

## 5-YEAR REVIEW

### Short Form Summary

**Species Reviewed:** *Bidens campylotheca* subsp. *pentamera* (ko‘oko‘olau)

**Current Classification:** Endangered

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

[USFWS] U.S. Fish and Wildlife Service. 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.

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

Region 1/Pacific Islands Fish and Wildlife Office (PIFWO), Honolulu, Hawai‘i

#### **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 campylotheca* subsp. *pentamera* (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/1897>).

#### **Review Analysis:**

Please refer to the previous 5-year reviews for *Bidens campylotheca* subsp. *pentamera* published in the Federal Register on September 25, 2020 (available at [https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public\\_docs/species\\_nonpublish/3102.pdf](https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/3102.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. campylotheca* subsp. *pentamera*.

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

#### New Status Information:

- The most recent observations of *Bidens campylotheca* subsp. *pentamera* on Haleakalā were in 2024 at Ko‘olau Gap (10 individuals), and in 2017 at two sites at ‘Ohe‘o (ca 5 and 50 individuals). The Kaukau‘ai population totaled 11 individuals in 2007. In 2005 there were two outplanted individuals at Kalena. Other small populations at West Wailua Iki and Waiho‘i Valley were last observed in the 1970s and 1980s (Plant Extinction Prevention Program [PEPP] 2024). There is an additional complication of possible hybridization of plants that co-occur with the subspecies *waihoiensis* at ‘Ohe‘o (Oppenheimer 2019, pers. comm.; PEPP 2024).
- On Kahālāwai (west Maui), the most recent observations were at Hana‘ula-Pōhākea in 2021 (few) and Hana‘ula-Ukumehame in 2023 (6 individuals) (PEPP 2024). In the 1980s at Pāpalaua-Manawainui Plant Sanctuary there were as many as 20 individuals declining to 15 in 2008 and only 1 individual observed in 2016. In 2011, there were 2 to 4 individuals at Kahakuloa, approximately 25 individuals at Kaua‘ula, 8 individuals at ‘Īao, 4 to 5 individuals at Launiupoko (Helu), and 4 individuals at Waikapū.
- In summary, three wild populations on Haleakalā total approximately 76 individuals with an outplanted population of 2 individuals. On Kahālāwai, there are seven wild populations totaling fewer than 60 individuals.
- There are 8 wild plants from 2 populations represented in *ex situ* storage.

#### New Threats:

- None reported.

#### New Management Actions:

- Monitoring and surveys—
  - In 2022, the Plant Extinction Protection Program (PEPP) added *Bidens campylotheca* subsp. *pentamera* to the list of “potential PEP” species, (meaning that the population total is nearing 50 or fewer individuals) (PEPP 2022, p. 26). PEPP plans to continue monitoring this subspecies to assess its status (PEPP 2024, p. 14).
  - In 2017, the National Park Service reported that 11 new plants were found in Kīpahulu Valley (Haleakalā National Park) and mapped; however, plants at ‘Ohe‘o were not relocated (National Park Service 2024a, pp. 22–23; National Park Service 2024b, p. 4).
- Captive propagation for genetic storage and reintroduction—
  - In 2024, Haleakalā National Park reported collection and storage of seeds from four founder plants in Kīpahulu Valley (National Park Service 2024a, pp. 22-23). Four plants were propagated representing one wild individual at ‘Ohe‘o (Haleakalā National Park 2022).

- Lyon Arboretum Seed Bank maintains a collection of 82 seeds from Pāpalaua (Kahālāwai) from a 2008 collection and 203 seeds from Pi‘ina‘au (Haleakalā) from a 2009 collection (Lyon Arboretum 2024).
- In 1994, the National Tropical Botanical Garden (NTBG) reported collection and storage of 300 seeds representing one individual at Kīpahulu Valley (Haleakalā); however, due to its age the viability of the collection is uncertain (NTBG 2019).

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

<b>Date</b>	<b>No. wild individuals</b>	<b>No. Outplanted</b>	<b>Preventing Extinction Criteria Identified by HPPRCC*</b>	<b>Preventing Extinction Criteria* Completed?</b>
<b>2013 (listing)</b>	Fewer than 200	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
<b>2020 (5-year review)</b>	134–184	0	All threats managed in all 3 populations	Partial
			Complete genetic storage	Partial
			3 populations with 50 mature individuals each	No
<b>2025 (5-year review)</b>	76 (east Maui) <60 (west Maui)	2 (east Maui)	All threats managed in all 3 populations	Partial, 3 populations on Haleakalā fenced; at least partial fencing for 2 populations on Kahālāwai
			Complete genetic storage	Partial
			Reproduction (i.e., viable seeds, seedlings) at all 3 populations	None reported
			3 populations with 50 mature individuals each	No

