Vegetation Descriptions

SOUTH SIERRAN ECOLOGICAL PROVINCE

CALVEG ZONE 4

April 27, 2009

Note: this zone contains the southern half of the Sierra Nevada Section (M261E), comprising many Subsections, as noted

CONIFER FOREST / WOODLAND

BT
BIG TREE ALLIANCE

The largest populations of the Big Tree or Giant Sequoia (Sequoiadendron giganteum) are in Tulare and Fresno Counties, but isolated Big Tree groves also occur north to Tuolumne County. These groves occur within Mixed Conifer - Pine stands at mid-montane elevations. As Big Tree is not a drought tolerant species, it is limited to mesic soils with sufficient soil moisture during the dry summer period. The stability of these groves are maintained by frequent fires which reduce competition from White Fir (Abies concolor), diminsh the accumulation of forest floor litter and allow germination of Big Tree seeds. It has been mapped as a dominant conifer in this alliance more commonly in the Lower Batholith and more rarely in the Upper Batholith Subsections in the elevation range from approximately 5400 – 7200 ft (1646 – 2196 m). Understory hardwoods such as Black Oak (Quercus kelloggii) occur very rarely in these groves.

DF
PACIFIC DOUGLAS-FIR ALLIANCE

Pacific Douglas-Fir (Pseudotsuga menziesii), often accompanied by Ponderosa Pine (Pinus ponderosa) in the South Sierran Calveg zone, has a strong Canyon Live Oak (Quercus chrysolepis) component on steep north-facing slopes. The Alliance, identified by the dominance of this conifer, occurs at relatively low elevations in the Sierras, mapped mainly between 3800 – 6000 ft (1160 – 1830 m) in scattered locations of five subsections. Large trees are often found near or in drainages with Jeffrey Pine (P. jeffreyi) as an associate in some areas.

DP
DOUGLAS-FIR - PINE ALLIANCE

Pacific Douglas-Fir (Pseudotsuga menziesii) is not commonly found in pure stands in inland locations of the South Sierran Calveg zone except in localized concentrations. Ponderosa Pine (Pinus ponderosa) often occurs with it abundantly on more exposed, often moderately steep or steep open sites at low to moderate elevations, below about 4500 ft (1372 m). This alliance of the co-dominant conifers is very common in the Upper Foothills Metamorphic Belt Subsection. Sites at higher elevations or with more shading or moisture potential generally are occupied by more of the typical mixed conifer and associated hardwood species such as Incense Cedar (Calocedrus decurrens), Sugar Pine (P. lambertiana), or Black Oak (Quercus kelloggii). Canyon Live Oak (Q. chrysolepis) may also be a low-elevation hardwood associate with the Douglas-Fir - Pine type.

EP
EASTSIDE PINE ALLIANCE

Jeffrey Pine (Pinus jeffreyi) alone or in combination with Ponderosa Pine (P. ponderosa) is a dominant conifer in association with Great Basin understory conifers, trees and shrubs in the Eastside Pine Alliance. Some of the more common shrubs in or adjacent to this Alliance include Mountain Sagebrush (Artemisia tridentata ssp. vaseyana), Big Basin Sagebrush (A. t. ssp. tridentata), Curlleaf Mountain Mahogany (Cercocarpus ledifolius), Rabbitbrush (Chrysothamnus spp.), Bitterbrush (Purshia tridentata), Snowberry (Symphoricarpos spp.), and Ocean Spray (Holodiscus spp.). In this region, these sites generally occur at moderate to upper montane elevations, especially between about 5400 – 10,000 ft (1646 – 3050 m), having been mapped extensively in the Eastern Slopes, Kern Plateau, Glaciated Batholith and Volcanic Flows and Tehachapi – Piute Mountains Subsections. This type also has been identified less commonly in two other subsections. Tree associates also occasionally include Singleleaf Pinyon Pine (P. monophylla), Utah Juniper (Juniperus osteosperma), White Fir (Abies concolor), Lodgepole Pine (P. contorta ssp. murrayana) and Quaking Aspen (Populus tremuloides).

FP
FOXTAIL PINE ALLIANCE

This high elevation Alliance, dominated by Foxtail Pine (Pinus balfouriana) has been abundantly mapped in the Glaciated Batholith and Kern Plateau Subsections as well as less commonly in the Eastern Slopes Subsection. It usually occurs on shallow, well drained, granitic soils and exposed ridges with a minimum of ground or understory vegetation cover. Although Foxtail Pine individuals may be windswept, a krummholzed form does not usually develop. Yellow Rabbitbrush (Chrysothamnus viscidiflorus), Spineless Horsebrush (Tetradymia canescens), Wax Currant (Ribes cereum), and Buckwheat (Eriogonum spp.) are occasional associates of this Alliance. Elevations are subalpine; the mapped range commonly, being about 8600 – 11,600 ft (2623 – 3538 m).

JP
JEFFREY PINE ALLIANCE

Jeffrey Pine (Pinus jeffreyi) assumes dominance on some west slopes of the Sierra Nevada with glacial deposits or on open granitic outcrops above the Ponderosa Pine Alliance. It is considered to be more adaptable to harsher or drier environments than Ponderosa Pine (P. ponderosa). The Jeffrey Pine Alliance has been mapped very extensively in the Glaciated Batholith, Kern Plateau, Tehachapi - Piute Mountains and Upper Batholith Subsections and frequently in the Lower Batholith, Eastern Slopes, Glaciated Batholith and Volcanic Flows, Upper Batholith and Volcanic Flows and Batholith and Volcanic Flows Subsections. Elevations are generally in the 4800 – 9800 ft (1464 – 2989 m) range, being higher on the eastside. Associates include White and Red Fir (Abies concolor, A. magnifica), Western (Mountain) Juniper (Juniperus occidentalis var. australis, also called Juniperus grandis), Canyon Live and Black Oaks (Quercus chrysolepis, Q. kelloggii), and the shrubs Huckleberry Oak (Q. vaccinifolia), Greenleaf Manzanita (Arctostaphylos patula) and Bush Chinquapin (Chrysolepis sempervirens).

JT
CALIFORNIA JUNIPER ALLIANCE

The tree form of California Juniper (Juniperus californica) as a dominant conifer occurs sparsely in this area in the Kern Plateau Subsection and somewhat more frequently in the Eastern Slopes and Tehachapi – Piute Mountains Subsections. It establishes on harsh sites such as those having shallow or coarse-textured soils, having been mapped generally at low to moderate elevations (2800 – 5000 ft or 854 to 1524 m). It is usually associated with Singleleaf Pinyon Pine (Pinus monophylla), Blue Oak (Quercus douglasii), Shrub Oaks (Quercus spp.), Buckwheat (Eriogonum spp.), annual grasses, and shrubs in the Great Basin – Mixed Desert Scrub type such as Blackbrush (Coleogyne ramosissima) and Big Sagebrush (Artemisia tridentata).

KP
KNOBCONE PINE ALLIANCE

Knobcone Pine (Pinus attenuata) occurs in small dense stands in association with species in the Lower Montane Mixed Chaparral, Ponderosa Pine and Canyon Live Oak Alliances. As a dominant conifer in this alliance, it is generally prevalent in the westside and foothills of the southern Sierras, having been mapped in the Upper Batholith and Lower Batholith Subsections at elevations usually between about 2600 – 4600 ft (792 – 1402 m). This type is often a result of past disturbances (usually fire) and may have an understory of Chamise (Adenostoma fasciculatum) in forest openings, but dense groves of Knobcone Pine may dominate disturbed areas. A closed cone, short-lived and rapidly growing pine, it is tolerant of ultrabasic rocks and other nutrient-poor soils and requires fire for seedling development.

LP
LODGEPOLE PINE ALLIANCE

The Lodgepole Pine (Pinus contorta ssp. murrayana) Alliance generally occurs within the Red Fir (Abies magnifica) elevation range in the southern Sierras, growing in open or closed stands on poorly drained soils or adjacent to meadows. The dominance of this pine in this alliance is usually an indicator of shallow soils formed by glacial scouring or areas having shallow water tables. It has been mapped abundantly in six subsections and less frequently in two others at elevations from about 5800 – 11,200 ft (1768 – 3416 m). Lodgepole Pine is an important invader species following fire or disturbance in the Sierra Nevadas and areas to the east and associates with other upper montane conifers such as Western White Pine (P. monticola), Foxtail Pine (P. balfouriana), and Whitebark Pine (P. albicaulis). It is often found adjacent to those Alliances as well as to the Subalpine Conifer, Wet Meadows, Mixed Conifer – Fir, Upper Montane Mixed Chaparral and Shrub Willow Alliances. In eastside conditions, higher elevation Great Basin shrubs such as Mountain Sagebrush (Artemisia tridentata var. vaseyana), Rothrock Sagebrush (A. rothrockii) and Low Sagebrush (A. arbuscula) may be found in close proximity to these sites.

MB
MIXED CONIFER FOREST WITH GIANT SEQUOIA ALLIANCE

This Alliance occurs on well drained and usually granitic soils at elevations below about 7800 ft (2379 m) in the southern Sierra Nevadas. Where it does not occupy half of the conifer canopy cover, Giant Sequoia (Sequoiadendron giganteum) is classified within this alliance and is associated with typical Mixed Conifer - Pine and Mixed Conifer – Fir trees such as Red and White Fir (Abies magnifica, A. concolor), Incense Cedar (Calocedrus decurrens), Sugar Pine (Pinus labertiana), Ponderosa Pine (P. ponderosa), and Black Oak (Quercus kelloggii). Upper Montane Mixed Chaparral shrubs such as Greenleaf Manzanita (Arctostaphylos patula) and Deerbrush (Ceanothus integerrimus) are sometimes found in close proximity to this type. It has been mapped in the Upper Batholith and Batholith and Volcanic Flows Subsections.

MD
INCENSE CEDAR ALLIANCE

Incense Cedar (Calocedrus decurrens) is a wide-ranging species that competes well on a variety of sites. It has been mapped sparsely as a dominant conifer in five subsections in the southern Sierras. The Incense Cedar Alliance is typically found in the elevation range 3000 - 4000 ft (915 – 1952 m), but this conifer is typically a component of the Mixed Conifer – Pine Alliance and associates with trees such as White Fir (Abies concolor), Ponderosa Pine (Pinus ponderosa) and Canyon Live and Black Oaks (Quercus chrysolepis, Q. kelloggii).

MF
MIXED CONIFER - FIR ALLIANCE

The Mixed Conifer – Fir Alliance is the higher elevation counterpart of the Mixed Conifer - Pine Alliance and is the second most prevalent conifer type of this zone, having been mapped within all subsections. It is especially abundant in the Upper Batholith, Lower Batholith, Kern Plateau, Upper Batholith and Volcanic Flows and Glaciated Batholith Subsections. This Alliance is mostly found within the elevation range of 5000 – 10,400 ft (1520 – 3172 m) on frigid soils in the Southern Sierras. The major species of this mixture include Red Fir (Abies magnifica), Western White Pine (Pinus monticola) and Lodgepole Pine (P. contorta ssp. murrayana) at the upper elevations and Jeffrey and Ponderosa Pines (P. jeffreyi, P. ponderosa) and White Fir (A. concolor) on lower sites. Other shrub associates, including Greenleaf Manzanita (Actostaphylos patula), Huckleberry Oak (Quercus vaccinifolia) and Mountain Whitethorn (Ceanothus cordulatus) are sometimes present in the understory.

MH
MOUNTAIN HEMLOCK ALLIANCE

Mountain Hemlock (Tsuga mertensiana), the dominant conifer of this Alliance, is representative of some subalpine areas within the Sierra Nevada especially north of Yosemite National Park, but has been mapped only in scattered stands in the southern Sierras. Generally found on north or east facing slopes where snow accumulation holds well into the summer months, it is prevalent in the Glaciated Batholith Subsection, but is much less common in four other subsections of this zone, having been mapped chiefly from about 8000-10,200 ft (2440 – 3111 m). Although it is potentially a tall tree in maturity, Mountain Hemlock may also become shrublike on exposed ridge tops. These stands may be associated with scattered conifers such as Lodgepole Pine (Pinus contorta ssp. murrayana), Western White Pine (P. monticola), Foxtail Pine (P. balfouriana) and Red Fir (Abies magnifica). In moist areas shrub Willows (Salix spp.) and Mountain Alder (Alnus incana ssp. tenuifolia) are commonly associated understory species.

MI
PIUTE CYPRESS ALLIANCE

Within Kern County, Piute Cypress (Cupressus arizonica ssp. nevadensis or Callitropsis nevadensis), a rare species, occurs in a major grove near Bald Eagle Peak. Smaller groves occur with chaparral species, Singleleaf Pinyon Pine (Pinus monophylla) and Junipers (Juniperus spp.) north of Bald Eagle Peak into Tulare County. The Piute Cypress Alliance has been mapped in small areas of the Lower Batholith and Tehachapi – Piute Mountains Subsections at elevations below about 6000 ft (1830 m). It is found adjacent to the Lower Montane Mixed Chaparral, California Buckwheat, Blue Oak and Singleleaf Pinyon Pine Alliances.

