# 5-YEAR REVIEW

Short Form Summary

**Species Reviewed**: Oloma‘o or Moloka‘i Thrush (*Myadestes lanaiensis rutha*)

**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.

**Lead Region/Field Office**:

Region 1/Pacific Islands Fish and Wildlife Office (PIFWO), Honolulu, Hawaii

**Name of Reviewer(s)**:

Jay Nelson, Fish and Wildlife Biologist, PIFWO

John Vetter, Animal Recovery Coordinator/Acting 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 of the U.S. Fish and Wildlife Service (USFWS), beginning on April 5, 2023. The review was based on a review of current, available information since the last 5-year review for oloma‘o (USFWS 2018). The evaluation by Jay Nelson, Fish and Wildlife Biologist, was reviewed and approved 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 Fish and Wildlife Service’s Environmental Conservation On-line System (ECOS) database for threatened and endangered species at: *http://ecos.fws.gov/tess_public*.

**Review Analysis**:

Please refer to the previous 5-year reviews for oloma‘o (*Myadestes lanaiensis rutha*) published on June 24, 2018 (available at: https://ecos.fws.gov/docs/tess/species_nonpublish/2548.pdf), August 20, 2015 (available at: https://ecos.fws.gov/docs/tess/species_nonpublish/2294.pdf), and July 29, 2009 (available at: https://ecos.fws.gov/docs/tess/species_nonpublish/1440.pdf) for a complete review of the species’ status, threats, and management efforts.

The oloma‘o is a medium sized solitaire with olive-brown upper parts, grayish white underparts, and a buffy patch at the base of the primaries. The bill and legs are dark. Juveniles exhibit the same scalloped plumage as other young native thrushes; i.e., ‘ōma‘o (*Myadestes obscurus*) and puaiohi or small Kaua‘i thrush (*Myadestes palmeri*) (USFWS 2006, p. 2-26).

New Status information:

- The last confirmed detection of oloma‘o was in 1980 (Reynolds and Snetsinger 2001, p. 136).
- No confirmed sightings of oloma’o occurred during forest bird surveys on east Moloka‘i in 2021 in areas with historical occurrences of the species (MFBRP 2021, entire). However, two

qualified observers heard a bird off a cliff in Pu‘u Ali‘i Natural Area Reserve (Pu‘u Ali‘i NAR), which sounded “thrush-like.” Observers recorded the bird as an “unknown species” (A. Wang, Hawai‘i Department of Land and Natural Resources [DOFAW], pers. comm., 2023).

- During a four-day Olokui Plateau biological survey in 2015 there were several sightings of oloma‘o near Ohialele in The Nature Conservancy’s Pelekunu Preserve by a Hawai‘i Department of Forestry and Wildlife (DOFAW) employee (Oppenheimer et al. 2015, p. 8). These sightings however were not confirmed by a second observer.
- In response to the reported sighting in May, 2005 of an oloma‘o near Ohialele just below Pu‘u Ali‘i NAR (Ken Wood, e-mail communication with Fern Duvall, 2005), biologists John Vetter and Kristy Swinnerton spent two to three days in Pu‘u Ali‘i NAR, shortly after the reported sighting. Using playback recordings for oloma‘o they covered the Pu‘u Ali‘i NAR well, but no oloma‘o were detected (John Vetter, U.S. Fish and Wildlife Service, pers. comm., 2018).
- Elphick et al. (2010, p. 619) estimated the extinction of the oloma‘o to have occurred in 1988 using a method by which the predicted probability of extinction increases as a function of the time since the species was last observed. Using 1980 as the last reliable observation record for oloma‘o, the authors determined the year 2009 as the upper 95% confidence bound for species extinction. This approach for establishing extinction probability is problematic however when applied to extremely rare species such as oloma‘o that are potentially distributed over a large area because absence of observation records may be the result of inadequate survey effort.
- Scott et al. (2008, p. 7) estimated the number of 8-minute variable circular-plot (VCP) surveys is 8,916 to determine with 95% confidence the absence of oloma‘o on Moloka‘i, or 74-fold increase in survey effort to determine species extinction with 95% confidence. Since publication of Scott *et al.* in 2008, approximately 300 VCP surveys have been conducted in areas where oloma‘o might still exist. As of 2023, approximately 21-fold increase needed survey effort using the VCP methodology to determine with 95% confidence absence of oloma‘o in areas of suitable habitat for the species on Moloka‘i.

