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The Rare, Threatened, and Endangered Plants of California

Glossary of Terms and Field Descriptions (Adopted and modified from the CNPS Inventory, 6th Edition, 2001)

The heart of the CNPS *Inventory* is our assessment of the current conservation status of each of our state's rare, threatened, and endangered plants. We present these assessments together with a summary of current information on the distribution and ecology of each taxon. We also include entries for plants that were considered but rejected for one or more reasons, as well as other scientific names that have been used in the standard literature or in previous editions of this *Inventory*.

Basis for Inclusion

The vast majority of the taxa in this *Inventory* are vascular plants (ferns, fern allies, gymnosperms, and flowering plants). We also present our evaluation of rarity and endangerment of California's bryophytes (mosses, liverworts, and hornworts). Algae, fungi, and lichens are not treated here.

A plant must be native to California to be included. Ornamentals, plants escaped from cultivation, and naturalized plants are excluded. So are the sporadic hybrids that sometimes occur under natural conditions. The relatively trivial color variants and occasional departures from typical vegetative or floral conditions, referred to by botanists as "forma," are similarly excluded.

This *Inventory* focuses on plants that are rare in California. A very small number of plants that are still somewhat common in California are included because they are in decline and face further immediate threats. We recognize that extensive habitat alteration and pervasive human impacts pose serious threats to many other species that are still common. However, evaluation of threats to species that are neither rare nor imminently becoming so is outside the scope of this *Inventory*. By limiting our scope in this way, we in no way imply that these species are not of concern.

Scientific Names

The plants in this *Inventory* are presented by their scientific names which have been properly published according to the *International Code of Botanical Nomenclature*. See Shevock (1993)^[10] for a general discussion of nomenclature.

In its simplest form, a scientific name has three parts. The first is the genus name. It is always capitalized. The second part is the specific epithet, often incorrectly called "the species name." Together, these two components make up the species name. If a scientific name is presented in its most complete form, these two words will be followed by the names of one or more persons, often in an abbreviated form, who first published the specific epithet or subsequently published a taxonomic modification of the plant. These names are the authorities. If a portion of an authority occurs within parentheses, then the author in parentheses originally placed the epithet in a different genus or species, or once assigned it to a different taxonomic rank. The name cited outside the parentheses is that of the person who published the combination as it now appears.

Often the scientific name is more complex because botanists have recognized categories below the level of species. The two most useful are the subspecies (abbreviated ssp.) and the variety (abbreviated var.) These names are also displayed according to the *International Code* and they have their own authorities.

Consider the example *Penstemon newberryi* Gray var. *sonomensis* (Greene) Jeps. *Penstemon* is the genus name; *newberryi* is the specific epithet; Gray, for Asa Gray, is the author of the specific epithet; var. is the abbreviation for variety;

sonomensis is the subspecific epithet; (Greene), for Edward L. Greene, first described the var. *sonomensis* as a full species; and Jeps., for Willis Lynn Jepson, modified its taxonomic position and made it a variety of *P. newberryi*. Following the general practice for foreign words and phrases, Latin portions of the name (genus, species, and infraspecific epithet) are typically distinguished from surrounding text with underlining or italic typeface.

Nomenclatural Usage

We use what we consider to be the current, best nomenclature based on the recommendations of the Rare Plant Program Committee and consultation with taxonomic authorities. Many names in this *Inventory* have been in use for a long time, appearing in Munz (1959, 1968, 1974)^{[7][8][9]} and Abrams (1923-1960)^[1]. Others have been introduced or reintroduced to us in The Jepson Manual (1993)^[4] and [The Jepson Online Interchange](#), or described new to science in the last several years.

The usage in this *Inventory* does not follow any single published source, though if other considerations are equal, we use the names found in The Jepson Manual and/or on their Online Interchange. When the nomenclature we use varies from that of The Jepson Manual, we include information in the Notes section of each entry describing the situation. See Skinner and Ertter (1993)^[11] for a discussion of taxonomic coordination between the *Inventory* and The Jepson Manual.

Where there is disagreement among experts on taxonomic distinctiveness, we lean towards recognizing doubtfully distinct taxa. Such taxa are typically assigned to List 3. By encouraging protection until taxonomic questions are resolved, we hope to reduce ex post facto regret over taxa that have been shown to be distinct only after their disappearance.

We do not include taxa that lack formally published scientific names.

