5-YEAR REVIEW

Short Form Summary

Species Reviewed: *Cyanea copelandii* ssp. *haleakalaensis* (hāhā)

Current Classification: Endangered

Federal Register Notice announcing initiation of this review:

[USFWS] U.S. Fish and Wildlife Service. 2021. Endangered and Threatened Wildlife and Plants; Initiation of 5-Year Status reviews for 77 Species in Oregon, Washington, Idaho, and Hawaii. Federal Register 86(120): 33726–33728, June 25, 2021.

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 Team 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 2021. The review was based on a review of current, available information since the last 5-year review for *Cyanea copelandii* ssp. *haleakalaensis* (USFWS 2018). The evaluation by Cheryl Phillipson, Biologist, was reviewed by Lauren Weisenberger, Plant Recovery Coordinator, and Megan Laut, Recovery Team 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/4574*).

Review Analysis:

Please refer to the previous 5-year reviews for *Cyanea copelandii* ssp. *haleakalaensis* published in the Federal Register on August 2, 2011, and October 22, 2018 (available at *https://ecos.fws.gov/docs/tess/species_nonpublish/1769.pdf* and *https://ecos.fws.gov/docs/tess/species_nonpublish/2618.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 *C. copelandii* ssp. *haleakalaensis*.

This short-lived perennial shrub in the Campanulaceae (bellflower) family is endangered and is known from the northern slopes of Haleakalā (east Maui). The status and trends for *Cyanea copelandii* ssp. *haleakalaensis* are provided in the tables below.

New Status Information:

- In 2018, there were estimated to be between 300 and 500 individuals of *Cyanea copelandii* ssp. *haleakalaensis* on Haleakalā (east Maui). Currently, small patches likely still occur in the Koʻolau Forest Reserve (Koʻolau FR) at Puohokamoa (24 individuals), Piʻinaʻau-Keʻanae (ca 3 individuals), Waiokamilo (> 10 individuals), west Wailua Iki (> 40 individuals), in the Hanawī Natural Area Reserve (Hanawī NAR) at Kūhiwa (10 individuals), and in the Hana FR at Kawaihāpapa (1 individual); with the largest numbers at ʻŌheʻo to Kaʻāpahu-Kalena-Kaukauʻai in Haleakalā National Park (HALE NP). In 2019, HALE NP estimated numbers of individuals in the Park totaled between 200 to 300 (HALE NP 2019a, p. 292). There is no current survey information for populations on private lands at Waikamoi or Kailua, although there are seed and plant collections from those areas (see New Management Actions, below). In summary, there are at least 300 to 400 total individuals; surveys are needed to reassess the current status of all populations. Natural regeneration has been observed in Park populations (HALE NP 2019a, p. 301).
- Currently, there are at least 10 founders (maternal lines) from six populations represented in *ex situ* storage.

New Threats:

- None reported.

New Management Actions:

- Surveys and monitoring—HALE NP reported that the current status of wild populations of *Cyanea copelandii* ssp. *haleakalaensis* is uncertain (Gates 2021, pers. comm.).
- Collection and propagation for genetic storage and reintroduction—
    - In 2022, the Lyon Arboretum Micropropagation Laboratory reported 489 explants representing four founders from Puohokamoa, Kūhiwa, and ʻŌheʻo in storage (Lyon Arboretum 2022). The Lyon Arboretum Seed Conservation Laboratory reported storage of more than 1,000 seeds representing plants cultivated in the nursery, and 527 seeds representing one founder at Kaukauʻai (Lyon Arboretum 2022), in addition to their collections received prior to 2019, which totals over 9,000 seeds and represents three founders from Puohokamoa, one founder from Kailua, one founder from Kūhiwa, one founder from Waikamoi, and two founders from ʻŌheʻo.
    - In 2021, HALE NP nursery collections represent 16 founders (Gates 2021, pers. comm.). Four cuttings representing two founders are kept in the Park nursery (HALE NP 2021, p. 21). Seeds were given to the National Tropical Botanical Garden (NTBG) for viability testing, and leaf material was sent to Chicago Botanic Garden to determine the genetic diversity of founders (Gates 2021, pers. comm.). Hand pollination has yielded many fruits (Gates 2021, pers. comm.). In 2021, 527 seeds from one founder at Kaukauʻai were sent to Lyon Arboretum and 32 individuals (unnamed founders) provided 162 fruits (thousands of seeds) (HALE NP 2019b; HALE NP 2021, p. 21).

