

## 5-YEAR REVIEW

### Short Form Summary

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

**Current Classification:** Endangered

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

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 montgomeryi* (USFWS 2019, entire). The evaluation by Charmian Dang, Fish and Wildlife Biologist, was reviewed by John Vetter, the Animal Recovery Coordinator, and Megan Laut, 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 montgomeryi* published on August 28, 2012 and May 19, 2019 (available at <https://ecos.fws.gov/ecp/species/2595>), 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. montgomeryi* as endangered.

This picture-wing fly is an endangered endemic species found only on the island of O‘ahu. It uses species in the family Urticaceae as its host plant, especially the federally endangered *Urera kaalae* (ōpuhe). The current status and trends for *Drosophila montgomeryi* are provided in the tables below.

**New status information:**

At Palikea, a maximum of one individual was observed during bait surveys in one day in 2017–2018 (ANRP 2018, p. 183); a maximum of two individuals were observed during bait surveys in one day in 2018–2019 (ANRP 2019, p. 189); a maximum of one individual was observed during bait surveys in one day in 2019–2020 (ANRP 2020, p. 172); a maximum of three individuals were observed during bait surveys in one day in 2020–2021 (ANRP 2021, p. 169); and no individual was observed during bait surveys in one day between 2021 and 2023 (ANRP 2022, p. 173; ANRP 2023, p. 189). *Drosophila montgomeryi* is seen at Palikea almost exclusively during the summer dry months, rather than in the winter as at other sites (ANRP 2020, p. 173; ANRP 2021, p. 171).

At Kalua‘ā-Central, a maximum of 22 individuals were observed during bait surveys in one day in 2017–2018 (ANRP 2018, p. 183); a maximum of 29 individuals were observed during bait surveys in one day in 2018–2019 (ANRP 2019, p. 189); a maximum of 15 individuals were observed during bait surveys in one day in 2019–2020 (ANRP 2020, p. 172); a maximum of nine individuals were observed during bait surveys in one day in 2020–2021 (ANRP 2021, p. 169); a maximum of 18 individuals were observed during bait surveys in one day in 2021–2022 (ANRP 2022, p. 173); and a maximum of 14 individuals were observed during bait surveys in one day in 2022–2023 (ANRP 2023, p. 189).

At Kalua‘ā-North, a maximum of eight individuals were observed during bait surveys in one day in 2017–2018 (ANRP 2018, p. 183); a maximum of two individuals were observed during bait surveys in one day in 2018–2019 (ANRP 2019, p. 189); a maximum of two individuals were observed during bait surveys in one day in 2019–2020 (ANRP 2020, p. 172); a maximum of five individuals were observed during bait surveys in one day in 2020–2021 (ANRP 2021, p. 169); no individual was observed during bait surveys in one day in 2021–2022 (ANRP 2022, p. 173); and a maximum of one individual was observed during bait surveys in one day in 2022–2023 (ANRP 2023, p. 189).

At Pu‘u Hāpapa, a maximum of 18 individuals were observed during bait surveys in one day in 2017–2018 (ANRP 2018, p. 183); a maximum of 19 individuals were observed during bait surveys in one day in 2018–2019 (ANRP 2019, p. 189); a maximum of 12 individuals were observed during bait surveys in one day in 2019–2020 (ANRP 2020, p. 172); a maximum of eight individuals were observed during bait surveys in one day in 2020–2021 (ANRP 2021, p. 169); a maximum of five individuals were observed during bait surveys in one day in 2021–2022 (ANRP 2022, p. 173); and a maximum of 12 individuals were observed during bait surveys in one day in 2022–2023 (ANRP 2023, p. 189).

No individuals were observed during bait surveys in one day at Puali‘i, Mākaha, and Kahanahāiki in 2017–2018 (ANRP 2018, p. 183); no surveys were conducted between 2018 and 2020 (ANRP 2019, p. 189; ANRP 2020, p. 172). At ‘Ēkahanui, no surveys were conducted between 2018 and 2020 (ANRP 2019, p. 189; ANRP 2020, p. 172); no individuals were observed during bait surveys in one day between 2020 and 2023 (ANRP 2021, p. 169; ANRP 2022, p. 173; ANRP 2023, p. 189). However, this site was part of the reintroduction program for captive-reared individuals in 2023 (HDLNR 2023, p. 25).

