

5-YEAR REVIEW

Short Form Summary

Species Reviewed: *Clermontia samuelii* (oha wai)

Current Classification: Endangered

Federal Register Notice 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.

Lead Region/Field Office:

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

Name of Reviewer(s):

Marie Bruegmann, Plant Recovery Coordinator, PIFWO

Jess Newton, Recovery Program Lead, PIFWO

Assistant Field Supervisor for Endangered Species, 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 16, 2009. The review was based on final critical habitat designations for *Clermontia samuelii* and other species from the island of Maui (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 Samuel Aruch, 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.

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).

Application of the 1996 Distinct Population Segment (DPS) Policy:

This Policy does not apply to plants.

Review Analysis:

Please refer to the final critical habitat designations for *Clermontia samuelii* published in the Federal Register on May 14, 2003 (USFWS 2003) for a complete review of the species' status (including biology and habitat), threats, and management efforts. No new threats and no significant new information regarding the species biological status have come to light since listing to warrant a change in the Federal listing status of *C. samuelii*.

At the time of listing in 1999, there were fewer than 350 to 400 individuals of *Clermontia samuelii* (USFWS 1999). Currently, there are 300 to 400 known individuals of *C. samuelii* (Bily *et al.* 2008).

Lammers divided *Clermontia samuelii* into two subspecies – subsp. *hanaensis* and subsp. *samuelii* (Lammers 1988, 1999). *Clermontia samuelii* subsp. *hanaensis* is differentiated from *C. samuelii* subsp. *samuelii* by the greenish white to white flowers; longer, narrower leaves with the broadest point toward the leaf base; and fewer hairs on the lower surface of the leaves. The species is separated from other members of this endemic Hawaiian genus by the size of the flowers and the hypanthium (USFWS 2002). Both subspecies are endemic to East Maui (Lammers 1995).

In 2002, the Service reported that since 1970 *Clermontia samuelii* was known from Papanalaho Point, Kuhiwa Valley, the ridge north of Palikea Stream, Kawaipapa Gulch, and Mokulehua Gulch with a total of 4 populations and 309 individuals on State and Federal lands within Haleakala National Park, Hanawi Natural Area Reserve, Hana Forest Reserve, and within the East Maui Watershed Partnership (USFWS 2002). Since that time a 2005 Nature Conservancy survey within Kopiliula in East Maui found three additional separate subpopulations of *C. samuelii* subsp. *hanaensis* totaling approximately 26 individuals (Wood and Bily 2006). In 2007, two additional subpopulations with around 50 to 70 individuals were observed, increasing the Kopiliula population to a total of 76 to 96 individuals. *Clermontia samuelii* subsp. *hanaensis* was observed in 1999 and 2006 on East Maui at Kawaipapa, in the Hana Forest Reserve, at 914 to 1,097 meters (3,000 to 3,600 feet) elevation (Wood 2009; Wood and Bily 2006). With the addition of *Clermontia samuelii* subsp. *hanaensis* populations in Kopiliula, the estimated total is 300 to 400 individuals known on State and Federal lands (Bily *et al.* 2008).

Typically *Clermontia samuelii* subsp. *samuelii* is found at higher elevations, 1,675 to 2,100 meters (5,495 to 6,890 feet), than *Clermontia samuelii* subsp. *hanaensis* (Lammers 1995). Two individuals of *Clermontia samuelii* subsp. *samuelii* were observed in 1997 in East Maui, in the Hanawi Natural Area Reserve, above State Camp, east fence, in the Heleleikeoha headwaters at 1,789 meters (5,870 feet) elevation (USFWS 2002; Wood 2009). In 2004, Haleakala National Park reported there were cuttings collected from 17 founder individuals of *Clermontia samuelii* subsp. *samuelii* from the Northeast Rift area of the Park (Haleakala National Park Resource Management, Vegetation Management 2004).

Clermontia samuelii subsp. *hanaensis* is found in wet *Metrosideros polymorpha* (ohia) and *Metrosideros polymorpha* – *Dicranopteris linearis* (uluhe) forest with *Acacia koa* (koa), *Adenophorus tamariscinus* (wahine noho mauna), *Broussaisia arguta* (kanawao), *Carex alligata* (no common name), *Cheirodendron trigynum* (olapa), *Cibotium* spp. (hapuu), *Clermontia arborescens* (oha wai nui), *Coprosma* spp. (pilo), *Cyrtandra* spp. (haiwale), *Diplazium sandwichianum* (hoio), *Dubautia* spp. (naenae), *Ilex anomala* (kawau), *Kadua axillaris*, (manono), *K. affinis* (manono), *Leptecophylla tameiameia* (pukiawe), *Lycopodiella cernua* (wawaeiole), *Melicope clusiifolia* (kolokolo mokihana),

Myrsine lessertiana (kolea lau nui), *Peperomia obovatilimba* (ala ala wai nui), *Perrottetia sandwicensis*, *Psychotria mariniana* (kopiko), *Rubus hawaiiensis* (akala), *Scaevola chamissoniana* (naupaka kuahiwi), *Tetraplasandra oahuensis* (ohe ohe), and *Vaccinium* spp. (ohelo). Ferns and mosses are common (USFWS 2002; Wood 2009; Wood and Bily 2006).