Common Names

Each of the plants has a common or vernacular name. Although the majority of the plants in the *Inventory* have no real common name, we include them because it is often easier for many of us to refer to a plant by a more familiar sounding name. Most of the common names were coined by Leroy Abrams for his *Illustrated Flora of the Pacific States*. In other instances, we simply follow his lead by contriving names, usually by translating the Latin or Greek roots into English or by selecting an appropriate geographical reference or person's name. We attempt to follow Kartesz and Thieret (1991)^[6] in matters of capitalization, spelling, and hyphenation of common names.

Family Names

Each entry includes the technical name of the family to which the plant belongs. Note that all of these names end with the suffix "-aceae." A few plant families have older, alternative names that the *International Code* allows to be used because their widespread acceptance predates formal nomenclature. Gramineae is a perfectly acceptable alternative for Poaceae; Compositae for Asteraceae; Cruciferae for Brassicaceae; Umbelliferae for Apiaceae; Leguminosae for Fabaceae; and Labiatae for Lamiaceae. However, these old names are gradually losing favor, so we use the standardized, modern names for these families.

The CNPS Ranking System

California Rare Plant Rank 1A: Plants Presumed Extirpated in California and Either Rare or Extinct Elsewhere

Plants with a California Rare Plant Rank of 1A are presumed extirpated or extinct because they have not been seen or collected in the wild in California for many years. A plant is extinct if it no longer occurs anywhere. A plant that is extirpated from California has been eliminated from California, but may still occur elsewhere in its range.

All of the plants constituting California Rare Plant Rank 1A meet the definitions of the California Endangered Species Act of the California Department of Fish and Game Code, and are eligible for state listing. Should these taxa be rediscovered, and impacts proposed to individuals or their habitat, they must be analyzed during preparation of environmental documents relating to the California Environmental Quality Act (CEQA), or those considered to be functionally equivalent to CEQA, as they meet the definition of Rare or Endangered under CEQA Guidelines §15125 (c) and/or §15380.

California Rare Plant Rank 1B: Plants Rare, Threatened, or Endangered in California and Elsewhere

Plants with a California Rare Plant Rank of 1B are rare throughout their range with the majority of them endemic to California. Most of the plants that are ranked 1B have declined significantly over the last century. California Rare Plant

Rank 1B plants constitute the majority of taxa in the CNPS *Inventory*, with more than 1,000 plants assigned to this category of rarity.

All of the plants constituting California Rare Plant Rank 1B meet the definitions of the California Endangered Species Act of the California Department of Fish and Game Code, and are eligible for state listing. Impacts to these species or their habitat must be analyzed during preparation of environmental documents relating to CEQA, or those considered to be functionally equivalent to CEQA, as they meet the definition of Rare or Endangered under CEQA Guidelines §15125 (c) and/or §15380.

California Rare Plant Rank 2A: Plants Presumed Extirpated in California, But Common Elsewhere

Plants with a California Rare Plant Rank of 2A are presumed extirpated because they have not been observed or documented in California for many years. This list only includes plants that are presumed extirpated in California, but more common elsewhere in their range.

All of the plants constituting California Rare Plant Rank 2A meet the definitions of the California Endangered Species Act of the California Department of Fish and Game Code, and are eligible for state listing. Should these species be rediscovered, any impacts proposed to individuals or their habitat must be analyzed during preparation of environmental documents relating to CEQA, or those considered to be functionally equivalent to CEQA, as they meet the definition of Rare or Endangered under CEQA Guidelines §15125 (c) and/or §15380.

California Rare Plant Rank 2B: Plants Rare, Threatened, or Endangered in California, But More Common Elsewhere

Except for being common beyond the boundaries of California, plants with a California Rare Plant Rank of 2B would have been ranked 1B. From the federal perspective, plants common in other states or countries are not eligible for consideration under the provisions of the Federal Endangered Species Act. With California Rare Plant Rank 2B, we recognize the importance of protecting the geographic range of widespread species. In this way we protect the diversity of our own state's flora and help maintain evolutionary processes and genetic diversity within species.

All of the plants constituting California Rare Plant Rank 2B meet the definitions of the California Endangered Species Act of the California Department of Fish and Game Code, and are eligible for state listing. Impacts to these species or their habitat must be analyzed during preparation of environmental documents relating to CEQA, or those considered to be functionally equivalent to CEQA, as they meet the definition of Rare or Endangered under CEQA Guidelines §15125 (c) and/or §15380.

California Rare Plant Rank 3: Plants About Which More Information is Needed - A Review List

Plants with a California Rare Plant Rank of 3 are united by one common theme - we lack the necessary information to assign them to one of the other ranks or to reject them. Nearly all of the plants constituting California Rare Plant Rank 3 are taxonomically problematic. For each California Rare Plant Rank 3 plant we have provided the known information and indicated in the "Notes" section of the CNPS *Inventory* record where assistance is needed. Data regarding distribution, endangerment, ecology, and taxonomic validity are welcomed and can be submitted by emailing the Rare Plant Program at rareplants@cnps.org.