Wai‘anae Kai Forest Reserve is not a managed population by ANRP, but historically contained the largest known population of *Drosophila montgomeryi*. A maximum of 52 individuals were observed during bait surveys in one day in 2017–2018 (ANRP 2018, p. 183); a maximum of 51 individuals were observed during bait surveys in one day in 2018–2019 (ANRP 2019, p. 189); no individual was observed during bait surveys in one day in 2019–2020 (ANRP 2020, p. 172); a maximum of 16 individuals were observed during bait surveys in one day in 2020–2021 (ANRP 2021, p. 169); a maximum of nine individuals were observed during bait surveys in one day in 2021–2022 (ANRP 2022, p. 173); and a maximum of four individuals were observed during bait surveys in one day in 2022–2023 (ANRP 2023, p. 189). Much of the host plant canopy (*Touchardia oahuensis*) in this area has disappeared due to rock fall, pigs, and invasive slugs that prevent recruitment and this decline has made it a priority to conserve individuals from this population (HDLNR 2023, p. 24). Adult individuals and larvae were collected from the site to start the captive rearing and reintroduction program led by the Hawai‘i Department of Land and Natural Resources Division of Forestry and Wildlife (DLNR-DOFAW) (HDLNR 2023, p. 10-11).

#### **New Threats:**

Western yellowjackets, *Vespula pensylvanica*, has 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. The big-headed ant, *Pheidole megacephala*, is present in parts of Puali‘i and is partially controlled, but seems to expand during dry weather and retreat in wetter conditions (ANRP 2018, p. 184; ANRP 2019, p. 189; ANRP 2020, pp. 173, 179).

#### **New management actions:**

The Army Natural Resources Program (ANRP) has been outplanting the host plant *Touchardia oahuensis* (= *Urera glabra*; ōpuhe) at various locations where *Drosophila montgomeryi* has been sighted. These include Palikea, Puali‘i, North and Central Kalua‘ā, and Hāpapa (ANRP 2018, pp. 183–186; ANRP 2019, pp. 189–191; ANRP 2020, pp. 173–179; ANRP 2021, pp. 170–172; ANRP 2022, pp. 174–175; ANRP 2023, pp. 190–192) and ‘Ēkahanui (ANRP 2020, p. 179; ANRP 2021, pp. 171–172; ANRP 2022, pp. 174–175; ANRP 2023, pp. 191–192). In addition, *T. oahuensis*, which has been growing rapidly and becoming established at outplanting sites, is being incorporated into general habitat restoration where appropriate (ANRP 2018, pp. xvii, 183–185; ANRP 2019, p. 190; ANRP 2020, pp. 173–175; ANRP 2021, pp. 170–171; ANRP 2022, p. 174; ANRP 2023, p. 190). Weed management occurred in areas where the ANRP found *D. montgomeryi* (ANRP 2018, pp. 184–185; ANRP 2019, p. 190; ANRP 2020, pp. 173–175; ANRP 2021, pp. 170–171; ANRP 2022, p. 174; ANRP 2023, p. 190).

In addition to the ANRP’s outplanting program, DLNR-DOFAW and the O‘ahu Plant Extinction Prevention Program (OPEPP) have outplanted *Urera kaalae* (ōpuhe) 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 presence of large populations of host plants provides an important resource for reestablishment of *D. montgomeryi*.

