

**Vegetation Map and Classification of Oak Grove property (type undesignated)
San Diego County, California**

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Department of Fish and Game
Vegetation Classification and Mapping Program
Biogeographic Data Branch

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Abstract

The California Department of Fish and Game (Department) Vegetation Classification and Mapping Program (VegCAMP) created a fine-scale vegetation classification and map of the Department's Oak Grove property, San Diego County, California following FGDC and National Vegetation Classification Standards. The vegetation classification was derived from floristic field survey data collected in the field in May 2010 and was based on previously described Alliances and Associations. The map was produced using true-color 2009 1-meter National Agricultural Imagery Program (NAIP) imagery as the base. Supplemental imagery including 2005 1-meter California Color Infrared (CIR) and true-color 1-foot aerial imagery available through GlobeXplorer ImageConnect were also used. The minimum mapping unit (MMU) is one acre, with the exception of wetland types, which were sometimes mapped to ½ acre. Field verification of 45% of the mapped polygons was conducted in June 2011; in combination with the 2010 sampling effort, 83% of the polygons were verified in the field.

Purpose

The purpose of the classification and vegetation map is to aid in the development of a management plan for the Department of Fish and Game Oak Grove property. This property is a recent acquisition and the property type (i.e., Wildlife Area or Ecological Reserve) and public use designations (i.e., access, hunting) have not yet been determined. The vegetation classification and mapping provides an inventory of habitat types and a measure of the extent of each type on the property, for use in assessing the biological resources present and determining appropriate management strategies. The mapping also provides a delineation of the location and extent of agricultural fields and old fields present on the property.

Supplemental Information

Rapid Assessment data were collected from 72 vegetation stands from May 24-28, 2010 following the California Native Plant Society's Rapid Assessment protocol (Appendix A). Additional field reconnaissance data were collected from 51 locations during this same time period. Sample point locations were collected with Trimble Junos (GPS-enabled PDAs) and stored in two ESRI-format shapefiles: "OakGroveDFGSurveys" and "OakGroveReconPoints." Rapid Assessment data were entered into VegCAMP's Rapid Assessment Database (MS Access format). The Rapid Assessment data include the date of sampling, GPS location, environmental characteristics of the sampled stands (microtopography, substrate, soil texture, slope, aspect, ground surface characteristics, disturbance type and intensity), vegetation structure (tree, shrub and herb cover and height, total vegetation cover), species cover, site history, and the Alliance and Association. Additionally, four digital photos taken in the cardinal

directions from each Rapid Assessment location are available from VegCAMP. These Rapid Assessment data and field photos can serve as a baseline for monitoring. The Field Reconnaissance data provide observational notes on stand composition and environmental attributes at specific GPS locations in the landscape, and are sometimes associated with photos. The primary use of Field Reconnaissance data was to aid in mapping.

Vegetation Classification Methods

An initial review of field data found that all major vegetation types (Alliances) observed were described in existing vegetation classifications for nearby locations (Gordon and White 1994, Keeler-Wolf et al. 1998, Keeler-Wolf and Thomas 2000, Evens and San 2006, Klein and Evens 2006, Sawyer et al. 2009). This Alliance list was used to create the vegetation classification and as the basis for mapping.

Naming conventions followed the National Vegetation Classification System (Grossman et al. 1998) and the Manual of California Vegetation (Sawyer et al. 2009). An Association is defined by a group of samples that have similar dominant and characteristic species in the overstory and other important or indicator species, whereby these species are distinctive for a particular environmental setting. A set of similar Associations is grouped hierarchically to the next higher level in the classification, the Alliance level.

Appendix B is a list of all plant species recorded during field data collection.

Field Verification

Field verification of the draft map was conducted in June 2011 by Rachelle Boul, Diana Hickson, Mary Jo Colletti, Randy Botta, and Melanie Gogol-Prokurat. We field checked 111 polygons. When combined with the 109 polygons for which field data were collected in 2010, a total of 83% of the final Oak Grove polygons were field verified.

Key to Identification of All Stands of Vegetation Sampled or Encountered in the Field

Example Terms and Concepts Used Throughout the Key:

Dominance by layer: Tree, shrub, and herbaceous layers are considered physiognomically distinct. A vegetation type is considered to belong to a certain physiognomic group if it is dominated by one layer. Layers are prioritized in order of height when naming the type.

Dominant: Dominance refers to the preponderance of vegetation cover in a stand of uniform composition and site history. It may refer to cover of an individual species (as in "dominated by Douglas-fir"), or it may refer to dominance by a physiognomic group, as in "dominated by shrubs." Dominance refers to the relative cover of one species or physiognomic group as compared to another species or physiognomic group.

Co-dominant: Co-dominance refers to two or more species in a stand that share dominance and have between 30 and 60 percent relative cover each.

Cover: The primary metric used to quantify the importance/abundance of a particular species or a particular vegetation layer within a stand. It is measured by estimating the aerial extent of the living plants, or the bird's-eye view looking from above, for each category. Cover in this and other California National Park Service vegetation classification and mapping projects uses the concept of "porosity" or foliar cover rather than "opacity" or crown cover. Thus, field crews are trained to estimate the amount of shade produced by the canopy of a plant or a stratum by taking into account the amount of shade it casts excluding the openings it may have in the interstitial spaces (e.g., between leaves or branches). This is assumed to provide a more realistic estimate of the actual amount of shade cast by the individual or stratum which, in turn, relates to the actual amount of light available to individual species or strata beneath it.

Relative cover: Refers to the amount of the surface of the plot or stand sampled that is covered by one species (or physiognomic group) as compared to (relative to) the amount of surface of the plot or stand covered by all species (in that group). Thus, 50 percent relative cover means that half of the total cover of all species or physiognomic groups is composed of the single species or group in question. Relative cover values are proportional numbers and, if added, total 100 percent for each stand (sample).

Absolute cover: Refers to the actual percentage of the ground (surface of the plot or stand) that is covered by a species or group of species. For example, *Pinus sabiniana* covers between 5 percent and 10 percent of the stand. Absolute cover of all species or groups if added in a stand or plot may total greater or less than 100 percent because it is not a proportional number.

Characteristic/Diagnostic species: Must be present in at least 80 percent of the samples, with no restriction on cover.

Often/Usually occurring species: Must be present in at least 50 percent of the samples, with no restriction on cover.

Sparse: Used to describe individual layers of vegetation (tree, shrub, herb, or subdivisions of them) where the cover is less than 8 percent absolute cover.

Trace: Used to describe individual layers of vegetation (tree, shrub, herb, or subdivisions of them) where the cover is less than 5 percent absolute cover.

Open: Used to describe individual layers of vegetation (tree, shrub, herb, or subdivisions of them) where the cover is generally less than 33 percent absolute cover.

Stand: Is the basic physical unit of vegetation in a landscape. It has no set size. Some vegetation stands are very small such as wetland seeps, and some may be several square kilometers in size such as desert or forest types. A stand is defined by two main unifying characteristics:

- a. It has *compositional* integrity. Throughout the site, the combination of species is similar. The stand is differentiated from adjacent stands by a discernable boundary that may be abrupt or gradual.
- b. It has *structural* integrity. It has a similar history or environmental setting, affording relatively similar horizontal and vertical spacing of plant species. For example, a hillside forest formerly dominated by the same species but has burned on the upper part of the slope and not the lower is divided into two stands. Likewise, a sparse woodland occupying

a slope with shallow rocky soils is considered a different stand from an adjacent slope of a denser woodland/forest with deep, moister soil and the same species.

Tree: Is a one-stemmed woody plant that normally grows to be greater than 5 meters tall. In some cases, trees may be multiple stemmed following ramifying after fire or other disturbance, but the size of mature plants is typically greater than 5 meters. Undisturbed individuals of these species are usually single stemmed.

Shrub: Is normally a multi-stemmed woody plant that is usually between 0.2 meters and 5 meters tall. Definitions are blurred at the low and high ends of the height scales. At the tall end, shrubs may approach trees based on disturbance frequencies (e.g., old-growth resprouting chaparral species such as *Cercocarpus betuloides*, *Fraxinus dipetala*, *Heteromeles arbutifolia*, *Prunus ilicifolia*, and so forth, may frequently attain "tree size"). At the short end, woody perennial herbs or subshrubs of various species are often difficult to categorize into a consistent life-form.

Herbaceous plant: Is any species of plant that has no main woody stem development and includes grasses, forbs, and dieback perennial species.

Class A: Tree-Overstory Vegetation

Group I. Upland Forests and Woodlands: Trees dominated by evergreen species (broad-leaved or coniferous); occurring on upland slopes or terraces; winter-deciduous, broad-leaved trees absent.

Group II. Riparian Forests and Woodlands: Trees including winter-deciduous, broad-leaved species; occurring on bottomlands or adjacent to perennial or episodic streams; tree canopy generally continuous; generally dominated by tree genera including *Populus*, and/or *Salix*.

Group I. Upland Forests and Woodlands

I.A. Coast live oak is the dominant species in the overstory...

***Quercus agrifolia* Alliance**

IA.1. While the overstory is dominated solely by coast live oak, the understory is primarily dominated by annual grasses and herbs...

***Quercus agrifolia*/Annual Grass-Herb Association**

IA.2. While the overstory is dominated solely by coast live oak, the understory is primarily dominated by a mixture of chaparral shrubs, such as scrub oak, chamise (*Adenostoma fasciculatum*), etc...

***Quercus agrifolia* / Chaparral Association**

Group II: Riparian Forests and Woodlands

II.A. Fremont cottonwood provides an open to intermittent tree overstory canopy. Willows may occur in the sub-canopy as co-dominants (though sometimes they are higher in cover), or Fremont cottonwood occurs as the sole dominant tree...

***Populus fremontii* Alliance**

IIA.1. Fremont cottonwood is dominant in the overstory as a canopy tree, or it shares dominance with willows, which are in the overstory canopy or sub-canopy...

IIA1.a. Red willow is present and co-dominant to dominant with Fremont cottonwood in the tree overstory. Shrubs are sparsely present...

***Populus fremontii-Salix laevigata* Association**

IIA1.b. Red willow is co-dominant to dominant in the tree overstory with Fremont Cottonwood. Arroyo willow and mulefat are usually co-dominant in the understory...

***Populus fremontii-Salix laevigata/Salix lasiolepis-Baccharis salicifolia* Association**

IIA.2. Fremont cottonwood is the sole dominant tree in the overstory. Mulefat is abundant in the understory, sometimes with *Tamarix*...

***Populus fremontii/Baccharis salicifolia* Association**

II.B. Tree layer dominated or codominated by *Quercus agrifolia*; *Salix lasiolepis* diagnostically present; if present, *Platanus racemosa*, *Populus* spp., and *Salix* spp. other than *S. lasiolepis* are only trace cover.

***Quercus agrifolia/Salix lasiolepis* Association
in the *Quercus agrifolia* Alliance**

II.C. *Chilopsis linearis* is the dominant or co-dominant small tree or tall shrub (<6 m). Stand may be a two-tiered canopy with shrubs including *Atriplex canescens*, *Artemisia tridentata*, or *Lepidospartum squamatum*. Found in intermittently flooded areas or on wash terraces where subterranean water is available.

***Chilopsis linearis* Alliance**

Class B. Shrubland Vegetation

Group I. Shrublands dominated by sclerophyllous temperate broad-leaved shrubs (with leaves hardened by a waxy cuticle). They are dominated by typical chaparral shrub genera; including chamise (*Adenostoma fasciculatum*), redshank (*Adenostoma sparsifolium*), mountain mahogany (*Cercocarpus*), manzanita (*Arctostaphylos*), scrub oaks (*Quercus*), *Rhus ovata*, etc.

