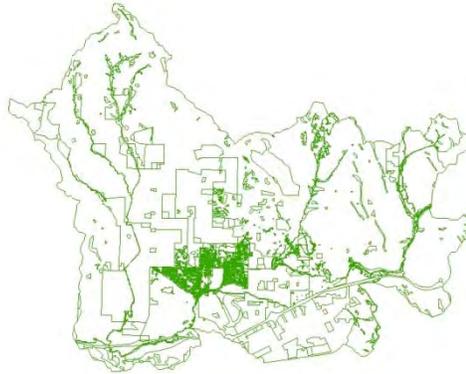


SPRINGTOWN ALKALI SINK PRESERVE

WETLANDS MAPPING PROJECT



PREPARED For The
UNIVERSITY OF CALIFORNIA BERKELEY HERBARIUM

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1. Introduction

The University of California Berkeley Herbarium contracted Aerial Information Systems, Inc. in 2008 to create a baseline inventory of wetlands and associated upland vegetation for approximately 38 square miles of land north of the city of Livermore, California, including and adjacent to the Springtown Alkali Sink Preserve. The vegetation map adheres to the 2008 National Vegetation Classification Standard (NVCS) and the Manual of California Vegetation.

The complete mapping effort is divided into two phases. The first phase is the detailed mapping of several focus study areas which total approximately 4200 acres in size and include the Springtown Preserve and adjacent areas along with Brushy Peak and the upper Altamont Creek drainage. The Phase II portion involves the creation of a more generalized vegetation map for the remaining thirty square miles including much of the remaining Altamont Creek watershed in the northern portion of the Livermore Valley.

The final vegetation map will serve multiple interests and will seek to provide the following:

- Baseline inventory of existing vegetation
- Baseline for monitoring change
- Conservation & management planning needs
- Addressing issues of increased alkalinity and expansion of Saltgrass habitat

2. Project Study Area – General Description



Figure 1 – Focus area in red; overall study in yellow
ESRI World Shaded Relief Maps – ESRI Resource Center¹

The mapping area is located about 10 miles southeast of Mount Diablo State Park in the southern portion of the Black Hills which represent the northern most portion of the Diablo Range. The study lies within portions of Contra Costa and Alameda County just north of Interstate 580 and is entirely within the Central Coast Ecoregion of the inner California Coast Ranges.

Listed below are the two watersheds that drain the study area:

- Altamont Creek (Primarily within the Focus Study)
- Cayetano Creek (West of the Focus Study)

¹ Environmental Systems Research Institute – ArcGis Resource Centers
<http://resources.esri.com/gateway/index.cfm>

Primary Focus Study – Alkali Preserve

The Primary Focus Study lies entirely within the northern portions of the Livermore Valley north of Interstate 580 and Arroyo Las Positas. Elevations range from about 500 feet in the southeastern portion to slightly over 600 feet in the southwest corner by the southern edge of the Black Hills. It is bounded to the west by North Livermore Avenue and to the east by Broadmoor Street. The southern fringe roughly follows the urban-grassland interface just north of Scenic Avenue, swings north and then south again where it follows the city limits to the study area's southwest corner. The Primary Focus Study encompasses roughly 1800 acres.

(See Figure 3)

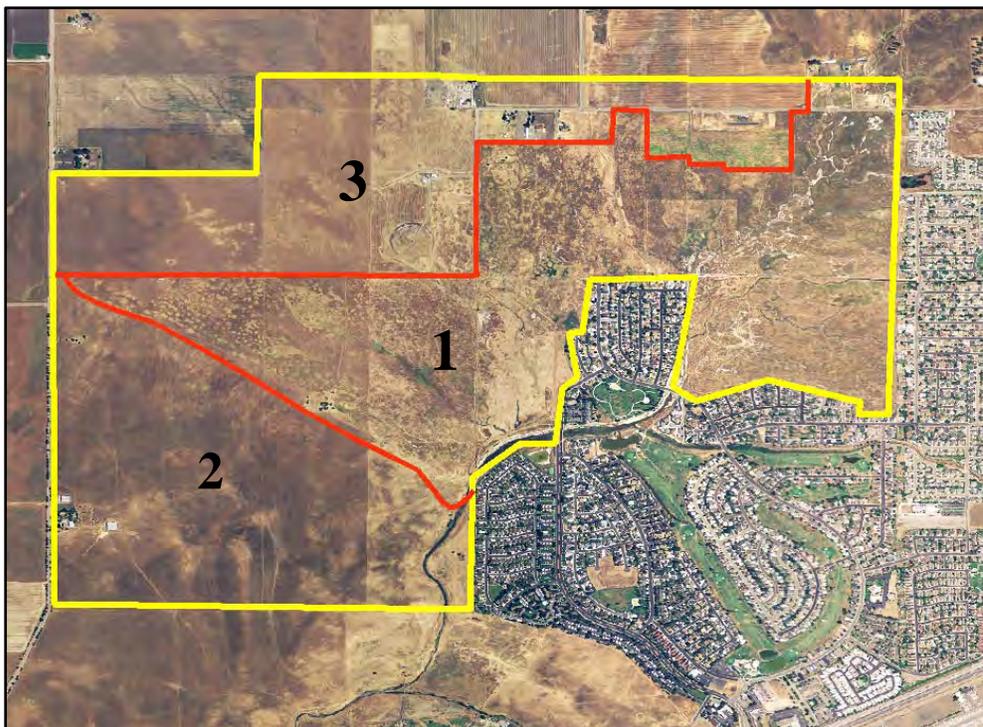


Figure 3: Primary Focus study area (In yellow) with three subregions separated out in red

Primary Focus Study Subregions

Subregion 1 – Alkali Sink Region

Subregion 1 takes up most of the focus study and corresponds roughly to the Natural Resources Conservation Service's map depicting the Pescadero Clay and Solano Fine Sandy Loam.² Both soils are recognized as saline-alkali soils with a ph of 7.9-9.0. Both also contain hog-walled (mima-mound) microrelief.³ Over 95% of the mapped polygons in

² Soil Survey, Alameda, 1961 - USDA National Resources Conservation Services

³ Springtown Alkali Sink Ecology, Botany, and Wildlife Notes – Friends of Springtown Preserve

the focus study occur within this subregion and contain most of the existing vernal pools within the study.

Subregion 2 – Black Hills

Subregion 2, located in the southwestern corner of the focus study, contains mostly hilly terrain that rises about 100 feet from the adjacent alkali regions. This region contains only a few wetlands, mainly confined to small ephemeral drainages which flow into Altamont Creek. Soils in the region consist primarily of the Altamont Clay (AaC) and Linne Clay Loam (LaD), both on areas of 15 to 30% slope.⁴ Most of the region is mapped to the generalized macrogroup Mediterranean California Naturalized Annual & Perennial Grasslands. One large polygon is noted with a minor component of *Distichlis spicata*.