The ANRP decided to implement several new steps for the management of *Drosophila montgomeryi* in 2021. These include ant and slug control in addition to the existing ungulate and weed control at management sites (ANRP 2021, p. 171; ANRP 2022, pp. 174–175; ANRP 2023, p. 191). In July of 2016, big-headed ants were found in the lower portion of the fenced unit around the *Urera kaalae* outplantings in Puali‘i population units. Although present in the gulch well below the fence, the big-headed ants had not previously been noted at this site and would be a threat to *Drosophila*. Over the past year, ant control has been successfully implemented, first across the entire population and then targeting remnants. In 2018, only one small patch of big-headed ants remained in the gulch bottom above the fence (ANRP 2018, p. 184). Their range expands and contracts with vegetation and microclimate changes, as they avoid darker and moister sites. Several large portions of the gulch are open and dry and susceptible to invasion of ants from adjacent alien-dominated areas. It is expected that increased cover as outplants and other native trees expand will reduce the area of suitable habitat for ants in the future (ANRP 2019, p. 189). The ANRP began ant control in North and Central Kalua‘ā with applications of Amdro Home Perimeter bait in March of 2021. The treatment area at the two sites are 600m<sup>2</sup> and 760 m<sup>2</sup>, respectively. A survey of both sites in June found ants still almost completely suppressed within the target area, despite very high numbers in the adjacent untreated parts of the gulch. These sites will be periodically resurveyed and re-treated at intervals of 3 and 6 months along with regular fly monitoring for evaluation of effectiveness. Palikea has very low abundance of thief ant, so it will not be treated unless conditions change (ANRP 2021, pp. 171–172; ANRP 2022, p. 175; ANRP 2023, p. 191).

Slugs are known to be destructive herbivores on *Urera* and *Touchardia* seedlings, and *Urera* exhibit almost no natural recruitment due to slug predation. The ANRP began slug control with application of Ferroxx®AQ when *T. oahuensis* began fruiting in the fall of 2021, 2022, and 2023. This was limited to North Kalua‘ā, since several trees fruit prolifically and two *Achatinella mustelina* were recently observed at Central Kalua‘ā. Pu‘u Hāpapa is known to have snails outside the predator-free enclosure so there are no plans to bait here. Nighttime surveys for *Achatinella* snails will be conducted prior to bait application (ANRP 2021, p. 172; ANRP 2022, p. 175; ANRP 2023, p. 192).

In January of 2023 the ANRP conducted a trial eDNA survey for picture-wing flies at East Manuwai. The sampling used was based on current monitoring techniques using baited sponges but were conducted over several days. This is intended to detect the presence of very low-density populations of *Drosophila* in their habitat which will prompt further monitoring of an area (ANRP 2023, pp. 196. 204).

In 2022, the *Drosophila* Rearing Program started rearing several rare *Drosophila*, including *D. montgomeryi* through a collaboration with Hawai‘i DLNR-DOFAW and ANRP (ANRP 2022, p. 176). Initially adult individuals were collected from Wai‘anae Kai Forest Reserve, however, these failed to reproduce in captivity, so around 50 larvae were collected and reared, which

produced a successful colony (HDLNR 2023, p. 10-11). The *D. montgomeryi* colony is housed at the University of Hawai‘i and has successfully produced over 10,500 individuals through 2023 (HDLNR 2023, p 21-22). The captive population has served as a source for reintroductions at two locations on O‘ahu – Mānoa Cliff Restoration Area in the southern Ko‘olau and ‘Ēkahanui in the Wai‘anaes. Over 6,500 individual *D. montgomeryi* have been released at Mānoa Cliff and another 3,900 individuals at ‘Ēkahanui. Initial releases show promise and more releases and continued monitoring of the sites is planned for 2024 (HDLNR 2023, p. 25-27).

*Drosophila* yeast trials is in its beginning stage and are being conducted by DOFAW to assess the attractiveness of wild yeasts associated with *Drosophila* host plants. Since the 1970s the primary method of attracting Hawaiian picture-wing flies has been through sponges baited with fermented mushroom juice and a banana mash containing baker’s yeast, *Saccharomyces cerevisiae*. In the decades since these baits were developed, many studies have been conducted focusing on the mutualistic relationships between *Drosophila* and various yeast species. Some of the benefits highlighted in such trials include increased survivorship, faster physical development, higher fecundity in adults, and higher rates of attraction to certain species of yeast (ANRP 2023, p. 201).

