



Saving the Kiwikiu (*Pseudonestor xanthophrys*): Recovery Efforts in Maui, Hawaii

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Kiwikiu Recovery Efforts 2005-2019

**RESEARCH
RESTORATION
REINTRODUCTION**

Kiwikiu (Maui Parrotbill; *Pseudonestor xanthophrys*), one of the most endangered Hawaiian passerines, continues to be under unmanageable threat from invasive mammalian predators and non-native disease.

Today I would like to give a summary and update on the recovery efforts for this species.

POPULATION



For a bit of background, there are six species of Hawaiian honeycreeper left on the Island of Maui.

The Kiwikiu is the most endangered of those six.

Kiwikiu (Maui Parrotbill; *Pseudonestor xanthophrys*) is a **critically endangered** insectivorous Hawaiian honeycreeper endemic to the island of Maui in Hawaii.

Historically distributed island-wide, populations are now restricted to 36 km².

Population estimates reveal **continued decline** even in protected habitats with **<312 individuals** left in the wild.

Population viability models predict extinction within 25 years.

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 - insectivorous
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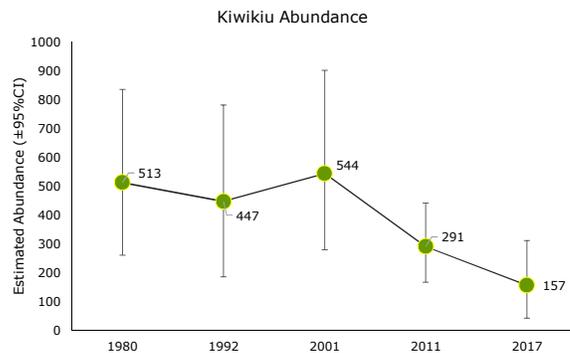
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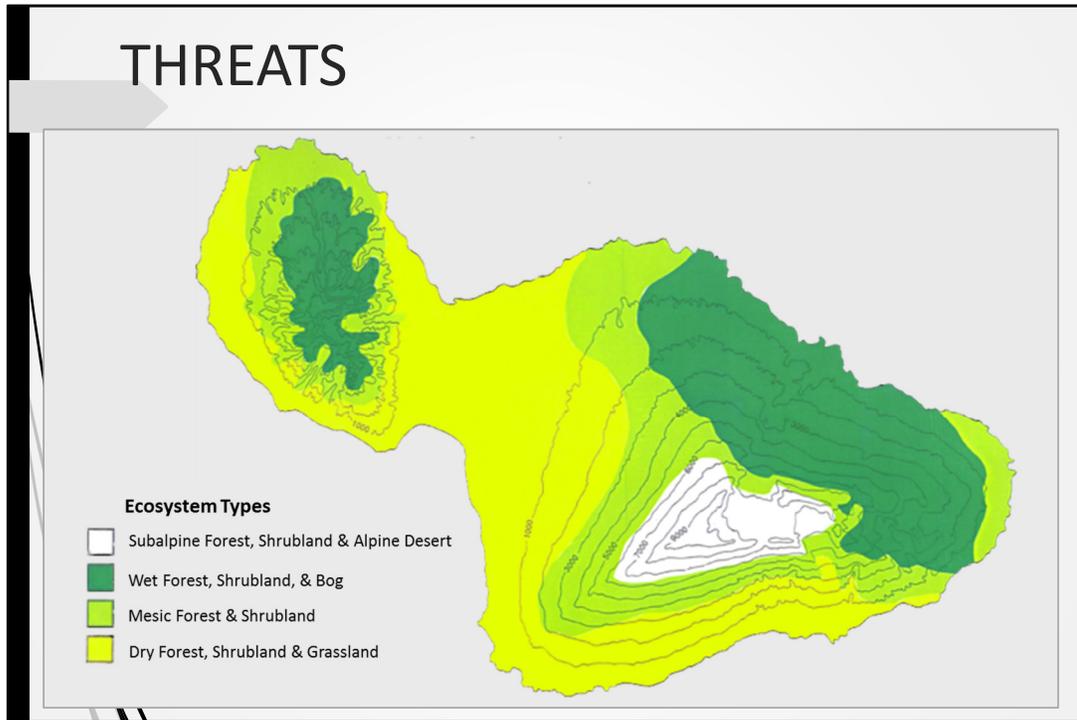
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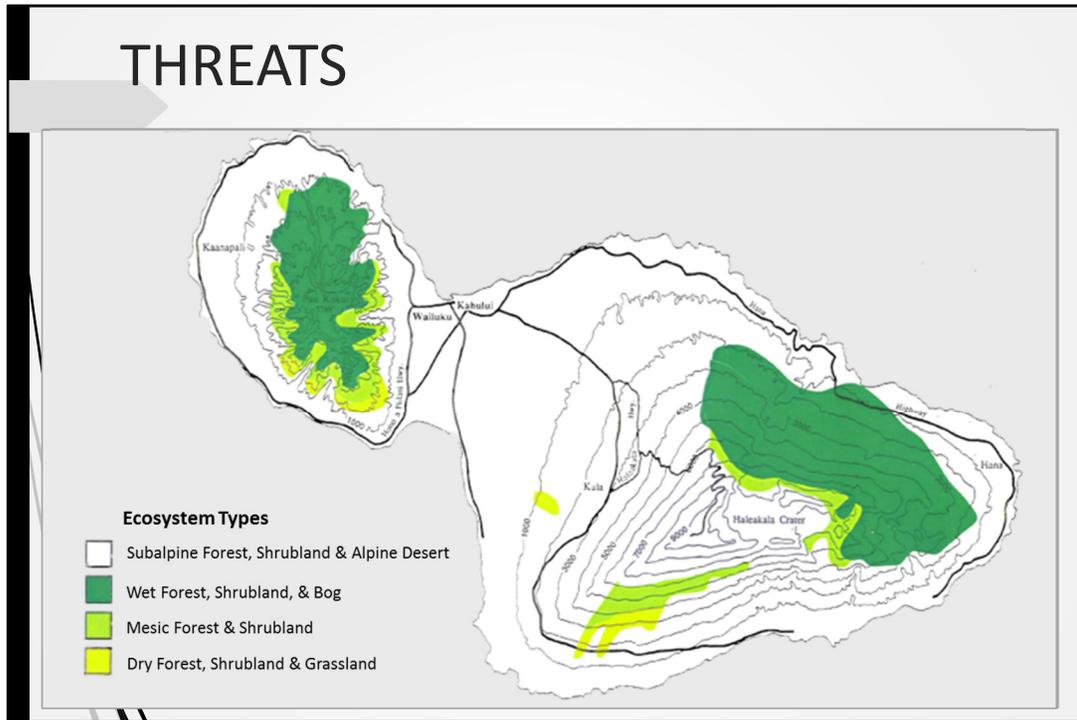
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THREATS



