

**Field Key to Ecological Systems and Target Alliances of  
Pacific Northwest -- Coastal Mountains, Puget Lowlands,  
Willamette Valley, Cascade Mountains of WA and OR  
and the Modoc Plateau, CA United States  
Map Zones 1, 2 & 7**

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## Introduction

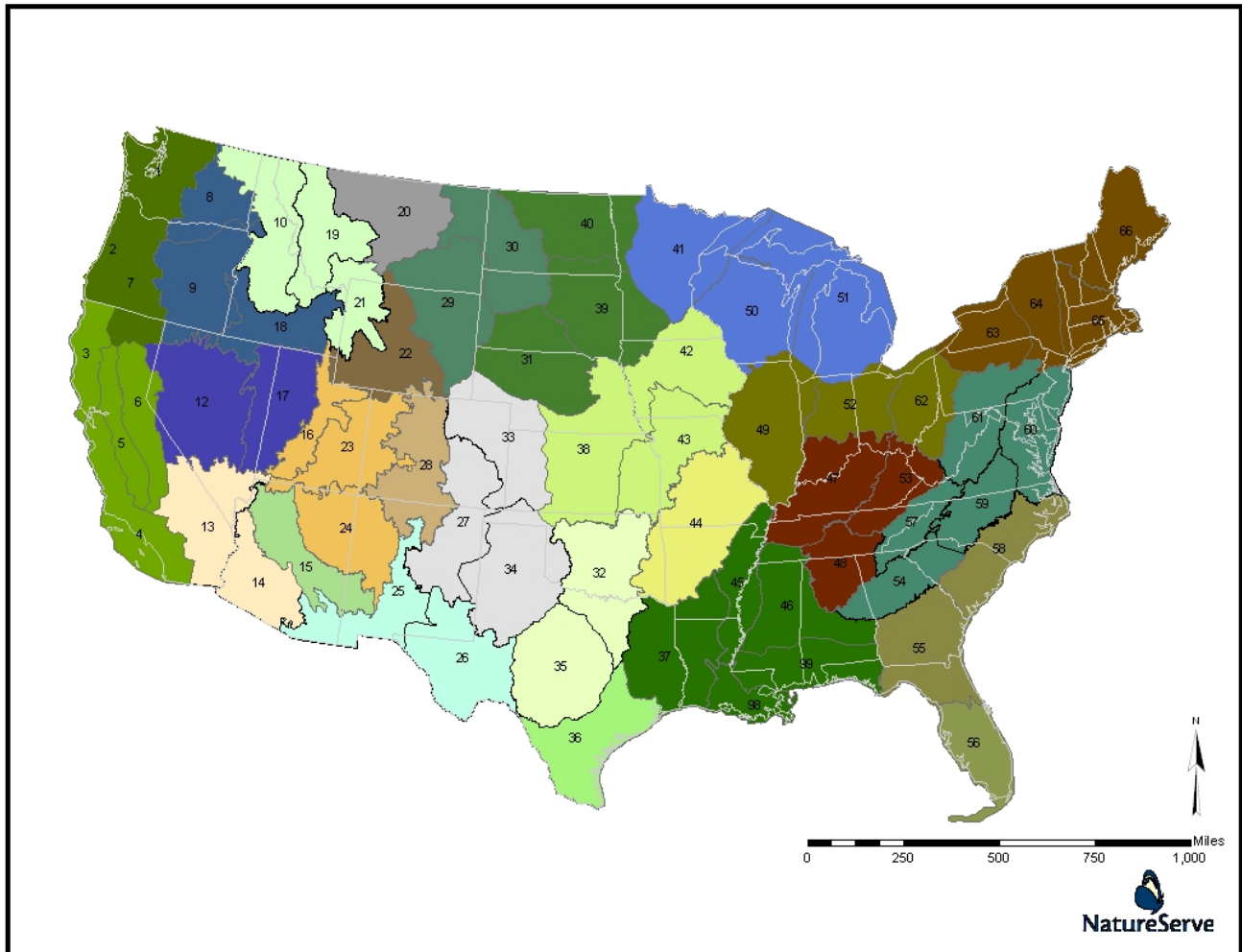
The following keys to NatureServe ecological systems and selected US-NVC vegetation alliances cover the areas found in NLCD map zones: 1, 2, and 7 (the Pacific Northwest). The systems and alliances included in these keys are intended to represent the legend that LANDFIRE will be striving to map for existing vegetation in the northern Rockies (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

<b>LAND USE OR UNVEGETATED SURFACES</b>	
<b>Open Water</b>	Open water
<b>Developed</b>	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.
<b>Agriculture</b>	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.
<b>Perennial Ice/Snow</b>	
<b>SEMI-NATURAL / ALTERED VEGETATION</b>	
<b>Ruderal Vegetation</b>	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	
<b>Introduced Vegetation</b>	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 caryophyllea</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.
<b>Modified/Managed Vegetation</b>	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.

# Pacific Northwest and Modoc Plateau Ecological Systems and Target Alliances

This key is intended for identifying Ecological Systems and selected alliances that are found in the Pacific Northwest western Washington and Oregon, east side of the Cascade Mountains, and the Modoc Plateau, including extreme northeastern California. 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). .....
  - ..... **Rocky Mountain Alpine Fell field\*\*\***
  - ..... **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 Pacific Alpine and Subalpine Bedrock and Scree*)	
..... <b>North Pacific Sparsely Vegetated Systems**</b>	
..... (North American Alpine Ice Field***)	
..... (Rocky Mountain Alpine Bedrock and Scree*)	
..... <b>Rocky Mountain Alpine/Montane Sparsely Vegetated Systems**</b>	
..... (Mediterranean California Alpine Bedrock and Scree***)	
..... <b>Mediterranean California Sparsely Vegetated Systems**</b>	
3b. Land cover is mostly exposed rock, below upper tree line, not alpine.....	<b>4</b>
4a. Land cover is volcanic in origin (includes lava, cinder, ash deposits).....	<b>5</b>
4b. Land cover is not volcanic in origin.....	<b>6</b>
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 Zones 1 & 7..... (North Pacific Volcanic Rock and Cinder Land*)	
..... <b>North Pacific Sparsely Vegetated Systems</b>	
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 Zone 7 ..... (North Pacific Volcanic Rock and Cinder Land*)	
..... <b>Inter-Mountain Basins Sparsely Vegetated Systems**</b>	
6a. Steep cliff faces, narrow canyons or small rock outcrops, or the talus slopes at the base of cliffs.....	<b>7</b>
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 .....	<b>8</b>
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 .....	
Coastal or Cascade Mts, Map Zones 1, 2, and 7 ..... (North Pacific Montane Massive Bedrock, Cliff and Talus*)	
Along the Pacific Ocean, Map Zones 1 & 2 ..... (North Pacific Coastal Cliff and Bluff*)	
..... <b>North Pacific Sparsely Vegetated Systems**</b>	
Along the Pacific Ocean southern Map Zone 2..... Mediterranean California Coastal Bluff	
..... <b>Mediterranean California Sparsely Vegetated Systems**</b>	
Eastside Cascades, Northern Washington ..... (Rocky Mountain Cliff, Canyon and Massive Bedrock*)	
..... <b>Rocky Mountain Alpine/Montane Sparsely Vegetated Systems**</b>	
Eastern Map Zone 7..... (Inter-Mountain Basins Cliff and Canyon*)	
..... <b>Inter-Mountain Basins Sparsely Vegetated Systems**</b>	
Klamath-Siskiyou Mts..... (Klamath-Siskiyou Cliff and Outcrop*)	
Sierra Nevada ..... (Sierra Nevada Cliff and Canyon*)	
..... <b>Mediterranean California Sparsely Vegetated Systems**</b>	
7b. Not as above.....	<b>8</b>
8a. Land is eroded shale, clay hills or shifting or stabilized sand hills/dunes .....	<b>9</b>
8b. Not as above.....	<b>10</b>
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*)	
..... ( <b>Mediterranean California Northern Coastal Dune*</b> )	
..... <b>Pacific Coastal Dunes and Other Sparsely Vegetated Systems*</b>	