Subregion 3 – Upper Livermore Valley

Subregion 3 contains most of the agricultural lands within the focus area and contains areas which both currently and recently have undergone agricultural practices. Soils in this region consist primarily of the Clear Lake Clay (CdA) which are very deep and have good drainage. Very few wetlands are mapped in this region; however, a large area in the central portion west of Lorraine Street has a historic vernal pool modifier attached to the polygons.

Brushy Peak Focus Study



Encompassing slightly under 700 acres of land, this region rises to an elevation of 1700' atop Brushy Peak where *Quercus agrifolia* (Coast Live Oak) forms open woodlands, with an understory of *Diplacus aurantiacus* (sticky monkey flower) and *Artemesia californica* (California sagebrush). The area is drained by a small intermittent stream with a mixture of temporarily flooded wetland communities containing both *Juncus sp.* and Saltgrass. This is one of the primary watersheds flowing into the Springtown Alkali Sink Region.

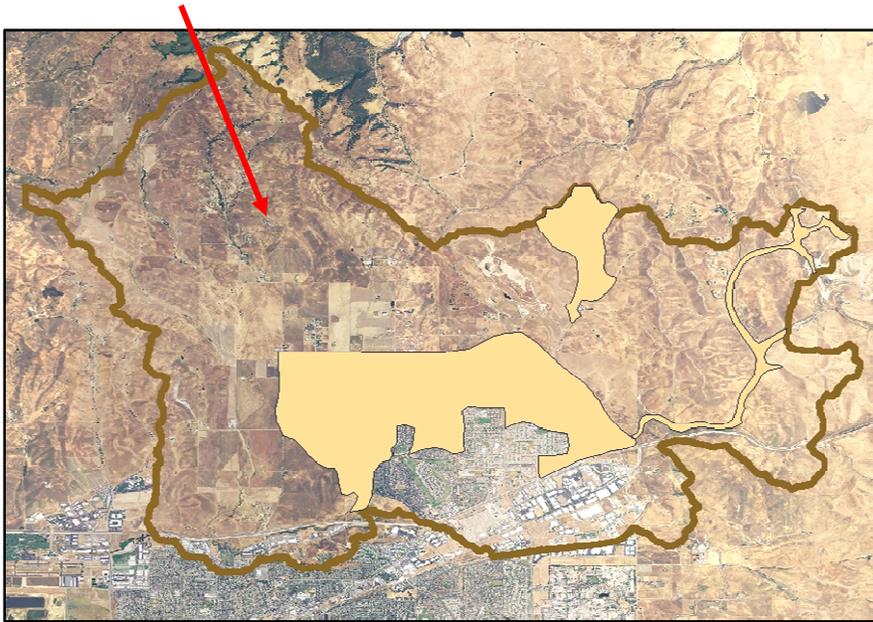
⁴ Soil Survey, Alameda, 1961 - USDA National Resources Conservation Services



Altamont Creek Focus Study

This focus region drains both the Altamont and Brushy Creek watershed just south of the Contra Costa County Line. The study boundary focuses on the riparian areas adjacent to the two creeks and is composed of both herbaceous and mixed willow riparian communities. The region encompasses approximately 500 acres and ranges in elevation from approximately 580 to just under 1000 feet.

Mapping Outside the Three Focus Regions



Encompassing the remaining approximately thirty square miles of land, the generalized mapping area includes a variety of woodland types, both riparian and upland, along with associated agriculture and land use. The dominant feature to the landscape is the California annual grassland communities which contain a variety of annual species from the genus *Bromus*, *Avena*, *Lolium* & *Hordium* in addition to forb species from a variety of *genera*. This region was mapped to a more generalized minimum mapping unit of 1 hectare and conforms to the mapping detail of most of the statewide projects completed in the past several years.

3. General Approach & Timeline

- April 9, 2008 – Signed purchase order
- February 2009 – Springtown imagery and GIS data to AIS
- April 2009 – Two day field reconnaissance effort
- May 2009 – Signature correlations – PI training
- June-September 2009 – Photo interpretation and map creation
- September 2009 – PI QC & final GIS
- October 2009 – Delivery of Interim map to Berkeley Herbarium
- November 2009 – Final report & map updates

4. Vegetation Mapping Criteria and Methodologies

Field Reconnaissance:

Vegetation mapping procedures include first conducting an initial field reconnaissance that establishes relationships between plant communities and their physiognomic requirements. The reconnaissance visit consisted of a two-day effort focused on both the overall mapping of vegetation outside the focus studies and an intensive effort within the three focus areas in order to map herbaceous wetland types as close to the Alliance level as possible. 270 GPS points (Figure 4) and associated waypoints were taken primarily in two of the three focus studies to acquire the photo signature characteristics needed to identify the different wetland categories being mapped.

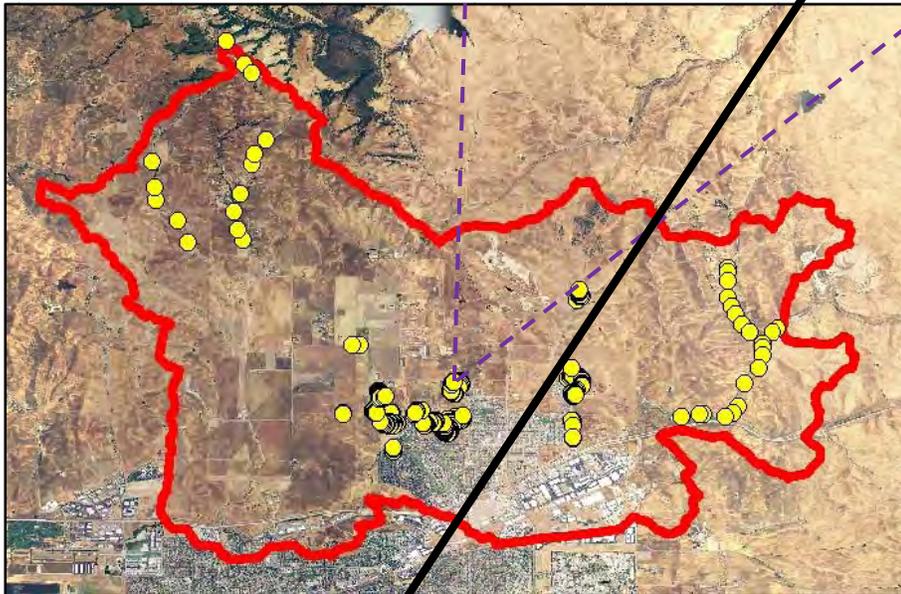
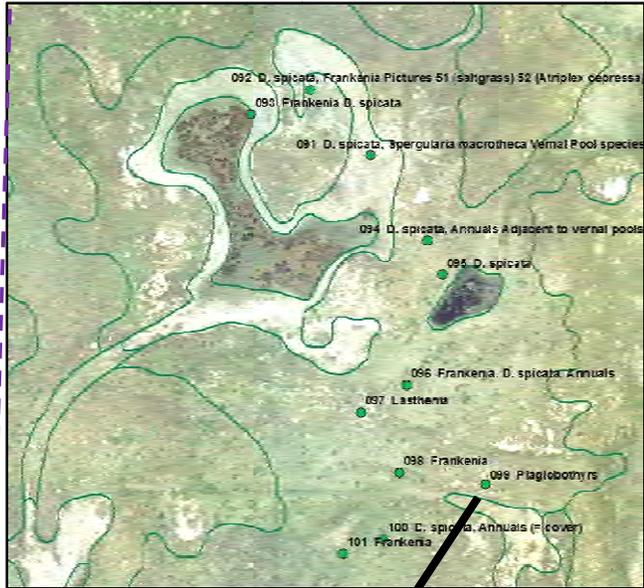


