Draft Amendment to the Recovery Plan for *Phacelia argillacea* (clay phacelia)
https://ecos.fws.gov/docs/recovery_plan/820412.pdf

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DRAFT AMENDMENT

We have identified information that indicates a need to amend the delisting recovery criteria for clay phacelia (*Phacelia argillacea*) which have been in place since the recovery plan was completed in 1982. In this proposed modification, we discuss the adequacy of the existing delisting recovery criteria, identify amended delisting recovery criteria, and present the rationale supporting the proposed recovery plan modification. The proposed modification will be included as an appendix that supplements the existing recovery plan, superseding only the delisting recovery criteria in the Recovery (Part II) section (pages 5 - 10) of the recovery plan (USFWS 1982).

BACKGROUND INFORMATION

Recovery plans should be consulted frequently, used to initiate recovery activities, and updated as needed. A review of the recovery plan and its implementation may show that the plan is out of date or its usefulness is limited, and therefore warrants modification. Keeping recovery plans current ensures that the species benefits through timely, partner-coordinated implementation based on the best available information. The need for, and extent of, plan modifications will vary considerably among plans. Maintaining a useful and current recovery plan depends on the scope and complexity of the initial plan, the structure of the document, and the involvement of stakeholders.

An amendment involves a substantial rewrite of a portion of a recovery plan that changes any of the statutory elements. The need for an amendment may be triggered when, among other possibilities: (1) the current recovery plan is out of compliance with regard to statutory requirements; (2) new information has been identified, such as population-level threats to the species or previously unknown life history traits, that necessitates new or refined recovery actions and/or criteria; or (3) the current recovery plan is not achieving its objectives. The amendment replaces only that specific portion of the recovery plan, supplementing the existing recovery plan, but not completely replacing it. An amendment may be most appropriate if significant plan improvements are needed, but resources are too scarce to accomplish a full recovery plan revision in a short time.

Although it would be inappropriate for an amendment to include changes in the recovery program that contradict the approved recovery plan, it could incorporate study findings that enhance the scientific basis of the plan, or that reduce uncertainties as to the life history, threats, or species' response to management. An amendment could serve a critical function while

awaiting a revised recovery plan by: (1) refining and/or prioritizing recovery actions that need to be emphasized, (2) refining recovery criteria, or (3) adding a species to a multispecies or ecosystem plan. An amendment can, therefore, efficiently balance resources spent on modifying a plan against those spent on managing implementation of ongoing recovery actions.

In this recovery plan amendment, we are amending the existing recovery criteria for clay phacelia and defining what constitutes a population. The 1982 recovery plan (USFWS 1982) does not include delisting recovery criteria that are quantitative, nor does it present the parameters used to define a population. By modifying the existing recovery criteria to be objective and measurable, we will be able to show when the criteria are met.

METHODOLOGY USED TO COMPLETE THE RECOVERY PLAN AMENDMENT

This amendment was prepared by the Utah Ecological Services Field Office. We coordinated recovery review and criteria development with the species' experts in Utah (U.S. Forest Service, Weber State University, Utah Natural Heritage Program, The Nature Conservancy), and we reviewed existing quantifiable recovery criteria for other narrow, endemic species (Revised Recovery Plan for Hawaiian Forest Birds, https://ecos.fws.gov/docs/recovery_plan/060922a.pdf; Revised Recovery Plan for Alala/Hawaiin Crow, https://ecos.fws.gov/docs/recovery_plan/090417.pdf). We also reviewed recommendations for quantifiable demographic and threat-based recovery criteria (Doak *et al.* 2015); the 2013 5-year review for clay phacelia; recent information on the species; recovery actions that have been taken since the development of the original plan; monitoring data provided by the U.S. Forest Service and Weber State University; and the survey extent for the species in Utah.

Our evaluation of the 1982 recovery plan (USFWS 1982), and the original 1978 listing rule (43 FR 44810) indicated that we did not present how we defined a population for clay phacelia. For this amendment and managing for clay phacelia in the future, we use NatureServe guidelines for delimiting plant populations (NatureServe 2004) based on the proximity of occupied habitat areas to one another. We considered locations within 2 kilometers (km) (1.24 miles (mi)) of each other and suitable habitat in between them to be a single population. Plant locations that are greater than 2 km (1.24 mi) from each other with unsuitable habitat in between them, are considered separate populations (NatureServe 2004). Based on this criterion, there are three populations of clay phacelia (Tucker-Clear Creek, Water Hollow – Garner Canyon, and Tie Fork), this is an increase since the time of listing when we knew of only one population (Tucker-Clear Creek). The amended delisting recovery criteria will be peer reviewed in accordance with the Office of Management and Budget (OMB) Peer Review Bulletin following the publication of the Notice of Availability.