Group II. Shrublands dominated mainly by soft-leaved, succulent, microphyllous, or broad-leaved species that are generally considered to be part of coastal sage scrub, desert transition or more soft-leaved shrub habitats. Chaparral species may be present but not dominant. Includes buckwheat (*Eriogonum*), sagebrush (*Artemisia*), sage (*Salvia*), prickly-pear (*Opuntia*), boxthorn (*Lycium*), bush Penstemon (*Keckiella*), ambrosia (*Ambrosia*), brittlebrush (*Encelia*), goldenbush (*Isocoma*), etc.

Group III. Shrublands dominated mainly by broad-leaved or microphyllous species that are generally considered to be part of riparian, wetland or marsh shrub habitats. Includes species such as shrub willow (*Salix*), baccharis (*Baccharis*), tamarisk (*Tamarix*), scalebroom (*Lepidospartum squamatum*), etc.

Group I. Sclerophyllous temperate broad-leaved shrubland (chaparral)

I.A. The overstory is dominated by redshank (*Adenostoma sparsifolium*) or chamise (*Adenostoma fasciculatum*), alone or in shared dominance.

IA.1. The overstory is dominated by redshank (*Adenostoma sparsifolium*) alone or in shared dominance with other chaparral, deciduous, or succulent species (including chamise) in an open to continuous shrub canopy...

***Adenostoma sparsifolium* Alliance**

IA1.a. Redshank occurs as a dominant or co-dominant with birchleaf mountain-mahogany (*Cercocarpus montanus*), big sagebrush, hoaryleaf ceanothus, wedgeleaf ceanothus, or California buckwheat. If chamise (*Adenostoma fasciculatum*) is present, it occurs as a sub-dominant...

IA1a.i. Big sagebrush occurs as a co-dominant or sub-dominant and no other shrubs occur as codominants...

***Adenostoma sparsifolium-Artemisia tridentata* Association**

IA1a.ii. California buckwheat, deerweed (*Lotus scoparius*), and sugar bush (*Rhus ovata*) characteristically occur as sub-dominants to co-dominants and no other shrubs occur as co-dominants...

***Adenostoma sparsifolium-Eriogonum fasciculatum-Lotus scoparius* Association**

IA1a.iii. California buckwheat, interior goldenbush, and beavertail cactus characteristically occur as sub-dominants...

***Adenostoma sparsifolium-Ericameria linearifolia-Eriogonum fasciculatum-Opuntia basilaris* Association**

IA1.b. Redshank usually occurs with chamise as a co-dominant in an open to continuous shrub layer...

IA1b.i. Cane cholla occurs as a characteristically present at greater than 1% cover... (Association named from Klein and Evens 2006, Vegetation of western Riverside County. Locally the taxon may be represented at least in part by the ecologically similar *Cylindropuntia ganderi*.)

***Adenostoma sparsifolium-Adenostoma fasciculatum-Opuntia parryi* Association**

IA1b.ii. Bigberry manzanita occurs as a sub-dominant to co-dominant...

***Adenostoma sparsifolium-Adenostoma fasciculatum-Arctostaphylos glauca* Association**

IA1b.iii. Cupleaf ceanothus occurs as a sub-dominant or co-dominant. If birchleaf mountain mahogany is present, it is lower in cover than cupleaf ceanothus...

***Adenostoma sparsifolium-Adenostoma fasciculatum-Ceanothus greggii* Association**

IA.2. The overstory is dominated by chamise (*Adenostoma fasciculatum*) alone or in shared dominance with other chaparral or coastal scrub species, including *Rhus ovata*, *Quercus berberidifolia*, *Hesperoyucca whipplei*, *Lotus scoparius*, etc., in an open to continuous shrub canopy. Redshank, if present, is sub-dominant or trace...

***Adenostoma fasciculatum* Alliance**

IA2.a. Chamise is the sole dominant shrub. Other chaparral or coastal sage species such as scrub oak, sugarbush, etc, may be present intermittently but at trace cover...

***Adenostoma fasciculatum* (pure) Association**

IA2.b. Chamise is the main chaparral species, while disturbance-following shrubs such as deerweed (*Lotus scoparius*) intermix as sub-dominants to co-dominants...

***Adenostoma fasciculatum* (disturbance) Association**

I.B. Shrublands characterized by birchleaf mountain-mahogany (*Cercocarpus montanus* = *C. betuloides*) or a species of scrub oak (*Quercus*), alone or in shared dominance. Found primarily on north-facing slopes...

IB.1. *Quercus berberidifolia* characterizes the shrub canopy as a dominant OR co-dominant with *Cercocarpus montanus* ...

***Quercus berberidifolia* Alliance**

IB1.a. *Cercocarpus montanus* is sub- to co-dominant with *Quercus berberidifolia*; *Q. berberidifolia* has at least 30% relative cover...

***Quercus berberidifolia-Cercocarpus montanus* Association**

IB.2. Shrublands characterized by birchleaf mountain-mahogany (*Cercocarpus montanus* = *C. betuloides*), typically dominant or co-dominant with >30% relative cover. A variety of mesic chaparral shrub species may intermix, such as *Quercus* (scrub oaks), *Artemisia californica*, and *Prunus ilicifolia*...

***Cercocarpus montanus* Alliance**

IB2.a. Hollyleaf cherry (*Prunus ilicifolia*) occurs as a sub-dominant to co-dominant with mountain mahogany (*Cercocarpus betuloides*), and redshank (*Adenostoma sparsifolium*) is often sub-dominant in the shrub overstory...

***Cercocarpus montanus -Prunus ilicifolia-Adenostoma sparsifolium* Association**

I.C. The shrub canopy is characterized by thicketleaf yerba santa (*Eriodictyon crassifolium*), hollyleaf cherry (*Prunus ilicifolia*), oak gooseberry (*Ribes quercetorum*), sugarbush (*Rhus ovata*), or toyon (*Heteromeles arbutifolia*) and these shrubs may share dominance with other evergreen, coastal scrub or succulent shrubs...

IC.1. Thicketleaf Yerba santa occurs as the dominant shrub in an open to intermittent overstory while other shrubs may be present at low cover ...

***Eriodictyon crassifolium* Alliance**

IC.2. Hollyleaf cherry occurs as a dominant or co-dominant shrub with other shrubs in an open to intermittent overstory...

***Prunus ilicifolia* Alliance**

IC2.a. Toyon occurs as a sub-dominant to co-dominant shrub with hollyleaf cherry in the overstory...

***Prunus ilicifolia-Heteromeles arbutifolia* Association**

IC2.b. Hollyleaf cherry occurs as a sub-dominant to co-dominant with mountain mahogany (*Cercocarpus montanus*), and redshank (*Adenostoma sparsifolium*) is often sub-dominant in the shrub overstory...

***Cercocarpus montanus-Prunus ilicifolia-Adenostoma sparsifolium* Association
of the *Cercocarpus montanus* Alliance
see IB.2**

IC.3. Sugarbush occurs as a dominant or co-dominant in an open to intermittent shrub overstory with other shrub species. No other tall shrubs exceed sugarbush in cover. *R. ovata* may be sub-dominant with short, drought-deciduous shrubs, such as California buckwheat (*Eriogonum fasciculatum*). If subdominant, *R. ovata* occurs as widely spaced, evenly distributed large shrubs with $\geq 3\%$ absolute cover, interspersed with more numerous, short, drought-deciduous shrubs...

***Rhus ovata* Alliance**

I.D. Shrublands dominated or characterized by *Lotus scoparius*...

ID.1. *Lotus scoparius* is a strong dominant with $>60\%$ relative cover in the shrub canopy. A variety of coastal sage scrub or desert transition species intermix. *Eriogonum fasciculatum*, if present, is sub-dominant. In the Oak Grove region, *Lotus scoparius* does not need fire or other disturbance to regenerate or persist. Upon further sampling and analysis, these interior stands of *Lotus scoparius* may be defined as an interior cismontane association.

***Lotus scoparius* Alliance**

Group II. Shrublands dominated mainly by soft-leaved, succulent, microphyllous, or broad-leaved species.

II.A. Stand characterized by Mojave Yucca (*Yucca schidigera*) with ≥ 2 percent absolute shrub cover; other species including *Eriogonum fasciculatum*, *Lotus scoparius*, or *Cylindropuntia ganderi* may have equal or higher cover.

***Yucca schidigera* Alliance**

II.B. Blue elderberry (*Sambucus nigra*) is dominant or codominant with $>50\%$ relative cover in the shrub layer.

***Sambucus nigra* Alliance**

II.C. A saltbush species (*Atriplex* spp.) provides \geq half of all shrub cover.

II.C.1. Shrublands characterized by four-Wing Saltbush (*Atriplex canescens*), dominant or co-dominant with $>2\%$ absolute cover and $>50\%$ cover in the shrub canopy.

***Atriplex canescens* Alliance**

II.D. *Simmondsia chinensis* is dominant, or co-occurs with variable cover of *Encelia actoni*, *Cylindropuntia ganderi* or *Lotus scoparius*...

***Simmondsia chinensis*-Provisional Alliance**

II.E. Shrubland with bush penstemon (*Keckiella antirrhinoides*) dominant or co-dominant in the shrub overstory...

***Keckiella antirrhinoides* Alliance**

II.E.1. Shrubland in which bush penstemon is the sole dominant shrub in the shrub overstory.

Other shrubs may occur at sparse cover...

***Keckiella antirrhinoides* Association**

II.E.2. Shrubland in which bush penstemon is co-dominant with chaparral species such as chamise, scrub oak, etc...

***Keckiella antirrhinoides*-Mixed chaparral Association**

II.F. Shrubland in which a species of sagebrush (*Artemisia*) is dominant or co-dominant with California buckwheat. The shrub canopy is sometimes over a higher cover of annual or perennial herbs such as bromes (*Bromus*), cryptantha (*Cryptantha*), and stork's bill (*Erodium*), etc ...

***Artemisia tridentata* Alliance**

II.F.1. Big sagebrush is the sole dominant in the shrub overstory...

***Artemisia tridentata* Association**

II.F.2. California buckwheat is sub-dominant to co-dominant with big sagebrush in the shrub canopy...

***Artemisia tridentata*-*Eriogonum fasciculatum* Association**

II.G. *Eriogonum fasciculatum* is dominant or occasionally co-dominant with *Bebbia juncea* or *Salvia apiana*. A variety of coastal sage shrub species intermix as sub-dominants (If *Rhus ovata* or *Yucca schidigera* are sub-dominant, see *Rhus ovata* Alliance or *Yucca schidigera* Alliance.)...

II.G.1 *Eriogonum fasciculatum* is co-dominant with *Salvia apiana*; both species with 30-60% relative cover in the shrub canopy...

***Eriogonum fasciculatum*-*Salvia apiana* Association
of the *Eriogonum fasciculatum*-*Salvia apiana* Alliance**

II.G.2 *Eriogonum fasciculatum* is generally dominant with >2% absolute cover and >50% relative cover in the shrub canopy; no other species with >half the cover of *E. fasciculatum* except occasionally *Bebbia juncea*. (If *R. ovata* is present, it is not evenly distributed and is <3% absolute cover). A variety of coastal sage shrub species intermix as sub-dominants...

***Eriogonum fasciculatum* Alliance**

II.G2.ii. *Bebbia* (*Bebbia juncea*) occurs as a sub-dominant with California buckwheat and California brickellbush (*Brickellia californica*) is characteristically present...

***Eriogonum fasciculatum*-*Bebbia juncea* Association**

II.G2.iii. Cane cholla and jojoba occur as sub-dominants to California buckwheat. If sugarbush is present, it is lower in cover than cane cholla ...

(Association named from Klein and Evens 2006, Vegetation of western Riverside County. Locally *Opuntia* may be represented at least in part by the ecologically similar *Cylindropuntia ganderi*.)