- 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 ..... (North Pacific Active Inland Dune\*\*\*)  
 ..... (Inter-Mountain Basins Active and Stabilized Dune\*)  
 ..... **Inter-Mountain Basins Sparsely Vegetated Systems\*\***
- 10a. Land is an ephemeral stream bed or playa lake, subject to flooding or inundation (maybe very infrequent) .....  
 ..... (Inter-Mountain Basins Playa\*)  
 ..... (Inter-Mountain Basins Wash\*)  
 ..... (Inter-Mountain Basins Alkaline Closed Depression\*)  
 ..... **Inter-Mountain Basins Sparsely Vegetated Systems**
- 10b. Land cover is barren, but not as above ..... **11**
- 11a. Serpentine barrens ..... **North Pacific Serpentine Barren**  
 ..... **Mediterranean California Serpentine Barrens**
- 11b. Land cover is barren, but not as above (review land use and disturbed classes) ..... (Undifferentiated Barren\*)  
 ..... **North Pacific 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. Higher elevation woodlands and shrublands generally >2600 m (8530 ft) (upper montane-subalpine-alpine) ..... **3**
- 2b. Middle and lower elevation (generally <2600 m, <8530 ft) woodlands and shrublands (lower montane to valley floor) ..... **5**
- 3a. High elevation woodlands ..... **4**
- 3b. High elevation shrublands restricted to drainages, stream terraces, semi-riparian flats and spring or seep fed slopes. Can be quite swampy or boggy. Above 2500 m (8530 ft) in elevation. Species of *Salix*, *Acer*, *Alnus* or *Betula* are commonly present.....  
 West of the Cascade Crest..... **North Pacific Montane Riparian Woodland and Shrubland**  
 West of the Cascade Crest, low-lying areas ..... (North Pacific Shrub Swamp\*)  
 ..... **North Pacific Swamp Systems**  
 East of the Cascade Crest ..... (Rocky Mountain Subalpine - Montane Riparian Shrubland\*)  
 ..... **Rocky Mountain Subalpine/Upper Montane Riparian Systems\*\***
- 4a. Well drained soils of drainages, steam terraces, semi-riparian flats and spring or seep fed slopes. If dominated by conifers than site is well drained, soils that may remain wet seasonally, but are rarely saturated year-round, never boggy or anoxic .....  
 West of the Cascade Crest..... **North Pacific Montane Riparian Woodland and Shrubland**  
 East of the Cascade Crest ..... (Rocky Mountain Subalpine - Montane Riparian Woodland\*)  
 East of the Cascade Crest ..... **Rocky Mountain Subalpine/Upper Montane Riparian Systems\*\***
- 4b. Poorly drained soils saturated year-round or with seasonal flooding in the spring. These are primarily on flat to gently sloping lowlands, but also occur up to near the lower limits of continuous forest (below the subalpine parkland). Soils are poorly drained, mucky areas, and areas are often a mosaic of moving water and stagnant water. Soils can be woody peat, muck or mineral but tend toward mineral. ....  
 West of the Cascade Crest, low-lying areas ..... (North Pacific Hardwood-Conifer Swamp\*)  
 ..... **North Pacific Swamp Systems**  
 East of the Cascade Crest ..... **Northern Rocky Mountain Conifer Swamp\*\***



- 5a. Lower montane – foothill to Coastal woodlands and shrublands of the Pacific Northwest, from southern Oregon northward to northern Washington, generally on the west side of Cascades, restricted to drainages, semi-riparian flats and spring or seep fed slopes, generally reliant on perennial source of water.....6
- 5b. Lower elevation areas, lower foothills to primarily valley bottom shrublands restricted to temporarily flooded drainages and flats, primarily of Mediterranean California, Northern Coast ranges reaching into Oregon, and in the foothill of the Sierra Nevada, and east of the Columbia Crest, but may occur on west side .....7
- 6a. Lower floodplains or lower terraces of rivers and streams, throughout the Pacific Northwest. Well drained though seasonally wet soils. Major broadleaf dominant species are *Acer macrophyllum*, *Alnus rubra*, *Populus balsamifera ssp. trichocarpa*, *Salix sitchensis*, *Salix lucida ssp. lasiandra*, *Cornus sericea*, and *Fraxinus latifolia*. ..... **North Pacific Lowland Riparian Forest and Shrubland**
- 6b. Low elevation bogs with deep organic soils, very poor drainage, saturated soils year round, dominated by *Chamaecyparis nootkatensis*, *Pinus contorta var. contorta*, *Picea sitchensis*, *Tsuga heterophylla*, *Ledum glandulosum*, *Thuja plicata*, *Gaultheria shallon*, *Spiraea douglasii*, *Carex aquatilis var. dives*, *Carex lyngbyei*, *Carex obnupta*, *Carex pluriflora*, *Darlingtonia californica*, *Sphagnum pacificum*, *Sphagnum henryense*, and *Sphagnum mendocinum*. .....**North Pacific Bog and Fen**
- 7a. Riparian and wetlands on serpentine soils.....  
..... **Mediterranean California Serpentine Foothill and Lower Montane Riparian Woodland and Seep**
- 7b. Riparian and wetlands not on serpentine soils .....8
- 8a. Montane stream sides of Southern Oregon, Northern California, from near sea level up to 300 m (900 feet) in the Coast Ranges and inland to 1500 m (4545 feet). Dominant species include *Acer macrophyllum* (in central and south coast), *Acer negundo*, *Alnus rhombifolia*, *Alnus rubra* (in Coast Ranges), *Cupressus sargentii*, *Frangula californica ssp. tomentella* (= *Rhamnus tomentella*), *Platanus racemosa*, *Populus fremontii*, *Pseudotsuga menziesii*, *Quercus agrifolia*, *Salix breweri*, *Salix laevigata*, *Salix gooddingii*, *Salix exigua*, and *Salix lasiolepis*.. . (**Mediterranean California Foothill and Lower Montane Riparian Woodland\***)  
..... **California Montane Riparian Systems**
- 8b. Not as above.....9
- 9a. Sagebrush dominated stream terraces, and other low areas with high water tables at least part of the year. Dominated by *Artemisia cana ssp. bolanderi* or *Artemisia cana ssp. viscidula* are dominant, with *Artemisia tridentata ssp. tridentata*, *Artemisia tridentata ssp. wyomingensis*, or *Artemisia tridentata ssp. vaseyana* occasionally codominant. .... **Columbia Plateau Silver Sagebrush Seasonally Flooded Shrub-Steppe\*\*\***
- 9b. Not dominated by sagebrush.....10
- 10a. Lower elevation riparian areas and seeps in the foothills and canyons along streams within the Columbia River Basin or the Great Basin. Distinguishing species include *Alnus rhombifolia*, *Alnus rubra*, *Betula occidentalis*, *Crataegus douglasii*, *Celtis laevigata var. reticulata*, *Frangula purshiana*, *Fraxinus*, *Pinus monticola*, *Pinus ponderosa*, *Philadelphus lewisii*, *Populus balsamifera ssp. trichocarpa*, *Populus fremontii*, *Populus acuminata*, *Pseudotsuga menziesii*, *Salix amygdaloides*, *Salix eriocephala*, *Salix exigua*, *Salix lasiolepis*, *Salix lemmonii*, *Salix lucida ssp. lasiandra*, and *Salix lutea* .....  
..... (**Columbia Basin Foothill Riparian Woodland and Shrubland \*\***)  
..... (**Great Basin Foothill and Lower Montane Riparian Woodland and Shrubland\***)  
..... **Inter-Mountain Basins Montane Riparian Systems\***
- 10b. Riparian and wetland areas not as above.....11
- 11a. Woodlands and or shrublands restricted to drainages and semi-riparian flats that are dominated by introduced species, such as *Alhagi maurorum*, *Elaeagnus angustifolia*, or *Prunus mahaleb* .....  
..... (*Elaeagnus angustifolia* **Semi-Natural Woodland Alliance\***)  
..... (*Tamarix spp.* **Semi-Natural Temporarily Flooded Shrubland Alliance\***)  
..... **Invasive Riparian Woodland and Shrubland\*\***
- 11b. Riparian/wetland woodlands and shrubland not like above .....  
..... **Undescribed or otherwise not included in this Key**

## KEY C: UPLAND FORESTS AND WOODLANDS

- 1a. Deciduous forests and woodlands or mixed conifer-aspen forests and woodlands (deciduous 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 Forests

- 2a. Deciduous forest or woodland typically dominated by *Populus tremuloides* singly or mixed with conifers, generally limited to East side of Cascade Mts .....**Rocky Mountain Aspen Forest and Woodland**
- 2b. *Populus tremuloides* not present, broadleaf forest or woodland dominated by *Alnus*, *Acer*, or *Quercus* .....3
- 3a. Deciduous forest or woodland (or really tall shrubs) that occur on steep slopes and bluffs subject to mass wasting, dominated by *Alnus rubra* and *Acer macrophyllum* are the major tree species. *Rubus spectabilis*, *Rubus parviflorus*, *Ribes bracteosum*, and *Oplopanax horridus* are some of the major shrub species.  
..... **North Pacific Broadleaf Landslide Forest and Shrubland**  
Note that *Alnus rubra* and/or *Acer macrophyllum* dominated sites not on steep, mass wasting slopes. Stands are early successional stage of North Pacific Maritime Douglas-Fir-Western Hemlock Forests, key based on conifers present in understory
- 3b. Deciduous oaks make up at least 25% of the relative canopy .....4
- 4a. Mixed forests with pine and oaks .....5
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- 5a. Stands of pines, mixed with oaks .....6
- 5b. Stands of mostly oaks, if pines present, only as a minor component .....9
- 6a. Characterized by woodlands or forests of *Pinus ponderosa* with one or more oaks, .....7
- 6b. Characterized by woodland of *Pinus sabiniana* with one or more oaks .....8
- 7a. 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**
- 7b. 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**
- 8a. Open park-like stands of *Pinus sabiniana*, with oaks and other various broadleaf tree and shrub species, including *Quercus douglasii*, *Quercus wislizeni*, *Quercus agrifolia* (primarily central and southern Coast Ranges), *Quercus lobata*, *Aesculus californica*, *Arctostaphylos* spp., *Cercis canadensis* var. *texensis*, *Ceanothus cuneatus*, *Frangula californica*, *Ribes quercetorum*, *Juniperus californica*, and *Pinus coulteri* .....  
..... **California Lower Montane Blue Oak-Foothill Pine Woodland and Savanna**
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- 9a. Stands of mixed oaks with few other tree species, The predominant oaks include *Quercus kelloggii* and *Quercus garryana*, with *Quercus garryana* var. *garryana* codominant in the central and northern Coast Ranges and *Quercus garryana* var. *breweri* 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 *Quercus garryana* is not the only oak. ....  
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..... <b>North Pacific Oak Woodland</b>	
Stands of pure <i>Quercus garryana</i> .....	<b>Quercus garryana Forest Alliance****</b>
Stands of mixed <i>Pseudotsuga menziesii</i> and <i>Quercus garryana</i> .....	
..... <i>Pseudotsuga menziesii</i> - <i>Quercus garryana</i> <b>Woodland Alliance****</b>	
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**Montane, Foothill and Coastal Forests**

