

**Umtanum Desert Buckwheat
(*Eriogonum codium*)**

**5-Year Review:
Summary and Evaluation**



Photo: Randi Riggs/U.S. Fish and Wildlife Service/2018

**U.S. Fish and Wildlife Service
Columbia – Pacific NW Region (Region 9)
U.S. Fish and Wildlife Service
Wenatchee, Washington**

September 2021

5-YEAR REVIEW

Umtanum desert buckwheat (*Eriogonum codium*)

GENERAL INFORMATION

Species: Umtanum desert buckwheat (*Eriogonum codium*)

Date Listed: May 23, 2013

FR citations: 78 FR 23984-24005 (original determination threatened status); 78 FR 76995-77004 (revised determination of threatened status); 78 FR 24008-24032 (original determination of critical habitat); 78 FR 76995-77004 (revised designation of critical habitat)

Classification: Threatened

Current Recovery Priority Number: 5

This recovery priority number is indicative of a plant that is a species with a high degree of threat and a low potential for recovery.

BACKGROUND

Methodology used to complete the review:

In accordance with section 4(c)(2) of the Endangered Species Act of 1973, as amended (Act), the purpose of a 5-year 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 List of Threatened and Endangered Wildlife and Plants. Public notice of this review was given in the *Federal Register* and a 60-day comment period was opened on June 11, 2019 (84 FR 27152-27154). The U.S. Fish and Wildlife Service (Service) evaluated the biology and status of the Umtanum desert buckwheat (*Eriogonum codium*) as part of a Species Biological Report (SBR; USFWS 2021a) to inform this 5-year review. The SBR is a comprehensive review of the species biology and provides a scientific assessment of the species status and viability, including those factors that impact or are likely to impact the species. Independent peer and partner reviewers reviewed the SBR prior to its use as the scientific basis to support the 5-year review decision-making process.

FR Notice citation announcing this status review:

USFWS. 2019. Endangered and Threatened Wildlife and Plants; Initiation of 5-Year Status Reviews for 91 Species in Oregon, Washington, Hawaii, and American Samoa. 84 FR 27152 27154. June 11, 2019.

REVIEW ANALYSIS

Updated Information and Species Status

The SBR provides a detailed summary of the biology, habitats, factors influencing the viability of the species, management and conservation measures, current status of the species, and a summary of the species viability (USFWS 2021a). A summary of new information and the factors influencing viability of the species are included in Chapter 2. The SBR provides a summary of stressors affecting the species and conservation efforts in Chapters 4 and 5,

respectively. The SBR also provides an analysis of the current condition of the species and a summary of the species viability in Chapters 6 and 7, respectively.

Threats Analysis (Threats and Conservation Measures)

Threats: In the SBR, we evaluated a number of stressors that may affect the resiliency of Umtanum desert buckwheat and determined the most significant threats to the species include small population size (Factor E), low recruitment (Factor E), narrow geographic distribution (Factor E), competition with plant species and wildfire (Factors A and E) and climate change (Factor E) (Service 2021a, pp. 27-34).

The single Umtanum desert buckwheat population is small and declining. The population has declined from a high of 5,228 plants in 1997 to a low of 3,016 plants in 2019. The Population Viability Analysis (PVA) model for Umtanum desert buckwheat reported an annual population growth rate of 0.9935 with low recruitment indicating that there are greater numbers of plant mortalities occurring than individuals being recruited into the population (Caplow et al. 2007). Therefore, there is a slow decline of less than 1 percent annually without accounting for stochastic events. The population size after stochastic events exhibited sharp declines of 17.7 percent in 1996 and 51.2 percent in 2017. Because the population is small and in decline, it is possible that a single catastrophic event could cause the extinction of the species.

Low recruitment was identified during listing as a threat to the species viability for Umtanum desert buckwheat. Since monitoring began in 1995, only 1 seedling has survived within the study plots long enough to produce flowers 5 years after germination. In general for most species, seedling germination and survival are correlated with climatic conditions. Climate data from 1997 to 2005 indicates precipitation was below normal and temperatures were above normal compared to 1950-1995 (NOAA 2005 as cited in Caplow 2005, p. 3). By 2050, local temperature change is projected to increase 2.2-2.4° Celsius (3.9-4.4° Fahrenheit), while moisture availability is projected to decrease 0.028-0.040 AET:PET (ratio of actual to potential evapotranspiration; Fertig 2020, p. 3). If average precipitation declines and/or average temperatures continue to rise, recruitment of new individuals becomes less likely and the mortality rate of adult plants is likely to increase.

