Dudleya abramsii ssp. *parva* (= *D. parva*) (Conejo Dudleya)

5-Year Review: Evaluation and Summary

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U.S. Fish and Wildlife Service
Ventura Fish and Wildlife Office
Ventura, California

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GENERAL INFORMATION:

Species: *Dudleya abramsii* ssp. *parva* (= *D. parva*)
FR citation: 62 FR 4172
Date listed: 29 January 1997
Classification: Threatened

BACKGROUND:

Most recent status review:
U.S. Fish and Wildlife Service. 2015. *Dudleya abramsii* ssp. *parva* (= *Dudleya parva*) (Conejo Dudleya) 5-Year Review: Summary and Evaluation. Ventura Fish and Wildlife Office. Ventura, California.

FR Notice citation announcing this status review:
Initiation of 5-Year Status Reviews of 40 Species in California, Nevada and Oregon. Notice of initiation of reviews; request for information. (87 FR 5832), 22 February 2022.

State and Local Listing

Dudleya abramsii ssp. *parva* is not listed under the California Endangered Species Act, but has a California Rare Plant Rank of 1B.2 (CNDDB 2023 p.59). It is considered to be a locally important plant by Ventura County (Ventura County Planning Division 2022 p.21).

ASSESSMENT:

Information acquired since the last status review:
This 5-year review was conducted by the U.S. Fish and Wildlife Service (Service) Ventura Fish and Wildlife Office. Data for this review were solicited from interested parties through a Federal Register notice announcing this review on February 2, 2022. We also contacted species experts to request any data or information we should consider in our review. Additionally, we conducted a literature search and a review of information in our files.

Introduction:
Dudleya abramsii ssp. *parva* (Crassulaceae) is a perennial forb that occurs in the Simi Hills of Ventura County, California. The species is unusual within the genus *Dudleya* because it has vernal leaves that die back in the dry season after flowering, leaving the plant inconspicuous on the landscape. The current accepted species name in the scientific community is *Dudleya parva* (Jepson Interchange 2023), however in this document we use *Dudleya abramsii* ssp. *parva* as when it was listed.

Population data:

Distribution:

Dudleya abramsii ssp. *parva* is found only on Conejo Volcanic rock substrate over an area of about 50 square kilometers (20 square miles) in the western end of the Simi Hills, along Mountclef Ridge and terminating near the Conejo Grade, in what is probably one metapopulation of about 14 occurrences (Service 2015 p.6). Currently, the California Natural Diversity Database (CNDDB) recognizes 13 occurrences (CDFW 2023, Table 1). These are the same occurrences that were recognized during the previous 5-year review (Service 2015); however, CNDDB occurrences for the species have not been updated since 2012. One recent observation near Hill Canyon Road has been submitted to CNDDB and is in the vicinity of a rejected CNDDB occurrence (EO7) (GAN22F0001, Gandy in litt. 2022; Table 1). In general, there are few recent reports on the status of occurrences (Abbey in litt. 2022, Gandy in litt. 2022), however, a local botanist who has been watching the species for many years considers the species to be "holding its own" (Burgess in litt. 2022). Known site conditions range from fair to excellent (Table 1, CNDDB 2023).

Table 1. Occurrences of *Dudleya abramsii* ssp. *parva*. Identifiers previously used in other documents are given in the Notes column. Data are from CDFW 2023, Service 2015 pp.8-9, Abbey in litt. 2022, and Gandy in litt. 2022. CNDDB = California Natural Diversity Database, EO = Element Occurrence, COSCA = Conejo Open Space Conservation Agency, CTO = City of Thousand Oaks, CRPD = Conejo Recreation and Park District.

