

**Field Key to Ecological Systems and Target Alliances
of California (excluding the Mojave Desert),
United States
Map Zones 3, 4, 5, & 6**

**NatureServe
Terrestrial Ecology Department
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Contacts:

Marion Reid, Senior Regional Ecologist, 303.541.0342, marion_reid@natureserve.org

Gwen Kittel, Vegetation Ecologist, 303.541.0364, gwen_kittel@natureserve.org

Keith Schulz, Regional Vegetation Ecologist, 303.541.0356, keith_schulz@natureserve.org

Pat Comer, Chief Terrestrial Ecologist, 303.541.0352, pat_comer@natureserve.org

TABLE OF CONTENTS

Introduction.....2

Land Use, Unvegetated, Semi-natural and Altered Vegetation.....5

California (excluding the Mojave Desert) Ecological Systems and Target Alliances.....7

KEY TO GROUPS..... 7

KEY A: SPARSELY VEGETATED (<10% vascular cover) 7

KEY B: WOODY WETLAND / RIPARIAN / EPHEMERAL WASH / LAKEBED (>10% woody cover, wet areas) 9

KEY C: UPLAND FORESTS AND WOODLANDS 10

 Deciduous Forest 10

 Mixed Pine-Deciduous Oak Woodlands..... 10

 Deciduous Oak Woodlands..... 11

 Subalpine Forests, Parklands, and Krummholz 11

 Montane, Foothill and Coastal Forests 12

 Coastal Forests 12

 Montane Forests..... 13

 Upper Montane and Subalpine Forests 13

 Lower Montane and Foothill Forests and Woodlands 14

 Serpentine Woodlands and Savannas 14

 Oak and Oak-Pine Woodland and Forests 14

 Mixed Evergreen and Mixed Conifer Forests..... 15

 Pine dominated Forest and Woodland 16

 Pinyon-Juniper, Mt. Mahogany Woodlands 17

KEY D: SHRUBLANDS..... 18

 Alpine Shrublands..... 18

 Coastal Shrublands (fog and salt spray zone) 18

 Interior California Shrublands 19

 Desert (Mojave, Sonoran, Intermountain Basin) Shrublands 20

 Intermountain and Great Basin Desert Shrublands..... 20

 Mojave and Sonoran Desert Shrublands..... 21

KEY E: HERBACEOUS ECOLOGICAL SYSTEMS AND ALLIANCES 21

 Wetland Herbaceous 21

 Upland Herbaceous..... 22

Introduction

The following keys to NatureServe ecological systems and selected US-NVC vegetation alliances cover the areas found in NLCD map zones: 3, 4, 5, and 6 (California excluding the Mojave Desert). The systems and alliances included in these keys are intended to represent the legend that LANDFIRE will be striving to map for existing vegetation in California (Figure 1). Some types are in the keys that characteristically occur at small spatial scales (generally <2 ha in size) and hence may not be mappable by the LANDFIRE project. However, we have chosen to be inclusive in the keys, so that the user will have information on these system types for

comparison purposes. In some cases they may be important for modeling fire condition class and, given their relative distinctiveness on the landscape, they may indeed be mappable.

Plant names are almost always in Latin and follow the nomenclature of Kartesz (1999). In limited cases, we have included synonyms for some taxa.

The keys are “dichotomous”, which means the user follows the order of the ‘couplets’ and makes a choice between the 2 options represented in the couplet. The ordering of the couplets in each key does matter, and the user should choose the option in each couplet that best fits the data or field situation. A choice leads the user to the next couplet to be utilized in the keying process, via a number at the far right, or else leads to a final result (an ecological system type or an alliance).

If the choice the user makes leads to a “result”, then either an Ecological System is named or a Vegetation Alliance is named. If an ecological system is followed by a number in parentheses, then the couplet so numbered is to alliances that are part of the system and which may be mappable. Alliances are recognizable because “alliance” is in the name, and they all start with one or more Latin names (e.g. *Pinus ponderosa* Woodland Alliance).

Systems do not include Latin species names in them, and always start with a Biogeographic region (e.g. Colorado Plateau Mixed Low Sagebrush Shrubland).

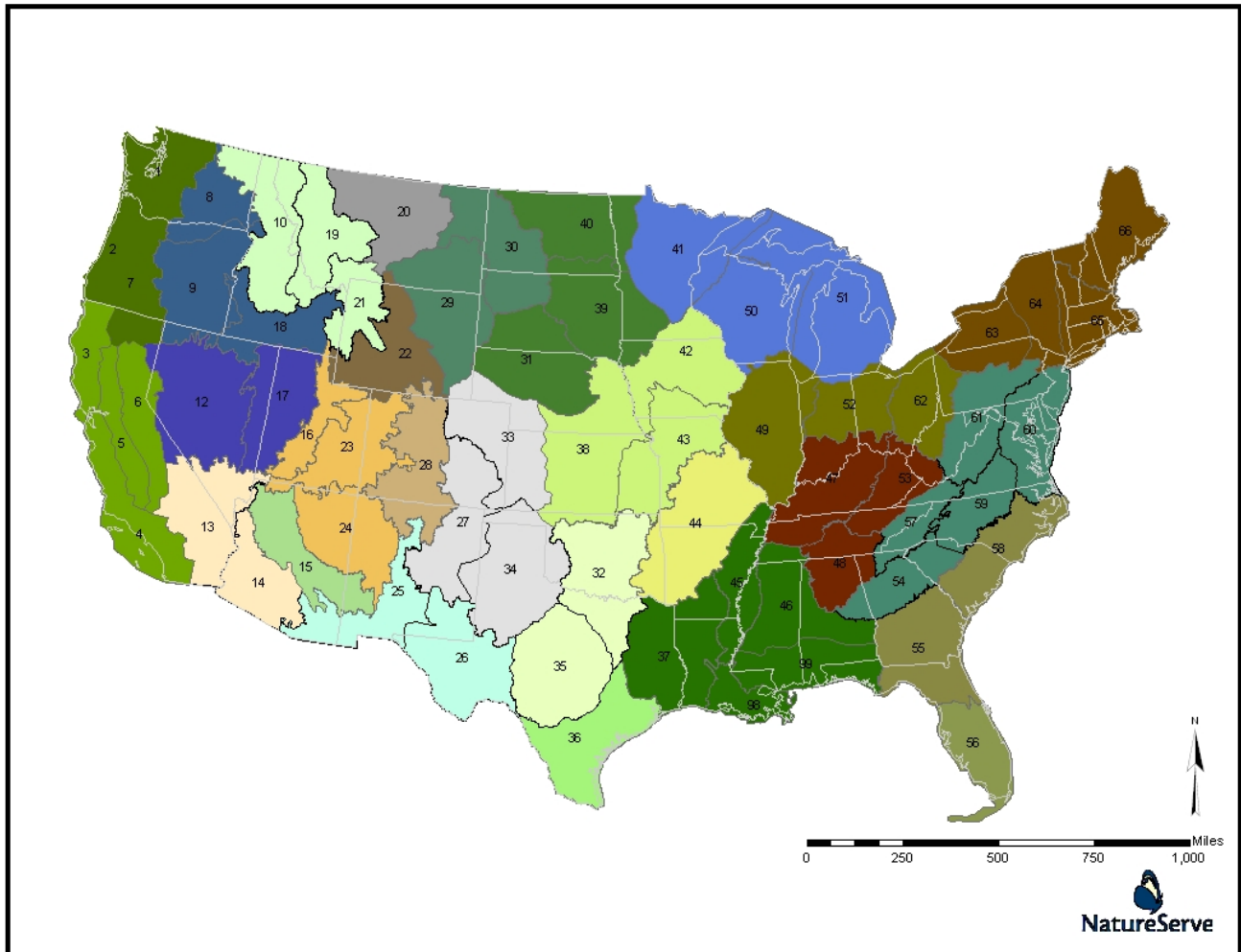


Figure 1. LANDFIRE map zone clusters with keys to ecological systems and selected alliances.

All the keys follow the same logic. First the user determines which Group Key: if the vegetation (or land cover) is ‘sparse’ (<10% vascular cover) (Key A); vascular cover >10% and woody cover >10% wetland or upland: woody wetlands/riparian areas (Key B); upland forest /woodlands (Key C); upland Shrublands (both tall, dwarf and shrub-steppe); or <10% woody cover, then Herbaceous Vegetation (Key E)

Keys are generally based on dominance within vegetation strata, with tree cover generally considered first, then that of shrubs, then the herbaceous component. Codominant species within a given strata are important as well, in some cases a system type or alliances will have 2 or more codominant species, which may or may not be present in all stands. Many ecological systems will have a variable physiognomy; where appropriate these variable systems have been placed into the keys in several places (i.e. some grassland systems have a “shrub-steppe” physiognomy and hence will be in the key both as shrub-steppe and herbaceous).

Some terminology is commonly employed throughout the keys that distinguish general spatial characteristics of the vegetation or environmental setting. For example ‘matrix’ types of

vegetation are dominant across the majority of a given landscape, while ‘large patch’ types tend to occur as distinctive patches within the larger ‘matrix.’ Elevation-based life zones are commonly employed, with reference to ‘alpine,’ ‘subalpine,’ ‘montane,’ or ‘foothill’ zones. These zones vary in actual elevational thresholds across multiple map zones, and within individual map zones. More precise definition of these elevation breaks by map zone could be accomplished with additional research.

In the next section of the document we have provided a table showing the LANDFIRE legend units that represent non-natural vegetation and a short description for each of them. They are not formally incorporated into the keys, since they are typically recognizable without the use of a key, or else their floristic composition is so variable as to be not useful in a field key. Our primary purpose was to provide keys for the natural and near-natural vegetation of these zones.

Land Use, Unvegetated, Semi-natural and Altered Vegetation

LAND USE OR UNVEGETATED SURFACES	
Open Water	Open water
Developed	Generally developed lands.
Developed, Open Space	Vegetation (primarily grasses) planted in developed settings for recreation, erosion control, or aesthetic purposes. Impervious surfaces account for less than 20% of total cover. Examples include parks, lawns, golf courses, airport grasses, and industrial site grasses.
Developed, Low Intensity	Includes areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20-50% of total cover. These areas most commonly include single-family housing units.
Developed, Medium Intensity	Includes areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50-80% of the total cover. These areas most commonly include single-family housing units
Developed, High Intensity	Includes highly developed areas where people reside in high numbers. Examples include apartment complexes, row houses and commercial/industrial. Impervious surfaces account for 80 to 100% of the total cover.
Agriculture	Generally developed for agricultural uses.
Pasture/Hay	These agriculture lands typically have perennial herbaceous cover (e.g. regularly-shaped plantings) used for livestock grazing or the production of hay. There are obvious signs of management such as irrigation and haying that distinguish it from natural grasslands. Identified CRP lands are included in this land cover type.
Cultivated Crops and Irrigated Agriculture	These areas used for the production of crops, such as corn, soybeans, small grains, sunflowers, vegetables, and cotton, typically on an annual cycle. Agricultural plant cover is variable depending on season and type of farming. Other areas include more stable land cover of orchards and vineyards.
Perennial Ice/Snow	
SEMI-NATURAL / ALTERED VEGETATION	
Ruderal Vegetation	Vegetation resulting from succession following significant anthropogenic disturbance of an area. It is generally characterized by unnatural combinations of species (primarily native species, though they often contain slight or substantial numbers and amounts of species alien to the region as well)
Ruderal Upland - Old Field	
Ruderal Upland - Abandoned Tree Plantation	
Ruderal Wetland	
Introduced Vegetation	Vegetation dominated by introduced species. These are spontaneous, self-perpetuating, and not (immediately) the result of planting, cultivation, or human maintenance. Land occupied by introduced vegetation is generally permanently altered (converted) unless restoration efforts are undertaken.

