5-YEAR REVIEW

Short Form Summary

Species Reviewed: Crimson Hawaiian damselfly (*Megalagrion leptodemas*)

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 crimson Hawaiian damselfly (*Megalagrion leptodemas*) (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/5897*)

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 crimson Hawaiian damselfly published on August 5, 2019 (available at http://ecos.fws.gov/ecp/species/5897) 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 crimson Hawaiian damselfly as endangered.

The crimson Hawaiian damselfly is endemic to the island of O‘ahu. This species has been extirpated from the Wai‘anae Mountains and is now limited to a handful of scattered populations in the Ko‘olau mountains (Polhemus and Asquith, 1996, p. 65). The crimson Hawaiian damselfly is the rarest of the endemic O‘ahu damselfly species. The crimson Hawaiian damselfly typically occurs in lowland wet and wet cliff habitats (USFWS, 2018, p. 5).

New status information:
No new information on the crimson Hawaiian damselfly (*Megalagrion leptodemas)* 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 crimson Hawaiian damselfly had been previously recorded, but none were observed during the 2022 surveys (Walter, 2022, p. 1). 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 (*M. 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 the crimson 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)	> 3 from 3 populations	Recovery outline developed.	No
2019 (5-year review)	> 3 from 3 populations	Recovery outline developed.	No
2023 (5-yr review)	> 3 from 3 populations	Recovery outline developed	No

Table 2. Threats to the crimson 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 crimson Hawaiian damselfly habitat through encroachment and modification.
Stream alteration	A	Ongoing	None, ongoing and extensive stream diversion and channelization continues to degrade the quantity and quality of crimson Hawaiian damselfly 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 continue to displace native species, increase runoff, and modify the riparian community or destroy the capability of the habitat to support viable populations of the crimson Hawaiian damselfly.
Stochastic events	A	Ongoing	None, the apparent restriction of the crimson Hawaiian damselfly to 3 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 crimson Hawaiian damselfly to adapt.
Predation	C	Ongoing	None, ants, bullfrogs, *Hydra vulgaris* and nonnative fish continue to pose threats to crimson Hawaiian damselfly individuals.
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 native Hawaiian damselfly stream and seep habitat. This dewatering may threaten the crimson Hawaiian damselfly if it proves to be dependent on seeps, streams, and the stream corridors where it has been observed.
Limited populations	E	Ongoing	None, crimson Hawaiian damselfly individuals were last observed in 2016 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 for the crimson 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 crimson 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 crimson Hawaiian damselfly to determine the distribution of the species.
- Based on survey results, stabilize and protect extant populations of crimson Hawaiian damselfly and develop and implement a recovery plan.
- Identify the primary habitat features and characteristics necessary for crimson Hawaiian damselfly recovery.
- Identify and evaluate the primary biological characteristics necessary for crimson Hawaiian damselfly recovery.
- Maintain and protect the habitat of crimson 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 crimson Hawaiian damselfly.
- Survey, document, and manage threats to crimson Hawaiian damselfly.
- Eliminate or manage use of pesticides and other pathogens in areas where crimson Hawaiian damselfly may occur.

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

Polhemus, D.A. and A. Asquith. 1996. Hawaiian damselflies: a field identification guide. Bishop Museum Press, Honolulu. Page 65.

[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. Crimson Hawaiian Damselfly (*Megalagrion leptodemas*) 5-Year Review Summary and Evaluation. Pacific Islands Fish and Wildlife Office, Honolulu, Hawaiʻi, 20 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 Crimson Hawaiian damselfly
(*Megalagrion leptodemas*)

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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