



Photo: Jim Denny

Forest Birds

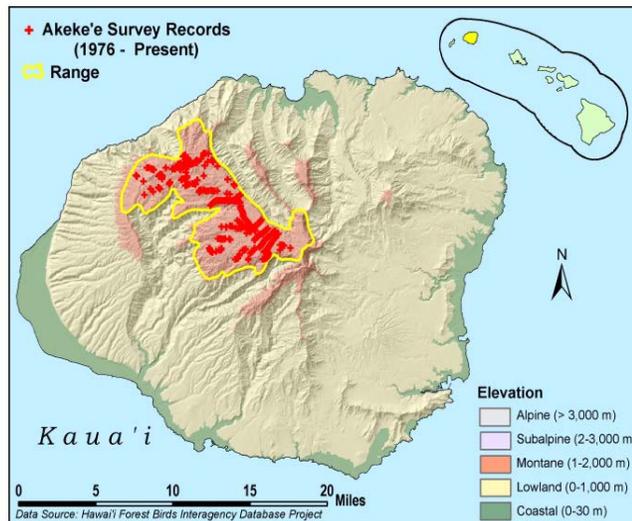
'Akeke'e or Kaua'i 'ākepa

Loxops caeruleirostris

SPECIES STATUS:

Federally Listed as Endangered
 State Listed as Endangered
 State Recognized as Endemic
 NatureServe Heritage Rank G2 – Imperiled
 IUCN Red List Ranking – Critically Endangered
 Revised Recovery Plan for Hawaiian Forest Birds – USFWS 2006

SPECIES INFORMATION: The 'akeke'e, or Kaua'i 'ākepa, is a small, slightly sexually dichromatic, insectivorous Hawaiian honeycreeper (Family: Fringillidae) endemic to Kaua'i. Adult males and females are greenish above and yellow below with a yellow crown and a black mask; females are slightly duller than males. Unlike the similar Kaua'i amakihi (*Hemignathus kauaiensis*), the 'akeke'e's bill is conical. Although not visible in the field, the lower mandible of the 'akeke'e is slightly bent to one side which results in the mandible tips being offset; a characteristic shared with the 'ākepa (*L. coccineus*). The 'akeke'e uses its bill to pry open 'ōhi'a (*Metrosideros polymorpha*) leaves and flower buds in search of arthropods, primarily spiders, psyllids, and caterpillars. The species is an 'ōhi'a specialist and rarely even perches on other trees or shrubs. Its methodical probing of leaf buds is distinctive and can be used to identify the species. 'Akeke'e are most often observed in pairs or family groups. Fewer than 20 'akeke'e nests have been found and the species' breeding biology is virtually unknown. In a sample of eight nests, mean nest height was 11.1 ± 2.3 m, and all nests were located in the small terminal branches of 'ōhi'a. At one nest, the male and female both participated in nest construction, but in the sample of eight nests, only females were observed building. In three nests that have been directly accessed during incubation, two had clutch sizes of two eggs, and the third nest contained three eggs. In another study, five nests were observed to fledge two chicks, and the sixth fledged one chick. Two nests did not fledge, one due to hatching failure and the other due to poor attendance by the female. Immediately post-hatch, only females fed nestlings, but thereafter both parents fed chicks. It is not clear whether this species renests or double broods.



DISTRIBUTION: Found in native forests of the Alaka'i swamp, upper Waimea, and Kōke'e regions mostly above 1,000 meters (3,280 feet) elevation, but are becoming less common in the latter. Although historically widespread, 'akeke'e apparently did not occur at lower elevations. Occupancy rates in 2012 increased from west to east along the plateau ($\psi = 0.03 \pm 0.10$ to 0.53 ± 0.33), but were low throughout its range. Currently estimated to occupy 10-12 percent of their original range.

ABUNDANCE: In the early 1970s the island-wide population was estimated at $5,066 \pm 1,680$ (SE) individuals. The Kaua'i Forest Bird Survey in 2012 suggested that the population was rapidly declining, especially in the periphery of its range; the 2012 population estimate was 945 (95% confidence interval: 460 to 1,547) individuals (U.S. Geological Survey unpublished data). Densities are highest in the interior of the Alaka'i Wilderness Preserve.