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**Coastal Forests**

28a. Forests with *Picea sitchensis* or *Thuja plicata* >10% cover .....29  
 28b. Forest with *Sequoia sempervirens* or *Pinus contorta* var. *contorta* present to dominant .....30

29a Forests with *Picea sitchensis* over 10%, often *Tsuga heterophylla*, *Thuja plicata*, *Chamaecyparis lawsoniana* or *Chamaecyparis nootkatensis* may codominant. ....  
 ..... **North Pacific Hypermaritime Sitka Spruce Forest**  
 29b. *Picea sitchensis* <10% cover, *Thuja plicata* present. Forests dominated by *Tsuga heterophylla*, *Thuja plicata*, *Abies amabilis*, *Abies grandis*, and/or *Chamaecyparis nootkatensis*. *Thuja plicata* always present. *Pseudotsuga menziesii* and *Abies grandis* <30% relative cover. Occurs only in Washington, BC and AK, within 25 km (15.5 miles) of the coast .....  
 ..... **North Pacific Hypermaritime Western Hemlock-Western Red Cedar Forest**

30a. Coastal forest with *Sequoia sempervirens* dominant or at least present, stands may include *Pseudotsuga menziesii*, *Tsuga heterophylla*, *Chamaecyparis lawsoniana*, and/or *Lithocarpus densiflorus* .....  
 ..... **California Coastal Redwood Forest**  
 30b. Coastal forests with *Pinus contorta* var. *contorta*, tall or stunted pygmy trees along the Oregon or Northern California Coast. .... **California Coastal Closed-Cone Conifer Forest and Woodland**

**Montane Forests**

31a. Stands of upper montane to subalpine, *Abies amabilis*, *Abies procera*, or *Tsuga mertensiana* present with at least 5% cover, often with *Tsuga heterophylla* .....32  
 31b. Stands of Lower Montane or foothills, not upper montane, *Abies amabilis*, *Abies procera*, and/or *Tsuga mertensiana* not present or if so less than 5% canopy cover .....34

**Upper Montane Forests**

32a. Stands of upper montane, *Abies amabilis* >5% cover, dominant or codominant, mostly on west side but can spill over east of the Cascade crest, if *Tsuga mertensiana* present, less than 40% cover .....33  
 32b. Stands of the upper montane, *Tsuga mertensiana* >5% cover, dominant to codominant, *Abies amabilis* <5% cover, *Abies magnifica* and *Abies X shastensis* absent. *Chrysolepis chrysophylla*, *Larix lyallii*, *Larix occidentalis*, *Pinus albicaulis*, or *Pinus monticola* <5% cover ..... **North Pacific Mountain Hemlock Forest**  
 33a. *Tsuga heterophylla* and/or *Abies amabilis* dominate, *Chamaecyparis nootkatensis* can be codominant. *Pseudotsuga menziesii* is relatively rare to absent. Understory dominated by *Vaccinium ovalifolium*. Other mesic to wet indicators that help distinguish this system from the next include *Oxalis oregana*, *Blechnum spicant*, and *Rubus pedatus* ..... **North Pacific Mesic Western Hemlock-Silver Fir Forest**  
 ..... *Abies amabilis* >25% and *Tsuga mertensiana* >25% cover .....  
 ..... *Tsuga mertensiana* - *Abies amabilis* **Woodland Alliance\*\*\*\***

- 33b. *Tsuga heterophylla* and/or *Abies amabilis* dominate the canopy of late-seral stands, though *Pseudotsuga menziesii* is usually also common, *Chamaecyparis nootkatensis* can be codominant. *Abies procera* forests (usually mixed with silver fir) are included in this system and occur in the Cascades from central Washington to central Oregon and rarely in the Coast Range of Oregon. *Vaccinium ovalifolium* may be present in moist microsites, but is not as abundant as above. Dry to mesic understory indicators include *Achlys triphylla*, *Mahonia nervosa*, *Xerophyllum tenax*, *Vaccinium membranaceum*, *Rhododendron macrophyllum*, and *Rhododendron albiflorum*.....  
 .....**North Pacific Dry-Mesic Silver Fir-Western Hemlock-Douglas-fir Forest**  
*Abies amabilis* >25% and *Tsuga mertensiana* >25% cover .....  
 ..... *Tsuga mertensiana* - *Abies amabilis* **Woodland Alliance\*\*\*\***

**Lower Montane and Foothill Forests**

- 34a. Forests of the west slope of the Cascade and Coastal Mountains, at montane, lower montane and foothill elevations. Forests dominated or codominated by *Pseudotsuga menziesii*, *Tsuga heterophylla* and/or *Thuja plicata*.....**35**
- 34b. Forests dominated by other species, can be small patch forests with similar canopy dominants, but on the east side of the Cascade crest, or in other ways not like above .....**39**
- 35a. Large to small patch forests, limited to the foothill transition zone of the Puget Trough - Willamette Valley - Georgia Basin ecoregion. Stands are dominated by *Pseudotsuga menziesii*. *Arbutus menziesii*, *Pinus contorta*, *Acer macrophyllum*, or *Abies grandis* may be codominant species. Only small amounts of *Tsuga heterophylla* or *Thuja plicata* may be present ..... **North Pacific Dry Douglas-fir Forest and Woodland**  
 Forests of pure *Pseudotsuga menziesii* in the upper canopy .....  
 ..... *Pseudotsuga menziesii* **Giant Forest Alliance\*\*\*\***
- 35b. Forests of montane or foothill areas, not like above .....**36**
- 36a. Dry Forests, matrix, not limited to moist microsites, in southern Oregon broadleaf evergreen species may be present.....**37**
- 36b. Mesic Forests, matrix or limited to moist microsites, throughout map zone .....**38**
- 37a. Overstory canopy is dominated by *Pseudotsuga menziesii*, with *Tsuga heterophylla* generally present in the subcanopy or as a canopy dominant in old-growth stands. *Abies grandis*, *Thuja plicata*, and *Acer macrophyllum* may be codominants. In the driest climatic areas, *Tsuga heterophylla* may be absent, and *Thuja plicata* takes its place. Dominant shrubs include *Gaultheria shallon*, *Mahonia nervosa*, *Rhododendron macrophyllum*, *Linnaea borealis*, *Achlys triphylla*, and *Vaccinium ovatum*. *Acer circinatum* is a common codominant. *Polystichum munitum* can be codominant. In southwestern Oregon, *Pinus lambertiana*, *Calocedrus decurrens*, and occasionally *Pinus ponderosa* may occur in these forests. This ecological system comprises much of the major lowland forests of western Washington, northwestern Oregon. In southwestern Oregon, it becomes local and more small-patch in nature.....  
 ..... **North Pacific Maritime Dry-Mesic Douglas-fir-Western Hemlock Forest**  
 Forests of pure *Pseudotsuga menziesii* in the upper canopy .....  
 ..... *Pseudotsuga menziesii* **Giant Forest Alliance\*\*\*\***  
 Forests pure *Tsuga heterophylla* in the upper canopy ..... *Tsuga heterophylla* **Giant Forest Alliance\*\*\*\***
- 37b. Forests are characterized by mixes of coniferous and broad-leaved evergreen trees. Characteristic trees include *Pseudotsuga menziesii*, *Quercus chrysolepis*, *Lithocarpus densiflorus*, *Arbutus menziesii*, *Umbellularia californica*, and *Chrysolepis chrysophylla*. On the eastern fringe of this system, in the western Siskiyou, other conifers occur such as *Pinus ponderosa* and *Chamaecyparis lawsoniana*. 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**
- 38a. Overstory canopy is dominated by *Pseudotsuga menziesii*, *Tsuga heterophylla*, and/or *Thuja plicata*, as well as *Chamaecyparis lawsoniana* in southwestern Oregon. *Pseudotsuga menziesii* is usually at least present to more typically codominant or dominant. *Acer macrophyllum* and *Alnus rubra* are commonly found as canopy or subcanopy. Undergrowth is dominated by *Polystichum munitum*, *Oxalis oregana*,

