Remote Sensing Lab, Ecosystem Planning

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Projects & Plans

Vegetation Classification

Vegetation Descriptions
North Sierran Ecological Province - CALVEG Zone 3

North Sierran Vegetation Field Key

Conifer Forest / Woodland
Hardwood Forest / Woodland
Shrubs And Chaparral
Herbaceous
Non-Native Vegetation
Land Use And Non-Vegetated Classes
No Vegetation Data

Descriptions updated February 3, 2005

Note: All Subsections mentioned are within the Sierra Nevada Section in this Province.

CONIFER FOREST / WOODLAND

BT
BIG TREE ALLIANCE

Big Tree or Giant Sequoia (Sequoiadendron giganteum) as a dominant conifer has been mapped in one small relict grove in the Upper Foothills Metamorphic Belt Subsection at about 4000 ft (1220 m). In this area, its closest tree associates are Ponderosa Pine (Pinus ponderosa) and Black Oak (Quercus kelloggii). It is adjacent to the Mixed Conifer - Pine Alliance.

DF
PACIFIC DOUGLAS-FIR ALLIANCE

Pacific Douglas-Fir (Pseudotsuga menziesii) maintains dense stands on north-facing, shaded or moist sites at the same general elevation range of the Douglas fir - Pine Alliance, approximately 660 - 4600 ft (200 - 1400 m). This Alliance is grouped within the Douglas-Fir - Pine Alliance in other Subsections in the North Sierran Ecological Province. It has been identified as growing sparsely in the Upper Foothills Metamorphic Belt and Batholith/Volcanic Flows Subsection, mainly in association with the hardwoods Canyon Live Oak (Quercus chrysolepis), Black Oak (Quercus kelloggii), Tanoak (Lithocarpus densiflorus), and more rarely with Tree (Golden) Chinquapin (Chrysolepis chrysophylla).

DP
DOUGLAS-FIR - PINE ALLIANCE

Pacific Douglas-Fir (Pseudotsuga menziesii) and Ponderosa Pine (Pinus ponderosa) are often found growing together below 5900 ft (1800 m) elevation in the Greenville - Graeagle, Upper Foothills Metamorphic Belt, and the Granitic and Metamorphic Foothills Subsections. At elevations as low as 900 ft (275 m), this Alliance is isolated to moist, shady north aspects, and to riparian positions where Ponderosa Pine may even be absent. In these riparian areas, this Alliance may be associated with the Maple and White Alder Alliances. On south, east, and west facing aspects at low elevations, the Ponderosa Pine, Gray Pine, Black Oak, Tanoak (Madrone), Canyon Live Oak, and Interior Live Oak Alliances may replace it. As the elevation increases, this Alliance becomes more common on these aspects. On higher-elevation north aspects, a transition from this Alliance to the Mixed Conifer Pine Alliance is evidenced by traces of Sugar Pine (Pinus lambertiana) and

White Fir (Abies concolor). The shrub Alliance most commonly associated with the Douglas-Fir - Pine Alliance is the Lower Montane Mixed Chaparral Alliance containing Wedgeleaf Ceanothus (Ceanothus cuneatus), Whiteleaf Manzanita (Arctostaphylos viscida), and Poison Oak (Toxicodendron diversilobum).

EP
EASTSIDE PINE ALLIANCE

On the eastside of the northern Sierra Nevada, Jeffrey Pine (Pinus jeffreyi) and Ponderosa Pine (Pinus ponderosa) may occur together or separately in this Alliance above about 4050 ft (1235 m). The Eastside Pine Alliance is characterized by the presence of Great Basin shrubs, forbs, and grasses such as Basin Sagebrush (Artemisia tridentata), Bitterbrush (Purshia tridentata), Rabbitbrush (Chrysothamnus spp.), Curlleaf Mountain Mahogany (Cercocarpus ledifolius), Bloomer Goldenbush (Haplopappus bloomeri), Mule Ears (Wyethia mollis), Arrowleaf Balsamroot (Balsamorhiza sagittata, Idaho fescue (Festuca idahoensis), and Squirreltail (Sitanion spp.). Drier or colder site conditions east of the Sierra crest in the habitats of the Eastside Pine Alliance occur as a result of several factors. For example, rainshadow deficits in moisture and colder temperatures from the lack of a maritime layer influence result from the location of higher peaks in the west. Low soil available moisture in the eastside condition occurs from harsher substrates such as the more extensive vulcanism on the eastside (lava flows and pyroclastic deposits). In addition, the abundance of coarse-textured glacial deposits in that region contributes to excessively drained soils. White Fir (Abies concolor) grows more abundantly on north aspects and in drainages, replacing this Alliance with the Mixed Conifer - Fir Alliance. After fire or other major disturbances, Lodgepole Pine (Pinus contorta var. murryana) may become locally abundant. Washoe Pine (Pinus washoensis) can occasionally be found above about 6400 ft (1952 m) elevation, such as in the Bald Mountain Range (Tahoe - Truckee Subsection). Western Juniper (Juniperus occidentalis) may also be found in trace amounts in this Alliance. This Alliance is also associated with hardwoods such as those found in the Mixed Riparian Hardwoods, Willow, Quaking Aspen, Willow - Aspen and Black Oak Alliances.

JP
JEFFREY PINE ALLIANCE

Jeffrey Pine (Pinus jeffreyi) in westside northern Sierra Nevada sites may replace Ponderosa Pine (Pinus ponderosa) on specific substrates, such as peridotite areas of the Upper Foothills Metamorphic Belt, Bucks Lake, Greenville - Graeagle, and Granitic and Metamorphic Foothills Subsections, particulary around the Red Hill area. Jeffrey Pine may also dominate localized sites with granitic outcrops or on glaciated soils such as tills and outwash deposits that create more xeric micro-environments. Shrub species such as Wedgeleaf Ceanothus (Ceanothus cuneatus), Whiteleaf Manzanita (Arctostaphylos viscida), Hoary Coffeeberry (Rhamnus tomentella ssp. tomentella), and Shrub Canyon Live Oak (Quercus chrysolepis var. nana) are commonly present under these conditions. Stands of the Jeffrey Pine Alliance typically occur at mid-montane elevations in the westside of the North Sierran Ecological Province, sometimes below 4000 ft (1220 m).

The Jeffrey Pine Alliance may also be found growing on granitic outcrops or on glaciated soils such as tills and outwash deposits that create xeric micro-environments at elevations up to about 7300 ft (2226 m) in eastside northern Sierra Nevada habitats. It is prominent in the Sierra Valley and Carson Range Subsections on this side of the range. This Alliance grows adjacent to other harsh site conifers such as Lodgepole Pine, Subalpine, Western Juniper, and Western White Pine. Shrub Alliances common in these areas are Huckleberry Oak, Montane Mixed Chaparral, and Snowbrush. The Jeffrey Pine Alliance occurs adjacent to and merges with the Eastside Pine Alliances as Great Basin species become more prominent in the understory.

KP
KNOBCONE PINE ALLIANCE

Knobcone Pine (Pinus attenuata) occurs in small dense stands scattered throughout the the Douglas-Fir - Pine, Mixed Conifer - Pine, Black Oak, Canyon Live Oak, Mixed Conifer - Pine, and Canyon Live Oak Alliances, but has rarely been mapped as a dominant type within the North Sierran Ecological Province. This Alliance is often a result of past disturbances (usually fire) and is typically associated with Whiteleaf Manzanita (Arctostaphylos viscida). It usually occurs from about 928 - 4300 ft (283 - 1311 m) on south or west facing slopes and is tolerant of ultrabasic parent materials.

LP
LODGEPOLE PINE ALLIANCE

The Lodgepole Pine Alliance occurs intermingled with the Red Fir and Mixed Conifer - Fir Alliance at elevations from around 4450 - 9000 ft (1356 - 2745 m) or on cryic soils above 9000 feet. Lodgepole Pine (Pinus contorta var. murryana) is found either in dense, pure stands in swales with abundant year-round moisture or as scattered individual trees on very dry soils. The Lodgepole Pine Alliance has been identified sparsely in both the Upper and Glaciated Batholith and Volcanic Flows Subsections but occurs in other subsections. This conifer is an aggressive pioneer series on such sites, but as microsite conditions improve, it may be replaced by Red Fir (Abies magnifica), White Fir (Abies concolor), or Jeffrey Pine (Pinus jeffreyi). On the periphery of meadows, as the water table level drops, Lodgepole Pine may be invasive and replace the sedge and forb species. The occurence of persistent Lodgepole Pine stands generally indicates environmental conditions unfavorable to the establishment and growth requirements of Red Fir or Jeffrey Pine, but they may replace it in time.

MB
MIXED CONIFER WITH GIANT SEQUOIA ALLIANCE

This Alliance is limited to one relic stand on the Tahoe National Forest in which Giant Sequoia (Sequoiadendron giganteum) occurs towards the eastern edge of the Upper Foothills Metamorphic Belt Subsection. The Mixed Conifer Pine overstory is dominated by Sugar Pine (Pinus lambertiana), Incense Cedar (Calocedrus decurrens), Pacific Douglas-Fir (Pseudotsuga menziesii), Ponderosa Pine (Pinus ponderosa), and occasionally White Fir (Abies concolor). Other understory species include Dogwood (Cornus spp.) and Western Azalea (Rhododendron occidentale). This Giant Sequoia grove occurs within an elevation band of 5100 - 5300 ft (1555 - 1616 m). As Giant Sequoia is not a drought tolerant species, the maintenance of this and other more southerly groves is dependent on mesic soils with sufficient soil moisture during the dry summer period. In addition, stability of these groves is maintained by frequent fires which reduce competition by conifers, reduce forest floor litter buildup and allow germination of the Sequoia seeds.