Introduced Upland Vegetation - Treed	Land cover is significantly altered/disturbed by introduced tree species.
Introduced Upland Vegetation - Shrub	Land cover is significantly altered/disturbed by introduced woody and/or herbaceous vegetation.
Introduced Upland Vegetation - Annual and Biennial Forbland	Land cover is significantly altered/disturbed by introduced annual and biennial forbs. Natural vegetation types are no longer recognizable. Typical species that dominate these areas are <i>Acroptilon repens</i> , <i>Leucanthemum vulgare</i> , <i>Cirsium arvense</i> , <i>C. vulgare</i> , <i>Euphorbia esula</i> , <i>Lepidium latifolium</i> , <i>Carduus nutans</i> , <i>Centaurea</i> spp. (<i>diffusa</i> , <i>solstitialis</i>), <i>Salsola kali</i> , <i>Bassia scoparia</i> , <i>Halogeton glomeratus</i> , <i>Melilotus officinalis</i> , and <i>Cardaria</i> spp.
Introduced Upland Vegetation – Annual Grassland	Land cover is significantly altered/disturbed by introduced annual grasses. Natural vegetation types are no longer recognizable. Typical species include <i>Bromus japonicus</i> , <i>B. rigidus</i> , <i>B. rubens</i> , <i>B. tectorum</i> , <i>Taeniatherum caput-medusae</i> , and/or <i>Schismus barbatus</i> .
California Annual Grassland	Land cover dominated by introduced, non-native annual grasses within the central valley and coastal portions of California. Natural vegetation types are no longer recognizable. Grass and forb species include <i>Bromus</i> spp. (e.g., <i>madritensis</i> , <i>diandrus</i> , <i>hordeaceus</i>), <i>Eschscholzia californica</i> , <i>Aira caryophylla</i> , <i>Lasthenia</i> spp., <i>Castilleja</i> spp., <i>Avena</i> spp., <i>Mesembryanthemum</i> , <i>Malephora</i> , and/or <i>Carpobrotus</i> , commonly referred to as 'iceplant.' The native shrubs <i>Ambrosia chamissonis</i> , <i>Eriogonum latifolium</i> , and/or <i>Abronia latifolia</i> may be present as emergents. <i>Poa douglasii</i> may also be present.
Introduced Upland Vegetation - Perennial Grassland and Forbland	Land cover is significantly altered/disturbed by introduced, non-native perennial grasses and forbs. Natural vegetation types are no longer recognizable. Grass species include <i>Agropyron cristatum</i> , <i>Poa bulbosa</i> , <i>Bromus inermis</i> , <i>Phleum pratense</i> , and <i>Poa pratensis</i> . Forbs may include: <i>Centaurea</i> spp., <i>Cirsium arvense</i> , <i>Euphorbia esula</i> , <i>Lepidium</i> spp., <i>Melilotus</i> spp.
Introduced Riparian Vegetation	Land cover is altered/disturbed and dominated by introduced woody vegetation (woodlands and shrublands). Typical riparian trees and shrubs include <i>Elaeagnus angustifolia</i> , <i>Tamarix</i> spp., <i>Triadica sebifera</i> , etc.
Introduced Wetland Vegetation	Land cover is altered/disturbed and dominated by introduced wetland vegetation. Species may include <i>Lythrum salicaria</i> , <i>Phalaris arundinacea</i> , <i>Phragmites australis</i> , etc.
Modified/Managed Vegetation	Vegetation resulting from management or modification of natural/near natural; vegetation, but producing a structural and floristic combination not clearly known to have a natural analogue. Modified vegetation may be easily restorable by either management, restoration of ecological processes, and/or succession.
Modified/Managed Upland Vegetation	Land cover is apparently managed/modified and dominated by trees and/or shrubs. Vegetation is a mixture of herbaceous, shrub, and tree species.
Recently Burned Forest and Woodland	Land cover is apparently modified by recent fires which have burned forest and woodland vegetation. Vegetation is a mixture of herbaceous, shrub, and tree species.
Recently Burned Shrubland	Land cover is apparently modified by recent fires which have shrubland vegetation. Vegetation is a mixture of herbaceous and shrub species.
Recently Burned Grassland	Land cover is apparently modified by recent fires which have burned grassland vegetation. Vegetation is a mixture of herbaceous and shrub species.
Managed Tree Plantation	Land cover is apparently modified and appears as a managed tree plantation.
Recently Logged Timberland	Land cover is apparently modified and appears as logged timberland.
Modified/Managed Wetland Vegetation	These areas include created and obviously managed wetlands of varying size resulting from water diversion. Artificial Wetlands will be mapped where obvious built structures may be distinguished from imagery.

California (excluding the Mojave Desert) Ecological Systems and Target Alliances

This key is intended for identifying Ecological Systems and selected alliances that are found in California, excluding the southeast Mojave Desert. Additional alliance couplets are to proposed mappable or target alliances and are not intended to be comprehensive (e.g. not all vegetation alliances are included in the keys).

Please note the following symbols:

* indicates NS ecological system that has been grouped into broader LANDFIRE Map Unit.

Included to help clarify key, but crews need to record broader LANDFIRE Map Unit(**)

** indicates broader LANDFIRE Map Unit.

*** small patch ecological system, NOT being mapped by LANDFIRE.

**** This alliance is not considered mappable, but is included as a counter-point to one that is mappable.

KEY TO GROUPS

1a. Total woody canopy cover generally less than 10%	2
1b. Total woody canopy cover generally 10% or more	3
2a. Total canopy cover (woody and herbaceous vascular plants) generally less than 10%.....	Key A
2b. Total canopy cover (herbaceous) >10%, some woody species may be present	5
3a. Land cover is restricted to drainages, potential inundated valley floors, semi-riparian flats, riparian areas, springs or seeps (flat, depressional or slope) and areas with high water tables, including ephemeral washes and saline to semi-saline flats (wetlands, seeps, riparian areas, washes, poorly drained lake beds).....	Key B
3b. Land cover is upland, sloping or flat, but without a high water table, no potential for flooding, a water shedding, not water receiving site	4
4a. Land covered in trees, from savannas (10-25% cover of trees, generally >3 m tall with a single main stem and >25% cover graminoids), to woodlands (25-60%) or forests (60-100%)	Key C
4b. Land covered in shrubs, tall or dwarf, at least 10% cover woody vegetation, scattered trees may be present, these less than 10%, and clearly not a savanna.....	Key D
5a. Total canopy cover (herbaceous) generally 10% or more	Key E
5b. Total canopy cover of vascular plants is less than 10% cover	Key A

KEY A: SPARSELY VEGETATED (<10% vascular cover)

1a. Barren and typically sparsely vegetated alpine substrates.....	2
1b. Barren and sparsely vegetated substrates NOT alpine	4
2a. Land cover is ice or exposed rock (usually >90% cover of either bedrock, boulders or scree).....	3
2b. Land cover has significant amounts (10-50% cover) of vascular herbaceous vegetation (typically dominated by cushion plants) and exposed rock (50-90% cover).	North American Alpine Ice Field***

3a. Land cover is mostly exposed rock (usually >90% cover of either bedrock, boulders or scree). Nonvascular cover (lichens) may be significant, at alpine elevations	
North and southern Sierran High Mountains..... (Mediterranean California Alpine Bedrock and Scree***)	
..... Mediterranean California Sparsely Vegetated Systems**	
Mt Shasta, Klamath Mts..... (North Pacific Alpine and Subalpine Bedrock and Scree*)	
..... North Pacific Sparsely Vegetated Systems**	
3b. Land cover is mostly exposed rock, below upper tree line, not alpine.....	4
4a. Land cover is volcanic in origin (includes lava, cinder, ash deposits).....	5
4b. Land cover is not volcanic in origin.....	6
5a. Volcanic substrates (generally <10% plant cover) such as basalt lava (malpais), basalt dikes with associated colluvium, basalt cliff faces and uplifted "backbones," ash, cinder cones or cinder fields.	
Map Zone 7	(North Pacific Volcanic Rock and Cinder Land*)
..... North Pacific Sparsely Vegetated Systems	
5b. Volcanic substrates (generally <10% plant cover) such as basalt lava (malpais), basalt dikes with associated colluvium, basalt cliff faces and uplifted "backbones," ash, cinder cones or cinder fields.	
Eastern portions of Map Zones 6 & 7.....	(Inter-Mountain Basins Volcanic Rock and Cinder Land *)
..... Inter-Mountain Basins Sparsely Vegetated Systems**	
6a. Steep cliff faces, narrow canyons or small rock outcrops, or the talus slopes at the base of cliffs.....	7
6b. Land surface is not bedrock, cliff faces but loose, shifting or eroding materials finer than talus and if so , not directly below a cliff face	8
7a. Steep cliff faces, narrow canyons, or smaller rock outcrops of various igneous, sedimentary, and metamorphic bedrock types. Also included are unstable scree and talus slopes that typically occur below cliff faces	
Along the Pacific Ocean, Northern edge Map Zone 3	(North Pacific Coastal Cliff and Bluff*)
..... North Pacific Sparsely Vegetated Systems**	
Along the Pacific Ocean southern Map Zones 3 & 4	Mediterranean California Coastal Bluff
..... Mediterranean California Sparsely Vegetated Systems**	
..... Central California Coast Ranges Cliff and Canyon	
Klamath-Siskiyou Mts.....	(Klamath-Siskiyou Cliff and Outcrop*)
Sierra Nevada Mts	(Sierra Nevada Cliff and Canyon*)
Central and Southern CA.....	(Southern California Coast Ranges Cliff and Canyon*)
..... Mediterranean California Sparsely Vegetated Systems**	
7b. Not as above.....	8
8a. Land is sand dunes	9
8b. Not as above.....	10
9a. Land is coastal active or stabilized dunes and sandsheets. Species are adapted to shifting, coarse-textured substrates (usually quartz sand) and form patchy or open grasslands, shrublands or steppe, and occasionally woodlands, in a predominantly barren landscape	
.....	(North Pacific Maritime Coastal Sand Dune and Strand*)
.....	(Mediterranean California Northern Coastal Dune*)
.....	(Mediterranean California Southern Coastal Dune*)
..... Pacific Coastal Dunes and Other Sparsely Vegetated Systems*	
9b. Land is inland, non coastal active or stabilized dunes and sandsheets. Species are adapted to shifting, coarse-textured substrates (usually quartz sand) and form patchy or open grasslands, shrublands or steppe, and occasionally woodlands, in a predominantly barren landscape	
.....	(Inter-Mountain Basins Active and Stabilized Dune*)
..... Inter-Mountain Basins Sparsely Vegetated Systems **	

10a. Serpentine barrens	Mediterranean California Serpentine Barrens
10b. Non-serpentine barrens	11
11a. Barrens of the warm desert, southern California and eastern of Sierra Nevada	North American Warm Desert Sparsely Vegetated Systems
11b. Land cover is barren, but not as above (review land use and disturbed classes).....(Undifferentiated Barren*)	Mediterranean California Sparsely Vegetated Systems**

