

Kāma`o or Large Kaua`i thrush
(Myadestes myadestinus)

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: Kāma`o or Large Kaua`i thrush (*Myadestes myadestinus*)

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5-YEAR REVIEW
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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. 460 (Wakelee and Fancy 1999), Hawaiian Forest Bird Survey (Scott *et al.* 1986), Hawai`i Rare Bird Search 1994 to 1996 (Reynolds and Snetsinger 2001), and the most recent Hawaiian forest bird surveys on the island of Kaua`i in 2005. 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 (Wakelee and Fancy 1999) 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:

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:

July 1983 (USFWS. 1983. Kauai Forest Birds Recovery Plan. Region 1, Portland, OR. 69 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 Alaka`i Wilderness Preserve is protected under Hawai`i law, but most habitat (>90percent) where the species might occur is unfenced and vulnerable to damage by feral ungulates and invasive nonnative plants.

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:

There is no new information regarding abundance, population trends, demographic features, or demographic trends as the species has not been observed since 1989.

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:

No new information.

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):

Habitat degradation resulting from the invasion of nonnative weeds has dramatically changed the forest structure and integrity. Two hurricanes in 1982 and 1992 severely disrupted portions of high quality native forest, and have made space for the germination and expansion of noxious weeds such as *Hedychium flavescens* (yellow ginger), *Erigeron karvinskianus* (daisy fleabane), *Tibouchina urvilleana* (glorybush), *Lonicera japonica* (Japanese honeysuckle), and others.

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 kāma`o 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.

Perhaps less obvious, but potentially detrimental to the health of the remaining kāma`o habitat, are introductions of new nonnative invertebrates to the forest ecosystem. Although kāma`o are primarily frugivorous, insects and spiders are likely to be an important component of the diet, especially for nestlings. Introductions of predatory and parasitic invertebrates that compete with native species for food pose a continuing threat throughout the islands. Introduced predatory insects also may reduce or eliminate specialized native insects that are necessary for pollination of certain food plants. Many of the food plants used by kāma`o could be negatively affected by herbivorous nonnative insects, such as the two-spotted leafhopper (*Sophonia rufofascia*), which may reduce their range, fruit set, and eventual survival. Introduced snails that prey on native snails could also reduce food resources of the kāma`o. On the other hand, the detrimental effects of some of these new insects and molluscs could be somewhat offset if they are utilized as direct prey items by the kāma`o.

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 best described as uncertain.

Well-documented visual and audio detections of this species occurred regularly until 1985 (Pyle 1985, Reynolds and Snetsinger 2001). No birds were detected during the 1994 to 1996 Hawai'i Rare Bird Search, which covered much, but not all of the area from which this species was known historically and where it is still most likely to occur (Reynolds and Snetsinger 2001). Based on the Rare Bird Search data, the species' extinction probability was determined to be ≥ 0.95 (Reynolds *et al.* 1997). However, during the 1990s there were three unconfirmed reports of this species, the most recent in 1995 (Reynolds and Snetsinger 2001), and there continue to be occasional unconfirmed reports.

John Sincock conducted the first extensive surveys of Kaua'i from 1968 to 1973 along stream and ridge transects within three areas of the Alaka'i Swamp: the "North Alaka'i," "South East Alaka'i," and "South West Alaka'i," which contain almost all habitat area (approx. 7,800 hectares (19,274 acres)) considered essential for endangered forest birds on Kaua'i and where rare species most likely would continue to be found (USFWS 1983). During these surveys, Sincock estimated populations of kāmā'o to be 24 with a standard error (S.E.) of 25 for the North Alaka'i, 292 with a S.E. of 117 for the Southeast Alaka'i, and 21 with a S.E. of 23 for the South West Alaka'i. The Hawaiian Forest Bird Survey in 1986 overlapped areas Sincock had surveyed and included areas where kāmā'o were detected, but encompassed only approximately one-quarter (1,700 hectares (4,200 acres)) of the total area that Sincock had surveyed (Scott *et al.* 1986, pages 16 and 39). Scott *et al.* (1986, pages 93 to 96) estimated 24 ± 20 kāmā'o for the smaller area they surveyed.

