

## 5-YEAR REVIEW

Short Form Summary

**Species Reviewed:** *Kokia cookei* (Cooke's koki'o)

**Current Classification:** Endangered

### **Federal Register Notice announcing initiation of this review:**

[USFWS] U.S. Fish and Wildlife Service. 2012. Endangered and threatened wildlife and plants; 5-year status reviews of 46 species in Idaho, Oregon, Washington, Nevada, Montana, Hawaii, Guam, and the Northern Mariana Islands. Federal Register 77(44):13248-13251.

### **Lead Region/Field Office:**

Region 1/Pacific Islands Fish and Wildlife Office (PIFWO), Honolulu, Hawaii

### **Name of Reviewer(s):**

Chelsie Javar-Salas, Plant Biologist, PIFWO  
Maui nui and Hawaii Island Team Manager, PIFWO  
Marie Bruegmann, Plant Recovery Coordinator, PIFWO  
Recovery Program Lead, PIFWO  
Kristi Young, Programmatic Deputy Field Supervisor, PIFWO

### **Methodology used to complete this 5-year review:**

This review was conducted by staff of the Pacific Islands Fish and Wildlife Office of the U.S. Fish and Wildlife Service (USFWS), beginning on March 6, 2012. The review was based on a review of current, available information since the last 5-year review for *Kokia cookei* (USFWS 2008). The evaluation by Chelsie Javar-Salas, Plant Biologist, was reviewed by the Island Team Manager, and Plant Recovery Coordinator, followed by the Recovery Program Lead. It was subsequently reviewed and approved by the Programmatic Deputy Field Supervisor.

### **Background:**

For information regarding the species listing history and other facts, please refer to the Fish and Wildlife Service's Environmental Conservation On-line System (ECOS) database for threatened and endangered species ([http://ecos.fws.gov/tess\\_public](http://ecos.fws.gov/tess_public)).

### **Review Analysis:**

Please refer to the previous 5-year review for *Kokia cookei* published on January 18, 2008 (available at [http://ecos.fws.gov/docs/five\\_year\\_review/doc1844.pdf](http://ecos.fws.gov/docs/five_year_review/doc1844.pdf)) for a complete review of the species' status, threats, and management efforts. No significant new information regarding the species' biological status has come to light since listing to warrant a change in the Federal listing status of *K. cookei*.

This short-lived perennial is endangered and endemic to the island of Molokai (USFWS 2008). This species has been extirpated from its natural range on Molokai since 1918 (USFWS 2008) and was known only from a single specimen in cultivation and tissue

culture maintained in a laboratory (USFWS 2012). The current status and trends for *Kokia cookei* are provided in the tables below.

**New status information:**

There is a single individual in cultivation at Waimea Arboretum, and there are propagules in captive propagation at the Lyon Arboretum, Amy Greenwell Ethnobotanical Garden, Leeward Community College, Hoolawa Farms, and Maui Nui Botanical Gardens (USFWS 2012). In 2012, two individuals were outplanted on Molokai in a living gardens collection (Plant Extinction Prevention Program [PEPP] 2012).

Overall, the status of *Kokia cookei* has not changed since the last 5-year review and remains extirpated from its natural range.

**New threats:**

- Climate change destruction or degradation of habitat – Climate change may pose a threat to this species. Fortini *et al.* (2013) conducted a landscape-based assessment of climate change vulnerability for native plants of Hawaii 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 climate change. The assessment by Fortini *et al.* (2013) did not include *Kokia cookei*.
- Slug herbivory – In 2012, slugs (unidentified species) were reported as a threat to *K. cookei* (PEPP 2012).
- Rodent predation or herbivory – Rats (*Rattus* spp.) were reported as a threat to *K. cookei* (PEPP 2012).

**New management actions:**

- Captive propagation for genetic storage and reintroduction
  - The Harold L. Lyon Arboretum Micropropagation Lab (2013) has nine propagules of *K. cookei* in captive propagation.
  - The National Tropical Botanical Garden (2013) has a single seed in storage for *K. cookei*.
  - Grafts from the last known individual in captive propagation on Molokai were transported to Maui Nui Botanical Gardens for use in captive propagation (PEPP 2012). As of 2013, the Maui Nui Botanical Gardens (2013) has a single grafted individual in captive propagation. One grafted individual of *K. cookei* died in early 2012 (Maui Nui Botanical Gardens 2012).
  - The Pahole Rare Plant Facility (2013) has a single individual in captive propagation.
  - The Waimea Valley Arboretum (2013) has five individuals of *K. cookei* in captive propagation.
- Listing and critical habitat designation – Two units of unoccupied areas of critical habitat for *K. cookei* was proposed in the lowland dry ecosystem on Molokai (USFWS 2012). The final rule for critical habitat designations has not been published at the time of this review.

**Synthesis:**

Downlisting and delisting objectives are provided in the recovery plan for *Kokia cookei* (USFWS 1998). To be considered for downlisting, this species must be managed to minimize the chances of its extinction due to random naturally occurring events by increasing and maintaining the number of cloned individuals to at least 1,000. These individuals must be distributed equally (80 to 100 individuals) in 8 field populations and in 5 cultivated collections.

The downlisting goals for this species have not been met, as currently no population of 80 to 100 mature individuals exists (Table 1) and all threats are not sufficiently managed throughout its range (Table 2). Therefore, *Kokia cookei* meets the definition of endangered as it remains in danger of extinction throughout its range.

