5-YEAR REVIEW
Ash Meadows blazingstar (*Mentzelia leucophylla*)

GENERAL INFORMATION

Species: Ash Meadows blazingstar (*Mentzelia leucophylla*)
Date listed: May 20, 1985
FR citation(s): 50 FR 20777
Classification: Threatened

BACKGROUND

Most recent status review
The status of Ash Meadows blazingstar was last reviewed on September 30, 2020, in a 5-year review (Service 2020a).

FR Notice citation announcing this status review
89 FR 83510, Endangered and Threatened Wildlife and Plants; Initiation of 5-Year Status Reviews for 59 Pacific Southwest Species. Published on October 16, 2024.

ASSESSMENT

Information acquired since the last status review
This 5-year review was conducted by the U.S. Fish and Wildlife Service's (Service) Southern Nevada Fish and Wildlife Office. Data for this review were solicited from interested parties through a Federal Register notice announcing this review on October 16, 2024. We did not receive any information from the public in response to our Federal Register Notice announcing this 5-year review. We also contacted the Nevada Division of Forestry, the Nevada Natural Heritage Program, the United States Bureau of Land Management (BLM) Southern Nevada District Office, the United States Geological Survey Boulder City Field Office, the Clark County Desert Conservation Program, the Rancho Santa Ana Botanic Garden, and the Desert Research Institute 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.

After review, the Service has concluded that limited new information has become available since the most recent status review. Since the 2020 5-yr review, there has been additional population monitoring and grant specific research conducted. We have provided summaries for this new information below.

Summary of population monitoring
At the time of listing, it was estimated that there was less than 100 Ash Meadows blazingstar individuals (Reveal 1978). In 2001, the population on the Ash Meadows National Wildlife Refuge (Refuge) was estimated to be approximately 358 individuals (Moorefield 2001). From 2007–2010, Refuge rare plant surveys estimated that 1,513 individuals were present on the Refuge (Bio-West 2011). From 2014-2021, four sites within the Refuge were selected to be monitored more frequently. These sites were surveyed six times during that period (2014-2016 & 2019-2021; Table 1). The sites monitored do not represent the full extent of the range for the

species. During the monitoring period, the total number of Ash Meadows blazingstar identified during surveys decreased by approximately 36 percent with population decreases in all four monitored populations (Pyramid Botanical 2021). Additional surveys of these four sites has occurred but data for these surveys is currently under review.

Table 1. Ash Meadows blazingstar counts from 2014-2016 & 2019-2021 for four sites within Ash Meadows National Wildlife Refuge (Pyramid Botanical 2021).

Site Name	2014 count	2015 count	2016 count	2019 count	2020 count	2021 count
Indian Spring	7	5	2	0	2	2
Peterson Road North	11	17	11	9	8	8
Purgatory Spring East	44	20	12	17	8	9
Purgatory Spring West	104	119	68	48	62	86
Cumulative	165	161	93	73	80	105

Additional surveys were also performed in 2024 as part of a vegetation inventory for the Upper Carson Slough at the Refuge (Miller and Boes 2025a). One hundred and fifty-eight occurrences were mapped with a total of 1,749 individuals. Of the 158 occurrences, 137 of these were new. Previous surveys from 2007-2010 identified 77 occurrences with a total of 851 individuals (Bio-West 2011; Miller and Boes 2025a). Of the 77 occurrences identified previously, only 21 occurrences had observations in 2024, suggesting the species' distribution may shift in relation to available resources (Miller and Boes 2025a). Of the 158 occurrences, threats from invasive plants were listed for four occurrences (Miller and Boes 2025a). Overall, the results of the 2024 inventory show an increase in occurrences and individuals since the 2007-2010 monitoring period and suggest the species' population in the Upper Carson Slough area of the Refuge is increasing in size and the species is capable of migrating into new areas.

In summary, although the locations of many species' occurrences have changed since the 2007-2010 monitoring period, our understanding of the species' distribution remains largely the same (within the boundaries of the Refuge), as described in our most recent 5-year review (Service, 2020a). Therefore, this information does not alter our understanding of the species' current range. However, the recent 2024 survey of the Upper Carson Slough does highlight the limitations of smaller, site-specific surveys, such as those performed from 2014-2021 (Pyramid Botanical 2021), when making inferences about the range-wide status of Ash Meadows blazingstar.