Finally, study areas for the 1994 to 1996 Hawai'i Rare Bird Search consisted of four major drainages within the Alaka'i Swamp: the Koai'e, Mōhihi-Waiakōali-Koali, Halehaha-Halepa`akia, and North Kawaikōi. These four areas were within the essential habitat area defined by Sincock (USFWS 1983), but did not include some areas of suitable habitat along the perimeter and inside the essential habitat boundary and approximately 800 hectares (1976 acres) of private lands (approximately 14 percent of the essential habitat area) along the southern boundary of the Alaka'i Swamp. Therefore, approximately 25 percent of the essential habitat area for kāmā'o

as defined by Sincock was last surveyed 36 to 41 years ago, between 1968 and 1973 (USFWS 1983). Reynolds and Snetsinger (2001) state that although they searched habitat with historical records and/or high native-species diversity to increase their chances for rare bird detections, similar habitat with rare bird detections existed outside their search areas. Therefore, determination of extinction probability by Reynolds and Snetsinger (2001) should be considered valid only for the areas surveyed which covers approximately 75 percent of the habitat area where the species is most likely to occur.

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. Given the only partial coverage by the Hawaiian Forest Bird Survey and Hawai`i Rare Bird Search of suitable habitats where the species may still exist, additional search effort is needed to confirm the status of the kāma`o. In addition, the extremely difficult terrain of the Alaka`i Wilderness on Kaua`i and the wet weather make surveys difficult, and numerous steep valleys on Kaua`i create small pockets of habitat where the species could potentially persist.

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, recent only partial coverage of habitat areas where the species may still persist, 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, in particular portions of suitable habitat for kāma`o not included in this survey. Although results of the 1994 to 1996 Hawai'i Rare Bird Search and the most recent Hawaiian forest birds survey for Kaua'i in 2005 suggest the kāma`o may be extinct, additional targeted searches for this species are needed to confirm this assessment. Therefore, PIFWO recommends the following actions:

- Conduct intensive searches for the kāma`o on Kaua`i, using similar methodologies as those employed during the 1994 to 1996 Hawai'i Rare Bird Search (Reynolds and Snetsinger 2001). Specifically, studies should include areas not surveyed during the 1994 to 1996 Hawai'i Rare Bird Search in these surveys.
- Deploy autonomous recording units, or 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

- Fitzpatrick, J.W. Ivory-bill quest. *Birdscope*, newsletter of the Cornell Lab of Ornithology, Spring 2002. <www.birds.cornell.edu>
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- 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. 1983. Kauai Forest Birds Recovery Plan. Region 1, Portland, OR. 69 pages.

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

Wakelee, K.M. and S.G. Fancy. 1999. `Ōma`o (*Myadestes obscurus*), Kāma`o (*Myadestes myadestinus*), Oloma`o (*Myadestes lanaiensis*), and `Āmaui (*Myadestes woahensis*). In The Birds of North America, No. 460 (A. Poole and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA.

Signature Page
U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW of Kāma`o or large Kaua`i thrush (*Myadestes myadestinus*)

Current Classification: E

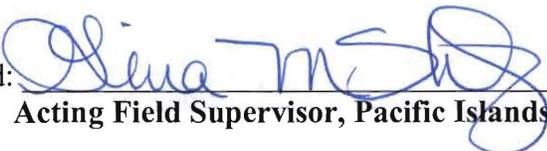
Recommendation resulting from the 5-Year Review:

- 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
Gina Shultz, Deputy Field Supervisor

Approved:  Date 31 July 2009
Acting Field Supervisor, Pacific Islands Fish and Wildlife Office