Many of the plants constituting California Rare Plant Rank 3 meet the definitions of the California Endangered Species Act of the California Department of Fish and Game Code, and are eligible for state listing. Impacts to these species or their habitat should be analyzed during preparation of environmental documents relating to CEQA, or those considered to be functionally equivalent to CEQA, as they may meet the definition of Rare or Endangered under CEQA Guidelines §15125 (c) and/or §15380.

California Rare Plant Rank 4: Plants of Limited Distribution - A Watch List

Plants with a California Rare Plant Rank of 4 are of limited distribution or infrequent throughout a broader area in California, and their status should be monitored regularly. Should the degree of endangerment or rarity of a California Rare Plant Rank 4 plant change, we will transfer it to a more appropriate rank.

Some of the plants constituting California Rare Plant Rank 4 meet the definitions of the California Endangered Species Act of the California Department of Fish and Game Code, and few, if any, are eligible for state listing. Nevertheless, many of them are significant locally, and we strongly recommend that California Rare Plant Rank 4 plants be evaluated for impact significance during preparation of environmental documents relating to CEQA, or those considered to be functionally equivalent to CEQA, based on CEQA Guidelines §15125 (c) and/or §15380. This may be particularly appropriate for:

- The type locality of a California Rare Plant Rank 4 plant,
- Populations at the periphery of a species' range,
- Areas where the taxon is especially uncommon,
- Areas where the taxon has sustained heavy losses, or
- Populations exhibiting unusual morphology or occurring on unusual substrates.

Threat Ranks

- 0.1-Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)
- 0.2-Moderately threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat)
- 0.3-Not very threatened in California (less than 20% of occurrences threatened / low degree and immediacy of threat or no current threats known)

Notes:

1. The above Threat Rank guidelines only represent a starting point in the assessment of threat level. Other factors, such as habitat vulnerability and specificity, distribution, and condition of occurrences, are also considered in setting the Threat Rank.
2. Many of the Threat Ranks have not been reassessed since the time they were first designated after implementation of the [Rare Plant Status Review Process](#), and therefore may not represent the current level of threats associated with a given taxon.
3. The Threat Ranks do not designate a change of environmental protections. For instance a CRPR 1B.3 plant has the same environmental protections as a CRPR 1B.1 plant, and it is mandatory that both be fully considered during preparation of environmental documents relating to CEQA.

State and Federal Status

For each taxon with official status under the California Endangered Species Act (CESA), the Federal Endangered Species Act (FESA), and/or the Native Plant Protection Act (NPPA), the plant's status is presented. Our definitions conform to those found in California state law and federal regulations.

CNDDDB ELEMENT RANKING^[3]

Global Ranking

The *global rank* (G-rank) is a reflection of the overall status of an element throughout its global range. **Both Global and State ranks represent a letter+number score that reflects a combination of Rarity, Threat and Trend factors, with weighting being heavier on Rarity than the other two.**

Species or Natural Community Level

- **G1 = Critically Imperiled** — At very high risk of extinction due to extreme rarity (often 5 or fewer populations), very steep declines, or other factors.
- **G2 = Imperiled** — At high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors.
- **G3 = Vulnerable** — At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors.
- **G4 = Apparently Secure** — Uncommon but not rare; some cause for long-term concern due to declines or other factors.
- **G5 = Demonstrably Secure** — Common; widespread and abundant.

Subspecies Level

Subspecies receive a **T-rank** attached to the G-rank. With the subspecies, the G-rank reflects the condition of the entire species, whereas the T-rank reflects the global situation of just the subspecies or variety. For example: *Chorizanthe robusta* var. *hartwegii*. This plant is ranked G2T1. The G-rank refers to the whole species range i.e., *Chorizanthe robusta*. The T-rank refers only to the global condition of var. *hartwegii*.

State Ranking

The *state rank* (S-rank) is assigned much the same way as the global rank, but state ranks refer to the imperilment status only within California's state boundaries.

- **S1 = Critically Imperiled** — Critically imperiled in the state because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.
- **S2 = Imperiled** — Imperiled in the state because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.
- **S3 = Vulnerable** — Vulnerable in the state due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.
- **S4 = Apparently Secure** — Uncommon but not rare; some cause for long-term concern due to declines or other factors.
- **S5 = Secure** — Common, widespread, and abundant in the state.