***Eriogonum fasciculatum*-*Simmondsia chinensis*-*Opuntia parryi* Association**

II.G2.iv. Cane cholla occurs as a sub-dominant to co-dominant with California buckwheat. If sugarbush is present, it is lower in cover than cane cholla and if jojoba (*Simmondsia chinensis*) is present, it occurs at extremely trace cover...

(Association named from Klein and Evens 2006, Vegetation of western Riverside County. Locally the taxon may be represented at least in part by the ecologically similar *Cylindropuntia ganderi*.)

***Eriogonum fasciculatum-Cylindropuntia californica* Association**

IIG2.v. California buckwheat is the usually dominant shrub in the canopy ...

***Eriogonum fasciculatum* Association**

Group III. Shrublands dominated mainly by broad-leaved or microphyllous species that are generally considered to be part of riparian, wetland or marsh shrub habitats.

III.A. Shrublands characterized by the presence of scalebroom (*Lepidospartum squamatum*), where scalebroom is usually dominant but may be co-dominant or sub-dominant with other shrubs...

***Lepidospartum squamatum* Alliance**

IIIA.1. Various mixtures of annual grasses and forbs occur at low to dense cover in the understory of scalebroom, while a variety of other shrub species may occur at sparse cover...

***Lepidospartum squamatum/Amsinckia menziesii* Association**

IIIA.2. Fourwing saltbush (*Atriplex canescens*) occurs with scalebroom as a co-dominant or sub-dominant shrub...

***Lepidospartum squamatum-Atriplex canescens* Association**

IIA.3. Mulefat (*Baccharis salicifolia*) occurs as a sub-dominant to co-dominant shrub with scalebroom and both species occur at low cover. Fourwing saltbush is absent or present at extremely trace cover...

***Lepidospartum squamatum-Baccharis salicifolia* Association**

III.B. A species of *Salix*, *Baccharis*, or *Sambucus* is dominant or occasionally co-dominant in the shrub canopy...

IIIB.1. Shrublands in which arroyo willow (*Salix lasiolepis*) is the most dominant and tall shrub, usually with >25% absolute cover and >50% relative cover in the tree or shrub canopy; an emergent and sparse tree layer may also be present...

***Salix lasiolepis* Alliance**

IIIB1.a. Shrublands characterized by arroyo willow (*Salix lasiolepis*); *Baccharis salicifolia* is co-dominant or sub-dominant in the shrub canopy...

***Salix lasiolepis - Baccharis salicifolia* Association**

IIIB.2. Shrublands characterized by the dominance of mulefat, usually with >50% relative cover. An emergent and sparse tree layer may also be present...

***Baccharis salicifolia* Alliance**

IIIB2.a. *Baccharis salicifolia* is dominant, usually with >50% relative cover. A variety of emergent trees and shrubs may intermix, such as other species of *Baccharis*, *Populus*, and *Salix*.

***Baccharis salicifolia* Association**

IIIB2.b. *Baccharis salicifolia* has >30% relative cover in the shrub canopy with elderberry (*Sambucus nigra*), which is characteristic in the shrub overstory...

***Baccharis salicifolia-Sambucus nigra* Association**

IIIB.3. Blue elderberry (*Sambucus nigra*) is dominant or codominant with >50% relative cover in the shrub layer.

***Sambucus nigra* Alliance**

IIIB.4. Desert False Willow (*Baccharis sergiloides*) is dominant, with >3% absolute cover and >50% relative cover in the shrub canopy...

***Baccharis sergiloides* Alliance**

IIIB4.a. *Baccharis sergiloides* is dominant in the shrub cover; herb layer is characterized by *Muhlenbergia rigens*, which may have greater cover than *Baccharis sergiloides*...

***Baccharis sergiloides - Muhlenbergia rigens* Association**

IIIC. Shrublands in which a tamarisk (*Tamarix*) species dominates the canopy, though there may be a minor presence of native shrubs...

***Tamarix* spp. semi-natural shrubland stands**

Class C. Herbaceous Vegetation

Group I. Upland Herbaceous Vegetation, dominated by nonhydrophytic herbaceous species, generally occurring on upland slopes and terraces.

Group II. Hydrophytic Herbaceous Vegetation, generally occurring in bottomlands, streams, or other areas with perennial or episodic soil saturation.

Group I. Upland Herbaceous Vegetation

I.A. Annual native herbs such as *Amsinckia* spp. or *Lupinus* spp. are characteristic and evenly distributed across the herbaceous layer, though non-native forbs and grasses may be dominant...

California Annual Herb/Grass Group

IA.1. *Eschscholzia californica* and/or *Lupinus bicolor* is/are seasonally dominant on upland slopes or flats. A variety of other native and non-native forbs and grasses may be present...

***Eschscholzia (californica)* Herbaceous Alliance**

IA1.a. *Lupinus bicolor* is seasonally dominant...

***Lupinus bicolor* Provisional Herbaceous Association**

IA.2. *Amsinckia* spp. is seasonally characteristic in the herbaceous layer with $\geq 10\%$ relative cover...

***Amsinckia (menziesii, tessellata)* Herbaceous Alliance**

I.B. Herbaceous stands strongly dominated by non-native annual and perennial grasses or herbs...

**Mediterranean California naturalized annual and perennial
grassland Group**

IB.1. *Bromus diandrus*, *B. hordeaceus*, or *Brachypodium distachyon* is dominant or co-dominant with other non-natives in the herbaceous layer.

***Bromus (diandrus, hordeaceus) – Brachypodium distachyon*
Semi-Natural Herbaceous Stands**

IB.2. *Bromus rubens* (= *B. madritensis* ssp. *r.*), *Schismus barbatus*, or *S. arabicus* is dominant or co-dominant with other non-natives in the herbaceous layer. Emergent shrubs may be present at low cover. Herbs < 75 cm; cover is intermittent to continuous..

***Bromus rubens-Schismus (arabicus, barbatus)*
Semi-Natural Herbaceous Stands**

IB.3. *Hirschfeldia incana* or *Raphanus sativus* is dominant in the herbaceous layer. Emergent shrubs and trees may be present at low cover...

***Brassica (nigra) and other mustards* Semi-Natural Stands**

Group II: Hydrophytic Herbaceous Vegetation

II.A. Herbs occurring in freshwater aquatic environments...

IIA.1. Herbaceous stands dominated by native species...

IIA1.a. Stands dominated by *Typha angustifolia*, *T. domingensis* and/or *T. latifolia* with > 50% relative cover in the herbaceous layer. May be found in ponded areas adjacent to riparian woodland...

***Typha (angustifolia, domingensis, latifolia)* herbaceous Alliance**

IIA.2. Herbaceous stands dominated by ruderal species such as *Urtica dioica*, *Hordeum murinum*, or *Heliotropium curassavicum*...

Naturalized Warm-Temperate Riparian and Wetland Group

Crosswalk between Vegetation and Mapping Legend

A mapping classification (legend) was developed based on vegetation types that are distinguishable on the aerial imagery. Following is the crosswalk between the vegetation classification and the mapping classification. Note that vegetation was mapped to the Alliance level, and in some cases to the Group level. If known from field data, the Association was noted in the 'Comments' field.

Group	Alliance	Association	Mapping Unit
Tree			
	<i>Chilopsis linearis</i>		539 - <i>Chilopsis linearis</i>
	<i>Populus fremontii</i>		147 - <i>Populus fremontii</i>
		<i>Populus fremontii</i> / <i>Baccharis salicifolia</i>	
		<i>Populus fremontii</i> - <i>Salix laevigata</i>	
		<i>Populus fremontii</i> - <i>Salix laevigata</i> / <i>Salix lasiolepis</i> - <i>Baccharis salicifolia</i>	
	<i>Quercus agrifolia</i>		10 - <i>Quercus agrifolia</i>
		<i>Quercus agrifolia</i> /Annual Grass-Herb	
		<i>Quercus agrifolia</i> /Chaparral	
		<i>Quercus agrifolia</i> / <i>Salix lasiolepis</i>	
Shrub			
	<i>Adenostoma fasciculatum</i>		172 - <i>Adenostoma fasciculatum</i>
		<i>Adenostoma fasciculatum</i> Disturbance	
		<i>Adenostoma fasciculatum</i> Pure	
	<i>Adenostoma sparsifolium</i>		356 - <i>Adenostoma sparsifolium</i>
		<i>Adenostoma sparsifolium</i> - <i>Adenostoma fasciculatum</i> - <i>Arctostaphylos glauca</i>	
		<i>Adenostoma sparsifolium</i> - <i>Adenostoma fasciculatum</i> - <i>Ceanothus greggii</i>	
		<i>Adenostoma sparsifolium</i> - <i>Adenostoma fasciculatum</i> - <i>Opuntia parryi</i>	
		<i>Adenostoma sparsifolium</i> - <i>Artemisia tridentata</i>	
		<i>Adenostoma sparsifolium</i> - <i>Ericameria linearifolia</i> - <i>Eriogonum fasciculatum</i> - <i>Opuntia basilaris</i>	
		<i>Adenostoma sparsifolium</i> - <i>Eriogonum fasciculatum</i> - <i>Lotus scoparius</i>	
	<i>Artemisia tridentata</i>		567 - <i>Artemisia tridentata</i>
		<i>Artemisia tridentata</i>	
		<i>Artemisia tridentata</i> - <i>Eriogonum fasciculatum</i>	
	<i>Atriplex canescens</i>		555 - <i>Atriplex canescens</i>

<i>Baccharis salicifolia</i>		153 - <i>Baccharis salicifolia</i>
	<i>Baccharis salicifolia-Sambucus mexicana</i>	
<i>Baccharis sergiloides</i>		154 - <i>Baccharis sergiloides</i>
	<i>Baccharis sergiloides / Muhlenbergia rigens</i>	
<i>Cercocarpus montanus</i>		204 - <i>Cercocarpus montanus</i>
	<i>Cercocarpus montanus-Prunus ilicifolia-Adenostoma sparsifolium</i>	
<i>Eriodictyon crassifolium</i>		183 - <i>Eriodictyon crassifolium</i>
<i>Eriogonum fasciculatum</i>		229 - <i>Eriogonum fasciculatum</i>
	<i>Eriogonum fasciculatum</i>	
	<i>Eriogonum fasciculatum-Bebbia juncea</i>	
	<i>Eriogonum fasciculatum-Cylindropuntia californica</i>	
	<i>Eriogonum fasciculatum-Simmondsia chinensis-Opuntia parryi</i>	
<i>Eriogonum fasciculatum-Salvia apiana</i>	<i>Eriogonum fasciculatum-Salvia apiana</i>	not mapped
<i>Keckiella antirrhinoides</i>		234 - <i>Keckiella antirrhinoides</i>
	<i>Keckiella antirrhinoides</i> Mixed Chaparral	
<i>Lepidospartum squamatum</i>		533 - <i>Lepidospartum squamatum</i>
	<i>Lepidospartum squamatum/Amsinckia menziesii</i>	
	<i>Lepidospartum squamatum-Atriplex canescens</i>	
	<i>Lepidospartum squamatum-Baccharis salicifolia</i>	
<i>Lotus scoparius</i>		245 - <i>Lotus scoparius</i>
<i>Prunus ilicifolia</i>		206 - <i>Prunus ilicifolia</i>
	<i>Prunus ilicifolia-Heteromeles arbutifolia</i>	
<i>Quercus berberidifolia</i>		207 - <i>Quercus berberidifolia</i>
	<i>Quercus berberidifolia-Cercocarpus montanus</i>	
<i>Rhus ovata</i>		362 - <i>Rhus ovata</i>
<i>Salix lasiolepis</i>		161 - <i>Salix lasiolepis</i>
	<i>Salix lasiolepis-Baccharis salicifolia</i>	
<i>Sambucus nigra</i>		162 - <i>Sambucus nigra</i>
<i>Simmondsia chinensis</i>		512 - <i>Simmondsia chinensis</i>
<i>Tamarix</i> spp. Semi-natural shrubland stands		165 - <i>Tamarix</i> spp. Semi-natural shrubland stands
<i>Yucca schidigera</i>		520 - <i>Yucca schidigera</i>

