

CALIFORNIA SAGEBRUSH

Artemisia californica Less.

Plant Symbol = ARCA11

Common Names: Coastal sagebrush, Coast sagebrush, California sagewort.

Scientific Names (The Plant List, 2013; USDA-NRCS, 2020):
Artemisia californica var. *californica* Less. (2011); *Artemisia californica* var. *insularis* (Rydb.) Munz (1935).

Description

General: Aster Family (Asteraceae). California sagebrush is an aromatic, native, perennial shrub that can reach 5 to 8 feet in height. It has a generally rounded growth habit, with slender, flexible stems branching from the base of the plant. Leaves are more or less hairy, light green to gray in color, usually 0.8 to 4.0 inches in length, with 2 to 4 thread-like lobes that are less than 0.04 inches wide, with the margins curled under. California sagebrush blooms in the later summer to autumn/winter (depending on locale), and inflorescences are long, narrow, leafy and sparse, generally exceeding the leaves, with heads less than 0.2 inches in diameter that nod when in fruit (Hickman, 1993).

Distribution: California sagebrush is found in coastal sage scrub communities from southwestern coastal Oregon, along the California coast and foothills, south into northern Baja California, Mexico (Figure 2) (Hickman, 1993). It also occurs on the coastal islands of California and Baja, generally below 3300 feet elevation, but may extend inland (and over 4920 feet in elevation) from the coastal zone.

Habitat Adaptation

This shrub is a dominant component of the coastal sage scrub, and an important member of some chaparral, coastal dune and dry foothill plant communities, especially near the coast (Hickman, 1993). Typical landforms include coastal terraces, low to middle slopes, valley bottoms, coastal bluffs, rock outcrops, and areas of disturbance on moderate to steeper slopes (Holland, 1986; Munz and Keck, 1949). Soils vary from coarse gravels to clays, but typically only support plant-available moisture with winter and spring rains. It grows best on shallow, well-drained soils in hardiness zones 7-9 and 14-24 (Norris-Brenzel, 2001).

California sagebrush is a native, dominant component of central and southern coastal sage scrub that generally occurs where the coastal (marine) effect of the Pacific Ocean moderates summer drought. The climate is seasonally wet, with most precipitation falling as rain between November and April. Other associated diagnostic shrub and half-shrub species in this association include; Coyotebrush, *Baccharis pilularis*; Blueblossom, *Ceanothus thyrsiflorus*; Bush sunflower, *Encelia californica*; California yerba santa, *Eriodictyon californicum*; Coastal buckwheat, *Eriogonum cinereum*; California buckwheat, *Eriogonum fasciculatum*; seaside woolly sunflower, *Eriophyllum stoechadifolium*; salal, *Gaultheria shallon*; goldenbush, *Isocoma menziesii*; deerweed, *Lotus scoparius*; Lupine spp. *Lupinus* spp.; chaparral bush mallow, *Malacothamnus fasciculatus*; Fremont's bush mallow, *Malacothamnus fremontii*; coastal prickly pear, *Opuntia littoralis*; California blackberry, *Rubus ursinus*; white sage, *Salvia apiana*; purple sage, *Salvia leucophylla*; black sage, *Salvia mellifera*; poison oak, *Toxicodendron diversilobum*, and California huckleberry, *Vaccinium ovatum* (Rundel, 2007; Sawyer et al., 2009;

Southern coastal scrub occurs below 1000 m (3300 feet) elevation and extends inland from the maritime zone in hotter, drier conditions than northern (less fog-drenched) shrublands (e.g., areas with 10-60 cm of annual precipitation) (Rundel, 2007). The more northern scrub extends inland in California in the vicinity of San Francisco Bay, the margins of the Sacramento-San Joaquin delta and up the Sierra Nevada foothills and North Coast Range and Klamath Range foothills to over 1500 m (4900 feet). Some of the inland extension follows coastal fog or cool marine air pushed inland by prevailing winds (Ford and Hays, 2007).

California sagebrush is adapted to summer heat and drought, dropping its leaves only under periods of extreme drought stress (Perry, 1981). The root system is shallow and fibrous, allowing the plant to take advantage of early season rains for rapid



Figure 1 California Sagebrush. James L. Reveal, USDA-NRCS PLANTS Database

growth (Hauser, 2006). The leaves produce soluble and volatile terpene compounds that are thought to inhibit germination and growth of some plants, resulting in relatively bare patches of soil under and around the shrub (Hauser, 2006). Early seral stands may form on disturbed sites such as roadsides, levees, and sites of recent landslides.

