SHOWERS

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Preliminary Descriptions of the Terrestrial Natural Communities of California

by

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Preface

The Natural Diversity Data Base is a computerized inventory of the locations of populations of rare and threatened plants, animals, and natural communities in California. These "elements of natural diversity" represent the dual approach taken to assure that California's rich biological heritage is adequately represented in the inventory.

On one hand, a minority of the state's biota is in such precarious condition that species-oriented management is required to assure that they will survive into the next century. These taxa (682 plants, 178 invertebrates, and 278 vertebrates) are the ones currently included in the Natural Diversity Data Base. However, even if we lived in an ideal world and were able to secure the long-term prospects for every one of these 1138 taxa, much of California's biota would want for protection. This "fine filter" approach of species-oriented protection would let many of the state's more common taxa slip through without protection until such time as they become "rare enough" to require this type of conservation effort.

On the other hand, there are several plant communities in California that, for any number of reasons, do not harbor any of these 1138 taxa. What is needed, then, is a "coarse filter" to catch the actual majority of the state's biota. This "coarse filter" is provided by the natural community component of the inventory.

This approach is patterned after The Nature Conservancy's natural heritage program methodology, which has been evolving for more than a decade. More than forty states have established similar programs. Basic to this system is the preparation of a list of species and communities to include in each state's inventory. Linnean taxonomy provides such a tool for plants and animals, but no such universally accepted protocol exists for plant communities. After several years effort including a few false starts, the NDDB adopted with some modifications a classification originated by Cheatham and Haller (1) to satisfy this need.

The Cheatham and Haller system, as modified by NDDB, divides California's landscape into about 375 "natural communities". Native species and natural communities are chosen as inventory elements because in combination they comprise all of a region's biotic diversity. They are tangible units that can be counted, protected, and managed. Including natural communities in such an inventory allows for the preservation of ecosystem components that may support valuable or sensitive species as yet unknown to science. More importantly, by protecting representative samples of all natural communities, we will protect the habitats of most plants and animals. This relieves the workload on the "fine filter", maximizes the returns on limited resource protection resources, and hopefully will keep several species from ever being considered for inventory.

The current list of natural communities appears as Appendix A to this report. This is the third revision since the classification was adopted by NDDB. Each of these revisions, though, has consisted of a simple list of communities: no set of descriptions has accompanied any of the previous revisions. The list has evolved enough that there is no easy way to determine what constituted each of the communities. Users have been left with the sometimes difficult and frustrating task of rectifying Cheatham and Haller's scheme with the NDDB list.

The descriptions presented here were prepared with hopes of meeting this need. I have prepared brief descriptions of nearly every element in the classification. These include descriptions of the overall aspect of each community, the abiotic site factors typically found on a site, a short list of characteristic species found in typical stands, the geographic range of the community, and one or more citations to literature.

These descriptions were prepared primarily from literature and discussions with biologists knowledgeable about particular areas. Only in a few areas did I have the luxury of extensive field work. I have every expectation that the descriptions will profit from scrutiny by the larger biological community of California. To this end I solicit constructive criticism of both the classification and the descriptions.

This is not intended as a definitive treatment on California's vegetation. Rather, it is a draft patterned after the early lists of plants of limited distribution within California that lead ultimately to the California Native Plant Society's Inventory of Rare and Endangered Vascular Plants of California. About 125 of the communities in the classification are preceded by an asterisk (*). These are the communities that we currently feel are rare enough to merit inclusion in the inventory. We are particularly interested in knowing particulars about surviving examples of these communities.

We also would like to know: 1) are there gross errors in the description, site factors, characteristic species, and distribution of each element? 2) Are there important literature citations that should be added? 3) Are there important communities that should be added to the list? 4) Are there communities that are too common to merit inclusion in the inventory, but currently have an asterisk? Input from California's botanists should help this classification in as many ways as it has helped to refine the CNPS Inventory.

Careful comparison of Appendix A with the main body of the report will reveal several communities for which there are no descriptions. These are listed in Appendix B. These are the elements for which I could not find adequate information to prepare even the briefest description. This can be attributed to several possible causes: 1) the community doesn't really exist, 2) the community exists but I was not able to ferret out any

published information or anybody who knew about it, 3) the community was mentioned in some published work, but not with enough detail to allow a cogent description. I am particularly interested in any information that will allow moving any community out of Appendix B.

I would like to acknowledge the considerable assistance I have received during the preparation of these descriptions. This help has run the gamut from actual field work to enlightening publications to brief conversations about some minor point. Drs. J. Griffin, R. Haller, J. Major, and R. Thorne together with N.H. Cheatham deserve special thanks. Deborah Jensen, my immediate predecessor as Data Base ecologist, has helped innumerable times to answer questions both large and small. Cynthia Roye has assisted ably in every aspect of this report's preparation. Joanne Gonzales, Laurie White, Rosemary Martinez and Pat Mallette all helped with the word processing. The most valuable help of all, however, has come from the biologists throughout California who were willing to take a few minutes (or a few days) to clarify some intriguing detail. I find myself in the position of gladly accepting all the blame for any errors (of omission or commission) in this report, while gratefully crediting California's biological community for all of this document's factual content.

ELEMENT NAME: Active Coastal Dunes ELEMENT CODE: 21100

DESCRIPTION: Barren, mobile sand accumulations whose size and shape are determined by abiotic site factors rather than by stabilizing vegetation.

SITE FACTORS: Dune size and shape varies with wind direction and speed, site topography, sand source, and grain size. Active Coastal Dunes often overrun adjacent Foredune (21200) or Backdune scrub (21300) communities.

CHARACTERISTIC SPECIES: None.

DISTRIBUTION: Along the Pacific Coast where sandy beaches are present and coastal headlands are absent: Crescent City, Ft. Bragg, Pt. Arena, Bodega Bay, Dillon Beach, Pt. Reyes, San Francisco, Monterey, Morro Bay, Nipomo Dunes, Los Angeles, and San Diego.

SOURCES: 1, 4, 8, 71, 84, 85, 86, 93

ELEMENT NAME: Northern Foredunes ELEMENT CODE: 21210

DESCRIPTION: Dominated by perennial grasses (to 70 cm tall) and low, often succulent, perennial herbs and subshrubs (about 10 cm tall). Coverage varies from nearly complete to scattered. The species typically are zoned, with Abronia, Ambrosia, and Cakile usually occurring in the sites most exposed to the wind and Calystegia and Camissonia in more sheltered sites. Growth and flowering are most active in late spring and early summer, but continue at a reduced rate all year.

SITE FACTORS: Usually foredunes, but upper beaches may be similar. Similar to Active Coastal Dunes (21100), but with less wind and/or a smaller supply of sand and/or more available groundwater. The relatively favorable conditions allow the establishment of plants which reduce the amount of blowing sand and partially stabilize the dunes. Drainage is rapid, but the deeper zones may be relatively moist. Plants are subject to dessicating, salt-bearing winds. May intergrade with Active Coastal Dunes toward the coast or with Northern Dune Scrub (22210) on more stabilized dunes away from the coast.

CHARACTERISTIC SPECIES: Abronia latifolia, Ambrosia chamissonis, [Ammophila arenaria], [Cakile maritima], C. edentula californica, Calystegia soldanella, Camissonia cheiranthifolia, Carpobrotus aequilateralis (central coast), Elymus mollis

DISTRIBUTION: Areas of sand accumulation along the coast, including all locations where Active Coastal Dunes (21100) occur and many less extensive areas as far south as Monterey Point Conception.

SOURCES: 1, 4, 8, 71, 84, 85, 86, 93

ELEMENT NAME: * Northern Foredune Grassland ELEMENT CODE: 21211

DESCRIPTION: A sparse grassland (10%-50% total cover) of the upper strand and foredunes dominated by Elymus mollis and Poa douglasii, with Ambrosia chamissonis, Abronia latifolia, Calystegia soldanella, and Cakile species in varying proportions.

SITE FACTORS: Nutrient-poor, circumneutral, well-drained arkosic sands exposed to incessant onshore breezes, therefore, easily eroded and transported.

CHARACTERISTIC SPECIES: Abronia latifolia, A. umbellata, Ambrosia chamissonis, [Ammophila arenaria], Artemisia pycnocephala, [Cakile maritima], Calystegia soldanella, Elymus mollis, Poa douglasii.

DISTRIBUTION: Once widespread along the Pacific Coast between Monterey, California and Coos Bay, Oregon, but now restricted to isolated occurrences near Humboldt Bay and Pt. Reyes.

SOURCES: 2, 4, 8, 87, 93

ELEMENT NAME: * Southern Foredunes ELEMENT CODE: 21230

DESCRIPTION: Very similar to Northern Foredunes (22110), but lacking the perennial grasses and with a higher proportion of suffrutescent plants (to 30 cm tall). The species typically are zoned as in the Northern Foredunes, with Abronia maritima, Ambrosia, and Cakile usually occurring in the exposed sites and Abronia umbellata, Calystegia, and Camissonia in less exposed sites. Growth and flowering are slightly earlier than in Northern Foredunes.

SITE FACTORS: Very similar to Northern Foredunes (21210), but drier, a little warmer, and probably with less strong or persistent onshore wind. May intergrade with Southern Dune Scrub (21330) on more stabilized dunes away from the coast.

CHARACTERISTIC SPECIES: Abronia maritima, Abronia umbellata, Ambrosia chamissonis bipinnatisecta, Atriplex leucophylla, [Cakile maritima], Calystegia soldanella, Camissonia cheiranthifolia suffruticosa, Distichlis spicata, Haplopappus venetus, [Carpobrotus edulis].

DISTRIBUTION: Areas of sand accumulation along the coast between Point Conception and the Mexican border. No areas remain which are as extensive as those found north of Point Conception. Small areas occur near Pt. Conception and Coal Oil Pt., Santa Barbara County; Pt. Mugu, Ventura County; El Segundo, Los Angeles County; and Coronado, San Diego County. Now much reduced by urban and other development.

SOURCES: 1, 4, 8, 89, 93

ELEMENT NAME: *Northern Dune Scrub ELEMENT CODE: 21310

DESCRIPTION: A soft, woody, more or less evergreen scrub 1-2 m tall, usually occurring inland of Northern Foredunes (21210), and dominated by Baccharis pilularis, Scrophularia californica, and Lupinus arboreus, with herbaceous openings dominated by Poa douglasii and Lathyrus littoralis or by Artemisia pycnocephala and Eriogonum latifolium and a rich annual herb flora.

SITE FACTORS: Less wind and salt spray allows better vegetative stabilization of the (taller) dunes. Intergrades away from the coast with Sitka Spruce-Grand Fir Forest (82100) on moist, sandy sites; with Coastal Closed-Cone Coniferous Forests (83100) on dry, sandy sites; and with Northern Coastal Scrubs (32100) on drier, rocky sites.

CHARACTERISTIC SPECIES: Abronia latifolia, Ambrosia chamisonia, Artemisia pycnocephala, Baccharis pilularis, Ericameria ericoides, Eriogonum latifolium, Eriophyllum staechadifolium, Eschscholtzia californica, Lathyrus littoralis, Lupinus arboreus, L. bicolor, L. chamissonis.

DISTRIBUTION: Areas of sand accumulation along the coast, but usually farther back than the foredune. Generally found from Bodega Bay north to Oregon.

SOURCES: 4, 8, 86, 93, 94, 95

ELEMENT NAME: *Central Dune Scrub ELEMENT CODE: 21320

DESCRIPTION: A dense coastal scrub community of scattered shrubs, subshrubs, and herbs, generally less than 1m tall and often developing considerable cover. Diagnostic species include Ericameria ericoides, Lupinus chamissonis, and Artemisia pycnocephala.

SITE FACTORS: Restricted to the coast on ± stabilized backdune slopes, ridges, and flats. Blowouts often are recolonized by foredune species (21200), or (where the blowout reaches the groundwater table) by freshwater marsh taxa around a Dune Slack Pond or Lake (B1115, B1116). Intergrades toward the coast with Foredunes (21200) and away from the coast with Coastal Scrub (32200), Maritime Chaparral (37C00), or Coastal Sage-Chaparral Scrub (37G00).

CHARACTERISTIC SPECIES: Artemisia pycnocephala, Corethrogyne filaginiforia, Ericameria ericoides, Lupinus chamissonis, Senecio blochmanae.

DISTRIBUTION: Restricted to the coastal strip roughly between Bodega Bay and Point Conception.

SOURCES: 4, 71, 84-87, 93, 94

ELEMENT NAME: *Southern Dune Scrub ELEMENT CODE: 21330

DESCRIPTION: Similar to Central Dune Scrub (21320) but plants somewhat shorter and often somewhat succulent.

SITE FACTORS: Similar to Central and Northern Dune Scrub (21310, 21320), but drier and somewhat warmer and probably with less onshore wind. Intergrades toward the coast with Southern Foredunes (21230) and away from the coast on rockier soils with Venturan Sage Scrub (32300), or Coastal Succulent Scrub (32400).

CHARACTERISTIC SPECIES: Atriplex leucophylla, Croton californicus, Ephedra californica, Ericameria ericoides, Haplopappus venetus vernonioides, Lupinus chamissonis, Lycium brevipes, [Mesembryanthemum crystallinum], Opuntia littoralis, Rhus integrifolia, Simmondsia chinensis.

DISTRIBUTION: Same general areas as Southern Foredune (21230), but usually a little farther back from the coast. With the notable exception of the El Segundo Dunes, this community has been virtually eliminated from mainland southern California. Other small examples persist in Baja California and the Channel Islands.

SOURCES: 1, 4, 93

ELEMENT NAME: * Active Desert Dunes ELEMENT CODE: 22100

DESCRIPTION: Essentially barren expanses of actively moving sand whose size and shape are determined by abiotic site factors rather than by stabilizing vegetation.

SITE FACTORS: Surface temperatures become extremely high during the summer. May intergrade with Stabilized and Partially-stabilized Desert Dunes (22200) in less windy areas or on smaller dunes with more available water.

CHARACTERISTIC SPECIES: Cleome sparsifolia, Dicoria canescens, Oenothera avita, Tiquilia plicata

DISTRIBUTION: Areas of sand accumulation in the desert. Well developed in Eureka Valley and Death Valley, Inyo County; near Kelso, San Bernardino County; Thousand Palms, Riverside County; between El Centro and Yuma, Imperial County, and to a lesser extent in Borrego Valley, San Diego County.

SOURCES: 1, 6

ELEMENT NAME: * Stabilized and Partially-Stabilized Desert Dunes ELEMENT CODE: 22200

DESCRIPTION: Dunesand accumulations in the desert which are stabilized or partially stabilized by evergreen and/or deciduous shrubs, scattered low annuals and perennial grasses.

SITE FACTORS: Typically lower than active dunes, these retain water just below the sand surface allowing perennial vegetation to survive long drought periods. Total cover increases as the dunes are progressively stabilized.

Intergrades with Active Desert Dunes (22100) in windier sites and with Stabilized and Partially Stabilized Desert Sand Fields (22300) or sandier phases of Creosote Bush Scrub (33100, 34100), or desert wash scrub (34250).

CHARACTERISTIC SPECIES: Abronia villosa, Ambrosia dumosa, Astragalus spp., Atriplex canescens, Croton californicus var. mojavensis, Dalea spp., Eriogonum deserticola, Geraea canescens, Hesperocallis undulata, Hilaria rigida, Larrea divaricata, Oenothera deltoides, Palafoxia linearis, Petalonyx thurberi, Prosopis juliflora, Psorothamnus spp., Rumex hymenosepalus, Tiquilia spp.

DISTRIBUTION: Areas of sand accumulation in the desert, including all locations where active Desert Dunes (22100) occur and many other less extensive areas. Elevation from near sea level to about 4,000 feet (1210 m).

SOURCES: 1, 6, 130

ELEMENT NAME: * Stabilized and Partially-Stabilized Desert Sand Fields ELEMENT CODE: 22300

DESCRIPTION: Desert sand accumulations that are not obviously worked into Dune landforms. Vegetation varies from scant cover of widely scattered shrubs and herbs to nearly closed shrub canopies.

SITE FACTORS: Similar to and intergrading with Stabilized and Partially Stabilized Desert Sand Dunes (22200), but with sand dune microrelief much reduced. Often found along the toe of bajada slopes.

CHARTACTERISTIC SPECIES: Abronia villosa, Ambrosia dumosa, Astragalus spp., Atriplex canescens, Croton californicus mojavensis, Dalea sp., Dicoria canescens, Eriophullum pringlei, E. wallacei, Geraea canescens, Hesperocallis undulata, Larrea divaricata, Mentzelia longiloba, Oenothera deltoides, Oryzopsis hymenoides, Palafoxia linearis, Petalonyx thurberi, Prosopis juliflora, Psorothamnus spp., Rumex hymenosepalus Tiquilia plicata.

DISTRIBUTION: Flatter sand accumulations throughout the Desert Region, generally below about 5,000 feet.

SOURCES: 1, 6, 48

ELEMENT NAME:* Stabilized Interior Dunes ELEMENT CODE: 23100

DESCRIPTION: An open, primarily perennial, winter- and spring-growing herbaceous community with a scattering of low shrubs, or Quercus agrifolia. Shrubs typically are less than waist-high and contribute less than 10% of cover. This includes the "Antioch Dunes."

SITE FACTORS: A riverbank community on the lower reaches of the San Joaquin River just above its confluence with the Sacramento River. The dunes were deposited by winds reworking glacial outwash from the Pleistocene Sierra Nevada.

CHARACTERISTIC SPECIES: Croton californicus, Gutierrezia californica, Heterotheca grandiflora, Eriogonum auriculatum, Erysimum capitatum angustatum, Oenothera deltoides howellii.

DISTRIBUTION: Narrowly restricted to the mouth of the Sacramento-San Joaquin Delta, and now much reduced by agricultural development and sand quarrying.

SOURCE: 7

ELEMENT NAME: *Relictual Interior Dunes ELEMENT CODE: 23200

DESCRIPTION: A low, very open Atriplex polycarpa-dominated shrubland with a well-developed understory of psamnophyllic herbs.

SITE FACTORS: Loose, sandy soils derived from old beaches that surrounded the large Valley Minnow Lakes (A1111) in the pre-agricultural Central Valley.

CHARACTERISTIC SPECIES: Amsinckia intermedia, Atriplex polycarpa, Astragalus hornii, Bromus rubens, Distichlis spicata, Heterotheca grandiflora, Lasthenia californica, Layia pentachaeta albida, Oenothera deltoides cognata.

DISTRIBUTION: Old beach deposits surrounding Tulare, Buena Vista, and Goose lakes, now mostly converted to agriculture.

ELEMENT NAME: *Monvero Residual Dunes ELEMENT CODE: 23200

DESCRIPTION: An open shrubland dominated by Ephedra californica, and Ericameria linearifolia with an understory of Stipa speciosa, Oryzopsis hymenoides, and several other forbs normally found in the Colorado and Mojave deserts.

SITE FACTORS: Hilltop sand accumulations that have weathered in place from Miocene sandstones. These sands have been identified as the Monvero soil series. They occur on hilltops and along ridgelines. They are not wind-transported.

CHARACTERISTIC SPECIES: Abronia poganatha, Eastwoodia elegans, Ephedra californica, Eriogonum fasciculatum, E. gracillinum, Ericameria linearifolia, Juniperus californicus, Malacothrix californicus, Oryzopsis hymenoides, Oxytheca perfoliata, Stipa speciosa.

DISTRIBUTION: Narrowly restricted to hilltops and ridgelines along the lower Inner South Coast Range in western Fresno County, generally between 1500 and 3000 feet elevation.

SOURCE: 81

ELEMENT NAME: Northern Coastal Bluff Scrub ELEMENT CODE: 31100

DESCRIPTION: A low, often prostrate, scrub 5-50 cm high, forming continuous mats or more scattered. Dwarf shrubs, herbaceous perennials, and annuals are represented. Varying degrees of succulence are shown. Most growth and flowering occur in late spring and early summer, but can occur almost year-round.

SITE FACTORS: Exposed to nearly constant winds with high salt content. Soil usually rocky and poorly developed. Intergrades in less exposed situations with Coastal Prairie (41000), Northern Coastal Scrub (32100), or North Coast Coniferous Forest (82000) and Coastal Closed-cone Coniferous Forest (83100).

CHARACTERISTIC SPECIES: Aira praecox, Allium dichlamydeum, Amsinckia spectablis, Armeria maritima var. californica, Castilleja latifolia, Ceanothus gloriosus, Chrysopsis villosa bolanderi, Dudleya farinosa, Erigeron glaucus, Eriogonum latifolium, Eriophyllum staechadifolium, Grindelia stricta ssp. venulosa, Hypochoeris radicata, Lasthenia chrysostoma, Lupinus variicolor, Plantago maritima, Polypodium scouleri, Spergularia maritima.

DISTRIBUTION: At localized sites along the Coast, between Pt. Conception and Point Mendocino: Cape Mendocino; Mendocino County coastline; Bodega Head; Pt. Reyes; Pt. Lobos; Monterey County coastline; Pt. Buchon; Pt. Sal, etc.

SOURCES: 1, 8, 57, 96

ELEMENT NAME: * Southern Coastal Bluff Scrub ELEMENT CODE: 31200

DESCRIPTION: Similar to Northern Coastal Bluff Scrub (31100), but plants less prostrate (up to 2 m tall). Most plants woody and/or succulent. Most growth and flowering occur from late winter through spring.

SITE FACTORS: Similar to Northern Coastal Bluff Scrub (31100), but conditions less extreme due to less intense but still moisture-laden winds. Intergrades in less exposed settings with Venturan Coastal Sage Scrub (32300), or on finer-grained soils with Valley and Foothill Grassland (42000).

CHARACTERISTIC SPECIES: Atriplex spp., Calystegia cyclostegia, C. macrostegia, Castilleja affinis, Chorizanthe orcuttiana, Coreopsis gigantea, C. maritima, Dudleya spp., Encelia californica, Erigeron glaucus, Eriophyllum staechadifolium, Mesembryanthemum sp., Haploppappus spp., Malacothrix saxatilis, Marah macrocarpus [Carpobrotus aequilateralus] [Mesembryanthemum crystallinum], Opuntia littoralis, Rhus integrifolia.

DISTRIBUTION: At localized sites along the coast, south of Pt. Conception; Pt. Mugu, Pt. Dume, Pt. Vicente, Dana Pt., Torrey Pines State Reserve, Pt. Loma, etc. Several sites on the off-shore islands.

SOURCES: 1, 8, 89

ELEMENT NAME: Northern (Franciscan) Coastal Scrub ELEMENT CODE: 32100

DESCRIPTION: Low shrubs, usually 0.5-2 m tall, usually dense but with scattered grassy openings. Most growth and flowering occur in late spring and early summer. Three cover types are recognized on the basis of the dominant species: 32110 Northern Coyote Brush Scrub, 32120 Northern Salal Scrub, and 32130 Northern Silk-Tassel Scrub.

SITE FACTORS: On windy, exposed sites with shallow, rocky soils. Less exposed than Northern Coastal Bluff Scrub (31110), but usually more exposed than North Coast Coniferous Forest (82000) or Coastal Closed-Cone Coniferous Forest (83100).

CHARACTERISTIC SPECIES: Artemisia suksdorfii, Baccharis pilularis, Ceanothus griseus, Erigeron glaucus, Eriophyllum staechadifolium, Gaultheria shallon, Heracleum sphondylium, Iris douglasiana, Mimulus aurantiacus, Rosa gymnocarpa, R. nutkana, Toxicodendron diversilobum, Rubus vitifolius, Vaccinium ovatum

DISTRIBUTION: Patchily distributed (often interspersed with Coastal Terrace Prairie (41100) from southern Oregon to Pt. Sur, Monterey County.

SOURCES: 1, 58, 61, 88, 95, 96, 109, 110, 116, 118

ELEMENT NAME: Central (Lucian) Coastal Scrub ELEMENT CODE: 32200

DESCRIPTION: Shrubs, 1-2 m tall, usually quite dense, lacking the grassy openings of Northern Coastal Scrub (32100) and with greater crown overlap than Coastal Sage Scrubs (32300, 32600, 32700). Shorter than, but often of similar density to the associated Upper Sonoran Mixed Chaparral (37100) and sharing with it several evergreen sclerophylls. Most growth occurs in late winter and spring; flowering is concentrated in spring and early summer, but may continue through most of the year. Some species are relatively inactive during the dry summer and fall, but this is less pronounced than in the Coastal Sage Scrubs. Adapted to fire by crown-sprouting.

SITE FACTORS: On exposed, often south-facing slopes with shallow, rocky soils. Geograpically and environmentally intermediate between Northern Coastal Scrub (32100) and Venturan Sage Scrub (32300). Intergrades with Upper Sonoran Mixed Chaparral (37100) on locally moister, rocky sites and with Venturan Sage Scrub (32300) in southern San Luis Obispo and Northern Santa Barbara counties. This scrub often interdigitates with madrean woodlands and even redwoods on more mesic sites.

CHARACTERISTIC SPECIES: Artemisia californica, Baccharis pilularis, Ericameria ericoides, Eriogonum latifolium, Eriophyllum confertiflorum, Hazardia squarrosa Lupinus albifrous, L. chamissonis, Mimulus aurantiacus, Rhamnus californicus, R. crocea, Salvia mellifera, Toxicodendron diversilobum, Yucca whipplei percursa

DISTRIBUTION: Common on the ocean side of the Santa Lucia range between Monterey and Pt. Conception, usually below about 2,000 feet.

SOURCES: 1, 58-61, 84, 104, 113, 142

ELEMENT NAME: Venturan Coastal Sage Scrub ELEMENT CODE: 32300

DESCRIPTION: Low, mostly soft-woody shrubs, 0.5-2 m tall, with crowns usually touching, but less dense than Central (Lucian) Coastal Scrub (32200) or Chaparral (37000), and typically with bare ground underneath and between shrubs. Growth occurs in late winter and spring, following the onset of winter rains. Most flowering occurs in spring, but some species continue into summer. Dormant and more or less deciduous in summer and fall. Adapted to fire by crown-sprouting.

SITE FACTORS: On dry, more or less rocky slopes, often at lower elevations and on drier but less rocky sites than associated Upper Sonoran (37100) and Chamise chaparrals (37200).

CHARACTERISTIC SPECIES: Artemisia californica, Coreopsis gigantea, Eriogonum fasciculatum, E. cinereum, E. parvifolium, Eriophyllum confertiflorum, Helianthemum scoparium, Rhus integrifolia, Salvia apiana, S. leucophylla, S. mellifera, Yucca whipplei intermedia

DISTRIBUTION: From the South Coast Ranges to Cismontane, southern California and northern Baja California, usually below 3,000 feet (910 m). Most abundant in coastal region south of Pt. Conception (see Central Coastal Scrub (32200), but extending inland to vicinity of Cajon and San Gorgonio passes in San Bernardino and Riverside counties.

SOURCES: 1, 58-61, 101, 105, 106, 111, 117, 119-121, 142

ELEMENT NAME: *Maritime Succulent Scrub ELEMENT CODE: 32400

DESCRIPTION: A low (knee to waist high), open (25-75% cover) scrub dominated by drought deciduous, subligneous, malacophyllous shrubs with a rich admixture of stem and leaf succulents. The proportion of cacti is highest toward the south or in some inland areas. The ground is more or less bare between the shrubs. Growth and flowering are concentrated in the spring.

SITE FACTORS: On thin rocky or sandy soils, often on steep slopes of coastal headlands and bluffs. Intergrades with Southern Coastal Bluff Scrub (31200) on more exposed headlands and bluffs and with Venturan Sage Scrub (32300) on better developed, moister soils away from the immediate coast.

CHARACTERISTIC SPECIES: Acalypha californica, Agave shawii, Artemisia californica, Bergerocactus emoryi, Encelia californica, Euphorbia misera, Ferocactus viridescens, Lycium californicum, Opuntia littoralis, O. oricola, O. prolifera, Rhus integrifolia, Viguera laciniata

DISTRIBUTION: Restricted to within a few miles of the coast from about Torrey Pines south to El Rosario, Baja California Norte, and on San Clemente and Catalina islands.

SOURCES: 1, 8, 58-61, 89, 103, 107, 108, 112, 115, 120, 142

ELEMENT NAME: *Diegan Coastal Sage Scrub ELEMENT CODE: 32500

DESCRIPTION: Low, soft-woody subshrubs (to ca. 1 m high) that are most active in winter and early spring. Many taxa are facultatively drought-deciduous. Dominated by Artemisia californica and Eriogonum fasciculatum together with Malosma laurina and Salvia apiana. Stem- and leaf-succulents, while present, are not nearly as conspicuous as in Maritime Succulent Scrub (32400).

SITE FACTORS: Typically on low moisture-availability sites: steep, xeric slopes or clay-rich soils that are slow to release stored water. Intergrades at higher elevations with several chaparrals (37000) or, in drier more inland areas with Riversidean Sage Scrub (32700).

CHARACTERISTIC SPECIES: Artemisia californica, Eriogonum fasciculatum, Galvesia speciosa, Haplopappus venetus, Lavatera assurgentiflora, Lotus scoparius, Malacothamnus fasciculatus, Malosma laurina, Rhus integrifolia, Salvia apiana, Stipa lepida.

DISTRIBUTION: This is the wide-spread coastal sage scrub in coastal southern California from Los Angeles into Baja California.

SOURCES: 6, 58-61, 103, 108, 142

ELEMENT NAME: Diablan Sage Scrub ELEMENT CODE: 32600

DESCRIPTION: Both Northern (32100) and Central (32200) Coastal Scrubs pass into Diegan Sage Scrub in the drier interior. Stands are dominated by Artemisia californica, Eriogonum fasciculatum, and Salvia mellifera with plenty of Mimulus aurantiacus also present. In comparison with other Coastal Scrubs, this type has a poorer shrub flora but a greater diversity of perennial herbs.

SITE FACTORS: Shallow, rocky soils, typically on hot southern exposures. Depauperate examples of this community frequently are found on roadcuts or similar disturbances.

CHARACTERISTIC SPECIES: Adenostoma fasciculatum, Artemisia californica, Atriplex canescens, A. polycarpa, Chrysothamnus nauseosus mohavensis, Ericameria linearifolia, Hazardia squarrosa, Haplopappus venetus, Eriogonum fasciculatum, Eriophyllum confertiflora, Guterriezia californica, Lotus scoparius, Lupinus albifrons, Mimulus aurantiacus, Salvia mellifera

DISTRIBUTION: Inner Coast Ranges from Mount Diablo south to the Cholame Hills, well inland from the coastal fog incursion zone.

SOURCES: 58-61, 111, 142

ELEMENT NAME: *Riversidean Sage Scrub ELEMENT CODE: 32700

DESCRIPTION: This is the most xeric expression of Coastal Sage Scrub south of Point Conception. Typical stands are fairly open and dominated by Artemisia californica, Eriogonum fasciculatum, and [Bromus rubens], each attaining at least 20% cover.

SITE FACTORS: Typically on xeric sites such as steep slopes, severely drained soils, or clays that release stored soil moisture only slowly. Intergrades at slightly higher elevations with several southern Californian chaparrals (37000).

CHARACTERISTIC SPECIES: Artemisia californica, Atriplex canescens, [Bromus rubens], Encelia farinosa, Ericameria pinefolia, Eriodictyon crassifolium, Eriogonum fasciculatum, Gutierrezia californica, Ericameria linearifolia, Isomeris arboreus, Lotus scoparius, Malacothamnus fasciculatus, Salvia apiana, S. mellifera, Yucca whipplei parishii

DISTRIBUTION: Along the coastal base of the Transverse and Peninsular ranges from central Los Angeles County to the Mexican frontier.

SOURCES: 58-61, 98, 99, 102, 103, 114, 137, 142

ELEMENT NAME: Sonoran Creosote Bush Scrub ELEMENT CODE: 33100

DESCRIPTION: Shrubs, 0.5-3 m tall, widely spaced, usually with bare ground between. Very similar in appearance to Mojave Creosote Bush Scrub (34110), but with greater species and life form diversity including several succulents. Growth occurs from winter to early spring (or rarely at other seasons) if rainfall is sufficient. Shrubs may be dormant for long periods. Many species of ephemeral herbs may flower in late February and March (earlier than in Mojave Creosote Bush Scrub (34110)) if the winter rains are sufficient. This is the basic creosote scrub of the Colorado Desert.

SITE FACTORS: Well-drained secondary soils of slopes, fans and valleys rather than upland sites with thin residual soils or sites with high soil salinity. Winter temperatures seldom below freezing.

CHARACTERISTIC SPECIES: Ambrosia dumosa, Encelia farinosa, Fouquieria splendens, Larrea tridentata.

DISTRIBUTION: Colorado Desert Region from the Little San Bernardino Mountains, south and eastward into Baja California, southern Arizona and Sonora. The dominant plant community below 2,500 or 3,000 feet (760 or 910 m). Intergrades broadly with Mojave Creosote Bush Scrub (34100) in southeastern San Bernardino County and eastern Riverside County.

SOURCES: 1, 8, 48, 62, 122, 123

ELEMENT NAME: Sonoran Mixed Woody and Succulent Scrub ELEMENT CODE: 33220

DESCRIPTION: This, the only Colorado Desert community with substantial dominance of cacti and other stem succulents, is dominated by shrubs, 0.5-3 m tall, similar in aspect to Sonoran Creosote Bush Scrub (33100) but more varied and usually denser. Includes species from Sonoran Creosote Bush Scrub (33100), and Desert Dry Wash Woodland (63200), with no clear dominant. Most stands have Agave deserti, Encelia farinosa, Fouquieria splendens, Peucephyllum schottii, and Yucca schidigera in varying proportions. This type could be subdivided into more comprehensible units.

SITE FACTORS: Rocky, well-drained slopes and alluvial fans, usually at the base of mountains. Similar to Sonoran Creosote Bush Scrub (34120), but terrain usually more varied and moisture supply often greater.

CHARACTERISTIC SPECIES: Acacia greggii, Agave deserti, Dalea spp., Echinocactus acanthodes, Echinocereus engelmannii, Encelia farinosa, Ferocactus acanthodes, Fouquieria splendens, Haplopappus spp., Larrea divaricata, Opuntia spp., Simmondsia chinensis

DISTRIBUTION: Southern and eastern Mojave Desert and the Colorado Desert, usually between 1,000 and 4,000 feet (300 and 1210 m). General distribution similar to Sonoran Creosote Bush Scrub (33100), but more localized.

SOURCES: 1, 8, 48, 62, 123

ELEMENT NAME: Mojave Creosote Bush Scrub ELEMENT CODE: 34100

DESCRIPTION: Shrubs, 0.5-3 m tall, widely spaced, usually with bare ground between. Growth occurs during spring (or rarely in summer or fall) if rainfall is sufficient. Growth is prevented by cold in winter and limited by drought at other seasons. Many species of ephemeral herbs may flower in late March and April if the winter rains are sufficient. Other, less numerous species of annuals appear following summer thundershowers. This is the basic creosote scrub of the Mojave Desert, dominated by Larrea tridentata and Ambrosia dumosa.

SITE FACTORS: Well-drained secondary soils with very low available water holding capacity on slopes, fans, and valleys rather than upland sites with thin residual soils or sites with high soil salinity. Winter temperatures often below freezing. Intergrades at higher elevations with Shadscale Scrub (36140), or Joshua Tree Woodland (73000); at lower elevations or more osmotic sites with Desert Chenopod Scrub (36100).

CHARACTERISTIC SPECIES: Ambrosia dumosa, Cassia armata, Ephedra nevadensis, Hymenoclea salsola, Larrea tridentata, Lycium spp.

DISTRIBUTION: Extensive from the Death Valley region southward across the Mojave Desert to the little San Bernardino Mountains, eastward to northwestern Arizona and southern Nevada. The dominant plant community below 3,000 or 4,000 feet (910 or 1210 m) in this region.

SOURCES: 1, 8, 13, 48, 63. 91, 127, 128, 130

ELEMENT NAME: Mojave Mixed Woody Scrub ELEMENT CODE: 34210

DESCRIPTION: A complex scrub, open enough to be passable, and usually characterized by Yucca brevifolia herbertii, Eriogonum fasciculatum polifolium, and Isomeris arborea arborea. Most of the constituent species also occur in other nearby communities.

SITE FACTORS: Very shallow, overly-drained , often rolling to steep soils, usually derived from granitic parent materials. These sites have extremely low water holding capacity, mild alkalinity, and are not very saline. Intergrades on deeper soils (with higher water holding capacity) or at cooler elevations with Great Basin Scrubs (35000), Blackbrush Scrub (34300), or Pinyon Woodlands (72000); at warmer elevations with Creosote Bush Scrub (33100, 34100).

CHARACTERISTIC SPECIES: Ambrosia dumosa, Atriplex spp., Brickellia oblongifolia linifolia, Camissonia kernensis, Chrysothamnus teretifolius, Coleogyne ramosissima, Dalea fremontii, Ephedra nevadensis, E. viridis, Ericameria linearifolia, Eriogonum fasciculatum polifolium, Eucnide urens, Galium argense, Gilia cana elongata, Grayia spinosa, Hymenoclea salsola, Isomeris arborea arborea, Lupinus excubitus, Mentzelia involucrata, Opuntia basalaris, Phacelia nashiana, Purshia glandulosa, Salazaria mexicana, Salvia dorrii, Teterdymia axillaris, Yucca brevifolia herbertii

DISTRIBUTION: Widely but erratically scattered along the eastern base of the Sierra Nevada from the southwestern Owens Valley southward along the Tehachapis, San Gabriel, San Bernardino, San Jacinto, and Peninsular ranges to northern Baja California. Typically occurs between 2000-5000 feet.

SOURCES: 1, 13, 48, 62, 91

ELEMENT NAME: Mojave Mixed Steppe ELEMENT CODE: 34220

DESCRIPTION: A fairly dense grassland dominated by Hilaria rigida, with several shrubby species from Mojave Woody Scrub (34210) scattered throughout. Yucca brevifolia frequently is an aspect dominant even though it has a minority of absolute cover.

SITE FACTORS: Dry, sandy or gravelly places from 2000 to 7000 feet.

CHARACTERISTIC SPECIES: Anisocoma acaulis, [Bromus tectorum], Coreopsis bigelovii, Eriogonum fasciculatum polifolium, Erioneuron pulchellum, Hilaria rigida, Lupinus concinnus orcuttii, Oryzopsis hymenoides, Stipa speciosa, Yucca brevifolia

DISTRIBUTION: Upper bajadas and lower residual slopes of the higher ranges of the eastern Mojave and northern Colorado deserts.

SOURCES: 48, 161, 162

ELEMENT NAME: Mojave Wash Scrub ELEMENT CODE: 34250

DESCRIPTION: A low, shrubby, open community with a scattered to locally dense overstory of microphyllous trees.

SITE FACTORS: Sandy bottoms of wide canyons, incised arroyos of upper bajadas, and sandy, braided, shallow washes of the lower bajadas, usually below about 5,000 feet.

CHARACTERISTIC SPECIES: Acacia gregii, Atriplex polycarpa, Chilopsis linearis, Chrysothamnus paniculatus, Dalea spinosa, Hymenoclea salsola, Peucephyllum schottii, Prosopis glandulosa torreyana, P. pubescens, Prunus fasciculata, Rhus trilobata anisophylla

DISTRIBUTION: Washes, arroyos, and canyons of intermittent streams throughout the Mojave Desert region.

SOURCES: 1, 8, 43

ELEMENT NAME: Blackbush Scrub ELEMENT CODE: 34300

DESCRIPTION: Low, often intricately branched shrubs, 0.5-1 m tall, with crowns usually not touching and with bare ground between plants. Most growth and flowering occurs in late spring. Dormant in winter (from cold) and probably in summer and fall (from drought).

SITE FACTORS: On dry, well-drained slopes and flats with shallow often calcareous soils of very low water holding capacity, often intergrading with Great Basin Sagebrush Scrub (35210), Joshua Tree Woodland (73000), or Pinyon-Juniper Woodlands (72000), but typically at somewhat lower elevations, warmer, and drier.

CHARACTERISTIC SPECIES: Agave utahensis, Artemisia spinescens, Atriplex confertifolia, Chrysothamnus teretifolius, Coleogyne ramosissima, Ephedra nevadensis, Eriogonum fasciculatum polifolium, Eurotia lanata, Hilaria rigida, Grayia spinosa, Menodora spinescens, Salazaria mexicana, Salvia dorrii, Sitanion longifolium, Spheralcea ambigua, Stipa speciosa, Thamnosma montana, Yucca baccata

DISTRIBUTION: From the Owens Valley region (Inyo and southern Mono counties) to the Mojave Desert (Kern and San Bernardino counties). Typically between 4000 and 7000 feet.

