5-YEAR REVIEW

Short Form Summary

Species Reviewed: *Urera kaalae* (ōpuhe)

Current Classification: Endangered

Federal Register Notice announcing initiation of this review:

[USFWS] U.S. Fish and Wildlife Service. 2017. Endangered and threatened wildlife and plants; initiation of 5-year status reviews for 138 species in Hawaii, Oregon, Washington, and California. Federal Register 82(75): 18665–18668, April 20, 2017.

Lead Region/Field Office:

Region 1/Pacific Islands Fish and Wildlife Office (PIFWO), Honolulu, Hawai‘i

Name of Reviewer:

Cheryl Phillipson, Biologist, PIFWO
Lauren Weisenberger, Plant Recovery Coordinator, PIFWO
Megan Laut, Conservation & Restoration Team Manager, PIFWO

Methodology used to complete this 5-year review:

This review was conducted by staff of the Pacific Islands Fish and Wildlife Office (PIFWO) of the U.S. Fish and Wildlife Service (Service) beginning in October 2018. The review was based on a review of current, available information since the last 5-year review for *Urera kaalae* (USFWS 2011). The evaluation completed by Cheryl Phillipson, Biologist, was reviewed by Lauren Weisenberger, Plant Recovery Coordinator, and Megan Laut, Conservation and Restoration Team Manager.

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*).

Review Analysis:

Please refer to the previous 5-year review for *Urera kaalae* published in the Federal Register on September 20, 2011 (available at *https://ecos.fws.gov/docs/five_year_review/doc3877.pdf*) for a complete review of the species' status, threats, and management efforts. We are not aware of any significant new information regarding the species' biological status since listing to warrant a change in the Federal listing status of *U. kaalae*.

This long-lived perennial shrub or small tree in the Urticaceae (nettle) family is endangered and endemic to O‘ahu. The current status and trends for *Urera kaalae* are provided in the tables below.

New Status Information:

- Currently, there is one known population of *Urera kaalae* with two sites totaling five mature and 16 immature individuals. There may also be two other population, with one to two individuals each at Waiʻeli to Kaluaa and ʻĒkahanui. All locations are in the southern Waiʻanae mountains on Oʻahu (Plant Extinction Prevention Program (PEPP) 2018).
- In 2012, eight critical habitat units were designated in two ecosystems (lowland mesic and lowland wet) for *Urera kaalae* in the Waiʻanae mountains of Oʻahu (6,555 acres, 2,653 hectares) (77 FR 57648, September 18, 2012).

New Threats:

- Climate change loss 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 Hawaiʻi 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) concluded that *Urera kaalae* is highly vulnerable to the impacts of climate change, with a vulnerability score of 0.862 (on a scale of 0 being not vulnerable to 1 being extremely vulnerable to climate change). Therefore, additional management actions may be needed to conserve this taxon into the future, such as locating key microsites that overlap with current and future climate envelopes for outplanting efforts.
- Disease—In 2016, *Pucciniastrum boehmeriae* (mamaki rust) was observed on *Urera kaalae* at Puʻuhapapa; however, after two years the rust did not appear to cause significant negative effects to the health of the plants, even with heavy infestations (ANRP 2018).

New Management Actions:

- Ungulate control—
  - The Army Natural Resource Program-Oʻahu (ANRP) undertakes stabilization and management of other endangered species to fulfill the requirements of the Biological Opinions for U.S. Army activities in Mākua and Oʻahu training areas, and *Urera kaalae* may benefit from these actions (fencing, ungulate and predator control, nonnative plant control) in management areas. Wild and/or reintroduced individuals of *Urera kaalae* may occur in four areas with ungulate exclosures maintained by ANRP: ʻĒkahanui, Palikea, Kaluaa-Waiʻeli, and Pualiʻi (ANRP 2018; U.S Army Garrison Hawaiʻi 2010).
  - In 2014, a team of 21 participants from various agencies and organizations collaborated to construct an ungulate exclosure fence to protect five *Urera kaalae* in Pālāwai gulch. Post construction reports indicated that this fence effectively stopped a boulder that had come loose from above (PEPP 2014).
- Rodent predation or herbivory—The ANRP has found that Goodnature™ A24 rat traps are more effective than the Victor® snap traps, and these traps are deployed in a large-scale grid at the ʻĒkahanui management unit. Traps are checked at 4-month intervals (ANRP 2018).

