

Draft Amendment to the Recovery Plan for *Caesalpinia kavaiensis* and *Kokia drynarioides*

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Original Prepared by: Pacific Region, U.S. Fish and Wildlife Service

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Species addressed in Draft Amendment: *Kokia drynarioides* (Koki‘o)

We have analyzed all of the best available information and find that there is a need to amend the recovery criteria for *Kokia drynarioides* (koki‘o) that have been in place since the recovery plan was completed. 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 is to be shown as an appendix that supplements the recovery plan, superseding only the Recovery Criteria in the Executive Summary (page iii) and the downlisting criteria (pages 40-41) in section II.1 (Recovery Objectives) of the recovery plan (USFWS 1994).

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 A review of the recovery plan and its implementation may show that the plan is out of date or its usefulness is limited, and therefore warrants modification.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 appropriate in cases where 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 more comprehensive 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 Hawai'i and Pacific Plants Recovery Coordinating Committee (HPPRCC), comprising biologists from federal and state agencies, private conservation organizations, botanical gardens, and universities, was established to advise the Service on the biology and management needs for recovery of listed plants. The HPPRCC has outlined general actions and goals for stages leading towards recovery of listed Hawaiian plants (HPPRCC 2011). Current information is lacking for many Hawaiian plant species with respect to the status of the species and their habitats, breeding systems, genetics, and propagule storage options. The Service has therefore adopted downlisting and delisting criteria for Hawaiian plants based on the revised recovery objective guidelines developed by the HPPRCC (2011). These criteria are assessed on a species-by-species basis, especially as additional information becomes available.

General distinctions made by the HPPRCC that are relevant to *Kokia drynarioides* include the following:

- *Life span*: Long-lived perennials are those taxa either known or believed to have life spans greater than 10 years; short-lived perennials are those known or believed to have life spans greater than 1 year but less than 10 years; and annuals are those known or believed to have life spans less than or equal to 1 year. When it is unknown whether a species is long- or short-lived, the Service has erred on the side of caution and considered the species short-lived. This evaluation will be revised as more is learned about the life histories of these species.
- *Range size*: Narrow extant range and broad contiguous range are recognized as not needing different numbers of individuals or populations, only that the populations be distributed more narrowly or more broadly, respectively, across the landscape.
- *Reproduction strategies*: Obligate outcrossers are species that either have male and female flowers on separate plants or otherwise require cross-pollination to fertilize seeds, and therefore require equal numbers of male and female individuals contributing to reproduction, doubling the number of mature individuals needed for recovery. Species that reproduce vegetatively may reproduce sexually only on occasion, resulting in the majority of the genetic variation being between populations, therefore species dependent on vegetative reproduction require additional populations.
- *Annual population stability*: Species that fluctuate in number of individuals from year to year require a larger number of mature individuals on average to allow for a decline in years of extreme habitat conditions and recuperation in numbers in years of more normal conditions.

The following downlisting and delisting criteria were determined based on known biology of *Kokia drynarioides* with consideration given to the above general guidelines. It is a long-lived tree with a narrow extant range, occupying dry forests of North Kona, Hawai'i. The species is capable of self-pollination (USFWS 1994). The State of Hawai'i Division of Forestry and Wildlife's botanist reviewed and confirmed these life-history traits and corresponding criteria as

quantified in the peer-reviewed guidelines (HPPRCC 2011). This recovery plan amendment was written by the Pacific Islands Fish and Wildlife Office's plant recovery coordinator.

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 listing factors.

Recovery Criteria

See previous version of criteria in the Executive Summary (page iii) and Part II. Recovery, Objectives Section (page 40-41) of the recovery plan (USFWS 1994).

The original downlisting criteria in the recovery plan are as follows:

"[*Kokia drynarioides*] should be considered for downlisting when:

- 1) It is observed and documented that the major threats listed in Part I are greatly reduced.
- 2) It is observed and documented that following the removal of threats, new trees are being recruited by natural regeneration at a rate adequate to replace individuals lost from the population and preserve long term genetic diversity.
- 3) Recovery proceeds for the time, approximately 13 years, needed to provide demographic data to be used in population viability analysis (PVA) to estimate minimum population numbers and densities for effective reproduction.
- 4) A thorough review of the environmental dynamics and human activities within the dry forest habitat is conducted to determine the minimum habitat area needed to give a high probability of survival of the species over the next 200 years.
- 5) Current habitat has been secured in perpetuity.
- 6) Any management practices necessary to maintain the protected habitats have been implemented.
- 7) The habitat is populated with the numbers and densities indicated by the results of research and the PVA (minimum of 100 naturally reproducing individuals in each of 3 populations in North Kona)."

