

Kākāwahie or Moloka`i creeper
(*Paroreomyza flammea*)

5-Year Review
Summary and Evaluation

U.S. Fish and Wildlife Service
Pacific Islands Fish and Wildlife Office
Honolulu, Hawai`i

5-YEAR REVIEW

Species reviewed: Kākāwahie or Moloka`i creeper (*Paroreomyza flammea*)

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5-YEAR REVIEW
Kākāwahie or Moloka`i creeper (*Paroreomyza flammea*)

1.0 GENERAL INFORMATION

1.1 Reviewers

Lead Regional Office:

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Lead Field Office:

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Cooperating Field Office(s):

N/A

Cooperating Regional Office(s):

N/A

1.2 Methodology used to complete the review:

This review was conducted by staff of the Pacific Islands Fish and Wildlife Office (PIFWO) of the U.S. Fish and Wildlife Service (USFWS) beginning on July 6, 2005. The evaluation of the status of the species was prepared by the lead PIFWO biologist and reviewed by the Hawaiian Birds Recovery Coordinator. The document was then reviewed by the Recovery Program Leader and acting Assistant Field Supervisor for Endangered Species, and Deputy Field Supervisor, before submission to the Field Supervisor for approval.

Information used to conduct this review was obtained from the following sources: the Revised Recovery Plan for Hawaiian Forest Birds (USFWS 2006), Birds of North America species account No. 503 (Baker and Baker 2000), Hawaiian Forest Bird Survey (Scott *et al.* 1986), Hawai`i Rare Bird Search 1994 to 1996 (Reynolds and Snetsinger 2001), and the most recent forest bird surveys on the island of Moloka`i in 2004. Information from these sources was used to determine the species' historical distribution, recovery criteria, threats, most recent documented sightings, and extinction probability. The Birds of North America species account (Baker and Baker 2000) and the peer-reviewed Revised Recovery Plan for Hawaiian Forest Birds (USFWS 2006) summarized all early scientific information gathered about the species, while the Hawaiian Forest Bird Survey (Scott *et al.* 1986), the Hawai`i Rare Bird Search 1994 to 1996, which was conducted specifically to search for extremely rare and potentially extinct Hawaiian forest birds, and periodic forest bird surveys performed on a five-year rotating cycle on each of the main Hawaiian islands, provided the most recent

information about the continued presence of the species in areas where it was known historically. The above sources constitute the most recent, complete, and scientifically reliable information available for the evaluation of the taxon's current status.

1.3 Background:

1.3.1 Federal Register (FR) Notice citation announcing initiation of this review:

USFWS. Endangered and threatened wildlife and plants; Initiation of 5-year reviews of the Mariana Fruit Bat (*Pteropus mariannus mariannus*), Mariana Crow (*Corvus hawaiiensis*), Laysan Duck (*Anas laysanensis*), Kauai Akialoa (Honeycreeper) (*Hemignathus procerus*), Large Kauai Thrush (*Myadestes myadestinus*), Kauai Oo (Honeyeater) (*Moho braccatus*), Ou (Honeycreeper) (*Psittirostra psittacea*), Molokai Creeper (*Paroreomyza flammea*), Molokai Thrush (*Myadestes lanaiensis rutha*), Kauai Cave Wolf Spider (*Adelocosa anops*) Kauai Cave Amphipod (*Spelaeorchestia koloana*), *Alsinidendron obovatum* (No Common Name), *Amaranthus brownii* (No Common Name), *Chamaesyce celastroides* var. *kaenana* (Akoko), *Chamaesyce deppeana* (Akoko), *Chamaesyce herbstii* (Akoko), *Chamaesyce skottsbergii* var. *kalaeloana* (Ewa Plains Akoko), *Clermontia pyrularia* (Oha Wai), *Cyanea grimesiana* ssp. *obatae* (No Common Name), *Cyanea pinnatifida* (Haha), *Cyanea st.-johnii* (Haha), *Cyanea superba* (Haha), *Cyanea truncata* (Haha), *Cyrtandra dentata* (Haiwale), *Gouania vitifolia* (No Common Name), *Hedyotis degeneri* (No Common Name), *Hibiscadelphus woodii* (Hau Kuahiwi), *Castilleja levisecta* (Golden paintbrush), Fender's Blue Butterfly (*Icaricia icarioides fenderi*), *Erigeron decumbens* var. *decumbens* (Willamette Daisy), *Lupinus sulphureus* ssp. *kincaidii* (Kincaid's Lupine), *Lomatium bradshawii* (Bradshaw's Desert Parsley), and *Sidalcea nelsoniana* (Nelson's Checker-mallow). Federal Register 70(128):38972-38975.

