

## 5-YEAR REVIEW

### Short Form Summary

**Species Reviewed:** *Hibiscus clayi* (Clay's hibiscus, aloalo)

**Current Classification:** Endangered

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

[USFWS] U.S. Fish and Wildlife Service. 2020. Endangered and Threatened Wildlife and Plants; Initiation of 5-Year Status reviews for 129 Species in Oregon, Washington, Idaho, Hawaii, Montana, California, and Nevada. Federal Register 85(48): 14240–14243, March 11, 2020.

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

Interior Region 12/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 or USFWS) beginning in October 2021. The review was based on a review of current, available information since the last 5-year review for *Hibiscus clayi* (USFWS 2017). The evaluation 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 (<https://ecos.fws.gov/ecp/species/4280>).

#### **Review Analysis:**

Please refer to the previous 5-year reviews for *Hibiscus clayi* published in the Federal Register on January 18, 2008, and September 13, 2017 (available at [https://ecos.fws.gov/docs/tess/species\\_nonpublish/1179.pdf](https://ecos.fws.gov/docs/tess/species_nonpublish/1179.pdf) and [https://ecos.fws.gov/docs/tess/species\\_nonpublish/2450.pdf](https://ecos.fws.gov/docs/tess/species_nonpublish/2450.pdf)) for a complete review of the species' status, threats, management efforts, and references cited. 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 *H. clayi*.

This long-lived perennial tree in the Malvaceae (mallow) family is listed as endangered and is known from the island of Kaua'i. The status and trends for *Hibiscus clayi* are provided in the tables below.

New Status Information:

- In 2017, a new population of 28 individuals (possibly as many as 50 individuals) and in 2021, five more individuals, were discovered in the Moloa‘a Forest Reserve (FR) on Kaua‘i (USFWS 2017; Plant Extinction Prevention Program [PEPP] 2021). Currently, the Moloa‘a FR (Pāpa‘a, Anahola, and ‘Aliomanu) and Nounou populations are estimated to total 111 individuals (Walsh et al. 2020).

New Threats:

- None reported.

New Management Actions:

- Surveys and inventories—The National Tropical Botanical Garden (NTBG) and the Plant Extinction Prevention Program (PEPP) continue to survey for and monitor populations of *Hibiscus clayi* on Kaua‘i (Walsh et al. 2020).
- Captive propagation for genetic storage and reintroduction—
  - In 2019, the Kōke‘e Mid-Elevation Nursery reported eight individuals of *H. clayi* in refugia representing one founder from Nounou, and nine plants representing two founders from Nounou readied for reintroduction (KMEN 2019). In 2020, KMEN reported storage of six plants and one plant in a living collection representing one founder from Nounou (KMEN 2020).
  - NTBG reported more than 150 individuals of *H. clayi* in living collections at the Southshore, McBryde, and Limahuli gardens (NTBG 2019). There are more than 40 seeds in storage representing two founders from Nounou and at least 10 individuals in propagation in the nursery (NTBG 2020). In addition, botanical gardens on Maui and O‘ahu sent individuals to NTBG for addition to the living collections.
  - Maui Nui Botanical Garden (MNBG) reported propagation and storage of 10 seeds, 2 plants, and 15 cuttings of *H. clayi* (MNBG 2019).
  - In 2018, the Waimea Valley Arboretum reported propagation and storage of 22 individuals representing three founders of *H. clayi* (Waimea Arboretum 2018).
  - From 2010 to 2017, the Lyon Arboretum Seed Conservation Laboratory reported 57 seeds in storage representing two founders from Nounou. From 2016 to 2021, the laboratory reported 87 seeds in storage representing one founder from Pāpa‘a, and from 2017 to 2021, the laboratory reported 125 seeds in storage representing 11 founders from ‘Aliomanu (Lyon Arboretum 2022).

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

<b>Date</b>	<b>No. wild individuals</b>	<b>No. outplanted</b>	<b>Stability Criteria identified by Recovery Plan</b>	<b>Stability Criteria Completed?</b>
1996 (listing)	4	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 25 mature individuals each	No
1995 (recovery plan)	4	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 25 mature individuals each	No
2003 (critical habitat)	4	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 25 mature individuals each	No
2008 (5-year review)	5	23	All threats managed in all 3 populations	No
			Complete genetic storage	Partially, collection and storage
			3 populations with 25 mature individuals each	No
<b>Date</b>	<b>No. wild individuals</b>	<b>No. outplanted</b>	<b>*Preventing Extinction Criteria identified by HPPRCC</b>	<b>*Preventing Extinction Criteria Completed?</b>

2017 (5-year review)	>50	ca 50	All threats managed in all 3 populations	No
			Complete genetic storage	Partially, seeds and cuttings in storage
			Reproduction (i.e., viable seeds, seedlings) at all 3 populations	Unknown
			3 populations with 25 mature individuals each	Partially
2022 (5-year review)	111	9	All threats managed in all 3 populations	No
			Complete genetic storage	Partially, 14 founders from 3 populations represented
			Natural reproduction at all 3 populations	Unknown
			3 populations with 25 mature individuals each	Partially, 2 subpopulations total >25 individuals

\* 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 stage after Preventing Extinction).