**KEY B: WOODY WETLAND / RIPARIAN / EPHEMERAL WASH / LAKEBED
(>10% woody cover, wet areas)**

1a. Land cover is restricted to drainages, potential inundated valley floors, semi-riparian flats, riparian areas, springs or seeps (flat, depressional or slope) and areas with high water tables	2
1b. Land cover is upland vegetation without seeps or high water tables	Key C
2a. Montane and Foothill woodlands and shrublands, above the valley floor	3
2b. Low elevation, valley floor or desert wetlands	5
3a. Serpentine substrates along riparian zones, seeps or fens with woody vegetation	4
..... (Mediterranean California Serpentine Foothill and Lower Montane Riparian Woodland and Seep**)	Mediterranean California Serpentine Fen**
..... California Montane Riparian Systems**	
3b. Non-serpentine wetlands	4
4a. Montane and foothill riparian areas or seeps, upper to lower montane, from near sea level up to 300 m (900 feet) in the Coast Ranges and inland to 1500 m (4545 feet). Dominant species include <i>Acer macrophyllum</i> (in central and south coast), <i>Acer negundo</i> , <i>Alnus rhombifolia</i> , <i>Alnus rubra</i> (in Coast Ranges), <i>Cupressus sargentii</i> , <i>Frangula californica</i> ssp. <i>tomentella</i> (= <i>Rhamnus tomentella</i>), <i>Platanus racemosa</i> , <i>Populus fremontii</i> , <i>Pseudotsuga menziesii</i> , <i>Quercus agrifolia</i> , <i>Salix breweri</i> , <i>Salix laevigata</i> , <i>Salix gooddingii</i> , <i>Salix exigua</i> , and <i>Salix lasiolepis</i>	California Montane Riparian Woodland*
..... California Montane Riparian Systems**	
4b. Montane riparian areas east side of the Sierra Nevada. Distinguishing species include <i>Alnus rhombifolia</i> , <i>Alnus rubra</i> , <i>Betula occidentalis</i> , <i>Crataegus douglasii</i> , <i>Celtis laevigata</i> var. <i>reticulata</i> , <i>Frangula purshiana</i> , <i>Fraxinus</i> , <i>Pinus monticola</i> , <i>Pinus ponderosa</i> , <i>Philadelphus lewisii</i> , <i>Populus balsamifera</i> ssp. <i>trichocarpa</i> , <i>Populus fremontii</i> , <i>Populus acuminata</i> , <i>Pseudotsuga menziesii</i> , <i>Salix amygdaloides</i> , <i>Salix eriocephala</i> , <i>Salix exigua</i> , <i>Salix lasiolepis</i> , <i>Salix lemmonii</i> , <i>Salix lucida</i> ssp. <i>lasiandra</i> , and <i>Salix lutea</i>	Inter-Mountain Basins Montane Riparian Woodland and Shrubland*
..... Inter-Mountain Basins Montane Riparian Systems**	
5a. Floodplains, narrow riparian areas, alkali sinks and wetlands of California's Central Valley.....	6
5b. Wetlands not in Central Valley	9
6a. Freshwater riparian areas, sometimes ephemeral	7
6b. Alkaline areas.....	8
7a. Riparian areas dominated by woodlands, shrublands and intermixed herbaceous areas. Important trees include <i>Populus fremontii</i> , <i>Platanus racemosa</i> , <i>Quercus lobata</i> , <i>Salix gooddingii</i> , <i>Acer negundo</i> , <i>Cephalanthus occidentalis</i> , and <i>Vitis californica</i>	California Central Valley Riparian Woodland and Shrubland
7b. Floodplains as above but dominated by invasive species such as <i>Juglans nigra</i> hybrids and <i>Ailanthus altissima</i> , <i>Tamarix</i> spp.....	Invasive Riparian Woodland and Shrubland**

- 8a. Strongly saline/alkaline playa-like depressions limited to the San Joaquin Valley, typically occur in a matrix of mixed salt desert scrub. Dominated by *Allenrolfea occidentalis*, *Suaeda moquinii*, *Distichlis spicata*, and *Salicornia rubra*. California Central Valley Alkali Sink***
- 8b. Alkaline/saline areas not in the central valley9
- 9a. Low elevation wetlands, may or may not be saline, on the east side of the Sierra Nevada, or otherwise in the warm desert10
- 9b. Riparian and wetland areas not as above **Undescribed or otherwise not included in this Key**
- 10a. Flats dominated or codominated by *Sarcobatus vermiculatus* **Inter-Mountain Basins Greasewood Flat**
- 10b. Riparian areas of the warm desert, southern California, edges of the Mojave desert (eastern edge of Map Zone 4). Vegetation is a mix of riparian woodlands and shrublands. Woody species may include *Acer negundo*, *Alnus oblongifolia*, *Baccharis salicifolia*, *Celtis laevigata* var. *reticulata*, *Fraxinus velutina*, *Juglans major*, *Platanus wrightii*, *Pluchea sericea*, *Populus angustifolia*, *Populus deltoides* ssp. *wislizeni*, *Populus fremontii*, *Prosopis glandulosa*, *Prosopis velutina*, *Prunus* spp., *Salix exigua*, *Salix lasiolepis*, *Salix geyeriana*, *Salix gooddingii*, *Sapindus saponaria*, and *Shepherdia argentea* **North American Warm Desert Riparian Systems****

KEY C: UPLAND FORESTS AND WOODLANDS

- 1a. Deciduous forests and woodlands or mixed conifer-aspen forests and woodlands (aspen or oak trees make up 25-100% of the tree canopy).2
- 1b. Evergreen forests and woodlands (deciduous trees may make up less than 25% cover of the tree canopy).....13

Deciduous Forest

- 2a. Deciduous forest or woodland typically dominated by *Populus tremuloides* singly or mixed with conifers.....3
- 2b. *Populus tremuloides* not present, Deciduous oaks make up at least 25% of the relative canopy4
- 3a. Broadleaf forest or woodland typically dominated by *Populus tremuloides* (and possible inclusions of other broadleaf tree species) with less than 25% total tree canopy cover by conifers **Rocky Mountain Aspen Forest and Woodland**
- 3b. Mixed conifer-broadleaf forests and woodlands codominated by *Populus tremuloides* and conifer trees with 25-75% relative tree canopy of each canopy type. These mixed stands will commonly occur in relatively small areas **Inter-Mountain Basins Aspen-Mixed Conifer Forest and Woodland**
- 4a. Mixed forests with pine and oaks5
- 4b. Forests of predominately oaks8

Mixed Pine-Deciduous Oak Woodlands

- 5a. Characterized by woodlands or forests of *Pinus ponderosa* with one or more oaks,6
- 5b. Characterized by woodland of *Pinus sabiniana* with one or more oaks7
- 6a. Characterized by woodlands or forests of *Pinus ponderosa* with one or more oaks including *Quercus kelloggii*, *Quercus garryana*, *Quercus wislizeni*, or *Quercus chrysolepis*. *Pseudotsuga menziesii* may co-occur with *Pinus ponderosa*, particularly in the North Coast Ranges and Klamath Mountains..... **Mediterranean California Lower Montane Black Oak-Conifer Forest and Woodland**
- 6b. Forests dominated by a mix of *Quercus garryana* and *Pinus ponderosa* or *Pseudotsuga menziesii*. This system occurs primarily east of the Cascade Crest at or near lower tree line in foothills of the eastern Cascades in Washington and Oregon within 65 km (40 miles) of the Columbia River Gorge. Disjunct occurrences in Klamath County OR, and Siskiyou county, California **East Cascades Oak-Ponderosa Pine Forest and Woodland**

7a. Open park-like stands of <i>Pinus sabiniana</i> , with oaks and other various broadleaf tree and shrub species, including <i>Quercus douglasii</i> , <i>Quercus wislizeni</i> , <i>Quercus agrifolia</i> (primarily central and southern Coast Ranges), <i>Quercus lobata</i> , <i>Aesculus californica</i> , <i>Arctostaphylos</i> spp., <i>Cercis canadensis</i> var. <i>texensis</i> , <i>Ceanothus cuneatus</i> , <i>Frangula californica</i> , <i>Ribes quercetorum</i> , <i>Juniperus californica</i> , and <i>Pinus coulteri</i>	California Lower Montane Blue Oak-Foothill Pine Woodland and Savanna
Stands of <i>Pinus sabiniana</i>	<i>Pinus sabiniana</i> Alliance
7b. Stands not like above	8

Deciduous Oak Woodlands

8a. Stands of mixed oaks with few other tree species. The predominant oaks include <i>Quercus kelloggii</i> and <i>Quercus garryana</i> , with <i>Quercus garryana</i> var. <i>garryana</i> codominant in the central and northern Coast Ranges and <i>Quercus garryana</i> var. <i>breweri</i> often codominant in the northwestern Coast Ranges as well as portions of Sierra Nevada. This system is similar to North Pacific Oak Woodland (see below) but does not include a conifer component, and <i>Quercus garryana</i> is not the only oak.	Mediterranean California Mixed Oak Woodland
8b. Forests not like above	9
9a. Oak Savannas of the Central Valley. <i>Quercus lobata</i> was the characteristic oak species of these savannas, though other species were present, including <i>Quercus wislizeni</i> , <i>Quercus agrifolia</i> , <i>Quercus douglasii</i> , <i>Aesculus californica</i> , <i>Cercis canadensis</i> var. <i>texensis</i> (= <i>Cercis occidentalis</i>), <i>Juniperus californica</i> , and <i>Nassella pulchra</i>	California Central Valley Mixed Oak Savanna
9b. Forests not like above	10
10a. <i>Quercus garryana</i> in pure stands or mixed with conifers and/or other oaks	11
10b. Stands dominated or codominated by other semi deciduous or evergreen oak species, with and without other species present	12
11a. <i>Quercus garryana</i> in pure stands or codominant with other conifers, tree cover ranges from savanna and woodland to forest, codominance often by <i>Pseudotsuga menziesii</i> , <i>Pinus ponderosa</i> , <i>Quercus kelloggii</i> or <i>Arbutus menziesii</i> . This system occurs primarily in the Puget Trough and Willamette Valley and extends southward at low elevations in the Klamath Mountains on both sides of the Oregon/California stateline	North Pacific Oak Woodland
11b. Forests dominated by a mix of <i>Quercus garryana</i> and <i>Pinus ponderosa</i> or <i>Pseudotsuga menziesii</i> . This system occurs primarily east of the Cascade Crest at or near lower tree line in foothills of the eastern Cascades in Washington and Oregon within 65 km (40 miles) of the Columbia River Gorge. Disjunct occurrences in Klamath County OR, and Siskiyou county, California	East Cascades Oak-Ponderosa Pine Forest and Woodland
12a. Stands of deciduous oaks with other evergreen species, semi-deciduous or evergreen oaks with or without other tree species, or otherwise not like above, continue to key as non-deciduous forest	13
12b. Stands of deciduous oaks, either key again starting at couplet 4 above, or	Undescribed or otherwise not included in this Key
13a. Subalpine conifer forests, woodlands or parklands	14
13b. Montane, foothills or coastal conifer forests and woodlands	19

Subalpine Forests, Parklands, and Krummholz

14a. Stunted tree clumps, open woodlands (stunted or limited height trees, total canopy 10-50% cover), and herb- or dwarf-shrub-dominated openings, occurring above closed forest ecosystems and below alpine communities,	15
14b. Conifer forests and woodlands forming substantial (full height trees, 25-100% cover) subalpine forests below tree line, dominated by <i>Tsuga mertensiana</i> , <i>Abies amabilis</i> , <i>Picea engelmannii</i> and/or <i>Abies lasiocarpa</i>	16

