Recovery Plan for *Primula maguirei* (Maguire Primrose)
https://ecos.fws.gov/docs/recovery_plan/900927a.pdf

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DRAFT AMENDMENT

We have identified information that indicates a need to amend the recovery criteria for Maguire primrose (*Primula maguirei*) which have been in place since the recovery plan was completed in 1990. In this proposed modification, we discuss the adequacy of the existing recovery criteria, identify amended 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 recovery criteria in the Executive Summary and the Recovery Objectives and Criteria section (page 5) of the recovery plan (USFWS 1990).

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 A review of the recovery plan and its implementation may show that the plan is out of date or its usefulness is limited, and therefore warrants modification.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 Maguire primrose and defining what constitutes a population. The 1990 recovery plan (USFWS 1990) does not include 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 confirm 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 development with the species' experts in Utah (Utah State University, U.S. Forest Service, Utah Natural Heritage Program), 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 2011 5-Year Review for Maguire primrose (USFWS 2011); more recent information on the species; recovery actions that were taken since the development of the original recovery plan; short-term monitoring data provided by the U.S. Forest Service; and available surveys for the species.

Our evaluation of the 1990 recovery plan (USFWS 1990), and the original 1985 listing rule (50 FR 33731) indicated that we did not present how we defined a population for Maguire primrose. For this amendment and managing for Maguire primrose in the future, we use NatureServe guidelines for delimiting plant populations (NatureServe 2004) which are based on the proximity of occupied habitat areas to one another. We consider locations within 2 kilometer (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 two populations of Maguire primrose (Lower Canyon and Upper Canyon), and the number of populations has not changed since the time of our listing decision. The amended 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 protection of Maguire primrose and its habitat, as described on page 5 in the 1990 recovery plan. The 1990 recovery plan identifies three recovery criteria on pages 5 – 8 (https://ecos.fws.gov/docs/recovery_plan/900927a.pdf).

Current Recovery Criteria

Recovery criteria identified as necessary to ensure the long-term survival of the species and its habitat are the following:

1. Ensure that all populations of *Primula maguirei* are known to all parties responsible for the management of *P. maguirei* and its habitat and that these populations are being monitored to ensure that no adverse activities or situations occur affecting the species.

2. Ensure that *Primula maguirei* habitat is protected from environmental degradation through section 7 of the Act.

3. Ensure that *Primula maguirei* is protected from over-collecting and commercial exploitation through section 9 of the Act and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

Synthesis

Maguire primrose is a small, perennial plant in the primrose family (*Primulaceae*) that occupies dolomite cliff tops and rock faces in Logan Canyon, Cache County, Utah. The species reproduces sexually and relies on pollinators for maximum seed production (Bjerregaard and Wolf 2008; Davidson and Wolf 2011; Davidson *et al.* 2013; Rayburn *et al.* 2013). Maguire primrose also reproduces clonally (asexually) using underground rhizomes (underground plant stems) to produce new shoots. This clonal growth pattern promotes survival during periods of dormancy, such as drought conditions. However, the clonal nature makes it difficult to discern genetically distinct individual plants (genets) during field observations. Therefore, population abundance for Maguire primrose is based on counts of rosettes or clumps of plants that we consider to be ramets (independent members of a clone) rather than the number of genets.

Two populations of Maguire primrose occur in Logan Canyon on U.S. Forest Service lands in Cache County, Utah. The two populations each contain four sites (an occurrence location of Maguire primrose recorded by one or more researchers over time within an individual population). Two sites, Heartland and Lower Logan Canyon South, contain more than 80 percent of the total population. The current extent of the species range and landownership has not changed since listing; however, we have more information on the species' abundance and distribution within its range. At the time of our last 5-Year Review, the status of Maguire primrose improved substantially since the time of listing in 1985 (USFWS 2011). The estimated total population (4,000 – 20,000 ramets) is much larger than the 340 individuals identified at the time of listing. The lower population estimate is based on population monitoring within accessible areas while the upper population estimate is based on the high likelihood of additional

plants in higher elevation, less accessible locations of suitable habitat. We recommend the use of unmanned aerial systems (drones) in less accessible locations to validate the upper population estimate (USFWS 2018). Based on our use of NatureServe criteria, newly located plants in Logan Canyon would be considered part of the two known populations rather than comprise a new population (Horton and Torti 2012; NatureServe 2004; USFWS 2018).

At the time of our last 5-Year Review we concluded that many of the threats identified at the time of listing and the original recovery plan have not materialized (USFWS 2011). Highway improvements, utility construction or maintenance, campground and trail maintenance and overutilization are not expected to impact the species within the foreseeable future.