MD
INCENSE CEDAR ALLIANCE

Incense Cedar (Calocedrus decurrens) is often identified as one of the conifers in the Mixed Conifer - Pine Alliance mixture. It has been mapped very infrequently as a dominant type within its own Alliance on drier, more open slopes. In this region, it is found in small areas of the Upper Foothills Metamorphic Belt Subsection at elevations from about 2100 - 2296 ft (640 - 700 m).

MF
MIXED CONIFER - FIR ALLIANCE

The Mixed Conifer - Fir Alliance is the high elevation counterpart of the Mixed Conifer - Pine Alliance. It occurs within an elevation range of about 3700 - 8800 ft (1128 - 2684 m) in this Province, typically on frigid soils. The Alliance is found most abundantly in the Fredonyer Butte-Grizzly Peak and Sierra Valley Subsections but is prominent in most Subsections. Three major species define this mixed conifer type: White Fir (Abies concolor), Jeffrey Pine (Pinus jeffreyi), and/or Lodgepole Pine (Pinus contorta var. murrayana). At lower elevations the Mixed Conifer Pine Alliance associates such as Pacific Douglas-Fir (Pseudotsuga menziesii) and Ponderosa Pine (Pinus ponderosa) may occur in trace amounts. As elevations begin to increase, Red Fir (Abies magnifica) becomes more prominent. Other associates at all elevations are Sugar Pine (Pinus lambertiana) and Incense Cedar (Calocedrus decurrens). The Upper Montane Mixed Chaparral and occasionally the Huckleberry Oak Alliances are often found adjacent to this Alliance. Although usually described as lacking most of the lower elevation productive hardwood species, the upper limits of the Black Oak and Maple Alliances can occasionally be found in close proximity to this Alliance. Other Alliances found nearby include Quaking Aspen, Willow, Mountain Alder, and Black Cottonwood.

MH
MOUNTAIN HEMLOCK ALLIANCE

Mountain Hemlock (Tsuga mertensiana), the dominant of this Alliance, is representative of subalpine areas within the Sierra Nevada. It has been mapped only within the Upper Batholith and Volcanic Flows Subsection and is generally found on north or east facing slopes where snow accumulation holds well into the summer months. It occurs as a dominant species in cold swales from 7000 ft - 9000 ft (2130 - 2740 m), and in almost pure open stands on ridgetops above 8500 feet (2590 m) with Western White Pine (Pinus monticola). In moist areas Willows (Salix spp.) and Mountain Alder (Alnus tenuifolia) are associated understory species.

MN
MCNAB CYPRESS ALLIANCE

The McNab Cypress Alliance occurs intermingled with the Ponderosa Pine and Gray Pine Alliances, at elevations from about 2250 - 2260 ft (688 - 689 m) on peridotite parent material. These sites are on the westside of the Sierra Nevada Section in the Granitic and Metamorphic Foothills Subsection. McNab Cypress (Cupressus macnabiana) has a shrub-like form, and is found as scattered clumps of trees, often on very dry harsh soils, generally indicating environmental conditions unfavorable to the establishment and growth requirements of other conifer and hardwood species. This Alliance is often associated with species of Ceanothus, Hoary Coffeeberry (Rhamnus tomentella ssp. tomentella), and other shrub species more typical of the Lower Montane Mixed Chaparral Alliance.

MP
MIXED CONIFER - PINE ALLIANCE

This Alliance occupies the western slopes of the North Sierran Ecological Province at elevations between about 1900 - 7800 ft (580 - 2380 m) on mesic soils, where it is found abundantly. It is defined by the presence of several conifer species, including Ponderosa Pine (Pinus ponderosa), Incense Cedar Calocedrus decurrens), Douglas-Fir (Pseudotsuga menziesii), White Fir (Abies concolor), and Sugar Pine (Pinus lambertiana) and the absence or only trace amounts of Jeffrey Pine (Pinus jeffreyi). Any one of these species may become locally dominant over small areas but dominance is shared by more than two species in this type. Knobcone Pine (Pinus attenuata) may occur as a pioneer species on shallow, south facing slopes or lava flow areas as an additional associate in this Alliance.

The pines normally are prominent on south and west facing slopes, Pacific Douglas-Fir and White Fir on north and east slopes, and Incense Cedar as a secondary component of all slopes. At lower elevations this Alliance may be found on north aspects and others such as the Gray Pine, Ponderosa Pine, Douglas-Fir - Pine, Black Oak, Tanoak (Madrone), and Canyon Live Oak Alliances on south, east and west facing aspects. At higher elevations this Alliance may typically occur on south, east and west aspects and the White Fir or Mixed Conifer - Fir Alliances on north aspects. Riparian habitats may be occupied by this Alliance in association with such Alliances as White Alder, Maple, and Willow. At lower elevations, Gray Pine (Pinus sabiniana) and Black Oak (Quercus kelloggii) may become common associates. Understory shrubs within this Alliance include Deerbrush (Ceanothus integerrimus), and Whiteleaf Manzanita (Arctostaphylos viscida) on lower sites, and Greenleaf Manzanita (Arctostaphylos patula) at higher elevations.

PD
GRAY PINE ALLIANCE

This Alliance, dominated by Gray Pine (Pinus sabiniana), grows primarily in the foothills of the Sierra Nevada, on steep, dry rocky canyons with south aspects, below about 4200 ft (1280 m). In the northern Sierras, it is found mainly in the Upper Foothill Metamorphic Belt and the Granitic and Metamorphic Foothills Subsections. These sites are typically diverse in structure, with a mixture of hardwoods such as Canyon Live Oak (Quercus chrysolepis), Interior Live Oak (Quercus wislizenii) and Blue Oak (Quercus douglasii) and low-elevation chaparral shrubs such as Wedgeleaf Ceanothus (Ceanothus cuneatus) and Whiteleaf and Common Manzanitas (Arctostaphylos viscida, Arctostaphylos manzanita). Patches of annual grasses are often found adjacent to Grey Pine stands.

PJ
SINGLELEAF PINYON ALLIANCE

Singleleaf Pinyon (Pinus monophylla) is uncommon in this area, but has been mapped occasionally as a dominant conifer in portions of the Glaciated Batholith and Volcanic Flows and Carson Range Subsections. It may associate with Curlleaf Mountain Mahogany (Cercocapus ledifolius) in this area, where it has been mapped in the elevation range 5200 - 7000 ft (1586 - 2135 m).

PP
PONDEROSA PINE ALLIANCE

This Alliance is defined by pure stands of Ponderosa Pine (Pinus ponderosa). It is very commonly found in the North Sierran Ecological Province between about 900 - 5800 ft (275 - 1770 m) on mesic westside slopes in the northern Sierra Nevada. It occurs most commonly in the Granitic and Metamorphic Foothills and Upper Foothill Metamorphic Belt Subsections. Pure stands of Ponderosa Pine often exist where the conifer is planted for revegetation of areas consumed by fire and in logged areas.

At lower elevations, this Alliance mixes with or is found adjacent to other common Foothill conifers such as those in the Douglas-Fir - Pine, Gray Pine and Knobcone Pine Alliances. On south, east and west aspects, it is associated with the Blue Oak and Interior Live Oak Alliances, on open flats and riparian areas with the Valley Oak Alliance and on north aspects with the Canyon Live Oak and Black Oak Alliances. As elevation increases, the Ponderosa Pine Alliance is associated most commonly with the Canyon Live Oak, Tanoak (Madrone) and Black Oak Alliances on south, east and west aspects, and with the Pacific Douglas-Fir - Ponderosa Pine and Mixed Conifer - Pine Alliances on north aspects. Shrubs of lower montane areas such as Whiteleaf Manzanita (Arctostaphylos viscida), Wedgeleaf Ceanothus (Ceanothus cuneatus), and Poison Oak (Toxicodendron diversilobum may also be commonly found within the Ponderosa Pine Alliance.

RF
RED FIR ALLIANCE

The Red Fir Alliance generally occurs in dense, pure stands or as an inclusion in the Mixed Conifer - Fir Alliance. It is found on both east and west slopes in the Sierra Nevada from about 7000 - 9000 ft (2135 - 2745 m) on frigid soils. The Alliance is especially prominent within the Diamond Mountains - Crystal Peak, Frenchman, Bucks Lake, Tahoe - Truckee, Tahoe Valley, Fredonyer Butte - Grizzly Peak, and Upper Batholith and Volcanic Flows Subsections. Understory plants do not occur in dense Red Fir (Abies magnifica) stands with heavy litter accumulation except for Pipsissewa (Chimaphila menziesii) and White-veined Wintergreen (Pyrola picta). In more open stands or where Red Fir intergrades with the Mixed Conifer - Fir Alliance, Snowbrush (Ceanothus velutinus), Mountain Whitethorn (Ceanothus cordulatus), Pinemat Manzanita (Arctostaphylos nevadensis), and Greenleaf Manzanita (Arctostaphylos patula) are the dominant understory shrubs. Western White Pine (Pinus monticola) and Lodgepole Pine (Pinus contorta var. murrayana) are associated conifer species. Mountain Hemlock (Tsuga mertensiana) may occur as isolated trees in colder areas of the Red Fir Alliance.

SA
SUBALPINE CONIFERS ALLIANCE

The Subalpine Conifers Alliance is defined as a mixture of high elevation conifer species where no one conifer species is dominant. This Alliance occurs above about 6550 ft (1998 m) on steep north and east aspects as scattered occurrences within the Upper and Glaciated Batholiths and Volcanic Flows and the Tahoe-Truckee Subsections. It contains mixtures of conifer species including Mountain Hemlock (Tsuga mertensiana), Western White Pine (Pinus monticola), Whitebark Pine (Pinus albicaulis), Lodgepole Pine (Pinus contorta var.

murrayana), and trace amounts of Red Fir (Abies magnifica), where no single conifer species dominates the site. The shrub understory and ground cover are better developed where this type adjoins moist areas, such as along riparian zones and montane meadows.