Figure 4 – Field Reconnaissance
 WP Number – 99
 Easting - 611572
 Northing - 4176562
 Species Dominance 1 – *Plagiobothrys*
 Species Dominance 2

Photo Interpretation: Photo interpretation is the process of identifying map units based on their photo signature. All land cover features have a photo signature. These signatures are defined by the color, texture, tone and pattern exhibited on the aerial photography. By observing the context and extent of the photo signatures associated with specific vegetation types, the photo interpreter is able to identify and delineate the boundaries between plant communities or signature units. Environmental factors such as elevation, slope and aspect also play an important part in the photo interpretation decision-making process.

Using the reconnaissance points, these PI signatures are correlated to their corresponding plant communities or plant species viewed in the field. AIS photo interpreters evaluated these correlations between the vegetation units and photo signatures and refined them to insure that the map would be useful at a resolution needed to meet the needs of the Berkeley Herbarium research effort.

A preliminary mapping classification and PI signature key is then developed using information derived from the field reconnaissance and any existing field plot data and vegetation classifications used in previous mapping efforts. In this mapping effort, supplemental plot data was not available during the photo interpretation effort.

GIS Procedures & Mapping Criteria: The vegetation units are interpreted across the entire study area using heads-up digitizing techniques through custom tools developed by AIS using ESRI's ArcGIS 9.3 Software. Every effort was made to delineate the smallest stands of wetlands; well below the contract specified limit of ½ hectare.

At times, photo interpreters found it necessary to aggregate vegetation types when patches of vegetation were too small to map. Aggregation follows two different sets of criteria that portray unique issues to the vegetation mappers:

- **Issues of complexing:** When a small patch of vegetation below the MMU that is clearly different from the larger adjacent vegetation is found within a mapped polygon one or more times, the mapped polygon is defined as a complex. When this occurs frequently in the polygon, the overall heterogeneity tends to be rather high. Examples include small alkali scalds which form a patchwork within a sparse cover of *Distichlis spicata*. These smaller inclusion patches are generally not mapped. In these instances, the "bare-ground" modifier field is assigned a category. (See page 16-17 for modifier descriptions)
- **Issues of ecological similarities:** When two species occur within a given polygon that tends to share similar ecological characteristics, and their relative abundance varies subtly within the mapped unit, the polygon is said to be transitional between two closely related vegetation types. An example of this includes the co-occurrence of saltgrass and upland annual grassland species in a single stand of vegetation. When these subtle mosaics within the vegetation stand are below the

minimum mapping unit, they are not separated out, and the overall heterogeneity of the polygon tends to be rather high. In this specific case, the “saltgrass” modifier field is assigned a “presence” value. (See page 16-17 for modifier descriptions)

Field Verification: No field verification has been performed on this mapping product to date. Photo interpreters are awaiting review of the preliminary product from Berkeley Herbarium staff in order to fine-tune the map and correct any erroneous photo interpretation correlations.

Accuracy Assessment: Accuracy Assessment (AA) is a statistical test of how well polygon map class attributes represent vegetation on the ground. The AA compares field observations with the map class assignment of the sampled polygon. The process involves the random selection of polygons that must be visited by field ecologists and classified without the knowledge of the photo interpreter’s mapped call.

At this time, no formal AA has been undertaken during this stage of the project. It is recommended that an accuracy assessment be performed on the map to ensure the user confidence in the final product.

Photo Interpretation & Mapping Tools

Digital Imagery: One-foot natural color imagery flown in May 2005 was used as a base for the delineated polygons and photo interpretation signature in the focus study areas. Additional online digital imagery was deemed necessary as supplementary information and included the National Agricultural Inventory Program (NAIP) imagery flown in the summer of 2005 which was used as a base for areas outside of the focus studies. In addition, a set of color infrared orthophotography was used to aid in some of the signature correlations. This set of imagery was not as valuable in discerning out subtle stands of *D. spicata* in annual grasslands as was the natural color high resolution imagery. The CIR tended to over emphasize plant vigor which was especially noticed in forb-related vegetation and annual grasses that had not completely senesced from spring greenness.

**Note: It is important to understand that the interpretation in the focus areas is geo-referenced to the 1-foot 2005 imagery and will not line up precisely to the NAIP imagery in all cases. Therefore it is not advisable to view the delineations over the NAIP imagery, especially at a fine-scale level in the focus studies.*

Ancillary Data: The following ancillary datasets were supplied by the contractor to further aid in mapping the vegetation types:

- USGS DRG topographic data
- Hydrology Data Layer
- USDA Natural Resources Conservation Service Soil Survey Maps
- Study Area Base Maps

Special Notations Regarding the Mapping Product

Study area boundary:

The southern extent of the mapping effort has been adjusted to conform to the South Bay Aqueduct; overall adjustments are less than 50 meters. The Springtown Primary Focus Area boundary is adjusted to follow urban or centerline road interface as depicted on the 1-foot digital imagery.

Minimum Mapping Unit (MMU):

Even though initial MMU guidelines set in the contract were ½ hectare for the entire mapping area, in order to capture sensitive habitats, AIS found it necessary to delineate wetland units down to as little as 200 square feet where pronounced wetlands were visible on the imagery. Interpretation outside of the focus area adheres to the ½ hectare MMU.

Conforming to the National & Statewide Mapping Guidelines

Every effort was taken to address the need by the University Herbarium for a thorough survey of the existing wetlands. Several limitations, in addition to the basic limitations to mapping products in general, had to be considered in order to adhere to overall consistency with other statewide mapping projects which conform to the NVCS.