- 15a. Subalpine woodlands dominated by *Tsuga mertensiana* and may include *Abies magnifica*, *Abies procera*, *Pinus albicaulis*, and *Pinus monticola*. Mesic-site shrubs will include *Cassiope mertensiana*, *Phyllodoce breweri*, *Phyllodoce empetrifomis*, *Vaccinium membranaceum*, and others. Occurs in the northern Sierra Nevada Mountains.....**Northern California Mesic Subalpine Woodland**
- 15b. Open woodlands typically found on high-elevation ridges and rocky slopes above subalpine forests and woodlands. Stands are strongly dominated by *Pinus flexilis* and/or *Pinus longaeva*. *Pinus monophylla* may be present in lower-elevation stands. Occurs primarily in the eastern and southern Sierra Nevada.....
.....**Inter-Mountain Basins Subalpine Limber-Bristlecone Pine Woodland**
- 16a. Stands dominated or codominated by *Pinus contorta* **17**
- 16b. Stands dominated by *Abies magnifica* or *Abies X shastensis*, *Pinus contorta* may be present **18**
- 17a. Subalpine forests dominated by *Pinus albicaulis* and *Pinus contorta* var. *murrayana*, other conifers may include *Pinus balfouriana* (only in the Klamath Mountains) and *Pinus monticola*. Shrubs present include *Arctostaphylos nevadensis*, *Chrysolepis sempervirens*, and *Holodiscus discolor*. The highest tree diversity occurs in the Klamath Mountains, with sometimes five or more conifers sharing codominance in one stand.....
.....**Mediterranean California Subalpine Woodland**
Pure mappable stands of *Pinus albicaulis* **Pinus albicaulis Woodland Alliance**
- 17b. Subalpine forests dominated by *Pinus contorta* var. *murrayana* without *Pinus albicaulis*, and has >5% relative cover of *Arctostaphylos nevadensis*, *Carex exserta*, *Carex filifolia*, *Carex rossii*, *Ceanothus cordulatus*, *Chrysolepis sempervirens*, *Poa wheeleri*, *Phyllodoce breweri*, and *Ribes montigenum***Sierra Nevada Subalpine Lodgepole Pine Forest and Woodland**
- 18a. Subalpine forests dominated by *Abies magnifica* (= var. *magnifica*), *Abies X shastensis* (= *Abies magnifica* var. *shastensis*), and/or *Abies procera*. Other conifers that can occur in varying mixtures with *Abies magnifica* include *Pinus contorta* var. *murrayana*, *Pinus monticola*, *Tsuga mertensiana*, *Pinus jeffreyi*, and *Abies concolor*. At warmer and lower sites of the North Coast Ranges and Sierra Nevada, *Abies concolor* can codominate with *Abies magnifica*.**Mediterranean California Red Fir Forest and Woodland**
- 18b. Full stature, full canopy closure subalpine or upper montane forests, not like above.....**19**

Montane, Foothill and Coastal Forests

- 19a. Conifer forests and woodlands within 25 km (15.5 miles) of the coast**20**
- 19b. Montane or foothill forests and woodlands beyond the salt spray or fog belt, at least 25 km (15.5 miles) from coast.....**25**

Coastal Forests

- 20b. Forest with *Cupressus macrocarpa*, *Cupressus goveniana*, and *Cupressus abramsiana* in scattered groves. *Pinus contorta* var. *contorta*, *Pinus contorta* var. *bolanderi*, *Pinus muricata*, *Pinus torreyana*, and *Pinus radiata* or *Pinus contorta* var. *contorta* present to dominant. Stands may be pygmy forests
.....**California Coastal Closed-Cone Conifer Forest and Woodland**
- 20a. Forests dominated by other conifers or oaks, and otherwise not like above**21**
- 21a. Forests dominated by *Picea sitchensis*, *Sequoia sempervirens*, *Chamaecyparis lawsoniana* or *Thuja plicata* >10% cover**22**
- 21b. Forests dominated by Coast live oak, or a mix of evergreen trees, such as *Pseudotsuga menziesii* and *Lithocarpus densiflorus*.....**23**
- 22a. Coastal forest with *Sequoia sempervirens* dominant or at least present, stands may include *Pseudotsuga menziesii*, *Tsuga heterophylla*, *Picea sitchensis*, *Chamaecyparis lawsoniana* and/or *Lithocarpus densiflorus*.....
.....**California Coastal Redwood Forest**
- 22b. Forests with *Picea sitchensis* over 10%, often *Tsuga heterophylla*, *Thuja plicata*, *Chamaecyparis lawsoniana* or *Chamaecyparis nootkatensis* may codominant, *Sequoia sempervirens* not present.....
.....**North Pacific Hypermaritime Sitka Spruce Forest**

23a. <i>Quercus agrifolia</i> -dominated woodlands and savannas, with few other tree species, if present than not dominant or codominant, merely present. Stands occur throughout the Pacific coastal areas from Sonoma County, California, south to Baja California.	California Coastal Live Oak Woodland and Savanna
23b. Forests not like above.....	24
24a. Forests of mixed evergreen broadleaf species, <i>Pseudotsuga menziesii</i> , <i>Lithocarpus densiflorus</i> and <i>Chrysolepis chrysophylla</i> typically present. Stands have only one conifer, characteristically include <i>Pseudotsuga menziesii</i> , <i>Lithocarpus densiflorus</i> , <i>Arbutus menziesii</i> , <i>Quercus chrysolepis</i> , <i>Umbellularia californica</i> , and <i>Chrysolepis chrysophylla</i> . Stands occurring the Santa Lucia and Santa Cruz mountains of California north into southwestern Oregon, throughout the outer and middle Coast Ranges and in southern California (Transverse and Peninsular ranges). It occurs in localized areas of the central to northern Sierra Nevada and southern and eastern Klamath Mountains. Overlaps with the next in the range of <i>Pseudotsuga macrocarpa</i>	Mediterranean California Mixed Evergreen Forest
24b. Forests of mixed evergreen broadleaf species, with more oaks than above, <i>Pseudotsuga menziesii</i> , <i>Lithocarpus densiflorus</i> and <i>Chrysolepis chrysophylla</i> are absent. Characteristic species include <i>Pinus coulteri</i> , <i>Pseudotsuga macrocarpa</i> , <i>Quercus agrifolia</i> , <i>Quercus chrysolepis</i> , <i>Quercus kelloggii</i> , <i>Quercus wislizeni</i> , <i>Quercus wislizeni</i> var. <i>frutescens</i> , <i>Acer macrophyllum</i> , <i>Arbutus menziesii</i> , <i>Juglans californica</i> , <i>Umbellularia californica</i> . Forests occur from Monterey, California, south across the outer Central Coast Ranges to crests of Peninsular Ranges, and in Transverse Ranges south to Mexico.....	Central and Southern California Mixed Evergreen Woodland

Montane Forests

25a. Stands of upper montane to subalpine (4,800-12,000 ft) conifer and mixed conifer forests, serpentine and non-serpentine substrates.....	26
25b. Stands of Lower Montane or foothills (sea-level - 6,000 ft), serpentine and non-serpentine substrates.....	32

Upper Montane and Subalpine Forests

26a. Upper elevation forests and woodlands of serpentine substrates.....	27
26b. Upper elevation forests and woodland not of serpentine substrates.....	28
27a. Upper montane forests in the Klamath-Siskiyou Mountains, generally above 1500 m (4550 feet) elevation common species include <i>Abies magnifica</i> , <i>Abies X shastensis</i> , <i>Chamaecyparis lawsoniana</i> , <i>Chamaecyparis nootkatensis</i> , <i>Pinus balfouriana</i> , <i>Pinus jeffreyi</i> , <i>Pinus monticola</i> , <i>Lithocarpus densiflorus</i> var. <i>echinoides</i>	Klamath-Siskiyou Upper Montane Serpentine Mixed Conifer Woodland
27b. Serpentine forests of the north and southern Coast Ranges and northern Sierra Nevada, highly diverse and spotty in distributions, common species include: <i>Cupressus sargentii</i> , <i>Pinus sabiniana</i> , <i>Garrya condonii</i> , <i>Quercus durata</i> , <i>Umbellularia californica</i> , and <i>Frangula californica</i> ssp. <i>tomentella</i> (= <i>Rhamnus tomentella</i> ssp. <i>tomentella</i>), <i>Heteromeles arbutifolia</i> , <i>Adenostoma fasciculatum</i> , <i>Arctostaphylos viscida</i> ssp. <i>pulchella</i> , <i>Ceanothus jepsonii</i> . In some settings <i>Arctostaphylos glauca</i> , <i>Styrax rediviva</i> or <i>Cercocarpus montanus</i> var. <i>glaber</i> (= <i>Cercocarpus betuloides</i>) can be common.....	Mediterranean California Mesic Serpentine Woodland and Chaparral
28a. Subalpine forests dominated or codominated by <i>Abies magnifica</i> , <i>Abies X shastensis</i> , <i>Abies procera</i> , and/or <i>Tsuga mertensiana</i> , several other conifer species may be present or even codominant.....	29
28b. Subalpine and upper montane forests dominated or codominated by other species, if the above species present, they have <5% cover in the stand	30
29a. Subalpine forests on ridges and rocky slopes around timberline at 2600 m (7900 feet) elevation, in mesic concave pockets, forest canopy is dominated by <i>Tsuga mertensiana</i> and may include <i>Abies magnifica</i> , <i>Abies procera</i> , <i>Pinus albicaulis</i> , and <i>Pinus monticola</i>	Northern California Mesic Subalpine Woodland
Stands dominated by <i>Pinus albicaulis</i> <i>Pinus albicaulis</i> Woodland Alliance	

29b. Subalpine forests at high-elevations (1600-2700 m [4850-9000 feet]) in the Sierra Nevada, dominated by <i>Abies magnifica</i> (= var. <i>magnifica</i>), <i>Abies X shastensis</i> (= <i>Abies magnifica</i> var. <i>shastensis</i>), and/or <i>Abies procera</i>	Mediterranean California Red Fir Forest and Woodland
30a. Stands on ridges and rocky slopes around timberline at 2900 m (9500 feet) elevation in the southern Sierra Nevada and Transverse and Peninsular ranges, up to 3500 m (11,500 feet) in the Sierra Nevada, dominated by <i>Pinus albicaulis</i> and/or <i>Pinus contorta</i> var. <i>murrayana</i> ; other important conifers and locally dominant species include <i>Pinus balfouriana</i> , <i>Pinus flexilis</i> , <i>Pinus monticola</i> and <i>Juniperus occidentalis</i> var. <i>australis</i>	Mediterranean California Subalpine Woodland
30b. Stands not as above.	31
31a. Forests and woodlands of upper montane to subalpine elevations of the central and northern Sierra Nevada and Transverse and Peninsular ranges where cold-dry conditions exist (1800-2450 m [6000-8000 feet] in the north and 2450-3600 m [8000-12,000 feet] in the south), dominated by <i>Pinus contorta</i> var. <i>murrayana</i>	Sierra Nevada Subalpine Lodgepole Pine Forest and Woodland
31b. Open woodlands on high-elevation ridges and rocky slopes above subalpine forests and woodlands. between 2530 and 3600 m (8300-12,000 feet), dominated by <i>Pinus flexilis</i> and/or <i>Pinus longaeva</i> . <i>Pinus monophylla</i> may be present in lower-elevation stands	Inter-Mountain Basins Subalpine Limber-Bristlecone Pine Woodland

Lower Montane and Foothill Forests and Woodlands

32a. Open woodlands, savannas or treed chaparral on Serpentine soils	33
32b. Open woodlands or closed forests, not of serpentine soils.....	35

