

5-YEAR REVIEW

Short Form Summary

Species Reviewed: *Cyperus trachysanthos* (puukaa)

Current Classification: Endangered

Federal Register Notice announcing initiation of this review:

[USFWS] U.S. Fish and Wildlife Service. 2010. Endangered and threatened wildlife and plants; initiation of 5-year status reviews of 58 species in Washington, Oregon, California, and Hawaii. Federal Register 75(226):71726-71729.

Lead Region/Field Office:

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

Name of Reviewer(s):

Vickie Caraway, Plant Biologist, PIFWO

Daniel Clark, Oahu, Kauai, Northwest Hawaiian and American Samoa Islands Team Manager, PIFWO

Marie Brueggemann, Plant Recovery Coordinator, PIFWO

Recovery Program Lead, PIFWO

Kristi Young, Programmatic Deputy Field Supervisor, 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 January 31, 2012. The review was based on a review of current, available information since the last five-year review for *Cyperus trachysanthos* (USFWS 2010). The National Tropical Botanical Garden provided an initial draft of portions of the five-year review and recommendations for conservation actions needed prior to the next five-year review. The document was reviewed by the Plant Biologist, Islands Team Manager, and Plant Recovery Coordinator, followed by the Recovery Program Lead. It was subsequently reviewed and approved by the Programmatic Deputy Field Supervisor.

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 five-year review for *Cyperus trachysanthos* (published on August 27, 2010 (available at http://ecos.fws.gov/docs/five_year_review/doc3335.pdf) for a complete review of the species' status, threats, and management efforts. No significant new information regarding the species' biological status has come to light since listing to warrant a change in the Federal listing status of *C. trachysanthos*.

This short-lived sedge is endangered and occurs on Oahu and Kauai. The current status and trends for *Cyperus trachysanthos* are provided in the tables below.

New status information:

- It is believed that a population of *Cyperus trachysanthos* persists at Nualolo Aina on Kauai's Na Pali Coast, although it has not been checked recently (K. Wood, National Tropical Botanical Garden [NTBG], pers. comm. 2012).
- No individuals of *Cyperus trachysanthos* are known to persist in the Kaena Natural Area Preserve, despite recent completion of the fence there. The area is exposed and dry, and in recent years has had no water holding areas and may no longer be suitable habitat (G. Mansker, Hawaii State Department of Land and Natural Resources, pers. comm. 2011).
- At the Naval Computer and Telecommunications Area Master Station Pacific, Radio Transmitting Facility, Lualualei, Oahu, *Cyperus trachysanthos* still exists in three small populations in mowed antenna fields in areas which have had intermittent standing water (Department of the Navy, Naval Facilities Engineering Command, Pacific 2007, 2008).

Overall, it is difficult to know the change in the current number of individuals for this species, given that it fluctuates widely in numbers depending on the amount of rainfall, and the years since the last five-year review have been very dry.

New threats:

- Climate change - Climate change may 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) funded climate modeling that will help resolve these spatial limitations. High spatial resolution climate outputs are expected to be available in 2013.

New management actions:

- Captive propagation for genetic storage and reintroduction
 - Waimea Valley has 5 plants in cultivation in 2011 from one Oahu founder (Waimea Valley 2011).
 - In 2012, the Harold L. Lyon Arboretum listed 40,558 seeds in storage for *Cyperus trachysanthos* (Harold L. Lyon Arboretum 2012).
 - NTBG maintains seeds in storage, but has not propagated *Cyperus trachysanthos* or had new accessions recently (NTBG 2011). Outplanted individuals do not seem to have regenerated themselves (E. Griffin-Noyes, NTBG, pers. comm. 2012; M. DeMotta, NTBG, pers. comm. 2012).
- Ecosystem-altering invasive plant species control – The Lualualei antenna area was mowed to reduce weeds and weed seeds after the plants had completed their reproductive cycle (Department of the Navy, Naval Facilities Engineering Command, Pacific 2007, 2008).

Synthesis:

Stabilizing, downlisting, and delisting objectives are provided in the recovery plan for multi-island plants (USFWS 1999), based on whether the species is an annual, a short-lived

perennial (fewer than 10 years), or a long-lived perennial. *Cyperus trachysanthos* 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* (at other than the plant's natural location, such as a nursery or arboretum) collection. In addition, a minimum of three populations should be documented on the islands of Oahu and Kauai. Each of these populations must be naturally reproducing and increasing in number, with a minimum of 50 mature individuals per population.

The downlisting goals for this species have not been met, as only two populations of 300 or more mature individuals exist (Table 1) and all threats are not being sufficiently managed throughout all of the populations (Table 2). Therefore, *Cyperus trachysanthos* meets the definition of endangered as it remains in danger of extinction throughout its range.