ADEQUACY OF RECOVERY CRITERIA

Section 4(f)(1)(B)(ii) of the Endangered Species Act (Act) requires that each recovery plan shall incorporate, to the maximum extent practicable, "objective, measurable criteria which, when met, would result in a determination…that the species be removed from the list." Legal challenges to recovery plans (see Fund for Animals v. Babbitt, 903 F. Supp. 96 (D.D.C. 1995)) and a Government Accountability Audit (GAO 2006) also have affirmed the need to frame recovery criteria in terms of threats assessed under the five delisting factors.

Recovery Criteria

The recovery objective is the preservation and enhancement of the clay phacelia population and its habitat, as described on page ii in the 1982 recovery plan. The recovery objective on pages 5 – 6 is actually the downlisting criterion for the species. The delisting criterion is identified on pages 6 and 10. The 1982 recovery plan is available online, here: https://ecos.fws.gov/docs/recovery_plan/820412.pdf

Current Recovery Criteria

The recovery plan identifies the following recovery criteria to achieve downlisting and delisting:

Downlisting Recovery Criterion

1. To establish a self-sustaining population of 2,000 to 3,000 individuals on 120 acres of protected habitat and possibly establish at least one new population.

Delisting Recovery Criterion

1. Clay phacelia will be delisted when the U.S. Fish and Wildlife Service through collaboration with professional botanists, including the Utah Native Plant Society, is satisfied that adequate self-sustaining populations have been established.

Synthesis

Clay phacelia is a showy, biennial plant in the forget-me-not family (*Boraginaceae*) that occupies steep hillsides of Green River shale in Spanish Fork Canyon, Utah County, Utah. The species has blue to violet flowers that attracts a variety of bee pollinators (USFWS 2013). The species likely requires insect pollinators to produce seeds, and large individuals produce abundant amounts of seed (USFWS 2013). Clay phacelia relies on a long-lived, dormant seedbank to survive periods of unfavorable climate conditions such as drought. Clay phacelia appears to be highly sensitive to seasonal precipitation as spring seedling emergence depends on winter precipitation and seedling summer survival depends on summer precipitation and suffers high mortality rates during the first year above-ground (USFWS 2013; Meyer 2018a; Skopec 2018).

At the time of listing, there was one known population of clay phacelia (Tucker – Clear Creek) of 9 individuals on private lands. The population was bisected by a railroad and highway. The status of clay phacelia has improved slightly since then with the location of a new population on private lands (Water Hollow – Garner Canyon). The population size of the Tucker – Clear Creek population is larger now, with 237 individuals documented in 2017 (Skopec *et al.* 2018). The Water Hollow – Garner Canyon population contains approximately 100 individuals based on the last partial-population estimate in 2006.

Clay phacelia introductions have also been attempted at two locations on U.S. Forest Service lands (Tie Fork and Water Hollow – Garner Canyon). The pilot introduction effort on U.S. Forest Service lands resulted in the development of a successful propagation protocol for the species, but was not large enough to maintain the species' presence on Federal lands.

At the time of our last 5-Year Review, we did not provide a range-wide total population estimate for clay phacelia (USFWS 2013). We now cautiously estimate there are 340 individuals range-wide. Past population counts haven't distinguished between juvenile and reproductive plants, and have not estimated the seed output of reproductive plants. We consider a meaningful measure of population health (resilience) to be the mean number of reproductive individuals and their estimated seed output over a minimum 5-year period. Since above ground plant abundance fluctuates dramatically from year to year, the measure of reproductive output over time will serve as the population estimate that takes into account the size of the population's viable seedbank (Meyer 2018b).

At the time of our last 5-year review, many of the threats identified at the time of listing and the original recovery plan continue to impact clay phacelia (USFWS 2013). The highway and railroad that bisect the Tucker – Clear Creek population and are directly adjacent to the Water Hollow – Garner Canyon population serve as corridors for weed dispersal into the population areas and may impact pollinator movement (i.e., gene flow) between populations (Aizen *et al.* 2002; Debinski and Holt 2000; Gathmann and Tscharntke 2002; Kolb 2008; Lennartsson 2002). Within the species' small range, continued habitat fragmentation is likely now that the Highway 6 corridor in Spanish Fork Canyon is a designated national energy corridor under section 368 of the Energy Policy Act of 2005. National energy corridors are designated to encourage and facilitate the installation of additional transmission lines, and two transmission lines are currently planned within the species' range (USFWS 2016a and 2016b).

