Draft Post-Delisting Monitoring Plan
Camissonia benitensis (San Benito evening primrose)

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1. Introduction

The United States Fish and Wildlife Service (Service) proposed delisting of *Camissonia benitensis* (San Benito evening primrose) in 2019 due to increases in the amount and character of occupied habitat, the observed stability of monitored populations, an improved understanding of the species biology and seed bank presence, and the removal of the primary threat to the species, OHV use, throughout much of the currently known range. A post-delisting monitoring plan is required for species that are removed from the Federal List of Threatened and Endangered Plants to ensure that the species does not become threatened or endangered following delisting.

Post-delisting monitoring is designed to verify that *C. benitensis* remains secure from risk of extinction after its removal from the Federal List of Endangered and Threatened Plants by detecting changes in population trends that indicate that the known occurrences have become unstable and/or are at risk of becoming once again Threatened or Endangered. The Act has a minimum post-delisting monitoring requirement of 5 years, but a longer period of time may be necessary to account for fluctuations in population counts from year to year, potential changes in land use, and climatic variability. If populations decline in abundance or a substantial new threat arises, post-delisting monitoring may be extended or modified and the status of the species will be re-evaluated.

This draft presents proposed monitoring methodologies, goals, and an implementation strategy. If *C. benitensis* is delisted, a final post-delisting monitoring plan will be created in coordination with the Bureau of Land Management (BLM), the sole Federal entity that manages land where *C. benitensis* occurs. The final post-delisting monitoring plan will be established prior to publication of a final rule.

2. Monitoring Overview

The Service is responsible for establishing a final post-delisting monitoring plan. Minimum required monitoring activities are described here. As the sole Federal entity that manages land where *C. benitensis* occurs, the BLM will contribute expertise for development and implementation of the final post-delisting monitoring plan.The goal of the proposed monitoring is to ensure that post-delisting monitoring evaluates the stability of *C. benitensis* across its known range, inclusive of all habitat types and disturbance history, and between restored and natural occurrences. Monitoring is designed to be able to evaluate the following questions:

- What is the population trend for occurrences in alluvial terrace habitat?
- What is the population trend for occurrences in geologic transition zone habitat?
- Is the species recovering in areas where it had previously been disturbed by off-highway vehicle use but where restoration has not taken place?
- Is the species recovering in areas that have been restored since being disturbed by off-highway vehicle use?
- Is the seed bank stable across habitat types and disturbance regimes?
- How is the species composition and cover of the occurrences changing through time?
- Are annual temperature and precipitation amounts following the predicted trend based on climate change models?

2.1. **Occurrence Selection**

The spatial unit of monitoring will be mapped occurrences based on the BLM's 2019 spatial data. Occurrences are considered to be groups of mapped polygons (sub-occurrences) that are within 0.25 mi (0.40 km). Data may be collected at the sub-occurrence level but will be analyzed across occurrences.

A minimum of 30 occurrences will be monitored as part of the post-delisting monitoring. The monitoring will include 12 occurrences from each habitat type (alluvial terrace and geologic transition zone), and 8 occurrences from sites with extant populations of *C. benitensis* that were exposed to heavy OHV use prior to closure in 2008. As many of the original 27 occurrences listed in the Recovery Plan should be used as possible, although a single occurrence may not be used to satisfy more than one category (i.e., alluvial terrace, geologic transition zone, prior heavy OHV use). Occurrences for each category (alluvial terrace, geologic transition zone, prior OHV use) should be spread across the geographic range of the species in order to capture variation that may be present throughout the range. This will yield a minimum of 30 occurrences for monitoring.

The history of disturbance and restoration will be described for occurrences chosen for their disturbance and restoration history. Historical photos, if available will be included as data.

The final occurrence selection for monitoring will be agreed upon by the Service and BLM.

