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AUTHOR	<i>Rita Reisor</i>	8/27/2021
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5- Year Review Short Form

Species Reviewed: Barneby ridge-cress (*Lepidium barnebyanum*)

Federal Register Notice Announcing Initiation of this Review: January 12, 2021. Endangered and threatened wildlife and plants; 5-year status reviews of 7 species in the Mountain Prairie Region (86 FR 2442)

Current Classification: Endangered

Current Recovery Priority Number: 11C

This recovery priority ranking is indicative of a full species with a moderate degree of threat, imminent conflicts with land development, and a relatively low potential for recovery.

Methodology used to complete this review:

The Utah Ecological Services Field Office completed this review on August 26, 2021. The Utah Ecological Services Field Office used all pertinent literature and documents on file for this review. The new information obtained since the last 5-year review in 2011 includes information on two new populations (EIS 2014; Spector 2015), new potential habitat designation (Lindstrom 2021), data from a seed germination test (Hinz 2017), a biological assessment for a potential construction project in the habitat (STB 2021), and reports from a recent field visits (Spector 2015; Croft 2021; Reisor 2021).

Review Summary:

Barneby ridge-cress (*Lepidium barnebyanum*) is an herbaceous perennial of the mustard (Brassicaceae) family that grows in Duchesne County, Utah (Welsh et al. 2008; Service 1993). This species grows on ridgelines at elevations of 5,896 to 6,654 feet (ft) (1,890 to 1,981 meters (m)) on poorly developed soils derived from the Uinta and Green River formations (Service 1993; Lindstrom 2021). The plants grow in raised cushions up to 8 inches (in) (20 centimeters (cm)) wide (Welsh et al. 2008). The stems are hairless with narrow leaves clustering at the base of the plant (Welsh et al. 2008). Flowers are cream colored, about 0.25 in (5-7 millimeters (mm)) across and alternate along a stem rising 1 to 1.5 in (2.5 to 6 cm) above the base of the plant (Welsh et al. 2008). Flowering occurs from April through May; fruit development and seed dispersal occur from June through July (Welsh et al. 2008). Seeds are small, about 0.04 in (1 mm) across and are borne in egg-shaped capsules (silicles) about 0.2 in (4-5 mm) long (Welsh et al. 2008).

Barneby ridge-cress reproduces by seeds, but we lack information on its pollinators and breeding system (Service 1993). Other *Lepidium* species with showy flowers like Barneby ridge-cress depend on pollination by bees in the Apidae and Halictidae families and wasps in the Sphecidae family (Robertson and Klemash 2003). Low seed production has been observed in this species and we need more information to evaluate possible contributing factors such as resource (drought conditions), genetic, and pollinator limitation (Service 2011). The species produces viable seeds at achieve high germination rates (90 percent) that remain viable for long periods (at least 21 years) in off-site (ex-situ) storage indicating the potential of a long-lived seedbank in the wild (Hinz 2017). Life history and

long-term population dynamics are unknown; individuals live at least five years based on infrequent site visits and monitoring (Service 1993). Associated plant species include other cushion-like plants, stemless four-nerve daisy (*Tetranerium acaulis*), Hooker's sandwort (*Arenaria hookeri*), Townsend daisy (*Townsendia mensana*), and Colorado feverfew (*Parthenium ligulatum*); other forbs, Bateman's buckwheat (*Eriogonum batemanii*), tufted milkvetch (*Astragalus spatulatus*), and rough Indian paintbrush (*Castilleja scabrida*); and tree species, Colorado pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) (Service 1993).

We listed Barneby ridge-cress as endangered under the authority of the Endangered Species Act, as amended, (Act) on September 28, 1990 (59 FR 39860). The total population estimate at that time was approximately 5,000 individuals in one population (Indian Canyon) composed of four distinct sites on three ridgelines. The total range of this species was less than 500 acres (ac) (200 hectares (ha)) spanning about 5 mi (8 km) on Tribal lands of the Uintah and Ouray Reservation of the Northern Ute Indian Tribe. Primary threats to the species were oil and gas development and unauthorized off-road vehicle (OHV) use in the habitat. The restricted range and single population of this species were listed as vulnerabilities with the potential to exacerbate the effects to the species from identified threats. At the time of listing, the recovery priority number (RPN) was 5C, a recovery priority that reflects a high degree of threat, a low recovery potential, and imminent conflicts with land development. We changed the RPN to 11C in 2011 to reflect that the degree of threat had changed from high to moderate (Service 2011). This change reflected additional protections afforded to the species and its habitat from oil and gas development projects through section 7 consultations and Tribal protections from unauthorized OHV use (Service 2011). We did not designate critical habitat for Barneby ridge-cress. We amended the recovery criteria for this species in 2018 to include objective delisting criteria not included in the 1993 Recovery Plan (Service 2018).