Identifier	Location	Last Year Seen	CNDDB Condition	Site Owner	Notes
CNDDB EO 3	Head of Arroyo Santa Rosa, within McCrea Wildlife Preserve	2010	good	COSCA	Includes former EO 4 and EO 15
CNDDB EO 5	Conejo Grade	2010	excellent	CTO	
CNDDB EO 6	0.5 air miles S of HWY 101, 1.1 air miles SW of Camarillo Oak Grove County Park	1987	unknown	Private	CNDDB 1994
CNDDB EO 8	N of HWY 101, just N of peak 915 on Topo	2010	unknown	Private/CTO	
CNDDB EO 9	S of Mountclef Ridge, N fork of Arroyo Conejo, Wildwood County Park	2018	good	COSCA	Includes former EO 14 and DUPA 1
CNDDB EO 10	W portion of California Lutheran University land	2010	good	CRPD	
CNDDB EO 12	W end of Mountclef Ridge, Wildwood County Park	2010	good	CRPD	
CNDDB EO 13	Upper end of N fork Arroyo Conejo	2010	fair	COSCA	Includes DUAB 101
CNDDB EO 16	0.3 miles due E of Mountclef Peak on Topo	1991	fair	COSCA	
CNDDB EO 17	Mountclef Ridge 0.4 to 1.4 miles WSW of Mount Clef, Wildwood Park	2017	excellent	CRPD	Former DUPA 3 and DUPA 4

Identifier	Location	Last Year Seen	CNDDB Condition	Site Owner	Notes
CNDDB EO 18	SE Side Box Canyon Trail	2010	fair	CRPD	
CNDDB EO 19	E of Hwy 23, N of Olsen Rd.	1998	>fair	Private	Former DUPA 2
CNDDB EO 20	200 ft from wooden gate of Reagan Library	2003	unknown	Private	Former DUAB 103
GAN22F0001	W of Hill Canyon Rd.	2022	good	COSCA	In the vicinity of CNDDB rejected EO 7

Element Occurrences 5, 6, and 8 may have burned in the November 2018 Hill Fire. The post-fire condition of these occurrences has not been documented. The newest occurrence (GAN22F0001) was burned in the Hill Fire, and in 2022 was observed to be in good condition (Gandy in litt. 2022).

Abundance:

It is not possible to assess current abundance of *Dudleya abramsii* ssp. *parva* with confidence because there is a lack of recent comprehensive surveys. Additionally, existing surveys have not been conducted consistently over time, often only include part of an occurrence, may be of inflorescences rather than plants, may not account for clonality, or are possibly of aggregated occurrences (Table 2). In 2010, staff of the Santa Monica Mountains National Recreation Area surveyed 9 of the 13 known occurrences (Service 2015 pp.8-9). Five of the surveys estimated the abundance of plants, totaling 64,775 plants. The remaining four surveys estimated the number of inflorescences instead of the number of plants. Inflorescences are an aggregation of flowers on a plant and often there are multiple inflorescences on a single plant. The surveys estimated 96,452 inflorescences. From online photos (iNaturalist 2023), there may be up to 6 inflorescences per plant, so a total count of 96,452 inflorescences may conservatively represent about 16,075 plants. The 64,775 plants directly counted and the 16,075 plants estimated from inflorescences suggest approximately 81,000 plants overall across the nine surveyed occurrences in 2010. The abundance of plants in the remaining 4 occurrences are unknown. Trends in abundance of *Dudleya abramsii* ssp. *parva* are also difficult to assess. There is perhaps a general increasing trend until 2010 in 5 occurrences, while 3 occurrences may have been decreasing. Six occurrences have only a single year of data (Table 2).

Table 2. Abundance of *Dudleya abramsii* ssp. *parva*. Data are from CDFW 2023, Service 2015 pp.8-9, and Gandy in litt. 2022. CNDDB = California Natural Diversity Database, EO = Element Occurrence.