Herbaceous			
California annual herb/grass group			
	<i>Eschscholzia (californica)</i>		
		<i>Lupinus bicolor</i>	256 - <i>Eschscholzia californica</i> - <i>Lupinus bicolor</i>
	<i>Amsinckia menziesii</i>		255 - <i>Amsinckia menziesii</i>
		<i>Amsinckia menziesii</i> - <i>Erodium</i> spp.	
Mediterranean California naturalized annual and perennial grassland			
	<i>Bromus (diandrus, hordeaceus)</i> - <i>Brachypodium distachyon</i> Semi-Natural Herbaceous Stands		271 - <i>Bromus (diandrus, hordeaceus)</i> - <i>Brachypodium distachyon</i> Semi-Natural Herbaceous Stands
	<i>Bromus rubens</i> - <i>Schismus (arabicus,</i> <i>barbatus)</i> Semi-Natural Herbaceous Stands		272 - <i>Bromus rubens</i> - <i>Schismus (arabicus,</i> <i>barbatus)</i> Semi-Natural Herbaceous Stands
	<i>Brassica (nigra)</i> and Other Mustards Semi- Natural Herbaceous Stands		270 - <i>Brassica (nigra)</i> and Other Mustards Semi-Natural Herbaceous Stands
Naturalized warm-temperate riparian and wetland group			450 - Naturalized warm-temperate riparian and wetland group
Arid West freshwater emergent marsh			
	<i>Typha (angustifolia, domingensis, latifolia)</i>		404 - <i>Typha (angustifolia, domingensis,</i> <i>latifolia)</i>
Other			
			921 - Agricultural field
			901 - Developed - roads
			902 - Developed - structures
			903 - Exotic trees and landscaping
			911 - Levees
			999 - Other
			912 - Reservoirs/ponds

Other map attributes are as follows:

Heterogeneity: (of the mapped polygon)

Code= Heterogeneity

- 1= Low, <5% heterogeneous (the polygon is mostly homogeneous for type, cover class, and size class)
- 2= Moderate, 5-40% heterogeneous
- 3= High, >40% heterogeneous

Total Cover: (Total, Conifer, Hardwood, Total Tree, Shrub)

Exact cover estimate from 0-100%. Cover values were rounded up to the next whole percentage (i.e., <1% was rounded up to 1%).

Total Cover: (Herb)

Code= Cover Class

- 1= <2%
- 2= 2-9%
- 3= 10-39%
- 4= 40-59%
- 5= 60-100%
- 0= 0 %

Impact: Invasives

Code= Level of Impact

- 0= Not Visible
- 1= Low (total non-native cover is =<33% of total vegetation cover)
- 2= Medium (total non-native cover is 34-66% of total vegetation cover)
- 3= High (total non-native cover is >66% of total vegetation cover)

Impact: Roads or Trails

Code= Level of Impact

- 0= No visible roads or trails through the polygon (the polygon is "whole")
- 1= Low (roads or trails bisecting the polygon so that from 2/3 to just below the entire polygon is "whole")
- 2= Medium (roads or trails bisecting the polygon so that 1/3-2/3 of the polygon is "whole")
- 3= High (roads or trails bisecting the polygon so that <1/3 of the polygon is "whole")

Other Impact/Disturbance:

OHV activity
Disking/grading
Development
Erosion/runoff
Ungulate Trails
none

Other Impact/Disturbance Level:

Code= Subjective determination of the level of impact

- 0= Not Visible
- 1= Low

- 2= Medium
- 3= High

Method of identification:

Code= Method

- 1= Rapid assessment field data
- 2= Relevé field data
- 3= Field reconnaissance
- 4= Photo-interpretation
- 5= Other information
- 6= Pre-map reconnaissance
- 7= Adjacent alliance to rapid assessment or relevé

Comments

Text field for additional information

UID

Unique identifier for each polygon

DB_ID

The Rapid Assessment used to attribute the polygon

NVCS_name

Standardized name of the vegetation description used in the National Vegetation Classification System

NVCS_level

The level of the National Vegetation Classification System Hierarchy to which the vegetation type corresponds

NVCS_Macrogroup

The standardized name for the macrogroup within the National Vegetation Classification System

CalVeg_Name

A crosswalk to the CalVeg vegetation system. Note that there may be a one-to-many relationship between CalVeg and NVCS.

CalVeg_Code

The CalVeg code

CWHR_Type

A crosswalk to the California Wildlife Habitat Relationships system. Note that there is usually a one-to-many relationship between CWHR and NVCS.

CWHR_Code

The CWHR code.

Global_Rank

The global rarity rank of the plant community mapped (only for alliances and associations). G1 and S1: Fewer than 6 viable occurrences worldwide and/or 2000 acres; G2 and S2: 6-20 viable occurrences worldwide and/or 2000-10,000 acres; G3 and S3: 21-100 viable occurrences

worldwide and/or 10,000-50,000 acres; G4 and S4: Greater than 100 viable occurrences worldwide and/or greater than 50,000 acres; G5 and S5: Community demonstrably secure due to secure worldwide and statewide abundance

State_Rank

The state rarity rank of the plant community mapped (only for alliances and associations). G1 and S1: Fewer than 6 viable occurrences worldwide and/or 2000 acres; G2 and S2: 6-20 viable occurrences worldwide and/or 2000-10,000 acres; G3 and S3: 21-100 viable occurrences worldwide and/or 10,000-50,000 acres; G4 and S4: Greater than 100 viable occurrences worldwide and/or greater than 50,000 acres; G5 and S5: Community demonstrably secure due to secure worldwide and statewide abundance

CaCode

California Natural Community Codes - unique code assigned to alliances and associations

Other Conventions Used in the Map Attribute Table

If a polygon contained a Rapid Assessment data point, the database ID of that sampled stand is noted.

The minimum mapping unit (MMU) is one acre for most types, and ½ acre for wetland types. Notes about inclusions of types below minimum mapping unit, etc. are in the notes text field.

The property boundaries used for this project are from the Department Lands coverage in 2010. Vegetation polygons were mapped for an unset distance beyond those boundaries.

Project Staff

Field staff included Randy Botta, Rachelle Boul, Janine Colby, Mary Jo Colletti, John Ekhoﬀ, Melanie Gogol-Prokurat, Diana Hickson, Julie Horenstein, Todd Keeler-Wolf, Kim McKee, Aicha Ougzin, and Rosie Yacoub. Data entry was completed by Mary Jo Colletti; mapping and attribution were completed by Rachelle Boul and Melanie Gogol-Prokurat; the report was written by Melanie Gogol-Prokurat.

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Appendix A: Survey protocol and field forms

CALIFORNIA NATIVE PLANT SOCIETY / DEPARTMENT OF FISH AND GAME PROTOCOL FOR COMBINED VEGETATION RAPID ASSESSMENT AND RELEVÉ SAMPLING FIELD FORM

(March 22, 2010)

Introduction

This protocol describes the methodology for both the relevé and rapid assessment vegetation sampling techniques as recorded in the combined relevé and rapid assessment field survey form dated March 22, 2010. The same environmental data are collected for both techniques. However, the relevé sample is plot-based, with each species in the plot and its cover being recorded. The rapid assessment sample is based not on a plot but on the entire stand, with 12-20 of the dominant or characteristic species and their cover values recorded. For more background on the relevé and rapid assessment sampling methods, see the relevé and rapid assessment protocols at www.cnps.org.

Selecting stands to sample:

To start either the relevé or rapid assessment method, a stand of vegetation needs to be defined. A stand is the basic physical unit of vegetation in a landscape. It has no set size. Some vegetation stands are very small, such as alpine meadow or tundra types, and some may be several square kilometers in size, such as desert or forest types. A stand is defined by two main unifying characteristics:

- 1) It has compositional integrity. Throughout the site, the combination of species is similar. The stand is differentiated from adjacent stands by a discernable boundary that may be abrupt or indistinct.
- 2) It has structural integrity. It has a similar history or environmental setting that affords relatively similar horizontal and vertical spacing of plant species. For example, a hillside forest originally dominated by the same species that burned on the upper part of the slopes, but not the lower, would be divided into two stands. Likewise, sparse woodland occupying a slope with very shallow rocky soils would be considered a different stand from an adjacent slope with deeper, moister soil and a denser woodland or forest of the same species.

The structural and compositional features of a stand are often combined into a term called homogeneity. For an area of vegetated ground to meet the requirements of a stand, it must be homogeneous (uniform in structure and composition throughout).

Stands to be sampled may be selected by evaluation prior to a site visit (*e.g.*, delineated from aerial photos or satellite images), or they may be selected on site during reconnaissance (to determine extent and boundaries, location of other similar stands, etc.).

Depending on the project goals, you may want to select just one or a few representative stands of each homogeneous vegetation type for sampling (*e.g.*, for developing a classification for a vegetation mapping project), or you may want to sample all of them (*e.g.*, to define a rare vegetation type and/or compare site quality between the few remaining stands).

For the rapid assessment method, you will collect data based on the entire stand.

Selecting a plot to sample within in a stand (for relevés only):

Because many stands are large, it may be difficult to summarize the species composition, cover, and structure of an entire stand. We are also usually trying to capture the most information as efficiently as possible. Thus, we are typically forced to select a representative portion to sample.

When sampling a vegetation stand, the main point to remember is to select a sample that, in as many ways possible, is representative of that stand. This means that you are not randomly selecting a plot; on the contrary, you are actively using your own best judgment to find a representative example of the stand.

Selecting a plot requires that you see enough of the stand you are sampling to feel comfortable in choosing a representative plot location. Take a brief walk through the stand and look for variations in species composition and in stand structure. In many cases in hilly or mountainous terrain look for a vantage point from which you can get a representative view of the whole stand. Variations in vegetation that are repeated throughout the stand should be included in your plot. Once you assess the variation within the stand, attempt to find an area that captures the stand's common species composition and structural condition to sample.

Plot Size

All relevés of the same type of vegetation to be analyzed in a study need to be the same size. Plot shape and size are somewhat dependent on the type of vegetation under study. Therefore, general guidelines for plot sizes of tree-, shrub-, and herbaceous communities have been established. Sufficient work has been done in temperate vegetation to be confident the following conventions will capture species richness:

Herbaceous communities: 100 sq. m plot

Special herbaceous communities, such as vernal pools, fens: 10 sq m plot

Shrublands and Riparian forest/woodlands: 400 sq. m plot

Open desert and other shrublands with widely dispersed but regularly occurring woody species: 1000 sq. m plot

Upland Forest and woodland communities: 1000 sq. m plot

Plot Shape

A relevé has no fixed shape, though plot shape should reflect the character of the stand. If the stand is about the same size as a relevé, the plot boundaries may be similar to that of the entire stand. If we are sampling streamside riparian or other linear communities, our plot dimensions should not go beyond the community's natural ecological boundaries. Thus, a relatively long, narrow plot capturing the vegetation within the stand, but not outside it would be appropriate. Species present along the edges of the plot that are clearly part of the adjacent stand should be excluded.

If we are sampling broad homogeneous stands, we would most likely choose a shape such as a circle (which has the advantage of the edges being equidistant to the center point) or a square (which can be quickly laid out using perpendicular tapes).

Definitions of fields in the protocol

Relevé or Rapid Assessment Circle the method that you are using.