The yeast trials focused on the hypothesis that highly host specific (one or two species of host plants) *Drosophila* species, such as *Drosophila montgomeryi*, are also highly specific in their relationship to the yeast species found within their host plants. If these *Drosophila* species are more attracted to the chemical signals of the yeasts found in rotting materials of their host plants, these yeast species may be used in bait traps instead of baker’s yeast to attract more flies during monitoring and help the ANRP acquire a more accurate population estimate of this species (ANRP 2023, p. 201).

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:**

Endemic to the island of O‘ahu, *Drosophila montgomeryi* is a picture-wing fly that is currently known on lands managed by the Army and nearby state-managed land. This species is known from ten sites that are regarded as five population units (PU) (Kalua‘ā (all three sites collectively), Puali‘i, and Palikea), effectively covering nearly its entire range in the Wai‘anae Mountains. The species is still found regularly at Palikea, Kalua‘ā, and Pu‘u Hāpapa, all of which the ANRP manages (ANRP 2018, p. 183; ANRP 2019, p. 189; ANRP 2020, p. 172; ANRP 2021, p. 169; ANRP 2022, p. 173; ANRP 2023, p. 189). In addition, it is known from Wai‘anae Kai Forest Reserve, which is unmanaged, and where the population is declining (ANRP 2018, p. 183; ANRP 2019, p. 189; ANRP 2020 p. 172; ANRP 2021, p. 169; ANRP 2022, p. 173; ANRP 2023, p. 189; HDLNR 2023 p. 10-11). In addition to the known wild populations, over 10,000 individuals were reintroduced at two sites (Mānoa Cliff Restoration Area and ‘Ēkahanui) in 2023 (HDLNR 2023, p. 25-27). Future reintroductions are planned for these sites.

No individuals were observed during bait surveys in one day at Puali‘i, Mākaha, and Kahanahāiki in 2017–2018 (ANRP 2018, p. 183); no surveys were conducted between 2018 and 2020 (ANRP 2019, p. 189; ANRP 2020, p. 172). At ‘Ēkahanui, no surveys were conducted between 2018 and 2020 (ANRP 2019, p. 189; ANRP 2020, p. 172); no individuals were observed during bait surveys in one day between 2020 and 2023 (ANRP 2021, p. 169; ANRP 2022, p. 173; ANRP 2023, p. 189).

A Draft Recovery Outline that included *Drosophila montgomeryi* was published in August of 2006. No Final Recovery Plan for *D. montgomeryi* has been written, and, 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. montgomeryi* meets the definition of endangered as it remains in danger of extinction throughout its range.

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

Date	No. wild individuals	Downlisting Criteria identified in Recovery Plan	Downlisting Criteria completed?
2006 (Listing)	210 individuals were observed between 1966 and 1997 at Alaeihe Gulch, Kalua‘ā Gulch, and Pu‘u Kāua.	Not yet established	N/A
2006 (Draft Recovery Outline)	No recent sightings	Not yet established	N/A
2008 (Critical Habitat)	1 individual was observed in 2007 at Pu‘u Kalena	Not yet established	N/A
2012 (5-year review)	57 individuals were observed at Pu‘u Kalena between 2008 and 2009; 3 individuals were observed at Pu‘u Hāpapa in 2010 and 1 individual was observed at Kalua‘ā Gulch in 2010.	Not yet established	N/A
2019 (5-year review)	Between 2014 and mid-2018 a maximum of 5 individuals were observed during bait surveys in one day at Palikea; between	Not yet established	N/A

