

significant plan improvements 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) emphasizing refined and/or prioritized recovery actions; (2) refining recovery criteria; or (3) adding a species to a multispecies or ecosystem plan. Therefore, we can use the amendment process to balance resources spent on modifying a recovery plan against those spent on managing implementation of ongoing recovery actions.

METHODOLOGY USED TO COMPLETE THE RECOVERY PLAN AMENDMENT

To help develop these recovery criteria, we looked at existing quantifiable recovery criteria for other listed plant species. We also reviewed what recovery actions our partners have taken since the development of the original Recovery Plan. In addition to the Recovery Plan, our other primary information source was the Arizona cliffrose five-year status review (USFWS 2013).

We knew of two Arizona cliffrose populations at the time of listing in 1984 (49 FR 22326). Surveyors subsequently found two additional populations in 1984 and 1985. Each population of Arizona cliffrose has unique biological and ecological characteristics and threats, and the Recovery Plan treats each population as an individual recovery unit necessary for recovery of the species. The USFWS addressed all four populations in the Recovery Plan (USFWS 1995).

ADEQUACY OF RECOVERY CRITERIA

Endangered Species Act (Act) section 4(f)(1)(B)(ii) requires each recovery plan to include, 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

We did not incorporate delisting criteria into the original Recovery Plan due to the number and significance of threats, and the unknown nature of the species' life history and habitat requirements at that time. See previous version of criteria (USFWS 1995, pp 52-54).

Synthesis

Our partners have implemented or continue to implement a number of the actions described in the outline of recovery actions on pages 54-73 of the 1995 Recovery Plan.

In 1996, the Arboretum at Flagstaff established 24 Arizona cliffrose monitoring plots in the Cottonwood Recovery Unit to determine long-term viability of the species. A report of this long-term monitoring is due sometime late 2018, and may form the basis for developing a systematic, long-term demographic monitoring program for all of the recovery units. In 1987, the Coconino National Forest established monitoring transects in the Cottonwood Recovery Unit

for Arizona cliffrose and associated species; long-term trend analysis is pending. The Coconino National Forest also established the 461-ha (1140-ac) Verde Valley Botanical Area in 1987, which includes 50 to 60 percent of the Cottonwood population, to protect the species and unique associated plant communities.

The Bureau of Land Management (BLM) has been monitoring the effects of livestock browsing in the Burro Creek Recovery Unit since 1987; long-term trend analysis is pending. For this population, about 98 percent of known Arizona cliffrose individuals are contained within an Area of Critical Environmental Concern (ACEC). In 1998, the BLM withdrew the 453-hectare (ha) (1,119.25 acre [ac]) ACEC from surface entry and mining for 50 years to protect Arizona cliffrose and its habitat (BLM 1993, 1998). The BLM has also excluded livestock grazing, prohibited off-road vehicle use, and closed and rehabilitated unauthorized “vehicle ways” within the ACEC (Peck 2009). The goal of the ACEC, designated in the BLM’s Resource Management Plan (1995), is to maintain a viable population of Arizona cliffrose (BLM 1993).

Within the Horseshoe Lake Recovery Unit, on the Tonto National Forest, the U.S. Forest Service (USFS) has prohibited all off-road motor vehicle use (USFS 2002) and the Lime Creek subpopulation is located within a congressionally designated roadless area (USFS 2001).

Within the Bylas Recovery Unit, the San Carlos Apache Tribe has not implemented measures specifically to conserve Arizona cliffrose, per se, because the Tribe does not consider ongoing land-use practices a threat; however, the population receives protection from the Tribe’s project review process and traditional cultural perspective on conservation (Pilsk, pers. comm., 2008).

AMENDED RECOVERY CRITERIA

Recovery criteria serve as objective, measurable standards to determine when an endangered species has recovered to the point that it no longer meets the definition of endangered or threatened, indicating the species may be downlisted or 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 distinct population segment) that 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 because of threats to the species. Section 4(b) of the Act requires that we make the determination “solely on the basis of the best scientific and commercial data available.” Thus, while recovery plans provide important guidance to the USFWS, states, tribes 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 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 endangered or

threatened. A decision to revise the status a species on the Lists, 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 and tribal comment, and peer review, followed by a final decision announced in the *Federal Register*.

We provide updated downlisting criteria and establish delisting criteria for Arizona cliffrose, which will supersede those included in the 1995 Recovery Plan, as follows:

Downlisting Recovery Criteria

We will consider Arizona cliffrose for downlisting when:

1. A single, long-term monitoring plan for all Arizona cliffrose populations and habitat is developed and implemented.

Justification: Populations of Arizona cliffrose are located on lands owned and managed by Federal, state, tribal, county and private entities. A cohesive monitoring plan with standardized monitoring protocols is necessary to collect robust information on plant abundance, population trends, and habitat conditions for this species. We will use this information to understand whether each population is stable or increasing.

2. Land managers conserve existing habitat, in each recovery unit, in perpetuity to prevent further habitat loss and/or degradation.

