

Friends of Hakalau Forest National Wildlife Refuge (NWR)



Hakalau Forest NWR

Hakalau Forest NWR consists of the Hakalau Forest Unit and the Kona Forest Unit, collectively managed as one complex (48,279 acres in total).

The Hakalau Forest Unit consisting of 32,733 acres, was established in 1985 to protect and manage endangered forest birds and their rain forest habitat. 27 of the native plants and birds in this unit are listed under the Endangered Species Act.

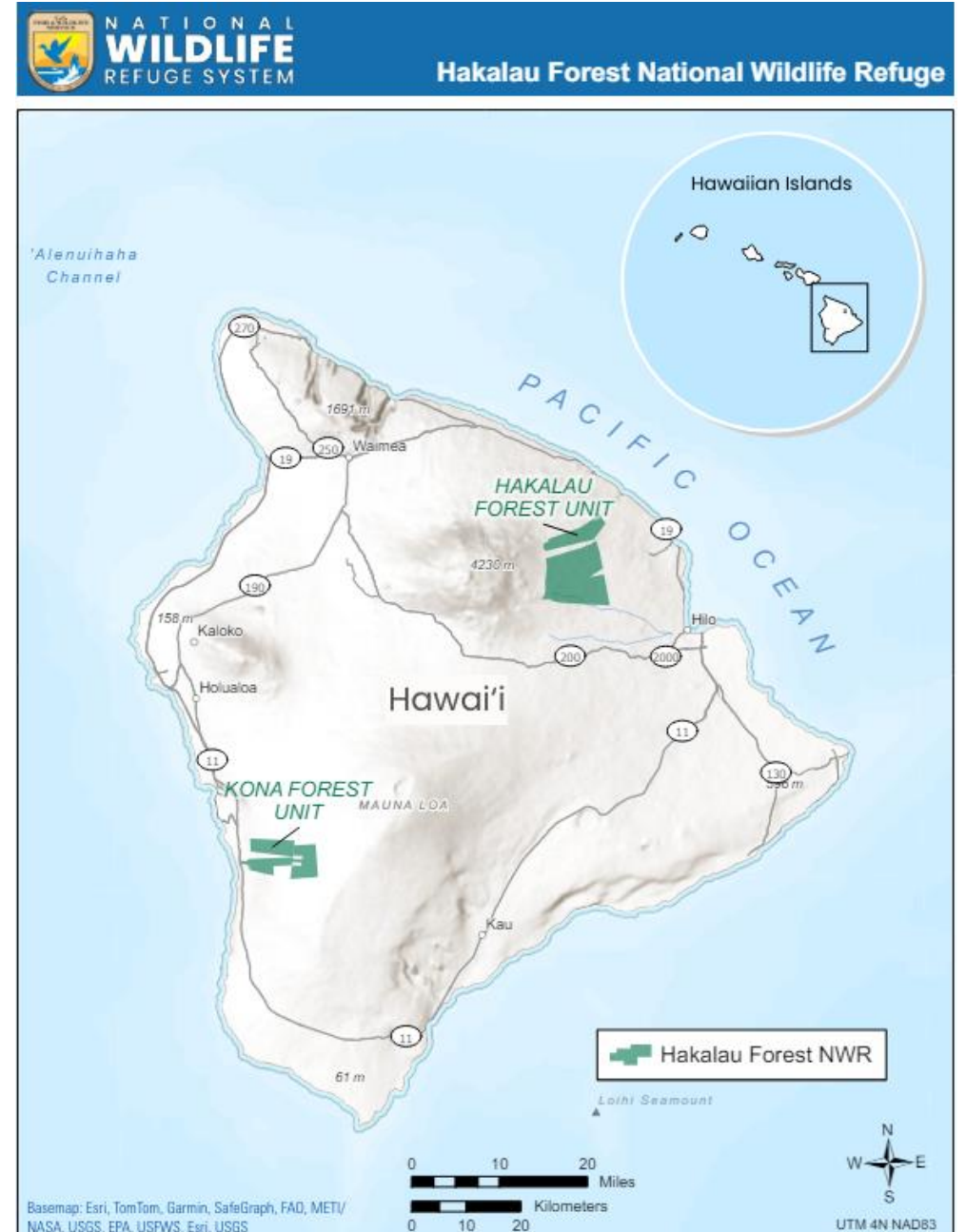
Annual rainfall: 250"

Elevation: 2,500 – 6,600'

The Kona Forest Unit with 15,546 acres was established in 1997 to protect diverse native forest birds and several listed plant species, as well as a rare lava tube and lava tube skylight habitats. The refuge was also established for the conservation of the last wild Hawaiian crows or ('alala) on the island of Hawai'i.

Annual rainfall: 48"

Elevation: 2,000 – 6,100'



Endangered Species

Here are some of the Federally-recognized endangered and threatened birds and plants found at Hakalau Forest

(photos @JackJeffreyPhoto)

First row, left to right

Endangered male 'Ākepa

Endangered 'Alawī

Threatened 'I'iwi

Second row, left to right

Endangered male 'Akiapōlā'au

Hawai'i 'Elepaio

Third row, left to right

Endangered *Cyanea shipmanii*

Endangered *Phyllostegia racemosa*

Endangered *Clermontia pyrularia*



Friends of Hakalau Forest NWR

The Friends of Hakalau Forest NWR is a nonprofit established in 2006 devoted to conserving the unique flora and fauna of Hawai'i Island. This group of hardworking, hands-on, committed volunteers and donors share a passion for protecting our native forests and critically endangered birds and plants.

