

Vegetation Descriptions
SOUTH INTERIOR ECOLOGICAL PROVINCE
CALVEG Zone 8

March 20, 2009

Note: This Province consists of the Mojave (322A), Colorado (322C), and Sonoran Desert (322B) Sections. Very limited vegetation mapping has occurred, and only in the Mojave and Colorado Sections.

CONIFER FOREST / WOODLAND

DM

BIGCONE DOUGLAS-FIR ALLIANCE

Bigcone Douglas-fir (*Pseudotsuga macrocarpa*) stands are found in the Transverse and Peninsular Ranges from the Mt. Pinos region south, extending east to the Mojave Section. This conifer has been mapped very sparsely along the southwestern edge of the High Desert Plains and Hills Subsection (Mojave Section), occasionally in association with Canyon Live Oak (*Quercus chrysolepis*). It occurs adjacent to the Lower Montane Mixed Chaparral, Singleleaf Pinyon Pine (*Pinus monophylla*) and Canyon Live Oak Alliances in the elevation range 3800 – 6000 ft (1158 – 1830 m) in this region.

EP

EASTSIDE PINE ALLIANCE

Although commonly occurring in the Great Basin Calveg zone, the Eastside Pine Alliance is very rare in this area, having been mapped on three sites in the High Desert Plains and Hills Subsection of the Mojave Section. Elevations are between 5000 – 5400 ft (1524 – 1646 m). Such sites are adjacent to the Singleleaf Pinyon Pine and other xeric Alliances.

PD

GRAY PINE ALLIANCE

Gray Pine (*Pinus sabiniana*) reaches its southeastern extent in northwestern areas of Los Angeles County and central Kern County close to the San Joaquin Valley. It has been mapped sparsely in the southwestern edge of the Mojave Section in the westernmost areas of the High Desert Plains and Hills Subsection. These sites are either pure conifer stands or mixed with Blue, Canyon Live and/or Valley Oaks (*Quercus douglasii*, *Q. chrysolepis*, *Q. lobata*). These open stands may have shrub components such as California Juniper (*Juniperus californica*), California Buckwheat (*Eriogonum fasciculatum*) or shrub Oaks (*Quercus* spp.) in addition to annual grasses and herbaceous species. Elevations are between approximately 3200 - 4000 ft (976 – 1220 m) in this zone.

PJ

SINGLELEAF PINYON PINE ALLIANCE

In many Mojave and Colorado Desert uplands, Singleleaf Pinyon Pine (*Pinus monophylla*) occurs in woodlands but is replaced by Fourneedle (or Parry) Pinyon Pine (*Pinus quadrifolia*) towards the southwest. The hardwood associates of mixed conifer and hardwood stands of this Alliance are mainly Canyon Live Oak (*Quercus chrysolepis*) and Joshua Tree (*Yucca brevifolia*). Shrub associates include Big Sagebrush (*Artemisia tridentata*), Bitterbrush (*Purshia tridentata*), Tucker Oak (*Quercus john-tuckeri*), and Rabbitbrush (*Chrysothamnus nauseosus*) where it has been mapped in the High Desert Plains and Hills Subsection of the Mojave Section. In that region, it occurs mainly in the elevation range 3400 - 7200 ft (1036 – 2196 m) on north-facing and low to mid - gradient slopes. These stands are often found adjacent to

the Lower Mixed Montane Chaparral, Semi-Desert Shrub, Desert Mixed Shrub, Joshua Tree and Scrub or Tucker Oak (Quercus spp.) Alliances.

HARDWOOD FOREST / WOODLAND

FO

WATER BIRCH ALLIANCE

Water Birch (Betula occidentalis) may occasionally dominate the hardwood layer in riparian sites in this zone. The Alliance has been mapped occasionally as widely scattered small patches in the western areas of the Owens Valley Subsection of the Mojave Section. Elevations are from 3900 - 7100 ft (1190 - 2166 m). Other wetland species may occur in minor amounts, such as shrub or tree Willows (Salix spp.), Quaking Aspen (Populus tremuloides), grasses and forbs in the adjacent Wet Meadows Alliance, and trees in the Riparian Mixed Hardwood Alliance such as Cottonwood (Populus spp.). These sites are often adjacent to xeric shrub types such as those in the Desert Mixed Scrub and High Desert Mixed Scrub Alliances.

NR

RIPARIAN MIXED HARDWOOD ALLIANCE

Most perennially flowing streamside sites in southern California are not occupied by a single dominant hardwood species, but rather a mixture of deciduous trees whose composition changes along the stream length. The Riparian Mixed Hardwood Alliance has been mapped occasionally in the High Desert Plains and Hills and Owens Valley Subsections of the Mojave Desert Subsection at elevations up to about 5800 ft (1768 m). In this area, the species mixture includes any combination of Willow (Salix spp.), Water Birch (Betula occidentalis) and Fremont Cottonwood (Populus fremontii), usually accompanied by a variety of riparian shrubs and perennial species such as Interior Rose (Rosa woodsii), Mugwort (Artemisia douglasiana), Baccharis spp., Rubus spp., Ribes spp., etc.

NX

INTERIOR MIXED HARDWOOD ALLIANCE

A mixture of upland hardwoods with no clearly dominant species occurs very rarely in this zone but has been mapped along the western border of the High Desert Hills and Valleys Subsection of the Mojave Section. Elevations of these sites are mainly in the narrow range 3400 – 4000 ft (1036 – 1220 m). The mixture includes any combination of Canyon Live Oak (Quercus chrysolepis), Blue Oak (Q. douglasii), Valley Oak (Q. lobata), or other interior hardwoods. Gray Pine (Pinus sabiniana) may be associated with this type.

QC

CANYON LIVE OAK ALLIANCE

Canyon Live Oak (Quercus chrysolepis) forms pure stands throughout southern California as a tree and shrubby species on steep and often rocky canyon slopes. It has been mapped as a hardwood type in this zone sparsely in three subsections of the Mojave Section and in the Coachella Valley Subsection of the Colorado Section at elevations generally between 3000 – 5400 ft (915 – 1646 m). Scrub Oak, Semi-Desert Chaparral, Lower Mixed Chaparral, Chamise, and Desert Mixed Scrub Alliances are located in close proximity to it.

QD

BLUE OAK ALLIANCE

Blue Oak (Quercus douglasii) forms open woodlands on well-drained soils in low elevation sites throughout interior California, reaching its southernmost extent in the Southern Coast and Montane Calveg zone and easternmost extent in this zone. The Alliance has been mapped very sparsely at the southwestern boundary of the High Desert Plains and Hills Subsection of the Mojave Section as a pure hardwood type as

well as an understory type in Gray Pine (*Pinus sabiniana*) woodlands. The Lower Montane Mixed Chaparral, Tucker Scrub Oak (*Quercus john-tuckeri*) and Annual Grasses and Forbs Alliances are found adjacent to it in this area. It occurs between about 3400 - 4000 ft (1036 – 1220 m) and is often found on north-facing slopes of low to moderate gradients.