Justification: The primary threat to Arizona cliffrose is habitat degradation and loss, mostly associated with urbanization, road development, off-road activities and mining activities; predation (grazing); and possibly drought exacerbated by climate change. To ameliorate these threats and ensure long-term survival of Arizona cliffrose, land managers should maintain all occupied habitat in high quality and unfragmented condition. High quality means habitat that supports or could support relatively high densities of Arizona cliffrose plants, is relatively undisturbed, supports other rare species, is protected by a management agreement, and/or has active recruitment. The following are measures, as identified in the Recovery Plan, needed for habitat conservation:

- Livestock grazing within the four recovery units meets standards set in recovery task 3b of the Recovery Plan, protecting Arizona cliffrose from adverse effects of livestock grazing. Recovery task 3b includes:
 - Developing, or revising and implementing allotment management plans;
 - Continually reviewing utilization, condition and trend information;
 - Complying with section 7 of the Act;
 - Maintaining the enclosure fence surrounding the Burro Creek population to control burro/livestock browsing; and
 - Providing educational opportunities to livestock operators.
- Recovery task 3a (manage mineral exploration and development) is met for all four recovery units as described in the Recovery Plan;

- Written commitments in place to retain all Federal lands containing Arizona cliffrose.
- Private and state lands containing Arizona cliffrose are protected from further habitat loss or degradation; and
- Off-road vehicle traffic is prohibited in Arizona cliffrose habitat.

3. Each of the four recovery units contains a population of Arizona cliffrose that is stable or increasing over a period of at least 10 years.

Justification: Arizona cliffrose is a long-lived, xerophytic perennial that occurs in Sonoran desertscrub, where winters are mild and summers hot. Annual rainfall for the four Arizona cliffrose areas ranges from 9 to 14 inches, evenly distributed between summer and winter rainfall periods, separated by dry seasons. The mean annual temperature ranges from 61 to 71 degrees Fahrenheit (°F), with extremes ranging from freezing to over 100 °F. At least two, consecutive years of adequate moisture and temperature are necessary for seed set and seedling establishment, followed by additional time to ensure recruitment into the population. Given the variation in precipitation and temperature the desertscrub community experiences from year to year, it may take as many as 10 years for two consecutive years of favorable weather conditions to occur. Therefore, a period of 10 consecutive years is the minimum amount of time needed to track population trends.

Delisting Recovery Criteria

In addition to meeting downlisting criteria 1 and 2, we will consider Arizona cliffrose for delisting when:

1. Each of the four recovery units contains a population of Arizona cliffrose that is stable or increasing over a period of at least 20 years.

Justification: Populations of Arizona cliffrose that have remained stable or increasing over a period of 20 years is demonstrative of species viability (long-term persistence in the wild). We have limited information about Arizona cliffrose life history; however, a review of the best available information on the species' life history indicates that a time frame of 10 years is suitable for tracking population trends and therefore we based the Delisting criterion on maintenance of downlisting criteria for an additional 10 years. This would involve the conservation of habitat in all four populations and the indication that the populations are viable, or are on a significant upward trend toward viability, demonstrated through monitoring.

Rationale for Amended Recovery Criteria

Quantifiable recovery criteria are necessary to determine when we have met the recovery goals for Arizona cliffrose, and can consider proposing the species for downlisting and delisting. These amended criteria ensure that the underlying causes of the species' decline will be addressed and mitigated within all four of the Arizona cliffrose recovery units, so that all populations may be sustained in their natural habitat. The U.S. Fish and Wildlife Service bases assessments of species viability, defined as the likelihood of persistence over the long term, on analyses of the species' resilience, redundancy, and representation. Resilience refers to the population size necessary to endure stochastic environmental variation (Shaffer and Stein 2000,

pp. 308-310). Redundancy refers to the number and geographic distribution of populations or sites necessary to endure catastrophic events (Shaffer and Stein 2000, pp. 308-310). Representation refers to the extent of genetic and ecological diversity, both within and among populations, necessary to conserve long-term adaptive capability (Shaffer and Stein 2000, pp. 307-308). These criteria are defined by trends in population size, the number and distribution of populations, and the abatement of threats through the conservation and protection of populations and habitats.

ADDITIONAL SITE SPECIFIC RECOVERY ACTIONS

No additional site-specific recovery actions are necessary for this species.

COSTS, TIMING, PRIORITY OF ADDITIONAL RECOVERY ACTIONS

No additional site-specific recovery actions are necessary for this species.

LITERATURE CITED

- Bureau of Land Management (BLM). 1993. Kingman Resource Area Proposed Resource Management Plan Management Plan and Environmental Impact Statement. Kingman Resource Area, Kingman Area. 606 pp.
- Bureau of Land Management (BLM). 1995. Record of Decision for the approval of the Kingman Resource Area Resource Management Plan. Kingman Resource Area, Kingman Arizona. 11 pp.
- Bureau of Land Management (BLM). 1998. Public Land Order No. 7341; Withdrawal of public land for the Clay Hills Area of Critical Environmental Concern; Arizona. Federal Register 63 (115):32894-32895. June 16, 1998.
- Peck, R. 2009. Memo to John Nystedt, U. S. Fish and Wildlife Service. Subject: Arizona Cliffrose Way Reclamation Project. September 1, 2009. Kingman Field Office, Bureau of Land Management. 1 pp with attachments.
- U.S. Forest Service (USFS). 2001. Special Areas; Roadless Area Conservation. Federal Register 66 (9):3244-3273. January 12, 2001.
- U.S. Forest Service (USFS). 2002. Order 12-4-2R: Special restrictions – Off-road Motor Vehicle Use. Tonto National Forest, Phoenix, Arizona. 4 pp.
- U.S. Fish and Wildlife Service (USFWS). 1995. Arizona Cliffrose (*Purshia subintegra*) Recovery Plan. USDI Fish and Wildlife Service, Arizona Ecological Services State Office, Phoenix, Arizona. 90 pp + appendix.
- U.S. Fish and Wildlife Service. 2013. Arizona Cliffrose (*Purshia subintegra*) 5-Year Review: Summary and Evaluation. U.S. Fish and Wildlife Service, Arizona Ecological Services Field Office. Phoenix, Arizona. 29 pp.