Supplemental Finding for the Recovery Plan for the desert slender salamander
(Batrachoseps major aridus)

Original Approved: 1982
Original Prepared by: U.S. Fish and Wildlife Service in cooperation with California Department of Fish and Game (now California Department of Fish and Wildlife) and the Hidden Palms Ecological Reserve Committee

[Recovery Plan for the Desert Slender Salamander]

For
U.S. Fish and Wildlife Service
Pacific Southwest Region
Carlsbad, California

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Approved: ____________________________

Regional Director, Pacific Southwest Region, Region 8
U.S. Fish and Wildlife Service

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BACKGROUND INFORMATION

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.” It is possible that for some species, however, delisting cannot be foreseen at the time a recovery plan is written. In some rare cases, the best available information is so seriously limited that it is truly not possible to identify delisting criteria. This would be an unusual case, such as one in which the species’ threats are not understood well enough to identify priorities and appropriate mitigation. For example, the natural habitat may have been so reduced for an endangered species that captive propagation and active management is necessary for the life of a reasonable recovery plan. In another example, the population of a long-lived, slow growing species may be so depleted that possible recovery may be beyond the life of a reasonable recovery plan.

A 2006 Government Accountability Office (GAO) audit of the NMFS’ and FWS’ endangered species recovery programs recommended that the Secretaries of the Department of Commerce and the Interior direct their staff to ensure that all new and revised recovery plans have either recovery criteria evidencing consideration of all five delisting factors or a statement regarding why it is impracticable to do so (GAO 2006). Since the 2006 GAO audit, we have updated our recovery planning and implementation guidance (NMFS and FWS 2010), and new plans have included determinations regarding the feasibility or possibility of incorporating delisting criteria related to each of the five factors, as recommended by the GAO. Active recovery plans remain, however, that lack delisting criteria and contain either an incomplete determination regarding the practicability of incorporating delisting criteria, or are silent about the absence of delisting criteria in the recovery plan. In this document, we clarify why it remains impracticable to incorporate delisting criteria for desert slender salamander in the Recovery Plan for the desert slender salamander (*Batrachoseps major aridus*).

METHODOLOGY USED TO COMPLETE THE FINDING

This supplemental finding was conducted by the Carlsbad Fish and Wildlife Office (CFWO) staff using information from the 1982 Recovery Plan (USFWS 1982), 2014 5-year Review (USFWS 2014), relevant scientific literature, and other documents available in the CFWO files.

FINDING

The desert slender salamander (*Batrachoseps major aridus*) was federally-listed as an endangered species under the Act in 1973 (38 FR 14678), and was listed as endangered by the State of California in 1971, pursuant to the California Endangered Species Act. The primary objective of the 1982 desert slender salamander Recovery Plan is to prevent extinction of the species through stabilizing, protecting, and monitoring existing habitat and to maintain a viable, self-sustaining population (USFWS 1982, p. 14-15). The recovery plan does not contain formal threats-based recovery criteria but rather a step-down outline for objectives to address in order to minimize the further decline of the desert slender salamander and degradation to its habitat. This outline was identified with the extremely limited information regarding the ecology of the desert slender salamander available at the time and our current knowledge has changed very little since
The Recovery Plan found that delisting the desert slender salamander is unlikely to occur due to: 1) the species extremely restricted distribution, 2) low population numbers, and 3) susceptibility to habitat destruction. The criterion developed to indicate the need for reclassification (downlist to threatened) is the establishment and maintenance of at least two viable, self-sustaining populations dependent on separate watersheds. However, the limited geographic range, lack of demographic data, susceptibility of its habitat to damage, and lack of knowledge regarding the biology of the species led us to determine that developing quantitative delisting criteria for the desert slender salamander was not practicable.

