

Phyllostegia hirsuta
(No common name)

**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: *Phyllostegia hirstua* (No common name)

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5-YEAR REVIEW
***Phyllostegia hirsuta* (No common name)**

1.0 GENERAL INFORMATION

1.1 Reviewers

Lead Regional Office:

Region 1, Jesse D'Elia, Chief, Division of Recovery, (503) 231-2071

Lead Field Office:

Pacific Islands Fish and Wildlife Office, Gina Shultz, Assistant Field Supervisor for Endangered Species, (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 (PIFWO) of the U.S. Fish and Wildlife Service (USFWS) between June 2006 and September 2007. The Hawaii Biodiversity and Mapping Program provided most of the updated information on the current status of *Phyllostegia hirsuta*. They also provided recommendations for conservation actions that may be needed prior to the next five-year review. The evaluation of the Plant Recovery Coordinator was reviewed by the Recovery Program Leader and the Assistant Field Supervisor for Endangered Species before final approval.

1.3 Background:

1.3.1 FR Notice citation announcing initiation of this review:

USFWS. 2006. Endangered and threatened wildlife and plants; initiation of 5-year reviews of 70 species in Idaho, Oregon, Washington, Hawaii, and Guam. Federal Register 71(69):18345-18348.

1.3.2 Listing history

Original Listing

FR notice: USFWS. 1996. 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 61(198):53089-53108.

Date listed: October 10, 1996
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 designation or nondesignation of critical habitat for 101 plant species from the island of Oahu, HI; final rule. Federal Register 68(116):35950-36406.

Critical habitat was designated for *Phyllostegia hirsuta* in four units totaling 1,249 hectares (3,090 acres) on Oahu. This designation includes habitat on Federal, state, and private lands (USFWS 2003).

1.3.4 Review History:

Species status review [FY 2006 Recovery Data Call (September 2006)]:
Decreasing

Recovery achieved:

1 (0-25%) (FY 2006 Recovery Data Call)

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: Recovery plan for the Oahu plants. 1998. U.S. Fish and Wildlife Service, Portland, Oregon. 207 pages + appendixes.

Date issued: October 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

No

2.2 Recovery Criteria

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

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?

Yes

No

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

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 (Factors A, C, D, and E) affecting this species is presented in section 2.4. 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 ten years), or a long-lived perennial. *Phyllostegia hirsuta* is a short-lived perennial, and to be considered stable, 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 Oahu. Each of these populations must be naturally reproducing and increasing in number, with a minimum of 50 mature individuals per population.

This recovery objective has not been met.

For downlisting, a total of five to seven populations of *Phyllostegia hirsuta* 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 300 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 *Phyllostegia hirsuta* should be documented on Oahu. Each of these populations must be naturally reproducing, stable or increasing in number, and secure from threats, with 300 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

In addition to the status summary table below, information on the species' status and threats was included in the final critical habitat rule referenced above in section 1.3.3 ("Associated Rulemakings") above and in section 2.4 ("Synthesis") below, which also includes any new information about the status and threats of the species.

Status of *Phyllostegia hirsuta* from listing through 5-year review.

Date	No. wild inds	No. outplanted	Stability Criteria	Stability Criteria Completed?
1996 – listing	150-200	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No

Date	No. wild inds	No. outplanted	Stability Criteria	Stability Criteria Completed?
1998 – recovery plan	150-200	0	All threats managed in all 3 populations	No
			Complete genetic storage	Partial
			3 populations with 50 mature individuals each	No
2003 – critical habitat	214-227	0	All threats managed in all 3 populations	Partial
			Complete genetic storage	Partial
			3 populations with 50 mature individuals each	No
2007 – 5-yr review	167	Unknown	All threats managed	Partial
			Complete genetic storage	Partial
			3 populations with 50 mature individuals each	Partial

2.3.1 Biology and Habitat

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

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:

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

2.3.1.4 Taxonomic classification or changes in nomenclature:

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.):

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

2.3.1.7 Other:

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:

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

2.3.2.3 Disease or predation:

2.3.2.4 Inadequacy of existing regulatory mechanisms:

2.3.2.5 Other natural or manmade factors affecting its continued existence:

2.4 Synthesis

Phyllostegia hirsuta is endemic to the Waianae and Koolau Mountain Ranges on the island of Oahu. Numbers have remained relatively stable since the species was listed (U.S. Army 2006 a and b). At the time of listing, approximately 150 to 200 individuals were known for this species, and currently, approximately 160 mature and seven immature individuals are known in nine populations (U.S. Army 2006 a and b). Only one population has 50 mature individuals (U.S. Army 2006b). In two populations assumed to be extirpated in Honouliuli Gulch, immature plants were found after several years (U.S. Army 2006a). Populations of *P. hirsuta* such as these that appear to be extirpated could possibly reappear from an existing seed bank (U.S. Army 2006; J. Lau, pers. comm. 2007). New populations of *Phyllostegia hirsuta* may yet be found in the considerable amount of the species' habitat that has not been well surveyed, particularly in the higher elevation gulches of the northern and central Koolau Mountains (U.S. Army 2005).

In the Koolau Mountains, *Phyllostegia hirsuta* occurs primarily in wet forests dominated by *Metrosideros polymorpha* (ohia lehua) and *Dicranopteris linearis* (uluhe). In contrast, the species in the Waianae Mountains were found in primarily in mesic forests. In both mountain ranges the species is found in gulch bottoms and on gulch slopes (U.S. Army 2005).

Habitat degradation and predation by feral pigs is one of the major threats affecting *Phyllostegia hirsuta* (Factors A, C, and D) (USFWS 1998 and 2003; U.S. Army 2005). Competition from invasive introduced plant species (Factor E) is another major threat. The most serious plant species impacting *P. hirsuta* in the Waianae Mountains include *Blechnum appendiculatum*, *Clidemia hirta* (Koster's curse), *Melinis minutiflorus* (molasses grass), *Passiflora suberosa* (huehue haole), *Psidium*

cattleianum (strawberry guava), *Rubus argutus* (prickly Florida blackberry), *Schinus terebinthifolius* (Christmas berry), and *Toona ciliata* (Australian red cedar). In the Koolau Mountains, the major invasive introduced plant threats to *P. hirsuta* include *Clidemia hirta* and *Psidium cattleianum* (U.S. Army 2005). *Phyllostegia hirsuta* is also potentially threatened by military training activities (USFWS 1998 and 2003). Military training threats to the species include fire, trampling of plants during foot maneuvers, and the introduction of introduced invasive plants in the transport of personnel and equipment between training areas (Factor E). However, the threats from fire and trampling are considered low since many of the *Phyllostegia hirsuta* populations are in remote areas where the terrain is steep (U.S. Army 2005).

In addition to all of the other threats, species like *Phyllostegia hirsuta* 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 and disease outbreaks (Factor E). When considered on their own, the natural processes associated with being a single island endemic do not affect *P. hirsuta* to such a degree that it is threatened or endangered with extinction in the foreseeable future, but these natural processes can exacerbate the threat from anthropogenic factors, such as habitat loss for human development or predation by alien species (USFWS 1998).

The only wild plants of *Phyllostegia hirsuta* currently within fenced exclosures are some of the plants in the Kaluaa Gulch population (U.S. Army 2006a). The Army plans to manage three populations of *Phyllostegia hirsuta* to interim stability, as defined in the recovery criteria (U.S. Army 2005 and 2006a). Two of the populations to be managed will be in the Waianae Mountains. One of these is the population in Mohiakea and Haleauau Gulches in West Range of Schofield Barracks Military Reservation. The second Waianae population to be managed is in Kaluaa Gulch in Honouliuli Preserve. Plants already occurring there naturally will be augmented with stock originating from the other extant populations south of Kolekole Pass, which are in the gulches of Huliwai and Waieli. The third population to be managed will be in the Koolau Mountains in Koloa Gulch, which is privately owned land on the windward side of the Koolau Mountains adjoining Kawaihoa Training Area. This population will be an outplanted population using stock from the leeward Koolau populations in Kawaihoa Training Area and East Range of Schofield Barracks Military Reservation, and the windward Koolau populations in Kaluanui and Kaipapau Valleys (U.S. Army 2006a).