WB
WHITEBARK PINE ALLIANCE

Whitebark Pine (Pinus albicaulis), a treeline conifer, may occur in pure stands or with Red Fir (Abies magnifica), Western White Pine (Pinus monticola), and Lodgepole Pine (Pinus contorta var. murrayana) on ridgetops on high elevation cryic soils. This Alliance grades into the Subalpine Conifers Alliance and often assumes krummholtz forms on very exposed sites. It has been mapped very sparsely in the Glaciated Batholith and Volcanic Flows Subsection in the elevation range from about 9106 - 9624 ft (2776 - 2934 m).

WF
WHITE FIR ALLIANCE

Pure stands of White Fir (Abies concolor) are found primarily on the westside of the northern Sierras at an elevation range of 3975 - 8500 ft (1212 - 2592 m). This Alliance is prominent in the Greenville-Graeagle, Granitic and Metamorphic Foothills, Upper Foothill Metamorphic Belt, and the Upper Batholith and Volcanic Flows Subsections of this Section. The White Fir band represents an intermediate zone between the Mixed Conifer - Pine and Mixed Conifer - Fir Alliances on south and west aspects, and between the Mixed Conifer - Pine and Red Fir Alliances on north and east aspects. The Montane Mixed Chaparral, Huckleberry Oak and Basin Sagebrush Alliances are commonly associated shrub types and Mountain Alder, Black Oak, Willow, Quaking Aspen - Willow, and Black Cottonwood are commonly associated hardwood Alliances. White Fir occurs typically in cool, moist, shady environments on north aspects, in riparian positions and around large lakes, such as Bucks Lake.

WJ
WESTERN JUNIPER ALLIANCE

Western Juniper (Juniperus occidentalis) is very limited in distribution in Northern Sierra Nevada. It generally occurs east of the Sierran crest, below about 8190 feet (2498 m) on gentle mountain slopes in the Sierra Valley Subsection. This Alliance may also occur west of the crest on dry, rocky ridges with shallow soils, such as in the Bucks Lake Subsection. Western Juniper usually occurs adjacent to the Eastside Pine Alliance and commonly associates with Curlleaf Mountain Mahogany (Cercocarpus ledifolius), Mule Ears (Wyethia mollis), Bitterbrush (Purshia tridentata), Sagebrush (Artemisia spp.) and Rabbitbrush (Chrysothamnus spp.) at lower elevations.

WP
WASHOE PINE ALLIANCE

Wahoe Pine (Pinus washoensis) becomes dominant in a few areas of northeastern California. It has been mapped very sparsely in this region in the Tahoe - Truckee Subsection at an elevation range of 8068 - 8192 ft (2460 - 2560 m). At this altitude and east of the Sierra crest, this pine associates with Curlleaf Mountain Mahogany (Cercocarpos ledifolius), Western White Pine (Pinus monticola), conifers in the Mixed Conifer - Fir Alliance such as Jeffrey Pine (Pinus jeffreyi) and White Fir (Abies concolor), and eastside shrubs such as Bitterbrush (Purshia tridentata).

WW
WESTERN WHITE PINE ALLIANCE

Western White Pine (Pinus monticola) occurs as a dominant conifer in small groves on high elevation, dry, windblown, granitic slopes in the northern Sierras. On better sites, it associates with Red Fir (Abies magnifica), Mountain Hemlock (Tsuga mertensiana), and Lodgepole Pine (Pinus contorta var. murrayana) in the Subalpine Conifers Alliance. This Alliance has been mapped in scattered areas of the Upper Batholith and Volcanic Flows, Bucks Lake and Tahoe - Truckee Subsections in association with moderately high elevation shrubs such as Huckleberry Oak (Quercus vaccinifolia) and Snowbrush (Ceanothus velutinus), conifers such as Jeffrey and Washoe Pines (Pinus jeffreyi, Pinus wahoenesis) and eastside shrubs such as Mountain Big Sagebrush (Artemisia tridentata ssp. vaseyana).

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HARDWOOD FOREST / WOODLAND

FM
CURLLEAF MOUNTAIN MAHOGANY ALLIANCE

Although the shrub form is more common identified, the single-stemmed tree form of Curlleaf Mountain Mahogany (Cercocarpus

ledifolius var. intermontanus) has been mapped occasionally in the northern and eastern sections of the Tahoe - Truckee and Carson Range Subsections. Elevations are in the range of 5000 - 8800 ft (1525 - 2684 m). It typically associates in this area with conifers such as Jeffrey Pine (Pinus jeffreyi)and White Fir (Abies concolor) and shrubs such as those in the Upper Montane Mixed Chaparral Alliance.

NR
MIXED RIPARIAN HARDWOODS ALLIANCE

Along rivers and streams, a mixture of riparian hardwood species may occur where no clearly dominant species exists. In this particular Section, the Mixed Riparian Hardwoods Alliance was used to describe areas in the Tahoe - Truckee Subsection. This mixture includes combinations of Quaking Aspen (Populus tremuloides), Willow (Salix spp.), and Black Cottonwood (Populus balsamifera spp. trichocarpa). It is associated with the Eastside Pine Alliance.

NX
INTERIOR MIXED HARDWOODS ALLIANCE

Several species of hardwoods occur together in stands with no clearly dominant species in the North Sierran Ecological Province. The Interior Mixed Hardwoods Alliance has been identified at elevations below about 3000 ft (915 m) in scattered areas along the western edge of the Upper Foothills Metamorphic Belt and extreme southern edge of the Granitic and Metamorphic Foothills Subsections. The mixture includes any combinations of Interior Live Oak (Quercus wislizenii), Canyon Live Oak (Quercus chrysolepis), Valley Oak (Quercus lobata), or Blue Oak (Quercus douglasii), in addition to shrubs commonly found in the Lower Montane Mixed Chaparral Alliance such as Wedgeleaf Ceanothus (Ceanothus cuneatus), Poison Oak (Toxicodendron diversilobum) and Whiteleaf Manzanita (Arctostaphylos viscida). Trees in the Montane Mixed Hardwoods Alliance may be present in the mixture, but do not form the majority elements in the mixture. Overstory conifers mainly include Douglas-fir (Pseudotsuga menziesii), Ponderosa Pine (Pinus ponderosa), Knobcone Pine (Pinus attenuata), and Gray (Foothill) Pine (Pinus sabiniana).

QB
CALIFORNIA BAY ALLIANCE

The California Bay Alliance is a minor component of the hardwood cover in the northern Sierras. It is dominated by California Bay (Umbellularia californica), occurring between about 2900 - 4050 ft (884 - 1235 m) elevation and is found to a very limited extent in the Upper Foothills Metamorphic Belt Subsection. California Bay is often an understory species growing within the Douglas-Fir - Pine, Black Oak, and Canyon Live Oak Alliances.

QC
CANYON LIVE OAK ALLIANCE

Canyon Live Oak (Quercus chrysolepis) occurs in pure or mixed stands in proximity to the Douglas-Fir - Pine, Mixed Conifer - Pine, Knobcone, Gray Pine, Ponderosa Pine, and Black Oak Alliances. It is generally found on more xeric habitats or in steep canyons between about 600 - 6500 ft (183 - 1982 m) elevation in the northern Sierras. Canyon Live Oak occurs abundantly in the Granitic and Metamorphic Foothills and Upper Foothill Metamorphic Belt Subsections and to a more limited extent elsewhere. At low elevations it may occur on north aspects in contrast to the Interior Live Oak, Ponderosa Pine, and Gray Pine Alliances, which are more likely to be found on south, east, and west facing aspects. Knobcone Pine (Pinus attenuata) may associate with it occasionally. A mixture of shrubs such as Wedgeleaf Ceanothus (Ceanothus cuneatus), Deerbrush (Ceanothus integerrimus), and Whiteleaf Manzanita (Arctostaphylos viscida) often occur in the understory of this Alliance.

QD
BLUE OAK ALLIANCE

Blue Oak (Quercus douglasii) occurs at the eastern edge of its range in pure or mixed stands in the northern Sierras. It is often found adjacent to the Gray Pine, Ponderosa Pine, and Douglas-Fir - Pine Alliances on gentle slopes below about 3300 ft (1006 m). The Blue Oak Alliance has been identified to a limited extent in the Upper Foothills Metamorphic Belt, and the Granitic and Metamorphic Foothills Subsections. On steeper south aspects, Interior Live Oak (Quercus wislizenii) may become more abundant. In deeper soils, Blue Oak may be replaced with Valley Oak (Quercus lobata). Wedgeleaf Ceanothus (Ceanothus cuneatus), Whiteleaf Manzanita (Arctostaphylos viscida), and Poison Oak (Toxicodendron diversilobum) are scattered throughout this Alliance.

QE
WHITE ALDER ALLIANCE

White Alder (Alnus rhombifolia) occurs in pure or mixed stands along rivers and streams in the Granitic and Metamorphic Foothills and Upper Foothills Metamorphic Belt Subsections. It is sometimes found in proximity to the Douglas-Fir - Pine and Mixed Conifer - Pine Alliances. This Alliance is generally found below about 6200 ft (1900 m) in association with a variety of riparian or shade tolerant species

such as Pacific Yew (Taxus brevifolia), California Hazelnut (Corylus cornuta var. californica), Fremont Cottonwood (Populus fremontii), Elk Clover (Aralia californica), Columbine (Aquilegia formosa), and Monkeyflower (Mimulus cardinalis).

QF
FREMONT COTTONWOOD ALLIANCE

Fremont Cottonwood (Populus fremontii) is found to a very limited extent in the Greenville-Graeagle and Bucks Lake Subsections. It grows adjacent to surface water sources in association with other obligate riparian species such as those found in the White Alder and Willow Alliances. Fremont Cottonwood stands may also be adjacent to those of the Douglas-Fir - Pine, Canyon Live Oak and Black Oak Alliances between the elevations of about 2050 - 2300 ft (625 - 700 m). This obligate seeder produces an abundance of tiny seeds that require moist substrate to germinate. As its roots must grow rapidly to avoid desiccation during the Mediterranean-type summer months, a constant supply of water is necessary and it is highly susceptible to water flow manipulation.

