5-YEAR REVIEW
Short Form Summary
Species Reviewed: *Poa siphonoglossa* (no common name)
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 *Poa siphonoglossa* (USFWS 2003) and other species from the island of Kauai, 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).

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 *Poa siphonoglossa* published in the Federal Register on February 27, 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 *P. siphonoglossa*.

At the time of listing, there were 2 populations with fewer than 30 known individuals of *Poa siphonoglossa* (USFWS 1992). Historically, the Kauai endemic grass *Poa siphonoglossa* was known from five populations on the island of Kauai: Kohua Ridge, near Kaholuamanu, Kaulaula Valley, Kuia Valley, and Kalalau.

In 1995, there were a total of five populations with a total of 50 individuals on State-owned land at Kahuamaa Flats, Mohihi-Waialae Trail, Kuia Valley, Makaha Ridge, and Kaulaula Valley (USFWS 2003). In the last ten years, approximately 50 to 70 clumps of plants have been observed in 6 populations.

Off the Mohihi-Waialae trail, just below a bench overlooking Koaie, three 25 centimeter (9.8 inch) diameter clumps of *Poa siphonoglossa* occurred at 1,149 to 1,180 meters (3,770 to 3,870 feet) elevation on a north aspect in January 1995 (Perlman 2009; Wood 2009). In Kokee, above Poomau Stream along the Ditch Trail, at 1,027 meters (3,370 feet) elevation, two clumps of *Poa siphonoglossa* were observed in a 100 square meter (1,076 square foot) area in August 1999 (Wood 2009). A meter-square (10.8 square foot) patch of *Poa siphonoglossa* was reported from steep slopes in Makaha Valley, in the north fork of the upper drainage in April of 1999 at 945 meters (3,100 feet) elevation (Wood 2009).

At Waikoali Stream, above Mohihi Road, 70 or more plants were seen in June 1996 at 1,076 meters (3,530 feet) elevation (National Tropical Botanical Garden 2008; Perlman 2009; Wood 2009). On Kalalau Rim, one plant was seen in 2000 and again in 2001 (Perlman 2009). In 2001, 30 to 50 individuals of *Poa siphonoglossa* were seen in Koaie Canyon drainages, above the south drainage of the twin falls north of Kawaiiki Ridge, at 1,015 meters (3,330 feet) elevation (National Tropical Botanical Garden 2008). One clump of *Poa siphonoglossa* was recorded in June 2004 in a drainage on a north facing aspect of Kawaiiki Valley at 1,055 meters (3,461 feet) elevation (Tangalin 2009).

In Nualolo Valley's northern headwaters, 30 clumps of *Poa siphonoglossa*, each 25 centimeters (9.8 inches) in diameter, were recorded at 1,128 to 1,158 meters (3,700 to 3,800 feet) elevation in November 1995 and in July 1996 at 1,149 meters (3,770 feet) elevation (National Tropical Botanical Garden 2008; Wood 2009). In the Kuia drainage, at the northern fork of the upper headwaters, 15 plants were seen on a north facing slope at 914 meters (3,000 feet) elevation in March 2000. In upper Kuia 10 separate plants were seen in the upper southeast gulch, along a ridge at 914 to 975 meters (3,000 to 3,200 feet) elevation in November 1994. In 2008, a new population of *P. siphonoglossa* was located in the Kuia Ridge area of the Kuia Natural Area Reserve (Hawaii Department of Land and Natural Resources 2008b).

Poa siphonoglossa typically grows on shady banks on steep slopes in mesic *Metrosideros polymorpha* (ohia) - *Acacia koa* (koa) forests at elevations between 480 and 1,300 meters (1,573 and 4,265 feet) elevation (USFWS 2003).

This species' habitat in Kalalau Valley is *Metrosideros polymorpha* wet forest with *Broussaisia arguta* (kanawao), *Chamaesyce remyi* (akoko), *Cheirodendron* sp. (olapa), *Dubautia laevigata* (naenae), *Ilex anomala* (kawau), *Tetraplasandra* sp. (ohe), and *Xylosma* sp. (no common name [NCN]) (Perlman 2009). In Kawaiiki Valley, the habitat is mixed mesic forest with associated species including *Bidens cosmoides* (poola nui), *Dianella sandwicensis* (uki uki), *Dryopteris* sp. (ii or kilau), *Kadua affinis* (manono), *Pittosporum glabrum* (hoawa), *Psychotria mariniana* (kopiko), and *Scaevola* sp. (naupaka kuahiwi) (Tangalin 2009).