We now know of three populations¹ (Indian Canyon, Starvation Reservoir, and Coyote Canyon) that contain approximately 7,731 plants (Spector 2015; EIS 2021; Service 2021). The most recent population estimate of 6,614 individuals for the Indian Canyon population is larger than we identified at listing (Service 2021). Two new populations were located in 2014 and 2015, the Starvation Reservoir and Coyote Canyon populations, respectively (Figure 1). The Starvation Reservoir population was found during project-level surveys unrelated to this species (EIS 2014). The Starvation Reservoir population is entirely on private land and has 27 individuals (EIS 2014; Service 2021). The Coyote Canyon population was found during plant surveys on State of Utah lands managed by the Utah Department of Wildlife Resources (UDWR) as a wildlife management area (WMA). The Coyote Canyon population contains at least 1,090 individuals, though additional suitable habitat has not been surveyed (Spector 2015; Service 2021).

¹ Population delineations are based on NatureServe criteria (NatureServe 2004).

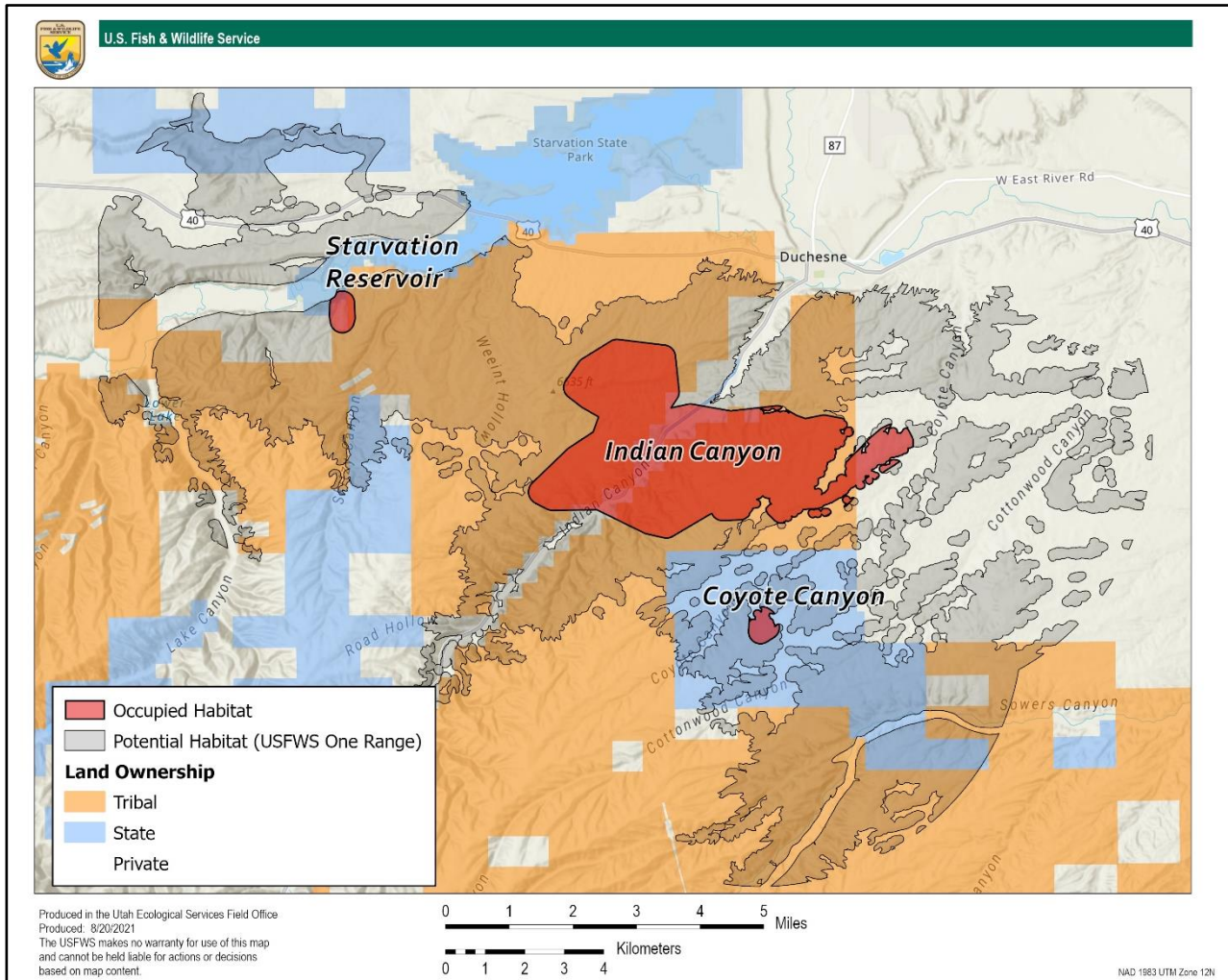


Figure 1. Map showing the three known populations of Barneby ridge-crest (red) on either Tribal (orange) or State (blue) land. The 2021 potential habitat polygon is shown in gray.

The species' current range has expanded to approximately 9 mi (14 km) and contains 985 ac (399 ha) of occupied habitat. We revised the potential habitat polygon in 2021 using the best available information for the species and its current range (Figure 1; Lindstrom 2021). The new polygon contains 45,714 ac (18,500 ha) of potential habitat (Service 2021). Access to the three populations for monitoring and survey efforts has been intermittent since they are located on non-Federal lands. As a result, we lack range-wide surveys and long-term population trend information. Most population information has been collected during project-level surveys for proposed oil and gas projects.

The threats originally identified for Barneby ridge-crest remain threats to the species today. There are 311 active oil and gas wells within the new potential habitat polygon boundaries, 22 of which are in occupied habitat (Service 2021). The estimated area of disturbance is approximately 2.6 percent (1,199 ac (485 ha)) of potential habitat and 13 percent (112 ac (45 ha)) of occupied habitat (Service 2021). The Tribe has been actively policing OHV trespassing, reducing (but not eliminating) OHV use in Barneby ridge-crest habitat on Tribal lands (Service 2011). Vehicle tracks and damage to plants have been observed in the Coyote Canyon population and habitat area within the Cottonwood WMA

(Spector 2015; Croft 2021; Reisor 2021). Regulatory mechanisms are inadequate to address threats to the species. More stringent and long-term habitat protections are needed to protect the populations on Tribal, private, and state lands from oil and gas and unauthorized OHV use. Discussions with the UDWR about the conservation of Barneby ridge-cress within the Cottonwood Canyon WMA are currently ongoing.