2.2. Occurrence Monitoring

Selected occurrences will be monitored annually for species composition and cover, and total number of individuals of *C. benitensis*. Above ground numbers of *C. benitensis* will be counted and associated species composition will be visually estimated for percent cover. The seed bank will be evaluated bi-annually. Soil samples will be randomly sampled from within the occurrence and processed for seed density. Either seedling emergence or direct count methodologies may be used to quantify the seedbank. The BLM has previously utilized seedling emergence to evaluate the seed bank and the methology established by the BLM may be used as a starting point for establishing a protocol (BLM 2011, pp. 33-42). As possible, observations of seed morphology should be recorded (i.e. black vs. blond seed) as visual characteristics have been demonstrated to suggest differences in viability (Taylor 1990 p. 55-57; BLM 2011p. 33). Viability tests may be conducted if seed viability is suspect.

Monthly temperature and precipitation data will be collected from the nearest weather station and recorded. General observations will be made of each occurrence during annual surveys to describe notable changes in the character of the occurrence such as natural and unnatural disturbances.

2.3. **Data Analysis**

Each year data will be shared with the Service. Spatial data will be shared in a format that maintains metadata and allows spatial analysis (e.g. geodatabase). Count and cover data will be shared in tabular form with associated spreadsheets. Observational data will be shared in report format. The collected data will then be analyzed for differences in trends among the habitat types and disturbance regimes to determine if there are patterns in the species stability. The data may be analyzed at different spatial scales to evaluate different features (e.g. population trend vs. differences trends between disturbed and undisturbed occurrences).

2.4. **Contingency Planning**

The goal of monitoring is to ensure that actions following delisting do not jeopardize the continued existence of *C. benitensis*. The monitoring is also designed to aid in the implementation of future restoration and/or management actions. The Service will be notified, and the post-delisting monitoring plan will be updated, to specifically monitor any new threats to *C. benitensis*. The Service will coordinate with BLM on measures to minimize impacts to *C. benitensis*. If landscape level changes occur within occurrences of *C. benitensis* (e.g. fire, flood, landslide) the monitoring may be modified to capture the response of the species to the environmental change. Similarly, if land management changes so that disturbance from human activities, such as OHV use or mining, is likely to disturb or otherwise alter occurrences of *C. benitensis*, the monitoring will be modified to document and track the population trajectory following the change in land management.

3. Implementation

Monitoring will take place annually during the peak of the blooming period for *C. benitensis* to best capture the above ground expression. Seed bank analysis may be conducted following seed set to reduce disturbance if necessary. Data collected during monitoring will be shared with the Service by September of each year. The data will be incorporated into existing trend analyses by the end of the calendar year to identify declines, threats, or expansion of the species. This will allow adequate time for discussion between the Service and the BLM prior to the next monitoring season so that adjustments to monitoring may be made as necessary. A final report will be produced by the Service and BLM following the 5th year of monitoring.

3.1. **Thresholds**

If monitoring indicates sustained declines in the observed numbers of above ground *C. benitensis*, or in the seed bank, the Service and the BLM will convene to discuss the sources of the decline and any management actions that may be taken to reverse the observed trend. If the current Record of Decision is to be altered in a manner that will impact *C. benitensis* the Service and BLM will consult in order to ensure that new management decisions do not negatively impact *C. benitensis*.

3.2. **Roles and Responsibilities**

The BLM will be responsible for collecting and sharing annual monitoring data with the Service by September of each year. The Service will be responsible for evaluating the data and sharing

the results with the BLM by the end of December for that season. This will ensure that there is adequate time to evaluate and discuss observed trends in the data and to suggest changes to monitoring or management prior to the start of the next monitoring season. At the conclusion of the 5th year of monitoring the Service will lead the creation of a report that summarizes the observed trends and conclusions of the post-delisting monitoring with input from the BLM.

4. References

Bureau of Land Management. 2011. Annual Report for the 2010 – 2011 Season Monitoring and Status of *Camissonia benitensis* and Implementation of the 2006 Record of Decision. Bureau of Land Management, Hollister Field Office, California.

Taylor, D. 1990. Ecology and life history of the San Benito evening-primrose (Camissonia benitensis). Prepared by BioSystems Analysis, Inc. BLM Contract No. CA950-RFP7-13 J-325. July 1990. 87 pp.