Identifier	Year Surveyed	Number	Notes
CNDDB EO 3	1983 1987 1991 1997 2003 2010	<10,000 2,000-3,000 <100 75-200 160 58,088	Includes former EO 4 and EO 15. Incomplete surveys and merging EOs limit certainty.
CNDDB EO 5	1983 2006 2010	600-1,000 25 0	2010 survey was through binoculars.
CNDDB EO 6	1980 1987	unknown unknown	
CNDDB EO 8	1991 1993 2010	250 300 25	Incomplete surveys limit certainty.
CNDDB EO 9	1993 2003 2010	<110 850 6,662	Includes former EO 14, DUPA 1. Incomplete surveys and merging EOs limit certainty.
CNDDB EO 10	1991 2003 2010	50 1000 58,867	2010 number is total number of inflorescences.
CNDDB EO 12	1983 2003 2010	<50 500 6,969	2010 number is total number of inflorescences.
CNDDB EO 13	2003 2010	1000 >477	Includes DUAB 101. 2010 number is total number of inflorescences.
CNDDB EO 16	1991	25	
CNDDB EO 17	2006 2010	several 1000s 30,005	Former DUPA 3, DUPA 4. 2010 number is number of inflorescences, and is incomplete.
CNDDB EO 18	2010	134	Inflorescences, not plants, counted.
CNDDB EO 19	1998	250	Former DUPA2.
CNDDB EO 20	2003	200	Former DUAB 103.
GAN22F0001	2022	8,000	In the vicinity of CNDDB rejected EO 7

Conservation seed banking:

There are only two accessions of *Dudleya abramsii* ssp. *parva* seed in a Center for Plant Conservation (CPC) approved conservation seed bank, both at the California Botanic Garden (Table 3; California Plant Rescue (CaPR) 2023). Two of the occurrences are represented, each from a single year. One occurrence is represented by 125 maternal lines.

Table 3. *Dudleya abramsii* ssp. *parva* conservation seed banking. All seeds are stored at California Botanic Garden (CaPR 2023). CNDDB = California Natural Diversity Database, EO = Element Occurrence.

CNDDB EO #	Collection Date	Location Description	Maternal Lines (count)	Seeds (count)
9	7/17/2006	S of Montclef Ridge, Wildwood County Park off Santa Rosa Trail near Wildwood Park	125	5192
15	7/25/1998	Mountclef Ridge N of Calle Contrento off Moorpark Rd.	unknown	60

EVALUATION OF THREATS:

At the time of listing in 1997, the threats to *Dudleya abramsii* ssp. *parva* were identified as development, recreational trampling, collection for horticulture, and fire management and suppression activities (Service 1997 entire). The threat of extinction from naturally occurring events because of the limited number of individuals and populations was also considered. The 1999 recovery plan considered the same threats but omitted the threat of small population sizes (Service 1999 p.24). The 2009 and 2015 5-year reviews evaluated the same threats as in the 1997 listing document, adding an evaluation of climate change and expanding upon fire management and suppression activities to differentiate between the threats of pre-fire fuel modification, wildfire itself, and fire suppression activities (Service 2009 pp.13-14; Service 2015 pp.18-19). In this document we reevaluate the threats of development, recreational trampling, collection for horticulture, wildfire related actions and processes, limited range and population sizes, and climate change.

Development:

About two thirds of the *Dudleya abramsii* ssp. *parva* occurrences occur on public lands and are relatively protected from development. The Conejo Open Space Conservation Agency (COSCA) has done a good job of protecting endangered species in general, and the majority of individuals of *Dudleya abramsii* ssp. *parva* is in COSCA open space (Burgess in litt. 2022). The remaining occurrences are on private land, where development may occur.

Dudleya abramsii ssp. *parva* is a special status plant for the State of California (CNDDB 2023 p.59) and a locally important plant for the County of Ventura (Ventura County Planning Division 2022 p.21). However, as the 2015 five-year review discusses (Service 2015 pp.14-16), protections are often functionally weak, and plants can still be impacted by future development. Development remains a threat to *Dudleya abramsii* ssp. *parva.*

Recreational trampling:

Recreational trampling remains a threat to some of the occurrences; for example, mountain biking has dislodged plants on the Stagecoach Bluff Trail on Wildwood Mesa (Burgess in litt. 2022).

Collection for horticulture:
Illegal collecting of plants within the genus *Dudleya* has emerged as an increasing problem since the 2015 5-year review (e.g., Department of Justice 2021). We are aware of no recent reports of illegal collecting of *Dudleya abramsii* ssp. *parva*. However, collecting remains a threat, given the limited distribution and few occurrences of *Dudleya abramsii* ssp. *parva*.