SOURCES: 1, 48, 63, 91

ELEMENT NAME: Great Basin Mixed Scrub ELEMENT CODE: 35100

DESCRIPTION: A moderately tall, fairly open shrubland with several species contributing to the canopy. Dominants usually include Artemisia tridentata and Purshia tridentata with several perennial grasses between the shrubs.

SITE FACTORS: Deep, gravelly, well drained sites, usually on alluvium derived primarily from granitic sources. Intergrades on cooler or more shallow-soiled sites with Subalpine Sagebrush Scrub (35220); with Great Basin Pinyon-Juniper Woodlands on residual upland sites; and with Big Sagebrush Scrub on slightly lower elevation, less fertile, or overgrazed sites.

CHARACTERISTIC SPECIES: Artemisia tridentata, Oryzopsis hymenoides, Pinus monophylla, Prunus andersonii, Purshia tridentata, Sitanion hystrix, Stipa speciosa

DISTRIBUTION: Widely distributed in the northern Mojave and throughout the Great Basin deserts, as well as extensive on much of the Modoc Plateau. Also apparently in isolated pockets in the Inner South Coast Ranges.

SOURCES: 1, 48, 68, 91, 132

ELEMENT NAME: Big Sagebrush Scrub ELEMENT CODE: 35210

DESCRIPTION: Mostly soft-woody shrubs, 0.5-2 m tall, usually with bare ground underneath and between shrubs. Artemisia tridentata is dominant. Growth occurs mostly in late spring and early summer. Some species flower in late spring (Coleogyne, Purshia), others in early fall (Artemisia, Chrysothamnus). Dormant in winter. Young et al (65) recognize 15 communities within this unit.

SITE FACTORS: Occurs on a wide variety of soils and terrain, from rocky, well-drained slopes to fine-textured valley soils with high water table. May be colder (from cold air drainage), drier, or with less well-drained more alkaline soil than Pinyon-Juniper Woodland (72000), a frequent associate.

CHARACTERISTIC SPECIES: Agropyron spicatum, Artemisia tridentata, Atriplex canescens, Bromus marginatus, Chrysothamnus nauseosus, Coleogyne ramosissima, Elymus cinereus, Festuca idahoensis, Hilaria jamesii, Oryzopsis hymenoides, Purshia tridentata, Stipa comata, S. lettermanii, S. occidentalis, S. thurberiana, S. speciosa

DISTRIBUTION: Widely distributed east of the Cascade-Sierra Nevada crest, especially in Modoc, Lassen, Mono and Inyo counties. Scattered localities within and along the margins of the Mojave and Sonoran deserts (on desert mountain ranges) and in interior cismontane southern California. Usually occurs between 4,000 and 9,000 feet (1210 and 2730 m). Distributed extensively through the Intermountain West.

SOURCES: 1, 48, 65, 68, 132

ELEMENT NAME: Subalpine Sagebrush Scrub ELEMENT CODE: 35220

DESCRIPTION: Dwarf shrubs, 0.2-0.5 m tall, with crowns touching or more open. Growth occurs mainly from early to mid-summer. flowering mid- to late-summer. Dormant in fall, winter, and early spring due to cold.

SITE FACTORS: Similar to Big Sagebrush Scrub (35210), with which it intergrades, but higher and colder. Usually on coarse, well-drained gravelly soils that often are carbonate-rich. These carbonates may form a hardpan 20-40 cm below the soil surface, making this a droughty site due to low water holding capacity. Same elevation as Subalpine Coniferous Forest (86000), but drier and often windswept.

CHARACTERISTIC SPECIES: Agropyron spicatum, Artemisia arbuscula, A. nova, Chrysothamnus viscidiflorus puberulus, Coryphantha vivipara, Cowania mexicana stansburiana, Ephedra nevadensis, Gutierrezia microcephala, Orobanche fasciculata, Oryzopsis hymenoides, Sitanion hystrix, Stipa comata

DISTRIBUTION: East of the Sierra Nevada crest in Mono and Inyo counties. Generally between 6000 and 11000 feet (2420 and 3330 m). Especially well-developed in the White and Inyo mountains.

SOURCES: 1, 48, 65, 131, 132

ELEMENT NAME: Sagebrush Steppe ELEMENT CODE: 35300

DESCRIPTION: A semi-closed steppe dominated by Big Sagebrush with several perennial bunchgrasses between the shrubs. Bunchgrass dominance varies with soil depth and reaction.

SITE FACTORS: Loamy to sandy soils of moderate depth and fertility.

CHARACTERISTIC SPECIES: Agropyron spicatum, Artemisia tridentata, Bromus marginatus, Festuca idahoensis, Stipa lettermanii, S. occidentalis, S. thurberiana

DISTRIBUTION: Mainly east of the Cascade-Sierran Crest below the elevations of the coniferous forests. Most extensive in the Modoc Plateau, but scattered widely as far south as the Owens Valley. Now substantially reduced by grazing.

SOURCES: 1, 65, 132

ELEMENT NAME: Rabbitbrush Scrub ELEMENT CODE: 35400

DESCRIPTION: Dominated by rubber rabbit brush, usually ca. 1 m tall, with fairly evenly spaced gray shrubs flowering in late summer or fall. Ecological relations among the various subspecific members of Chrysothamnus viscidiflorus remain to be illucidated.

SITE FACTORS: A disturbance-maintained community (fire, grazing, soil tilling). Vertisols (self-churning soils) may have been the only "pristine" rabbitbrush sites.

CHARACTERISTIC SPECIES: Chrysothamnus viscidiflorus, others?

DISTRIBUTION: Great Basin and western margin of the Mojave Desert, reaching west across the Sierra-Cascade Axis into the drainages of Kern, Feather, and Pit Rivers.

SOURCES: 1, 65

ELEMENT NAME: Desert Saltbush Scrub ELEMENT CODE: 36110

DESCRIPTION: Usually low, grayish, microphyllous shrubs, 0.3-1 m tall, with some succulent species. Total cover often low, with much bare ground between the widely spaced shrubs. Stands typically are strongly dominated by a single Atriplex species.

SITE FACTORS: Fine-textured, poorly drained soils with high alkalinity and/or salinity, usually surrounding playas on slightly higher ground, hence somewhat drier than the adjacent Desert Sink Scrub (36120).

CHARACTERISTIC SPECIES: Aster intricatus, Atriplex argentea, Atriplex canescens, A. confertifolia, A. elegans ssp. fasciculata, A. hymenolytra, A. lentiformis, A. nuttallii, A. parryi, A. phyllostegia, A. polycarpa, A. pusilla, A. torreyi, Grayia spinosa, Hymenoclea salsola, Kochia californica, Lycium andersonii, L. cooperi, Prosopis glandulosa var. torreyana, Suaeda occidentalis

DISTRIBUTION: Widely scattered on margins of dry lake beds in the Colorado, Mojave, and Great Basin deserts.

SOURCES: 1, 8, 48, 130, 132, 133

ELEMENT NAME: Desert Sink Scrub ELEMENT CODE: 36120

DESCRIPTION: Similar to Desert Saltbush Scrub (36110), but plants often more widely spaced and with most species succulent chenopods.

SITE FACTORS: Poorly drained soils with extremely high alkalinity and/or salt content. Often with high water table and with salt crust at the surface.

CHARACTERISTIC SPECIES: Allenrolfea occidentalis, Atriplex canescens, Cleome sparsiflora, Cressa truxillensis minima, Erysimum capitatum bealianum, Frankenia grandifolia campestris, Heliotropium curassavicum oculatum, Kochia californica, Lepidium dictyotum, Monolepis nuttalliana, Nitrophila occidentalis, Oxystylis lutea, Sarcobatus vermiculatus, Sesuvium verrucosum, Ruppia cirrhosa, Sueda torreyana, Wislizenia refracta

DISTRIBUTION: Moist valley bottoms and lake beds scattered throughout the Sonoran Desert, Mojave Desert, Owens Valley, and nearby areas, usually below about 4000 feet.

SOURCES: 1, 8, 13, 48, 65

ELEMENT NAME: Desert Greasewood Scrub ELEMENT CODE: 36130

DESCRIPTION: Similar to Desert Saltbush Scrub (36110), but with plants more widely scattered, most species succulent, and species diversity lower.

SITE FACTORS: Heavy, fine-textured, poorly drained soils of high osmotic potential. Often with high water table and salty soil surface crust.

CHARACTERISTIC SPECIES: Allenrolfea occidentalis, Atriplex confertifolia, A. parryi, Sarcobatus vermiculatus

DISTRIBUTION: Valley bottoms and dry lake beds, widely scattered through Great Basin, Mojave, and Colorado deserts.

SOURCES: 1, 6

ELEMENT NAME: Shadscale Scrub ELEMENT CODE: 36140

DESCRIPTION: Low, intricately branched, often spiny shrubs, 0.3-0.6 m tall, usually well-spaced with bare ground between dominant Atriplex confertifolia and Artemisia spinescens. Growth, flowering, and dormancy sequence similar to Blackbush Scrub (34300), but usually a little earlier because of slightly higher temperatures and/or greater aridity.

SITE FACTORS: Often on poorly-drained flats with heavy, somewhat alkaline soil, adjacent to Desert Chenopod Scrub (36100). Also on well-drained slopes at higher elevations, intergrading at its upper limits with Blackbush Scrub (34300), Great Basin Sagebrush Scrub (35200) or Joshua Tree Woodland (73000). May occur above Creosote Bush Scrub (34100) on well-drained slopes or below it in poorly-drained basins with cold air accumulation.

CHARACTERISTIC SPECIES: Abronia villosa, Artemisia spinescens, Atriplex confertifolia, Atriplex hymenolytra, Coleogyne ramosissima, Ephedra nevadensis, Eurotia lanata, Grayia spinosa, Gutierrezia spp., Haplopappus acradenius, Kochia americana, Menodora spinescens, Oryzopsis hymenoides, Sarcobatus vermiculatus, Tetradymia glabrata

DISTRIBUTION: From the Owens Valley region (Inyo County) to the Mojave Desert (Kern and San Bernardino counties), and north and eastward across southern Nevada. Typically between 3000 and 6000 feet (910 and 1800 m).

SOURCES: 1, 13, 48, 63, 64, 136

ELEMENT NAME: * Valley Sink Scrub ELEMENT CODE: 36210

DESCRIPTION: Low, open to dense succulent shrublands dominated by alkali-tolerant Chenopodiaceae, especially Allenrolfea occidentalis or several Sueda species. Understories usually are lacking, though sparse herbaceous cover dominated by [Bromus rubens] develop occasionally. The annuals are most active from January to April; the perennials from March to September.

SITE FACTORS: Heavy, saline and/or alkaline clays of lakebeds or playas. High ground water supplies provide capillary water for the perennials. Soil surfaces often have a brilliant white salty crust over dark, sticky clay. Hot, dry summers, damp winters with long periods of tule fog. Interdigitates on less severe sites with Valley Saltbush Scrub (36220).

CHARACTERISTIC SPECIES: Allenrolfea occidentalis, Delphinium recurvatum, Distichlis spicata, Kochia californica, Lasthenia chrysantha, L. ferrisae, Nitrophila occidentalis, Salicornia subterminalis, Sporobolis airoides, Sueda fruticosa, S. torreyana

DISTRIBUTION: Formerly surrounded the large San Joaquin Valley lakes (Kern, Buena Vista, Tulare, Goose) and north along the trough of the San Joaquin Valley through Merced County to the gooselands of the Sacramento Valley (Solano to Glenn County, west of the Sacramento River); but now essentially extirpated due to flood control, agricultural development,a nd ground water pumping.

SOURCES: 1, 13, 66, 135, 291

ELEMEMT NAME: *Valley Saltbush Scrub ELEMENT CODE: 36220

DESCRIPTION: Open, gray- or blue-green chenopod scrubs (10-40% cover), usually over a low herbaceous annual understory. Cover types dominated by Atriplex polycarpa (36221) or A. spinifera (36222) perhaps are differentiable. Most perennials (except A. spinifera) flower in May-September. The annuals (and A. spinifera) are active January-April.

SITE FACTORS: Typically on sandy to loamy soils without surface alkalinity; largely on rolling, disected alluvial fans with low relief. Long, hot, dry summers; short, damp winters often shrouded in tule fog for weeks at a time from December through February.

CHARACTERISTIC SPECIES: Atriplex polycarpa, A. phyllostegia, A. spinifera, Delphinium recurvatum, Frankenia grandifolia campestris, Haplopappus acradenius bracteosus, Gilia tricolor, Hemizonia pungens, Platystemon californicus

DISTRIBUTION: Southern and southwestern San Joaquin Valley and the Carrizo Plains of San Luis Obispo County. Foremrly extensive but now essentially estirpated by agricultural conversion, flood control, and groundwater pumping.

SOURCES: 1, 13, 66, 134, 135, 291

ELEMENT NAME: *Sierra-Tehachapi Saltbush Scrub ELEMENT CODE: 36310

DESCRIPTION: An open shrubland dominated by Atriplex polycarpa and several other shrubs, interspaced with extensive areas of introduced and native annual grasses and forbs.

SITE FACTORS: Rolling to hilly, disected alluvial fans with sandy to loamy, non-alkaline soils with good drainage. Hot, dry summers, short moist winters, without prolonged tule fogs.

CHARACTERISTIC SPECIES: Atriplex polycarpa, Encelia virgenensis actoni, Eriogonum fasciculatum polifolium, Haplopappus acradenius bracteosus, Hymenoclea salsola, Isomeris arborea globosa, Opuntia treleasii, Stephanomeria pauciflora, S. virgata

DISTRIBUTION: Along the base of the foothills of the southern Sierra Nevada and Tehachapi mountians, from north of Porterville to a little west of Grapevine.

SOURCES: 1, 13, 66, 134, 135

ELEMENT NAME: *Interior Coast Range Saltbush Scrub ELEMENT CODE: 36320

DESCRIPTION: A moderate to dense, shoulder-high scrub dominated by Atriplex polycarpa, Ephedra californica, and Isomeris arborea arborea, usually with a grassy understory dominated by [Bromus rubens].

SITE FACTORS: Rolling to hilly, disected alluvial fans and uplands with sandy to loamy, non-alkaline soils. Hot,rainless summers; sool dry winters without tule fog. Changes abruptly to Valley Saltbush Scrub (36220) where soils become alkaline. Much of this community has been type-converted to Non-native Grassland (42200) by year-round grazing.

CHARACTERISTIC SPECIES: Astragalus lentiginosus nigricalycis, A. oxyphysus, Atriplex polycarpa, Ephedra californica, Eriogonum fasciculatum, Gutierrezia bracteata, Haplopappus acradenius bracteosus, Isomeris arborea arborea

DISTRIBUTION: Base of the Inner South Coast RAnges from near Pacheco Pass south to around Maricopa, from the top of the tule fog up to about 2000 feet.

SOURCES: 1, 13, 66, 134, 135, 291

ELEMENT NAME: Northern Mixed Chaparral ELEMENT CODE: 37110

DESCRIPTION: Broad-leaved sclerophyll shrubs, 2-4 m tall, forming dense, often nearly impenetrable vegetation dominated by Quercus dumosa, Adenostoma fasciculatum, and any one of several taxa in Arctostaphylos and Ceanothus. Plants typically deep-rooted. Usually little or no understory vegetation; often considerable accumulation of leaf litter. Growth may occur throughout the year but is highest in spring and much reduced during the late summer-fall dry season or during the winter at higher elevations. Flowering season extends from late winter to early summer. Adapted to repeated fires, to which many species respond by stump sprouting. A dense cover of annual herbs may appear during the first growing season after a fire, followed in subsequent years by perennial herbs, short-lived shrubs and re-establishment of dominance by the original shrub species.

SITE FACTORS: Dry, rocky, often steep slopes with little soil. Slopes are typically south-facing in northern California but north-facing in the south. Often adjacent to, but on rockier soils than Oak Woodland (71100) or Valley and Foothill Grassland (42000), rockier but moister than Venturan Coastal Sage Scrub (32300) or Riversidian Sage Scrub (32700); and warmer, rockier and drier than Broadleaved Evergreen Forest (81000) or Lower Montane Coniferous Forest (84100).

CHARACTERISTIC SPECIES: Adenostoma fasciculatum, Aesculus californica, Arctostaphylos glandulosa, A. glauca, A. viscida, Ceanothus cuneatus, C. greggii, C. leucodermis, C. velutinus, Cercis occidentalis, Cercocarpus betuloides, Eriodictyon californicum, Fraxinus dipetala, Fremontia californica, Heteromeles arbutifolia, Lonicera involucrata, Malacothamnus fremontii, Pickeringia montana, Prunus ilicifolia, Quercus chrysolepis, Q. dumosa, Q. wislizenii, Rhus ovata, R. trilobata malacophylla, Toxicodendron diversilobum

DISTRIBUTION: Interior slopes of the Klamath Mountains and North Coast Ranges, coastal and interior slopes of the South Coast Ranges; western foothills of the Sierra Nevada; Transverse and Peninsular Ranges of southern California on slopes away from the deserts. Generally becoming more abundant from north to south, usually below 3,000 feet (910 m) in northern California and 5,000 feet (1520 m) in southern California.

SOURCES: 1, 8, 106, 142, 148, 155

ELEMENT NAME: *Gabroic Northern Mixed Chaparral ELEMENT CODE: 37111

DESCRIPTION: An edaphically restricted mixed chaparral dominated by Adenostoma fasciculatum, but with several endemic shrubs conspicuous. Fire adapted by stump sprouting.

SITE FACTORS: Edaphically restricted to ultramafic gabros, usually on rather xeric exposures.

CHARACTERISTIC SPECIES: Adenostoma fasciculatum, Arctostaphylos viscida, Calystegia stebbinsii, Ceanothus lemmonii, C. roderickii, Chlorogalum grandiflorum, Fremontodendron decumbens, Galium californicum sierrae, Helianthemum suffrutescens, Senecio layneae, Wyethia reticulata.

DISTRIBUTION: Restricted to the Rescue stony loam soils of western El Dorado County (Pine Hill area).

SOURCES: 160

ELEMENT NAME: *Southern Mixed Chaparral ELEMENT CODE: 37120

DESCRIPTION: Similar to Northern Mixed Chaparral (37110) but typically not quite so tall (1.5-3 m) or dense. Occasionally with patches of bare soil or forming a mosaic with Venturan Coastal Sage Scrub (32300) or Riversidean Sage Scrub (32700). Divisible into Granitic (37121) and Mafic (37122) subtypes based on substrate, but floristic distinctions between these two subtypes remain unknown.

SITE FACTORS: Similar to Northern Mixed Chaparral (37110) but somewhat lower precipitation and more moderate temperatures. Often adjacent to and on moister sites than Chamise Chaparral (37200). Transitional from the chaparral habitats of California to the coastal semi-desert of Baja California Norte.

CHARACTERISTIC SPECIES: Adenostoma fasciculatum, Arctostaphylos glandulosa, A. pennisularis, Calochortus albus, Ceanothus tomentosus olivaceus, C. verrucosus, Cercocarpus minutiflorus, Cneoridium dumosum, Fritillaria biflora, Heteromeles arbutifolia, Lonicera subspicata, Quercus dumosa, Malosma laurina, Rhamnus crocea, Rhus ovata, Ribes indecorum, Xylcoccus bicolor, Yucca schidigera, Y. whipplei

DISTRIBUTION: Coastal foothills of San Diego County and northern Baja California, usually below 3,000 feet (910 m).

SOURCES: 103, 141, 142

ELEMENT NAME: Chamise Chaparral (Chamisal) ELEMENT CODE: 37200

DESCRIPTION: A 1-3 m tall chaparral overwhelmingly dominated by chamise. Associated species contribute little to cover. Adapted to repeated fires by stump sprouting. Mature stands are densely interwoven with very little herbaceous understory or litter.

SITE FACTORS: Similar to Upper Sonoran Mixed Chaparrals (37100), but on shallower, drier soils or at somewhat lower elevations. Often on xeric slopes and ridges, with adjacent more mesic sites mantled by Upper Sonoran Mixed Chaparrals.

CHARACTERISTIC SPECIES: Adenostoma fasciculatum, Arctostaphylos glauca, A. tomentosa, A. viscida, Ceanothus cuneatus, C. papillosus, Cercocarpus betuloides, Dendromecon rigida, Eriogonum fasciculatum, Eriodictyon californicum, Lotus scoparius, Prunus ilicifolia, Quercus dumosa, Rhus ovata, R. laurina, Salvia apiana, S. mellifera, Selaginella cinerascens, Yucca schidigera, Y. whipplei

DISTRIBUTION: General distribution similar to Northern Mixed Chaparral (37110) but relatively infrequent in the north compared to its abundandance in the south. The predominant chaparral type in Ventura, Los Angeles, San Bernardino, Riverside, and San Diego counties.

SOURCES: 1, 8, 67, 68, 101, 128, 137, 141, 142, 148, 155, 157

ELEMENT NAME: Redshank Chaparral ELEMENT CODE: 37300

DESCRIPTION: Very similar to Chamise Chaparral (37200), but typically taller (2 to 4 m) and somewhat more open. Often forming nearly pure stands of Adenostoma sparsifolium which flowers in mid-summer, in contrast to the spring flowering of A. fasciculatum. Probably dormant in winter, at least at its higher elevations.

SITE FACTORS: Similar to Chamise Chaparral (37200), but usually confined to granitic soils; often at higher elevation with greater precipitation and colder winters. Often adjacent to and intergrading with Chamise Chaparral; on rockier soils than Peninsular Pinyon-Juniper Woodland (72300); and at lower elevations or on rockier sites than Lower Montane Coniferous Forest (84100).

CHARTACTERISTIC SPECIES: Adenostoma fasciculatum, A. sparsifolium, Arctostaphylos spp., Ceanothus spp., Quercus dumosa, Rhus ovata

DISTRIBUTION: Common from San Gorgonio Pass southward into northern Baja California, most commonly on interior cismontane slopes between 300 feet and 6,000 feet. Abundant on the slopes of the San Jacinto and Santa Rosa Mountains. Outliers occur in the Santa Monica Mountains, in Santa Barbara County and San Luis Obispo County.

SOURCES: 67, 148

ELEMENT NAME: Semi-Desert Chaparral ELEMENT CODE: 37400

DESCRIPTION: Very similar to Northern Mixed Chaparral (37110), but more open and not quite so tall (1.5-3 m). Several of the dominant taxa (Juniperus, Eriogonum, Opuntia, etc.) are not broad-leaved sclerophylls. Probably dormant in winter (from cold) and in late summer and fall (from drought).

SITE FACTORS: Similar to Northern Mixed Chaparral (37110), but drier and with colder winters. Very similar to Red Shank Chaparral (37300), but probably a bit drier and hotter in summer. Often intergrading with Mojavean Pinyon-Juniper Woodlands (72200), but on rockier soils or recently burned sites. Less fire-prone than other chaparrals due to lower fuel loads.

CHARACTERISTIC SPECIES: Adenostoma fasciculatum, Arctostaphylos glauca, A. parryana, A. pungens, Ceanothus cuneatus, C. greggii, C. vestitus, Cercocarpus betuloides, Cowania mexicana stansburiana, Dendromecon rigida, Ephedra spp., Eriodictyon trichocalyx, Eriogonum fasciculatum, Fallugia paradoxa, Fremontodendron californicum, Garrya flavescens pallida, Juniperus californica, Opuntia spp., Prunus fasciculatum, P. fremontii, Purshia tridentata, Quercus dunnii, Q. turbinella, Rhus ovata, R. trilobata, Yucca whipplei

DISTRIBUTION: Inner South Coast Ranges from San Benito County to Kern County, extending into northern Ventura and Santa Barbara counties. Interior slopes of the Transverse and Peninsular Ranges bordering the Mojave and Colorado Deserts north to Kern County. Most common from 2,000-5,000 feet (610-1524 m).

SOURCES: 1, 13, 48, 67, 68, 148

ELEMENT NAME: Mixed Montane Chaparral ELEMENT CODE: 37510

DESCRIPTION: A dense, heterogeneous, sclerophyllous thicket dominated by Ceanothus cordulatus, Castanopsis sempervirens, and any of several species of Arctostaphylos or Ceanothus. Understories typically are very sparse except in the few years immediately following fire. Most plants are under 5 feet tall. Canopies usually are not quite closed.

SITE FACTORS: Steep, usually south-facing slopes in the coniferous forest zones. Much of the annual precipitaion comes as snow, leading to shorter growing seasons (and hence, slower post-fire recovery) than in lower elevation chaparrals. Some of these sites appear to be edaphic disclimaxes (due to shallow, rocky soil) rather than seral stages such as in many Montane Ceanothus Chaparrals (37530).

CHARACTERISTIC SPECIES: Arctostaphylos glandulosa, A. glauca, A. manzanita, A. nevadensis, A. patula, Artemisia tridentata, Castanopsis sempervirens, Ceanothus cordulatus, C. leucodermis, Cercocarpus betuloides, Heteromeles arbutifolia, Holodiscus microphyllus, Prunus emarginata, P. ilicifolia, Quercus dumosa, Rhus ovata

DISTRIBUTION: Widely scattered in the Sierran foothils, the cooler heights of the Coast Ranges and the Transverse and Peninsular ranges of southern California, typically between 4000 and 11000 feet.

SOURCES: 1, 68, 137, 150

ELEMENT NAME: Montane Manzanita Chaparral ELEMENT CODE: 37520

DESCRIPTION: Dense 2-5 m tall chaparrals dominated by any of several species of manzanita. May occur as a post-fire successional stage in burned Westside Ponderosa Pine Forest (84210), Sierran Mixed Conifer Forest (84230), White Fir Forest (84240, 85320), or Jeffery Pine Forest (85100). Plants dormant during winter, most active in late spring and early summer.

SITE FACTORS: Similar to and often intergrading with Upper Sonoran Mixed Chaparrals (37100), but generally at higher elevations and therefore cooler and moister. Often immediately below or on rockier or more xeric sites than Westside Ponderosa Pine Forest (84210).

CHARACTERISTIC SPECIES: Arctostaphylos glandulosa, A. manzanita, A. mariposa, A. mewukka, A. nevadensis, A. patula, A. pungens, A. viscida, Ceanothus cuneatus

DISTRIBUTION: Scattered in Klamath and North Coast Ranges south to Lake County. Common in the western foothills of the Cascade-Sierra south to Yuba and Nevada counties (2,000-4,000 feet), scattered from there south in the Sierra to Kern County (3,000-5,500) and the higher mountains of southern California.

SOURCES: 68, 140, 141, 148, 149

ELEMENT NAME: Montane Ceanothus Chaparrals ELEMENT CODE: 37530

DESCRIPTION: Dense, 1-3 m tall mostly sclerophyllous chaparral dominated by any of several species of Ceanothus. Plants winter-dormant, most active in late spring and early summer. These stands are taller (to 10 feet) and much denser than other Montane Cahaparrals. At least three types are recognized based on the dominant species: 37531 - Deer Brush Chaparral (C. integerimus); 37532 - Whitethorn Chaparral (C. leucodermis); and 37533 - Tobacco Brush Chaparral (C. velutinus).

SITE FACTORS: Similar to and often intergrading with Upper Sonoran Mixed Chaparral (37100), but generally higher (therefore cooler and moister). Most stands are successional after fire, landslide, gold mining, or other catostrophic disturbances. Best developed on dry, exposed sites.

CHARACTERISTIC SPECIES: Amelanchier pallida, Arctostaphylos parryana, A. patula, Ceanothus integerrimus, C. leucodermis, C. velutinus, Holodiscus boursieri, H. microphyllus, Lonicera involucrata, Prunus emarginata, Quercus chrysolepis, Sorbus scopulina

DISTRIBUTION: Scattered widely in the lower elevation conifer zones (5000-8000 feet) throughout California.

SOURCES: 68, 140, 156

ELEMENT NAME: Shin Oak Brush ELEMENT CODE: 37541

DESCRIPTION: A dense, 1-5 m tall shrub field that is winter-deciduous, fire resistant, and dominated almost exclusively by Quercus garryana semota. "Chaparral" is something of a misnomer, as this type is neither sclerophyllous not evergreen.

SITE FACTORS: Deep, rich, heavy soils at higher (therefore moister and cooler) elevations than Mixed or Chamise Chaparrals (3000-7000 feet).

CHARACTERISTIC SPECIES: Q. chrysolepis, Quercus garryana semota

DISTRIBUTION: Forming extensive patches in Kern and Tulare counties, and more sporadically north in the Sierran foothills to Butte and Shasta counties. Floristic distinctions among sites dominated by var semota vs var breweri need clarification.

SOURCES: 11, 13

ELEMENT NAME: Huckleberry Oak Chaparral ELEMENT CODE: 37542

DESCRIPTION: A low (1-2 m), evergreen sclerophyllous chaparral largely dominated by Huckleberry Oak. Plants active only during the snow-free season (April-November).

SITE FACTORS: Dry ridges, xeric exposures, and windswept places in the montane coniferous forests, usually from 1,000-10,000 feet.

CHARACTERISTIC SPECIES: Ceanothus leucodermis, Juniperus occidentalis, Pinus monticola, Quercus vaccinifolia

DISTRIBUTION: Cascade-Sierra Range south to Fresno County; North Coast and Siskiyou Ranges south to Mendocino County.

SOURCES: ?

ELEMENT NAME: Bush Chinquapin Chaparral ELEMENT CODE: 37550

DESCRIPTION: Dense, low (1-2 m) sclerophyllous, evergreen shrub fields dominated by bush chinquapin. Plant activity concentrated in spring and summer.

SITE FACTORS: Rocky or gravelly mountain summits or xeric slopes, largely between 1,500 and 6,000 feet in the Coast Range and Sierra Nevada, but to ~ 10,000 feet in the Transverse and Peninsular ranges. This type usually occurs in shallow-soiled or rocky sites within Lower or Upper Montane Coniferous Forest.

CHARACTERISTIC SPECIES: Arctostaphylos nevadensis, A. patula, Castanopsis sempervirens, Ceanothus velutinus, Prunus emarginata, Quercus vaccinifolia

DISTRIBUTION: From southern Oregon south in the Coast Ranges to Mendocino County, in the Cascade-Sierra to Kern County, and in the higher parts of the San Gabriel and San Jacinto ranges.

SOURCES: 13

ELEMENT NAME: * Serpentine Chaparral ELEMENT CODE: 37600

DESCRIPTION: Scrubby sclerophyllous shrublands dominated by any of several shrubs or small conifers that are edaphically restricted to serpentine. Species composition varies widely. Two main types are recognized: 37610 - Mesic Serpentine Chaparral dominated by Adenostoma fasciculatum and Heteromeles arbutifolia; and 37620 - Leather Oak Chaparral, with clear dominance by Quercus durata.

SITE FACTORS: Shallow, stony, infertile soils derived from serpentine. Usually below about 5,000 feet.

CHARACTERISTIC SPECIES: Adenostoma fasciculatum, Arctostaphylos montana, A. obispoensis, A. viscida, Berberis dictyota, Ceanothus divergens confusa, C. ferrisae, C. jepsonii, C. pumilus, Cupressus macnabiana, C. sargentii, Eriodictyon californicum, Garrya buxifolia, G. congdonii, Heteromeles arbutifolia, Juniperus californica, Pinus sabiniana, Quercus durata

DISTRIBUTION: Scattered throughout Central and Northern California, wherever serpentine outcrops occur.

SOURCES: 67, 75, 148

ELEMENT NAME: * Island Chaparral ELEMENT CODE: 37700

DESCRIPTION: Similar to Southern Mixed Chaparral (37120), sometimes taller (2-5 m), but more variable in density, often with more space between plants than on the mainland. Some of the species reach tree size. Many are larger than their most closely related mainland counterparts. Many of the species or subspecies are island endemics. The growing season is relatively long, with some growth probably occurring throughout the year.

SITE FACTORS: Very similar to Southern Mixed Chaparral (37120), but even milder, more equable climate. On rockier soils than Island Woodland (71190), with which it is frequently associated. In many areas, Island Chaparral and Island Woodland are not clearly differentiable, but form an intermediate community in terms of habit, height, density, and species composition.

CHARACTERISTIC SPECIES: Adenostoma fasciculatum, Arctostaphylos catalinae, A. insularis, A. subcordata, A. tomentosa, A. viridissima, Ceanothus arboreus, C. insularis, Cercocarpus betuloides var. blanchae, Dendromecon rigida ssp. harfordii, D. rigida ssp. rhamnoides, Heteromeles arbutifolia var. macrocarpa, Lyonothamnus floribundus, Prunus lyonii, Quercus agrifolia, Q. macdonaldii, Q. tomentella, Rhamnus integrifolia, R. pirifloria, Toxicodendron diversilobum

DISTRIBUTION: Santa Rosa, Santa Cruz, Anacapa, Santa Catalina and San Clemente islands. Especially abundant on Santa Cruz and Santa Catalina.

SOURCES: 89, 148

ELEMENT NAME: Buck Brush Chaparral ELEMENT CODE: 37810

DESCRIPTION: A dense chaparral to ~ 3 m tall, clearly dominated by Ceanothus cuneatus with some admixture of Adenostoma fasciculatum. Cover is higher than in Chamise Chaparral (37200) but is not so dense because the branches are not so interwoven.

SITE FACTORS: Dry slopes and alluvial fans, usually below ~6,000 feet. This may be a climax chaparral in parts of its range, but it clearly is seral to some deciduous oak woodlands (71110-71140) or Lower Montane Coniferous Forests (84000) at many sites.

CHARACTERISTIC SPECIES: Adenostoma fasciculatum, Ceanothus cuneatus, Garrya fremontii, Heteromeles arbutifolia, Quercus dumosa, Rhus diversiloba

DISTRIBUTION: Widely distributed from southwestern Oregon to northern Baja California, especially in the north where it appears to replace Chamise Chaparral (37200)

SOURCES: 67, 148

ELEMENT NAME: Blue Brush Chaparral ELEMENT CODE: 37820

DESCRIPTION: A tall chaparral (to 5-6 m) dominated by Ceanothus thrysiflorus.

SITE FACTORS: Relatively mesic sites (for chaparrals), mostly in the Mixed Evergreen Forest (81100) zone, or intergrading with Northern (32100) or Central (32200) Coastal Scrubs; below ~ 2,000 feet. This chaparral appears to be early seral after fire, especially in the southern part of its range where it eventually succeeds to Coast Live Oak Woodland (71160) or some Broadleaved Upland Forests (81000).

CHARACTERISTIC SPECIES: Adenostoma fasciculatum, Ceanothus thrysiflorus, Heteromeles arbutifolia, Quercus dumosa, Rhus ovata, Ribes malvaceum

DISTRIBUTION: Outer Coast Ranges from southwest Oregon to Santa Barbara County.

SOURCES: 67, 148

ELEMENT NAME: Ceanothus crassifolius Chaparral ELEMENT CODE: 37830

DESCRIPTION: A stiff, gray-green chaparral to 2-3 m tall, dominated by Ceanothus crassifolius and Adenostoma fasciculatum, with virtually no Arctostaphylos. The Ceanothus tends to die out after about 40 years, leading to a gradual thinning of old stands. There is considerably more leaf litter than in Chamise Chaparral (37200).

SITE FACTORS: Rather xeric sites with shallow, stony soils, usually below about 4000 feet. This too may be a fire-dependent seral type. Intergrades on more xeric sites with Chamise Chaparral (37200); on more mesic sites with Coast Live Oak (71160) or Englemann Oak Woodland (71180) or with Whitethorn Chaparral (37532).

CHARACTERISTIC SPECIES: Adenostoma fasciculatum, Ceanothus crassifolius, Heteromeles arbutifolia, Quercus dumosa, Rhus ovata, Ribes malvaceum

DISTRIBUTION: Very common along the coastal side of the Transverse and Peninsular ranges from Santa Barbara County south to Baja, usually below 4000 feet.

SOURCES: 68, 148

ELEMENT NAME: Ceanothus megacarpus Chaparral ELEMENT CODE: 37840

DESCRIPTION: A tall (to 20 feet), dense chaparral strongly dominated by Ceanothus megacarpus. This Ceanothus does not stump sprout, but apparently is very long-lived absent fire. Fire scarification results in even aged stands.

SITE FACTORS: Xeric slopes with shallow, rocky, poorly differentiated soils, usually fairly near the coast, but above the Coastal Scrub zone. This appears to be a fire-maintained type.

CHARACTERISTIC SPECIES: Adenostoma fasciculatum, Arctostaphylos glandulosa, A. glauca, Ceanothus megacarpus, C. spinosus, Cercocarpus betuloides, Eriogonum fasciculatum, E. parvifolium, Hazardia squarrosa, Helianthemum scoparium, Prunus ilicifolia, Malosma laurina, Salvia mellifera, Yucca whipplei

DISTRIBUTION: The dominant chaparral along the coastal mountains of Santa Barbara and Ventura counties, this type also occurs patchily from there south into Baja California. Best developed between 600 and 3000 feet. Intergrades at lower elevations with Venturan Sage Scrub (32300); with Chamise Chaparral (37200) on harsher sites; or with Broadleaved Upland Forests (81000) on more mesic or higher sites.

SOURCES: 105, 117, 144

ELEMENT NAME: Scrub Oak Chaparral ELEMENT CODE: 37900

DESCRIPTION: A dense, evergreen chaparral to 20 feet tall, dominated by Quercus dumosa with considerable Cercocarpus betuloides.

SITE FACTORS: Somewhat more mesic than many chaparrals, and often occurring at slightly higher elevations (to ~ 5,000 feet). These more favorable sites recover from fire more quickly than other chaparrals. Substantial leaf litter accumulates.

CHARTACTERISTIC SPECIES: Arctostaphylos glandulosa, Ceanothus integerrimus, C. leucodermis, C. thrysiflorus, Cercocarpus betuloides, Fraxinus dipetala, Galium angustifolium, Garrya veatchii, Heteromeles arbutifolia, Lonicera spp., Pickeringia montana, Prunus ilicifolia, Quercus dumosa, Q. wislizenii frutescens, Rhamnus californica, R. ilicifolia, Toxicodendron diversilobum

DISTRIBUTION: Western Sierran foothills and North Coast ranges from Tehama County south through the southern California mountains to Baja California.

SOURCES: 68, 148

ELEMENT NAME: Interior Live Oak Chaparral ELEMENT CODE: 37A00

DESCRIPTION: A dense, tall (to 20 feet) chaparral dominated by Quercus wislizenii and Q. dumosa with several other sclerophylls also in the canopy. Interior live oak stump sprouts readily following fire. Persistent leaf litter and dense canopies preclude much understory.

SITE FACTORS: This is a fairly mesic chaparral of valleys and foothills away from the immediate coast, especially in Lower Montane Coniferous Forests (84000) where it frequently is a fire-disclimax. Often interdigitates with Blue Oak Woodland or Chamise Chaparral on adjacent south-facing slopes or on sites with shallower soils or poorer drainiage. Recovers rapidly after fire.

CHARACTERISTIC SPECIES: Aesculus californica, Arctostaphylos glandulosa, A. glauca, Ceanothus leucodermis, Ceanothus papillosus (including var. roweanus), Cercocarpus betuloides, Fraxinus dipetala, Heteromeles arbutifolia, Pinus attenuata, P. sabiniana, Prunus ilicifolia, Quercus agrifolia, Q. chrysolepis, Q. douglasii, Q. dumosa, Q. wislizenii (including var frutescens), Rhamnus californica, R. ilicifolia, Rhus ovata, Toxicodendron diversilobum

DISTRIBUTION: Extensive in the Sierran foothills from Shasta to Kern counties, and North Coast Ranges south to Lake and Mendocino counties. Discontinuous south through the Central Coast, Transverse, and Peninsular ranges to northern Baja California. Intergrades at lower elevations with other more xeric chaparrals; at higher elevations with Interior Live Oak (81330) or Canyon Live Oak Forest (81320).

SOURCES: 27, 28, 32, 67, 68, 142, 143, 148, 149

ELEMENT NAME: Upper Sonoran Manzanita Chaparral ELEMENT CODE: 37B00

DESCRIPTION: A dense chaparral to 15 feet in which dominance is shared by chamise and various species of manzanita.

SITE FACTORS: Most stands appear to be disturbance followers, establishing after fire, logging, hydraulic mining, or other disruptions. Young conifers (especially Abies concolor or Pinus ponderosa) often can be found beneath the shrub canopy in these seral stands.