QF

FREMONT COTTONWOOD ALLIANCE

Fremont Cottonwood (*Populus fremontii*), the dominant species of this Alliance, occurs as a riparian species in sub-irrigated washes throughout the desert and adjacent to the Colorado River. Fremont Cottonwood will not tolerate saline conditions and has been mapped sparsely in three subsections of the Mojave Section where elevations are usually below 4000 ft (1219 m). In that area, the Alliance is mainly found adjacent to the Riparian Mixed Hardwood Alliance that includes tree Willows (*Salix* spp.) and with the Wet Meadows herbaceous Alliances.

QK

BLACK OAK ALLIANCE

California Black Oak (*Quercus kelloggii*), the dominant species in this Alliance, has been mapped very sparsely in the western Owens Valley Subsection (Mojave) as a dominant hardwood in this zone, generally at elevations between about 5100 – 5900 ft (1556 – 1800 m). These stands are adjacent to the Riparian Mixed Hardwoods and upland High Desert Mixed Scrub Alliances.

QL

VALLEY OAK ALLIANCE

Valley Oak (*Quercus lobata*) reaches its southernmost extent in western Los Angeles County in association with dry grasslands in open woodlands. It has been mapped in clustered stands along the southwestern edge of the High Desert Plains and Hills Subsection of the Mojave Desert Section at elevations between about 3200 – 4000 ft (976 – 1220 m) and generally on north-facing slopes. Its nearest associates in that area are the Gray Pine (*Pinus sabiniana*) and Scrub/Tucker Oak (*Quercus* spp.), Lower Montane Mixed Chaparral, and Annual Grasses and Forbs Alliances.

QO

WILLOW ALLIANCE

This riparian Alliance has been identified occasionally in three subsections of the Mojave Section at elevations below 7200 ft (2196 m). Species of tree Willows such as Shining (*Salix lucida*), Black (*Salix gooddingii*), and Red (*Salix laevigata*) dominate this hardwood mixture. Occasionally, shrub willows such as Narrow-leaved (*Salix exigua*), Arroyo (*Salix lasiolepis*), and Yellow (*Salix lutea*) may be included in the understory layer. Alliances such as Wet Meadows and Alkaline Mixed Grasses and Forbs are often found adjacent to this Alliance in this region.

QP

CALIFORNIA SYCAMORE ALLIANCE

Riparian areas dominated by California Sycamore (*Platanus racemosa*) are very sparsely mapped in the mesic southwestern border of the High Desert Plains and Hills Subsection in the Mojave Section at elevations below 4000 ft (1220 m). Common upland associates in this area include shrubs in the Lower Montane Chaparral and Chamise (*Adenostoma fasciculatum*) Alliances.

QQ

QUAKING ASPEN ALLIANCE

Stands of Quaking Aspen (*Populus tremuloides*) have been mapped sparsely along the western edge of the Owens Valley Subsection in the Mojave Section. These sites are adjacent to Wet Meadows and Water Birch (*Betula occidentalis*) populations in moist areas and types such as the High Desert Mixed Scrub and

California Buckwheat (Eriogonum fasciculatum) in upland xeric areas. Alliances in the elevation range from about 5200 – 7200 ft (1568 – 2196 m).

QW

INTERIOR LIVE OAK ALLIANCE

Interior Live Oak (Quercus wislizenii) occurs throughout interior valleys and coast foothills of the Transverse and Peninsular Ranges in its shrub and arboreal forms. Its occurrence has been mapped only sparsely in more xeric areas of the High Desert Plains and Hills and Owens Valley Subsections of the Mojave Section at elevations around 3200 – 4200 ft (976 – 1280 m). In this area, it is adjacent to hydric, xeric and arid alliances such as Riparian Mixed Hardwood, Chamise (Adenostoma fasciculatum), Semi-Desert Chaparral and High Desert Mixed Scrub.

QX

BLACK COTTONWOOD ALLIANCE

Black Cottonwood (Populus balsamifera ssp. trichocarpa), as a dominant hardwood in its own alliance, has been mapped on only one site towards the extreme northern boundary of the Owens Valley Subsection (Mojave) at elevations between about 5100 – 5300 ft (1556 – 1617 m). It intergrades there with trees and shrubs in the Riparian Mixed Hardwood, Water Birch (Betula occidentalis) Alliances and with upland shrubs in the High Desert Mixed Scrub types.

UD

DESERT WILLOW ALLIANCE

The Desert Willow (Chilopsis linearis) Alliance is closely related to the Smoke Tree Alliance, sharing the same species with it such as Smoke Tree (Psoralea arguta), Blue Palo Verde (Cercidium floridum), Ironwood (Olyrea tesota), and Honey Mesquite (Prosopis glandulosa). The Alliance occurs in desert washes of the Coachella Valley Subsection.

UJ

JOSHUA TREE ALLIANCE

Joshua Tree (Yucca brevifolia) occurs as a dominant hardwood in this Alliance. The species is widespread and very characteristic of the Mojave Desert. It often associates with California Juniper (Juniperus californica), Singleleaf Pinyon Pine (Pinus monophylla), Tucker Oak (Quercus john-tuckeri) and shrubs in the Lower Montane Chaparral Alliance such as Chamise (Adenostoma fasciculatum). Occasionally, Joshua Tree forms stands by cloning, which are seldom over an acre (0.4 ha) in size. These Yuccas are restricted to dry, rocky slopes and mesas and have been mapped abundantly in the High Desert Plains and Hills and Lucerne – Johnson Valleys and Hills Subsections (Mojave) at elevations between about 2800 – 5400 ft (853 – 1646 m). They typically occur on low- gradient slopes; these sites are often found adjacent to the Desert Mixed Scrub Alliance.

UL

CATCLAW ACACIA ALLIANCE

The Catclaw Acacia (Acacia greggii) Alliance may become dominant in canyons and sandy washes below 6000 ft (1830 m). It also often associates with Boxthorn (Lycium spp.), Burrobush (Hymenoclea salsola), Creosote Bush (Larrea tridentata), and Brittlebush (Encelia farinosa) in those sites and in rocky sites, with Cholla (Opuntia spp.) and Paloverde (Cercidium spp.). The Catclaw Acacia Alliance occurs adjacent to the Singleleaf Pinyon Pine Alliance in the Colorado and southern Mojave Deserts in the High Desert Plains and Hills Subsection on low gradient slopes.

UP

PALO VERDE ALLIANCE

Blue (*Cercidium floridum*) and/or Littleleaf Palo Verde (*Cercidium microphyllum*) form the dominant hardwood components of this desert wash Alliance. Occurring in the Coachella Valley Subsection, the Alliance is associated with species such as Arrowweed (*Pluchea sericea*), Mulefat (*Baccharis salicifolia*), Fremont Cottonwood (*Populus fremontii*), and Honey and Screwbean Mesquites (*Prosopis glandulosa* var. *torreyana*, *Prosopis pubescens*).

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* and *T. ramosissima*). All are usually found along desert and semi-desert washes, moist desert seeps and streams. This Alliance has been mapped as scattered patches along the Owens River watershed in the Owens Valley and sparsely in the High Desert Plains and Hills Subsections (Mojave Section) at elevations between about 3000 – 3800 ft (915 – 1158 m). Alkaline tolerant species such as Saltbush (*Atriplex* spp.), Greasewood (*Sarcobatus vermiculatus*), and those in the Alkaline Mixed Grasses and Forbs and Alkaline Mixed Shrub Alliances are sometimes found in the immediate proximity of Tamarisk stands in this area.