QH
MADRONE ALLIANCE

Pacific Madrone (Arbutus menziesii) occasionally occurs in pure stands within the Granitic Metamorphic Foothills and Upper Foothills Metamorphic Belt Subsection of the Sierra Nevada. These stands usually occur adjacent to the Douglas-Fir - Pine, Ponderosa Pine and Mixed Conifer - Pine conifer Alliances. Black Oak, Maple, Tanoak (Madrone) and Canyon Live Oak Alliances may also be found in close proximity to this Alliance, which is generally found below 3850 ft (1174 m) elevation.

QI
CALIFORNIA BUCKEYE ALLIANCE

California Buckeye (Aesculus californica) has been mapped in pure stands or very rarely with Foothill Pine (Pinus sabiniana) occasionally in this area, mainly in mesic slopes within the Upper Foothills Metamorphic Belt Subsection of the. Elevations are from 984 - 2624 ft (300 - 800 m).

QJ
COTTONWOOD - ALDER ALLIANCE

The Cottonwood - Alder Alliance of the North Sierran Ecological Province is represented by a mixture of both Fremont Cottonwood (Populus fremontii) and White Alder (Alnus rhombifolia). It occurs very rarely in this region, since both species reach their easternmost distributions in northern California here. The Alliance has been identified along the western edge of the Upper Foothills Metamorphic Belt Subsection at elevations between about 1800 - 2400 ft (550 - 730 m). Fremont Cottonwood - White Alder stands are adjacent to those of the Ponderosa Pine, Douglas-Fir - Pine and Blue Oak Alliances in this Section.

QK
BLACK OAK ALLIANCE

Black Oak (Quercus kelloggii) forms one of the most common and wide-ranging hardwood Alliances in this Subsection. Generally it is found on mesic soils up to about 7020 ft (2140 m) on both west and east slopes of the Sierra Nevada. It occurs in pure or mixed stands as an understory component within several different conifer Alliances, including Douglas-Fir - Pine, Ponderosa Pine, Knobcone Pine, Mixed Conifer - Pine, White Fir, Eastside Pine, and Mixed Conifer - Fir. The Black Oak Alliance is found most abundantly in the Granitic and Metamorphic Foothills and the Upper Foothills Metamorphic Belt Subsections. It is occasionally found in the Diamond Mountain - Crystal Peak, Fredonyer Butte - Grizzly Peak, Greenville - Graeagle, Bucks Lake, Upper Batholith and Volcanic Flows, and a few other Subsections. Black Oak often intermixes with Canyon Live Oak (Quercus chrysolepis), creating mixed stands in the Mixed Hardwoods Alliance. Generally speaking, Black Oak dominates sites with better growing conditions than Canyon Live Oak. In areas of topographic shading or along riparian corridors, Bigleaf Maple (Acer macrophyllum) and Dogwood (Cornus spp.), White Alder (Alnus rhombifolia) and California Bay (Umbellularia californica) are common associates.

QL
VALLEY OAK ALLIANCE

The largest oak in North America, the Valley Oak (Quercus lobata), reaches heights of 100 ft tall and 80 ft wide. This species grows quickly, having a lifespan of nearly 600 years. It occurs in pure or mixed stands in the Ponderosa Pine Alliance, on deep stable soils in valley bottoms or along streams below about 2000 ft (610 m) in this area of the northern Sierras. The Valley Oak Alliance has been identified in the Upper Foothills Metamorphic Belt Subsections.

QM

BIGLEAF MAPLE ALLIANCE

The Bigleaf Maple Alliance may occur in pure stands of Bigleaf Maple (Acer macrophylla) or mixed with Dogwoods (Cornus spp.). It is often found with conifers of the Mixed Conifer - Pine and Douglas-Fir - Pine Alliances. The Alliance is found on mesic soils up to about 6000 ft (1830 m) on the Westside of the Sierra Nevada along riparian areas or on shady north aspects. It has been mapped sparsely in the Granitic and Metamorphic Foothills, Upper Batholith and Volcanic Flows, and the Upper Foothills Metamorphic Belt Subsections.

QO
WILLOW ALLIANCE

The Willow Alliance is a wide-ranging type covering an elevation range from about 2100 - 8600 ft (640 - 2622 m) on both western and eastern Sierran slopes. Species of tree and shrub Willows (Salix spp.) dominate the hardwood mixture. It occurs in pure stands along streams and moist canyon bottoms mixed with conifers such as those in the Mixed Conifer - Pine, Mixed Conifer - Fir, Red Fir, Lodgepole Pine, and Eastside Pine Alliances. Hardwoods such as those in the Quaking Aspen, Willow-Aspen, Mixed Riparian Hardwoods, White Alder, Mountain Alder, and Fremont and Black Cottonwood Alliances may be associated with the Willow Alliance. It has been mapped sparsely in the Frenchman, Upper Batholith and Volcanic Flows, and Tahoe - Truckee Subsections. Occasionally upland, non-riparian species of Willow are found associated with the Eastside Pine and Mixed Conifer - Fir Alliances.

QQ
QUAKING ASPEN ALLIANCE

Quaking Aspen (Populus tremuloides) occurs in pure stands or as scattered individuals throughout moist areas between about 3168 - 8050 ft (966 - 2455 m) elevation. It is commonly associated with conifer species such as those in the Red Fir, Lodgepole Pine, Eastside Pine, White Fir and Mixed Conifer - Fir Alliances. The Quaking Aspen Alliance has been identified very occasionally in the northern Sierras. It is mapped primarily in the Diamond Mountain - Crystal Peak and Frenchman Subsections and is usually found adjacent to meadows and streams associated with Willows (Salix spp.) or Black Cottonwood (Populus balsamifera ssp. trichocarpa) along high elevation streams.

QS
WILLOW - ASPEN ALLIANCE

The main distribution of Quaking Aspen in California is in the North and South Sierran Ecological Provinces, occurring much more commonly in the Rocky Mountain, Intermountain and North Central states. A combination of Willows (Salix spp.) and Quaking Aspen (Populus tremuloides) occur as the dominant hardwoods in widely scattered small riparian or meadow areas of the North Sierran Ecological Province such as in the Diamond Mountain - Crystal Peak and Frenchman Subsections. This Alliance occurs in pure stands and mixed with conifer alliances throughout moist areas between about 4600 - 8500 ft (1403 - 2593 m) elevation. Conifer species such as those in the Red Fir, Lodgepole Pine, Eastside Pine, White Fir and Mixed Conifer - Fir Alliances may associate with it. Black Cottonwood (Populus balsamifera ssp. trichocarpa) is a minor component of these sites.

QT
TANOAK (MADRONE) ALLIANCE

This Alliance of Tanoak (Lithocarpus densiflorus), alone or in combination with Pacific Madrone (Arbutus menziesii) is commonly found growing in pure stands or mixed with conifer Alliances such as the Douglas-Fir - Pine and Mixed Conifer - Pine Alliances and less commonly in the Ponderosa Pine Alliance. The Tanoak (Madrone) Alliance exists in the western Sierra Nevada below about 4800 feet (1464 m) from Butte County to Tuolumne County. It is commonly found in the Granitic and Metamorphic Foothills, and less commonly found in the Upper Foothill Metamorphic Subsection, generally on deep, well drained mesic soils. Common hardwood associates are Black Oak (Quercus kelloggii), California Bay (Umbellularia californica) and Canyon Live Oak (Quercus chrysolepis). Drier granitic type soils often result in an increased Pacific Madrone abundance.

QW
INTERIOR LIVE OAK ALLIANCE

The Interior Live Oak (Quercus wislizenii) Alliance occurs in semi-open or closed stands and often on south aspects at lower elevations. As elevation increases the Canyon Live Oak Alliance becomes more prevalent on cooler north and east aspects. It is often associated the Gray Pine and Ponderosa Pine Alliances and less commonly with the Douglas-Fir - Pine Alliance, usually above the Blue Oak Alliance. These elevations are generally between 700 - 3010 ft (213 - 918 m). It has been identified occasionally in the Upper Foothills Metamorphic Belt Subsection. Black Cottonwood (Populus balsamifera ssp. trichocarpa) and White Alder (Alnus rhombifolia) are the associated riparian species.

QX
BLACK COTTONWOOD ALLIANCE

Black Cottonwood (Populus balsamifera ssp.trichocarpa) occurs in the higher Sierra Nevada Mountains more commonly than does Fremont Cottonwood (Populus fremontii), but their ranges occasionally overlap. Over its broad range in California, it may occur at elevations up to about 9000 ft (2800 m). In the northern Sierras, it is generally found between about 3532 - 7940 ft (1077 - 2422 m). Being shade intolerant, it requires freshly deposited alluvial materials for its maintenance and stands are often even-aged as a result of episodic flood events. Tree Willows (Salix spp.), are often present in this type. At higher elevations and towards eastern California, Black Cottonwood occurs in association with Quaking Aspen (Populus tremuloides) and with White Alder (Alnus rhombifolia) at lower elevations towards the west. It has been mapped sparsely in the Upper Batholith and Volcanic Flows, in the Fredonyer Butte - Grizzly Peak and in the Diamond Mountain - Crystal Peak Subsections.

QY
WILLOW - ALDER ALLIANCE

This Alliance includes any species of Willow (Salix spp.) combined with White or Mountain Alders (Alnus rhombifolia, Alnus tenuifolia) occurring together in stream or seepage areas where neither is clearly dominant in the riparian mixture. It is found in the Fredonyer Butte - Grizzly Peak and Bucks Lake Subsections at elevations generally between 3181 - 6953 ft (970 - 2120 m). It usually occurs in low-elevation scattered riparian areas. Common associates include species of Gooseberry and Currant (Ribes spp.), Blackberry and other edible berries (Rubus spp.), Wild Rose (Rosa spp.), and Poison Oak (Toxicodendron diversilobum) along with various graminoids and forbs.

