

`Akiapōlā`au
(*Hemignathus munroi*)

5-Year Review
Summary and Evaluation

U.S. Fish and Wildlife Service
Pacific Islands Fish and Wildlife Office
Honolulu, Hawaii

5-YEAR REVIEW
Species reviewed: `Akiapōlā`au / *Hemignathus munroi*

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5-YEAR REVIEW
***Hemignathus munroi* (`akiapōlā`au)**

1.0 GENERAL INFORMATION

1.1 Reviewers

Lead Regional Office:

Region 1, Endangered Species Program, Division of Recovery, Jesse D`Elia, (503) 231-2071

Lead Field Office:

Pacific Islands Fish and Wildlife Office, Loyal Mehrhoff, Field Supervisor, (808) 792-9400

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) in 2008. The Revised Recovery Plan for Hawaiian Forest Birds (USFWS 2006) and recent surveys of populations on the Island of Hawai`i (Gorresen *et al.* 2009) provided most of the updated information on the current status of *Hemignathus monroi*. The document was then reviewed by the Vertebrate Recovery Coordinator, Assistant Field Supervisor for Endangered Species, and Acting Deputy Field Supervisor before submittal to the Field Supervisor for approval.

1.3 Background:

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

USFWS. 2008. Endangered and Threatened Wildlife and Plants; Initiation of 5-year Status Reviews for 70 Species in Idaho, Montana, Oregon, Washington, and the Pacific Islands. Federal Register 73(83):23264-23266.

1.3.2 Listing history

Original Listing

FR notice: USFWS. 1967. Office of the Secretary, Native Fish and Wildlife, Endangered Species. 32 FR 4001.

Date listed: March 13, 1967

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 review [FY 2009 Recovery Data Call (September 2009)]:
Stable

Recovery achieved:

2 (26-50%) (FY 2007 Recovery Data Call – this was the last year this was reported)

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

2

1.3.6 Current Recovery Plan or Outline

Name of plan or outline: Revised Recovery Plan for Hawaiian Forest Birds. Region 1, Portland, OR. 622 pp.

Date issued: September 22, 2006.

Dates of previous revisions, if applicable: N/A

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?

 X 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?

 X 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:

A taxon may be downlisted from endangered to threatened when all four of the following criteria have been met.

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, and viable populations exist in Hāmākua, Kūlani/Kīlauea/Keauhou, Ka`ū, south Kona, and māmane forest on Mauna Kea.

This criterion has not been met. Some populations are declining and others are not viable or extirpated.

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 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.

This criterion has not been met. Some populations are declining and others are not viable.

3. Sufficient recovery area is protected and managed to achieve criteria 1 and 2 above.

Sufficient recovery area is identified to have protection; however, some areas are not adequately managed.

4. The threats that were responsible for the decline of the species have been identified and controlled.

Threats responsible for the decline of `akiapōlā`au have been identified, but have not been adequately controlled.

A taxon may be delisted when all four of the criteria above have been met for a 30-year period.

2.3 Updated Information and Current Species Status

The `akiapōlā`au is a medium-sized (14 centimeter, 28 gram; 5.5 inch, 0.9 ounce), stocky, short-tailed Hawaiian honeycreeper endemic to Hawai`i island. Its most remarkable feature is the extraordinary bill, which has a long, sickle-shaped upper mandible and a short, straight lower mandible that is only half as long as the upper. Males are larger and heavier than females and have a slightly longer bill. Adult males have a bright yellow head and under parts, a greenish back and wings, and black lores. Adult females differ in color, with a yellowish-white chin, throat, and upper breast that contrasts with a pale yellowish-gray lower breast and belly (Pratt *et al.* 1994). Fledglings have a mottled yellowish-gray or green juvenile plumage with pale under parts. Within a few months of fledging juveniles molt into a similar but unmottled first basic plumage. Most birds molt into definitive basic (adult) plumage in their second year (Pratt *et al.* 1994).

