5-YEAR REVIEW

Short Form Summary

Species Reviewed: *Achyranthes mutica* (no common name)

Current Classification: Endangered

Federal Register Notice announcing initiation of this review:

[USFWS] U.S. Fish and Wildlife Service. 2013. Endangered and threatened wildlife and plants; Initiation of 5-year status reviews of 44 species in Oregon, Hawaii, Guam, and the Northern Mariana Islands. Federal Register 78(24):8185-8187.

Lead Region/Field Office:

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

Name of Reviewer(s):

Chelsie Javar-Salas, Plant Biologist, PIFWO
Marie Bruegmann, Plant Recovery Coordinator, 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 March 4, 2013. The review was based on a review of current, available information since the last 5-year review for *Achyranthes mutica* (USFWS 2009). The evaluation by Chelsie Javar-Salas, Plant Biologist, was reviewed by the 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 at: *http://ecos.fws.gov/tess_public*.

Review Analysis:

Please refer to the previous 5-year review for *Achyranthes mutica* published on April 7, 2009 (available at: *http://ecos.fws.gov/docs/five_year_review/doc2423.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 *A. mutica*.

This short-lived perennial is endangered and historically known from three collections from opposite ends of the main archipelago – Kauai and Hawaii islands (USFWS 1999). Currently, this species is known only from the Kohala Mountains on Hawaii Island (USFWS 1999). The status and trends for *Achyranthes mutica* are provided in the tables below.

New status information:

In 2009, there were two populations containing approximately 40 wild individuals of *Achyranthes mutica* on Hawaii Island (Plant Extinction Prevention Program [PEPP] 2009). In 2015, at Puuloa there were 20 mature and 20 immature wild individuals of *A. mutica* (J. VanDeMark, pers. comm. 2015). The individuals at Kalopi and Lanikepu Gulch were not monitored (J. VanDeMark, pers. comm. 2015).

The number of wild individuals remains stable at approximately 40 individuals as reported in the previous 5-year review. However, more surveys are needed to determine the status of the species.

New threats:

- Climate change destruction or degradation of habitat – Fortini *et al*. (2013) conducted a landscape-based assessment of climate change vulnerability for native plants of Hawaii using high resolution climate change projections. Climate change vulnerability is defined as the relative inability of a species to display the possible responses necessary for persistence under climate change. The assessment by Fortini *et al*. (2013) concluded that *Achyranthes mutica* is highly vulnerable to the impacts of climate change. Therefore, additional management actions are needed to conserve this taxon into the future.

New management actions:

- Population viability monitoring and analysis
    - PEPP (2009, 2010) monitored the wild population in South Kohala and reported the plants to be in poor condition due to browsing by feral goats and the effects of drought.
    - In 2014, the outplanted individuals at South Kohala were monitored and reported to be in healthy condition; however, the wild individuals were not monitored (PEPP 2014).
- Captive propagation for genetic storage and reintroduction
    - The Volcano Rare Plant Facility (2013) has 19 individuals in its nursery and propagated 80 individuals for outplantings.
    - The Lyon Arboretum's Seed Conservation Laboratory (2014) has 1,059 seeds in storage from a single accession.
    - The National Tropical Botanical Garden (2012) propagated more than 10 cuttings in their nursery and outplanted 6 individuals at the main visitor's center and 12 individuals at McBryde Garden in Lawai for genetic storage. There are more than 1,500 seeds in storage at the National Tropical Botanical Garden (2014). The National Tropical Botanical Garden (2012) propagated 18 cuttings in their nursery.
- Reintroduction / translocation – In 2012, the State of Hawaii Department of Land and Natural Resources (2012) outplanted 11 individuals of *A. mutica* within a Natural Area Reserve on Hawaii Island.
- Ungulate monitoring and control – A fence encompassing approximately 140 acres was constructed to protect the South Kohala population of *A. mutica* (Kalopi Ranch 2012). The fenced area is free of goats and pigs.

- Alliance and partnership development – PEPP (2010) initiated discussions for fencing options with a private landowner to provide protection from feral goats for *A. mutica*.

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. *Achyranthes mutica* 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 islands where they now occur or occurred historically. 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, as only 40 wild individuals are known (Table 1), and all threats are not being sufficiently managed throughout all of the populations (Table 2). Therefore, *Achyranthes mutica* meets the definition of endangered as it remains in danger of extinction throughout its range.