	<p>2013 and mid-2018 a maximum of 34 individuals were observed during bait surveys in one day at Kalua‘ā; between 2014 and 2017 a maximum of 6 individuals were observed during bait surveys in one day at Puali‘i; between 2014 and mid-2018 a maximum of 86 individuals were observed during bait surveys in one day at Wai‘anae Kai; between 2014 and 2016 a maximum of 3 individuals were observed during bait surveys in one day at Schofield Barracks South; between 2007 and 2014 a maximum of 45 individuals were observed during bait surveys in one day at Schofield Barracks West.</p>		
2024 (5-year review)	<p>Between 2018 and mid-2023 a maximum of 3 individuals were observed during bait surveys in one day at Palikea; between 2018 and mid-2023 a maximum of 29 individuals were observed during bait surveys in one day at Kalua‘ā-Central; between 2018 and mid-2023 a maximum of 8 individuals were observed during bait</p>	Not yet established	N/A

	<p>surveys in one day at Kalua‘ā North; between 2018 and mid-2023 a maximum of 19 individuals were observed during bait surveys in one day at Pu‘u Hāpapa; between 2018 and mid-2023 a maximum of 52 individuals were observed during bait surveys in one day at Wai‘anae Kai; between 2020 and mid-2023 no individuals were observed during bait surveys in one day at ‘Ēkahanui; no individuals were observed during bait surveys in one day at Puali‘i, Mākaha, and Kahanahāiki in 2017–2018.</p>		
--	--	--	--

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

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Ungulate degradation of habitat	A	Ongoing	Yes. OANRP’s 2009 INRMP included 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 species 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	Yes. Host plants are vulnerable to rat and slug predation and are vulnerable to habitat degradation. The ANRP began slug control when <i>Touchardia oahuensis</i> (= <i>U. glabra</i> ) began fruiting in the fall of 2021, 2022, and 2023; this was limited to North Kalua‘ā.
Alien predators - Invertebrates	C	Ongoing	Yes. <i>Drosophila montgomeryi</i> face substantial predation pressure from nonnative insects such as yellowjacket wasps and ants. The ANRP began ant control for the big-headed ants, <i>Pheidole megacephala</i> , in North and Central Kalua‘ā with applications of Amdro Home Perimeter bait in March of 2021. These sites will be periodically resurveyed and re-treated at intervals of 3 and 6 months along with regular fly monitoring for evaluation of effectiveness. Ant control is also occurring at Puali‘i
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 montgomeryi</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 plant.
Human disturbance	E	Ongoing	No.
Environmental catastrophes	E	Ongoing	No.
Stochastic events— Reduced viability due to low numbers	E	Ongoing	No. Surveys are currently being conducted on lands managed by the Army. <i>Drosophila montgomeryi</i> is in captive rearing and will be release in fall of 2023 at ‘Ēkahanui.

**Recommendations for Future Actions:**

- Survey and Inventory - Develop and implement a systematic *Drosophila montgomeryi* 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 montgomeryi* habitat and *Urera kaalae*, and possibly *Touchardia oahuensis* (= *Urera glabra*), habitat.
  - Evaluate the need to re-establish or supplement *Urera kaalae*, *Touchardia oahuensis*, and wild picture-wing fly populations within their historical range.
- Evaluate *Urera kaalae* and *Touchardia oahuensis* 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 montgomeryi* life stages and host plants 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 montgomeryi* and its host plant 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 by continuing and expanding the captive rearing and reintroduction program.
- Population biology research.
  - Conduct biological and ecological research on *Drosophila montgomeryi*.
  - Conduct biological and ecological research on the host plants of *Drosophila montgomeryi*.
- Alliance and partnership development - Coordination efforts with stake holders for host plant 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. 2018. Status report for the Mākua and O‘ahu Implementation Plans. U.S. Army Garrison, Hawai‘i. 261 pp.

[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.

[HDLNR] Hawai‘i Department of Land and Natural Resources, Division of Forestry and Wildlife. 2023. Report to the U.S. Fish and Wildlife Service for Native Endangered Species Recovery Permit. Permit: TE19045C-3. Reporting Period: January 1, 2023–December 31, 2023.

[USFWS] U.S. Fish and Wildlife Service. 2019. *Drosophila montgomeryi* (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 montgomeryi*)**

**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**

---