- Photo interpreters were confronted with instances where several wetland types occurred in an extremely small area. In those cases, only one call was made to the polygon. Note *Issues of Complexing* on Page 14 for further details on complexing and aggregations.
- Mapping herbaceous categories to Alliance level dominance was not possible in all instances; therefore, mapping aggregation units had to be defined by photo interpreters which would allow accurate labeling of the polygons to more generalized levels in the hierarchy. Splitting out herbaceous types always proves a challenge to photo interpreters, regardless of the resolution of the imagery.
- No Accuracy Assessment has been performed on this product to date

Special Modifier Fields:

To address the special interests and concerns of the University Herbarium and researchers at the Springtown Preserve, photo interpreters have identified up to five modifiers to each polygon interpreted to denote information pertinent to the final product. The following modifiers have been added to the vegetation map:

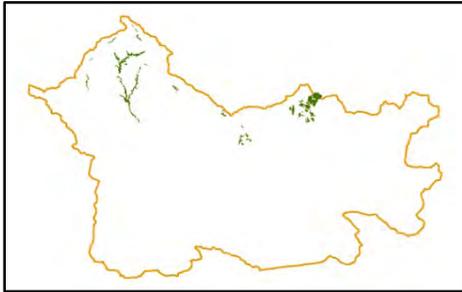
- Bare Ground Modifier: Used to denote stands of vegetation which have small patches of alkali scalds throughout the mapped unit but are not assigned this type in the primary floristic code.
- Iodine Bush Modifier: Used to denote the presence of a sparse cover of *Allenrolfea occidentalis* in stands of vegetation that is assigned a different floristic code such as saltgrass or annual grasslands.

- **Saltgrass Modifier:** Used to denote a visible presence of saltgrass in other herbaceous types (especially annual grasses), where individual patches are too small to map or where relative cover is too low to separate out as a salt grass type.
- **Vernal Pool Topography:** Used to signify a past presence of vernal pool vegetation based on existing mima topography which is visible on the imagery but has since undergone disturbance and no longer contains vernal pool vegetation.
- **Agriculture Modifier:** Used to denote recent practices of agriculture that is visible on the imagery (usually areas exhibiting past row cropping) and is currently mapped as annual grasses.

5. Mapping & Floristic Descriptions

Note: Distribution boxes depict mapped polygons highlighted in green

Formation Category (Mesomorphic Tree Vegetation – Forest & Woodlands)



Three Upland species mapped in the study –
Quercus Agrifolia, *Q.lobata* & *Aesculus californica*

1112 – Coast Live Oak

Mapping Descriptions: Most stands mapped in the Brushy Peak Focus Area in open grassland settings, often with an understory of *Diplacus aurantiacus* or *Artemesia californica* and along Cayetano Creek in riparian and low slope settings. Mapped where coast live oak dominates the hardwood tree layer with at least 8-10% cover.

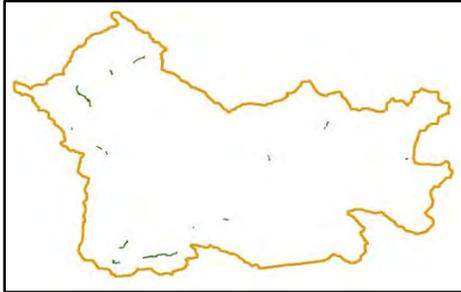
1310 – California Buckeye

Mapping Descriptions: One small patch mapped upslope from a tributary of Cayetano Creek on a steep north trending slope along the Morgan Territory Road. Stand was verified during reconnaissance.

1313 – Valley Oak

Mapping Descriptions: Several stands mapped in a riparian setting along Cayetano Creek north of the Alameda-Contra Costa county line. Valley oak dominates in these settings, with components of coast live oak and red willow.

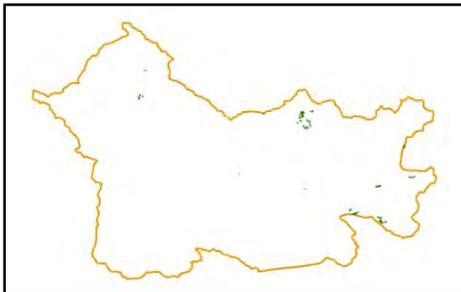
3111 – Red Willow



One riparian species mapped in the study –
Salix laevigata; & 1 polygon mapped as *S. exigua*

Mapping Descriptions: Noted along the major drainages including a large stand along Highland Road on a tributary of Cayetano Creek. Also mapped in the southern portion of the mapping area along Las Positas Creek. All stands contain other riparian species. Several polygons where species were not determined off the imagery were mapped to the generic Sonoran Riparian Woodland or Madrean Riparian Scrub Macrogroups (codes 3100 & 6200).

Formation Category (Mesomorphic Shrub Vegetation)



Four upland shrub types mapped in the study-
Baccharis pilularis, *Lupinus albifrons*
Diplacus aurantiacus, *Artemisia californica*

4420 – Coyotebrush

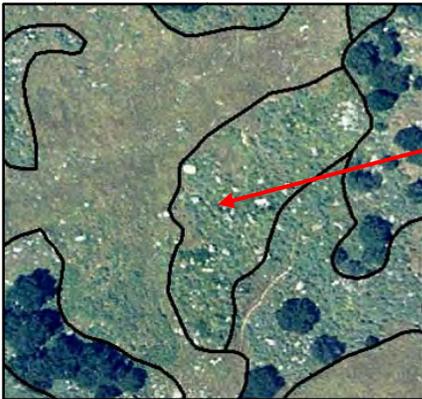
Mapping Descriptions: Several small patches mapped south of the interstate and Altamont Creek on north trending slopes. Stands observed were in grassy settings, occasionally with poison oak as a co-dominant.

4421 – Silver Bush Lupine

Mapping Descriptions: Four small patches were observed on the reconnaissance east of Morgan Territory Road in an open grassy setting. Sparse stands are difficult to distinguish from the adjacent grasslands on the 1-foot or NAIP imagery. Stands noted had under 15% shrub cover.

4501 – Sticky Monkeyflower

Mapping Descriptions: A few small patches noted adjacent to the coast live oak on the upper slopes of Brushy Peak in the northern part of the study (Brushy Peak Focus Area). Mapped in open settings with a grassy understory.



Mimulus is recognized by its somewhat yellower color than adjacent sagebrush. This stand is a mix of the two species.

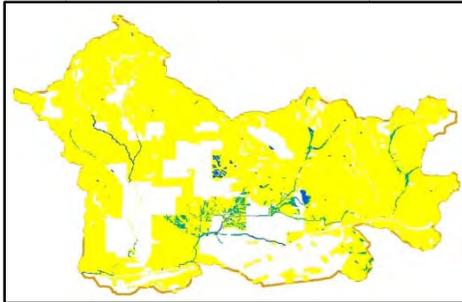
4502 – California Sagebrush

Mapping Descriptions: Mapped in small patches primarily in the Brushy Peak Focus Area adjacent to coast live oak. Noted on somewhat less rocky settings than the sticky monkeyflower where it occurred nearby.

