

Northwestern Hawaiian Islands Passerines



Nihoa millerbird

Acrocephalus familiaris

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

Northwestern Hawaiian Islands Passerines Recovery Plan – USFWS 1984

SPECIES INFORMATION: The Nihoa millerbird is an obligate insectivore endemic to Nihoa Island in the Northwestern Hawaiian Islands. The Nihoa millerbird and its congener, the Laysan millerbird, are the only known Old World warblers (subfamily Sylviinae) known to have colonized the Hawaiian Archipelago. The Laysan subspecies, discovered first, was named “millerbird” because of its fondness for feeding on large miller moths (Family Noctuidae). Although the Laysan subspecies was driven to extinction by 1923 after European rabbits (*Oryctolagus cuniculus*) were introduced to Laysan in 1903, the Nihoa millerbird has persisted. Nihoa millerbirds are small (about 13 centimeters, or about 5 inches, in length), drably colored, and highly active due to their insectivorous habits. Male and female Nihoa millerbirds have similar plumage, but differ in size, with males being slightly larger than females. Nihoa millerbirds feed exclusively on insects and larvae, especially moths and caterpillars (Lepidoptera), gleaned from shrubs and bunchgrass tussocks. Like most insectivores, Nihoa millerbirds are territorial, and display a high degree of year-to-year territory fidelity. During breeding season, both sexes construct nests and incubate eggs.

DISTRIBUTION: Nihoa millerbirds are now restricted to the approximately 63 hectares (156 acres) area of Nihoa Island. Of those 63 hectares, approximately 40 hectares (100 acres) are considered suitable habitat for millerbird territories. With a mean territory size estimated at 0.2–0.4 hectares (0.5–1 acres), Nihoa Island can support, on average, between 100 and 200 millerbird territories. A small population of Nihoa millerbirds was translocated from Nihoa Island to Laysan Island, which has a land area of approximately 411 hectares (1,016 acres) and appears to be increasing steadily.

ABUNDANCE: The most recent population estimate on Nihoa Island was approximately 650 birds in 2009. In 2011 and 2012, 50 millerbirds (24 and 26, respectively) were translocated to Laysan Island. By September 2014, the population was estimated at approximately 164 birds.

LOCATION AND CONDITION OF KEY HABITAT: Nihoa millerbirds reside year-round on the steep-sided, rocky, and shrub-covered island of Nihoa. Maximum elevation is 277 meters (839 feet), with steep cliffs on three of the island’s four sides. Nihoa's vegetation community comprises about 25 species of plants; the four most abundant are (in descending order of abundance): the shrub *Chenopodium oahuense*, the shrub *Solanum nelsonii*, the shrub *Sida fallax*,

and the bunchgrass *Eragrostis variabilis*. Millerbirds are found throughout the island's 32 to 40 hectares (80 to 100 acres) of optimal habitat, and in suboptimal habitat as well. Millerbirds have not been observed to congregate at, or drink from, Nihoa's five to seven small freshwater seeps. The entire range of this species occurs within the Hawaiian Islands National Wildlife Refuge.

The habitat used by the translocated birds on Laysan is primarily composed of the shrub *Scaevola taccada*, with the bunchgrass *Eragrostis variabilis*, and the vine *Ipomoea pes-caprae* also present.

THREATS: Limiting factors are primarily weather (i.e., drought and storms), variations in food supply (typically due to weather), and availability of appropriate nest sites. Nihoa finches have been observed breaking and eating millerbird eggs, but the incremental mortality attributable to this behavior has not been estimated. Additional threats include:

- Invasive alien plants. Habitat quality could be degraded by weed invasions. The millerbird diet of mature and larval insects depends on the abundance of native plant populations, which could be adversely affected by competition with invasive alien plants such as *Miconia calvescens* or *Clidemia hirta*.
- Invasive alien arthropods. Preferred food insects could be suppressed by competition with, or predation by, introduced arthropods, which might not be attractive or palatable to millerbirds.
- Arthropod irruptions. Periodic irruptions of a nonnative grasshopper on Nihoa Island reduce plant cover and degrade habitat.
- Population size. Small populations are plagued by a variety of potentially irreversible problems that fall into three categories: demographic, stochastic, and genetic; the former are usually most problematic. Demographic factors include skewed sex ratios and stochastic factors include natural disasters. Habitat fragmentation exacerbates demographic and genetic problems.
- Introduced mammals. The risk of rat (*Rattus* spp.) introduction via transport (i.e., ships, planes) is of concern as rats are known to have decimated passerine populations in the Northwestern Hawaiian Islands in the past as a result of shipwrecks.

CONSERVATION ACTIONS: Nihoa millerbird persistence requires that the integrity of the island's small, remote ecosystems be maintained. This requires excluding and removing any introduced non-native plants, insects, passerine birds, avian disease, and mammalian and reptilian land animals. Quarantine measures and visitation restrictions in place for researchers appear to be controlling the rate of new introductions, but species that do become established may be extremely difficult to eradicate. Thus, rigorous statewide reduction or elimination of non-native invertebrates and plants introductions through stricter quarantine and reduction of ship groundings are necessary. In addition to these efforts, future management specific to the recovery of Nihoa millerbirds may include the following:

- Conduct aggressive weed control and native plant restoration to stabilize habitat quality.
- Monitor and, when warranted, conduct aggressive control of unstable arthropod populations.
- Prevent the introduction of rats and other possible predators.

MONITORING: Continue transect counts and habitat monitoring on both Nihoa and Laysan.

RESEARCH PRIORITIES: More research is needed on best quarantine techniques, best methods for early detection of alien species, and best eradication methods. Current knowledge suggests that Nihoa millerbird reproduction may be driven by variable external environmental factors, such as rainfall, but knowledge of breeding behavior and demographics is limited. The millerbird population is small, and the extirpation of the Laysan subspecies suggests an urgent need to establish another population. Research priorities specific to Nihoa millerbirds include the following:

- Conduct additional demographic studies to further refine estimates of population structure, dispersal, survivorship, nesting phenology and success, and other life history and behavioral characteristics.
- Further study translocation techniques and habitat restoration on target islands. Keeping insectivorous passerines alive for translocation is extremely difficult, but known techniques could be refined using non-endangered closely related species.

References:

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