Wildfire-related actions and processes:
Since listing in 1997, wildfire-related activities and processes have been considered a threat. Initially, the impacts of fire management and suppression were a concern. Habitat disruption from bulldozers, handlines, and fuels modification around dwellings were known to have destroyed plants. With the close proximity of the species to houses and other infrastructure, this threat remains. In the 2009 five-year review (Service 2009 pp. 13-14), the direct impact of fire on the plants was considered an additional threat. Fuel breaks (and the recreational opportunities they provide) allow the establishment of non-native annual grasses and the alteration of natural fire regimes. *Dudleya abramsii* ssp. *parva* typically occurs in fairly open, rocky areas, but these areas can be invaded by non-native annual grasses that increase fire risk in areas where it normally would be low. However, the ephemeral nature of its leaves and the annual dormancy of the species may help protect it from fire, at least at during times of year when dormancy is expected. The newest occurrence (GAN22F0001) was burned over in the 2018 Hill Fire, and in 2022 was in good condition and particularly abundant in areas where the fire caused soil slippage (Gandy in litt. 2022). Research on the effects of fire on the species is needed. The known negative effects of fire related activities and processes remain a threat.

Limited range and number of populations:
The occurrences of *Dudleya abramsii* ssp. *parva* are generally small both in area and number of plants (Table 2), and little is known about the general trends of abundance of the species or the size of soil seed banks. The threat of extirpation of these small populations and extinction of the species from random naturally occurring events such as fires or extreme flooding remains.

Climate change effects:
The 2009 5-year review (Service 2009 p.14) introduced climate change as a threat to *Dudleya abramsii* ssp. *parva.* Threats resulting from climate change may be complex, and include physical stress, death by erosion, increased competition, and increased likelihood of fire. Expected climate change for the Los Angeles area predicts rising annual and extreme high temperatures (Hall et al. pp. 10-11) and more episodic rainfall with more extreme floods and drier droughts (Hall et al. pp. 11-14, 18). Changes in climate could threaten *Dudleya abramsii* ssp. *parva* in several ways. First, although the species is dormant in the dry part of the year, more intensely dry summers with long-term drought could kill plants (Burgess (in litt. 2022). Second, more intense precipitation and erosion could cause slope slippage, destroying plants. Third, with changing climate, non-native annual grasses are expected to increase in dominance both as a result of increased fire frequency (Hall *et al.* 2018 p. 53) and with increasing annual temperatures (Sandel and Dangremond 2012 entire). The increased annual grass dominance can both promote more fire and may have negative competitive effects on *Dudleya abramsii* ssp. *parva*. Because it characteristically occurs in rocky areas with sparse vegetation that does not carry fire well, this may not negatively affect the species. However, if non-native annual grass cover does increase and fires do increase in frequency or intensity at *Dudleya abramsii* ssp.

parva occurrences, the species could be negatively impacted. The threat of climate change on *Dudleya abramsii* ssp. *parva* remains.

Summary of threats:
Since its 1997 listing, the threats to *Dudleya abramsii* ssp. *parva* have been identified as development, recreational trampling, collection for horticulture, wildfire-related actions and processes, random events effecting small populations, and climate change. Each of these threats remain relevant.

EVALUATION OF DELISTING CRITERIA:

Delisting criteria for *Dudleya abramsii* ssp. *parva* are described in the 1999 Recovery Plan (Service 1999, p. 42) and are evaluated below:

1. *All current sites (including seedbanks) are fully protected and managed with the primary intention of preserving the populations in perpetuity.*
    - This criterion has not been met. Not all sites, including on public property, are fully protected and managed with the primary intention of preserving the populations in perpetuity.

2. *All current sites (including seed banks) are shown to be self-sustaining over a minimum of 10 years.*
    - This criterion has not been met. The available data is insufficient to determine population trends and as a result it is not possible to evaluate whether a population is self-sustaining.

CONCLUSION:

We reviewed the best available scientific information and evaluated the threats affecting *Dudleya abramsii* ssp. *parva* in 2023 under factors in 4(a)(1) of the U.S. Endangered Species Act of 1973 (as amended). There has been no substantial change in threats since time of listing and the available data are insufficient in determining population trends. *Dudleya abramsii* ssp. *parva* remains threatened by development, recreation, wildfire-related actions and processes, a limited range, and climate change. Therefore, we conclude that the species still meets the definition of a threatened species and recommend no change in status at this time.