CHARACTERISTIC SPECIES: Adenostoma fasciculatum, Arctostaphylos glandulosa, A. glauca, A. mariposa, A. mewukka, A. nevadensis, A. patula, A. viscida, Ceanothus leucodermis

DISTRIBUTION: Widespread in the Sierran foothills and Coast Ranges, usually at elevations higher than Chamise Chaparral (37200), but lower than montane chaparral (37500). Somewhat more patchily distributed along the coastal side of the Transverse and Peninsular ranges, typically between 2500 and 5000 feet.

SOURCES: 68, 148, 149

ELEMENT NAME: *Northern Maritime Chaparral ELEMENT CODE: 37C10

DESCRIPTION: A fairly open chaparral (50-80% cover, usually fairly easy to walk through). Dominated by several narrowly restricted Manzanita or Ceanothus species.

SITE FACTORS: Associated with sandy substrates within the zone of coastal fog incursion, usually on rolling to hilly terrain. Fire appears necessary for continued reproduction.

CHARACTERISTIC SPECIES: Adenostoma fasciculatum, Arctostaphylos crinita, A. crustacea, A. glutinosa, A. pallida, A. silvicola, Ceanothus gloriosus, Chrysolepis chrysophylla minor, Dendromecon rigida, Lonicera hispidula vacillans, Mimulus aurantiacus, Pinus attenuata, Quercus agrifolia, Q. wislizenii, Vaccinium ovatum

DISTRIBUTION: Santa Cruz to Sonoma County near the Coast, usually as islands in Mixed Evergreen Forests (81100) of coast live oak, redwood, and douglas fir, or adjacent to Northern Coastal Scrub (32100).

SOURCES: 158

ELEMENT NAME: * Central Maritime Chaparral ELEMENT CODE: 37C20

DESCRIPTION: A variable sclerophyll scrub of moderate to high cover (50-100%) dominated by forms of Arctostaphylos tomentosa plus one or more other narrowly distributed manzanita.

SITE FACTORS: Well-drained, sandy substrates within the zone of summer coastal fog incursion. Fire appears necessary for continued reproduction. Intergrades on more mesic, less sandy sites with Monterey Pine Forest (83130), Bishop Pine Forest ((83120), and Monterey Pygmy Cypress Forest (83162); with Chamise (37200) and Upper Sonoran Mixed Chaparral (37100) on stonier sites out of the foggy area; and with Lucian Coastal Scrub (32200) closer to the coast or on shaley substrates.

CHARACTERISTIC SPECIES: Adenostoma fasciculatum, Arctostaphylos crustacea, A. cruzensis, A. glandulosa g., A. hearstiorum, A. hookeri, A. montereyensis, A. morroensis, A. pajaroensis, A. pechoensis, A. pilosula, A. pumila, A. purissima, A. rudis, A. tomentosa, Artemisia californica, Baccharis pilularis, Ceanothus dentatus, C. hearstiorum, C. impressus, C. maritimus, C. ramulosus fascicularis, C. rigidus, Cercocarpus betuloides, Ericameria ericoides, E. fasciculata, Eriodictyon altissimum, Heteromeles arbutifolia, Mimulus aurantiacus, Prunus ilicifolia, Quercus agrifolia, Rhamnus californica, R. crocea, Salvia mellifera, Toxicodendron diversilobum

DISTRIBUTION: Survives at scattered locations near Monterey and Ft. Ord, and in southern San Luis Obispo and northern Santa Barbara counties.

SOURCES: 104, 145, 153, 158

ELEMENT NAME: * Southern Maritime Chaparral ELEMENT CODE: 37C30

DESCRIPTION: A low, fairly open chaparral dominated by Wart-stemmed ceanothus and thick-leaved eastwood's manzanita.

SITE FACTORS: Weathered sands within the coastal fog belt. Fire appears necessary for continued reproduction of many characteristic species.

CHARACTERISTIC SPECIES: Adenostoma fasciculatum, Arctostaphylos glandulosa crassifolia, Baccharis vanessae, Ceanothus verricosus, Cercocarpus minutiflorus, Cneoridium dumosum, Comarostaphylos diversifolia, Coreopsis maritima, Corethrogyne filaginifolia linifolia, Dichondra occidentalis, Heteromeles arbutifolia, Pinus torreyana, Quercus dumosa, Malosma laurina, R. ovata, Salvia clevelandii, Xylococcus bicolor, Yucca schidigera

DISTRIBUTION: Today restricted to Torrey Pines State Reserve and a few scattered nearby localities.

SOURCES: 1

ELEMENT NAME: * Ione Chaparral ELEMENT CODE: 37D00

DESCRIPTION: A chaparral of low heath-like shrubs and scattered herbs dominated (sometimes exclusively) by Ione Manzanita. Shrub cover in mature stands usually exceeds 50%, with very little understory.

SITE FACTORS: Edaphically restricted to very acidic, nutrient-poor, coarse soils, mostly derived from the Eocene Ione formation. Warm, dry summers; cool, moist winters. This community occurs directly across the Central Valley from the Golden Gate, so summer high temperatures are less intense than elsewhere in the Sierran foothills. Relative humidities appear to be enough higher to support several epiphytic lichens.

CHARACTERISTIC SPECIES: Adenostoma fasciculatum, Arctostaphylos myrtifolia, A. viscida, Ceanothus tomentosus, Eriodictyon californicum, Eriogonum apricum, Helianthemum suffrutescens, Heteromeles arbutifolia, Lotus scoparius, Pinus attenuata, P. sabiniana, Quercus chrysolepis, Q. dumosa, Q. wislizenii (and var. frutescens), Rhamnus californica tomentella

DISTRIBUTION: Western Amador and northern Calaveras counties.

SOURCES: 145, 146

ELEMENT NAME: Mesic North Slope Chaparral ELEMENT CODE: 37E00

DESCRIPTION: A mixed chaparral with no single dominant species. Two geographically defined types are recognized: 37E10 - Northern North Slope Chaparral; and 37E20 - Southern North Slope Chaparral.

SITE FACTORS: This chaparral typically is found on more mesic exposures, in northern California typically surrounding stands of Mixed Evergreen Forest; and on shady slopes above 3000 feet in Scrub Oak Chaparral (37900) in the south.

CHARACTERISTIC SPECIES: Adenostoma fasciculatum, Arctostaphylos spp., Ceanothus leucodermis, Cercocarpus betuloides, Garrya fremontii, Heteromeles arbutifolia, Pickeringia montana, Rhamnus californica, Rhus trilobata, Quercus chrysolepis, Q. dumosa, Q. wisilzenii, Toxicodendron diversilobum

DISTRIBUTION: Throughout the Coast Ranges, Sierran foothills, and southern California mountains, usually below ~ 6,000 feet.

SOURCES: 67

ELEMENT NAME: Poison Oak Chaparral ELEMENT CODE: 37F00

DESCRIPTION: A chaparral dominated by poison oak. (Therefore little compositional data available).

SITE FACTORS: Is this a disturbance type maintained by frequent fires?

CHARACTERISTIC SPECIES: Toxicodendron diversilobum, Mimulus aurantiacus, others?

DISTRIBUTION: ?

SOURCES: ?

ELEMENT NAME: Coastal Sage - Chaparral Scrub ELEMENT CODE: 37G00

DESCRIPTION: A mix of sclerophyllous, woody chaparral species and drought-deciduous, malacophyllous sage scrub species.

SITE FACTORS: Apparently a post-fire successional community. Site factors need clarification. A catch-all type intermediate between Coastal Scrubs (32000) and chaparrals (37000).

CHARACTERISTIC SPECIES: Adenostoma spp., Artemisia californica, Ceanothus spp., Salvia mellifera, Toxicodendron diversilobum

DISTRIBUTION: Outer Coast Ranges and Peninsular Range from the Big Sur Coast south to Baja.

SOURCES: 89

ELEMENT NAME: * Upper Sonoran Subshrub Scrub ELEMENT CODE: 39000

DESCRIPTION: A low, fairly penetrable scrub of soft-wooded, summer-dormant, drought-tolerant shrubs. Dominance varies among sites, but usually includes Ericameria linearifolia, Eriogonum fasciculatum polifolium, Isomeris arborea arborea, or Ephedra californica, with many annuals derived from nearby grasslands filling the spaces between the shrubs.

SITE FACTORS: Usually of fairly well drained soils derived from sandstone, shale, or even sterile white diatomaceous deposits. Intergrades at lower elevations with Blue Oak (71140) or Alvord Oak Woodland (71170), Diablan Sage Scrub (32600), or some chaparrals (37000). Particularly sandy sites support Monvero Residual Dunes (23300).

CHARACTERISTIC SPECIES: Amsinckia furcata, A. vernicosa, Camissonia californica, Clarkia temblorensis, Eastwoodia elegans, Ephedra californica, Eriogonum fasciculatum polifolium, E. temblorense, Gutierrezia bracteatus, Haplopappus acradenius bracteosus, Ericameria linearifolia, Isomeris arborea globosa, Mentzelia pectinata, Stylomecon heterophylla micropetala

DISTRIBUTION: Arid hills surrounding the southern and western San Joaquin Valley, from the Adobe Hills (northwest of Bakersfield) across the Tehachipi and San Emigdio ranges and north along the rainshadow of the Inner South Coast Ranges to Alameda County.

SOURCES: 13

ELEMENT NAME: * Coastal Terrace Prairie ELEMENT CODE: 41100

DESCRIPTION: A dense, tall grassland (to 1m tall) dominated by both sod and tussock-forming perennial grasses. Most stands are quite patchy and variable in composition, reflecting local differences in available soil moisture capacity.

SITE FACTORS: Sandy loams on marine terraces near the coast (below ~700-1000 ft) within the zone of coastal fog incursion.

CHARACTERISTIC SPECIES: Agrostis tenuis, [Anthoxanthum odoratum], Armeria maritima californica, Calamagrostis nutkaensis, Danthonia californica, [D. pilosa], Deschampsia caespitosa holciformis, [Festuca arundinacea], F. rubra, [Holcus lanatus]

DISTRIBUTION: Discontinuous from Santa Cruz County north into Oregon.

SOURCES: 88, 96, 97, 109, 116, 175, 194

ELEMENT NAME: * Bald Hills Prairie ELEMENT CODE: 41200

DESCRIPTION: An edaphically determined (?) grassland occurring in zonal Mixed Evergreen (81100) and North Coast Conifer Forests (82000). Species composition varies gradually from north to south.

SITE FACTORS: Argillic ("self-churning"), fine-textured soils on ridge crests, usually a few miles back from the coast (beyond the limit of coastal fog incursion?). Surrounding zonal forests occur on rockier sites.

CHARACTERISTIC SPECIES: Carex tumicola, Danthonia californica, Festuca idahoensis, Festuca rubra, Melica, Poa, Stipa pulchra

DISTRIBUTION: Patchy from Sonoma County to southern Oregon.

SOURCES: 175, 193, 194

ELEMENT NAME: * Valley Needlegrass Grassland ELEMENT CODE: 42110

DESCRIPTION: A midheight (to 2 ft) grassland dominated by perennial, tussock-forming Stipa pulchra. Native and introduced annuals occur between the perennials, often actually exceeding the bunchgrasses in cover.

SITE FACTORS: Usually on fine-textured (often clay) soils, moist or even waterlogged during winter, but very dry in summer. Often interdigitates with Oak Woodlands (71100) on moister, better drained sites.

CHARACTERISTIC SPECIES: Achillea borealis, Achyrachaena mollis, Agoseris heterophylla, [Avena fatua], Bloomeria crocea, Brodiaea lutea, [Bromus

diandrus, B. mollis, B. rubens], Chlorogalum pomeridianum, Clarkia purpurea, Dodecatheon jefferyi, Melica californica, M. imperfecta, Orthocarpus attenuatus, Plantago hookeriana californica, Poa scabrella, Stipa cernua, S. pulchra

DISTRIBUTION: Formerly extensive around the Sacramento, San Joaquin, and Salinas Valleys, as well as the Los Angeles Basin, but now much reduced. The relationship of this type to the Potrero Grasslands of the Peninsular Ranges needs clarification.

SOURCES: 1, 134, 172, 175, 176, 182, 183, 189, 194, 198

ELEMENT NAME: * Valley Sacaton Grassland ELEMENT CODE: 42120

DESCRIPTION: Midheight (to 3 ft) tussock-forming grassland dominated by Sporobolus airoides.

SITE FACTORS: Fine textured, poorly drained, usually alkaline soils. Most sites have seasonally high water tables or are overflowed during winter flooding. Intergrades and often co-occurs with Alkali Meadow (45310) and Northern Claypan Vernal Pool (44120)

CHARACTERISTIC SPECIES: Distichlis spicata, Hordeum depressum, Sporobolus airoides, others?

DISTRIBUTION: Formerly extensive in the Tulare Lake Basin and along the San Joaquin Valley trough north to Stanislaus and Contra Costa Counties, now much reduced.

SOURCES: 134, 175, 176, 198

ELEMENT NAME: * Serpentine Bunchgrass ELEMENT CODE: 42130

DESCRIPTION: An open grassland dominated by perennial bunchgrasses. Total cover typically is low, but is markedly dominated by native species (usually much more so than in Valley Needlegrass Grassland (42110) or Non-native Grasslands (42200)).

SITE FACTORS: Restricted to serpentine sites.

CHARACTERISTIC SPECIES: [Bromus mollis], Calamagrostis ophitidis, Eschscholtzia californica, Festuca grayii, Hemizonia luzulaefolia, Lotus subpinnatus, Melica californica, Poa scabrella, Stipa cernua, S. lepida, S. pulchra, Vulpia microstachys

DISTRIBUTION: Scattered widely through the Coast Ranges, less common in the Sierra Nevada and southern California mountains.

SOURCES: 176, 183, 198

ELEMENT NAME: Valley Wildrye Grassland ELEMENT CODE: 42140

DESCRIPTION: A dense sod prairie dominated by Elymus triticoides.

SITE FACTORS: Moist sites at low elevations, often adjacent to stands of riparian forest or freshwater marsh. Soils frequently subalkaline and/or seasonally overflowed.

CHARACTERISTIC SPECIES: Artemisia Douglasiana, Elymus triticoides, Urtica holosericea, others?

DISTRIBUTION: Scattered widely through the Central Valley and surrounding foothills.

SOURCES: 176

ELEMENT NAME: * Pine Bluegrass Grassland ELEMENT CODE: 42150

DESCRIPTION: Shrubless grasslands dominated by Poa scabrella with high cover and constancy of several native forbs.

SITE FACTORS: Toe slopes and clay flats of moderate or better fertility. Associated forbs vary with aspect, with Lasthenia minor often dominant on ungrazed flats, and Trifolium tridentatum more extensive on better drained, warmer sites.

CHARACTERISTIC SPECIES: [Achillea millefolium], [Bromus rubens], [Erodium cicutarium], Grindelia camporum, Lasthenia minor, Orthocarpus purpurescens, Sitanion jubatum, Stipa spp., Trifolium tridentatum, Triteleia laxa, Vulpia microstachys

DISTRIBUTION: Lower elevations of the Inner South Coast Ranges, at least from Contra Costa County south to the Carrizo Plains area of eastern San Luis Obispo County.

SOURCES: 13, 82, 134, 176, 194, 198

ELEMENT NAME: Non-native Grassland ELEMENT CODE: 42200

DESCRIPTION: A dense to sparse cover of annual grasses with flowering culms 0.2-0.5 (1.0) m high. Often associated with numerous species of showy-flowered, native annual forbs ("wildflowers"), especially in years of favorable rainfall. Germination occurs with the onset of the late fall rains; growth, flowering, and seed-set occur from winter through spring. With a few exceptions, the plants are dead through the summer-fall dry season, persisting as seeds.

SITE FACTORS: On fine-textured, usually clay soils, moist or even waterlogged during the winter rainy season and very dry during the summer and fall. Oak Woodland (71100) is often adjacent on moister, better drained soils.

CHARACTERISTIC SPECIES: [Avena barbata], [A. fatua], [Bromus mollis], [B. rigidus], [B. rubens], [Erodium botrys], E. cicutarium], Eschscholtzia californica, Gilia spp., Hemizonia spp. (summer), Lasthenia spp., Layia spp., [Lolium multiflorum], Lupinus spp., Lepidium dictyotum, [Medicago hispida], Nemophila menziesii, Orthocarpus spp., Phacelia spp., [Schismus arabicua], Vulpia megalura, V. microstachys

DISTRIBUTION: Valleys and foothills of most of California, except for the north coastal and desert regions. Usually below 3000 ft., but reaching 4000 ft. in the Tehachapi Mtns. and interior San Diego Co. Intergrades with Coastal Prairie (41000) along the central coast. Formerly occupied large portions of the Sacramento, San Joaquin, and Salinas Valleys as well as the Los Angeles Basin, areas that are now agricultural or urban.

SOURCES: 1, 13, 134, 171, 172, 176, 181-184, 192, 194, 198

ELEMENT NAME:* Wildflower Field ELEMENT CODE: 42300

DESCRIPTION: An amorphous grab bag of herb-dominated types noted for conspicuous annual wildflower displays. Dominance varies from site to site and from year to year at a particular site.

SITE FACTORS: Usually on fairly poor sites (droughty, low in nutrients), associated with Grasslands or Oak Woodlands on surrounding, more productive sites.

CHARACTERISTIC SPECIES: Eschscholtzia californica, Gilia bicolor, Layia platyglossa, Lupinus bicolor, Orthocarpus attenuatus, O. purpurasens

DISTRIBUTION: Valleys and foothills of the Californian Floristic Province except the north coast (too wet) and desert (too dry) regions. Below about 2000 ft. in the north, 4000-5000 ft. in the south.

SOURCES: ?

ELEMENT NAME: *Great Basin Grassland ELEMENT CODE: 43000

DESCRIPTION: Open, steppe-like vegetation of perennial bunch grasses, with flowering culms 0.3-1 m high. Most growth and flowering occur during late spring and early summer. The plants are dormant in winter (from cold) and mostly dormant in late summer and fall (from drought).

SITE FACTORS: On fine-textured soils, damp or frozen at the surface in winter, moist in spring, dry in summer and fall. Often intermixed with Big Sagebrush Scrub (35210), which becomes dominant on better-drained, drier soils. Overgrazing may cause expansion of sagebrush into the grassland and/or replacement of native grassland by introduced species. This habitat is now uncommon in its original form.

CHARACTERISTIC SPECIES: Agropyron spicatum, Bromus carinatus, Carex geyeri, Elymus cinereus, Festuca idahoensis, Koeleria cristata, Poa sandbergii, P. secunda, Sitanion hystrix, Stipa comata, S. thurberiana

DISTRIBUTION: Scattered through the valleys of Modoc and Lassen Cos.; occasional in eastern Plumas Co., Mono Co. (Bridgeport Valley, Long Valley), and Inyo Co. (Owens Valley). More abundant in the northern Great Basin and interior Pacific Northwest.

SOURCES: 132, 184

ELEMENT NAME: *Northern Hardpan Vernal Pool ELEMENT CODE: 44110

DESCRIPTION: A low, amphibious, herbaceous community dominated by annual herbs and grasses. Germination and growth begin with winter rains, often continuing even when inundated. Rising spring temperatures evaporate the pools, leaving concentric bands of vegetation that colorfully encircle the drying pool.

SITE FACTORS: Old, very acidic, Fe-Si cemented hardpan soils (Redding, San Joaquin, and similar series). The microrelief on these soils typically is hummocky, with mounds intervening between localized depressions. Winter rainfall perches on the hardpan, forming pools in the depressions. Evaporation (not runoff) empties the pools in spring.

CHARACTERISTIC SPECIES: Allocarya stipitata micrantha, A. undulata, Boisduvalia stricta, Deschampsia danthonoides, Downingia bicornuta, D. cuspidata, D. pulchella, Eryngium vaseyi, Juncus leiospermus, J. uncialis, Lasthenia fremontii, Limnanthes alba, Limosella aquatica, Navarretia leucocephala, Orthocarpus campestris, Pogogyne zizyphoroides, Psilocarphus brevissimus, Veronica arvensis

DISTRIBUTION: "Red Dirt Hogwallow Lands", primarily on old alluvial terraces on the east side of the Great Valley from Tulare or Fresno County north to Shasta County.

SOURCES: 13, 169, 170

ELEMENT NAME: * Northern Claypan Vernal Pool ELEMENT CODE: 44120

DESCRIPTION: Similar to Northern Hardpan Vernal Pools, but with lower microrelief, and usually lower overall cover. Pools may be small (a few square meters) or quite large (covering several ha).

SITE FACTORS: Fairly old, circum-neutral to alkaline, Si-cemented hardpan soils. Often more or less saline. Intergrades via Cismontane Swale (52500) with Cismontane Alkali Marsh (52310) which has water present throughout the year.

CHARACTERISTIC SPECIES: Allocarya leptoclada, A. stipitata stipitata, Boisduvalia glabella, Cressa truxillensis vallicola, Downingia bella, D. insignis, Eryngium aristulatum, Lasthenia ferrisiae, L. glaberrima, L. minor, Myosurus minimus, Pogogyne douglasii, Spergularia marina, Veronica peregrina xalaphesis

DISTRIBUTION: On lower terraces and basin rims, toward the valley trough compared to Northern Hardpan Vernal Pools; Central San Joaquin Valley north to Glenn and Colusa counties.

SOURCES: 13

ELEMENT NAME: * Northern Basalt Flow Vernal Pool ELEMENT CODE: 44131

DESCRIPTION: Very low, open mixture of amphibious annual herbs and grasses. Growth begins following fall rains and continues even while plants are submerged until the standing water is evaporated in spring. Plant growth is abruptly terminated by warm spring weather. Pools typically are small, covering under ca 50 square meters.

SITE FACTORS: Occur in small depressions on tops of massive basalt flows. These pools fill and empty many times during the winter, and have extremely thin soils over the solid bedrock that prevents downward rainwater percolation.

CHARACTERISTIC SPECIES: Blennosperma nanum, Boisduvalia densiflora, Callitriche marginata, Cicendia quadrangularis, Crassula aquatica, Downingia cuspidata, Eryngium vaseyi, Gnaphalium palustre, Lasthenia Fremontii, Linanthus ciliatus, Parvisedum pumilum, Psilocarphus brevissimus, P. tenellus

DISTRIBUTION: Scattered along the western Sierra foothills between Shasta and Tulare Counties, and in the volcanic tablelands of the Modoc Plateau in Shasta, Lassen, Modoc, and Siskiyou Counties.

SOURCES: 192

ELEMENT NAME: * Northern Volcanic Mudflow Vernal Pool ELEMENT CODE: 44132

DESCRIPTION: A very low, open mixture of amphibious annual herbs and grasses. Germination occurs following early fall rains; flowering begins by late February, and most plant activity is finished by mid-May. Pools typically are small, covering at most a few score square meters.

SITE FACTORS: Restricted to irregular depressions in Tertiary pyroclastic flows (Lahars--largely on the Mehrten Formation). Shallow soils prevent forests from developing. Pools form in the small depressions following winter rains.

CHARACTERISTIC SPECIES: Downingia bicornuta, Lasthenia glaberrima, Limnanthes douglasii rosea, Navarretia tagetina

DISTRIBUTION: Scattered on flat-topped mesas (many called "Table Mountain") along the Sierran foothills, mostly between 500-2000 ft. elevation in the Blue Oak Woodland (71140) and Digger Pine-Chaparral Woodland (71320).

SOURCES: ?

ELEMENT NAME: *Southern Interior Basalt Flow Vernal Pool ELEMENT CODE: 44310

DESCRIPTION: A very low, open to nearly closed mixture of amphibious annual herbs and grasses that require seasonal inundation and desiccation for completion of their life cycle. Most species are active in winter, flower in spring, and spend summers as seeds waiting for the return of fall rain. Pools range in size from a few score m2 to several ha.

SITE FACTORS: Occurs mostly as small, playa-like lakes on tops of basalt-capped plateaux. Shallow soils over bedrock prevent woodlands from establishing. The pools fill at the onset of fall rains and dry by evaporation during warm spring weather.

CHARACTERISTIC SPECIES: Alopecurus howellii, Blennosperma nanum, Callitriche marginata, Crassula aquatica, Downingia bella, D. cuspidata, Eryngium parishii, Limnanthes gracilis parishii, Myosurus minimus, Navarretia prostrata, Orcuttia californica, Pilularia americana, Plagiobothrys undulatus, Psilocarpus brevissimus

DISTRIBUTION: Apparently limited to 3 lava-capped mesas of the Santa Rosa Plateau in southwestern Riverside County.

SOURCES: 98, 163-166

ELEMENT NAME: * San Diego Mesa Hardpan Vernal Pool ELEMENT CODE: 44321

DESCRIPTION: Very similar in aspect to Northern Hardpan Vernal Pools, but with different species composition. Surrounding high ground, however, usually is mantled with chamisal (37200) rather than grassland. Pool sizes range from very small to moderate (up to ca. 700 square meters).

SITE FACTORS: Small depressions in flat-topped marine terraces. Fe-Si cemented hardpan prevents downward drainage of rainwater. Soils often are stonier than Northern Hardpan Vernal Pools, and are always coarser and redder than San Diego Mesa Claypan Vernal Pools (44322).

CHARACTERISTIC SPECIES: Eryngium aristulatum parishii, Myosurus minimus, Navarretia fossalis, Ophioglossum californicum, Pogogyne nudiuscula

DISTRIBUTION: Formerly extensive on the flat marine terraces north of San Diego, but now almost extirpated by urban blight.

SOURCES: ?

ELEMENT NAME: * San Diego Mesa Claypan Vernal Pools ELEMENT CODE: 44322

DESCRIPTION: Similar to Northern Claypan Vernal Pools, but less markedly saline/alkaline. Surrounded by Grassland rather than Chamisal.

SITE FACTORS: Soils decidedly finer textured and greyer than San Diego Mesa Hardpan Vernal Pools, and lacking an iron cemented hardpan.

CHARACTERISTIC SPECIES: Myosurus minimus apus, Navarretia fossalis, Orcuttia californica, Pogogyne abramsii

DISTRIBUTION: Restricted to marine terraces between San Diego and Ensenada, Mexico and much reduced by agricultural and urban development.

SOURCES: ?

ELEMENT NAME: Montane Meadow ELEMENT CODE: 45100

DESCRIPTION: Dense growth of sedges and other perennial herbs, usually from 0.5-1 m high, but with some taller herbs to 2 m. Main growth period from late spring through summer (summer only at higher elevations); flowering mostly in summer; dormant in winter (from fall through spring at higher elevations). Montane Meadows are subdivided into Wet (45110) and Dry (45120) subtypes. Wet Montane Meadows have soils that remain saturated throughout the year.

SITE FACTORS: On fine-textured, more or less permanently moist or wet soils. May be associated with Bogs (51100), Fens (51200) or Freshwater Swamps (52600) in more extremely waterlogged soils. Adjacent forest or scrub are on coarser, better drained soils. Often a successional stage in the filling of lakebeds with soil, and characterized by young trees encroaching from the margins. On seasonally drier, but still fine-textured soils may intergrade with Coastal Prairie (41000) in the North Coast Ranges, Valley and Foothill Grasslands (42000) in the Sierra Nevada foothills, and Great Basin Grassland (43100) or Great Basin Sagebrush (35200) in northeastern California. Both Wet and Dry types may occur in a given meadow.

CHARACTERISTIC SPECIES: Camassia quamash, Carex bolanderi, C. rostrata, C. vesicaria, Dodecatheon jeffreyi, Glyceria elata, Eleocharis acicularis bella, Heracleum sphondylium ssp. montanum, Juncus nevadensis, Lupinus polyphyllus ssp. superbus, Muhlenbergia filiformis, Pteridium aquilinum, Scirpus congdonii, S. criniger, Veratrum californicum, V. fimbriatum (in North Coast Ranges). Ratliff (195, 196) discusses several distinctions between Wet and Dry types.

DISTRIBUTION: Scattered within the North Coast Coniferous Forests (82000), Lower Montane Forests (84000), and Upper Montane Forests (85000) of the North Coast Ranges, Klamath Ranges, Cascade Range, Sierra Nevada, Transverse and Peninsular ranges. Elevation from 1000-7000 ft. (300-2130 m) in the north to 5000-9000 ft. (1520-2740 m) in the south.

SOURCES: 1, 13, 48, 150, 174, 190, 195, 196

ELEMENT NAME:* Wet Subalpine or Alpine Meadow ELEMENT CODE: 45210

DESCRIPTION: Open areas within the Subalpine Forest (86000) or above treeline where a rich flora of grasses, sedges, rushes, and forbs form low (typically under 0.5 m), dense, often matted vegetation.

SITE FACTORS: Wet Meadows remain saturated throughout the growing season. Growing season limited by snow. Some meadows appear to be late hydroseres, while others ("Stringer Meadows") are maintained by streams that flow through the meadow.

CHARACTERISTIC SPECIES: Calamagrostis breweri, Cardamine breweri, Carex excerta, C. nebrascensis, C. rostrata, C. scopulorum, Deschampsia caespitosa, Eleocharis pauciflora, Juncus nevadensis, J. orthophyllus, Mimulus primuloides, Oryzopsis kingii, Senecio scorzonella, Triglochin palustris, Trisetum spicatum, Vaccinium nivictum, Veratrum californicum

DISTRIBUTION: Common at scattered locations at mid to high elevations in the Klamath Ranges and the Cascade-Sierra. Elevations from 6-9000 ft. in the north, 9-11000 ft. in the south.

SOURCES: 1, 13, 150, 154, 173, 174, 190, 191, 194, 195

ELEMENT NAME: * Dry Subalpine or Alpine Meadow ELEMENT CODE: 45220

DESCRIPTION: Open areas within the Subalpine Forest (86000) or above treeline where a rich flora of grasses, rushes, and forbs form a low (typically under 0.3 m), fairly open vegetation.

SITE FACTORS: Dry Meadows have no capillary water available during some part of growing season. Growing season limited by snow. Dry Meadow vegetation may form a "fairy ring" around a Wet Meadow.

CHARACTERISTIC SPECIES: Achillea lanulosa, Artemisia rothrockii, Aster alpigenus, Calamagrostis breweri, Calyptridium umbellatum, Carex exserta, C. subfusca, C. teneraeformis, Eriogonum incanum, E. ovalifolium nivale, Festuca brachyphylla, Gentiana newberryi, Ivesia purpurescens, Lupinus breweri bryoides, Muhlenbergia richardsonis, Penstemon davidsonii, Poa pratensis, Solidago multiradiata, Stipa occidentalis, Taraxacum officinale, Trisetum spicatum

DISTRIBUTION: Common at scattered locations at mid to high elevations in the Klamath Ranges and the Cascade-Sierra. Elevations 6-9000 ft in the north, 9-12000 ft in the south.

SOURCES: 13, 150, 154, 173, 174, 190, 191, 194, 195

ELEMENT NAME: * Alkali Meadow ELEMENT CODE: 45310

DESCRIPTION: Dense to fairly open growth of perennial grasses and sedges. Usually low growing, but occasionally with tufts to 1 m high (Sporobolus airoidea). Growing and flowering season from late spring to early fall. Relatively few species.

SITE FACTORS: On fine-textured, more or less permanently moist, alkaline soils. May intergrade with Great Basin Sagebrush (35200), Shadscale Scrub (34400, 35400), or Great Basin Grassland (43100) on moist, nonalkaline soil; with Desert Chenopod Scrub (36100) on drier, more alkaline soils; with Non-native Grassland (42200), and Northern Claypan Vernal Pools (44120) on drier, less alkaline soils of the Central Valley; or with Alkali Marsh (52300) on permanently flooded sites.

CHARACTERISTIC SPECIES: Allenrolfea occidentalis, Anemopsis californica, Carex spp., Cordylanthus mollis hispidus, Distichlis spicata var. stricta, Juncus, spp., Muhlenbergia asperifolia, Phragmites australis, Sida leprosa hederacea, Sisyrinchium halophyllum, Spartina gracilis, Sporobolus airoides, Triglochin concinna debilis

DISTRIBUTION: In valley bottoms and on the lower portions of alluvial slopes east of the Cascades and Sierra Nevada, from the Modoc Plateau to Owens Valley at elevations of 3500 to 7000 ft. (1070 to 2130 m). Also occuring around Alkali Seeps (45320) arising from the Valley Springs Formation of eastern Central Valley from Kern to Placer Counties, on salt-affected grasslands of the San Joaquin Valley trough and the Livermore Valley, and the salty grasslands of the western Sacramento Valley from San Joaquin to Glenn and Colusa counties.

SOURCES; 1, 48, 130, 133

ELEMENT NAME: * Alkali Seep ELEMENT CODE: 45320

DESCRIPTION: Low-growing perennial herbs, usually forming relatively complete cover, growing throughout the year in areas with mild winters. Relatively few species.

SITE FACTORS: Permanently moist or wet alkaline seeps. Often associated with Alkali Meadows (45400).

CHARACTERISTIC SPECIES: Distichlis spicata var. stricta, Najas marina, Nitrophila occidentalis, Potamogeton latifolius, P. pectinatus, Ruppia maritima, Zannichellia palustris

DISTRIBUTION: Scattered throughout the desert regions of California; less common in other areas.

SOURCES: 48, 133

ELEMENT NAME: * Freshwater Seep ELEMENT CODE: 45400

DESCRIPTION: Mostly perennial herbs, especially sedges and grasses, usually forming complete cover, often low-growing but sometimes taller, growing throughout the year in areas with mild winters.

SITE FACTORS: Permanently moist or wet soil around freshwater seeps, often associated with grasslands or meadows.

CHARACTERISTIC SPECIES: Carex sp., Juncus sp., Nasturtium officinale, others?

DISTRIBUTION: Scattered through most regions of California, probably most common in grassland habitats, uncommon in the deserts.

SOURCES: ?

ELEMENT NAME:* Alkali Playa ELEMENT CODE: 46000

DESCRIPTION: Usually low, grayish, microphyllous and succulent shrubs to ca. 1 m tall. Total cover usually low due to wide spacing between shrubs and minimally developed understory.

SITE FACTORS: Poorly drained soils with high salinity and/or alkalinity due to evaporation of water that accumulates in closed drainages. Often with high water table and with salt crust on the surface.

CHARACTERISTIC SPECIES: Allenrolfea occidentalis, Atriplex confertifolia, A. parryi, Sarcobatus vermiculatus

DISTRIBUTION: Closed basins of the Transmontane Deserts, and some smaller examples in the Central Valley.

SOURCES: 1, 133, 185

ELEMENT NAME:* Pavement Plain ELEMENT CODE: 47000

DESCRIPTION: Herb- and grass-dominated openings in Jeffrey Pine Forests (85100) or Pinyon-Juniper Woodland (72300). Total cover usually is low (ca. 35%), composed of scattered, short, cushion-forming plants, and dominated by several taxa endemic to the San Bernardino Mountains.

SITE FACTORS: Dense, clay soils armored by a lagg-gravel of quartzite pebbles. Frost action, and wind and water action, prevent large, woody vegetation from establishing.

CHARACTERISTIC SPECIES: Antennaria dimorpha, Arenaria ursina, Artemisia nova, Eriogonum kennedyi, Ivesia argyrocoma, Poa incurva

DISTRIBUTION: Restricted to about 30 pavements in the area around Big Bear Lake and Holcomb Valley in San Bernardino County. Elevation about 6500-7000 ft.

SOURCES: 167, 168, 186, 197

ELEMENT NAME:* Sphagnum Bog ELEMENT CODE: 51110

DESCRIPTION: Dominated by a dense growth of low-growing, herbaceous perennials and low shrubs. The growing season extends from spring through fall in low-elevation, coastal localities, but is limited to summer at high elevations. Most flowering occurs in the first half of the growing season.

SITE FACTORS: In cold, highly acid, permanently waterlogged soils; low in available nutrients. Peat tends to accumulate without decomposing completely. Occasionally the "soil" is pure peat. Intergrades with Montane or Subalpine Meadows (45100, 45210, 45220) in less acid and/or waterlogged soils, with Coastal (82000) or Montane Coniferous Forests (84000) on drier, better-drained soils.

CHARACTERISTIC SPECIES: Carex arcta, Carex spp., Drosera rotundifolia, Dulichium arundinaceum, Gaultheria shallon, Eriophorum gracile, Ledum glandulosum ssp. columbianum, Menyanthes trifoliata, Potentilla palustris, Rynchospora sp., Sphagnum spp., Spiraea douglasii, Vaccinium uliginosum

DISTRIBUTION: Scattered in the North Coast Ranges and Klamath Ranges from Sonoma Co. into Oregon. Scattered in the Sierra Nevada and Cascade Ranges from Tulare Co. into Oregon. Elevation between 1000 and 6000 ft. (300 and 1820 m) in the north and 5000 - 9000 ft. (1515 - 2730 m) in the south.

SOURCES: 1, 202

ELEMENT NAME: * Darlingtonia Bog ELEMENT NAME: 51120

DESCRIPTION: Very similar to Sphagnum Bog (51110) but with the conspicuous addition of Darlingtonia californica, the only native California pitcher plant, a herbaceous perennial which grows to about 0.6 m high.

SITE FACTORS: Very similar to Sphagnum Bog. Often associated with ultrabasic soils in the Klamath Ranges, less so in the Sierra Nevada.

CHARACTERISTIC SPECIES: Carex spp., Chamaecyparis lawsoniana (northwest California only), Darlingtonia californica, Drosera rotundifolia, Ledum glandulosum ssp. columbianum, Lilium ssp., Parnassia palustris, Pinguicula vulgaris, Rhododendron occidentale, Rudbeckia californica var. glauca, Scirpus criniger, Sphagnum spp.

DISTRIBUTION: In scattered localities in the Klamath Ranges from Trinity Co. to Siskiyou Co., Del Norte Co. and southern Oregon. Also in the northern Sierra Nevada and in Nevada and Plumas counties. Elevation about 300 - 4000 ft. (90 - 1210 m) in the Klamath Ranges, 4000 - 6000 ft. (1210 - 1820 m) in the Sierra Nevada.

SOURCES: 1, 209, 210

ELEMENT NAME: * Fen ELEMENT CODE: 51200

DESCRIPTION: Very similar to Sphagnum Bog (51110) but with a richer flora including larger shrubs.

SITE FACTORS: Peaty accumulations in cold, poorly drained areas. Fens are less acidic (pH 5-8) and have more nutrient-rich water than bogs.

CHARACTERISTIC SPECIES: Athryium felix-femina, Baccharis douglasii, Blechnum spicant, Botrychium multifidum, Calamagrostis nutkaensis, Campanula californica, Carex spp., Epilobium spp., Habenaria dilatata, Eleocharis acicularis, Hypericum anagalloides, Juncus spp., Ledum glandulosum ssp. columbianum, Lysichiton americanum, Marah oreganus, Menyanthes trifoliata, Myrica californica, Oenanthe sarmentosa, Potentilla palustris, Sidalcea calycosa, Sphagnum spp., Veratrum fimbriatum

DISTRIBUTION: Widely scattered in the North Coast and Klamath Ranges and through the Sierra Nevada from Tulare County to Oregon. Elevations from near sea level to 6000 ft. in the north, 5000 - 9000 ft. in the south.

SOURCES: 1, 96, 203, 207

ELEMENT NAME: * Northern Coastal Salt Marsh ELEMENT CODE: 52110

DESCRIPTION: Highly productive, herbaceous and suffructescent, salt-tolerant hydrophytes forming moderate to dense cover and up to 1 m tall. Most species are active in summer, dormant in winter. Usually segregated horizontally with Spartina nearer the open water, Salicornia at mid-littoral elevations, and a richer mixture closer to high ground.

SITE FACTORS: Usually found along sheltered inland margins of bays, lagoons, and estuaries. These hydric soils are subject to regular tidal inundation by salt water for at least part of each year.

CHARACTERISTIC SPECIES: Cuscuta salina, Distichlis spicata spicata, Eleocharis parvula, Frankenia grandifolia, Grindelia paludosa, Jaumea carnosa, Juncus lesueurii, Limonium californicum, Plantago maritima, Potentilla egedii, Salicornia virginica, Spartina foliosa, Triglochin maritima

DISTRIBUTION: Along the coast from the Oregon border south to about Point Conception. Intergrades with Southern Coastal Salt Marsh (52120) over a considerable portion of the south central coast. Extensively developed around Humboldt Bay and other Humboldt Co. areas; Tomales Bay, Marin Co.; Elkhorn Slough, Monterey Co.; Morro Bay, San Luis Obispo Co.; and very extensively in the San Francisco Bay area.

