

Recovery Plan for *Argemone pleicantha* spp. (Sacramento prickly poppy)

Original Approved: 1994

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DRAFT AMENDMENT 1

We have identified best available information that indicates the need to amend recovery criteria for this species since the recovery plan was completed. In this proposed modification, we synthesize the adequacy of the existing recovery criteria, show amended recovery criteria, and the rationale supporting the proposed recovery plan modification. The proposed modification is shown as an appendix that supplements the recovery plan, superseding only Part II, Objective and Criteria (pages 16-17), of the recovery plan.

**For
U.S. Fish and Wildlife Service
Southwest Regional Office
Albuquerque, NM 87103**

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Regional Director, Region 2
U.S. Fish and Wildlife Service

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 A review of the recovery plan and its implementation may show that the plan is out of date or its usefulness is limited, and therefore warrants modification.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.

METHODOLOGY USED TO COMPLETE THE RECOVERY PLAN AMENDMENT

The recovery criteria were developed based on input by a group of individuals consisting of species experts, biologists, and botanists from New Mexico Energy, Minerals, and Natural Resources Department, U.S. Forest Service (USFS), and the U.S. Fish and Wildlife Service (Service). The development process was informed by the best available science regarding species biology and current threats. The recovery criteria were designed to be objective and quantifiable, in order to meet the conditions needed to ensure species viability through sustainment of populations in the wild that demonstrate resiliency, redundancy, and representation.

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 following summarizes the recovery criteria for the Sacramento Prickly Poppy. For a detailed version of the criteria, please reference the 1994 Sacramento Prickly Poppy (*Argemone pleicanth spp.*) Recovery Plan (USFWS 1994, pp. 16-17).

Downlisting Criteria

The Sacramento prickly poppy will be considered for downlisting when:

1. Long-term protection of the populations from human threats on Forest Service, City of Alamogordo, and Bureau of Land Management lands, and on land affected by New Mexico State Highway Department activities has been ensured.
2. Reproducing populations of Sacramento prickly poppy within each of the 10 canyons occupied prior to 1994 on the western slope of the Sacramento Mountains are maintained.
3. Requirements for the germination and establishment of new individuals are determined.
4. Genetic variability within the subspecies is studied.

Delisting Criteria

Criteria for removing the Sacramento Prickly Poppy from the Endangered Species list cannot be determined at this time.

Synthesis

Since the recovery plan was published in 1994, several studies and regular monitoring of some occupied habitats have been conducted which have added greatly to our knowledge of this species (Worthington 2002; Barker 2006; Tonne 2008; USFWS 2004a, 2004b, 2005, 2008, 2009, 2012a, 2012b; USFS 2002, 2004, 2008, 2009, 2010, 2011). Field data have indicated that populations are likely extirpated from 3 canyons listed in the recovery plan (Dry, Mule, and La Luz Canyons), while 3 other occupied canyons (Marble, Gordon, and Deadman) were not named at the time of the original recovery plan (USFWS 2013). Thus, it appears that some fluctuations in occupancy within these canyon systems occur over time and the impact on population dynamics continues to not be well understood. Therefore, occupancy within the 10 specific canyons named in the original recovery plan may not be the most appropriate for recovery.

In addition, Sacramento prickly poppy populations are continuing to decline due to the interaction of a variety of factors including floods, drought, livestock impacts, disease, water diversion, and road and pipeline maintenance (USFWS 2004a, 2012; Tonne 2008). Therefore, the threats to this increasingly narrow endemic species have increased since time of listing in 1989 and since the 1994 Sacramento Prickly Poppy Recovery Plan was published (USFWS 2013).

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 Sacramento prickly poppy no longer meets the definition of an endangered or threatened species and 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 distinct population segment) which is in danger of extinction throughout all or a significant portion of its range. The term “threatened species” means any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

We provide both downlisting and delisting criteria for the Sacramento prickly poppy, which will supersede those included in the 1994 Sacramento Prickly Poppy (*Argemone pleicantha* spp.) Recovery Plan, as follows:

Downlisting Recovery Criteria

The Sacramento prickly poppy will be considered for downlisting when:

1. The Alamo-Caballero Canyon population is shown to be stable or improving over a 20-year period with at least 1,000 individuals according to the following measures:
 - a) The Alamo-Caballero Canyon population has been designated as the core recovery population. The Alamo-Caballero Canyon population includes all individuals located with these two canyon systems. This core population will be monitored yearly using