Threats to Kīwīkiū are similar to other Hawaiian forest birds including habitat loss, with little forested areas remaining on island. We have continued habitat degradation, from both introduced plants and animals. We have depredation by introduced predators. And then we also face unique challenges with introduced avian disease spread by introduced mosquitos which is elevationally restricted but that limitation is being effected by climate change.

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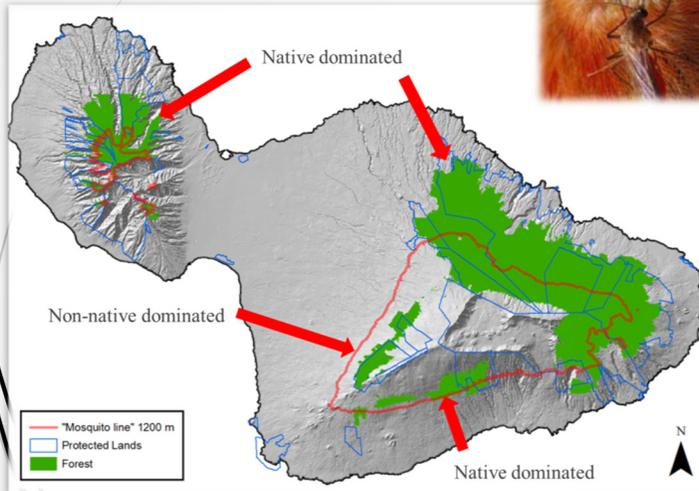
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RESEARCH



Intensive research studies were conducted throughout the species' range from 2006 - 2014. With a range of threats, we sought to identify the key limiting factors effecting the population by looking at productivity, survival, and population genetics. Results clearly directed us to issues with habitat availability and/or suitability.