UW

FAN PALM ALLIANCE

Fan Palm (*Washingtonia filifera*) occurs naturally in the Colorado and Sonoran Deserts within oases maintained by seeps, springs, or water courses. Some or all of these sites were induced by active faulting processes in the Coachella Valley Subsection. It has also been widely planted and some limited degree of naturalization has reportedly occurred in Kern County.

UX

SMOKE TREE ALLIANCE

Smoke Tree (*Psoralea spinosa*) may occur infrequently in nearly pure stands in sandy washes of the Mojave and Colorado Deserts. It dominates this hardwood Alliance at elevations below 2000 ft (610 m) in the High Desert Plains and Hills Subsection, also occurring in the Coachella Valley Subsection. Other hardwoods in this Alliance include Blue Palo Verde (*Cercidium floridum*), Ironwood (*Olynea tesota*), Desert Willow (*Chilopsis linearis*), and Honey Mesquite (*Prosopis glandulosa* var. *torreyana*).

SHRUBS AND SUBSHRUBS

AD

WHITE BURSAGE ALLIANCE

White Bursage (*Ambrosia dumosa*) is the dominant shrub in this abundant desert Alliance. It occurs, often in sandy areas, in close association with Creosote Bush (*Larrea tridentata*) in the Mojave and Colorado Deserts. It has been mapped on low to moderate gradient slopes sparsely in the High Desert Plains and Hills and Owens Valley Subsections (Mojave Section) at elevations between about 2800 – 4600 ft (854–1402 m). Brittlebush (*Encelia farinosa*) and less frequently, Saltbush (*Atriplex* spp.) also may be found in this Alliance.

BB

BITTERBRUSH ALLIANCE

This Alliance is characterized by almost pure stands of Bitterbrush (Purshia tridentata) which has been mapped occasionally in the vicinity of Owens Valley in the Mojave Section in the elevation range of about 4000 – 7400 ft (1220 – 2256 m). It is associated with the Big Sagebrush (Artemisia tridentata), Buckwheat (Eriogonum spp.) and with the Great Basin – Desert Mixed Scrub Alliances in this area.

BC

SALTBUSH ALLIANCE

Within the Mojave Desert, Allscale and/or Fourwing Saltbush (Atriplex polycarpa, Atriplex canescens) and/or Desert Holly (Atriplex hymenelytra) associate in variable dominance on alkali soils. Greasewood (Sarcobatus vermiculatus), Iodine Bush (Allenrolfea occidentalis), and Budsage (Artemisia spinescens) may also occur in association with the Saltbushes. Any of these species may display local dominance. In the Sonoran Desert and on moist sandy loams, Saltbush may occur with Mesquite (Prosopis spp.). Here, Saltbush occupies drier, coarser soils and Mesquite grows within areas of shallow water tables. Other associates of this Alliance include Creosote Bush (Larrea tridentata), Pickleweed (Salicornia spp.), Saltgrass (Distichlis spicata), and other grasses. The Alliance has been mapped in the Owens Valley Subsection (northwestern Mojave), sparsely in the High Desert Plains and Hills and Lucerne – Johnson Valleys and Hills Subsections (southwestern Mojave) and Coachella Valley Subsection (Colorado Desert) at elevations below about 4800 ft (1646 m).

BG

GREASEWOOD ALLIANCE

Greasewood (Sarcobatus vermiculatus) becomes a dominant shrub in scattered patches as mapped occasionally in the Owens Valley Subsection. These flat, dry alkaline slopes are in the elevation range 3600 – 3800 ft (1098 – 1158 m). Saltbush (Atriplex spp.) and Horsebrush (Tetradymia spp.) may also occur in this Alliance. Halophytic Alliances derived from present or former evaporating surface water sources such as Alkaline Mixed Scrub, Saltbush, and Alkaline Mixed Grasses and Forbs are sometimes found adjacent to it, as are riparian types such as shrubby and arboreal Willows (Salix spp.) and Water Birch (Betula occidentalis).

BI

LITTLELEAF MOUNTAIN MAHOGANY ALLIANCE

Littleleaf Mountain Mahogany (Cercocarpus intricatus), formerly classified as a small shrub variety of Curlleaf Mountain Mahogany (C. ledifolius), has been identified and mapped on one site within the northeastern Owens Valley Subsection (Mojave) at an elevation range between about 6600 – 7000 ft (2012 – 2135 m). These sites are adjacent to Big Sagebrush (Artemisia tridentata) and Singleleaf Pinyon Pine (Pinus monophylla).

BQ

GREAT BASIN MIXED SCRUB ALLIANCE

A mixture of common Great Basin shrubs defines the Great Basin Mixed Scrub Alliance, which has been mapped sparsely in the Owens Valley, High Desert Plains and Hills and Lucerne – Johnson Valleys and Hills Subsections. Elevations are generally in the range 3000 – 6400 (915 – 1952 m) in this area. The species mixture includes Big Sagebrush (Artemisia tridentata), California Buckwheat (Eriogonum fasciculatum), Bitterbrush (Purshia tridentata), Rabbitbrush (Chrysothamnus spp.), and others.

BR

RABBITBRUSH ALLIANCE

Any single or combinations of species of Rabbitbrush are dominant shrubs of this Alliance. Rubber Rabbitbrush and Yellow Rabbitbrush (Chrysothamnus nauseosus, Chrysothamnus viscidiflorus) very

commonly occur in the Mojave and Colorado Desert Sections, but Long-Flower (Chrysothamnus depressus), Black-Stem (Chrysothamnus paniculatus), Parry (Chrysothamnus parryi), and Needle-Leaf (Chrysothamnus teretifolius) are less common in this area. The Alliance has been mapped frequently on dry slopes or flats in the High Desert Plains and Hills and Owens Valley Subsections at elevations between about 2600 – 5400 ft (792 – 1646 m) on low-gradient slopes. Associated species of this Alliance include Great Basin shrubs such as Big Sagebrush (Artemisia tridentata), and chaparral shrubs such as Buckwheat (Eriogonum spp.) and dry and alkaline grasses and forbs.

BS

BIG SAGEBRUSH ALLIANCE

Big Sagebrush (Artemisia tridentata) is the dominant shrub in this Alliance. It is most characteristic of the Great Basin Desert but has been mapped in the Owens Valley and High Desert Plains and Hills Subsections of the Mojave Section and locally elsewhere in arid areas of southern California. Associated shrubs include Bitterbrush (Purshia tridentata), Rabbitbrush (Chrysothamnus spp.), Buckwheat (Eriogonum spp.), Blackbush (Coleogyne ramosissima) and Mormon Tea (Ephedra spp.). Where mapped in the southwestern Mojave, its elevation range is between 3000 - 5400 ft (915 - 1646 m) on low-gradient, north-facing slopes.