In Koaie, the habitat is *Acacia koa - Metrosideros* mesic forest with *Alyxia stellata* (maile), *Antidesma platyphyllum* (hame), *Carex sp.* (NCN), *Cheirodendron* sp., *Cyanea* sp. (haha), *Dianella sandwicensis, Diplazium sandwichianum* (hoio), *Dubautia laevigata, Elaeocarpus bifidus* (kalia), *Kadua affinis, Leptecophylla tameiameiae* (pukiawe), *Lobelia yuccoides* (panaunau), *Melicope* sp. (alani), *Santalum freycinetianum* var. *pyrularium* (iliahi), and *Wikstroemia* sp. (akia) (National Tropical Botanical Garden 2008).

In Kokee, *Poa siphonoglossa* grows in *Metrosideros* montane mesic to wet forest with *Coprosma waimeae* (olena), *Dianella sandwicensis, Dodonaea viscosa* (aalii), *Melicope feddei* (alani), and *Microlepia strigosa* (palapalai) (Wood 2009).

In Kuia, *Poa siphonoglossa* is associated with *Alphitonia ponderosa* (kauila), *Cheirodendron* spp., *Dodonaea viscosa, Melicope* spp., *Pouteria sandwicensis* (alaa), *Psychotria* spp. (kopiko), *Tetraplasandra kavaiensis* (ohe ohe), and *Wikstroemia furcata* (akia) (Wood 2009). In upper Kuia, *P. siphonoglossa* grows in *Metrosideros polymorpha – Alphitonia ponderosa – Acacia koa* montane mesic forest associated with *Bobea brevipes* (ahakea lau lii), *Dodonaea viscosa, Melicope ovata* (alani), *Panicum nephelophilum* (konakona), *Pouteria sandwicensis, Remya kauaiensis* (NCN), and *Scaevola procera* (naupaka kuahiwi) (Wood 2009). *Poa siphonoglossa* occurs in Nualolo on a north facing slope with *Acacia koa, Alphitonia ponderosa, Alyxia stellata, Bobea brevipes, Claoxylon sandwicense* (laukea), *Dicranopteris linearis* (uluhe), *Dryopteris glabra* (kilau), *Kadua affinis, Lobelia hypoleuca* (kuhiaikamo owahie), *Lobelia yuccoides, Lysimachia kalalauensis* (NCN), *Melicope anisata* (mokihana), *Metrosideros polymorpha, Nothocestrum peltatum* (aeia), *Psychotria greenwelliae* (kopiko), *P. mariniana*, and *Xylosma crenatum* (NCN) (National Tropical Botanical Garden 2008; Wood 2009).

In Makaha, the habitat is *Acacia koa – Metrosideros polymorpha* montane mesic forest, with *Alphitonia ponderosa, Dodonaea viscosa, Leptecophylla tameiameiae, Psychotria mariniana, Tetraplasandra kavaiensis*, and *Zanthoxylum dipetalum* (kawau) (Wood 2009). The habitat on the Mohihi-Waialae Trail area is in *Metrosideros polymorpha – Cheirodendron* spp. montane wet forest with a gently sloping north facing slope of *Cyanea leptostegia, Melicope anisata, M. clusiifolia* (kukaemoa), *Syzygium* sp., *Tetraplasandra waimeae* (ohe kikoola), and *Wikstroemia oahuensis* (akia) (Wood 2009); and *Acacia koa - Metrosideros polymorpha* mesic forest with *Coprosma* sp., *Cyanea*

leptostegia, *Dianella sandwicensis*, *Leptecophylla tameiameiae*, *Melicope anisata*, *Psychotria* sp., and *Xylosma* sp. (Perlman 2009).

