

**5-YEAR REVIEW**  
**Santa Clara Valley Dudleya (*Dudleya setchellii*)**

**GENERAL INFORMATION:**

**Species:** Santa Clara Valley Dudleya (*Dudleya setchellii*)

**Date listed:** February 3, 1995

**Federal Register (FR) citation:** 60 FR 6671

**Classification:** Endangered

**State Listing:**

Santa Clara Valley dudleya is not listed as threatened or endangered by the State of California.

**BACKGROUND:**

**Most recent status review:**

U.S. Fish and Wildlife Service. 2013. Santa Clara Valley Dudleya (*Dudleya setchellii*) Metcalf Canyon Jewelflower (*Streptanthus albidus ssp. albidus*). 5-Year Review: Summary and Evaluation. U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office, Sacramento, California. 36 pp.

**FR Notice citation announcing this status review:**

U.S. Fish and Wildlife Service. 2020. Initiation of 5-Year Review Status of 66 Species in California and Nevada; request for information. Federal Register 85:4692-4694.

We did not receive any information from the public regarding Santa Clara Valley dudleya.

**ASSESSMENT:**

**Information acquired since the last status review:**

This 5-year review was conducted by the U.S. Fish and Wildlife Service's (Service) Sacramento Field Office. Data for this review were solicited from interested parties through a Federal Register notice announcing this review on January 27, 2020. We also contacted species experts, performed a literature search, reviewed information from our own files - including Santa Clara Valley Habitat Conservation Plan annual reports - and obtained data from an occurrence search of the California Natural Diversity Database (Diversity Database) maintained by the California Department of Fish and Wildlife.

Changes in Taxonomic Classification or Nomenclature

Santa Clara Valley dudleya is recognized as a discreet biological entity at the subspecies level by botanical reference guides and experts; however, the closest taxonomic relationships between this subspecies and other subspecies of dudleya are a subject of ongoing research. The following research and nomenclature updates have occurred since the last 5-year review:

1. The Santa Clara Valley dudleya was reclassified as a subspecies (*Dudleya abramsii setchellii*) in the 2<sup>nd</sup> edition of the Jepson Manual (McCabe 2012).
2. A phylogenetic analysis of the genus *Dudleya* published after the Jepson update found many of the subspecies relationships within species complexes of *Dudleya* are polyphyletic (the different subspecies within a species complex evolved from different ancestral species of dudleya). These results suggest the Santa Clara Valley dudleya subspecies is most closely related to two subspecies from the *Dudleya cymosa* species complex (*D. c. cymosa* and *D. c. paniculata*) and recommend the current taxonomic nomenclature of the Santa Clara Valley dudleya as *Dudleya abramsii setchellii* be reevaluated (Yost *et al.* 2013).

Because the results of Yost *et al.* (2013) do not change the subspecies status of Santa Clara dudleya as a distinct entity, and until a reevaluation of the entire dudleya taxon can be completed to further clarify the taxonomic relationships and nomenclature between the different dudleya species' complexes, the Service will continue to follow previous nomenclature for the Santa Clara Valley dudleya as *Dudleya setchellii*.

#### Occurrences, Status, and Protection

New occurrences of Santa Clara Valley dudleya have been discovered since our 2013 review. The discovery of these new occurrences are most likely due to increased survey efforts and incidental observations, and two of these occurrences, one at Elephant Head Summit and the other at Elephant Head Ridge, are further southeast than any of the previously identified occurrences. More populations have been and are in the process of being protected and preserved under the Santa Clara Valley Habitat Conservation Plan (SCVHCP) since our 2013 review. These include the Coyote Ridge Open Space Preserve, the Davidson and Baird Ranch Properties on Morgan Hill, Calero County Park, a property on Tulare Hill, East Coyote Ridge, and a portion of Tilton Ranch (Service *in litt.* 2020).

Population trends of known occurrences vary across the species' range, with most occurrences having little to no data due to lack of surveys. Known trends include: a decline of individuals at the Metcalf Energy Center Ecological Preserve on the southern half of Tulare Hill due to the Bayliss fire (Niederer 2020); and an overall stable trend over 20 years of monitoring for the Silver Creek and Kirby Slope Preserves (WRA 2019).