TC
TREE (GOLDEN) CHINQUAPIN ALLIANCE

Tree Chinquapin (Chrysolepis chrysophylla) has been mapped sparsely in the Upper Foothills Metamorphic Belt Subsection. It is more common in areas to the northwest of this zone. In this area, it occurs mainly as a dominant hardwood understory species within Douglas-fir (Pseudotsuga menziesii) forests. Elevations are from 2296 - 3116 ft (700 - 950 m).

TX
MONTANE MIXED HARDWOODS ALLIANCE

This alliance generally occurs on sites favorable to the growth of mid-montane conifers such as Ponderosa Pine (Pinus ponderosa) and usually above the Interior Mixed Hardwoods sites. Within the Granitic and Metamorphic Foothills, Upper Foothills Metamorphic Belt and Batholith/Volcanic Flows Subsections, it has been mapped at elevations from 492 - 5400 ft (150 - 1650 m). The mixture includes any combination of non-dominant Black Oak (Quercus kelloggii), Pacific Madrone (Arbutus menziesii), and/or Tree Chinquapin (Chrysolepis chrysophylla) in this area. Other species such as Canyon or Interior Live Oak (Quercus chrysolepis, Quercus wislizenii) may be included, but are not the main species. The principal overstory conifer associates are Douglas-fir (Pseudotsuga menziesii), Ponderosa Pine and others such as Incense Cedar (Calocedrus decurrens) or Sugar Pine (Pinus lambertiana).

WD
DOGWOOD ALLIANCE

Hardwood species of Dogwood such as Mountain Dogwood (Cornus nuttallii) and Miner's Dogwood (Cornus sessilis) are occasionally mapped along streambanks or in shaded forest areas. This Alliance occurs very infrequently in the Upper Foothills Metamorphic Belt and Batholith/Volcanic Flows Subsections at an elevation range of 3280 - 5084 ft (1000 - 1550 m). It also may include some small tree or shrubby species such as Brown (Cornus glabrata) or American (Cornus sericea) Dogwoods.

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SHRUBS, SUBSHRUBS AND CHAPARRAL

AX
MIXED ALPINE SCRUB ALLIANCE

These mountain-top communities are often low graminoid and semi-woody subshrub species with a mixture of some fully woody dwarf or taller shrubs. They have been identified sparsely in the Carson Range, Tahoe - Truckee, Tahoe Valley and Glaciated Batholith and Volcanic Flows Subsections at elevations above about 7900 ft (2400 m). Species composition varies considerably and usually is quite diverse, often dependent on the presence of late-lying snowbanks and other moisture sources. In the northern Sierra Nevada, the most common dwarf shrubs in the Mixed Alpine Scrub Alliance are Creambush Oceanspray (Holodiscus discolor), Greene Goldenweed (Haplopappus greenei) and Mountain White Heather (Cassiope mertensiana). These may be augmented by taller shrubs such as Sierra, Geyer's, Jepson's, and Gray-leaved Sierra Willows (Salix eastwoodiae, Salix orestera, Salix jepsonii, Salix geyeriana) and others such as Bush Cinquefoil (Potentilla fruticosa) and Sierra Primrose (Primula suffrutescens). East of the Sierra crest, as in the Carson Range Subsection, Great Basin shrubs may be evident in the mixture, such as Mountain Sagebrush (Artemisia tridentata ssp. vaseyana), or

Bitterbrush (Purshia tridentata var. tridentata). Some elements of the herbaceous Alpine Mixed Grass and Forbs Alliance may also be present, such as grasses and sedges (Poa spp., Elymus spp., Carex spp.) and Pussytoes (Antennaria media).

BB
BITTERBRUSH ALLIANCE

Bitterbrush (Purshia tridentata) generally occurs on dry slopes and plains from about 5300 - 7300 ft (1616 - 2226 m) east of the Sierran crest, predominantly in the Tahoe - Truckee Subsection. This Alliance is usually found on flat or gentle slopes within the Basin Sagebrush Alliance and adjacent to the Eastside Pine and Western Juniper Alliances. This high value forage species occurs at higher elevations than Saltgrass (Distichlis spp.) meadows. Associated species include Singleleaf Pinyon Pine (Pinus monophylla) and Junipers (Juniperus spp.), Basin Sagebrush (Artemisia tridentata), Rabbitbrush (Chrysothamnus spp.), Squirreltail (Sitanion hystrix) and other Ryegrass (Elymus spp.), Fescue (Festuca spp.), Wheatgrass (Agropyron spp.), Kentucky Bluegrass (Poa pratensis) and Brome (Bromus spp.).

BL
LOW SAGEBRUSH ALLIANCE

Low Sagebrush (Artemisia arbuscula) is the dominant shrub of this eastside Alliance in the North Sierran Ecological Province. It is generally restricted to basins with clay or saline-alkaline soils which are intermittently flooded, as well as to terraces with hardpan or heavy clay substrates. Shrub and tree associates include Black Sagebrush (Artemisia nova), Basin Sagebrush (Artemisia tridentata), Rabbitbrush (Chrysothamnus spp.), Bitterbrush (Purshia tridentata), Singleleaf Pinyon Pine (Pinus monophylla), Junipers (Juniperus spp.), a few grass species such as Needlegrass-(Achnatherum spp.) and a rich variety of forbs. This Alliance has been mapped occasionally in the Sierra Nevada Section at elevations from 4920 - 7708 ft (1500 - 2350 m). It has been mapped at the higher elevations in the Diamond Mountain - Crystal Peak Subsection and lowest elevations in the Sierra Valley Subsection. It also occurs in the Frenchman Subsection.

BM
CURLLEAF MOUNTAIN MAHOGANY ALLIANCE

This Alliance occurs on gently to steeply sloping mountain uplands and ridgetops usually in association with rocky outcrops. On more xeric sites Curlleaf Mountain Mahogany (Cercocarpus ledifolius) occurs as the dominant species in association with Idaho Fescue (Festuca idahoensis), Squirreltail (Elymus elymoides), and a few other grasses and forbs. On more mesic sites, associates may include Juniper (Juniperus spp.), scattered Ponderosa Pine (Pinus ponderosa), Jeffrey Pine (Pinus jeffreyi) or Singleleaf Pinyon Pine (Pinus monophylla). Curlleaf Mountain Mahogany may adapt a shrub form or a small tree form that occurs in dense thickets.

BQ
BASIN MIXED SCRUB ALLIANCE

A mixture of common Great Basin shrubs defines the Basin Mixed Scrub Alliance in which no single species or genus is dominant. It is a common type in the northern areas of the Carson Range Subsection and has been mapped more sparsely in the Tahoe - Truckee, and Glaciated Batholith and Volcanic Flows Subsections at elevations mostly from about 5200 - 8400 ft (1586 - 2562 m). The species mixture includes Mountain Sagebrush (Artemisia tridentata ssp. vaseyana), shrub form of Curlleaf Mountain Mahogany (Cercocarpus ledifolius), Bitterbrush (Pushia tridentata) and other shrubs. This type is spatially associated with the Eastside Pine and Mixed Conifer - Fir Alliances.

BR
RABBITBRUSH ALLIANCE

Single or a combination of several species of Rabbitbrush (Chrysothamnus spp.) may become dominant in this Alliance. In this area, it is more often associated with the Eastside Pine Alliance. It has been mapped infrequently in the Tahoe - Truckee and occasionally in parts of the Carson Range Subsections, mainly at elevations between 5200 - 6400 ft (1586 - 1952 m). Small inclusions of Great Basin shrubs such as Bitterbrush (Purshia tridentata) and Big Basin Sagebrush (Artemisia tridentata ssp. tridentata) may be present in this Alliance in minor amounts.

BS
BASIN SAGEBRUSH ALLIANCE

Basin Sagebrush (Artemisia tridentata) generally occurs on dry slopes and plains from about 3500 - 8700 ft (1068 - 2654 m) east of the Sierran crest in the North Sierran Ecological Province. It has been mapped prominently in the Diamond Mountain - Crystal Peak and Frenchman Subsections and occasionally in the Tahoe - Truckee, Carson Range, Sierra Valley and Tahoe Valley Subsections. This Alliance is usually found on frigid, coarse-grained soils with a lack of soil profile development, although soils may be deep. Associated species include Bitterbrush (Purshia tridentata), Rabbitbrush (Chrysothamnus spp.), Low Sagebrush (Artemisia arbuscula), Black Sagebrush (Artemisia nova), Squirreltail (Sitanion hystrix), Fescue (Festuca spp.), Wheatgrass (Agropyron spp.), Ryegrass (Elymus spp.), Kentucky Bluegrass (Poa pratensis) and Brome (Bromus spp.). This Alliance is associated with Eastside Pine, Mixed Conifer - Fir, and less

commonly with other conifer Alliances.

BX
DESERT - MIXED CHAPARRAL ALLIANCE

This Eastside Alliance is a mixture of montane hard chaparral species such as Snowbrush (Ceanothus velutinus), Mountain Whitethorn (Ceanothus cordulatus), Greenleaf Manzanita (Arctostaphylos patula), Thimbleberry (Rubus parviflorus), and Snowberry (Symphoricarpos spp.) with an equivalent vegetation cover of Great Basin species such as Mountain and Big Basin Sagebrush (Artemisia tridentata ssp. vaseyana, Artemisia tridentata ssp. tridentata), Bitterbrush (Purshia tridentata) and Curleaf Mountain Mahogany (Cercocarpus ledifolius). It is sometimes associated with conifer plantations or open areas within the Eastside Pine Alliance. Jeffrey Pine, Mixed Conifer - Fir and Red Fir Alliances are sometimes found in close proximity to the Desert - Mixed Chaparral Alliance in this zone. This transitional type has been identified mainly at mid to upper montane elevations of about 5600 - 8000 ft (1708 - 2440 m) and has been mapped abundantly in the northern and eastern areas of the Tahoe - Truckee and Carson Range and scattered in the Glaciated Batholith and Volcanic Flows Subsections.