Key Projects:

Endowment Fund, started in 2015, managed by the Hawaii Community Foundation, now over \$1.5 million raised, goal is \$3.5 million

Walk for the Wild, every October

Volunteer Service Trips to the Refuge

Education Outreach – Community-wide

Visitor Services – Provide more access and interpretation

Quarterly Newsletter

Social Media – FB and IG

Website – friendsofhakalauforest.org



Conservation Success



Since 1985, FWS staff and volunteers have planted over 600,000 native plant species to restore the upper elevation Hakalau Unit forests previously decimated by ranch activities.

`I'iwi, `Amakihi, and `Apapane are now feeding in (and pollenating) planted Ohia, Mamani, Lobelia, `Akala and native mint Clermontia flowers. `Alawi and `Akiapola'au are nesting and feeding in restored Koa forests. `Oma`o feeding on planted Pilo, `Olapa, `Akala, Kolea, Pukiawe and Kawa`u fruit, dispersing the seeds and helping restore the forest. `Elepaio are feeding on insects and taking up residence in the restored forest areas.

Many of these endangered bird species are also breeding in the restored forest tracts.

FWS Hakalau Goal: Restore the forest (canopy and understory), particularly at higher elevations (above mosquito presence)

Threats - Ungulates



Ungulate control (primarily pigs and occasionally cattle and sheep)

Despite an ongoing trapping program and regular fence maintenance, its extremely difficult and consumes significant FWS staff time to control these invasive pests.

Controversial issues with pigs: Some oppose pig control because of traditional hunting and a desire to maintain pigs for locals to hunt. This also limits methods for controlling pigs effectively



FWS Hakalau Goal: Get and maintain invasive species to manageable levels

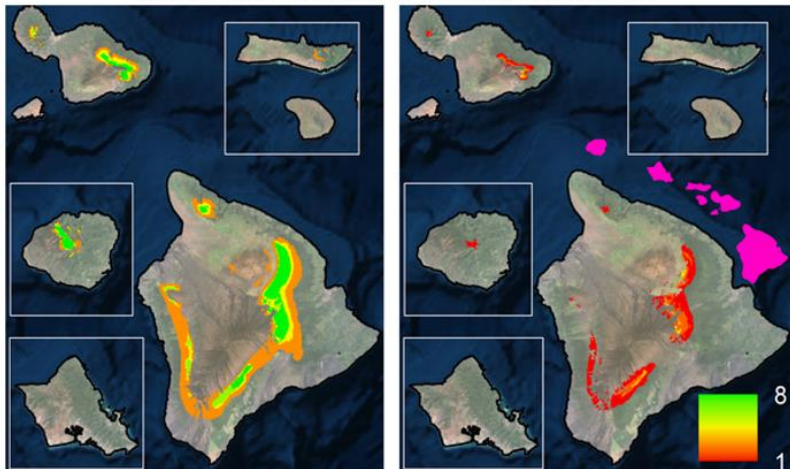
Threats – Climate Change



'Apapane (*Himatione sanguinea*), a crimson red Hawaiian honeycreeper, being bitten by the alien invasive mosquito *Culex quinquefasciatus*. Photo: (c) Jack Jeffrey

- Avian malaria, a disease transmitted by the southern house mosquito, *Culex quinquefasciatus*, has devastated Hawaii's native forest birds over the last century.
- There has been a sharp escalation in population declines over the last 20 years.
- Mosquitoes are encroaching on the forest birds' last mosquito-free high elevation refugia.
- Robust surveillance of both mosquitoes and the conditions that drive invasion is key to inform conservation action that can safeguard bird populations.

Fig 2. Current (left) and future (right) forest bird number of species based on modeled range and available primary habitat of high model reliability species.



Fortini LB, Vorsino AE, Amidon FA, Paxton EH, Jacobi JD (2015) Large-Scale Range Collapse of Hawaiian Forest Birds under Climate Change and the Need 21st Century Conservation Options. PLOS ONE 10(10): e0140389. <https://doi.org/10.1371/journal.pone.0140389>

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0140389>

PLOS ONE

Threats – Other Invasive Animal and Plant Species



An invasive species is defined as a species whose migration and growth within a new range is causing detrimental effects to the native biota in that range.

Introduced birds,

- barn owl,
- Japanese white-eye,
- red-billed leiothrix,
- northern cardinal,
- house finch,
- Hwamei, and others

Introduced mammals,

- **feral pigs**, cattle, sheep, goats
- rats,
- feral cats,
- small Indian mongoose

Introduced reptiles and amphibians

Introduced arthropods

Introduced plants, such as gorse, Florida blackberry, English holly, Photinia and banana poka (HFU) and strawberry guava, Christmas berry, banana poka, German Ivy and nonnative pasture grasses (KFU)