New threats:

Climate change – destruction or degradation of habitat – Hawaiian honeycreepers are known to be highly susceptible to introduced avian disease, particularly avian malaria (*Plasmodium relictum*) (Atkinson et al. 1995, p. S59; Atkinson et al. 2000, p. 197; Banko and Banko 2009, pp. 52-53). According to some climate change projections, temperature increases could present an additional threat specific to Hawaiian forest birds by causing an increase in the elevation below which regular transmission of avian malaria occurs, potentially reducing the remaining suitable habitat for these species (Atkinson and LaPointe 2009, p. 53; Atkinson et al. 2014, p. 2426). In Hawai‘i, the threshold temperature for transmission of avian malaria has been estimated to be 55 degrees Fahrenheit (13 degrees Celsius), whereas peak *P. relictum* prevalence in wild mosquitoes occurs in mid-elevation forest where the mean ambient summer temperature is 64 degrees Fahrenheit (17 degrees Celsius) (Benning et al. 2002, p. 14247). Benning et al. (2002, p. 14248) used GIS simulation to show that an increase in temperature of 3.6 degrees Fahrenheit (2 degrees Celsius), which is within the range predicted by most climate models, would result in 100 years in the virtual complete disappearance from Kaua‘i of disease-free habitat for Hawaiian forest birds. Moloka‘i is similar to Kaua‘i in elevation. Fortini et al. (2015, entire) had similar

finding with disappearance of suitable habitats on the lower islands of Kauaʻi and Molokaʻi by 2080-2100, and also disappearance of large areas on higher islands of Maui and Hawaiʻi of suitable habitats at both middle and higher elevations. Liao et al. (2015, p. 3486) assessed how global climate change will affect future malaria risk for native Hawaiian bird populations and expects even high elevation areas of the Hawaiian Islands to remain mosquito free only to mid-century due to combined factors of increased rainfall and increasing temperatures. If climate change were to reduce the remaining suitable habitat for olomaʻo as predicted, it could contribute to the extinction of this species over time. Hawaiian thrushes, however, do not appear as vulnerable to effects of avian malaria, as suggested by high tolerance of ʻōmaʻo (*Myadestes obscurus*) to experimental infection with avian malaria and continued persistence of puaiohi on Kauaʻi in areas with avian malaria (Atkinson et al. 2001, p. 209; VanderWerf et al. 2014).

**Table 1. Trends in status of olomaʻo since listing.**

| **Date** | **Number wild individuals** | **Key Recovery Actions** | **Actions Accomplished** |
|---|---|---|---|
| 1970 (listing) | Very rare | See below | |
| 1980 (Hawaii Forest Bird Survey) | 19 $\pm$ 38 (95% CI) | See below | |
| 1984 (first recovery plan) | 19 | Improve habitat conditions; decrease threat of avian disease; systematically search area of suitable forest habitat; | Improve habitat conditions – Yes; Decrease threat of avian disease – No; Systematically search area of suitable forest habitat – Yes; |
| 2006 (revised recovery plan) | Unknown | Improve habitat conditions; decrease threat of avian disease; systematically search area of suitable forest habitat; | Improve habitat conditions – Yes; Decrease threat of avian disease – No; Systematically search area of suitable forest habitat – No; |

| | | | |
|---|---|---|---|
| 2009 (5-year review) | Unknown | Improve habitat conditions; decrease threat of avian disease; systematically search area of suitable forest habitat; | Improve habitat conditions – Yes; Decrease threat of avian disease – No; Systematically search area of suitable forest habitat – No; |
| 2015 (5-year review) | Unknown | Improve habitat conditions; decrease threat of avian disease; systematically search area of suitable forest habitat; | Improve habitat conditions – Yes; Decrease threat of avian disease – No; Systematically search area of suitable forest habitat – Four-day biological survey in Olokui Plateau; |
| 2018 (5-year review) | Unknown | Improve habitat conditions; decrease threat of avian disease; systematically search area of suitable forest habitat; | Improve habitat conditions – Yes; Decrease threat of avian disease – No; Systematically search area of suitable forest habitat – No; |
| 2023 (5-year review) | Unknown | Improve habitat conditions; decrease threat of avian disease; systematically search area of suitable forest habitat; | Improve habitat conditions – Yes; Decrease threat of avian disease – No; Systematically search area of suitable forest habitat – No; however 2021 VCP Molokaʻi forest bird survey conducted |

**Table 2. Threats to olomaʻo and ongoing conservation efforts.**

| **Threat** | **Listing factor** | **Current Status** | **Conservation/Management Efforts** |
|---|---|---|---|
| Ungulates – degradation of habitat and herbivory | A, C, E | Ongoing | Partially, some habitat areas fenced |

| | | | |
|---|---|---|---|
| Invasive introduced plants | A, E | Ongoing | Partially, some habitat areas managed |
| Low numbers | E | Ongoing | None |
| Climate change | A, E | Ongoing | Research, methods for broad-scale control of mosquitoes that transmit avian disease |

**Synthesis**:
We applied a standard of demonstrated species absence at the 95% confidence level when considering recommend species status change from "unknown" to "delisting" due to extinction. This standard means we assumed a species is potentially extant until survey or other information shows the species is absent with 95% confidence from suitable habitat in areas it was known to have occupied historically during the roughly last half century. The last confirmed detection of oloma'o was in 1980 (Reynolds and Snetsinger 2001, p. 136); however several putative detections have occurred in the last 20 years. In 2005 and 2015 there were several unconfirmed sightings of oloma'o near Ohialele on the boundary of the Pu'u Ali'i NAR and The Nature Conservancy's Pelekunu Preserve (Wood, pers. comm. 2005; Oppenheimer et al. 2015, p. 8); and during the most recent VCP survey in 2021 a bird was heard that sounded "thrush-like" but recorded as an "unknown species" (A. Wang, DOFAW, pers. comm., 2023).