The species was described by Rothschild (1893 to 1900), who named it *Heterorhynchus wilsoni*. The `akiapōlā`au was later grouped with the `amakihi and renamed *Hemignathus munroi* (Pratt 1979, American Ornithologists Union 1983). The `akiapōlā`au is closely related to the nukupu`u (*H. lucidus*, Olson and James 1994). There is no notable morphological variation with elevation or locality. The `akiapōlā`au is endemic to Hawai`i island and is presently unknown from the fossil record (James and Olson 1991).

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:

Based on analysis of variable circular plot point count data from the 1980s to the present, there were approximately 1,900 `akiapōlā`au in 2009, distributed in two wild populations (Gorresen *et al.* 2009, p. 135). Density is increasing in Hakalau Forest National Wildlife Refuge, stable in upper Ka`ū, likely decreasing in central windward Hawai`i island, and the species has been extirpated from subalpine Mauna Kea and probably both the North and South Kona districts (Gorresen *et al.* 2009, p. 135).

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.):

The `akiapōlā`au was much more common and widespread historically than it is today, being found virtually island-wide in native forest (Pratt *et al.* 2001). Perkins (1903) reported that the species was abundant and occurred as low as 500 meters (1,650 feet) above sea level (asl) in forests near Hilo. In the 1940s, they were still present above 1,700 meters (5,500 feet) asl in Hawai`i Volcanoes National Park (Baldwin 1953), but by 1970 they had disappeared from Hawai`i Volcanoes National Park and were less common elsewhere (Conant 1975, Banko and Banko 1980).

In the 1970s, `akiapōlā`au were found in five disjunct populations with a total estimated population size of $1,500 \pm 400$ birds (95 percent confidence interval; Scott *et al.* 1986). Four of these populations inhabited koa-dominated montane forests in Hāmākua south to the upper Waiākea kīpuka, Kūlani, and Keauhou, in Ka`ū and Kapāpala, in southern Kona, and in central Kona. A fifth population occupied subalpine dry forest

on Mauna Kea. Originally these populations were all connected, but they have been isolated by loss of forest mainly to grazing.

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

See 2.3 above.

2.3.1.7 Other:

See 2.3 above.

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

Habitat loss and modification, avian disease, and predation by introduced mammals are thought to have caused the `akiapōlā`au to become endangered, and these factors continue to limit the abundance and distribution of `akiapōlā`au today.

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

Destruction and degradation of forest habitat from development, logging, and ranching has greatly reduced the range of the `akiapōlā`au, and has been particularly severe in mesic and dry forest areas. Dry, high-elevation māmane-naio forest habitat on the slopes of Mauna Kea has been severely degraded by decades of browsing by feral goats and sheep. Designation of critical habitat for the endangered palila (*Loxioides bailleui*), and subsequent court orders to remove ungulates, has resulted in some regeneration of this habitat, but `akiapōlā`au have already been extirpated from this area. Widespread loss and alteration of forest habitats also has led to fragmentation of the remaining suitable forest. The dispersal behavior of `akiapōlā`au is poorly known, but habitat fragmentation may isolate the remaining populations, decrease the effective population size, and hinder recolonization of formerly occupied areas.

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

Not a limiting factor at this time.

2.3.2.3 Disease or predation:

Most Hawaiian forest birds are susceptible to introduced mosquito-borne diseases, and the `akiapōlā`au may be limited to its current high-elevation distribution by these diseases (Scott *et al.* 1986, van Riper *et al.* 1986, Atkinson *et al.* 1995). Despite the availability of apparently suitable habitat, `akiapōlā`au are absent from most areas below 4,500 feet (1,350 meters) asl, where mosquitoes are common. This pattern contrasts with that of species not listed as threatened or endangered, such as `apapane (*Himatione sanguinea*) and Hawai`i `amakihi (*Hemignathus virens*), suggesting that `akiapōlā`au and other endangered species are especially susceptible to disease.

Predation of nests and adults by rats, cats, mongoose, and owls is suspected to have a significant impact on many native Hawaiian bird species (Atkinson 1977), but the significance of predation in limiting the `akiapōlā`au is not clear. Surveys indicate rat densities are high at Hakalau Forest National Wildlife Refuge, which contains a significant portion of the largest remaining `akiapōlā`au population (Nelson *et al.* 2002). The low density of `akiapōlā`au nests hampers evaluation of the effects of predator control on this species. Mostello (1996) found the upper mandible of a juvenile `akiapōlā`au in a pellet from an introduced barn owl (*Tyto alba*). Juvenile `akiapōlā`au may be especially vulnerable to predators during the post-fledging period because their loud, persistent begging call makes them easy to locate. Predation, especially on adults, may affect `akiapōlā`au more than other native birds because the low reproductive rate of this species increases the demographic value of breeding adults (Ralph and Fancy 1996).