Project proponents for the two planned transmission lines committed to avoiding and minimizing impacts to clay phacelia through section 7 consultation of the Act. There is also active management of weeds in the Tucker – Clear Creek population by private, state, and Federal conservation partners. We are exploring the use of alternative non chemical weed control methods and low-residual herbicides in and near occupied habitat.

Herbivory by native and domesticated ungulates is another threat to clay phacelia. Periodic herbivory, largely from mule deer, at the Tucker – Clear Creek population has repeatedly resulted in significant plant losses (Skopec *et al.* 2018). There are plans to actively manage the threat of herbivory by installing fences and cages, repairing existing fences, and monitoring wildlife activity at the Tucker – Clear Creek, Tie Fork, and Water Hollow – Garner Canyon populations.

There is a high frequency of wildfire occurrence in Spanish Fork Canyon that could impact this species. Wildfire has not impacted clay phacelia. However, the risk and severity of wildfire in occupied habitat increases with the spread and coverage of weeds from adjacent road and other habitat disturbances. Wildfire has the potential to be a catastrophic event that could result in the loss of a clay phacelia population if high fire temperatures kill the viable seedbank. We recommend the preparation of a fire management plan for clay phacelia to support fire and post-fire planning efforts.

There is a recognized need to improve clay phacelia's resiliency and redundancy by introducing plants at all three populations to increase plant abundance and introducing additional populations

on federal lands. There is high potential to establish new populations within Spanish Fork Canyon on Federal lands. A micro-level analysis (e.g, unmanned aerial system (drones) surveys at low elevation, with high resolution imagery) of currently occupied habitat should be completed to help identify suitable introduction sites (USFWS 2018). Recovery efforts should also support and maintain clay phacelia's genetic diversity (representation) and recognize that active genetic management of future introduction efforts is needed. The U.S. Forest Service and other conservation partners are propagating plants from the Tucker – Clear Creek population to support future introduction efforts on Federal lands.

AMENDED RECOVERY CRITERIA

Recovery criteria serve as objective, measurable guidelines to assist in determining when an endangered species has recovered to the point that it may be downlisted to threatened, or that the protections afforded by the Act are no longer necessary and clay phacelia may be delisted. Delisting is the removal of a species from the Federal Lists of Endangered and Threatened Wildlife and Plants. Downlisting is the reclassification of a species from endangered to threatened. The term "endangered species" means any species (species, sub-species, or DPS) which is in danger of extinction throughout all or a significant portion of its range. The term "threatened species" means any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Revisions to the Lists, including delisting or downlisting a species, must reflect determinations made in accordance with sections 4(a)(1) and 4(b) of the Act. Section 4(a)(1) requires that the Secretary determine whether a species is an endangered species or threatened species (or not) because of threats to the species. Section 4(b) of the Act requires that the determination be made "solely on the basis of the best scientific and commercial data available." Thus, while recovery plans provide important guidance to the Service, States, and other partners on methods of minimizing threats to listed species and measurable objectives against which to measure progress towards recovery, they are guidance and not regulatory documents.

Recovery criteria should help indicate when we would anticipate that an analysis of the species' status under section 4(a)(1) would result in a determination that the species is no longer an endangered species or threatened species. A decision to revise the status of or remove a species from the Federal Lists of Endangered and Threatened Wildlife and Plants, however, is ultimately based on an analysis of the best scientific and commercial data then available, regardless of whether that information differs from the recovery plan, which triggers rulemaking. When changing the status of a species, we first propose the action in the *Federal Register* to seek public comment and peer review, followed by a final decision announced in the *Federal Register*.

We provide amended delisting criteria for clay phacelia, which will supersede those included in the Clay phacelia (*Phacelia argillacea* Atwood) recovery plan, as follows:

Delisting Recovery Criteria

Clay phacelia will be considered for delisting when the amended recovery criteria are met. We are replacing the delisting criterion 1, above, with the amended criteria. We are removing the delisting criterion 1, above, because it is not objective or measureable. The amended delisting

recovery criterion provides a quantifiable approach to determining when clay phacelia has recovered to the point that it may be delisted:

Amended Delisting Recovery Criteria

The clay phacelia will be considered for delisting if the following criteria are met:

1. Maintain at least two natural populations (Tucker – Clear Creek and Water Hollow – Garner Canyon) and three introduced populations at a level that demonstrates an increasing trend in the 5-year mean (average) adult plant abundance and population reproductive output over a consecutive ten-year period. Adult plant abundance and population reproductive output (a population-level value measured by the number of reproductive individuals and seed production of those individuals) may fluctuate on an annual basis, but the defined populations should have an increasing 5-year mean over the ten-year time period.