C1
ULTRAMAFIC MIXED SHRUB ALLIANCE

Serpentized and ultramafic rocks do not occur in the North Sierran Ecological Province except for very sparse occurrences towards the northwest. Ultramafic rocks touch the Granitic and Metamorphic Foothills Subsection and were mapped as the Ultramafic Mixed Shrub Alliance. Shrubs such as Wedgeleaf Ceanothus (Ceanothus cuneatus), Whiteleaf Manzanita (Arctostaphylos viscida), Hoary Coffeeberry (Rhamnus tomentella), Huckleberry Oak (Quercus vaccinifolia), and Poison Oak (Toxicodendron diversilobum) are identified in this type. Occasional Grey Pine (Pinus sabiniana), MacNab Cypress (Cupressus macnabiana) and California Bay (Umbellularia californica) also occur on these sites. Elevations are less than 3500 ft (1068 m).

CA
CHAMISE ALLIANCE

This fire-adapted Alliance, dominated by Chamise (Adenostoma fasciculatum), grows on mesic and thermic soils and steep slopes from about 1800 - 3000 ft (549 - 915 m) within the North Sierran Ecological Province. It is found sparsely in the Upper Foothills Metamorphic Belt Subsection, mainly in El Dorado and Amador Counties. Canyon Live Oak (Quercus chrysolepis) stands and shrubs of the Lower Montane Mixed Chaparral Alliance such as Wedgeleaf Ceanothus (Ceanothus cuneatus) and Whiteleaf Manzanita (Arctosaphylos viscida) may be found in close proximity to the Chamise Alliance.

CC
CEANOTHUS CHAPARRAL

The Ceanothus Chaparral Alliance occurs in the Sierra Nevada Mountains at elevations below about 4500 ft (1372 m). It differs from the Lower Montane Mixed Chaparral Alliance by having a dominance of Ceanothus species such as Wedgeleaf and Lemmon Ceanothus and Chaparral Whitethorn (Ceanothus cuneatus, Ceanothus lemmonii, Ceanothus leucodermis) in the shrub mixture. It also may include, in minor quantities, some of the more common mixed chaparral shrubs such as Whiteleaf and Common Manzanitas (Arctostaphylos viscida, Arctostaphylos manzanita), Chamise (Adenostoma fasciculatum), Fremont or Wavyleaf Silk-tassel (Garrya fremontii, Garrya elliptica), Birchleaf Mountain Mahogany (Cercocarpus betuloides), Poison Oak (Toxicodendron diversilobum), Shrub Oaks (Quercus spp.) and other low-elevation shrub species below productive coniferous and hardwood sites. Individual sites many support pure stands of these shrubs such as in the Wedgeleaf Ceanothus Alliance.

CG
GREENLEAF MANZANITA ALLIANCE

Greenleaf Manzanita (Arctostaphylos patula) may dominate sites at elevations above the Whiteleaf Manzanita Alliance in proximity to the Mixed Conifer - Fir and Red Fir Alliances. It occasionally associates with Jeffrey Pine in the southern Sierras. Other mid-montane shrubs may be present in this Alliance, including Deerbrush (Ceanothus intergerrimus) and Bush Chinquapin (Chrysolepis sempervirens). The ability of the species to sprout after fire and the long-term viability of its seeds allow it to reoccupy a site within a decade of ground disturbance. This Alliance has not yet been mapped in the North Sierran Ecological Province.

CH
HUCKLEBERRY OAK ALLIANCE

Within the North Sierran Ecological Province, Huckleberry Oak (Quercus vaccinifolia) occurs in pure stands or mixed with Pinemat Manzanita (Arctostaphylos nevadensis) on very shallow, stoney or gravelly soils at elevations between about 3850 - 9000 ft (1175 - 2745 m) and on shallow ultrabasic soils at lower elevations. The Alliance represents an edaphic habitat on ridgetops and elsewhere that identify

poor conifer production sites. It has been identified in scattered patches in several subsections, including the Carson Range, Tahoe - Truckee, Glaciated Batholith and Volcanic Flows, Diamond Mountain - Crystal Peak, Fredonyer Butte - Grizzly Peak, Frenchman, Bucks Lake, and Upper Foothills Metamorphic Belt. It is prominent in the Upper Batholith and Volcanic Flows Subsection. Greenleaf Manzanita (Arctostaphylos patula), Bush Chinquapin (Chrysolepis sempervirens), Mountain Whitethorn (Ceanothus cordulatus), and Bitter Cherry (Prunus emarginata) are minor associated shrub species. Conifer species, if present, are Jeffrey Pine (Pinus jeffreyi), Red Fir (Abies magnifica), Western White Pine (Pinus monticola), Lodgepole Pine (Pinus contorta var. murrayana), and Western Juniper (Juniperus occidentalis).

CI
DEERBRUSH ALLIANCE

Deerbrush (Ceanothus intergerrimus) typically occurs as a successional species after stand-replacing disturbances such as fire, landslide, and logging. Its conifer associates in this area include Douglas-fir (Pseudotsuga menziesii), Ponderosa Pine (Pinus ponderosa) and possibly others in the Mixed Conifer Pine Alliance. It has been mapped in the elevation range of 1935 - 3608 ft (590 - 1100 m) within the Granitic/Metamorphic Foothills and Batholith/Volcanic Flows Subsections.

CJ
BREWER OAK ALLIANCE

Steep and rocky upper slopes of foothills and lower montane areas of the Sierra Nevada occasionally are occupied by a dominant shrub, Brewer Oak (Quercus garryana var. breweri). It is sometimes associated with lower elevation shrubs, subshrubs, and trees such as Shrub Interior Live Oak (Quercus wislizenii var. frutescens), Birchleaf Mountain Mahogany (Cercocarpus betuloides), Wedgeleaf Ceanothus (Ceanothus cuneatus), Black Oak (Quercus kelloggii), Sumac (Rhus spp.), and Honeysuckle (Lonicera spp.). The vine Virgin's Bower (Clematis lasiantha) may also occur in this Alliance. The Alliance has not yet been mapped in this general area.

CL
WEDGELEAF CEANOTHUS ALLIANCE

This Alliance is dominated by Wedgeleaf Ceanothus (Ceanothus cuneatus) and occurs on well drained soils of dry, exposed slopes and ridges. It occurs between about 300 - 4000 ft (90 - 1200 m) as a nearly pure, dense thicket or in more open stands mixed with minor amounts of other shrubs. These associated species include Greenleaf Manzanita (Arctostaphylos patula), Deerbrush (Ceanothus integerrimus), Black Oak (Quercus kelloggii), California Ash (Fraxinus dipetala), Flannel Bush (Fremontodendron californicum), and California Buckeye (Aesculus californica).

CM
UPPER MONTANE MIXED SHRUB ALLIANCE

This mixed shrub Alliance occurs in upper montane positions on harsh sites such as exposed ridge tops or under excessively drained soils conditions. Elevations typically are between 6000 - 9000 ft (1860 - 2790 m) within the Red Fir, Lodgepole Pine, and Jeffrey Pine Alliance. Major shrub species include Huckleberry Oak (Quercus vaccinifolia), Creeping Snowberry (Symphoricarpus acutus), Pinemat Manzanita (Arctostaphylos nevadensis), and Bush Chinquapin (Chrysolepis sempervirens). Minor associates include Greenleaf and Whiteleaf Manzanita (Arctostaphylos patula, Arctostaphylos viscida), Bitter Cherry (Prunus emarginata), and Mountain Whitethorn (Ceanothus cordulatus) towards the west. Basin Sagebrush (Artemisia tridentata), Bitterbrush (Purshia tridentata), and Mountain or Parish's Snowberry (Symphoricarpus vaccinioides or Symphoricarpus parishii) occur on the east side.

CN
PINEMAT MANZANITA ALLIANCE

Pinemat Manzanita (Arctostaphylos nevadensis), a dwarf shrub, is the sole dominant of this relatively uncommon alliance. It has been mapped occasionally in the Glaciated Batholith and Volcanic Flows and Carson Range Subsections at elevations generally exceeding 7600 ft (2318 m). Sites are often harsh and adjacent to barren areas and to upper montane conifers such as Lodgepole Pine (Pinus contorta ssp. murrayana) and Red Fir (Abies magnifica). Mountain Sagebrush (Artemisia tridentata ssp. vaseyana) is often found in adjacent areas.

CP
BUSH CHINQUAPIN ALLIANCE

Pure stands of Bush Chinquapin (Chrysolepis sempervirens), similar to those of Mountain Whitethorn (Ceanothus cordulatus), are often initiated and maintained after disturbances in montane conifer sites such as through fire, logging, or windthrow. This alliance has been mapped occasionally in the Carson Range and Eastern Slopes Subsections mostly at mid to upper montane elevations from about 7400 - 9400 ft (2257 - 2867 m). Overstory conifers associated with these sites include Red Fir (Abies magnifica), Western White Pine (Pinus monticola), and Lodgepole Pine (Pinus contorta). Shrubs of the Upper Montane Mixed Chaparral Alliance such as Snowbrush (Ceanothus

velutinus) and Great Basin shrubs such as Mountain Sagebrush (Artemisia tridentata ssp. vaseyana) and Low Sagebrush (Artemisia arbuscula) may also be found adjacent to or within these stands.