SOURCES: 93, 133, 200, 201

ELEMENT NAME: * Southern Coastal Salt Marsh ELEMENT CODE: 52120

DESCRIPTION: Similar to Northern Coastal Salt Marsh (52110) but with a longer growing season and a greater abundance of suffrutescent species in the higher, drier sites. Southern "specialties" include Atriplex watsonii, Batis maritima, Lycium californicum, Monanthochloe littoralis, Sueda californica, and Salicornia subterminalis

SITE FACTORS: Very similar to Northern Coastal Salt Marsh but with warmer water and air temperatures. Frankenia, Suaeda, and/or Salicornia subterminalis often occur along the upper, landward edges of the marshes; Salicornia bigelovii, S. virginica, and Batis maritima at middle elevations; and Spartina closest to open water.

CHARACTERISTIC SPECIES: Amblyopappus pussilus, Atriplex watsonii, Batis maritima, Cressa truxillensis, Cuscuta salina, Distichlis spicata var. spicata, Frankenia grandifolia, Heliotropium curassavicum, Jaumea carnosa, Juncus acutus sphaerocarpus, Heliotropium Limonium californicum, Carpobrotus aequilateralis, [Mesembryanthemum crystalinum], [M. nodiflorum], Monanthochloe littoralis, Salicornia bigelovii, Salicornia spp., Spartina foliosa, Suaeda californica

DISTRIBUTION: Bays, lagoons, and estuaries along the coast from about Point Conception to the Mexican border. Integrades broadly with Northern Coastal Salt Marsh (52110) along the south central coast. Nowhere as extensive as the larger northern marshes, and now considerably reduced by land development activities. Good to fair examples occur at Goleta Slough and near Carpinteria, Santa Barbara Co.; Point Mugu, Ventura Co.; Upper Newport Bay, Orange Co.; and several small areas in San Diego Co.

SOURCE: 93, 132, 201, 204, 206

ELEMENT NAME: * Coastal Brackish Marsh ELEMENT CODE: 52200

DESCRIPTION: Dominated by perennial, emergent, herbaceous monocots to 2 m tall. Cover is often complete and dense. Similar to Salt Marshes (52100) and to Freshwater Marshes (52400) with some plants characteristic of each.

SITE FACTORS: Similar to Coastal Salt Marshes, but brackish from freshwater input. Salinity may vary considerably, and may increase at high tide or during seasons of low freshwater runoff or both. Usually intergrades with Coastal Salt Marshes toward the ocean and occasionally with Freshwater Marshes (52400) at the mouths of rivers, especially in the Sacramento-San Joaquin River Delta.

CHARACTERISTIC SPECIES: Carex harfordii, Carex obnupta, Carex spp., Distichlis spicata var. spicata, Juncus spp., Salicornia spp., Scirpus spp., Typha latifolia

DISTRIBUTION: Usually at the interior edges of coastal bays and estuaries or in coastal lagoons. Adjacent to several Salt Marshes (52110 and 52120). Most extensively developed around Suisun Bay at the mouth of the Sacramento-San Joaquin Delta.

SOURCES: 1, 93

ELEMENT NAME: * Cismontane Alkali Marsh ELEMENT CODE: 52310

DESCRIPTION: Very similar to Coastal Brackish Marsh (52200) with many of the same species. Most growth and flowering occur in summer.

SITE FACTORS: Standing water or saturated soil present during most or all of year. High evaporation and low input of fresh water render these marshes somewhat salty, especially during the summer. Probably similar to Coastal Brackish Marsh in quantitative range of saltiness, but more alkaline and usually with salts other than sodium chloride. Marshes that become mostly dry during the summer are Vernal Marshes (52500); those with a more constant input of fresh water are Coastal and Valley Freshwater Marshes (52410). Chenopod scrubs (36000) occur in areas with moist, highly alkaline soil that usually lack water at the surface. All of the above habitats may intergrade with Alkali Marshes.

CHARACTERISTIC SPECIES: Anemopsis californica, Carex spp., Distichlis spicata var. stricta, Elymus triticoides, Frankenia grandifolia, Juncus mexicanus, Juncus spp., Pluchea purpurascens, Salicornia virginica, Typha angustifolia, Typha domingensis

DISTRIBUTION: Lake beds and other areas on the flood plains of the Sacramento and San Joaquin rivers. Also in low-lying areas of Kings and Kern counties in the southwestern San Joaquin Valley and occasionally near the Colorado River in eastern Riverside and Imperial counties. Elevation below 1000 ft. (300 m). Now much reduced in area by drainage and cultivation.

SOURCES: 1, 132, 133

ELEMENT NAME: * Transmontane Alkali Marsh ELEMENT CODE: 52320

DESCRIPTION: Very similar to Cismontane Alkali Marsh (52310) with many of the same species. Differs in having a shorter growing season confined more strictly to the summer and with winter dormancy more absolute.

SITE FACTORS: Very similar to Valley Alkali Marsh but subject to much lower temperatures in winter, often well below freezing. Intergrades with Transmontane Freshwater Marshes (52420) in less alkaline situations; with Vernal Marshes (52500) where summer drying occurs; with Chenopod Scrubs (36000) in areas of moist, highly alkaline soil that usually lack surface water; and with Alkali Meadows (45400) where the soil is moist and moderately alkaline.

CHARACTERISTIC SPECIES: Anemopsis californica, Carex spp., Distichlis spicata var. stricta, Juncus cooperi, Nitrophila occidentalis, Phragmites australis, Scirpus nevadensis, Scirpus olneyi, S. robustus spp., Suaeda torreyana, Triglochin concinna var. debilis, Typha domingensis, T. latifolia

DISTRIBUTION: Lake beds, margins of springs, and river bottomlands of the Modoc Plateau in eastern Siskiyou Co., Modoc Co., and Lassen Co., east of the Sierra Nevada in Mono Co., and Inyo Co., especially near Bridgeport and in Owens Valley, and sporadically around wet spots in the Mojave. Elevations 3000 - 7000 ft.

SOURCES: 1, 48, 130, 133

ELEMENT NAME: * Coastal and Valley Freshwater Marsh ELEMENT CODE: 52410

DESCRIPTION: Dominated by perennial, emergent monocots to 4-5 m tall. Often forming completely closed canopies. Scripus and Typha dominated types and their environmental and floristic distinctions require clarification.

SITE FACTORS: Quiet sites (lacking significant current) permanently flooded by fresh water (rather than brackish, alkaline, or variable). Prolonged saturation permits accumulation of deep, peaty soils.

CHARACTERISTIC SPECIES: Carex lanuginosa, C. senta, Cyperus esculentus, C. eragrostis, Eleocharis spp., Hydrocotyl verticillata triradiata, Limosella aquatica, Phragmites australis, Scirpus acutus, S. americanus, S. californicus, S. robustus, Sparganium eurycarpum, Typha angustifolia (?), T. domingensis, T. latifolia, Verbena bonariensis

DISTRIBUTION: Occasional along the coast and in coastal valleys near river mouths and around the margins of lakes and springs. Most extensive in the upper portion of the Sacramento-San Joaquin River Delta. Common in the Sacramento and San Joaquin Valleys in river oxbows and other areas on the flood plain. Occasional along the Colorado River on the California-Arizona border. Now much reduced in area through its entire range.

SOURCES: 1, 13

ELEMENT NAME: * Transmontane Freshwater Marsh ELEMENT CODE: 52420

DESCRIPTION: Very similar to Coastal and Valley Freshwater Marsh (52410) and to Transmontane Alkali Marsh (52320), sharing species from both. Differs from Coastal and Valley Freshwater Marsh in having a shorter growing season, confined more strictly to the summer.

SITE FACTORS: Very similar to Coastal and Valley Freshwater Marsh but subject to much lower temperatures in winter, often well below freezing. Similar to Transmontane Alkali Marsh (52320), often intergrading with it but with a steadier or more abundant freshwater input. Often located immediately adjacent to rivers or springs with Transmontane Alkali Marsh further removed from the freshwater source.

CHARACTERISTIC SPECIES: Carex simulata, Carex spp., Ceratophyllum demersum, Elodea canadensis, Eleocharis spp., Juncus spp., Ludwigia spp., Najas marina, Phragmites australis, Potomogeton spp., Ruppia maritima, Sagittaria spp., Scirpus acutus, S. fluviatilis, S. nevadensis, Scirpus spp., Typha latifolia, Zannichellia palustris

DISTRIBUTION: Same general distribution as Transmontane Alkali Marsh (52320). Lake beds, margins of springs and river bottomlands of the Modoc Plateau in eastern Siskiyou Co., Modoc Co., and Inyo Co., especially near Bridgeport and in Owens Valley. Elevation 3500 - 7500 ft.

SOURCES: 1, 48, 208

ELEMENT NAME: * Montane Freshwater Marsh ELEMENT CODE: 52430

DESCRIPTION: Similar to Coastal and Valley Freshwater Marsh (52410) and to Bogs and Fens (51000), with which many species are shared.

SITE FACTORS: Similar to Coastal and Valley Freshwater Marsh but with a shorter growing season due to cold winters. Less acidic and nutrient-rich than Bogs or Fens.

CHARACTERISTIC SPECIES: Carex athrostachya, C. nebracensis, Eriophorum, Scirpus acutus, S. americanus, others?

DISTRIBUTION: Widely scattered throughout Montane California, though less frequent in the Transverse and Peninsular ranges.

SOURCES: 1, 208

ELEMENT NAME: *Vernal Marsh ELEMENT CODE: 52500

DESCRIPTION: Mostly low growth, primarily of annual herbs, contrasting with the taller perennials in more permanent marshes. Similar to Vernal Pools (44000), sharing many species with them, often flowering behind the retreating water's edge as the marsh dries. The growing season varies with the water input, but is usually spring and early summer, later than for Vernal Pools, but earlier than for other marshes.

SITE FACTORS: Marshy with standing water following the winter rains, but greatly reduced or completely dry by summer. Similar to Valley Alkali Marsh (52310) or to Coastal and Valley Freshwater Marsh (52410), but with greater seasonal fluctuation. Often, but not necessarily alkaline, tending to become more alkaline late in the season. Similar to Vernal Pools (44000), but larger and less ephemeral. Intergrades with all of the above.

CHARACTERISTIC SPECIES: Brasenia shreberi, Carex spp., Downingia spp., Eryngium spp., Gratiola spp., Juncus spp., Machaerocarpus californicus, Marsilea mucronata, Navarretia spp., Sagittaria spp., Scirpus spp., Utricularia spp.

DISTRIBUTION: Widely scattered in the coastal and interior valleys (Boggs Lake, Lake Co.); also in low-lying areas of the Sacramento and San Joaquin Valleys. Often found at the upland end of blind sloughs, at the transition between marshy slough vegetation and drier upland grassland.

SOURCES: 1, 13, 165, 166

ELEMENT NAME: *Freshwater Swamp ELEMENT CODE: 52600

DESCRIPTION: Usually a dense growth of small trees with a shrubby understory in the more open places. Some of the same species occur on better-drained soils where they usually grow larger. Most seedlings become established on rotting logs and stumps rather than in the waterlogged soil. Most growth occurs during the summer.

SITE FACTORS: Similar to Coastal and Valley Freshwater Marsh (52410) but usually with less standing water. Similar to Bogs (51110) but usually less acidic. Somewhat similar to Red Alder Forest (81A00) and to Western Hemlock Forest (82200) but with wetter, more poorly drained soil. Intergrades with all of the above.

CHARACTERISTIC SPECIES: Alnus rubra, Carex atherodes, Carex spp., Ledum glandulosum ssp. columbianum, Myrica californica, Populus trichocarpa, Salix spp., Thuja plicata, Tsuga heterophylla, Vaccinium arbuscula

DISTRIBUTION: Scattered small areas in northwestern California along the coast, in coastal valleys, and at lower elevations in the mountains. Usually near the mouths of rivers or around the margins of lakes and springs.

SOURCES: 1, others?

ELEMENT NAME: * North Coast Black Cottonwood Riparian Forest ELEMENT CODE: 61110

DESCRIPTION: Dense broadleafed, winter deciduous riparian forests dominated by Populus trichocarpa with tree willows and often conspicuous Alnus rubra. Most stands are even-aged, reflecting episodic recruitment. Very old stands of this seral type may have emergent Abies grandis, Picea sitchensis, Pseudotsuga menziesii, Thuja plicata, or Tsuga heterophylla.

SITE FACTORS: Bottomlands, floodplains, gravel bars, and banks of perennially-flowing streams. Black cottonwood is very shade intolerant: it requires moist, bare, freshly deposited sands or silts such as deposited during flooding. Prolonged flood control can favor type conversion to shade-tolerant conifers.

CHARACTERISTIC SPECIES: Acer circinatum, A. macrophyllum, Alnus rubra, Athyrium felix-femina, Corylus cornuta, Cornus stolonifera, Crataegus douglasii, Fraxinus latifolia, Lonicera involucrata, Polystichum munitum, Rubus spectabilis, Salix hindsiana, S. hookeriana, S. lasiandra, S. scouleriana, Symphoricarpos mollis, Urtica californica, U. lyallii

DISTRIBUTION: Close to rivers in the North Coast Ranges and Klamath Mountains, particularly in the Eel River drainage. Occurs spottily south at least to Monterey County (Pacific Valley area).

SOURCES: 11, 276

ELEMENT NAME: * North Coast Alluvial Redwood Forest ELEMENT CODE: 61120

DESCRIPTION: Moderately dense evergreen riparian forests dominated by Sequoia sempervirens, usually about 80 m but occasionally over 100 m tall. The tallest forest type in California and one of the tallest in the world. Similar to Western Hemlock Forest (82200) but not quite so dense and less diverse. The understory often consists largely of Polystichum munitum and Oxalis oregana. The growing season is almost year-round, with a maximum from late spring to early summer.

SITE FACTORS: On alluvial flats with deep, well-drained soils. Subject to frequent fogs in summer, periodic flooding in winter, and infrequent, sometimes devastating fires. Intergrades with Western Hemlock Forest (82200) or Sitka Spruce-Grand Fir Forest (82100) in moister or more coastal localities and with Upland Redwood Forest (82320) in drier localities with shallower soil.

CHARACTERISTIC SPECIES: Aralia californica, Oxalis oregana, Polystichum munitum, Rhododendron macrophyllum, Sequoia sempervirens, Vaccinium ovatum

DISTRIBUTION: Primarily in Del Norte and Humboldt counties away from the immediate coast, on the flood plains and lower drainages of Redwood Creek and the Smith, Mad, Van Duzen, and Eel rivers. Also on the Russian River in Sonoma County and at scattered localities farther south as far as southern Monterey County.

SOURCES: 1, 247, 271

ELEMENT NAME: *Red Alder Riparian Forest ELEMENT CODE: 61130

DESCRIPTION: Mesic, dense, broadleafed deciduous riparian forests to 25 m tall, dominated by Alnus rubra. Understory structure depends on site; stands near streams typically are overwhelmingly monocultural, sites removed from frequent stream disturbance often have dense shrub layers. Most growth occurs between late spring and fall, although some taxa remain active through most of the year.

SITE FACTORS: Moist, rich soils, especially on bottomlands, along streams, or on seepy hillsides. Apparently tolerant of poorly aerated, marshy soils as the type also can occur on the edges of marshes. Intergrades with Sitka Spruce-Grand Fir Forest (82100) near the coast (Humboldt and Del Norte counties), as well as with other North Coast Conifer Forests (82000) farther inland. This is not the same as the early seral red alder copses that follow logging in spruce or fir stands.

CHARACTERISTIC SPECIES: Alnus rubra, Aralia californica, Cornus spp. (not nuttallii), Populus trichocarpa, Salix spp.

DISTRIBUTION: Streambanks along the immediate coast from northernmost San Luis Obispo County to Cape Mendocino, Humboldt County. From the Eel River region of Humboldt county northward to Oregon the type may occur up to 80 km (50 mi) inland and in moist areas away from streambanks. Extends northward to Alaska.

SOURCES: 242

ELEMENT NAME: *Central Coast Cottonwood-Sycamore Riparian Forest ELEMENT CODE: 61210

DESCRIPTION: Moderately closed broadleafed riparian forests dominated by Platanus racemosa and Populus fremontii, with lesser amounts of Quercus agrifolia. Understories may be dense thickets of shrubby willows, Baccharis, or Urtica. Similar to and perhaps the same as Southern Cottonwood-Sycamore Riparian Forest (61330).

SITE FACTORS: Floodplains of sub-perennial streams, usually with fairly coarse bedload and seasonally variable depths to the water

table. The dominant type on steeper reaches, this forest intergrades with arroyo willow-dominated types (61230, 61320) at lower elevations or along flatter stream reaches with finer-textured sediment and more constant depth to the water table.

CHARACTERISTIC SPECIES: Acer macrophyllum, Aesculus californica, Alnus rhombifolia, Platanus racemosa, Populus trichocarpa, Quercus agrifolia, Salix laevigata, S. lasiandra, Umbellularia californica, Vitis girdiana

DISTRIBUTION: Canyons and creeks throughout the South Coast Ranges. Distinctions between this type and Southern Cottonwood-Sycamore Riparian Forest (61330) need to be clarified.

SOURCES: 11, 277, 279

ELEMENT NAME: *Central Coast Live Oak Riparian Forest ELEMENT CODE: 61220

DESCRIPTION: A low, evergreen sclerophyllous riparian forest, usually with an open appearance, dominated by Quercus agrifolia. This type has many species usually associated with Coast Live Oak Woodland (71160) or Chaparral (37000) in the open understory. Grasses usually form a fairly extensive ground layer. Similar to and questionably distinct from Southern Coast Live Oak Riparian Forest (62310).

SITE FACTORS: Drier, outer floodplains along perennial streams, in many respects ecotonal between more mesic cottonwood- or willow-dominated types nearer streams and more xeric chaparrals.

CHARACTERISTIC SPECIES: Artemisia douglasiana, A. tridentata, [Avena fatua], Baccharis pilularis, [Bromus spp.], Ceanothus cuneatus, C. spinosus, Lonicera johnstonii, Quercus agrifolia, Rhus trilobata, Rosa californica, Rubus ursinus, Sambucus mexicana, Symphoricarpos mollis, Toxicodendron diversilobum

DISTRIBUTION: Canyon bottoms and floodplains of the South Coast and Transverse ranges, from Sonoma County south to near Point Conception.

SOURCES: 73, 278

ELEMENT NAME: *Central Coast Arroyo Willow Riparian Forest ELEMENT CODE: 61230

DESCRIPTION: Dense, low, closed-canopy broadleafed winter-deciduous riparian forests dominated by Salix lasiolepis. This plant often grows as a large, tree-like shrub. Reproduction may be limited to plants that establish on fallen logs.

SITE FACTORS: Moist to saturated sandy or gravelly soil, especially on bottomlands or around dune slack ponds within the coastal fog incursion zone.

CHARACTERISTIC SPECIES: Alnus rhombifolia, Myrica californica, Salix lasiandra, S. lasiolepis, others?

DISTRIBUTION: Low gradient stream reaches near the coast from Monterey south at least as far as Santa Barbara.

SOURCES: 217

ELEMENT NAME: * Southern Coast Live Oak Riparian Forest ELEMENT CODE: 61310

DESCRIPTION: Open to locally dense evergreen sclerophyllous riparian woodlands dominated by Quercus agrifolia. This type appears to be richer in herbs and poorer in understory shrubs than other riparian communities. Similar to and questionably distinct from Central Coast Live Oak Riparian Forest (61220).

SITE FACTORS: Bottomlands and outer floodplains along larger streams, on fine-grained, rich alluvium.

CHARACTERISTIC SPECIES: Acer macrophyllum, Artemisia douglasiana, Cardamine californica, Eucrypta chrysanthemifolia, Heteromeles arbutifolia, Keckiella cordifolia, Lonicera hispidula, Marah macrocarpus, Pholistoma auritum, Quercus agrifolia, Rhus trilobata, Rosa californica, Rubus ursinus, Sambucus mexicana, Symphoricarpos mollis, Toxicodendron diversilobum, Umbellularia californica

DISTRIBUTION: Canyons and valleys of coastal southern California, mostly south of Point Conception.

SOURCES: 11, 68, 89, 282

ELEMENT NAME: * Southern Cottonwood-Willow Riparian Forest ELEMENT CODE: 61330

DESCRIPTION: Tail, open, broadleafed winter-deciduous riparian forests dominated by Populus fremontii, P. trichocarpa, and several tree willows. Similar to Central Coast Cottonwood-Sycamore Riaprian Forest (61210), although apparently with less Quercus agrifolia or Alnus rhombifolia (this merits further study). Understories usually are shrubby willows.

SITE FACTORS: Sub-irrigated and frequently overflowed lands along rivers and streams. The dominant species require moist, bare mineral soil for germination and establishment. This is provided after flood waters recede, leading to uniform-aged stands in this seral type.

CHARACTERISTIC SPECIES: Artemisia douglasiana, Baccharis viminea, Marah macrocarpus, Platanus racemosa, Populus fremontii, P. trichocarpa, Salix gooddingii, S. hindsiana, S. lasiandra, S. lasiolepis, Urtica holosericea

DISTRIBUTION: Along perennially wet stream reaches of the Tranverse and Peninsular ranges, from Santa Barbara County south to Baja California Norte and east to the edge of the deserts.

SOURCES: 11, 68, 277, 282

ELEMENT NAME: *Great Valley Cottonwood Riparian Forest ELEMENT CODE: 61410

DESCRIPTION: A dense, broadleafed, winter deciduous riparian forest dominated by Populus fremontii and Salix gooddingii variabilis. Understories are dense, with abundant vegetative reproduction of canopy dominants. Vitis californica is the most conspicuous liana. Scattered seedlings and saplings of shade-tolerant species such as Acer negundo californica or Fraxinus latifolia may be found, but frequent flooding prevents their reaching into the canopy.

SITE FACTORS: Fine-grained alluvial soils near perennial or nearly-perennial streams that provide subsurface irrigation even when the channel is dry. These sites are inundated yearly during spring, resulting in annual input of nutrients, soil, and new germination sites. Intergrades at sites higher and farther from the river with Great Valley Mixed Riparian Forest (61420); and with Great Valley Willow Scrub (63410) on sites closer to the river that are subject to more severe flooding disturbance.

CHARACTERISTIC SPECIES: Acer negundo californica, Cephalanthus occidentalis, Elymus triticoides, Fraxinus latifolia, Populus fremontii, Salix gooddingii variabilis, S. hindsiana, S. laevigata, S. lasiandra, S. lasiolepis, Vitis californica

DISTRIBUTION: Formerly extensive along the major low-gradient (depositional) streams throughout the Great Valley, but now reduced to scattered, isolated remnants or young stands because of flood control, water diversion, agricultural development, and urban expansion; typically below about 1000 feet in the north, 300 feet in the south.

SOURCES: 125, 214, 215, 217-220

ELEMENT NAME: * Great Valley Mixed Riparian Forest ELEMENT CODE: 61420

DESCRIPTION: This is a tall, dense, winter-deciduous, broadleafed riparian forest. The tree canopy usually is fairly well closed and moderately to densely stocked with several species including Acer negundo californica, Juglans hindsii, Platanus racemosa, Populus fremontii, Salix gooddingii variabilis, S. laevigata, and S. lasiandra. Understories consist of these taxa plus shade-tolerant shrubs like Cephalanthus occidentalis and Fraxinus latifolia. Several lianas are conspicuous in both tree and shrub canopies.

SITE FACTORS: Relatively fine-textured alluvium somewhat back from active river channels. These sites experience overbank flooding (with abundant alluvial deposition and groundwater recharge) but not too severe physical battering or erosion. Intergrades closer to the river with Great Valley Cottonwood Riparian Forest (61410) where disturbance is both more frequent and more severe; intergrades farther away from the river with Great Valley Valley Oak Riparian Forest (61430) where such disturbance is less.

CHARACTERISTIC SPECIES: Acer negundo californica, Cephalanthus occidentalis, Clematis ligusticifolia, Juglans hindsii, Platanus racemosa, Populus fremontii, Salix gooddingii variabilis, S. laevigata, S. lasiandra, Toxicodendron diversilobum, Vitis californica

DISTRIBUTION: Floodplains of low-gradient, depositional streams of the Great Valley, usually below about 500 feet. Formerly very extensive in the Sacramento and northern San Joaquin valleys, this forest largely has been cleared for agriculture, flood control, and urban expansion.

SOURCES: 125, 126, 215, 217

ELEMENT NAME: * Great Valley Valley Oak Riparian Forest ELEMENT CODE: 61430

DESCRIPTION: A medium to tall (rarely to 100 feet) broadleafed, winter deciduous, closed-canopy riparian forest dominated by Quercus lobata. Understories include scattered Fraxinus latifolia, Juglans hindsii, and Platanus racemosa as well as young Q. lobata. Lianas often are conspicuous, quickly occupying wind-throw generated light gaps. They also are more scattered throughout the shady understory.

SITE FACTORS: Restricted to the highest parts of floodplains, most distant from or higher above active river channels and therefore less subject to physical disturbance from flooding, but still receiving annual inputs of silty alluvium and subsurface irrigation. Intergrades closer to the river with Great Valley Mixed Riparian Forest (61420).

CHARACTERISTIC SPECIES: Aristolochia californica, Clematis ligusticifolia, Elymus triticoides, Fraxinus latifolia, Juglans hindsii, Platanus racemosa, Quercus lobata, Rosa californica, Rubus spp., Smilax californica, Toxicodendron diversilobum

DISTRIBUTION: Formerly extensive on low-gradient, depositional reaches of the major streams of the Sacramento and northern San Joaquin valleys. More scattered in the San Joaquin watershed and on the floodplains of the Kings and Kaweah rivers. Now virtually eliminated by agriculture and fire wood harvesting.

SOURCES: 215, 217-220, 222, 223

ELEMENT NAME: * White Alder Riparian Forest ELEMENT CODE: 61510

DESCRIPTION: Medium-tall broadleafed deciduous streamside forests dominated by Alnus rhombifolia, with a shrubby, deciduous understory. Stands in the Coast Ranges have abundant Salix, Baccharis viminea, Symphoricarpos spp., Rosa californica, and Toxicodendron diversilobum, while Sierran stands have understories rich in Cornus stolonifera, Fraxinus latifolia, and Rhododendron occidentale. These two types probably should be separated. Riparian alder forests in southern California need study -- these too may be separable.

SITE FACTORS: Best developed along rapidly flowing, well aerated perennial streams with coarse bedloads that reflect high stream power during spring runoff. These streams typically flow in bedrock-constrained, steep sided canyons, so the riparian corridor typically is rather narrow.

CHARACTERISTIC SPECIES: Acer macrophyllum, Alnus rhombifolia, Baccharis viminea, Cornus sessilis, C. stolonifera, Fraxinus latifolia, Rhododendron occidentale, Salix spp., Toxicodendron diversilobum

DISTRIBUTION: Perennial streams in incised canyons of the lower Sierra Nevada, Coast, Transverse, and Peninsular ranges, usually below about 6000 feet.

SOURCES: 217, 278

ELEMENT NAME: * Aspen Riparian Forest ELEMENT CODE: 61520

DESCRIPTION: An essentially entirely deciduous, broadleafed streamside forest dominated by Populus tremuloides which may reach 50 feet tall. The tree canopy is nearly closed, which precludes much shrubby understory. The herb layer, however, is very rich and varied.

SITE FACTORS: Along relatively flat, slow-flowing stream reaches, typically on soils rich in organic material and saturated through the growing season.

CHARACTERISTIC SPECIES: Aconitum columbianum, Aguilegia formosa, Carex senta, Delphinium spp., Lilium spp., Lupinus latifolia, Oxytropis occidentalis, Populus tremuloides, Scirpus microcarpus, Sphenosciadium capitellatum, Thalictrum fendleri, Veratrum californicum

DISTRIBUTION: Streamsides between 4000 and 8500 feet, best developed east of the Sierran crest from Plumas to Inyo counties. Reaches lower elevations on larger streams due to cold air drainage. Also occurs on several streams of the western Sierra Nevada and sparingly in the Cascades. This riparian forest should not be confused with zonal Aspen Forest (81800).

SOURCES: 208

ELEMENT NAME: * Montane Black Cottonwood Riparian Forest ELEMENT CODE: 61530

DESCRIPTION: A fairly dense, mixed riparian forest dominated by deciduous Populus trichocarpa with emergent evergreen Pinus jeffreyi towering to as much as 150 feet. The shrub canopy is well developed, averaging around 25% cover. Herb cover also is high, in some cases even reaching 100%.

SITE FACTORS: Well developed on large flowrate streams, typically in areas constrained by steep canyon walls. Usually below about 6000 feet in the north, and 8500 feet in the south.

CHARACTERISTIC SPECIES: Abies concolor, Artemisia ludoviciana, Aster hesperius, Carex lanuginosa, C. nebrascensis, Cornus stolonifera, Deschampsia elongata, Elymus triticoides, Juniperus occidentalis occidentalis, Pinus contorta murrayana, P. jeffreyi, Populus trichocarpa, P. tremuloides, Prunus virginiana demissa, Rosa woodsii ultramontana, Salix rigida, Smilacina stellata, Trifolium longpies

DISTRIBUTION: Scattered widely through the Sierra Nevada, and more sporadically in the higher parts of the Transverse and Peninsular ranges.

SOURCES: 208

ELEMENT NAME: * Modoc-Great Basin Cottonwood-Willow Riparian Forest ELEMENT CODE: 61610

DESCRIPTION: An open-canopied, broadleafed, winter-deciduous riparian forest dominated by Populus fremontii and Salix laevigata without much shrubby understory other than scattered Chrysothamnus nauseosus consimilis. Elymus triticoides, Phragmites australis, and several other graminoids form a fairly dense (though usually grazed) herb layer.

SITE FACTORS: Along the larger streams at lower montane elevations, usually where streams debauch onto valleys and begin to grade.

CHARACTERISTIC SPECIES: Chrysothamnus nauseosus consimilis, Elymus triticoides, Juncus balticus montanus, Populus fremontii, Rosa woodsii ultramontana, Salix exigua, S. laevigata

DISTRIBUTION: Along lower elevation (usually below about 7000 feet) streams of the eastern Sierra Nevada, from Inyo County north to the Modoc Plateau and southern Oregon.

SOURCES: 208, 281

ELEMENT NAME: * Mojave Riparian Forest ELEMENT CODE: 61700

DESCRIPTION: A relatively open, broadleafed, winter-deciduous streamside forest dominated by Populus fremontii, Salix gooddingii, and S. laevigata. The open canopy allows a dense shrubby understory of Atriplex torreyi, Chrysothamnus nauseosus, Rosa woodsii, and Salix exigua to prosper. Similar to and intergrading in the lower elevations of Inyo County with Modoc-Great Basin Cottonwood-Willow Riparian Forest (61610).

SITE FACTORS: Flat, fine-grained, subirrigated alluvium along perennial desert rivers.

CHARACTERISTIC SPECIES: Atriplex confertifolia, A. parryi, A. torreyi, Chrysothamnus nauseosus, [Eleagnus angustifolia], Forestiera neomexicana, Populus fremontii (and var. macdougallii), Rosa woodsii, Salix exigua, S. gooddingii, S. laevigata, Sarcobatus vermiculatus, [Tamarix spp.]

DISTRIBUTION: Along the larger desert rivers (Owens, Mojave, Colorado) where the vegetation has not been cleared for irrigated agriculture or been dewatered by upstream diversions. Generally below about 4000 feet.

SOURCES: 208, 219, 280

ELEMENT NAME: * Sonoran Cottonwood-Willow Riparian Forest ELEMENT CODE: 61810

DESCRIPTION: Winter-deciduous, broadleafed streamside forests to about 60 feet tall, dominated by Populus fremontii macdougallii with dense understories of several Salix species. There appear to be virtually no compositional data available for this type.

SITE FACTORS: Deep, well-watered, loamy alluvial soils along the near-channel floodplains of perennial desert rivers. This forest intergraded on sites slightly higher above and farther away from the river channels with Mesquite Bosques (61820) before these were cut down for fence posts and fuel.

CHARACTERISTIC SPECIES: [Arundo donax], Aster spinosus, Atriplex lentiformis, Baccharis glutinosa, B. sarothroides, Phragmites australis, Pleuchea sericea, Populus fremontii macdougallii, Salix exiqua, S. gooddingii gooddingii, Sesbania macrocarpa, [Tamarix spp.]

DISTRIBUTION: Formerly extensive along the lower Colorado River, but now virtually eliminated by flood control projects, agriculture, or by Tamarisk invasion.

SOURCES: 48, others?

ELEMENT NAME: * Mesquite Bosque ELEMENT CODE: 61820

DESCRIPTION: An open to fairly dense, drought-deciduous streamside thorn forest dominated by Prosopis pubescens with open, park-like interiors maintained by frequent flooding or fire. Understories historically were open, dominated by annual and perennial grasses and with scattered Atriplex species and several lianas.

SITE FACTORS: Washes, streambanks, alkali sinks, or outwash plains with substantial near-surface groundwater supplies. Often occurring on higher alluvial terraces away from perennial streams that support Mojave (61700) or Sonoran Cottonwood-Willow Riparian Forests (61810) closer to the water. Intergrades on drier sites with less reliable water supplies with Desert Dry Wash Woodland (62200).

CHARACTERISTIC SPECIES: Amaranthus palmeri, Ambrosia dumosa, Atriplex canescens, A. lentiformis, A. polycarpa, Celtis reticulata, Cercidium floridum, Coldenia palmeri, Cucurbita spp., Larrea tridentata, Lycium spp., Prosopis glandulosa, P. pubescens, P. velutina, Sambucus mexicana, Sarcostemma spp., Sueda torreyana

DISTRIBUTION: Apparently restricted to along the lower Colorado River, never extensive in California and now virtually extirpated by agricultural development, flood control, and tamarisk invasion. More extensive in Arizona and northwestern mainland Mexico. Does anyone know anything about the screwbean mesquite stands in western Fresno County?

SOURCES: 83, 212

ELEMENT NAME: *Sycamore Alluvial woodland ELEMENT CODE: 62100

DESCRIPTION: Open to moderately closed, winter-deciduous broadleafed riparian woodland overwhelmingly dominated by well-spaced Platanus racemosa. Aesculus californica and Sambucus mexicana are widely spaced in the subcanopy. Understories usually are introduced grasses or Baccharis viminea.

SITE FACTORS: Braided, depositional channels of intermittent streams, usually with cobbly or bouldery substrate. These streams rely on rainfall, rather than snowmelt, for their water supply, so they usually have flowing water only for brief periods after winter storms. These flows may be quite violent, damaging or even uprooting the trees. Sycamores have well developed vegetative reproduction, giving the woodland a clumped appearance.

CHARACTERISTIC SPECIES: Aesculus californica, Artemisia californica, Baccharis viminea, [Bromus diandrus, B. mollis], [Marrubium vulgare], Platanus racemosa, Populus fremontii, Quercus agrifolia, Q. lobata, Salix breweri, S. laevigata

DISTRIBUTION: Apparently restricted to the South Coast Ranges from Alameda to Santa Barbara counties.

SOURCES: 217, 278

ELEMENT NAME: *Desert Dry Wash Woodland ELEMENT CODE: 62200

DESCRIPTION: An open to dense, drought-deciduous, microphyllous riparian thorn scrub woodland to 30-60 feet tall, dominated by any of several fabaceous trees.

SITE FACTORS: Sandy or gravelly washes and arroyos of the lower Mojave and Colorado deserts, largely in frost-free areas. These washes typically have braided channels that substantially rearranged with every surface flow event.

CHARACTERISTIC SPECIES: Aesculus subulata, Baccharis sarothroides, Calliandra eriophylla, Cassia armata, Cercidium floridum, Condalia globosa, Psorothamnus spinosa, Hoffmannseggia glauca, Hymenoclea monogyra, Lycium andersonii, Zizyphus obtusifolia canescens

DISTRIBUTION: Along the larger drainages of the lower Mojave and more generally through the Colorado deserts.

SOURCES: 1, 48, 62

ELEMENT NAME: *Desert Fan Palm Oasis Woodland ELEMENT CODE: 62300

DESCRIPTION: Open to dense groves dominated by Washingtonia filifera to 75-100 feet tall. The understory is sparse in dense groves (where the ground is mulched by fallen fronds) or in more alkaline areas. More open or favorable sites may have a dense understory reminiscent of Mojave or Colorado Riparian Forests (61700, 61800) or Riparian Scrubs (62700, 62800).

SITE FACTORS: Restricted to sites with high water tables in regions with high summer temperatures, mild winters, and little rain. The largest groves are in steep-sided canyons with permanent streams, or adjacent to large springs. Smaller groves occur in canyon bottoms with intermittent surface water, moist canyon sides, or seeps. Oases often have alkaline soils due to high evaporation. Intergrades (often abruptly) with Mojave Riparian Forest (61700), Mojave Mixed Scrub (32400), Desert Dry Wash Woodland (62200), or Sonoran Creosote Bush Scrub (33100).

CHARACTERISTIC SPECIES: Adiantum capillus-veneris, Aguilegia shockleyi, Baccharis sergiloides, Celtis reticulata, Cirsium nidulum, Epipactis gigantea, Equisetum laevigatum, Fraxinus velutina, Haplopappus acradenius, Phragmites australis, Platanus racemosa, Pleuchea sericea, Populus fremontii, Prosopis gladulosa, Quercus chrysolepis, Salix exiqua, S. gooddingii, S. lasiolepis, Sambucus mexicana, Sporobolis airoides, [Tamarix spp.], Typha domingensis, Urtica dioica

DISTRIBUTION: Scattered in the canyons of the western edge of the Colorado Desert from near Twentynine Palms south into Baja California, usually below about 3000 feet.

SOURCES: 1, 48, 62, 221, 224

ELEMENT NAME: *Southern Sycamore-Alder Riparian Woodland ELEMENT CODE: 62400

DESCRIPTION: A tall, open, broadleafed, winter-deciduous streamside woodland dominated by Platanus racemosa (and often also Alnus rhombifolia). These stands seldom form closed canopy forests, and even may appear as trees scattered in a shrubby thicket of sclerophyllous and deciduous species. Lianas include Rubus ursinus and Toxicodendron diversilobum. Distinctions between this type and Sycamore Alluvial Woodland (62100) merit additional study.

SITE FACTORS: Very rocky streambeds subject to seasonally high-intensity flooding. Alnus increases in abundance on more perennial streams, while Platanus favors more intermittent hydrographs.

CHARACTERISTIC SPECIES: Acer macrophyllum, Alnus rhombifolia, Artemisia douglasiana, Aralia californica, Equisetum hyemale, Oryzopsis miliacea, Quercus agrifolia, Rubus ursinus, Sambucus mexicana, Toxicodendron diversilobum, Umbellularia californica, Urtica holsoericea

DISTRIBUTION: Transverse and Peninsular ranges from Point Conception south into Baja California Norte.

SOURCES: 225

ELEMENT NAME: * North Coast Riparian Scrub ELEMENT CODE: 63100

DESCRIPTION: An early seral, broadleafed deciduous riparian thicket usually dominated by any of several Salix species, together with several other fast-growing shrubs and vines.

SITE FACTORS: Sand and gravel bars along and at the mouths of streams, within the coastal fog incursion zone.

CHARACTERISTIC SPECIES: Acer macrophyllum, Alnus rubra, Lonicera involucrata, Myrica californica, Rhamnus purshiana, Salix delnortensis, S. hindsiana, S. hookeriana, S. lasiandra, S. lasiolepis, S. melanopsis, S. parksiana, S. piperi, S. scouleriana coetana, S. sitchensis, S. tracyi, Sambucus callicarpa, Spiraea douglasii, Umbellularia californica

DISTRIBUTION: Along coastal streams from Sonoma or Mendocino counties north into Oregon, usually below about 1000 feet.

SOURCES: 217, 286, 287

ELEMENT NAME: * Central Coast Riparian Scrub ELEMENT CODE: 63200

DESCRIPTION: A scrubby streamside thicket, varying from open to impenetrable, dominated by any of several willows. This early seral community may succeed to any of several riparian woodland or forest types absent severe flooding disturbance.

SITE FACTORS: Relatively fine-grained sand and gravel bars that are closed to river channels and therefore close to ground water. Coarser substrates or greater depths to the water table favors dominance by Baccharis.

CHARACTERISTIC SPECIES: Baccharis pilularis consanguinea, Salix coulteri, S. gooddingii, S. hindsiana, S. lasiandra, S. lasiolepis, S. scouleriana, S. sitchensis, others?

DISTRIBUTION: Along and at the mouths of most perennial and many intermittent streams of the South Coast Ranges, from the Bay Area south to about Point Conception.

SOURCES: 217, 282

ELEMENT NAME: Mule Fat Scrub ELEMENT CODE: 63310

DESCRIPTION: A depauperate, tall, herbaceous riparian scrub strongly dominated by Baccharis viminea. This early seral community is maintained by frequent flooding. Absent this, most stands would succeed to cottonwood- or sycamore-dominated riparian forests or woodlands.

