Urera kaalae
(opuhe)

5-Year Review
Summary and Evaluation

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

5-YEAR REVIEW

Species reviewed: *Urera kaalae* / opuhe

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5-YEAR REVIEW
Urera kaalae (opuhe)

1.0 GENERAL INFORMATION

1.1 Reviewers

Lead Regional Office:
Region 1, Endangered Species Program, Division of Recovery, Jesse D`Elia, (503) 231-2071

Lead Field Office:
Pacific Islands Fish and Wildlife Office, Loyal Mehrhoff, Field Supervisor, (808) 792-9400

Cooperating Field Office(s):
N/A

Cooperating Regional Office(s):
N/A

1.2 Methodology used to complete the 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 16, 2009. The review was based on final critical habitat designations for *Urera kaalae* and other species from the island of Oahu (USFWS 2003) as well as a review of current, available information. The National Tropical Botanical Garden provided an initial draft of portions of the review and recommendations for conservation actions needed prior to the next five-year review. The evaluation of Tamara Sherrill, biological consultant, was reviewed by the Plant Recovery Coordinator. The document was then reviewed by the Recovery Program Lead and the Assistant Field Supervisor for Endangered Species before submission to the Field Supervisor for approval.

1.3 Background:

1.3.1 Federal Register (FR) Notice citation announcing initiation of this review:

[USFWS] U.S. Fish and Wildlife Service. 2009. Endangered and threatened wildlife and plants; initiation of 5-year reviews of 103 species in Hawaii. Federal Register 74(49):11130-11133.

1.3.2 Listing history

Original Listing
FR notice: USFWS. 1991. Endangered and threatened wildlife and plants; determination of endangered status for 26 plants from the Waianae Mountains, island of Oahu, Hawaii; final rule. Federal Register 56(209):55770-55786.
Date listed: October 29, 1991
Entity listed: Species
Classification: Endangered

Revised Listing, if applicable
FR notice: N/A
Date listed: N/A
Entity listed: N/A
Classification: N/A

1.3.3 Associated rulemakings:

USFWS. 2003. Endangered and threatened wildlife and plants; final designations or nondesignations of critical habitat for 101 plant species from the island of Oahu, Hawaii; final rule. Federal Register 68(116):35949-36406.

Critical habitat was designated for *Urera kaalae* in six units totaling 462 hectares (1,145 acres) on Oahu. These designations include habitat on State, Federal, and private lands (USFWS 2003).

1.3.4 Review History:

Species status review [FY 2010 Recovery Data Call (September 2010)]: Stable

Recovery achieved:
1 (0-25%) (FY 2007 Recovery Data Call – most recent year reported)

1.3.5 Species' Recovery Priority Number at start of this 5-year review:

5

1.3.6 Current Recovery Plan or Outline

Name of plan or outline: U.S. Fish and Wildlife Service. 1998. Recovery plan for Oahu plants. U.S. Fish and Wildlife Service, Portland, Oregon. 207 pages plus appendices.
Date issued: August 10, 1998.

Dates of previous revisions, if applicable: N/A

2.0 REVIEW ANALYSIS

2.1 Application of the 1996 Distinct Population Segment (DPS) policy

2.1.1 Is the species under review a vertebrate?

____ ***Yes***
__X_ ***No***

2.1.2 Is the species under review listed as a DPS?

____ ***Yes***
__X_ ***No***

2.1.3 Was the DPS listed prior to 1996?

____ ***Yes***
____ ***No***

2.1.3.1 Prior to this 5-year review, was the DPS classification reviewed to ensure it meets the 1996 policy standards?

____ ***Yes***
____ ***No***

2.1.3.2 Does the DPS listing meet the discreteness and significance elements of the 1996 DPS policy?

____ ***Yes***
____ ***No***

2.1.4 Is there relevant new information for this species regarding the application of the DPS policy?

____ ***Yes***
__X_ ***No***

2.2 Recovery Criteria

2.2.1 Does the species have a final, approved recovery plan containing objective, measurable criteria?

__X_ ***Yes***
____ ***No***

2.2.2 Adequacy of recovery criteria.

2.2.2.1 Do the recovery criteria reflect the best available and most up-to date information on the biology of the species and

its habitat?

