

Isodendrion pyriform
(Wahine noho kula)

**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: *Isodendrion pyriformis* (Wahine noho kula)

TABLE OF CONTENTS

1.0	GENERAL INFORMATION	1
1.1	Reviewers	1
1.2	Methodology used to complete the review	1
1.3	Background	1
2.0	REVIEW ANALYSIS	3
2.1	Application of the 1996 Distinct Population Segment (DPS) policy.....	3
2.2	Recovery Criteria.....	4
2.3	Updated Information and Current Species Status	5
2.4	Synthesis.....	7
3.0	RESULTS	9
3.1	Recommended Classification	9
3.2	New Recovery Priority Number	9
3.3	Listing and Reclassification Priority Number.....	9
4.0	RECOMMENDATIONS FOR FUTURE ACTIONS	9
5.0	REFERENCES	10
	Signature Page.....	12

5-YEAR REVIEW
***Isosendrion pyrifolium* (Wahine noho kula)**

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 June 2007. The National Tropical Botanical Garden provided most of the updated information on the current status of *Isodendrion pyrifolium*. They also provided recommendations for conservation actions that may be needed prior to the next five-year review. The evaluation of the lead PIFWO biologist was reviewed by the Plant Recovery Coordinator. These comments were incorporated into the draft five-year review. The document was then 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. 1994. Determination of endangered or threatened status for 21 plants from the island of Hawaii, State of Hawaii; final rule. Federal Register 59(43):10305-10325.

Date listed: March 4, 1994

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. 2003a. Endangered and threatened wildlife and plants: final designation or nondesignation of critical habitat for 42 plant species from the island of Molokai, HI: final rule. Federal Register 68(52):12982-13141.

USFWS. 2003b. Endangered and threatened wildlife and plants: final designation or nondesignation of critical habitat for 60 plant species from the islands of Maui and Kahoolawe, HI: final rule. Federal Register 68(93):25934-26165.

USFWS. 2003c. 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.

USFWS. 2003d. Endangered and threatened wildlife and plants; final designation and nondesignation of critical habitat for 46 plant species from the island of Hawaii, HI; final rule. Federal Register 68(127):39624-39761

USFWS. 2003e. Endangered and threatened wildlife and plants; final designation or nondesignation of critical habitat for 95 plant species from the islands of Kauai and Niihau, HI; final rule. Federal Register 68(39):9116-9479.

USFWS. 2003f. Endangered and threatened wildlife and plants; final designation of critical habitat for three plant species from the island of Lanai, Hawaii; final rule. Federal Register 68(6):1220-1274.

Critical habitat was designated for *Isodendrion pyrifolium* in one unit totaling 101 hectares (249 acres) on Molokai, three units totaling 233 hectares (573 acres) on Oahu, and one unit totaling of 224 hectares (555 acres) on Maui. This designation includes habitat on state and private lands (USFWS 2003a, b and c). Critical

habitat was not designated on the island of Hawaii because we believed there was a higher likelihood of beneficial conservation activities occurring on this private land without the designation of critical habitat than there would be with a critical habitat designation. In addition, exclusion of the private land on Hawaii that had been proposed as critical habitat would not lead to the extinction of the species (USFWS 2003d). Critical habitat was not designated on Niihau and Lanai because the species no longer occurs on these islands and we were unable to identify habitat essential for its conservation there (USFWS 2003e and f).

1.3.4 Review History:

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

Recovery achieved:

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

1.3.5 Species' Recovery Priority Number at start of this 5-year review:

2

1.3.6 Current Recovery Plan or Outline

Name of plan or outline: Recovery plan for the Big Island plant cluster .1996.
U.S. Fish and Wildlife Service, Portland, Oregon. 202 + pages.

Date issued: September 26, 1996

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
 No

2.1.2 Is the species under review listed as a DPS?

Yes
 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, 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 Big Island cluster (USFWS 1996), based on whether the species is an annual, a short-lived perennial (fewer than 10 years), or a long-lived perennial. *Isodendron pyrifolium* 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 the island of Hawaii and if possible, at least one other island where the species now occurs or occurred historically. 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 *Isodendrion pyrifolium* should be documented on the island of Hawaii and at least one other island where it now occurs or occurred historically. 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 *Isodendrion pyrifolium* should be documented on the island of Hawaii and at least one other island where it now occurs or occurred historically. Each of these populations must be naturally reproducing, stable or increasing in number, and secure from threats, with 300 mature individuals per population for short-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 I.C.5 ("Associated Rulemakings") and in section II.D ("Synthesis") below, which also includes any new information about the status and threats of the species.

Status of *Isodendrion pyrifolium* from listing through 5-year review.