SITE FACTORS: Intermittent stream channels with fairly coarse substrate and moderate depth to the water table. Frequently occurs as a patchy understory in light gaps in Sycamore Alluvial Woodland (62100), especially under heavy grazing.

CHARACTERISTIC SPECIES: Baccharis viminea, Carex barbarae, Salix exigua (?), S. hindsiana, S. lasiolepis, Urtica holosericea

DISTRIBUTION: Widely scattered along intermittent streams and near larger rivers from about Tehama County south through the Coast Ranges and Sierra Nevada to San Diego and northwestern Baja California Norte, usually below about 2000 feet.

SOURCES: 217, 228

ELEMENT NAME: * Southern Willow Scrub ELEMENT CODE: 63320

DESCRIPTION: Dense, broadleafed, winter-deciduous riparian thickets dominated by several Salix species, with scattered emergent Populus fremontii and Platanus racemosa. Most stands are too dense to allow much understory development.

SITE FACTORS: Loose, sandy or fine gravelly alluvium deposited near stream channels during flood flows. This early seral type requires repeated flooding to prevent succession to Southern Cottonwood-Sycamore Riparian Forest (61330).

CHARACTERISTIC SPECIES: Pluchea sericea, Populus fremontii, Salix gooddingii, S. hindsiana, S. laevigata arauipa, S. lasiandra, S. lasiolepis, S. hindsiana, leucodendroides, others?

DISTRIBUTION: Formerly extensive along the major rivers of coastal southern California, but now much reduced by urban expansion, flood control, and channel "improvements".

SOURCES: 285

ELEMENT NAME: * Great Valley Willow Scrub ELEMENT CODE: 63410

DESCRIPTION: An open to dense, broadleafed, winter-deciduous shrubby streamside thicket dominated by any of several Salix species. Dense stands usually have little understory or herbaceous component. More open stands have grassy understories, usually dominated by introduced species.

CHARACTERISTIC SPECIES: [Bromus diandrus], Chenopodium ambrosioides, [Cynodon dactylon], Populus fremontii, Rosa californica, Salix hindsiana, S. lasiandra, S. lasiolepis, S. melanopsis, Vitis californica

DISTRIBUTION: Along all the major rivers and most of the smaller streams throughout the Great Valley watershed, usually below 1000 feet.

SOURCES: 283, 284

ELEMENT NAME: * Great Valley Mesquite Scrub ELEMENT CODE: 63420

DESCRIPTION: An open woodland or savanna dominated by Prosopis glandulosa torreyana and Atriplex polycarpa. Understories are grassy in good rainfall years, though usually dominated by introduced annuals. Perennial cover usually is low, with Prosopis densities as low as 2-3 per acre.

SITE FACTORS: Sandy loams of alluvial origin, often with wind-modified microtopography. Mesquite is a phreatophyte, thus requiring a high water table. Hot, dry summers; moist foggy winters. Sierran snowmelt provided the necessary groundwater for the perennial phreatophytes.

CHARACTERISTIC SPECIES: Artiplex polycarpa, [Bromus rubens], Haplopappus acradenius bracteosus, Prosopis glandulosa torreyana

DISTRIBUTION: Formerly extensive in the southern San Joaquin Valley from Bakersfield to the Inner South Coast Range at Tupman and Buena Vista Lake; now virtually extirpated by flood control, agricultural development, and groundwater pumping.

SOURCES: 13

ELEMENT NAME: * Buttonbush Scrub ELEMENT CODE: 63430

DESCRIPTION: A dense, broadleaved, winter-deciduous riparian copse dominated by Cephalanthus occidentalis, usually as tall shrubs (20-30 feet) but in some areas reaching to even 50-60 feet tall.

SITE FACTORS: Poorly aerated, fine-textured soils with high water tables, usually along backwater sloughs, oxbow lakes, or other quiet waters.

CHARACTERISTIC SPECIES: Cephalanthus occidentalis, Cornus "X californica", Salix lasiandra, Sagittaria latifolia

DISTRIBUTION: Formerly abundant along quiet waterways throughout the Great Valley, but now virtually eliminated by agricultural development and flood control projects.

SOURCES: 217

ELEMENT NAME: *Elderberry Savanna ELEMENT CODE: 63430

DESCRIPTION: An open, winter-deciduous shrub savanna dominated by Sambucus mexicana, usually with an understory of introduced annual grasses and forbs. This seral community rapidly succeeds to Great Valley Mixed Riparian Forest (61420) without grazing, flooding, or fire. Such "old" stands frequently are overrun by Vitis californica.

SITE FACTORS: Deep, fine-textured, rich alluvium well back from active river channels, but still subject to flooding (and therefore input of silt) during high water.

CHARACTERISTIC SPECIES: [Bromus diandrus, B. mollis], [Centaurea solstitialis], [Marrubium vulgare], Sambucus mexicana

DISTRIBUTION: Spottily scattered among surviving stands of riparian vegetation throughout the Sacramento and northern San Joaquin valleys, at least as far south as Merced County.

SOURCES: ?

ELEMENT NAME: *Montane Riparian Scrub ELEMENT CODE: 63500

DESCRIPTION: Open to dense, broadleafed, winter-deciduous shrubby riparian thickets usually dominated by any of several Salix species, Alnus, or Cornus. This catch-all community includes a bewildering array of cover types that require substantial study.

SITE FACTORS: Relatively fine-textured alluvium along fairly low-gradient reaches of snowmelt fed streams. Often occurs as a thin scrubby corridor through Montane (45100) or Subalpine and Alpine Meadows (45200).

CHARACTERISTIC SPECIES: Alnus tenuifolia, Cornus sessilis, C. stolonifera, Lonicera involucrata, Salix anglorum antiplasti, S. caudata, S. drummondiana subcoerulea, S. eastwoodiae, S. geyeriana argentea, S. jepsonii, S. lemmonii, S. liqulifolia, S. lutea, S.

lutea watsonii, S. mackenziana, S. melanopsis, S. orestera, S. planifolia monica, S. pseudocordata, S. scouleriana, Spiraea densiflora

DISTRIBUTION: Widely scattered above 5000-7000 feet, throughout montane parts of the Klamath, Sierra Nevada, and southern California mountains. Most of these have been ravaged by past livestock grazing and today are threatened by dewatering from small hydro projects.

SOURCES: 208

ELEMENT NAME: * Modoc-Great Basin Riparian Scrub ELEMENT CODE: 63600

DESCRIPTION: Open to impenetrably dense, broadleafed, winter deciduous thickets dominated by shrubby willows. Open stands frequently have dense herbaceous understories of Juncus spp., Carex spp., or Distichlis spicata.

SITE FACTORS: Relatively fine grained sand and gravel bars and low, wet alluvial terraces along perennial and intermittent streams.

CHARACTERISTIC SPECIES: Artemisia tridentata, Carex spp., Chrysothamnus nauseosus, Distichlis spicata, Juncus spp., Rosa woodsii, Salix commutata, S. exigua, S. lutea, S. lutea watsonii, S. melanopsis, Shepherdia argentea

DISTRIBUTION: Along most of the streams and creeks of the Modoc Plateau and Great Basin deserts, from far northeastern California south to Mono and Inyo counties.

SOURCES: 208, 280

ELEMENT NAME: Mojave Desert Wash Scrub ELEMENT CODE: 63700

DESCRIPTION: A low, scrubby, remarkably diverse scrub, often characterized by Acacia greggii, Chilopsis linearis, Ephedra californica, Forestiera neomexicana, Mahonia haematocarpa, and Psorothamnus spinosus, but lacking the conspicuous microphyllous trees of Desert Dry Wash Woodland (62200).

SITE FACTORS: Sandy arroyos, washes, and sub-irrigated bajadas, usually below about 5000 feet. These stands experience some winter frost, which appears to keep out the fabaceous trees.

CHARACTERISTIC SPECIES: Acacia greggii, Ambrosia eriocentra,

Artemisia ludoviciana, Atriplex spp., Baileya multiradiata, Baccharis spp., Bebbia juncea, Brickellia incana, Cassia armata, Chilopsis linearis, Chrysothamnus paniculatus, Cleome isomeris, Cucurbita palmata, Ephedra californica, Forestiera neomexicana, Mahonia haematocarpa, Psorothamnus spinosus

DISTRIBUTION: Washes, springs, and arroyos throughout the Mojave Desert.

SOURCES: 48

ELEMENT NAME: Tamarisk Scrub ELEMENT CODE: 63810

DESCRIPTION: A weedy, virtual monculture of any of several Tamarix species, usually supplanting native vegetation following major disturbance.

SITE FACTORS: Sandy or gravelly braided washes or intermittent streams, often in areas where high evaporation increases the stream's saltiness. Tamarisk is a strong phreatophyte and a prolific seeder, attributes which predispose the species to be aggressive competitors in disturbed riparian corridors.

CHARACTERISTIC SPECIES: Atriplex lentiformis, Coldenia palmeri, Distichlis spicata, Pleuchea sericea, Salix exigua, [Tamarix chinensis, T. ramosissima]

DISTRIBUTION: Widely scattered and increasing its range, throughout the drier parts of California from the rainshadow east of the Inner North Coast Ranges south through the Great Valley to southern California and across the deserts to Nevada, Arizona and beyond.

SOURCES: 83, 216, 289

ELEMENT NAME: Arrowweed Scrub ELEMENT CODE: 63820

DESCRIPTION: Moderate to dense streamside thickets strongly dominated by Pluchea sericea. Typha, Scirpus, Juncus, and Distichlis spicata may occur as scattered individuals, especially around the margins of the thickets.

SITE FACTORS: Streambanks, ditches, and washes with gravelly or sandy channels. This disturbance-maintained community appears to be increasing in extent at the expense of willow, cottonwood, and cottonwood-sycamore riparian forest types as a result of grazing and groundwater pumping.

CHARACTERISTIC SPECIES: Distichlis spicata, Juncus spp., Pluchea sericea, Salix exigua, Tamarix spp., Typha domingensis

DISTRIBUTION: In most major drainages in the drier southern parts of California. From the Cuyama Valley and Santa Ynez River in Santa Barbara County east to the Amargosa river in Death Valley, Antelope Valley, the Mojave River at least to Barstow, around the Salton Sea, and along the lower Colorado River.

SOURCES: 289, 290

ELEMENT NAME: Oregon Oak Woodland ELEMENT CODE: 71110

DESCRIPTION: This woodland varies from pure, closed-canopy stands of Quercus garryana to mixtures with conifers and broadleaf trees to open savannas.

SITE FACTORS: Drier, warmer slopes and canyon bottoms within the Mixed Evergreen (81100) and Douglas Fir (82400) Forests. Many stands have older, open-growth form trees surrounded by more narrow-canopied, younger trees--a reflection of reduced fire frequency.

CHARACTERISTIC SPECIES: Arbutus menziesii, Libocedrus decurrens, Pinus ponderosa, Pseudotsuga menziesii, Quercus chrysolepis, Q. kelloggii, Q. garryana, Toxicodendron diversilobum, Umbellularia californica

DISTRIBUTION: Coast Ranges from the Santa Cruz Mountains north, and the Cascades from the Pit River drainage north into Southern Oregon.

SOURCES: 10, 11, 27

ELEMENT NAME: Black Oak Woodland ELEMENT CODE: 71120

DESCRIPTION: Open to dense woodlands are dominated by Quercus kelloggii. Shruby understories usually are partly open, often with Cercocarpus betuloides. Pinus ponderosa is a common associate on all but the poorest sites. Most stands are even aged and younger than 125 years. Ground cover usually is well developed, contributing to a good litter layer.

SITE FACTORS: Mainly a seral community maintained by fire. Quercus kelloggii is a vigorous stump sprouter. Stands younger than about 60 years are not very resistant to fire. Stands that have been overtopped by taller conifers may decline because Q. Kelloggii is very shade-intolerant. Best developed between 1500 ft and 3000 ft, in areas receiving 30-50 inches of rain. (to 7000 in southern California)

CHARACTERISTIC SPECIES: Arbutus menziesii, Abies condor, Libocedrus decurrens, Lithocarpus densiflorus, Pinus jeffreyi, Pinus attenuata, P. coulteri (in south), P. ponderosa, Pseudotsuga macrocarpa (in south), P. menziesii, Quercus chrysolepis (poor sites), Q. garryana, Q. kelloggii, Pterideum aquilinum, Q. wizlizenii, Umbellularia californica, Aesculus californicus, Q. Douglasii, Ceanothus intergerrimus, Arctostaphylos viscida, Rhamnus crocea, Lonicera interupta, Cercis occidentalis, Cercocarpus betuloides, Toxicodendron diversiloba.

DISTRIBUTION: Discontinuously scattered from the central Oregon Cascades south through the mountains to near the Mexican border. Best developed in the southern Cascades and Klamath mountains and northern parts of the Coast Ranges and Sierra Nevada, especially between 2500 and 5000 feet.

SOURCE: 12, 13, 27, 68, 150, 155

ELEMENT NAME: *Valley Oak Woodland ELEMENT CODE: 71130

DESCRIPTION: Similar to Northern Oak Woodland (71110) and Blue Oak Woodland (71140), but typically more open, forming a grassy-understoried savanna rather than a closed woodland. Quercus lobata is usually the only tree present. This winter-deciduous species is California's largest broad-leaved tree, with mature individuals reaching 15-35 m. Most stands consist of open-canopy growth form trees and seldom exceed 30-40% absolute cover.

SITE FACTORS: On deep, well-drained alluvial soils, usually in valley bottoms, apparently with more moisture in summer than in Blue Oak Woodland (71140). Intergrades with Valley Oak Riparian Forest (62143) near rivers and with Blue Oak Woodland (71140) on drier slopes. Also found on nonalluvial settings in the South Coast and Transverse ranges. Fire may have prevented some valley oak stands from succeeding to Ponderosa Pine (84130, 84210) or Coulter Pine (84140) forests before fire supression.

CHARACTERISTIC SPECIES: Quercus lobata, Elymus triticoides, Toxicodendeon diversilobum, Q. Douglasii.

DISTRIBUTION: Sacramento and San Joaquin valleys adjacent to the Sierra Nevada foothills; valleys of the Coast Ranges from Lake County to western Los Angeles County. Usually below 2000 ft (610 m).

SOURCES: 1, 11, 13, 17, 213, 222

ELEMENT NAME: Blue Oak Woodland ELEMENT CODE: 71140

DESCRIPTION: A highly variable climax woodland dominated by Quercus douglasii, but usually including individuals of several other oaks as well as Pinus sabiniana. Stands vary from open savannas with grassy understories (usually at lower elevations) to fairly dense woodlands with shrubby understories.

SITE FACTORS: Well-drained soils in Mediterranean California, usually below 3000-4000 ft. Frequent fire favors blue oak (a long-lived stump sprouter) over digger pine. Supplanted at higher elevations and more mesic sites by Black Oak Woodland (71120) or Digger Pine-Oak Woodlands (71410). Interdigitates on more mesic sites at lower elevations with Valley and Foothill Grasslands (42000), where it is largely confined to north slope and canyons.

CHARACTERISTIC SPECIES: Aesculus californica, Arctostaphylos spp., A. viscida, Ceanothus spp., Eriodictyon californicum, Pinus sabiniana, Quercus douglasii, Q. dumosa, Viola quercitorum, Q. kelloggii, Q. lobata, Q. wislizenii, Rhamnus crocea, Rhamnus californica, Prunus ilocifolia, Plagiobothrys tenellus, Sanicula crassicaulis, Nemophila menzesii, N. pulchella, Delphinium hansenii, Lithofragrue affore, Lithophragma affinis.

DISTRIBUTION: Valleys and lower slopes of the southern and interior North Coast Ranges, the South Coast ranges, and the western foothills of the Sierra Nevada, almost completely encircling the Great Valley.
SOURCE: 1, 27, 72, 150, 155

ELEMENT NAME: Interior Live Oak Woodland ELEMENT CODE: 71150

DESCRIPTION: A broad-leaved, sclerophyllous woodland to 50 feet tall dominated by Quercus wislizenii, with Q. douglasii, Aesculus californica and Umbellumlaria californica also important. Dense canopy closure and abundant, persistant leaf litter preclude much herbaccous understory.

SITE FACTORS: Usually on sloping to steep, north-facing hillsides below about 8500 feet. Intergrades with Mixed Evergreen (81100) and Upland Redwood Forest (82320) or more mesic sites; or with Scrub Oak (37800) and Interior Live Oak Chaparral (37A00) on more xeric or frequently burned sites. This forest recovers from fire very rapidly. Canopy closure may reach 80% within 10 years.

CHARACTERISTIC SPECIES: Quercus wislizenii, Aesculus californica, Quercus douglasii, Umberlullaria californica, Q. chrysolopis, Pinus ponderosa, Sambucus caerullea, staphylea bolanderi, Torreya californica, Rhamnus crocea, Ceanoothus velutinus, Fraxinus dipetala, Fremontia californica, Lonicer interrupta, Rhus trilobata malacophylla, Cercis occidentalis, Cercocarpus betuloides, Rhus diversiloba, Pseudotsuga macrocarpa (Southern California only).

DISTRIBUTION: Extensive from Shasta County south through the North Coast Range to Sonoma and Lake Counties and down the Sierran foothills to the Kern River. Scattered in South Coast Ranges (especially to Santa Cruz and Monterey counties), Transverse and Peninsular ranges to northern Baja California.

SOURCE: 11, 28, 150, 68, 155

ELEMENT NAME: Coast Live Oak Woodland ELEMENT CODE: 71160

DESCRIPTION: Very similar to Oregon Oak Woodland (71110) with only one dominant tree, Quercus agrifolia, which is evergreen and reaches 10-25 m in height. The shrub layer is poorly developed, but may include heteromeles arbutifolia, Ribes spp., Rhus laurina, or Sambucus mexicana. The herb component is continuous and dominated by [Bronus diandrus] and several other introduced taxa.

SITE FACTORS: Typically on north-facing slopes and shaded ravines in the south and more exposed sites in the north. Intergrades with Coastal Scrub (32000) and Upper Sonoran Mixed Chaparral (37100) on drier sites and with Coast Live Oak Forest (81310) or Mixed Evergreen Forest (81100) on moister sites.

CHARACTERISTIC SPECIES: Aesculus californica, sanicula laciniata, Heteromeles arbutifolia, Quercus agrifolia, Rhamnus californica, Sambucus mexicana, Toxicodendron diversilobum, Diplacus aurantiacus, Lathyrus vestitus, Artemisia californica, Arbutus menziesii, Umbellularia californica, Ribes spp. [Bronus diandrus) [Stellaria media], [Galium apartine], [Cirsium vulgare], Torilis nodosa

DISTRIBUTION: Outer South Coast Ranges, and coastal slopes of Transverse and Peninsular ranges, usually below 4000 ft (1220 m). Intergrades with Blue Oak Woodland (71120) in the inner South Coast Ranges and with Englemann Oak Woodland (71180) in interior southern California.

SOURCE: 1, 27, 73, 104, 139, 171, 225

ELEMENT NAME: Alvord Oak Woodland ELEMENT CODE: 71170

DESCRIPTION: A variable woodland similar to Blue Oak Woodland, though the trees usually are shorter (or even shrubby). Alvord oak is a hybrid of Quercus Douglassii and Q. turbanella.

SITE FACTORS: Droughty sites in the rain shadows of the South Coast Ranges. Site differences (if any) between this habitat and Blue Oak Woodland (71140) need clarification.

CHARACTERISTIC SPECIES: Aesculus californica, Juniperus californica, Pinus sabiniana, Quercus agrifolia, Q. douglassii, Q. kelloggii, Q. alvordiana, Q. lobata, Pinus coulteri, Q. turbanella.

DISTRIBUTION: Inner South Coast Ranges from the Salinas Valley area south into the Tehachapi Mountains and northern Los Angeles County.

SOURCES: 9, 11, 14, 27, 138, 139

ELEMENT NAME:* Open Engelmann Oak Woodland ELEMENT CODE: 71181

DESCRIPTION: An evergreen woodland quite reminscent of Blue Oak Woodland (71140) but dominated by Quercus engelmannii with an understory of typical "grassland" species.

SITE FACTORS: Relatively moist sites on fine-textured soils of gentle slopes and valley bottoms. Intergrades with Venturan (32300) or Riversidian (32700) Sage Scrubs on drier, rockier sites, and with Dense Engelmann Oak Woodland (71182) on more mesic sites. Often surrounds grassland potreros, occupying the ecotone between the grassland (on fine-textured, deep soils) and surrounding shrub fields (on rockier, drier sites).

CHARACTERISTIC SPECIES: Juglans californica, Quercus agrifolia, Q. Engelmannii, Rhus ovata, R. trilobata

DISTRIBUTION: Mainly in the Santa Ana Mountains of San Diego and adjacent Riverside counties, usually below about 4000 ft.

SOURCES: 9, 11, 14

ELEMENT NAME:* Dense Englemann Oak Woodland ELEMENT CODE: 71182

DESCRIPTION: Very similar to Open Englemann Oak Woodland (71181), but has Quercus agrifolia as an additional significant constituent. Canopy cover is very similar to that observed in Open Englemann Oak Woodland, but stem densities are much greater due to Q. agrifolia being superimposed on the Q. engelmannii.

SITE FACTORS: On slightly more mesic sites (especially in steep canyons) than Open Englemann Oak Woodland (71181). Intergrades also with Coast Live Oak Woodland (71160) at slightly higher elevations on even more mesic sites.

CHARACTERISTIC SPECIES: Quercus agrifolia, Q. engelmannii, Toxicodendron diversilobum

DISTRIBUTION: Mainly in the Santa Ana and other Peninsular ranges.

SOURCES: 9, 11, 14, 27, 137, 139

ELEMENT NAME: * Island Oak Woodland ELEMENT CODE: 71190

DESCRIPTION: A mixture of large shrubs and small- to medium-sized trees, 5-15 m tall. Mostly evergreen, often forming a nearly closed canopy. Frequently one or two species form small, dense stands. Often similar in aspect to Island Chaparral (37700), but with trees rather than shrubs predominating. Several of the smaller trees are arborescent relatives of chaparral species. Nearly all of the dominant trees and large shrubs are island endemics. Growth is most active in spring, but probably continues at a reduced rate during the other months.

SITE FACTORS: On relatively deep, moist, somewhat rocky soils of north-facing slopes, ravines, and narrow valleys. Intergrades extensively with Island Chaparral (37700) on drier, rockier slopes, and forms savannas with Valley and Foothill Grassland (42000) on fine-textured soils.

CHARACTERISTIC SPECIES: Cercocarpus betuloides var. blancheae, Heteromeles arbutifolia var. macrocarpa, Lyonothamnus floribundus, Prunus lyonii, Quercus agrifolia, Q. macdonaldii, Q. tomentella Arctostaphylos tomentosa subcordata, A. insulanis, A. tomentosa insulicola, Ceanothus anbodeus, Pinus aff. remonata, Comarostaphylos diversifolia, Quercus chrysolepis, Marrah macrocarpus, Symphoricarpos mollis

DISTRIBUTION: The larger islands off the coast of southern California: Santa Rosa, Santa Cruz, Santa Catalina, San Clemente.

SOURCES: 1, 16, 74, 89

ELEMENT NAME: California Walnut Woodland ELEMENT CODE: 71210

DESCRIPTION: Similar to and intergrading with Interior Live Oak Woodland (71150) or Coast Live Oak Woodland (71160), but with a more open tree canopy locally dominated by Juglans californica. The open tree canopy allows develoment of a grassy understory. In most sites, this understory is comprised of introduced winter-active annuals that complete most of their growth cycle before the deciduous Juglans leafs out in spring.

SITE FACTORS: On relatively moist, fine-textured soils of valley slopes and bottoms, as well as encircling rocky outcrops. These drier, rocky sites often support Venturan (32300) or Riversidian Sage Scrub (32700). Intergrades with Coast Live Oak Woodland (71160) or Coast Live Oak Forest (81310) on more mesic sites, especially in canyons.

CHARACTERISTIC SPECIES: Juglans californica, Quercus agrifolia, Q. Engelmannii, Rhus ovata, R,. trilobata, [Bromus rubens], [Marrubium vulgare]

DISTRIBUTION: South side of San Gabriel Mountains to the Santa Ana Mountains, mostly between 500 ft and 3000 ft.

SOURCES: 1, 11, 27

ELEMENT NAME: Open Digger Pine Woodland ELEMENT CODE: 71310

DESCRIPTION: An open, savanna-like woodland dominated by Pinus sabiniana. Stocking density and canopy closure are quite variable in this climax type. Understories typically are annual-dominated.

SITE FACTORS: Well-drained (but not necessarily deep) soils, generally below about 4000 ft. Intergrades at lower elevations with Blue Oak Woodland (71140); with Upper Sonoran Mixed Chaparral (37100), Black Oak Woodland (71120), or Oregon Oak Woodland (71110) at higher elevations or more mesic sites. Frequent fire favors Blue Oak over Digger Pine.

CHARACTERISTIC SPECIES: Aesculus californica, Ceanothus cuneatus, Lotus scoparius, Quercus agrifolia, Q. douglassii, Q. lobata, Q. wislizenii, Pinus sabiniana

DISTRIBUTION: Essentially surrounds the Central Valley from the Pit River drainage south to Ventura and Santa Barbara counties except for a hiatus in Tulare County.

SOURCES: 9, 17, 18

ELEMENT NAME: Serpentine Digger Pine-Chaparral Woodland

ELEMENT CODE: 71321

DESCRIPTION: A usually open woodland of Digger Pines emergent from a moderate-to- dense, shrubby cover similar to Mixed Serpentine Chaparral (37610).

SITE FACTORS: Low-nutrient, xeric, rocky sites with ultramafic substrates. Usually at lower elevations or on more xeric exposures than Westside Ponderosa Pine Forest (84210). Intergrades with Serpentine Chaparral (37600) on flatter, more mesic sites.

CHARACTERISTIC SPECIES: Adenostoma fasciculum, Arctostahylos spp., Ceanothus cuneatus, Quercus durata, Pinus sabiniana

DISTRIBUTION: Widely scattered, on serpentine areas throughout the chaparral zone, usually below 5000-6000 ft.

SOURCES: 9, 17, 19, 67, 75, 148

ELEMENT NAME: Nonserpentine Digger Pine-Chaparral Woodland

ELEMENT CODE: 71322

DESCRIPTION: Dominated by evergreen sclerophyls, often impenetrable, with an open canopy of emergent Pinus sabiniana. Shrub canopy composition varies considerably, but usually is dominated by species of Arctostaphylos, Ceanothus, or Quercus.

SITE FACTORS: Often seral to Westside Ponderosa Pine Forest (84210), Sierran Mixed Conifer Forest (84230), or Coast Range Mixed Conifer Forest (84110) following fire, logging, or other disturbance. Also ocurs as an edaphic disclimax on extremely xeric or shallow-soiled sites within these types.

CHARACTERISTIC SPECIES: Aesculus californicus, Arctostaphylos mariposa, A. viscida, Berberis californica, Ceanothus cuneatus, C. divaricatus, C. integerrimus, Cercis occidentalis, Cercocarpus betuloides, Pinus sabiniana, Rhamnus californicus, R. crocea, Rhus diversiloba, Quercus dumosa, Q. wislizenii, Q. chrysorepis, Fraxinus dipetala, Heteromeles arbutifolia, Garrya fremontii, Lonicera interrupta

DISTRIBUTION: Along the Sierra Nevada, Coast Ranges, and western Transverse Ranges, generally near the transition between chaparral and conifer forests.

SOURCES: 9, 17, 67, 145, 150

ELEMENT NAME: Digger Pine-Oak Woodland ELEMENT CODE: 71410

DESCRIPTION: This climax woodland is a mixture of Pinus sabiniana and Quercus douglassii. Pure stands of either tree do occur, but mixed stands are much more common. Pinus sabiniana usually towers over the oaks in undisturbed stands. Understories usually are dominated by introduced annuals.

SITE FACTORS: Well-drained sites with Mediterranean climate. Usually in rocky, or exposed sites along ridges or canyons with poor or shallow soils. Intergrades on more mesic sites with Upper Sonoran Mixed Chaparral (37100) or scrubby, dense stands of Blue Oak Woodland (71140). Frequent fire favors blue oak over digger pine.

CHARACTERISTIC SPECIES: Aesculus californicus, Quercus agrifolia, Q. chrysolepis, Q. dumosa, Q. kelloggii, Q. lobata, Q. wislizenii, Lithophragma heterophylla, Saxifraga californica, Dodecatheon hendersonii, Collensia heterophylla, Astragalus lentiginosus idriensis, Ribes quercetorum, Yucca whipplei caespitosa

DISTRIBUTION: Forming a nearly continuous belt around the Central Valley, between Valley and Foothill Grassland (42000) and Lower Montane Mixed Conifer Forest (84000) except for a gap in Tulare County where P. sabiniana does not occur.

SOURCES: 6, 9, 13, 17, 72

ELEMENT NAME: Mixed North Slope Cismontane Woodland

ELEMENT CODE: 71420

DESCRIPTION: Dominated by broad-leaved trees, 7-20 m tall, varying from nearly closed forests on moist and/or rocky sites to open savannas on dry and/or fine-textured soils. Valley and Foothill Grassland species (42000) predominate in the openings between the trees; other herbaceous species characterize the shaded areas. Open savannas, almost entirely of Quercus garryana, and very similar in aspect to Valley Oak Woodland (71130), may occur in valley bottoms. The dominant trees include evergreen, winter-deciduous and summer-deciduous species, but with fewer scerophyllous trees than Mixed Evergreen Forest (81100). Winter is characterized by germination of annual understory species; flowering of these species and leafing out of most deciduous trees occur in spring. In summer the trees grow at reduce rates and the annual herbs die.

SITE FACTORS: On relatively fine-textured soils of valleys and slopes; often around rock outcrops on slopes. Intergrades with Valley and Foothill Grasslands (42000) on drier, fine-textured soils, with Upper Sonoran Mixed Chaparral (37100) on dry, rocky soils, and with Mixed Evergreen Forest (81100) or Mixed North Slope Forest (81500) on moister soils (often in ravines or adjacent north-facing slopes) or at higher elevations.

CHARACTERISTIC SPECIES: Acer macrophyllum, Aesculus californica, Arctostaphylos manzanita, Quercus chrysolepis, Q. Garryana, Q. kelloggii, Q. lobata, Q. wislizenii, Umbellularia californica, Prunus ilicifolia, Heteromeles arbutifola

DISTRIBUTION: Valleys and lower slopes of the Klamath and North Coast ranges, from Humboldt and Siskiyou counties to Marin County, usually away from the coast, between 500 ft and 3000 ft (150 m and 915 m). Intergrades with Valley Oak Woodland (71130), Blue Oak Woodland (71140, or Interior Live Oak Woodland (71150) towards the south.

SOURCE: 27

ELEMENT NAME: Juniper-Oak Cismontane Woodland ELEMENT CODE: 71430

DESCRIPTION: A compact woodland of Juniperus californica and shrubby Quercus douglasii.

SITE FACTORS: Rocky sites, with xeric exposures or severe drainage. Often occurs on rocky outcrops.

CHARACTERISTIC SPECIES: Ephedra californica, E. viridis, Eriogonum fasciculatum polifolium, Eriophyllum confertiflorum, Gutierrezia bracteata, Haplopapus linearifolius, Juniperus californicus, Quercus douglasii, Yucca whipplei, Pinus sabiniana, Artemisia tridentata

DISTRIBUTION: Inner South Coast Ranges from Santa Barbara and Ventura counties north to at least Mt Diablo.

SOURCES: 1, 21, 22, 27, 77

ELEMENT NAME: Northern Juniper Woodland ELEMENT CODE: 72110

DESCRIPTION: An open woodland dominated by Juniperus occidentalis occidentalis with understory of Big Sagebrush Scrub (35210) or Subalpine Sagebrush Scrub (35220). Densely stocked stands often have grassy understories, while more open stands are more shrubby.

SITE FACTORS: Typically deep or well-drained soils (with Artemisia tridentata understories) or shallow rocky, poorly drained soils (with A. arbuscula understories). Often forms broad ecotones between Big Sagebrush Scrub (35210) at lower elevations or on drier or more poorly drained soils, and Eastside Ponderosa Pine Forest (84220) or Jeffrey Pine Forest (85100) at higher elevations or on moister sites.

CHARACTERISTIC SPECIES: Amelanchier utahensis, A. pallida, Artemisia arbuscula, A. tridentata, Cercocarpus ledifolius, Juniperus occidentalis, Purshia tridentata, Ribes velutinum, Chrysothamnus nauseosus, Pinus jeffreyi, P. ponderosa, Quercus garryana, Rhus trilobata.

DISTRIBUTION: From southern Washington and southwestern Idaho to the Modoc Plateau and Cascade Range in northern California.

SOURCES: 1, 21, 65

ELEMENT NAME: Great Basin Piñon-Juniper Woodland

ELEMENT CODE: 72121

DESCRIPTION: Very similar to Northern Juniper Woodland (72110), but lacking the occasional taller trees and having Juniperus occidentalis and Pinus monophylla as conspicuous canopy components. Shrub and herb species typically are those seen in adjacent nonforested stands of Great Basin Scrubs (35000 series).

SITE FACTORS: Very similar to Northern Juniper Woodland (72110) but receiving slightly more moisture. Intergrades at higher elevations with Jeffrey Pine Forest (85100) or Montane Chaparral (37500) in the Sierra Nevada; and with Bristlecone Pine Forest (86400) or Subalpine Sagebrush Scrub (35200) in the White, Inyo, and Panamint ranges.

CHARACTERISTIC SPECIES: Agropyron spicatum, Artemisia tridentata, Cercocarpus ledifolius, Juniperus osteosperma, Pinus monophylla, Purshia glandulosa, P. tridentata

DISTRIBUTION: Desert mountains from the first range east of the Sierra Nevada from Alpine County to Kern County, east through the Basin Ranges of Nevada. Abundant in the White Mountains, Inyo Mountains, and Panamint Range, from 6000-9000 ft (1830-2745 m). Intergrades in Kern County (on both sides of the Sierran crest) with Mojavean Piñyon-Juniper Woodland (72210).

SOURCES: 1, 21

ELEMENT NAME: Great Basin Piñon Woodland ELEMENT CODE: 72122

DESCRIPTION: Scrubby steppe to 1 tall (shorter on cold, exposed winds ridges), dominated by Artemisia tridentata with Pursitia tridentata. Very similar to Nevadan Piñon-Juniper Woodland (72121) except lacking Juniperus osteosperma.

SITE FACTORS: Typically on rocky soils, usually with low nutrient content and pedogenic horizons. Intergrades at higher elevations with Jeffrey Pine Forest (85100) or Mountain Mahogany Woodland. Passes at lower elevations or drier sites to Great Basin Juniper Woodland and Scrub (72123) or Joshua Tree Woodland (73000). Fire supression favors Juniperus or Purshia over Pinus.

CHARACTERISTIC SPECIES: Agropyron spicatum, Artemisia tridentata, Cercocarpus ledifolius, Festuca idahoensis, Pinus jeffreyi, P. monophylla, Purshia glandulosa, P. tridentata, Sitanion hystrix

DISTRIBUTION: East side of The Sierra Nevada from near Mono Lake south to the South Fork Kern River, as well as the west sides of the next eastward ranges (Sweetwater, White, etc.).

SOURCES: 1, 13, 20, 21

ELEMENT NAME: Great Basin Juniper Woodland and Scrub

ELEMENT CODE: 72123

DESCRIPTION: An open woodland or scrub dominated by Juniperus occidentalis, with scrub and herb components from adjacent nonforested stands of Great Basin Scrub (35000 series).

SITE FACTORS: Dry, shallow, often stony soils. Perhaps slightly colder and drier than Great Basin Piñon Woodland (72122).

CHARACTERISTIC SPECIES: Artemisia tridentata, Chrysothamnus nauseosus, Juniperus osteosperma, others?

DISTRIBUTION: Modoc Plateau, eastern flanks of the northern Sierra Nevada, and widely distributed throughout the northern Great Basin.

SOURCES: 1, 21

ELEMENT NAME: Mojavean Piñon Woodland ELEMENT CODE: 72210

DESCRITION: An open woodland dominated by Pinus monophylla, with an open shrubby understory of species commonly found in adjacent nonforested stands. Understories are more diverse in shrubs than most Piñon-Juniper types, and may actually exceed tree cover. Dominant shrubs include Artemisia tridentata and Cercocarpus ledifolius.

SITE FACTORS: Desert mountain ranges, usually between about 4000 ft and 8000 ft. Intergrades at higher elevations with Desert Mountain White Fir Forest (85330) or Bristlecone Pine Forest (86400); at lower elevations with Mojavean Juniper Woodland and Scrub (72220). Better developed on steeper, every slopes.

CHARACTERISTIC SPECIES: Artemisia tridentata, Cercocarpus ledifolius, Coleogyne ramosissima, Cowania mexicana stansburiana, Ephedra nevadensis, Eriogonum fasciculatum polifolium, Fallugia paradoxa, Pinus monophylla, Purshia glandulosa, Quercus turbinella, Yucca brevifolia, Salvia pachyphylla, Lupinus excubitus, Eriogonum wrightii, Coreopsis bigelovii, Gilia latiflora, [Brownus tectorum].

DISTRIBUTION: At appropriate elevations on most Mojave Desert mountain ranges, as well as the drier headwaters of South Fork Kern River.

SOURCES: 1, 13, 21, 48, 150

ELEMENT NAME: Mojavean Juniper Woodland and Scrub

ELEMENT CODE: 72220

DESCRIPTION: An extremely open woodland dominated by Juniperus californicus, with understory of typical Mojave Mixed Scrub and Steppe species (34200). Understories are more diverse than in most Piñon-Juniper types.

SITE FACTORS: Better developed on gentle slopes or alluvium, usually at slightly lower elevations than the Mojavean Piñon Woodland (72210), Jeffrey Pine Forest (85100), or Semidesert Chaparral (37400). Also intergrades with Joshua Tree Woodland (73000) or Mojave Creosote Bush Scrub (34100) on drier soils at lower elevations. 5000-8000 ft in the north, 4000-6000 ft in the south.

CHARACTERISTIC SPECIES: Cercocarpus intricatus, Coleogyne ramosissima, Cowania mexicana stansburiana, Fallugia paradoxa, Juniperus californicus, Quercus turbinella, Thamnosma montana, Yucca brevifolia

DISTRIBUTION: Southern Sierra Nevada and Tehachapi mountains and along the desert slopes of the Transverse and Peninsular ranges; also at appropriate elevations around the mountains in the Mojave Desert.

SOURCES: 1, 13, 21, 48, 129

ELEMENT NAME: Peninsular Piñon Woodland ELEMENT CODE: 72310

DESCRIPTION: A relatively dense Piñon Woodland, locally dominated by Pinus quadrifolia rather than P. monophylla. Typical stands have scattered or clumped individuals emergent through relatively dense chaparral.

SITE FACTORS: Similar to but more mesic than Mojavean Piñon Woodland (72220), with which it intergrades near its lower eastern (desert) margins; intergrades with Upper Sonoran Mixed, Chamise, or Red Shank chaparrals (37100-37300) along its lower western margin; also intergrades with Montane Coniferous Forests (84000) near its upper margin.

CHARACTERISTIC SPECIES: Adenostoma fasciculatum, A. sparsifolium, Juniperus californica, Pinus quadrifolia, Pinus jeffreyi, Cercocarpus ledifolius.

DISTRIBUTION: A conspicuous component of west-facing drainages in the desert transition from the San Jacinto Mountains south into northern Baja California.

SOURCES: 1, 21, 48, 68

ELEMENT NAME: Peninsular Juniper Woodland and Scrub

ELEMENT CODE: 72320

DESCRIPTION: Very similar to Peninsular Piñon Woodland (72310), but with Juniperus californica conspicuous or even dominating xeric sites to the exclusion of any Pinus. Litter layers are restricted to directly beneith the tree driplines.

SITE FACTORS: Alluvial fans and desert slopes, slightly lower and more xeric than the Peninsular Piñon Woodland with which it intergrades. Fuel loads usually are insufficient to carry a fire. The woodland species do not tolerate fire: burning this type usually leads to semi-desert chaparral (37400).

CHARACTERISTIC SPECIES: Juniperus californica, Nolina parryi, Pinus quadrifolia, Quercus turbinella, Yucca schidigera, Artemisia tridentata.

DISTRIBUTION: San Jacinto and Santa Rosa Mountains in Riverside County, Laguna Mountains in southern San Diego County, southward into northern Baja California. Elevation mostly between 3500 ft and 5500 ft (1070 m and 1680 m).

