5-YEAR REVIEW

Short Form Summary

Species Reviewed: Oceanic Hawaiian damselfly (*Megalagrion oceanicum*)

Current Classification: Endangered

FR 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 Hawai‘i. Federal Register 86 (120):33726–33728.

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

Name of Reviewer(s):

Elyse Sachs, Fish and Wildlife Biologist, PIFWO

John Vetter, Animal Recovery Coordinator, PIFWO

Methodology used to complete this 5-year review: This review was conducted by staff of the PIFWO of the U.S. Fish and Wildlife Service (USFWS), beginning on May 1, 2023. The review was based on a review of current, available information since the last 5-year review for the oceanic Hawaiian damselfly (*Megalagrion oceanicum*) (USFWS 2019, entire). The evaluation by Elyse Sachs, Fish and Wildlife Biologist, was reviewed by John Vetter, the Animal Recovery Coordinator and acting Recovery Team Manager.

Background:

For information regarding the species' listing history and other facts, please refer to the USFWS Environmental Conservation Online System database for threatened and endangered species at *http://ecos.fws.gov/ecp/species/663*)

Review Analysis:

Please refer to the Recovery Outline for the Island of O‘ahu (USFWS 2018, entire) and the previous 5-year review for the oceanic Hawaiian damselfly published on August 5, 2019 (available at *http://ecos.fws.gov/ecp/species/663*) for a complete review of the species' status, threats, and management efforts. No new threats or no new information regarding the species biological status have come to light since listing to warrant a change in the Federal listing status of the oceanic Hawaiian damselfly as endangered.

The oceanic Hawaiian damselfly is endemic to the island of O‘ahu. The species is thought to be extirpated from the Wai‘anae mountains, with only a small population still occurring on the windward side of the Ko‘olau mountains at elevations above 100 meters (Polhemus and Asquith, 1996, p. 77). The oceanic Hawaiian damselfly typically occurs in lowland mesic, lowland wet, and wet class habitats (USFWS, 2018, p. 5)

New status information:

No new information on the oceanic Hawaiian damselfly (*Megalagrion oceanicum)* biology or life history has become known since the last 5-year review in 2019. The Army

Natural Resources (ARNPO) conducted a two-day survey in the South Kaukōnāhua Drainage, where observations of the oceanic Hawaiian damselfly had been previously recorded, but none were observed during the 2022 surveys (Walter, 2022, p. 1). In a series of surveys completed by USFWS biologist Dan Polhemus from 2021-2022, surveys were done in streams where the oceanic Hawaiian damselfly had been observed many years prior, but none were observed during these surveys. It was noted that the habitat was excellent for the species even though none were encountered (Polhemus, 2022, pp. 16, 18, 55). There are no individuals currently in captive rearing.

New threats:

- Pathogens (yet unidentified) are likely to be a threat to native damselflies, as they are suspected of playing a role in population decline of the orangeblack Hawaiian damselfly (*Megalagrion xanthomelas*) at Tripler Army Medical Center (Haines, 2023, in litt.).
- Habitat poisoning is a potential threat to native Hawaiian damselflies. Exposure to pesticide contamination can cause acute and chronic poisoning and lead to the mortality of non-target. Hawaiian damselfly larvae and eggs can be exposed to pesticide contaminated water through direct contact. In addition, secondary poisoning can occur to Hawaiian damselfly adults and larvae through bioaccumulation by the consumption of contaminated prey. Hawaiian damselfly adults, naiads, and eggs may be directly exposed to pesticide through contaminated water; adults and naiads may also be exposed (USFWS, 2022, p. 15).
- An invasive cnidarian (*Hydra vulgaris*) has been identified preying on damselfly naiads and could be a major threat to native damselflies. This cnidarian appears to be fairly widespread on Oʻahu. Scientists from UC Berkeley (the Gillespie-Roderick lab) are working on detection protocols for Hydra using eDNA to assess how widespread *H. vulgaris* is, and whether native damselflies can coexist with *H. vulgaris* (Haines, 2023, in litt.).
    - Water studies by State of Hawaiʻi Department of Land and Natural Resources Division of Forestry and Wildlife Hawaiʻi Invertebrate Program have shown *H. vulgaris* is a threat to the orangeblack Hawaiian damselfly population located at Tripler Army Medical Center. This common aquarium system pest appears to be preying on damselfly naiads in addition to their other prey (USFWS, 2022, p. 16).

New management actions:

- There are no new management actions at this time.

Table 1. Status and trends of oceanic Hawaiian damselfly from listing through current 5-year review.

Date	No. Adult Wild Individuals	Downlisting Criteria Identified in Recovery Plan	Downlisting Criteria Completed?
2012 (listing)	Unknown	No recovery plan developed yet.	No
2018 (recovery outline)	> 12 from 12 populations	Recovery outline developed.	No
2019 (5-year review)	> 12 from 12 populations	Recovery outline developed.	No
2023 (5-yr review)	> 12 from 12 populations	Recovery outline developed	No

Table 2. Threats to oceanic Hawaiian damselfly and ongoing conservation efforts.