CQ
LOWER MONTANE MIXED CHAPARRAL ALLIANCE

This low-elevation mixed shrub Alliance occurs scattered in foothills areas to the west of the higher mountains in the Northern Sierran Ecological Province between 750 - 6350 ft (228 - 1937 m). The Lower Montane Mixed Chaparral Alliance is a floristically diverse type associated with conifer Alliances such as the Douglas-Fir - Pine, Ponderosa Pine, and Gray Pine Alliances. It includes a mixture of Whiteleaf and Common Manzanitas (Arctostaphylos viscida, Arctostaphylos manzanita), Wedgeleaf and Lemmon Ceanothus and Chaparral Whitethorn (Ceanothus cuneatus, Ceanothus lemmonii, Ceanothus leucodermis), Chamise (Adenostoma fasciculatum), Fremont and Wavyleaf Silktassel (Garrya fremontii, Garrya elliptica), Birchleaf Mountain Mahogany (Cercocarpus betuloides), Poison Oak (Toxicodendron diversilobum), shrub Oaks (Quercus spp.), Hoary Coffeeberry (Rhamnus tomentella) and other lower elevation shrub species. Individual sites many support pure stands of these shrubs such as in the Wedgeleaf Ceanothus Alliance.

CS
SCRUB OAK ALLIANCE

The Scrub Oak Alliance is found intermixed with the Lower Montane Mixed Chaparral Alliance below about 5000 feet (1550 m) in the Upper Foothills Metamorphic Belt Subsection. It is dominated by Scrub Oak (Quercus berberidifolia), Shrub Interior Live Oak (Quercus wislizenii var. frutescens), and/or Shrub Canyon Live Oak (Quercus chrysolepis var. nana). As there is much hybridization among Quercus species, positive identifications become difficult. Most species of oak in this Alliance stump sprout after fire and may fully occupy the site within ten years. Other associated shrubs include Birchleaf Mountain Mahogany (Cercocarpus betuloides), Poison Oak (Toxicodendron diversilobum). and other mesic chaparral species.

CV
SNOWBRUSH ALLIANCE

Snowbrush (Ceanothus velutinus var. velutinus) is the dominant shrub species on the eastside slopes of the southern Sierra Nevada. The brushfields of the Snowbrush Alliance occur in the elevational range of the Upper Montane Mixed Chaparral Alliance. It occurs most prominently in the Frenchman and Tahoe - Truckee Subsections between 2150 - 7850 ft (655 - 2394 m). Snowbrush associates with Jeffrey Pine (Pinus jeffreyi), Red Fir (Abies magnifica) and occasionally with White Fir (Abies concolor), Greenleaf Manzanita (Arctostaphylos patula), Choke Cherry (Prunus virginiana), Mountain Whitethorn (Ceanothus cordulatus), and Bitter Cherry (Prunus emarginata). On the eastside of the Sierra Nevada, this Alliance grows adjacent to the Basin Sagebrush Alliance and occurs as understory within the Mixed Conifer - Fir and Eastside Pine Alliances.

CW
WHITELEAF MANZANITA ALLIANCE

Whiteleaf Manzanita (Arctostaphylos viscida) occurs in pure stands in scattered areas towards the western edges of the Upper Foothills Metamorphic Belt and more sparsely in the Granitic and Metamorphic Foothills Subsections. This Alliance has been identified mainly in the elevation range of 1330 - 3150 ft (405 - 960 m), occurring adjacent to the Lower Montane Mixed Chaparral Alliance.

CX
UPPER MONTANE MIXED CHAPARRAL ALLIANCE

The Upper Montane Mixed Chaparral Alliance is a mixed shrub type that occurs abundantly at moderate to high elevations of the Northern Sierran Ecological Province, between about 2200 - 8900 ft (671 - 2715 m). It is prominent in the Frenchman, Upper Batholith and Volcanic Flows, and Upper Foothill Metamorphic Belt Subsections. Chaparral species such as Greenleaf Manzanita (Arctostaphylos patula), Mountain Whitethorn (Ceanothus cordulatus), Snowbrush (Ceanothus velutinus), and Deerbrush (Ceanothus integerrimus) are indicators of this Alliance. Deerbrush is found extensively on deep mesic soils of the westside of the Northern Sierras. Greenleaf Manzanita, a stump-sprouter, and Mountain Whitethorn are found most commonly associated with the Mixed Conifer - Fir, Red Fir, and White Fir Alliances. On eastside Sierran slopes, Basin Sagebrush (Artemesia tridentata) and Squirreltail (Elymus elymoides) may also occur in this Alliance. Whiteleaf Manzanita (Arctostaphylos viscida) may be present on the westside foothills at lower elevations of this type, representing a transition between the Lower Montane Mixed Chaparral Alliance and this Alliance.

TA
MOUNTAIN (THINLEAF) ALDER ALLIANCE

Mountain or Thinleaf Alder (Alnus tenuifolia) is a dominant high-elevation small tree or tall shrub species, generally occurring in pure stands between about 4100 - 9020 ft (1250 - 2750 m) in this region. It has been identified in small, very scattered stands in many of the

Subsections. The type occurs in large perennial grass and forb meadows where stream courses and coarse, shallow or gravelly soils exist. These saturated or seasonally flooded sites are sometimes adjacent to White Fir, Mixed Conifer - Fir, and Red Fir sites. Minor inclusions of tree or shrub Willows (Salix spp.) or Mountain Maple (Acer glabrum) may occur in this type, but the density of Mountain Alder stands limits the growth of other species aside from some aquatic gaminoids and forbs.

TB
BITTERBRUSH - SAGEBRUSH ALLIANCE

On eastside northern Sierra slopes, Bitterbrush (Purshia tridentata) and upland Sagebrushes such as Big Basin (Artemisia tridentata ssp. tridentata) occasionally mix where the combination of the two has dominance of the shrub layer, forming the Bitterbrush - Sagebrush Alliance. It has been mapped frequently in the north and eastern portions of the Tahoe - Truckee and Carson Range and more sparsely in the Glaciated Batholith and Volcanic Flows Subsections, mostly within an elevational range of 5000 - 6800 ft (1525 - 2074 m). It is spatially associated with the Eastside Pine Alliance.

TN
BLACK SAGEBRUSH ALLIANCE

Black Sagebrush (Artemisia nova) has been identified more frequently in the Great Basin zone than in the eastside Sierra Nevada, but it has been mapped sparsely in the Carson Range and Tahoe - Truckee Subsections of the northern Sierras. Elevations of these sites are generally between 5400 - 7000 ft (1647 - 2135 m). In this region, it occurs in close proximity to Jeffrey Pine (Pinus jeffreyi), Bitterbrush (Purshia tridentata), Big Basin or Mountain Sagebrush (Artemisia tridentata), and Curlleaf Mountain Mahogany (Cercocarpus ledifolius).

TS
SNOWBERRY ALLIANCE

The Snowberry Alliance consists of one or more Snowberry (Symphoricarpos) species that are dominant in the shrub layer, mainly Roundleaf Snowberry (Symphoricarpos rotundifolius) and Creeping Snowberry (Symphoricarpos mollis) in the northern Sierras. These stands have been mapped occasionally in the Tahoe - Truckee, Glaciated Batholith and Volcanic Flows and Carson Range Subsections at elevations mainly in the range 7400 - 8800 ft (2257 - 2684 m) where they are associated with trees such as Lodgepole Pine (Pinus contorta ssp. murrayana), Red Fir (Abies magnifica), and Quaking Aspen (Populus tremuloides). Shrubs such as Mountain Sagebrush (Artemisia tridentata ssp. vaseyana), and Low Sagebrush (Artemisia arbuscula) may also be found in minor amounts in this Alliance.

TT
BIG BASIN SAGEBRUSH ALLIANCE

Big Basin Sagebrush (Artemisia tridentata ssp. tridentata) forms dominant stands in this Alliance, being distinguished from Mountain Sagebrush (Artemisia tridentata ssp. vaseyana) in some eastside sections of the northern Sierras. The Alliance has been mapped with some abundance in the parts of the Tahoe - Truckee and Carson Range and more rarely in the Glaciated Batholith and Volcanic Flows Subsections, generally within the elevation range of 5000 - 6400 ft (1525 - 1952 m). Eastside species such as Jeffrey Pine (Pinus jeffreyi), Bitterbrush (Purshia tridentata), Curlleaf Mountain Mahogany (Cercocarpus ledifolius), Rabbitbrush (Chrysothamnus spp.) and Greenleaf Manzanita (Arctostaphylos patula) occur in close proximity to these sites in this zone.

TV
MOUNTAIN SAGEBRUSH ALLIANCE

The Mountain Sagebrush (Artemisia tridentata ssp. vaseyana) subspecies of Basin Sagebrush (Artemisia tridentata) generally forms dominant stands at somewhat higher elevations than does Big Basin Sagebrush (Artemisia tridentata ssp. tridentata). Within the eastside northern Sierras region, it has been mapped abundantly in the Tahoe - Truckee, Carson Range and Glaciated Batholith and Volcanic Flows Subsections at elevations mainly within the range of 7000 - 9000 ft (2135 - 2745 m). Trees such as Lodgepole Pine (Pinus contorta ssp. murrayana), Red and White Fir (Abies magnifica, Abies concolor), Jeffrey Pine (Pinus jeffreyi), and Quaking Aspen (Populus tremuloides) are found within and in close proximity to the Mountain Sagebrush Alliance. A variety of Great Basin and upper montane chaparral shrubs are also associated with this type, such as Low Sagebrush (Artemisia arbuscula), Curlleaf Mountain Mahogany (Cercocarpus ledifolius) and Snowbrush (Ceanothus velutinus).

WL
WILLOW (RIPARIAN SCRUB) ALLIANCE

Any single or combination of shrub Willow(s) dominate the species composition of this Alliance. It has been mapped in almost all of the Subsections at elevations from 2296 - 9348 ft (700 - 2850 m). In the Northern Sierras, species may include Arctic (Salix arctica), Booth's (Salix boothii), Drummond's (Salix drummondiana), Sierra (Salix eastwoodiae), Narrow-leaved (Salix exigua), Geyer's (Salix geyeriana), Jepson's (Salix jepsonii), Arroyo (Salix lasiolepis), Lemmon's (Salix lemmonii), Strapleaf (Salix ligulifolia), Shining (Salix lucida), Dusky

(Salix melanopsis), Sierra (Salix orestera), Mackenzie's (Salix prolixa), Snow (Salix reticulata), or Scouler's (Salix scouleriana) Willows.