SOURCES: 1, 21, 68

ELEMENT NAME: Cismontane Juniper Woodland and Scrub ELEMENT CODE: 72400

DESCRIPTION: A dense to somewhat open, medium-tall bunchgrass community with many forbs and with widely scattered, shrubby Juniperus californica.

SITE FACTORS: Xeric sites near the upper altitudinal limit of Valley and Foothill Grassland (42000). Intergrades with and questionably distinct from Juniper-Oak Cismontane Woodland (71430) except for lower tree cover and relatively low tree density.

CHARACTERISTIC SPECIES:
Cercocarpus betuloides, Ephedra californica, E. viridis, Eriogonum fasciculatum spp. polifolium, Eriophyllum confertifolum, Gutierrezia bracteata, Haploppus linearifolius, Juniperus californicus, Quercus douglasii, Stipa cernua, S. pulchra, Yucca whipplei, Ephedra californica, E. viridis

DISTRIBUTION: Inner South Coast Ranges, mainly betwen San Benito and San Luis Obispo counties.

SOURCE: 21, 22, 23, 27, 77

ELEMENT NAME: *Joshua Tree Woodland ELEMENT CODE: 73000

DESCRIPTION: An open woodland with Yucca brevifolia usually as the only arborescent species (to 12 m high) and numerous shrub species between 1 and 4 m tall. Little or no herbaceous understory during most of the year. The dominant species display a diversity of life forms: sclerophyllous evergreen trees and shrubs (Yucca spp.), microphyllous evergreen shrubs (Juniperus spp.), semideciduous shrubs (Eriogonum, Tetradymia), semisucculents (Lycium spp.), and succulents (Opuntia spp.). The main growing season is spring, with most growth limited by cold in winter and brought in summer and fall. Many species of ephemeral herbs may germinate following sufficient late fall or winter rains and flower in mid-spring.

SITE FACTORS: Typically on sandy, loamy, or gravelly, well-drained gentle alluvial slopes. Transitional climatologically and biologically between low and high elevation desert regions. Intergrades at lower elevations with Mojave Creosote Bush Scrub (34100) (poorer soil drainage, colder winters from cold air drainage). At higher elevations, intergrades with Mojavean Pinyon-Juniper Woodland (72200) (cooler and moister, but better drained).

CHARACTERISTIC SPECIES: Eriogonum fasciculatum ssp. polifolium, Juniperus californica, J. osteosperma, Lycium spp., Opuntia spp., Tetradymia axillaris, Yucca brevifolia, Y. schidigera, Y. baccata, Artemisia tridentata, Coreogyme ramossissina, Grayia spinosa, Juniperus californica, Larrea divaricata, Lycium andersonii, Stipa speciosa, Ephedra nevadenses, Hilaria rigida, Menodora spinescens, Opuntia ramosissima, Salazaria mexicana.

DISTRIBUTION: Desert slopes of the Southern Sierra Nevada, Tehachapi, and Transverse Ranges of Inyo, Kern, Los Angeles, San Bernardino, and northern Riverside counties. Eastward across the Mojave Desert to southwestern Utah, mostly on the slopes of mountains and mesas. Extensive stands in the vicinity of Halloran Summit and Mountain Pass in northeastern San Bernardino County. One extensive stand west of the Sierran crest on the watershed of the South Fork of

Kern River. Elevation from 2500-5000 ft (760-1520 m). Many of the characteristic species (but not Yucca brevifolia) occur southward into San Diego County and northern Baja California, on the desert slopes of the Peninsular Ranges.

SOURCES: 1, 8, 48, 68, 129

ELEMENT NAME: *Crucifixion Thorn Woodland ELEMENT CODE: 75200

DESCRIPTION: A desert woodland where the small tree Castela (Holocantha) emoryi is dominant (at least visually) over a grassy and Herbaceous understory.

SITE FACTORS: Normally on fire textured alluvial soils between 500 and 2000 feet, but also on unstabilized sand dunes in the driest parts of the desert.

CHARACTERISTIC SPECIES: Castela emoryi, others?

DISTRIBUTION: Scattered localities at the northern edge of the Sonoran Desert and a few Mojave localities in California; more common in Arizona, Sonora, and Chihuahua.

SOURCE: 8,78

ELEMENT NAME: *All-Thorn Woodland ELEMENT CODE: 75300

DESCRIPTION: A questionable woodland (often more shrubby), forming dense, spiny thickets from 3-15 ft tall.

SITE FACTORS: Sandy sites, otherwise poorly understood.

CHARACTERISTIC SPECIES: Koberlinia spinosa, others?

DISTRIBUTION: Reported from the Chocolate Mountains of Imperial County (now a Marine Corps gunnery range). More widespread in southern Arizona and New Mexico.

SOURCE: 8,78

ELEMENT NAME: * Arizona Woodland ELEMENT CODE: 75400

DESCRIPTION: A medium-tall, open woodland typical of the Arizona Upland Region of the Sonoran Desert. It is dominted by Cercidium microphyllum and Carnegiea gigantea, with many shrubs and cacti in the understory.

SITE FACTORS: Well-drained soils.

CHARACTERISTIC SPECIES: Cercidium microphyllum, Prosopis juliflora velutina, Olneya rinaga tesota, Fouquieria splendens, Carnegia gigante, Ferocactus wislizenii.

DISTRIBUTION: Reported from a few sites in the Whipple Mountains (San Bernardino County); widely distributed in the Arizona Upland Region of the Sonoran Desert.

SOURCE: 8, 69, 124

ELEMENT NAME: Mixed Evergreen Forest
ELEMENT CODE: 81100

DESCRIPTION:
Dominated by broadleaved trees, 10-30 m tall, often with taller conifers interspersed, forming a closed forest. Most species are sclerophyllous evergreens, but winter-deciduous species also occur. Relatively little understory grows under the dense canopy. Often occurs in small, mosaic-like patches, surrounded by grassland on heavier soils. Most species are relatively inactive during the winter; growth increases rapidly in spring and continues at a reduced rate into summer.

SITE FACTORS:
On moist, well-drained, coarse soils, usually on slopes. Often around rock outcrops on heavier soils. Intergrades with Californian Mixed Chaparral (37110) on drier, rockier slopes; with Coast Live Oak Forest (81301) on drier, interior slopes; with Northern Oak Woodland (71100), or Valley and Foothill Grassland (42000) on drier, fine-textured soils; with Douglas Fir Forest (82400) or Redwood Forest (82300) on moister slopes or canyon bottoms and with Coast Range Coniferous Forests (84100) at higher elevations. Geographically and biologically transitional between the dense coniferous forests of northwestern California and the open woodlands and savannas of the interior. Each of the dominant species, except Arbutus menziesii, is well-represented in one or more of these other habitat types.

CHARACTERISTIC SPECIES:
Acer macrphyllum, Arbutus Menziesii, Chrysolepis chrysophylla, Lithocarpus densiflorus, Pseudotsuga menziesii, Quercus chrysolipis, Quercus Kelloggii, Umbellularia californica

DISTRIBUTION:
More or less continuous from Santa Cruz Co. northward through the outer coast ranges into Oregon, usually away from the immediate coast. Typically follows the upper and/or inland margins of the coastal Redwood Forest (82300) or Douglas Fir Forest (82400). Also on north-facing slopes of the inner north coast ranges, the Santa Lucia Mtns., and with small outliers extending to Santa Barbara co. Elevations ranging from 200-3000 ft (60-910 m) in the north to 1000-4000 ft (300-1210 m) in the south.

SOURCES: 1,8,26

ELEMENT NAME: *California Bay Forest
ELEMENT CODE: 81200

DESCRIPTION:
Similar to Mixed Evergreen Forest (81100), but typically consisting entirely of Umbellularia californica, a broadleaved sclerophyll tree up to 30 m tall. Often forms dense, wind-pruned stands less than

10 m tall on exposed coastal slopes. Even away from the coast, stands are usually dense (probably from cloning after fires) and support little or no understory.

SITE FACTORS:
Similar to Mixed Evergreen Forest (81100), but probably somewhat moister. Usually occurs on exposed slopes and ridges to the north of San Francisco Bay and on moist, north-facing slopes further south. Adapted to the seawinds of exposed coastal slopes. Responds to fire by crown-sprouting. Merges with Mixed Evergreen Forest (81100) toward the interior, Redwood Forest (82300) on moister slopes or in canyons and with Californian Mixed Chaparral (37110) on drier, rockier slopes.

CHARACTERISTIC SPECIES:
Arctostaphylos tomentosa, Castanopsis chrysophyla and var. minor, Ceanothus sorediatus, Cornus "Californica," Rubus laciniatus, R. procerus, R. ursinus, Symphoricarpus alba

DISTRIBUTION:
Outer Coast Ranges from the Oregon border to northern San Luis Obispo Co. Best developed away from the immediate coast to the north of San Francisco Bay, and close to the coast south of the bay. The occurrence is usually patchy, with stands limited to a few acres. Elevation usually below 3000 ft (910 m).

SOURCES: 1, 25

ELEMENT NAME: Coast Live Oak Forest
ELEMENT CODE: 81310

DESCRIPTION:
Similar to Mixed Evergreen Forest (81100) and Coast Live Oak Woodland (71160), not quite so dense and with fewer tree species than the former; more dense than the latter, forming a forest instead of a woodland. Dominated by Quercus agrifolia, a broad-crowned, sclerophyllous evergreen tree up to 25 m tall. The growing season may begin earlier than in Mixed Evergreen Forest, at least in the southern coastal locations, whereas a greater reduction of growth probably occurs during the summer-fall drought.

SITE FACTORS:
Similar to Mixed Evergreen Forest (81100) and Coastal Live Oak Woodland (71160), but drier than the former and moister than the latter. May intergrade with these locally as well as regionally. May occur in valley bottoms as well as on slopes.

CHARACTERISTIC SPECIES:
Arbutus Menziesii, Pinus Coulteri, Quercus agrifolia, Toxicodendron diversilobum, Umbellularia californica

DISTRIBUTION:

Coast ranges from Sonoma Co. to Santa Barbara Co. Most common away from the coast in the north and near the coast in the south. Often adjacent to Mixed Evergreen Forest (81100) in the north or merging with Coast Live Oak Woodland (71160) in the south. Elevation usually below 3000 ft (1000 m).

SOURCES: 1

ELEMENT NAME: Cañon Live Oak Forest
ELEMENT CODE: 81320

DESCRIPTION:
Similar to Coast Live Oak Forest (81310), but usually denser and not so tall. Dominated by Quercus chrysolepis, a broadleaved sclerophyll. Typically forms forests with little understory up to 20 m tall in canyons or on north-facing slopes, and low, chaparral-like stands less than 10 m tall on south-facing slopes. Trees often with multiple trunks, probably from crown-sprouting after fires. Growing season from late spring into summer, similar to that of Lower Montane Coniferous Forests (84000).

SITE FACTORS:
Transitional between low elevation broadleaved forests and higher elevation coniferous forests. On rocky, often steep slopes with little soil development. Typically in canyons and on north-facing slopes at relatively low elevations and on south-facing slopes at higher elevations. At higher elevations with colder winters than Mixed Evergreen Forest (81100), Blue Oak Woodland (71210), Coast Live Oak Forest or Californian Mixed Chaparral (37110). Often adjacent to Montane Chaparral (37500) on dry slopes or lower Montane Coniferous Forest (84000) on less rocky soils. May intergrade with any of the above vegetation types and is not always distinct from them.

CHARACTERISTIC SPECIES:
Calocedrus decurrens, Lithocarpus densiflorus, Pinus Coulteri (South Coast Ranges), Pseudotsuga Menziesii, Quercus chrysolepis, Umbellularia californica

DISTRIBUTION:
Inner North Coast Ranges from Siskiyou Co. to Lake Co., South Coast Ranges from Mount Diablo to Monterey Co. West slope of the Sierra Nevada from Tehama Co. to Kern Co. at elevations of 1000 to 4000 ft in the north and 3000 to 6000 ft in the south. Replaced by the closely related Bigcone Spruce-Cañon Oak Forest (84150) in the Transverse and Peninsular Ranges of southern California.

SOURCE:

ELEMENT NAME: Interior Live Oak Forest
ELEMENT CODE: 81330

DESCRIPTION:
A dense, closed canopy evergreen forest dominated by Quercus Wislizenii, usually brushy understories. Most pure stands are small and appear to be seral stages of Oak Woodland (71100) with little herbaceous cover.

SITE FACTORS:
Exceedingly variable; mesic mountainsides in southern California; broad, alluvial river banks in the Sierran foothills; and valley bottoms and foothills in the Coast Ranges. Not a fire type, but Quercus Wislizenii is a vigorous stump. Sprouter following fire or logging--this often results in even-aged stands.

CHARACTERISTIC SPECIES:
Cercos occidentalis, Pinus sabiniana, Quercus agrifolia, Q. chrysolepis, Q. Douglasii, Q. dumosa, Q. Wislizenii, Toxicodendron diversilobum

DISTRIBUTION:
Sierran foothills and North Coast Ranges just below the Montane Forest; more disjunctly scattered in the South Coast and Transverse Ranges. Below about 2000 ft in the north, above about 6000 ft in the south.
SOURCES: 11, 27, 28

ELEMENT NAME: Black Oak Forest
ELEMENT CODE: 81340

DESCRIPTION:
A persistent subclimax forest dominated by Quercus Kelloggii, with scattered emergent Pinus ponderosa (except in poorest sites). Most stands are even-aged, reflecting past disturbances.

SITE FACTORS:
An obvious fire type, Quercus Kelloggii requires disturbance to hold its own outside its core zone. Occurs on mountain slopes, benches and coves, canyon bottoms, lower sidehills and upper foothill slopes.

CHARACTERISTIC SPECIES:
Abies concolor, Aesculus californicus, Arbutus Menziesii, Libocedrus decurrens, Lithocarpus densiflorus, Pinus attenuata, P. Coulteri (southern California only), P. Jeffreyi, P. Lambertiana, P. ponderosa, Pseudotsuga macrocarpa (southern California only), P. Menziesii, Quercus chrysolepis, Q. Garryana, Q. Kelloggii, Umbellularia californica

DISTRIBUTION:
Best developed and most extensive in southern Cascade and Klamath Mountains and in northern parts of the Coast Ranges and Sierra Nevada, mostly between 1500-3000 ft. Found elsewhere in the Sierra Nevada, South Coast, and Transverse Ranges as low as 200 and as high

as 8000 ft.

SOURCES: 12, 28

ELEMENT NAME: Tan-Oak Forest
ELEMENT CODE: 81400

DESCRIPTION:
A dense-canopied forest of evergreen sclerophyl trees, dominated by Lithocarpus densiflorus and Arbutus Menziesii.

SITE FACTORS:
Usually a seral stage in Mixed Evergreen Forest (81100) or as an edaphic disclimax on xeric, rocky sites. This forest often occurs around the margins of stands of Redwood Forest (82300) or Douglas Fir Forest (82400).

CHARACTERISTIC SPECIES:
Arbutus Menziesii, Castanopis chrysophylla, Lithocarpus densiflorus, Pseudotsuga Menziesii, Quercus agrifolia, Q. chrysolepis, Umbellularia californica

DISTRIBUTION:
Klamath and North Coast Ranges; also scattered south even to the Transverse Ranges of southern California.

SOURCES: 8, 29

ELEMENT NAME: Red Alder Forest
ELEMENT CODE: 81A00

DESCRIPTION:
Mesic, dense, broadleafed deciduous forests to 25 m tall, dominated by Alnus rubra. Understory structure depends on site; near streams typically are overwhelmingly monocultural, sites removed from frequent stream disturbance often have dense shrub layers. Most growth occurs between late spring and fall, although some taxa remain active through most of the year.

SITE FACTORS:
Moist, rich soils, especially on bottomlands, along streams, or on seepy hillsides. Also occurs as an early seral stage following logging of spruce or fir stands. Apparently tolerant of poorly aerated, marshy soils as the type occurs on edges of marshes. Intergrades with Sitka Spruce-Grand Fir (82100) near the coast (Humboldt and Del Norte counties), as well as with other North Coast Conifer Forest elements (82000) farther inland.

CHARACTERISTIC SPECIES:
Alnus rubra (A. oregona), Aralia californica, Cornus spp. (NOT

nuttallii), Populus trichocarpa, Salix spp.

DISTRIBUTION:
Streambanks along the immediate coast from northernmost San Luis Obispo Co. to Cape Mendocino, Humboldt Co. From the Eel River region of Humboldt Co. northward to Oregon may occur up to 80 miles (50 km) inland and in moist areas away from streambanks. Extends northward to Alaska.

SOURCES:

ELEMENT NAME: Aspen Forest
ELEMENT CODE: 81B00

DESCRIPTION:
Typically dense groves dominated by Populus tremuloides growing to 20 m tall. Similar to Red Alder Groves (62200). Scrubby thickets may occur at the edges of groves, in other areas of relatively dry soil or at high altitudes. The trunks may be bent downslope near their bases or otherwise contortal in areas of heavy snowfall. The understory is sparse in dense groves, but includes a variety of small shrubs and herbaceous perennials in more open stands. The growing season is from late spring or early summer through early fall. The brilliant yellow and orange colors of the leaves in October are notable for California. The trees are leafless from late October until late May, or longer at high elevations. Flowering occurs in spring, before the leaves emerge.

SITE FACTORS:
Very similar to Montane Riparian Woodland (62130), but occurring in areas with still colder winters. May occur away from streambanks near springs or other areas with high soil moisture. Populus tremuloides regenerates from vegetative offshoots, and entire groves may consist of single clones. The transition to other communities where the soil moisture is lower may be abrupt, especially east of the Sierran Crest where Aspen groves are often scattered within stands of Sagebrush (33100). This species is more abundant in the Rocky Mtns., where it typically is successional, apparently not usually the case in California.

CHARACTERISTIC SPECIES:
Populus tremuloides, Prunus virginiana, Rosa gymnocarpa, R. woodsii, Symphoricarpos mollis

DISTRIBUTION:
Scattered in the interior Klamath Ranges and Cascade Range. Common in Warner Mtns., Modoc Co. Common in the Sierra Nevada from eastern Plumas and southern Lassen Cos. to southern Tulare Co. Most abundant to the east of the Sierran crest, especially between Lake Tahoe and Mono Lake. Scattered in the White Mtns. near the Inyo-Mono Co. line. Disjunct groves occur near the head of the South Fork of the Santa Ana River in the San Bernardino Mtns., San Bernardino Co. and in the

Sierra San Pedro Martir, Baja California. Elevation about 5000-8000 ft (1500-2420 m) in the north and 7000-10,000 ft (2100-3030 m) in the south.

SOURCES: 1, 48

ELEMENT NAME: Sitka Spruce-Grand Fir Forest
ELEMENT CODE: 82100

DESCRIPTION:
Dense forest dominated by coniferous evergreen trees up to 35 m tall, but shorter and wind-pruned on exposed headlands. Dense understory of broadleaved trees, shrubs and perennial herbs, including several species of ferns. The growing season is almost year-round, but reaches a maximum from late spring to early summer. Some plants are dormant during the relatively dry late summer or during the winter.

SITE FACTORS:
Moist, well-drained soils of seaward slopes and coastal headlands, with strong seawinds, frequent fogs, and small annual temperature fluctuation. Intergrades with Western Hemlock Forest (8.22) or Redwood Forest in more protected sites back from the coast, with Northern Coastal Scrub (32100) on exposed coastal headlands or with Shore Pine-Bishop Pine Forest (83110) on headlands of Mendocino Co.

CHARACTERISTIC SPECIES:
Abies grandis, Acer circinatum, Alnus rubra, Maianthemum dilatatum, Myrica californica, Picea sitchensis, Rhamnus purshiana, Tsuga heterophylla, Epiphytic mosses

DISTRIBUTION:
Immediate coastal strip from southern Del Norte Co. to Cape Mendocino, Humboldt Co. Also along the coast of central Mendocino Co., especially in the vicinity of Pt. Cabrillo.

SOURCES: 1, 268, 269

ELEMENT NAME: Western Hemlock Forest
ELEMENT CODE: 82200

DESCRIPTION:
Similar to Sitka Spruce-Grand Fir Forest (82100), but usually taller (to 60 m) and more diverse. Tree seedlings usually become established on rotting longs, rather than in soil. Several species of ferns and Vaccinium frequently occur as epiphytes on the lower trunk or branches of the large trees. The growing season is similar, but more variable than in Sitka Spruce-Grand Fir Forest.

SITE FACTORS:
Moist, usually well-drained soils of slopes and valley bottoms;

occasionally somewhat swampy. Small annual temperature range with frequent fogs. Similar to, and often intergrading with Sitka Spruce-Grand Fir Forest (82100) in exposed, coastal localities. Merges with Redwood Forest (82300) on drier, more fire-prone sites toward the south, inland or at higher elevations.

CHARACTERISTIC SPECIES:
Acer circinatum, A. macrophyllum, Chamaecyparis lawsoniana (on serpentine soil), Picea sitchensis, Polystichum munitum, Pseudotsuga Menziesii, Rhamnus purshiana, Rhododendron macrophyllum, Thuja plicata, Tsuga heterophylla, Vaccinium parvifolium

DISTRIBUTION:
Slopes and valleys of the outer North Coast Ranges from Del Norte Co. to the vicinity of the lower Eel River, Humboldt Co. Well developed from the lower Mad River drainage (Griffin and Critchfield 1972) northward. Scattered, less-developed stands occur near the coast of Mendocino Co. Much more extensive in Oregon, Washington and British Columbia. Elevation usually below 2000 ft (605 m).

SOURCES: 1, 268, 269

ELEMENT NAME: Alluvial Redwood Forest
ELEMENT CODE: 82310

DESCRIPTION:
Moderately dense forest dominated by Sequoia sempervirens, usually around 80 m but occasionally over 100 m tall. The tallest forest type in California and one of the tallest in the world. Similar to Western Hemlock Forest (82200) but not quite so dense and less diverse. The understory often consists largely of Polystichum munitum and Oxalis oregana. The growing season is almost year-round, with a maximum from late spring to early summer.

SITE FACTORS:
On alluvial flats with deep, well-drained soils. Subject to frequent fogs in summer, periodic flooding in winer and infrequent, sometimes devastating fires. Intergrades with Western Hemlock Forest (82200) or Sitka Spruce-Grand Fir Forest (82100) in moister or more coastal localities and with Upland Redwood Forest (82320) in drier localities with shallower soil.

CHARACTERISTIC SPECIES:
Oxalis oregana, Polystichum munitum, Rhododendron macrophyllum, Sequoia sempervirens, Vaccinium ovatum

DISTRIBUTION:
Primarily in Del Norte and Humboldt Counties away from the immediate coast, on the flood plains and lower drainages of Redwood Creek and the Smith, Klamath, Mad, Van Duzen and Eel Rivers. Also on the Russian River in Sonoma Co. and scattered localities to the south.

SOURCES:

ELEMENT NAME: Upland Redwood Forest
ELEMENT CODE: 82320

DESCRIPTION:
Similar to Alluvial Redwood Forest (82310) but not quite so tall, with a greater diversity of tree species and a more shrubby understory. Growth is more likely to be limited by drought in summer and fall. Sequoia sempervirens, Lithocarpus densiflora, and a few other species respond to fire by crown-sprouting, often becoming multi-trunked as a result.

SITE FACTORS:
Similar to Alluvial Redwood Forest (82310); growing within reach of summer fogs, with inland and upper altitudinal ranges possibly limited by this factor. On shallow, well-drained soils, often on steep slopes subject to erosion; confined to north exposures and canyon bottoms near the interior and southern margins of the range. Often stunted and wind-pruned on the Monterey coast. Subject to infrequent devastating fires. Intergrades with Sitka Spruce-Grand Fir Forest (82100), Western Hemlock Forest (82200), or Alluvial Redwood Forest on moister or more coastal sites in the north, and with Douglas Fir Forest (82400), Mixed Evergreen Forest (81100) or Californian Mixed Chaparral (37110) toward the interior, at higher elevations, or on rockier, drier soils.

CHARACTERISTIC SPECIES:
Acer macrophyllum, Chrysolepis chrysophylla, Gaultheria shallon, Lithocarpus densiflorus, Polystichum munitum, Pseudotsuga Menziesii, Rhododendron macrophyllum, Rubus spp., Sequoia sempervirens, Torreya californica, Umbellularia californica, Vaccinium ovatum

DISTRIBUTION:
Abundant and nearly continuous in the outer Coast Ranges from extreme southwestern Oregon to Sonoma Co. Abundant in southern Marin Co. and from southern San Mateo Co. through Santa Cruz Co. In coastal canyons of Monerey Co. south of Monterey, nearly to the the San Luis Obispo Co. line. Extends inland about 35 miles near the headwaters of the Russian River, Mendocino Co. and 45 miles in southeastern Napa Co. Elevation from sea level to about 3000 ft. Usually absent from exposed coastal headlands and the entire region of Cape Mendocino, Humboldt Co.

SOURCES: 1, 225, 247, 257, 265, 271

ELEMENT NAME: * Coastal Douglas Fir-Western Hemlock Forest
ELEMENT CODE: 82410

DESCRIPTION:

A tall, dense, mixed needle-leaved evergreen forest dominated by Douglas Fir and Western Hemlock, with frequent Sitka Spruce and Western Yew. Dominance by Douglas Fir declines with age, but this may require centuries due to the species' extreme longevity.

SITE FACTORS:
Moderately deep, medium-acid soils in mild, humid climates. Precipitation ranges from 50 to 160 inches, with less than 10% falling in summer. Very little snow falls due to marine influence.

CHARACTERISTIC SPECIES:
Abies amabilis, A. grandis, Acer circinatum, A. macrophyllum, Alnus rubra, Arbutus Menziesii, Castanopsis chrysophylla, Picea sitchensis, Pinus monticola, Populus trichocarpa, Pseudotsuga Menziesii, Taxus brevifolia, Thuja plicata, Tsuga heterophylla

DISTRIBUTION:
Along the immediate coast of Humboldt and Del Norte Counties, usually below about 1000-1500 ft. More widely distributed west of the Cascade crest as far north as Vancouver Island and coastal British Columbia.

SOURCES: 11, 30

ELEMENT NAME: *Upland Douglas Fir Forest
ELEMENT CODE: 82420

DESCRIPTION:
A tall (60 m), mixed-age climax forest dominated (greater than 80%) by Douglas Fir. Most stands dominated by Douglas Fir are seral to Sitka Spruce-Grand Fir Forest (82100) or Western Hemlock Forest (82200). These typically are even-aged, dense (with canopy closure greater than ~70%).

SITE FACTORS:
Climax stands appear restricted to droughty but not xeric conditions as caused by rainshadows, overly-drained soils, or aspect. Sites typically occur on moderately deep, well-drained soils. Annual precipitation ranges from 23 to 120 inches.

CHARACTERISTIC SPECIES:
Gaultheria Shallon, Holodiscus discolor, Tsuga

DISTRIBUTION:
North Coast Ranges discontinously scattered from Mendocino Co. north to Oregon, thence more extensive west of the Cascade crest into British Columbia, up to, occasionally occurring as high as 6000 ft.

SOURCES: 1, 11, 31, 248, 271

ELEMENT NAME: *Beach Pine Forest
ELEMENT CODE: 83110

DESCRIPTION:
Moderately dense forest up to 20 m tall but often wind-pruned, stunted and hedge-like on seaward edge. Understory of shrubs and perennial herbs where canopy is not too dense. Cones usually remaining on trees after maturing. The growing season is nearly year-round with a maximum from late spring to early summer.

SITE FACTORS:
Commonly on stabilized shoreline dunes or rock outcrops. Small annual temperature range; subject to nearly constant onshore winds. Fog is frequent from June through October. Intergrades with Northern Coastal Scrub (32100) on rocky, exposed sites and with Sitka Spruce-Grand Fir Forest (82100) or Upland Redwood Forest (82320) on more protected sites with better soil.

CHARACTERISTIC SPECIES:
Arctostaphylos Uva-ursi, Garrya elliptica, Gaulteria Shallon, Myrica californica, Pinus contorta ssp. contorta (Critchfield, 1957), P. Muricata, Polystichum munitum, Vaccinium ovatum

DISTRIBUTION:
Abundant near the immediate coast from north of Fort Bragg to Point Arena, Mendocino Co. nd near Patrick's Point, Humboldt Co. Shore pine continues northward to Alaska; Bishop pine ocurs sporadically southward to Baja California.

SOURCES: 1, 6

ELEMENT NAME: *Northern Bishop Pine Forest
ELEMENT CODE: 83121

DESCRIPTION:
Forests up to 25 m tall, usually less toward the south. Relatively open on poorer sites but very dense, even-aged stands may follow fires. Typically dominated by pure stands of Pinus Muricata, with cones that remain closed on the trees for many years. The seeds are released in large quantities and germinate freely following fires. The understory of shrubs and perennial herbs is almost continuous in open stands on moist sites and nearly absent from dense stands or dry, rocky sites. The main growing and flowering season is spring, with some activity through the rest of the year.

SITE FACTORS:
Very similar to Beach Pine Forest (83110) but somewhat drier. Often on sterile, rocky soil. Often foggy during spring and early summer. Subject to periodic conflagration. Intergrades in northern California with Northern Coastal Scrub (32100) on rocky, exposed sites, with Upland Redwood Forest (82320) on protected sites and with Pygmy Cypress Forest (83160) on coastal terraces with podzol soils.

CHARACTERISTIC SPECIES:
Pinus Muricata, Pteridium aquilinum, Polystichum munitum, Rhamnus californica, Rubus spp., Toxicodendron diversilobum, Vaccinium ovatum

DISTRIBUTION:
Abundant near the coast from the vicinity of Fort Bragg, Mendocino Co. to northern Sonoma Co. On Inverness Ridge and Mt. Tamalpais, Marin Co. One small stand in the Del Monte Forest on the Monterey Peninsula.

SOURCES: 1, 11

ELEMENT NAME: *Southern Bishop Pine Forest
ELEMENT CODE: 83122

DESCRIPTION:
Very similar to Northern Bishop Pine Forest (83121 but shorter. This type includes stands dominated by Pinus remorata as well as P. Muricata.

SITE FACTORS:
Similar to Northern Bishop Pine Forest but perhaps experiencing more summer fogs. In San Luis Obispo and Santa Barbara Counties, it intergrades with Central Coastal Scrub (32200) or Upper Sonoran Mixed Chaparral (37110) on dry, rocky sites.

CHARACTERISTIC SPECIES:
Pinus Muricata, Pteridium aquilinum, Polystichum munitum, Rhamnus californica, Rubus ssp., Toxicodendron diversilobum, Vaccinium ovatum

DISTRIBUTION:
Common in the hills near Point Buchon, San Luis Obispo Co., especially in Hazard Canyon. Scattered through the Purisima Hills and Santa Ynez Mtns. or western Santa Barbara Co. and on Santa Cruz and Santa Rosa Islands.

SOURCES: 1, 11

ELEMENT NAME: *Monterey Pine Forest
ELEMENT CODE: 83130

DESCRIPTION:
Somewhat similar to Bishop Pine Forest (83120) but dominted by Pinus radiata. Canopies may reach 30 m and be 80% Monterey Pine. Quercus agrifolia usually is the next most abundant tree. Understories are variable in both composition and density.

SITE FACTORS:
Limited to well-drained, sandy soils within the limits of summer

marine fog incursion. Apparently less fire-prone than other coastal closed-cone conifer types (83000). Intergrades with Upland Redwood Forest (82320) or Knobcone Pine Forest (83210) (Año Nuevo); Monterey Cypress Forest (83150) and Bishop Pine Forest (83120) (Monterey); Upper Sonoran Mixed Chaparral (37110) (Monterey, Cambria); or Grassland (Año Nuevo, Monterey, Cambria).

CHARACTERISTIC SPECIES:
Agrostis diegoensis, Arctostaphylos tomentosa, Baccharis pilularis, Elymus glacus, Galium californicum, Heteromeles arbutifolia, Pinus radiata, Pteridium aquilinum, Quercus agricolia, Rhamnus californica, Rubus ursinus, Symphoricarpos mollis, Toxicodendron diversilobum, Vaccinium ovatuma

DISTRIBUTION:
Three natural stands occur in California, the largest in the vicinity of the Monterey Peninsula. The others are near Año Nuevo Point, San Mateo-Santa Cruz Counties and Cambria, San Luis Obispo City. Monterey Pine has been planted widely as an ornamental and commercial species.

SOURCES: 32

ELEMENT NAME: *Torrey Pine Forest
ELEMENT CODE: 83140

DESCRIPTION:
Open to moderately dense forest up to 20 m tall in sheltered localities, becoming much shorter and wind-pruned in exposed situations. Dominated by Pinus torreyana. The understory varies from almost nothing on the driest, rockiest sites to fairly dense chaparral on generally rocky soil to an open mixture of grasses and shrubs on better-developed soils. With a dense tree canopy, needles accumulate on the ground, and again, few understory plants occur. The first two conditions are more prevalent at Del Mar, the other two on Santa Rosa Island. Most growth and flowering occur in late winter and spring, with some activity in other months, at least in mesic sites.

SITE FACTORS:
Occurs on rocky sandstone soil in areas of mild, essentially frost-free climate, with low precipitation. Fogs may occur at any time of year but are less common in winter and late spring. Intergrades with Southern Coastal Bluff Scrub (31200) and Southern Mixed Chaparral (37120) (Del Mar); with Island Chaparral (37700) and Valley and Foothill Grasslands (42000) (Santa Rosa Island).

CHARACTERISTIC SPECIES:
Adenostoma fasciculatum, Arctostaphylos glandulosa crassifolia, Artemisia californica, Baccharis viminea, Cneoridium dumosum, Coreopsis gigantea, C. maritima, Dendromecon rigida, Encelia californica, Haplopappus squarrosus, Heteromeles arbutifolia, Pinus

torreyana, Quercus dumosa, Rhus integrifolia, R. laurina, Salvia apiana, S. mellifera, Xylococcus bicolor

DISTRIBUTION:
There are two small natural stands: the larger on the coast of San Diego County in the vicinity of Del Mar and Torrey Pines State Reserve; the smaller on the northeastern side of Santa Rosa Island.

SOURCES: 1, 32

ELEMENT NAME: *Monterey Cypress Forest
ELEMENT CODE: 83150

DESCRIPTION:
A moderately dense forest up to 20 m tall in sheltered localities, becoming much shorter and severely wind-pruned in exposed situations. Typically a pure stand of Cupressus macrocarpa with an understory of scattered dwarf shrubs and perennial herbs.

SITE FACTORS:
Confined to rocky, granitic soils of coastal headlands and bluffs. Subject to nearly constant onshore winds. Temperatures are cool all year, with little fluctuatiion. Fog or low clouds are very common in all seasons but winter. Intergrades with Northern Coastal Bluff Scrub (3.11) on exposed seaward edges and with Monterey Pine Forest (8.313) away from the ocean.

CHARACTERISTIC SPECIES:
Artemisia californica, Baccharis pilularis, Ceanothus thrysiflorus, Cupressus macrocarpa, Dudleya farinosa, Erigeron glaucus, Eriophyllum staechidifolium, Iris Douglasiana, Ramalina reticulata

DISTRIBUTION:
There are two small natural stands: one between Point Cypress and Pescadero Point on the north side of Carmel Bay, Monterey Peninsula and a smaller one near Point Lobos on the south side of Carmel Bay. Widely planted and naturalized along the coast of California.
SOURCES: 1, 32

ELEMENT NAME: *Mendocino Pygmy Cypress Forest
ELEMENT CODE: 83161

DESCRIPTION:
A low, gnarled, stunted "forest" to 3 m tall (much taller on better soil), often quite scattered. Dry sites tend to have a dense, shrubby understory, mesic sites are more herbaceous. Most growth and flowering occurs in spring and early summer.

SITE FACTORS:
Confined to poorly drained, acidic podzols (Blacklock series),low in

nutrients and flooded during winter. Intergrades with Upland Redwood Forest (82320) and Sitka Spruce-Grand Fir Forest (82100) on better sites, often with Bishop Pine Forest (83121) on these ecotones.

CHARACTERISTIC SPECIES:
Arctostaphylos columbiana, A. nummularia, Cupressus pygmaea, Gaultheria Shallon, Ledum glandulosum ssp. columbianum, Pinus contorta ssp. bolanderi, Pinus muricata, Rhodendron macrophyllum, Vaccinium ovatum, Xerophyllum tenax

DISTRIBUTION:
On coastal terraces, primarily between Fort Bragg and Albion on the Mendocino coast, but with scattered stands south to the central Sonoma County coast.

SOURCES: 1, 11, 32

ELEMENT NAME: *Monterey Pygmy Cypress Forest
ELEMENT CODE: 83162

DESCRIPTION:
A fairly low, often scattered forest, very similar in aspect to Mendocino Pygmy Cypress Forest (83161), with which it shares many closely related species. Growth and flowering are concentrated in spring and early summer.

SITE FACTORS:
Partially podzolized marine terraces with sterile, acidic, poorly drained soils. Intergrades on deeper surrounding soils with Monterey Pine Forest (83130).

CHARACTERISTIC SPECIES:
Arctostaphylos hookeri, Cupressus goveniana, Pinus muricata, Rhododendron macrophyllum, Vaccinium ovatum, Xerophyllum tenax

DISTRIBUTION:
Restricted to two populations on the Monterey Peninsula--Cypress Point and Gibson Creek.

SOURCES: 1, 11, 32

ELEMENT NAME: *Knobcone Pine Forest
ELEMENT CODE: 83210

DESCRIPTION:
A fire-maintained, variable forest dominated by Pinus attenuata that may reach 25-30 m, though usually closer to 15 m tall. Stands usually are even-aged except on relatively "fire-proof", rocky sites. Understories usually are sparse scatters of chaparral shrubs whose composition varies greatly over the type's range.

SITE FACTORS:
Shallow, dry, stoney sites, often on serpentine or other magnesium-rich ultramafics that limit effective conifer competition. Adapted to frequent fires by means of very early and abundant production of seeds, which are retained in the closed cones until released by the heat of a fire. Similar to Bishop Pine Forest (83121), but in more interior, hotter and drier localities, where growth is probably more limited by drought in summer. Often associated with Serpentine Chaparral (37600), Chamise Chaparral (37200) or Californian Mixed Chaparral (37110). On better-developed or nonserpentine soils, may intergrade with Broadleaved Evergreen Forest (81000), North Coast Coniferous Forest (82000) or Lower Montane Coniferous Forest (84000).

CHARACTERISTIC SPECIES:
Adenostoma fasciculatum, Amelanchier alnifolia, Arctostaphylos glandulosa, Ceanothus cordulatus, C. velutinus, Cupressus abramsiana, Dendromecon rigida, Holodiscus discolor, Pinus attenuata, P. Coulteri, P. radiata, Quercus Sadleriana, Q. vaccinifolia, Q. Wislizenii

DISTRIBUTION:
Abundant in the Siskiyou, Klamath and North Coast Ranges away from the immediate coast, from southwesern Oregon to southern Sonoma and Napa Counties. On Mt. Diablo, Contra Costa Co. Abundant in the Santa Cruz Mtns. in Santa Cruz and Santa Clara Counties. In the Santa Lucia Mtns. of Monterey Co. and near San Luis Obispo. Eastward from the Klamath Mtns. across the southern Cascade Range to Modoc Co. On the west slope of the Sierra Nevada from Sierra to El Dorado Counties and Mariposa Co. Also in the San Bernardino Mtns. and Santa Ana Mtns. in southern California, and near Ensenada, Baja California. Elevation usually between 1000 and 5000 ft (300 and 1500 m), occasionally to 6000 ft (1800 m).

SOURCES: 1, 32, 33

ELEMENT NAME: *Northern Interior Cypress Forest
ELEMENT CODE: 83220

DESCRIPTION:
An open, fire-maintained scrubby "forest" similar to Knobcone Pine Forest (83210) but dominated by one of several Cupressus species. These stands may be as much as 15 m tall, but usually are lower.

SITE FACTORS:
On dry, rocky, sterile, often ultramafic soils, frequently associated with Serpentine Chaparral (37600). Intergrades on less severe sites with Upper Sonoran Mixed Chaparral (37100), Montane Chaparral (37500), or Knobcone Pine Forest (83210); and on more mesic site with Mixed Evergreen Forest (81100) or Montane Coniferous Forest (84000, 85000).