_X_ ***Yes***
___ ***No***

2.2.2.2 Are all of the 5 listing factors that are relevant to the species addressed in the recovery criteria?

__X_ ***Yes***
____ ***No***

2.2.3 List the recovery criteria as they appear in the recovery plan, and discuss how each criterion has or has not been met, citing information:

A synthesis of the threats (Listing Factors A, C, D, and E) affecting this species is presented in section 2.3.2 and Table 2. Listing Factor B (overutilization for commercial, recreational, scientific, or educational purposes) is not known to be a threat to this species.

Stabilizing, downlisting, and delisting objectives are provided in the recovery plan for Oahu plants (USFWS 1998), based on whether the species is an annual, a short-lived perennial (fewer than 10 years), or a long-lived perennial. *Urera kaalae* is a long-lived perennial, and to be considered stabilized, which is the first step in recovering the species, the taxon must be managed to control threats (*e.g*., fenced, weeding, etc.) and be represented in an *ex situ* (off-site) collection. In addition, a minimum of three populations should be documented on Oahu. Each of these populations must be naturally reproducing and increasing in number, with a minimum of 25 mature individuals per population.

This recovery objective has been met due to reintroduction efforts; four populations containing more than 50 reintroduced individuals currently exist on Oahu in addition to the 16 wild individuals that still survive.

For downlisting, a total of five to seven populations of *Urera kaalae* should be documented on Oahu. Each of these populations must be naturally reproducing, stable or increasing in number, and secure from threats, with a minimum of 100 mature individuals per population. Each population should persist at this level for a minimum of five consecutive years before downlisting is considered.

This recovery objective has not been met.

For delisting, a total of eight to ten populations of *Urera kaalae* should be documented on Oahu. Each of these populations must be naturally

reproducing, stable or increasing in number, and secure from threats, with 100 mature individuals per population for long-lived perennials. Each population should persist at this level for a minimum of five consecutive years before delisting is considered.

This recovery objective has not been met.

2.3 Updated Information and Current Species Status

No new information.

2.3.1 Biology and Habitat

2.3.1.1 New information on the species' biology and life history:

No new information.

2.3.1.2 Abundance, population trends (e.g. increasing, decreasing, stable), demographic features (e.g., age structure, sex ratio, family size, birth rate, age at mortality, mortality rate, etc.), or demographic trends:

Urera kaalae was known historically from the central to southern windward Waianae Mountains of Oahu, from Waianae Uka to Kupehau Gulch. When the recovery plan was published in 1998, only ten populations were known with a total of 44 individuals. Those populations were North and South Ekahanui, Pualii, Napepeiauolelo, Halona, and Kaluaa gulches, North and South Palawai, Schofield Barracks Military Reservation, and Waianae Kai (USFWS 1998).

From 2000 to 2008, 118 to 168 individuals were reported in the Honouliuli Preserve, with a few dying trees observed in other locations. Currently, there appear to be only about 15 or 16 wild individuals on Oahu (Ane Bakutis, Plant Extinction Prevention Program, pers. comm. 2009; USFWS 2009, 2010).

In the Honouliuli Preserve, occurrences were reported at three locations around North Palawai Gulch: on the north branch at 625 meters (2,050 feet) elevation, one mature and one immature individual were seen in 2004; at 745 to 762 meters (2,450 to 2,500 feet) elevation where five mature, eight juvenile, and 3

seedlings were seen in 2001; and on the south branch, south fork, at 719 meters (2,360 feet) elevation, three mature individuals were seen in 2004. Also in Honouliuli, at North Pualii Gulch, south branch at 671 to 732 meters (2,200 to 2,400 feet), 14 mature and nine immature individuals were seen in 2004 (Hawaii Biodiversity and Mapping Program 2009). In 2000, Steve Perlman of the National Tropical Botanical Garden saw 15 individuals at 745 meters (2,450 feet) elevation at North Palawai Gulch, and two at 762 meters (2,500 feet) elevation. In 2001, he saw 16 individuals at 713 to 762 meters (2,340 to 2,500 feet) elevation, and he reported 50 to 100 individuals, with an additional 12 individuals located further up the gulch, in 2003 (Perlman 2010).