**Table 2. Threats to *Bidens campylotheca* subsp. *pentamera* and ongoing conservation efforts.**

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Degradation and destruction of habitat by feral ungulates	A	Ongoing	Partial, fencing at 3 populations on Haleakalā and at least partial fencing for 2 populations on Kahālāwai
Established ecosystem altering invasive plant species degradation of habitat	A	Ongoing	Partial, nonnative plant control within fenced areas
Climate change degradation or loss of habitat, including drought and landslides	A	Ongoing	None
Predation and herbivory by ungulates	A	Ongoing	Partial, fencing at 3 populations on Haleakalā and at least partial fencing for 2 populations on Kahālāwai
Predation and herbivory by rodents and invertebrates	C	Ongoing	None
Reduced viability due to low numbers	E	Ongoing	Partial, seed collection and storage
Loss of dispersal agents	E	Ongoing	None
Hybridization	E	Potential	None

**Synthesis:**

Currently there are 76 wild individuals of *Bidens campylotheca* subsp. *pentamera* in three wild populations on Haleakalā and fewer than 60 wild individuals in seven populations on Kahālāwai. Three populations on Haleakalā and two populations on Kahālāwai are protected from feral ungulates by exclosures and/or strategic fencing. Surveys are conducted opportunistically. Eight founders from two populations are represented in *ex situ* collections. In 2005, there were two individuals remaining from five originally outplanted at Kalena (Haleakalā); however, their current status is not reported.

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 2023b). 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 campylothea* subsp. *pentamera* 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 numbers of wild individuals of *Bidens campylothea* subsp. *pentamera* remains low. Approximately eight founders from two populations are represented in storage or propagation, with possibly only two outplanted individuals remaining. Not all threats are being managed including slug and rat predation/herbivory, loss of dispersal agents, and potential hybridization (Tables 1a, 1b, Table 2). Therefore, *B. campylothea* subsp. *pentamera* meets the definition of Endangered as it remains in danger of extinction throughout its range.

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

No 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 conduct surveys for *Bidens campylothea* subsp. *pentamera* in historical locations and areas of suitable habitat on Haleakalā and Kahālāwai.
- 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. campylothea* subsp. *pentamera*.
- 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.
- Captive propagation for genetic storage and reintroduction—Continue to collect genetic material (seeds and cuttings) for storage and propagation efforts.
- 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, landslides, drought, and low numbers.

- Loss of dispersal agents—Determine if pollinators and dispersers are lacking or if other factors are limiting this subspecies’ survival and reproduction.
- Hybridization—Monitor populations in Kīpahulu Valley where *B. campylothea* subsp. *waihoiensis* co-occurs 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:

Haleakalā National Park. 2022. 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.

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.

National Park Service. 2024a. Draft Biological Assessment Haleakalā National Park—operation and management, Maui, Hawai‘i. U.S. Department of the Interior. Dec 2024. 98 pp.

National Park Service. 2024b. 2024 annual report, Haleakalā National Park, Maui, Hawai‘i. USFWS biological opinion 1-2-2013-F-0049 & Recovery Permit #ES014497-17. 6 pp.

[PEPP] Plant Extinction Prevention Program. 2022. Plant Extinction Prevention Program fiscal year 2022 interim performance report (October 1, 2021-September 30, 2022), Cooperative Agreement F19AC00532 (Interim report), U.S. Fish and Wildlife Service CFDA Program #15.657 Endangered Species Conservation—Recovery Implementation Funds, University of Hawai‘i at Mānoa, Pacific Cooperative Studies Unit, Plant Extinction Prevention Program. 50 pp.

[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 campylothea* subsp. *pentamera* (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/3102.pdf](https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/3102.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. Recovery Plan for the 44 Species from Maui Nui (Islands of Maui, Moloka‘i and Lāna‘i). Portland, Oregon. Xv + 90 pages + Appendices. [https://ecos.fws.gov/docs/recovery\\_plan/Maui%20Nui%20Final%20Recovery%20Plan.pdf](https://ecos.fws.gov/docs/recovery_plan/Maui%20Nui%20Final%20Recovery%20Plan.pdf)

**U.S. FISH AND WILDLIFE SERVICE**

SIGNATURE PAGE for 5-YEAR REVIEW of *Bidens campylotheca* subsp. *pentamera*  
(ko'oko'olau)

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 \_\_\_\_\_