Recommendations for Future Actions:

- Surveys / inventories – Survey geographical and historical range for a current assessment of the species' status.
- Ungulate monitoring and control – Maintain existing exclosures and monitor for potential incursions and fence third population.
- Invasive plant monitoring and control – Eradicate invasive introduced plants within ungulate exclosures and maintain the exclosures free of invasive plants.
- Captive propagation for genetic storage and reintroduction
    - Continue collection of genetic resources for storage, propagation, and reintroduction into protected suitable habitat within historical range.
    - Evaluate genetic resources currently in storage to determine the need to place additional genetic resources in long-term storage due to this species' vulnerability to climate change.
- Population viability monitoring and analysis – Continue monitoring all wild and outplanted individuals.
- Fire monitoring and control – Develop and implement a fire management plan for each population.
- Climate change adaptation strategy – Research the suitability of habitat for reintroducing this species in the future due to the impacts of climate change.
- Alliance and partnership development – Initiate planning and contribute to implementation of ecosystem-level restoration and management to benefit this taxon.

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

Date	No. wild indivs	No. outplanted	Stability Criteria identified in Recovery Plan	Stability Criteria Completed?
1996 (listing)	20-50	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
1999 (recovery plan)	20-50	0	All threats managed in all 3 populations	Partially
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No
2003 (critical habitat)	20-50	0	All threats managed in all 3 populations	Partially
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No
2009 (5-yr review)	38	0	All threats managed in all 3 populations	Partially
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No
2015 (5-yr review)	40	11	All threats managed in all 3 populations	Partially
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No

Table 2. Threats to *Achyranthes mutica* and ongoing conservation efforts.

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Ungulates – degradation of habitat and herbivory	A, C, D, E	Ongoing	Partially, two populations are fenced
Invasive introduced plants	A, E	Ongoing	None
Drought	E	Ongoing	None
Fire	E	Ongoing	None
Low numbers	E	Ongoing	Partially, captive propagation for genetic storage and reintroduction
Climate change	A, E	Increasing	None

References:

See previous 5-year review for a full list of references (USFWS 2009). Only references for new information are provided below.

Fortini, L., J. Price, J. Jacobi, A. Vorsino, J. Burgett, K. Brinck, F. Amidon, S. Miller, S. Gon II, G. Koob, and E. Paxton. 2013. A landscape-based assessment of climate change vulnerability for all native Hawaiian plants. Technical report HCSU-044. Hawaii Cooperative Studies Unit, University of Hawaii at Hilo, Hawaii. 141 pages.

Harold L. Lyon Arboretum Seed Conservation Laboratory. 2014. Report on controlled propagation of listed and candidate species, as designated under the U.S. Endangered Species Act. Seed storage access database. University of Hawaii at Manoa, Honolulu, Hawaii. Unpublished.

Kalopi Ranch. 2012. Progress report, protection of *Achyranthes mutica* on Kalopi Ranch. Unpublished report submitted to the U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, Honolulu, Hawaii.

National Tropical Botanical Garden. 2012. Report on controlled propagation of listed and candidate species, as designated under the U.S. Endangered Species Act. Unpublished.

National Tropical Botanical Garden. 2014. Report on controlled propagation of listed and candidate species, as designated under the U.S. Endangered Species Act. Unpublished.

[PEPP] Plant Extinction Prevention Program. 2009. Plant Extinction Prevention Program annual report, fiscal year 2009 (July 1, 2008-June 30, 2009). Unpublished report submitted to the U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, Honolulu, Hawaii.

Plant Extinction Prevention Program. 2010. Plant Extinction Prevention Program annual report, fiscal year 2010 (July 1, 2009-June 30, 2010). Unpublished report submitted to the U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, Honolulu, Hawaii.

Plant Extinction Prevention Program. 2014. Plant Extinction Prevention Program annual report, fiscal year 2014 (July 1, 2013-June 30, 2014). Unpublished report submitted to the U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, Honolulu, Hawaii.

State of Hawaii Department of Land and Natural Resources. 2012. Department of Land and Natural Resources, Division of Forestry and Wildlife, Section 6 annual performance report for plant habitat management, natural area reserves, Hawaii. July 1 2011 – June 30, 2012. 9 pages.

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

[USFWS] U.S. Fish and Wildlife Service. 2009. *Achyranthes mutica* 5-year review short form summary. Pacific Islands Fish and Wildlife Office, Honolulu, Hawaii. 6 pages.

Volcano Rare Plant Facility. 2013. Report on controlled propagation of listed and candidate species, as designated under the U.S. Endangered Species Act. 12 pages. Unpublished.

Personal communication:

VanDeMark, Joshua R. 2015. Hawaii Island Coordinator, Plant Extinction Prevention Program. Phone call to Chelsie Javar-Salas, Pacific Islands Fish and Wildlife Office, on March 11, 2015.

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SIGNATURE PAGE for 5-YEAR REVIEW of *Achyranthes mutica* (no common name)

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:_____

for **Programmatic Deputy Field Supervisor, Pacific Islands Fish and Wildlife Office**

Maile M Bluegmann Date 2015-06-25