#### **Distribution and Abundance:**

The Santa Clara Valley dudleya is found only in the Coyote Valley area, from San Jose south about 30 kilometers (25 miles) to Gilroy (Diversity Database 2012). At the time of listing in 1995, the Santa Clara Valley dudleya was known from fourteen sites and a total of approximately 33,000 plants were known to exist. At the time of the Recovery Plan, there were 20 known occurrences with three of those new additions occurring within the Almaden Quicksilver County Park (Service 1998; Diversity Database 1996). At the time of the last 5-year review there were conflicting numbers of known occurrences in the entire range, from 207 to 209 (Service 2013; ICF 2012; Diversity Database 2009; Diversity Database 2012). However, these numbers from the last 5-year review are misleading, as the bulk of the numbers come from a difference in how occurrences are counted between the SCVHCP and the Diversity Database. The SCVHCP defines occurrence as "one rock outcrop", while the Diversity Database defines an

occurrence as groups of plants that are separated by at least 0.25 mile (Edell 2021; SCVHA 2017). At the time of the last 5-year review, there were 48 occurrences listed in the Diversity Database (Diversity Database 2012). The previous 5-year review stated either 50 or 51 occurrences were listed in the Diversity Database, however those numbers are not accurate to 2012. As described in the previous 5-year review, the estimated number of individuals known for the species varies greatly due in part to the variation in the methodology of counting the rosettes which are formed as individual plants spread vegetatively (Jones & Stokes 1998). Therefore, an abundance estimate was not provided in the last 5-year review.

Currently there are 59 occurrences listed in the Diversity Database (Diversity Database 2021). There are new occurrences that have been added since the last 5-year review, as well as occurrences that have now been combined. Surveys do occur regularly at certain occurrences, however overall population estimates or trends have not yet been determined. Occurrences in the Diversity Database cannot be accurately compared to reported numbers in years past, as many occurrences have been lumped together or split apart. This makes comparing the number of occurrences listed inaccurate, where it may seem as though there are more or less occurrences when, in fact, the same occurrences have been put together or listed as separate numbers.

### **Threats:**

At the time of listing, the primary threats to the Santa Clara Valley dudleya were identified as development, landfill activities, unauthorized dumping, and off-road vehicles. The final listing rule also noted that urban development has fragmented serpentine plant populations, increasing the risk of extinction due to chance events such as fire, pest or disease outbreaks, reproductive failure, or other natural or human-caused disaster (Service 1995). Threats to the species identified at the time of the 2013 5-year review include all the original threats identified at the time of listing, as well as nitrogen deposition, climate change, and change of land management due to urban development (Service 2013). Although some of the previously mentioned threats have been addressed at occurrences protected by the SCVHCP, there is no evidence that the status of these threats has changed outside of these protected areas. Furthermore, the risk of catastrophic fire outside of fully developed areas in the Bay Area is an increasing concern (Ackerly *et al.* 2018) and in 2020 a large fire complex, known as the SCU lightning complex, burned 396,624 acres over six counties, including Santa Clara County (CalFire 2021). This increased fire risk puts already fragmented populations at further risk of extinction, as mentioned in the final listing rule (Service 1995).

Since the last 5-year review, the Pacific Gas and Electric Company's Bay Area Operations and Maintenance Habitat Conservation Plan has been permitted, and includes the Santa Clara Valley dudleya as a covered species (Service 2017). In the Habitat Conservation Plan, the Santa Clara Valley dudleya habitat was estimated using Diversity Database polygon data with an accuracy class of 1 or 2 (records that have a specific, known location) (ICF 2017). The estimated habitat was then overlaid with Pacific Gas and Electric Company's facility corridor, which defines the area within which covered activities could affect the Santa Clara Valley dudleya. This approach provides a quantitative assessment of where covered activities could result in impacts to the species (ICF 2017; Service 2017).

Covered activities associated with utility transmission and distribution are anticipated to affect 3.84 acres of Santa Clara Valley dudleya habitat over the permit term of 30 years. These impacts are anticipated to result in the loss of 800 individuals over the 30 year permit term (Service 2017). As compensation for these impacts, the Pacific Gas and Electric Company has committed to offset effects to the species by implementing the following measures: salvage and re-plant during right-of-way restoration; propagate replacement stock and transplant into right-of-way locations with suitable habitat; partner with the SCVHCP implementing agency to enhance restoration efforts; acquire lands or conservation easements consistent with the SCVHCP; and monitoring of restoration/transplant success (Service 2017).