BX

GREAT BASIN – MIXED CHAPARRAL TRANSITION ALLIANCE

This Alliance has been mapped occasionally in three subsections of the Mojave Desert at elevations from about 3200 – 6000 ft (976 – 1830 m). It is a mixture of shrubs such as scrub Oaks (Quercus spp.), Buckwheat (Eriogonum spp.) and Cupleaf Ceanothus (C. greggii) with an equivalent vegetation cover of Great Basin species such as Big Sagebrush (Artemisia tridentata), Bitterbrush (Purshia tridentata), and Rabbitbrush (Chrysothamnus spp.). It is often found adjacent to Singleleaf Pinyon Pine (Pinus monophylla) stands.

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, Ephedra viridis), Creosote Bush (Larrea tridentata), and Horsebrush (Tetradymia glabrata, Tetradymia stenolepis) occur together in this type. The Alliance consists of these two groups represented with equivalent cover values. It has been mapped abundantly in the Owens Valley Subsection, where elevations are chiefly below 6600 ft (2012 m) and more rarely in the High Desert Plains and Hills Subsection. Adjacent Alliances reflect nearby alkaline conditions in Alkaline Mixed Shrubs and Alkaline Mixed Grasses and Forbs types; Mojave Desert species in the Desert Mixed Shrub and Blackbush (Coleogyne ramosissima) types; Great Basin species in Big Sagebrush (Artemisia tridentata), Bitterbrush (Purshia tridentata), and Rabbitbrush (Chrysothamnus spp.) types, and possibly species maintained by ground disturbance in the California Buckwheat (Eriogonum fasciculatum) type.

CA

CHAMISE ALLIANCE

Chamise (Adenostoma fasciculatum) occurs in pure stands and is locally important along the southern boundary of the High Desert Plains and Hills Subsection at elevations between about 2800 – 4800 ft (854 – 1464 m) on low-gradient slopes. It is not common elsewhere in this region. This Alliance is found adjacent to and is a component of the Lower Montane Mixed Chaparral and Semi-Desert Chaparral Alliances in this area.

CC

CEANOOTHUS CHAPARRAL ALLIANCE

The Ceanothus Chaparral Alliance, in which Ceanothus is the dominant genus, has been mapped sparsely in the High Desert Plains and Hills Subsection on moderate to high-gradient slopes below about 5400 ft (1646 m). These areas border the San Gabriel and San Bernardino Mountains, where the species are much more prevalent. In this area, Desert Ceanothus (Ceanothus greggii var. vestitus), Deerbrush (Ceanothus integerrimus), Hoaryleaf Ceanothus (Ceanothus crassifolius), Mountain Whitethorn (Ceanothus cordulatus), and Chaparral Whitethorn (Ceanothus leucodermis) are the main components of this Alliance, with minor amounts of Chamise (Adenostoma fasciculatum) and Sugarbush (Rhus ovata) occasionally present.

CQ

LOWER MONTANE MIXED CHAPARRAL ALLIANCE

This is a mixed shrub Alliance occurring prominently along the southern edge of the High Desert Plains and Hills Subsection at elevations mainly between about 2600 – 5600 ft (792 – 1708 m) and mainly on north and east facing slopes. In this area, elevations of this Alliance may be slightly higher than in other parts of the state. In part, moisture stress and different species compositions may be factors in these elevated ranges. The species mixture is highly variable and includes any combination of non-dominant Ceanothus, especially Desert Ceanothus (Ceanothus greggii ssp. vestitus); non-dominant Scrub Oak (Quercus john-tuckeri); Bigberry (Arctostaphylos glauca), Eastwood (Arctostaphylos glandulosa), or other species of Manzanita (Arctostaphylos spp.); and Sugar Bush (Rhus ovata). Chamise (Adenostoma fasciculatum) is usually abundant but not dominant in this Alliance. This Alliance is typically found adjacent to the California Buckwheat (Eriogonum fasciculatum), Chamise, Semi-Desert Chaparral, Scrub Oak (Quercus spp.) and Annual Grasses and Forbs Alliances in this area.

CS

SCRUB OAK ALLIANCE

Scrub Oak, generally Tucker (Quercus john-tuckeri) or Muller Oak (Quercus cornelius-mulleri) in this area, or other species of shrubby oaks are dominant in this Alliance, either singly or in combination. The Scrub Oak Alliance has been mapped abundantly along the southeastern edge of the High Desert Plains and Hills Subsection at elevations between about 2600 – 5200 ft (792 – 1586 m) on low-gradient and generally north-facing slopes. The combination can also include other shrubby oaks such as Scrub Oak (Quercus berberidifolia) and Shrub Canyon Live Oak (Quercus chrysolepis var. nana). In this area, the Scrub Oak Alliance grades into the Singleleaf Pinyon Pine (Pinus monophylla), Semi-Desert Chaparral, Chamise (Adenostoma fasciculatum), Lower Montane Mixed Chaparral, Desert Mixed Scrub, and Annual Grasses and Forbs Alliances.

CT

TUCKER OAK ALLIANCE

Dominance by Tucker Oak (Quercus john-tuckeri) identifies this type in the High Desert Plains and Hills and Lucerne – Johnson Valleys and Hills Subsections of the Mojave Section, where it has been mapped sparsely. Desert Scrub Oak (Q. turbinella) may be mixed with Tucker Oak in some locations. Elevations are generally in the range 3000 – 5000 ft (915 – 1524 m) and sites are typically adjacent to the California Juniper shrub (Juniperus californica) and Desert Mixed Scrub Alliances.

CY

MOUNTAIN WHITETHORN ALLIANCE

Found in a variety of sites throughout the state, Mountain Whitethorn (Ceanothus cordulatus) has been identified on one site in the western boundary in the Owens Valley Subsection (Mojave) within an elevation range of about 5900 – 6022 ft (1800 – 1837 m). Big Sagebrush (Artemisia tridentata) and shrubs within the Great Basin – Mixed Chaparral Transition Alliance such as Snowberry (Symphoricarpos spp.) are associated with these sites in this area.

CZ

SEMI-DESERT CHAPARRAL ALLIANCE

This Alliance develops on interior (transmontane) slopes at elevations between about 3000 – 5600 ft (915 – 1708 m). Sites are often open and sparsely vegetated. It is a transitional type that includes a mixture of common chaparral shrubs such as Chamise (Adenostoma fasciculatum), Scrub Oaks (Quercus spp.) and California Buckwheat (Eriogonum fasciculatum) with other desert or semi-desert tree, shrub or perennial species such as Flannel Bush (Fremontodendron californicum), Desert Bitterbrush (Purshia tridentata var. glandulosa), Tucker or Muller Scrub Oak (Quercus john-tuckeri, Quercus cornelius-mulleri), Desert Ceanothus (Ceanothus greggii var. vestitus), Rabbitbrush (Chrysothamnus spp.), Mojave Yucca (Yucca schidigera), Prickly Pear or Cholla (Opuntia spp.), Desert Almond or Desert Apricot (Prunus fasciculata, Prunus fremontii), Basin Sagebrush (Artemisia tridentata), and more rarely Creosote Bush (Larrea tridentata). It has been mapped prominently along the southern edges of the High Desert Plains and Hills Subsection, and frequently found adjacent to Singleleaf Pinyon Pine (Pinus monophylla) sites.