This plant is moderately adapted to fire, resprouting from the root crown about 25% of the time, or germinating from seed, especially in the second year after a fire (Keeley, 1998). Foliage contains substantial amounts of oil, making it highly flammable during the summer (Perry, 1981). Generally, coastal shrublands including California sagebrush as a dominant component become established following fire, but do not necessarily require fire for regeneration.

Uses

Landscaping and erosion control: Landscape use is usually restricted to slope plantings, especially road scars, and revegetation of disturbed areas for erosion control (Perry, 1981).

Wildlife: Late-successional California sagebrush communities provide foraging and nesting habitat for many birds, including critical habitat for the federally threatened California gnatcatcher and the endemic Bell's sage sparrow, a state-listed species of special concern (Hauser, 2006). These communities also support a number of amphibians, reptiles and small mammals, such as dusky-footed and desert woodrats who preferentially feed on California sagebrush (Meserve, 1974).

Ethnobotany

Native Americans in California used the leaves of California sagebrush for a number of medicinal treatments, including as a poultice for tooth aches or wounds, or applied to the back to treat asthma; as a decoction taken for menstrual problems, to ease childbirth, to ease menopausal symptoms, and for newborns to flush out their systems; and as a decoction used as a bath for colds, rheumatism and coughs (Bean and Saubel, 1972; Bocek, 1984; Foster and Hobbs, 2002).

The leaves are also reported to have been chewed fresh, or dried and used for smoking, mixed with tobacco and other dried leaves (Bean and Saubel, 1972). The Luiseno Indians reportedly burned the bushes with white sage in ceremonial fires before hunting (Sparkman 1908). Early Spanish Californians knew the plant as "Romerillo", and regarded it as a panacea, using it in tea for bronchial troubles, or as a wash for wounds and swellings (Dale, 1986). It was also used by early miners in sprays to drive fleas from their beds (Dale, 1986).

Status

Global rank for the species is G4 (Apparently Secure).

California state rank for the species is not currently assessed (as of 21 Apr 2020), but has been ranked in the past as S5 (Secure - common, widespread, and abundant in the state). However, California sagebrush is often a dominant component of two plant communities within the California Coastal Scrub association that are designated sensitive natural communities within California (The California Biologist's Handbook, 2020). These communities – Diegan and Venturan Coastal Sage Scrub – carry a global ranking of 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), and California state ranking of S3.1 ('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 from the state).

No special federal legal status.

Wetland Indicator Status: Upland.

Ranking and status values may change over time. Please consult the PLANTS Web site (<http://plants.usda.gov/>) and your state's Department of Natural Resources for this plant's current status (e.g., threatened or endangered species, state noxious status, and wetland indicator values).



Figure 2 California county level distribution map of California sagebrush. Image from PLANTS database (2020).

Planting / Seeding Guidelines

California sagebrush can be established from container stock or by direct seeding. Shallow seeding methods should be used, such as hydroseeding or broadcasting followed by seed imprinting or surface harrowing or dragging, as seeds have a light requirement for germination. For restoration projects, especially on steeper slopes, either seeding method can be followed by blowing a thin layer of straw at a rate of approximately 1,500 lbs/acre, with a hydromulch slurry of water, wood fiber at 300 lbs/acre, and tackifier (soil stabilizer) at 120 lbs/acre sprayed over the straw (Montalvo et al., 2002).

Management

For ornamental use, shrubs should be pruned or pinched back each year to maintain their form. In rangeland and other grazing applications, most classes of livestock generally avoid California sagebrush due to the pungent aroma and bitter taste. Domestic goats, however, will browse the shrub year-round (Hauser, 2006).

The species withstands cooler natural fires and controlled

burns and will typically sprout from surviving crowns. California sagebrush can be top killed by hotter fire regimes, but appears to recover within a few years. It can sprout from surviving root crowns as early as the next growing season. Coverage of California sagebrush may be slightly reduced from pre-fire levels for several years after fire, then typically returns to pre-fire levels (Keeley, 1998). It is sometimes seeded after fire to help stabilize denuded soil.

