



Hawai'i Volcanoes National Park Landbird Survey (2020–2021)

How are Hawai'i's landbirds faring in the face of non-native predators, altered habitats, and avian diseases? Long-term surveys in Hawai'i Volcanoes National Park are helping to answer that question. Scientists have been surveying landbirds and their habitats in the park since 2010 as part of the Pacific Island Network's ongoing monitoring program. Surveys conducted in 2020–2021 provide the third snapshot in this ongoing record, allowing the scientists to track changes in landbird distribution and population size over more than a decade. The latest findings provide insight into which species are increasing and which are declining, and provide critical information to guide management decisions.

The 2020–2021 surveys were conducted in seven forested tracts at Hawai'i Volcanoes National Park that totaled 15,375 hectares (Figure 1). The scientists used standardized point counts to estimate bird population density and abundance during the breeding season.

Results

Overall, 29 species of landbirds were detected during the 2020–2021 surveys; eight native species and 21 non-native species.

Native landbirds

Trends in native landbird populations varied widely by location and species (Table 1), but included the following:

‘Apapane (a Hawaiian honeycreeper; Figure 2A): The most broadly distributed and abundant species detected. Its numbers increased in four tracts but declined in three others.

Hawai'i ‘Amakihi (a Hawaiian honeycreeper): Increased in the two largest tracts but remained scarce in others, where numbers have stayed very low since 2010. The species has evolved some tolerance to avian malaria and can occur in many low elevation areas where mosquitoes are abundant.

Hawai'i ‘Elepaio (an endemic monarch flycatcher): Increased in some tracts but declined sharply or was altogether absent in others. This species, due to its tendency to nest in low canopy, is especially vulnerable to predation by rats and understory disturbances.

‘Iiwi (a federally threatened Hawaiian honeycreeper; Figure 2B): Populations were absent from several areas in the park where it occurred in 2010, including one area that previously supported more than 2,400 birds. In another tract, however, ‘Iiwi showed a

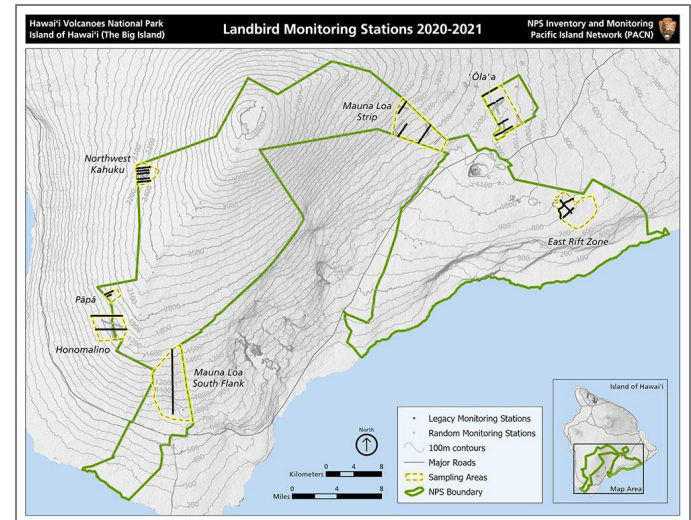


Figure 1. Landbird monitoring tracts at Hawai'i Volcanoes National Park. NPS

slight increase to a density of 0.17 birds/hectare. There were an estimated 1,366 birds in this area, where ungulate and predator control have benefited the species and its habitat.

Ōma'o (an endemic Hawai'i Island thrush): Populations were mixed, with a notable increase in one large tract. The Ōma'o, being a native frugivore, can disperse seeds from rare native trees and is critical for ecosystem function.

The three federally endangered Hawaiian honeycreepers, the **‘Akiapōlā‘au**, **‘Alawī**, and **Hawai'i ‘Ākepa**, were not detected within the survey area, but small numbers persist in another area of the park (Judge et al. 2024).

Non-native landbirds

Population trends for some of the 21 non-native species encountered during the 2020–2021 surveys included the following:

Warbling White-eye remained the most widespread non-native species, although its numbers declined in most areas.

Japanese Bush Warbler, which was absent in 2010, irrupted in density and distribution across most surveyed areas.

Northern Cardinal and **Red-billed Leiothrix** also increased in many locations.