Research and/or grant supported activities

I. *Inventory of Moisture and Salt Distribution in Soils and Sediments that Support Threatened and Endangered Plants in the Ash Meadows National Wildlife Refuge* (Breit 2019):

Auger holes and excavations were used to inventory the vertical and lateral distribution of salts in soils and sediment at 20 sites known to contain protected plant species and at eight sites lacking those plants. Two sites were instrumented with soil moisture sensors so that Refuge staff can monitor long-term change. Information from this project will help to identify suitable sites for expansion and restoration of threatened and endangered

plants as well as provide baseline data on the full extent of impacts from water extraction within the Amargosa Desert Hydrographic Basin.
Project Status: Completed.

II. *Protocol Survey Report 2014-2021: Monitoring of Nine Endemic Rare Plants* (Pyramid Botanical Consulting, 2021)
The objectives of this project were: (1) Summarize the existing dataset and evaluate the status of the nine endemic plant species using the established viability analysis; (2) Examine how climate has influenced plant abundance for each species; and (3) Evaluate management objectives for nine endemic plant species at the Refuge.
Project Status: Completed.

III. *Ash Meadows National Wildlife Refuge Natural Resource Management Plan* (Service 2020b)
The objectives of this plan were: (1) Identify natural resource conservation priorities for resources of concern (ROC); (2) Define priority ROC objectives; (3) Identify key ecological attributes of each priority ROC and provide a framework for tracking their status and response to change; (4) Identify and rank threats to priority ROC; (5) Select the highest priority management strategies; (6) Identify the highest priority surveys; and (7) Establish a regular practice of evaluation, learning, and adaptation through annual work planning and evaluation. Priority ROC include desert springs and spring outflows, spring-fed emergent marsh and wet meadows, alkali meadows, seeps and shallow groundwater-fed uplands, and Ash Meadows woodlands.
Project Status: Completed.

IV. *Ash Meadows National Wildlife Refuge Inventory and Monitoring Plan* (Service 2021)
The objectives of this plan were: (1) Document Refuge resources of concern (ROC) and identify highest priority ROC; (2) Develop and document specific, measurable, achievable, results-oriented, and time-bound management objectives for the highest priority ROC; and (3) Select natural resource surveys conducted at the Refuge to manage its highest priority ROC.
Project Status: Completed.

V. *Investigating Phylogenetic Placement and Species-Level Relationships in a Recent Radiation of Mentzelia Section Bartonia (Loasaceae) from the Mojave Desert* (Cohen and Schenk 2022)
This study used genomic data from restriction site associated DNA sequences (RADseq) to examine the phylogenetic relationships of the recently evolved and diverse Mojave clade of *Mentzelia* section *Bartonia* (Losaaceae). The results of this study support the recognition of *M. leucophylla* as a distinct species from *M. oreophila* and *M. puberula*.
Project Status: Completed.

VI. *Site specific protocol for Ash Meadows National Wildlife Refuge, Upper Carson Slough management unit vegetation inventory* (Miller and Boes 2025a)
The general objective of this protocol is to provide standardized methods to complete and report on invasive and listed plant (*Astragalus phoenix*, *Mentzelia leucophylla* and *Nitrophila mohavensis*) inventory in the Upper Carson Slough management unit at the

Refuge. The survey effort can be adjusted to allow for budget and time constraints, or to address specific management questions.
Project Status: In prep.

VII. *Ash Meadows National Wildlife Refuge Upper Carson Slough Management Unit, 2024-2025 Invasive and Rare Plant Inventory* (Miller and Boes 2025b)
The objectives of this project were: (1) Document the distribution and abundance of priority invasive plant species on the Refuge within the Upper Carson Slough management unit; (2) Document the distribution and abundance of *Astragalus phoenix*, *Mentzelia leucophylla* and *Nitrophila mohavensis* within the Upper Carson Slough management unit; and (3) Implement annual monitoring of *Nitrophila mohavensis* abundance and plant traits within *Nitrophila mohavensis* monitoring macroplots (Nitrophila South, Crystal Nitrophila, and Crystal Pipeline), including data archiving, analysis and reporting, following the protocol from Moore-O'Leary *et al*. 2022.
Project Status: Draft report is in review.