DA

BLACKBUSH ALLIANCE

Blackbush (Colyogyne ramossissima) is dominant in this Mojave Desert Alliance on non-alkaline soils, and is also occasionally found in the Colorado Desert. It is well-represented in the High Desert Plains and Hills and Owens Valley Subsections within mid-elevation ranges and is often found on low-gradient slopes having shallow soils. Associated species in this area are Creosote Bush (Larrea tridentata), Buckwheat (Eriogonum spp.), and Singleleaf Pinyon Pine (Pinus monophylla).

DB

DESERT BUCKWHEAT ALLIANCE

This Alliance identifies the occurrence of California Buckwheat (Eriogonum fasciculatum) and other Buckwheats (Eriogonum spp.) found in true desert or desert-fringe environments in contrast to those found in more coastal or dry chaparral areas (Buckwheat Alliance). Other species such as the shrubby Wright's Buckwheat (Eriogonum wrightii) and the perennial Desert Trumpet (Eriogonum inflatum) may be included as well as other Buckwheats adapted to arid and desert environments. This type is often initiated through fire or brush clearing. It has been mapped in the High Desert Plains and Hills Subsection at elevations below about 5000 ft (1524 m). The Semi-Desert Chaparral, Desert Mixed Scrub and Lower Montane Chaparral Alliances are often found adjacent to this type.

DC

CHOLLA ALLIANCE

Teddybear or Jumping Cholla (Opuntia bigelovii) grows in fine-textured soils on south-facing slopes in the Sonoran and Colorado Deserts. This Alliance usually occurs adjacent to the Creosote Bush (Larrea tridentata) Alliance and includes species such as Hedgehog Cactus (Echinocereus engelmannii) and Barrel Cactus (Echinocactus anthodes) as associates in the Coachella Valley Subsection at elevations below about 2000 ft (610 m).

DI

INDIGO BUSH ALLIANCE

Two species of Indigo Bush (Psoralea arborescens and Psoralea polydenius) are known to occur in this area and the combination of one or both as dominant shrubs defines the Alliance. It has been mapped very sparsely in the Owens Valley Subsection at elevations between 3900 - 4000 ft (1190 - 1220 m). Other desert shrubs such as Horsebrush (Tetradymia spp.), Saltbush (Atriplex spp.), and Mormon Tea (Ephedra spp.) may be present in minor amounts in this Alliance. The Alkaline Mixed Scrub, Alkaline Mixed Grasses and Forbs, and High Desert Mixed Scrub Alliances are found adjacent to the Indigo Bush Alliance in this area.

DL

CREOSOTE BUSH ALLIANCE

Throughout the Sonoran and Mojave Deserts, Creosote Bush (*Larrea tridentata*) becomes a very common dominant species in pure stands or as an associate with White Bursage (*Ambrosia dumosa*) or Brittlebush (*Encelia farinosa*) on flat desert lands and alluvial fans. White Bursage, a short-lived subshrub, may be eliminated following disturbances such as drought or selected grazing pressure, allowing Creosote Bush to dominate an area. Harsher sites, such as under rocky, steeper, or warmer conditions, may encourage an abundance of Brittlebush in Creosote-dominated areas. The Creosote Bush Alliance has been mapped abundantly in the Lucerne – Johnson Valley and Hills, Owens Valleys and High Desert Plains and Hills Subsections, and is generally confined to low-gradient slopes below about 5000 ft (1524 m). Associates in that area include California Juniper (*Juniperus californica*), Blackbush (*Coleogyne ramosissima*), and Joshua Tree (*Yucca brevifolia*), Teddybear Cholla (*Opuntia bigelovii*), Ocotillo (*Fouquieria splendens*), etc.

DO

OCOTILLO ALLIANCE

Ocotillo (*Fouquieria splendens*) is the dominant desert shrub in this Alliance. It seldom occurs in pure stands but may dominate a site under certain conditions. In the Colorado Desert, it is emergent above Creosote Bush (*Larrea tridentata*), Brittlebush (*Encelia farinosa*), or White Bursage (*Ambrosia dumosa*) shrubs on rocky sites. Desert Agave (*Agave deserti*) and Hedgehog Cactus (*Echinocereus* spp.) also may occur in this Alliance. The Ocotillo Alliance is sometimes identified within the Coachella Valley Subsection at elevations below 2000 ft (610 m).

DS

SHADSCALE ALLIANCE

Shadscale or Spiny Saltbush (*Atriplex confertifolia*) dominates some basins of the Mojave Desert and certain valleys southeast of Mono Lake. These basins form pluvial or dry lakes with salt accumulations. Associated species in the Shadscale Alliance include Budsage (*Artemisia spinescens*), Nevada Ephedra (*Ephedra nevadensis*), Iodine Bush (*Allenrolfea occidentalis*), Greasewood (*Sarcobatus vermiculatus*), and occasionally Joshua Tree (*Yucca brevifolia*). Allscale (*Atriplex polycarpa*) associates with Shadscale in San Bernardino County near Kramer Junction (High Desert Plains and Hills Subsection) and elsewhere. The Shadscale Alliance, a subtype of the Saltbush Alliance, has been mapped prominently in the northeastern sector of the Owens Valley Subsection at elevations in the range of about 3600 – 4800 ft (1098 – 1464 m).

DX

DESERT MIXED SCRUB ALLIANCE

This Alliance consists of clearly desert subshrub and shrub species within the South Interior zone. No single species is dominant in this mixture, but the indicators are Creosote Bush (*Larrea tridentata*), White Bursage (*Ambrosia dumosa*), and Cholla or Prickly Pears (*Opuntia* spp.). Other species in the mixture may include Joshua Tree or Mojave Yuccas (*Yucca brevifolia*, *Yucca schidigera*), Catclaw Acacia (*Acacia greggii*), species of Saltbush (*Atriplex* spp.), Ocotillo (*Fouquieria splendens*), Brittlebush (*Encelia farinosa*), Hop-Sage (*Grayia spinosa*), Agave (*Agave* spp.), Boxthorn (*Lycium* spp.) and Barrel Cactus (*Ferocactus* spp.). Indicator shrubs of the High Desert Mixed Scrub Alliance such as Blackbush (*Coleogyne ramosissima*), Green Ephedra (*Ephedra viridis*), Yellow Rabbitbrush (*Chrysothamnus viscidiflorus*), White Bursage (*Ambrosia dumosa*) and Spiny Menodora (*Menodora spinescens*) tend to be absent in this Alliance. It has been mapped prominently within the Owens Valley, Lucerne – Johnson Valleys and Hills and along the southern boundary of the High Desert Plains and Hills Subsections and less extensively in the northern Coachella Valley Subsection at elevations from about 1000 – 5400 ft (305 – 1646 m). Many Alliances are found adjacent to it, including Joshua Tree, Semi-Desert Chaparral, California Juniper, Creosote Bush, White Bursage, and Singleleaf Pinyon Pine.