Serpentine Woodlands and Savannas

33a. Serpentine savanna or chaparral with <i>Pinus jeffreyi</i> or <i>Pinus attenuata</i> can form a scattered tree layer over bunch grasses. Dense shrub layers can also be present in some stands, <i>Quercus vacciniifolia</i> , <i>Quercus sadleriana</i> (coastal and wetter climate but found on xeric sites), <i>Lithocarpus densiflorus</i> var. <i>echinoides</i> , <i>Quercus garryana</i> var. <i>breweri</i> (drier, inland), <i>Ceanothus cuneatus</i> , <i>Ceanothus pumilus</i> , <i>Arctostaphylos viscida</i> , <i>Arctostaphylos X cinerea</i> , <i>Arctostaphylos canescens</i> , <i>Frangula californica</i> , and <i>Garrya buxifolia</i> . Perennial grasses such as <i>Festuca roemerii</i> , <i>Achnatherum lemmonii</i> , <i>Melica</i> , and <i>Danthonia californica</i>	Klamath-Siskiyou Xeromorphic Serpentine Savanna and Chaparral
33b. Forests or open woodland not like above	34
34a. Serpentine woodlands throughout the Klamath - Siskiyou region below 1500 m (4550 feet). Common species include <i>Pseudotsuga menziesii</i> , <i>Pinus sabiniana</i> , <i>Pinus lambertiana</i> , <i>Pinus jeffreyi</i> , <i>Pinus attenuata</i> , <i>Lithocarpus densiflorus</i> var. <i>echinoides</i> , <i>Calocedrus decurrens</i> , <i>Arctostaphylos</i> spp., <i>Quercus vacciniifolia</i> , and <i>Xerophyllum tenax</i> . <i>Chamaecyparis lawsoniana</i> communities can occur within occurrences of this system in mesic and linear riparian zones.	Klamath-Siskiyou Lower Montane Serpentine Mixed Conifer Woodland
34b. Serpentine forests and woodlands of the north and southern Coast Ranges and northern Sierra Nevada, highly diverse and spotty in distributions, common species include: <i>Cupressus sargentii</i> , <i>Pinus sabiniana</i> , <i>Garrya congdonii</i> , <i>Quercus durata</i> , <i>Umbellularia californica</i> , and <i>Frangula californica</i> ssp. <i>tomentella</i> (= <i>Rhamnus tomentella</i> ssp. <i>tomentella</i>), <i>Heteromeles arbutifolia</i> , <i>Adenostoma fasciculatum</i> , <i>Arctostaphylos viscida</i> ssp. <i>pulchella</i> , <i>Ceanothus jepsonii</i> . In some settings <i>Arctostaphylos glauca</i> , <i>Styrax rediviva</i> or <i>Cercocarpus montanus</i> var. <i>glaber</i> (= <i>Cercocarpus betuloides</i>) can be common	Mediterranean California Mesic Serpentine Woodland and Chaparral
35a. Oak and Pine-oak dominated woodlands	36
35b. Forests and woodlands not dominated by oaks or oak-pine combinations	43

Oak and Oak-Pine Woodland and Forests

36a. Mixed forests with pine and oaks.....	37
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36b. Forests of predominately only oaks	40
37a. Characterized by woodlands or forests of <i>Pinus ponderosa</i> with one or more oaks,	38
37b. Characterized by woodland of <i>Pinus sabiniana</i> with one or more oaks	39
38a. Characterized by woodlands or forests of <i>Pinus ponderosa</i> with one or more oaks including <i>Quercus kelloggii</i> , <i>Quercus garryana</i> , <i>Quercus wislizeni</i> , or <i>Quercus chrysolepis</i> . <i>Pseudotsuga menziesii</i> may co-occur with <i>Pinus ponderosa</i> , particularly in the North Coast Ranges and Klamath Mountains.....	
..... Mediterranean California Lower Montane Black Oak-Conifer Forest and Woodland	
38b. Forests dominated by a mix of <i>Quercus garryana</i> and <i>Pinus ponderosa</i> or <i>Pseudotsuga menziesii</i> . This system occurs primarily east of the Cascade Crest at or near lower tree line in foothills of the eastern Cascades in Washington and Oregon within 65 km (40 miles) of the Columbia River Gorge. Disjunct occurrences in Klamath County OR, and Siskiyou county, California	
..... East Cascades Oak-Ponderosa Pine Forest and Woodland	
39a. Open park-like stands of <i>Pinus sabiniana</i> , with oaks and other various broadleaf tree and shrub species, including <i>Quercus douglasii</i> , <i>Quercus wislizeni</i> , <i>Quercus agrifolia</i> (primarily central and southern Coast Ranges), <i>Quercus lobata</i> , <i>Aesculus californica</i> , <i>Arctostaphylos</i> spp., <i>Cercis canadensis</i> var. <i>texensis</i> , <i>Ceanothus cuneatus</i> , <i>Frangula californica</i> , <i>Ribes quercetorum</i> , <i>Juniperus californica</i> , and <i>Pinus coulteri</i>	
..... California Lower Montane Blue Oak-Foothill Pine Woodland and Savanna	
Stands of <i>Pinus sabiniana</i>	<i>Pinus sabiniana</i> Alliance
39b. Stands not like above	40
40a. Stands of mixed oaks with few other tree species. The predominant oaks include <i>Quercus kelloggii</i> and <i>Quercus garryana</i> , with <i>Quercus garryana</i> var. <i>garryana</i> codominant in the central and northern Coast Ranges and <i>Quercus garryana</i> var. <i>breweri</i> often codominant in the northwestern Coast Ranges as well as portions of Sierra Nevada. This system is similar to North Pacific Oak Woodland (see below) but does not include a conifer component, and <i>Quercus garryana</i> is not the only oak.	
..... Mediterranean California Mixed Oak Woodland	
40b. Forests not like above.....	41
41a. Oak Savannas of the Central Valley. <i>Quercus lobata</i> was the characteristic oak species of these savannas, though other species were present, including <i>Quercus wislizeni</i> , <i>Quercus agrifolia</i> , <i>Quercus douglasii</i> , <i>Aesculus californica</i> , <i>Cercis canadensis</i> var. <i>texensis</i> (= <i>Cercis occidentalis</i>), <i>Juniperus californica</i> , and <i>Nassella pulchra</i>	
..... California Central Valley Mixed Oak Savanna	
41b. Forests not like above.....	42
42a. <i>Quercus agrifolia</i> -dominated woodlands and savannas, with few other tree species, if present than not dominant or codominant, merely present. Stands occur throughout the Pacific coastal areas from Sonoma County, California, south to Baja California.	California Coastal Live Oak Woodland and Savanna
42b. Oak woodlands and savannas on coastal plains and in intermountain valleys from Santa Barbara and Ventura County, California, south into Baja California, Mexico. <i>Quercus agrifolia</i> , <i>Quercus wislizeni</i> , <i>Quercus engelmannii</i> , and/or <i>Juglans californica</i> dominate a mixed closed or open canopy. Southern chaparral species such as <i>Adenostoma fasciculatum</i> , <i>Rhus integrifolia</i> , <i>Rhus ovata</i> , <i>Rhus trilobata</i> , <i>Ceanothus</i> spp., <i>Ribes</i> spp., and <i>Arctostaphylos</i> spp. are also characteristic.....	
..... Southern California Oak Woodland and Savanna	
43a. Mixed conifer and Mixed evergreen woodlands	44
43b. Pine dominated woodlands	48
<u>Mixed Evergreen and Mixed Conifer Forests</u>	
44a. Forests are mixed evergreen, usually only one or two conifer species.....	45
44b. Forests are mix of several conifer species, if only 2 then broadleaf evergreen species are not codominant.....	46

45a. Forests are characterized by mix of conifer and broad-leaved evergreen trees. Characteristic trees include <i>Pseudotsuga menziesii</i> , <i>Quercus chrysolepis</i> , <i>Lithocarpus densiflorus</i> , <i>Arbutus menziesii</i> , <i>Umbellularia californica</i> , and <i>Chrysolepis chrysophylla</i> . On the eastern fringe of this system, in the western Siskiyou, other conifers occur such as <i>Pinus ponderosa</i> and <i>Chamaecyparis lawsoniana</i> . Forests of southwestern Oregon throughout the outer and middle Coast Ranges, and in localized areas of the central to northern Sierra Nevada and southern and eastern Klamath Mountains	
.....	Mediterranean California Mixed Evergreen Forest
45b. Forests of mixed evergreen broadleaf species, with more oaks than above. <i>Pseudotsuga menziesii</i> , <i>Lithocarpus densiflorus</i> and <i>Chrysolepis chrysophylla</i> are usually absent. Characteristic species present include <i>Pinus coulteri</i> , <i>Pseudotsuga macrocarpa</i> , <i>Quercus agrifolia</i> , <i>Quercus chrysolepis</i> , <i>Quercus kelloggii</i> , <i>Quercus wislizeni</i> , <i>Quercus wislizeni var. frutescens</i> , <i>Acer macrophyllum</i> , <i>Arbutus menziesii</i> , <i>Juglans californica</i> , <i>Umbellularia californica</i> . Forests occur from Monterey, California, south across the outer Central Coast Ranges to crests of Peninsular Ranges, and in Transverse Ranges south to Mexico.....	
.....	Central and Southern California Mixed Evergreen Woodland
46a <i>Tsuga heterophylla</i> present with >10%, limited to northern coastal ranges. Overstory canopy is dominated by <i>Pseudotsuga menziesii</i> , <i>Tsuga heterophylla</i> , and/or <i>Thuja plicata</i> , as well as <i>Chamaecyparis lawsoniana</i> . These forests occur on moist habitats and microhabitats, mainly lower slopes or valley landforms. These forests occur as small patches in northern California Coast Ranges.....	
.....	North Pacific Maritime Mesic-Wet Douglas-fir-Western Hemlock Forest
46b. Forests lacking <i>Tsuga heterophylla</i> , or if present than not like above	47
47a. Overstory canopy is characteristically co-occurring <i>Abies concolor var. lowiana</i> , <i>Calocedrus decurrens</i> , and <i>Pinus lambertiana</i> . <i>Pinus jeffreyi</i> and <i>Pseudotsuga menziesii</i> occur frequently but are not dominant. In limited locations in the central Sierra Nevada, <i>Sequoiadendron giganteum</i> dominates, usually with <i>Abies concolor</i> , and at the highest elevations also with <i>Abies magnifica</i> . This system is found from 800-1000 m (2400-3000 feet) elevation in the Sierra Nevada and 1250-2200 m (3800-6700 feet) in the Klamath Mountains.....	
.....	Mediterranean California Mesic Mixed Conifer Forest and Woodland
Stands of only Redwoods	Sequoiadendron giganteum Forest Alliance
47b. Mixed conifer forests of <i>Pseudotsuga menziesii</i> , <i>Pinus ponderosa</i> , and <i>Calocedrus decurrens</i> . Occasionally present are <i>Pinus jeffreyi</i> , <i>Pinus attenuata</i> , and <i>Pinus lambertiana</i> (although not as common as above), Additional subcanopy trees include <i>Quercus chrysolepis</i> and <i>Quercus kelloggii</i> . <i>Arbutus menziesii</i> and <i>Lithocarpus densiflorus</i> may be common with the oaks in northern areas. Occur in the lower montane zones (600-1800 m in northern California; 1200-2150 m in southern California)	
.....	Mediterranean California Dry-Mesic Mixed Conifer Forest and Woodland
Pine dominated Forest and Woodland	
48a. Pine forests and woodlands strongly dominated by <i>Pinus monticola</i> , <i>Pinus ponderosa</i> and/or <i>Pinus jeffreyi</i> other conifers may be present, usually with <25% cover	49
48b. Pine forests and woodland strongly dominated by other conifer species.....	52
49a. <i>Pinus monticola</i> dominant to codominant with other species, <i>Pseudotsuga menziesii</i> is not present. <i>Abies concolor var. lowiana</i> is usually present, at least in the understory, and occasionally as the dominant in the canopy, replacing <i>Pinus monticola</i> , particularly at lower elevations, and <i>Pinus ponderosa</i> is also often present This system occurs on the Modoc Plateau and Warner Mountains of California, north into the Fremont National Forest along the east slope of the southern Cascades in Oregon, and may also occur in isolated high-elevation ranges of northern Nevada	
.....	Sierran - Intermontane Desert Western White Pine - White Fir Woodland
49b. Forests or shrubby woodlands dominated or codominated by <i>Pinus ponderosa</i> and/or <i>Pinus jeffreyi</i> , or otherwise not as above.....	50
50a. Forests dominated or codominated by <i>Pinus jeffreyi</i> , <i>Abies concolor</i> , <i>Abies magnifica</i> , <i>Pinus monticola</i> , <i>Pinus lambertiana</i> , <i>Pinus coulteri</i> , or <i>Pinus attenuata</i>	51
50b. Forests not like above.....	52

