



Photo: Jim Denny

Forest Birds

Puaiohi or Small Kaua'i Thrush

Myadestes palmeri

SPECIES STATUS:

Federally listed as Endangered

State listed as Endangered

State recognized as Endemic

NatureServe Heritage Rank G1 – Critically imperiled

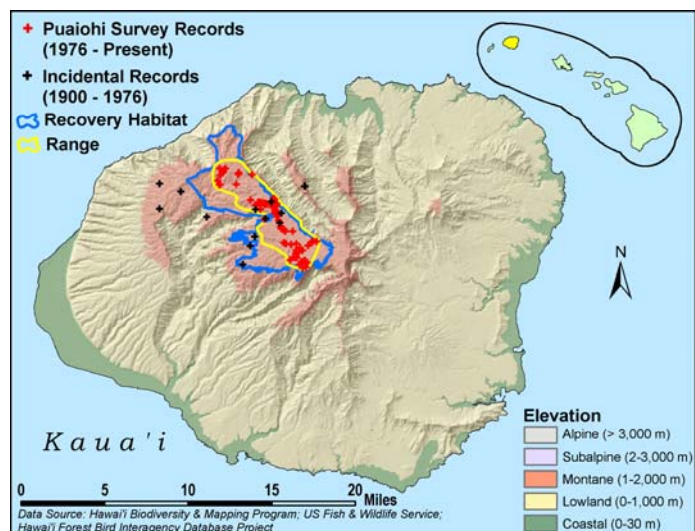
IUCN Red List Ranking – Critically endangered

Draft Revised Recovery Plan for Hawaiian Forest Birds – USFWS 2003

SPECIES INFORMATION: The puaiohi, or small Kaua'i thrush, is the smaller of two solitaires (family: Turdidae) endemic to Kaua'i, and was the last of the island's avifauna to be discovered by western ornithologists. In the late 1800s, the puaiohi was considered exceedingly rare, but this was likely due to its cryptic behavior and preference for remote, inaccessible ravines. Puaiohi are extremely sedentary and appear to have specific habitat requirements. Of the five Hawaiian solitaires, it is behaviorally, morphologically, and vocally the most divergent. Compared to the kama'o, or large Kaua'i thrush (*M. myadestinus*), the puaiohi has a short tail, and a white eye-ring; in addition, it has a relatively simple song. The species life history is relatively well-known because of recent, intensive studies. The diet of the puaiohi includes fleshy fruits, insects, snails and other invertebrates. Fruit dominates the non-breeding season diet; insects are important during the breeding season. Nests are built by the female in cavities or on cliff ledges, and only females incubate eggs and brood young. Breeding peaks from April to June, and re-nesting occurs after failed and successful nest attempts. This, plus a high rate of nest success and a long breeding season, can result in high annual productivity. Hatch-year and second-year birds (i.e., helpers) are known to assist in nest defense and feeding of related nestlings and fledglings. Young are very sedentary for two to four days after fledging.

DISTRIBUTION: Puaiohi are restricted to a 20 square kilometer (7.6 square miles) area on the southern and central plateau of the Alaka'i Wilderness Preserve. Currently, the species occurs above 1,050 meters (3,450 feet), which is similar to its upper limit historically.

ABUNDANCE: The most recent puaiohi surveys estimated the population at between 200 and 300 individuals. Densities peak at 16 breeding pairs per square kilometer



(0.62 square miles). This species was considered rare since the late 1800s.

LOCATION AND CONDITION OF KEY HABITAT: Puaiohi occur in areas characterized by deeply dissected, steep-walled ravines supporting wet montane forest dominated by 'ōhi'a (*Metrosideros polymorpha*) and 'ōlapa (*Cheirodendron* spp.). Their former range included mesic areas dominated by 'ōhi'a and koa (*Acacia koa*). These areas are now largely dominated by introduced plant species including fire tree (*Myrica faya*) and strawberry guava (*Psidium cattleianum*). Densities are very low even in apparently suitable habitat. The entire known range of this species is within the Alaka'i Wilderness Preserve and is managed by the State of Hawai'i.