A few individuals were observed in other locations reported since 2000, including Central Waieli Gulch at 610 to 823 meters (2,000 to 2,700 feet) elevation; South Waieli Gulch at 713 meters (2,340 feet) elevation, where one dying individual was seen in 2000 (Hawaii Biodiversity and Mapping Program 2009); South Ekahanui Gulch at 610 to 671 meters (2,000 to 2,200 feet) elevation where one dying individual was seen in 2002, and was dead in 2003 (Hawaii Biodiversity and Mapping Program 2009); in Kaluaa Gulch, south branch at 640 meters (2,100 feet) elevation, where one plant died in 2002 (Hawaii Biodiversity and Mapping Program 2009) and another was reported dying in 2000 at 701 meters (2,300 feet) elevation (Wood 2010). Also in the Waianae Mountains, below Puu Hapapa a voucher of *Urera kaalae* was made in 2000 (National Tropical Botanical Garden 2010).

In 2007, Perlman and Ane Bakutis of the Plant Extinction Prevention Program saw one individual at Ekahanui Gulch, Puu Kaua (Perlman 2010). In 2008, *Urera kaalae* was reported from military management units in Ekahanui, Kaluaa-Waieli, and North Pualii (U.S. Army Garrison 2008). In 2009, Bakutis reported that only about 15 or 16 individuals remain in the wild on Oahu, between Palikea and Kaluaa at Ekahanui and Palawai (A. Bakutis, pers. comm. 2009; USFWS 2009, 2010).

2.3.1.3 Genetics, genetic variation, or trends in genetic variation (e.g., loss of genetic variation, genetic drift, inbreeding, etc.):

No new information.

2.3.1.4 Taxonomic classification or changes in nomenclature:

No new information.

2.3.1.5 Spatial distribution, trends in spatial distribution (e.g. increasingly fragmented, increased numbers of corridors, etc.), or historic range (e.g., corrections to the historical range, change in distribution of the species within its historic range, etc.):

See above section 2.3.1.2.

2.3.1.6 Habitat or ecosystem conditions (e.g., amount, distribution, and suitability of the habitat or ecosystem):

The habitat where *Urera kaalae* occurs in the Waianae Mountains is *Acacia koa* (koa) – *Metrosideros polymorpha* (ohia) lowland wet to mesic forest with associated species including *Alectryon macrococcus* (mahoe), *Alyxia stellata* (maile), *Asplenium kaulfussii* (kuau), *Antidesma platyphyllum* (hame), *Boehmeria grandis* (akolea), *Canavalia galeata* (awikiwiki), *Carex meyenii* (no common name [NCN]), *C. wahuensis* (NCN), *Euphorbia* sp. (akoko), *Charpentiera* sp. (papala), *Claoxylon sandwicensis* (poola), *Coprosma foliosa* (pilo), *C. longifolia* (pilo), *Cyanea membranacea* (haha), *Delissea* sp. (NCN), *Diospyros hillebrandii* (lama), *D. sandwicensis* (lama), *Diplazium sandwichianum* (hoio), *Doodia kunthiana* (kupukupu), *Dryopteris unidentata* (akole), *Dubautia plantaginea* (naenae), *Flueggea neowawraea* (mehamehame), *Freycinetia arborea* (ie ie), *Hibiscus arnottianus* (kokio kea), *Ilex anomala* (kawau), *Kadua acuminata* (au), *K. affinis* (manono), *K. centranthoides* (NCN), *Labordia kaalae* (kamakahala), *Lysimachia hillebrandii* (kolokolo kuahiwi), *Melicope peduncularis* (alani), *Microlepia speluncae* (NCN), *Morinda trimera* (noni kuahiwi), *Myrsine lessertiana* (kolea lau nui), *Neraudia melastomifolia* (maaloa), *Peperomia* sp. (ala ala wai nui), *Perrottetia sandwicensis* (olomea), *Pipturus albidus* (mamake), *Pisonia sandwicensis* (papala kepau), *Pittosporum* sp. (hoawa), *Pleomele* sp. (hala pepe), *Pouteria sandwicensis* (alaa), *Psychotria hathewayi* (kopiko), *Sapindus oahuensis* (lonomea), *Scaevola* sp. (naupaka), *Schiedea kaalae* (NCN), *Senna gaudichaudii* (kolomona), *Sida fallax* (ilima), *Streblus*

pendulinus (aiai), *Syzygium sandwicensis* (ohia ha),*Urera glabra* (opuhe), *Christella parasitica* (NCN), *Viola* sp. (pamakani), *Xylosma hawaiiense* (maua), *Zanthoxylum kauaense* (ae), and many ferns (National Tropical Botanical Garden 2010; Perlman 2010; Wood 2010).

2.3.1.7 Other:

No new information.