We believe the status of the oloma'o is "unknown," based on conclusion of the Hawai'i Rare Bird Search 1994-1996 that the species could still be potentially extant (Reynolds and Snetsinger, 2001, pp. 141-142), the low survey effort for oloma'o after this (see Table 1), and the recent unconfirmed sightings of oloma'o in 2005, 2015 and audio detection of an "unknown bird" that sounded "thrush-like" in 2021. There are instances where rare Hawaiian birds have been rediscovered after they were presumed extinct or have been found in larger populations than expected (Reynolds and Snetsigner 2001, p. 142). The large area of the Olokui Plateau, an area of 656 hectares (1,616 aces) that was not surveyed during the Hawaii Rare Bird Search, and the many remote areas within this that are only rarely visited by qualified observers, increase the potential that a small population of oloma'o could still exist on Moloka'i.

**Recommendations for Future Actions:**
- Surveys/inventories
  - One of the most important recovery actions for the oloma'o is to search areas of forest habitat where the species occurred historically (USFWS 2006, p. 3-17) intensively and systematically. Statewide surveys of Hawaiian forest bird populations are conducted along widely spaced transects (Scott et al. 1986, p. 37) and do not cover all areas where extremely rare Hawaiian forest birds are most likely to be. Additionally, these surveys do not spend the lengths of time needed to maximize the probability that extremely rare Hawaiian forest birds will be detected or rediscovered. Therefore, we recommend that an intensive search for oloma'o be conducted on Moloka'i using similar methodologies as those employed during the Hawai'i Rare Bird Search 1994-1996 (Reynolds and Snetsinger 2001, pp. 134 and 137).
  - In addition, we recommend that autonomous recording units, or ARUs (Fitzpatrick 2002, pp 1-2; Wallace 2010, p. 26), be deployed in suitable habitats for this species. These field recording units record vocalizations of forest birds. The tapes are then analyzed using

computer programs to determine if the target species is present in the area. Use of this technology would greatly increase the amount of search time for this species.

- Threats – disease control research – Of particular concern to the continued survival of many Hawaiian forest birds (particularly Hawaiian honeycreepers) is avian disease. Existing tools and approaches have proved largely ineffective in addressing this problem given mosquito dispersal distance and the abundance of mosquito breeding sites in most wet native forest habitats (LaPointe et al. 2009, pp 406-409). Recent progress has been made with the development of sterile male and genetically modified mosquitoes for disease control. Several of these techniques have achieved proof-of-principle in laboratory studies, while other insect techniques, including self-sustaining technologies to achieve long-term transmission control are anticipated to advance to field testing soon (LaPointe et al. 2009, pp. 415-417). Landscape-scale mosquito control is planned on Maui and Kaua‘i in the near future. We encourage continued research in the fields of sterile insect techniques and genomic technologies for disease control and their field application as a conservation strategy for Hawaiian forest birds and application on a landscape-scale to reduce threat of avian disease in native forests on Moloka‘i.
- Habitat and natural process management and restoration – oloma‘o benefit from habitat protection including fencing, ungulate removal, weed control, and habitat restoration that assist other native Hawaiian forest birds on Moloka‘i.

**References:**

*For a complete list of reference see previous 5-year reviews.*

Fortini, L.B., A.E. Vorsino, F.A. Amidon, E.H. Paxton, and J.D. Jacobi. 2015. Large-scale range collapse of Hawaiian birds under climate change and the need 21st century conservation options. Plos One. https://doi.org.10.1371/journal.pone.0140389.

[MFBRP] Maui Forest Bird Recovery Project, State of Hawai‘i Department of Land and Natural Resources, Division of Forestry and Wildlife. 2021 Moloka‘i Hawai‘i Forest Bird Survey Report. 72 pp.

[USFWS] U.S. Fish and Wildlife Service. 2018. Short form summary. Oloma‘o or Moloka‘i Thrush (*Myadestes lanaiensis rutha*). U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, Honolulu, Hawaii. 8 pages.

[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.

VanderWerf, E.A., L.H. Crampton, P.K. Roberts, J.S. Diegmann, and D.L. Leonard. 2014. Survival estimates of and captive-bred released Puaiohi, an endangered Hawaiian thrush. Condor 116(4):609-618.

**Personal communication:**

Wang, Alex. 2023. Hawai‘i Department of Land and Natural Resources, Division of Forestry and Wildlife, E-mail communication with Jay Nelson, dated May 19, 2023. Subject: Five-year Status Review for Molokai Thrush.

**U.S. FISH AND WILDLIFE SERVICE**
**SIGNATURE PAGE for 5-YEAR REVIEW of**
**Oloma‘o or Moloka‘i Thrush (*Myadestes lanaiensis rutha*)**

**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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