6301 – Poison Oak

Mapping Descriptions: One patch mapped between the interstate and Altamont Creek.

Formation Category (Mesomorphic Herbaceous Vegetation)



Upland annual grasses in yellow, wetland Species in green.

7102 – *Bromus diandrus* – *B. hordaeceous* – Clover mix

Mapping Descriptions: Mapped in the driest settings on mima topography that remains dry throughout the year. *B. diandrus* dominates or co-dominates the herbaceous layer. Upland forb like vegetation (*Brassica*, *Erodium*, *Trifolium* etc.) can be a component to the cover.



Note interface between the drier *B. diandrus* which yields a more golden color (from the large seed head) than the adjacent *B. hordaeceous* – *Hordium* mix.



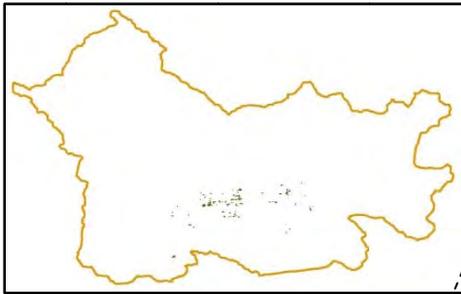
7103 – *Hordium* spp. – *Bromus hordaeceous* mix

Mapping Descriptions: Mapped in somewhat drier and lower settings than adjacent *B. diandrus*. Often containing a component of *D. spicata* (noted by saltgrass modifier). Mapped to this category primarily when adjacent to the higher mima “mounds”.

7105, 7106, 7110 – *Brassica nigra*, *Carduus pycnocephalus*, Weedy Ruderal Forbs Mapping Unit

Mapping Descriptions: Mapped sparingly; may not represent a current snapshot in time; weedy forbs tend to be highly variable year to year. *Brassica* is mapped most frequently based on the imagery showing it in flower.

7300, 7301, 7302 – Western North American Vernal Pools Macrogroup



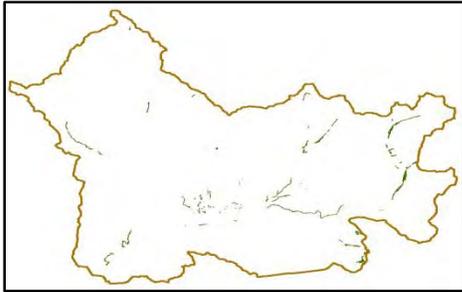
Existing Vernal Pools in Study



Imagery depicts *Lasthenia fremontii* in bloom; also shown in ground photo where it is a component to other vernal pool vegetation.

Mapping Descriptions: Mapped to either 7300 (Vernal Pools where species cannot be differentiated) or to 7301 (*Lasthenia fremontii*) as depicted above. In no instances were any other species (Including *Downigia pulchella*) mapped unless verified by reconnaissance data. Past vernal pool presence is denoted by a modifier. See page 31 for modifier descriptions.

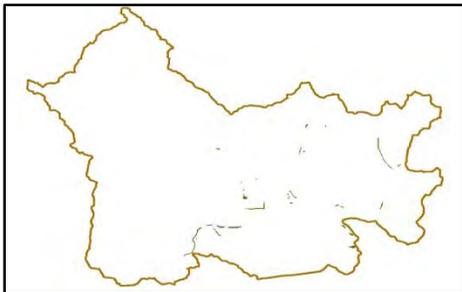
**7400, 7401 – North American Arid West Freshwater Marsh Macrogroup
(*Typha-Scirpus*) Marsh**



Freshwater marshes in the study

Mapping Descriptions: Mapped in permanently flooded regimes where either *Typha spp.* or *Scirpus spp.* dominates or shares dominance in the stand. Numerous examples line the margins of impounded stream channels through urban areas; a good example of this type occurs in the Primary Focus Study area along Raymond Road.

**7500, 7501 – Western North American Temperate Marsh & Wet Meadow Macrogroup
(*Juncus balticus* – *Eleocharis sp.*)**



Meadow vegetation in the study

Mapping Descriptions: Mapped in temporarily to seasonally flooded regimes where either *Juncus balticus* or *Eleocharis spp.* dominate the herbaceous layer. Often found in narrow ephemeral drainages as discontinuous bands of vegetation. When species are not identifiable, the more generalized category (7500) is assigned to the polygon.

Figure 5 – 7601 - Saltgrass

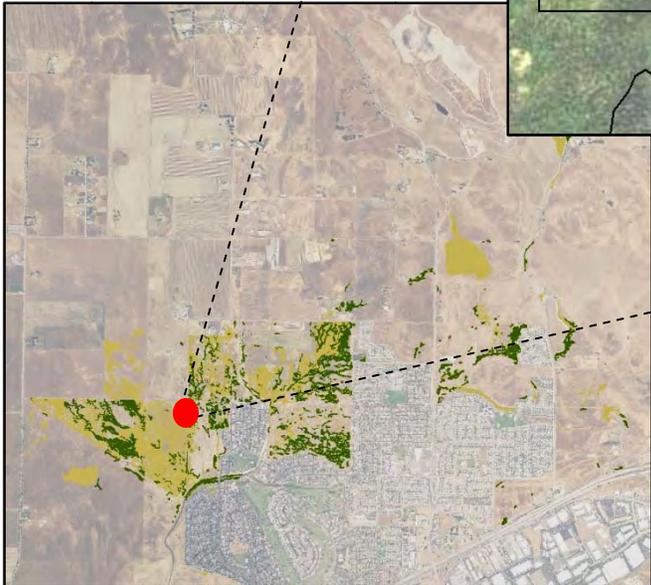
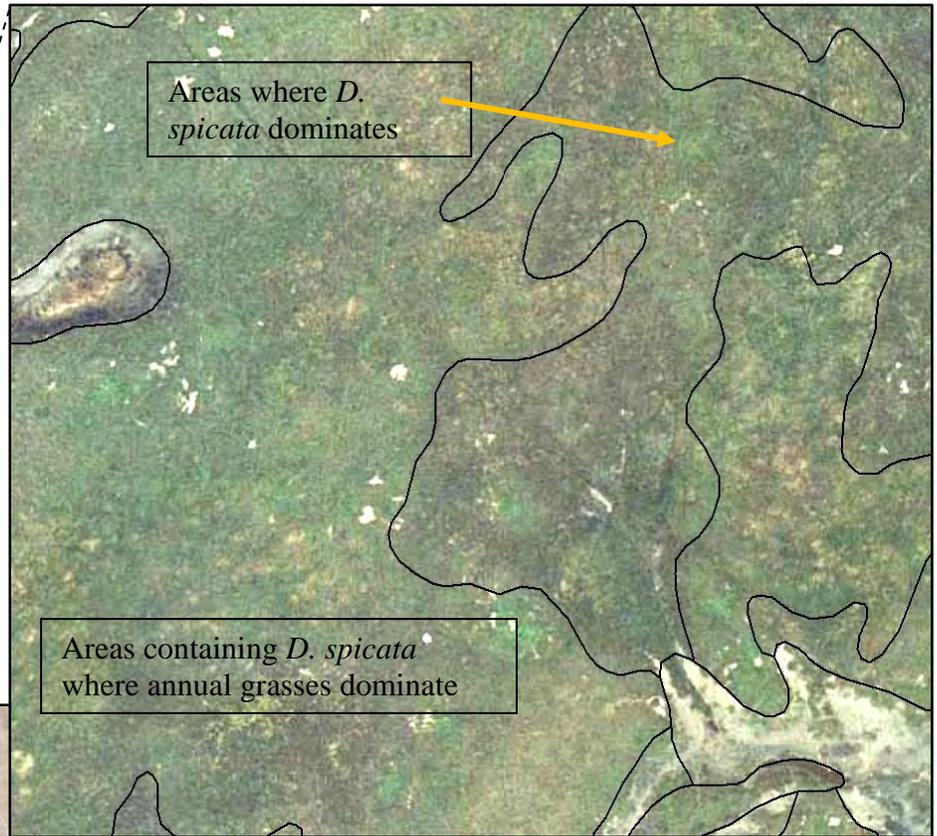