*Rubus spectabilis*, and *Oplopanax horridus*.. *Gaultheria shallon*, *Mahonia nervosa*, *Rhododendron macrophyllum*, and *Vaccinium ovatum* are often present but are generally not as abundant as in the above type. *Acer circinatum* is a very common codominant as a tall shrub. These forests occur on moist habitats and microhabitats, mainly lower slopes or valley landforms .....  
.....**North Pacific Maritime Mesic-Wet Douglas-fir-Western Hemlock Forest**  
Forests of pure *Pseudotsuga menziesii* in the upper canopy .....  
..... *Pseudotsuga menziesii* **Giant Forest Alliance\*\*\*\***  
Forests pure *Tsuga heterophylla* in the upper canopy ..... *Tsuga heterophylla* **Giant Forest Alliance\*\*\*\***  
38b. Forests not like above.....**39**

39a. Forests of the East side of the Cascades, mixed-conifer, Pine-oak, foothill pine, larch or subalpine forests.....**40**  
39b. Forests of the West of Cascade crest, southern Oregon, and/or Klamath Mts, and otherwise not as above .....**54**

**East-side Forests**

40a. Conifer forests dominated by Pines such as *Pinus ponderosa*, *Pinus jeffreyi*, *Pinus monticola* and/or *Pinus contorta*. Other species may be codominant, such as *Abies concolor* var. *lawsoniana*.....**41**  
40b. Conifer forests and woodlands not dominated by Pines, but by other species, OR the canopy is a mix of conifers, such as *Pseudotsuga menziesii*, *Pinus ponderosa*, *Pinus contorta*, *Pinus monticola*, *Larix occidentalis*, and *Abies grandis* OR forests are a mix of pines with Oaks, or forests of serpentine soils, OR in other ways not as above.....**48**

**Pine dominated Forests**

41a. Pine forests and woodlands strongly dominated by *Pinus contorta* (not the coastal variety, var. *contorta*), other conifers may be present, usually with <25% cover .....**42**  
41b. Pine forests and woodland strongly dominated by other conifer species .....**43**

42a. Subalpine forests, occasionally found in the montane zone, where the dominance of *Pinus contorta* is related to topo-edaphic conditions and nutrient-poor soils (e.g. well-drained pumice deposits, glacial till, alluvium on valley floors where there is cold-air accumulation, warm and droughty shallow soils over fractured quartzite bedrock, or shallow moisture-deficient soils with a significant component of volcanic ash.....**Rocky Mountain Poor Site Lodgepole Pine Forest**  
42b. Pine forests and woodlands strongly dominated by *Pinus contorta* (>2/3 total tree canopy), site characteristics not as above, typically early to mid-seral forest on productive soils .....  
..... **Rocky Mountain Lodgepole Pine Forest**

43a. *Pinus monticola* dominant to codominant with other species, *Pseudotsuga menziesii* is not present. *Abies concolor* var. *lowiana* is usually present, at least in the understory, and occasionally as the dominant in the canopy, replacing *Pinus monticola*, particularly at lower elevations, and *Pinus ponderosa* 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**  
43b. Forests or shrubby woodlands dominated or codominated by *Pinus ponderosa* and/or *Pinus jeffreyi*, or otherwise not as above.....**44**

44a. Forests dominated or codominated by *Pinus jeffreyi*, *Abies concolor*, *Abies magnifica*, *Pinus monticola*, *Pinus lambertiana*, *Pinus coulteri*, or *Pinus attenuata*.....**45**  
44b. Forests dominated by *Pinus ponderosa* and/or *Pseudotsuga menziesii*, *Pinus jeffreyi* generally not present.....**46**

45a. 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 Pine Woodland**

- 45b. 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**
- 46a. Dry mixed forests dominated by *Pseudotsuga menziesii* and *Pinus ponderosa* (but there can be one without the other) and other typically seral species, including *Pinus contorta*, *Pinus monticola*, *Larix occidentalis*, *Abies concolor* and *Abies grandis*. Difficult to distinguish from the next.....  
..... **Northern Rocky Mountain Dry-Mesic Montane Mixed Conifer Forest**
- 46b. *Pinus ponderosa* forests not like above.....47
- 47a. Forests and woodlands on productive soils, biomass is sufficient to carry fires periodically. *Pinus ponderosa* is the dominate canopy component. May have inclusions of *Pseudotsuga menziesii* woodlands on cool aspects. .... **Northern Rocky Mountain Ponderosa Pine Woodland and Savanna**
- 47b. Open woodlands to savanna canopy, occurring on rocky substrates that limit growth. Biomass is never abundant enough to carry fire. Wooded steppes occur at the lower tree line/ecotone between grasslands or shrublands and forests and woodlands typically on warm, dry, exposed sites too droughty to support a closed tree canopy. *Pinus ponderosa* (vars. *ponderosa* and *scopulorum*) and *Pseudotsuga menziesii* are the predominant conifers (not always together); *Pinus flexilis* may be present or common .....  
..... **Northern Rocky Mountain Foothill Conifer Wooded Steppe**

### Mixed-Conifer Forests

- 48a. Dry mixed forests dominated by *Pseudotsuga menziesii* and *Pinus ponderosa* (but there can be one without the other) and other typically seral species, including *Pinus contorta*, *Pinus monticola*, *Larix occidentalis*, *Abies concolor* and *Abies grandis*. The nature of this forest system is a matrix of large patches dominated or codominated by one or combinations of the above species; *Abies grandis* (a fire-sensitive, shade-tolerant species) has increased on many sites once dominated by *Pseudotsuga menziesii* and *Pinus ponderosa*. Difficult to distinguish from the next .... **Northern Rocky Mountain Dry-Mesic Montane Mixed Conifer Forest**
- 48b. Forests not as above .....49
- 49a. Forests dominated by a mix of *Pseudotsuga menziesii* with *Abies grandis* and/or *Tsuga heterophylla*. Several other conifers can dominate or codominate, including *Thuja plicata*, *Pinus contorta*, *Pinus monticola*, and *Larix occidentalis*, or *Abies grandis*. Stands are generally limited to places along rivers and slopes, and in mesic "coves" which were historically protected from wildfires. Most occurrences of this system are dominated by a mix of *Pseudotsuga menziesii* with *Abies grandis* and/or *Tsuga heterophylla* .....  
..... **East Cascades Mesic Montane Mixed-Conifer Forest and Woodland**
- 49b. Forests dominated by *Larix occidentalis*, a mix of *Quercus garryana* with *Pinus ponderosa* or *Pseudotsuga menziesii*, or otherwise not as above .....50
- 50a. Forests dominated by a mix of *Quercus garryana* and *Pinus ponderosa* or *Pseudotsuga menziesii* .....  
..... **East Cascades Oak-Ponderosa Pine Forest and Woodland**
- 50b. Forest not as above.....51
- 51a. Forest dominated by *Larix occidentalis* ..... **Northern Rocky Mountain Western Larch Savanna**
- 51b. Forests dominated by a mix of species, not including *Larix occidentalis* .....52
- 52a. Open forests of recent lava flows, excessively well-drained lahars, debris avalanches and pyroclastic flows. With open to sparse tree cover; characteristic species include *Pseudotsuga menziesii*, *Pinus contorta*, *Pinus monticola*, and *Abies lasiocarpa*. Tree cover can range from scattered (5%) up to 70% or occasionally even more. There may be scattered dense shrubs present, such as *Acer circinatum*, *Vaccinium membranaceum*, *Arctostaphylos uva-ursi* (very characteristic), *Mahonia nervosa*, *Amelanchier alnifolia*, and *Xerophyllum tenax*. Soil development is limited, and mosses and lichens often cover the soil or rock surface ..... **North Pacific Wooded Volcanic Flowage**
- 52b. Forests not as above .....53



**West of Cascade crest, southern Oregon/northern California, or Klamath Mts Forests**

- 53a. Forests dominated or codominated by oak (*Quercus*) species .....54
- 53b. Forests without oaks, if oaks are present they are not dominant nor codominant, only a minor component .....61

**Oak or Pine-Oak Forests**

- 54a. Stands of mixed oaks with *Pinus sabiniana*, *Pinus ponderosa* or *Pinus coulteri* .....55
- 54b. Mixed forest with oaks, not like above .....56

55a. 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**

55b. Open park-like stands of *Pinus sabiniana*, with oaks and other various broadleaf tree and shrub species, including *Quercus douglasii*, *Quercus wislizeni*, *Quercus agrifolia* (primarily central and southern Coast Ranges), *Quercus lobata*, *Aesculus californica*, *Arctostaphylos* spp., *Cercis canadensis* var. *texensis*, *Ceanothus cuneatus*, *Frangula californica*, *Ribes quercetorum*, *Juniperus californica*, and *Pinus coulteri* .....  
..... **California Lower Montane Blue Oak-Foothill Pine Woodland and Savanna**