CHARACTERISTIC SPECIES:
Cupressus Abramsiana (Santa Cruz Mountains, on sandstone), C. Bakeri (Cascade and northern Sierra Nevada, on serpentine or aerated basic sites), C. Macnabiana (North Coast Ranges and northern Sierra Nevada, on serpentine), C. Sargentii (North and South Coast Ranges, on serpentine), Pinus attenuata, Quercus durata

DISTRIBUTION:
Scattered through the Siskiyou Mountains, North and South Coast Ranges, Cascades and northern Sierra Nevada. Combining the four species into a single element is open to question, but does reflect a common pattern of occurring on serpentine or other sterile substrate and moisture status intermediate between mesic Coastal Closed Cone Conifer Forests (83100) and xeric Southern Interior Cypress Forests (83300).

SOURCES: 1, 11, 32

ELEMENT NAME: *Southern Interior Cypress Forest
ELEMENT CODE: 83330

DESCRIPTION:
A fairly dense, fire-maintained, low forest dominated by either Cupressus nevadensis, C. forbesii, or C. Stephensonii. This forest often occurs as isolated groves within a matrix of Chaparral or Piñon-Juniper Woodland. Many stands are even-aged due to fire density, and spacing within the stands vary in relation to site factors and fire history.

SITE FACTORS:
Similar to but in a drier climate than Northern Interior Cypress Forests (83220), but not usually associated with ultramafic substrates. Most often found on northern exposures.

CHARACTERISTIC SPECIES:
Adenostoma faciculatum, Arctostaphylos glandulosa, Cercocarpus betuloides, Cupressus Forbesii C. nevadensis, C. Stephensonii, Eriogonum faciculatum, Heteromeles arbutifolia, Juniperus californica, Pinus Coulteri, P. monophylla

DISTRIBUTION:
Southern Sierra Nevada (Kern River watershed, C. nevadensis) and Peninsular Ranges south into Baja California. Elevations vary with species: 1000-4500 ft for C. Forbesii, ~5500 ft for C. Stephensonii, and 4000-6000 ft for C. nevadensis.

SOURCES: 1, 11, 32, 34

ELEMENT NAME: Coast Range Mixed Coniferous Forest

ELEMENT CODE: 84110

DESCRIPTION:
An essentially closed forest to 150-200 ft tall, dominated by Pinus ponderosa and Pseudotsuga Menziesii, in varying proportions, together with Pinus Lambertiana, Calocedrus decurrens, and several broadleaved trees. There is very little Abies concolor. Stands usually are uneven aged, with upper canopies dominated by Pinus ponderosa. Understories usually are sparse. Most growth occurs in late spring and early summer.

SITE FACTORS:
Primarilly found on mesic sites (north and east aspects, cañons, etc.) in California, usually on well-drained, course but relatively moist soils, sometimes occurring on serpentine. Transitional between Mixed Evergreen Forest (81100) and Sierran Mixed Conifer Forest (84230), usually at higher elevations with a more severe climate than the former and at lower elevations with a milder climate than the latter. May also intergrade with Douglas Fir Forest (82400), Knobcone Pine Forest (83210), Santa Lucia Fir Forest (84120), Coulter Pine Forest (84140) or Coast Range Ponderosa Pine Forest (84130).

CHARACTERISTIC SPECIES:
Acer macrophyllum, Arbutus Menziesii, Calocedrus decurrens, Cornus nuttallii, Corylus cornuta californica, Lithocarpus densiflorus, Pinus Coulteri (Monterey Co.), P. Lambertiana, P. ponderosa, Pseudotsuga Menziesii (N. Coast Ranges), Quercus chrysolepis, Q. Kelloggii, Rosa Woodsii, Trientalis latifolia, Viola lobata

DISTRIBUTION:
Klamath and North Coast Ranges from southwestern Oregon to Sonoma and Napa counties, thence scattered southward on summits of the Santa Lucia Mountains in Monterey County. Elevations from 2000-4000 ft in the north, 3500-6000 ft in the south.

SOURCES: 1

ELEMENT NAME: *Santa Lucia Fir Forest
ELEMENT CODE: 84120

DESCRIPTION: Scattered individuals or clumps of trees occur on typical rocky sites; continuous forest, to 50 m tall, occurs only on sites with better-developed soil. Abies bracteata often dominates the rockiest sites; the largest individuals of this species occur on better soils along with other conifers and broadleaved evergreens, Where continuous, the forest is dense, with little understory. The growing season is probably very similar to that in the Coast Range Mixed Conifer Forest (84110).

SITE FACTORS:
Typically on steep, rocky slopes with little soil developement. Apparently not adapted to fire and usually in areas not susceptible

to burning. Similar in many respects and often intergrading with Mixed Evergreen Forest (81100), near the upper altitudinal limit of the latter. May also intermix with Coast Range Mixed Conifer Forest 84110) on better-developed soils at higher elevations. Abies bracteata is very sensitive to fire and appears to be restricted to relatively "fire-proof" sites.

CHARACTERISTIC SPECIES:
Abies bracteata, Pinus Coulteri, P. Lambertiana, P. ponderosa, Lithocarpus densiflorus, Quercus chrysolepis

DISTRIBUTION:
Rocky slopes and canyons of the Santa Lucia Mtns. in Monterey and northern San Luis Obispo Counties. Most common near the crest of the mountains and toward the north. Elevation from 2000-5000 ft (605-1520 m).

SOURCES: 1, 36

ELEMENT NAME: Upland Coast Range Ponderosa Pine Forest
ELEMENT CODE: 84131

DESCRIPTION:
These open, tall, park-like forests dominated by Pinus ponderosa may reach 200 feet. Other conifers or hardwoods may be present in small amounts. Frequent ground files fueled by abundant litter accumulations keep the understory fairly open in this climax type.

SITE FACTORS:
Typically on well-drained, relatively dry soils of slopes and ridges. Best developed on gently sloping ridges and uplands. Very similar to Sierran "Westside" Ponderosa Pine Forest (84210) but probably moister and with milder temperatures. Doubtfully distinct from and intergrading with this forest in higher, drier localities of the Klamath Mtns. and North Coast Ranges. Also intergrades with Mixed Evergreen Forest (81100) or Douglas Fir Forest (82400) in low-elevation, moist sites, with Oak Woodlands (71000) in low-elevation, dry sites and with Coast Range Mixed Conifer Forest (84110) in high-elevation, moist sites.

CHARACTERISTIC SPECIES:
Arbutus Menziesii, Pinus Coulteri (South Coast Ranges), Pinus ponderosa, Quercus chrysolepis, Q. Kelloggii, Rhamnus californica, Toxicodendron diversilobum

DISTRIBUTION:
Klamath Mountains and inner North Coast Ranges south to northwestern Napa Co. Hamilton Range, Santa Clara Co. Common on the higher ridges of the Santa Lucia Mtns. in Monterey and northernmost San Luis Obispo Co. Elevation from 1500 to 3500 ft (460-1360 m) in the north and from 2500 to 4500 ft (760-1520 m) in the south.

SOURCES: 1, 37

ELEMENT NAME: *Maritime Coast Range Ponderosa Pine Forest
ELEMENT CODE: 84132

DESCRIPTION:
This is an open, park-like forest of scattered Pinus ponderosa occurring as either an open savanna of widely spaced P. ponderosa or a denser stand of P. ponderosa together with Quercus agrifolia and (sometimes) Pinus attenuata. Understory in the savanna phase consists of introduced grasses and native forbs, while the dense phase understory consists of (sometimes impenetrable) shrubs. Several localized species are restricted to this forest.

SITE FACTORS:
Restricted to sterile marine sand deposits within the summer. Coastal fog incursion zone. Fire is implicated in maintaining the open quality of the understory. Intergrades on finer-textured, more consolidated soils with Maritime Chaparral (37C00) and with Mixed Evergreen Forest (81100) or Redwood Forest (82300) on more mesic sites.

CHARACTERISTIC SPECIES:
Adenostoma fasciculatum, Arctostaphylos silicola, Armeria maritima, Erysimum teretifolium, Haplopappus ericoides, Lupinus albifrons, Pinus attenuata, P. ponderosa, Pieridium aquilinum, Quercus agrifolia, Vulpia megalura

DISTRIBUTION:
Narrowly restricted to Santa Margarita Formation exposures in coastal Santa Cruz County (Scotts Valley-Ben Lomond and Bonny Doon areas).

SOURCES: 38, 39

ELEMENT NAME: Coulter Pine Forest
ELEMENT CODE: 84140

DESCRIPTION:
An open forest (or more accurately, woodland) of scattered Pinus Coultieri and Quercus Kelloggii over shrubs typically associated with Upper Sonoran Mixed Chaparral (37100). Some stands are dense enough to supress the shrubby layer. Most growth occurs in spring and early summer.

SITE FACTORS:
Typically on dry, rocky soils of slopes and ridges, Most frequent on south-facing slopes, frequently intermixing there with Californian Mixed Chaparral (371100) or Lower Montane Chaparral (37510). Subject to fairly frequent fires on these sites. In the Coast Ranges intergrades with Coast Range Mixed Conifer Forest (84110), Coast

Range Ponderosa Pine Forest (84130), or Mixed Evergreen Forest (81100) on moist sites; Blue Oak Woodland on low-elevation, dry sites; Knobcone Pine Forest (83210) on dry, sterile soils. In southern California, frequently merges into Sierran Mixed Conifer Forest (84230) at its upper limits. Fire exclusion may be facilitating conversion of some oak woodlands to Coulter pine stands, as in the Gabilan Range.

CHARACTERISTIC SPECIES:
Abies bracteata, Arctostaphylos glandulosa, A. Pringlei ssp. drupacea, A. pungens, Ceanothus integerrimus, Cercocarpus betuloides, Pinus Coulteri, P. ponderosa, P. Sabiniana, Pseudotsuga macrocarpa, Quercus agrifolia, Q. chrysolepis, Q. Kelloggii

DISTRIBUTION:
Widely scattered, though fragmented, throughout the South Coast Ranges from Contra Costa County south into Baja California. Elevations vary from 2500-5000 ft in the north, to 4000-6500 ft in the south. Best developed in San Gabriel, San Bernardino, and San Jacinto mountains.

SOURCES: 1, 27, 36, 40 .

ELEMENT NAME: Bigcone Spruce-Cañon Oak Forest
ELEMENT CODE: 84150

DESCRIPTION:
An open (on steep slopes) to dense (on flats) forest dominated by Pseudotsuga macrocarpa 50-80 ft tall over a dense subcanopy of Quercus chrysolepis and a very sparce herb layer. Most stands are fairly small within a chaparral matrix.

SITE FACTORS:
Largely on rocky sites with little soil development. Restricted to mesic exposures and cañon sides at low elevations (~1000 ft), but on warmer aspects at upper altitudinal limit (~8000 ft). Fires appear to be frequent, though perhaps less intense than in surrounding chaparrals. Mature Pseudotsuga is capable of trunk-sprouting after fire. Intergrades in cañon bottoms Southern Riparian Forest (62130), with Upper Sonoran Mixed Chaparral (37100) on more xeric sites, and with Coulter Pine Forest (84140) or Sierran Mixed Conifer Forest (84200) at higher elevations.

CHARACTERISTIC SPECIES:
Acer macrophyllum, Calocedrus decurrens, Cercocarpus betuloides, Pseudotsuga macrocarpa, Quercus agrifolia, Q. chrysolepis, Ribes californicum, Toxicodendron diversilobum, Umbellularia californica, Vitis girdiana

DISTRIBUTION:
Transverse and Peninsular Ranges from the Mt. Pinos region south to near Banner in San Diego County, mostly on coastal (rather than

desert-facing) slopes.

SOURCES: 1, 6, 11, 36

ELEMENT NAME: Westside Ponderosa Pine Forest
ELEMENT CODE: 84210

DESCRIPTION:
An open, park-like forest of coniferous evergreens to 70 m tall, dominated by Pinus ponderosa. The understory typically is sparse, consisting of scattered chaparral shrubs and young trees. There is often considerable accumulation of needle litter and pine cones on the ground. Growth occurs mostly from late spring to midsummer and is probably limited by summer and fall drought. Cones mature in the early autumn. All plants are essentially dormant in winter.

SITE FACTORS:
Well-developed in areas with warm, dry summers and cool, moist winters with considerable snow accumulation at the higher elevations. Often on south-facing slopes, except near lower elevationl margins. Usually on coarse, well-drained soils; often granitic or basaltic, very rarely serpentine. Probably maintained by occasional ground fires. Crown fires may result in temporary replacement of the forest by dense Montane Chaparral (37500). At its lower limits, intergrades with Coast Range Ponderosa Pine Forest (84130) in the North Coast Ranges, with Blue Oak Woodland (71210) on nonrocky soils in the interior North Coast Ranges and Cascade-Sierra foothills, with Coulter Pine Forest (84140) in southern California, with Knobcone Pine Forest (83210) on rocky, often serpentine soils; with Lower Montane Chaparral (37510) on dry, rocky soils in the Cascades and northern Sierra Nevada; with Californian Mixed Chaparral (37110) in the southern Sierra and extensively in southern California. Within its elevational range, intergrades with Montane Chaparral (37500) or Coulter Pine Forest (84140) on dry, rocky sites and with Sierran Mixed Conifer Forest (84230) on moist sites. At its upper limits, intergrades with Sierran Mixed Conifer Forest (84230) on moist slopes and with Jeffrey Pine Forest (85100) on dry slopes.

CHARACTERISTIC SPECIES:
Abies concolor, Arctostaphylos patula, Calocedrus decurrens, Ceanothus integerrimus, C. cordulatus, Chamaebatia foliolosa, Lithocarpus densiflorus, Pinus attenuata, P. Coulteri, P. Lambertiana, P. ponderosa, Quercus chrysolepis, Q. Kelloggii, Rhamnus californica

DISTRIBUTION:
Higher elevations of the interior North Coast Ranges and Siskiyou Mtns. from Lake Co. to Siskiyou Co. and northward into Oregon. Abundant on the west side of the Cascade Range and Sierra Nevada from the Siskiyou Mtns. to northern Kern Co. Also on the coastal sides of the eastern San Gabriel Mtns, Los Angeles-San Bernardino Cos.; the San Bernardino Mtns., San Bernardino Co.; and the San Jacinto Mtns.,

Riverside Co. Sparingly present in the San Rafael-San Emigdio Mtns., Santa Barbara-Ventura Cos.; Tehachapi Mtns., Kern Co.; Palomar and Cuyamaca Ranges, San Diego Co. Elevation from 2000-5000 ft (900-1500 m) in the north to 4500-6500 ft (1300-2000 m) in the south. The lowest-occuring montane forest type over most of its range.

SOURCES: 1, 37

ELEMENT NAME: *Eastside Ponderosa Pine Forest
ELEMENT CODE: 84220

DESCRIPTION:
Very similar to "Westside" Ponderosa Pine Forest (84210), but not quite so tall. Understory often of Great Basin Sagebrush (33110) rather than Montane Chaparral (37500), especially in forest openings on dry sites. Pinus ponderosa on the east side of the Sierra-Cascade crest is characterized by shorter, thicker needles; smaller, denser cones and greater cold tolerance than that on the west side. The growth period is probably shorter than in "Westside" Ponderosa Pine Forest because of the longer, colder winter.

SITE FACTORS:
Similar to "Westside" Ponderosa Pine Forest (84210) but drier; much colder in winter. Usually on coarse, well-drained basaltic soils. At its lower limits, intergrades with Great Basin Sagebrush (33110), Great Basin Grassland (43000) or Northern Juniper Woodland (72110), often on finer-textured, more poorly drained soils. Intermixed with Sierran Mixed Conifer Forest (84230) on moist sites and with Jeffrey Pine Forest (85100) or Washoe Pine-Fir Forest (85220) (represented mostly as hybrids with P. ponderosa) in areas of cold air drainage. At its upper limits, intergrades with Sierran Mixed Conifer Forest (84230) on moist sites (often north-facing slopes) and Jeffrey Pine Forest (85100) on dry sites.

CHARACTERISTIC SPECIES:
Abies concolor, Arctostaphylos patula, Artemesia tridentata, Calocedrus decurrens, Ceanothus sp., Cercocarpus betuloides, C. ledifolius, Juniperus occidentalis, Pinus Jeffreyii, P. ponderosa, Purshia tridentata

DISTRIBUTION:
East side of the Cascade Range, the northern Sierra Nevada and the plateaus to the east, from Siskiyou and Modoc Cos. to Nevada Co. Intergrades with "Westside" Ponderosa Pine Forest (84210) west of the Sierran crest in eastern Plumas Co. and Sierra Co. Abundant east of the Cascades in Oregon. Elevation from 4000-6000 ft (1200-1800 m).

SOURCES: 1, 41, 42

ELEMENT NAME: Sierran Mixed Conifer Forest

ELEMENT CODE: 84230

DESCRIPTION:
Similar to "Westside" Ponderosa Pine Forest (84210), but denser, with the crowns often touching, often slightly taller (to 75 m) and with several dominant species. Abies, Pseudotsuga and Cornus are more common on moist sites; Pinus spp. and Ceanothus spp. on dry sites. Pseudotsuga is lacking south of northern Fresno Co. Understory much as in "Westside" Ponderosa Pine Forest but with scattered, broadleaved mesophytic shrubs and small tress, and with greater accumulation of wood on the ground. The growing period is similar to that in "Westside" Ponderosa Pine Forest, concentrated in early summer.

SITE FACTORS:
Similar to "Westside" Ponderosa Pine Forest (84210), but usually on moister soils. Usually on north-facing slopes near its lower elevational margin. In areas of greater winter snowpack than "Westside Ponderosa Pine Forest, "Eastside" Ponderosa Pine Forest (84220), Lower Montane Chaparral (37500) or Upper Montane Chaparral (37520). Intergrades with Sierran White Fir Forest (84240) on cool, moist, north-facing slopes within its elevational range. At its upper limit, intergrades with Upper Montane Mixed Conifer Forest (85200) on direr slopes or with Upper Montane Fir Forest (85300) on moist, north-facing slopes.

CHARACTERISTIC SPECIES:
Abies concolor, Artostaphylos patula, Calocedrus decurrens, Castanopsis sempervirens, Ceanothus cordulatus, C. integerrimus, C. prostratus, Cornus nuttallii, Pinus Jeffreyi, P. Lambertiana, P. ponderosa, Prunus emarginata, Pseudotsuga Menziesii, Quercus Kelloggii, Ribes Roezlii, R. nevadensis, Ribes spp., Sequoiadendron gigantea

DISTRIBUTION:
Very similar to "Westside" Ponderosa Pine Forest (84210), but ranging, in addition, to the east side of the Sierra Nevada-Cascade crest on moist slopes from southeastern Siskiyou Co. to the Lake Tahoe region. Elevation from 3000-6000 ft (900-1800 m) in the north to 5000-7000 ft (1500-2100 m) in the south, averaging slightly higher than "Westside" Ponderosa Pine Forest. Also present on the summit plateau of the Sierra San Pedro Martir, Baja, California between 7000 and 8000 ft (2100-2400 m).

SOURCES: 1, 42, 43

ELEMENT NAME: Sierran White Fir
ELEMENT CODE: 84240

DESCRIPTION:
Similar to Sierran Mixed Conifer Forest (84230) but denser, with the narrow crowns often overlapping and casting a deep shade. Typically

consists of nearly pure stands of Abies concolor, which grows to about 70 m tall. The understory is very sparse, with occasional seedlings of A. concolor, and with an abundance of downed branches and needle litter. The growing season is slightly later than in the "Westside" Ponderosa Pine Forest (84210) or Sierran Mixed Conifer Forest (84230), concentrated in early and midsummer.

SITE FACTORS:
Very similar to Sierran Mixed Conifer Forest (84230), but usually on somewhat cooler, moister sites; typically on north-facing slopes. Probably the coolest, moistest nonriparian habitat within the Sierran Lower Montane Conifer Forest. Apparently persists without fires, and may expand at the expense of Sierran Mixed Conifer Forest in the absence of fire. Intergrades with and often surrounded by Sierran Mixed Conifer Forest on drier soils. At its upper limits, often intergrades broadly with Red Fir Forest (85310). Vast acreages of Sierran White Fir Forest on lands logged, burned, or mined for gold in the last century.

CHARACTERISTIC SPECIES:
Abies concolor, Calocedrus decurrens, Chrysolepis sempervirens, Rubes spp. Sarcodes sanguinea. Mature stands typically have little undergrowth. This usually is restricted to canopy openings that harbor Ribes Roezlii, R. viscoissimum, Symphoricarpos oreophilus, Arctostaphylos nevadensis, A. patula, Ceanothus cordulatus, C. velutinus, Calamagrostis rubescens.

DISTRIBUTION:
Similar to Sierran Mixed Conifer Forest (84320) but mostly absent east of the Sierra-Cascade crest and from southern California. Replaced in the latter locality by Sierran Mixed Conifer Forest or by Southern California White Fir Forest (85320). Elevation about 4000-6000 ft (1200-1800 m) in Tulare and Kern Counties, averaging slightly higher in elevation than Sierran Mixed Conifer Forest.

SOURCES: 1, 42, 44

ELEMENT NAME: ⋆Big Tree Forest
ELEMENT CODE: 84250

DESCRIPTION:
Very similar to Sierran Mixed Conifer Forest (84230), but lacking its more xeric species and with the conspicuous addition of Sequoiadedron giganteum, which grows to about 100 m tall and 12 m D.B.H. Sequoiadendron usually occurs in discrete groves, usually intermixed with Sierran Mixed Conifer Forest; very isolated individual trees of this species rarely occur. Growth may be less limited by summer drought than in the other Sierran Lower Montane Forests because of the availability of ground water.

SITE FACTORS:
Very similar to the moister portion of Sierran Mixed Conifer Forest

(84230), and scarcely distinct from it. Associated with abundant ground water (Rundel 1969); often near springs, but rarely associated with major streams. Probably dependent on periodic fires for establishment of Sequoiadendron seedlings. May eventually be replaced by Sierran Mixed Conifer Forest or Sierran White Fir Forest (84240) in absence of fire. Mature trees of Sequoiadendron often survive repeated fires. This species does not crown sprout, but its thick, fibrous, tannin-filled bark resists burning. Individuals of this species may live for over 3000 years.

CHARACTERISTIC SPECIES:
Abies concolor, Calocedrus decurrens, Pinus lambertiana, P. ponderosa, Pseudotsuga Menziezii, Sequoiadendron giganteum

DISTRIBUTION:
West side of the Sierra Nevada, in isolated groves mostly surrounded by Sierran Mixed Conifer Forest (84230). Eight very isolated groves occur along a 150-mile stretch of the central Sierra Nevada, from Placer Co. to Fresno Co. Most of the groves occur in a 70-mile portion of the southern Sierra Nevada, from Converse Basin in southern Fresno Co. to Deer Creek in southern Tulare Co. The largest groves are near Giant Forest and Grant Grove in Sequoia-Kings Canyon National Park. Elevation ranges from 2700 ft to 8800 ft (800 to 2700 m), but usually between 5000 and 7000 ft. (1500 and 2100 m).

SOURCES: 1, 42

ELEMENT NAME: Jeffrey Pine Forest
ELEMENT CODE: 85100

DESCRIPTION:
A tall, open forest dominated by Pinus Jeffreyi, with sparse understories of species drawn from Montane Chaparral (37500) or Sagescrub Scrub (35200). Very similar in aspect to Ponderosa Pine Forest (84210, 84220). Pure stands are best developed on desert-facing slopes.

SITE FACTORS:
Dry, cold sites, especially on well-drained slopes, ridges, or cold air accumulation basins. West of the Sierran crest, it intergrades at its lower elevational limit (5000-6500 ft) with Montane Chaparral (37500), Coulter Pine Forest (84140) or Westside Ponderosa Pine Forest (84210). East of the crest it passes to Piñon-Juniper Woodlands (72000), Great Basin Scrub (35000) or Eastside Ponderosa Pine Forest (84220). Passes in more mesic sites or higher elevations (7000-9000 ft) into Upper Montane Mixed Conifer Forest (85200) or Subalpine Forest (86000).

CHARACTERISTIC SPECIES:
Artemisia tridentata, Chrysolepsis sempervirens, Pinus Jeffreyi, Purshia tridentata, Quercus vaccinifolia, Symphoricarpus Parishii, Ceanothus prostratus, C. velutinus, C. cordulatus, Arctostaphylos

patula, Cercocarpus ledifolius, Arctostaphylos nevadensis

DISTRIBUTION:
Similar to Sierran Mixed Conifer Forest (84230) but typically at higher elevation and more extensive toward the south and east. Scattered through the higher North Coast Ranges and Klamath Mtns. Abundant from Shasta and Lassen Cos. southward through the Sierra Nevada to Kern Co. Best developed on the east side of the central Sierra Nevada, especially south of Mono Lake. Relatively abundant in the higher portions of the Transverse and Peninsular Ranges of southern California and Baja California, including the Mt. Pinos region, the eastern San Gabriel Mtns., San Bernardino Mtns., San Jacinto Mtns., Cuyamaca-Laguna Mtns., and the Sierra San Pedro Martir. Elevation usually 5500-7500 ft (1650-2700 m) in the north and 6500-9000 ft (2000-2700 m) in the south. Stands at lower elevations probably are on ultramafic substrates.

SOURCES: 1, 11, 45

ELEMENT NAME: Jeffrey Pine-Fir Forest
ELEMENT CODE: 85210

DESCRIPTION:
Very similar to Sierran Mixed Conifer Forest (84230), but not quite so tall (to 60 m). The understory is open, primarily of scattered Montane Chaparral (37500) and small trees, lacking the mesophytic components of the Sierran Mixed Conifer Forest. Growth is most active in early and midsummer, about the same as in Jeffrey Pine Forest (85100) and a little later than in Sierran Mixed Conifer Forest.

SITE FACTORS:
Similar to and probably the high-elevation equivalent of Sierran Mixed Conifer Forest (84230). Similar to Jeffrey Pine Forest (85100) but moister. On well-drained slopes, usually avoiding the driest and moistest sites. Typically occurs above Sierran Mixed Conifer Forest and intergrades broadly with Jeffrey Pine Forest on dry slopes and ridges, with Upper Montane Fir Forest (85300) on moist, north-facing slopes and with Lodgepole Pine Forest (86100) in cold, wet sites and stream valleys. Replaced at its upper limit by Subalpine Coniferous Forest (86000), usually Lodgepole Pine Forest.

CHARACTERISTIC SPECIES:
Abies concolor (mostly in southern California), A. magnifica (lacking in southern California), Ceanothus cordulatus, Chrysolepis sempervirens, Pinus Jeffreyi, P. monticola (lacking in southern California), P. Murrayana, Quercus vaccinifolia

DISTRIBUTION:
Abundant from Mt. Lassen southward along the west side of the Sierra Nevada to Tulare Co. More scattered on the east side of the Sierra Nevada from Lake Tahoe to the Mt. Whitney region and in the higher

portions of the North Coast Ranges and Klamath Mtns. Occurs with fewer trees species in the southern Sierra Nevada in Kern Co., and the higher portions of the Tehachapi Mtns., the Mt. Pinos region, the eastern San Gabriel Mtns., San Bernardino Mtns. and San Jacinto Mtns. Elevation usually 6000-8000 ft (1800-2420 m) in the north and 7000-9000 ft (2100-2700 m) in the south.

SOURCES: 1

ELEMENT NAME: *Washoe Pine-Fir Forest
ELEMENT CODE: 85220

DESCRIPTION:
Very similar to Jeffrey Pine-Fir Forest (85210) but with Pinus Jeffreyi replaced entirely or partly by P. washoensis. Understory shrubs include more Great Basin components than in Jeffrey Pine-Fir Forest. Pinus washoensis hybridizes freely with P. ponderosa (often to the near exclusion of "pure" P. washoensis) in areas of overlap with "Eastside" Ponderosa Pine Forest (84220).

SITE FACTORS:
Very similar to Jeffrey Pine-Fir Forest (85210), but possibly somewhat colder in winter. May occur above Jeffrey Pine-Fir Forest, Jeffrey Pine Forest (85100) or "Eastside" Ponderosa Pine Forest (84220). Intergrades broadly with the latter two in the high valleys of Lassen and eastern Plumas, Sierra and Nevada Cos., between 5500 and 6500 ft (1680 and 1970 m) (Haller 1961). Can occur below Red Fir Forest (85310) (Mt. Rose, Nevada) or Subalpine Coniferous Forests (86000) (Warner Mtns.).

CHARACTERISTIC SPECIES:
Abies concolor, A. magnifica (only on Mt. Rose, Nevada), Artemisia tridentata, Ceanothus velutinus, Pinus Jeffreyi (only on Mt. Rose, Nevada), P. Murrayana, P. washoensis

DISTRIBUTION:
Well-established in two small areas in California and one in Nevada: near the crest of the southern Warner Mtns. in southern Modoc Co. and northernmost Lassen Co.; near the summit of Babbit Peak, Sierra Co.; and on the eastern slopes of Mt. Rose and Slide Mtn., about 7 miles northeast of Lake Tahoe, Washoe Co., Nevada. Elevation 7000-8500 ft (2100-2850 m) but as low as 5500 ft (168 m) in areas of intergradation.

SOURCES: 1

ELEMENT NAME: Red Fir Forest
ELEMENT CODE: 85310

DESCRIPTION:

Very similar to Sierran White Fir Forest (84240) but still denser, with the narrow crowns often overlapping and casting a deep shade. Typically consists of essentially pure stands of Abies magnifica, which grow to about 60 m tall. Abies magnifica grades into the closely realted A. procera in the northwestern Klamath Ranges. The latter forms similar forests which have not been distinguished here from those of A. magnifica. The understory is very nearly absent, but needle litter and downed branches are abundant. The growing season is a little later than in Sierran White Fir Forest, concentrated in midsummer. Growth is probably limited by low temperature most of the year, and summer drought is probably less limiting than in most other Sierran forests.

SITE FACTORS:
Similar to, and probably the high elevation equivalent of Sierran White Fir Forest (84240), but cooler and moister, often on north-facing slopes. Usually on coarse, well-drained, but moist soils. The heavy precipitation at this elevation, the north slope localities and the densely growing trees combine to make this forest the area of greatest winter snow accumulation in the Sierra Nevada, often reaching 3 m and occasionally 6 m. The snow usually remains until June. At its lower elevational limit, often intergrades broadly with Sierran White Fir Forest. Replaced by Jeffrey Pine-fir Forest (8.521) on dry sites and by Lodgepole Pine Forest (86100) on cold, moist sites near meadows and streams. Replaced at its upper limit by Lodgepole Pine Forest or Subalpine Forest (86000).

CHARACTERISTIC SPECIES:
Abies magnifica, Chrysolepsis sempervirens, Pinus contorta ssp. Murrayana, Pterospora andromedea, Pyrola spp., Ribes spp., Sarcodes sanguinea, Symphoricarpos spp.

DISTRIBUTION:
Scattered in the highest parts of the North Coast Ranges, from Snow Mtn. (Lake Co.) northward. More extensive in the higher areas of the Klamath Mtns. Abundant in the vicinity of Mt. Shasta and Mt. Lassen. Abundant on the west side of the Sierra Nevada from Tehama Co. to southern Tulare Co. Abundant in the Lake Tahoe region. South of Lake Tahoe scattered on the east slope of the Sierra Nevada to the Mt. Whitney region (Inyo Co.), except locally common near Mammoth Lakes (Mono Co.). Elevation 5500-7000 ft (1650-2100 m) in the north and 7500-9000 ft (2300-2700 m) in the south.

SOURCES: 1, 11, 46, 47

ELEMENT NAME: Southern California White Fir Forest
ELEMENT CODE: 85320

DESCRIPTION:
Very similar to Sierran White Fir Forest (84240) and Red Fir Forest (85310) but not so tall or dense. Typically consists of nearly pure stands of Abies concolor which grows to about 30 m tall. The

southern Californian stands of this species, especially the Mojave Desert disjuncts, show some affinity to the Rocky Mountain form (Griffen and Critchfield 1972). The understory is sparse, with scattered Montane Chaparral shrubs (37500) in the openings and with moderate accumulation of needle litter and downed branches. Growth is most active from early to midsummer, probably limited by drought in late summer and by low temperature.

SITE FACTORS:
Similar to Sierran White Fir Forest (84240), but higher, colder and probably drier. Similar to Red Fir Forest (85310) and probably its southern equivalent, but drier. Usually confined to steep, north-facing slopes where snow lingers until late spring. The soil is usually rocky and well drained. Intergrades at its lower elevational limit or on drier sites with Jeffrey Pine-Fir Forest (85210). Replaced at its upper limit by Lodgepole Pine Forest (86100).

CHARACTERISTIC SPECIES:
Abies concolor, Chrysolepis sempervirens, Pinus lambertiana, Ribes spp., Sarcodes sanguinea, Symphoricarpos spp.

DISTRIBUTION:
Scattered in the southern Sierra Nevada and the highest parts of the Tehachapi Mtns., Kern Co; on Mt. Pinos, Ventura-Kern Co. line; common in the higher portions of the eastern San Gabriel Mtns., Los Angeles-San Bernardino Cos.; the San Bernardino Mtns., San Barnardino Co. and the San Jacinto-Santa Rosa Mtns., Riverside Co. Elevation usually 7500-9500 ft (2300-2880 m).

SOURCES: 1, 6, 11, 44

ELEMENT NAME: *Desert Mountain White Fir
ELEMENT CODE: 85330

DESCRIPTION:
Fairly low (to 50 feet) open forests dominated by the Rocky Mountain race of white fir (Abies concolor var. concolor) and Pinus monophylla. Understories are fairly open, shorter than 8-10 ft, characterized by several shrubs with affinities to the southern Rocky Mountains.

SITE FACTORS:
Steep, mesic, north-facing cañons and slopes near mountain ridges and summits, mostly between 6200 and 7500 feet. Occurs on both granite and limestone parent materials.

CHARACTERISTIC SPECIES:
Acer glabrum diffusum, Amelanchier utahensis Covillei, Carex brevipes, Chrysothamnus viscodiflorus, Ephedra utridis, Fendlerella utahensis, Fraxinus anomala, Haplopappus cuneatus, Halimolobos diffusa jaegeri, Heuchera rubescens pachypoda, Holodiscus

microphyllus, Juniperus osteosperma, Leptodactylon pungens Hallii, Lomatium parryi, Oryzopsis micrantha, Philadelphus microphyllus stramineus, Pinus monophylla, Ribes cereum, R. velutinum, Symphoricarpos longiflorus

DISTRIBUTION:
Limited to the higher ranges of the eastern Mojave Desert: Kingston, Clark, and New York mountains.

SOURCES: 48, 49

ELEMENT NAME: *Siskiyou Enriched Conifer Forest
ELEMENT CODE: 85410

DESCRIPTION:
More or less closed forest up to 60 m tall, dominated by evergreen conifers. Similar to Coast Range Mixed Conifer Forest (84110) and Sierran Mixed Conifer Forest (84230), but usually with more abundant understory. In moist sites the understory can be nearly continuous, consisting of mesophytic broadleaved shrubs and herbs. In drier sites it is more scattered, consisting primarily of more Xerophytic Montane Chaparral shrubs (37500). Growing season is primarily in summer, with growth probably limited by drought at the end of summer and by low temperature or snow on the ground from fall through spring. To a certain extent this forest represents a compact mosaic of distinct associations rather than a single habitat type; it is, nevertheless, characterized by high diversity and unusual combinations of species even within single stands (Sawyer and Thornburgh 1969). This, or the Salmon-Scott Enriched Conifer Forest (85420), may constitute the world's richest coniferous forest.

SITE FACTORS:
Combines the heavy precipitation of the North Coast Coniferous Forest (82000) with the more extreme temperatures of the Montane Coniferous Forests. Warmer in summer, cooler in winter than North Coast Coniferous Forest (82000), with deep winter snowpack that probably maintains soil moisture well into summer. Temperatures a little cooler and precipitation spread over a longer wet season than in the Sierran Mixed Conifer Forest (84230). Characterized by high topographic relief and a diversity of rock and soil types. Local composition of the forest varies correspondingly. The disjunct northern species are usually confined to cool, moist north- and east-facing slopes. Merges, at its lower, western limits in Del Norte Co. with Coast Range Mixed Conifer Forest (84110) or Douglas Fir Forest (82400); toward the east, in Siskiyou Co., with Coast Range Mixed Conifer Forest or Sierran Mixed Conifer Forest (84230). The upper limit is apparently characterized by a "false timberline" of Montane Chaparral (37500).

CHARACTERISTIC SPECIES:
Abies amabilis, A. procera, Calocedrus decurrens, Chamaecyparis Lawsoniana (serpentine outcrops), C. nootkatenis, Picea Breweriana,

Pinus attenuata (serpintine outcrops), P. Jeffreyi (serpentine outcrops), P. Lambertiana, P. monticola, P. ponderosa, Pseudotsuga Menziesii, Taxus brevifolia, Tsuga Mertensiana

DISTRIBUTION:
Well developed near the crest of the Siskiyou Mtns., on both sides of the Del Norte-Siskiyou Co. line, especially in the vicinity of Preston Peak. Smaller, less diverse enclaves, probably more similar to Salmon-Scott Enriched Conifer Forest (85420) occur in the Marble and Salmon Mtns. to the east. Elevation about 4500-6500 ft (1360-1970 m). Several species, including Abies amabilis, A. procera, and Chamaecyparis nootkatensis are disjunct from the Cascade Range of Oregon and Washington, where they are much more extensive. Picea Breweriana is endemic to this forest and the adjacent Salmon-Scott Enriched Conifer Forest.

SOURCES: 1, 50

ELEMENT NAME: *Salmon-Scott Enriched Conifer Forest
ELEMENT CODE: 85420

DESCRIPTION:
Very similar to Siskiyou Enriched Conifer Forest (85410); and sharing many species, most notably the endemic Picea Breweriana, but with more subalpine components. Probably not quite so tall as the Siskiyou Forest (to about 50 m). An understory of perennial herbs and dwarf shrubs (usually of northern affinities) is well developed in moist sites. Montane Chaparral shrubs (37500) are most common in drier localities. Flowering is concentrated in the early summer. Growth is also mostly confined to this season, probably limited more often by low temperature or snow on the ground than by drought.

SITE FACTORS:
Similar to Siskiyou Enriched Conifer Forest (85410); colder in winter with more persistent snowpack, but with lower total precipitation. Similar to Upper Montane Mixed Conifer Forest (85200), but moister, with shorter summer dry season. Probably slightly warmer and moister than Red Fir Forest (85310). Soil moisture probably remains fairly high throughout the summer. Merges, at its lower limits, with Sierran Mixed Conifer Forest (84230); on drier sites with Upper Montane Mixed Conifer Forest (85200); on dry, rocky sites with Montane Chaparral (37500); at its upper limits with Red Fir Forest (85310) or Subalpine Coniferous Forests (86000).

CHARACTERISTIC SPECIES:
Abies concolor, A. lasiocarpa, A. magnifica var. shastensis, Calocedrus decurrens, Picea Breweriana, P. Engelmannii, Pinus Jeffreyi, P. Lambertiana, P. monticola, P. Murrayana, P. ponderosa, Pseudotsuga Menziesii, Taxus brevifolia, Tsuga Mertensiana

DISTRIBUTION:
Higher elevations of the Klamath Ranges in eastern Siskiyou Co. and

adjacent Trinity Co. Best developed in the vicinity of Russian Peak, Salmon Mtns. (Sawyuer and Thornburgh 1969). Also in the Scott Mtns., Marble Mtns. and Trinity Alps. Elevation about 5200-7200 ft (1580-2180 m). Abies lasiocarpa and Picea Engelmannii are disjunct from the subalpine forests of the Cascade Range to the north, where they are much more extensive.

SOURCES: 1, 50

ELEMENT NAME: Lodgepole Pine Forest
ELEMENT CODE: 86100

DESCRIPTION:
Typically forms dense forests of slender tress up to 40 m tall, often in nearly pure stands of Pinus Murrayana. More open stands up to 20 m tall occur on dry sites or near timberline. May form krummholz at timberline. The trees in the moister, denser stands are relatively short-lived, and if the stand has not burned for a long time, fallen trees, branches and needles cover the ground. The understory is normally sparse in these dense stands, but low shrubs and perennial herbs occur abundantly in forest openings. There is much less litter in the drier, more open stands; other tree species occur occasionally and understory plants are scattered throughout the stand. Flowering of most plants is concentrated in the early summer; growth of at least the smaller plants may be limited by drought in late summer. Most plants are dormant from fall through spring.