Photo interpreters attempted to map saltgrass where it was only a component to annual grasses (as depicted in the tan color above). The natural color imagery was used for pulling out this signature since it did not over emphasize herbaceous vigor and yielded a distinct blue to brown color for the saltgrass.



Dense band of saltgrass with annual grasses adjacent

**7700 – Western North American Interior Alkali-Saline Wetlands
(Salt Marsh Vegetation)**

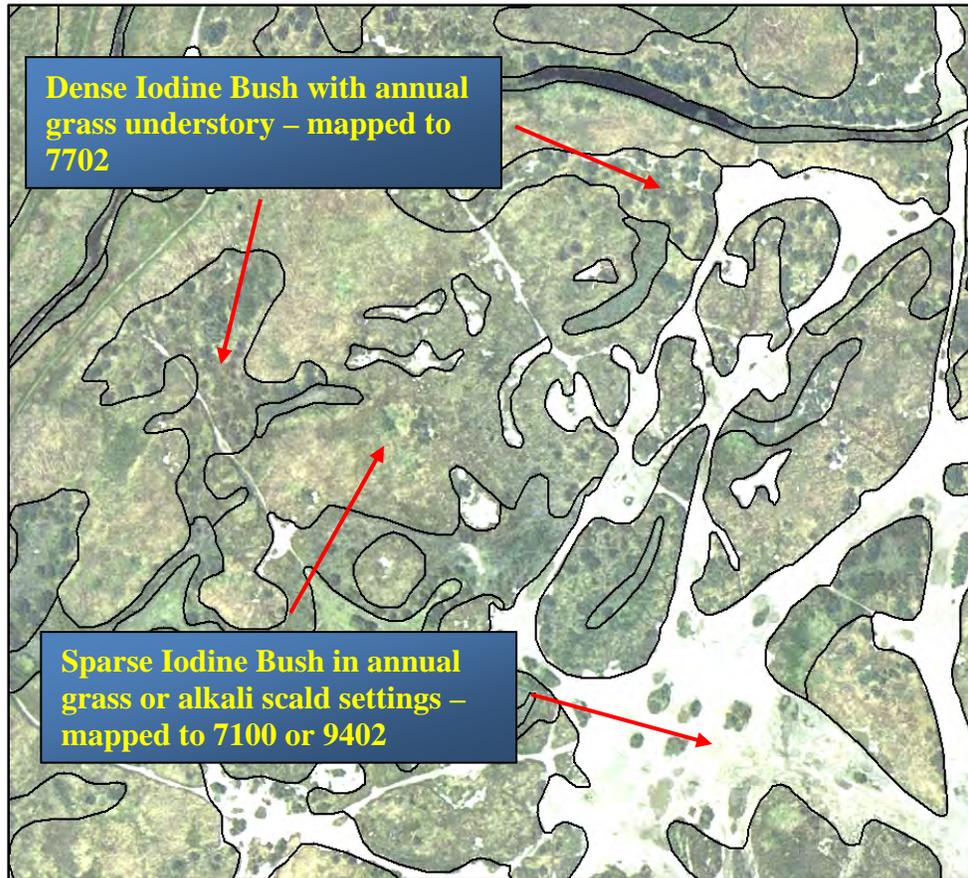
7701 – *Sporobolus airoides*

Mapping Descriptions: Two fairly large stands noted between Lorrain and Raymond Road in the southern portion of the Primary Focus Area. Mapped where alkali sacaton dominated the herbaceous layer often with a component of *D. spicata*. Herbaceous density varies considerably within the mapped polygons. Individual plants were also noted in stands labeled as *Allenrolfea occidentalis* and where overall vegetative cover was sparse within alkali scald settings.



7702 – *Allenrolfea occidentalis*

Mapping Descriptions: Mapped where *A. occidentalis* made up at least 8-10% of the overstory shrub layer; usually on or adjacent to sparse alkali scalds. Also noted in areas where annual grasses dominated with *D. spicata*. Stands under 10% cover were assigned to an iodine bush presence modifier and given another code for the Alliance.



7703 – *Frankenia salina*

Mapping Descriptions: Mapped only where noted on reconnaissance. A reliable photo signature could be established for this species due to the fact that it never formed large or dense enough areas where it dominated the vegetation. Often found as an associate to *D. spicata* or adjacent to alkali scalds.

7704 – *Salicornia virginica*

Mapping Descriptions: Mapped sparingly also due to the limited extent in the study area. Generally too sparse to map (as noted in alkali scalds); also noted as a subordinate species to *D. spicata* in open scald environments.

7705 – *Atriplex* spp.

Mapping Descriptions: Due to the existing flooded conditions of Frick Lake, photo interpreters were able to map only several stands of *Atriplex*, generally along the existing shoreline as depicted on the base digital imagery. Other stands observed during reconnaissance were either too small or yielded no signature characteristics. These included species not yet identified in the field within Frick Lake.

Formation Category: Lithomorphic, Anthropogenic, & Water

9200 – Agriculture

Mapping Descriptions: Mapped where agricultural practices are existing at the time of the base imagery, or where recently harvested products have not been replaced by annual grasses (Usually after the last crop and before the onset of the spring growing season). Fallow land that has not been worked for over a year will generally have a cover of annuals and will be mapped to a 7000 category with a past agriculture modifier. Areas that have undergone agricultural practices in the past and have since reverted to annual grasses and show a history of vernal pool topography are given a special modifier depicting the area as having historic vernal pool vegetation.



