U.S. FISH AND WILDLIFE SERVICE
5-YEAR STATUS REVIEW
Parachute Beardtongue (*Penstemon debilis*)

GENERAL INFORMATION:

Species: Parachute beardtongue (*Penstemon debilis*)

Date listed: August 26, 2011

Federal Register Notice of Listing Determination and Designation of Critical Habitat:

- July 27, 2011. Endangered and Threatened Wildlife and Plants; Determination of Endangered Species Status for *Ipomopsis polyantha* (Pagosa skyrocket) and Threatened Status for *Penstemon debilis* (Parachute beardtongue) and *Phacelia submutica* (DeBeque phacelia) (76 FR 45054).
- August 13, 2012. Designation of Critical Habitat for *Ipomopsis polyantha* (Pagosa skyrocket), *Penstemon debilis* (Parachute beardtongue), and *Phacelia submutica* (DeBeque phacelia) (77 FR 48367).

Classification: Threatened

Most recent status review: August 28, 2019. 5-Year Review for Parachute beardtongue (*Penstemon debilis*).

Federal Register Notice citation announcing this 5-year status review: March 13, 2023. Endangered and Threatened Wildlife and Plants; Initiation of 5-Year Status Reviews of 27 Listed Species in the Mountain-Prairie Region (88 FR 15448).

Lead Region: Region 6, Mountain-Prairie Region, Colorado Ecological Services Field Office, Nathan Darnall, Western Colorado Supervisor, nathan_darnall@fws.gov, 970-819-0541.

Current Recovery Priority Number (RPN): 8C

Methodology used to complete this review: In accordance with section 4(c)(2) of the Endangered Species Act of 1973 (16 U.S.C Section 1531 *et seq*.), as amended (Act), the purpose of a 5-year status review is to assess each threatened and endangered species to determine whether its status has changed and it should be classified differently or removed from the Lists of Threatened and Endangered Wildlife and Plants. Status reviews are to be completed in accordance with Sections 4(a) and 4(b) of the Act (16 U.S.C. Section 1533(c)). This 5-year status review was conducted by the U.S. Fish and Wildlife Service's (Service) Colorado Field Office – Western Team. Data for this review were solicited from interested parties through a Federal Register notice announcing this review on March 13, 2023. We also contacted the Bureau of Land Management (BLM), Denver Botanic Gardens, Colorado Natural Areas Program (CNAP), and Colorado Natural Heritage Program (CNHP) 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.

ASSESSMENT:

Information acquired since the last status review:

The largest effort that has occurred for Parachute beardtongue since the 2019 5-year status review is the implementation of small Unmanned Aerial Systems (sUAS; drone) surveys for the Parachute beardtongue across the five occupied populations and the discovery of two new populations using those drone surveys. These efforts were conducted by CNHP, Aridlands, and EcoloGIS. These survey efforts were explored in 2019 but were not fully implemented until 2020 and 2021, in which drone surveys were flown over current occupied habitat and several areas of potentially suitable habitat based on similar geological characteristics. Drone surveys are particularly useful for surveying this plant species because of the cliffy, often inaccessible habitats upon which it grows. The sUAS took over 60,000 red, green, blue (RGB) photos, and 40,000 multispectral photos, that were then processed to identify 4,546 individual Parachute beardtongue across the study sites, including new detections in existing populations at Mount Logan, Logan Wash Mine, and Anvil Points. New detections in new populations were found at the Red Pinnacle and Anvil Creek study areas, where the group found 426 and 218 individuals, respectively. Abundance results from the drone surveys, when compared to an existing photo quadrat method, were found to be statistically significantly different, indicating that the drone surveying method, while useful for monitoring Parachute beardtongue, especially in remote populations, cannot provide complete census population estimates at a site (Swayze and Handwerk 2022).

We reviewed CNHP's Element Occurrence (EO) records from 2023 for each of these populations. These reports include information from prior years in addition to the newest information for each EO. Individuals of Parachute beardtongue have not been observed at the Anvil Points Mine Transplant Site (EO 4611) since 2014. A return visit to the site in 2020 found no individuals, and an additional visit with no observations could confirm that this site is extirpated (CNHP 2023a). Other EOs showed increases in abundance due to the drone survey work, most notably Mount Logan Road, which had a population size of 3 individuals in our SSA report (Service 2020, p. 13), and which the 2023 EO record indicates has a population size of 132 individuals, all of which were found in areas inaccessible by foot (CNHP 2023b). Anvil Points, Mount Logan Road, and Mount Callahan Saddle Natural Area and Smith Gulch EOs all showed increases in the population size due to monitoring from the drone surveys finding individuals that were not previously found (CNHP 2023b; CNHP 2023c; CNHP 2023d). The Mount Callahan Natural Area EO shows fewer plants than previously expected, though still over 1,000 individuals (CNHP 2023e). These observed changes in abundance were driven by the drone surveys refining our knowledge of abundance at these sites (Swayze and Handwerk 2022).

We reviewed reports from CNAP to update information about the Mount Callahan Natural Area and Logan Wash Mine EOs. The general conditions at both Mount Callahan and Mount Callahan Saddle remain unchanged with minimal disturbance (CNAP 2022a). At the Logan Wash Mine site, CNAP mapped 32 new Parachute beardtongue individuals along the roadside. CNAP also monitored the transplants that had been moved out of a roadside at the site, with mixed results (CNAP 2022b).

