5-YEAR REVIEW

Short Form Summary

Species Reviewed: *Bidens conjuncta* (koʻokoʻolau)

Current Classification: Endangered

Federal Register Notice announcing initiation of this review:

[USFWS] U.S. Fish and Wildlife Service. 2023. Endangered and Threatened Wildlife and Plants; Initiation of 5-Year Status reviews for 133 Species in Oregon, Washington, Idaho, Montana, California, Nevada, Hawaii, Guam, and the Commonwealth of the Northern Mariana Islands. Federal Register 88(56):17611–17614, March 23, 2023.

Lead Region/Field Office:

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

Name of Reviewer:

Cheryl Phillipson, Biologist, PIFWO
Lauren Weisenberger, Plant Recovery Coordinator, PIFWO
Megan Laut, Recovery Program Manager, PIFWO

Methodology used to complete this 5-year review:

This review was conducted by staff of the Pacific Islands Fish and Wildlife Office (PIFWO) of the U.S. Fish and Wildlife Service (Service) beginning in October 2023. The review was based on a review of current, available information since the last 5-year review for *Bidens conjuncta* (USFWS 2020). The evaluation by Cheryl Phillipson, Biologist, was reviewed by Lauren Weisenberger, Plant Recovery Coordinator, and Megan Laut, Recovery Program Manager.

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/ecp/species/5024*).

Review Analysis:

Please refer to the previous 5-year reviews for *Bidens conjuncta* published in the Federal Register on March 2, 2020 (available at *https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/2942.pdf*) for a complete review of the species' status, threats, management efforts, and references cited. We are not aware of any significant new information regarding the species' biological status since listing to warrant a change in the Federal listing status of *B. conjuncta*.

This short-lived perennial herb in the Asteraceae (sunflower) family is endangered and occurs on Kahālāwai, west Maui. The status and trends for *Bidens conjuncta* are provided in the tables below.

New Status Information:

- The most recent estimates for wild individuals were provided in the Service's Species Report and in the Recovery Plan for *Bidens conjuncta* at an estimated 1,800 to 1,900 individuals in five populations on Kahālāwai, west Maui (USFWS 2023b, 2023c). The largest population (ca 1,500) was at Honokōhau to Waiheʻe that now may total fewer than 300 individuals (USFWS 2023, p. 17; Plant Extinction Prevention Program [PEPP] 2019–2024). The two Kahakuloa populations total a little more than 50 individuals, the ʻĪao occurrence consists of scattered individuals, and the Pōhākea population totals fewer than 10 individuals (PEPP 2019–2024).
- There are at least 5 wild plants from 3 populations represented in *ex situ* storage.

New Threats:

- Herbivory by slugs is reported as a threat to *Bidens conjuncta*. The effects of slug herbivory on plants range from reduced vigor and decreased reproduction to mortality of individuals and complete lack of recruitment (Oppenheimer 2022, pers. comm.).

New Management Actions:

- Ungulate monitoring and control—In 2023, Maui Land & Pineapple Company, Inc. (ML&P) reported completion of fence retrofitting (to increase height to exclude axis deer) was completed for the northern boundary of Puʻu Kukui Watershed Preserve (ML&P 2023, p. 20). More retrofitting is planned for other fence sections.
- Captive propagation for genetic storage and reintroduction—
    - In 2024, the Lyon Arboretum Seed Conservation Laboratory reported collection of 2,405 seeds representing five founders from three populations at Kahakuloa, Honokōhau, and Waiheʻe. Eighty-five seeds were withdrawn from the Kahakuloa collection, and 50 seeds were withdrawn from the Waiheʻe collection for testing. Currently, there are 1,761 seeds stored representing the three founders at Kahakuloa, 210 seeds stored representing one founder at Honokōhau, and 299 seeds stored representing one founder at Waiheʻe (Lyon Arboretum 2024).
    - The Olinda Rare Plant Facility (ORPF) on Maui reported propagation of nine plants representing at least one founder at Kahakuloa (ORPF 2025).
    - The National Tropical Botanical Garden (NTBG) reported storage of 1,127 seeds representing one founder at Kahakuloa; however, the viability of this collection made in 1991 is uncertain (NTBG 2024).
- Reintroduction and translocation—In 2023, PEPP monitored an outplanting at Ukumehame upper drainage and found two plants surviving (PEPP 2023). In 2024, PEPP reintroduced an additional 14 immature plants to Ukumehame (PEPP 2024, pp. 9, 14).