1.3.2 Listing history

Original Listing

FR notice: USFWS. 1970. Title 50 – Wildlife and Fisheries. Chapter 1 – Bureau of Sport Fisheries and Wildlife, Fish and Wildlife Service, Department of Interior; Part 17 – Conservation of Endangered Species and other Fish and Wildlife; Appendix D – United States List of Endangered Native Fish and Wildlife. Federal Register 35(199):16047-16048.

Date listed: October 13, 1970

Entity listed: Species

Classification: Endangered

Revised Listing, if applicable

FR notice: N/A

Date listed: N/A

Entity listed: N/A

Classification: N/A

1.3.3 Associated rulemakings:

N/A

1.3.4 Review History:

Species status [FY 2008 Recovery Data Call (September 2008)]:

Uncertain

Recovery achieved:

1 (0-25%) (FY 2008 Recovery Data Call)

1.3.5 Species' Recovery Priority Number at start of this 5-year review:

5

1.3.6 Current Recovery Plan or Outline

Name of plan or outline: Revised Recovery Plan for Hawaiian Forest Birds

Date issued: September 22, 2006

Dates of previous revisions, if applicable:

May 1984 (USFWS. 1984. Maui-Molokai Forest Birds Recovery Plan. Region 1, Portland, OR. 110 pages.)

2.0 REVIEW ANALYSIS

2.1 Application of the 1996 Distinct Population Segment (DPS) policy

2.1.1 Is the species under review a vertebrate?

Yes

No

2.1.2 Is the species under review listed as a DPS?

Yes

No

2.1.3 Was the DPS listed prior to 1996?

Yes

No

2.1.3.1 Prior to this 5-year review, was the DPS classification reviewed to ensure it meets the 1996 policy standards?

Yes

No

2.1.3.2 Does the DPS listing meet the discreteness and significance elements of the 1996 DPS policy?

Yes

No

2.1.4 Is there relevant new information for this species regarding the application of the DPS policy?

Yes

No

2.2 Recovery Criteria

2.2.1 Does the species have a final, approved recovery plan containing objective, measurable criteria?

Yes

No

2.2.2 Adequacy of recovery criteria.

2.2.2.1 Do the recovery criteria reflect the best available and most up-to date information on the biology of the species and its habitat?

Yes

No

2.2.2.2 Are all of the 5 listing factors that are relevant to the species addressed in the recovery criteria?

Yes

No

2.2.3 List the recovery criteria as they appear in the recovery plan, and discuss how each criterion has or has not been met, citing information:

Downlisting criteria:

Criterion 1. The species occurs in two or more viable populations or a viable metapopulation that represent the ecological, morphological, behavioral, and genetic diversity of the species (Factors A, C, and E).

This criterion has not been met. It is not known whether the species still exists.

Criterion 2. Either (a) quantitative surveys show that the number of individuals in each isolated population or in the metapopulation has been stable or increasing for 15 consecutive years, or (b) demographic monitoring shows that each population or the metapopulation exhibits an average intrinsic growth rate (λ) not less than 1.0 over a period of at least 15 consecutive years; and total population size is not expected to decline by more than 20 percent within the next 15 consecutive years for any reason (Factors A, C, and E).

This criterion has not been met. Survey efforts have not been adequate to determine with confidence whether the species still exists.

Criterion 3. Sufficient recovery habitat is protected and managed to achieve Criteria 1 and 2 (Factor A).

This criterion has not been fully met. The remote Oloku`i Plateau and Kamakou Preserve is protected and managed. However, other areas of habitat where the species might occur are unfenced and vulnerable to damage by feral ungulates.

Criterion 4. The mix of threats that were responsible for the decline of the species have been identified and controlled (Factors A, C, and E).

This criterion has not been fully met. Most threats have been identified, including disease, predation, and habitat damage by feral ungulates. However, each of these threats has been only partly controlled. The threat from disease has been partly controlled by protecting forest habitat in some areas from feral pigs that create mosquito breeding sites, but mosquitoes are known to fly several kilometers in forested habitats and thus may still threaten forest birds even in pristine forest. Predator control and ungulate removal has been implemented in some areas where the species may still occur, but not in the entire suitable habitat area for the species.

The taxon may be delisted when the downlisting criteria described above have been satisfied for at least 30 consecutive years.

2.3 Updated Information and Current Species Status

Information on the species' status and threats is also included in the revised recovery plan (USFWS 2006) and in section 2.4 ("Synthesis") below.

2.3.1 Biology and Habitat

2.3.1.1 New information on the species' biology and life history:

No new information.

2.3.1.2 Abundance, population trends (e.g. increasing, decreasing, stable), demographic features (e.g., age structure, sex ratio, family size, birth rate, age at mortality, mortality rate, etc.), or demographic trends:

No new information.

