U.S. FISH AND WILDLIFE SERVICE
5-YEAR STATUS REVIEW
Clay phacelia (*Phacelia argillacea*)

GENERAL INFORMATION:

Species: Clay phacelia (*Phacelia argillacea*)

Date listed: October 29, 1978

Federal Register Notice of Listing Determination: September 28, 1978. Endangered and Threatened Wildlife and Plants; Determination of Five Plants as Endangered Species (43 FR 44810).

Classification: Endangered

Most recent status review: July 11, 2019. Clay phacelia (*Phacelia argillacea*) 5-year review.

Federal Register Notice citation announcing this 5-year status review:
March 13, 2023, Endangered and Threatened Wildlife and Plants; Initiation of 5-Year Status Reviews of 27 Listed Species in the Mountain-Prairie Region (88 FR 15448).

Lead Region: U.S. Fish and Wildlife Service, Mountain-Prairie Region, Region 6
Lead Field Office Contact: George Weekley, Field Office Supervisor, Utah Ecological Services Field Office, *George_Weekley@fws.gov*, 801-239-0561

Current Recovery Priority Number (RPN): 2, high degree of threats with a high recovery potential.

Methodology used to complete this review: In accordance with section 4(c)(2) of the Endangered Species Act of 1973 (16 U.S.C Section 1531 *et seq*.), as amended (Act), the purpose of a 5-year status 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 Lists of Threatened and Endangered Wildlife and Plants. Status reviews are to be completed in accordance with sections 4(a) and 4(b) of the Act (16 U.S.C. Section 1533(c)). This 5-year status review was conducted by the U.S. Fish and Wildlife Service's (Service's) Utah Ecological Services Field Office. Data for this review were solicited from interested parties through a *Federal Register* notice announcing this review on March 13, 2023. We also contacted State agencies, Federal agencies, universities, and The Nature Conservancy 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.

Review Summary: Clay phacelia is a showy, biennial plant in the forget-me-not family (Boraginaceae) that occupies steep hillsides on the Green River Shale geologic formation in Spanish Fork Canyon, Utah County, Utah. The species has blue to violet flowers, attracts a variety of bee pollinators, and likely requires insect pollinators to produce seeds (Service 2013).

Clay phacelia relies on a long-lived seedbank to survive periods of unfavorable climate conditions such as drought. The species appears to be highly sensitive to seasonal precipitation and suffers high mortality rates during the first year above-ground due to summer drought or winter exposure (Service 2013; Meyer 2018; Skopec 2018). Threats to the species evaluated in previous 5-year status reviews (Service 2013, 2019) include railway development and maintenance, livestock grazing and trampling, highway improvements, transmission line development, invasive species, herbivory, inadequacy of regulatory mechanisms, and climate change. There has been no new information collected as part of this 5-year review to suggest that clay phacelia isn't still subject to these previously identified threats.

ASSESSMENT:

Information acquired since the last status review: We received annual performance reports from Weber State University and Utah Valley University, including information on annual counts, herbivory and soil analysis, though a final report with comprehensive analysis has not been received at this time. The results indicate the species is still present at the two previously known populations and is distributed sporadically at reintroduction sites (Skopec 2022, 2023). Data from wildlife cameras documented moderate herbivory by ungulates, small mammals, and insects (Skopec 2024). Drought conditions during summer and fall are likely the biggest contributor to patterns in survival from emergence to flowering particularly at introduction sites (Skopec 2021, 2022, 2023, 2024, 2025). Preliminary soil testing indicates that sites occupied by clay phacelia have higher concentrations of nickel, lead, zinc, chromium and strontium than unoccupied sites with similar appearance (Bruggink 2022). Despite this new information the species distribution remains largely the same as described in our previous 5-year Review (USFWS 2019) and this information does not alter our understanding of the species' current distribution or status.

Stevens et al. (2023) attempted to establish new populations of clay phacelia on U.S. Forest Service land from 2022 to 2023. Seeds from 2019, 2020, and 2021 were introduced at Indian Creek, West Canyon, and Watson Canyon using three sowing methods: surface broadcasting, raking plus broadcasting, and broadcasting plus soil covering. Locations were recorded with GPS and GIS. Seedlings appeared primarily at Indian Creek and West Canyon, with no seedlings found at Watson Canyon. Peak emergence occurred in June, followed by a decline due to summer heat and dryness. Survival rates to mid-July were 42.9% at Indian Creek and 77.8% at West Canyon. A chi-square analyses showed no significant differences in germination numbers among the Indian Creek and West Canyon sites, seed lots, or sowing methods. Future plans include monitoring for germination and survivorship, and protecting rosettes from herbivory with cages.