- Slug herbivory—Testing showed that Ferroxx® is a more effective slug control than Sluggo®, and this toxicant is currently used to protect some managed species from herbivory by slugs at the Kaluaa–Waiʻeli management unit, and may also benefit *Urera kaalae* (ANRP 2018).
- Captive propagation for genetic storage and reintroduction—
    - The Plant Extinction Prevention Program (PEPP) reports collections representing 100 percent of the founders at two subpopulations (PEPP 2017).
    - Lyon Arboretum Micropropagation Laboratory reports seven explants in storage representing one plant at Pālāwai (Lyon Arboretum 2018). The Lyon Arboretum Seed Conservation Laboratory reports collection and storage of more than 158,000 seeds representing 12 individuals from two populations (three subpopulations) (Lyon Arboretum 2018).
    - The Pahole Rare Plant Facility (PRPF) reports 10 plants in storage representing six individuals from one population at Pālāwai, with 25 plants grown for outplanting (PRPF 2018).
- Reintroductions—
    - The ANRP outplants *Urera kaalae* to provide this host plant for *Drosophila montgomeryi*, an endangered endemic Hawaiian picture-wing fly (ANRP 2018). Since the fall of 2014, 300 *Urera kaalae* were outplanted at North Kaluaa, Central Kaluaa, Puali‘i, and Palikea (ANRP 2018). Puali‘i is the only site where outplanted *U. kaalae* are successfully reproducing.
    - The Plant Extinction Prevention Program (PEPP) also outplants *Urera kaalae*, and reports 185 outplanted individuals total at Kapuna, ‘Ēkahanui, Waiʻeli, Pālāwai, and Puali‘i, with currently 150 surviving (PEPP 2017).

Synthesis:
Currently there are five mature and 16 immature wild individuals of *Urera kaalae* in the Waiʻanae mountains of Oʻahu. A landscape-based assessment of climate change vulnerability for native plants of Hawai‘i using high resolution climate change projections was made by Fortini *et al.* (2013) and their analysis showed that *U. kaalae* is highly vulnerable to the effects of climate change. Collection, propagation, and reintroductions are ongoing, with almost 500 plants reintroduced since the last 5-year review. Ungulate exclosures protect most wild and outplanted individuals of *U. kaalae*. Some rodent and slug control is conducted in two areas where *U. kaalae* occurs.

Stabilizing (interim), downlisting, and delisting objectives were provided in the Recovery Plan for the Oʻahu Plants (USFWS 1998), and have been updated according to the draft revised recovery objective guidelines developed by the Hawai‘i and Pacific Plants Recovery Coordinating Committee (HPPRCC 2011). The HPPRCC identifies an additional initial objective, the Preventing Extinction Stage, in addition to the Interim Stabilization, Delisting, and Downlisting objectives. Furthermore, life history traits such as breeding system, population size fluctuation or decline, and reproduction type (sexual or vegetative), have been included in the calculation of goals for the number of populations and reproducing individuals for each stage. The goals for each stage remain grouped by life span defined as annual, short-lived perennial (fewer than 10 years), or long-lived perennial.

Urera kaalae is a long-lived perennial dioecious shrub or small tree. To prevent extinction, which is the first step in recovering the species, the taxon must be managed to control threats (*e.g*., fenced) and have 50 individuals (or the total number of individuals if fewer than 50 exist) from each of three populations represented in *ex situ* (secured off-site, such as a nursery or seed bank) collections. In addition, a minimum of three populations should be documented on O‘ahu where they now occur or occurred historically and each of these populations must be naturally reproducing (*i.e.,* viable seeds, seedlings, saplings) and increasing in number, with a minimum of 50 mature, reproducing individuals per population.

The preventing extinction goals for this species have not been met. No subpopulations total more than 50 individuals, and only one reintroduced population is observed to be reproducing. Genetic representation is likely complete, but not all threats are managed (Table 1, Table 2). Therefore, *Urera kaalae* meets the definition of Endangered as it remains in danger of extinction throughout its range.

Recommendations for Future Actions:
We are not aware of any new threats except for mamaki rust and new data on this taxon’s vulnerability to climate change. There is no significant new information regarding the species’ biological status since the last 5-year review in 2011. Thus, the following recommendations for future actions are added or reiterated for the 5-year review for 2019.

- Ungulate monitoring and control—Maintain fencing and monitor wild and introduced populations to protect plants from impacts of feral ungulates.
- Invasive plant monitoring and control—Control established ecosystem-altering nonnative invasive plant species, and those that compete with *Urera kaalae* at all populations.
- Climate change adaptation strategy—Assess the modeled effects of climate change on this species and use to determine future landscape needed for the recovery of the species.
- Predator and herbivore control—Continue to implement effective control methods for rodents and slugs at all wild and reintroduced populations.
- Disease control—Investigate the effects of mamaki rust and determine if control is needed, implement controls if necessary.
- Captive propagation for genetic storage and reintroduction—Continue seed collections from tagged wild and outplanted individuals, keeping close track of the maternal source for use in *ex situ* propagation.
- Reintroduction—Augment and establish new populations and determine which reintroduction sites have the highest likelihood of success.
- Alliance and partnership development—Work with the Division of Forestry and Wildlife and the ANRP to initiate planning and contribute to implementation of ecosystem-level restoration and management to benefit this species.