The life history and ecology of the desert slender salamander is still largely unknown and much of the available information has been presumed through closely related species. As with other plethodontid salamanders, soil moisture is thought to be of critical importance for physiological processes (USFWS 2014, p. 7). There is little information regarding the abundance, range, dispersal, or demographic rates for the species, though it has been assumed that the activity and movements of the species are similar to other *Batrachoseps* spp. Salamanders from this genus are known to be sedentary and have a limited home range that is dependent on the environment and body size of the species (Hendrickson 1954, pp. 10–11; Cunningham 1960, p. 95). During surveys at Hidden Palm Canyon, observations of *B. aridus* movements were found to be difficult to track as many were found partially obscured beneath the surface or remained sedentary (Bleich 1978, pp. 13–14). Within the genus, female movement may be especially limited as shown by geographically restricted distributions of mtDNA haplotypes among individuals (Wake and Jockusch 2000, p. 107). However, once again, much of this information is inferred from other species of the genus (*Batrachoseps major aridus* n=1, Wake and Jockusch 2000, p. 102). Such information is too imprecise to serve as a meaningful guide for recovery. Reliable estimates of key demographic parameters from populations of desert slender salamander are not available and therefore can provide no insights into what a stable, recovered population of desert slender salamanders might look like.

The desert slender salamander has historically been reported from two canyons located within the Santa Rosa and San Jacinto Mountains National Monument area. They were first discovered in a small (less than 1 acre [0.4 hectare] in size) area within Hidden Palm Canyon, in the Santa Rosa Mountains of Riverside County in 1969. They were then discovered during surveys of potential sites that could harbor other populations of desert slender salamander in 1980–1981 at Guadalupe Canyon (4.5 miles [7.2 kilometers] from Hidden Palm Canyon). They were then discovered during surveys of potential sites that could harbor other populations of desert slender salamander in 1980–1981 at Guadalupe Canyon (4.5 miles [7.2 kilometers] from Hidden Palm Canyon). Subsequent surveys performed by USGS in 1984 at Guadalupe Canyon were conducted over 15 nights and detected 30 individuals. In 2016–2017, the United States Geological Survey (USGS) conducted surveys for six nights at Guadalupe Canyon and did not detect any individuals. The desert slender salamander has not been observed since 1997, when it was seen by the California Department of Fish and Wildlife (CDFW) at Hidden Palm Canyon. Since the species has not been seen in many years, extensive knowledge gaps remain about the species biology and habitat requirements and predictions about how population dynamics might change into the future are unlikely to be accurate.
The 1982 Recovery Plan for the desert slender salamander identified extremely restricted distribution, habitat loss due to erosion, and ground water pumping/water diversions as threats to the continued existence of the species (USFWS 1982, p. 11). Threats in addition to those listed in the Recovery Plan described in subsequent 5-year reviews of the species (USFWS 2009; USFWS 2014) include: fire, disease, climate change and resulting drought, and small population size. While these threats are ongoing, the lack of demographic data makes it difficult to assess the potential impacts to the species. Assessment of both potential extant populations and the threats facing the species are further complicated due to the difficulty accessing the habitats and the risk of habitat damage from survey techniques. The limestone and talus in Hidden Palm Canyon has undergone much erosion following severe storms, one of which washed out an estimated 33 percent of the habitat (USFWS 1982, p.9). The area also continues to experience further erosion despite the placement of gabion structures intended to prevent damage (USFWS 2014, p. 15). Consequently, the soil in Hidden Palm Canyon is now mostly secured by vegetation, and additional disturbance will likely cause further erosion. Any survey method more thorough than surface searching will cause additional habitat damage (USFWS 2014, p. 14).

There is now much less habitat remaining than when the desert slender salamander was listed (USFWS 2009, p. 8). Determining population status will be difficult until strategic monitoring protocols have been implemented that eliminate risk of further habitat degradation. Research on determining non-destructive surveying techniques would help in addressing data gaps for this species.

In summary, we find that the development of measurable, objective criteria that describe recovery for the Desert slender salamander is not practicable at this time given the lack of basic demographic and ecological information along with limited understanding of persistent threats and how to address them in the context of recovery. Knowledge gaps continue to exist regarding population distribution, demographics, and trends that prevent us from establishing quantifiable criteria needed to define recovery for the species. There has been no thorough monitoring for the species since 1978. Subsequent surveys have been opportunistic as no strategic survey method has been implemented. Additionally, the sensitivity and limited accessibility of the habitat where the desert slender salamander occurs increases concern over potential habitat damage that may occur while performing surveys. The lack of understanding regarding the species biology and ecology render it not practicable to develop objective, quantifiable recovery criteria at this time.
LITERATURE CITED

Bleich, K. 1978. Preliminary results of a study on Batrachoseps aridus in Hidden Palm Canyon, Riverside County, California. Report to California Department of Fish and Game. 18 pp. + tables.