MP
MIXED CONIFER - PINE ALLIANCE

Ponderosa Pine (Pinus ponderosa) and Sugar Pine (P. lambertiana) are important components of the Mixed Conifer - Pine Alliance, the most commonly mapped conifer alliance in the southern Sierras. It has been mapped abundantly in the Batholith and Volcanic Flows (westside), Upper Foothills Metamorphic Belt and Upper Batholith Subsections and less commonly in five others in this zone. White Fir (Abies concolor), Incense Cedar (Calocedrus decurrens), Knobcone Pine (P. attenuata) and

several hardwoods such as Black Oak (Quercus kelloggii) may be present in varying amounts in the mixture. The Mixed Conifer – Pine Alliance is generally found at elevations between about 3200 – 6400 ft (976 – 1952 m), although scattered sites have been mapped at higher and lower altitudes. This Alliance is usually found on mesic soils between the higher Mixed Conifer - Fir and the lower Ponderosa Pine Alliances. Understory shrubs include Mountain Misery (Chamaebatia foliosa), Mountain Whitethorn (Ceanothus cordulatus), Mariposa (Whiteleaf) Manzanita (Arctostaphylos viscida ssp. mariposa), and at higher elevations, Greenleaf Manzanita (A. patula).

PD
GRAY PINE ALLIANCE

Gray Pine (Pinus sabiniana) is primarily found in the foothills, front country and steep, drier canyons of the Southern Sierras. When it is the dominant (and usually the only) conifer, such stands typically have a diverse multi-layered structure, with a mix of hardwoods and shrubs. The Gray Pine Alliance tends to be discontinuous, with interspersed patches of annual grasses. Blue Oak (Quercus douglasii), Interior Live Oak (Q. wislizenii) and Canyon Live Oak (Q. chrysolepis) often occur as mixed conifer-hardwood stands in this Alliance, especially towards the west and under drier site conditions in the southern Sierras. It has been mapped abundantly in the Upper Foothills Metamorphic Belt, Lower Batholith and Tehachapi – Piute Mountains Subsections and occasionally in the Upper Batholith and Volcanic Flows, Kern Plateau, Eastern Slopes and Upper Batholith Subsections at elevations up to about 7000 ft (2135 m), but usually much lower.

PJ
SINGLELEAF PINYON ALLIANCE

Singleleaf Pinyon Pine (Pinus monophylla) dominates open woodlands on dry, east slopes of the Southern Sierras and north of Mono Lake. Associated with this small conifer are the conifers Western (Mountain) Juniper (Juniperus occidentalis var. australis, also called J. grandis), Jeffrey Pine (P. jeffreyi) and Utah Juniper (J. osteosperma), occasional hardwoods such as Canyon and Interior Live Oaks and Black Oak (Quercus chrysolepis, Q. wislizenii, Q. kelloggii) and Curlleaf Mountain Mahogany (Cercocarpus ledifolius). Understory shrub species occurring in this type include California Juniper (J. californica), Big Sagebrush (Artemisia tridentata), Bitterbrush or Cliffrose (Purshia tridentata, P. mexicana), Cacti (Opuntia spp.) and Rabbitbrush (Chrysothamnus spp.). The Singleleaf Pinyon Pine Alliance is very common in the Eastern Slopes, Tehachapi – Piute Mountains and Kern Plateau Subsections and has been less frequently mapped in the Upper Batholith, Lower Batholith, Glaciated Batholith and Glaciated Batholith and Volcanic Flows Subsections.

PL
LIMBER PINE ALLIANCE

Limber Pine (Pinus flexilis) is dominant in this Alliance, which persists on dry, steep, high elevation sites. These slopes are often east facing, eroded, rocky, coarse-textured, and with low soil nutrient levels; Limber Pine apparently grows where Whitebark Pine (P. albicaulis) is absent in the Southern Sierras. As soil conditions improve, Limber Pine loses its site dominance and becomes mixed with other conifer species in the Subalpine Conifers Alliance. The Limber Pine Alliance has been mapped frequently in the Eastern Slopes, and occasionally in the Glaciated Batholith, and Glaciated Batholith and Volcanic Flows Subsections, generally at elevations in the range 8000 - 10,600 ft (2440 - 3232 m). These stands occasionally form an association with an understory of Curlleaf Mountain Mahogany (Cercocarpus ledifolius) or Aspen (Populus tremuloides).

PP
PONDEROSA PINE ALLIANCE

Ponderosa Pine (Pinus ponderosa), the dominant conifer of this Alliance, forms an identifiable zone within an elevation range of about 1600 – 7000 ft (488 – 2135 m) in this area. This zone occurs above the low elevation chaparral and hardwood alliances, and below the Mixed Conifer - Pine Alliance and has been mapped very extensively in the Upper Foothills Metamorphic Belt, Lower Batholith, Batholith and Volcanic Flows and Upper Batholith Subsections, also occurring in four other subsections. Ponderosa Pine occurs on xeric soils and is well adapted to low ground fires which create forest openings for this light demanding conifer to become established. Associated conifer species are those in the Mixed Conifer – Pine Alliance, such as Pacific Douglas-Fir (Pseudotsuga menziesii), Incense Cedar (Calocedrus decurrens), Sugar Pine (P. lambertiana), and White Fir (Abies concolor). Hardwoods of mixed stands in this alliance include mainly Canyon Live Oak (Quercus chrysolepis), but also some Interior Live and Black Oaks, (Q. wislizenii, Q. kelloggii). Mountain Misery (Chamaebatia foliolosa) and Whiteleaf (Mariposa) Manzanita (Arctostaphylos viscida ssp. mariposa) are major understory shrub species.

PW
PONDEROSA PINE – WHITE FIR ALLIANCE

Ponderosa Pine (Pinus ponderosa) and White Fir (Abies concolor) occur together in this Alliance with no other significant conifers present in the mixture, conditions being optimal for White Fir regeneration and maintenance. This type has been mapped very rarely, and occurs only in the Tehachapi – Piute Mountains Subsection at elevations around 5200 – 6600 ft (1586 – 2012 m) in close proximity to the Mixed Conifer – Fir and Ponderosa Pine Alliances. Hardwoods such as Black and Canyon Live Oaks (Quercus kelloggii, Q. chrysolepis) are sometimes associated with this type.

RF
RED FIR ALLIANCE

Red Fir (Abies magnifica) generally occurs in dense, pure stands or as a local inclusion in the Mixed Conifer - Fir Alliance. As a dominant conifer in this alliance, it is found on both east and west slopes in the Sierra Nevada from about 6000 – 10,200 ft (1830 – 3111 m) on frigid soils. It has been mapped extensively in the Upper Batholith, Glaciated Batholith, Upper Batholith and Volcanic Flows, Glaciated Batholith and Volcanic Flows, and Kern Plateau Subsections. It occurs less prominently in the Lower Batholith, Eastern Slopes and two other Subsections. Understory plants do not generally occur in dense Red Fir stands with heavy litter accumulation except for low growing shrubs such as Pipsissewa and Wintergreen (Chimaphila menziesii, 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 (A. patula) are the dominant understory shrubs. Western White Pine (Pinus monticola) and Lodgepole Pine (P. contorta ssp. murrayana) are associated conifer species, but Mountain Hemlock (Tsuga mertensiana) may occur as isolated trees in colder areas of the Red Fir Alliance.

SA
SUBALPINE CONIFERS ALLIANCE

A mixture of high-elevation conifers in this region has been identified as the Subalpine Conifers Alliance. Depending on latitude and other environmental factors, the mixture includes three or more of the following species: Mountain Hemlock (Tsuga mertensiana), Lodgepole Pine (Pinus contorta ssp. murrayana), Western White Pine (P. monticola), Foxtail Pine (P. balfouriana), Red Fir (Abies magnifica), Limber Pine (P. flexilis) and/or Whitebark Pine (P. albicaulis). Hardwoods such as Aspen (Populus tremuloides) are rarely associated with this Alliance, but shrubs such as Willows (Salix spp.) and Low Sagebrush (Artemisia arbuscula) are often found adjacent to this type. The Subalpine Conifers Alliance has been abundantly mapped on westside and eastside sites in five subsections and less frequently in four others, where the general elevation range is approximately 7600 - 11,800 ft (2318 – 3599 m).

WB
WHITEBARK PINE ALLIANCE

This Alliance is dominated by Whitebark Pine (Pinus albicaulis), occurring on high windswept ridges at the uppermost Red Fir or subalpine zone, having been mapped most frequently within the elevation range 8600 – 12,000 ft (2623 – 3660 m) in this zone. In these areas, a krummholzed form is common, but an upright form also grows in areas of glacial scouring where soil development is poor. It has been identified with some abundance in the Glaciated Batholith and Eastern Slopes Subsections, and also occurs in four other subsections in the southern Sierras. Lodgepole Pine (P. contorta ssp. murrayana), Western White Pine (P. monticola) and Foxtail Pine (P. balfouriana) are the main conifer associates on these open sites with typical understories of alpine grasses and forbs.

WF
WHITE FIR ALLIANCE

White Fir (Abies concolor) occurs in pure stands in this Alliance, which is usually found at elevations higher than the Mixed Conifer-Fir Alliance in which White Fir has favorable conditions for its regeneration. This type has been mapped in scattered locations of all ten subsections of the southern Sierras zone at elevations generally between about 4800 – 9400 feet (1464 – 2866 m), the higher altitudes being on the eastside. Ponderosa and Jeffrey Pines (Pinus ponderosa, P. jeffreyi) are very occasionally associated. These stands usually have both a White Fir overstory and understory. There are few understory shrubs as litter accumulation is usually quite high but scattered Pipsissewa and Wintergreen (Chimaphila menziesii and Pyrola picta) may occur. At its higher elevations, White Fir overlaps the elevational distribution of Red Fir (A. magnifica) and they often occur together.

WJ
WESTERN (MOUNTAIN) JUNIPER

Western or Mountain Juniper (Juniperus occidentalis var. australis, also called J. grandis), a very long-lived, shade-intolerant conifer, is characteristic of warm, dry and often windy upper slopes. Although fairly wind-firm, its short form becomes wind-trained and picturesque on exposed sites. Scattered junipers on open sites may dominate such areas and form this alliance. This type has been mapped in the southern Sierras at elevations mainly between about 6400 - 10,000 ft (1952 – 3050 m). It occurs, commonly in association with Jeffrey Pine (Pinus jeffreyi); on relatively open stands, on granitic, exposed sites of higher slopes and ridges. The Mountain Juniper Alliance has been mapped extensively in the Glaciated Batholith Subsection and more sparsely in five others. Species adjacent to and within this type include Huckleberry Oak (Quercus vaccinifolia), Red Fir (Abies magnifica), Western White Pine (P. monticola), Lodgepole Pine (P. contorta ssp. murrayana) and Mountain Whitethorn (Ceanothus cordulatus).

WW
WESTERN WHITE PINE ALLIANCE

Western White Pine (Pinus monticola), a tall and adaptable conifer, often occurs in small groves on high elevation, dry, windblown, granitic slopes in this zone. On better sites, it associates with Red Fir (Abies magnifica) and trees in the Subalpine Conifers Alliance such as Mountain Hemlock (Tsuga mertensiana), Lodgepole Pine (P. contorta ssp. murrayana) and Whitebark Pine (P. albicaulis). Western White Pine is not found south of Tulare County but has been mapped in the southern Sierras abundantly in the Kern Plateau and less frequently in the Upper Batholith, Glaciated Batholith and Volcanic Flows and Upper Batholith and Volcanic Flows Subsections. It has been identified generally within the range of 7400 – 10,600 (2256 – 3233 m). On the eastside, the Western White Pine Alliance is associated with shrubs such as Low and Mountain Sagebrush (Artemisia arbuscula, A. tridentata var. vaseyana).

HARDWOOD FOREST / WOODLAND

FM
CURLLEAF MOUNTAIN MAHOGANY ALLIANCE

The single-stemmed tree form of Curlleaf Mountain Mahogany (Cercocarpus ledifolius var. intermontanus) occurs as a dominant hardwood on gently to steeply sloping mountain uplands and ridge tops, usually in association with rocky outcrops. On xeric sites, Curlleaf Mountain Mahogany may occur as the dominant woody species in association with grasses such as Idaho Fescue (Festuca idahoensis) and Squirreltail (Elymus elymoides). On more mesic sites, associates may include Quaking Aspen (Populus tremuloides), Jeffrey Pine (Pinus jeffreyi), Singleleaf Pinyon Pine (P. monophylla) and White Fir (Abies concolor) in the southern Sierras. The shrub form of Curlleaf Mountain Mahogany and other Great Basin shrubs such as Mountain and Low Sagebrush (Artemisia tridentata ssp. vaseyana, A. arbuscula) are often found in close proximity to these sites. This Alliance has been mapped occasionally in four subsections, most notably in the Eastern Slopes Subsection at elevations chiefly above about 7000 ft (2135 m).