FD

EPHEDRA ALLIANCE

Single species or a mixture of several species of Mormon Tea (Ephedra californica, Ephedra funerea, Ephedra nevadensis, Ephedra viridis) may dominate a site in this zone. The Ephedra Alliance has been mapped very sparsely in the Owens Valley Subsection within an elevation range of about 3900 - 5500 ft (1190 - 1676 m). Associated species include Big Sagebrush (Artemisia tridentata), Bitterbrush (Purshia tridentata), and shrubs in the Great Basin – Desert Mixed Scrub Alliance such as Horsebrush (Tetradymia spp.).

HS

BURROBUSH ALLIANCE

Burrobush (Hymenoclea salsola) dominates the shrub canopy of this desert wash Alliance. It has been mapped very sparsely in the Lucerne – Johnson Valleys and Hills and Owens Valleys Subsections (Mojave Section) and in the Coachella Valley Subsection (Colorado Section) within the elevation ranges from about 1200 – 4000 ft (366 – 1220 m). Associated species include those in the Desert Mixed Scrub and High Desert Mixed Scrub Alliances such as White Bursage (Ambrosia dumosa), Mormon Tea (Ephedra spp.) and Brittlebush (Encelia farinosa).

JC

CALIFORNIA JUNIPER ALLIANCE

California Juniper (Juniperus californica) is generally shrub-like in southern California, and is dominant in this Alliance. It has been mapped broadly in the High Desert Plains and Hills Subsection of the Mojave Desert, typically within the elevation band of around 2800 - 4800 ft (854 – 1464 m). Joshua Tree (Yucca brevifolia), Muller or Tucker Oak (Quercus cornelius-mulleri, Quercus john-tuckeri), and other species in the Desert Mixed Scrub and Semi-Desert Chaparral Alliances may be associated with it in different areas. This alliance may also include minor amounts of species in the Lower Montane Alliance such as Chamise (Adenostoma fasciculatum) and Buckwheat (Eriogonum spp.).

LS

SCALEBROOM ALLIANCE

Drainages of intermittent streams and washes of the Mojave Desert may be dominated by Scalebroom (Lepidospartum squamatum) in the vicinity of alluvial fans in this Alliance. The Alliance has been mapped sparsely in the High Desert Plains and Hills Subsection within an elevation band of 3000 - 4600 ft (914 - 1402 m) on low-gradient slopes in these areas. This alliance is found adjacent to the Desert Mixed Scrub Alliance, Joshua Tree (Yucca brevifolia) and other species adapted to dry lands in addition to riparian taxa such as Fremont Cottonwood (Populus fremontii) and Mule Fat (Baccharis salicifolia).

ML

BACCHARIS (RIPARIAN) ALLIANCE

This riparian or dry wash Alliance is dominated by any species of Baccharis occupying seasonally wet habitats, including the most common, Mulefat (Baccharis salicifolia), and others such as Desert Baccharis (Baccharis sergiloides), Shortleaf Baccharis (Baccharis brachyphylla), Broom Baccharis (Baccharis sarothroides), and Emory Baccharis (Baccharis emoryi). Tree Willows (Salix spp.), and Fremont Cottonwood (Populus fremontii), are hardwoods associated with this Alliance. It has been mapped sparsely in an elevation band of about 2600 – 3800 ft (792 - 1158 m) in the High Desert Hills and Plains Subsection.

NA

ALKALINE MIXED SCRUB ALLIANCE

Interior drainage basins evaporate quickly in this zone 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 extensively and broadly in the Owens Valley Subsection, occupying mostly

flat, depositional sites within an elevation range of about 3800 - 6000 ft (1160 - 1830 m). This Alliance is one of the two most abundant in this Subsection, often found adjacent to other edaphic types such as the Alkaline Mixed Grasses and Forbs, and Greasewood (*Sarcobatus vermiculatus*) Alliances. The shrub mixture lacks a significant cover of Cacti (*Opuntia* spp.) and includes, among others, species of Saltbush (*Atriplex* spp.), Iodine Bush (*Allenrolfea occidentalis*), Horsebrush (*Tetradymia* spp.), *Kochia* spp., Budsage (*Artemisia spinescens*), and Hop-Sage (*Grayia spinosa*). This type is also often adjacent to other desert shrub Alliances such as others in the High Desert Mixed Scrub and Desert Mixed Scrub.

NM

RIPARIAN MIXED SHRUB ALLIANCE

A community of shrubs in riparian and moist meadow areas has been mapped very rarely in the Owens Valley Subsection within the elevation range 3900 - 4600 ft (1190 - 1404 m). No single species or genus is dominant in this Alliance. The shrub mixture may include species of shrub Willow (*Salix* spp.), Blue Elderberry (*Sambucus mexicana*), Water Birch (*Betula occidentalis*), possibly California Blackberry (*Rubus ursinus*), Interior Rose (*Rosa woodsii*), Silver Sagebrush (*Artemisia cana*), and herbaceous forms such as Tarragon (*Artemisia dracunculoides*), and possibly Mugwort (*Artemisia douglasiana*). Other riparian or alkaline-tolerant species are sometimes found adjacent to this Alliance, such as Fremont Cottonwood (*Populus fremontii*), and those in the Alkaline Grasses and Forbs Alliance.

NQ

HIGH DESERT MIXED SCRUB ALLIANCE

A mixture of desert shrubs occupies toe slopes of alluvial fans in this area, above and adjacent to the more alkaline conditions on the floor of Owens Valley. In the Great Basin Calveg zone, this Alliance tends to be at somewhat higher elevations than does the Desert Mixed Scrub Alliance, but in the Owens Valley Subsection it has been mapped abundantly only up to about 6500 ft (1982 m). In this area, it is identified by its indicator species Blackbush (*Coleogyne ramosissima*), Yellow Rabbitbrush (*Chrysothamnus viscidiflorus*), Green Ephedra (*Ephedra viridis*) or other *Ephedra* spp., and Spiny Menodora (*Menodora spinescens*). Others often present in the mixture in minor amounts include Horsebrush (*Tetradymia* spp.), Greasewood (*Sarcobatus vermiculatus*), and Hop-Sage (*Grayia spinosa*). Indicators of the Desert Mixed Shrub Alliance such as Creosote Bush (*Larrea tridentata*), White Bursage (*Ambrosia dumosa*), and Cacti species (*Opuntia* spp. and others) tend to be absent in this Alliance.

RS

RIVERSIDEAN ALLUVIAL SCRUB ALLIANCE

Alluvial fans and dry washes in xeric, interior areas of the Mojave Desert Section close to developed areas may contain a mixture of species, of which Scalebroom (*Lepidospartum squamatum*), Buckwheat (*Eriogonum* spp.), White Sage (*Salvia apiana*), and *Encelia* spp., may be important components. The history of ground disturbance is a factor in the species composition of this Alliance and other species may also occur, including *Opuntia* spp., Chaparral Yucca (*Yucca whipplei*), *Rhus* spp., Desert Tea (*Ephedra californica*), Allscale (*Atriplex polycarpa*), Bladderpod (*Isomeris arborea*), Paleleaf Goldenbush (*Isocoma acradenia*) and California Juniper (*Juniperus californica*). This Alliance has been mapped sparsely in the High Desert Plains and Hills Subsection at elevations between about 2600 – 3800 ft (792 – 1158 m) on low-gradient slopes. It is found in proximity to the Semi-Desert Chaparral, Lower Montane Chaparral, Scalebroom (*Lepidospartum squamatum*) and Chamise (*Adenostoma fasciculatum*) Alliances in this region, as well as close to Urban areas.

