

## **5-YEAR REVIEW**

Short Form Summary

**Species Reviewed:** *Dubautia latifolia* (naenae)

**Current Classification:** Endangered

### **Federal Register Notice announcing initiation of this review:**

[USFWS] U.S. Fish and Wildlife Service. 2008. Endangered and threatened wildlife and plants; initiation of 5-year status reviews of 70 species in Idaho, Montana, Oregon, Washington, and the Pacific Islands. Federal Register 73(83):23264-23266.

### **Lead Region/Field Office:**

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

### **Name of Reviewer(s):**

Marie Bruegmann, Pacific Islands Fish and Wildlife Office, Plant Recovery Coordinator  
Marilet A. Zablan, Pacific Islands Fish and Wildlife Office, Assistant Field Supervisor for Endangered Species  
Jeff Newman, Pacific Islands Fish and Wildlife Office, Acting Deputy Field Supervisor

### **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 29, 2008. The review was based on the final critical habitat designation for *Dubautia latifolia* and other species from the island of Kauai (USFWS 2003), as well as a review of current, available information. The National Tropical Botanical Garden 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 Samuel Aruch, biological consultant, was reviewed by the Plant Recovery Coordinator. The document was then reviewed by the Assistant Field Supervisor for Endangered Species and Acting Deputy Field Supervisor 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](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 final critical habitat designation for *Dubautia latifolia* published in the Federal Register on February 23, 2003 (USFWS 2003) for a complete review of the species' status (including biology and habitat), threats, and management efforts. No new threats and no significant new information regarding the species' biological status have come to light since listing to warrant a change in the Federal listing status of *D. latifolia*.

*Dubautia latifolia* still occurs in many scattered locations, with an estimated population of 100 to 200 individuals (Perlman 2008). In 2005, on Kawaiiki Ridge at the top of a sub-gulch above Kawaiiki Stream, one mature individual of *D. latifolia* was observed climbing six meters (20 feet) into a dead tree at an elevation of 1,067 meters (3,500 feet) (Tangalin 2008).

*Dubautia latifolia* was seen in 2007 at several spots along and just off the Camp 10 - Mohihi Road and at the beginning of the Mohihi-Waiialae Trail in its more mesic area (Tangalin 2008). It has also been observed north of Mohihi Stream, at 1,067 meters (3,500 feet) elevation (National Tropical Botanical Garden 2008a; Tangalin 2008) and in the Waiialae Valley, on a ridge trail west from Waiialae Cabin, and near the State goat enclosure at 900 to 1,000 meters (2,953 to 3,281 feet) elevation (National Tropical Botanical Garden 2008b). One mile in on Mohihi Road, between Sugi Grove and Waikoali Stream, several scattered individuals of *D. latifolia* were seen at 1,006 to 1,036 meters (3,300 to 3,398 feet) elevation in 1999 and 2001, on a west facing slope above the road and just above the stream (National Tropical Botanical Garden 2008a).

In Kokee State Park, along the Nualolo Trail at an elevation of 1,021 meters (3,350 feet), one individual of *Dubautia latifolia* was observed on the west side of the trail about 0.5 miles down in May 2004. This individual vine, without flower or fruit, covered a 21 square meter (15 by 15 foot) area (Tangalin 2008). *Dubautia latifolia* was seen in 1993 on the boundary line of the Kuia Natural Area Reserve at 1,006 to 1,036 meters (3,300 to 3,400 feet) elevation on the north facing slope of the valley floor; in 1995 in upper Nualolo Stream's north branch, at 1,128 to 1,158 meters (3,700 to 3,800 feet); and in Nualolo, below the Awaawapuhi Trail in 1996 (National Tropical Botanical Garden 2008b, c). In Kumuwela, about ten individuals of *D. latifolia* with fruit were observed in January 2007 (Tangalin 2008). In 2002, *D. latifolia* was seen in Awaawapuhi, near the drainage bottom to the north of the trail at 981 to 1,036 meters (3,220 to 3,400 feet) (National Tropical Botanical Garden 2008a). In Kumuwela in 1992, *D. latifolia* was seen two miles in on the Ditch Trail on a steep hillside overlooking the canyon at 1,135 to 1,175 meters (3,723 to 3,855 feet) elevation (National Tropical Botanical Garden 2008b). In 1996, five individuals were seen by Ken Wood of the National Tropical Botanical Garden in Kaunuhua, on the upper border of Kuia (National Tropical Botanical Garden 2008a). In 1994, it was seen on Kauhau Ridge near the gauging station and ditch, on a north facing slope, and in 1996, three mature individuals were observed in upper Kauhau, north of the Boy Scout camp (National Tropical Botanical Garden 2008a).