FO
WATER BIRCH ALLIANCE

Water Birch (Betula occidentalis) may become a dominant small tree in riparian areas, especially on east slopes of the southern Sierras. It has been mapped in this zone occasionally in the Glaciated Batholith and Eastern Slopes Subsections, generally in an elevation range between 4000 – 9000 ft (1220 – 2744 m). Other hardwoods associated with this type include Quaking Aspen (Populus tremuloides) and Black Cottonwood (Populus balsamifera ssp. trichocarpa). Upland conifers such as Jeffrey Pine (Pinus jeffreyi) and Singleleaf Pinyon Pine (P. monophylla) are occasionally found in close proximity to this type, as well as the shrub Big Sagebrush (Artemisia tridentata).

NR
RIPARIAN MIXED HARDWOOD ALLIANCE

A mixture of two or more non-dominant hardwoods found in shaded drainages, riparian and seep sites has been mapped in scattered pockets of seven subsections in the southern Sierras zone such as in the Upper Foothills Metamorphic Belt, Tehachapi – Piute Mountains, and Lower Batholith Subsections. Elevations range from below 1000 ft (305 m) up to about 9600 feet (2928 m), reflecting a variety of hardwoods such as Bigleaf Maple (Acer macrophyllum), California Bay (Umbellularia californica), Mountain Dogwood (Cornus nuttallii), Fremont or Black Cottonwoods (Populus fremontii, P. balsamifera ssp. trichocarpa) and Oregon Ash (Fraxinus latifolia). Tree Willows (Salix spp.), White Alder (Alnus rhombifolia) also commonly occur, with California Sycamore (Platanus racemosa) occasionally towards the west part of this zone. Upland

trees such as Interior Live Oak (Quercus wislizenii) and Canyon Live Oak (Q. chrysolepis) occasionally occur on these sites. Quaking Aspen (Populus tremuloides) and Water Birch (Betula occidentalis) are more prevalent in this type in the Eastern Slopes Subsection and an occasional Valley Oak (Q. lobata) is more likely to occur in the Kern Plateau Subsection.

NX
INTERIOR MIXED HARDWOOD ALLIANCE

A mixture of upland hardwoods with no clearly dominant species occurs very commonly in the Lower Batholith and Tehachapi - Piute Mountains Subsections and more rarely in five other subsections. This type has been mapped most often in the elevation range of about 1000 – 6000 ft (305 – 1830 m). The mixture includes any combination of Interior Live Oak (Quercus wislizenii), Canyon Live Oak (Q. chrysolepis), Blue Oak (Q. douglasii), and/or California Buckeye (Aesculus californica), with Valley Oak (Q. lobata) or Black Oak (Q. kelloggii) occurring less frequently. The occasional overstory conifers may include Gray Pine (Pinus sabiniana) or Ponderosa Pine (P. ponderosa). Lower-elevation shrubs in canopy openings such as Wedgeleaf Ceanothus (Ceanothus cuneatus) and Birchleaf Mountain Mahogany (Cercocarpus betuloides) may also be present onsite or in the vicinity.

QC
CANYON LIVE OAK ALLIANCE

Canyon Live Oak (Quercus chrysolepis) in pure stands generally occurs above the Lower Montane Mixed Chaparral Alliance and below the Black Oak (Q. kelloggii) and Ponderosa Pine (Pinus ponderosa) Alliances on droughty sites. The Canyon Live Oak Alliance is the most frequently mapped hardwood type in the southern Sierras, being present in eight subsections, most abundantly in the Lower Batholith Subsection. These sites are often found on shallow colluvial soils in steep canyons generally between about 1600 feet (488 m) and 8400 feet (2562 m) in the Southern Sierras, the higher elevations in the east. The Alliance is occasionally also associated with the Mixed Conifer – Pine and Interior Live Oak (Q. wislizenii) Alliances, usually on rock outcrops and ridge tops. Shrubs such as Deerbrush (Ceanothus integerrimus) and Whiteleaf Manzanita (Arctostaphylos viscida) may occur in the understory, as well as annual grasses and forbs. In the Tehachapi – Piute Mountains Subsection, this type is frequently found adjacent to the Singleleaf Pinyon Pine, California Buckwheat, Scrub Oak and Great Basin – Mixed Chaparral Transition Alliances.

QD
BLUE OAK ALLIANCE

The Blue Oak (Quercus douglasii) Alliance occurs on shallow upland soils in foothill savannas adjacent to the western slopes of the Sierra Nevada. It has been mapped in five ecological units, most commonly in the Tehachapi – Piute Mountains, Lower Batholith and Upper Foothills Metamorphic Belt Subsections. Elevations where mapped are often in the 1000 – 5800 ft (305 – 1768 m) range, highest towards the south. Blue Oak naturally occurs in an oak-grass association on well drained, gentle slopes. Gray Pine (Pinus sabiniana) is the most common tree associate in this hillside type; Interior Live Oak (Q. wislizenii) may also be a major hardwood occurring in close proximity to this type. Non-stump sprouting chaparral shrubs such as Wedgeleaf Ceanothus (Ceanothus cuneatus), Manzanitas (Arctostaphylos spp.), Coffeeberry (Rhamnus spp.), California Buckwheat (Eriogonum fasciculatum) and Poison Oak (Toxicodendron diversilobum) are scattered throughout this Alliance and Chamise (Adenostoma fasciculatum) often occurs adjacent to these sites.

QE
WHITE ALDER ALLIANCE

White Alder (Alnus rhombifolia) is the major dominant hardwood in this Alliance, although Oregon Ash (Fraxinus latifolia), Water Birch (Betula occidentalis) and Black Cottonwood (Populus balsamifera ssp. trichocarpa) are often present. The White Alder Alliance occurs in riparian areas at mid-montane elevations throughout the southern Sierra Nevada on both eastside and westside slopes, and has been mapped to a limited extent in seven subsections. Elevations are in the range of about 2600 – 6400 ft (792 – 1952 m). Upland associated types include the Lower Montane Mixed Chaparral, Ponderosa Pine and Mixed Conifer – Pine Alliances.

QF
FREMONT COTTONWOOD ALLIANCE

Fremont Cottonwood (Populus fremontii) is the dominant hardwood of this type and is especially common in riparian areas east of the Kern River northward to Mono Lake. Willows (Salix spp.), both shrubby and arboreal, may also be present in this type, with California Buckeye (Aesculus californica) and an occasional Bigleaf Maple (Acer macrophyllum) associating in moist or shaded areas. The Fremont Cottonwood Alliance has been mapped sparsely in three subsections of the southern Sierras, generally within the elevation range of 2800 – 4400 ft (854 – 1342 m). Within the Eastern Slopes Subsection, this type

is more likely to be found adjacent to the Willow, Rabbitbrush, and Wet Meadows Alliances.

QI
CALIFORNIA BUCKEYE ALLIANCE

California Buckeye (Aesculus californica) has been mapped on occasion in pure stands in three subsections of the southern Sierras, occurring most often in the western sectors of the Lower Batholith Subsection at elevations between 1600 – 4800 ft (488 – 1464 m). These areas are adjacent to hardwoods such as Interior and Canyon Live Oaks (Quercus wislizenii, Q. chrysolepis) and Blue Oak (Q. douglasii). Sites on which California Buckeye occur tend to be xeric in this zone, but often moister in areas of other zones further north and west.

QK
BLACK OAK ALLIANCE

Black Oak (Quercus kelloggii) occurs in pure stands or associates with Ponderosa Pine (Pinus ponderosa), generally below about 8200 feet (2501 m) on westside slopes of the southern Sierra Nevada. This occasionally sprouting hardwood out-competes the pine on poorly drained or somewhat shallow soils. In other mixed stands, Black Oak is more commonly associated with the Mixed Conifer – Pine and Mixed Conifer – Fir Alliances. It has been mapped in nine subsections, most often in the Upper Foothills Metamorphic Belt, Lower Batholith, Tehachapi – Piute Mountains, Upper Batholith, and Batholith and Volcanic Flows Subsections. Shrubs of the Lower and Upper Montane Mixed Chaparral Alliances may be found adjacent to this type.

QL
VALLEY OAK ALLIANCE

Valley Oak (Quercus lobata) has been mapped in open stands in five subsections of the southern Sierras area. It is found more commonly along the western edges of the Lower Batholith Subsection and further inland in the Tehachapi – Piute Mountains Subsection at mapped elevations generally up to about 5400 ft (1648 m). Annual grasses and forbs often are found adjacent to this type, as are the frequent hardwood associates Blue Oak (Q. douglasii) and Interior Live Oak (Q. wislizenii).

QM
BIGLEAF MAPLE ALLIANCE

Bigleaf Maple (Acer macrophyllum), a tree of mesic environments, is found in limited areas of this zone being more commonly found in the North Coast and Montane Calveg zone. It is identified as the dominant hardwood in this alliance. The shrubs Pacific Dogwood (Cornus nuttallii) and California Hazelnut (Corylus cornuta) and the hardwoods Boxelder (Acer negundo), White Alder (Alnus rhombifolia) and Black Cottonwood (Populus balsamifera ssp. trichocarpa) are sometimes found on these sites. Sites are usually either well-shaded or are riparian areas of low to moderate elevation ranges. This Alliance has been mapped sparsely in three subsections, where it is found in close proximity to upland types such as the Canyon Live Oak, Upper Montane Mixed Chaparral and Mixed Conifer – Pine Alliances.

QO
WILLOW ALLIANCE

This Alliance is dominated by mixed or single species of tree Willow (Salix spp.). It has been mapped most frequently on the east side of the Sierra Nevada where stream or pond conditions provide sufficient moisture in seven subsections at low to moderate elevations, mostly from about 2600 – 7400 ft (792 – 2256 m). Riparian hardwoods such as Water Birch (Betula occidentalis) and Fremont Cottonwood (Populus fremontii) often occur in close proximity to these areas, while Great Basin upland shrub species such as Rabbitbrush (Chrysothamnus spp.), Interior Rose (Rosa woodsii), and Big Sagebrush (Artemisia tridentata) may occur in narrow canyons adjacent to this Alliance.

QP
CALIFORNIA SYCAMORE ALLIANCE

Riparian areas dominated by California Sycamore (Platanus racemosa) have been mapped in one area of the Lower Batholith Subsection at elevations between about 1800 – 4400 ft (548 – 1342 m). Other riparian or mesic site hardwoods may be present in this alliance in minor amounts, such as Fremont Cottonwood (Populus fremontii), Bigleaf Maple (Acer macrophyllum) and Willows (Salix spp.).

QQ
QUAKING ASPEN ALLIANCE

Quaking Aspen (Populus tremuloides) forms clonal stands and dominates the hardwoods in this Alliance. In the southern Sierras, it occurs at high elevations as an indicator of moist conditions in association with Red Fir (Abies magnifica), Lodgepole Pine (Pinus contorta ssp. murrayana), Whitebark Pine (P. albicaulis), and Jeffrey Pine (P. jeffreyi). The Quaking Aspen Alliance has been mapped with some frequency in the Eastern Slopes Subsection, generally above an elevation of about 4600 ft (1402 m). In this eastside region, its associated shrubs have Great Basin affinities: Mountain Sagebrush (Artemisia tridentata ssp. vaseyana), Curlleaf Mountain Mahogany (Cercocarpus ledifolius) and Low Sagebrush (A. arbuscula). It also occurs less commonly in seven other subsections. At higher elevations and under exposed conditions, Quaking Aspen stands may maintain a shrub-like form and never reach tree sizes.

QW
INTERIOR LIVE OAK ALLIANCE

Interior Live Oak (Quercus wislizenii) occurs as a hardwood dominant in semi-open or closed stands in this Alliance, and was mapped broadly and widespread along the western borders and some interior locations of six subsections of the southern Sierra Nevadas. It is most abundant in the Lower Batholith, Upper Foothills Metamorphic Belt and Tehachapi – Piute Mountains, and Batholith and Volcanic Flows Subsections, generally at elevations between about 1200 – 6400 ft (366 – 1952 m). Canyon Live Oak (Q. chrysolepis) or Black Oak (Q. kelloggii) may become associated with the Interior Live Oak Alliance at higher elevations, grading into the Interior Mixed Hardwoods Alliance, especially in the Tehachapi – Piute Mountains Subsection. Ponderosa Pine (Pinus ponderosa) commonly occurs with Interior Live Oak in mixed stands. On drier sites or lower elevations, Gray Pine (P. sabiniana), Blue Oak (Q. douglasii) and Buckeye (Aesculus californica) are associated trees. In most areas, shrub associates are chiefly those in the Lower Montane Mixed Chaparral type, such as Chamise (Adenostoma fasciculatum) and Wedgeleaf Ceanothus (Ceanothus cuneatus). However, shrubs such as California Buckwheat (Eriogonum fasciculatum), Scrub Oak (Q. berberidifolia) and Big Sagebrush (Artemisia tridentata) are more likely to be within and adjacent to this Alliance in the Tehachapi – Piute Mountains Subsection.

