

5-YEAR REVIEW

Short Form Summary

Species Reviewed: Picture-wing Fly (*Drosophila aglaia*)

Current Classification: Endangered

Federal Register Notice announcing initiation of this review:

[USFWS] U.S. Fish and Wildlife Service. 2022. Endangered and threatened wildlife and plants; initiation of 5-year status reviews of 167 species in Oregon, Washington, Idaho, Montana, California, Hawai‘i, Guam, and the Northern Mariana Islands. Federal Register 87 (90): 28,031–28,034.

Lead Region/Field Office:

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

Name of Reviewer(s):

Charmian Dang, Fish and Wildlife Biologist, PIFWO

John Vetter, Animal 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 PIFWO of the U.S. Fish and Wildlife Service (USFWS), beginning in October of 2023. The review was based on a review of current, available information since the last 5-year review for *Drosophila aglaia* (USFWS 2019, entire). The evaluation by Charmian Dang, Fish and Wildlife Biologist, was reviewed by John Vetter, the Animal Recovery Coordinator, and Megan Lau, the Recovery Team Manager.

Background:

For information regarding the species’ listing history and other facts, please refer to the USFWS Environmental Conservation Online System (ECOS) database for threatened and endangered species (<https://ecos.fws.gov/ecp/species>).

Review Analysis:

Please refer to the previous 5-year reviews for *Drosophila aglaia* published on August 28, 2012 and July 15, 2019 (available at <https://ecos.fws.gov/ecp/species/212>), for a complete review of the species’ status, threats, and management efforts. No new information regarding the species’ biological status has come to light since listing to warrant a change in the Federal listing status of *D. aglaia* as endangered.

This picture-wing fly is an endangered endemic species found only on the island of O‘ahu. The species uses plants in the Urticaceae family as its host plants, mostly *Touchardia oahuensis* (formerly *Urera glaba*; ōpuhe) and *Urera kaalae* (also known as ōpuhe), a federally endangered species. The current status and trends for *Drosophila aglaia* are provided in the tables below.

New status information:

No new records of *Drosophila aglaia* have been documented since the previous 5-year review. The Army Natural Resources Program (ANRP) conducts regular surveys for *Drosophila* species at several sites in the Waianae mountains, including at Palikea where this species was last observed in 1997, but no individuals of *D. aglaia* have been recorded (ANRP 2019, p. 193-195; ANRP 2020, p. 187-188; ANRP 2021, p. 176; ANRP 2022, p. 182; ANRP 2023, p. 198).

New Threats:

Western yellowjackets, *Vespula pensylvanica*, have been monitored at Palikea and Hāpapa, but monitoring was stopped due to their consistently low numbers, and consequently low expected impact (ANRP 2019, p. 197; ANRP 2020, p. 179). The thief ant, *Solenopsis papuana*, has been found to exert a significant negative impact on *Drosophila* reproductive success, and work is currently underway on the best way to manage them on the landscape (ANRP 2020, p. 179).

New management actions:

At Palikea (where *Drosophila aglaia* was last observed in 1997), approximately 35 endemic *Touchardia oahuensis* (formerly *Urera glabra*) and 110 endangered *U. kaalae* individuals were outplanted between 2017–2018; 77 *T. oahuensis* individuals were outplanted between 2018–2019; and 106 *T. oahuensis* were outplanted between 2019–2020 by the ANRP to expand habitat for the endangered *D. montgomeryi* (ANRP 2020, p. 178). Outplanted *T. oahuensis* individuals have done exceptionally well; after six years many are large sprawling trees, 8–10 feet tall (ANRP 2019, p. 190; ANRP 2020, p. 173; ANRP 2021, p. 171; ANRP 2022, p. 174). Weed control is ongoing as some parts of the restoration area currently lack canopy cover and are susceptible to heavy invasion of invasive plants (ANRP 2019, p. 190; ANRP 2020, p. 173; ANRP 2021, p. 171).

In addition to the ANRP's outplanting program, the Hawai'i Department of Land and Natural Resources Division of Forestry and Wildlife (DLNR-DOFAW) and the O'ahu Plant Extinction Prevention Program (OPEPP) have outplanted *Urera kaalae* at various sites (Palikea, Kalua'ā, Hāpapa, 'Ēkahanui, Pahole, and Mākaha) (ANRP 2018, p. 185; ANRP 2019, p. 190; ANRP 2020, p. 173; ANRP 2021, pp. 169, 171–172; ANRP 2022, pp. 172–175; ANRP 2023, pp. 188, 190, 192). In 2021, DLNR-DOFAW and OPEPP outplanted close to 1,500 *U. kaalae* individuals in Honouliuli, 500 *U. kaalae* individuals in Palikea, 500 *U. kaalae* individuals in 'Ēkahanui, and 350 *U. kaalae* individuals in Kalua'ā (Ching 2022 in litt., entire).

