

5-YEAR REVIEW

Short Form Summary

Species Reviewed: *Amaranthus brownii* (No common name)

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 69 species in Idaho, Washington, Hawaii, Guam, and the Commonwealth of the Northern Mariana Islands. Federal Register 75(67):17947-17950.

Lead Region/Field Office:

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

Name of Reviewer(s):

Chelsie Javar, Fish and Wildlife Biologist, PIFWO

Marie Brueggemann, Plant Recovery Coordinator, PIFWO

Jess Newton, Recovery Program Leader, 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 April 8, 2010. The review was based on a review of current, available information since the last 5-year review for *Amaranthus brownii* (USFWS 2007). Bernice Pauahi Bishop Museum 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 Chelsie Javar, Fish and Wildlife Biologist, was reviewed by the Plant Recovery Coordinator. The document was then reviewed by the Recovery Program Leader 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 previous 5-year review for *Amaranthus brownii* published on August 2, 2007 (available at http://ecos.fws.gov/docs/five_year_review/doc1121.pdf), and the recovery plan for three plant species on Nihoa Island (USFWS 1998), for a complete review of the species' status, threats, and management efforts. No new threats or no new information regarding the species biological status have come to light since listing to warrant a change in the Federal listing status of *A. brownii*.

This herbaceous annual is endangered and restricted to the island of Nihoa in the Northwestern Hawaiian Islands (USFWS 1998). The number of individuals remains the same since the previous 5-year review and management actions are ongoing as described in the previous 5-year review. The current status and trends for *Amaranthus brownii* are provided in the tables below.

New taxonomic information:

None.

New threats:

While *Portulaca oleracea* (pigweed) was identified as the primary invasive plant species competing with *Amaranthus brownii* on Nihoa (USFWS 1998), Tangalin (2006) also noted *Tetragonia tetragonioides* (New Zealand spinach) as an invasive species competing with *A. brownii* and recommended the removal of this species from the vicinity of Needle Rock.

Climate change may also 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) has currently funded climate modeling that will help resolve these spatial limitations. We anticipate high spatial resolution climate outputs by 2013.

New management actions:

- Surveys / inventories – A botanical survey was conducted on Nihoa in April 2006 (Tangalin 2006), however, *Amaranthus brownii* was not relocated on the island and hasn't been seen since 1983, when two colonies totaling 35 individuals were noted (USFWS 2003). Being an herbaceous annual, *A. brownii* likely has a short growing season dependent on rainfall, suggesting that the optimal time to survey for this species would be during the wetter winter months. However, access to the island during the winter months can be difficult and dangerous due to high sea conditions that can change without warning, stranding visitors on an island with a limited source of fresh water and no regular food supply (USFWS 2003).
- Existing population management and restoration – Following the establishment of the Papahānaumokuākea Marine National Monument in 2006, a draft management plan (Papahānaumokuākea Marine National Monument 2008) drawn up by the Monument Management Board advocated not only monitoring existing populations of *Amaranthus brownii* and other rare plant taxa on Nihoa, but also seeking to increase numbers and locations on the island by 2018. There would also be continued evaluation of the potential to establish one to three populations of *A. brownii* outside of its historical range to protect the species against catastrophic events and achieve recovery objectives.

- Reintroduction / translocation site identification – The Papahānaumokuākea Marine National Monument draft management plan identified potential *ex situ* sites as Necker, Laysan Island, Kure Atoll, and Eastern and Sand Islands at Midway Atoll (Papahānaumokuākea Marine National Monument 2008).

Synthesis:

Stabilizing, downlisting, and delisting objectives are provided in the recovery plan for three plant species on Nihoa Island (USFWS 1998), based on whether the species is an annual, a short-lived perennial (fewer than 10 years), or a long-lived perennial.

Amaranthus brownii is a short-lived perennial, and to be considered stable, this species must be managed to control threats and be represented in an *ex situ* collection. In addition, a minimum of three populations should be documented on the island of Nihoa where the species now occurs or occurred historically. Each of these colonies must be naturally reproducing and increasing in number, with a minimum of 100 mature individuals per population.