QX
BLACK COTTONWOOD ALLIANCE

Black Cottonwood (Populus balsamifera ssp. trichocarpa) has been mapped occasionally as a riparian Alliance in the southern Sierras within a wide elevation band. The Black Cottonwood Alliance has been mapped in five subsections, generally between about 1800 – 8000 ft (550 – 2440 m). The higher sites are in the Eastern Slopes Subsection, where it associates with hardwoods such as Quaking Aspen (Populus tremuloides) and Water Birch (Betula occidentalis) and riparian and upland shrubs such as Big Sagebrush (Artemisia tridentata), Bitterbrush (Purshia tridentata) and Willows (Salix spp.). In other areas, it is found adjacent to the Wet Meadows and Mixed Conifer – Pine Alliances.

TX
MONTANE MIXED HARDWOOD ALLIANCE

The Montane Mixed Hardwood type usually has been mapped at mid-montane elevations where Ponderosa Pine (Pinus ponderosa) becomes an important conifer, often at altitudes between about 3600 ft (1098 m) and 6000 ft (1830 m). These are often, but not exclusively, above the Interior Mixed Hardwoods type in the southern Sierras. Such sites have no single dominant hardwood, but usually have Black Oak (Quercus kelloggii) as an important component of a mixture in which Canyon and Interior Live Oaks (Q. chrysolepis, Q. wislizenii) may also occur. The type has been identified in six subsections, most commonly in the Tehachapi – Piute Mountains, where it is often found adjacent to annual grasses and forbs and pure stands of Black and Canyon Live Oaks. In the Tehachapi Mountains, species such as Brewer Oak (Q. garryana var. breweri) and Scrub Oak (Q. berberidifolia) may occur in adjacent sites.

UJ
JOSHUA TREE ALLIANCE

Joshua Tree (Yucca brevifolia), a tree-like monocot, is widespread and very characteristic of the Mojave Desert. As a dominant hardwood in this alliance, it has been mapped in scattered areas of the Eastern Slopes Subsection within an elevation range of about 3000 – 6200 ft (914 – 1890 m). In this region of the southern Sierras, this type associates with a diversity of desert shrubs in the Desert Mixed Scrub, High Desert Mixed Scrub and Great Basin – Desert Mixed Scrub Alliances such as Greasewood (Larrea tridentata), Mormon Tea (Ephedra spp.), Blackbrush (Coleogyne ramosissima), Spiny Menodora (Menodora spinescens), White Bursage (Ambrosia dumosa), Horsebrush (Tetradymia spp.) and Big Sagebrush (Artemisa tridentata).

UT
TAMARISK ALLIANCE

Tamarisk or Salt Cedar (Tamarix spp.), a genera of species introduced from Asia, Africa, and southeastern Europe, is dominant in this Alliance. The most common species in this area are Four-Stamen and Five-Stamen Tamarisk (Tamarix parviflora, Tamarix ramosissima). All are usually found along desert and semi-desert washes, moist desert seeps and streams, commonly in the South Interior Calveg Zone. In the South Sierran Calveg Zone, the Tamirisk Alliance has been mapped very sparsely in the Eastern Slopes Subsection along Cache Creek in the vicinity of 4000 ft (1220 m).

UX
SMOKE TREE ALLIANCE

Smoke Tree (Psorothamnus spinosa) may occur infrequently in nearly pure stands in sandy washes of Mojave-influenced arid areas. It dominates this hardwood Alliance and has been mapped very sparsely at elevations below 2000 ft (610 m) in the North Fork Watershed of a southern section of the Eastern Slopes Subsection. In this area, it is associated with areas of annual grasses and forbs, Creosote Bush (Larrea tridentata) and shrubs in the Desert Mixed Wash Scrub Alliance, such as Saltbush (Atriplex spp.), Iodine Bush (Allenrolfea occidentalis), and Horsebrush (Tetradymia spp.),

WD
DOGWOOD ALLIANCE

Brown Dogwood (Cornus glabrata) and/or Mountain Dogwood (Cornus nuttallii) occur as dominant hardwoods in the Dogwood Alliance of the southern Sierras. Arboreal forms of American Dogwood (C. sericea) may also be included in this type. It has been mapped in only one location at the extreme southern end of the Batholith and Volcanic Flows Subsection at elevations from about 5400 – 6200 ft (1646 – 1890 m). Dogwoods occur on these mesic sites as understory trees to conifers in the Mixed Conifer Forest with Giant Sequoia Alliance, in association with Incense Cedar (Calocedrus decurrens) and Giant Sequoia (Sequoiadendron giganteum).

SHRUBS AND CHAPARRAL

AD
WHITE BURSAGE ALLIANCE

As a dominant shrub, White Bursage (Ambrosia dumosa) occurs occasionally in the Eastern Slopes Subsection at an elevation range between about 3000 – 6000 ft (1915 – 1830 m). It is found adjacent to and is associated with the Desert Mixed Scrub, High Desert Mixed Scrub and the Great Basin – Desert Mixed Scrub types in this area. These types may include species such as Blackbrush (Coleogyne ramosissima), Mormon Tea (Ephedra spp.), Creosote Bush (Larrea tridentata) and other desert or Great Basin shrubs such as Big Sagebrush (Artemisia tridentata).

AX
ALPINE MIXED SCRUB ALLIANCE

Alpine Mixed Scrub communities are often a mixture of tall and dwarf shrubs and some low graminoid and forb species which often include cushion or rosette-leaved plants that are able to survive harsh climatic conditions above timberline. Species composition varies considerably throughout California. In the Sierra Nevada, the most common subshrubs are Creambush Oceanspray (Holodiscus discolor), Greene's Goldenweed (Ericameria greenei) and Mountain White Heather (Cassiope mertensiana). Shrubby Willows (Salix spp.) are also common in this type. Non-shrub species include those represented in the Alpine Grasses and Forbs Alliance. The Alpine Mixed Scrub Alliance has been mapped occasionally in three subsections of the southern Sierras, chiefly in a range of about 8000 – 12,600 ft (2440 – 3843 m) in close proximity to shrubs such as Low Sagebrush (Artemisia arbuscula) and to the Alpine Grasses and Forbs Alliance and within patches between stands of subalpine conifers such as Whitebark Pine (Pinus albicaulis) and Lodgepole Pine (Pinus contorta ssp. murrayana). Shrubs such as Low Sagebrush (Artemisia arbuscula) and the Alpine Grasses and Forbs Alliance are in the immediate vicinity.

BB
BITTERBRUSH ALLIANCE

Bitterbrush (Purshia tridentata) becomes a dominant subshrub of this Alliance in four eastside subsections in areas such as the Mono Basin southeast of Mono Lake and in the headwaters of the Owens River. The Bitterbrush Alliance includes both Antelope Bitterbrush (P. t. var. tridentata) and Desert Bitterbrush (P. t. var. glandulosa) in this zone, but not Cliffrose (P. mexicana var. stansburyana), which is more common in the Great Basin Calveg Zone. The Alliance has been mapped at

elevations from about 4800 – 8000 ft (1464 – 2440 m). This high value forage species is associated with eastside species such as Big Sagebrush (Artemisia tridentata), Singleleaf Pinyon Pine (Pinus monophylla), and Jeffrey Pine (P. jeffreyi).

BC
SALTBUSH ALLIANCE

Both Shadscale (Atriplex confertifolia) and Fourwing Saltbush (A. canescens) occur from northern Owens Valley to Kern County. Shadscale is generally located on dry alkaline plains and hills on the east slopes of the Sierra Nevada in Mono, Kern, and Inyo Counties. Fourwing Saltbush may be abundant on saline desert flats and washes of the same counties. The Saltbush Alliance is a combination of these two and/or other Atriplex species. It has been very sparsely mapped in the Eastern Slopes and Tehachapi - Piute Mountains Subsections at elevations of about 3000 – 5000 ft (914 – 1524 m). The Rabbitbrush Alliance (Chrysothamnus spp.) is closely associated with this type, as are other alkaline desert species such as Horsebrush (Tetradymia spp.).

BL
LOW SAGEBRUSH ALLIANCE

Low Sagebrush (Artemisia arbuscula), a dwarf and spreading shrub, has been mapped as a dominant shrub extensively in this zone in five subsections at elevations from about 7000 – 11, 800 ft (2134 – 3600 m). It typically grows on sites too harsh for Big Sagebrush (A. tridentata), such as those on dry, rocky slopes with shallow or alkaline soils and/or those with prominently exposed bedrock. It is often found in shallow claypan soils, for example, and on warmer slopes at high elevations. When found growing with Black Sagebrush (A. nova), it may occupy more saline or alkaline sites. Within the Eastern Slopes Subsection, where the Low Sagebrush type is very common, associated conifers are chiefly Whitebark Pine (Pinus albicaulis) and Lodgepole Pine (P. contorta ssp. murrayana) at these high altitudes. Quaking Aspen (Populus tremuloides) is sometimes found adjacent to Low Sagebrush sites, as well as the Alpine Grasses and Forbs Alliance. In addition, other Great Basin species, including Mountain Sagebrush (A. tridentata ssp. vaseyana) and Curlleaf Mountain Mahogany (Cercocarpus ledifolius) are typically found within the vicinity of these sites.

BM
CURLLEAF MOUNTAIN MAHOGANY ALLIANCE

This Alliance occurs on gently to steeply sloping mountain uplands and ridge tops, usually in association with rocky outcrops. Curlleaf Mountain Mahogany (Cercocarpus ledifolius) has been mapped more frequently in its shrub form than as a tree in the southern Sierras. It is abundant in the Eastern Slopes, Glaciated Batholith and Volcanic Flows and Markleeville Subsections mainly at elevations above about 5400 ft (1646 m) and has also been mapped in the Tehachapi - Piute Mountains Subsection. Great Basin shrubs such as Mountain and Low Sagebrush (Artemisia tridentata ssp. vaseyana, A. arbuscula) and conifers such as Jeffrey, Lodgepole and Singleleaf Pinyon Pines (Pinus jeffreyi, P. contorta ssp. murrayana, P. monophylla) occur in the vicinity of this Alliance. Quaking Aspen (Populus tremuloides) is occasionally associated with it.

BQ
GREAT BASIN MIXED SCRUB ALLIANCE

A mixture of common Great Basin shrubs defines this type, which has been mapped abundantly in the Eastern Slopes and Markleeville Subsections and less frequently in the Glaciated Batholith, Glaciated Batholith and Volcanic Flows, and Kern Plateau Subsections. Elevation ranges are commonly within about 5000 – 10,600 ft (1524 – 3233 m) in the southern Sierras. The species mixture includes Big Basin Sagebrush (Artemisia tridentata ssp. tridentata), Mountain Sagebrush (A. t. ssp. vaseyana), Low Sagebrush (A. arbuscula), Bitterbrush (Purshia tridentata), Curlleaf Mountain Mahogany (Cercocarpus ledifolius) and species of Currant (Ribes spp.), Snowberry (Symphoricarpos spp.) and/or Interior Rose (Rosa woodsii). Trees most often found in the vicinity of the Great Basin Mixed Scrub type include Quaking Aspen (Populus tremuloides), Jeffrey Pine (Pinus jeffreyi), Whitebark Pine (P. albicaulis) and Lodgepole Pine (P. contorta ssp. murrayana).

BR
RABBITBRUSH ALLIANCE

Extreme southeastern areas of the southern Sierra Nevada are partially under the influence of the Mojave Desert climate regime. This Alliance is found on dry slopes and flats that are dominated by various species of Rabbitbrush (Chrysothamnus spp.) in those areas as well as in other sites that may have a history of ground disturbance. The Bitterbrush Alliance has been mapped in scattered locations in six subsections, chiefly within an elevation range of about 2600 – 9000 ft (792 – 2745 m), often in proximity to the Annual Grasses and Forbs Alliance in the Eastern Slopes, Kern Plateau and Tehachapi – Piute Mountains Subsections. In the Tehachapis, it is also associated with Gray Pine (Pinus sabiniana) and in eastside environments, with Big Sagebrush (Artemisia tridentata). California Buckwheat (Eriogonum fasciculatum) may be present in this alliance in

minor amounts.

BS
BIG SAGEBRUSH ALLIANCE

Big Sagebrush (Artemisia tridentata), the dominant shrub of this Alliance, has been mapped separately as Mountain Sagebrush (A. t. ssp. vaseyana) and Big Basin Sagebrush (A. t. ssp. tridentata) in parts of the southern Sierras and especially in the Great Basin Calveg Zone. The subspecies are merged in this alliance and it has been consequently mapped within a wide elevation range, mainly from 3600 – over 10,000 ft (1098 – 3050 m). This alliance is very prominent in the Eastern Slopes and Kern Plateau Subsections, and less so in five others. Big Sagebrush is usually found on frigid soils having little or no soil profile development and in coarse depositional areas, being strongly associated with other Great Basin or dry-site shrubs such as Curlleaf Mountain Mahogany (Cercocarpus ledifolius), Bitterbrush (Purshia tridentata) and Rabbitbrush (Chrysothamnus spp.). It is a main component of several types of mixed shrub communities that are often found in close proximity, including the Great Basin Mixed Scrub, the Great Basin – Mixed Chaparral Transition and the Great Basin – Desert Mixed Scrub Alliances. Eastside trees such as Singleleaf Pinyon Pine (Pinus monophylla), Junipers (Juniperus spp.), Jeffrey Pine (P. jeffreyi) and Quaking Aspen (Populus tremuloides) occur in the vicinity of this alliance.