RECOMMENDATIONS FOR FUTURE ACTIONS:

The recommendations for future actions largely mirror those of the 2015 5-year review (Service pp.22-23):

1. Conduct thorough population surveys of known occurrences and areas of suitable habitat.

2. Develop and implement a monitoring plan for known existing occurrences. Monitoring should include population abundance surveys, habitat condition assessment, and documentation of existing and potential threats.

3. Work with public and private landowners to raise public awareness of the species to support appropriate conservation measures.

4. Update and expand knowledge of the species' life history and specific habitat requirements.

5. Improve the completeness of coverage of *Dudleya abramsii* ssp. *parva* in conservation seed banks, with more occurrences over more years.

APPROVAL:

Lead Field Supervisor, Fish and Wildlife Service

Approved STEPHEN HENRY Digitally signed by STEPHEN HENRY Date: 2023.03.09 15:45:18 -08'00'

LITERATURE CITED:

[CaPR] California Plant Rescue. 2023. Online seed collection database. Retrieved 10 January 2023, from https://www.caplantrescue.org/collections-database.html#memberssearch

[CDFW] California Department of Fish and Wildlife. 2023. California Natural Diversity Database (CNDDB), RareFind 5.2.14 online database. Retrieved 10 January 2023, from https://apps.wildlife.ca.gov/rarefind/view/RareFind.aspx

[CNDDB] California Natural Diversity Database. January 2023. Special Vascular Plants, Bryophytes, and Lichens List. California Department of Fish and Wildlife. Sacramento, CA. 155 pp.

Department of Justice. 2021. South Korean National Pleads Guilty to Federal Criminal Charge for Poaching Wild Succulent Plants for Illegal Exportation to Asia. Press Release 21-185, updated 9 September 2021. Retrieved 12 January 2023, from https://www.justice.gov/usao-cdca/pr/south-korean-national-pleads-guilty-federal-criminal-charge-poaching-wild-succulent

Hall, A., N. Berg, and K. Reich. 2018. Los Angeles Summary Report. California's Fourth Climate Change Assessment. Publication number: SUM-CCCA4-2018-007.

iNaturalist. 2023. Online database of species observations. Accessed 12 January 2023, from https://www.inaturalist.org/observations?place_id=any&taxon_id=76736

Jepson Interchange. 2023. Online index of California plant names. Retrieved 10 January 2023, from https://ucjeps.berkeley.edu/cgi-bin/get_cpn?50227&expand=1

Sandel, B., and E.M. Dangremond. 2012. Climate change and the invasion of California by grasses. Global Change Biology 18: 277-289.

[Service] U.S. Fish and Wildlife Service. 1997. Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for Two Plants and Threatened Status for Four Plants from Southern California. FR 62 4172--4183.

[Service] U.S. Fish and Wildlife Service. 1999. Recovery Plan for Six Plants from the Mountains Surrounding the Los Angeles Basin. Portland, Oregon. 67 pp.

[Service] U.S. Fish and Wildlife Service. 2009. *Dudleya abramsii* ssp. *parva* (= *Dudleya parva*) (Conejo Dudleya) 5-Year Review: Summary and Evaluation. Ventura Fish and Wildlife Office. Ventura, California. 23 pp.

[Service] U.S. Fish and Wildlife Service. 2015. *Dudleya abramsii* ssp. *parva* (= *Dudleya parva*) (Conejo Dudleya) 5-Year Review: Summary and Evaluation. Ventura Fish and Wildlife Office. Ventura, California. 29 pp.

Ventura County Planning Division. 2022. 2022 Locally Important Plant List. 36 pp.

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Abbey, Zach. Biologist, Padre Associates. Email communication 6 October 2022.

Burgess, Rick. Retired planner, City of Thousand Oaks. Email communication 21 September 2022.

Gandy, Devlin. PhD Student, University of Cambridge. Email communication 23 November 2023.