VIII. *Inventory and Mapping of Select Invasive and Rare Endemic Plants at Ash Meadows National Wildlife Refuge* (Service 2025)
The overall goal of the project is the continuation of a previously implemented rotational invasive plant inventory and management strategy for the Refuge whereby a management unit is surveyed for invasive plants and rare, endemic plants. The resulting information is used to establish control priorities for that unit, and control efforts are then planned and implemented in subsequent years. The current unit being surveyed in 2025 is the Crystal Spring Management Unit.
Project Status: Project implemented in 2025.

IX. *Multiple metrics of trichome diversity support independent evolutionary hypotheses in blazingstars (Mentzelia:Loasaceae)* (Glos and Weber 2025)
This study examined the functional importance of trichomes and the structures response to selection pressures across ecological gradients and evolutionary timescales. *Mentzelia* species tend to invest more energy in trichome production in less arid environments and at higher elevations. Barbed trichomes, which help deter herbivores, are less common on the underside of species with larger petals and on the upper surface of leaves for all species, possibly due to a conflict between herbivory and pollination. Overall, the study demonstrated the need to examine trichomes along multiple axes of diversity when considering adaptive hypotheses for their origin.
Project Status: Completed.

Conclusion

After reviewing the best available scientific information, we conclude that Ash Meadows blazingstar remains a threatened species. The evaluation of threats affecting the species under the factors in 4(a)(1) of the Endangered Species Act and analysis of the status of the species in our most recent 5-year review (2020a) remains an accurate reflection of the species' current status.

RECOMMENDATIONS FOR FUTURE ACTIONS

1. Monitor compliance with the January 12, 2018, Nevada Revised Statute Order 1197A, Curtailment of New Appropriations of Groundwater within the Amargosa Valley Hydrographic Basin 230, to ensure groundwater levels in Devils Hole can support the population (Nevada State Engineer 2018). Order 1197 is no longer in effect. Water levels in Devils Hole are affected by pumping centers in Amargosa Desert and the Ash Meadows groundwater basins (Halford and Jackson 2020);

2. Collaborate with the Ash Meadows NWR to implement the Desert National Wildlife Refuge Complex – Ash Meadows, Desert, Moapa Valley, and Pahranagat National Wildlife Refuges Final Comprehensive Conservation Plan and Environmental Impact Statement, Volume I – August 2009 (Service 2009) and the Ash Meadows Natural Resource Management Plan (Service 2020b);

3. Support Ash Meadows blazingstar research at the Refuge to monitor the population as identified in the Recovery Plan for the Endangered and Threatened Species of Ash Meadows (Service 1990); and

4. Monitor the future activity of mineral rights in the Ash Meadows area. The BLM Area of Critical Environmental Concern surrounding the Refuge is withdrawn from mining and entry until 2029 (PLO# 7737, signed November 2nd, 2009), but requires renewal every 20 years. Mining can still occur on private inholdings within the Refuge, but no active mining permits exist at this time.

Lead Field Supervisor, U. S. Fish and Wildlife Service

Approve  Digitally signed by BRIAN CROFT
Date: 2025.08.11 10:21:11 -07'00' Date _____

Literature Cited

Bio-West, Inc. 2011. *Ash Meadows National Wildlife Refuge: Vegetation community mapping and rare plant survey; final report*. Report submitted to U.S. Fish and Wildlife Service by Bio-West, Inc., Logan, Utah. 207 pp + appendices.

Breit, G.N. 2019. *Inventory of moisture and salt distribution in soils and sediment that support threatened and endangered plants in the ash Meadows National Wildlife Refuge*. Geology, Geophysics, and Geochemistry Science Center, U.S. Geological Survey. Lakewood, Colorado. 83 pp + appendices.

Cohen, D. H., and Schenk, J. J. 2022. *Investigating Phylogenetic Placement and Species-Level Relationships in a Recent Radiation of Mentzelia Section Bartonia (Loasaceae) from the Mojave Desert.* Systematic Botany, 47(1): pp. 140-151.