2.3.2 Five-Factor Analysis (threats, conservation measures, and regulatory mechanisms)

2.3.2.1 Present or threatened destruction, modification or curtailment of its habitat or range:

Invasive introduced plant species have altered the habitat and compete for resources with *Urera kaalae.* These include *Ageratina riparia* (spreading mist flower), *Aleurites moluccana* (kukui), *Bryophyllum pinnatum* (airplant), *Buddleia asiatica* (dog tail), *Clidemia hirta* (Koster's curse), *Deparia petersonii* (NCN), *Grevillea robusta* (silk oak), *Heliocarpus popayaensis* (white moho), *Lantana camara* (lantana), *Oplismenus* sp.(basketgrass), *Passiflora suberosa* (corkystem passion flower), *Physalis peruviana* (Cape gooseberry), *Pimenta dioica* (allspice tree), *Psidium guajava* (common guava), *Rubus argutus* (blackberry), *Rubus rosifolius* (thimbleberry), *Setaria parviflora* (yellow foxtail), and *Schinus terebinthifolius* (Christmas berry). Feral ungulates, including pigs (*Sus scrofa*) and goats (*Capra hircus*), have caused degradation of the habitat where this species occurs. Many reports also include observations of damage and mortality of these trees from landslides and rolling rocks, which can be precipitated by these animals (Hawaii Biodiversity and Mapping Program 2009; Perlman 2010; Plant Extinction Prevention Program 2009; Wood 2010).

2.3.2.2 Overutilization for commercial, recreational, scientific, or educational purposes:

Not a threat.

2.3.2.3 Disease or predation:

Rats (*Rattus* spp.) and slugs (unidentified species) have been noted to consume vegetative or floral parts of *Urera kaalae* (Perlman 2010; Wood 2010).

2.3.2.4 Inadequacy of existing regulatory mechanisms:

No new information.

2.3.2.5 Other natural or manmade factors affecting its continued existence:

The introduced invasive plant species discussed in section 2.3.2.1 above are also a threat to *Urera kaalae* because they compete with the species for water, light, and nutrients.

Climate change may also pose a threat to this species. However, current climate change analyses in the Pacific Islands lack sufficient spatial resolution to make predictions on impacts to this species. The Pacific Islands Climate Change Cooperative (PICCC) has currently funded climate modeling that will help resolve these spatial limitations. We anticipate high spatial resolution climate outputs by 2013.

In addition to all of the other threats, species like *Urera kaalae* that are endemic to small portions of a single island are inherently more vulnerable to extinction than widespread species because of the higher risks posed to a few populations and individuals by random demographic fluctuations and localized catastrophes such as hurricanes, landslides, flooding, and disease outbreaks. The extent of these natural processes on this single island endemic are exacerbated by anthropogenic threats, such as habitat loss for human development or predation by introduced species (USFWS 2010).

Conservation measures have been undertaken by the Oahu Plant Extinction Prevention Program, including reintroductions into the Pualii area (State of Hawaii Department of Land and Natural Resources 2008; Plant Extinction Prevention Program 2009). Plants have been grown at the Pahole Rare Plant Nursery and outplanted in the Honouliuli area (A. Bakutis, pers. comm. 2009), and in 2009 there were three plants in the nursery (Pahole Rare Plant Facility 2010). Trees have been reintroduced on U.S. Army lands into the Ekahanui and Palikea management units (U.S. Army Garrison 2009). In all, there were more than 50

individuals each reintroduced into Ekahanui, North Kaluaa, Palawai, and Palikea by 2008, for a total of more than 200 reintroduced trees (USFWS 2009, 2010).

Several seed collections have been made from different populations and put into long-term storage at the Harold L. Lyon Arboretum on Oahu (Center for Conservation Research and Training Seed Storage Laboratory 2010). The National Tropical Botanical Garden has around 900 seeds collected in 1991 from Kaluaa North Gulch and Waianae Kai in long-term storage (National Tropical Botanical Garden 2009).

2.4 Synthesis

Stabilizing, downlisting, and delisting objectives are provided in the recovery plan for the Oahu plants (USFWS 1998), based on whether the species is an annual, a short-lived perennial (fewer than ten years), or a long-lived perennial. *Urera kaalae* is a long-lived perennial, and to be considered stabilized, which is the first step in recovering the species, the taxon must be managed to control threats (*e.g.*, fenced) and be represented in an *ex situ* (off-site) collection. In addition, a minimum of three populations should be documented on islands where they now occur or occurred historically. For the species to be considered stable, each of these populations must be naturally reproducing and increasing in number, with a minimum of 25 mature individuals per population.