While it was observed many times previously in Makaha Valley, (National Tropical Botanical Garden 2008b) *Dubautia latifolia* was last seen there in 1996 (Perlman 2008).

*Dubautia latifolia* flowers from September to November (National Tropical Botanical Garden 2008a).

The natural community in Kawaiiki is *Acacia koa* (koa) - *Metrosideros polymorpha* (ohia) - *Dicranopteris linearis* (uluhe) mesic forest with associated plant species that

include *Alyxia stellata* (maile), *Antidesma platyphyllum* (hame), *Asplenium aethiopicum* (iwa iwa a Kane), *A. hobydi* (no common name [NCN]), *A. macraei* (iwa iwa lau lii), *A. polyodon* (punana manu), *Bidens cosmoides* (po ola nui), *Bobea* sp. (ahakea lau nui), *Carex* sp. (NCN), *Cheirodendron* sp. (olapa), *Claoxylon sandwicense* (laukea), *Coprosma* sp. (pilo), *Cyanea leptostegia* (haha lua), *Dianella sandwicensis* (uki uki), *Dodonaea viscosa* (aalii), *Dryopteris wallichiana* (laukahi), *Dubautia laevigata* (naenae), *Elaeocarpus bifidus* (kalia), *Ilex anomala* (kawau), *Kadua affinis* (manono), *Leptecophylla tameiameiae* (pukiawe), *Luzula hawaiiensis* var. *glabrata* (wood rush), *Melicope anisata* (mokihana), *Melicope barbiger*a (uahiapele), *Microlepia strigosa* (palapala), *Perrottetia sandwicensis* (olomea), *Platydesma spathulata* (pilo kea), *Poa sandwicensis* (NCN), *Pouteria sandwicensis* (kauulu), *Psychotria mariniana* (kopiko), *Santalum* sp. (iliahi), *Scaevola gaudichaudii* (naupaka kuahiwi), *Solanum sandwicense* (popolo aiakeakua), *Tetraplasandra* sp. (ohe), *Wikstroemia furcata* (akia), *Zanthoxylum dipetalum* var. *dipetalum* (kawau), and *Zanthoxylum hawaiiense* (ae) (National Tropical Botanical Garden 2008b; Tangalin 2008)

The Mohihi to Waialae site consists of *Acacia koa* - *Metrosideros polymorpha* mesic forest with 50 percent tree cover, and an eight- to ten-meter-high canopy including *Alphitonia ponderosa* (kauila), *Diospyros* sp. (lama), *Pteralyxia kauaiensis* (kauulu), *Tetraplasandra kavaiensis* (ohe ohe), *Tetraplasandra waimeae* (ohe kiko ola), *Xylosma* sp. (NCN), and *Zanthoxylum dipetalum* with understory of *Scaevola procera* (naupaka kuahiwi), *Leptecophylla tameiameiae*, *Cheirodendron trigynum*, *Dianella sandwicensis*. Other associated species includes *Bidens cosmoides*, *Bobea brevipes*, *Carex wahuensis*, *Chamaesyce atrococca* (akoko), *Claoxylon sandwicense*, *Coprosma waimeae* (olena), *Cryptocarya mannii* (holio), *Dodonaea viscosa*, *Exocarpos luteolus* (heau), *Labordia helleri* (kamakahala), *Lysimachia kalalauensis* (NCN), *Melicope anisata*, *M. barbiger*a, *M. clusiifolia* (kukaemoa), *Myoporum sandwicense* (naio), *Myrsine* sp. (kolea), *Perrottetia sandwicensis* (olomea), *Pittosporum glabrum* (hoawa), *Pouteria sandwicensis*, *Pritchardia minor* (loulou), *Psychotria greenwelliae* (kopiko), *P. mariniana*, *Sophora chrysophylla* (mamane), *Wikstroemia furcata*, and *Wikstroemia oahuensis* (akia) (National Tropical Botanical Garden 2008a, b; Perlman 2008).

