

Santa Clara Valley Dudleya (*Dudleya setchellii*)

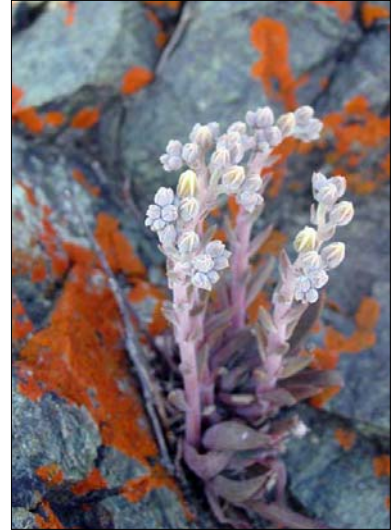
Legal Status

State: CNPS 1B.¹

Federal: Endangered (USFWS 1995)

Critical Habitat: None

Recovery Planning: *Recovery Plan for Serpentine Species of the San Francisco Bay Area* (U.S. Fish and Wildlife Service 1998)



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Taxonomy

Santa Clara Valley dudleya was first collected by the famous botanist Willis Jepson on Tulare Hill at the turn of the last century (Jepson 1901). The species was originally described as *Cotyledon laxa* var. *setchellii*. In 1903, this taxa was elevated to full species status and transferred to the new genus *Dudleya* (Britton and Rose 1903). The taxa was subsequently reduced to the subspecies level as *Dudleya cymosa* ssp. *setchellii* (Moran 1959, Nakai 1987). It was most recently elevated from subspecies to species level by Bartel in his treatment of the genus, resurrecting the original species name from 1903 (Hickman 1993). Santa Clara Valley dudleya is a member of the stonecrop family (Crassulaceae).

Description

Descriptions of the species' physical characteristics can be found in Hickman (1993) and in the *Recovery Plan for Serpentine Species of the San Francisco Bay Area* (U.S. Fish and Wildlife Service 1998). Santa Clara Valley dudleya is a perennial with succulent leaves one to three inches long and 0.3 to 0.6 inches wide. The species produces two to three flowering stalks up to 8 inches tall with pale yellow flowers in a terminal inflorescence.

¹ 1B means rare, threatened, or endangered in California and elsewhere; .1 means seriously endangered in California

Distribution

General

Santa Clara Valley dudleya is only found in Santa Clara County in the vicinity of Coyote Valley, from San Jose south about 20 miles to San Martin, at elevations of 300–900 feet (Figure 1).

Occurrences within the Study Area

Thirty-seven occurrences have been documented within the study area between 1989 and 2004, and all of these are presumed to be extant (Figure 2) (H.T. Harvey and Associates 2000, California Natural Diversity Database 2006). A total of 30,000–85,000 individuals are known to exist. This large range in the estimated number of individuals known for the species is due in part to the variation in the methodology of counting the rosettes which are formed as individual plants spread vegetatively (Jones & Stokes 1998). Of the 37 known occurrences, 17 are located on private land, 13 on public land, and five on land of unknown ownership. The remaining two occurrences are located partially on private land and partially on public land. Two of the populations on private land are located on land owned by IBM. The company plans to preserve these occurrences (U.S. Fish and Wildlife Service 1998).

Natural History

Habitat Requirements

Santa Clara Valley dudleya is restricted to rocky outcrops in serpentine grassland and oak woodland from 300–900 ft in elevation. McCarten (1993) suggests that suitable rock outcrops must have deep enough crevices for this species' roots, which are at least 6 inches long. Not all serpentine rock outcrops, therefore, may be suitable for Santa Clara Valley dudleya. Table 1 lists expected land cover associations for this species.

The rock outcrops where this species is found are otherwise largely unvegetated. However, adjacent serpentine grasslands typically are dominated by a mixture of native grasses, such as purple needlegrass (*Nasella pulchra*), and non-native grasses, such as wild oats (*Avena* spp.) and soft chess (*Bromus hordeaceus*). Native forbs are also common associates of this species, including lomatium (*Lomatium* spp.), soap plant (*Chlorogalum pomeridianum*), narrowleaf plantain (*Plantago erecta*), California poppy (*Eschscholzia californica*), and naked buckwheat (*Eriogonum nudum*) (U.S. Fish and Wildlife Service 1998, California Natural Diversity Database 2006). Santa Clara Valley dudleya may also occur on serpentine rock outcrops in oak woodland or savanna, where coast live oak (*Quercus agrifolia*) and valley oak (*Quercus lobata*) have been reported as associates (California Natural Diversity Database 2006).