SITE FACTORS:
Typically occurs at elevations with long, snowy winters and cool, dry summers; colder in winter and usually drier than Red Fir Forest (85310). Often best developed in the transitional elevations between the Upper Montane Coniferous Forest (85000) and the true Subalpine Coniferous Forest (86000). At its lower limit it occupies cold, moist sites within the Upper Montane Coniferous Forest; at its upper limit it occupies dry, exposed sites at timberline, especially in the southern Sierra Nevada and in southern California. Apparently tolerates large variations in soil and moisture factors, but most commonly occurs on rocky, well-drained soils. Where it forms dense forests, it is subject to devastation by fire or epidemic outbreaks of the Lodgepole Pine Needle Miner (Coleothechnites milleri). Reseeding is relatively rapid following fires, and Lodgepole Pine Forest is often successional in areas that are eventually dominated by other species. However, this fire succession is more universal in the moister forests of the Cascades and northern Rockies.

CHARACTERISTIC SPECIES:
Phyllodoce Breweri, Pinus contorta Murrayana, Populus tremuloides, Potentilla Breweri, Pyrola spp., Tsuga Martensiana (from Yosemite North), Vaccinium spp.

DISTRIBUTION:
Scattered and poorly developed in the Klamath Mtns. More extensive

stands occur east of Mt. Shasta on the Modoc Plateau of eastern Siskiyou and Shasta Counties. Scattered in the higher parts of the Warner Mtns. in eastern Modoc Co. Abundant in the vicinity of Mt. Lassen. Scattered in the northernmost part of the Sierra Nevada, then very abundant from Sierra Co. to southern Tulare Co. A few small stands occur in the White Mtns., Mono Co. Scattered in the highest portions of the San Gabriel Mtns., Los Angeles-San Bernardino Counties; abundant on the upper slopes of the San Barnardino Mtns., San Bernardino Co.; locally abundant near the summit of Mt. San Jacinto, Riverside Co.; the southern limit is on the summit plateau of the Sierra San Pedro Martir, Baja California. Extensively developed on the east side of the Cascade Range in Oregon and in the northern Rockies. Elevation 6000-8000 ft (1800-2420 m) in the north, 9000-11000 ft (2700-3330 m) in the south. Common as much as 2000 ft (610 m) lower in cold, moist sites such as stream valleys and meadow margins.

SOURCES: 1, 51

ELEMENT NAME: Whitebark Pine-Mountain Hemlock Forest
ELEMENT CODE: 86210

DESCRIPTION:
Open forest or woodland to 15 m tall on sites protected from the wind or forming a low krummdolz on exposed sites at timberline. The understory of dwarf shrubs and perennial herbs is varied and abundant in moist sites, sparse in dry sites or where the forest is dense. The trees are slow-growing and long-lived. Tsuga Martensiana is a dominant or important component in the Klamath Ranges and northern Sierra Nevada, but becomes less important, increasingly replace by Pinus albicaulis or P. Murrayana from the central Sierra southward. Flowering and growth is concentrated in midsummer, with most plants dormant for 9-10 mos. On dry sites, growth of the smaller plants may be limited by drought in late summer.

SITE FACTORS:
Occurs on sites with long, severe winters and brief, cool summers. Most common near timberline. Similar to the high elevation stands of Lodgepole Pine Forest (86100) but probably somewhat cooler and moister. Subject to strong, dessicating winds on ridges and near timberline. Usually confined to moist, protected, north-facing slopes in the southern portion of its range. Generally on rocky, well-drained sites. Usually occurs above Lodgepole Pine Forest (86100) or, toward the north, Red Fir Forest (85310). On drier sites intergrades with Whitebark Pine-Lodgepole Pine Forest (86220) or, in the Klamath Ranges, Foxtail Pine Forest (86300). Replaced above timberline by Alpine Fell-Fields (91100).

CHARACTERISTIC SPECIES:
Kalmia polifolia, Phyllodoce Breweri, Pinus albicaulis, P. contorta Murrayana, Ribes spp., Rubus spp, Salix spp., Tsuga Mertensiana, Vaccintum spp.

DISTRIBUTION:
Scattered in the Klamath Ranges of Siskiyou and northern Trinity Cos., on the high peaks of the Salmon Mtns., Scott Mtns., and Trinity Alps. Occurs on the slopes of Mt. Shasta and more abundantly on Mt. Lassen. In the Sierra Nevada from the peaks around Lake Tahoe southward to the headwaters of Bubbs Creek, Fresno-Tulare Co. line. Becomes relatively scarce and is largely replaced by Whitebark Pine-Lodgepole Pine Forest (86220) south of Yosemite and Mammoth Mtn. Well developed in portions of the Cascade Range in Oregon and Washington. Elevation about 7000-8000 ft (2100-2420 m) in northern California and 9000-11000 ft (2700-3330 m) in the south.

SOURCES: 1, 52, 53

ELEMENT NAME: Whitebark Pine-Lodgepole Pine Forest
ELEMENT CODE: 86220

DESCRIPTION:
An open or clumped timberline forest to about 70 feet tall, dominated by Pinus albicaulis and P. contorta Murrayana. Several other conifers may occur in some stands. Clumps of trees occur in localized soil accumulations among rocky ridges and outcrops. Shrub canopies usually are low and sparse.

SITE FACTORS:
Cold, stony sites with poorly developed, nutrient-poor soils, usually derived from granite. Growing seasons are short (limited by cold). Intergrades at lower elevations (below ~7500 ft in the north, 9000 ft in the south) or better sites with Jeffrey Pine Forest (85100), Red Fir Forest (85300) and Lodgepole Pine Forest (86100). Passes at higher elevations (above 9500-11000 ft depending on latitude) to Treeless Alpine Fell-Fields (91100).

CHARACTERISTIC SPECIES:
Abies concolor, A. magnifica, Artemisia Rothrockii, Eriogonum spp., Juniperus occidentalis australis, Leptodactylon pungens, Pinus albicaulis, P. balfouriana, P. contorta Murrayana, P. flexilis, P. Jeffreyi, P. monophylla, Populus tremuloides, Potentilla fruticosa, Primula suffrutescens, Ribes spp.

DISTRIBUTION:
Sparsely represented on the peaks of the interior Klamath Range and on the drier slopes of Mt. Lassen. Common on the highest peaks of the Warner Mtns. in eastern Modoc Co. Common in the Sierra Nevada from the Lake Tahoe region southward to the headwaters of the Kern River in northern Tulare Co. The dominant subalpine forest of the central Sierra Nevada, largely replaced by Whitebark Pine-Mountain Hemlock Forest (86210) to the north and by Foxtail Pine Forest (86300) to the south. Elevation 8000-9000 ft (2420-2700 m) in the north and 9500-11500 ft (2880-3490 m) in the south.

SOURCES: 1, 54

ELEMENT NAME: *Foxtail Pine Forest
ELEMENT CODE: 86300

DESCRIPTION:
Open forest to 20 m tall, dominated by Pinus balfouriana, often in nearly pure stands. Trees of this species are reduced in stature and often contorted near timberline, but rarely form krummholz. The understory is sparse, with scattered low shrubs and cushion plants. Much of the rocky ground is barren. Downed trees and branches are often scattered conspicuously; these persist for many years without decaying. Growth and flowering of the smaller plants are concentrated in the first half of summer, and are probably limited by drought later in the season.

SITE FACTORS:
Similar to Whitebark Pine-Lodgepole Pine Forest (86220) but probably drier. Nearly always confined to dry, rocky ridges and south-facing slopes in the Klamath Ranges. In a greater variety of situations in the Sierra Nevada, but best developed on dry, rocky sites. In the Klamath Ranges replaced at lower elevations by Jeffrey Pine-Fir Forest (85210), Salmon Scott Enriched Conifer Forest (85420) or Lodgepole Pine Forest (86100), and in moister, high elevation sites by Whitebark Pine-Mountain Hemlock Forest (86210). In the Sierra Nevada, usually replaced by Lodgepole Pine Forest at lower elevations and on moister sites, occasionallly by Jeffrey Pine-Fir Forest at unusually low elevations. In the northern portion of its range, intergrades with Whitebark Pine-Lodgepole Pine Forest (86220) near timberline. Replaced above timberline by Alpine Fell-Fields.

CHARACTERISTIC SPECIES:
Artemisia Rothrockii, Eriogonum spp., Pinus albicaulis, P. balfouriana, P. contorta Murrayana, Primula suffructescens

DISTRIBUTION:
Occurs in two widely separated areas: the Klamath Ranges in northwestern California and the southern Sierra Nevada. In the Klamath region, occurs on the higher peaks of the Marble Mtns., Salmon Mtns., Scott Mtns. and quite abundantly in the Trinity Alps. Also on north and south Yolla Bolly Mtns. near the Tehama-Trinity Co. line. In the Sierra Nevada, occurs abundantly from the headwaters of the south fork of the Kings River in southeastern Fresno Co. to the Kern Plateau in eastcentral Kern Co. Also east of the Sierra crest in this region, from near Mt. Baxter to Olancha Peak, Inyo Co. Usually the most abundant subalpine forest within its Sierran distribution area, usually replacing Whitebark Pine-Lodgepole Pine Forest (86220). Elevation 7000-8000 ft (2100-2420 m) or higher in the Klamath region; 9500-11500 ft (2880-3490 m) in the Sierra Nevada.

SOURCES: 1

ELEMENT NAME: *Bristlecone Pine Forest
ELEMENT CODE: 86400

DESCRIPTION:
Similar to but somewhat shorter than Foxtail Pine Forest (86300), but dominated by Pinus longaeva or Pinus flexilis. The forest is usually quite open, and often occurs in patches rather than dominating extensive areas. The trees are often very contorted and have many dead branches near timberline, but like Foxtail Pine Forest, do not normally form krummholz. The understory may be somewhat more abundant than in Foxtail Pine Forest made up of scattered low shrubs from the Subalpine Sagebrush (33120) and of Cusion plants. Growth and flowering, especially of the smaller plants, is concentrated in early midsummer, probably limited by drought later in the summer and by low temperature the rest of the year.

SITE FACTORS:
Very similar to Foxtail Pine Forest (86300), but drier and probably with greater extremes of temperature. The driest of the California subalpine forests and probably one of the driest anywhere. Best developed on relatively mesic sites, such as north-facing slopes. Occurs on a variety of rock and soil types, with Pinus longaeva usually dominant on dolomitic outcrops and P. flexilis often more common on other substrates. Individuals of the former species may live for over 4000 years, with the longest lived trees usually occurring on the poorer sites. Occasionally occurs as low as the upper limits of Nevadan Piñyon-Juniper Woodland (72120) but more often intergrades with Subalpine Sagebrush (33120) on drier sites. Replaced above timberline by White Mtns. Fell-Fields (91140).

CHARACTERISTIC SPECIES:
Artemisia nova, Cercocarpus ledifolius, Chamaebatiaria millefolium, Chrysothamnus spp., Eriogonum spp., Haplopappus Gilmanii, Pinus flexilis, P. longaeva, Ribes spp.

DISTRIBUTION:
Most extensive development in California in the White Mtns. of Inyo and Mono Cos. More scattered in the Inyo Mtns., Inyo Co. An isolated sparse stand occurs on Telescope Peak, Panamint Range, Inyo Co., and a small isolated stand of Pinus longaeva occurs in the Last Chance Range, Inyo Co. Also on several of the Great Basin Ranges in Nevada. Elevation 9500-11500 ft (2880-3490 m).

SOURCES: 1, 55

ELEMENT NAME: Southern California Subalpine Forest
ELEMENT CODE: 86500

DESCRIPTION:
Very similar to Whitebark Pine-Lodgepole Pine Forest (86220) and to

Foxtail Pine Forest (86300), but dominated by Pinus flexilis and P. Murrayana. The former species is most important on exposed high slopes and ridges, where it may form small pure stands. The trees are rarely over 10 m high even in the lower portions of the forest and form a very scattered, low krummholz at timberline. The understory is typically very sparse. Growth is concentrated in early summer, probably limited by drought in late summer and by low temperature the rest of the year.

SITE FACTORS:
Similar to Whitebark Pine-Lodgepole Pine Forest (86220), but drier and probably not quite so cold. Very similar to Foxtail Pine Forest (86300), but possibly with more variable precipitation and/or faster runoff. Usually occurs on dry, rocky slopes and ridges subject to very strong winds in winter. These winds, rather than other factors associated with high altitude, may determine the upper timberline of this forest. At its lower limit may intergrade with Jeffrey Pine Forest (85100) on south-facing slopes, Southern California White Fir Forest (84320) on north-facing slopes, or Lodgepole Pine Forest (86100) in various situations. Lodgepole pine forest may also occur to timberline. Replaced above timberline by Southern California Alpine Fell-Fields (91130).

CHARACTERISTIC SPECIES:
Ceanothus cordulatus, Chrysoleris sempervirens, Arctostaphylos patula platyphylla, Pinus flexilis, P. contorta Murrayana, Juniperus occidentalis australis, Cercocarpus ledifolius, Abies concolor, Eriogonum Kennedyi alpigenum

DISTRIBUTION:
Confined to the highest peaks in southern California: the upper slopes of Mt. Baden-Powell and San Antonio Mtn. in the San Gabriel Mtns.; Mt. San Jacinto in the San Jacinto Mtns.; most abundant in the vicinity of Mt. San Gorgonio in the San Bernardino Mtns. Outliers of Pinus flexilis occur on Mt. Pinos, southwestern Kern Co. and on Toro Peak, Riverside Co. Elevation usually 9500-11200 feet (2880-3390 m) but occasionally as low as 8500 ft (2580 m).

SOURCES: 1, 40, 54

ELEMENT NAME: Whitebark Pine Forest
ELEMENT CODE: 86600

DESCRIPTION:
These open forests are dominated by Pinus albicaulis, with other subalpine trees present only in small quantities. The trees seldom exceed 50 ft, and often are wind-pruned into grotesquely gnarled, picturesque krummholz.

SITE FACTORS:
Shallow rocky "soil" at the alpine timberline. Growing season very short due to cold, with frost or snow possible in any month.

Intergrades at lower elevations with Sierran Mixed Subalpine Coniferous Forest (86200), and at higher elevations (8000-12000 ft depending on latitude) with Treeless Alpine Fell-Field (91100).

CHARACTERISTIC SPECIES:
Carex Cogdonii, Draba spp., Eriogonum spp., Haplopappus macronema, Ivesia Muirii, Ivesia pygmaea, Jamesia americana californica, Lupinus Breweri bryoides, Phlox spp., Pinus albicaulis, Ribes cereum, R. inebrians, R. montigenum, Ribes spp., Trisetum spicatum,

DISTRIBUTION:
Extensive in the higher central and southern Sierra Nevada, especially east of the crest. Widely scattered but less extensive in Siskiyou and Trinity Counties and the Warner Mountains.

SOURCES: 11, 42, 53

ELEMENT NAME: Klamath-Cascade Fell-Field
ELEMENT CODE: 91110

DESCRIPTION:
Perennial herbs or dwarf shrubs less than 0.5 m tall, including "cushion plants." Forms a low turf on favorable sites but more often scattered among the rocks and gravel. Often well developed at the bases of larger rocks. Growth occurs during July and August, but is often delayed until the beginning of August in areas of heavy snow accumulation or limited by drought after the first few weeks in drier sites. Flowering is usually concentrated in late July and early August. Many of the plants have conspicuous flowers.

SITE FACTORS:
Similar to Subalpine Forest (86000) but above treeline and colder, with a brief summer growing season. Subject to intense solar radiation and freezing nights in summer. Subject to severe winds and very low temperatures in winter on windward slopes, which are often blown almost clear of snow. More protected slopes accumulate deep snowdrifts which may persist until midsummer or later. The substrate is rocky, with little soil formation and excellent drainage. Plants are often subject to dessication by midsummer, after the meltwater has disappeared. Occurs above Sierran Mixed Subalpine Forest (86200) on relatively moist slopes or Foxtail Pine Forest (86300) on dry slopes.

CHARACTERISTIC SPECIES:
Cassiope Mertensiana, Castilleja arachnoidea, Claytonia bellidifolia, Draba Paysonii treleasii, Draba Howelli, Epilobium obcordum siskiyouense, Heuchera Pringlei, Lewisia cotyledon, Romanzoffia sitchensis, Saxifraga fragarioides

DISTRIBUTION:
Highest peaks of the Klamath Ranges (Trinity Alps, Salmon-Scott Mtns.) in Siskiyou and Trinity Cos. Elevation above 7500 ft

(2270 m). Also on Mt. Shasta, Siskiyou Co. and Mt. Lassen, Shasta Co., between about 8500-10500 ft (2500 to 3180 m) and occasionally higher.

SOURCES: 1, 56

ELEMENT NAME: Sierra Nevada Fell-Field
ELEMENT CODE: 91120

DESCRIPTION:
Very similar to Klamath Cascade Fell-Fields (91110), but probably with a greater proportion of xerophytic "cushion plants."

SITE FACTORS:
Very similar to Klamath-Cascade Fell-Fields (91110), but probably somewhat drier and possibly slightly cooler, at least at the highest elevations. Usually occurs above Sierran Mixed Subalpine Forest (86200), except in the south (southeastern Fresno Co., Tulare Co. and adjacent Inyo Co.) where it usually occurs above Foxtail Pine Forest (86300).

CHARACTERISTIC SPECIES:
Aquilegia pubescens, Carex exserta, Draba spp. Epilobium obcordatum, Oxyria digyna, Penstemon Davidosonii, Polemonium eximium, Primula suffrutescens

DISTRIBUTION:
Highest elevations of the Sierra Nevada. Confined to the highest peaks from the Lake Tahoe region to Yosemite; more or less continuous near the crest from Yosemite to the Sequoia-Mt. Whitney region and along the Great Western Divide in Sequoia National Park. Southern limit on Olancha Peak, Tulare-Inyo Cos. Also in the Sweetwater Range, Mono Co. and sparingly in the Warner Mtns., Modoc Co. Elevation above 8500 ft (2575 m) in the north and 11500 ft (3480 m) in the south.

SOURCES: 1, 56

ELEMENT NAME: Southern California Fell-Field
ELEMENT CODE: 91130

DESCRIPTION:
Very similar to Sierra Nevada Fell-Fields (91120), but generally more sparsely vegetated and with a higher proportion of xerophytic "cushion plants." The growing season often begins in June, earlier than in the Sierra Nevada Fell-Fields. Flowering occurs mostly in July.

SITE FACTORS:
Very similar to Sierra Nevada Fell-Fields (91120), but probably drier

with less accumulation of snow and not quite so cold. Subject to very severe winds from fall through spring which are probably the cause of the lowered treeline on these peaks. Occurs above Southern California Subalpine Forest (86500), or Alpine Talus and Scree Slopes (91200), sometimes intergrading with the latter.

CHARACTERISTIC SPECIES:
Draba corrugata, Eriogonum Kennedyi var. alpigenum, Heuchera Parishii, Holodiscus microphyllus, Raillardella argentea, Ranunculus eschscholtzii

DISTRIBUTION:
Summit region of Mt. San Gorgonio and adjoining ridges in the San Barnardino Mtns., San Bernardino Co., mostly above 11000 ft (3330 m). Sparingly developed on the summit of San Antonio Mtn., San Gabriel Mtns., Los Angeles-San Bernardino Co. at 10000 ft (3030 m) and on the summit of Mt. San Jacinto, San Jacinto Mtns., Riverside Co. at 10800 ft (3270 m).

SOURCES: 1, 56

ELEMENT NAME: White Mountains Fell-Field
ELEMENT CODE: 91140

DESCRIPTION:
Similar to Sierra Nevada Fell-Fields (91120) but generally more sparsely vegetated and with a considerably higher proportion of xerophytic "cushion plants." Growth is probably more often limited by drought than in the Sierra Nevada.

SITE FACTORS:
Similar to Sierra Nevada Fell-Fields (91120), but significantly drier, with much less snow, and possibly colder in winter. Occurs above Bristlecone Pine Forest (86400) or Subalpine Sagebrush (33120), often forming part of the understory in the former and intergrading broadly with the latter.

CHARACTERISTIC SPECIES:
Agropyron scribneri, Artemisia Rothrockii, Phlox spp. Polemonium chartaceum

DISTRIBUTION:
Main ridge of the White Mtns. in southeastern Mono Co. above about 11500 ft (3480 m).

SOURCES: 1, 56

ELEMENT NAME: Alpine Talus and Scree Slope
ELEMENT CODE: 91200

DESCRIPTION:
Steep slopes covered with rocks and gravels of various sizes, with small plants scattered in the relatively stable areas. Usually more sparely vegetated than Alpine Fell-Fields (91100). Most plants are more or less xerophytic herbaceous perennials less than 0.5 m tall; many are cushion plants. Most growth and flowering occurs in early summer, somewhat earlier on the average than in Alpine Fell-Fields.

SITE FACTORS:
Very similar to Alpine Fell-Fields (91100) but with substrate of unstable, shifting rocks. Drainage is more rapid and water retention poorer than in typical Alpine Fell-Fields.

CHARACTERISTIC SPECIES:
Aquilegia pubescens, Carex Congdonii, Epilobium obcordatum, Haplopappus macronema, Hulsea algida, Ivesia pygmaea, Oxyria digyna, Phoenicaulis eurycarpa

DISTRIBUTION:
Same general distribution as Alpine Fell-Fields (91100) but more scattered and localized. Similar habitats occur at lower elevations.

SOURCES: 1, 56

ELEMENT NAME: Alpine Snowbank Margin
ELEMENT CODE: 91300

DESCRIPTION:
Very similar to Alpine Fell-Fields (91100), but most plants less than 0.2 m tall. Often more densely vegetated and turf-like than Fell-Fields. Dwarf ericaceous shrubs (Cassiope Kalmia) are often prominent. Growth begins as the snow melts in late July or August, with plant activity following the receding snowbank margin.

SITE FACTORS:
Similar to Alpine Fell-Fields (91100) but with soil remaining moist and cold from meltwater through most or all of the summer. Better soil drainage than in Alpine Meadow (45220). Accumulated snow protects the plants from wind and low temperatures until summer, but delays the onset of growth.

CHARACTERISTIC SPECIES:
Carex haydeniana, C. spectablis, Cassiope Mertensiana, Kalmia polifolia var. microphylia, Ranunculus eschscholzii, Salix anglorum var. antiplasta

DISTRIBUTION:
Same general distribution as Alpine Fell-Fields (91100) but confined to locations where snowbanks regularly persist well into the summer; usually on north- or east-facing slopes.

SOURCES: 1, 56

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California Department of Fish and Game
Natural Diversity Data Base
Natural Communities

November 1986

TERRESTRIAL SECTION

20000 DUNE COMMUNITY

- 21000 Coastal Dunes
  - 21100 Active Coastal Dunes
  - 21200 Foredunes
    - 21210 Northern Foredunes
      - 21211* Northern Foredune Grassland
    - 21230* Southern Foredunes
  - 21300 Backdune Scrub
    - 21310* Northern Dune Scrub
    - 21320* Central Dune Scrub
    - 21330* Southern Dune Scrub
- 22000 Desert Dunes
  - 22100* Active Desert Dunes
  - 22200* Stabilized and Partially-Stabilized Desert Dunes
  - 22300* Stabilized and Partially-Stabilized Desert Sand Fields
- 23000 Interior Dunes
  - 23100* Stabilized Interior Dunes
  - 23200* Relictual Interior Dunes
  - 23300* Monvero Residual Dunes

30000 SCRUB AND CHAPARRAL

- 31000 Coastal Bluff Scrub
  - 31100* Northern Coastal Bluff Scrub
  - 31200* Southern Coastal Bluff Scrub
- 32000 Coastal Scrub
  - 32100 Northern (Franciscan) Coastal Scrub
    - 32110 Northern Coyote Bush Scrub
    - 32120 Northern Salal Scrub
    - 32130 Northern Silk-tassel Scrub
  - 32200 Central (Lucian) Coastal Scrub
  - 32300 Venturan Coastal Sage Scrub

Terrestrial section based on Natural Community classification developed by Cheatham and Haller (1975) as modified by Glen Holstein, Deborah Jensen, and Robert Holland.

*Communities with highest inventory priorities.

32400* Maritime Succulent Scrub
32500* Diegan Coastal Sage Scrub
32600 Diablan Sage Scrub
32700* Riversidian Sage Scrub
32710* Riversidian Upland Sage Scrub
32720* Riversidian Alluvial Fan Sage Scrub
32730* Riversidian Desert Scrub

33000 Sonoran Desert Scrub
33100 Sonoran Creosote Bush Scrub
33200 Sonoran Desert Mixed Scrub
33210 Sonoran Mixed Woody Scrub
33220 Sonoran Mixed Woody and Succulent Scrub

34000 Mojavean Desert Scrub
34100 Mojave Creosote Bush Scrub
34200 Mojave Mixed Scrub and Steppe
34210 Mojave Mixed Woody Scrub
34220 Mojave Mixed Steppe
34230 Mojave Yucca Scrub and Steppe
34240 Mojave Mixed Woody and Succulent Scrub
34250 Mojave Wash Scrub
34300 Blackbush Scrub

35000 Great Basin Scrub
35100 Great Basin Mixed Scrub
35200 Sagebrush Scrub
35210 Big Sagebrush Scrub
35220 Subalpine Sagebrush Scrub
35300 Sagebrush Steppe
35400 Rabbitbrush Scrub

36000 Chenopod Scrub
36100 Desert Chenopod Scrub
36110 Desert Saltbush Scrub
36120 Desert Sink Scrub
36130 Desert Greasewood Scrub
36140 Shadscale Scrub
36200 Great Valley Chenopod Scrub
36210* Valley Sink Scrub
36220* Valley Saltbush Scrub
36300 Foothill Chenopod Scrub
36310 Sierra-Tehachapi Saltbush Scrub
36320* Interior Coast Range Saltbush Scrub

37000 Chaparral
37100 Upper Sonoran Mixed Chaparral
37110 Northern Mixed Chaparral
37111* Gabbroic Northern Mixed Chaparral
37120 Southern Mixed Chaparral
37121* Granitic Southern Mixed Chaparral
37122* Mafic Southern Mixed Chaparral
37200 Chamise Chaparral (Chamisal)

37300 Red Shank Chaparral
37400 Semi-Desert Chaparral
37500 Montane Chaparral
37510 Mixed Montane Chaparral
37520 Montane Manzanita Chaparral
37530 Montane Ceanothus Chaparral
37531 Deer Brush Chaparral
37532 Whitethorn Chaparral
37533 Tobacco Brush Chaparral
37540 Montane Scrub Oak Chaparral
37541 Shin Oak Brush
37542 Huckleberry Oak Chaparral
37550 Bush Chinquapin Chaparral
37600 Serpentine Chaparral
37610* Mixed Serpentine Chaparral
37620* Leather Oak Chaparral
37700* Island Chaparral
37800 Upper Sonoran Ceanothus Chaparral
37810 Buck Brush Chaparral
37820 Blue Brush Chaparral
37830 Ceanothus crassifolius Chaparral
37840 Ceanothus megacarpus Chaparral
37900 Scrub Oak Chaparral
37A00 Interior Live Oak Chaparral
37B00 Upper Sonoran Manzanita Chaparral
37C00 Maritime Chaparral
37C10* Northern Maritime Chaparral
37C20* Central Maritime Chaparral
37C30* Southern Maritime Chaparral
37D00* Ione Chaparral
37E00 Mesic North Slope Chaparral
37E10 Northern North Slope Chaparral
37E20 Southern North Slope Chaparral
37F00 Poison-Oak Chaparral
37G00 Coastal Sage-Chaparral Scrub
37H00 Alluvial Fan Chaparral
37J00 Flannel Bush Chaparral
38000 Montane Dwarf Scrub
39000 Upper Sonoran Subshrub Scrub

40000 GRASSLANDS, VERNAL POOLS, MEADOWS, AND OTHER HERB COMMUNITIES

41000 Coastal Prairie
41100* Coastal Terrace Prairie
41200* Bald Hills Prairie

42000 Valley and Foothill Grassland
42100 Native Grassland
42110* Valley Needlegrass Grassland
42120* Valley Sacaton Grassland
42130* Serpentine Bunchgrass
42140 Valley Wildrye Grassland
42150* Pine Bluegrass Grassland
42200 Non-Native Grassland

42300* Wildflower Field

43000* Great Basin Grassland

44000 Vernal Pool
- 44100 Northern Vernal Pool
  - 44110* Northern Hardpan Vernal Pool
  - 44120* Northern Claypan Vernal Pool
  - 44130* Northern Volcanic Vernal Pool
    - 44131* Northern Basalt Flow Vernal Pool
    - 44132* Northern Volcanic Mud Flow Vernal Pool
- 44300 Southern Vernal Pool
  - 44310* Southern Interior Basalt Flow Vernal Pool
  - 44320* San Diego Mesa Vernal Pool
    - 44321* San Diego Mesa Hardpan Vernal Pool
    - 44322* San Diego Mesa Claypan Vernal Pool

45000 Meadow and Seep
- 45100 Montane Meadow
  - 45110 Wet Montane Meadow
  - 45120 Dry Montane Meadow
- 45200 Subalpine and Alpine Meadow
  - 45210* Wet Subalpine or Alpine Meadow
  - 45220* Dry Subalpine or Alpine Meadow
- 45300 Alkali Meadows and Seeps
  - 45310* Alkali Meadow
  - 45320* Alkali Seep
- 45400* Freshwater Seep

46000* Alkali Playa Community

47000* Pavement Plain Community

50000 BOG AND MARSH

51000 Bog and Fen
- 51100 Bog
  - 51110* Sphagnum Bog
  - 51120* Darlingtonia Bog
- 51200* Fen

52000 Marsh and Swamp
- 52100 Coastal Salt Marsh
  - 52110* Northern Coastal Salt Marsh
  - 52120* Southern Coastal Salt Marsh
- 52200* Coastal Brackish Marsh
- 52300 Alkali Marsh
  - 52310* Cismontane Alkali Marsh
  - 52320* Transmontane Alkali Marsh
- 52400 Freshwater Marsh
  - 52410* Coastal and Valley Freshwater Marsh
  - 52420* Transmontane Freshwater Marsh
  - 52430* Montane Freshwater Marsh
- 52500* Vernal Marsh
- 52600* Freshwater Swamp

5251A* Ledum Swamp

60000 RIPARIAN AND BOTTOMLAND HABITAT

61000 Riparian Forests
- 61100 North Coast Riparian Forests
  - 61110* North Coast Black Cottonwood Riparian Forest
  - 61120* North Coast Alluvial Redwood Forest
  - 61130* Red Alder Riparian Forest
- 61200 Central Coast Riparian Forest
  - 61210* Central Coast Cottonwood-sycamore Riparian Forest
  - 61220* Central Coast Live Oak Riparian Forest
  - 61230* Central Coast Arroyo Willow Riparian Forest
- 61300 Southern Riparian Forest
  - 61310* Southern Coast Live Oak Riparian Forest
  - 61320* Southern Arroyo Willow Riparian Forest
  - 61330* Southern Cottonwood-willow Riparian Forest
- 61400 Great Valley Riparian Forest
  - 61410* Great Valley Cottonwood Riparian Forest
  - 61420* Great Valley Mixed Riparian Forest
  - 61430* Great Valley Valley Oak Riparian Forest
- 61500 Montane Riparian Forest
  - 61510* White Alder Riparian Forest
  - 61520* Aspen Riparian Forest
  - 61530* Montane Black Cottonwood Riparian Forest
- 61600 Modoc-Great Basin Riparian Forest
  - 61610* Modoc-Great Basin Cottonwood-willow Riparian Forest
- 61700 Mojave Riparian Forest
- 61800 Colorado Riparian Forest
  - 61810* Sonoran Cottonwood-willow Riparian Forest
  - 61820* Mesquite Bosque

62000 Riparian Woodlands
- 62100* Sycamore Alluvial Woodland
- 62200* Desert Dry Wash Woodland
- 62300* Desert Fan Palm Oasis Woodland
- 62400* Southern Sycamore-alder Riparian Woodland

63000 Riparian Scrubs
- 63100* North Coast Riparian Scrub
  - 63110* Woodwardia Thicket
- 63200* Central Coast Riparian Scrub
- 63300 Southern Riparian Scrub
  - 63310 Mule Fat Scrub
  - 63320* Southern Willow Scrub
- 63400 Great Valley Riparian Scrub
  - 63410* Great Valley Willow Scrub
  - 63420* Great Valley Mesquite Scrub
  - 63430* Buttonbush Scrub
  - 63440* Elderberry Savanna
- 63500* Montane Riparian Scrub
- 63600* Modoc-Great Basin Riparian Scrub
- 63700 Mojave Desert Wash Scrub

63800 Colorado Riparian Scrub
63810 Tamarisk Scrub
63820 Arrowweed Scrub

70000 WOODLAND

71000 Cismontane Woodland
71100 Oak Woodland
71110 Oregon Oak Woodland
71120 Black Oak Woodland
71130 Valley Oak Woodland
71140 Blue Oak Woodland
71150 Interior Live Oak Woodland
71160 Coast Live Oak Woodland
71170 Alvord Oak Woodland
71180 Engelmann Oak Woodland
71181* Open Engelmann Oak Woodland
71182* Dense Engelmann Oak Woodland
71190* Island Oak Woodland
71200 Walnut Woodland
71210* California Walnut Woodland
71220* Hinds Walnut Woodland
71300 Digger Pine Woodland
71310 Open Digger Pine Woodland
71320 Digger Pine-Chaparral Woodland
71321 Serpentine Digger Pine-Chaparral Woodland
71322 Non-Serpentine Digger Pine-Chaparral Woodland
71400 Mixed Cismontane Woodland
71410 Digger Pine-Oak Woodland
71420 Mixed North Slope Cismontane Woodland
71430 Juniper-Oak Cismontane Woodland

72000 Pinon and Juniper Woodlands
72100 Great Basin Woodlands
72110 Northern Juniper Woodland
72120 Great Basin Pinyon and Juniper Woodlands
72121 Great Basin Pinon-Juniper Woodland
72122 Great Basin Pinon Woodland
72123 Great Basin Juniper Woodland and Scrub
72200 Mojavean Pinon and Juniper Woodlands
72210 Mojavean Pinon Woodland
72220 Mojavean Juniper Woodland and Scrub
72300 Peninsular Pinon and Juniper Woodlands
72310 Peninsular Pinon Woodland
72320 Peninsular Juniper Woodland and Scrub
72400 Cismontane Juniper Woodland and Scrub

73000 Joshua Tree Woodland

75000 Sonoran Thorn Woodland
75100* Elephant Tree Woodland
75200* Crucifixion Thorn Woodland
75300* All-thorn Woodland

75400* Arizonan Woodland

80000 FOREST

81000 Broadleaved Upland Forest
- 81100 Mixed Evergreen Forest
- 81200* California Bay Forest
- 81300 Oak Forest
  - 81310 Coast Live Oak Forest
  - 81320 Canyon Live Oak Forest
  - 81330 Interior Live Oak Forest
  - 81340 Black Oak Forest
- 81400 Tan-Oak Forest
- 81500 Mixed North Slope Forest
- 81600* Walnut Forest
- 81700* Island Ironwood Forest
- 81800 Cherry Forest
  - 81810* Island Cherry Forest
  - 81820* Mainland Cherry Forest
- 81900 Silk-tassel Forest
- 81B00 Aspen Forest

82000 North Coast Coniferous Forest
- 82100 Sitka Spruce-Grand Fir Forest
- 82200 Western Hemlock Forest
- 82300 Redwood Forest
  - 82320 Upland Redwood Forest
- 82400 Douglas-Fir Forest
  - 82410* Coastal Douglas-Fir-Western Hemlock Forest
  - 82420* Upland Douglas-Fir Forest
- 82500* Port-Orford-Cedar Forest

83000 Closed-cone Coniferous Forest
- 83100 Coastal Closed-cone Coniferous Forest
  - 83110* Beach Pine Forest
  - 83120 Bishop Pine Forest
    - 83121* Northern Bishop Pine Forest
    - 83122* Southern Bishop Pine Forest
  - 83130* Monterey Pine Forest
  - 83140* Torrey Pine Forest
  - 83150* Monterey Cypress Forest
  - 83160 Pygmy Cypress Forest
    - 83161* Mendocino Pygmy Cypress Forest
    - 83162* Monterey Pygmy Cypress Forest
- 83200 Interior Closed-cone Coniferous Forest
  - 83210* Knobcone Pine Forest
  - 83220* Northern Interior Cypress Forest
  - 83330* Southern Interior Cypress Forest

84000 Lower Montane Coniferous Forest
- 84100 Coast Range and Klamath Coniferous Forest
  - 84110 Coast Range Mixed Coniferous Forest
  - 84120* Santa Lucia Fir Forest
  - 84130 Coast Range Ponderosa Pine Forest
    - 84131 Upland Coast Range Ponderosa

Pine Forest
84132* Maritime Coast Range Ponderosa Pine Forest
84140 Coulter Pine Forest
84150 Bigcone Spruce-Canyon Oak Forest
84160 Ultramafic White Pine Forest
84170 Ultramafic Jeffrey Pine Forest
84171 Northern Ultramafic Jeffrey Pine Forest
84172* Southern Ultramafic Jeffrey Pine Forest
84180 Ultramafic Mixed Coniferous Forest
84200 Sierran Coniferous Forest
84210 Westside Ponderosa Pine Forest
84220* Eastside Ponderosa Pine Forest
84230 Sierran Mixed Coniferous Forest
84240 Sierran White Fir Forest
84250* Big Tree Forest

85000 Upper Montane Coniferous Forest
85100 Jeffrey Pine Forest
85200 Upper Montane Mixed Coniferous Forest
85210 Jeffrey Pine-Fir Forest
85220* Washoe Pine-Fir Forest
85300 Upper Montane Fir Forest
85310 Red Fir Forest
85320 Southern California White Fir Forest
85330* Desert Mountain White Fir Forest
85400 Klamath Enriched Coniferous Forest
85410* Siskiyou Enriched Coniferous Forest
85420* Salmon-Scott Enriched Coniferous Forest

86000 Subalpine Coniferous Forest
86100 Lodgepole Pine Forest
86200 Sierran Mixed Subalpine Coniferous Forest
86210 Whitebark Pine-Mountain Hemlock Forest
86220 Whitebark Pine-Lodgepole Pine Forest
86300* Foxtail Pine Forest
86400* Bristlecone Pine Forest
86500 Southern California Subalpine Forest
86600 Whitebark Pine Forest
86700 Limber Pine Forest

90000 ALPINE HABITATS

91000 Alpine Boulder and Rock Field
91100 Alpine Fell-Field
91110 Klamath-Cascade Fell-Field
91120 Sierra Nevada Fell-Field
91130 Southern California Fell-Field
91140 White Mountains Fell-Field
91200 Alpine Talus and Scree Slope
91210 Wet Alpine Talus and Scree Slope
91220 Dry Alpine Talus and Scree Slope
91300 Alpine Snowbank Margin

93000 Alpine Snow and Ice Habitat

93100 Alpine Snowfield
93200 Alpine Glacier

94000 Alpine Dwarf Scrub

Appendix B. Communities not treated in this report. Asterisks (*) indicated communities for which additional descriptive materials are needed.

Element Code	Element Name
32110*	Northern coyote bush scrub
32120*	Northern salal scrub
32130*	Northern silk-tassel scrub
32710*	Riversidean upland sage scrub
32720	Riversidean alluvial fan sage scrub
32730*	Riversidean desert scrub
33210*	Sonoran mixed woody scrub
34230*	Mojave yucca scrub and steppe
34240*	Mojave mixed woody and succulent scrub
37121*	Granitic southern mixed chaparral
37122*	Mafic southern mixed chaparral
37531*	Deer brush chaparral
37532*	Whitethorn chaparral
37533*	Tobacco brush chaparral
37610*	Mesic serpentine chaparral
37620*	Leather oak cahparral
37E10*	Northern north slope chaparral
37E20*	Southern north slope chaparral
37H00*	Alluvial fan chaparral
37J00*	Flannel bush chaparral
38000*	Montane dwarf scrub
45110	Wet montane meadow
45120	Dry montane meadow
5251A*	*Ledum* swamp
61320*	Southern arroyo willow forest
63110*	*Woodwardia* thicket
71120*	Hinds' walnut woodland
75100*	Elephant tree woodland
81500*	Mixed north slope forest
81600*	Walnut forest
81700*	Island ironwood forest
81810*	Island cherry forest
81820*	Mainland cherry forest
81900*	Silk-tassel forest
84160*	Ultramafic white pine forest
84171*	Northern ultramafic Jeffrey pine forest
84172*	Southern ultramafic Jeffrey pine forest
84180*	Ultramafic mixed conifer forest
91210	Wet alpine talus and scree slope
91220	Dry alpine talus and scree slope
93100	Alpine snowfield
93200	Alpine glacier
94000	Alpine dwarf scrub