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

Date	No. wild individuals	No. Outplanted	Preventing Extinction Criteria Identified by HPPRCC*	Preventing Extinction Criteria* Completed?
2013 (listing)	ca 7,000	0	All threats managed in all 3 populations	Partially, strategic fencing
			Complete genetic storage	Partially, many collections pooled
			3 populations with 50 mature individuals each	Partially, 2 populations >1,000
2020 (5-year review)	3,000	0	All threats managed in all 3 populations	Partially, strategic fencing
			Complete genetic storage	Partially, many collections pooled
			3 populations with 50 mature individuals each	Partially, 2 populations >1,000
2025 (5-year review)	ca <400	ca 21, 9 surviving	All threats managed in all 3 populations	Partially, 3 populations fenced
			Complete genetic storage	Partially
			Reproduction (i.e., viable seeds, seedlings) at all 3 populations	Uncertain, populations declining
			3 populations with 50 mature individuals each	Partially, 2 populations >50 each

Table 2. Threats to *Bidens conjuncta* and ongoing conservation efforts.

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Degradation and destruction of habitat and herbivory by feral ungulates	A, C	Ongoing	Partial, fencing for 3 populations (Pu‘u Kukui, West Maui NAR, private property)
Established ecosystem altering invasive plant species degradation of habitat	A	Ongoing	Partial, some landscape scale nonnative plant management in Pu‘u Kukui Watershed Preserve
Climate change degradation or loss of habitat, including hurricanes	A	Ongoing	None
Predation and herbivory by rodents and invertebrates	C	Ongoing	None
Hybridization	E	Potential	None

Synthesis:
Currently there are fewer than 400 individuals of *Bidens conjuncta* in five wild populations on Kahālāwai. The two largest populations are protected from feral ungulates by exclosures and/or strategic fencing. Surveys are conducted by the Pu‘u Kukui Watershed Preserve and the Plant Extinction Prevention Program. Five founders from three populations are represented in collections and propagation. Recently at least 21 individuals were translocated to Ukumehame with approximately nine surviving.

Preventing extinction, interim stabilization, downlisting, and delisting objectives are provided in the Recovery Plan for 44 Species from Maui Nui (Islands of Maui, Moloka‘i and Lāna‘i) (USFWS 2023c). Furthermore, life history traits such as breeding system, population size fluctuation or decline, and reproduction type (sexual or vegetative), have been included in the calculation of goals for the number of populations and reproducing individuals for each stage. The goals for each stage remain grouped by life span defined as annual, short-lived perennial (fewer than 10 years), or long-lived perennial.

Bidens conjuncta is a short-lived perennial herb. To prevent extinction, which is the first milestone in recovering the species, the taxon must be managed to control threats (e.g., fenced) and have 50 individuals (or the total number of individuals if fewer than 50 exist) from each of three populations represented in *ex situ* (secured off-site, such as a nursery or seed bank) collections that are well managed. In addition, a minimum of a total of three populations should be documented on Maui where the species occurs or occurred historically and each of these populations must be naturally reproducing (i.e., viable seeds, seedlings) with a minimum of 50 mature, reproducing individuals per population.

The preventing extinction goals for this species have not been met. The current status of the remaining populations (totaling approximately 400 individuals) is uncertain and numbers continue to decline. Populations in Pu‘u Kukui Watershed Preserve are almost completely fenced; however, fencing must be monitored for incursion by feral pigs. In addition, most fencing has been retrofitted to exclude axis deer. The population at Pōhākea is not fenced. Five founders from three populations are represented in storage or propagation, with approximately 21 outplanted individuals. Some conservation actions such as nonnative plant control are conducted at a landscape scale where *B. conjuncta* occurs. The effects of climate change including hurricanes, seed predation and herbivory by rats and slugs, and potential hybridization are not addressed (Tables 1a, 1b, Table 2). Therefore, *B. conjuncta* meets the definition of Endangered as it remains in danger of extinction throughout its range.

Recommendations for Future Actions:
Herbivory by slugs is reported as a new threat; however, no other significant new information regarding the species' biological status has been reported since the last 5-year review in 2020. Thus, the following recommendations for future actions are updated or reiterated for the 5-year review for 2025.