- In 2019, the Olinda Rare Plant Facility (ORPF) reported storage of eight plants in the nursery representing one founder from ʻŌheʻo and five plants representing one founder from Waikamoi stream (ORPF 2020).

- Translocation/Augmentation—HALE NP reported that 45 individuals were translocated in the Park at 1,000 to 4, 000 ft (HALE NP 2019a, p. 133).

Table 1. Status and trends of *Cyanea copelandii* ssp. *haleakalaensis* from listing through current 5-year review.

Date	No. wild individuals	No. outplanted	Stability Criteria identified in Recovery Plan	Stability Criteria Completed?
1999 (listing)	235	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
2011 (5-year review)	>300	30	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No
Date	**No. wild individuals**	**No. outplanted**	***Preventing Extinction Criteria identified by HPPRCC**	***Preventing Extinction Criteria Completed?**
2018 (5-year review)	300–500	0	All threats managed in all 3 populations	Partially
			Reproduction (i.e., viable seeds, seedlings) at all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	Partially, 1 population >50 individuals

2023 (5-year review)	ca 300	45	All threats managed in all 3 populations	Partially, 3 fenced areas
			Complete genetic storage	Partially
			Natural reproduction at all 3 populations	Yes, in HALE NP
			3 populations with 50 mature individuals each	No

* The Preventing Extinction Stage was established in 2011. Prior to 2011, the Interim Stabilization Stage was the first stage towards recovery (now it is the second stage after Preventing Extinction).

Table 2. Threats to *Cyanea copelandii* ssp. *haleakalaensis* 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 Kūhiwa, Pi‘ina‘au, and HALE NP
Established ecosystem altering invasive plant species degradation of habitat	A	Ongoing	Partial, nonnative plant control within exclosures at Kūhiwa and HALE NP
Landslides and flooding destruction and degradation of habitat	A	Ongoing	None
Climate change degradation or loss of habitat	A	Ongoing	None
Predation and herbivory by feral ungulates	C	Ongoing	Partial, fencing at Kūhiwa, Pi‘ina‘au, and Haleakalā NP
Predation and herbivory by rodents	C	Ongoing	None
Predation and herbivory by invertebrates	C	Ongoing	None
Reduced viability due to low numbers	E	Ongoing	Partial, seed storage, propagation, and translocation efforts

Synthesis:
Seed collections indicate populations in the same areas as reported in the previous 5-year review, keeping the total at approximately 300 individuals. At least 10 founders are

represented in collections and translocation. Three locations of wild and translocated individuals are in protected (fenced) and managed areas.

Stabilizing (interim), downlisting, and delisting objectives are provided in the Addendum to the Recovery Plan for the Multi-Island Plants (USFWS 2002) and have been updated according to the draft revised recovery objective guidelines developed by the Hawai‘i and Pacific Plants Recovery Coordinating Committee (HPPRCC 2011). The HPPRCC identifies an additional initial objective, the Preventing Extinction Stage, in addition to the Interim Stabilization, Delisting, and Downlisting objectives. 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.

Cyanea copelandii ssp. *haleakalaensis* is a short-lived perennial vine-like shrub. To prevent extinction, which is the first step 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 adequately 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 and Lāna‘i where they now occur or occurred historically. Each of these populations must be naturally reproducing (e.g., viable seeds, seedlings) and increasing in number, with a minimum of 50 mature, mature reproducing individuals per population.