Recommendations for Future Actions:

- Surveys / inventories - Survey Oahu and Kauai populations to determine current number of individuals and if populations are increasing or decreasing in number.
- Captive propagation for genetic storage and reintroduction - Continue collecting material for genetic storage and propagation for reintroduction, especially from those Oahu populations underrepresented in seed storage (all but Lualualei).
- Reintroduction / translocation - Continue reintroduction into suitable protected habitat, possibly at Koko Head or where *Marsilea villosa* is reintroduced at Haunama Bay or Makapuu on Oahu.
- Alliance and partnership development - Initiate planning and contribute to implementation of ecosystem-level management and restoration to benefit this species.

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

Date	No. wild individuals	No. outplanted	Stability Criteria identified in Recovery Plan	Stability Criteria Completed?
1996 (listing)	350	0	All threats managed in 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
1998(recovery plan)	517	0	All threats managed in all 3 populations	Partially
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No
2003 (critical habitat)	340	0	All threats managed in all 3 populations	Unknown
			Complete genetic storage	Unknown
			3 populations with 50 mature individuals each	No
2010 (5-yr review)	691	several	All threats managed in all 3 populations	Partially
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	Partially
2013 (5-yr review)	unknown	200	All threats managed in all 3 populations	Partially (Table 2)
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	Partially

Table 2. Status of threats to *Cyperus trachysanthos* and ongoing conservation efforts

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Ungulates – habitat modification	A	Ongoing	Fencing at Kaena is protecting habitat
Fire – habitat modification and plant destruction	A, E	Ongoing	Unknown.
Invasive introduced plants	A, E	Ongoing	Some management in Lualualei
Climate change	A, E	Increasing	No
Loss of wetlands from pumping for flood and mosquito control	A, E	Ongoing	No
Risk of random naturally occurring events such as hurricanes, tsunamis	A, E	Unknown	No
Off-road vehicles disturb habitat	A, E	Ongoing	Partially - Controlled by fence at Kaena. No vehicle access at Nualolo.
Mowing and herbicide application	A, E	Only at Lualualei	Partially.
Run-off from Hawaii National Guard activities at Diamond Head	E	Unknown	Unknown

References:

See previous 5-year review for a full list of references (USFWS 2010). Only references for new information are provided below.

Department of the Navy, Naval Facilities Engineering Command, Pacific. 2007, 2008. Annual permit report for the U.S. Fish and Wildlife Service recovery permit number TE-096741-0. Pearl Harbor, Hawaii. Unpublished.

Harold L. Lyon Arboretum. 2012. Micropropagation database and seed storage inventory. University of Hawaii at Manoa, Honolulu, Hawaii. Unpublished.

National Tropical Botanical Garden. 2011. Report on controlled propagation of listed and candidate species, as designated under the U.S. Endangered Species Act. 48 pages. Unpublished.

[USFWS] U.S. Fish and Wildlife Service. 1999. Recovery plan for multi-island plants. U.S. Fish and Wildlife Service, Portland, Oregon. 206 pages + appendices.

[USFWS] U.S. Fish and Wildlife Service. 2010. *Cyperus trachysanthos* (no common name) 5-year review summary and evaluation. U.S. Fish and Wildlife Service,

Honolulu, Hawaii. 10 pages. Available online at
<http://ecos.fws.gov/docs/five_year_review/doc3335.pdf>.

Waimea Valley. 2011. Report on controlled propagation of listed and candidate species, as designated under the U.S. Endangered Species Act. 15 pages. Unpublished.

Personal Communications:

DeMotta, Michael. 2012. National Tropical Botanical Garden, E-mail to Margaret Clark, National Tropical Botanical Garden, dated January 5, 2012. Subject: *Cyperus trachysanthos*.

Griffin-Noyes, Emory. 2012. National Tropical Botanical Garden. E-mail to Margaret Clark, National Tropical Botanical Garden, dated January 5, 2012. Subject: *Cyperus trachysanthos*.

Mansker, Greg. 2011. Hawaii State Department of Land and Natural Resources, Kaena Point Nursery. Phone call with Margaret Clark, National Tropical Botanical Garden, dated December 22, 2011. Subject: *Cyperus trachysanthos*.

Wood, Ken R. 2012. National Tropical Botanical Garden. E-mail to Margaret Clark, National Tropical Botanical Garden, dated January 5, 2012. Subject: *Cyperus trachysanthos*.

U.S. FISH AND WILDLIFE SERVICE
SIGNATURE PAGE for 5-YEAR REVIEW of *Cyperus trachysanthos* (puukaa)

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

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