LOCATIONAL/ENVIRONMENTAL DESCRIPTION

Polygon/Stand #: Number assigned either in the field or in the office prior to sampling. It is usually denoted with a four-letter abbreviation of the sampling location and then a four-number sequential number of that locale (*e.g.* CARR0001 for Carrizo sample #1). The maximum number of letters/numbers is eight.

Air photo #: The number given to the aerial photo in a vegetation-mapping project, for which photo interpreters have already done photo interpretation and delineations of polygons. If the sample site has not been photo-interpreted, leave blank.

Date: Date of the sampling.

Name(s) of surveyors: The full names of each person assisting should be provided for the first field form for the day. On successive forms, initials of each person assisting can be recorded. Please note: The person recording the data on the form should circle their name/initials.

GPS waypoint #: The waypoint number assigned by a Global Positioning System (GPS) unit when marking and storing a waypoint for the sample location. Stored points should be downloaded in the office to serve as a check on the written points and to enter into a GIS.

For relevé plots, take the waypoint in the southwest corner of the plot or in the center of a circular plot.

GPS name: The name/number assigned to each GPS unit. This can be the serial number if another number is not assigned.

Datum: (NAD 83) The standard GPS datum used is NAD 83. If you are using a different datum, note it here.

Bearing, left axis at SW pt (note in degrees) of Long or Short side: For square or rectangular plots: from the SW corner (= the GPS point location), looking towards the plot, record the bearing of the axis to your left. If the plot is a rectangle, indicate whether the left side of the plot is the long or short side of the rectangle by circling “long” or “short” side (no need to circle anything for circular or square plots). If there are no stand constraints, you would choose a circular or square plot and straight-sided plots should be set up with boundaries running in the cardinal directions. If you choose a rectangular plot that is not constrained by the stand dimensions, the short side should run from east to west, while the long side should run from north to south.

UTM coordinates: Easting (UTME) and northing (UTMN) location coordinates using the Universal Transverse Mercator (UTM) grid. Record in writing the information from a GPS unit or a USGS topographic map.

UTM zone: Universal Transverse Mercator zone. Zone 10 is for California west of the 120th longitude, zone 11 is for California east of 120th longitude, which is the same as the straight portion of California’s eastern boundary.

Error: ± The accuracy of the GPS location, when taking the UTM field reading. Please record the error units by circling feet (ft), meters (m), or positional dilution of precision (pdop). If your GPS does not determine error, insert N/A in this field.

Is GPS within stand? Yes / No Circle “Yes” to denote that the GPS waypoint was taken directly within or at the edge of the stand being assessed for a rapid assessment, or circle “No” if the waypoint was taken at a distance from the stand (such as with a binocular view of the stand).

If No, cite from waypoint to stand, distance (note in meters) & bearing (note in degrees): An estimate of the number of meters and the compass bearing from the GPS waypoint to the stand.

Elevation: Recorded from the GPS unit or USGS topographic map. Please circle feet (ft) or meters (m).

Photograph #s: Write the name or initials of the camera owner, JPG/frame number, and direction of photos (note the roll number if using film). *Take four photos in the main cardinal directions (N, E, S, W) clockwise from the north, from the GPS location.* If additional photos are taken in other directions, please note this information on the form.

Stand Size: Estimate the size of the entire stand in which the sample is taken. As a measure, one acre is about 4000 square meters (approximately 64 x 64 m), or 208 feet by 208 feet. One acre is similar in size to a football field.

Plot Size: If this is a relevé, circle the size of the plot.

Plot Shape: Record the length and width of the plot and circle measurement units (i.e., ft or m). If it is a circular plot, enter radius (or just put a check mark in the space).

Exposure: (Enter actual ° and circle general category): With your back to the general uphill direction of the slope (i.e., by facing downhill of the slope), read degrees of the compass for the aspect or the direction you are standing, using degrees from north, adjusted for declination. Average the reading over the entire stand, even if you are sampling a relevé plot, since your plot is representative of the stand. If estimating the exposure, write “N/A” for the actual degrees, and circle the general category chosen. “Variable” may be selected if the same, homogenous stand of vegetation occurs across a varied range of slope exposures. Select “all” if stand is on top of a knoll that slopes in all directions or if the same, homogenous stand of vegetation occurs across all ranges of slope.

Steepness: (Enter actual ° and circle general category): Read degree slope from a compass or clinometer. If estimating, write “N/A” for the actual degrees, and circle the general category chosen.. Make sure to average the reading across the entire stand even if you are sampling in a relevé plot.

Topography: First assess the local (**Micro**) topographic features or the lay of the area (*e.g.*, surface is flat or concave). **Circle only one of the microtopographic descriptors.**

Geology: Geological parent material of site. If exact type is unknown, use a more general category (*e.g.*, igneous, metamorphic, sedimentary). *See code list for types.*

Soil Texture: Record soil texture that is characteristic of the site (*e.g.*, coarse loamy sand, sandy clay loam). *See soil texture key and code list for types.*

Upland or Wetland/Riparian (circle one): Indicate if the stand is in an upland or a wetland. There are only two options. Wetland and riparian are one category. Note that a site need not be officially delineated as a wetland to qualify as such in this context (*e.g.*, seasonally wet meadow).

% Surface cover (abiotic substrates). It is helpful to imagine “mowing off” all of the live vegetation at the base of the plants and removing it – you will be estimating what is left covering the surface. **The total should sum to 100%.** Note that non-vascular cover (lichens, mosses, cryptobiotic crusts) is not estimated in this section.

- % Water:** Estimate the percent surface cover of running or standing water, ignoring the substrate below the water.
- % BA Stems:** Percent surface cover of the plant basal area, *i.e.*, the basal area of stems at the ground surface. Note that for most vegetation types BA is 1-3% cover.
- % Litter:** Percent surface cover of litter, duff, or wood on the ground.
- % Bedrock:** Percent surface cover of bedrock.
- % Boulders:** Percent surface cover of rocks > 60 cm in diameter.
- % Stone:** Percent surface cover of rocks 25-60 cm in diameter.
- % Cobble:** Percent surface cover of rocks 7.5 to 25 cm in diameter.
- % Gravel:** Percent surface cover of rocks 2 mm to 7.5 cm in diameter.
- % Fines:** Percent surface cover of bare ground and fine sediment (e.g. dirt) < 2 mm in diameter.

% Current year bioturbation: Estimate the percent of the sample or stand exhibiting soil disturbance by fossorial organisms (any organism that lives underground). Do not include disturbance by ungulates. Note that this is a separate estimation from surface cover.

Past bioturbation present? Circle Yes if there is evidence of bioturbation from previous years.

% Hoof punch: Note the percent of the sample or stand surface that has been punched down by hooves (cattle or native grazers) in wet soil.

Fire Evidence: Circle Yes if there is visible evidence of fire, and note the type of evidence in the “Site history, stand age and comments section,” for example, “charred dead stems of *Quercus berberidifolia* extending 2 feet above resprouting shrubs.” If you are certain of the year of the fire, put this in the Site history section.

Site history, stand age, and comments: Briefly describe the stand age/seral stage, disturbance history, nature and extent of land use, and other site environmental and vegetation factors. Examples of disturbance history: fire, landslides, avalanching, drought, flood, animal burrowing, or pest outbreak. Also, try to estimate year or frequency of disturbance. Examples of land use: grazing, timber harvest, or mining. Examples of other site factors: exposed rocks, soil with fine-textured sediments, high litter/duff build-up, multi-storied vegetation structure, or other stand dynamics.

Disturbance code / Intensity (L,M,H): List codes for potential or existing impacts on the stability of the plant community. Characterize each impact each as **L** (=Light), **M** (=Moderate), or **H** (=Heavy). For invasive exotics, divide the total exotic cover (e.g. 25% *Bromus diandrus* + 8% *Bromus madritensis* + 5% *Centaurea melitensis* = 38% total exotics) by the total % cover of all the layers when added up (e.g. 15% tree + 5% low tree + 25% shrub + 40% herbs = 85% total) and multiply by 100 to get the % relative cover of exotics (e.g. 38% total exotics/85% total cover = 45% relative exotic cover). L = 0-33% *relative* cover of exotics; M = 34-66% relative cover, and H = > 66% relative cover. *See code list for impacts.*

II. HABITAT AND VEGETATION DESCRIPTION per California Wildlife-Habitat Relationships (CWHR)

For CWHR, identify the size/height class of the stand using the following tree, shrub, and/or herbaceous categories. These categories are based on functional life forms.

Tree DBH: Record tree size classes when the tree canopy closure exceeds 10 percent of the total cover (except in desert types), or if young tree density indicates imminent tree dominance. Size class is based on the average diameter at breast height (dbh) of each trunk (standard breast height is 4.5ft/137cm). When marking the main size class, make sure to estimate the mean diameter of all trees over the entire stand, and weight the mean if there are some larger tree dbh's. The "**T6 multi-layered**" dbh size class contains a multi-layered tree canopy (with a size class T3 and/or T4 layer growing under a T5 layer and a distinct height separation between the classes) exceeding 60% total cover. Stands in the T6 class need also to contain at least 10% cover of size class 5 (>24" dbh) trees growing over a distinct layer with at least 10% combined cover of trees in size classes 3 or 4 (>11-24" dbh).

Shrub (mark one): Record shrub size classes when shrub canopy closure exceeds 10 percent (except in desert types). You can record shrub size class by circling the class that is predominant in the survey. Shrub size class is based on the average amount of crown decadence (dead standing vegetation on live shrubs when looking across the crowns of the shrubs).

Herb (mark one): Record herb height when herbaceous cover exceeds 2 percent. You can record herb class by the size class that is predominant in the survey (H1 or H2). *This height class is based on the average plant height at maturity, not necessarily at the time of observation.*

Overall cover of vegetation

Provide an estimate of cover for the following categories below (based on functional life forms). Record a specific number for the total aerial cover or "bird's-eye view" looking from above for each category, estimating cover for the living plants only. Litter/duff should not be included in these estimates. The porosity of the vegetation should be taken into consideration when estimating percent cover (how much of the sky can you see when you are standing under the canopy of a tree, or how much light passes through the canopy of the shrub layer?).

To come up with a specific number estimate for percent cover, first use to the following CWHR cover intervals as a reference aid to get a generalized cover estimate: <2%, 2-9%, 10-24%, 25-39%, 40-59%, 60-100%. While keeping these intervals in mind, you can then refine your estimate to a specific percentage for each category below.

% Total Non-Vasc cover: The total cover of all lichens, bryophytes (mosses, liverworts, hornworts), and cryptogammic crust on substrate surfaces including downed logs, rocks and soil, but not on standing or inclined trees or vertical rock surfaces.

% Total Vasc Veg cover: The total cover of all vascular vegetation taking into consideration the porosity, or the holes, in the vegetation. This is an estimate of the absolute vegetation cover, disregarding overlap of the various tree, shrub, and/or herbaceous layers and species.

% Cover

% Conifer Tree /Hardwood Tree: The total foliar cover (considering porosity) of all live tree species, disregarding overlap of individual trees. Estimate conifer and hardwood covers separately. **Please note:** These cover values should not include the coverage of regenerating tree species (i.e., tree seedlings and saplings).

% Regenerating Tree: The total foliar cover of seedlings and saplings, disregarding overlap of individual recruits. See seedling and sapling definitions below.

%Shrub: The total foliar cover (considering porosity) of all live shrub species disregarding overlap of individual shrubs.

%Herbaceous: The total cover (considering porosity) of all herbaceous species, disregarding overlap of individual herbs.

