica association	S	Coastal Scrub	Central and south coastal Californian coastal sage scrub group (Artemisia californica-Eriogonum fasciculatum group)	Californian Facultatively Drought-Deciduous Scrub (Lupinus albifrons, Lotus scoparius macrogroup)	Upland Habitats_Coastal Scrub
2013	Malosma laurina	S	Coastal Scrub	Californian maritime chaparral (Arctostaphylos tomentosa, A. hookeri, Ceanothus verrucosus Group)	Californian Chaparral (Adenostoma fasciculatum, Heteromeles arbutifolia MG)	Upland Habitats_Coastal Scrub

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