The DLNR-DOFAW is actively managing the Honouliuli Forest Reserve with fence maintenance, construction of ungulate exclosures, and ungulate control. It also maintains the fire break and water catchment tanks in this forest reserve (Peralta 2022, in litt., entire).

Synthesis:

Since the last 5-year review was completed in 2019, no new information on the status of *Drosophila aglaia* has been collected. Historically, a total of 20 individuals had been observed during bait-based surveys conducted since April of 1969 in the range of *D. aglaia* (Kaneshiro 2005, in litt.; Magnacca 2012a, in litt.; OANRP 2007). The historical sites

include: three lowland mesic forest sites in Makaleha Valley, Palikea, and Peacock Flat (Kapuahikahi); one site in the diverse mesic forest at Pu‘u Kaua; one lowland, dry to mesic forest site at Pu‘u Pane (Kaneshiro 2005, in litt.); and Ka‘ala, where *D. aglaia* was first collected by Harding in 1946 (USFWS 2012, p. 6).

The last observation of this species occurred in May of 1997 during a survey at Palikea. This species has not been observed at the other historical sites since 1970 or 1971. However, Makaleha Valley and Peacock Flats (Kapuahikahi Gulch) have not been surveyed since the 1970s and Pu‘u Pane has been surveyed only once in 1991 (Kaneshiro 2005, in litt.).

Drosophila aglaia flies have not been observed in subsequent surveys conducted between 2006 and 2011 at Palikea, Pu‘u Kalena, Kalua‘ā Gulch, and Pu‘u Hāpapa, or along Ka‘ala trail (Magnacca 2012a, in litt.). Other listed *Drosophila* species have been observed during these surveys. The rarity in detection of *D. aglaia* and the wide variability in detection of *Drosophila* species in general, complicate estimation of population abundance, structure, and demographic. Previously identified, ongoing threats, continue to place *D. aglaia* in danger of extinction. New surveys are needed to demonstrate this species is still extant.

A Draft Recovery Outline that included *Drosophila aglaia* was published in August of 2006. No Final Recovery Plan for *D. aglaia* has been written, thus, recovery criteria and goals have not been identified for this species. Threats identified in the Final Listing Rule and Draft Recovery Outline are not sufficiently managed throughout the range of the species (Table 2). Therefore, *D. aglaia* meets the definition of endangered as it remains in danger of extinction throughout its range.

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

Date	No. wild individuals	Downlisting Criteria identified in Recovery Plan	Downlisting Criteria completed?
2006 (Listing)	No recent sightings	Not yet established	N/A
2006 (Draft Recovery Outline)	No recent sightings	Not yet established	N/A
2008 (Critical Habitat)	No recent sightings	Not yet established	N/A
2012 (5-year review)	No recent sightings	Not yet established	N/A
2019 (5-year review)	No recent sightings	Not yet established	N/A
2024 (5-year review)	No recent sightings	Not yet established	N/A

Table 2. Threats to *Drosophila aglaia* and ongoing conservation efforts.

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Ungulate degradation of habitat	A	Ongoing	Yes. OANRP's 2009 INRMP include feral ungulate control in areas within and adjacent to the West Range of Schofield Barracks Military Reservation. Hawai'i Department of Land and Natural Resources, Division of Forestry and Wildlife is actively managing the Honouliuli Forest Reserve with fence maintenance, construction of ungulate exclosures, and ungulate control.
Established ecosystem altering invasive plant species degradation of habitat	A	Ongoing	Yes. OANRP's 2009 INRMP included nonnative plant control in areas within and adjacent to the West Range of Schofield Barracks Military Reservation.
Climate change degradation or loss of habitat	A, E	Increasing	No.
Rodent predation or herbivory degradation of habitat	C	Ongoing	No. <i>Touchardia oahuensis</i> (formerly <i>Urera glabra</i>) and <i>U. kaalae</i> are vulnerable to rat predation and the plants are vulnerable to habitat degradation.
Alien predators - Invertebrates	C	Ongoing	No. <i>Drosophila aglaia</i> face substantial predation pressure from nonnative insects such as yellowjacket wasps and ants.
Inadequacy of existing regulatory mechanisms	D	Ongoing	Yes. O'ahu has a biosecurity program in place to prevent introduction of invasive species but the program is in its beginning stage.
Alien competitors	D, E	Ongoing	No. <i>Drosophila aglaia</i> larval stage may possibly face resource competition from nonnative tipulid flies (crane flies, family Tipulidae). Existing regulations offer inadequate protection to these species from the introduction of nonnative insects and the loss of their host plants.
Human disturbance	E	Ongoing	No.
Environmental catastrophes	E	Ongoing	No.