56a. Stands of mixed oaks with few other tree species, The predominant oaks include *Quercus kelloggii* and *Quercus garryana*, with *Quercus garryana* var. *garryana* codominant in the central and northern Coast Ranges and *Quercus garryana* var. *breweri* 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 *Quercus garryana* is not the only oak. ....  
..... **Mediterranean California Mixed Oak Woodland**

56b. Forests not like above.....57

- 57a. *Quercus garryana* in pure stands or mixed with conifers and/or other oaks.....58
- 57b. Stands dominated or codominated by other oak species, with and without other species present .....59

58a. *Quercus garryana* in pure stands or codominant with other conifers, tree cover ranges from savanna and woodland to forest, codominance often by *Pseudotsuga menziesii*, *Pinus ponderosa*, *Quercus kelloggii* or *Arbutus menziesii*. 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 state line .....  
..... **North Pacific Oak Woodland**  
Stands of pure *Quercus garryana*..... ***Quercus garryana* Forest Alliance\*\*\*\***  
Stands of mixed *Pseudotsuga menziesii* and *Quercus garryana* .....  
..... ***Pseudotsuga menziesii* - *Quercus garryana* Woodland Alliance\*\*\*\***

58b. 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**

- 59a. Forests are characterized by a mix of coniferous and broad-leaved evergreen trees. Characteristic trees include *Pseudotsuga menziesii*, *Quercus chrysolepis*, *Lithocarpus densiflorus*, *Arbutus menziesii*, *Umbellularia californica*, and *Chrysolepis chrysophylla*. On the eastern fringe of this system, in the western Siskiyou, other conifers occur such as *Pinus ponderosa* and *Chamaecyparis lawsoniana* .....  
..... **Mediterranean California Mixed Evergreen Forest**
- 59b. Forests are codominated by numerous conifers, without an evergreen broadleaf component, or not as above .....60

- 60a. Stands on dry locations such as upper slopes at higher elevations, canyon side slopes, ridge tops, and south- and west-facing slopes. Several conifer species co-occur in individual stands. *Pseudotsuga menziesii*, *Pinus ponderosa*, and *Calocedrus decurrens* are the most common conifers. Other conifers that can occasionally be present include *Pinus jeffreyi*, *Pinus attenuata*, *Pinus lambertiana*. Common subcanopy trees include *Quercus chrysolepis* and *Quercus kelloggii*. *Arbutus menziesii* and *Lithocarpus densiflorus* may be common with the oaks in northern areas. ....  
**Mediterranean California Dry-Mesic Mixed Conifer Forest and Woodland**
- 60b. In cool ravines and north-facing slopes. Mixed conifer stands of *Abies concolor* var. *lowiana*, *Calocedrus decurrens*, and *Pinus lambertiana*. *Pinus jeffreyi*, *Pinus ponderosa*, and *Pseudotsuga menziesii*, *Chrysolepis chrysophylla* also occurs in the western Klamaths. Common understory species include *Corylus cornuta*, *Cornus nuttallii*, and at higher elevations *Chrysolepis sempervirens*.....  
**Mediterranean California Mesic Mixed Conifer Forest and Woodland**
- 61a. Forests or woodlands on serpentine soils .....**62**
- 61b. Forests or woodlands not on serpentine soils .....**65**

**Serpentine Forests**

- 62a. Mesic serpentine areas dominated by *Cupressus sargentii*, *Pinus sabiniana*, *Garrya congdonii*, *Quercus durata*, *Umbellularia californica*, and *Frangula californica* ssp. *tomentella* (= *Rhamnus tomentella* ssp. *tomentella*) ..... **Mediterranean California Mesic Serpentine Woodland and Chaparral**
- 62b. Dry to xeric serpentine areas, not as above .....**63**
- 63a. In the Klamath - Siskiyou region above 1500 m (4550 feet) elevation on thin, rocky, ultramafic (gabbro, peridotite, serpentinite) soils in dry-mesic conditions. Common species include *Pinus monticola*, *Pinus balfouriana*, *Quercus vaccinifolia*, *Pinus jeffreyi*, *Ceanothus pumilus*, *Arctostaphylos* spp., *Lithocarpus densiflorus* var. *echinoides*, *Abies X shastensis* (= *Abies magnifica* var. *shastensis*), and *Chamaecyparis nootkatensis*. *Chamaecyparis lawsoniana* may also occur in riparian areas .....  
**Klamath-Siskiyou Upper Montane Serpentine Mixed Conifer Woodland**
- 63b. In the Klamath - Siskiyou region below 1500 m (4550 feet) elevation on thin, rocky, ultramafic (gabbro, peridotite, serpentinite) soils below winter snow accumulations and typically experiences hot and dry summers. ....**64**
- 64a. Serpentine forests at low elevations. Common species include *Pseudotsuga menziesii*, *Pinus sabiniana*, *Pinus lambertiana*, *Pinus jeffreyi*, *Pinus attenuata*, *Lithocarpus densiflorus* var. *echinoides*, *Calocedrus decurrens*, *Arctostaphylos* spp., *Quercus vaccinifolia*, and *Xerophyllum tenax*.....  
**Klamath-Siskiyou Lower Montane Serpentine Mixed Conifer Woodland**
- 64b. Serpentine savanna or chaparral with *Pinus jeffreyi* or *Pinus attenuata* can form a scattered tree layer over bunch grasses. Dense shrub layers can also be present in some stands, *Quercus vaccinifolia*, *Quercus sadleriana* (coastal and wetter climate but found on xeric sties), *Lithocarpus densiflorus* var. *echinoides*, *Quercus garryana* var. *breweri* (drier, inland), *Ceanothus cuneatus*, *Ceanothus pumilus*, *Arctostaphylos viscida*, *Arctostaphylos X cinerea*, *Arctostaphylos canescens*, *Frangula californica*, and *Garrya buxifolia*. Perennial grasses such as *Festuca roemerii*, *Achnatherum lemmonii*, *Melica*, and *Danthonia californica* .....  
**Klamath-Siskiyou Xeromorphic Serpentine Savanna and Chaparral**

**Mixed Conifer Forests on Non-Serpentine Soils**

- 65a. Pinyon-Juniper or Mt Mahogany (*Cercocarpus ledifolius*) woodlands. P-J either together or individually. *Pinus monophylla*, *Juniperus osteosperma* and/or *J. occidentalis* .....**66**
- 65b. Mixed conifer stands dominated by other species.....**68**

**Pinyon-Juniper, Mt. Mahogany Woodlands**

- 66a. 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**

66b. Woodlands dominated by <i>Juniperus occidentalis</i> , or a mix of <i>Pinus monophylla</i> and/or <i>Juniperus osteosperma</i> .....	67
67a. Woodlands dominated a mix of <i>Pinus monophylla</i> and/or <i>Juniperus osteosperma</i> .....	<b>Great Basin Pinyon-Juniper Woodland</b>
67b. Woodlands are dominated by <i>Juniperus occidentalis</i> as the only tree species, <i>Pinus ponderosa</i> or <i>Pinus jeffreyi</i> may be present. <i>Cercocarpus ledifolius</i> may occasionally codominate .....	<b>Columbia Plateau Western Juniper Woodland and Savanna</b>
Stands dominated by <i>Juniperus occidentalis</i> with 10-25% cover, no other tree species present and over 20% cover of perennial graminoids. Limited to the Modoc Plateau, in the Columbia Basin and Cascade mountains .....	<b><i>Juniperus occidentalis</i> Wooded Herbaceous Alliance****</b>
Woodlands dominated by <i>Juniperus occidentalis</i> with >15% tree cover, no other tree species. Perennial graminoid cover is typically low. If perennial graminoid cover >20% cover, then tree cover is over 25% cover. This is not fire maintained. Stands occur on the Modoc Plateau, in the Columbia Basin and Cascade mountains .....	<b><i>Juniperus occidentalis</i> Woodland Alliance****</b>
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68b. Forests not like above.....	71
69a. Forests are characterized by mixes of coniferous 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> .....	<b>Mediterranean California Mixed Evergreen Forest</b>
69b. Forests are codominated by numerous conifers, without an evergreen broadleaf component, or otherwise not as above .....	70
70a. Stands on dry locations such as upper slopes at higher elevations, canyon side slopes, ridge tops, and south- and west-facing slopes. Several conifer (at least 2) species co-occur in individual stands. <i>Pseudotsuga menziesii</i> , <i>Pinus ponderosa</i> , and <i>Calocedrus decurrens</i> are the most common conifers. Other conifers that can occasionally be present include <i>Pinus jeffreyi</i> , <i>Pinus attenuata</i> , <i>Pinus lambertiana</i> . Common 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. ....	<b>Mediterranean California Dry-Mesic Mixed Conifer Forest and Woodland</b>
70b. In cool ravines and north-facing slopes. Mixed conifer stands of <i>Abies concolor</i> var. <i>lowiana</i> , <i>Calocedrus decurrens</i> , and <i>Pinus lambertiana</i> . <i>Pinus jeffreyi</i> , <i>Pinus ponderosa</i> , <i>Pseudotsuga menziesii</i> , and <i>Chrysolepis chrysophylla</i> also occur in the western Klamaths. Common understory species include <i>Corylus cornuta</i> , <i>Cornus nuttallii</i> , and at higher elevations <i>Chrysolepis sempervirens</i> .....	<b>Mediterranean California Mesic Mixed Conifer Forest and Woodland</b>
71a. Upland forest near wetlands/riparian areas swamps or seeps, try Woody Wetland Key.....	<b>Group B</b>
71b. Upland/Non-wetland Forests, Woodland or Savannas not as described above.....	<b>Undescribed or otherwise not included in this Key</b>