Height Class

Modal height for conifer tree /hardwood tree, shrub, and herbaceous categories: Provide an estimate of height for each category listed. Record an average height value per each category by estimating the mean height for each group. Please use the following height intervals to record a height class: 01 =< 1/2m, 02=1/2-1m, 03 = 1-2 m, 04 = 2-5 m, 05 = 5-10 m, 06 = 10-15 m, 07 = 15-20 m, 08 = 20-35 m, 09 = 35-50 m, 10 => 50m.

Species list and coverage

For rapid assessments, list the 10-20 species that are dominant or that are characteristically consistent throughout the stand. These species may or may not be abundant, but they should be constant representatives in the survey. When different layers of vegetation occur in the stand, make sure to list species from each stratum. As a general guide, make sure to list at least 1-2 of the most abundant species per stratum.

For relevés, list all species present in the plot, using the second species list page if necessary.

For both sample types, provide the stratum where:

T = Tree. A woody perennial plant that has a single trunk.

S = Shrub. A perennial, woody plant that is multi-branched and doesn't die back to the ground every year.

H = Herb. An annual or perennial that dies down to ground level every year.

E = Seedling. A tree species clearly of a very young age that is less than 1" dbh.

A = Sapling. 1" - <6" dbh and young in age, OR small trees that are less than 1" diameter at breast height and are clearly of appreciable age and kept short by repeated browsing or burning.

N = Non-vascular. Includes mosses, liverworts, hornworts, cryptogammic crust, lichens, and algae.

Be consistent and don't break up a single species into two separate strata. The only time it would be appropriate to do so is when one or more tree species are regenerating, in which case the Seedling and/or Sapling strata should be recorded for that species. These may be noted on the same line, e.g.:

Strata	Species	%Cover	C
T/E/A	Quercus douglasii	40/<1/<1	

If a species collection is made, it should be indicated in the collection column with a “C” (for collected). If the species is later keyed out, cross out the species name or description and write the keyed species name in pen on the data sheet. Do not erase what was written in the field, because this information can be used if specimens get mixed up later. If the specimen is then thrown out, the “C” in the collection column should be crossed out. If the specimen is kept but is still not confidently identified, add a “U” to the “C” in the collection column (CU = collected and unconfirmed). In this case the unconfirmed species epithet should be put in parentheses [e.g. *Hordeum (murinum)*]. If the specimen is kept and is confidently identified, add a “C” to the existing “C” in the collection column (CC = Collected and confirmed).

Use Jepson Manual nomenclature. Write out the genus and species of the plant. Do not abbreviate. When uncertain of an identification (which you intend to confirm later) use parentheses to indicate what part of the determination needs to be confirmed. For example, you could write out *Brassica (nigra)* if you are sure it is a *Brassica* but you need further clarification on the specific epithet.

Provide the % absolute aerial cover for each species listed. When estimating, it is often helpful to think of coverage in terms of the following cover intervals at first:

<1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%.

Keeping these classes in mind, then refine your estimate to a specific percentage. All species percent covers may total over 100% because of overlap.

Include the percent cover of snags (standing dead) of trees and shrubs. Note their species, if known, in the “Stand history, stand age and comments” section.

For rapid assessments, make sure that the major non-native species occurring in the stand also are listed in the space provided in the species list with their strata and % cover. For relevés, all non-native species should be included in the species list.

Unusual species: List species that are locally or regionally rare, endangered, or atypical (*e.g.*, range extension or range limit) within the stand. This field will be useful to the Program for obtaining data on regionally or locally significant populations of plants.

INTERPRETATION OF STAND

Field-assessed vegetation alliance name: Name of alliance or habitat following the most recent CNPS classification system or the Manual of California Vegetation (Sawyer J.O., Keeler-Wolf T., and Evens, J. 2009). Please use scientific nomenclature, *e.g.*, *Quercus agrifolia* forest. An alliance is based on the dominant or diagnostic species of the stand, and is usually of the uppermost and/or dominant height stratum. A dominant species covers the greatest area. A diagnostic species is consistently found in some vegetation types but not others.

Please note: The field-assessed alliance name may not exist in the present classification, in which case you can provide a new alliance name in this field. If this is the case, also make sure to state that it is not in the MCV under the explanation for “Confidence in alliance identification.”

Field-assessed association name (optional): Name of the species in the alliance and additional dominant/diagnostic species from any strata, as according to CNPS classification. In following

naming conventions, species in differing strata are separated with a slash, and species in the uppermost stratum are listed first (e.g., *Quercus douglasii*/*Toxicodendron diversilobum*). Species in the same stratum are separated with a dash (e.g., *Quercus lobata-Quercus douglasii*).

Please note: The field-assessed association name may not exist in the present classification, in which you can provide a new association name in this field.

Adjacent Alliances/direction: Identify other vegetation types that are directly adjacent to the stand being assessed by noting the dominant species (or known type). Also note the distance away in meters from the GPS waypoint and the direction in degrees aspect that the adjacent alliance is found (e.g., *Amsinckia tessellata* / 50m, 360° N *Eriogonum fasciculatum* /100m, 110°).

Confidence in Identification: (L, M, H) With respect to the “field-assessed alliance name”, note whether you have L (=Low), M (=Moderate), or H (=High) confidence in the interpretation of this alliance name.

Explain: Please elaborate if your “Confidence in Identification” is low or moderate. Low confidence can occur from such things as a poor view of the stand, an unusual mix of species that does not meet the criteria of any described alliance, or a low confidence in your ability to identify species that are significant members of the stand.

Phenology: Indicate early (E), peak (P) or late (L) phenology for each of the strata.

Other identification problems or mapping issues: Discuss any further problems with the identification of the assessment or issues that may be of interest to mappers. Note if this sample represents a type that is likely too small to map. If it does, how much of the likely mapping unit would be comprised of this type. For example: “this sample represents the top of kangaroo rat precincts in this general area, which are surrounded by vegetation represented by CARR000x; this type makes up 10% of the mapping unit.”

Is polygon >1 type: Yes / No (circle one): *In areas that have been delineated as polygons on aerial photographs/imagery for a vegetation-mapping project*, assess if the polygon is mapped as a single stand. “Yes” is noted when the polygon delineated contains the field-assessed alliance and other vegetation type(s), as based on species composition and structure. “No” is noted when the polygon is primarily representative of the field-assessed alliance.

If yes, explain: If “Yes” above, explain the other vegetation alliances that are included within the polygon, and explain the amount and location that they cover in the polygon.

CNPS and CDFG Combined Vegetation Rapid Assessment and Relevé Field Form

Relevé or Rapid Assessment (circle one)

(Revised July 15 2010) Project Code: _____

For Office Use:	Final database #:	Final vegetation type name:	Alliance Association
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I. LOCATIONAL/ENVIRONMENTAL DESCRIPTION

Polygon/Stand #:	Air photo:	Date:	Name(s) of surveyors (circle recorder):
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GPS wypt #: _____ GPS name: _____ Datum: _____ or NAD83. Bearing, left axis at SW pt _____ (degrees) of Long / Short side
 UTME _____ UTMN _____ Zone: **10 / 11** (circle one) Error: ± _____ ft / m / pdop
 GPS within stand? Yes / No If No, cite from waypoint to stand, distance _____ (meters) & bearing _____ (degrees)

Elevation: _____ ft / m Camera Name/Photograph #'s: _____

Stand Size (acres): <1, 1-5, >5 | Plot Size (m²): 10 / 100 / 400 / 1000 | Plot Shape ___ x ___ ft / m or Circle Radius ___ ft / m
 Exposure, Actual °: _____ NE NW SE SW Flat Variable All | Steepness, Actual °: _____ 0° 1-5° 5-25° > 25

Topography: Macro: top upper mid lower bottom | Micro: convex flat concave undulating
 Geology code: _____ Soil Texture code: _____ | Upland or Wetland/Riparian (circle one)

% Surface cover: _____ (Incl. outcrops) (>60cm diam) (25-60cm) (7.5-25cm) (2mm-7.5cm) (Incl sand, mud)
 H20: ___ BA Stems: ___ Litter: ___ Bedrock: ___ Boulder: ___ Stone: ___ Cobble: ___ Gravel: ___ Fines: ___ =100%

% Current year bioturbation _____ Past bioturbation present? Yes / No | % Hoof punch _____
 Fire evidence: Yes / No (circle one) If yes, describe in Site history section, including date of fire, if known.

Site history, stand age, comments: _____

Disturbance code / Intensity (L,M,H): _____ / _____ / _____ / _____ / _____ / _____ "Other" _____ / _____

II. HABITAT AND VEGETATION DESCRIPTION

Tree DBH : **T1** (<1" dbh), **T2** (1-6" dbh), **T3** (6-11" dbh), **T4** (11-24" dbh), **T5** (>24" dbh), **T6** multi-layered (T3 or T4 layer under T5, >60% cover)
 Shrub: **S1** seedling (<3 yr. old), **S2** young (<1% dead), **S3** mature (1-25% dead), **S4** decadent (>25% dead)
 Herbaceous: **H1** (<12" plant ht.), **H2** (>12" ht.) % Non-Vasc cover: _____ Total % Vasc Veg cover: _____
 % Cover - Conifer tree / Hardwood tree: _____ / _____ Regenerating Tree: _____ Shrub: _____ Herbaceous: _____
 Height Class - Conifer tree / Hardwood tree: _____ / _____ Regenerating Tree: _____ Shrub: _____ Herbaceous: _____
 Height classes: 01=<1/2m 02=1/2-1m 03=1-2m 04=2-5m 05=5-10m 06=10-15m 07=15-20m 08=20-35m 09=35-50m 10=>50m

Species, Stratum, and % cover. Stratum categories: T=Tree, S = Shrub, H= Herb, E = SEedling, A = SApling, N= Non-vascular.
 % cover intervals for reference: <1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, 75%.

Strata	Species	% cover	C	Strata	Species	% cover	C

Unusual species: _____

III. INTERPRETATION OF STAND

Field-assessed vegetation alliance name: _____
 Field-assessed association name (optional): _____
 Adjacent alliances/direction: _____ / _____, _____ / _____
 Confidence in alliance identification: L M H Explain: _____
 Phenology (E,P,L): Herb _____ Shrub _____ Tree _____ Other identification or mapping information: _____
 Is poly >1 type: Yes / No If yes, explain: _____

Appendix B:

Plant List

Department of Fish and Game Lands: Oak Grove Unit

compiled by DFG VegCAMP, 2010

Family	Species Name	Common Name	Stratum (herb unless otherwise noted)
Agavaceae	<i>Yucca schidigera</i> Roezl ex Ortgies	Mojave yucca	shrub
	<i>Yucca whipplei</i> Torr.	chaparral yucca	shrub
Anacardiaceae	<i>Rhus ovata</i> S. Watson	sugar sumac	shrub
	<i>Rhus trilobata</i> Nutt.	skunkbush sumac	shrub
Apiaceae	<i>Bowlesia incana</i> Ruiz & Pav.	hoary bowlesia	
	<i>Tauschia arguta</i> (Torr. & A. Gray) J.F. Macbr.	southern umbrellawort	
Asclepiadaceae	<i>Asclepias californica</i> Greene	California milkweed	
	<i>Sarcostemma cynanchoides</i> Decne.	fringed twinevine	
Asteraceae	<i>Ambrosia psilostachya</i> DC.	Cuman ragweed	
	<i>Ambrosia salsola</i> (Torr. & A. Gray) Strother & B.G. Baldw.	burrobrush	
	<i>Artemisia douglasiana</i> Besser	Douglas' sagewort	
	<i>Artemisia dracunculus</i> L. (=A. dracunculoides)	tarragon	
	<i>Artemisia tridentata</i> Nutt.	big sagebrush	shrub
	<i>Baccharis salicifolia</i> (Ruiz & Pav.) Pers.	mule-fat	shrub
	<i>Baccharis sarothroides</i> A. Gray	desertbroom	shrub
	<i>Baccharis sergiloides</i> A. Gray	desert baccharis	shrub
	<i>Bebbia juncea</i> (Benth.) Greene var. <i>aspera</i> (Benth.) Greene	sweetbush	
	<i>Brickellia californica</i> (Torr. & A. Gray) A. Gray	California brickellbush	shrub
	<i>Centaurea melitensis</i> L.	Maltese star-thistle	
	<i>Chaenactis artemisiifolia</i> (Harv. & A. Gray ex A. Gray) A. Gray	white pincushion	
	<i>Chaenactis glabriuscula</i> DC.	yellow pincushion	
	<i>Chaenactis glabriuscula</i> DC. var. <i>lanosa</i> (DC.) H.M. Hall	yellow pincushion	
	<i>Chaenactis stevioides</i> Hook. & Arn.	Esteve's pincushion	
	<i>Cirsium vulgare</i> (Savi) Ten.	bull thistle	
	<i>Cnicus benedictus</i> L.	blessed thistle	
	<i>Conyza canadensis</i> (L.) Cronquist	Canadian horseweed	

