

# Hakalau Forest National Wildlife Refuge

by Barbara Maxfield

Although it's only a "teenager" in the National Wildlife Refuge System, the 32,700-acre (13,230-hectare) Hakalau Forest National Wildlife Refuge (NWR) on the Big Island of Hawai'i stands among the leaders in endangered species recovery as we celebrate our centennial year. With eight endangered bird species, an endangered bat, and at least six endangered plant species, the refuge harbors one of the highest numbers of listed species within the system. But perhaps more remarkable is the progress the refuge staff has overseen during its short history.

Hakalau Forest NWR was created in 1985 to protect endangered forest birds and their rainforest habitat. Located on the windward slope of Mauna Kea between the elevations of 2,500 and 6,500 feet (760 and 1,980 meters), the refuge contains some of the finest remaining stands of native rainforest in the state. However, at the time of purchase, the native forest merged into about 4,000 acres (1,620 ha) of open grassland at higher elevations, where rainfall decreases. The grassland area was forested 200 years ago, before cattle and ranching were established on the Big Island.

The refuge staff's philosophy has always been that the best way to conserve the native forest birds is to restore their habitat, so 16 years ago it embarked on a major habitat rehabilitation effort. Since 1987, more than 252,000 native trees have been planted on the refuge, including about 208,000 koa (*Acacia koa*) trees and more than 1,300 endangered plants.

"We've had tremendous support from the State's Division of Forestry and

Wildlife, whose Waimea tree nursery propagated many of our koa seedlings, the U.S. Forest Service, the Big Island Resource Conservation and Development Office, *AMERICAN FORESTS*, and the Natural Resources Defense Council," says refuge manager Richard Wass. "The technical assistance, funding, and support these partners provided have energized our reforestation program."

An onsite greenhouse has supplied most of the planting materials since 1997, particularly the endangered species. The refuge horticulturist developed highly successful propagation techniques for *Clermontia pyrularia*, *Cyanea shipmanii*, *Cyrtandra tintinnabula*, *Phyllostegia racemosa*, and *Phyllostegia velutina*, all listed plant species with four or fewer populations left in the world. *Clermontia lindseyana*, which is not as rare but still endangered, also has been propagated from seeds found on the refuge and planted in the wild.

Wass gives volunteers most of the credit for replanting efforts within the refuge. Led by refuge staff, volunteer groups from schools, Scouts, conserva-



*The 'akiapala'au, an endangered Hawaiian forest bird.*

Photo © Jack Jeffrey

**A portrait of the contributions the National Wildlife Refuge System has made toward endangered species recovery would not be complete without mention of the island ecosystems of the Pacific. From low sandy coral islets to high rainforests, the 11 National Wildlife Refuges in the Hawaiian archipelago support more than 55 threatened and endangered animal and plant species. Though each is special in its own right, perhaps the most unique is Hakalau Forest National Wildlife Refuge, the only high elevation tropical rainforest found within the Refuge System.**



**Intact habitat at Hakalau Forest NWR**

USFWS photo

tion organizations, and service clubs have been gathering seeds and planting native trees and shrubs for the past 15 years. Last year, 875 volunteers donated 6,344 hours of service to Hakalau Forest, making the long trek up Mauna Kea over rough four-wheel-drive trails to spend their weekends working.

Significant effort also has gone into alien species control. Forty-five miles (72 kilometers) of fencing have been installed and maintained, creating eight “feral ungulate management units.” Feral and domestic cattle (*Bos taurus*) have been completely removed from seven of those units, and only about six head remain in the eighth unit. Four units are now free from damage by feral pigs (*Sus scrofa*), while two others have low pig populations remaining. Feral ungulates

are known to consume native plants, facilitate dispersal of alien plants, and cause erosion. Pigs in particular create breeding grounds for mosquitos (*Culex quinquefasciatus*), which carry avian pox and malaria. These diseases are one of the primary threats to the island’s native forest birds. It is worth noting that the mosquitos and both of these diseases were introduced inadvertently to the Hawaiian Islands.

Eradication of invasive weeds such as gorse (*Ulex europaeus*), banana poka (*Passiflora mollissima*), and Florida blackberry (*Rubus argutus*) is another challenge faced by staff, contractors, and volunteers. To date, about 80 percent of the gorse has been removed from the refuge. The more accessible areas of the refuge are nearly “poka free,” thanks to



hundreds of hours of volunteer labor. The area infested with Florida blackberry is shrinking, with the assistance of funding from the U.S. Forest Service.

But are these efforts helping? Endangered species recovery is usually a slow, long-term process, so it is particularly gratifying to the refuge staff to see remarkable results over the past 17 years. Last year, it announced the first known sighting of an endangered forest bird—a juvenile ‘akiapola‘au (*Hemignathus munroi*)—within rehabilitated habitat on the refuge. The chick was heard calling from an area planted with koa trees in 1995. This year, the refuge biologist boasts that the staff now finds ‘akiapola‘au family groups in planted groves and corridors of koa on a regular basis.

A draft report on Hawaiian forest bird species modeling by the U.S. Geological Survey's Pacific Island Ecosystem Research Center offers more good news, at least for four species. Using data gathered since the mid-1970s, it concludes that the Hawai'i 'amakihi (*Hemignathus virens virens*, not a listed species) population is widespread and sizable, with approximately 68,650 birds

in Hakalau Forest. The rare ‘akiapola‘au population is very small, with about 800 birds within the refuge, but the population appears to be relatively stable.

For two other endangered forest birds, the Hawai'i 'akepa (*Loxops coccineus*) and the Hawai'i creeper (*Oreomystis mana*), scientists found increasing populations over a 24-year period. About 5,000 'akepa and 9,100 Hawai'i creepers are thought to occur within the refuge. Results for nine additional forest birds species are expected soon.

"These endangered forest birds avoid open areas and even open forest canopy areas," explains Wass. "With less than 20 years of effort, we've demonstrated that recreating habitat for these species is possible. We have a long road ahead of us, but think of what could be here at Hakalau Forest for the Refuge System's tricentennial celebration!"

---

*Barbara Maxfield is Chief of External Affairs for the Service's Pacific Islands Office in Honolulu, Hawaii (email [barbara\\_maxfield@fws.gov](mailto:barbara_maxfield@fws.gov); telephone 808/541-2749).*



***Cyanea shipmanii is one of the endangered plants being propagated at Hakalau Forest NWR.***

*USFWS photo*



***Reforestation of cleared lands at Hakalau Forest NWR.***

*USFWS photo*