5-YEAR REVIEW

Baker's larkspur (*Delphinium bakeri*)

GENERAL INFORMATION:

Species: Baker's larkspur (*Delphinium bakeri*)
Date listed: January 26, 2000
FR citation(s): 65 FR 4156
Classification: Endangered

BACKGROUND:

Most recent status review:

The most recent status review of Baker's larkspur was a 5-year review completed by the Sacramento Fish and Wildlife Office in 2012 (USFWS 2012). [CLICK HERE TO VIEW DOCUMENT]

FR Notice citation announcing this status review:

A notice announcing initiation of the 5-year review for this taxon and the opening of a 60-day period to receive information from the public was published in the Federal Register on June 18, 2018 (83 FR 28251-28254).

We did not receive any information from the public in response to the Federal Register Notice announcing this 5-year review.

ASSESSMENT:

Information acquired since the last status review:

This 5-year review was conducted by the U.S. Fish and Wildlife Service's (USFWS) Sacramento Fish and Wildlife Office (SFWO). Data for this review were solicited from interested parties through a Federal Register notice announcing this review on June 18, 2018. We also contacted species experts and the California Department of Fish and Wildlife (CDFW) to request data or information we should consider in our review. Additionally, we obtained data from the California Natural Diversity Database (CNDDB; maintained by CDFW), conducted a literature search, and reviewed information in our files. Personal communications with species experts and annual reports submitted by project partners were our primary sources of information.

Population Status and Abundance

As of 2018, there are three extant populations of Baker's larkspur, one historical population and two introduced populations. The University of California (UC) Botanical Garden at Berkeley monitors the historical and introduced populations of Baker's larkspur four to five times per year. Data gathered at each site include counts for each of the following: individuals in each life stage, leaves, flower buds, open flowers, and developing fruits (H. Forbes, UC Botanical Garden at Berkeley, *in litt*. 2018a).

The single extant historical population of Baker's larkspur (CNDDB 2018, occurrence #1; along Marshall-Petaluma Road) has had fewer than five flowering plants each year since 2004 (**Table 1**). In 2018, the site contained only three plants of flowering size. However, there are signs that the habitat condition at this location has been gradually improving since the damage caused by fire and road maintenance activities in 2004 (H. Forbes, *in litt*. 2018a). Details of the 2004 damage to this population, as well as earlier damage that occurred in 2002, can be found in the 2012 status review (USFWS 2012).

Table 1. Number of Baker's larkspur plants [individuals (all life stages), flowering plants, and plants that successfully produced seeds] and number of seeds collected annually in the historical population along Marshall-Petaluma Road, CNDDB (2018) occurrence #1, 2001-2018 (H. Forbes, unpubl. data 2018). Seeds were collected by UC Botanical Garden at Berkeley staff.

Year	# Individuals	# Flowering individuals	# Individuals that set seed	# Seeds collected
2001	64	32	21	301
2002	85	>23	No data, population mistakenly mowed in May	0
2003	95	38	28	477
2004	51	33	16	293
2005	9	2	1	88
2006	7	2	1	0
2007	11	2	1	395
2008	10	2	1	0
2009	16	2	1	62
2010	11	3	3	552
2011	7	4	4	1,349
2012	11	4	4	0
2013	6	4	3	722
2014	10	4	4	295
2015	8	3	1	16
2016	10	3	3	94
2017	7	3	3	308
2018	7	3	3	859

Between 2009 and 2012, 203 adult, greenhouse-raised Baker's larkspurs were planted at three introduction sites, Marshall-Petaluma Road Private Ranch, Chileno Valley Road Private Ranch, and Soulajoule Reservoir (CNDDB 2018; occurrences #5, #6, and #7, respectively). Descriptions of the sites (all within 5 air miles of the historical occurrence) and details of the introductions can be found in the recovery plan for Baker's larkspur (USFWS 2015). As of 2018, none of the three introduced populations has been successful and only two remain extant (**Table 2**). Although seedlings were documented at all introduction sites in the year(s) following out-planting, none of the seedlings produced on site have reached seed set (H. Forbes, *in litt*. 2018a). The Chileno Valley Road Private Ranch introduction site has supported 0 to 5 flowering plants each spring since 2012 but none of the plants has successfully set seed since 2013. In 2018, there were 25

adult Baker's larkspur plants at the Soulajoule Reservoir introduction site but no plants have flowered at this site since 2013 (**Table 2**).