Table 1. Habitat Associations for Santa Clara Valley Dudleya

Land Cover Type	Suitability	Rationale
Serpentine bunchgrass grassland	Moderate	Rock outcrops present in serpentine grassland may be below the minimum mapping unit size but still provide habitat.
Serpentine rock outcrop/barrens	High	Primary habitat for species (California Natural Diversity Database 2006, U.S. Fish and Wildlife Service 1998)
Valley oak woodland	Low	Reported from serpentine rock outcrops within Valley Oak savannah (California Natural Diversity Database 2006)
Coast live oak forest and woodland	Low	May occur on serpentine rock outcrops in cismontane woodland (California Native Plant Society 2006). Coast live oak is reported as an associate (California Natural Diversity Database 2006).
Mixed oak woodland and forest	Low	May occur on serpentine rock outcrops in cismontane woodland (California Native Plant Society 2006). Coast live oak is reported as an associate (California Natural Diversity Database 2006).

Population Ecology

Santa Clara Valley dudleya produces wind-dispersed seeds (McCarten 1993), and also reproduces vegetatively by forming rosettes that either remain attached to the parent plant or separate from it. (Plants that remain attached to parents make counting unique individuals difficult.) Individual plants live for up to 10 years. Seedling germination is high in wet years, but seedling survival is low, often less than 5% (McCarten 1993, U.S. Fish and Wildlife Service 1998). The highest seedling survival rates were on east- and north-facing slopes, suggesting that dessication may be a major source of seedling mortality (McCarten 1993, Jones & Stokes 1998). Suitable microhabitats on rock outcrops (crevices with enough soil to retain moisture) may greatly limit the population size of this species. Table 2 shows key seasonal periods for Santa Clara Valley dudleya.

Table 2. Key Seasonal Periods for Santa Clara Valley Dudleya

	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec
Germination (unknown)												
Flowering				✓	✓	✓						
Fruiting (unknown)												
Seed Dispersal (unknown)												

Population Status and Trends

Global: *Stable?*
State: *Stable?*
Within Study Area: *Stable?*

Insufficient data are available to characterize long-term demographic trends within populations (California Natural Diversity Database 2006). However, it

has been suggested that populations of Santa Clara Valley dudleya may be stable because of the stability of their microhabitats in crevices on serpentine rock outcrops (S. Weiss, pers. comm.). Population monitoring is needed to confirm this hypothesis.

Threats

The primary threats to Santa Clara Valley dudleya are overgrazing, development, and competition from non-native species (U.S. Fish and Wildlife Service 1998, Weiss 1999, California Native Plant Society 2006, California Natural Diversity Database 2006). Overcollecting is also a significant threat Santa Clara Valley dudleya because of its attractiveness to collectors, accessible population sites, and slow growth rate (U.S. Fish and Wildlife Service 1995). Other threats may include feral pigs, off-road vehicle use, and foot traffic (California Native Plant Society 2006, California Natural Diversity Database 2006).

Data Characterization

The general habitat requirements of Santa Clara Valley dudleya and the species distribution within its narrow range are relatively well understood. For example, a County-wide survey for this species was conducted in 2000 (H.T. Harvey and Associates 2000), and local botanists with the California Native Plant Society have been devoting significant attention to identifying and protecting local populations (D. Mayhall, pers. comm.). The species microhabitat requirements are not well understood, nor are the species' demography or pollination biology. The management needs of the species also need investigation.

Existing Conservation Actions in the Study Area

The recovery plan for Santa Clara Valley dudleya calls for protection and management of extant populations, as well as educational outreach in the San Jose area and collection and banking of seed (U.S. Fish and Wildlife Service 1998). Recommended research topics to inform conservation efforts include research on the effects of vegetation management on the species, demographic and dispersal studies, and research on the efficacy of seed germination and propagation techniques.

Protection of mitigation lands on Coyote Ridge and other sites such as the Valley Christian High School site (Jones & Stokes 1998) have preserved some habitat for Santa Clara Valley dudleya.

[Note to Reader: Jones & Stokes requests additional information on any conservation or monitoring activities for Santa Clara Valley dudleya in the study area.]

Modeled Habitat Distribution in Study Area

A habitat distribution model for Santa Clara Valley dudleya could not be developed because of the highly specialized and localized habitat requirements of the species. It is restricted to serpentine outcrops within annual grassland and oak woodland. However, only rock outcrops with sufficient crevice depth and soil depth within these crevices are likely to support the species. Serpentine rock outcrops were mapped in the study area, but only the largest outcrops were visible on the aerial photographs. This land cover types is therefore likely underrepresented on the land cover map. This species has received significant attention by the local botanical community in the last 5-10 years, particularly leading up to and since listing the species as endangered in 1995. As a result, the species' distribution is assumed to be well understood, and most large populations are assumed to be known and mapped. Therefore, there is less need for a habitat distribution model to predict unknown occurrences.

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