The preventing extinction goals for *Cyanea copelandii* ssp. *haleakalaensis* have not been met. There are no known populations totaling more than 50 mature, reproducing individuals (Table 1). Genetic representation is incomplete. Three locations are fenced, two of which have some maintenance. Other threats including flooding, climate change, and rodent and invertebrate herbivory are not being managed (Table 1, Table 2). Therefore, *C. copelandii* ssp. *haleakalaensis* 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 2018. Thus, the following recommendations for future actions are updated or reiterated for the 5-year review for 2023.

- Surveys and inventories—Continue to survey known populations of *Cyanea copelandii* ssp. *haleakalaensis* to assess their status.
- Ungulate monitoring and control—Continue to construct and maintain exclosures to protect individuals from the negative impacts of habitat destruction and herbivory by feral ungulates.
- Invasive nonnative plant monitoring and control—Continue control of established ecosystem-altering nonnative invasive plant species at all wild and translocated populations.

- Climate change adaptation strategy—Assess the modeled effects of climate change and determine future landscape needed for the recovery of this subspecies.
- Predator and herbivore monitoring and control—
  - Implement effective control methods for rodents.
  - Develop and implement effective control methods of slug control.
- Captive propagation for genetic storage and reintroduction—Continue collection and propagation efforts for maintenance of genetic stock and for translocation.
- Translocation and augmentation—Continue translocation of individuals into suitable habitat within historic range that is being managed for known threats.
- Build resiliency, redundancy, and representation—Continue translocation of individuals into suitable habitat that is being managed for known threats to this species to reduce impacts of herbivory and landslides and flooding.
- Alliance and partnership development—Continue to work with partners and other land managers in planning and implementation of ecosystem-level restoration and management to benefit this subspecies.

References:

Gates, N. 2021, pers. comm. National Park Service comments on initiation of 5-year status reviews for 77 species in Oregon, Washington, Idaho, and Hawaii, *Cyanea copelandii* ssp. *haleakalaensis*. 19 AUG 2021.

[HALE NP] Haleakalā National Park. 2019a. Natural Resource Condition Assessment Haleakala National Park, Natural Resource Report NPS/HALE/NRR—2019/1977, National Park Service, US Dept of the Interior, Natural Resource Stewardship and Science. 386 pp.

[HALE NP] 2019b. 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.

[HALE NP] 2021. Annual report for T & E species permit TE014497-15, Haleakalā National Park Resource Management Vegetation Management 2021, 30 pp.

[HPPRCC] Hawai‘i and Pacific Plants Recovery Coordinating Committee. 2011. Revised recovery objective guidelines. 8 pp.

Lyon Arboretum. 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.

[ORPF] Olinda Rare Plant Facility. 2020. 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.

[USFWS] U.S. Fish and Wildlife Service. 2002. Addendum to the Recovery Plan for the Multi-Island Plants. Portland. 2002. 93 pp. + appendices.

[USFWS] 2011. *Cyanea copelandii* ssp. *haleakalaensis* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI. *https://ecos.fws.gov/docs/tess/species_nonpublish/1769.pdf.*

[USFWS] 2018. *Cyanea copelandii* ssp. *haleakalaensis* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI. *https://ecos.fws.gov/docs/tess/species_nonpublish/2618.pdf*.

[USFWS] 2021. Endangered and Threatened wildlife and plants; initiation of 5-year status reviews for 77 Species in Oregon, Washington, Idaho, and Hawaii. Federal Register 86(120):33726–33728, June 25, 2021.

U.S. FISH AND WILDLIFE SERVICE
SIGNATURE PAGE for 5-YEAR REVIEW of *Cyanea copelandii* ssp. *haleakalaensis* (hāhā)

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**

LAUREN WEISENBERGER Digitally signed by LAUREN WEISENBERGER Date: 2023.08.17 18:24:29 -10'00'

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