The interim stabilization goals for this species have been met due to reintroduction efforts; four populations containing more than 50 reintroduced individuals currently exist on Oahu in addition to the 16 wild individuals that still survive.

For downlisting, a total of five to seven populations of *Urera kaalae* should be documented on Oahu. Each of these populations must be naturally reproducing, stable or increasing in number, and secure from threats, with a minimum of 100 mature individuals per population. Each population should persist at this level for a minimum of five consecutive years before downlisting is considered.

The downlisting goals for this species have not been met. There are only four populations of *Urera kaalae*; none of the four populations with reintroduced individuals contain 100 mature individuals; and two of those populations have only one and 15 wild individuals, respectively (Table 1). The reintroduced populations have not been in existence long enough to determine whether they will survive, reproduce, and increase in number, and all threats are not being

managed (Table 2). Therefore, *Urera kaalae* meets the definition of endangered as it remains in danger of extinction throughout its range.

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

Date	No. wild indivs	No. outplanted	Downlisting Criteria identified in Recovery Plan	Stability Criteria Completed?
1996 (listing)	33	0	All threats managed in all 5-7 populations	No
			Naturally reproducing, stable or increasing in number	No
			5-7 populations with 100 mature individuals each	No
1998 (recovery plan)	44	1	All threats managed in all 5-7 populations	No
			Naturally reproducing, stable or increasing in number	No
			5-7 populations with 100 mature individuals each	No
2003 (critical habitat)	41	Unknown	All threats managed in all 5-7 populations	No
			Naturally reproducing, stable or increasing in number	Unknown
			5-7 populations with 100 mature individuals each	No
2010 (5-year review)	16	200+	All threats managed in all 5-7 populations	No (Table 2)
			Naturally reproducing, stable or increasing in number	Unknown
			5-7 populations with 100 mature individuals each	No; only 16 wild individuals, and none of the 4 reintroduced populations with 100 mature individuals

Table 2. Threats to *Urera kaalae*.

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Ungulates – habitat modification and herbivory	A, C, D	Ongoing	No
Rats – herbivory	C	Ongoing	No
Slugs – herbivory	C	Ongoing	No
Invasive introduced plants	A, E	Ongoing	No
Small population size	E	Ongoing	Partially: 4 reintroduced populations, not known if viable yet
Climate change	A, E	Increasing	No

3.0 RESULTS

3.1 Recommended Classification:

____ Downlist to Threatened
____ Uplist to Endangered
____ Delist
____ *Extinction*
____ *Recovery*
____ *Original data for classification in error*
__X_ No change is needed

3.2 New Recovery Priority Number:

Brief Rationale:

3.3 Listing and Reclassification Priority Number:

Reclassification (from Threatened to Endangered) Priority Number: ____
Reclassification (from Endangered to Threatened) Priority Number: ____
Delisting (regardless of current classification) Priority Number: ____

Brief Rationale:

4.0 RECOMMENDATIONS FOR FUTURE ACTIONS

- Continue to collect seed from all remaining wild individuals as well as reintroduced individuals for genetic storage and reintroduction.
- Construct large-scale fences around all naturally occurring and reintroduced individuals to control feral ungulates.
- Control invasive introduced plant species around all known populations.
- Continue reintroducing individuals into protected suitable habitat within historical range.
- Control rats in the vicinity of these populations.
- Develop and implement methods to control slugs.
- Work with Hawaii Division of Forestry and Wildlife and U.S. Army to initiate planning and contribute to implementation of ecosystem-level restoration and management to benefit this species.
- Assess the modeled effects of climate change on this species, and use to determine future landscape needed for the recovery of the species.

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Personal Communications:

Bakutis, Ane. 2009. Molokai Coordinator, Plant Extinction Prevention Program, Kaunakakai, Hawaii. E-mail to Margaret Clark, National Tropical Botanical Garden, dated August 10, 2009. Subject: 5-year review list and schedule.

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U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW of *Urera kaalae* (opuhe)

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

Appropriate Listing/Reclassification Priority Number, if applicable: _____

Review Conducted By:
Chelsie Javar, Fish and Wildlife Biologist
Marie Bruegmann, Plant Recovery Coordinator
Jess Newton, Recovery Program Lead
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Date SEP 2 0 2011