**Recommendations for Future Actions:**

- Captive propagation protocol development – Research and develop better propagation methods to produce viable seeds in cultivation.
- Captive propagation for genetic storage and reintroduction
  - Continue collection of genetic resources for storage, propagation, and reintroduction into protected suitable habitat within historical range.
  - Continue to increase numbers of grafted individuals.
  - Propagate individuals of *K. cookei* in captive propagation to produce viable seeds.
- Reintroduction / translocation – Continue reintroducing into protected suitable habitat within historical range to increase numbers of individuals.
- Ungulate monitoring and control – Fence remaining populations to protect them from the impacts of feral ungulates.
- Invasive plant monitoring and control – Control invasive introduced plant species in the vicinity of all known *K. cookei* populations.
- Predator / herbivore monitoring and control – Control slugs and rodents within the vicinity of all known *K. cookei* populations.
- Population viability monitoring and analysis – Continue monitoring outplanted and captive propagated individuals.
- Alliance and partnership development – Initiate planning and contribute to implementation of ecosystem-level restoration and management to benefit this taxon.

**Table 1. Status and trends of *Kokia cookei* from listing through current 5-year review.**

<b>Date</b>	<b>No. wild indivs</b>	<b>No. outplanted</b>	<b>Downlisting Criteria identified in Recovery Plan</b>	<b>Downlisting Criteria Completed?</b>
1979 (listing)	0	0	1,000 cloned individuals in 8 field populations and 5 cultivated collections (80-100 individuals each)	No
1998 (recovery plan)	0	0	1,000 cloned individuals in 8 field populations and 5 cultivated collections (80-100 individuals each)	No
2003 (critical habitat)	0	0	1,000 cloned individuals in 8 field populations and 5 cultivated collections (80-100 individuals each)	No
2007 (5-year review)	0	0	1,000 cloned individuals in 8 field populations and 5 cultivated collections (80-100 individuals each)	No
2012 (critical habitat – proposed)	0	0	1,000 cloned individuals in 8 field populations and 5 cultivated collections (80-100 individuals each)	No
2014 (5-yr review)	0	2	1,000 cloned individuals in 8 field populations and 5 cultivated collections (80-100 individuals each)	No

**Table 2. Threats to *Kokia cookei* and ongoing conservation efforts.**

<b>Threat</b>	<b>Listing factor</b>	<b>Current Status</b>	<b>Conservation/ Management Efforts</b>
Ungulates – degradation of habitat and herbivory	A, C, D, E	Ongoing	None
Invasive introduced plants	A, E	Ongoing	None
Rodent predation or herbivory – rats	C	Ongoing	None
Slugs herbivory	C	Ongoing	None
Loss of mutualists	E	Ongoing	None
Low numbers	E	Ongoing	Yes, captive propagation for genetic storage and reintroduction
Climate change	A, E	Increasing	None

**References:**

See previous 5-year review for a full list of references (USFWS 2008). Only references for new information are provided below.

Fortini, L., J. Price, J. Jacobi, A. Vorsino, J. Burgett, K. Brinck, F. Amidon, S. Miller, S. Gon II, G. Koob, and E. Paxton. 2013. A landscape-based assessment of climate change vulnerability for all native Hawaiian plants. Technical report HCSU-044. Hawaii Cooperative Studies Unit, University of Hawaii at Hilo, Hawaii. 141 pages.

Harold L. Lyon Arboretum Micropropagation Laboratory. 2013. Micropropagation database. University of Hawaii at Manoa, Honolulu, Hawaii. Unpublished.

Maui Nui Botanical Gardens. 2012. Report on controlled propagation of listed and candidate species, as designated under the U.S. Endangered Species Act. 15 pages. Unpublished.

Maui Nui Botanical Gardens. 2013. Report on controlled propagation of listed and candidate species, as designated under the U.S. Endangered Species Act. 12 pages. Unpublished.

National Tropical Botanical Garden. 2013. Report on controlled propagation of listed and candidate species, as designated under the U.S. Endangered Species Act. 30 pages. Unpublished.

Pahole Rare Plant Facility. 2013. Report on controlled propagation of listed and candidate species, as designated under the U.S. Endangered Species Act. 16 pages. Unpublished.

[PEPP] Plant Extinction Prevention Program. 2012. Plant Extinction Prevention Program annual report, fiscal year 2012 (July 1, 2011-June 30, 2012). 169 pages. Unpublished.

[USFWS] U.S. Fish and Wildlife Service. 1998. Recovery plan for *Kokia cookei*. U.S. Fish and Wildlife Service, Portland, Oregon. 55 pages + appendices.

[USFWS] U.S. Fish and Wildlife Service. 2008. *Kokia cookei* 5-year review summary and evaluation. U.S. Fish and Wildlife Service, Honolulu, Hawaii. 11 pages.

[USFWS] U.S. Fish and Wildlife Service. 2012. Endangered and threatened wildlife and plants; listing 38 species on Molokai, Lanai, and Maui as endangered and designating critical habitat on Molokai, Lanai, Maui, and Kahoolawe for 135 species; proposed rule. Federal Register 77(112):34464-34775.

Waimea Valley Arboretum. 2013. Report on controlled propagation of listed and candidate species, as designated under the U.S. Endangered Species Act. 16 pages. Unpublished.

**U.S. FISH AND WILDLIFE SERVICE**  
**SIGNATURE PAGE for 5-YEAR REVIEW of *Kokia cookei* (Cooke's koki'o)**

Pre-1996 DPS listing still considered a listable entity? N/A

Recommendation resulting from the 5-year review:

- Delisting
- Reclassify from Endangered to Threatened status
- Reclassify from Threatened to Endangered status
- No Change in listing status

Appropriate Listing/Reclassification Priority Number, if applicable: \_\_\_\_\_

*for* Programmatic Deputy Field Supervisor, Pacific Islands Fish and Wildlife Office

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