- annual demographic trend monitoring at representative sites to provide a population estimate based on methodology peer-reviewed by species experts and approved by the Service. The 20-year monitoring period will accommodate for periods of fluctuation in population size or years when monitoring may not be possible.
- b) Approximately every 5 years, range wide and peripheral counts within Alamo and Caballero Canyons will be conducted using standardized methods peer-reviewed by species experts and approved by the Service.
 - c) Species presence and abundance is maintained at the aforementioned level within the core Alamo-Caballero Canyon population. The population shall be considered stable when a linear regression analysis (or other method which has been peer-reviewed by species experts and approved by the Service) of the population numbers estimated from the results of annual demographic monitoring reveals no significant decline in numbers.
 - d) A population viability analysis (PVA) (or other appropriate method which has been peer-reviewed by species experts and approved by the Service) will be conducted to determine the demographic parameters necessary to maintain a *resilient* population. A resilient population is one that is able to maintain approximately a 95% likelihood of persistence over a 100-year period (or other appropriate period of time). Based on the PVA, the recovery criteria would be reassessed or adjusted to establish an accurate population numbers to achieve a resilient population, if necessary.

Justification: These criteria establish a resilient core population which is able to withstand the threat of demographic and environmental stochasticity.

- 2. The 7 additional canyon systems (outside of Alamo-Caballero canyon), which represent the currently-known occupied habitat for the Sacramento prickly poppy, are shown to maintain stable or improving occupancy over a 20-year period with at least 50% of the canyons demonstrating an average of 75% probability of occupancy over this time frame, according to the following measures:
 - a) Maintain or increase occupied and high probability of occupancy habitat within these canyon systems.
 - b) These additional canyon systems will be surveyed at least once every 2 years utilizing annual occupancy monitoring at representative sites within each canyon to provide a probability of occupancy for the canyon based on methodology approved peer-reviewed by species experts and approved by the Service. The 20-year monitoring period will accommodate for periods of fluctuation in population size or years when monitoring may not be possible.
 - c) Occupancy is maintained at 75% probability of occupancy within at least 50% of the additional canyon systems. The canyon systems shall be considered stable when occupancy analysis based on methodology peer-reviewed by species experts and approved by the Service reveals no significant decline in occupancy.
 - d) As well as demonstrating no significant decline in occupancy, each canyon system should maintain functionality over the 20-year period with appropriate demonstrated

- population dynamics as defined by methodology peer-reviewed by species experts and approved by the Service.
- e) Approximately every 5 years, efforts to characterize occupied and high probability of occupancy habitat throughout the canyon systems should be conducted based on methodology peer-reviewed by species experts and approved by the Service.
 - f) A population viability analysis (PVA) (or other appropriate method which has been peer-reviewed by species experts and approved by the Service) will be conducted to determine the demographic parameters necessary to maintain a *resiliency* across these additional populations. A resilient population is one that is able to maintain approximately a 95% likelihood of persistence over a 100-year period (or other appropriate period of time). Based on the PVA, the recovery criteria would be reassessed or adjusted to establish an accurate population numbers to achieve a resilient population, if necessary.

Justification: The criteria ensure redundancy through the establishment stable patterns of occupancy for Sacramento prickly poppy in 7 additional canyon systems.

- 3. The genetic corridors between populations are maintained through patterns of occupancy within different canyon systems to promote gene transfer as defined by methodology peer-reviewed by species experts and approved by the Service.

Justification: These criteria ensure genetic and ecological representation of Sacramento prickly poppy across large portions of its range.

- 4. The Alamo/Caballero Canyon populations, as well as populations within additional canyon systems considered occupied habitat, must be protected through the development and implementation of species-specific management recommendations that protect the species from identified threats (e.g., livestock grazing and water extraction) and are consistent with land uses in the area.

Justification: These criteria will help ameliorate threats to the Sacramento prickly poppy via management actions.