Stevens et al. (2024) studied the effects of herbivory on reproduction and growth. The study was designed to assess the effects of herbivory by small mammals and insects and not large ungulates which tend to forage on entire plants. Among the 15 half-sibling families, significant genetic variation in shoot mass and a significant correlation between total mass between defoliated and undefoliated plants suggests a strong genetic component to growth. The study also found that defoliation was correlated with significant reductions in seed production, shoot production and root production. For these traits, interactions between family (F) and defoliation (D) were not

statistically significant, suggesting fixation for tolerance to herbivory. In contrast, for root-to-shoot ratio, there was a statistically significant F × D interaction, revealing genetic variation for tolerance to herbivory. Depending on the type, intensity, and timing of herbivory, clay phacelia may benefit from either increased allocation to shoots or to roots. In fact, tolerance in terms of reproduction was correlated with shoot mass when defoliated, while tolerance in terms of growth was correlated with root mass when defoliated.

Conclusion:

The Act defines an endangered species as any species that is "in danger of extinction throughout all or a significant portion of its range" and a threatened species as any species that is "likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." After reviewing the best available scientific information, we conclude that clay phacelia is in danger of extinction throughout all or a significant portion of its range. The threats present at the time of listing and recognized during subsequent status reviews, including railway development, maintenance, and expansion; transmission line development, highway improvements, invasive species (factor A); herbivory (factor C); inadequacy of existing regulatory mechanisms (factor D); and small population sizes as well as the potential effects of climate change (factor E) are present and ongoing. The evaluation of threats affecting the species under the factors in section 4(a)(1) of the Act and the analysis of the status of the species in our 2019 status review (Service 2019) remain an accurate reflection of the species' current status as an endangered species. Following this review, we recommend no change in status under the Act for clay phacelia at this time.

U.S. FISH AND WILDLIFE SERVICE
5-YEAR STATUS REVIEW
Clay phacelia (*Phacelia argillacea*)

CURRENT CLASSIFICATION:

RECOMMENDATION RESULTING FROM THE 5-YEAR STATUS 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
_X_ No change is needed

APPROPRIATE LISTING/RECLASSIFICATION PRIORITY NUMBER, IF APPLICABLE:

Clay phacelia currently has a recovery priority number of 2 representing a high degree of threat and high recovery potential. We recommend changing this number to 5. This new ranking recognizes that clay phacelia is a full species, still faces a high degree of threat, but based on information in this 5-year review and Service files, the species has a low degree of recovery potential. The limited success of reintroduction efforts combined with the intensive management at historic sites leads to our conclusions of a low recovery potential determination.

Lead Field Office Approval:

Signature: GEORGE WEEKLEY Digitally signed by GEORGE WEEKLEY Date: 2026.03.20 09:27:12 -06'00' Date: _____

George Weekley
U.S. Fish and Wildlife Service
Utah Ecological Services Field Office

Literature Cited:

Bruggnik, J. 2022. Email communication: Subject: Declined Coordination Call. From Jeff Bruggnik (USDA) to Jennifer Lewinsohn (USFWS) on April 5, 2022.

Meyer, S. 2018b. Status and Recovery Questionnaire Conducted for Clay phacelia (*Phacelia argillacea*). Research Ecologist, U.S. Forest Service Rocky Mountain Research Station, Shrub Sciences Laboratory, Provo, Utah. 11 p.

Skopec, M. 2018. Status and Recovery Questionnaire Conducted for Clay phacelia (*Phacelia argillacea*). Professor of Zoology, Weber State University, Ogden, Utah. 13 pp.

Skopec, M. 2021. Performance Progress Report for Agreement F20AC00259 Clay phacelia herbivory protection. Weber State University.

Skopec, M. 2022. Performance Progress Report for Agreement F20AC00259 Clay phacelia herbivory protection. Weber State University.

Skopec, M. 2023. Performance Progress Report for Agreement F20AC00259 Clay phacelia herbivory protection. Weber State University.

Skopec, M. 2024. Performance Progress Report for Agreement F20AC00259 Clay phacelia herbivory protection. Weber State University.

Skopec, M. 2025. Performance Progress Report for Agreement F20AC00259 Clay phacelia herbivory protection. Weber State University.

Stevens MT, Smith LS, Shaver TR. 2023. Monitoring clay phacelia (Phacelia argillacea) seeds introduced on U.S. Forest Service land and protecting the resulting plants from herbivory. Progress Report for 22-PA-11041908-053. Performance Period: 8/16/2022 to 8/15/2023

Stevens MT, McGovern SOH, Smith LS, Sermersheim HE, Fife JS. 2024. Relationships between reproduction, growth, and tolerance to herbivory for the endangered plant clay phacelia (Phacelia argillacea). Acta Oecologica 124:1-6.

U.S. Fish and Wildlife Service (Service). 2019. Clay phacelia (*Phacelia argillacea*) 5-year review short form. U.S. Fish and Wildlife Service, Utah Field Office, West Valley City, UT. 5 pp

U.S. Fish and Wildlife Service (Service). 2013. Clay phacelia (*Phacelia argillacea*) 5-Year review: summary and evaluation. U.S. Fish and Wildlife Service, Utah Field Office, West Valley City, UT. 31 pp.