Pests and Potential Problems

There are no known pests or diseases of concern. However, the plant is sensitive to sulphur dioxide and ozone air pollution, which reduce foliar cover and may result in plant death (Preston, 1988; Westman, 1985). Elevated nitrogen deposition levels in the Los Angeles air basin also pose a threat to stand longevity, as exotic annual grasses tend to out-compete the shrub under such conditions (Hauser, 2006).

Environmental Concerns

California sagebrush is native shrub, and spreads primarily by seed distribution. Seed may remain viable in the soil for several years. In general, this species is well documented as having beneficial qualities, with no or negligible negative impacts on wild or domestic animals. There are no known environmental concerns associated with California sagebrush.

It is not normally considered "weedy", but could slowly spread into adjoining vegetative communities under ideal climatic and environmental conditions in some regions or habitats. Please consult with your local NRCS Field Office, Cooperative Extension Service office, or state natural resource or agriculture department regarding its status and use. Weed information is also available from the PLANTS Web site at www.plants.usda.gov.

Control

Effective control of California sagebrush requires careful attention to growth stage of the plant and proper timing of applications. Use labeled rates that will consistently achieve desired results, and include responsible rotation of methods and materials to manage the undesirable plant. Herbicides differ considerably in their non-target vegetation impact, volatility and residual carryover. California sagebrush can be reduced or suppressed by manual or mechanical mowing and grubbing, and has been shown to be controlled with the herbicides glyphosate and 2,4-D (Hauser, 2006).

Please contact your local agricultural extension specialist or county weed specialist to learn what works best in your area and how to use it safely. Always read label and safety instructions for each control method. Trade names and control measures appear in this document only to provide specific information. USDA-NRCS does not guarantee or warranty the products and control methods named, and other products may be equally effective.

Seeds and Plant Production

There are approximately 5,500,000 seeds/lb (USDA-NRCS, 2009; S & S Seeds, 2009). Seed is collected from October to February from mature (brown) inflorescences. Seed is light to dark brown when mature, and achenes should be pulled from the seed head at time of collection to check for maturity (they should not be green) (Young, 2001). Germination occurs in 21–30 days at 73.4°F (23°C) in light, and no seed treatment is required. Germination rates are generally



Figure 3. Flower structures and inflorescence form on California sagebrush, *Artemisia californica*. © 2008 Keir Morse, Calphotos

60–75% in controlled environments, but as low as 10–30% when broadcast (Keeley, 1987; Perry, 1981; Young, 2001). Stratification at 41°F for 15 days is reported to produce more rapid and uniform germination in other species of *Artemisia* (Long, 1986), and stratification for three months at 41°F is used to improve germination of California sagebrush in commercial nurseries (personal communication, California Flora Nursery, 5 November 2009).

Young (2001) recommends surface sowing seed in flats, then transplanting seedlings to individual tubes (2" dia. x 7" deep Deepot 16) 21 days after germination (transplant survival rate of 70%), and maintaining seedlings in a shadehouse for at least five weeks to develop further before being planted out. Alternately, seed can be sown directly in individual containers (1.5" dia. x 8.25" deep Supercell), with thinning required one and two months after sowing to leave only a single plant per container (Long, 1986).

Shrubs can also be propagated by semi-hard new-wood cuttings in the spring. Cuttings are treated with rooting hormone and maintained in flats with bottom heat and mist until rooted (personal communication, California Flora Nursery, 5 November 2009).

Cultivars, Improved, and Selected Materials (and area of origin)

Seed and transplants are generally available in the commercial market. Sources derived from specified local, natural origins should be favored. Cultivated varieties are also available for use in certain regions of the West Coast. More information about USDA-NRCS plant releases may be found in the release notice available from your local NRCS office. Contact your local NRCS office for more information. Look in the phone book under United States Government. The Natural Resources Conservation Service will be listed under the subheading "Department of Agriculture."

'**Canyon Gray**,' also called trailing sagebrush, is a prostrate cultivar that spreads along the ground, reaching 3 ft (0.9 m) high and 6 ft wide. It prefers sunny locations, is drought tolerant, and deer resistant (Yerba Buena Nursery, 2009). 'Montara' was selected by Roger Raiche at Montara Ridge in San Mateo County, CA. This cultivar forms a mound of finely-cut, fragrant foliage to around 2-3 ft tall by 3 ft wide. The plant requires full sun with decent drainage and is drought tolerant once established, but occasional summer water helps retain fresh look. 'Montara' thrives in coastal environments, and is deer resistant (California Flora Nursery, 2009).

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