BX
GREAT BASIN - MIXED CHAPARRAL TRANSITION ALLIANCE

This Alliance is a transition type that includes shrub species associated with the Great Basin such as Mountain Big Sagebrush (Artemisia tridentata ssp. vaseyana), Big Basin Sagebrush (A. t. ssp. tridentata), Low Sagebrush (A. arbuscula), Bitterbrush (Purshia tridentata, Rabbitbrush (Chrysothamnus spp.) and Curlleaf Mountain Mahogany (Cercocarpus ledifolius) with an equivalent vegetation cover of upper montane hard chaparral species such as Snowbrush (Ceanothus velutinus), Mountain Whitethorn (Ceanothus cordulatus), Thimbleberry (Rubus parviflorus), and Snowberry (Symphoricarpos spp.). Bladderpod (Isomeris arborea) and California Buckwheat (Eriogonum fasciculatum) may also be present on some of these sites. This type has been mapped frequently at moderate elevations in the Tehachapi – Piute Mountains Subsection (3800 – 5800 ft or 1160 – 1770 m), where this type is adjacent to lower elevation trees such as Canyon Live Oak (Quercus chrysolepis), Interior Live Oak (Q. wislizenii) and Gray Pine (Pinus sabiniana) and Blue Oak (Q. douglasii) in the west. It occasionally has been mapped at much higher elevations in the Eastern Slopes Subsection (7400 – 9600 ft or 2256 – 2928 m), where tree associates might include Quaking Aspen (Populus tremuloides), Singleleaf Pinyon Pine (P. monophylla), and Lodgepole Pine (P. contorta ssp. murrayana). It also occurs less abundantly in five other subsections.

BZ
GREAT BASIN – DESERT MIXED SCRUB ALLIANCE

Great Basin species such as Big Sagebrush (Artemisia tridentata), Bitterbrush (Purshia tridentata) and Curlleaf Mountain Mahogany (Cercocarpus ledifolius) and more southerly Mojave Desert species such as Saltbush (Atriplex spp.), Mormon Tea (Ephedra nevadensis, E. viridis), Creosote Bush (Larrea tridentata), White Bursage (Ambrosia dumosa) and Horsebrush (Tetradymia glabrata, Tetradymia stenolepis) occur in this Alliance together with equivalent cover values. The Great Basin – Desert Mixed Scrub type has been mapped abundantly near the eastern and southern edges of the Eastern Slopes Subsection, as precipitation decreases sharply towards desert conditions. Its greatest mapped extent is within the Eastern Slopes Subsection, but it also occurs infrequently in the Tehachapi – Piute Mountains and Kern Plateau Subsections. Elevations are chiefly in the range of 3800 – 7400 ft (1158 – 2256 m). The main Alliances found in the vicinity of this type include Big Sagebrush, High Desert Mixed Scrub and Singleleaf Pinyon Pine.

CA
CHAMISE ALLIANCE

Chamise (Adenostoma fasciculatum) is a dominant shrub of lower elevation, xeric slopes and ridges of the western Sierra Nevada Mountains between about 1200 - 4800 ft (366 – 1464 m). This alliance has been mapped most frequently in the westside Upper Foothills Metamorphic Belt Subsection, and more sparsely in the Lower Batholith Subsection. Associated minor species of this Alliance include shrubs of the Lower Mixed Chaparral Alliance such as Birchleaf Mountain Mahogany (Cercocarpus betuloides) and Whiteleaf Manzanita (Arctostaphylos viscida). California Buckwheat (Eriogonum fasciculatum var. polifolium) and, especially towards the eastside, the grass Squirreltail (Elymus elymoides) may also be present in this type. Interior Live Oak (Quercus wislizenii), Canyon Live Oak (Q. chrysolepis), Gray Pine (Pinus sabiniana) and Ponderosa Pine (P. ponderosa) may occur in close proximity to the Chamise Alliance.

CC
CEANOTHUS CHAPARRAL ALLIANCE

An Alliance of Ceanothus species has been mapped sparsely and well scattered in the Tehachapi – Piute Mountains, Kern Plateau, Lower Batholith and the Upper Batholith and Volcanic Flows Subsections at elevations in the general range of about 3000 – 8000 ft (915 – 2440 m). Within the higher ranges of the Tehachapi Mountains, the mixture is more likely to contain prominent Mountain Whitethorn (C. cordulatus), Mojave Ceanothus (C. greggii var. vestitus) and/or Deerbrush (C. integerrimus), where its main associates are White Fir (Abies concolor), Black Oak (Quercus kelloggii) and other shrubs in the Great Basin – Mixed Chaparral Transition Alliance. Areas lower and further west, such as in the Lower Batholith Subsection, are more likely to include conspicuous Wedgeleaf Ceanothus (C. cuneatus), Chaparral Whitethorn (C. leucodermis) and/or Woolyleaf Ceanothus (C. tomentosus) in the mixture. Snowbrush (C. velutinus) may appear more prominently in northern areas, such as in the Upper Batholith and Volcanic Flows Subsection.

CE
MOUNTAIN MISERY ALLIANCE

Mountain Misery (Chamaebatia foliolosa) and/or Fern Bush (Chamaebatiaria millefolium) occur separately or together as dominants in the shrub layer in the Mountain Misery Alliance. Mountain Misery is more likely to occur on the westside and Fern Bush on the eastside of the southern Sierras. Most often under coniferous canopies, this Alliance has been mapped very sparsely in the Lower Batholith Subsection at elevations between 4600 – 7000 ft (1402 – 2135 m). Its nearest neighbors are conifers in the Mixed Conifer – Pine Alliance and a few hardwoods.

CG
GREENLEAF MANZANITA ALLIANCE

Greenleaf Manzanita (Arctostaphylos patula) may dominate shrub sites at upper montane elevations in the southern Sierras in this Alliance, which has been mapped sparsely in seven subsections at elevations up to about 10,400 ft (3172 m). Conifers in open stands such as Jeffrey Pine (Pinus jeffreyi) and Red Fir (Abies magnifica) often form mosaics with Greenleaf Manzanita at these elevations. On the westside, the Alliance also may include minor amounts of other upper montane shrubs such as Deerbrush (Ceanothus intergerrimus) and Bush Chinquapin (Chrysolepis sempervirens). On the eastside, Great Basin species such as Low and Big Sagebrush (Artemisia arbuscula, A. tridentata) and Curlleaf Mountain Mahogany (Cercocarpus ledifolius) may be found within or in the vicinity of these sites. 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 or so of ground disturbance.

CH
HUCKLEBERRY OAK ALLIANCE

Huckleberry Oak (Quercus vaccinifolia) is the dominant species of this Alliance, which occurs on both eastside and westside southern Sierran slopes. It has been mapped widely but sparsely in seven subsections at montane elevations, generally from about 6000 – 10,000 ft (1830 – 3050 m). The Alliance is associated with Mixed Conifer - Fir, Red Fir and Jeffrey Pine Alliances but it indicates locally poor conifer growing conditions such as rocky sites, shallow soils or ridges. Western (Mountain) Juniper (Juniperus occidentalis var. australis or J. grandis) may be present in minor amounts in this type. Shrubs in the Upper Montane Mixed Chaparral Alliance such as Greenleaf Manzanita (Arctostaphylos patula), Bush Chinquapin (Chrysolepis sempervirens), Mountain Whitethorn (Ceanothus cordulatus) and Bitter Cherry (Prunus emarginata) are sometimes also associated with it.

CI
DEERBRUSH ALLIANCE

Deerbrush (Ceanothus integerrimus) may appear in pure stands, especially in areas of relatively recent fires or other ground disturbance. The Deerbrush Alliance has been mapped occasionally in the southern Sierras at elevations up to about 7000 ft (2135 m) in four subsections. Its associates may include Ponderosa Pine (Pinus ponderosa), Black and Canyon Live Oaks (Quercus kelloggii, Q. chrysolepis) and shrub species in the Upper Montane Chaparral and Lower Montane Chaparral Alliances such as Greenleaf Manzanita (Arctostaphylos patula) and Birchleaf Mountain Mahogany (Cercocarpus betuloides).

CJ
BREWER OAK ALLIANCE

Brewer Oak (Quercus garryana ssp. breweri), the shrub form of Oregon White Oak, has been mapped as a dominant shrub in scattered locations in the Lower Batholith, Kern Plateau, Eastern Slopes and Tehachapi – Piute Mountains Subsections. Elevations usually are within about 3600 – 6400 ft (1098 – 1952 m). The Brewer Oak Alliance is found adjacent to pure and

mixed hardwoods stands of Canyon Live, Blue and Black Oaks (Quercus chrysolepis, Q. douglasii, Q. kelloggii) and low- to mid-montane shrubs such as Scrub Oak (Q. berberidifolia) in the south and Big Sagebrush (Artemisia tridentata) in the east.

CL
WEDGELEAF CEANOTHUS ALLIANCE

This Alliance is dominated by Wedgeleaf Ceanothus (Ceanothus cuneatus) and occurs prominently in the Tehachapi – Piute Mountains, Lower Batholith and Eastern Slopes Subsections and less commonly in several other subsections. Elevations are generally in the 3000 – 6000 ft (914 – 1830 m) range. These stands are in close proximity to other shrubs of the Lower Montane Chaparral Alliance such as Birchleaf Mountain Mahogany (Cercocarpus betuloides) as well as lower elevation trees such as Canyon and Interior Live Oaks (Quercus chrysolepis, Q. wislizenii) and Gray and Ponderosa Pines (Pinus sabiniana, P. ponderosa). California Buckwheat (Eriogonum fasciculatum) may also be associated with it on drier or more disturbed sites.

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, often in areas that have some winter snow cover. Major shrub indicator species of the Upper Montane Mixed Shrub Alliance include Huckleberry Oak (Quercus vaccinifolia), Creeping Snowberry (Symphoricarpos mollis), Pinemat Manzanita (Arctostaphylos nevadensis) and Bush Chinquapin (Chrysolepis sempervirens). Mountain Misery (Chamaebatia foliolosa) may be included in the mixture in some areas. Minor associates may include Greenleaf Manzanita (Arctostaphylos patula), Bitter Cherry (Prunus emarginata) and Mountain Whitethorn (Ceanothus cordulatus). The Upper Montane Mixed Shrub Alliance has been mapped in ten subsections, more commonly within the Upper Batholith and Volcanic Flows, Glaciated Batholith and Glaciated Batholith and Volcanic Flows Subsections. Elevations tend to be upper montane (6200 – 9400 ft or 1890 – 2866 m) and associated trees are compatible with that altitude: Red Fir (Abies magnifica), Lodgepole Pine (Pinus contorta ssp. murrayana) and Jeffrey Pine (Pinus jeffreyi).

CN
PINEMAT MANZANITA ALLIANCE

Pinemat Manzanita (Arctostaphylos nevadensis), a dwarf shrub, is the sole dominant of this relatively rare alliance. It has been mapped occasionally in the Glaciated Batholith and more rarely in three other subsections at elevations exceeding 7400 ft (2256 m). Sites are often harsh and adjacent to barren areas and to upper montane conifers such as Lodgepole Pine (Pinus contorta ssp. murrayana), Jeffrey Pine (Pinus jeffreyi), Foxtail Pine (P. balfouriana) and Red Fir (Abies magnifica).

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 four subsections, mostly within the Glaciated Batholith Subsection, at mid to upper montane elevations from about 4800 – 10,000 ft (1464 – 3050 m). Overstory conifers in the general vicinity associated with these sites include Red Fir (Abies magnifica), Western White Pine (Pinus monticola), Lodgepole Pine (P. contorta ssp. murrayana), Jeffrey Pine (P. jeffreyi), Mountain Juniper (Juniperus occidentalis var. australis or J. grandis) and Mountain Hemlock (Tsuga mertensiana). Shrubs of the Upper Montane Chaparral Alliance such as Snowbrush (Ceanothus velutinus) may also be found adjacent to these stands.

CQ
LOWER MONTANE MIXED CHAPARRAL ALLIANCE

The Lower Montane Mixed Chaparral Alliance is very common in the southern Sierra Nevada Mountains at elevations below about 5800 ft (1372 m) on the westside and higher in the Tehachapi – Piute Mountains Subsection. The Alliance has been mapped in nine subsections and may contain mixtures of Ceanothus species, Whiteleaf and Common Manzanitas (Arctostaphylos viscida, A. manzanita), Chamise (Adenostoma fasciculatum), Fremont or Wavyleaf Silk-tassel (Garrya fremontii, G. elliptica), Flannelbush (Fremontodendron californicum), Birchleaf Mountain Mahogany (Cercocarpus betuloides), Poison Oak (Toxicodendron diversilobum), Shrub Oaks (Quercus spp.) and other lower elevation shrub species. Foothill Ash (Fraxinus dipetala) and Bush Poppy (Dendromecon rigida) may occasionally be part of this mixture as well. Individual sites may support pure stands of these shrubs such as in the Wedgeleaf Ceanothus (C. cuneatus) Alliance. Associated trees often include Canyon and Interior Live Oaks (Quercus chrysolepis, Q. wislizenii) adjacent to these sites and often Ponderosa Pine (Pinus ponderosa) as well.