Propagation for genetic storage and reintroduction is occurring in the Army's baseyard, the University of Hawaii's Lyon Arboretum Micropropagation Laboratory and Center for Conservation Research and Training Seed Storage Laboratory, National Tropical Botanical Garden, the state of Hawaii's Division of Forestry and Wildlife's Pahole Rare Plant Facility, and at Audubon Society's Waimea Valley Park. These organizations and agencies are working together to store genetic material long-term against stochastic events and to supply the Army with plants for reintroductions

(U.S. Army 2005; Makua Implementation Team 2003). Three outplantings of *Phyllostegia hirsuta* have been conducted in the past few years by The Nature Conservancy staff in the Kaluaa Gulch area in Honouliuli Preserve. About two dozen plants were used in each of the outplantings. Two of the three outplantings are considered to have failed given the death of most of the plants and the lack of recruitment. The third outplanting was conducted too recently for its success to be evaluated (U.S. Army 2006 a and b).

The stabilization and recovery goals for this species have not been met, as only one population has numbers at interim stability, and not all of the threats are being managed in any of populations. Therefore, *Phyllostegia hirsuta* meets the definition of endangered as it remains in danger of extinction throughout its range.

3.0 RESULTS

3.1 Recommended Classification:

- Downlist to Threatened
- Uplist to Endangered
- Delist
 - Extinction
 - Recovery
 - Original data for classification in error
- 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 seed collection for *ex situ* genetic storage and reintroduction.
- Continue to survey historical sites for potential seedlings from residual seed banks.
- Control introduced invasive plant species around wild and outplanted plants.
- Continue rodent control around remaining plants.

- Fence areas to control feral pigs.
- Study *Phyllostegia hirsuta* populations with regard to population size and structure, geographical distribution, flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, limiting factors, and threats.

5.0 REFERENCES:

Makua Implementation Team. 2003. Implementation Plan for the Makua Military Reservation, Island of Oahu. Prepared for U.S. Army Garrison, Hawaii, May 2003.

[U.S. Army] U.S. Army Garrison, Hawaii. 2005. 2005 Status report, Makua Implementation Plan, island of Oahu. Unpublished.

[U.S. Army] U.S. Army Garrison, Hawaii. 2006a. 2006 Status reports for the Makua implementation plan and the draft O`ahu implementation plan. Unpublished.

[U.S. Army] U.S. Army Garrison, Hawaii. 2006b. Rare plant database. Unpublished.

[USFWS] U.S. Fish and Wildlife Service. 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):35950-35993.

[USFWS] U.S. Fish and Wildlife Service. 1998. Recovery plan for the Oahu plants. Portland, Oregon. 207 pages + appendixes.

[USFWS] U.S. Fish and Wildlife Service. 1996. Determination of endangered status for twenty-five plant species from the Island of Oahu, HI; final rule. Federal Register 61(198):53089-53108.

Personal Communications:

Lau, Joel. 2007. Botanist, Hawaii Biodiversity and Mapping Program. April 26, 2007.

Signature Page
U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW of *Phyllostegia hirsuta* (No common name)

Current Classification: _____ E _____

Recommendation resulting from the 5-Year Review:

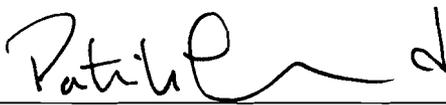
- Downlist to Threatened
- Uplist to Endangered
- Delist
- No change needed

Appropriate Listing/Reclassification Priority Number, if applicable: _____

Review Conducted By:

Marilet A. Zablan, Recovery Program Leader and Acting Assistant Field Supervisor for Endangered Species, October 30, 2007

Marie Bruegmann, Plant Recovery Coordinator, August 13, August 30, and September 4, 2007

Approve  Date 1/18/08
Lead Field Supervisor, Fish and Wildlife Service