**Table 2. Threats to *Hibiscus clayi* and ongoing conservation efforts.**

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Degradation and destruction of habitat by feral ungulates	A	Ongoing	Partial, 1 occurrence fenced
Established ecosystem altering invasive plant species degradation of habitat and competition	A	Ongoing	None
Landslides and flooding destruction or degradation of habitat	A	Ongoing	None

Fire destruction and degradation of habitat	A	Ongoing	None
Climate change degradation and destruction of habitat, including hurricanes	A	Ongoing	None
Predation and herbivory by rodents	C	Ongoing	None
Predation and herbivory by invertebrates	C	Ongoing	None
Human disturbance	E	Ongoing	None
Reduced viability due to low numbers	E	Ongoing	Partial, propagation and reintroduction efforts

### Synthesis:

Currently there are 111 wild mature individuals of *Hibiscus clayi* on Kaua‘i. NTBG and PEPP monitor occurrences of *H. clayi*. One wild/augmented population is fenced for ungulate control. Fourteen founders from three populations are represented in collections and propagation. Reintroduction is ongoing.

Stabilizing (interim), downlisting, and delisting objectives are provided in the Kaua‘i Islandwide Recovery Plan (USFWS 2021) 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.

*Hibiscus clayi* is a long-lived perennial tree. To prevent extinction, which is the first milestone 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 that are well managed. In addition, a minimum of a total of three populations should be documented on Kaua‘i where this species now occurs or occurred historically and each of these populations must be naturally reproducing (i.e., viable seeds, seedlings) with a minimum of 25 mature, reproducing individuals per population.

The preventing extinction goals for *Hibiscus clayi* have not been met. There are two subpopulations totaling more than 25 mature individuals; but recruitment is unknown (Table 1). There is genetic representation and propagation of several individuals from one subpopulation and 14 founders from three populations are represented in collections (Table 1, Table 2); however, other threats including landslides and rodent and

invertebrate predation are not being addressed. Therefore, *H. clayi* meets the definition of Endangered as it remains in danger of extinction throughout its range.

### **Recommendations for Future Actions:**

No new threats and no significant new information regarding the species' biological status have been reported since the last 5-year review in 2017. Thus, the following recommendations for future actions are reiterated or updated for the 5-year review for 2022.

- Surveys and inventories—Continue to survey current and historical range of *Hibiscus clayi* to determine the status of the species.
- Ungulate monitoring and control—Continue to construct and maintain exclosures protect all occurrences from the negative impacts of feral ungulates.
- Nonnative invasive plant monitoring and control—Control established ecosystem-altering nonnative invasive plant species and those that compete with *H. clayi*.
- Predator and herbivore monitoring and control—
  - Control rats at all populations.
  - Determine level of threat from invertebrate predation and the need for additional recovery actions.
- Climate change adaptation strategy—Research suitability of habitat for viability of species, including where to conduct translocations in the future due to impacts of climate change.
- Captive propagation for genetic storage and reintroduction—Continue to collect seeds and propagative materials for storage, reintroduction, and for maintenance of genetic stock.
- Reintroduction and augmentation—Continue to augment wild populations and establish new populations within protected and managed suitable habitat.
- Build resiliency and redundancy—Increase numbers of individuals and populations through historic range to reduce impacts of landslides, hurricanes, and low numbers.
- Human interaction management—Develop and implement measures to reduce the threat of damage by trail maintenance.
- Population biology research—Conduct research to determine viable population size and structure, flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and threats.
- Alliance and partnership development—Continue to work with partners and other land managers in planning and implementation of ecosystem-level restoration and management to benefit this species.

### **References:**

- [HPPRCC] Hawai'i and Pacific Plants Recovery Coordinating Committee. 2011. Revised recovery objective guidelines. 8 pp.
- [KMEN] Kōke'e Mid-Elevation Nursery. 2019. 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, Hawai‘i.
- [KMEN] 2020. 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, Hawai‘i.
- Lyon Arboretum. 2022. 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, Hawai‘i.
- [MNBG] Maui Nui Botanical Garden. 2019. 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, Hawai‘i.
- [NTBG] National Tropical Botanical Garden. 2019. 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, Hawai‘i.
- [NTBG] 2020. 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, Hawai‘i.
- [PEPP] Plant Extinction Prevention Program. 2021. Fiscal year 2021 interim performance report (October 1, 2020–September 30, 2021) cooperative agreements F18AC00502 and F19AC00532, US Fish and Wildlife Service CFDA Program #15.657, Endangered species conservation—recovery implementation funds, University of Hawaii at Manoa, Pacific Cooperative Studies Unit, Plant Extinction Prevention Program.
- [USFWS] U.S. Fish and Wildlife Service. 2008. *Hibiscus clayi* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI. [https://ecos.fws.gov/docs/tess/species\\_nonpublish/1179.pdf](https://ecos.fws.gov/docs/tess/species_nonpublish/1179.pdf).
- [USFWS] 2017. *Hibiscus clayi* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI. [https://ecos.fws.gov/docs/tess/species\\_nonpublish/2450.pdf](https://ecos.fws.gov/docs/tess/species_nonpublish/2450.pdf).
- [USFWS] 2020. Endangered and threatened wildlife and plants; initiation of 5-year status reviews for 129 Species in Oregon, Washington, Idaho, Hawaii, Montana, California, and Nevada. Federal Register 85(48): 14240–14243, March 11, 2020.

[USFWS] 2021. Kaua‘i Islandwide Recovery Plan. U.S. Fish and Wildlife Service, Portland, OR. 65 pp. + appendices.

Waimea 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, Hawai‘i.

Walsh, S., B. Nyberg, and K. Wood. 2020. *Hibiscus clayi*. The IUCN Red List of Threatened Species 2020: e.T35153A149815881.  
<https://dx.doi.org/10.2305/IUCN.UK.2020-2.RLTS.T35153A149815881.en>.



**U.S. FISH AND WILDLIFE SERVICE**

SIGNATURE PAGE for 5-YEAR REVIEW of *Hibiscus clayi*  
(Clay's hibiscus, aloalo)

**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**

\_\_\_\_\_ Date \_\_\_\_\_