THREATS: Puaiohi are likely susceptible to the same factors that threaten other native Hawaiian forest birds, including: loss and degradation of habitat, predation by introduced mammals, and disease. For puaiohi populations, the following are of particular concern:

- Disease. Only five puaiohi have been tested for disease; none had lesions or scars and one carried malarial (*Plasmodium relictum*) antibodies. These data are equivocal, indicating low transmission rates, possible resistance, or very high mortality for this species.
- Predation. Two years of field data indicate that rats (*Rattus* spp.) were responsible for 14 to 22 percent of nest failures, as well as the mortality of three adult females. Fledglings typically spend their first days out of the nest within two meters (6.5 feet) of the ground, a behavior that makes them vulnerable to feral cats (*Felis silvestris*).
- Competition. Several non-native birds, including the introduced Japanese white-eyes (*Zosterops japonicus*), melodious laughing thrush (*Copsychus malabaricus*), and white-rumped shama (*Copsychus malabaricus*) occupy the same habitat and may compete with the puaiohi for food and nest resources.
- Habitat degradation. Feral pigs (*Sus scrofa*) and goats (*Capra hircus*) have facilitated the invasion of non-native plants into puaiohi habitat. The establishment of these plants has altered the structure of these forests, especially that of the ground and shrub layer. Hurricanes in 1982 and 1992 further altered and degraded the forests of Kaua'i, including those within the Alaka'i Wilderness Preserve.
- Non-native arthropods. Recently introduced non-native insects, especially yellow jackets (*Vespula pensylvanica*) and Argentine ants (*Linepithema humile*), may compete with the puaiohi's native arthropod prey or disrupt the pollination of the species' food plants. Introduced herbivorous insects also could reduce the abundance of food plants.
- Natural disasters. The hurricanes of 1982 and 1992 likely caused the death of an unknown number of individuals.

CONSERVATION ACTIONS: In 1995, an intensive field ecology and behavior study was initiated. The results from this study are the basis for the current management actions directed at the species. Using captive propagation and re-introduction techniques developed using the 'ōma'o (*M. obscurus*), a captive breeding flock of puaiohi was established in 1996. To date, the program has been very successful. Thirty-four birds have been re-introduced, and these captive-raised birds have been documented successfully breeding. In addition, puaiohi likely have benefited from management activities designed to conserve other endangered forest birds including the establishment of the Alaka'i Wilderness Preserve, regular surveys of forest bird populations, monitoring of habitat conditions, studies of disease and disease vectors, and public

education efforts featuring Kauai's endangered forest birds. In addition to these efforts, future management specific to the recovery of puaiohi will likely include the following:

- Systematic rat control using registered rodenticides in puaiohi nesting habitat.
- Continue re-introductions of captive-bred puaiohi with the goal of establishing additional populations.
- Aggressive ungulate control would likely improve the quality of puaiohi habitat and facilitate the recovery of degraded, but potential habitat. Control of non-native plants should be part of forest restoration efforts.
- Eradication of rats and feral cats from the Alaka'i Wilderness Preserve.
- Preventing the introduction of the small Indian mongoose (*Herpestes auropunctatus*) and other possible predators.
- Public outreach and education.
- Continue protection and management of wildlife sanctuaries and refuges.

MONITORING: Continue forest bird surveys and habitat monitoring. This information is needed to assess the efficacy of habitat management efforts. Additional monitoring for the puaiohi includes the following:

- Monitor survival and reproductive success of released birds to assess the efficacy of re-introduction efforts.

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

- The identification and captive-breeding of disease resistant individuals would potentially allow the establishment of disease-resistant populations at lower elevations.
- Continued field studies are needed to document survival and dispersal.

References:

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Wakelee KM, Fancy SG. 1999. 'Oma'o (*Myadestes obscurus*), kama'o (*Myadestes myadestinus*), oloma'o (*Myadestes lanaiensis*), and 'amaui (*Myadestes woahensis*). In *The Birds of North America*, No. 460 (Poole A, Gill F, editors.). Philadelphia, (PA): The Academy of Natural Sciences; and Washington DC: The American Ornithologists' Union.