The primary potential threat to the species is rock climbing. Rappelling activities associated with rock climbing may result in a larger impact to Maguire primrose than climbing the cliff faces along established routes. Currently, there is no established monitoring to evaluate the impacts of rappelling activities. Overall, the U.S. Forest Service has actively managed potential rock climbing impacts with the implementation of site closures, and outreach and education to the rock climbing community. Based on active management, improved survey data, and short-term monitoring results, rock climbing appears to be less of a threat to Maguire primrose than previous assessments (USFWS 2011).

Native bee poaching is a concern on national forests (Tepedino and Nielson 2017). Bee poaching has not been documented in Logan Canyon and more information is needed before we consider this as a potential stressor to Maguire primrose.

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 Maguire primrose 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 Maguire primrose, which will supersede those included in the Maguire primrose (*Primula maguirei*) Recovery Plan, as follows:

Delisting Recovery Criteria

Maguire primrose will be considered for delisting when the amended recovery criteria are met. We are replacing criteria 1, 2, and 3 (Current Recovery Criteria) with the amended criteria. We are removing Criterion 1 and 2 (Current Recovery Criteria), because we consider them recovery actions rather than recovery criteria for delisting. Criterion 3 was met when we evaluated the status of the species in 2011 and determined that over-collecting and commercial exploitation was not a threat to Maguire primrose. The amended recovery criteria provide a quantifiable approach to determining when Maguire primrose has recovered to the point that it may be delisted:

<u>Amended Recovery Criteria</u>

1. Maintain at least two populations (Lower Canyon and Upper Canyon) at a level that demonstrates stable or increasing trend in plant abundance over a consecutive ten-year period. Plant abundance (measured by the number of ramets) may fluctuate within individual sites, but the defined populations should have a stable or increasing growth rate (lambda equal to or greater than 1) over a consecutive ten-year period. The ten-year period may start retroactively.

   Justification: We expect a period of ten years should be long enough to include variability in the timing and extent of rainfall that occurs in the species' range. Stable or increasing population growth rates over that time period should indicate that the two populations are resilient to stochastic events and other stressors.

2. Maintain an estimated range-wide total population size at or greater than 4,000 individuals for a five-year minimum period. This population estimate will be based on a measure of the number of ramets identified in criterion 1, above. The five-year period may start retroactively.

   Justification: The total population estimate of 4,000 individuals is based on the lower end of the current population estimate of 4,000 – 20,000 ramets. We have high certainty that the total population is comprised of at least 4,000 individuals and has been stable from 2008 to 2011 based on population monitoring within accessible areas.

We have much lower certainty that the population is comprised of 20,000 individuals because this estimate is based on the potential for the species to occur in abundance in inaccessible areas of Logan Canyon. The 4,000 population estimate value is similar to a standardized minimum viable population (MVP) midpoint-size value of 4,824 individuals for plant taxa in general (Traill *et al.* 2007, Table 2), and provides some support that a viable population size for Maguire primrose may be achieved with 4,000 individuals.

3. The two populations (Lower Canyon and Upper Canyon) demonstrate sexual reproduction by pollinators over a consecutive ten-year period. Sexual reproduction (recorded as the presence of mature fruits that contain viable seeds) should be documented at all eight extant sites within the two populations. This measure does not need to be recorded on an annual basis, but should be recorded every two or three years over a ten-year period. The ten-year period may start retroactively.

   Justification: This criterion indicates that pollinator visitation is occurring and that the species continues to reproduce sexually on a periodic basis. This criterion serves as a proxy for the sexual recruitment potential of the two populations since non-destructive confirmation of seedling recruitment rather than clonal recruitment in the field is not possible for this species. Sexual reproduction should indicate the species is able to maintain existing levels of genetic diversity (or representation) to support its adaptive capacity to changing climate conditions.

4. Long-term habitat protections are in place for the two populations (Lower Canyon and Upper Canyon) to protect Maguire primrose from rock climbing and other potential threats with the U.S. Forest Service via long-term management agreements, conservation agreements, or memoranda of understanding (MOU). Species management would include outreach and education efforts to climbing audiences that would continue to build community support for long-term protections.

   Justification: We estimate the combination of long-term implementation of avoidance and minimization measures and outreach efforts will maintain Maguire primrose's population abundance and stable population growth rates (resiliency), as we state in criterion 1.

5. The two populations (Lower Canyon and Upper 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 populations.

   Justification: Having off-site preservation of the two 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 (unpredictable and highly consequential) events for which adaptation is unlikely.

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 Maguire primrose 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 2011). The amended recovery criteria are based on our understanding of the species' needs and requirements. This understanding 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 the reduction in threats to the species, and they 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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