The interim stabilization goals for this species have not been met, as currently no individuals of *Amaranthus brownii* are known and the species has not been observed since 1983, although surveys for the species have been conducted in 2004 and 2006 (Table 1). In addition, all threats are not being managed (Table 2), as access to the island is difficult and management has been very minimal. Although *A. brownii* was not detected during surveys in 2004 and 2006 on Nihoa, there is a good likelihood that the species is still extant, as this species is an herbaceous annual and its phenology may vary depending on rainfall and climatic factors. Therefore, *Amaranthus brownii* meets the definition of endangered as it remains in danger of extinction throughout its range.

Recommendations for Future Actions:

- Surveys / inventories – Conduct surveys for *Amaranthus brownii* late in the wet season, when there is a better chance of observing sprouting individuals.
- Captive propagation for genetic storage and reintroduction – If the species is rediscovered, secure vegetative material or fruit for *ex situ* cultivation and genetic storage.
- Reintroduction / translocation implementation – If *ex situ* cultivation is successful, consider establishing new populations in suitable habitat on other islands in the Northwestern Hawaiian Islands, preferably on the adjacent Necker Island.
- Competitive invasive plant species control – Continue to control invasive plant species that compete with the species around all populations, especially *Portulaca oleracea* and *Tetragonia tetragonioides*.
- Threats monitoring and control – Continue to monitor the threat of nonnative grasshoppers (*Schistocerca nitens*) to the species.
- Invertebrate control research:

- Conduct research to collect data that will facilitate in the suppression of the grasshopper on Nihoa.
- Develop a list of possible control measures for nonnative grasshoppers.

Table 1. Status of *Amaranthus brownii* from listing through current 5-year review.

Date	No. wild indivs	No. outplanted	Stability Criteria identified in Recovery Plan	Stability Criteria Completed?
1996 (listing)	35	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 100 mature individuals each	No: Not observed since 1983
1998 (recovery plan)	<40	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 100 mature individuals each	No: Not observed since 1983
2003 (critical habitat)	35 to 40	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 100 mature individuals each	No: Not observed since 1983
2007 (5-year review)	35 to 40	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 100 mature individuals each	No: Not observed since 1983
2012 (5-yr review)	Unknown	0	All threats managed in all 3 populations	Partially (see Table 2)
			Complete genetic storage	No
			3 populations with 100 mature individuals each	No: Not observed since 1983

Table 2. Threats to *Amaranthus brownii* and ongoing conservation actions.

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Invertebrate predation or herbivory – Grasshoppers	C	Ongoing	Partially: 2005 workshop held but no viable control method was identified
Established invasive plant species	E	Ongoing	Partially: Periodic weed control
Fire	E	Ongoing	Partially: Human-caused threat controlled through strict conservation guidelines
Climate change	A, E	Increasing	No

References:

See previous 5-year review for a full list of references (USFWS 2007). Only references for new information are provided below.

Papahānaumokuākea Marine National Monument. 2008. Papahānaumokuākea Marine National Monument Draft Monument Management Plan. U.S. Fish and Wildlife Service, National Oceanic and Atmospheric Administration, and Hawai'i Department of Land and Natural Resources, Honolulu, Hawaii. 351 pages + appendices. Available online at <http://www.papahānaumokuākea.gov/management/mp.html>.

Tangalin, N. 2006. Nihoa Trip Report: April 1 – 8 2006. National Tropical Botanical Garden, Kalaheo, Hawaii. 10 pages. Unpublished.

[USFWS] U.S. Fish and Wildlife Service. 1998. Final recovery plan for three plant species on Nihoa Island. U.S. Fish and Wildlife Service, Portland, Oregon. 83 pages. Available online at <http://www.fws.gov/pacificislands/recoveryplans.html>.

[USFWS] U.S. Fish and Wildlife Service. 2003. Endangered and threatened wildlife and plants; designation of critical habitat for five plant species from the Northwestern Hawaiian Islands, Hawaii; final rule. Federal Register 68(99):28054-28075.

[USFWS] U.S. Fish and Wildlife Service. 2007. *Amaranthus brownii* (no common name), 5-year review; summary and evaluation. U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, Honolulu, Hawaii. 9 pages. Available online at http://ecos.fws.gov/docs/five_year_review/doc1121.pdf.

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U.S. FISH AND WILDLIFE SERVICE
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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

Appropriate Listing/Reclassification Priority Number, if applicable: _____

Review Conducted By:

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Date 8/28/2012