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

Date	No. wild individuals	No. outplanted	Stabilization Criteria identified in Recovery Plan	Stabilization Criteria Completed?
1996 (listing)	33	0	All threats managed in all three populations	No
			Complete genetic storage	No
			Three populations with 50 mature individuals each	No
1998 (recovery plan)	44	3	All threats managed in all three populations	No
			Complete genetic storage	No
			Three populations with 50 mature individuals each	No
2003 (critical habitat)	41	ca 7	All threats managed in all three populations	No
			Complete genetic storage	No
			Three populations with 50 mature individuals each	No
2011 (5-year review)	16	>200	All threats managed in all three populations	No
			Complete genetic storage	Partially
			Three populations with 50 mature individuals each	No
2012 (critical habitat)	49–60	40	All threats managed in all three populations	No
			Complete genetic storage	Partially

			Three populations with 50 mature individuals each	No
Date	**No. wild individuals**	**No. outplanted**	***Preventing Extinction Criteria identified by HPPRCC**	***Preventing Extinction Criteria Completed?**
2019 (5-year review)	At least 5 mature, 16 immarure	ca 500 planted, 150 survive	All threats managed in all three populations	No
			Complete genetic storage	Partially
			Reproduction (*i.e.* viable seeds, seedlings) at all three populations	Partially, at one reintroduced population
			Three populations with 50 mature individuals each	No

* The Preventing Extinction Stage was established in 2011. Prior to 2011, the Interim Stabilization Stage was the first stage towards recovery (now it is the second after Preventing Extinction).

Table 2. Threats to *Urera kaalae* and ongoing conservation efforts.

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Ungulate destruction and degradation of habitat	A	Ongoing	Partial, fencing at three sites
Degradation of habitat by established ecosystem-altering invasive plant species	A	Ongoing	None
Climate change degradation or loss of habitat	A	Ongoing	None
Ungulate predation and herbivory	C	Ongoing	Partial, fencing at three sites
Rodent predation and herbivory	C	Ongoing	Partial, indirect management at one site
Invertebrate predation and herbivory	C	Ongoing	Partial, indirect management at one site
Disease—Mamaki rust	C	Ongoing	None
Competition with established invasive plant species	E	Ongoing	None
Small population size	E	Ongoing	Partial, collection, propagation, and reintroduction ongoing

References:

See previous 5-year review for a full list of references (USFWS 2011). Only references for new information are provided below.

[ANRP] Army Natural Resource Program-O‘ahu. 2018. 2018 status report for the Makua and Oahu implementation plans. 217 pp.

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. 134 pp.

[HPPRCC] Hawai‘i and Pacific Plants Recovery Coordinating Committee. 2011. Revised recovery objective guidelines. 8 pp.

Lyon Arboretum. 2018. Report on controlled propagation of listed species, as designated under the U.S. Endangered Species Act. Unpublished report submitted to the U.S.

Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, Honolulu, Hawaii.

[PRPF] Pahole Rare Plant Facility. 2018. Report on controlled propagation of listed and candidate species, as designated under the U.S. Endangered Species Act. Unpublished report submitted to the U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, Honolulu, Hawaii.

[PEPP] Plant Extinction Prevention Program. 2014. Annual report fiscal year 2014 (July 1, 2013-June 30, 2014). 185 pp.

[PEPP] 2017. Plant Extinction Prevention Program FY 2017 annual report (Oct 1, 2016-Sep 30, 2017), US FWS CFDA program #15.657; Endangered species conservation-recovery implementation funds, Cooperative Agreement F14AC00174, December 12, 2017, UH Manoa, PCSU, PEPP. 235 pp.

[PEPP]. 2018. Plant Extinction Prevention Program FY 2019 annual report (Oct 1, 2017-Sep 30, 2018), US FWS CFDA program #15.657; Endangered species conservation-recovery implementation funds, Cooperative Agreement F14AC00174, December 30, 2018, UH Manoa, PCSU, PEPP. 49 pp.

U.S. Army Garrison Hawai‘i. 2010. Integrated natural resources management plan 2010-2014, Island of O‘ahu. 375 pp.

[USFWS] U.S. Fish and Wildlife Service. 2011. *Urera kaalae* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI. *https://ecos.fws.gov/docs/five_year_review/doc3877.pdf.*

[USFWS] 2012. Endangered and threatened wildlife and plants; Endangered status for 23 species on Oahu and designation of critical habitat for 124 species; final rule. Department of the Interior, Federal Register 77 (181): 57648–57862, September 18, 2012.

[USFWS] 2017. Endangered and threatened wildlife and plants; initiation of 5-year status reviews for 138 species in Hawaii, Oregon, Washington, and California. Federal Register 82(75): 18665–18668, April 20, 2017.

U.S. FISH AND WILDLIFE SERVICE
SIGNATURE PAGE for 5-YEAR REVIEW of *Urera kaalae* (ōpuhe)

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
_X____ No Change in listing status

For **Field Supervisor, Pacific Islands Fish and Wildlife Office**

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