SB

BUCKWHEAT ALLIANCE

The combination of Buckwheat (*Eriogonum fasciculatum*) with or unaccompanied by White Sage (*Salvia apiana*), form the dominant components of this Alliance. It has been mapped abundantly in the High Desert Plains and Hills and Owens Valley Subsections at elevations below about 6800 ft (2074 m). This environmentally diverse but sparsely vegetated type is found adjacent to shrub types such as those in the

Lower Montane Chaparral, Desert Mixed Scrub, Alkaline Mixed Scrub and California Juniper (*Juniperus californica*) types and often forms next to urbanized landscapes and annual grasses and forbs.

SD

MANZANITA CHAPARRAL ALLIANCE

The dominance of the shrub layer by single or multiple species of Manzanita (*Arctostaphylos* spp.) define this Alliance. It has been identified and mapped sparsely at the southern boundaries of the High Desert Plains and Hills Subsection (Mojave) at elevations between 4400 - 5600 ft (1341 - 1646 m). The Manzanita Chaparral Alliance has been mapped more frequently in the adjoining Southern California Mountains and Valleys Section of the South Coast and Montane Calveg zone, where it occurs at elevations from 2600 - 7400 ft (792 - 2256 m). Greenleaf (*Arctostaphylos patula*), Bigberry (*Arctostaphylos glauca*), Eastwood (*Arctostaphylos glandulosa*), Mexican (*Arctostaphylos pungens*) and Pink-Bract Manzanitas (*Arctostaphylos pringlei* spp. *drupacea*) occur in this area. Minor amounts of Tucker Oak (*Quercus john-tuckeri*), Singleleaf Pinyon Pine (*Pinus monophylla*) and other dryland species may be associated with this Alliance.

SE

ENCELIA SCRUB ALLIANCE

This Alliance is dominated by Brittlebush (*Encelia farinosa*), a subshrub. The Encelia Scrub Alliance has been mapped at low elevations in the Lucerne – Johnson Valleys and Hills (Mojave Section) and Coachella Valley (Colorado Section) Subsections. Creosote Bush (*Larrea tridentata*) and White Bursage (*Ambrosia dumosa*) are very commonly associated species, as are other desert species.

SQ

SOFT SCRUB - MIXED CHAPARRAL ALLIANCE

Ground disturbances such as fire and urban development often initiate the development of this short-lived shrub Alliance. It is a mixture of subshrubs, forbs, and woody shrubs, none approaching dominance. Its occurrence in the High Desert Plains and Hills Subsection is at elevations from about 2800 – 5200 ft (854 – 1586 m). Indicator species in the Mojave Desert Section include California Buckwheat (*Eriogonum fasciculatum*), White Sage (*Salvia apiana*), Yerba Santa (*Eriodictyon* spp.), Deerweed (*Lotus scoparius*), and Goldenbush (*Ericameria*, *Isocoma* spp.). Mesic and xeric chaparral shrubs such as Chamise (*Adenostoma fasciculatum*) and Scrub or Tucker Oaks (*Quercus* spp.) merge with these sites in addition to those in the Semi-Desert Chaparral Alliance.

SS

CALIFORNIA SAGEBRUSH ALLIANCE

California Sagebrush occurs in several habitats, including interior low-elevation locations below the Lower Montane Mixed Conifer Alliance and in local pockets of disturbed or dry sites. Within this general desert area, it has been mapped in one small area of the High Desert Plains and Hills Subsection (Mojave Section), adjacent to the northern edge of the San Gabriel Mountains Subsection (Southern California Mountains and Valleys Section) to the south. The sites in this zone of the state have been mapped at elevations between about 3000 – 3800 ft (915 – 1158 m), slightly higher than those in the west. The Alliance has a prominent California Sagebrush (*Artemisia californica*) component along with a varying mixture of other shrubs, subshrubs, and perennials. In the area mapped, shrub associates include California Buckwheat (*Eriogonum fasciculatum*), Chamise (*Adenostoma fasciculatum*), Deerweed (*Lotus scoparius*), California Juniper (*Juniperus californica*) and Desert Ceanothus (*Ceanothus greggii* var. *vestitus*).

TM

HORSEBRUSH ALLIANCE

Upland portions of the southwestern Mojave Desert are occasionally dominated by Horsebrush (species of *Tetradymia*). The Horsebrush Alliance has been mapped sparsely in scattered locations at elevations up to about 5600 ft (1708 m) in the Owens Valley Subsection (Mojave Section). Associated species include

Saltbush (*Atriplex* spp.), Budsage (*Artemisia spinescens*), Greasewood (*Sarcobatus vermiculatus*) and other desert shrubs.

WL

SHRUB WILLOW ALLIANCE

Shrub forms of Willow (*Salix* spp.) are mapped as this Alliance where they dominate the shrub layer in a riparian, seep or meadow site. In this region, they have been identified at scattered locations in the Owens Valley, High Desert Plains and Hills (Mojave Section) and Coachella Valley (Colorado Section) Subsections at low to mid-elevations, often on gravel bars adjacent to or in permanent water sources, and chiefly from 1400 – 6200 ft (426 – 1890 m). This Alliance may include a combination of Narrow-leaved Willow (*Salix exigua*), Yellow Willow (*Salix lutea*) and Arroyo Willow (*Salix lasiolepis*). Grasses and grasslike plants such as Water Sedge (*Carex aquatilis*), Meadow Barley (*Hordeum brachyantherum*), Nebraska Sedge (*C. nebrascensis*), and Woolly Sedge (*C. lanuginosa*) may be common in this Alliance. Alliances found adjacent to this type include Wet Meadows, High Desert, Desert and Alkaline Mixed Scrubs, and Annual and Alkaline Grasses and Forbs.

WM

BIRCHLEAF MOUNTAIN MAHOGANY ALLIANCE

Birchleaf Mountain Mahogany (*Cercocarpus betuloides*) 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 is found adjacent to the Chamise, Lower Montane Mixed Chaparral and Annual Grasses and Forbs Alliances where it has been mapped in the Mojave Section. These stands are found mainly in the elevation range 3600 – 6000 ft (1098 – 1830 m) in the High Desert Plains and Hills Subsection on middle to high gradient slopes. Mesic species such as Canyon Live Oak (*Quercus chrysolepis*), Gray Pine (*Pinus sabiniana*) and Wedgeleaf Ceanothus (*C. cuneatus*) are often found on these sites at lower elevations. Arid species such as Singleleaf Pinyon Pine (*P. monophylla*) may be associated with this type at upper elevations in this zone.