2.3.2.4 Inadequacy of existing regulatory mechanisms:

Current regulatory mechanisms are adequate: The `akiapōlā`au was federally listed as endangered March 13, 1967 (USFWS 1967), and thus receives regulatory protection under the Endangered Species Act. Species listed under the Endangered Species Act are automatically added to the State of Hawai`i list of endangered species, and thus are also protected by State regulations. The Service recently added 24 species that belong to families covered by the Canadian and/or Mexican Conventions, but occur naturally in the United States only in Hawai`i, to the List of Migratory Birds. Accordingly, these species, including the `akiapōlā`au, receive protection under the Migratory Bird Treaty Act (USFWS 2010).

2.3.2.5 Other natural or manmade factors affecting its continued existence:

The `akiapōlā`au is threatened with extinction because of its small total population size and restricted distribution. These characteristics make the species vulnerable to a variety of natural processes, including reduced reproductive vigor caused by inbreeding depression, loss of genetic variability and evolutionary potential over time due to random genetic drift, stochastic fluctuations in population size and sex ratio, and natural disasters such as hurricanes and fires.

Climate change may also pose a threat to the `akiapōlā`au. However, current climate change models do not allow us to predict specifically what those effects, and their extent, would be for this species.

2.4 Synthesis

Recent surveys confirm the `akiapōlā`au population is stable overall and is increasing in Hakalau Forest National Wildlife Refuge. However, `akiapōlā`au is recently extirpated from subalpine Mauna Kea and probably the North and South Kona districts. Although the overall population is stable, the species' range is contracting, thus the `akiapōlā`au still meets the definition of endangered.

3.0 RESULTS

3.1 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:

Brief Rationale:

3.3 Listing and Reclassification Priority Number:

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

Recovery of the `akiapōlā`au will require protection, management, and restoration of native forests above 4,000 feet (1,300 meters) asl, as well as lower elevation forest areas, research to gain key information that is presently lacking for this species, management of threats such as predation and disease, and possibly captive breeding and release of birds to augment or reestablish wild populations. The Hakalau Forest National Wildlife Refuge was established in 1985 primarily to protect and manage habitat for native birds, including the `akiapōlā`au. Much of the refuge has been fenced and efforts are underway to remove feral pigs from the refuge. Planting of koa and other native plants began in the early 1990s, and over 350,000 koa seedlings have been planted thus far.

Research. Studies are needed in four main areas: (1) testing of survey methodology, followed by surveying and mapping of all populations and long-term monitoring in representative areas in Hāmākua, upper Waiākea kīpukas, Kūlani/Keauhou, Ka`ū/Kapāpala, and southern and central Kona; (2) demographic studies to measure life history parameters such as population structure, dispersion, dispersal, adult survivorship, clutch size, nesting success, social system, and phenology of nesting and molting; (3) habitat selection and foraging ecology, including diet and food availability, particularly in regenerating forest, and the role that koa silviculture practices play in the creation of suitable habitat; and (4) response of `akiapōlā`au populations to control of mammalian predators, particularly in low-stature dry forests where the species has difficulty maintaining itself. This information is needed to understand the dynamics of `akiapōlā`au populations, predict the densities of birds achievable across the species' geographic range, and enhance efforts to restore and reconnect declining populations and re-establish new populations in portions of the former range.

Habitat Protection and Restoration. The most important component of the recovery strategy for the `akiapōlā`au is protection, management, and restoration of koa/`ōhi`a forests above 1,300 meters (4,000 feet) asl. High elevation forest is of primary importance because it provides the greatest refuge from mosquito-borne diseases, but forests at lower elevation also could be valuable if a means of controlling mosquitoes can be found. To maintain

connectivity and allow dispersal among fragmented patches of habitat, cattle should be removed and habitat restoration pursued in several key parcels, such as the Kapāpala Forest Reserve and adjoining lands leased by the state for ranching.