Notes:

- Other considerations used when ranking a species or natural community include the pattern of distribution of the element on the landscape, fragmentation of the population/stands, and historical extent as compared to its modern range. It is important to take a **bird's eye or aerial view** when ranking sensitive elements rather than simply counting element occurrences.
- Uncertainty about the rank of an element is expressed in two major ways:
 - By expressing the ranks as a **range** of values: e.g., S2S3 means the rank is somewhere between S2 and S3.
 - By adding a ? to the rank: e.g., S2? This represents more certainty than S2S3, but less certainty than S2.
- Other symbols:
 - GH - All sites are **historical**; the element has not been seen for at least 20 years, but suitable habitat still exists (SH = All California sites are historical).
 - GX - All sites are **extirpated**; this element is extinct in the wild (SX = All California sites are extirpated).
 - GXC - Extinct in the wild; exists in cultivation.
 - G1Q - The element is very rare, but there are **taxonomic questions** associated with it.
 - T - Rank applies to a subspecies or variety.

Occurrence Data from DFG California Natural Diversity Database^[2]

Element Occurrence (EO)

- **Element:** A plant, animal, or natural community tracked by the natural heritage program.
- **Occurrence:** The specific location(s) where an element is known to occur.

Definition of plant EOs in California: A population or group of populations found within 0.25 miles and not separated by significant habitat discontinuities.

Total # of Known Element Occurrences / Occurrence Count

The current number of occurrences for a particular element.

Element Occurrence Ranks

An element's *Occurrence Rank* is a ranking of the quality of the habitat and the condition of the population at that location. The possible values for Occurrence Rank are:

- **A** - Excellent
- **B** - Good
- **C** - Fair
- **D** - Poor
- **X** - None (extirpated or possibly extirpated element occurrences)
- **U** - Unknown

Population Status

Displays number of element occurrences that have been seen and/or not seen within the past 20 years. Element occurrences that have not been seen within the past 20 years are considered historic.

Presence

Presence refers to the condition of the occurrence at the site when it was last observed. The possible values for Presence are:

- **Presumed Extant:** The most common entry. An occurrence is presumed to still be in existence until evidence to the contrary is received by the CNDDDB.
- **Possibly Extirpated:** Evidence of habitat destruction or population extirpation has been received by the CNDDDB for this site, but questions remain as to whether the element still exists.
- **Extirpated:** Only used when the element has been searched for but not seen for many years or when the habitat is destroyed at this site.

Biology

Life Form

A brief description of plant duration and life form. The information is primarily developed from published and unpublished literature and from herbarium material. Our simplified classification system is as follows:

Duration:

- **Annual:** Grows from seed and reproduce within a single year.
- **Perennial:** Lives more than one year.
(Annual/Perennials are variable depending on environment and conditions.)

Growth Form:

- **Herbs:** Plants that are herbaceous and lack above-ground woody tissue.
 - **Bulbiferous herb:** Plants have fleshy underground storage organs typically derived from scale leaves (this category includes cormiferous and other similar plants in which storage organs have other origins).
 - **Rhizomatous herb:** Plants have underground stems (rhizomes), typically bearing shoots which develop into new plants.
 - **Stoloniferous herb:** Plants have above-ground runners (stolons) which typically root and produce new plants.
- **Shrubs:** Smaller woody perennials that retain most of their above-ground woody tissue and are typically many-stemmed.
 - **Leaf succulents:** Succulents with thick, fleshy leaves.
 - **Stem succulents:** Succulents with thick, fleshy stems and reduced or absent leaves.
- **Trees:** Larger woody perennials that retain all of their above-ground wood tissue and are typically single-stemmed.
- **Vines:** Twining woody perennials requiring external support for growth.

- **Mosses:** Small green plants (one of three groups of bryophytes) with structures that resemble miniature leaves and stems. The leaves generally have a midrib called a costa. The sporophyte (the spore-bearing structure) is persistent for weeks.
- **Liverworts:** Small green plants (one of three groups of bryophytes). There are both leafy and thalloid types - leafy liverworts lack a midrib on the leaves, while thalloid liverworts have no leaves. The sporophyte is short-lived.
- **Leaf Condition (for shrubs, trees, vines only):**
 - **Deciduous:** Plants shed their leaves for part of the year.
 - **Evergreen:** Plants retain their leaves for an entire year.
- **Special Habitat:**
 - **Aquatic:** Plants are submerged or floating on the water surface.
 - **Emergent:** Plants are rooted in water but bear some foliage out of the water.
- **Mode of Nutrition:**
 - **Achlorophyllous:** Plants lack chlorophyll and live on existing organic matter in the soil.
 - **Hemiparasitic:** Plants are connected to host plants and derive energy, water, and minerals from them, but also maintain their own functional root systems or photosynthetic surfaces.
 - **Parasitic:** Plants are connected to host plants and rely solely on them for energy, water, and nutritional requirements.
 - **Carnivorous:** Plants trap insects and other small animals and derive nourishment from them.