At Kumuwela *Dubautia latifolia* grows with *Bidens cosmoides*, *Chamaesyce* sp., *Coprosma* sp., *Dianella* sp., *Leptecophylla tameiameiae*, and *Panicum nephelophilum* (kona kona grass) (Tangalin 2008). Kauhau Ridge is mesic forest with *Alphitonia ponderosa* (kauila), *Acacia koa* (koa), *Melicope anisata*, *Metrosideros polymorpha*, *Panicum nephelophilum*, *Pleomele aureum* (hala pepe), *Poa mannii* (NCN), *Pouteria sandwicensis*, *Zanthoxylum dipetalum*, and *Z. kauaense* (National Tropical Botanical Garden 2008b).

In Nualolo, *Dubautia latifolia* occurs in *Metrosideros polymorpha*-*Acacia koa* - *Dicranopteris linearis* montane mesic forest. Associated species include *Alphitonia ponderosa*, *Alyxia stellata*, *Bobea brevipes*, *Carex* sp., *Claoxylon sandwicense*, *Diplazium sandwichianum*, *Dodonaea viscosa*, *Doodia* sp. (okupukupu), *Elaeocarpus bifidus* (kalia), *Labordia helleri* (kamakahala), *Leptecophylla tameiameiae*, *Lobelia yuccoides* (panaunau), *Lysimachia kalalauensis*, *Melicope macropus* (alani), *Myrsine*

*knudsenii* (kolea), *Nesoluma polynesicum* (keahi), *Nestegis sandwicensis* (olopua), *Nothocestrum peltatum* (aiea), *Perrottetia sandwicensis*, *Pleomele aurea*, *Poa siphonoglossa* (NCN), *P. sandwicensis* (NCN), *Psychotria grandiflora* (kopiko), *P. greenwelliae*, *P. mariniana*, *Scaevola* sp., *Tetraplasandra kawaiensis*, *Wikstroemia* sp., *Xylosma crenatum*, and *Zanthoxylum dipetalum* (National Tropical Botanical Garden 2008b).

In Kaunuhua, *Dubautia latifolia* grows in *Acacia koa* - *Metrosideros polymorpha* mesic forest with *Alyxia stellata*, *Alphitonia ponderosa*, *Bobea brevipes*, *Dianella sandwicensis*, *Dicranopteris linearis*, *Dodonaea viscosa*, *Dryopteris glabra* (kilau), *Melicope barbiger*, *Myrsine* sp., *Pittosporum glabrum*, *Psychotria greenwelliae*, *P. mariniana*, *Scaevola procera*, *Xylosma hawaiiense* (maua), *Zanthoxylum dipetalum*, and *Z. kauaense* (National Tropical Botanical Garden 2008b, c).

Awaawapuhi Trail where *Dubautia latifolia* grows is *Acacia koa* - *Metrosideros montana* mesic forest with *Antidesma platyphyllum*, *Athyrium sandwichianum* (akolea), *Bobea* sp., *Claoxylon sandwicensis*, *Coprosma* sp., *Cryptocarya mannii*, *Cyrtandra* sp. (haiwale), *Dianella sandwicensis*, *Dodonaea viscosa*, *Elaeocarpus bifidus*, *Ilex anomala*, *Kadua affinis*, *Melicope anisata*, *Melicope barbiger*, *Nestegis sandwicensis*, *Pleomele* sp., *Pouteria sandwicensis*, *Psychotria mariniana*, and *Tetraplasandra kawaiensis* (National Tropical Botanical Garden 2008b, c).