West of Lorraine Road, vernal pool topography is still evident, but annual grasses dominate on land that has undergone intensive agricultural practices in the past. Note existing wetlands west of the road.

9300 – Built Up & Related Disturbance

Mapping Descriptions: Noted in the mapping effort especially along the southern margins of the Primary Focus Area (city of Livermore). Wetlands were delineated through urban areas as much as possible to show connectivity of major watersheds. Both urban and agricultural lands are further defined with a separate land use classification. (See Data Dictionary, Page 29)

9400 – Areas of Little or no Vegetation



9401 – Cliffs & Rock Outcroppings

Mapping Descriptions: Mapped as an aggregation type unit where rock outcroppings are noted on the imagery; often between small patches of annual grasslands.

Diplacus aurantiacus or *Artemisia californica* may be present as a sparse cover. The Jepson Herbarium has expressed an interest in capturing rock outcrops in order to support analysis regarding the Alameda whipsnake and its habitat.

9402 – Alkali Scalds

Mapping Descriptions: Mapped where vegetative cover is generally under 10%. Noted frequently in the harshest environments within the Alkali Preserve of the Primary Focus Area. Where vegetation forms a complex mosaic with small patches of alkali, the polygon is given a floristic code with a bare ground modifier (see description of modifier codes) and example on p.26.

9403 – Undefined areas with little or no vegetation

Mapping Descriptions: Mapped where areas are generally cleared of vegetation, but are not identified as to their origin of disturbance.

9500, 9501 – Exotic Trees, *Eucalyptus*

Mapping Descriptions: Mapped where *Eucalyptus spp.* dominates (9501) or where other unidentifiable non native species were observed (9500).

9800 – Water

Mapping Descriptions: Mapped where either NAIP or the 1-foot natural color imagery depicted existing water.

9999 – Unknown

Two polygons depicting shrubby vegetation (probably exotics) and four polygons depicting an herbaceous signature were not identifiable to a mappable unit at the time the imagery was produced.

7. Data Dictionary

Springtown Preliminary Mapping Classification

Original – May 2009

Updated – September 2009

LEVEL 1 FORMATION CLASS

Level 3 Formation

Levels 4, 5, or 6: Divisions, Macro Groups, & Groups
California Scientific Name (Alliance)
Mapping Units & Non-hierarchy Vegetation

MESOMORPHIC FORESTS & WOODLANDS

Warm Temperate Forests

1100 – California Evergreen Broadleaf Sclerophyll Forests & Woodlands

1110 – *Umbellularia californica*

1112 – *Quercus Agrifolia*

1300 – California Upland Deciduous & Mixed Evergreen Forests & Woodlands

1310 – *Aesculus californica*

1313 – *Quercus lobata*

Temperate Flooded Forests

3100 – Sonoran Riparian Broadleaf Deciduous Woodlands

3110 – *Populus fremontii*

3111 – *Salix laevigata* (?)

MESOMORPHIC SHRUB VEGETATION

4400 – California Evergreen Coastal Scrub Macrogroup

4420 – *Baccharis pilularis*

4421 – *Lupinus albifrons*

4500 – California Facultatively Drought-Deciduous Scrub

- 4501 – *Diplacus aurantiacus*
- 4502 – *Artemesia californica*
- 6200 – Madrean Warm-temperate Riparian Wash Scrub**
- 6211 – *Salix exigua*

- 6300 – Vanacouverian Coastal Deciduous Shrubs**
- 6301 – *Toxicocendron diversilobum*

MESOMORPHIC HERBACEOUS VEGETATION

Temperate & Boreal Scrub and Herb Coastal Vegetation

7100 – Mediterranean California Naturalized Annual & Perennial Grassland & Meadow Macro Group

- 7101 – *Bromus diandrus*
- 7102 – *Bromus diandrus* – *B. hordaeceous* – (Clover) mix
- 7103 – *Hordium spp.* - *B. hordaeceous* mix
- 7104 – *Lolium perenne*
- 7105 – *Brassica nigra*
- 7106 – *Carduus pycnocephalus*
- 7107 – *Leymus sp.*
- 7110 – Weedy Ruderal Forbs Mapping Unit

7200 – California Annual herb/grass Group (Native Presence Dominates)

- 7200 – *Layia chrysanthemoides* – *Lasthenia gracilis*

Mediterranean California Grassland & Forb Meadow

7300 – Western NA Vernal Pools & Other Seasonally Flooded Macro Group

- 7301 – *Lasthenia fremontii*
- 7302 – *Downigia pulchella*

Temperate & Boreal Freshwater Marsh

7400 – North American Arid West Freshwater Marsh Macro Group

- 7401 – *Typha-Scirpus*

7500 – Western North American Temperate Marsh & Wet Meadow Macro Group

- 7501 – *Juncus balticus*- *Eleocharis sp.*
- 7502 – *Lepidium latifolium*

Temperate & Boreal Salt Marsh

7600 – North America Pacific Coastal Salt Marsh

- 7601 – *Distichlis spicata*

7700 – Western North American Interior Alkali-Saline Wetland

- 7701 – *Sporobolus airoides*
- 7702 – *Allenrolfea occidentalis*
- 7703 – *Frankenia salina*
- 7704 – *Salicornia virginica*
- 7705 – *Atriplex spp.* (to be determined)

LITHOMORPHIC, ANTHROPOGENIC & WATER

9200 – Agriculture (Without fallow annual grasses dominating)

9300 – Built up & Urban Disturbance

*Note: Separate land use classification in different field

9400 – Areas of Little or No Vegetation

9401 – Cliffs & Rock Outcroppings

9402 – Alkali Scalds

9403 – Undefined areas with little or no vegetation

9500 – Exotic Trees

9501 Eucalyptus

9800 – Water

9999 – Unknown, field check needed to classify polygon

MODIFIER FIELDS

Bare Ground Modifier:

1=1 -10%

2=10-40%

3 - >40%

>90% Mapped to 9400 Code

Iodine Bush Modifier:

1=1-10%

>10% Mapped to Alliance

Saltgrass Modifier:

1= Salt Grass Presence Noted

Vernal Pool History Noted:

1 = Presence noted based on soil hydrology; floristic presence modified by disturbance

Agriculture Modifier

1 = Past agricultural practices noted

Field Check Values:

0= None

1= Field question

2 = Field question answered

4 = Field question sent, but not answered to date

Landuse: *Note – See Landuse Classification

Springtown Land Use Classification

1000 Urban or Built-Up

1100 Residential:

Includes Single Family Residential, Multi-Family Residential, Mobile Homes and Trailer Parks, and Rural Residential