- 51a. Closed to open forests dominated or codominated by *Pinus jeffreyi*, *Pinus ponderosa* may be codominant, +/- limited to the Modoc Plateau of SW OR and northeastern CA **California Jeffrey (-Ponderosa) Pine Woodland**
Ponderosa pine on altered, andesite soils, small patch limited to eastern Sierra **(Great Basin Altered Andesite Pine Woodland***)**
- 51b. Shrubby woodlands, trees can include *Pinus jeffreyi*, *Abies concolor*, *Abies magnifica*, *Pinus monticola*, *Pinus lambertiana*, *Pinus coulteri*, or *Pinus attenuata*. Typical sclerophyllous chaparral shrubs include *Arctostaphylos nevadensis*, *A. patula*, *A. glandulosa*, *Ceanothus cordulatus*, *C. diversifolius*, *C. pinetorum*, *C. velutinus*, and *Chrysolepis sempervirens* **California Montane Woodland and Chaparral**
- Pinyon-Juniper, Mt. Mahogany Woodlands**
- 52a. Woodlands dominated by *Cercocarpus ledifolius* . Scattered junipers or pines may also occur. This system includes both woodlands and shrublands dominated by *Cercocarpus ledifolius* **Inter-Mountain Basins Mountain Mahogany Woodland and Shrubland**
- 52b. Woodlands dominated by *Juniperus occidentalis*, or a mix of *Pinus monophylla* and/or *Juniperus osteosperma*.....53
- 53a. Woodlands dominated a mix of *Pinus monophylla* and/or *Juniperus osteosperma* **Great Basin Pinyon-Juniper Woodland**
- 53b. Woodlands or forests not as above.....54
- 54a. Woodlands are dominated by *Juniperus occidentalis* as the only tree species, *Pinus ponderosa* or *Pinus jeffreyi* may be present. *Cercocarpus ledifolius* may occasionally codominate **Columbia Plateau Western Juniper Woodland and Savanna**
Stands dominated solely by *Juniperus occidentalis* **Juniperus occidentalis Wooded Herbaceous Alliance******
Woodlands dominated solely by *Juniperus occidentalis*..... **Juniperus occidentalis Woodland Alliance******
- 54b. Forests and Woodland dominated by other species55
- 55a. Forests and woodlands dominated by introduced tree species **Introduced Upland Vegetation Treed**
- 55b. Upland/Non-wetland Forests, Woodland or Savannas not as described above..... **Undescribed or otherwise not included in this Key**

KEY D: SHRUBLANDS

- 1a. Alpine dwarf-shrublands, alpine vegetation.....2
- 1b. Shrublands below upper tree-line, montane or near the coast.....3

Alpine Shrublands

- 2a. Alpine fell fields concentrated in the Sierra Nevada, Mount Shasta, Peninsular Ranges and White Mountains. Common species include *Ribes cereum*, *Leptodactylon pungens*, *Ericameria discoidea*, *Castilleja nana*, *Minuartia nuttallii* (= *Arenaria nuttallii*), *Phlox condensata*, *Draba densifolia*, *Oxyria digyna*, and *Aquilegia pubescens*..... **Mediterranean California Alpine Fell-Field**
- 2b. Alpine and subalpine dwarf-shrublands throughout the Sierra Nevada and surrounding high mountain ranges. The system is commonly comprised of a mosaic of plant communities that include *Arenaria kingii*, *Ericameria discoidea*, *Artemisia arbuscula*, *Phlox covillei*, *Eriogonum incanum*, *Eriogonum ovalifolium*, *Eriogonum roseum*, *Polygonum shastense*, *Leptodactylon pungens*, and *Phyllodoce breweri* **Sierra Nevada Alpine Dwarf-Shrubland**
- 3a. Shrubland (tall or dwarf) within 25 km of Coast, with fog and or salt spray zone.....4
- 3b. Shrublands away from the coast, montane or desert8

Coastal Shrublands (fog and salt spray zone)

- 4a. Shrubland with a significant succulent cover5
- 4b. Shrublands not like above6
- 5a. Areas of sea bluffs and rocky headlands occur just above the tidal zone throughout rugged portions of coastal Oregon, California, Baja Norte, and off-shore islands (e.g., Channel Islands). Plant communities along these often vertical slopes are typically sparse, with many succulents and prostrate shrubs, and species that readily withstand salt spray and saline soils, as well as seasonal drought. These may include *Baccharis pilularis*, *Dudleya* spp., *Carpobrotus chilensis*, *Carpobrotus edulis*, *Hazardia squarrosa* (= *Haplopappus squarrosus*), *Eriogonum parvifolium*, *Erigeron glaucus*, *Eriophyllum stoechadifolium*, and *Plantago maritima*. Slope instability and erosion result in severe climate, setting back succession in this system. **Mediterranean California Coastal Bluff******
- 5b. Succulent-rich shrublands along maritime coastal bluffs and terraces that are restricted to isolated locations from Baja Norte, Mexico, north to Orange County and Catalina Island, California Characteristic plant species include *Lycium californicum*, *Rhus integrifolia*, *Opuntia californica* var. *parkeri* (= *Opuntia parryi*), *Opuntia prolifera*, *Opuntia littoralis*, *Yucca schidigera*, *Ferocactus viridescens*, *Agave shawii*, *Euphorbia misera*, *Bergerocactus emoryi*, and *Simmondsia chinensis* **Baja Semi-Desert Coastal Succulent Scrub**
- 6a. Dense shrublands with and without herbaceous understory, well within the fog belt, dominated by any combination of *Arctostaphylos tomentosa*, *Arctostaphylos nummularia*, *Arctostaphylos tomentosa* ssp. *crustacea*, *Arctostaphylos hookeri*, *Arctostaphylos pajaroensis*, *Arctostaphylos montaraensis* (and others), *Ceanothus masonii*, *Ceanothus griseus*, and *Ceanothus verrucosus*. In southern Oregon, *Arctostaphylos hispidula* is the predominant chaparral shrub. (See also **lead 13a** California Montane Woodland and Chaparral) **California Maritime Chaparral**
- 6b. Shrublands not like above7
- 7a. Dense shrublands on marine sediments, coastal bluffs, terraces, stabilized dunes, and hills below 500 m (1500 feet) elevation from southern Oregon south through central California. Dominated by *Baccharis pilularis*, *Lupinus arboreus*, *Ceanothus thyrsiflorus*, *Eriophyllum stoechadifolium*, *Diplacus aurantiacus* (= *Mimulus aurantiacus*), *Toxicodendron diversilobum*, *Rubus ursinus*, *Rubus parviflorus*, *Rubus spectabilis*, *Frangula californica* (= *Rhamnus californica*), *Holodiscus discolor*, *Gaultheria shallon*, *Heracleum maximum* (= *Heracleum lanatum*), and *Polystichum munitum* **Northern California Coastal Scrub**

7b. Mixed coastal shrublands from Monterey, California, south into Baja Norte, Mexico. Predominant shrubs include *Artemisia californica*, *Salvia mellifera*, *Salvia apiana*, *Salvia leucophylla*, *Encelia californica*, *Eriogonum fasciculatum*, *Eriogonum cinereum*, *Opuntia littoralis*, *Diplacus aurantiacus* (= *Mimulus aurantiacus*), *Lotus scoparius* (early seral after fire), and *Baccharis pilularis* (in moister, disturbed sites). Characteristic (constant but not dominant) resprouting, deep-rooted sclerophyllous shrubs include *Malosma laurina*, *Rhus integrifolia*, and *Rhamnus crocea***Southern California Coastal Scrub**

8a. Shrublands of Interior California, Coastal Mountains, Central Valley, Sierra Nevada.....**9**

8b. Shrublands of the Desert: Mojave, Sonoran, or Intermountain Basins**14**

Interior California Shrublands

9a. Chaparral on serpentine soils, characteristic plant species include *Cupressus macnabiana*, *Quercus durata*, *Arctostaphylos viscida*, *Arctostaphylos pungens*, and *Arctostaphylos glauca*. Common associates include *Adenostoma fasciculatum*, *Ceanothus cuneatus*, *Fremontodendron californicum*, *Quercus sadleriana*, *Quercus vacciniifolia*, *Garrya* spp., *Umbellularia californica*, *Ceanothus pumilus*, *Frangula californica* (= *Rhamnus californica*), and *Arctostaphylos nevadensis***California Xeric Serpentine Chaparral**

9b. Not as above, chaparral not on serpentine soils**10**

10a. Chaparral dominated by *Arctostaphylos nevadensis*, *A. patula*, *A. glandulosa*, *Ceanothus cordulatus*, *C. diversifolius*, *C. pinetorum*, *C. velutinus*, and *Chrysolepis sempervirens* and with scattered trees, from very sparse to almost savanna-like**13**

10b. True chaparral shrubland, trees, if present, are islands of other systems or intrusions from neighboring forests, dominant shrubs not in the above combination.....**11**

11a. Mesic Chaparral occurs throughout Mediterranean California away from the fog belt, generally on north-facing slopes up to 1500 m (4550 feet) in elevation and up to 1830 m (6000 feet) in southern California. Generally dominated by a variety of mixed (or alone) evergreen, sclerophyllous shrubs: *Quercus berberidifolia*, *Quercus dumosa*, *Quercus wislizeni* var. *frutescens*, *Cercocarpus montanus* var. *glaber* (= *Cercocarpus betuloides*), *Fraxinus dipetala*, *Garrya flavescens*, *Garrya elliptica*, *Heteromeles arbutifolia*, *Lonicera* spp., *Prunus ilicifolia*, *Rhamnus crocea*, *Rhamnus ilicifolia*, *Toxicodendron diversilobum*, *Ribes* spp., and *Sambucus* spp. **California Mesic Chaparral**

11b. Chaparral not as above in all respects**12**

12a. Chaparral located inland from maritime chaparral up to 1500 m (4550 feet), not within the fog belt. Occurs in central and northern California through the north end of the Central Valley. Characteristic species include *Adenostoma fasciculatum*, *Ceanothus cuneatus*, *Arctostaphylos viscida*, *Arctostaphylos manzanita*, *Arctostaphylos glauca*, *Arctostaphylos glandulosa*, *Arctostaphylos stanfordiana*, *Fremontodendron californicum*, *Malacothamnus fasciculatus*, *Dendromecon rigida*, and *Pickeringia montana*..... **Northern and Central California Dry-Mesic Chaparral**

12b. Chaparral from sea level up to 1500 m (4550 feet) elevation throughout central and southern California and inland portions of Baja Norte, Mexico. Characteristic species include *Ceanothus megacarpus*, *Ceanothus crassifolius*, *Ceanothus leucodermis*, *Ceanothus greggii*, *Adenostoma fasciculatum*, *Adenostoma sparsifolium*, *Arctostaphylos glauca*, *Cercocarpus montanus* var. *glaber* (= *Cercocarpus betuloides*), *Cercocarpus montanus* var. *minutiflorus* (= *Cercocarpus minutiflorus*), *Rhus ovata*, and *Xylococcus bicolor***Southern California Dry-Mesic Chaparral**

13a. Inland chaparral that can have scattered trees, or none, including *Pinus jeffreyi*, *Abies concolor*, *Abies magnifica*, *Pinus monticola*, *Pinus lambertiana*, *Pinus coulteri*, or *Pinus attenuata*. Typical sclerophyllous chaparral shrubs include *Arctostaphylos nevadensis*, *A. patula*, *A. glandulosa*, *Ceanothus cordulatus*, *C. diversifolius*, *C. pinetorum*, *C. velutinus*, and *Chrysolepis sempervirens* **California Montane Woodland and Chaparral**