There is a narrow geographic distribution for the one known naturally occurring Umtanum desert buckwheat population. This population is restricted to a narrow, discontinuous band, atop the eastern end of Umtanum Ridge on lithosol soils and is surrounded by human development such as the Hanford Site, agricultural lands, and roads, all of which could restrict expansion or migration from the ridge (Dunwiddie et al. 2000, p. 59; Fertig 2020, p. 7). Suitable habitat within and adjacent to the current geographic distribution was previously degraded by overgrazing and is currently being degraded by a combination of factors such as wildfires, invasive plant species, and climate change. Reintroduction efforts have occurred at 11 sites with minimal success as overall survival was 7 percent of the individuals with only a few plants surviving as long as 32 months (Newsome and Goldie 2017, p. 10). Due to the limited distribution, the ecological diversity of the species is likely low, and it is possible that a single catastrophic event could cause the extinction of the species or further confine the distribution.

Previous ground disturbance, wildfires, and lack of post-burn management have facilitated the establishment of fire-adapted and fire-promoting invasive species, such as cheatgrass (*Bromus tectorum*) and Russian thistle (*Salsola tragus*), in and adjacent to Umtanum Ridge (Newsome and Goldie 2017, p. 1). These invasive species act as a fuel source and compete with Umtanum desert buckwheat adults and seedlings for soil, nutrients, space, and moisture. Notably, cheatgrass and Russian thistle cluster around Umtanum desert buckwheat adults and seedlings (Dunwiddie et al. 2000, p. 68). Before the 1900s, wildfires were likely small, intense, and occurred at 32- to 70-year intervals (USFWS 2001, p. 23). However, in the last 20 years, more frequent and intense wildfires now threaten the species existence by degrading suitable habitat and killing a significant portion of the population. Impacts to Umtanum desert buckwheat from competition with invasive species and their associated increased risk of wildfire, combined with the negative effects of wildfire on individual survival, recruitment, seed viability and germination, continue to pose a threat to this species long-term viability.

Conservation Measures: Since 1995, a census has been conducted six times and the monitoring methodology was refined over time. Since 1997, the Washington Natural Heritage Program has led permanent plot monitoring in the East sub-population on plant growth, demography, recruitment, and survival of Umtanum desert buckwheat (Fertig 2018, p. 23). Seed germination trials, seed bank characterization, investigation of supplemental watering of seedlings, and a study of Umtanum desert buckwheat's response to cheatgrass were conducted from 2002 through 2005 (Caplow 2005, p. 7). The cheatgrass study was discontinued because zero Umtanum desert buckwheat seeds germinated with cheatgrass present even though the same seed cohort, methodology, and nursery was used as the successful seed germination trials. The study was funded for a limited time, so the researchers were unable to setup additional trials to clarify the exact reason for the lack of germination with cheatgrass present.

Seed banking accessions were collected and stored in 1997, 2001, and 2002 at three facilities approved by the Center for Plant Conservation: Rae Selling Berry Seed Bank, USDA National Laboratory of Genetic Resources Preservation, and Miller Seed Vault. Approximately 1,509 seeds from three years of collection are stored at Rae Selling Berry Seed Bank. Approximately half of these seeds, or about 755 seeds, are stored for security in the USDA National Laboratory of Genetic Resources Preservation as detailed in Rae Selling Berry Seed Bank's seed storage protocol. In 2017, Hanford Reach National Monument Refuge staff sent five seed packets to be stored at Miller Seed Vault and included seed accessions from partially burned, lightly burned, and unburned plants after the 2017 Silver Dollar Fire (Shank 2019, pp. 19-20). In 2019, a maternal line seed collection of approximately 1,200 seeds from 49 different individuals included all three sub-populations was sent to Miller Seed Vault for seed banking and future recovery efforts (Gibble pers. comm. 2021).

Propagation techniques were developed by Rain Shadow Nursery in Kittitas, Washington, in 2002 and 2003 (Caplow 2005, p. 8). These propagation techniques were further refined by volunteer staff at Hanford Reach National Monument (Newsome and Goldie 2017, entire). In 2019, Derby Canyon Natives nursery in Peshastin, Washington, began a seed production bed using 100, 1-year old Umtanum desert buckwheat plants grown from seed from over 50 individuals. Produced seed will be used for recovery efforts, such as population augmentations and direct seeding, in the future.