   Justification: We expect a period of ten years should be long enough to monitor five generations of clay phacelia, and include variability in above-ground plant abundance that responds to the climatic variation in the species' range. Increasing adult plant abundance and population reproductive output over this time period should indicate that the five populations are resilient to stochastic events and other stressors.

2. Maintain an estimated range-wide total population size at or greater than 15,000 adult plants over a five-year minimum period. This population estimate is based on the mean adult plant abundance measure identified in criterion 1, above, and does not include the size of the viable seedbank.

   Justification: The total population estimate of 15,000 adult plants assumes an adult plant population target of 3,000 individuals for each of the five populations. Species-specific demography data is not available to inform an evaluation of a minimum viable population (MVP) size for clay phacelia. The total population estimate is based on a standardized MVP size range (2,512 – 15,992) for plant taxa (Traill *et al.* 2007, Table 2) which we use as a surrogate value. We selected the upper end of the MVP range for plants rather than the midpoint or lower estimate. This is based on consideration of clay phacelia's short life-span and high annual variation in above ground abundance, two characteristics that indicate a higher abundance in needed for long-term persistence. The adult plant life stage indicates active regeneration from the seedbank is occurring and is the largest contributor to population growth.

3. The three introduced populations collectively demonstrate 80 percent of the genetic variation of the two natural populations over a minimum of five generations (a consecutive ten-year period). Genetic variation (measured as the number and frequency of unique alleles within a population) is anticipated to vary from year-to-year, but we expect this measure will provide a meaningful evaluation of population-level genetic diversity over time.

Justification: Attainment of this criterion would indicate that introduced populations contain a similar level of genetic health (representation) as natural populations. This criterion would also indicate the successful genetic management of introduction efforts to create populations that have the ability to adapt to near and long-term changes in the environment.

4. Long-term habitat protections and habitat management plans are in place for the five populations to protect clay phacelia from habitat fragmentation and loss, herbivory, weed invasion, and other potential threats. Habitat protection can be achieved via fee acquisition, land trades, conservation easement, or long-term management agreements. Habitat management plans will include site-specific measures to address herbivory and weed control to improve reproductive output and minimize threats in occupied habitat. The combination of habitat protection and threat minimization will support increasing trends in reproductive output and population resiliency, as we state in criterion 1.

   Justification: Habitat protections and regulatory mechanisms are needed to provide assurances that land use threats (road and energy development) and habitat management threats (herbivory and weed invasion) do not threaten the continued existence of clay phacelia or its habitat**.**

5. The two natural populations (Tucker – Clear Creek and Water Hollow – Garner Canyon) are represented in an *ex-situ* seed collection that is managed according to the Center for Plant Conservation guidelines (Guerrant *et al.* 2004). The *ex-situ* seed collection should contain existing levels of genetic diversity (or representation) of the two natural populations.

   Justification: Having off-site preservation of the two natural populations will help preserve the breadth of adaptive diversity of the species (representation). This criterion also provides additional redundancy to enable the species to withstand catastrophic events, such as wildfire.

All classification decisions consider the following five factors: (1) is there a present or threatened destruction, modification, or curtailment of the species' habitat or range; (2) is the species subject to overutilization for commercial, recreational scientific or educational purposes; (3) is disease or predation a factor; (4) are there inadequate existing regulatory mechanisms in place outside the ESA (taking into account the efforts by states and other organizations to protect the species or habitat); and (5) are other natural or manmade factors affecting its continued existence. When delisting or downlisting a species, we first propose the action in the *Federal Register* and seek public comment and peer review. Our final decision is announced in the *Federal Register*.

Rationale for Amended Recovery Criteria

We have amended the recovery criteria for clay phacelia to include quantitative delisting criteria that incorporate the biodiversity principles of representation, resiliency, and redundancy (Shaffer and Stein 2000) and threats addressed under the five factors in the latest 5-year review (USFWS

2013). The amended recovery criteria are based on our understanding of the species' needs and requirements. This includes information gathered since the original recovery plan was published, such as more recent information about population status and trends, along with an updated understanding of the threats acting on the species. The amended criteria are based on increasing the population trend and population size, maintaining genetic diversity, reducing threats to the species, and include a temporal aspect to ensure the species is resilient to expected variation within a reasonable time frame.

ADDITIONAL SITE SPECIFIC RECOVERY ACTIONS

No additional site-specific recovery actions are necessary for this species; therefore, this is not applicable.

COSTS, TIMING, PRIORITY OF ADDITIONAL RECOVERY ACTIONS

No additional site-specific recovery actions are necessary for this species; therefore, this is not applicable.

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