13b. Chaparral not like any of the above in all respects.....Undescribed or otherwise not included in this Key

Desert (Mojave, Sonoran, Intermountain Basin) Shrublands

- 14a. Shrublands east of the Sierra Nevada, of the Inter-mountain basin, and Great Basin Desert.....15
- 14b. Shrublands of the southern Deserts, Mojave and Sonoran Deserts22

Intermountain and Great Basin Desert Shrublands

- 15a. Montane or subalpine (>2000 m elevations) shrubland or shrub-steppe (herbaceous cover >25%) dominated or codominated by *Artemisia tridentata ssp. vaseyana*, *A. tridentata ssp. spiciformis*, non-riparian *A. cana ssp. viscidula* and/or *A. arbuscula ssp. arbuscula*. *Symphoricarpos* spp. may codominate some stands. These are mixed-montane shrublands, with many shrubs commonly present in varying abundance..... **Inter-Mountain Basins Montane Sagebrush Steppe**
Artemisia tridentata ssp. vaseyana **Shrubland Alliance******.....16
- 15b. Shrublands at lower elevations, other wise not as above16
- 16a. *Artemisia tridentata ssp. tridentata* dominated shrublands and shrub-steppe17
- 16b. Shrublands dominated by other *Artemisia tridentata* subspecies, or other shrub species18
- 17a. *Artemisia tridentata ssp. tridentata* and/or *Artemisia tridentata ssp. wyomingensis* dominate relative cover of shrub layer with 10% or more absolute cover and with less than 25% total perennial herbaceous cover; typically in broad basins between mountain ranges, plains and foothills between 1500 and 2300 m elevation. Soils are typically deep, well-drained and non-saline **Inter-Mountain Basins Big Sagebrush Shrubland**.....
- 17b. *Artemisia tridentata ssp. tridentata*, *Artemisia tridentata ssp. xericensis*, *Artemisia tridentata ssp. wyomingensis*, *Artemisia tripartita ssp. tripartita*, and/or *Purshia tridentata* dominate open to moderately dense (10-40% cover) shrub layer and with at least 25% total perennial herbaceous cover. The natural fire regime of this ecological system likely maintains a patchy distribution of shrubs, so the general aspect of the vegetation is a grassland **Inter-Mountain Basins Big Sagebrush Steppe**.....
- 18a. Low shrubland or shrub-steppe dominated or codominated *Krascheninnikovia lanata*, *Chrysothamnus viscidiflorus*, *Chrysothamnus Greenei*, *Gutierrezia sarothrae*, *Ephedra* spp., *Ericameria nauseosa* and/or *Ericameria parryi*. This widespread type occurs throughout the intermountain western U.S. typically at lower elevations on alluvial fans and flats with moderate to deep soils. This semi-arid shrub-steppe is typically dominated by graminoids (>25% cover) with an open shrub layer **Inter-Mountain Basins Semi-Desert Shrub-Steppe**.....
- 18b. Shrubland not as above19
- 19a. Low shrubland or shrub-steppe dominated or codominated by low *Atriplex confertifolia* or *Atriplex canescens*. Open-canopied shrublands of typically saline basins, alluvial slopes and plains composed of one or more *Atriplex* species such as *Atriplex confertifolia*, *Atriplex canescens*, *Atriplex polycarpa*, or *Atriplex spinifera*..... **Inter-Mountain Basins Mixed Salt Desert Scrub**.....
- 19b. Other shrub taxa dominate the shrub layer.....20
- 20a. Shrublands or shrub-steppe dominated by *Sarcobatus vermiculatus*. Other shrubs that may be present to codominant in some occurrences include *Atriplex canescens*, *Atriplex confertifolia*, *Atriplex gardneri*, *Artemisia cana ssp. cana*, or *Krascheninnikovia lanata*. **Inter-Mountain Basins Greasewood Flat**.....
- 20b. Shrublands not like above in all respects21
- 21a. Shrublands in the Great Basin, on dry flats and plains, alluvial fans, rolling hills, rocky hillslopes, saddles and ridges at elevations between 1000 and 2600 m. Shrublands are dominated by *Artemisia nova* (mid and low elevations), *Artemisia arbuscula* (higher elevation) and may be codominated by *Artemisia tridentata ssp. wyomingensis* or *Chrysothamnus viscidiflorus*..... **Great Basin Xeric Mixed Sagebrush Shrubland**.....
- 21b. Chaparral of low-elevation desert landscapes or pinyon-juniper woodlands of the western and central Great Basin. May occur in limited amounts in the inner Coast Ranges in central California. Characteristic species may include *Arctostaphylos patula*, *Arctostaphylos pungens*, *Ceanothus greggii*, *Ceanothus*

velutinus, *Cercocarpus montanus* var. *glaber*, *Cercocarpus intricatus*, *Eriogonum fasciculatum*, *Garrya flavescens*, *Quercus turbinella*, *Purshia stansburiana*, and *Rhus trilobata*. ...**Great Basin Semi-Desert Chaparral**

Mojave and Sonoran Desert Shrublands

- 22a. Desert scrub is dominated by an open shrub layer of one or more species of *Atriplex*. Species of *Allenrolfea*, *Salicornia*, *Suaeda*, or other halophytic plants are often present to codominant. Commonly occurs on saline/alkaline plains and basins, sometimes encircling playas or on stream terraces.**Sonora-Mojave Mixed Salt Desert Scrub**
- 22b. Desert scrub is not dominated by species of *Atriplex*.....**23**

- 23a. Upland desert scrub widespread in lower Colorado River Valley of the Sonoran Desert and the Mojave Desert. Stands are typically dominated by an open shrub canopy of *Larrea tridentata* and *Ambrosia dumosa* without a xeromorphic wooded layer. This system includes stands with as little as 2% woody cover and typically occurs below 750 m. elevation. **Sonora-Mojave Creosotebush-White Bursage Desert Scrub**
- 23b. Not as above.....**24**

- 24a. Evergreen shrublands on side slopes transitioning from low-elevation desert landscapes up into woodlands of the western Mojave and Sonoran deserts. It extends from northeast Kern County, California, into Baja Norte. Associated species include *Quercus john-tuckeri*, *Quercus cornelius-mulleri*, *Quercus berberidifolia*, *Arctostaphylos patula*, *Arctostaphylos pungens*, *Arctostaphylos glauca*, *Rhus ovata*, *Cercocarpus montanus* var. *glaber* (= *Cercocarpus betuloides*), *Ceanothus greggii*, *Garrya flavescens*, *Juniperus californica*, and *Nolina parryi*.**Sonora-Mojave Semi-Desert Chaparral**
- 24b. Not as above.....**25**

- 25a. Upland shrublands occur on plains and foothills in the southern portion of the Great Basin in the broad transition zone from desert scrub in the Mojave Desert. Vegetation is variable, but in the transition zone shrublands are typically dominated by *Coleogyne ramosissima*, *Ephedra nevadensis*, *Grayia spinosa*, or *Menodora spinescens*. Perennial desert grasses are important in some stands.**Mojave Mid-Elevation Mixed Desert Scrub**
- 25b. Shrublands not as above.....**26**

- 26a. Shrublands dominated by introduced species..... **Introduced Upland Vegetation – Shrub**
- 26b. Shrublands not as above in all respects.....**Undescribed or otherwise not included in this Key**

KEY E: HERBACEOUS ECOLOGICAL SYSTEMS AND ALLIANCES

(Perennial graminoids dominant >20% cover with low woody cover <10%)

- 1a. Herbaceous land cover is restricted to drainages, semi-riparian flats, springs, seeps, or of vernal pools.....**2**
- 1b. Herbaceous land cover is mesic to dry upland herbaceous vegetation.....**11**

Wetland Herbaceous

- 2a. Middle and lower elevation herbaceous wetlands (lower montane to valley floor)**3**
- 2b. Middle to upper elevation herbaceous wetlands (montane to alpine elevations, montane valleys)**7**

- 3a. Wetland dominated by emergent graminoids or floating aquatic species in open water (fresh or saline) (Emergent graminoid spp.: *Carex*, *Scirpus* and/or *Schoenoplectus*, *Eleocharis*, *Juncus*, *Typha latifolia*. Floating aquatic spp.: *Azolla* spp., *Nuphar lutea*, *Polygonum* spp., *Potamogeton* spp., *Ranunculus* spp., and *Wolffia* spp.). May be any of the following Systems, generally small patch types, too small for Landfire Mapping purposes, although some occurrences can be quite large **North American Arid West Emergent Marsh*****

.....	Temperate Pacific Freshwater Emergent Marsh***	
.....	Temperate Pacific Freshwater Aquatic Bed***	
.....	Mediterranean California Alkali Marsh***	
3b. Wetland dominated by herbaceous vegetation not like the above.....		4
4a. Herbaceous wetlands dominated by introduced species such as <i>Arundo donax</i> , <i>Echinochloa crus-galli</i> , <i>Hordeum murinum</i> , <i>Hordeum murinum ssp. leporinum</i> , <i>Phragmites australis</i>	Introduced Wetland Vegetation	
4b. Herbaceous wetlands not like above, if introduced species present, not solely present or dominant over native species.....		5
5a. Freshwater sparsely vegetated mud to extensive sods of herbaceous vegetation, occur primarily in seasonally flooded shallow lakebeds on floodplains. Species include <i>Eleocharis obtusa</i> , <i>Lilaeopsis</i> <i>occidentalis</i> , <i>Crassula aquatica</i> , <i>Limosella aquatica</i> , <i>Gnaphalium palustre</i> , <i>Eragrostis hypnoides</i> , and <i>Ludwigia palustris</i>	Temperate Pacific Freshwater Mudflat***	
5b. Wetlands not like above.....		6
6a. Shoreline, interdunal and other Coastal Wetlands	Pacific Coastal Marsh Systems	
.....	(Temperate Pacific Intertidal Mudflat*)	
.....	(Mediterranean California Coastal Interdunal Wetland*)	
.....	(Mediterranean California Eelgrass Bed*)	
.....	(Mediterranean California Coastal Salt Marsh*)	
6b. Non-coastal wetlands		7
7a. Vernal pool wetlands (may be completely dry part of the year or for several years).....		
.....	Modoc Basalt Flow Vernal Pool***	
.....	Northern California Claypan Vernal Pool***	
.....	Northern California Volcanic Vernal Pool***	
.....	South Coastal California Vernal Pool***	
7b. Non-vernal pool wetland, other types of herbaceous wetlands		8
8a. Fens, soils are deep organic substrates, localized to large wetlands.....		9
8b. herbaceous wetlands, not on organic substrates, on mineral soils, wetlands to wet meadows.....		10
9a. Serpentine wetlands defined by groundwater inflows, mineral-rich alkaline soil and water, and peat accumulation of at least 40 cm.	Mediterranean California Serpentine Fen***	
9b. Non-serpentine montane to alpine to wet meadows without a 40 cm deep organic layer	Mediterranean California Subalpine-Montane Fen***	
10a Herbaceous riparian and wetlands at middle and high montane settings, or lower, dominated by <i>Carex</i> <i>aquatilis</i> , <i>Carex athrostachya</i> , <i>Carex limosa</i> , <i>Carex microptera</i> , <i>Carex nebrascensis</i> , <i>Carex pellita</i> , <i>Carex</i> <i>praegracilis</i> , <i>Carex scopulorum</i> , <i>Carex utriculata</i> , <i>Carex vesicaria</i> , <i>Distichlis spicata</i> , <i>Hordeum jubatum</i> , <i>Leymus triticoides</i> , or <i>Senecio triangularis</i> , or other herbaceous wetlands, fresh or alkaline.....		
.....	(Temperate Pacific Subalpine-Montane Wet Meadow***)	
.....	Wetland-Riparian Herbaceous	
10b. Herbaceous wetland not as above	Undescribed or otherwise not included in this Key	