Date	No. wild inds	No. outplanted	Stability Criteria	Stability Criteria Completed?
1994 – listing	50-60	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
1996 – recovery plan	50-60	0	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No

Date	No. wild inds	No. outplanted	Stability Criteria	Stability Criteria Completed?
2003 – critical habitat	9	0	All threats managed in all 3 populations	Partially
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No
2007 – 5-yr review	3	25	All threats managed	Partially
			Complete genetic storage	Yes
			3 populations with 50 mature individuals each	No

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

Historical records indicate that *Isodendrion pyrifolium* occurred on most of the major Hawaiian Islands (Wagner *et al.* 1999) and it now occurs only on the island of Hawaii (Perlman 2006). *Isodendrion pyrifolium* was thought to be extinct since 1870, but was rediscovered in 1991 during a survey for a proposed high school at Kealakehe, near Kailua on the island of Hawaii. *Isodendrion pyrifolium* was seen growing in three sites, which were close together, and were considered one population (Perlman 2006). Plant numbers have declined precipitously, from approximately 60 plants in the early 1990s, to only four individuals in 2006. In addition, no recruitment is occurring in the wild (Perlman 2006). As of May 2007, another plant has died, leaving three remaining wild individuals (R. David, Rana Productions, Ltd., pers. comm. 2007). Five *Isodendrion pyrifolium* have been outplanted at the Kaloko-Honokohau National Historical Park, but they are not doing well, and another 20 plants were outplanted in Puu Waawaa (Tummons 2006c).

Isodendrion pyrifolium is located in degraded lowland dry forest. This area has been under development for the last ten years, converting suitable habitat to a high school and residential housing. Efforts were made in 2002 to create low stone wall barriers around *I. pyrifolium* (Tummons 2006c), but these were breached by a bulldozer in 2005. The area is dry and subject to both drought and fire (J. Perry, Hawaii Division of Forestry and Wildlife, pers. comm. 2006).

The major threats identified for *Isodendrion pyrifolium* include habitat degradation by introduced invasive plants species (Factor E) like *Pennisetum setaceum* and *Leucaena leucocephala*, susceptibility to fire (Factor E), stochastic extinction (Factor E), and residential development (Factor A) (USFWS 1994; Perlman 2006). The invasive introduced plant *Pennisetum setaceum* (fountain grass) forms dense clumps and competes for space; increases fuel loading for fires, and competes very efficiently for surface moisture (Tummons 2006c, D'Antonio and Vitousek 1992). The Department of Hawaiian Home Lands, as the current land manager, has agreed to carry out mitigation for the residential development, which includes fire prevention measures (Tummons 2006a and b). In addition, species like *Isodendrion pyrifolium* that are currently restricted to small portions of a single island, and limited to a few populations and individuals, are inherently more vulnerable to extinction than

widespread species because of the higher risks posed by genetic bottlenecks, random demographic fluctuations and localized catastrophes such as housing development (Factor E).

Rats eat seeds and unknown insects eat leaves of *Isodendrion pyriformis* (Factor C) (Perlman 2006). Other threats affecting the plants are drought (Factor E) (Perlman 2006; Tummons 2006c and d).

Since the rediscovery of the species on state owned land in 1991, efforts by the USFWS and the Hawaii Division of Forestry and Wildlife to implement a mitigation plan with the land managers have been largely unsuccessful (Factor D). The land manager at that time was the state Housing and Community Development Corporation of Hawaii and most recently, the state Department of Hawaiian Home Lands (J. Perry, pers. comm. 2006; Tummons 2006c). The final mitigation plan was never signed by Housing and Community Development Corporation of Hawaii, and was not officially accepted by Department of Hawaiian Home Lands (M. Bruegmann, USFWS, pers. comm. 2006). Mitigation measures were tied to the development of individual villages. Some villages were developed, and some mitigation measures were completed. Others villages have been delayed, and particularly in those areas which were not developed, no mitigation measures have been undertaken (J. Perry, pers. comm. 2006). The species is also more vulnerable to extinction due to stochastic factors, as it is currently restricted to a single population.

Plants are being grown at the Amy Greenwell Ethnobotanical Garden, Harold L. Lyon Arboretum Micropropagation Nursery, Volcano Rare Plants Facility, National Tropical Botanical Garden, Future Forests Nursery, and the Kaupulehu Dryland Forest Nursery for outplanting (J. Wagner, Kaloko-Honokohau National Historic Park, pers. comm. 2006; Harold L. Lyon Arboretum Micropropagation Laboratory 2006; National Tropical Botanical Garden 2006; Volcano Rare Plants Facility 2006). Five *Isodendrion pyriformis* have been outplanted at the Kaloko-Honokohau National Park, but they are not doing well, and other 20 plants were outplanted in Puu Waawaa (Tummons 2006b). The Kona Dryland Forest Working Group has nursery plants for outplanting at Kaupulehu dry forest (J. Wagner, pers. comm. 2006). Other plants are to be outplanted in the Kealekehe, as well as at Manuka, and Auwahi (Tummons 2006c; M. Bruegmann, *in litt*, 2000).