Delisting Recovery Criteria

The Sacramento prickly poppy will be considered for delisting when:

- 1. The Alamo-Caballero Canyon population is shown to be stable or improving over a 20-year period with at least 1,500 individuals according to the following measures:
 - a) The Alamo-Caballero Canyon population has been designated as the core recovery population. The Alamo-Caballero Canyon population includes all individuals located with these two canyon systems. This core population will be monitored yearly using annual demographic trend monitoring at representative sites to provide a population estimate based on methodology peer-reviewed by species experts and approved by the Service. The 20-year monitoring period will accommodate for

periods of fluctuation in population size or years when monitoring may not be possible.

- b) Approximately every 5 years, range wide and peripheral counts within Alamo and Caballero Canyons will be conducted using standardized methods peer-reviewed by species experts and approved by the Service.
- c) Species presence and abundance is maintained at the aforementioned level within the core Alamo-Caballero Canyon population. The population shall be considered stable when a linear regression analysis (or other method which has been peer-reviewed by species experts and approved by the Service) of the population numbers estimated from the results of annual demographic monitoring reveals no significant decline in numbers.
- d) A population viability analysis (PVA) (or other appropriate method which has been peer-reviewed by species experts and approved by the Service) will be conducted to determine the demographic parameters necessary to maintain a *resilient* population. A resilient population is one that is able to maintain approximately a 95% likelihood of persistence over a 100-year period (or other appropriate period of time). Based on the PVA, the recovery criteria would be reassessed or adjusted to establish an accurate population numbers to achieve a resilient population, if necessary. The recovery criteria would be reassessed to establish more appropriate population numbers, if necessary.

Justification: These criteria establish a resilient core population which is able to withstand the threat of demographic and environmental stochasticity.

- 2. The 7 additional canyon systems (outside of Alamo-Caballero canyon) which represent occupied habitat for the Sacramento prickly poppy are shown to maintain stable or improving occupancy over a 20-year period with at least 75% of the canyons demonstrating an average of 75% probability of occupancy over this time frame, according to the following measures:
 - a) Maintain or increase occupied and high probability of occupancy habitat within these canyon systems.
 - b) These additional canyon systems will be surveyed at least once every 2 years utilizing annual occupancy monitoring at representative sites within each canyon to provide a probability of occupancy for the canyon based on methodology peer-reviewed by species experts and approved by the Service. The 20-year monitoring period will accommodate for periods of fluctuation in population size or years when monitoring may not be possible.
 - c) Occupancy is maintained at the aforementioned levels within the additional canyon systems. The canyon system shall be considered stable when occupancy analysis based on methodology peer-reviewed by species experts and approved by the Service reveals no significant decline in occupancy.
 - d) As well as demonstrating no significant decline in occupancy, each canyon system should maintain functionality over the 20-year period with appropriate demonstrated

- population dynamics as defined by methodology peer-reviewed by species experts and approved by the Service.
- e) Approximately every 5 years, efforts to characterize occupied and high probability of occupancy habitat throughout the canyon systems should be conducted based on methodology peer-reviewed by species experts and approved by the Service.
 - f) A population viability analysis (PVA) (or other appropriate method which has been peer-reviewed by species experts and approved by the Service) will be conducted to determine the demographic parameters necessary to maintain a *resiliency* across these populations. A resilient population is one that is able to maintain approximately a 95% likelihood of persistence over a 100-year period (or other appropriate period of time). Based on the PVA, the recovery criteria would be reassessed or adjusted to establish an accurate population numbers to achieve a resilient population, if necessary.

Justification: The criteria ensure redundancy through the establishment stable patterns of occupancy for Sacramento prickly poppy in 7 additional canyon systems.

- 3. Genetic diversity is maintained within the core Alamo/Caballero canyon population, and throughout populations within canyon systems which are considered occupied habitat, according to the following measures:
 - a) The weak genetic divergence that has been observed between populations found in different canyon systems is maintained at a sufficient level to avoid any potential outbreeding depression as defined by methodology peer-reviewed by species experts and approved by the Service.
 - b) The genetic corridors between populations are maintained through patterns of occupancy within different canyon systems to promote gene transfer as defined by methodology peer-reviewed by species experts and approved by the Service.