HERBACEOUS

HA

ALKALINE MIXED GRASSES AND FORBS ALLIANCE

Alkaline and hyper-saline soils occur extensively in this xeric zone in internal drainage basins that accumulate soluble salts and may have moist pockets. Areas occupied by herbaceous species and grasses adapted to these conditions have been mapped as the Alkaline Mixed Grasses and Forbs Alliance in extensive areas of the Owens Valley Subsection (Mojave Section). Herbaceous species and graminoids in this area may include Bush Seepweed (*Suaeda moquinii*), Western Miterwort (*Nitrophila occidentalis*), Alkali Weed (*Cressa truxillensis*), Saltgrass (*Distichlis spicata*), Salt Heliotrope (*Heliotropium curassavicum*), Nevada Sumpweed (*Iva nevadensis*), Alkali Sacaton (*Sporobolus airoides*), Galleta (*Pleuraphis jamesii*), Torrey's Blazing Star (*Mentzelia torreyi*), Sandberg Bluegrass (*Poa secunda*) and invasive weeds such as Halogeton (*Halogeton glomeratus*), and Rocky Mountain Goosefoot (*Chenopodium glaucum*). They are often adjacent to halophytes such as Shadscale (*Atriplex confertifolia*) and those in the Alkaline Mixed Scrub Alliances as well as fresh water species such as tree and shrub Willows (*Salix* spp.), Saltbushes (*Atriplex* spp.), and wet meadows. These sites are usually on flat or low-gradient alluvium within the narrow elevation range of about 3800 - 3900 ft (1160 - 1190 m).

HG

ANNUAL GRASSES AND FORBS ALLIANCE

Exotic grasses are characteristic of the Annual Grasses and Forbs Alliance, including species of Wild Oats (*Avena* spp.), various Bromes (*Bromus* spp.), Foxtail Fescue (*Vulpia myuros*), and possibly Kentucky Bluegrass (*Poa pratensis*). This Alliance also includes perennial or annual forbs such as Filaree (*Erodium*

spp.), Checker Bloom (*Sidalcea malvaeflora*), California or Desert Chicory (*Rafinesquia californica*, *R. neomexicana*), and species of *Chorizanthe*. This type has been mapped abundantly in the High Desert Plains and Hills and Owens Valley Subsections (Mojave Section), typically on low-gradient sites up to about 6200 ft (1890 m).

HJ

WET MEADOWS (WET GRASSES AND FORBS) ALLIANCE

Moist or saturated mountain meadows are associated with springs, seeps, or faulted areas in which a high water table is maintained throughout the year but excessive evaporation may accumulate salts at the surface of some sites. They are rare in this zone, but have been mapped very sparsely in three subsections (Mojave Section) at elevations from about 3000 – 6400 ft (915 - 1952 m). They often have a dense growth of Sedges (*Carex* spp.), Rushes (*Juncus* spp.), and perennial grasses such as Mat Muhly (*Muhlenbergia richardsonis*). Herbaceous annuals or perennials include species such as False Hellebore (*Veratrum californicum*), Clovers (*Trifolium variegatum*, *Trifolium wormskioldii*), and Monkey Flower (*Mimulus guttatus*) as well as some halophytes such as Saltgrass (*Distichlis spicata*) and Alkali Sacaton (*Sporobolus airoides*).

HM

PERENNIAL GRASSES AND FORBS ALLIANCE

The Alliance consisting of perennial grasslands and forbs has been mapped sparsely within the elevation range of about 3600 – 3800 ft (1098 – 1158 m) in the Owens Valley Subsection (Mojave Section). The mixture may include both native and introduced Bluegrass (*Poa* spp.), the natives Indian Ricegrass (*Achnatherum hymenoides*), Nevada Needlegrass (*A. nevadense*), Pine Needlegrass (*A. pinetorum*), Thingrass (*Agrostis pallens*), Great Basin Wild Rye (*Leymus cinereus*), and Squirreltail (*Elymus elymoides*); the non-native Crested Wheatgrass (*Agropyron desertorum*), Tall Wheatgrass (*Elytrigia elongata*), and Quackgrass (*Elytrigia repens*) on more disturbed sites; and many native perennial forbs such as Eaton's Daisy (*Erigeron eatonii*), Glaucous Willowherb (*Epilobium glaberrimum*), Congdon's False Horkelia (*Horkeliella congdonis*), and Desert Biscuitroot (*Lomatium foeniculaceum*). It is found adjacent to the Wet Meadows Alliance and to halophytic shrub and herbaceous species.

HT

TULE - CATTAIL ALLIANCE

Cattail or Tule marshes are rare in the Mojave and Colorado Sections, but have been mapped sparsely in the High Desert Plains and Hills and Owens Valley Subsections at elevations from 3200 - 4000 ft (976 - 1220 m). Dominant species include Tule (*Scirpus acutus* var. *occidentalis*), Great Basin Bulrush (*Scirpus nevadensis*), Southern Cattail (*Typha domingensis*), and/or Broad-leaved Cattail (*Typha latifolia*). Other wetlands herbaceous genera may also be represented such as Sedges (*Carex* spp.), Spikerush (*Eleocharis* spp.), and the non-native annual or perennial forb Loosestrife (*Lythrum* spp.). In this region, alkaline-tolerant species may be found in adjacent Alliances, such as Saltbushes (*Atriplex* spp.) in addition to herbaceous Alliances such as Perennial Grasses and Forbs and Wet Meadows types.

NON-NATIVE VEGETATION

IC

NON-NATIVE/ORNAMENTAL CONIFER ALLIANCE

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

IG

NON-NATIVE/ORNAMENTAL GRASS ALLIANCE

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

IH

NON-NATIVE/ORNAMENTAL HARDWOOD ALLIANCE

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

IM

NON-NATIVE/ORNAMENTAL CONIFER/HARDWOOD ALLIANCE

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

IS

NON-NATIVE/ORNAMENTAL SHRUB ALLIANCE

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

LAND USE AND NON-VEGETATED CLASSES

AG

AGRICULTURE

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

A4

ORCHARD AGRICULTURE

Orchards are usually evergreen or deciduous small trees producing fruit or nut crops, usually planted in rows with or without irrigation channels. Apples, citrus fruits, avocados, walnuts, peaches, olives and other familiar crops cover many acres in California. Occasionally, shrub forms may become horticulturally trained to resemble small trees, such as filberts.

A6

GRAIN AND CROP AGRICULTURE

Irrigated or dry crop agriculture is usually harvested in rows as edible or useful herbaceous products such as cereals (wheat, sorghum, oats, millet, corn, rye, etc.) or vegetables (squash, celery, beans, peas, etc.), for stock 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 and fiber content and others for medicinal uses.

AK

ALKALINE FLATS

Evaporation of ponds or lakes in lower elevations of this zone often create alkaline pans or flats which are essentially barren of vegetation. Such areas have been mapped in scattered locations of the Owens Valley Subsection (Mojave Section) at elevations between about 3400 – 3800 (1036 – 1158 m). Most of the adjoining vegetated Alliances are also alkaline, including Alkaline Mixed Grasses and Forbs, Alkaline Mixed Shrub, and Saltbush (*Atriplex* spp.). Herbaceous Alliances indicating wet or moist conditions, such as Wet Meadows and Perennial Grasses and Forbs, are also sometimes found in the immediate vicinity of these flats.

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.

IB

URBAN – RELATED BARE SOIL

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 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.

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 appropriate, 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.