The species is less vulnerable to catastrophic loss and small population size with the addition of the two new populations. However, it remains a narrow, endemic species with a small range. A potential future threat facing Barneby ridge-cress is a proposed railroad construction project within the Indian Canyon population that would bisect the population. The project is contingent on approval and funding from the Federal Surface Transportation Board (STB 2021).

Climate change and drought were not identified as threats to Barneby ridge-cress at the time of listing. As a desert-adapted species in an environment characterized by drought cycles, we expect the species is well adapted to naturally occurring droughts. However, an increase in periodic prolonged droughts due to climate change beyond the naturally occurring drought cycles may reduce the resilience and redundancy of Barneby ridge-cress (Gonzalez et al. 2018). The potential effects of climate change and drought to the species have not been evaluated.

Recommendations on species status:

After reviewing the best available scientific information and recovery status, we conclude that Barneby ridge-cress remains an endangered species. Oil and gas development and OHV use remain threats to this species. Baseline information regarding the species' biology, including its life history, reproductive strategies, genetic stability, and long-term population trends remain unknown. Downlisting and delisting criteria have not been met. Therefore, we recommend no change in status to the species at this time.

Recommended future actions:

Based on recent discussions with Federal agencies and conservation partners, we recommend the following future actions to support the recovery of the species (in order of priority): (1) work with private, State, and Tribal land owners to develop and implement conservation agreements that provide long-term protections for this species where it occurs; (2) survey suitable habitat areas to locate additional populations; (3) develop and implement standardized range-wide, long-term monitoring procedures for the species; (4) implement and maintain *ex-situ* (off-site) seed collection and preservation at a Center for Plant Conservation affiliated institution; (5) establish a set of need-based research priorities into the species' biology and life history aimed at minimizing threats and supporting recovery; (6) communicate with partners and stakeholders regarding the species' recovery needs and progress; and (7) evaluate the effect of climate change and drought on the species.

Approve: _____

Date: _____

Yvette Converse, Field Supervisor
Utah Ecological Services Field Office

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