Justification: These criteria ensure genetic and ecological representation of Sacramento prickly poppy across large portions of its range

- 4. The existing species-specific management recommendations have been effective and successful in protecting the species over the 20-year period required to reach the delisting criteria described above. In addition, all land managing agencies have developed a Post-Delisting Monitoring Plan (which has been approved by the Service's Southwest Regional Director) to cover a minimum of 5 years post-delisting of the species and are prepared to implement this plan prior to delisting to ensure the ongoing conservation of the listed species and the continuing effectiveness of management actions.
 - a) In addition to this criterion, monitoring and research have been completed to conclude with a high degree of certainty that population sizes, quality, configuration, and management are adequate to provide a high probability of species survival (greater than 90 percent over 100 years).

Justification: These criteria will help ensure the continued amelioration of threats to the Sacramento prickly poppy via management actions.

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 Act (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 Recovery Criteria

While some of the existing downlisting recovery criteria are objective and measurable, the current targets set for recovery are inadequate based on recent trends and new information since the 1994 Recovery Plan and the 2013 5-year review. The 5-year review indicated that up to 3 of the 10 named canyons included in the 1994 Recovery Plan have become extirpated, while 3 other occupied canyons were not included in the 1994 Recovery Plan. Thus, maintaining populations in those specific 10 canyons may not be among the most important aspects for determining recovery of the poppy without some additional criteria in terms of trends in occupancy of those canyons. Since the 1994 Recovery Plan, new information has been presented regarding the requirements for germination and establishment of new individuals, as well as the genetic variability within the species. This new information would meet two of the original downlisting recovery criteria; however, data since the 1994 Recovery Plan also indicate a reduction of 57 percent in population numbers, indicating that the species is no closer to recovery than at the time of listing (USFWS 2013). In addition, the original delisting recovery criteria provided are not considered objective and measurable. These criteria refer to the lack of information to determine what will be required for delisting. Thus, these criteria needed to be re-evaluated and amended accordingly based on the best available science.

In the development of these amended recovery criteria, we used the three conservation biology principles of resiliency, representation, and redundancy (Shaffer and Stein 2000, pp. 306-310). Briefly, resiliency supports the ability of the species to withstand environmental and demographic stochasticity; representation supports the ability of the species to adapt over time to long-term changes in the environment; and redundancy supports the ability of the species to withstand catastrophic events. The amended downlisting and delisting criteria number 1 are objective and measurable in relation to the concept of population resiliency. These criteria allow for the threat of demographic and environmental stochasticity to be mitigated through the establishment of a core population which is protected from random population fluctuations. The population abundance values (1,000 for downlisting and 1,500 for delisting) indicated in the amended criteria reflect species experts' opinions on the number of individuals needed within Alamo/Caballero Canyon population to establish population resiliency; these values are based on interpretations of population trends observed from previous years of monitoring. Population persistence over time will be achieved via stable or increasing demographic trends. The

amended downlisting and delisting criteria number 2 are objective and measurable in relation to the concept of population redundancy. The criteria ensure a stable pattern of occupancy within the 7 additional canyons systems outside of Alamo/Caballero Canyon, which will provide redundancy. Redundancy provides for security against extinction from catastrophic events that could impact a single population by ensuring that one or more additional resilient, representative populations persist. The probability of occupancy values indicated in the amended criteria reflect species experts' opinions on the trends in occupancy necessary to maintain resiliency and redundancy within and among these populations. The amended downlisting and delisting criteria number 3 are objective and measurable in relation to the concept of population representation. These criteria ensure that Sacramento prickly poppy populations have genetic representation, while having Sacramento prickly poppy across large portions of their range ensures ecological representation. Diversity within and among populations should confer populations, and the species, greater resistance to pathogens and parasites and greater adaptability to environmental stochasticity (random variations, such as annual rainfall and temperature patterns) and environmental changes. The amended downlisting and delisting criteria number 4 and 5 are objective and measurable in relation to the concept of threats management. These criteria will help ensure management actions which ameliorate recognized threats and help to sustain the Sacramento prickly poppy in its natural habitat over a biologically meaningful timeframe within the conditions on the landscape and inherent biological limitations of the species.

Based on the best available information that includes the input and data from species experts during our recovery criteria review (developing the various methodologies stated in the amended recovery criteria), these amended recovery criteria provide quantifiable measures for identifying and implementing recovery actions, a means to measure progress towards recovery, and the ability to recognize when recovery will be achieved.

ADDITIONAL SITE SPECIFIC RECOVERY ACTIONS

Not applicable

COSTS, TIMING, PRIORITY OF ADDITIONAL RECOVERY ACTIONS

Not applicable

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