We reviewed monitoring that CNHP conducted at the Logan Wash Mine site to understand the trends of abundance for Parachute beardtongue over time. Although yearly monitoring occurred previously at additional sites, concerns regarding damages to plants along with funding and workload concerns has resulted in monitoring occurring only at a single site (Logan Wash Mine) across the range (Service 2020, p. 23). This monitoring is conducted with photo quadrats to limit disturbance to plants and the site. Abundance at the site, which was highest in 2018 at 162 plants, was at 104 individuals in 2023. This is after a drop to 73 individuals observed in 2020 (Smith and Crook 2024). The monitoring shows that abundance declined in response to the drought from 2020 to 2022, with 2020 being a particularly severe drought year. Low numbers of flowering individuals from 2020 to 2022 drove low fruiting from 2021 to 2023. The abundance in 2023 was statistically significantly lower than the abundances observed from 2016 through 2018, likely due to drought conditions from 2020 to 2022. We expect that future drought conditions will have further detrimental effects to abundance and reproduction, especially if those droughts are more frequent and more severe (Smith and Crook 2024; Lukas et al. 2014).

Abundance estimates in several of the populations have increased as a result of the drone survey work; however, one population saw lower abundance compared to previous estimates (Mount Callahan Natural Area) due to a refining of the estimates there based on drone surveys, going from an estimated abundance of over 6,000 individuals to around 1,000 individuals, which lowers the ability of that population to sustain itself through environmental and demographic stochasticity. The previous estimate at Mount Callahan Natural Area was based on a simple visual estimate across the occurrence (CNHP 2023e). Habitat quality has also fluctuated over time. The monitoring at the Logan Wash Mine EO, which is the only consistently monitored EO at this time, suggests that climate effects to habitat quality in the form of higher temperatures and lower levels of precipitation have statistically significant negative effects on population abundance. Drought conditions reduce habitat quality, which reduces the ability of Parachute beardtongue to survive and reproduce, with lower reproduction observed during drought years (Smith and Crook 2024). Drone surveys resulted in the addition of two new populations (Red Pinnacle and Anvil Creek). The Red Pinnacle population, which is the most spatially distant from the other known populations, expands the known range of the species. In contrast, the Anvil Points Mine Transplant site is likely extirpated (CNHP 2023a).

The drone surveys conducted by CNHP show that many of the Parachute beardtongue populations are more abundant than we had previously thought (Swayze and Handwerk 2022). While drought conditions and their observed effects at Logan Wash Mine are concerning, these conditions are currently not occurring frequently or severely enough to extirpate individual populations. In addition, the SSA report describes the stressors described in the listing rule, including oil and gas development, oil shale extraction and mine reclamation, vehicle access, climate change, invasive species, and small population size and geographic range (Service 2020, pp. 19-21). While oil and gas development continues at a low level, CNAP agreements and BLM best management practices have largely curtailed impacts to individual plants across subpopulations. Oil shale extraction is unlikely to continue in the area into the future, and mine reclamation activities have been monitored by the BLM to limit impacts to Parachute beardtongue individuals (Service 2020, p. 19). Vehicle access has been limited in areas where it has been identified as a threat to Parachute beardtongue. Climate change and current drought frequency and severity have not proved to be a population level threat currently, as current

droughts are not long enough or severe enough to extirpate populations to date. Invasive species have not been identified at different EOs as a significant threat to Parachute beardtongue, likely due to its isolated, harsh habitat. Small population size can drive extinction risk, but new information shows larger populations and more populations than previously expected when the species was listed as threatened (Service 2020, p. 20; Swayze and Handwerk 2022).

Conclusion:

The Act defines an endangered species as any species that is "in danger of extinction throughout all or a significant portion of its range" and a threatened species as any species that is "likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range."

After a review of the best available scientific information and an evaluation of threats affecting the species under the factors in Section 4(a)(1) of the Act, we conclude that Parachute beardtongue remains a threatened species. Our review of the new information acquired since the previous 5-year status review (Service 2019), as well as the information documented in our SSA report (Service 2020, entire), supports our previous evaluation that Parachute beardtongue continues to meet the definition of a threatened species.

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CURRENT CLASSIFICATION:

RECOMMENDATION RESULTING FROM THE 5-YEAR STATUS REVIEW:

____ Downlist to Threatened
____ Uplist to Endangered
____ Delist (Indicate reasons for delisting per 50 CFR 424.11):
    ____ Extinction
    ____ Recovery
    ____ Original data for classification in error
__X_ No change is needed

APPROPRIATE LISTING/RECLASSIFICATION PRIORITY NUMBER, IF APPLICABLE:

RECOMMENDATIONS FOR FUTURE ACTIONS:

We recommend updating the SSA report (Service 2020, entire) to incorporate the addition of new populations and the likely extirpation of the Anvil Points Mine Transplant Site population. Additionally, an examination of the metrics used to assess population resiliency may lead to improvements in this analysis. Other future actions could be to expand drone surveying across more suitable habitat, monitoring with drones, and conducting trend monitoring in more populations using drones or photo quadrats to better understand abundance trends across the range.

Lead Field Office Approval:

Signature: JOHN CLAYTON Digitally signed by JOHN CLAYTON Date: 2024.08.30 07:43:58 -06'00' Date: 08/30/2024

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