## KEY D: SHRUBLANDS

1a. Alpine dwarf-shrublands, alpine vegetation.....	2
1b. Shrublands below upper tree-line, montane or near the coast, not above upper tree-line .....	4

### Alpine Shrublands

- 2a. Alpine and subalpine dwarf-shrublands, alpine tundra and fell fields at elevations above 2350 m (7200 feet) in the Klamath Mountains and Cascades mountains. It is commonly comprised of a mosaic of plant

communities with characteristic species including <i>Cassiope mertensiana</i> , <i>Phyllodoce empetriformis</i> , <i>Phyllodoce glanduliflora</i> , <i>Luetkea pectinata</i> , <i>Saxifraga tolmiei</i> , and <i>Carex</i> spp. ....	
..... <b>North Pacific Dry and Mesic Alpine Dwarf-Shrubland, Fell-field and Meadow</b>	
2b. Alpine vegetation not as above, limited to east side of northern Cascade or southern Mts .....	3
3a. Alpine and subalpine dwarf-shrublands may be dominated by <i>Dryas octopetala</i> , <i>Ledum glandulosum</i> , <i>Kalmia microphylla</i> , <i>Salix arctica</i> , <i>S. nivalis</i> , <i>S. petrophila</i> , <i>Salix reticulata</i> , and/or <i>Vaccinium</i> spp. ....	
..... <b>Rocky Mountain Alpine Dwarf-Shrubland</b>	
3b. 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 <i>Arenaria kingii</i> , <i>Ericameria discoidea</i> , <i>Artemisia arbuscula</i> , <i>Phlox covillei</i> , <i>Eriogonum incanum</i> , <i>Eriogonum ovalifolium</i> , <i>Eriogonum roseum</i> , <i>Polygonum shastense</i> , <i>Leptodactylon pungens</i> , and <i>Phyllodoce breweri</i> .....	
..... <b>Sierra Nevada Alpine Dwarf-Shrubland</b>	
4a. Shrubland (tall or dwarf) within 25 km of Coast, with fog and or salt spray zone.....	5
4b. Shrublands away from the coast, montane or desert .....	7

### Coastal Shrublands (fog and salt spray zone)

5a. Dense to open shrublands intermixed with grasslands on steep slopes and level areas on coastal bluffs, headlands, or small islands. Usually a mix of shrubland and grassland. Dominated by <i>Vaccinium ovatum</i> , <i>Gaultheria shallon</i> , <i>Rubus spectabilis</i> , <i>Calamagrostis nutkaensis</i> , and <i>Festuca rubra</i> . Scattered stunted trees, especially <i>Picea sitchensis</i> , often present. The relative prevalence of grasslands versus shrublands increases to the south.....	<b>North Pacific Hypermaritime Shrub and Herbaceous Headland*</b>
5b Not as above.....	6
6a. 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 <i>Baccharis</i> <i>pilularis</i> , <i>Lupinus arboreus</i> , <i>Ceanothus thyrsiflorus</i> , <i>Eriophyllum stoechadifolium</i> , <i>Diplacus aurantiacus</i> (= <i>Mimulus aurantiacus</i> ), <i>Toxicodendron diversilobum</i> , <i>Rubus ursinus</i> , <i>Rubus parviflorus</i> , <i>Rubus spectabilis</i> , <i>Frangula californica</i> (= <i>Rhamnus californica</i> ), <i>Holodiscus discolor</i> , <i>Gaultheria shallon</i> , <i>Heracleum</i> <i>maximum</i> (= <i>Heracleum lanatum</i> ), and <i>Polystichum munitum</i> .....	<b>Northern California Coastal Scrub</b>
6b. Dense shrublands with and without herbaceous understory, well within the fog belt, dominated by any combination of <i>Arctostaphylos tomentosa</i> , <i>Arctostaphylos nummularia</i> , <i>Arctostaphylos tomentosa</i> ssp. <i>crustacea</i> , <i>Arctostaphylos hookeri</i> , <i>Arctostaphylos pajaroensis</i> , <i>Arctostaphylos montaraensis</i> (and others), <i>Ceanothus masonii</i> , <i>Ceanothus griseus</i> , and <i>Ceanothus verrucosus</i> . In southern Oregon, <i>Arctostaphylos</i> <i>hispidula</i> is the predominant chaparral shrub. (See also lead 11b California Montane Woodland and Chaparral)	<b>California Maritime Chaparral</b>
7a. Shrublands of West slope, but can occur on East side .....	8
7b. Shrublands restricted to the east side of the Cascade Mts.....	14
8a. Shrublands of steep, slopes, either mass wasting or avalanche chutes.....	9
8b. Shrublands in mountains or foothills, not on disturbed slopes.....	10

### Shrublands of West or East sides

9a. Shrublands of steep, frequently disturbed (snow avalanches) slopes. On the west side of the Cascades, the major dominant species are <i>Acer circinatum</i> , <i>Alnus viridis</i> ssp. <i>sinuata</i> , <i>Rubus parviflorus</i> , and small trees, especially <i>Chamaecyparis nootkatensis</i> . Forbs, grasses, or other shrubs can also be locally dominant. <i>Prunus virginiana</i> , <i>Amelanchier alnifolia</i> , <i>Vaccinium membranaceum</i> or <i>Vaccinium scoparium</i> , and <i>Fragaria</i> spp. are common species on drier avalanche tracks on the east side of the Cascades.....	<b>North Pacific Avalanche Chute Shrubland</b>
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- 9b. Deciduous shrubland that occur on steep slopes and bluffs subject to mass wasting, dominated by *Alnus rubra* and *Acer macrophyllum* are the major tree species. *Rubus spectabilis*, *Rubus parviflorus*, *Ribes bracteosum*, and *Oplopanax horridus* are some of the major shrub species. ....  
 ..... **North Pacific Broadleaf Landslide Forest and Shrubland**
- 10a. Shrublands of recently logged areas, tree stumps evident, shrub species present were once the understory shrub canopy, now exposed, i.e. shrubs were present prior to logging, not early seral, recent growth shrubs. These recently exposed shrublands are considered part of the forested ecological system. Key based on conifer species that once comprised the tree canopy. Typical shrub species of the matrix forested systems of the west slope include *Gaultheria shallon*, *Holodiscus discolor*, *Linnaea borealis*, *Mahonia nervosa*, *Menziesia ferruginea*, *Paxistima myrsinites*, *Polystichum munitum*, *Pteridium aquilinum*, *Rhododendron macrophyllum*, *Vaccinium membranaceum*, *V. ovatum*, *V. ovalifolium*, *V. parvifolium*, *Mahonia nervosa*, *Blechnum spicant*, and *Oxalis oregana* ..... **Group C**  
 Or map as ..... **Recently Logged Timberland**
- 10b. Shrublands not exposed from recently logging, but are more permanent shrublands of chronic disturbance or rock-outcrop or other habitats, or otherwise not as above.....**11**
- 11a. Long-lived, post-fire shrublands on ridge tops and upper to middle mountain slopes, more common on sunny southern aspects. Species composition is highly variable, and some of most common species include *Acer circinatum*, *Vaccinium membranaceum*, *Ceanothus velutinus*, *Holodiscus discolor*, *Xerophyllum tenax* and *Rubus parviflorus*.....**North Pacific Montane Shrubland**
- 11b. Shrublands of Northern California, Southern Oregon chaparral, sometimes with scattered trees, or otherwise not as above.....**12**
- 12a. 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**
- 12b. Not as above, chaparral not on serpentine soils .....**13**
- 13a. Chaparral located inland from maritime chaparral up to 1500 m (4550 feet), not within the fog belt. Characteristic species in Oregon include *Arctostaphylos viscida*, *Cercocarpus montanus* var. *glaber*, and *Ceanothus cordulatus*. In California, 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**
- 13b. Inland chaparral that can have scattered trees, 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**