Fencing and/or removal of feral ungulates from the remaining high elevation forests will protect these areas and allow natural regeneration. In previously grazed or logged areas it may be necessary to replant with koa while allowing `ōhi`a and other native species to regenerate as well, as has been done in the upper portions of Hakalau Forest National Wildlife Refuge. Old-growth koa/`ōhi`a forest on many parcels in recovery area is deteriorating due to browsing and rooting by feral pigs, sheep, or mouflon, singly or in combination. Control of these animals would improve forest conditions and possibly increase `akiapōlā`au density.

To maintain or reestablish connectivity of habitat and bird populations among the currently fragmented patches of `akiapōlā`au habitat, cattle should be removed from key parcels and stock ponds should be drained to reduce mosquito breeding. Priority should be given to reforesting upper drainages of the Wailuku River, upper Keauhou Ranch, Kapāpala Forest Reserve, and numerous parcels in Kona between Hōnaunau and Manukā Natural Area Reserve. A corridor between the koa/`ōhi`a forest of Hakalau Forest National Wildlife Refuge and the dry māmane forest at Kanakaleonui upslope from the refuge could be created by removing cattle from pastures above the refuge and replanting the area with koa and māmane, and would reestablish a valuable connection between native bird populations in these two areas and habitat types.

Predator control and avian disease. Control of alien predators, especially rats, has been shown to be an effective method of increasing reproduction and survival in other Hawaiian forest birds (VanderWerf and Smith 2002). The degree of threat from alien rodents may vary among species and locations, and rodent control programs initially should be conducted in an experimental way to document population-level effects on `akiapōlā`au. Ground-based methods of rodent control using snap traps and diphacinone bait stations have been effective on a small scale, but are labor intensive. Effective large-scale rodent control likely will require aerial broadcast methods. Implementation of aerial broadcast of diphacinone for rodent control should be actively pursued and supported. Eradication of mosquitoes is not practical with methods currently available, and management for avian disease should focus on reduction of breeding habitat for mosquitoes through drainage of stock ponds, public education/container removal in residential areas, and removal of feral pigs.

Captive Propagation and Reintroduction. Natural recovery of `akiapōlā`au and reestablishment of wild populations in portions of the former range may be slow due to the low reproductive capacity of this species. Captive propagation techniques such as collection of eggs from the wild, artificial incubation and hand-rearing, captive breeding, and reintroduction may be required to speed recovery. Translocation of wild birds also may be valuable, but captive propagation may be a more cost-effective means of reestablishing or augmenting wild populations. `Akiapōlā`au nests are difficult to locate and reach, so it may be difficult to obtain a sufficient number of young wild birds for translocation. Previous translocations with Hawaiian forest birds have shown that young birds are more likely to remain in an area after release (Fancy *et al.* 2001). Feasibility should be determined for reintroducing `akiapōlā`au into now-protected areas of its former range, particularly at the Pu`u Wa`awa`a Forest Bird Sanctuary, the Kona unit of the Hakalau National Wildlife Refuge, Mauna Loa Strip of Hawai`i Volcanoes National Park, and the upper forests of Kīpāhoehoe Natural Area Reserve.

5.0 REFERENCES

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Signature Page
U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW of `Akiapōlā`au (*Hemignathus munroi*)

Current Classification: E

Recommendation resulting from the 5-Year Review:

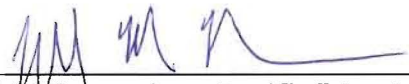
- Downlist to Threatened
- Uplist to Endangered
- Delist
- No change needed

Appropriate Listing/Reclassification Priority Number, if applicable:

Review Conducted By:

Jay T. Nelson, Fish and Wildlife Biologist
Holly Freifeld, Vertebrate Recovery Coordinator
Marilet A. Zablan, Assistant Field Supervisor for Endangered Species
Jeff Newman, Acting Deputy Field Supervisor

Approved


for

Date **AUG 27 2010**

Field Supervisor, Pacific Islands Fish and Wildlife Office