From 2011 to 2016, Hanford Reach National Monument Refuge staff conducted experimental outplantings on the Hanford Reach National Monument to determine if plants could survive in similar habitats away from Umtanum Ridge and to increase redundancy in order to protect the species from extinction in case of catastrophic events. Potential experimental introduction sites were identified by reviewing geographic information system (GIS) data layers of soil type, aspect and elevation (Newsome and Goldie 2017, p. 1). The Kiona Silt Loam soil series type was used as a mandatory site characteristic. Potential experimental introduction sites were identified on Umtanum Ridge, Gable Butte, Gable Mountain, Yakima Ridge and Saddle Mountains. A new geographic analysis of potential introductions sites will be completed in 2022 by the WDNR Natural Heritage Program.

Refuge staff and volunteers harvested seed, propagated plants in north Richland, planted 548 first-year seedlings at 11 sites (102 plants on Yakima Ridge and 446 plants on Saddle Mountain) and monitored their survival and seedling production (Newsome and Goldie 2017, entire; Arnett and Goldner 2017, pp. 26-27). The overall survival of all outplanted seedlings was seven percent and only a few plants survived for as long as 32 months (Newsome and Goldie 2017, p. 10). As of 2018, a few of the outplanted seedlings remained alive, although not all the sites were visited that year, and a few outplanted individuals exhibited reproductive effort such as flowering or seed set but successful seed set has not been documented (Newsome pers. comm. 2020; Newsome and Goldie 2017, p. 10). Outplanting sites experienced wildfires in 2016, 2017, and 2018, and wildfires were identified as partially responsible for the low survival.

Recovery Criteria

Recovery Plan or Outline: Draft Recovery Plan for Umtanum Desert Buckwheat (USFWS 2021b)

Table 1. Delisting recovery criteria for Umtanum desert buckwheat (USFWS 2021b).

Delisting Recovery Criteria	Status of Criterion
Six Umtanum desert buckwheat populations	Not met
Self-sustaining populations with an average size of 1,200 individuals for at least 15 years	Not met
Populations are in a matrix of native shrub-steppe habitat within effective pollinator distance of 300 meters and threats managed by partners with long-term management commitments	Not met
Populations are adequately protected from wildfire	Not met
Seed collections are established, stored, and maintained at seed banks	Partially met

Synthesis

Our assessment of species viability, defined as the likelihood of persistence over the long term, is based on the concepts of resiliency, redundancy, and representation. The species has low resiliency, even though the single extant population is above the estimated minimum viable

population size, mainly due to the poor condition of its habitat and demographic factors such as invasive species abundance and low recruitment, respectively. There is only one population, so redundancy is non-existent. The species is a narrow endemic occupying a small area with little ecological differentiation and most likely has little genetic diversity resulting in low representation. In synthesis, the species viability is low due to its low resiliency, redundancy, and representation and thus extinction risk remains high because of its inability to withstand stochastic and catastrophic events. After reviewing the best available scientific information and comparing the current condition with the recovery criteria for the species, we conclude that Umtanum desert buckwheat remains a threatened species. Therefore, we recommend no change in status to the species at this time.

RESULTS

Recommended Classification:

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

New Recovery Priority Number: No change

RECOMMENDATIONS FOR FUTURE ACTIONS

- Recovery Action 1: Protect the extant population and reduce the risk from wildfire. Improve access to Umtanum Ridge for emergency activities and recovery actions. Implement habitat restoration activities within and adjacent to occupied habitat to reduce wildfire risk due to abundant invasive plants.
- Recovery Action 2: Preserve and augment the extant population by connecting subpopulations and isolated individuals to increase reproductive rates.
- Recovery Action 3: Identify potentially suitable habitat sites and survey for additional Umtanum desert buckwheat populations.
- Recovery Action 4: In areas of suitable habitat, establish and/or identify at least five additional populations to increase the species' redundancy, representation, and resiliency.
- Recovery Action 5: Monitor the rangewide population, track trends, and assess threats. Implement a rangewide monitoring protocol and determine population trends. Develop and implement a detailed monitoring plan to assess known threats and identify potential new threats to the species and its habitat.
- Recovery Action 6: Study the species ecology and breeding system, factors limiting reproductive success, the effect of climate change, and the response to management actions to guide conservation efforts.
- Recovery Action 7: Promote awareness and conservation of Umtanum desert buckwheat throughout its geographic range.

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U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW of Umtanum desert buckwheat (*Eriogonum codium*)

Current Classification: Threatened

Recommendation resulting from the 5-Year 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
- No change needed

Appropriate Listing/Reclassification Priority Number, if applicable: N/A

FIELD OFFICE APPROVAL:

State Supervisor, Fish and Wildlife Service

Approve _____ Date _____