CS
SCRUB OAK ALLIANCE

Shrub forms of oaks (Quercus spp.) may occur as recognized species, varietal forms of tree oaks, unclassified oak hybrids or as environmentally determined morphologic forms in which frequent fires may play a role. The Scrub Oak Alliance consists of shrubby oaks that are dominant in the shrub canopy at the time of mapping. It has been mapped abundantly in four subsections and less commonly in three others. Elevations generally range from about 2600 – 9000 ft (792 – 2744 m), reflecting a variety of species that may occur in the mixture. In the southern Sierras, including the Tehachapi Mountains, mesic sites may have Scrub Oak (Q. berberidifolia), Interior Live Oak (Q. wislizenii var. frutescens), Brewer Oak (Q. garryana var. breweri) and/or Canyon Live Oak (Q. chrysolepis var. nana) in the mixture, with Huckleberry Oak (Q. vaccinifolia) on harsher sites and Tucker Oak (Q. john-tuckeri) in drier climates. Alliances adjacent to the Scrub Oak Alliance reflect this habitat diversity such as the common occurrence of tree forms of the Live Oaks, Blue Oak (Q. douglasii), Gray Pine (Pinus sabiniana), Singleleaf Pinyon Pine (P. monophylla), both Upper and Lower Montane Mixed Chaparral types, Buckwheat (Eriogonum fasciculatum) and the Great Basin – Mixed Chaparral Transition type.

CT
TUCKER OAK ALLIANCE

Dominance by Tucker Oak (Quercus john-tuckeri) identifies this alliance in the Eastern Slopes and Tehachapi – Piute Mountains Subsections, where it has been mapped sparsely towards the southeast. Desert Scrub Oak (Q. turbinella) may be mixed with Tucker Oak in some of these locations. Elevations are generally in the range 4600 – 5800 ft (1402 – 1770 m) and sites are adjacent to the Singleleaf Pinyon Pine (Pinus monophylla), Great Basin – Mixed Chaparral Transition, Canyon Live Oak and Annual Grasses and Forbs Alliances.

CV
SNOWBRUSH ALLIANCE

Snowbrush (Ceanothus velutinus var. velutinus), a strongly sprouting shrub, is the dominant shrub species on the eastside slopes of the southern Sierra Nevada in this Alliance. The brush fields of the Snowbrush Alliance occur in upper montane elevation ranges, from about 6200 – 10,000 ft (1890 – 3050 m). Trees such as Jeffrey Pine (Pinus jeffreyi), Western (Mountain) Juniper (Juniperus occidentalis var. australis or J. grandis) and Red and White Firs (Abies magnifica, A. concolor), and shrubs such as Greenleaf Manzanita (Arctostaphylos patula), Sierra Plum (Prunus subcordata), Bitter Cherry (Prunus emarginata) and Great Basin shrubs such as Mountain and Low Sagebrush (Artemisia tridentata ssp. vaseyana, A. arbuscula) and Curlleaf Mountain Mahogany (Cercocarpus ledifolius) may be found in minor amounts on these sites or in the near vicinity. It may invade deep, well drained soils after fire or logging but occurs on both good and poor soils, with density and vigor of the stand being an indicator of local site conditions. The Snowbrush Alliance has been mapped infrequently in this area in three subsections.

CW
WHITELEAF MANZANITA ALLIANCE

Two forms of Whiteleaf Manzanita (Arctostaphylos viscida var. viscida) and Mariposa Manzanita (Arctostaphylos viscida var. mariposa) assume dominance on dry slopes in the same elevation range as Ponderosa Pine and the Mixed Conifer - Pine Alliances in the southern Sierra Nevada. These varieties are merged in the Whiteleaf Manzanita Alliance, which occurs more prominently toward the west (Central Valley Calveg Zone) and less commonly in this zone. The Alliance has been mapped in scattered locations of five subsections, chiefly between about 2600 – 5400 ft (792 – 1646 m). The species is usually found on south and west aspects or on rocky or infertile soils in association with Chamise (Adenostoma fasciculatum) and other lower elevation shrubs and Canyon Live Oak (Quercus chrysolepis).

CX
UPPER MONTANE MIXED CHAPARRAL ALLIANCE

The Upper Montane Mixed Chaparral Alliance is a mid- to upper-elevation shrub type in which no single species is dominant. It has been mapped abundantly in this zone. Species that are commonly found in the mixture include Greenleaf Manzanita (Arctostaphylos patula), Mountain Whitethorn (Ceanothus cordulatus), Mountain Misery (Chamaebatia foliolosa), Deerbrush (Ceanothus integerrimus), Huckleberry Oak (Quercus vaccinifolia), Bush Chinquapin (Chrysolepis sempervirens) and Bitter Cherry (Prunus emarginata). Site differences, autoecological factors, and especially fire history account for variability in the mixtures. For example, Deerbrush, a prolific deciduous-leaved seeder, is found on mesic, well-drained soils on westside slopes while Greenleaf Manzanita, a prolific evergreen root-sprouter and seeder, most often is found on xeric sites or on coarse soils on both eastside and westside slopes. Mountain Whitethorn, an evergreen stump-sprouter and prolific seeder, found mainly on the westside, is preferred browse for deer and is often heavily cropped after fires. In the eastside condition, Big Sagebrush

(Artemisia tridentata), Snowbrush (Ceanothus velutinus), an evergreen prolific seeder and vigorous rootcrown-sprouter, Fern Bush (Chamaebatiaria millefolium), Snowberry (Symphoricarpos spp.) and Squirreltail (Elymus elymoides) may occur as species associated with this Alliance.

CY
MOUNTAIN WHITETHORN ALLIANCE

Mountain Whitethorn (Ceanothus cordulatus) has been mapped in scattered locations across nine subsections of the southern Sierras as a dominant shrub in this alliance. It has been identified with some frequency in the Upper Batholith Subsection, where it is more common in the elevation range of about 5800 – 8400 ft (1770 – 2562 m). At these altitudes, it has been mapped most often adjacent to the Mixed Conifer – Fir, Jeffrey Pine, Upper Montane Mixed Chaparral, Red Fir and Mixed Conifer – Pine Alliances. This shrub may assume a more prostrate form under conditions where snow has accumulated naturally or manually along roadsides.

CZ
SEMI-DESERT CHAPARRAL ALLIANCE

This Alliance is a transitional type that includes a mixture of common eastside chaparral shrubs such as Mountain Whitethorn (Ceanothus cordulatus) and desert or semi-desert shrubs such as Basin Sagebrush (Artemisia tridentata), Joshua Tree (Yucca brevifolia), Creosote Bush (Larrea tridentata) and White Bursage (Ambrosia dumosa) in this area. It has been mapped very sparsely in the Eastern Slopes and Tehachapi - Piute Mountains Subsections within the elevation range of about 3800 – 5600 ft (1160 – 1708 m). Trees such as Singleleaf Pinyon Pine (Pinus monophylla) and Blue Oak (Quercus douglasii) and shrubs such as California Juniper (Juniperus californica) may also be onsite or in the general vicinity of these stands.

DA
BLACKBUSH ALLIANCE

Blackbrush (Coleogyne ramosissima) often occurs in mixture with other Mojave Desert shrubs such as in the Desert Mixed Scrub Alliance. Nevertheless, it has been mapped abundantly as a dominant species in the Eastern Slopes and Tehachapi - Piute Mountains Subsections in low- to mid-montane slope positions adjacent to Great Basin species such as Big Sagebrush (Artemisia tridentata) and Singleleaf Pinyon Pine (Pinus monophylla). Other desert shrubs, especially Mormon Tea (Ephedra spp.), White Bursage (Ambrosia dumosa) and Saltbush (Atriplex spp.) may be present in minor cover values in this type.

DI
INDIGO BUSH ALLIANCE

This alliance is defined by the occurrence of Mojave Indigo Bush (Psorothamnus arborescens) and/or Nevada Dalea (P. polydenius) where either (or the combination) is dominant in the shrub layer. Being extremely rare in this zone but much more extensive in both the Great Basin and South Interior Calveg zones, this alliance has been identified and mapped only in the Eastern Slopes Subsection at elevations between about 3800 – 4600 ft (1158 – 1402 m). It is typically adjacent to the White Bursage (Ambrosia dumosa) and Desert Mixed Scrub Alliances.

DL
CREOSOTE BUSH ALLIANCE

Creosote Bush (Larrea tridentata), a shrub very characteristic of the Mojave Desert, has been mapped infrequently in this zone as a dominant shrub. However, within the Eastern Slopes Subsection at elevations up to about 4000 ft (1220 m), it has been mapped in association with other desert shrubs such as White Bursage (Ambrosia dumosa), Mormon Tea (Ephedra spp.) and Blackbrush (Coleogyne ramosissima).

DS
SHADSCALE ALLIANCE

Shadscale (Atriplex confertifolia) becomes a dominant shrub in some alkaline alluvial pockets. It has been occasionally mapped in the Eastern Slopes Subsection within Kern County in an elevation range of about 2600 – 5000 ft (792 – 1524 m). Shrubs of the Desert Mixed Scrub Alliance, such as Creosote Bush (Larrea tridentata), Joshua Tree (Yucca brevifolia) and White Bursage (Ambrosia dumosa) have often been mapped on adjacent, non-alkaline sites. Great Basin species such as Big Sagebrush (Artemisia tridentata) and Bitterbrush (Purshia tridentata) may also be associated with it in this area. Wetter sites adjacent to the Shadscale Alliance are occasionally dominated by shrub Willows such as Geyer's Willow (Salix geyeriana).

DX
DESERT MIXED SCRUB ALLIANCE

Low elevation east slopes of the southern Sierra Nevada may support a species mixture characteristic of the Desert Mixed Scrub Alliance. It is especially common in the Eastern Slopes Subsection, generally within an elevation range of about 3000 – 6000 ft (914 – 1830 m) and has also been mapped very sparsely within the Kern Plateau and Tehachapi - Piute Mountains Subsections. Creosote Bush (Larrea tridentata) is an important component of this type, associated with Mormon Tea (Ephedra spp.), Hopsage (Grayia spinosa), Cacti (Opuntia spp.), Joshua Tree (Yucca brevifolia), Saltbush (Atriplex spp.) and/or Blackbrush (Coleogyne ramosissima). The Desert Mixed Scrub Alliance occurs on non-saline soils in association with the High Desert Mixed Scrub Alliance to the west and north and the Great Basin – Desert Mixed Scrub Alliance to the west.

FD
EPHEDRA ALLIANCE

Single species or a mixture of several species of the gymnosperm Mormon Tea (Ephedra californica, E. nevadensis, E. viridis) may dominate a site in this zone. The Ephedra Alliance has been mapped sparsely in several pockets in the Eastern Slopes Subsection at elevations from about 5400 – 6600 ft (1646 – 2012 m). It associates with species such as Bitterbrush (Purshia tridentata) and Big Sagebrush (Artemisia tridentata).

HS
CHEESEBUSH ALLIANCE

Cheesebush or Burrobrush (Hymenoclea salsola) dominates the shrub canopy of this desert alliance in some eastside sites in the southern Sierras as a locally abundant type in low precipitation areas of Kern County. Sites have been located in the Eastern Slopes Subsection within elevation ranges of about 2600 - 5000 ft (792 – 1524 m). Associated shrubs in this area include Rabbitbrush (Chrysothamnus spp.), California Buckwheat (Eriogonum fasciculatum), Big Sagebrush (Artemisia tridentata) and Saltbush (Atriplex spp.). The Annual Grasses and Forbs Alliance is commonly found adjacent to this type.

JC
CALIFORNIA JUNIPER ALLIANCE

The shrub form of California Juniper (Juniperus californica) occurs occasionally in the Tehachapi – Piute Mountains and Eastern Slopes Subsections at elevations between about 2800 – 5000 ft (854 – 1525 m). It associates with the tree form of the Juniper, annual grasses and forbs, Buckwheat (Eriogonum spp.) and as an understory shrub in Blue Oak (Quercus douglasii) stands.

KQ
ASPEN (SHRUB) ALLIANCE

Quaking Aspen (Populus tremuloides) will persist in a shrub form as snow-sculpted clones in high elevations of this zone. These “krummholz aspen” stands have been mapped sparsely in the Glaciated Batholith and Upper Batholith Subsections at elevations between about 6200 – 8400 ft (1980 – 2562 m). Such sites are often surrounded by tree-sized aspen clones where conditions become more favorable. Lodgepole Pine (Pinus contorta ssp. murrayana), Red Fir (Abies magnifica), Foxtail Pine (P. balfouriana) and Mountain Sagebrush (Artemisia tridentata ssp. vaseyana) are typically associated with this alliance.