**Recovery criteria:**

Recovery criteria for downlisting and delisting are described in Service (1998). Downlisting criteria for Santa Clara Valley dudleya have not been met (Table 1), thus delisting criteria are not assessed here.

Downlisting criteria	Criterion still valid?	Has criterion been met?
<p>Secure and protect occupied habitat or 20 populations representing the range of the species along with adjacent unoccupied habitat and a 150-meter (500- foot) buffer. Representation of the species’ includes: three populations north of the Santa Teresa Hills U.S. Geological Survey (USGS) 7.5 minute quadrangle, at least one population in the southern portion of the range (Gilroy USGS 7.5 minute quadrangle map), and at least 14 populations in the center of the species range, with at least one center population within the westernmost extent of the range (Los Gatos USGS 7.5 minute quadrangle).</p>	<p>Yes, although a population needs to be better defined to assess this criterion</p>	<p>No. Although this criterion has been met in the southern, central, and western portions of the species’ range (Figure 1), there are no protected populations north of the Santa Teresa Hills USGS 7.5 minute quadrangle (Figure 2).</p>
<p>Management plan approved and implemented for all populations and any occupied or unoccupied habitat identified as essential to survival</p>	<p>Yes</p>	<p>No. As described in the previous 5-year review (Service 2013), there are management plans for some protected sites, but this criterion has generally not been met.</p>
<p>Population monitoring shows stable or increasing populations for a period of 20 years that include the normal precipitation cycle (or longer if suggested by the results of demographic monitoring)</p>	<p>Yes</p>	<p>No. As described in Service (2013), although some surveys have been performed at some of the known occurrences, monitoring of populations has not been performed at a sufficient level to satisfy this criterion.</p>