2.3.1.3 Genetics, genetic variation, or trends in genetic variation (e.g., loss of genetic variation, genetic drift, inbreeding, etc.):

No new information.

2.3.1.4 Taxonomic classification or changes in nomenclature:

There has been no change in taxonomy or nomenclature.

2.3.1.5 Spatial distribution, trends in spatial distribution (e.g. increasingly fragmented, increased numbers of corridors, etc.), or historic range (e.g. corrections to the historical range, change in distribution of the species' within its historic range, etc.):

No new information.

2.3.1.6 Habitat or ecosystem conditions (e.g., amount, distribution, and suitability of the habitat or ecosystem):

The kākāwahie's range historically included forested regions of East Moloka'i from the highest peaks to a few hundred feet above sea level (Baker and Baker 2000). Lower-elevation forested habitats on East Moloka'i have largely disappeared the last century as result of agriculture, urbanization, and ungulate grazing.

2.3.1.7 Other:

N/A

2.3.2 Five-Factor Analysis (threats, conservation measures, and regulatory mechanisms)

2.3.2.1 Present or threatened destruction, modification or curtailment of its habitat or range:

One of the primary threats to this species and to other Hawaiian forest birds is habitat loss and degradation by agriculture, urbanization, cattle (*Bos taurus*) grazing, browsing by feral ungulate species, timber harvesting, and invasion of nonnative plant species into native-dominated plant communities (USFWS 2006). Feral pigs (*Sus scrofa*), and goats (*Capra hircus*) to a lesser degree, have had a long-term damaging effect upon native forests in the remaining kākāwahie range by consuming and damaging understory vegetation, creating openings on the forest floor for nonnative weeds, transporting nonnative weed seeds into the forest, and causing soil erosion and disruption of seedling regeneration of native plants.

2.3.2.2 Overutilization for commercial, recreational, scientific, or educational purposes:

Overutilization is not known to be a threat.

2.3.2.3 Disease or predation:

Predation by nonnative mammals such as black rats (*Rattus rattus*) and Polynesian rats (*Rattus exulans*) and diseases such as avian malaria (*Plasmodium relictum*) and avian pox (*Poxvirus avium*) carried by nonnative mosquitoes have also been primary threats to this species (USFWS 2006).

2.3.2.4 Inadequacy of existing regulatory mechanisms:

No new information.

2.3.2.5 Other natural or manmade factors affecting its continued existence:

This species now occurs in such low numbers and in such restricted ranges, if it exists at all, that it is threatened by natural processes, such as inbreeding depression and demographic stochasticity, and by natural and man-made factors such as hurricanes, wildfires, and periodic vegetation die-back (USFWS 2006). Impacts of nonnative birds are not well understood, but include aggressive behavior towards native bird species, possible competition for food, nest sites, and roosting sites, and possibly supporting elevated predator population levels.

2.4 Synthesis

Reevaluation of conclusions regarding extinction probability based on the 1994 to 1996 Hawai'i Rare Bird Search (Reynolds and Snetsinger 2001) and reexamination of data from the Hawaiian Forest Bird Survey (Scott *et al.* 1986) indicates that the species' status is uncertain.

The species was last observed in 1963 (Pekelo 1963), and was not detected during forest bird surveys in 1980 and 1988 (Scott *et al.* 1986, Reynolds and Snetsinger 2001). The species also was not detected during the most recent forest birds survey on Moloka'i in 2004. Reynolds and Snetsinger (2001) reported they believed the kākāwahie to be extinct based on failure of the Hawaiian Forest Bird Survey (Scott *et al.* 1986, page 148) to find the species in 1980, failure of the Hawaiian forest bird survey on Moloka'i in 1988 to detect the species, and failure of the 1994 to 1996 Hawai'i Rare Bird Search to find the species in the Kamakou-Pelekunu area. Reynolds and Snetsinger (2001) found it highly likely the species is extirpated from the Kamakou-Pelekunu area ($P \geq 0.95$). However, the Oloku'i Plateau, an area of 656

hectares (1,621 acres) and one of the most pristine areas of native forest left in Hawai`i, was not surveyed during the Hawai`i Rare Bird Search, and the determination of extinction probability by Reynolds and Snetsinger (2001) therefore should be considered valid only for the area surveyed (Pelekunu-Kamakou) and not the Oloku`i Plateau.