Major threats are pigs (*Sus scrofa*), feral goats (*Capra hircus*), and mule deer (*Odocoileus hemionus*) (Factors A and D). Invasive introduced plant species that compete with and modify the habitat of *Dubautia latifolia* include *Erechtites valerianifolia* (fireweed), *Erigeron karvinskianus* (daisy fleabane), *Hedychium* sp. (ginger), *Lantana camara* (lantana), *Psidium* spp. (guava), *Kalanchoe pinnata* (airplant), *Passiflora tarminiana* (banana poka), *Morella faya* (firetree), *Grevillea robusta* (silk oak), *Rubus argutus* (blackberry), and *Solanum americanum* (glossy nightshade) (Factor E) (National Tropical Botanical Garden 2008a, b; Perlman 2008; Tangalin 2008). Rats (*Rattus* spp.), goats, and deer eat *Dubautia latifolia* plants (Factor C) (Perlman 2008).

Climate change may also pose a threat to *Dubautia latifolia* (Factors A and E). However, current climate change models do not allow us to predict specifically what those effects, and their extent, would be for this species.

National Tropical Botanical Garden (2009) has 11,709 seeds in storage. There is one plant record of outplanting in the McBryde Garden (National Tropical Botanical Garden 2008a). The Hawaii Division of Forestry and wildlife has outplanted 24 individuals in the Kalalau Enclosure (Hawaii Department of Land and Natural Resources 2008). Both of these are plantings for genetic storage.

Stabilizing, downlisting, and delisting objectives are provided in the recovery plan for plants from the island of Kauai (USFWS 1995), based on whether the species is an annual, a short-lived perennial (fewer than 10 years), or a long-lived perennial. *Dubautia latifolia* 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 island of Kauai. 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 (see Table 1), as no population has more than 50 mature individuals and all threats are not being managed. Therefore, *Dubautia latifolia* meets the definition of endangered as it remains in danger of extinction throughout its range.

### **Recommendations for Future Actions:**

- Continue to collect seeds for genetic storage and propagation.
- Fence areas where this species grows to protect against negative impacts from ungulates and control invasive introduced plant species.
- Identify appropriate sites for reintroduction.
- Propagate for augmentation and reintroduction into suitable protected habitat.
- Work with Hawaii Division of Forestry and Wildlife and Hawaii State Parks to initiate planning and contribute to implementation of ecosystem-level restoration and management to benefit this species.

### **References:**

Hawaii Department of Land and Natural Resources. 2008. Division of Forestry and Wildlife Kokee Rare Plant Facility. Report on controlled propagation of listed and candidate species, as designated under the U.S. Endangered Species Act. Lihue, Hawaii. Unpublished.

National Tropical Botanical Garden. 2008a. Plant-out records from living collections database. National Tropical Botanical Garden. Kalaheo, Hawaii.

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[USFWS] U.S. Fish and Wildlife Service. 2003. Endangered and threatened wildlife and plants; final designation or nondesignation of critical habitat for 95 plant species from the islands of Kauai and Niihau, Hawaii; final rule. Federal Register 68(39):9116-9479.

**Table 1. Status of *Dubautia latifolia* from listing through 5-year review.**

<b>Date</b>	<b>No. wild indivs.</b>	<b>No. outplanted</b>	<b>Stability Criteria identified in Recovery Plan</b>	<b>Stability Criteria Completed?</b>
1992 (listing)	40	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
1995 (recovery plan)	>100	Unknown	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No
2003 (critical habitat)	65-84	Unknown	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No
2009 (5-year review)	100-200	24+	All threats managed	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No

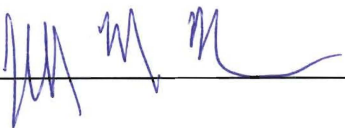
**U.S. FISH AND WILDLIFE SERVICE**  
SIGNATURE PAGE for 5-YEAR REVIEW of *Dubautia latifolia* (na'ena'e)

**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

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

  
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Date   AUG 27 2010