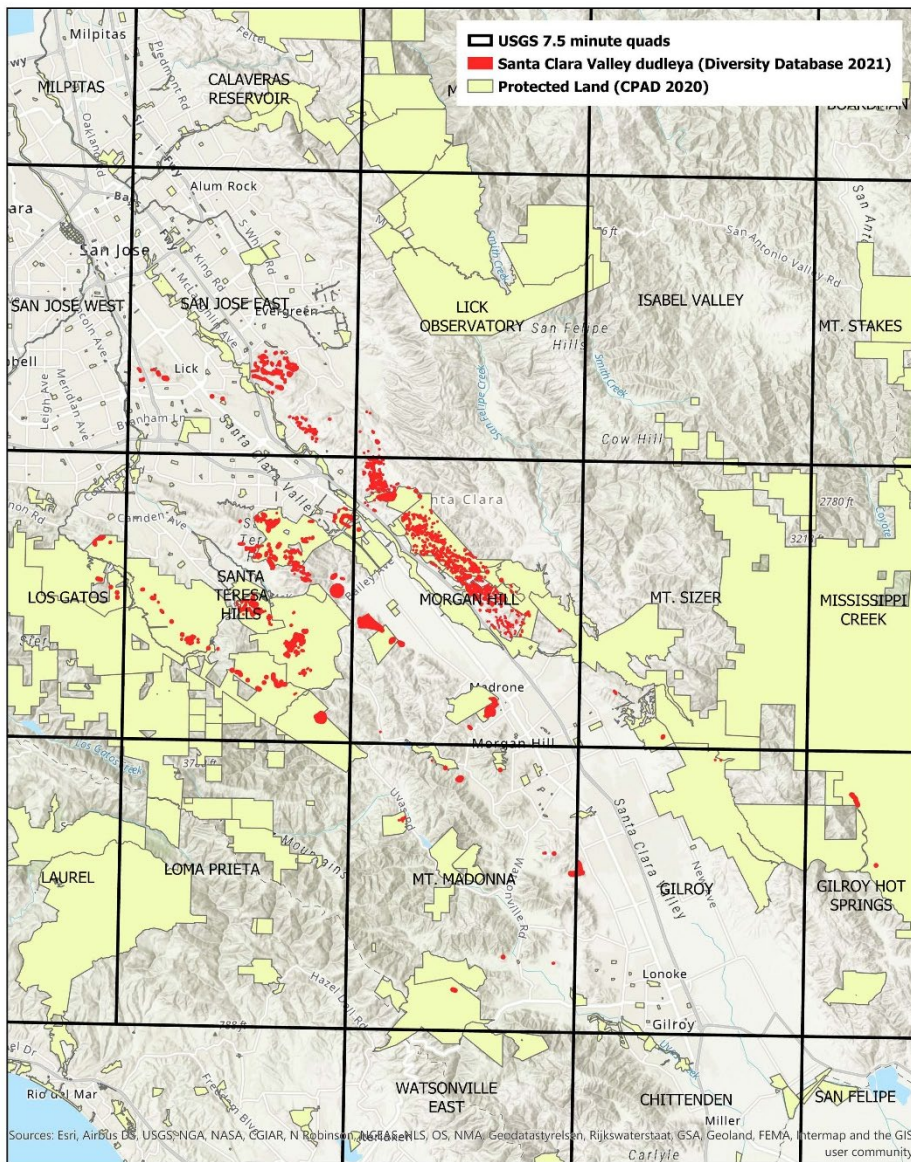


Figure 1. Santa Clara Valley dudleya occurrence data, conservation lands, and USGS 7.5 minute quadrangles.