As in most classifications, some of the above distinctions are somewhat arbitrary, particularly the divisions between growth forms. Furthermore, plant growth form can vary depending on geography and local environmental conditions. Perennials that are often referred to as either suffrutescent herbs or subshrubs present special difficulties. Generally, if these plants die back seasonally to the ground or to a small crown of woody tissue we classify them as herbs, and if they retain much or all of their woody above-ground tissue we call them shrubs.

Blooming Period

The month(s) when each rare plant is typically in bloom. For ferns and other spore-bearing plants, we give the months when spores are released and spore-bearing structures such as sori are typically present on the plant. We do not included any comparable information for gymnosperms and nonvascular taxa.

Note: Months in parentheses are uncommon.

Habitats

One or more habitats in which a rare, threatened, or endangered plant is typically found. This information is compiled from field survey forms, unpublished reports, original descriptions, floras, and herbarium material. Note that for habitats which typically occur within a broader matrix of another habitat, we usually list both. For example, a rare plant from Meadows and Seeps occurring in a matrix of Upper Montane Coniferous Forest would typically have its habitat presented as "Meadows and Seeps, Upper Montane Coniferous Forest."

Habitats follow brief characterizations outlined by Robert F. Holland and John O. Sawyer, Jr. and are presented in taxonomic rather than alphabetical order. Please refer to Holland (1986)^[5] for a more complete discussion of the types and their classification.

Habitats:

- **Coastal Dunes:** Herbs or shrubs on coastal sand deposits from Del Norte to San Diego counties. Cover usually low near the beach, increasing with distance from salt spray and blowing sand.
- **Desert Dunes:** Sand accumulations east of the Pacific Crest from Modoc to Imperial counties. Vegetation on desert dunes varies considerably. Active dunes usually support only sparse herbs and grasses, but partially stabilized or stabilized dunes often will support shrubs, including mesquite and creosote bush.
- **Inland Dunes:** Mostly herbs, although shrubs may be locally important. Sand accumulations in and around the Great Valley.
- **Coastal Bluff Scrub:** Dense shrubs, prostrate to 1-2 meters tall. Typically on fairly steep, rocky sites exposed to considerable wind and salt spray because of proximity to the ocean. Many plants succulent, especially to the south. Found from Del Norte to San Diego counties.
- **Coastal Scrub:** Dense shrubs 0.5 to 2 meters tall with scattered grassy openings. Many plants dormant, even deciduous, during periods of water stress. Most sites have shallow rocky soils, frequently with a southern or western exposure. Many taxa adapted to fire by stump sprouting or high seed production.