In Waikoali, *Poa siphonoglossa* is seen cascading down very steep walls in *Metrosideros polymorpha* wet forest with *Broussaisia argutus*, *Chamaesyce remyi*, *Cheirodendron* sp., *Claoxylon sandwicensis*, *Dicranopteris linearis*, *Dubautia laevigata*, *Elaphoglossum* sp. (ekaha), *Eurya sandwicensis* (anini), *Ilex anomala*, *Lobelia hypoleuca*, *Perrottetia sandwicensis* (olomea), *Pritchardia minor* (loulu), *Psychotria mariniana*, *Scaevola glabra* (ohe naupaka), *Sphenomeris chinensis* (palaa), *Syzygium sandwicense* (ohia ha), *Tetraplasandra waimeae*, *Vaccinium dentatum* (ohelo), and *Xylosma* sp. (Perlman 2009; Wood 2009).

The primary threat to the survival of *Poa siphonoglossa* is habitat degradation by feral pigs (*Sus scrofa*) and deer (*Odocoileus hemionus*) (Factors A and C). The invasive introduced plants *Erigeron karvinskianus* (daisy fleabane), *Psidium cattleianum* (strawberry guava), *Rubus argutus* (Florida blackberry), *Rubus rosifolius* (thimbleberry), and *Lantana camara* compete with *P. siphonoglossa* for light, nutrients, and water (Factor E). Small population size and the potential for one disturbance event to destroy the majority of known individuals are also serious threats to this species (Factor E) (USFWS 2003; Wood 2009). Herbivory by rats (*Rattus* spp.), pigs, and deer has been noted (Factor C) (USFWS 2003; Wood 2009). There is no new information regarding overutilization for commercial, recreational, scientific, or educational purposes (Factor B). There is no new information regarding disease or predation (Factor C), and no changes in the adequacy of existing regulatory mechanisms (Factor D). Climate change may also pose a threat to *P. siphonoglossa* (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.

In addition to all of the other threats, species like *Poa siphonoglossa* that are endemic to small portions of a single island are inherently more vulnerable to extinction than widespread species because of the higher risks posed to a few populations and individuals by random demographic fluctuations and localized catastrophes such as hurricanes, landslides, flooding and disease outbreaks (Factor E). The extent of these natural processes on this single island endemic are exacerbated by anthropogenic threats, such as habitat loss for human development or predation by introduced species (Factor E) (USFWS 1998).

Conservation measures for *Poa siphonoglossa* include maintenance of an existing exclosure. Hawaii Department of Land and Natural Resources staff removed branches from the fence at Puu Ka Pele Forest Reserve in 2008 (Hawaii Department of Land and Natural Resources 2008b). Five seeds are in storage at the Hawaii Division of Forestry and Wildlife's Kokee Rare Plant Facility (Hawaii Department of Land and Natural Resources 2008a). The National Tropical Botanical Garden is storing 275 seeds for future propagation of the species (National Tropical Botanical Garden 2009).

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. *Poa siphonoglossa* 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 only one population has more than 50 mature individuals and all threats are not being managed. Therefore, *Poa siphonoglossa* meets the definition of endangered as it remains in danger of extinction throughout its range.

Recommendations for Future Actions:

- Collect seed from all populations for storage and propagation.
- Propagate for reintroduction and augmentation into suitable habitat.
- Control ungulates and invasive introduced plant species in the wild populations.
- Work with Hawaii Division of Forestry and Wildlife to initiate planning and contribute to implementation of ecosystem-level restoration and management to benefit this species.
- Research to increase understanding of its biology, life cycle and natural reproduction.

References:

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Wood, K.R. 2009. Field observations and collections of *Poa siphonoglossa* (Poaceae), Kauai Hawaii. National Tropical Botanical Garden, Kalaheo, Hawaii. Unpublished. 10 pages.

Table 1. Status of *Poa siphonoglossa* from listing through 5-year review.

Date	No. wild indivs.	No. outplanted	Stability Criteria identified in Recovery Plan	Stability Criteria Completed?
1992 (listing)	<30	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	Partially
1995 (recovery plan)	42	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	Partially
2003 (critical habitat)	50	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	Partially
2009 (5-year review)	50-70	0	All threats managed in 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	Partially

U.S. FISH AND WILDLIFE SERVICE
SIGNATURE PAGE for 5-YEAR REVIEW of *Poa siphonoglossa* (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

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

_____ Date AUG 2 7 2010