

5 -YEAR REVIEW
Applegate's milk vetch (*Astragalus applegatei*)

GENERAL INFORMATION:

Species: Applegate's milk-vetch (*Astragalus applegatei*)

Date Listed: July 28, 1993

FR citations: 58 FR 40547

Classification: Endangered

BACKGROUND:

Most recent status review: U.S. Fish and Wildlife Service. 2019. Applegate's Milk-vetch (*Astragalus applegatei*) 5-Year Review: Summary and Evaluation. 9 pgs. Finalized August 9, 2019.

ASSESSMENT:

Information acquired since the last status review: This 5-year review was conducted by the U.S. Fish and Wildlife Service's (Service) Klamath Falls, Oregon, Field Office. Data for this review were solicited from interested parties through a Federal Register notice announcing this review on August 1, 2023. We also contacted partners/stakeholders Humboldt State University (HSU), The Nature Conservancy, the Oregon Department of Agriculture (ODA), Oregon Department of Fish and Wildlife, Oregon State Parks and Recreation (OPRD), and Kimley-Horn Engineering Planning and Design Consultants (Kimley-Horn) 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.

We did not receive any information from the public in response to the Federal Register Notice announcing this 5-year review. We did receive survey/monitoring and anecdotal observation reports as well as research project updates in response to our outreach to the above partners and stakeholders.

The 2019 5-Year Review for Applegate's milkvetch (ASAP) (USFWS 2019) reported eight sites that were known or thought to contain ASAP populations at that time; Ewauna Flats, Collins Products (Collins), Worden, Miller Island Unit of the Klamath Wildlife Area (Miller Island), Crater Lake-Klamath Regional Airport (Airport), Washburn Railroad right of way (Washburn RR), Mallard Lane, and the OC and E Woods Line State Trail (OC&E). Information that we received indicate that the species is known to still be present at seven of these sites, with five of the sites having been censused or surveyed since 2019 (Table 1).

The Ewauna Flats, Collins, and Worden sites are all privately owned and were last surveyed prior to 2019. ODA reported that ASAP continues to exist at the Ewauna Flats and Collins sites, however they were unable to contact the Worden site owners to request access. While ASAP is assumed to be extirpated at the Worden site, the population number and status at all three sites is currently unknown. HSU continues to maintain and monitor experimental ASAP plots on the Ewauna Flats site, which is under the ownership and management of The Nature Conservancy.

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The Miller Island site is State of Oregon owned, managed by ODFW, and consists of five subpopulations. In 2022, due to time constraints, ODA was only able to survey subpopulations EO 002 (23 plants) and EO 010 (307 plants), finding a total of 330 reproductive plants. This is an increase of 229 plants since its last reported survey in 2008. Both patches were observed to be dominated by thatch forming, non-native grasses and other competing non-native vegetation. ODA did, however, note an improvement in habitat quality in EO 010 comparing to EO 002. According to the refuge manager the increase in habitat quality and ASAP numbers could be related to an escaped controlled burn in 2020 (Sandlin, 2024). HSU continues to maintain and monitor experimental ASAP plots within the site.

The Airport site consists of two properties, both of which are owned by the City of Klamath Falls. A portion of one property is operated for civilian purposes and the other property is leased to the military as the Kingsley Field Air National Guard Base (ANGB). The population was first counted in 2013, when the Service documented 30,873 plants (USFWS, 2019). Rabe Consulting conducted a survey in 2020, recounting patches that the company had identified as containing plants in 2018 and 2019, along with the remaining previously un-surveyed portion of the site. The 2020 survey reported a total count of 3,049 plants but did not revisit areas surveyed in 2018 and 2019 where plants were not observed (Rape, 2020).

Concerned by the dramatic count decline, and unable to recreate Rabe's survey methodology (Spaur, personal communication, 2021), ODA surveyed the majority of the site's patches in 2022 and documented 9,193 plants (Sandlin, 2024). Sandlin (2024) estimated that the remaining patches could possibly contain up to an additional 2,000 individual plants, based on the size of the patches and the density of surrounding patches. HSU continues to maintain and monitor experimental ASAP plots within the site.

The Washburn RR site consists of a half-acre of combined railroad right of way (ROW) and adjacent private property. In 2019, the Service counted 228 individual plants in the combined properties. Shortly after that, the privately owned portion was bulldozed and developed, and the population was thought to be extirpated (J. Spaur, personal communication, 2019). However, in 2022, ODA found that eight large individual plants continued to exist within the ROW (Sandlin, 2024).

The Mallard Lane site falls within two parcels of privately owned property, one of which is owned by Pacific Corp. The Pacific Corp property is currently undergoing construction under the oversight of Kimley-Horn. Kimley-Horn documented 75 plants on the property in 2024 (J. Carlson, personal communication, 2024) and reported that a minimum 25' construction buffer was established around all the plants (S. Myers, personal communication, 2024).

The OC&E Trail site is owned by the State of Oregon and managed by OPRD. The site's ASAP population was discovered in 2013, when 8,910 plants were counted. In 2024, ODA attempted a full census of the population, counting 3,150 plants before time constraints prevented completion of the site. After collaborating with ODA, OPRD, and the Service to develop a research project exploring ASAP management techniques, HSU established research plots within the site's

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population. HSU researchers then counted each individual adult, juvenile, and seedling within the plots, reaching a total higher than that of the ODA count, which covered a larger amount of area (Sandling, personal communication, 2024).