Family	Species Name	Common Name	Stratum (herb unless otherwise noted)
	Coreopsis californica (Nutt.) H.K. Sharsmith	California tickseed	
Asteraceae	Corethrogyne filaginifolia (Hook. & Arn.) Nutt. (=Lessingia filaginifolia)	common sandaster	
	Deinandra fasciculata (DC.) Greene	clustered tarweed	
	Encelia actonii Elmer	Acton's brittlebush	shrub
	Ericameria fasciculata (Eastw.) J.F. Macbr.	Eastwood's goldenbush	shrub
	Ericameria linearifolia (DC.) Urbatsch & Wussow	narrowleaf goldenbush	shrub
	Ericameria pinifolia (A. Gray) H.M. Hall	pinebush	shrub
	Erigeron foliosus Nutt.	leafy fleabane	
	Eriophyllum confertiflorum (DC.) A. Gray	golden-yarrow	shrub
	Eriophyllum multicaule (DC.) A. Gray	manystem woolly sunflower	
	Eriophyllum stoechadifolium Lag.	seaside woolly sunflower	shrub
	Filago californica Nutt.	California cottonrose	
	Filago gallica L.	narrowleaf cottonrose	
	Gnaphalium californicum DC.	ladies' tobacco	
	Gnaphalium canescens DC.	Wright's cudweed	
	Gutierrezia californica (DC.) Torr. & A. Gray	San Joaquin snakeweed	shrub
	Hazardia squarrosa (Hook. & Arn.) Greene	sawtooth goldenbush	shrub
	Hypochaeris glabra L.	smooth cat's ear	
	Isocoma menziesii (Hook. & Arn.) G.L. Nesom	Menzies' goldenbush	shrub
	Lactuca serriola L.	prickly lettuce	
	Lasthenia californica DC. ex Lindl.	California goldfields	
	Lasthenia coronaria (Nutt.) Ornduff	royal goldfields	
	Layia glandulosa (Hook.) Hook. & Arn.	whitedaisy tidytips	
	Lepidospartum squamatum (A. Gray) A. Gray	California broomsage	shrub
	Malacothrix californica DC.	California desertydandelion	
	Malacothrix glabrata (A. Gray ex D.C. Eaton) A. Gray	smooth desertydandelion	
	Microseris sp.	silverpuffs	
	Porophyllum gracile Benth.	slender poreleaf	
	Rafinesquia californica Nutt.	California plumeseed	
	Rafinesquia neomexicana A. Gray	New Mexico plumeseed	
	Senecio californicus DC.	California ragwort	
	Senecio flaccidus Less.	threadleaf ragwort	shrub

Family	Species Name	Common Name	Stratum (herb unless otherwise noted)
Asteraceae	Stephanomeria exigua Nutt.	small wirelettuce	
	Stephanomeria exigua Nutt. ssp. deanei (J.F. Macbr.) Gottlieb	Deane's wirelettuce	
	Stephanomeria virgata Benth.	rod wirelettuce	
	Stylocline gnaphalioides Nutt.	mountain neststraw	
	Uropappus lindleyi (DC.) Nutt.	Lindley's silverpuffs	
Bignoniaceae	Chilopsis linearis (Cav.) Sweet	desert willow	shrub
Boraginaceae	Amsinckia intermedia Fisch. & C.A. Mey.	common fiddleneck	
	Amsinckia menziesii (Lehm.) A. Nelson & J.F. Macbr.	Menzies' fiddleneck	
	Cryptantha decipiens (M.E. Jones) A. Heller	gravelbar cryptantha	
	Cryptantha intermedia (A. Gray) Greene	Clearwater cryptantha	
	Cryptantha sp.	cryptantha	
	Cryptantha micrantha (Torr.) I.M. Johnst.	redroot cryptantha	
	Cryptantha micrantha (Torr.) I.M. Johnst. ssp. lepida (A. Gray) Mathew & P.H. Raven	redroot cryptantha	
	Cryptantha microstachys (Greene ex A. Gray) Greene	Tejon cryptantha	
	Cryptantha muricata (Hook. & Arn.) A. Nelson & J.F. Macbr.	pointed cryptantha	
	Cryptantha nevadensis A. Nelson & Kennedy	Nevada cryptantha	
	Cryptantha simulans Greene	pinewoods cryptantha	
	Heliotropium curassavicum L.	salt heliotrope	
	Pectocarya linearis (Ruiz & Pav.) DC.	sagebrush combseed	
	Pectocarya penicillata (Hook. & Arn.) A. DC.	sleeping combseed	
	Pectocarya setosa A. Gray	moth combseed	
	Plagiobothrys canescens Benth.	valley popcornflower	
Brassicaceae	Descurainia sophia (L.) Webb ex Prantl	herb sophia	
	Hirschfeldia incana (L.) Lagr.-Foss.	shortpod mustard	
	Raphanus sativus L.	cultivated radish	
	Rorippa nasturtium-aquaticum (L.) Hayek	watercress	
	Sisymbrium altissimum L.	tall tumbledustard	
	Sisymbrium irio L.	London rocket	
	Sisymbrium orientale L.	Indian hedgemustard	
	Thysanocarpus sp.	fringe pod	
Cactaceae	Cylindropuntia ganderi (C.B. Wolf) J. Rebman	Gander's buckhorn cholla	shrub
	Echinocereus engelmannii (Parry ex Engelm.) Lem.	Engelmann's hedgehog cactus	shrub

Family	Species Name	Common Name	Stratum (herb unless otherwise noted)
	<i>Opuntia basilaris</i> Engelm. & Bigelow	beavertail pricklypear	shrub
Cactaceae	<i>Opuntia basilaris</i> Engelm. & Bigelow var. <i>basilaris</i>	beavertail pricklypear	shrub
	<i>Opuntia chlorotica</i> Engelm. & Bigelow	dollarjoint pricklypear	shrub
Campanulaceae	<i>Nemacladus longiflorus</i> A. Gray var. <i>longiflorus</i>	longflower threadplant	
Caprifoliaceae	<i>Lonicera hispidula</i> (Lindl.) Douglas ex Torr. & A. Gray var. <i>vacillans</i> A. Gray	pink honeysuckle	
	<i>Lonicera subspicata</i> Hook. & Arn.	southern honeysuckle	shrub
	<i>Sambucus nigra</i> L. (= <i>Sambucus mexicana</i>)	black elderberry	shrub
Chenopodiaceae	<i>Atriplex canescens</i> (Pursh) Nutt.	fourwing saltbush	shrub
	<i>Atriplex triangularis</i> Willd.	triangle orache	
	<i>Chenopodium californicum</i> (S. Watson) S. Watson	California goosefoot	
	<i>Chenopodium</i> sp.	goosefoot	
Convolvulaceae	<i>Calystegia macrostegia</i> (Greene) Brummitt	island false bindweed	
Crassulaceae	<i>Dudleya saxosa</i> (M.E. Jones) Britton & Rose ssp. <i>aloides</i> (Rose) Moran	Panamint liveforever	
Cucurbitaceae	<i>Cucurbita foetidissima</i> Kunth	Missouri gourd	
	<i>Cucurbita palmata</i> S. Watson	coyote gourd	
	<i>Marah macrocarpus</i> (Greene) Greene	Cucamonga manroot	
Cuscutaceae	<i>Cuscuta californica</i> Hook. & Arn.	chaparral dodder	
	<i>Cuscuta</i> sp.	dodder	
Cyperaceae	<i>Carex</i> sp.	sedge	
	<i>Scirpus microcarpus</i> J. Presl & C. Presl	panicked bulrush	
Ericaceae	<i>Arctostaphylos glauca</i> Lindl.	bigberry manzanita	shrub
Euphorbiaceae	<i>Chamaesyce albomarginata</i> (Torr. & A. Gray) Small	whitemargin sandmat	
	<i>Croton californicus</i> Müll. Arg.	California croton	
	<i>Stillingia linearifolia</i> S. Watson	queen's-root	shrub
Fabaceae	<i>Amorpha fruticosa</i> L.	desert false indigo	shrub
	<i>Lotus argophyllus</i> (A. Gray) Greene	silver bird's-foot trefoil	
	<i>Lotus hamatus</i> Greene	San Diego bird's-foot trefoil	
	<i>Lotus scoparius</i> (Nutt.) Ottley	common deerweed	shrub
	<i>Lupinus albifrons</i> Benth.	silver lupine	shrub
	<i>Lupinus andersonii</i> S. Watson	Anderson's lupine	
	<i>Lupinus bicolor</i> Lindl.	miniature lupine	

Family	Species Name	Common Name	Stratum (herb unless otherwise noted)
	Lupinus concinnus J. Agardh	bajada lupine	
Fabaceae	Lupinus concinnus J. Agardh ssp. optatus (C.P. Sm.) D. Dunn	bajada lupine	
	Lupinus sparsiflorus Benth.	Coulter's lupine	
	Lupinus truncatus Nutt. ex Hook. & Arn.	collared annual lupine	
	Medicago polymorpha L.	burclover	
	Melilotus indicus (L.) All.	annual yellow sweetclover	
	Trifolium microcephalum Pursh	smallhead clover	
	Trifolium willdenovii Spreng.	tomcat clover	
Fagaceae	Quercus agrifolia Née	California live oak	tree
	Quercus berberidifolia Liebm.	scrub oak	shrub
Frankeniaceae	Frankenia salina (Molina) I.M. Johnst.	alkali seaheath	
Garryaceae	Garrya flavescens S. Watson ssp. pallida (Eastw.) Dahling	ashy silktassel	shrub
Gentianaceae	Centaurium venustum (A. Gray) B.L. Rob.	charming centaury	
Geraniaceae	Erodium cicutarium (L.) L'Hér. ex Aiton	redstem stork's bill	
Grossulariaceae	Ribes quercetorum Greene	rock gooseberry	shrub
Hydrophyllaceae	Emmenanthe penduliflora Benth.	whisperingbells	
	Eucrypta chrysanthemifolia (Benth.) Greene	spotted hideseed	
	Nemophila menziesii Hook. & Arn.	baby blue eyes	
	Phacelia cicutaria Greene	caterpillar phacelia	
	Phacelia distans Benth.	distant phacelia	
	Phacelia minor (Harv.) Thell.	wild canterbury bells	
	Phacelia parryi Torr.	Parry's phacelia	
	Phacelia ramosissima Douglas ex Lehm.	branching phacelia	
	Pholistoma racemosum (Nutt. ex A. Gray) Constance	racemed fiestaflower	
Juncaceae	Juncus balticus Willd.	mountain rush	
	Juncus sp.	rush	
Lamiaceae	Marrubium vulgare L.	horehound	
	Salvia apiana Jeps.	white sage	shrub
	Salvia carduacea Benth.	thistle sage	
	Salvia columbariae Benth.	chia	
	Salvia mellifera Greene	black sage	
	Stachys ajugoides Benth.	bugle hedgenettle	
Lamiaceae	Stachys ajugoides Benth. var. rigida Jeps. & Hoover	rough hedgenettle	