Scott *et al.* (1986) determined probability of detecting one bird from a randomly distributed population of n individuals as a function of the effective search area on either side of the search transects using the effective detection distance for each species calculated from Hawaiian Forest Bird Survey data. Based on this data, for the remaining montane forest habitat on East Moloka`i surveyed, Scott *et al.* (1986, pages. 69 to 71) determined the probability of detecting at least one bird of a species unrecorded during the Hawaiian Forest Bird Survey to be 0.660 and 0.170 for hypothesized populations of 50 and 10 kākāwahie, respectively; or for a population of 10 kākāwahie within the area surveyed, Scott *et al.* (1986) determined there was only a 17 percent chance the surveys would have detected at least one of these individuals. This low probability of detection points out the limited time spent and area covered and the much greater effort needed to effectively survey for extremely rare species such as the kākāwahie using variable circular-plot point count methodology (Scott *et al.* 1986, pages 16, 35, and 37).

As Reynolds and Snetsinger (2001) describe, there are instances where rare Hawaiian birds have been rediscovered after they were presumed extinct or have been found in larger populations than expected. The authors noted that although searches for kākāwahie during the Hawai`i Rare Bird Search were conducted in habitats with historical records for the species and/or high native species diversity, the 1994 to 1996 Hawai`i Rare Bird Search did not search the large Oloku`i Plateau, where the species was known historically, and which has not been surveyed for this species since 1988.

3.0 RESULTS

3.3 Recommended Classification:

Downlist to Threatened

Uplist to Endangered

Delist

Extinction

Recovery

Original data for classification in error

No change is needed

3.2 New Recovery Priority Number: N/A

Brief Rationale:

3.3 Listing and Reclassification Priority Number: N/A

Reclassification (from Threatened to Endangered) Priority Number: _____
Reclassification (from Endangered to Threatened) Priority Number: _____
Delisting (regardless of current classification) Priority Number: _____

Brief Rationale:

4.0 RECOMMENDATIONS FOR FUTURE ACTIONS

Given the low survey effort for this species and the difficulty of detecting forest birds in remote mountainous habitats in Hawai`i, the species' biological status is uncertain. This determination is based on reexamination of data from the 1994 to 1996 Hawai`i Rare Bird Search and analysis of earlier data from the Hawaiian Forest Bird Survey (Scott *et al.* 1986). Although results of the 1994 to 1996 Hawai`i Rare Bird Search and the most recent forest bird surveys on Moloka`i in 2004 suggest the kākāwahie may be extinct, additional targeted searches for this species are needed to confirm this assessment, especially in areas where the species was last known to have occurred and that have been searched infrequently. Therefore, PIFWO recommends the following actions:

- Conduct intensive searches for the kākāwahie on Moloka`i, using similar methodologies as those employed during the 1994 to 1996 Hawai`i Rare Bird Search (Reynolds and Snetsinger 2001). Include areas not surveyed during the 1994 to 1996 Hawai`i Rare Bird Search in these surveys, particularly the Oloku`i Plateau.
- Deploy autonomous recording units (ARUs) (Fitzpatrick 2002) in suitable habitats for this species. These field recording units record vocalizations of forest birds. The recordings can then be 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.

5.0 REFERENCES

- Baker, P.E., and H. Baker. 2000. Kākāwahie (*Paroreomyza flammea*) and O`ahu `Alauahio (*Paroreomyza maculata*). In *The Birds of North America*, No. 503 (A. Poole and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA.
- Fitzpatrick, J.W. Ivory-bill quest. *Birdscope*, newsletter of the Cornell Lab of Ornithology, Spring 2002. <www.birds.cornell.edu>
- Pekelo, N., Jr. 1963. Nature notes from Molokai. `Elepaio 24:17-18.
- Reynolds, M.H. and T.J. Snetsinger. 2001. The Hawai`i Rare Bird Search 1994-1996. *Studies in Avian Biology* 22:133-143.
- Scott, J.M., S. Mountainspring, F.L. Ramsey, and C.B. Kepler. 1986. Forest bird communities of the Hawaiian Islands: their dynamics, ecology, and conservation. *Studies in Avian Biology* 9:69-71.

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[USFWS] U.S. Fish and Wildlife Service. 1984. Maui-Molokai Forest Birds Recovery Plan. Region 1, Portland, OR. 110 pages.

[USFWS] U.S. Fish and Wildlife Service. 2006. Revised Recovery Plan for Hawaiian Forest Birds. Region 1, Portland, OR. 622 pages.

Signature Page
U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW of Kākāwahie or Moloka`i creeper (*Paroreomyza flammea*)

Current Classification: E

Recommendation resulting from the 5-Year Review:

- Downlist to Threatened
- Uplist to Endangered
- Delist
- No change needed

Appropriate Listing/Reclassification Priority Number, if applicable: _____

Review Conducted By:

Jay Nelson, Fish and Wildlife Biologist
Eric VanderWerf, (former) Hawaiian Birds Recovery Coordinator
Marilet A. Zablan, Recovery Program Leader and acting Assistant Field Supervisor for Endangered Species
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Approved:  Date 31 July 2009
Acting Field Supervisor, Pacific Islands Fish and Wildlife Office