Table 2. Numbers of Baker's larkspur plants (adult plants, flowering plants, and plants that successfully produced seeds) at three introduced populations, CNDDB (2018) occurrences #5-7, 2009-2018 (H. Forbes, unpubl. data 2018).

	Marshall-Petaluma Road Private Ranch			**Chileno Valley Road Private Ranch**			**Soulajoule Reservoir**		
Year	# Adult plants	# Flowered	# Set seed	# Adult plants	# Flowered	# Set seed	# Adult plants	# Flowered	# Set seed
2009	(11 planted)			(45 planted)					
2010							(40 planted)		
2011	5	3	0	26 (30 planted)	13	10	20 (70 planted)	13	9
2012	8 (7 planted)	8	8	4	4	4	22	0	0
2013	3	3	3	14	5	5	18	1	0
2014	3	1	0	14	2	0	20	0	0
2015	3	0	0	14	0	0	14	0	0
2016	0	0	0	2	1	0	9	0	0
2017	0	0	0	14	3	0	4	0	0
2018	0	0	0	7	2	0	25	0	0

Threats

Threats to Baker's larkspur remain the same as in the 2012 status review (USFWS 2012). Direct, human-caused damage has not occurred since 2004. However, within the past five years, Holly Forbes (UC Botanical Garden at Berkeley) found a cloth bag, placed by an unknown person, over a Baker's larkspur stem with developing seeds. This observation, which occurred at the historical population site, could be indicative of an illegal attempt to collect seeds, but the intent of the unidentified person remains unknown. Forbes replaced the cloth bag with a UC Botanical Garden at Berkeley seed-collection bag and left a note with her business card. No subsequent activity was observed and Forbes has not been contacted regarding the incident (H. Forbes, *in litt.* 2018a,b).

Baker's larkspur is susceptible to extinction from ordinary events and environmental pressures because of its extremely small population. Baker's larkspur at all four sites have been adversely affected by wildlife herbivory and/or activity (Forbes 2017; H. Forbes, *in litt.* 2018a). Herbivory by banana slugs (*Ariolimax* species) has been particularly inhibitory for Baker's larkspur establishment and recruitment at the introduction sites. Drought also had an adverse effect on recruitment of Baker's larkspur seedlings. Prolonged dry weather led to deep layers of leaf litter, which impeded seedling establishment at the introduction sites (H. Forbes, *in litt.* 2018a). Tree falls, although not known to have directly harmed Baker's larkspur plants, have occurred at the Marshall-Petaluma Road and Soulajoule Reservoir introduction sites (USFWS 2015; H. Forbes, *in litt.* 2018b). Given the small size of each remaining Baker's larkspur population, a future tree fall could cause an extirpation.

Conservation

A fourth introduction site for Baker's larkspur has been identified on the same property as the Chileno Valley Road Private Ranch introduction site. The first out-planting of greenhouse-raised Baker's larkspurs at this new location was conducted during the winter of 2018/2019 (H. Forbes,

in litt. 2019). Approximately 0.5 million Baker's larkspur seeds are currently banked at -18 degrees Celsius at the UC Botanical Garden at Berkeley (H. Forbes, *in litt*. 2018a). The UC Botanical Garden at Berkeley is still collaborating with Dr. Jason Koontz of Augustana College, Rock Island, Illinois. Dr. Koontz has been conducting microsatellite research on larkspurs, but has not yet been successful with microsatellite markers in Baker's larkspur (J. Koontz, *in litt*. 2018).

Conclusion:

After reviewing the best available scientific information, we conclude that Baker's larkspur remains an endangered species. The evaluation of threats affecting the species under the factors in 4(a)(1) of the Act and analysis of the status of the species in the 2012 status review (USFWS 2012) remains an accurate reflection of the species current status.

RECOMMENDATIONS FOR FUTURE ACTIONS:

Recommendations remain essentially the same as in the 2012 status review (USFWS 2012). In particular, focus should be on establishment of new Baker's larkspur populations. Additionally, we recommend the implementation of an adaptive strategy, whereby detailed observations of successes and failures are recorded and used to evaluate and adapt methods on a regular basis.

Lead Field Supervisor, Fish and Wildlife Service

Approve _____ Date 5/2/2019

LITERATURE CITED

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In Litteris

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Koontz, Jason. 2018. Professor of Biology and Co-Chair of Environmental Studies, Augustana College, Rock Island, Illinois. Electronic mail message to Stephanie Prevost of the Sacramento Fish and Wildlife Office dated October 23, 2018. Subject: California *Delphiniums* inquiry.