Table 1. Comparison of known Applegate’s milk-vetch (ASAP) populations between 5-year reviews based on population number and status. For additional site descriptions please see the ASAP 2019 Species Status Assessment (SSA) (USFWS 2019).

Site Name	Status at 5-year Reviews			Population Changes Since Previous Known Status				Ownership	Under Protected Management?
	2009*	2019*	2024	Increase?	Decrease?	Suggest Stability or Growth?	Self Sustaining Population?		
Ewauna Flats	2,198	3,390	Unknown	Unknown		Unknown	No	The Nature Conservancy	Yes
Collins	10,143	47,516	Unknown	Unknown		Unknown	No	Private	No
Worden	9	Unknown	Unknown	Unknown		Unknown	No	Private	No
Miller Island	112	122	330**	208		Yes	No	State of Oregon	Yes
Airport	21,049	30,873	9,183**	21,690		No	No	City of Klamath Falls	Yes
Washburn RR	307	228	8**	220		No	No	Private	No
Mallard Lane	625	Unknown	78***	547		No	No	Private	No
OC&E Trail	Unknown	8,910	>3,105****	Unknown			Yes	State of Oregon	Yes

* USFWS, 2019a
 ** Sandlin, 2024
 *** J. Carlson, Kimley Horn, personal communication 2024
 **** Sandlin, 2024, personal communication

According to the 2019 SSA, the species must maintain at least four self-sustaining populations/sites that are being protected and managed for the benefit of the species. A self-sustaining population is defined as having maintained a minimum of 2,200 reproductive plants (opposed to the count also including juveniles and/or seedlings) over five consecutive years of monitoring (USFWS 2019b).

To date, none of the populations qualify as self-sustaining. It is unknown how many of the OC&E 2024 censused plants were, or could be, categorized as reproductive. If a minimum of 2,200 reproductive plants were documented, then the 2024 census will count toward the required five years of consecutive monitoring to be classified as self-sustaining.

HSU research studies completed and/or analyzed over the previous five years focused on the demographics of naturally occurring ASAP populations and of planted populations and on the role played by arbuscular mycorrhiza fungus (AMF) in association with ASAP. Stewart and Byrne (2024) assessed long-term demographic data from extant and planted ASAP individuals. Their findings indicate that overall, planted individuals can recover from the translocation process and have immediate and long-term positive impacts to population growth, which in turn demonstrates that reinforcement is a viable strategy for ASAP. However, the authors caution that as population reinforcement is an understudied category of translocation, there is a need for additional research prior to considering it a conservation strategy.

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Cuellar-Gempeler and Sogingco (2023) collected ASAP roots and surrounding soil samples from seedlings and reproductive plants within four populations. Findings support their hypothesis that AMF play an important role in seedling development and indicate that AMF, while site-dependent, appear to disperse well in soils and successfully colonize seedlings. Results also indicate a dynamic AMF community that can provide differential support to ASAP across sites. The significant differences observed in community composition between sites, if casually proven through additional study, could open the door for potential interventions of AMF communities that aim to improve restoration efforts (Cuellar-Gempeler and Sogingco, 2023).

In summary, using the best available data, it appears that Applegate's milkvetch may be experiencing a considerable decline across its range (Table 1). Additionally, the Service acquired newly generated research information that, with additional study, could provide helpful towards restoration. However, analysis of the newly provided information does not alter the Service's understanding of ASAP's stressors, distribution, condition, nor status (USFWS 1993, 1998, 2019c). Nor does the new information allow the species to qualify for down or de-listing.

CONCLUSION:

After reviewing the best available scientific information, we conclude that Applegate's milkvetch 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 our 2019 species status review remains an accurate reflection of the species current status.

RECOMMENDATIONS FOR FUTURE ACTIONS:

To work towards delisting, the Service recommends implementing a plan for annual surveying of ASAP populations, including indication of life stage, for all populations close to reaching the benchmark of 2,200 reproductive individuals. Surveys for other populations are recommended at least once every five years, also with indication of individual life stage. All surveys should also include a habitat condition and composition component.

Previous research results indicate the need for additional study related to ASAP restoration and management. The Service recommends the continued research of population reinforcement and the role of AMF communities related to ASAP as restoration tools and to explore the response of ASAP to various management options, including fire, mowing, and scraping.

As mentioned above, a current research collaboration between ODA, ODPR, HSU, and the Service is underway at the OC&E site to 1) census and map the entire OC&E site ASAP population; 2) collect baseline abundance information on the species through establishment of plots; 3) apply experiment management treatments that may foster population growth; 4) monitor responses to the treatments; 5) collect soil samples and sequence microbiome to characterize soil microbiome associations and habitat characteristics; 6) analyze data; and 7) report findings. Results are preliminarily expected in 2025 with a final report in 2026 (ODA, 2023).

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Lead Field Supervisor, Fish and Wildlife Service

Approve _____ Date _____

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