LOCATION AND CONDITION OF KEY HABITAT: Occurs above 600 meters (1,950 feet), although populations are densest above 1,100 meters (3,600 feet), in lowland mesic and wet forests dominated by 'ōhi'a, koa (*Acacia koa*), 'ōlapa (*Cheirodendron trigynum*), and lapa'apa (*C. platyphyllum*). Most of the current range occurs in Kōke'e State Park and the Alaka'i Wilderness Preserve. Occupancy is positively correlated with canopy height and maximum 'ōhi'a diameter at breast height.

THREATS:

- **Habitat degradation.** The spread of non-native plants and degradation by ungulates may reduce habitat suitability. The correlation of occupancy with large tree metrics suggest that damage done by two hurricanes may also limit distribution and abundance.
- **Disease.** 'Akeke'e may be highly susceptible to mosquito-borne avian malaria. Only one of 20 'akeke'e caught since 1994 has tested positive for malarial antibodies; since malaria seems to be established on the Alakai' Plateau, the most likely explanation for this result is high mortality after infection with malaria. Disease and habitat degradation are the most probable causes of population declines in this species in the last decade.
- **Competition.** Non-native insects, especially yellow-jackets (*Vespula pensylvanica*) and ants (*Linepithema humile*), may compete with or prey on the native arthropods on which 'akeke'e feed. The role of non-native insects in native Hawaiian forests is unclear.
- **Predation.** Although predation on adults or their nests has not been documented, rats (*Rattus* spp.), cats (*Felis silvestris*), Hawaiian short-eared owls (*Asio flammeus sandwichensis*), and barn owls (*Tyto alba*) occur throughout the forests of Kaua'i and may prey on young and adults.
- **Small population dynamics.** The observed hatching failures may indicate genetic issues associated with small population sizes.

CONSERVATION ACTIONS: 'Akeke'e likely benefited from actions to conserve other endangered forest birds including the establishment of the Alaka'i Wilderness Preserve, regular surveys of forest bird populations, habitat monitoring, studies of disease and disease vectors, control of feral ungulates through public hunting, and public education featuring Kauai's endangered forest birds. In 2015, an effort to form a captive flock was initiated by collecting 'akeke'e eggs from the wild. Five eggs were harvested from two nests; all eggs hatched but only one chick survived to fledging. This project will continue in subsequent years. In addition to these efforts, future actions specific to the 'akeke'e may include the following:

- Aggressively control ungulates to improve habitat quality, facilitate the recovery of degraded habitat, and potentially reduce breeding habitat for mosquitoes. Control of non-native plants should be part of forest restoration efforts.
- Eradicate or manage mosquito breeding habitat on the Alaka'i Plateau and release sterile mosquitoes.
- Eradicate rats, feral cats, and barn owls from the Alaka'i Wilderness Preserve.
- Prevent the introduction of the small Indian mongoose (*Herpestes auro-punctatus*) and other predators.
- Conduct public outreach and education.
- Continue protection and management of wildlife sanctuaries and refuges.

MONITORING: Continue forest bird surveys and habitat monitoring.

RESEARCH PRIORITIES: Research priorities for most Hawaiian forest birds include improving methods for controlling rats and feral cats in native forests, determining ecological requirements of *Culex* mosquitoes at mid- and high-elevation forests, and developing methods to control mosquito populations. Research priorities specific to the 'akeke'e include the following:

- Conduct life history studies to quantify the population structure, dispersal patterns, survivorship, nesting phenology, and success of this poorly known species.
- Continue to assess the species' susceptibility to avian malaria and avian pox.
- Determine sources of mosquitoes and investigate appropriate methods of mosquito control.
- Determine the effects of recently established non-native insects on native arthropods, especially those that are part of the species' diet.
- Determine the status of populations outside of the greater Alaka'i swamp region.

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