LS
SCALEBROOM ALLIANCE

Drainages of low-gradient intermittent streams and washes in interior locations of the semiarid Tehachapi – Piute Mountains Subsection may be dominated by Scalebroom (Lepidospartum squamatum), a nearly leafless shrub. This Alliance has been mapped in a small area within an elevation range of about 2400 – 3200 ft (732 – 976 m) in close association with species of Rabbitbrush (Chrysothamnus spp.). Trees found in this vicinity include Blue Oak (Quercus douglasii) and Gray Pine (Pinus sabiniana).

ML
BACCHARIS (RIPARIAN) ALLIANCE

This riparian or dry wash Alliance is dominated by any species of Baccharis occupying wet habitats, including the most common, Mule Fat (B. salicifolia) and /or Desert Baccharis (B. sergiloides) in this area of the southern Sierras. Shortleaf Baccharis (B. brachyphylla) and/or Marsh Baccharis (B. douglasii) may also be found in this Alliance, which has been mapped occasionally in the Eastern Slopes and Tehachapi – Piute Mountains Subsections at elevations from about 2000 –2800 ft (610 – 854 m). Fremont Cottonwood (Populus fremontii) and wet meadows are often found adjacent to or within these riparian sites,

while Gray Pine (Pinus sabiniana) and Blue Oak (Quercus douglasii) stands are commonly found upland in the general vicinity.

NA
ALKALINE MIXED SCRUB ALLIANCE

Interior drainage basins in the Eastern Slopes Subsection evaporate quickly and often precipitate saline or alkaline salt deposits. Shrubs that tolerate this habitat, where no single genus is dominant, identify the Alkaline Mixed Scrub Alliance. It has been mapped in limited areas of this area within an elevation range of about 3200 – 5400 ft (976 – 1646 m), and much more commonly in the Great Basin Calveg zone. The shrub mixture lacks a significant cover of Cacti (Opuntia spp.) and may include, among others, species of Saltbush (Atriplex spp.), Iodine Bush (Allenrolfea occidentalis), Horsebrush (Tetradymia spp.), Molly (Kochia spp.), Budsage (Artemisia spinescens), and Hopsage (Grayia spinosa).

NB
DESERT MIXED WASH SCRUB ALLIANCE

This Alliance occupies desert washes and intermittent drainages and is not dominated by a single species. The shrub mixture includes Saltbush (Atriplex spp.), Mojave Indigo Bush (Psorothamnus arborescens), Bush Seepweed (Suaeda moquinii), Greasewood (Sarcobatus vermiculatus), and/or Alkali Seaheath (Frankenia salina). Grasses and forbs such as Alkali Sacaton (Sporobolus airoides), Slender Grasswort (Salicornia europaea) and non-dominant Saltgrass (Distichlis spicata) may be present. It has been mapped occasionally in the Eastern Slopes and Kern Plateau Subsections in the vicinity of 2800 – 4200 ft (854 – 1280 m) elevation. Upland associated eastside species include Rabbitbrush (Chrysothamnus spp.) and Big Sagebrush (Artemisia tridentata).

NM
RIPARIAN MIXED SHRUB ALLIANCE

A community of shrubs in riparian and moist meadow areas has been mapped very sparsely in the Markleeville, Eastern Slopes and Glaciated Batholith Subsections at elevations from about 6000 – 9000 ft (1830 – 2745 m). No single species or genus is dominant in this Alliance, which, in contrast to the Desert Mixed Wash Scrub Alliance, requires water sources at or near the surface. The shrub mixture may include species of shrub Willow (Salix spp.), Blue Elderberry (Sambucus mexicana), Water Birch (Betula occidentalis), California Blackberry (Rubus ursinus), Whitestem Gooseberry (Ribes inerme), Interior Rose (Rosa woodsii), Silver Sagebrush (Artemisia cana), and forbs such as Tarragon (Artemisia dracunculus) and/or possibly Mugwort (Artemisia douglasiana).

NQ
HIGH DESERT MIXED SCRUB ALLIANCE

A mixture of desert shrubs occupies areas at somewhat higher elevations, up to about 7400 ft (2256 m), than does the Desert Mixed Shrub Alliance, which is often associated with it towards the east. It has been mapped abundantly in the Eastern Slopes Subsection and much less commonly in the Kern Plateau Subsection. The species mixture is defined by the presence of abundant (but not dominant) Ephedra species, especially Green Ephedra (Ephedra viridis), Spiny Menodora (Menodora spinescens), and Horsebrush (Tetradymia spp.). White Bursage (Ambrosia dumosa) and Blackbrush (Coleogyne ramosissima) may be in the mixture at lower elevations, and some alkaline-tolerant shrubs such as Saltbush (Atriplex spp.), Greasewood (Sarcobatus vermiculatus) and Hop-sage (Grayia spinosa) may also be found in this Alliance. Great Basin species such as Big Sagebrush (Artemisia tridentata) may occur in the vicinity of this type towards the north and other Mojave species such as Creosote Bush (Larrea tridentata) and Joshua Tree (Yucca brevifolia) in the south of this area. The Singleleaf Pinyon Pine (Pinus monophylla) Alliance is often found to the west of this type.

SB
BUCKWHEAT ALLIANCE

California Buckwheat (Eriogonum fasciculatum var. polifolium), a semi-woody shrub, has been mapped very commonly as a dominant shrub in the Tehachapi – Piute Mountains, Eastern Slopes and Kern Plateau Subsections. Additionally, it has been identified sparsely in the Lower Batholith Subsection. The usual mapped elevation range is from about 3000 – 6200 ft (914 – 2135 m). It is closely associated with the Annual Grasses and Forbs and the Pinyon – Juniper Alliances throughout the area. In the limited region of Kern Plateau where California Buckwheat is dominant, westside species such as Canyon Live Oak (Quercus chrysolepis), Gray Pine (Pinus sabiniana) and shrubs in the Lower Montane Chaparral Alliance such as Wedgeleaf Ceanothus (Ceanothus cuneatus) occur in close proximity to this Alliance. In the Tehachapis and in the Eastern Slopes, more xeric conditions favor an association with Singleleaf Pinyon Pine (P. monophylla), Big Sagebrush (Artemisia tridentata) and shrubs in the High Desert Mixed Scrub Alliance and Great Basin – Desert Mixed Scrub Alliances.

SD
MANZANITA ALLIANCE

The dominance of the shrub layer by single or multiple species of Manzanita (Arctostaphylos spp.) define this alliance. It has been mapped in scattered patches in limited areas of the Tehachapi-Piute Mountains and Lower Batholith Subsections as well as on sites in the adjoining Upper Batholith Subsection at elevations between about 3600 – 6400 ft (1098 – 1952 m). In this zone, the following manzanitas may be included in this mixture: non-dominant Pinemat (A. nevadensis), non-dominant Greenleaf (A. patula), non-dominant Whiteleaf (A. viscida var. viscida), Mariposa (A. viscida var. mariposa) and/or Mewukka (A. mewukka). Trees often in association with these sites include Canyon Live and Black Oaks (Quercus chrysolepis, Q. kelloggii), Ponderosa Pine (Pinus ponderosa) and shrubs in the Lower Montane Chaparral Alliance such as Birchleaf Mountain Mahogany (Cercocarpus betuloides) and Chamise (Adenostoma fasciculatum).

SI
BLADDERPOD ALLIANCE

Bladderpod (Isomeris arborea), a distinctively flowering and fruiting, versatile evergreen shrub, naturally occurs in coastal to desert areas of central and southern California and Baja California at low to moderate elevations. As a dominant shrub in this Alliance, it has been mapped in the Eastern Slopes Subsection of this zone at elevations of about 3800 - 4800 ft (1160 - 1464 m) in association with Great Basin shrubs such as Rabbitbrush (Chrysothamnus spp.) and Sagebrush (Artemisia spp.) and Mojave Desert or halophytic shrubs such as Creosote Bush (Larrea tridentata) and Saltbush (Atriplex spp.).

SY
CHAPARRAL YUCCA ALLIANCE

Chaparral Yucca (Yucca whipplei) occurs as individual shrubs and in several subspecies in a variety of habitats, but will occasionally dominate harsher sites such as those having shallow, rocky or porous soils in the southern Sierras. It also may sprout vigorously from basal leaves after light fires, increasing its dominance over small areas. The Chaparral Yucca Alliance has been mapped sparsely in western areas of the Tehachapi - Piute Mountains Subsection, mainly at elevations between about 2200 – 6000 ft (670 – 1830 m). On these dry sites, it occurs in the vicinity of Chamise (Adenostoma fasciculatum), Canyon and Interior Live Oaks (Quercus chrysolepis, Q. wislizenii) and in proximity to the Annual Grasses and Forbs Alliance.

TA
MOUNTAIN ALDER ALLIANCE

Mountain Alder (Alnus incana ssp. tenuifolia), is considered here to be a shrub occupying wet sites at mid- to higher elevations. As a dominant shrub type, it has been mapped occasionally in four subsections of this area at elevations from about 5400 – 9600 ft (1646 – 2744 m). On these sites, it is often found adjacent to the Red Fir, Lodgepole Pine, Subalpine Conifers, Upper Montane Mixed Chaparral and Huckleberry Oak Alliances.

TB
BITTERBRUSH – SAGEBRUSH ALLIANCE

On eastside southern Sierra slopes, Bitterbrush (Purshia tridentata) and Sagebrushes (Artemisia spp.) occasionally mix where either is dominant in the shrub layer, forming the Bitterbrush – Sagebrush Alliance. It has been mapped sparsely in the Tehachapi - Piute Mountains, Glaciated Batholith and Volcanic Flows and Upper Batholith Subsections in a general elevation range of about 5600 – 8600 ft (1708 – 2622 m). Quaking Aspen (Populus tremuloides) and Singleleaf Pinyon Pine (Pinus monophylla) are sometimes associated with this alliance in close proximity.

TM
HORSEBRUSH ALLIANCE

Species of Horsebrush (Tetradymia spp.) may dominate desert shrubby areas alone or in combination. This alliance, however, is found very rarely in this region, although it has been mapped occasionally in the Great Basin and South Interior Calveg zones. Within the Eastern Slopes Subsection, Horsebrush stands occur within the elevation range of about 3800 – 4200 ft (1158 – 1280 m) adjacent to others such as the Shadscale (Atriplex confertifolia), Desert Mixed Scrub and High Desert Mixed Scrub Alliances.

TN
BLACK SAGEBRUSH ALLIANCE

Black Sagebrush (Artemisia nova), most often a low-growing, spreading shrub, may form pure stands in the southern Sierras. However, this alliance has been mapped only rarely in the Glaciated Batholith and Volcanic Flows Subsections at elevations

between about 5400 – 7400 ft (1646 – 2256 m). In contrast to Big Sagebrush (A. tridentata) and Low Sagebrush (A. arbuscula), another dwarf shrub, Black Sagebrush typically grows on warmer, more calcareous sites and those having coarse-textured shallow soils, such as alluvial flats. In this eastside region, it occurs in close proximity to Jeffrey Pine (Pinus jeffreyi), Bitterbrush (Purshia tridentata), Big Basin or Mountain Sagebrush (A. t. var. tridentata, A. t. var. vaseyana) and Singleleaf Pinyon Pine (P. monophylla).

TR
ROTHROCK SAGEBRUSH ALLIANCE

Rothrock Sagebrush (Artemisia rothrockii), a low-growing shrub, has been identified in pure stands in moist or saturated high-elevation sites. It has been mapped frequently in the Kern Plateau and Glaciated Batholith Subsections, and less so in another subsection at elevations above about 7800 ft (2380 m). It is very often found adjacent to and associated with the Lodgepole Pine (Pinus contorta ssp. murrayana) and other subalpine conifers such as Foxtail and Whitebark Pines (P. balfouriana, P. albicaulis), Alpine Grasses and Forbs, Wet Meadows and Low Sagebrush (Artemisia arbuscula) Alliances. Big Sagebrush (Artemisia tridentata), Singleleaf Pinyon Pine (P. monophylla), Jeffrey Pine (P. jeffreyi) and shrub Willows such as the Gray-leaved Sierra Willow (Salix orestera) are important associates as well.

TS
SNOWBERRY ALLIANCE

Snowberry (Symphoricarpos spp.) has several species that grow in the southern Sierras at different elevations and habitats. The Snowberry Alliance consists of one or more of these species that are dominant in the shrub layer, mainly Roundleaf Snowberry (S. rotundifolius) on the eastside. The Snowberry Alliance has been mapped occasionally at upper montane elevations, mainly between 7400 – 10,000 ft (2256 – 3050 m) in the Glaciated Batholith and Volcanic Flows, Markleeville and Eastern Slopes Subsections, where it is associated with trees such as Red Fir (Abies magnifica), Quaking Aspen (Populus tremuloides) and Lodgepole Pine (Pinus contorta ssp. murrayana) and shrubs such as Mountain Sagebrush (Artemisia tridentata ssp. vaseyana) and Low Sagebrush (A. arbuscula).