Threats	**Listing Factor**	**Current Status**	**Conservation or Management Actions**
Agriculture/urban development	A	Ongoing	None. Agriculture and urban development continue to pose a threat to the oceanic Hawaiian damselfly's habitat through encroachment and modification of water resources.
Stream alteration	A	Ongoing	None. Ongoing and extensive stream diversion and channelization continues to degrade the quantity and quality of the oceanic Hawaiian damselfly's habitat and needed seeps.
Habitat modification by pigs	A	Ongoing	None. Ongoing habitat destruction and degradation of riparian habitat caused by feral pigs promote the establishment and spread of nonnative plants.
Habitat modification by nonnative plants	A	Ongoing	None. Nonnative plants that displace native species, increase runoff, and modify the riparian community lower or destroy the capability of the habitat to support viable populations of the oceanic Hawaiian damselfly.
Stochastic events	A	Ongoing	None. The apparent restriction of the oceanic Hawaiian damselfly to 12 small populations puts the species at risk of extinction from catastrophic events.
Climate change	A	Ongoing	None. Climate change is expected to affect water levels in stream corridors. Reduced genetic diversity of the remaining populations may limit the ability of the oceanic Hawaiian damselfly to adapt.
Predation	C	Ongoing	None. Ants, bullfrogs, *Hydra vulgaris* and nonnative fish pose threats to the native Hawaiian damselfly adults and naiads.
Inadequate habitat protection	D	Ongoing	None. The State of Hawai'i considers all natural flowing surface water (streams, springs, and seeps) as State property (Hawai'i Revised Statues 174c, 1987). However, the State's Water Commission has not consistently enforced State Water Code regulations to protect the native Hawaiian damselfly's stream and seep habitat. This dewatering may threaten the oceanic Hawaiian damselfly if it proves to be dependent on stream corridors where it has been observed.
Limited populations	E	Ongoing	None. Oceanic Hawaiian damselfly individuals were last observed in 2011 at 2 sites. The species appears to have low representation, resiliency, and redundancy.
Habitat Poisoning	E	New	None.

Syntheses:
There is currently no downlisting criterial for oceanic Hawaiian damselfly, but a Recovery Plan will be developed in the future that will include recovery criteria for the species.

The current population of the species is unknown, and no new individuals have been observed since the last 5-year review published in 2019. The key threats to the species are agriculture and urban development that encroach and modify water resources, stream diversion and channelization that continues to degrade the quantity and quality of the species habitat, modification of the species habitat by pigs and nonnative plants, nonnative predatory species, catastrophic events such as hurricane, landslides, or drought, climate change, habitat poisoning, and lack of population representation, resiliency, and redundancy due to its apparent limited populations. Currently, existing regulations are inadequate to protect this species from introduction of nonnative species and to maintain their aquatic and riparian habitat. These threats are not managed. Therefore, the oceanic Hawaiian damselfly continues to meet the definition of endangered as it remains in danger of extinction throughout its range.

Recommendations for Future Actions:

- Conduct targeted surveys for oceanic Hawaiian damselfly to determine the distribution of the species.
- Based on survey results, stabilize and protect extant populations of oceanic Hawaiian damselfly and develop and implement a recovery plan.
- Identify the primary habitat features and characteristics necessary for oceanic Hawaiian damselfly recovery.
- Identify and evaluate the primary biological characteristics necessary for oceanic Hawaiian damselfly recovery.
- Maintain and protect the habitat of oceanic Hawaiian damselfly.
- Refine and calibrate the indices for invertebrate communities that are used for monitoring programs to improve stream habitat.
- Eliminate or manage nonnative predators of oceanic Hawaiian damselfly.
- Survey, document, and manage threats to oceanic Hawaiian damselfly.
- Eliminate or manage use of pesticides and other pathogens in areas where oceanic Hawaiian damselfly may occur.

References:
See previous 5-year reviews for additional references.

Polhemus, D.A. 2022. Megalagrion Damselfly Surveys in the Koʻolau Mountains of Oʻahu 2021-2022. Final Report. Prepared for Hawaiʻi Department of Land and Natural Resources, Division of Forestry and Wildlife, Natural Area Reserves System, Honolulu. 71 pp.

Polhemus, D.A. and A. Asquith. 1996. Hawaiian damselflies: a field identification guide. Bishop Museum Press, Honolulu. Page 77.

[USFWS] U.S. Fish and Wildlife Service. 2018. Recovery Outline for the Island of Oʻahu. Pacific Islands Fish and Wildlife Office, Honolulu, Hawaiʻi, 42 pp.

[USFWS] U.S. Fish and Wildlife Service. 2019. Oceanic Hawaiian Damselfly (*Megalagrion oceanicum*) 5-Year Review Summary and Evaluation. Pacific Islands Fish and Wildlife Office, Honolulu, Hawaiʻi, 18 pp.

[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 Hawaiʻi. Federal Register 86 (120):33726–33728.

[USFWS] U.S. Fish and Wildlife Service. 2022. Species Report for the Pacific Hawaiian Damselfly (*Megalagrion pacificum*). Pacific Islands Fish and Wildlife Office, Honolulu, Hawaiʻi, 36 pp.

Walter, R. 2022. Schofield Barracks East Range (SBE) Damselfly Surveys. Unpublished Report. 3 pp.

***In Litteris*:**

Haines, W. 2023. Electronic mail message regarding *Megalagrion nigrohamatum nigrolineatum* surveys, captive rearing, and new threats to *Megalagrion* species (June 12, 2023). 1 pp.

U.S. FISH AND WILDLIFE SERVICE
SIGNATURE PAGE for 5-YEAR REVIEW on Oceanic Hawaiian damselfly
(*Megalagrion oceanicum*)

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

Review Conducted By:
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