Glos, R. A. E., and Weber, M. G. 2025. *Multiple metrics of trichome diversity support independent evolutionary hypotheses in blazingstars (Mentzelia:Loasaceae)*. Evolution,

Halford, K.J., and Jackson, T.R., 2020. *Groundwater characterization and effects of pumping in the Death Valley regional groundwater flow system, Nevada and California, with special reference to Devils Hole*. U.S. Geological Survey Professional Paper 1863, 178 pp., https://doi.org/10.3133/pp1863.

Miller, A.L. and W. Boes 2025a. *Ash Meadows National Wildlife Refuge: 2024 Invasive and Rare Plant Inventory*. Unpublished report, Pyramid Botanical Consultants, Inc., Twin Bridges, CA. 79 pp + appendices.

Miller, A.L. and W. Boes 2025b. *Standard operating procedure for vegetation inventory, Upper Carson Slough management unit, Ash Meadows National Wildlife Refuge*. Unpublished protocol report. Prepared by Pyramid Botanical Consultants, Inc., Twin Bridges, CA. Prepared for U.S. Fish and Wildlife Service, Ash Meadows National Wildlife Refuge, Nevada. 27 pp.

Morefield, J.D. 2001. *Nevada rare plant atlas: Mentzelia leucophylla*. Report submitted to the U.S. Fish and Wildlife Service by the Nevada Natural Heritage Program, Carson City, Nevada.

Nevada State Engineer. 2018. Order # 1197A: *Curtailment of New Appropriations of Groundwater within the Amargosa Valley Hydrographic Basin* (230), Nye County, Nevada. State of Nevada January 2018. 2 pp.

Pyramid Botanical Consultants. 2021. *Protocol Survey Report 2014–2021 Monitoring of Nine Endemic Rare Plants* (FF08RASH00-053). Unpublished report prepared for the U.S. Fish and Wildlife Service. 92 pp.

Reveal, J.L. 1978. *Status Report on Mentzelia leucophylla [Brandgee] (Ash Meadows stick-leaf)*. Unpublished draft report prepared for the Department of the Interior. 35 pp.

[Service] U.S. Fish and Wildlife Service. 1985. *Endangered and threatened wildlife and plants; determination of threatened status with critical habitat for six plants and one insect in Ash Meadows, Nevada and California; and endangered status with critical habitat for one plant in Ash Meadows, Nevada and California*. Federal Register 50:20777-20794.

[Service] U.S. Fish and Wildlife Service. 1990. *Recovery plan for the endangered and threatened species of Ash Meadows, Nevada*. U.S. Fish and Wildlife Service, Portland, Oregon. 123 pp.

[Service] U.S. Fish and Wildlife Service. 2009. *Desert National Wildlife Refuge Complex – Ash Meadows, Desert, Moapa Valley, and Pahranagat National Wildlife Refuges Final Comprehensive Conservation Plan and Environmental Impact Statement*, Volume I – August 2009. 44 pp.

[Service] U.S. Fish and Wildlife Service. 2020a. *Ash Meadows blazingstar (Mentzelia leucophylla) Five-Year Review*. 9pp.

[Service] U.S. Fish and Wildlife Service. 2020b. *Ash Meadows National Wildlife Refuge Natural Resource Management Plan*. U.S. Fish and Wildlife Service, National Wildlife Refuge System, Department of the Interior Unified Regions 8 & 10 (Legacy Region 8, Pacific Southwest Region), Sacramento, CA.

[Service] U.S. Fish and Wildlife Service. 2021. *Ash Meadows National Wildlife Refuge Inventory and Monitoring Plan*. U.S. Fish and Wildlife Service, National Wildlife Refuge System, Department of the Interior Unified Regions 8 & 10 (Legacy Region 8, Pacific Southwest Region), Sacramento, CA.

[Service] U.S. Fish and Wildlife Service. 2025. *Performance Work Statement: Inventory and Mapping of Select Invasive and Rare Endemic Plants at Ash Meadows National Wildlife Refuge*. U.S. Fish and Wildlife Service, National Wildlife Refuge System, Department of the Interior Unified Regions 8 & 10 (Legacy Region 8, Pacific Southwest Region), Sacramento, CA.