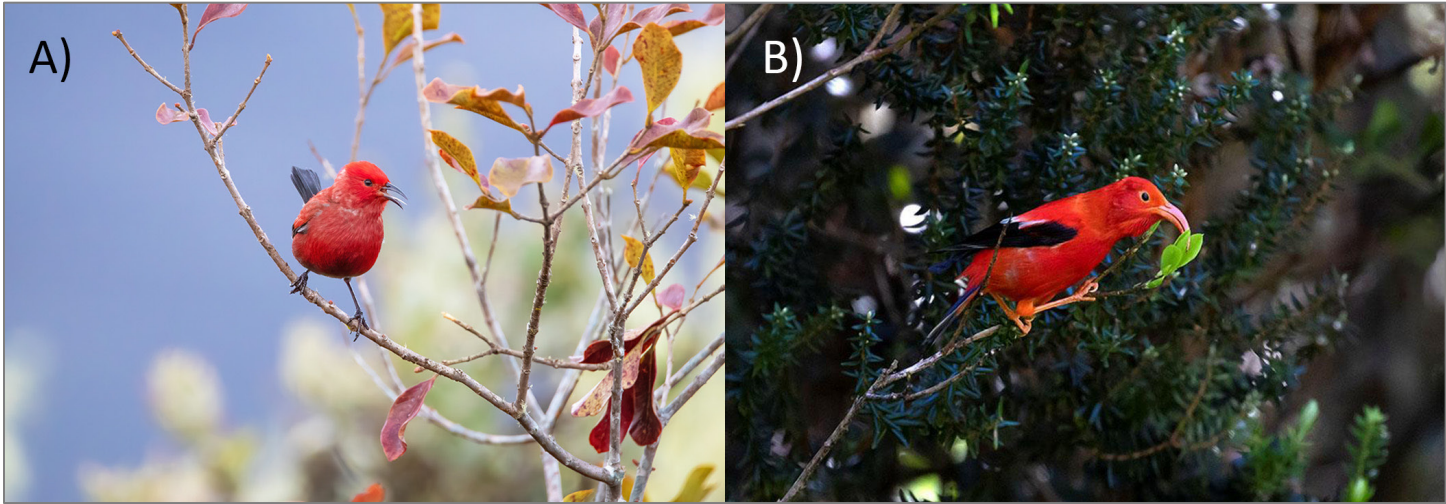


Figure 2. Hawaiian landbirds. A) An ‘Apapane, the most frequently-observed species during the 2020–2021 monitoring survey. B) An ‘I’iwi perched on a branch. The ‘I’iwi is vulnerable to avian malaria, so is extirpated from many of the main Hawaiian Islands. This survey showed that the species is also nearly extirpated from the park, with populations only in small areas in high elevation refugia where it is safe from mosquito-borne disease. *NPS / Janice Wei*

Table 1. Total native bird detections recorded during the 2020–2021 Hawai’i Volcanoes National Park landbird monitoring survey. Total detections (*n*) represent the number of birds recorded during 458 counts at 450 stations across seven distinct monitoring tracts. Stations occupied indicates the number of stations with one or more detections of a species. Percent occurrence was calculated as the proportion of stations occupied relative to the total number of stations surveyed. Birds per count (BPC) was calculated as total detections divided by the number of counts.

Common Name	Scientific Name	<i>n</i>	Stations Occupied	Occurrence	BPC
‘Apapane	<i>Himatione sanguinea</i>	1,876	392	87.1%	4.14
Hawai’i ‘Amakihi	<i>Chlorodrepanis virens virens</i>	1,411	287	63.8%	3.11
Hawai’i ‘Elepaio	<i>Chasiempis sandwichensis</i>	171	86	19.1%	0.38
‘I’iwi	<i>Drepanis coccinea</i>	19	11	2.4%	0.04
‘Io (Hawaiian Hawk)	<i>Buteo solitarius</i>	10	9	2.0%	0.02
Nēnē (Hawaiian Goose)	<i>Branta sandvicensis</i>	7	2	0.4%	0.02
‘Ōma’o	<i>Myadestes obscurus</i>	187	116	25.8%	0.41
Pueo	<i>Asio flammeus sandwichensis</i>	1	1	0.2%	<0.01

Why do these results matter?

The results of the 2020–2021 surveys show that Hawai’i Volcanoes National Park continues to provide important habitat for native forest landbirds, although many species remain vulnerable. Declines and local disappearances in several areas reflect the ongoing, interacting challenges facing native bird species, including:

- Habitat degradation from invasive weeds and feral ungulates,
- Predation by introduced species, such as rats, cats, and mongooses,
- Mosquito-borne diseases, such as avian malaria and avian pox, and
- Wildfires.

Non-native birds can further compound these challenges by competing with native species for limited resources and acting as reservoirs for avian diseases.

Long-term monitoring is essential for understanding how landbird populations are changing over time. By tracking trends in bird population density and abundance, scientists and park

managers can evaluate conservation efforts, identify emerging threats, and make informed decisions to protect, stabilize, and increase Hawai’i’s native bird populations.

For more information...

Please see the Science Report on which this resource brief is based ([Status of Forest Birds in Hawai’i Volcanoes National Park: Mixed Results for Native and Non-Native Species](#)), as well as the following resources:

[Pacific Island Network Landbird Monitoring Dataset, 2010–2024](#)

Judge, S.W., K.W. Brinck, A.S. Genz, L. Berry, J.M. Gaudioso, A.X. Wang, and R.J. Camp. 2024. [Divergent trends in distribution and abundance of landbirds in low and high elevation habitats of the Ka’ū Rainforest](#). Science Report NPS/SR—2024/141. National Park Service, Fort Collins, Colorado.

If you have any questions...

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