1200 Commercial and Services:

Includes General Office Use, Retail Stores and Commercial Services, Other Commercial Facilities, Public Facilities, Special Use Facilities, Educational Institutions, and Military Installations

1300 Industrial:

Includes Light Industrial, Heavy Industrial, Extraction, and Wholesaling and Warehousing

1400 Transportation, Communications, and Utilities

1500 Mixed Commercial and Industrial

1600 Mixed Urban

1700 Under Construction

1800 Open Space and Recreation

Includes Golf Courses, Local Parks, Regional Parks and Recreation, Cemeteries, Wildlife Preserves and Sanctuaries, Specimen Gardens and Arboreta, Other Open Space and Recreation

2000 Agriculture

2100 Cropland and Improved Pasture Land

2200 Orchards and Vineyards

2300 Nurseries

2400 Dairy, Intensive Livestock, and Associated Facilities

2500 Poultry Operations

2600 Other Agriculture

Includes farm structures and equipment storage areas not associated with a residential or other agricultural category

2700 Horse Ranches

3000 Vacant

4000 Water

ADDITIONAL FIELDS CONTAINED IN THE DATABASE

FIELDCHECK

0 = No Field Check

1 = AIS PI Questions – Polygons denoted by photo interpreters where they have questions regarding the final label (call).

2 = Field Question Answered

COMMENT

Used to denote further information about the mapped polygon; generally for PI references and training sites for Phase III effort. Also valuable information as added detail to formation level mapping unit.

GIS-RELATED

Shape Length & Shape Area

Table 1 – Total Acreages by Mapping Type

OBJECTID	FREQUENCY	MAPPING TYPE	Veg	Acres
1	35	<i>Quercus Agrifolia</i>	1112	168.5
2	1	<i>Aesculus californica</i>	1310	0.8
3	6	<i>Quercus lobata</i>	1313	55.8
4	11	Sonoran Riparian Woodland	3100	16.4
6	3	<i>Salix laevigata</i>	3111	11.8
7	5	<i>Baccharis pilularis</i>	4420	4.0
8	4	<i>Lupinus albifrons</i>	4421	1.8
9	2	Drought Deciduous Shrub	4500	0.2
10	3	<i>Diplacus aurantiacus</i>	4501	2.0
11	18	<i>Artemesia californica</i>	4502	23.4
12	8	Madrean Riparian Scrub	6200	14.5
13	1	<i>Salix exigua</i>	6211	0.1
14	1	<i>Toxicodendron diversilobum</i>	6301	1.6
15	183	California Annual Grasses M.G.	7100	16963.7
16	555	<i>Bromus diandrus - B. hordaeceous</i>	7102	335.9
17	103	<i>Hordium spp. - B. hordaceous</i>	7103	174.1
18	27	<i>Brassica nigra</i>	7105	7.1
19	1	<i>Carduus pycnocephalus</i>	7106	0.0
20	1	<i>Leymus spp.</i>	7107	2.3
21	52	Weedy Ruderal Mapping Unit	7110	115.6
22	96	Vernal Pools Macrogroup	7300	6.8
23	18	<i>Lasthenia chrysanthemoides - L. gracilis</i>	7301	1.6
24	1	<i>Downigia pulchella</i>	7302	0.4
25	41	<i>Typha-Scirpus</i>	7401	27.4
26	29	Wet Meadow Macrogroup	7500	42.8
27	60	<i>Juncus balticus - Eleocharis spp.</i>	7501	20.6
28	15	<i>Lepidium latifolium</i>	7502	0.9
29	503	<i>Distichlis spicata</i>	7601	120.4
30	10	Alkali Saline Wetland Macrogroup	7700	2.4
31	2	<i>Sporobolus airoides</i>	7701	0.9
32	120	<i>Allenrolfea occidentalis</i>	7702	28.6
33	2	<i>Frankenia salina</i>	7703	0.6
34	3	<i>Salicornia virginica</i>	7704	0.4
35	5	<i>Atriplex spp.</i>	7705	4.3
36	20	Agriculture	9200	2421.3
37	205	Urban Built Up - Disturbance	9300	4400.9
38	11	Cliffs & Rock Outcroppings	9401	2.1
39	149	Alkali Scalds	9402	17.3
40	11	Undefined areas of little or no vegetation	9403	7.9
41	8	Exotic Trees	9500	6.9
42	9	<i>Eucalyptus</i>	9501	14.2
43	95	Water	9800	100.1
44	6	Unknown	9999	4.8
	2440	Totals		25132.9

Table 2 - National Vegetation Classification Hierarchy (FGDC 2008)⁵

Hierarchy Level	Criteria	Example
Upper: Physiognomy plays a predominant role.		
L1 – Class	Broad combinations of general dominant growth forms adapted to basic temperature (energy budget), moisture, and/or substrate or aquatic conditions.	1.Forest and Woodland
L2 - Subclass	Combinations of general dominant and diagnostic growth forms that reflect global macroclimatic factors driven primarily by latitude and continental position, or that reflect overriding substrate or aquatic conditions.	1.C .Temperate Forest
L3 – Formation	Combinations of dominant and diagnostic growth forms that reflect global macroclimatic factors as modified by altitude, seasonality of precipitation, substrates and hydrologic conditions.	1.C.1. Warm Temperate Forest
Middle: Both floristics and physiognomy play a significant role.		
L4 – Division	Combinations of dominant and diagnostic growth forms and a broad set of diagnostic plant taxa that reflect biogeographic differences in composition and continental differences in mesoclimate, geology, substrates, hydrology, and disturbance regimes.	1.C.1.c. Madrean Forest
L5 – Macrogroup	Combinations of moderate sets of diagnostic plant species and diagnostic growth forms that reflect biogeographic differences in composition and subcontinental to regional differences in mesoclimate, geology, substrates, hydrology, and disturbance regimes.	California Forest and Woodland MacroGroup
L6 – Group	Combinations of relatively narrow sets of diagnostic plant species (including dominants and co-dominants), broadly similar composition, and diagnostic growth forms that reflect biogeographic differences in composition and sub-continental to regional differences in mesoclimate, geology, substrates, hydrology, and disturbance regimes	California Coastal Closed-Cone Conifer Forest and Woodland Group
Lower: Floristics plays a predominant role.		
L7 – Alliance	Diagnostic species, including some from the dominant growth form or layer, and moderately similar composition that reflect regional to subregional climate substrates, hydrology, moisture/nutrient factors and disturbance regimes.	Foothills Pine Woodland Alliance
L8 – Association	Diagnostic species, usually from multiple growth forms or layers, and more narrowly similar composition that reflect topo-edaphic climate, substrates, hydrology and disturbance regimes.	<i>Pinus sabiniana</i> / <i>Eriogonum fasciculatum</i> Alluvial Woodland

⁵ National Vegetation Classification Hierarchy - Federal Geographic Data Committee - 2008