Family	Species Name	Common Name	Stratum (herb unless otherwise noted)
Liliaceae	Calochortus superbus Purdy ex J.T. Howell	yellow mariposa	
Liliaceae	Dichelostemma capitatum (Benth.) Alph. Wood	bluedicks	
	Muilla maritima (Torr.) S. Watson	sea muilla	
Malvaceae	Malva parviflora L.	cheeseweed mallow	
Nyctaginaceae	Mirabilis laevis (Benth.) Curran (Mirabilis bigelovii)	desert wishbone-bush	
	Mirabilis multiflora (Torr.) A. Gray	Colorado four o'clock	
Oleaceae	Fraxinus latifolia Benth.	Oregon ash	shrub
	Fraxinus velutina Torr.	velvet ash	tree
Onagraceae	Camissonia bistorta (Nutt. ex Torr. & A. Gray) P.H. Raven	southern suncup	
	Camissonia californica (Nutt. ex Torr. & A. Gray) P.H. Raven	California suncup	
	Camissonia campestris (Greene) P.H. Raven	Mojave suncup	
	Camissonia confusa P.H. Raven	San Bernardino suncup	
	Camissonia strigulosa (Fisch. & C.A. Mey.) P.H. Raven	sandysoil suncup	
	Epilobium minutum Lindl. ex Lehm.	chaparral willowherb	
Papaveraceae	Argemone munita Durand & Hilg.	flatbud pricklypoppy	
	Eschscholzia caespitosa Benth.	tufted poppy	
	Eschscholzia californica Cham.	California poppy	
Poaceae	Achnatherum coronatum (Thurb.) Barkworth	giant ricegrass	
	Achnatherum diegoense (Swallen) Barkworth	San Diego needlegrass	
	Achnatherum speciosum (Trin. & Rupr.) Barkworth	desert needlegrass	
	Avena barbata Pott ex Link	slender oat	
	Avena fatua L.	wild oat	
	Avena sativa L.	common oat	
	Bromus arenarius Labill.	Australian brome	
	Bromus diandrus Roth	rippgut brome	
	Bromus madritensis L.	compact brome	
	Bromus madritensis L. ssp. rubens (L.) Duvin	red brome	
	Bromus tectorum L.	cheatgrass	
	Distichlis spicata (L.) Greene	saltgrass	
	Ehrharta sp.	veldtgrass	
	Hordeum murinum L.	mouse barley	
	Hordeum murinum L. ssp. leporinum (Link) Arcang.	hare barley	
	Leymus condensatus (J. Presl) A. Löve	giant wildrye	

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	<i>Melica frutescens</i> Scribn.	woody melicgrass	
Poaceae	<i>Melica imperfecta</i> Trin.	smallflower melicgrass	
	<i>Muhlenbergia rigens</i> (Benth.) Hitchc.	deergrass	
	<i>Nassella lepida</i> (Hitchc.) Barkworth	foothill needlegrass	
	<i>Nassella pulchra</i> (Hitchc.) Barkworth	purple needlegrass	
	<i>Poa secunda</i> J. Presl	Sandberg bluegrass	
	<i>Polypogon monspeliensis</i> (L.) Desf.	annual rabbitsfoot grass	
	<i>Schismus arabicus</i> Nees	Arabian schismus	
	<i>Schismus barbatus</i> (Loefl. ex L.) Thell.	common Mediterranean grass	
	<i>Vulpia myuros</i> (L.) C.C. Gmel.	rat-tail fescue	
Polemoniaceae	<i>Eriastrum densifolium</i> (Benth.) H. Mason	giant woollystar	
	<i>Eriastrum sapphirinum</i> (Eastw.) H. Mason	sapphire woollystar	
	<i>Gilia australis</i> (H. Mason & A.D. Grant) V.E. Grant & A.D. Grant	southern gilia	
	<i>Gilia capillaris</i> Kellogg	miniature gilia	
	<i>Gilia ochroleuca</i> M.E. Jones	volcanic gilia	
	<i>Gilia ochroleuca</i> M.E. Jones ssp. <i>exilis</i> (A. Gray) A.D. Grant & V.E. Grant	volcanic gilia	
	<i>Langloisia schottii</i> (Torr.) Greene	Schott's calico	
	<i>Langloisia setosissima</i> (Torr. & A. Gray ex Torr.) Greene	Great Basin langloisia	
	<i>Linanthus bellus</i> (A. Gray) Greene	desertbeauty	
	<i>Linanthus lemmonii</i> (A. Gray) Greene	Lemmon's linanthus	
	<i>Linanthus orcuttii</i> (Parry & A. Gray) Jeps.	Orcutt's linanthus	
	<i>Navarretia hamata</i> Greene	hooked pincushionplant	
Polygonaceae	<i>Centrostegia thurberi</i> A. Gray ex Benth.	red triangles	
	<i>Chorizanthe fimbriata</i> Nutt.	fringed spineflower	
	<i>Chorizanthe leptoceras</i> (A. Gray ex Benth.) S. Watson	slenderhorn spineflower	
	<i>Chorizanthe leptotheca</i> Goodman	Ramona spineflower	
	<i>Chorizanthe staticoides</i> Benth.	turkish rugging	
	<i>Eriogonum davidsonii</i> Greene	Davidson's buckwheat	
	<i>Eriogonum fasciculatum</i> Benth.	Eastern Mojave buckwheat	shrub
	<i>Eriogonum fasciculatum</i> Benth. ssp. <i>polifolium</i> (Benth.) S. Stokes	Eastern Mojave buckwheat	shrub

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	<i>Eriogonum gracile</i> Benth.	slender woolly buckwheat	
Polygonaceae	<i>Eriogonum gracile</i> Benth. var. <i>gracile</i>	slender woolly buckwheat	
	<i>Eriogonum nudum</i> Douglas ex Benth.	naked buckwheat	
	<i>Eriogonum thurberi</i> Torr.	Thurber's buckwheat	
	<i>Lastarriaea coriacea</i> (Goodman) Hoover	leather spineflower	
	<i>Polygonum arenastrum</i> Jord. ex Boreau	oval-leaf knotweed	
	<i>Polygonum</i> sp.	knotweed	
	<i>Pterostegia drymarioides</i> Fisch. & C.A. Mey.	woodland pterostegia	
	<i>Rumex hymenosepalus</i> Torr.	canaigre dock	
	<i>Rumex salicifolius</i> Weinm. var. <i>denticulatus</i> Torr.	toothed willow dock	
Portulacaceae	<i>Cistanthe monandra</i> (Nutt.) Hershkovitz (=Calyptridium monandrum)	common pussypaws	
	<i>Claytonia parviflora</i> Douglas ex Hook.	streambank springbeauty	
	<i>Claytonia parviflora</i> Douglas ex Hook. ssp. <i>parviflora</i>	streambank springbeauty	
	<i>Claytonia perfoliata</i> Donn ex Willd.	miner's lettuce	
Pteridaceae	<i>Cheilanthes covillei</i> Maxon	Coville's lipfern	
	<i>Pellaea</i> sp.	cliffbrake	
	<i>Pentagramma triangularis</i> (Kaulf.) Yatsk., Windham & E. Wollenw.	goldback fern	
Ranunculaceae	<i>Clematis lasiantha</i> Nutt.	pipestem clematis	
	<i>Delphinium hesperium</i> A. Gray	foothill larkspur	
Rhamnaceae	<i>Ceanothus cuneatus</i> (Hook.) Nutt.	buckbrush	shrub
	<i>Ceanothus greggii</i> A. Gray	desert ceanothus	shrub
	<i>Rhamnus crocea</i> Nutt.	redberry buckthorn	shrub
	<i>Rhamnus ilicifolia</i> Kellogg	hollyleaf redberry	shrub
Rosaceae	<i>Adenostoma fasciculatum</i> Hook. & Arn.	chamise	shrub
	<i>Adenostoma sparsifolium</i> Torr.	redshank	shrub
	<i>Cercocarpus betuloides</i> Nutt.	birchleaf mountain mahogany	shrub
	<i>Cercocarpus montanus</i> Raf.	alderleaf mountain mahogany	shrub
	<i>Heteromeles arbutifolia</i> (Lindl.) M. Roem.	toyon	shrub
	<i>Prunus ilicifolia</i> (Nutt. ex Hook. & Arn.) D. Dietr.	hollyleaf cherry	shrub
Rosaceae	<i>Rosa californica</i> Cham. & Schldl.	California wildrose	shrub
Rubiaceae	<i>Galium andrewsii</i> A. Gray	phloxleaf bedstraw	

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Rubiaceae	<i>Galium angustifolium</i> Nutt. ex A. Gray	narrowleaf bedstraw	shrub
Salicaceae	<i>Populus fremontii</i> S. Watson	Fremont cottonwood	tree
	<i>Salix exigua</i> Nutt.	narrowleaf willow	shrub
	<i>Salix laevigata</i> Bebb	red willow	tree
	<i>Salix lasiolepis</i> Benth.	arroyo willow	shrub
Scrophulariaceae	<i>Antirrhinum coulterianum</i> Benth. ex A. DC.	Coulter's snapdragon	
	<i>Castilleja exserta</i> (A. Heller) T.I. Chuang & Heckard	exserted Indian paintbrush	
	<i>Castilleja foliolosa</i> Hook. & Arn.	Texas Indian paintbrush	
	<i>Castilleja minor</i> (A. Gray) A. Gray ssp. <i>spiralis</i> (Jeps.) T.I. Chuang & Heckard	lesser Indian paintbrush	
	<i>Collinsia heterophylla</i> Buist ex Graham	purple Chinese houses	
	<i>Keckiella antirrhinoides</i> (Benth.) Straw	snapdragon penstemon	shrub
	<i>Linaria canadensis</i> (L.) Chaz.	Canada toadflax	
	<i>Mimulus aurantiacus</i> W. Curtis	orange bush monkeyflower	shrub
	<i>Mimulus bigelovii</i> (A. Gray) A. Gray	Bigelow's monkeyflower	
	<i>Mimulus floribundus</i> Lindl.	manyflowered monkeyflower	
	<i>Mimulus guttatus</i> DC.	seep monkeyflower	
	<i>Mimulus parishii</i> Greene	Parish's monkeyflower	
	<i>Mimulus pilosus</i> (Benth.) S. Watson	false monkeyflower	
	<i>Penstemon centranthifolius</i> (Benth.) Benth.	scarlet bugler	shrub
	<i>Penstemon</i> sp.	beardtongue	
	<i>Scrophularia californica</i> Cham. & Schltldl.	California figwort	
<i>Veronica anagallis-aquatica</i> L.	water speedwell		
Simmondsiaceae	<i>Simmondsia chinensis</i> (Link) C.K. Schneid.	jojoba	shrub
Solanaceae	<i>Datura wrightii</i> Regel	sacred thorn-apple	
	<i>Lycium andersonii</i> A. Gray	water jacket	shrub
	<i>Nicotiana glauca</i> Graham	tree tobacco	shrub
	<i>Nicotiana trigonophylla</i> Dunal	desert tobacco	
Tamaricaceae	<i>Tamarix</i> sp.	tamarisk	shrub
Typhaceae	<i>Typha latifolia</i> L.	broadleaf cattail	
Urticaceae	<i>Urtica dioica</i> L. ssp. <i>holosericea</i> (Nutt.) Thorne	stinging nettle	
Urticaceae	<i>Urtica urens</i> L.	dwarf nettle	