Upland Herbaceous

11a. Upland herbaceous cover dominated by annual graminoids or annual and biennial forbs.....	12
11b. Upland herbaceous cover dominated by perennial species	14
12a. Herbaceous areas dominated by annual species	13
12b. Herbaceous vegetation dominated by perennials, biennials or a mix of annual with longer lived species	14

13a. Herbaceous cover dominated by introduced annual species of grass, such as <i>Briza maxima</i> , <i>Bromus tectorum</i> (>50% cover), <i>Bromus briziformis</i> , <i>Bromus japonicus</i> , <i>Bromus rubens</i> , <i>Bromus rigidus</i> , <i>Taeniatherum caput-medusae</i> , <i>Schismus</i> , <i>Vulpia myuros</i> . Generally limited to the east side of the Sierra Nevada and southern deserts	Invasive Annual Grassland
13b. Grassland dominated by annual introduced species, such as <i>Aira caryophyllea</i> , <i>Avena</i> , <i>Brachypodium distachyon</i> , <i>Bromus diandrus</i> , <i>Bromus hordeaceus</i> , <i>Bromus hordeaceus ssp. hordeaceus</i> , <i>Bromus madritensis</i> , <i>Bromus tectorum</i> (<50%), <i>Cynosurus echinatus</i> , <i>Hordeum marinum</i> , <i>Taeniatherum caput-medusae</i> . Can contain many annual forb species as well. Occurs throughout California, except the interior southeastern deserts and east of the Sierra Nevada	California Annual Grassland
14a. Herbaceous cover dominated by introduced species, not like above.....	15
14b. Herbaceous cover dominated by native species, introduced species may be present.....	16
15a. Herbaceous cover dominated by introduced annual and biennial	Invasive Annual and Biennial Forbland
15b. Herbaceous cover dominated by introduced perennial grasses and forbs	Invasive Perennial Grassland and Forbland
16a Alpine and upper subalpine herbaceous vegetation.....	17
16b Lower subalpine, montane, foothill and basin vegetation	21
17a. Alpine herbaceous and/or fell-field vegetation	18
17b. Subalpine herbaceous vegetation	21
18a. Fells fields (plant cover 10-50%, snow cover is scoured away, plants generally exposed in winter, rock cover can be high, often in close proximity/ intermixed with alpine tundra)	19
18b. Alpine meadows, plant cover more abundant than above, rocks, if present, are only a minor portion of the landscape	20
19a. Alpine fell fields of the Sierra Nevada high country, the Klamath and southern Cascades, possible overlapping with the next. Dominant species include <i>Ribes cereum</i> , <i>Ericameria discoidea</i> , <i>Castilleja nana</i> , <i>Leptodactylon pungens</i> , <i>Minuartia nuttallii</i> , <i>Phlox condensata</i> , <i>Draba densifolia</i> , <i>Oxyria digyna</i> , or <i>Aquilegia pubescens</i>	Mediterranean California Alpine Fell-Field
19b. Alpine fell fields of the Pacific Northwest, including the Klamath and southern Cascades, possibly on Mt Shasta and Mt Lassen, overlapping with the former. Dominated by graminoids, foliose lichens, dwarf-shrubs, and/or forbs, with species such as <i>Arabis lyallii</i> , <i>Carex breweri</i> , <i>C. capitata</i> , <i>C. nardina</i> , <i>C. pellita</i> , <i>C. proposita</i> , <i>C. scirpoidea var. pseudoscirpoidea</i> , <i>C. spectabilis</i> , <i>Empetrum nigrum</i> , <i>Eriogonum aureum</i> , <i>Eriogonum pyrolifolium</i> , <i>Festuca roemerii</i> , <i>Luetkea pectinata</i> , <i>Lupinus sellulus</i> , <i>Luzula piperi</i> , <i>Oreostemma alpigenum</i> , <i>Packera cana</i> , <i>Phlox diffusa</i> , <i>Phlox diffusa ssp. longistylis</i> , <i>Salix cascadenis</i> , or <i>Saxifraga tolmiei</i>	North Pacific Dry and Mesic Alpine Dwarf-Shrubland, Fell-field and Meadow
20a. Dry Alpine meadows of the northern Sierra Nevada, Klamath Mountains or Cascade Mountains. Characteristic species include <i>Phlox diffusa</i> , <i>Phlox covillei</i> , <i>Eriogonum pygmaeus</i> , <i>Podistera nevadensis</i> , <i>Carex congdonii</i> , <i>Calamagrostis purpurascens</i> , <i>Eriogonum incanum</i> , <i>Raillardiopsis muirii</i> (= <i>Raillardella muirii</i>), <i>Castilleja nana</i> , <i>Eriogonum compositus</i> , <i>Eriogonum ovalifolium</i> , <i>Eriogonum gracilipes</i>	Mediterranean California Alpine Dry Tundra
20b. Alpine dry grasslands of the southern Cascades, possibly on Mt Shasta, Mt Lassen, overlapping with the former in northern California. Typical dominant species include <i>Festuca idahoensis</i> , <i>Festuca viridula</i> , and <i>Festuca roemerii</i> (the latter species occurring only in the Olympic Mountains).....	North Pacific Alpine and Subalpine Dry Grassland
21a. Subalpine or montane herbaceous vegetation	22
21b. Coastal and valley floor herbaceous vegetation	24

22a. Dry grasslands on the Inter-Mountain basins, montane or foothill areas, typically dominated or codominated by <i>Achnatherum hymenoides</i> , <i>Aristida</i> spp., <i>Bouteloua gracilis</i> , <i>Hesperostipa comata</i> , <i>Muhlenbergia</i> spp., or <i>Pleuraphis jamesii</i> and may include scattered shrubs and dwarf-shrubs of species of <i>Artemisia</i> , <i>Atriplex</i> , <i>Coleogyne</i> , <i>Ephedra</i> , <i>Gutierrezia</i> , or <i>Krascheninnikovia lanata</i>	
	Inter-Mountain Basins Semi-Desert Grassland
22b. Grasslands not like above.....	23
23a. Subalpine meadows of California, Nevada and Oregon. Characteristic plant species include <i>Achillea millefolium</i> var. <i>occidentalis</i> , <i>Artemisia rothrockii</i> , <i>Oreostemma alpigenum</i> , <i>Calamagrostis breweri</i> , <i>Cistanthe umbellata</i> , <i>Carex exserta</i> , <i>Eriogonum incanum</i> , <i>Horkeliella purpurascens</i> , and <i>Trisetum spicatum</i>	
	Mediterranean California Subalpine Meadow
23b. Large patch grasslands generally surrounded by montane forests, dominated by <i>Elymus</i> spp., <i>Festuca idahoensis</i> , and <i>Nassella cernua</i> . These large-patch grasslands are intermixed with matrix stands of red fir, lodgepole pine, and dry-mesic mixed conifer forests and woodlands	North Pacific Montane Grassland
24a. Herbaceous Balds within the hypermaritime salt and fog spray zone.	25
24b. Herbaceous vegetation of the interior, maybe near the coast, but outside salt/fog belt.....	28
25a. Areas of sea bluffs and rocky headlands occur just above the tidal zone throughout rugged portions of coastal Oregon and California. Vegetation of nearly vertical cliffs, often dominated by succulent plants. Species may include <i>Baccharis pilularis</i> , <i>Dudleya</i> spp., <i>Carpobrotus chilensis</i> , <i>Carpobrotus edulis</i> , <i>Hazardia squarrosa</i> (= <i>Haplopappus squarrosus</i>), <i>Eriogonum parvifolium</i> , <i>Erigeron glaucus</i> , <i>Eriophyllum stoechadifolium</i> , and <i>Plantago maritima</i>	
	Mediterranean California Coastal Bluff
25b. Coastal vegetation not as above	26
26a. Grasslands on coastal terraces and ridgeline balds in the Coast Ranges and Klamath Mountains of southern Oregon and Northern California. Dominant species include <i>Agrostis</i> spp., <i>Bromus carinatus</i> , <i>Calamagrostis nutkaensis</i> , <i>Danthonia californica</i> , <i>Festuca rubra</i> , <i>Festuca idahoensis</i> , <i>Deschampsia caespitosa</i> , <i>Koeleria macrantha</i> , <i>Trisetum canescens</i> , and perennial forbs such as <i>Iris douglasiana</i> , <i>Sisyrinchium bellum</i> , <i>Grindelia hirsutula</i> , and <i>Sanicula arctopoides</i>	
	California Northern Coastal Grassland
26b. Not as above.....	27
27a. Herbaceous Balds in the interior, away from the coastal influences, not on serpentine soils. Dominant species include <i>Festuca roemerii</i> , <i>Danthonia californica</i> , <i>Achnatherum lemmonii</i> , and <i>Koeleria macrantha</i> . Forb diversity can be high. Typical forbs include <i>Camassia quamash</i> , <i>Camassia leichtlinii</i> , <i>Triteleia hyacinthina</i> , <i>Mimulus guttatus</i> (seeps), <i>Plectritis congesta</i> , <i>Lomatium martindalei</i> , <i>Allium cernuum</i> , and <i>Phlox diffusa</i>	
	North Pacific Herbaceous Bald and Bluff
27b. Herbaceous vegetation on serpentine soils. Characteristic species include <i>Calamagrostis ophitidis</i> , <i>Eschscholzia californica</i> , <i>Vulpia microstachys</i> var. <i>ciliata</i> (= <i>Festuca grayi</i>), <i>Poa secunda</i> (= <i>Poa scabrella</i>), <i>Hemizonia congesta</i> ssp. <i>luzulifolia</i> (= <i>Hemizonia luzulifolia</i>), <i>Nassella cernua</i> , and <i>Nassella pulchra</i>	
	California Mesic Serpentine Grassland
28a. Grasslands located from 10-1200 m (30-3600 feet) elevation, in the central valley and southern coastal foothills, found with fine-textured soils, moist or even waterlogged in winter, but very dry in summer. Historically, common among oak savanna and woodland now mostly converted to stable introduced species. Characteristic plant species include <i>Nassella pulchra</i> , <i>Nassella lepida</i> , <i>Aristida</i> spp., <i>Achillea millefolium</i> var. <i>borealis</i> (= <i>Achillea borealis</i>), <i>Achyrochaena mollis</i> , <i>Agoseris heterophylla</i> , <i>Bloomeria crocea</i> , <i>Triteleia ixioides</i> (= <i>Brodiaea lutea</i>), <i>Chlorogalum pomeridianum</i> , <i>Clarkia purpurea</i> , <i>Dodecatheon jeffreyi</i> , <i>Elymus glaucus</i> , <i>Leymus condensatus</i> , <i>Leymus triticoides</i> , <i>Festuca californica</i> , <i>Melica californica</i> , <i>Castilleja attenuata</i> (= <i>Orthocarpus attenuatus</i>), and <i>Poa secunda</i> (= <i>Poa scabrella</i>).....	
	California Central Valley and Southern Coastal Grassland
28b. Not as above.....	29

- 29a. Grassland dominated by annual introduced species, such as *Aira caryophylla*, *Avena*, *Brachypodium distachyon*, *Bromus diandrus*, *Bromus hordeaceus*, *Bromus hordeaceus ssp. hordeaceus*, *Bromus madritensis*, *Bromus tectorum*, *Cynosurus echinatus*, *Hordeum marinum*, *Taeniatherum caput-medusae*
 Can contain many annual forb species as well. Occurs throughout California, except the interior southeastern deserts and east of the Sierra Nevada **California Annual Grassland**
- 29b. Grasslands not as above **System not described or otherwise not included in this Key**