- **Sonoran Desert Scrub:** Widely scattered creosote bushes with the considerable space between them sometimes occupied by ephemeral, colorful shows of annuals following particularly wet winters. Succulents and microphyllous trees conspicuous, especially in rocky environments. The part of Munz's (1959)^[7] "Creosote bush scrub" found roughly south of the San Bernardino / Riverside county line.
- **Mojavean Desert Scrub:** Widely scattered creosote bushes with the considerable space between them sometimes occupied by ephemeral, colorful shows of annuals following particularly wet winters. At elevations of 600 meters or higher, succulents or microphyllous trees lacking. This habitat type constitutes most of Munz's (1959)^[7] "Creosote bush scrub" found north of the San Bernardino / Riverside county line.
- **Great Basin Scrub:** Shrubs, ranging in height from very short, <20 centimeters, on very cold sites or shallow soils to 1 or 2 meters tall on warmer sites where soils are deeper. Perennial grasses occupy much of the space between shrubs. Found on the Modoc Plateau, high Cascade Range, Warner Mountains, High Sierra Nevada, and North Coast Ranges.
- **Chenopod Scrub:** Usually gray, intricately branched, microphyllous shrubs most commonly on fine-textured, alkaline and/or saline soils in areas of impeded drainage. Diversity usually low to monotonous. Saltbushes and greasewood frequently dominate. This vegetation occurs from Modoc County south to Mexico, including parts of the Great Valley and Inner South Coast Ranges.
- **Chaparral:** Impenetrably dense, evergreen, leathery-leaved shrubs that are active in winter, dormant in summer, and adapted to frequent fires either through resprouting or seed carry-over. There is a characteristic florula of fire-following annuals and short-lived perennials. Mature stands may exceed 3-4 meters in height. It occurs on diverse substrates, many of which support distinctive suites of edaphic indicators. Chaparral may be successional to conifer forests or oak woodlands, as tree seedlings can be found beneath the shrub canopies.
- **Coastal Prairie:** Dense, fairly tall (<1 meter) perennial sod- and tussock-forming grasses and grass-like herbs. They occur in two distinct settings: sandy marine terraces within the zone of coastal fog (usually <350 meters elevation, within a matrix of Northern Coastal Scrub), or on fine-textured soils of ridgetops beyond coastal fogs (usually >750 meters, within a matrix of Mixed Evergreen or North Coastal Conifer Forests). Intermittent from the Santa Cruz area north to southern Oregon.
- **Great Basin Grassland:** Perennial sod-forming and bunch grasses. Presumed to have once been widespread on the Modoc Plateau and northeastern California. Currently represented as scattered, mostly small, islands in areas where grazing pressure has been low and fire frequencies higher than surrounding scrubs. Both upland and bottom-land forms occur.
- **Valley and Foothill Grassland:** Introduced, annual Mediterranean grasses and native herbs. On most sites the native bunch grass species, such as needle grass, have been largely or entirely supplanted by introductions. Stands rich in natives usually found on unusual substrates, such as serpentinite or somewhat alkaline soils.
- **Vernal Pools:** Seasonal amphibious environments dominated by annual herbs and grasses adapted to germination and early growth under water. Spring desiccation triggers flowering and fruit set, resulting in colorful concentric bands around the drying pools.
- **Meadows and Seeps:** More or less dense grasses, sedges, and herbs that thrive, at least seasonally, under moist or saturated conditions. They occur from sea level to treeline and on many different substrates. They may be surrounded by grasslands, forests, or shrublands.
- **Playas:** Non-vascular plants and sparse, gray shrubs on poorly drained soils with usually high salinity and/or alkalinity, due to evaporation of water from closed basins. Found from the Modoc Plateau to Sonoran Desert and in the San Joaquin Valley.
- **Pebble or Pavement Plain:** Herb- and grass-dominated openings of low cover, dominated by several cushion-forming plants endemic to dense, clay soils armored by a lag gravel of quartzite pebbles. Many of the dominant taxa are themselves rare plants. Found only in the San Bernardino Mountains.
- **Bogs and Fens:** Wetlands, typically occupying sites sub-irrigated by cold, frequently acidic, water. Plant growth dense and low growing, dominated by perennials herbs or low shrubs. Saturated soils frequently allow substantial accumulations of "peat." From the Klamath Ranges to North Coast Ranges, along the North Coast and in the northern Sierra Nevada.
- **Marshes and Swamps:** Emergent, suffrutescent herbs adapted to seasonally or permanently saturated soils. These include salt, brackish, alkali, and fresh water marshes, as well as swamps, with their woody dominants and hydrophytic herbs. Found throughout California.
- **Riparian Forest:** Broadleaved, winter deciduous trees, forming closed canopies, associated with low- to mid-elevation perennial and intermittent streams. Most stands even-aged, reflecting their flood-mediated, episodic reproduction. These habitats can be found in every county and climate in California.
- **Riparian Woodland:** Broadleaved, winter deciduous trees with open canopies associated with low- to mid-elevation streams. Most stands even-aged, reflecting their flood-controlled, episodic reproduction. This type tends to occupy more intermittent streams, often with cobbly or bouldery bedloads.
- **Riparian Scrub:** Streamside thickets dominated by one or more willows, as well as by other fast-growing shrubs and vines. Most plants recolonize following flood disturbance.