Synthesis

There is 1 location with 1 individual and another location with 15 wild individuals. Additionally, there have been six reintroductions totaling over 1,000 individuals. Populations are fenced and fences are maintained. Therefore, the populations are considered protected from ungulates (PEPP 2017).

Grazing by introduced ungulates and competition with invasive plants, mainly fountain grass (*Cenchrus setaceus*), were the two main threats identified in the recovery plan (USFWS 1994). Fire, development, rodent and invertebrate seed predation, and damage by introduced aphids have been identified as additional threats (USFWS 2009). Impacts of climate change have been

identified as another threat (USFWS 2015). To quantify potential impacts from climate change, Fortini *et al.* (2013) conducted a landscape-based assessment of climate change vulnerability for native plants of Hawai‘i using high resolution climate change projections. Climate change vulnerability is defined as the relative inability of a species to display the possible responses necessary for persistence under predicted climate change. This assessment concluded that *K. drynarioides* is vulnerable to the impacts of climate change, with a score of 0.73 (on a scale of 0 being not vulnerable to 1 being extremely vulnerable to climate change). Therefore, additional management actions are needed to conserve this taxon into the future. Collections and controlled propagation are ongoing management activities, along with threat control at several populations, including fencing and weed management (USFWS 2015).

The downlisting criteria in the current recovery plan will be modified. Downlisting Criterion 1 is being modified to include all currently known threats. Criterion 2 is being modified to just focus on the need for regeneration and population stability and not directly link it to threat control. Criterion 3 is modified from 13 years to 10 years (for downlisting), which is the standard HPPRCC recommendation, and no data exists to support the need for 3 additional years. Criterion 4 is being removed, as there is little biological data available to provide an accurate estimate, there are many variable, exogenous factors that would be difficult to control or model, there are efforts to conduct similar models for all listed Hawaiian plants without needing to require it for this particular species, and the goal for a specific amount of stable populations at a large enough size is regardless of an estimate for how much space is needed. Due to the broad distribution of the species, Criterion 5 is modified to “suitable habitat is available”, and Criterion 6 is simply re-worded. Lastly, Criterion 7 is being slightly modified to better fit the new HPPRCC framework (see HPPRCC 2011), and allow for flexibility in the requirements for each island to further encourage reintroductions in the best available habitats. The total number of individuals recommended for recovery remains the same, except that a range is provided between downlisting and delisting.

Delisting criteria will also now be included in this amendment, as described below.

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 *Kokia drynarioides* 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, subspecies, 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.

We provide both downlisting and delisting criteria for *Kokia drynarioides*, which will supersede those included in the Recovery Plan for *Caesalpinia kavaiensis*, and *Kokia drynarioides* (USFWS 1994), as follows:

Downlisting Recovery Criteria

Kokia drynarioides will be considered for downlisting when:

- 1) There are 5 to 10 populations in suitable, protected habitat with 200 mature individuals per population;
- 2) All major threats are controlled around the target populations,
- 3) Populations are represented in an *ex situ* collection as defined in the Center for Plant Conservation guidelines (Guerrant *et al.* 2004) that is secure and well managed, and
- 4) All target populations have been stable, secure, and naturally reproducing for a minimum of 10 years. Species-specific management actions may continue to be necessary.

Delisting Recovery Criteria

Kokia drynarioides will be considered for delisting when:

- 1) There are at least 10 populations in suitable, protected habitat with 200 mature individuals per population;
- 2) All of the downlisting criteria have been met; and
- 3) All target populations have been stable, secure, naturally reproducing, and within secure and viable habitats for a minimum of 20 years. Species-specific management actions must no longer be necessary, but an ongoing need for ecosystem-wide management actions may remain if long-term agreements are in place to continue management.

These numbers are initial targets, but may be revised upward as additional information is available. An adequate population viability analysis (PVA) for *K. drynarioides* should be conducted to assess needed numbers more accurately based on current management and monitoring data. Information necessary for the PVA includes major limiting factors, breeding system, population structure and density, and proven management methods for major threats. Genetic analyses should be conducted to ensure that adequate genetic representation is present within and among populations compared to the initial variation assessed in the interim stage.

All classification decisions consider an analysis of 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 limiting 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 of our analysis. Our final decision is announced in the *Federal Register*.

Rationale for Recovery Criteria

The amended recovery criteria are based on the current known biology of the species from the latest 5-year review, species expert data, and the Hawai'i and Pacific Plants Recovery Coordinating Committee's Revised Recovery Objective Guidelines (HPPRCC 2011, PEPP 2017, USFWS 2015).

LITERATURE CITED

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