Stochastic events— Reduced viability due to low numbers	E	Ongoing	No. <i>Drosophila aglaia</i> has not been documented since 1997. No current population or distribution is known. No <i>D. aglaia</i> are in captive rearing.
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Recommendations for Future Actions:

- Survey and Inventory—Develop and implement a systematic *Drosophila aglaia* survey and monitoring plan that includes historic habitats and other suitable habitats on O‘ahu.
- Develop and implement a Recovery Plan and Recovery Implementation Strategy.
- Habitat and natural process protection, management, and restoration.
 - Protect, manage, and restore *Drosophila aglaia* habitat and host plants, *Touchardia oahuensis* (= *Urera glabra*) and *Urera kaalae*, habitat.
 - Evaluate the need to re-establish or supplement *Touchardia oahuensis* and *Urera kaalae* and wild picture-wing fly populations within their historical range.
- Evaluate *Touchardia oahuensis* and *Urera kaalae* population and enhance age class structure from seedling to senescent phase, if necessary.
- Survey and document predator threats.
- Ungulate monitoring and control.
 - Construct and maintain fenced exclosures to protect all *Drosophila aglaia* life stages and host plant from the negative impacts of feral ungulates.
 - Monitor fenced areas to maintain absence of ungulates.
- Fire, predation, herbivore, and disease monitoring and control—Implement effective control methods for fire, rat, nonnative insect, predator, and ungulate threats, and habitat altering plant disease within the vicinity of *Drosophila aglaia* and its host plants populations.
- Climate change adaptation strategy—Research the suitability of habitat for reintroducing this species and its host plants in the future due to the impacts of climate change.
- Stochastic events—build resilience and redundancy—Increase numbers of populations and individuals scattered through the historic range to reduce impacts from low numbers.
- Population biology research.
 - Conduct biological and ecological research on *Drosophila aglaia*.
 - Conduct biological and ecological research on the host plants of *Drosophila aglaia*.
- Captive rearing and reintroduction—Evaluate the need to develop and implement a captive rearing and reintroduction program for *Drosophila aglaia* in its historic range.
- Alliance and partnership development—Coordination efforts with stake holders for host plants management and invasive plant, insect, and mammal control.
- Outreach and Education – Develop and implement a public information program.

References:

See previous 5-year reviews completed in 2012 and 2019 for a more complete list of references (USFWS 2012, 2019). Only references not included in these documents are provided below.

[ANRP] Army Natural Resources Program, O‘ahu. 2019. Status report for the Mākua and O‘ahu Implementation Plans. U.S. Army Garrison, Hawai‘i. 253 pp.

[ANRP] Army Natural Resources Program, O‘ahu. 2020. Status report for the Mākua and O‘ahu Implementation Plans. U.S. Army Garrison, Hawai‘i. 238 pp.

[ANRP] Army Natural Resources Program, O‘ahu. 2021. Status report for the Mākua and O‘ahu Implementation Plans. U.S. Army Garrison, Hawai‘i. 232 pp.

[ANRP] Army Natural Resources Program, O‘ahu. 2022. Status report for the Mākua and O‘ahu Implementation Plans. U.S. Army Garrison, Hawai‘i. 255 pp.

[ANRP] Army Natural Resources Program, O‘ahu. 2023. Status report for the Mākua and O‘ahu Implementation Plans. U.S. Army Garrison, Hawai‘i. 281 pp.

[USFWS] U.S. Fish and Wildlife Service. 2019. *Drosophila aglaia* (Picture-wing Fly) 5-Year Review Summary and Evaluation. 6 pp.

[USFWS] U.S. Fish and Wildlife Service. 2022. Endangered and threatened wildlife and plants; initiation of 5-year status reviews of 167 species in Oregon, Washington, Idaho, Montana, California, Hawai‘i, Guam, and the Northern Mariana Islands. Federal Register 87(90): 28,031–28,034.

In Litteris

Ching, S. 2022. in litt. Email communication between Susan Ching, O‘ahu State Biologist, Division of Forestry and Wildlife and Charmian Dang, U.S. Fish and Wildlife Service, Honolulu, Hawai‘i on January 7, 2022.

Peralta, R. 2022. in litt. Email communication between Ryan Peralta, Forest Management Supervisor, Division of Forestry and Wildlife and Charmian Dang, U.S. Fish and Wildlife Service, Honolulu, Hawai‘i on January 7, 2022.

**U.S. FISH AND WILDLIFE SERVICE
SIGNATURE PAGE for 5-YEAR REVIEW of
Picture-wing Fly (*Drosophila aglaia*)**

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

Review Conducted By:

Charmian Dang, Fish and Wildlife Biologist, PIFWO
John Vetter, Animal Recovery Coordinator, PIFWO
Megan Laut, Recovery Team Manager, PIFWO

for **Field Supervisor, Pacific Islands Fish and Wildlife Office**