TT
BIG BASIN SAGEBRUSH ALLIANCE

Big Basin Sagebrush (Artemisia tridentata ssp. tridentata) is identified as a distinctive subspecies of Big Sagebrush (A. tridentata) and forms dominant stands in this alliance. It has been mapped sparsely in the Eastern Slopes and Glaciated Batholith and Volcanic Flows Subsections at moderate elevations, generally from about 5600 – 7000 ft (1708 – 2135 m). Eastside species such as Jeffrey Pine (Pinus jeffreyi), Bitterbrush (Purshia tridentata) and Singleleaf Pinyon Pine (P. monophylla) occur in close proximity to these sites.

TV
MOUNTAIN SAGEBRUSH ALLIANCE

The Mountain Sagebrush (Artemisia tridentata ssp. vaseyana) subspecies of Big Sagebrush (A. tridentata) forms dominant stands at somewhat higher elevations than does Big Basin Sagebrush (A. t. ssp. tridentata). For example, it has been mapped prominently in the Glaciated Batholith and Volcanic Flows and less commonly in the adjoining sections of the Eastern Slopes and Glaciated Batholith Subsections at elevations between 6400 – 12,000 ft (1952 – 3660 m) on dry sites. Low Sagebrush (A. arbuscula) and Lodgepole Pine (Pinus contorta ssp. murrayana) often occur near and within these sites.

WL
SHRUB WILLOW ALLIANCE

Shrub Willows (Salix spp.) may dominate stretches of low to high elevation streams, springs and seeps in the southern Sierras. Depending on location and elevation, species may include Geyer's (S. geyeriana), Gray-leaved Sierra (S. orestera), Lemmon's (S. lemmonii), Narrow-leaved (S. exigua), Shining (S. lucida), Yellow (S. lutea), or other Willows. This type has been mapped extensively over ten subsections, most frequently in the Glaciated Batholith, Eastern Slopes, Glaciated Batholith and Volcanic Flows, and Upper Batholith Subsections. On the eastside, it is often found adjacent to upland Great Basin types such as Low, Mountain and Big Sagebrushes (Artemisia arbuscula, A. tridentata var. vaseyana, A. tridentata), subalpine and upper montane trees such as Lodgepole Pine (Pinus contorta ssp. murrayana), Western White Pine (P. monticola), Red Fir (Abies magnifica), Whitebark Pine (P. albicaulis), Mountain Hemlock (Tsuga mertensiana) and Quaking Aspen (Populus tremuloides). Mesic shrubs of these elevations, such as Huckleberry Oak (Quercus vaccinifolia) also are often found near the Shrub Willow Alliance. As this type may occupy the wettest upland sites, the Wet Meadows Alliance is very frequently associated with it, as are riparian shrubs such as Blue Elderberry (Sambucus mexicana), White-stemmed Gooseberry (Ribes inerme) and California

Blackberry (Rubus ursinus). The mapped elevation range of this alliance is extremely broad, ranging from about 3000 – 12,000 ft (915 – 3660 m).

WM
BIRCHLEAF MOUNTAIN MAHOGANY ALLIANCE

Birchleaf Mountain Mahogany (Cercocarpus betuloides, also called C. montanus) may occasionally occur in pure stands on xeric, semi-desert, cliff or even moist sites to the exclusion of other species. The Birchleaf Mountain Mahogany Alliance, where it is the dominant shrub, has been mapped infrequently on slopes in the southern Sierras within the Lower Batholith, Tehachapi – Piute Mountains, Eastern Slopes and Upper Foothills Metamorphic Belt Subsections. Elevations of these sites are within the range from about 2000 – 6200 ft (610 – 1890 m). Canyon and Interior Live Oaks (Quercus chrysolepis, Q. wislizenii), and other Lower Montane Chaparral shrubs such as Chamise (Adenostoma fasciculatum) are associated with this type in this region.

HERBACEOUS

AC
ALPINE GRASSES AND FORBS ALLIANCE

Prostrate or low-growing perennials and graminoids form the major vegetation components in alpine areas of this botanically diverse type. The Alpine Grasses and Forbs Alliance has been mapped abundantly in the Glaciated Batholith Subsection and occurs occasionally in eight other subsections, most often within an elevation range of about 8200 – over 13,000 ft (2501 – 3965 m). There are generally less woody species present in this Alliance than in the Alpine Mixed 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. Nevertheless, there are a rich variety of herbaceous species that may be found in this Alliance, partially due to diverse habitats and moisture. On dry, open fell-fields, Phlox (Phlox condensata) often dominates a site and on granite and metamorphics, Oval-leaved Buckwheat (Eriogonum ovalifolium) is a prominent species in many areas. When parent material is 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.), Pine Needlegrass (Achnatherum pinetorum) 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, and Columbine (Aquilegia pubescens), Prairie Flax (Linum lewisii), Dwarf Indian Paintbrush (Castilleja nana), Payson's Draba (Draba paysonii), Stemless Mock Goldenweed (Stenotus acaulis), Jacob's Ladder (Polemonium pulcherrimum), Alpineflames (Pyrrocoma apargioides), Pygmyflower Rockjasmine (Androsace septentrionalis) and Heart Willowweed (Epilobium obcordatum). Subshrubs such as Davidson's Penstemon (Penstemon davidsonii) may also be found here. This Alliance is associated with moist site types such as Wet Meadows and Shrub Willows and subalpine conifers such as Whitebark Pine (Pinus albicaulis) and Lodgepole Pine (Pinus contorta ssp. murrayana).

HC
(PICKLEWEED) – CORDGRASS ALLIANCE

Occasionally, fresh water meadows in this area may partially evaporate and create alkaline or saline moist pockets that are dominated by halophytic or alkaline-tolerant grasses and forbs such as Alkali Cordgrass (Spartina gracilis), Alkali Sacaton (Sporobolus airoides), Horned Sea-Blite (Suaeda calceoliformis), Bush Seepweed (Suaeda moquinii) and Saltgrass (Distichlis spicata). One such area has been mapped in this zone in the Kern Plateau Subsection within an elevation range of about 5600 – 5800 ft (1708 – 1768 m). This xeric pocket is at the edge of the Wet Meadows, Annual Grasses and Forbs and Singleleaf Pinyon Pine Alliances.

HG
ANNUAL GRASSES AND FORBS ALLIANCE

Throughout the low elevations of the western slopes of the southern Sierra Nevada, annual grasses such as Bromes (Bromus spp.), Needlegrass (Achnatherum spp.) and Wild Oats (Avena spp.) may dominate rolling hills. Dominant forbs in this Alliance include Owl's Clover (Orthocarpus spp.), Fiddleneck (Amsinckia intermedia) and Stork's Bill (Erodium spp.). They may occur in pure stands or contain an overstory of scattered oaks (Quercus spp.) or California Buckeye (Aesculus californica). Associated westside species include hardwoods growing in sheltered areas and conifers such as Gray Pine (Pinus sabiniana) or

Ponderosa Pine (P. ponderosa) in the Upper Foothills Metamorphic Belt and Lower Batholith Subsections. In some areas, this Alliance may dominate a vast array of slopes and aspects due to wildfires, xeric conditions and other factors; on eastside slopes in the Eastern Slopes and Kern Plateau Subsections, recent wildfires have created large grass patches at elevations up to 8000 ft (2440 m) or more. Great Basin species such as Big Sagebrush (Artemisia tridentata), Rabbitbrush (Chrysothamnus spp.), Singleleaf Pinyon Pine (P. monophylla) and Jeffrey Pine (P. jeffreyi) are often found adjacent to these patches.

HJ
WET MEADOWS ALLIANCE

This Alliance is partially composed of Sedges (Carex spp.), Rushes (Juncus spp.) and Spikerushes (Eleocharis spp.) and designates year long water availability, as in lakeshore, stream bank, perched water tables, and seep areas. Perennial forbs such as Western Bistort (Polygonum bistortoides), Monkeyflower (Mimulus primuloides) and Corn Lily (Veratrum californicum), shrub Willows (Salix spp.), Mountain Alder (Alnus incana ssp. tenuifolia) and Lodgepole Pine (Pinus contorta ssp. murrayana) may be associated with this high elevation montane alliance. Grasses and grasslike species such as King's Ricegrass (Ptilagrostis kingii), Intermediate Oatgrass (Danthonia intermedia), Weak Mannagrass (Torreyochloa pallida), Hairy Woodrush (Luzula orestra), Reedgrass (Calamagrostis canadensis) and Bentgrass (Agrostis idahoensis) may also be indicators of this type in the southern Sierras.

HM
PERENNIAL GRASSES AND FORBS ALLIANCE

Perennial grasses and forbs in moist sites have been mapped in widespread areas of the southern Sierra Nevada Mountains within ten subsections. The elevations of these sites generally are within about 6400 – 12,000 ft (1952 – 3660 m), spanning the mid-montane to alpine regions. Upper elevations are often associated with subalpine conifers such as Whitebark Pine (Pinus albicaulis), Lodgepole Pine (P. contorta ssp. murrayana) and Red Fir (Abies magnifica). The Perennial Grasses and Forbs Alliance is a form of dry to moist grassland or meadows in which it is difficult to determine species composition and to separate it from the Wet Meadows and Alpine Grasses and Forbs types. At lower altitudes, 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 Crested, Tall and Intermediate Wheatgrasses (Agropyron desertortum, Elytrigia pontica and 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 may be included in the mixture. Mules-ears (Wyethia spp.) are a common component on some eastside locations. Sites may have other grass or grasslike indicators such as Sedges of various species (Carex spp.), Barley (Hordeum brachyantherum) and forbs such as Groundsel (Senecio spp.), Aster (Aster alpigenus), Beardtongue (Penstemon heterodoxus), and others in the alpine herbaceous type.

HT
TULE - CATTAIL ALLIANCE

Interior marsh sites of the southern Sierras that are not alkaline are usually dominated by Tule (Scirpus acutus var. occidentalis) or other Bulrushes (Scirpus spp.) and Cattails (Typha latifolia, T. domingensis, T. angustifolia). 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 Eastern Slopes Subsection on level or gently sloping sites. Commonly associated species are Sedges (Carex spp.) and Rushes (Juncus spp.) as well as water tolerant grasses and forbs. These areas are adjacent to Rabbitbrush (Chrysothamnus spp.), wet meadows and urban areas.

NON-NATIVE VEGETATION

IG
NON-NATIVE/ORNAMENTAL GRASS ALLIANCE

Ornamental or non-native grass species define this Alliance, although 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. This type has been mapped occasionally in three subsections at mid to upper montane elevations.

IH
NON-NATIVE/ORNAMENTAL HARDWOOD ALLIANCE

Ornamental or non-native hardwood species dominate this Alliance, although other non-native conifers, shrubs and grasses may be present. Mapped areas are usually in developed areas, including urban and residential landscapes, parks, recreational areas, highways, cemeteries, etc. It has been mapped sparsely in the southern Sierras at mid-elevations in two subsections.

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 it. Mapped areas are usually in developed areas, including urban and residential landscapes, parks, recreational areas, highways, cemeteries, etc.

LAND USE AND NON-VEGETATED CLASSES

A6
GRAIN AND CROP AGRICULTURE

Irrigated or dry crop agriculture is usually harvested in rows as edible herbaceous products such as cereals (wheat, sorghum, oats, millet, corn, rye, etc.) and "vegetables" (squash, celery, beans, peas, etc.) for livestock and human uses. Agricultural crop fields are also occasionally planted for both animal forage and to improve nitrogen levels, as with legumes such as alfalfa and sweet clovers. Certain crops are grown for other multiple uses, such as flax and cotton for their seed oils (that is, linseed and cottonseed oils), fibers and medicinal uses, etc.

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. This type represents agricultural features in which a prevailing covertype has not been determined. Land used exclusively for livestock pasture may, however, be mapped as Annual Grasses and Herbs 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, but may include quarries and mine sites.

IB
URBAN-RELATED NON-VEGETATED

Urban development in California occurs in phases. When land is cleared prior to being paved, this category represents the occurrence of non-vegetated barren ground that is caused by urbanization. This land-use type also represents other mechanically-caused barren ground, such as open quarries or mined areas, barren ground along highways, and other areas cleared of vegetation prior to, during and after construction. The category has been mapped throughout this state, usually adjacent to agricultural areas, already established urbanized centers or other paved areas of the landscape.

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.

In addition, surface water bodies have recently been mapped separately in some parts of this zone under the following categories:

W1: Rivers and Streams (natural, flowing surface waters)

W2: Perennial Lakes and Ponds (natural lacustrine bodies)

W3: Reservoirs (man-made lakes and ponds)

W5: Playas (desert basin features)

W6: Intermittent Stream Channel (seasonally flowing channeled waters)

W8: Intermittent or Seasonal Lake or Pond (occasionally drained surface waters)

W9: Exposed non-water features such as gravel, sand bars, etc.