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HERBACEOUS

AC
ALPINE MIXED GRASS AND FORBS ALLIANCE

Prostrate or low-growing perennials and graminoids form the major vegetation components in alpine areas of this type. There are generally less woody species present in this Alliance than in the Mixed Alpine Scrub Alliance. Due to high evaporative potential, the short growing season and abrasion or dessication by wind, morphological adaptions by particular species are often similar to those in the desert. For example, several cushion-forming plants occur within these rocky sites, as well as species with basal rosette-type leaves. On dry, open fell-fields, Phlox (Phlox covillei) often dominates a site. On granite and metamorphics, Oval-leaved Buckwheat (Eriogonum ovalifolium) is a prominent species in many areas. When parent material is dominated by marble, Cymopterus (Cymopterus cinerarius) may be of major importance along with Phlox on some sites. Local conditions and seed sources contribute heavily to plant diversity in these high elevation areas, such as the occurrence of herbaceous species such as Pussytoes (Antennaria media), graminoids such as Sedge (Carex exerta), Bluegrass (Poa spp.), and Ryegrass (Elymus spp.). Other species that may be identified in this Alliance include Prostrate Sibbaldia (Sibbaldia procumbens), Knotweed (Polygonum davisiae) at lower elevations, Eschscholtz Buttercup (Ranunculus eschscholtzii), Rockcress (Arabis lemmonii), Mountain Sorrel (Oxyria digyna), Pussypaws (Calyptridium umbellatum), Indian Paintbrush (Castilleja lemmonii) on moist sites, Columbine (Aquilegia pubescens), Payson's Draba (Draba paysonii), Jacob's Ladder (Polemonium pulcherrimum) and Heart Willowweed (Epilobium obcordatum). Subshrubs such as Davidson's Penstemon (Penstemon davidsonii), and may also be found here.

HG
ANNUAL GRASS - FORB ALLIANCE

The Annual Grass Alliance occurs frequently on privately owned lands of the Upper Foothills Metamorphic Belt and more rarely in the Glaciated Batholith and Volcanic Flows Subsections. These grasslands are dominated by Cheatgrass (Bromus tectorum), often occurring as a direct result of fire. They are occasionally associated with the Basin Sagebrush Alliance.

HJ
WET MEADOWS (GRASS - SEDGE - RUSH) ALLIANCE

The Wet Meadows Alliance occurs on aquic soils of level or gently sloping areas. These sites have permanent water sources and occur mainly on the eastside of the Sierran crest, although some exist in rain shadow westside areas of the North Sierran Ecological Province. They have been identified in scattered locales within the Diamond Mountain, Fredonyer Butte - Grizzly Peak, Frenchman, Greenville - Graeagle, Upper and Glaciated Batholith and Volcanic Flows, Sierra Valley, Tahoe Valley and Carson Range Subsections. The Alliance also occurs adjacent to streams, meadows, lakes, and occasionally as an understory to Lodgepole Pine (Pinus contorta var. murryana) in wet swales. Dominant species are Sedges (Carex spp.) and Rushes (Juncus spp.) as well as water tolerant grass and forb species.

HM
PERENNIAL GRASS ALLIANCE

Perennial grasslands have been mapped sparsely in the Diamond Mountain - Crystal Peak Subsection in the Northern Sierra Nevada Mountains. This type is a form of dry to moist grassland in which it is difficult to determine species composition. Some of these areas are currently being used for livestock pasture and are a mix of perennial and annual grasses and legumes that vary according to management practices. Perennial bunchgrasses introduced from Eurasia such as Desert, Tall, and Intermediate Wheatgrasses (Agropyron desertortum, Elytrigia pontica, Elytrigia intermedia), in addition to Tall Fescue (Festuca arundinacea), Clover (Trifolium spp.), Needlegrass (Achnatherum spp.), Squirreltail (Elymus elymoides), Rockcress (Arabis spp.), Monardella (Monardella spp.), Buckwheat (Eriogonum spp.), Cheatgrass (Bromus tectorum) and others generally found in northern California may be included in the mixture. This Alliance is occasionally associated with the Basin Sagebrush Alliance. Mules Ears (Wyethia mollis) is a typical associate towards the east.

HT
TULE - CATTAIL ALLIANCE

Interior marsh sites of northern California that have little brackish influence and are not alkaline are usually dominated by Tule (Scirpus acutus) or other Bulrushes (Scirpus spp.) and Cattails (Typha latifolia, Typha domingensis, Typha angustifolia). These small areas have been identified in the Upper Foothills Metamorphic Belt Subsection of the Northern Sierras. They are permanently flooded, usually accumulate deep, peaty soils and may occur around the margins of lakes and springs. The Tule - Cattail Alliance occurs to a very limited

extent on the westside of the Sierra Nevada, within the Upper Foothill Metamorphic Belt Subsection on level or gently sloping low elevation areas. Commonly associated species are Sedges (Carex spp.) and Rushes (Juncus spp.) as well as water tolerant grasses and forbs.

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NON-NATIVE VEGETATION

IA
GIANT REED - PAMPAS GRASS ALLIANCE

This non-native and invasive Alliance is dominated by invasive species of Giant Reed (Arundo donax) in wetlands or Pampas Grasses (Black Pampas Grass - Cortaderia jubata or White Pampas Grass - Cortaderia selloana) on moist, disturbed sites. It has been mapped in stringers within the Fontana Plain - Calimesa Terraces Subsection (Mountains Section) and the Los Angeles Plain Subsection (Coast Section) mainly at elevations below 800 ft (244 m). Associated hardwoods include Fremont Cottonwood (Populus fremontii), Tree Willows (Salix spp.), California Sycamore (Platanus racemosa), and the shrub Mule Fat (Baccharis salicifolia).

IC
NON-NATIVE / ORNAMENTAL CONIFER ALLIANCE

Planted conifers comprise this Alliance, including species such as Canary or Norfolk Island Pines (Araucaria spp.), Deodar and Atlas Cedars (Cedrus deodar, Cedrus atlantica), Redwood (Sequoia sempervirens), Scotch Pine (Pinus sylvestris), etc. Other non-native hardwoods, shrubs and grasses may be associated in minor amounts. Mapped areas of this Alliance are usually in developed areas, including urban and residential landscapes, parks, recreational areas, highways, cemeteries, etc.

IG
NON-NATIVE / ORNAMENTAL GRASS ALLIANCE

Ornamental or non-native grass species define this Alliance. Other non-native conifers, hardwoods and shrubs may be associated as minor elements. Mapped areas of this Alliance are usually in developed areas, including urban and residential landscapes, parks, recreational areas, highways, cemeteries, etc.

IH
NON-NATIVE / ORNAMENTAL HARDWOOD ALLIANCE

Ornamental or non-native hardwood species dominate this Alliance. Other non-native conifers, shrubs and grasses may be present in this Alliance. Mapped areas of this Alliance are usually in developed areas, including urban and residential landscapes, parks, recreational areas, highways, cemeteries, etc.

IM
NON-NATIVE / ORNAMENTAL CONIFER / HARDWOOD ALLIANCE

Mixtures of ornamental or non-native conifer and hardwood species comprise the dominant species of this Alliance. Small amounts of non-native pure stands of hardwood, conifer, shrubs, and grasses may be also associated with this Alliance. Mapped areas of this Alliance are usually in developed areas, including urban and residential landscapes, parks, recreational areas, highways, cemeteries, etc.

IS
NON-NATIVE / ORNAMENTAL SHRUB ALLIANCE

Ornamental or non-native shrub species dominate this Alliance. Other non-native conifers, hardwoods, and grasses may be present in this Alliance. Mapped areas of this Alliance are usually in developed areas, including urban and residential landscapes, parks, recreational areas, highways, cemeteries, etc.

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LAND USE AND NON-VEGETATED CLASSES

AG
AGRICULTURE

Agricultural land is used primarily for the production of food and fiber. High-altitude imagery indicates agricultural activity by distinctive geometric field and road patterns on the landscape and traces produced by mechanized equipment. Agricultural land uses include forest landscapes such as orchards as well as non-forested land uses such as vineyards and field crops. Land used exclusively for livestock pasture may, however, be mapped as Annual Grassland in those cases in which land uses are not recognizable.

BA
BARREN

Landscapes generally devoid of vegetation as seen from a high-altitude image source such as aerial photography, are labeled as Barren. This category includes mappable landscape units in which surface lithology is dominant, such as exposed bedrock, cliffs, interior sandy or gypsum areas, and the like. It does not include areas considered as modified or developed, as in urban areas.

SN
SNOW / ICE

Permanent or long-term snow and ice fields found on the tallest peaks of the Sierra Nevada and Southern Cascades mountains. Snow / Ice may be mapped in areas that are typically barren in drier years but were covered in snow or ice at the time of mapping imagery acquisition.

UB
URBAN OR DEVELOPED

This category applies to landscapes that are dominated by urban structures, residential units, or other developed land use elements such as highways, city parks, cemeteries and the like. In those cases in which the managed landscapes may have a considerable vegetation component, other land use categories may be more appopriate, such as Ornamental Conifer and Hardwood mixtures within city parks.

WA
WATER

Water is labeled in CALVEG mapping in those cases in which permanent sources of surface water are identified within a landscape unit of sufficient size to be mapped. The category includes lakes, streams and canals of various size, bays and estuaries and similar water bodies. These areas are considered to have a minimum of vegetation components, except along the edges, which may be mapped as types such as Wet Meadows, Tule-Cattail freshwater marshes, or Pickleweed-Cordgrass saline or mixed marshes. Islands within water bodies may be mapped according to their terrestrial dominant vegetation types.

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NO VEGETATION DATA

XX
UNMAPPED

These are unsegmented areas within a section that have not yet been mapped to the CALVEG mapping standard. This map condition generally exists for expansive agricultural and urban areas such as the Sacramento Valley, or for extensive desert habitats in the southeastern portion of California.