**Shrublands East of Cascade Crest**

- 14a. Shrublands of lower montane and foothill elevations dominated by *Physocarpus malvaceus*, *Spiraea douglasii*, *Amelanchier alnifolia*, *Prunus emarginata*, *Prunus virginiana*, *Holodiscus discolor*; in more mesic areas, *Symphoricarpos albus*, *Menziesia ferruginea*, *Crataegus douglasii*, or *Rosa* spp. can be predominant; typically occurring around the fringes of the Columbia Basin and in northern Rockies .....  
 ..... **Northern Rocky Mountain Montane-Foothill Deciduous Shrubland**
- 14b. Shrubland not as above .....**15**
- 15a. Shrubland or shrub-steppe dominated or codominated by *Artemisia* spp. ....**16**
- 15b. Tall shrublands (>0.5 m) dominated by other species.....**23**
- 16a. Open dwarf-shrub canopy dominated by *Artemisia rigida* or *Eriogonum* spp.....  
 ..... **Columbia Plateau Scabland Shrubland**

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17a. <i>Artemisia tridentata</i> ssp. <i>vaseyana</i> is the dominant sagebrush, other species may be present, stands in the mountains, generally above 2000 m (6560 ft) .....	18
17c. Stands dominated or codominated by other <i>Artemisia</i> species.....	19
18a. Montane or subalpine (>2000 m elevations) shrubland or shrub-steppe (herbaceous cover >25%) dominated or codominated by <i>Artemisia tridentata</i> ssp. <i>vaseyana</i> , <i>A. tridentata</i> ssp. <i>spiciformis</i> , non-riparian <i>A. cana</i> ssp. <i>viscidula</i> and/or <i>A. arbuscula</i> ssp. <i>arbuscula</i> . <i>Symphoricarpos</i> spp. may codominate some stands. These are mixed-montane shrublands, with many shrubs commonly present in varying abundance.....	<b>Inter-Mountain Basins Montane Sagebrush Steppe</b>
18b. <i>Artemisia tridentata</i> ssp. <i>vaseyana</i> typically dominates shrub layer with 10% or more absolute cover and with typically less than 20% total perennial herbaceous cover. .... ..... <i>Artemisia tridentata</i> ssp. <i>vaseyana</i> <b>Shrubland Alliance****</b>	
19a. Stands dominated by <i>Artemisia arbuscula</i> , <i>Artemisia nova</i> , <i>Purshia tridentata</i> , <i>Artemisia arbuscula</i> ssp. <i>longiloba</i> , <i>Artemisia tridentata</i> ssp. <i>wyomingensis</i> , singly or mixed .....	20
19a. Shrublands dominated by other species.....	21
20a. Stands dominated by <i>Artemisia arbuscula</i> , <i>Artemisia nova</i> alone or together and often with some <i>Purshia tridentata</i> (less than 5% relative cover). <i>Artemisia arbuscula</i> ssp. <i>longiloba</i> may be present as well. Stands typically occur on mountain ridges and flanks and broad terraces, ranging from 1000 to 3000 m in elevation.....	<b>Columbia Plateau Low Sagebrush Steppe</b>
20b. Stands 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 <i>Artemisia nova</i> (mid and low elevations), <i>Artemisia arbuscula</i> (higher elevation) and may be codominated by <i>Artemisia tridentata</i> ssp. <i>wyomingensis</i> or <i>Chrysothamnus viscidiflorus</i> .....	<b>Great Basin Xeric Mixed Sagebrush Shrubland</b>
21a. Stands dominated by <i>Artemisia tridentata</i> ssp. <i>tridentata</i> , shrubland or steppe.....	22
21b. Stands dominated by other species.....	23
22a. <i>Artemisia tridentata</i> ssp. <i>tridentata</i> and/or <i>Artemisia tridentata</i> ssp. <i>wyomingensis</i> 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 .....	<b>Inter-Mountain Basins Big Sagebrush Shrubland</b>
22b. <i>Artemisia tridentata</i> ssp. <i>tridentata</i> , <i>Artemisia tridentata</i> ssp. <i>xericensis</i> , <i>Artemisia tridentata</i> ssp. <i>wyomingensis</i> , <i>Artemisia tripartita</i> ssp. <i>tripartita</i> , and/or <i>Purshia tridentata</i> 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 .....	<b>Inter-Mountain Basins Big Sagebrush Steppe</b>
23a. Low shrubland or shrub-steppe dominated or codominated <i>Krascheninnikovia lanata</i> , <i>Chrysothamnus viscidiflorus</i> , <i>Chrysothamnus Greenei</i> , <i>Gutierrezia sarothrae</i> , <i>Ephedra</i> spp., <i>Ericameria nauseosa</i> and/or <i>Ericameria parryi</i> . 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 .....	<b>Inter-Mountain Basins Semi-Desert Shrub-Steppe</b>
23b. Low shrubland or shrub-steppe dominated or codominated by <i>Atriplex</i> spp. ....	24
24a. Low shrubland or shrub-steppe dominated or codominated by low <i>Atriplex confertifolia</i> or <i>Atriplex canescens</i> . Open-canopied shrublands of typically saline basins, alluvial slopes and plains composed of one or more <i>Atriplex</i> species such as <i>Atriplex confertifolia</i> , <i>Atriplex canescens</i> , <i>Atriplex polycarpa</i> , or <i>Atriplex spinifera</i> .....	<b>Inter-Mountain Basins Mixed Salt Desert Scrub</b>
24b. Other shrub taxa dominate the shrub layer.....	25

- 25a. 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**
- 25b. Shrublands not as above..... **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. Land cover is restricted to drainages, semi-riparian flats, springs or seeps..... **2**
- 1b. Land cover is mesic to dry upland herbaceous vegetation ..... **10**

### Wetland Herbaceous

- 2a. Middle and lower elevation herbaceous wetlands (lower montane to valley floor) ..... **3**
- 2b. Middle to upper elevation herbaceous wetlands (montane 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\*\*\***  
 Small scale wetlands occurring entirely within and surrounded by sand dunes.....  
 ..... **Inter-Mountain Basins Interdunal Swale Wetland\*\*\***  
 Small depressions gouged into basalt, typically at the bottom of a basalt cliff, circular or linear depression..... **Northern Columbia Plateau Basalt Pothole Ponds \*\*\***
- 3b. Wetland dominated by herbaceous vegetation not like the above..... **4**
- 4a. Freshwater sparsely vegetated mud to extensive sods of herbaceous vegetation, occur primarily in seasonally flooded shallow lakebeds on floodplains, especially along the lower Columbia River. Species include *Eleocharis obtusa*, *Lilaeopsis occidentalis*, *Crassula aquatica*, *Limosella aquatica*, *Gnaphalium palustre*, *Eragrostis hypnoides*, and *Ludwigia palustris*. ..... **Temperate Pacific Freshwater Mudflat\*\*\***
- 4b. Wetlands not like above ..... **5**
- 5a. Coastal and Shoreline Wetlands ..... **Pacific Coastal Marsh Systems**  
 Washington and most of Oregon Coast..... (North Pacific Maritime Eelgrass Bed\*\*\*)  
 Washington and most of Oregon Coast..... (North Pacific Intertidal Freshwater Wetland\*\*\*)  
 Washington and most of Oregon Coast..... (Temperate Pacific Tidal Salt and Brackish Marsh\*\*\*)  
 Washington and most of Oregon Coast..... (Temperate Pacific Intertidal Mudflat\*\*\*)  
 Southern Oregon Coast ..... (Mediterranean California Coastal Interdunal Wetland\*\*\*)  
 Southern Oregon Coast ..... (Mediterranean California Eelgrass Bed\*\*\*)
- 5b. Non-coastal wetlands ..... **6**
- 6a. Vernal pool wetlands (may be completely dry part of the year or for several years).....  
 ..... **Columbia Plateau Vernal Pool\*\*\***  
 ..... **Modoc Basalt Flow Vernal Pool\*\*\***  
 ..... **North Pacific Hardpan Vernal Pool\*\*\***  
 ..... **Northern California Claypan Vernal Pool\*\*\***  
 ..... **Northern California Volcanic Vernal Pool\*\*\***
- 6b. Non-vernal pool wetland, other types of herbaceous wetlands ..... **7**