- Surveys and monitoring—Continue to assess the status of known populations of *Bidens conjuncta* in historical locations and in areas of potentially suitable habitat
- Ungulate monitoring and control—Continue to construct and maintain exclosures and strategic fencing to protect individuals from the negative impacts of feral ungulates.
- Invasive nonnative plant monitoring and control—Continue to control established ecosystem-altering nonnative invasive plant species and those that compete with *B. conjuncta*.
- Climate change adaptation strategy—Research suitability of habitat in the future due to the impacts of climate change.
- Predator and herbivore monitoring and control—Implement effective controls against predation and herbivory by feral ungulates, rodents, and invertebrates at all populations.
- Captive propagation for genetic storage and reintroduction—Continue to collect genetic material (seeds) for storage and propagation efforts and for maintenance of genetic stock. Track individual founders.
- Reintroduction and translocation—Continue to propagate and reintroduce individuals into suitable habitat within historic range that is being managed for known threats to reduce the impacts of climate change, predation, hybridization, and declining numbers.
- Hybridization—Monitor populations where *B. campylotheca* subsp. *pentamera and B. micrantha* subsp. *micrantha* co-occur with *B. conjuncta* to determine if hybridization is a threat.
- Build resiliency, redundancy, and representation—Increase species' viability through habitat restoration, threat control, and reintroductions into suitable habitat that is being managed for known threats.

- Alliance and partnership development—Continue to work with partners in planning and implementation of ecosystem-level restoration and management to benefit this species.

References:

Lyon Arboretum. 2024. Report on controlled propagation of listed species, as designated under the U.S. Endangered Species Act. Unpublished report submitted to the U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, Honolulu, Hawai‘i.

[ML&P] Maui Land & Pineapple Company, Inc. 2023. Proposal Pu’u Kukui Watershed Preserve fiscal years 2024-2030 long range management plan Natural Area Partnership Program. Prepared for Division of Forestry & Wildlife, Department of Land and Natural Resources, State of Hawaii. 51 pp.

[NTBG] National Tropical Botanical Garden. 2024. Report on controlled propagation of listed species, as designated under the U.S. Endangered Species Act. Unpublished report submitted to the U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, Honolulu, Hawai‘i.

[ORPF] Olinda Rare Plant Facility. 2025. Report on controlled propagation of listed species, as designated under the U.S. Endangered Species Act. Unpublished report submitted to the U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, Honolulu, Hawai‘i.

Oppenheimer, H. 2022, pers. comm. Comment on draft species report regarding herbivory by slugs as a threat to *Bidens conjuncta*, 10 AUG 2022.

[PEPP] Plant Extinction Prevention Program. 2019–2024. Plant Extinction Prevention Program fiscal years 2019 to 2023 interim performance report (October 1, 2018-September 30, 2023). U.S. Fish and Wildlife Service CFDA Program $15.657 Endangered Species Conservation—Recovery Implementation Funds, Cooperative Agreement: F18AC00502 (Final performance report), University of Hawaii at Manoa, Pacific Cooperative Studies Unit. 105 pp. + database.

[PEPP] 2023. Monthly PEPP report for Maui species occurrences. Excel table.

[PEPP] 2024. U.S. Fish and Wildlife Service CFDA Program #15.657, Endangered Species Conservation—Recovery Implementation Funds, Plant Extinction Prevention Program Fiscal Year 2024 Interim Performance Report (October 1, 2023—September 30, 2024). Cooperative Agreements F10AC00532, F22AC02205, F23AC01766. 56 pp.

[USFWS] U.S. Fish and Wildlife Service. 2020. *Bidens conjuncta* (ko‘oko‘olau) 5-year review summary and evaluation. Pacific Islands Fish and Wildlife Office,

Honolulu. 24 pp. *https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/2942.pdf.*

[USFWS] 2023a. Endangered and Threatened Wildlife and Plants; Initiation of 5-Year Status reviews for 133 Species in Oregon, Washington, Idaho, Montana, California, Nevada, Hawaii, Guam, and the Commonwealth of the Northern Mariana Islands. Federal Register 88(56):17611–17614, March 23, 2023.

[USFWS] 2023b. Species report for *Bidens conjuncta* version 1.0. USFWS Pacific Region, Honolulu, HI. 23 pp.

[USFWS] 2023c. Recovery plan for 44 species from Maui Nui (islands of Maui, Molokaʻi, and Lānaʻi). July 18, U.S. Fish and Wildlife Service, Portland, OR. 90 pp. + appendices.

U.S. FISH AND WILDLIFE SERVICE
SIGNATURE PAGE for 5-YEAR REVIEW of *Bidens conjuncta* (koʻokoʻolau)

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**

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