Clermontia samuelii subsp. *samuelii* is found in wet *Metrosideros polymorpha* – *Cheirodendron trigynum* forests with *Athyrium microphyllum* (akolea), *Kadua axillaris*, *Kadua* spp. (no common name), *Cibotium* spp., *Broussaisia arguta*, *Dubautia* spp. (naena), *Rubus hawaiiensis* (akala), *Clermontia arborescens* subsp. *waihia*, *C. grandiflora* (oha wai), *Vaccinium* spp., *Carex alligata*, and *Melicope clusiifolia*. Native ferns include *Diplazium sandwichianum* (pohole), *Dryopteris* spp., *Elaphoglossum* spp. (ekaha), and *Sadleria* spp. (amau) (USFWS 2002; Wood 2009).

The main threats to *Clermontia samuelii* subsp. *hanaensis* include feral pigs (*Sus scrofa*) (Listing Factors A and D) and competition with invasive introduced plant species including *Ageratina adenophora* (Maui pamakani), *Axonopus fissifolius* (narrow-leaved carpetgrass), *Clidemia hirta* (Koster's curse), *Tibouchina herbacea* (cane tibouchina), *Rubus rosifolius* (thimbleberry), *Prunella vulgaris* (selfheal), *Hedychium gardnerianum* (Kahili ginger), *H. coronarium* (white ginger), *Juncus* sp. (rush), *Holcus lanatus* (common velvet grass), *Miconia calvescens* (miconia), *Paspalum conjugatum* (Hilo grass), *P. urvillei* (vasey grass), and *Rubus argutus* (blackberry) (Listing Factor A and E) (Bily *et al.* 2008; USFWS 2002; Wood 2009).

Unidentified slug species (USFWS 2002) and seed predation by rats (*Rattus* spp.) and mongoose (*Herpestes javanicus*) are threats to *Clermontia samuelii* (Listing Factor C) (Bily *et al.* 2008; USFWS 2002; Wood 2009). Climate change may also pose a threat to this species (Listing Factors A and E). 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.

The current focus of the East Maui Watershed Partnership includes control of *Miconia calvescens* (in concert with the Maui Invasive Species Committee), fencing, and removal of feral pigs across the watershed above 1,065 to 1,220 meters (3,500 to 4,000 feet) elevation (USFWS 2002).

In the Haleakala National Park, *Clermontia samuelii* subsp. *samuelii* is being collected for propagation. In 2005, one individual was outplanted in the Northeast Rift area (Haleakala National Park Resource Management, Vegetation Management 2005). Currently, Haleakala National Park has 4 propagules from two wild individuals in storage (Haleakala National Park 2010). The National Tropical Botanical Garden has 100 seeds of *C. samuelii* subsp. *hanaensis* in storage (National Tropical Botanical Garden 2010)

Stabilizing, downlisting, and delisting objectives are provided in the recovery plan for the Maui plant cluster (USFWS 1997), based on whether the species is an annual, a short-lived perennial (fewer than ten years), or a long-lived perennial. *Clermontia samuelii* is a short-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 50 mature individuals per population.

The interim stabilization goals for this species have not been met. Only one population has greater than 50 mature individuals (Table 1), and all threats are not being managed (Table 2). Therefore, *Clermontia samuelii* meets the definition of endangered as it remains in danger of extinction throughout its range.

Recommendations for Future Actions:

- Fence all populations to protect against negative impacts from ungulates.
- Control introduced invasive plant species in all populations.
- Collect seeds from all populations for propagation and genetic storage.
- Work with East Maui Watershed Partnership and other land managers 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.

References:

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Table 1. Status of *Clermontia samuelii* from listing through 5-year review.

Date	No. wild indivs	No. outplanted	Stability Criteria identified in Recovery Plan	Stability Criteria Completed?
1999 (listing)	350 - 400	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
2002 (recovery plan)	309	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
2003 (critical habitat)	309	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
2010 (5-year review)	300 - 400	1	All threats managed in all 3 populations	Partially (Table 2)
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	Partially: only Kopiliula population, with 76 to 96 individuals over 50

Table 2. Threats to *Clermontia samuelii*.

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Ungulates – habitat modification and herbivory	A, D	Ongoing	Partially: Most of populations are within large scale East Maui Watershed Partnership fences
Rats – herbivory	C	Ongoing	No
Slugs – herbivory	C	Ongoing	No
Mongoose – herbivory	C	Ongoing	No
Invasive introduced plants	A, E	Ongoing	Partially: only <i>Miconia calvescens</i> control
Climate change	A, E	Increasing	No

U.S. FISH AND WILDLIFE SERVICE
SIGNATURE PAGE for 5-YEAR REVIEW of *Clermontia samuelii*
(oha wai)

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

Field Supervisor, Pacific Islands Fish and Wildlife Office



Date 8/2/11