7a. Wet meadows largely restricted to the Willamette Valley of Oregon and adjacent Washington, dominated by <i>Deschampsia caespitosa</i> , <i>Camassia quamash</i> , <i>Carex densa</i> , and <i>Carex unilateralis</i> , and to a lesser degree by forbs (e.g., <i>Isoetes nuttallii</i> ) or shrubs (e.g., <i>Rosa nutkana</i> ) .....	<b>Willamette Valley Wet Prairie</b>	
7b. Wet meadows or fens, not as above .....		<b>8</b>
8a. Herbaceous riparian and wetland at middle and high montane settings, dominated by <i>Carex aquatilis</i> , <i>Carex athrostachya</i> , <i>Carex limosa</i> , <i>Carex microptera</i> , <i>Carex nebrascensis</i> , <i>Carex pellita</i> , <i>Carex 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> .....	<b>Temperate Pacific Subalpine-Montane Wet Meadow***</b>	
8b. Not as above.....		<b>9</b>
9a. Serpentine wetlands defined by groundwater inflows, mineral-rich alkaline soil and water, and peat accumulation of at least 40 cm. ....	<b>Mediterranean California Serpentine Fen***</b>	
9b. Non-serpentine montane to alpine to wet meadows without a 40 cm deep organic layer .....	<b>Mediterranean California Subalpine-Montane Fen***</b>	
<b>Upland Herbaceous</b>		
10a. Upland herbaceous cover dominated by annual graminoids or annual and biennial forbs.....		<b>11</b>
10b. Upland herbaceous cover dominated by perennial species .....		<b>12</b>
11a. Herbaceous cover dominated by introduced annual species of grass (typically <i>Bromus tectorum</i> , <i>Bromus briziformis</i> , <i>Bromus japonicus</i> , <i>Bromus rubens</i> , <i>Bromus rigidus</i> , <i>Taeniatherum caput-medusae</i> , <i>Vulpia myuros</i> .....	<b>Invasive Annual Grassland</b>	
11b. Herbaceous cover dominated by introduced annual and biennial forbs (including <i>Centaurea solstitialis</i> , <i>Ceratocephala testiculata</i> , <i>Chondrilla juncea</i> , <i>Descurainia pinnata</i> , <i>Halogeton glomeratus</i> , <i>Lepidium perfoliatum</i> , <i>Salsola kali</i> , <i>Salsola tragus</i> , <i>Sisymbrium altissimum</i> , etc.) .....	<b>Invasive Annual and Biennial Forbland</b>	
12a. Herbaceous cover dominated by introduced perennial grasses and forbs (including <i>Agropyron cristatum</i> , <i>Agrostis capillaris</i> , <i>Aira caryophyllea</i> , <i>Arrhenatherum elatius</i> , <i>Bromus hordeaceus ssp. hordeaceus</i> , <i>Bromus inermis</i> , <i>Centaurea</i> , <i>Centaurea biebersteinii</i> , <i>Cirsium arvense</i> , <i>Cynodon dactylon</i> , <i>Dactylis glomerata</i> , <i>Elymus repens</i> , <i>Euphorbia esula</i> , <i>Lepidium latifolium</i> , <i>Leucanthemum vulgare</i> , <i>Linaria vulgaris</i> , <i>Phleum pratense</i> , <i>Poa pratensis</i> , <i>Taraxacum officinale</i> , <i>Thinopyrum intermedium</i> , <i>Verbascum thapsus</i> , and other introduced forage species) .....	<b>Invasive Perennial Grassland and Forbland</b>	
12b. Herbaceous cover dominated by native species .....		<b>13</b>
13a Alpine and upper subalpine herbaceous vegetation.....		<b>14</b>
13b Lower subalpine, montane, foothill and basin vegetation .....		<b>16</b>
14a. Alpine herbaceous and/or fell-field vegetation .....		<b>15</b>
14b. Subalpine herbaceous vegetation .....		<b>20</b>
15a. 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) .....		<b>16</b>
15b. Alpine meadows, plant cover more abundant than above, rocks, if present, are only a minor portion of the landscape .....		<b>18</b>
16a. Alpine Fell fields of the Cascades and Olympic Mountains, from Southern Oregon and Northern California north through Washington Cascades .....		<b>17</b>
16b. Alpine fell fields of northern Washington, east of the Cascadian crest. Small areas may be dominated by <i>Arenaria capillaris</i> , <i>Geum rossii</i> , <i>Kobresia myosuroides</i> , <i>Minuartia obtusiloba</i> , <i>Myosotis asiatica</i> , <i>Paronychia pulvinata</i> , <i>Phlox pulvinata</i> , <i>Sibbaldia procumbens</i> , <i>Silene acaulis</i> , <i>Trifolium dasyphyllum</i> , and <i>Trifolium parryi</i> . .....	<b>Rocky Mountain Alpine Fell-Field</b>	



17a. Alpine fell fields of the Pacific Northwest, 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</i> var. <i>pseudoscirpoidea</i> , <i>C. spectabilis</i> , <i>Empetrum nigrum</i> , <i>Erigeron aureus</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</i> ssp. <i>longistylis</i> , <i>Salix cascadiensis</i> , or <i>Saxifraga tolmiei</i> .....	
	<b>North Pacific Dry and Mesic Alpine Dwarf-Shrubland, Fell-field and Meadow</b>
17b. Alpine fell fields of southern Cascades, 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> .....	<b>Mediterranean California Alpine Fell-Field</b>
18a. Alpine herbaceous vegetation limited to east of Cascade Crest in Washington. Dominant species include <i>Artemisia arctica</i> , <i>Carex</i> spp., <i>Deschampsia caespitosa</i> , <i>Festuca brachyphylla</i> , <i>Geum rossii</i> , <i>Kobresia myosuroides</i> , and <i>Trifolium dasyphyllum</i> . Cover of cushion plants is generally low.....	<b>Rocky Mountain Dry Tundra</b>
18b. Alpine herbaceous vegetation not like above.....	<b>19</b>
19a. Alpine dry grasslands. 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).....	<b>North Pacific Alpine and Subalpine Dry Grassland</b>
19b. 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>Erigeron 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>Erigeron compositus</i> , <i>Eriogonum ovalifolium</i> , <i>Eriogonum gracilipes</i> .....	<b>Mediterranean California Alpine Dry Tundra</b>
20a. Subalpine herbaceous vegetation .....	<b>21</b>
20b. Montane, Coastal and valley floor herbaceous vegetation.....	<b>22</b>
21a. Subalpine dry grasslands are small openings to large open ridges above or drier than high-elevation conifer trees. 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).....	<b>North Pacific Alpine and Subalpine Dry Grassland</b>
21b. 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> . .....	<b>Mediterranean California Subalpine Meadow</b>
22a. Montane grasslands that are often surrounded by forests, often called “balds” .....	<b>23</b>
22b. Valley floor grasslands, surrounded by vegetation lower than lower tree line.....	<b>28</b>
23a. Large patch grasslands generally surrounded by montane forests in Oregon, 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 ....	<b>North Pacific Montane Grassland</b>
23b. Not as above.....	<b>24</b>
24a. Herbaceous (often shrubby) Balds within the hypermaritime salt and fog spray zone. ....	<b>25</b>
24b. Herbaceous vegetation of the interior, out side the coastal influence .....	<b>27</b>
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> .....	<b>Mediterranean California Coastal Bluff</b>
25b. Coastal vegetation not as above .....	<b>26</b>

- 26a. Grasslands of coastal Washington and Oregon, occurring on steep slopes on coastal bluffs, headlands, or small islands, sometimes on relatively level tops of headlands or islands. Dominant species include *Vaccinium ovatum*, *Gaultheria shallon*, *Rubus spectabilis*, *Calamagrostis nutkaensis*, and *Festuca rubra* .....  
 ..... **North Pacific Hypermaritime Shrub and Herbaceous Headland**
- 26b. Grasslands on coastal terraces and ridgeline balds in the Coast Ranges and Klamath Mountains of southern Oregon and Northern California. Dominant species include *Agrostis* spp., *Bromus carinatus*, *Calamagrostis nutkaensis*, *Danthonia californica*, *Festuca rubra*, *Festuca idahoensis*, *Deschampsia caespitosa*, *Koeleria macrantha*, *Trisetum canescens*, and perennial forbs such as *Iris douglasiana*, *Sisyrinchium bellum*, *Grindelia hirsutula*, and *Sanicula arctopoides*..... **California Northern Coastal Grassland**
- 27a. Herbaceous (often shrubby) Balds in the interior, away from the coastal influences, not on serpentine soils. Dominant species include *Festuca roemerii*, *Danthonia californica*, *Achnatherum lemmonii*, and *Koeleria macrantha*. Forb diversity can be high. Typical forbs include *Camassia quamash*, *Camassia leichtlinii*, *Triteleia hyacinthina*, *Mimulus guttatus* (seeps), *Plectritis congesta*, *Lomatium martindalei*, *Allium cernuum*, and *Phlox diffusa* ..... **North Pacific Herbaceous Bald and Bluff**
- 27b. Herbaceous vegetation on serpentine soils, Characteristic species include *Calamagrostis ophitidis*, *Eschscholzia californica*, *Vulpia microstachys* var. *ciliata* (= *Festuca grayi*), *Poa secunda* (= *Poa scabrella*), *Hemizonia congesta* ssp. *luzulifolia* (= *Hemizonia luzulifolia*), *Nassella cernua*, and *Nassella pulchra*. ..... **California Mesic Serpentine Grassland**
- 28a. Grasslands endemic to the Puget Trough and Willamette Valley, dominated by perennial bunch grasses, especially *Festuca roemerii* and, to a lesser degree, *Danthonia californica*, with abundant and diverse forbs. Scattered deciduous (*Quercus garryana*) and/or coniferous (*Pseudotsuga menziesii*, *Pinus ponderosa*) trees are rarely found now, but such savannas historically covered about one-third of the total acreage .....  
 ..... **Willamette Valley Upland Prairie and Savanna**
- 28b. Grasslands not as above ..... **System not described or otherwise not included in this Key**