On-the-ground management is being conducted by a volunteer. Monitoring by Hawaii Division of Forestry and Wildlife personnel continues, and the Department of Hawaiian Home Lands, through an informal consultation with USFWS, will develop and implement a revised mitigation plan for this and another endangered species, which will include a 26-acre preserve (M. Kane, Hawaiian Home Commission, *in litt*. 2007).

The stabilization and recovery goals for this species have not been met, as only three individuals are known in the wild, outplanted individuals have not yet reproduced,

and not all threats are being managed. Therefore, *Isodendrion pyrifolium* 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:

- Secure specimens of all remaining individuals for *ex situ* storage.
- Protect remaining population from fire, invasive introduced plants, and monitor for ungulate ingress into area.
- Control rodents around remaining plants.
- Implement existing mitigation plan.
- Survey for additional populations in suitable historical habitats.
- Reintroduce additional individuals into suitable habitat within historical range that is being managed for known threats to this species.

5.0 REFERENCES:

- Harold L. Lyon Arboretum Micropropagation Laboratory. 2006. Report on controlled propagation of species, as designated under the U.S. Endangered Species Act. Unpublished.
- National Tropical Botanical Garden. 2006. Report on controlled propagation of listed and candidate species, as designed under the U.S. Endangered Species Act. Unpublished.
- Perlman, S. 2006. Summary of field notes from 1992-2005 for *Isodendrion pyriformium*. Unpublished.
- Tummons, P. 2006a. At Kealakehe, Kona, a death watch as native species slide to extinction. *Environment Hawai'i* 16(8):1.
- Tummons, P. 2006b. A cry for help from Kealakehe. *Environment Hawai'i* 16(8):3-6.
- Tummons, P. 2006c. DHHL OKs Mitigation; *Environment Hawai'i* 16(10):2.
- Tummons, P. 2006d. DHHL moves forward with the plans for homes in area of rare plants. *Environment Hawai'i* 15(5):3-4.
- [USFWS] U.S. Fish and Wildlife Service. 2003a. Endangered and threatened wildlife and plants: final designation or nondesignation of critical habitat for 42 plant species from the island of Molokai, HI: final rule. *Federal Register* 68(52):12982-13141.
- [USFWS] U.S. Fish and Wildlife Service. 2003b. Endangered and threatened wildlife and plants: final designation or nondesignation of critical habitat for 60 plant species from the Island of Maui and Kahoolawe, HI: final rule. *Federal Register* 68(93):25934-26165.
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- [USFWS]. U.S. Fish and Wildlife Service. 2003e. Endangered and threatened wildlife and plants; final designation or nondesignation of critical habitat for 95 plant species from the islands of Kauai and Niihau, HI; final rule. *Federal Register* 68(39):9116-9479.
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[USFWS] U.S. Fish and Wildlife Service. 1994. Determination of endangered or threatened status for 21 plants from the Island of Hawaii, State of Hawaii; final rule. Federal Register 59(43):10305-10325.

Vitousek, P.M., C.M. D'Antonio, L.L. Loope, M. Rejnánek, and R. Westerbrooks. 1997. Introduced species: a significant component of human-caused global change. New Zealand Journal of Ecology 21(1):1-16.

Volcano Rare Plant Facility. 2006. Report on controlled propagation of species, as designated under the U.S. Endangered Species Act. Unpublished.

Wagner, W.L., D. Herbst, and S.H. Sohmer. 1999. Manual of the flowering plants of Hawai'i, Revised Edition. University of Hawai'i Press, Bishop Museum Press, Special Publication. 97:1-1918.

Personal and Written Communications:

Bruegmann, Marie. 2006. Plant Recovery Coordinator, USFWS, January 18, 2006.

Bruegmann, Marie. 2000. Memorandum to Christa Russell, Subject: Kealakehe and *Isodendron pyrifolium*. August 5, 2000.

David, Reggie, 2007. Rana Productions, Ltd.. Telephone conversation with Marie Bruegmann (USFWS). May 17, 2007.

Kane, Micah. 2007. Chairman, Hawaiian Homes Commission. Letter to Patrick Leonard, Field Supervisor (USFWS). April 20, 2007.

Perry, J. Lyman, Hawaii Division of Forestry and Wildlife, Hawaii District, July 27-August 2, 2006.

Wagner, Jill. 2006. Horticulturist, Kaloko-Honokohau National Historic Park, TREE Hawaii, Future Forests Nursery, July 31, 2006.

Signature Page
U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW of *Isodendron pyrifolium* (Wahine noho kula)

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-
Endangered Species, June 24, 2007

Marie Bruegmann, Plant Recovery Coordinator, January 17, February 6, March 19, May
24, and June 29, 2007

Christian Torres-Santana, Fish and Wildlife Biologist, December 17, February 5, and
June 6, 2007

Approve Patih E d Date 1/18/05
Lead Field Supervisor, Fish and Wildlife Service