- **Cismontane Woodland:** Trees deciduous, evergreen, or both, with open canopies. Broadleaved trees, especially oaks, dominate, although conifers may be present in or emergent through the canopy. Understories may be open and herbaceous or closed and shrubby. This type occurs on a variety of sites below the conifer forests in Mediterranean California.
- **Pinyon and Juniper Woodland:** Open stands of round-topped conifers to 5 meters. Understories frequently comprised of shrubs and herbs seen in adjacent stands lacking trees. They often form broad ecotones between higher elevation forests and lower elevation scrublands or grasslands.
- **Joshua Tree Woodland:** Joshua trees with open canopies are usually the only arborescent species present. Shrubstories typically are diverse mixtures of microphyllous, evergreen shrubs, semi-deciduous shrubs, semi-succulents, and succulents.
- **Sonoran Thorn Woodland:** Succulents, microphyllous herbs and shrubs, especially of rocky environments. Tree-like plants the visual dominant.
- **Broadleaved Upland Forest:** Stands of evergreen or deciduous, broadleaved trees 5 meters or more tall, forming closed canopies. Many, but not all, with very poorly developed understories. Several are seral to montane conifer forests. It includes the "mixed evergreen forest" of the Coast Ranges.
- **North Coast Coniferous Forest:** Needle-leaved evergreen trees in usually quite dense stands that may attain impressive heights. Usually on well-drained, moist sites within the reach of summer fogs, but not experiencing much winter snow. This type occurs in the wetter parts of the North Coast Ranges.
- **Closed-cone Coniferous Forest:** Dense, even-aged stands dominated by serotinous-coned conifers. Most stands are even-aged due to fire establishment. Usually associated with sterile, rocky soils, strong and steady winds, and impaired drainage. Many open stands have understories composed of chaparral or coastal scrub species from surrounding areas. Found in most areas, except for the Great Valley or deserts.
- **Lower Montane Coniferous Forest:** Open to dense stands of conifers found at lower and middle elevations in the mountains. Broadleaved trees may be present in the understory. Shrubstories may be dense assemblages of chaparral species, especially in seral stands. The upper limit of lower montane coniferous forests more or less coincides with the elevation of maximum annual precipitation.
- **Upper Montane Coniferous Forest:** Open to dense conifer forests, found at high elevations in the mountains. Trees tend to be somewhat shorter than at lower elevations. Shrubstories tend to be open, drawn from adjacent montane chaparral species, or lacking. Above the elevation of maximum precipitation, with growing seasons curtailed by winter snow accumulations.
- **Subalpine Coniferous Forest:** Conifer forests and associated clearings of highest elevations of tree establishment. This type occurs in areas where substantial snowpack accumulation and cold temperatures limit the growing season to three months or less.
- **Alpine Boulder and Rock Field:** Fell-fields, talus slopes, and meadows found above forest line. Favorable sites may develop continuous turf, but in most areas plants are tucked between large nurse rocks that provide protection from harsh winter conditions.
- **Alpine Dwarf Scrub:** Compact, woody subshrubs above forest line, adapted to short growing seasons resulting from snow accumulation or harsh winter winds.

Habitat Modifiers

Descriptors that denote substrate type, hydrological information, etc., are often used to modify habitat types as follows:

- "(descriptor)" pertains only to the habitat type immediately preceding
- "descriptor" prior to habitat types pertains to *all* habitats

Typical Modifiers

sandy	serpentine	burned areas	bajadas
gravelly	granitic	disturbed areas	lake margins
rocky	carbonate	roadsides	streambanks
scree	gabbroic	openings	
talus	volcanic	edges	freshwater (used for Marshes and Swamps)
	metamorphic	mesic	coastal salt (used for Marshes and Swamps)
alkaline	clay	vernally mesic	maritime (used for Chaparral)
acidic	pumice	seeps	coastal
	loam		

Distribution

The distribution of the taxon is described by county or island within California, together with other states and countries where we know the plant to exist. We record only natural occurrences of rare plants, or occurrences that have been reestablished within the species' historic range as part of an approved recovery plan. For example, although both Northern California black walnut (*Juglans hindsii*) and Monterey pine (*Pinus radiata*) are widely planted within the state, we track only the few natural occurrences of these taxa. When we indicate that a particular plant occurs in a particular county, we are making a positive statement that is based upon specimens, photographs, the literature, or field observations. In no way does this imply that a plant does not occur in other counties in California or in other states. Our understanding of plant distribution constantly improves, and new localities for rare plants are discovered often in unpredicted circumstances.

The following symbols are used as modifiers preceding counties, quads, and/or states to express extirpation and/or uncertainty:

- * Presumed extirpated
- ? Uncertain about distribution or identity
- ?* Uncertain about distribution, but presumed extirpated if once present
- (?) Occurrence confirmed, but possibly extirpated

Counties and Islands

Three letter codes have been attributed for each county and island within California to maintain and manage swift data control of the *Inventory*. In turn, these codes are used as abbreviations in the "Notes" section on the plant detail page for some taxa.

County and Island Codes:

ALA Alameda	MEN Mendocino	SIE Sierra
ALP Alpine	MER Merced	SIS Siskiyou
AMA Amador	MOD Modoc	SJQ San Joaquin
ANA Anacapa Isl.	MNO Mono	SLO San Luis Obispo
BUT Butte	MNT Monterey	SMI San Miguel Isl.
CAL Calaveras	NAP Napa	SMT San Mateo
CCA Contra Costa	NEV Nevada	SNI San Nicolas Isl.
COL Colusa	ORA Orange	SOL Solano
DNT Del Norte	PLA Placer	SON Sonoma
ELD El Dorado	PLU Plumas	SRO Santa Rosa Isl.
FAR Farallon Isl.	RIV Riverside	STA Stanislaus
FRE Fresno	SAC Sacramento	SUT Sutter
GLE Glenn	SBA Santa Barbara	TEH Tehama
HUM Humboldt	SBD San Bernardino	TRI Trinity
IMP Imperial	SBR Santa Barbara Isl.	TUL Tulare
INY Inyo	SBT San Benito	TUO Tuolumne
KNG Kings	SCL Santa Clara	VEN Ventura
KRN Kern	SCM San Clemente Isl.	YOL Yolo
LAK Lake	SCT Santa Catalina Isl.	YUB Yuba
LAS Lassen	SCR Santa Cruz	
LAX Los Angeles	SCZ Santa Cruz Isl.	BA Baja California
MAD Madera	SDG San Diego	GU Isla Guadalupe, Baja
MPA Mariposa	SFO San Francisco	SA South America
MRN Marin	SHA Shasta	SO Sonora, Mexico

Quadrangles

To provide more detailed location information, we cite the U.S. Geological Survey (USGS) 7.5 minute quadrangle (quad) map for all plants on CNPS Lists 1, 2, and 3, as well as some plants on List 4 (please see warning about quad maps for List 4's below). We employ a modified version of the quad numbering system previously used by the California Department of Water Resources. [Please follow this link](#) to translate this system's quad numbers into USGS topographic map names or vice versa. In those few cases where a quad is listed without a letter following the number, this indicates that our occurrence data are too vague to pinpoint its location on a 7.5 minute quadrangle. As with counties, this is positive siting information - when we indicate that a plant has been reported from an area on a topographic quad, it is based on hard

data. In no way does this imply that a plant does not occur on a topographic quad we have not listed; rather, it may be there but botanists have yet to find it. As with distribution, quads are also often modified with the symbols "*" and "?", which respectively express extirpation and uncertainty (see above).

Quad data is not available for all List 3 and 4 plants. For those that do contain this data, it has not been quality controlled and is potentially incomplete, inaccurate, and/or out of date. Please use caution when referencing this information. We are currently working hard to maintain this data and hope to provide accurate and up to date information in the near future.

A complete list of California USGS quads is available [here](#). Alternatively, an abbreviated index of only quads occupied with taxa included in the *Inventory* is available [here](#).

Elevation

An elevational range is provided for each taxon in meters. The stated range is for the California portion of a plant's range only (if the taxon also occurs outside the state). These elevational range data are accumulated from literature, herbarium specimens, and field survey information.

Notes

Many entries include additional notes on distribution, endangerment, relationship to names in The Jepson Manual, or important literature citations. We again include information about legal status and endangerment in neighboring states in the notes; official state designations are specifically indicated as such and capitalized, as in "State-listed as Endangered in OR". We make a special effort to indicate missing information about distribution, endangerment, or taxonomy for each entry, in the hope that knowledgeable users will fill in the gaps.

Abbreviations that are commonly used in the notes include:

ACEC	Area of Critical Environmental Concern	NA	North America
AFB	Air Force Base	NF	National Forest
BA	Botanical Area	NM	National Monument
BLM	Bureau of Land Management	NP	National Park
CalTrans	California Department of Transportation	NS	National Seashore
Cyn.	Canyon	Pk.	Peak
DFG	California Department of Fish and Wildlife	Pt.	Point
DOD	United States Department of Defense	RNA	Research Natural Area
ER	Ecological Reserve	SP	State Park
Ft.	Fort	SR	State Reserve
HCP	Habitat Conservation Plan	TNC	The Nature Conservancy
Mt.	Mount	USFS	United States Forest Service
Mtn.	Mountain	USFWS	United States Fish and Wildlife Service
Mtns.	Mountains	WA	Wildlife Area

Threats: Includes information on *significant* threats to the plant over its range in California. Typical threats provided in the notes section include, but are not limited to the following:

development	recreational activities	military activities
urbanization	foot traffic (i.e. from people)	Border Patrol activities
agriculture		
logging	energy development	alteration of fire regimes
	pipeline construction	fire suppression
vehicles		frequent wildfires
horticultural collecting	mining	
illegal dumping	sand mining	competition
	gravel mining	non-native plants
	carbonate mining	introgression with...
	limestone mining	hybridization with...

road construction	flood control projects	meadow succession
road maintenance	hydrological alterations	erosion
road widening	inundation	habitat loss
	water diversions	habitat alteration
grazing	waterway channelization	habitat disturbance
overgrazing	groundwater pumping	
innappropriate grazing	flood control	
trampling		
feral herbivores		
feral pigs		
feral goats		

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Questions and Comments

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