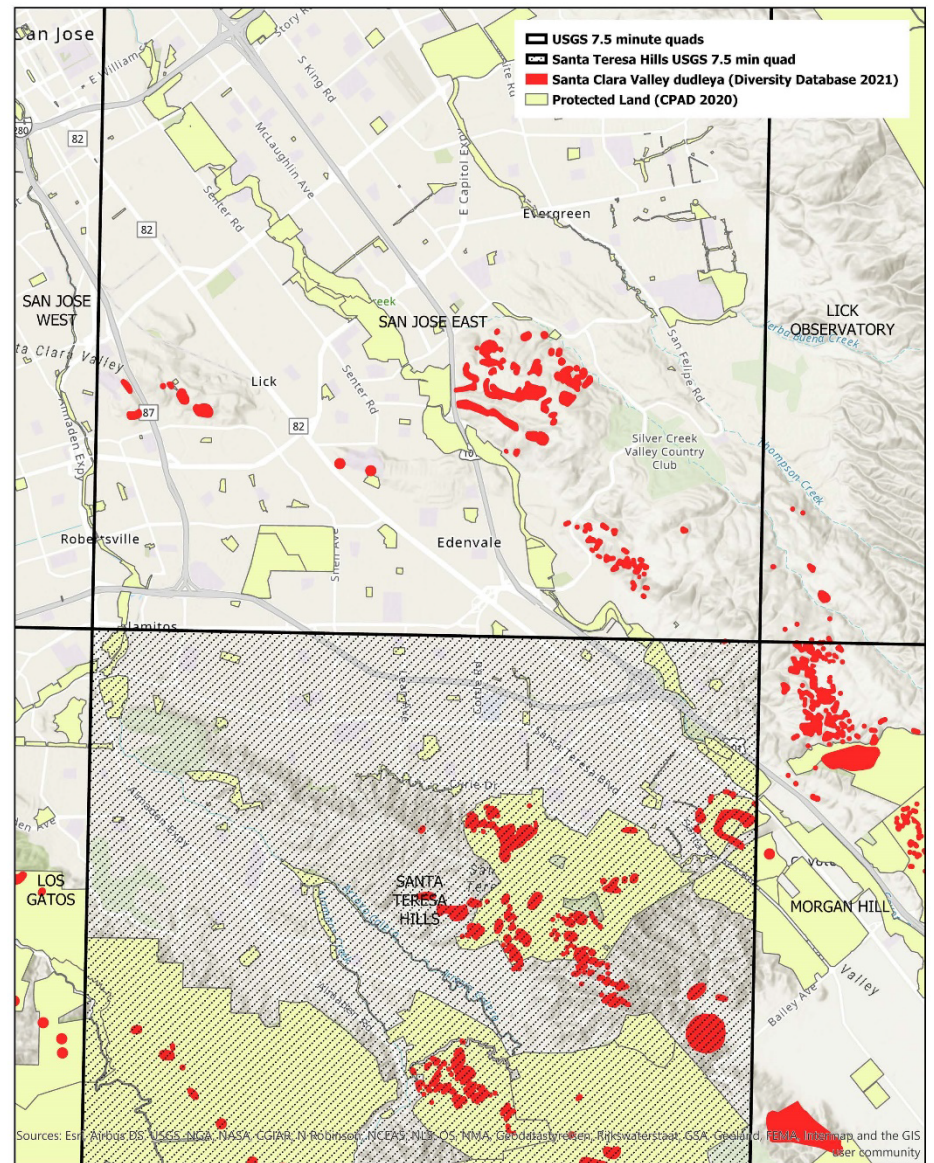


Figure 2. Santa Clara Valley dudleya occurrence data and conservation lands north of the Santa Teresa Hills USGS 7.5 minute quadrangle.

## **Conclusion:**

After reviewing the best available scientific information, we conclude that the Santa Clara Valley dudleya remains an endangered species. Although there has been an increase in the number of occurrences reported in the Diversity Database, most of these new sightings are within the known range of the species and none of the downlisting criteria for the species have been met. Furthermore, the current status of many of these occurrences is unknown as they are not regularly monitored, there are inconsistencies in how a population is defined, and threats such as nitrogen deposition and fire risk are increasing throughout the species' range. Therefore, due to the uncertainty of what constitutes a Santa Clara Valley dudleya population, the unknown status of many of the occurrences throughout the species' range, and the increasing threats of nitrogen deposition and fire, we recommend no change in the species' status. However, because the species' known range has expanded, the number of reported occurrences distributed throughout the range has increased, and the increasing protection and proper management of known populations can lessen the impacts of nitrogen deposition and fire, we acknowledge future results of range-wide monitoring may indicate a potential change in status for the Santa Clara Valley dudleya. As described below, we recommend genetic studies to better understand how populations are distributed across the landscape and standardized surveys of all known occurrences to validate the status of the species at these locations. These actions would provide a stronger assessment for our next status review.

## **RECOMMENDATIONS FOR FUTURE ACTIONS:**

Here we propose several habitat conservation and ecological research recommendations which will aid in the recovery and conservation of Santa Clara Valley dudleya. Some of these recommendations have already been discussed in previous recovery documents (Service 2013) and remain valid.

1. *Genetic and Demographic Studies.* Genetic testing across rock outcrops should be conducted in order to develop an understanding of genetic populations of Santa Clara Valley dudleya. This may change or solidify how an occurrence is defined, leading to more consistent surveys and clarifying the recovery effort which is dependent on population trends.
2. *Standardized Surveys.* A standard way of determining populations as well as regular monitoring of known populations should be done in the future to get a better understanding of how the species is doing across its range. Surveys should utilize a standardized methodology to determine trends in population/occurrence abundance and should include an in-depth analysis of threats and management actions at each occupied location.
3. *Dispersal Studies.* Research into pollinators and seed dispersal may help determine why Santa Clara Valley dudleya occur at certain rocky outcrops and not others that also seem suitable. Along with genetic testing it could clear up uncertainties with the species' local distribution and clarify recovery efforts.
4. *Habitat Acquisition, Management, and Restoration.* Additional sites with Santa Clara Valley dudleya present should be protected, managed, and monitored to address recovery goals. Resource agencies and private partner groups should work to ensure land

protection through acquisition or easement, and unprotected areas currently occupied by a large occurrence should be given the highest priority. Protected lands must also be adequately managed or restored based on the best available science.

**Field Supervisor, Sacramento Fish and Wildlife Office**

**Approve** \_\_\_\_\_ **Date** \_\_\_\_\_

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#### **Personal Communication**

- Edell, Torrey. 2021. ICF International. Electronic mail communication regarding occurrence discrepancies addressed to Joseph Terry, U.S. Fish and Wildlife Service.
- Niederer, Christal. 2020. Creekside Science. Electronic mail communication with attachment addressed to Cassandra Schlosser, U.S. Fish and Wildlife Service.

#### ***In Litteris***

- U.S. Fish and Wildlife Service (Service). 2020. Four Endangered Serpentine Plants in Santa Clara County Meeting Notes. Meeting held virtually via Teams on December 10, 2020.