The Productivity studies showed:

Habitat “full”

Low productivity given species biology

Nests are failing in heavy weather events

The Survival studies:

High adult survival

Low juvenile survival/recruitment

Furthermore we also found, genetically disjunct eastern and western populations

Most of these limiting factors, we cannot manage. Without practical tools for protection for adverse weather or landscape-level disease, vector, or predator control, REINTRODUCTION to new areas has been identified as the most important recovery action for this species. A conservation translocation will also allow us to manually mix the genetic diversity of

and potentially facilitate the generation of new genetic diversity if we can increase the total population size.

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- Productivity limited by weather - Habitat
- Survival limited by space available - Habitat

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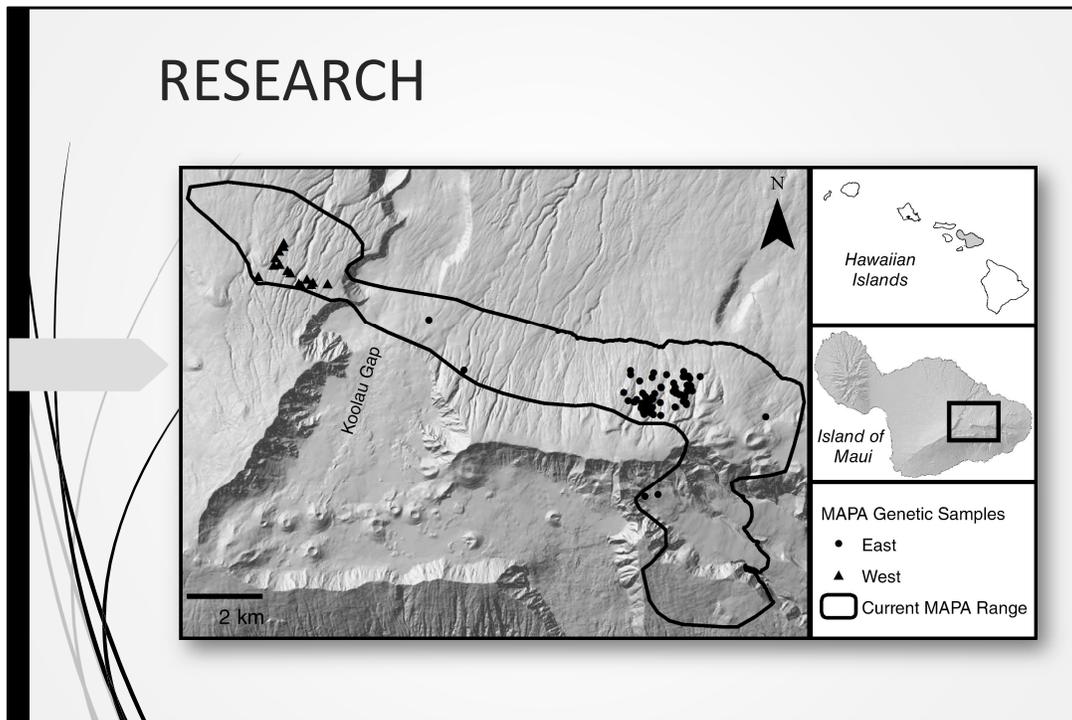
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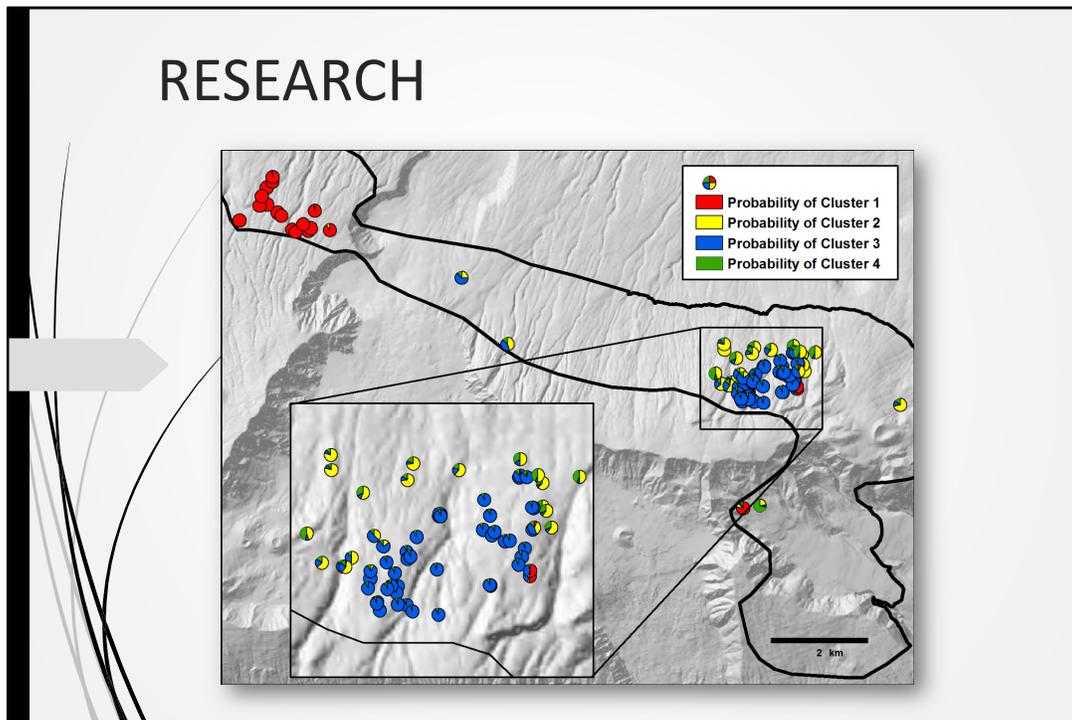
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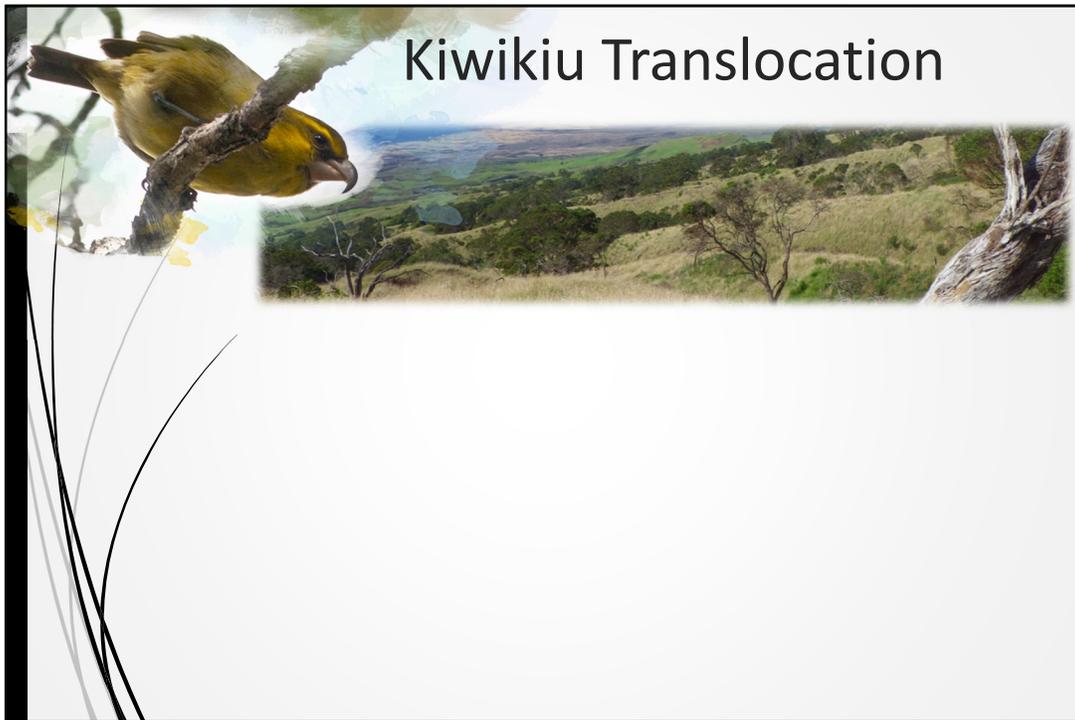
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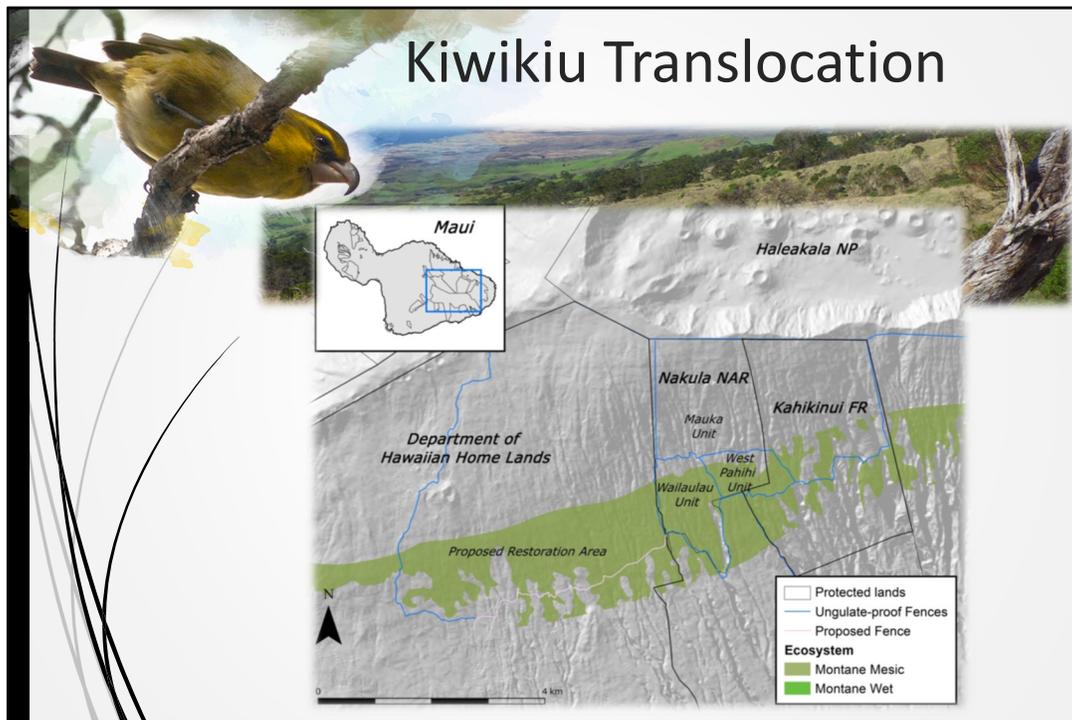
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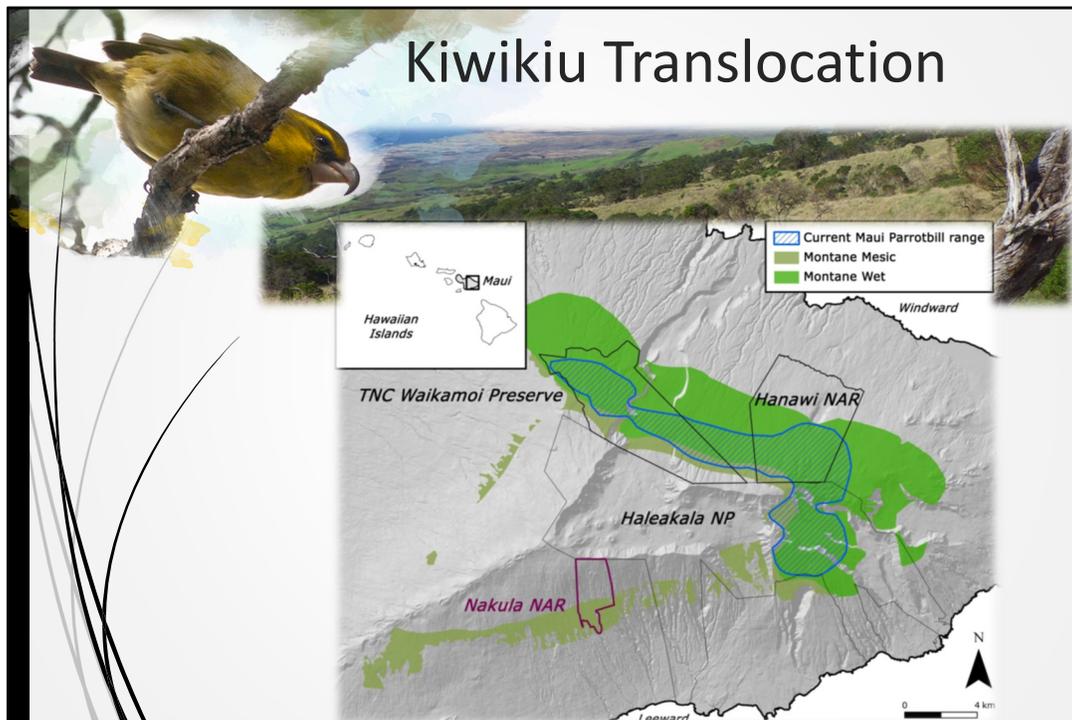
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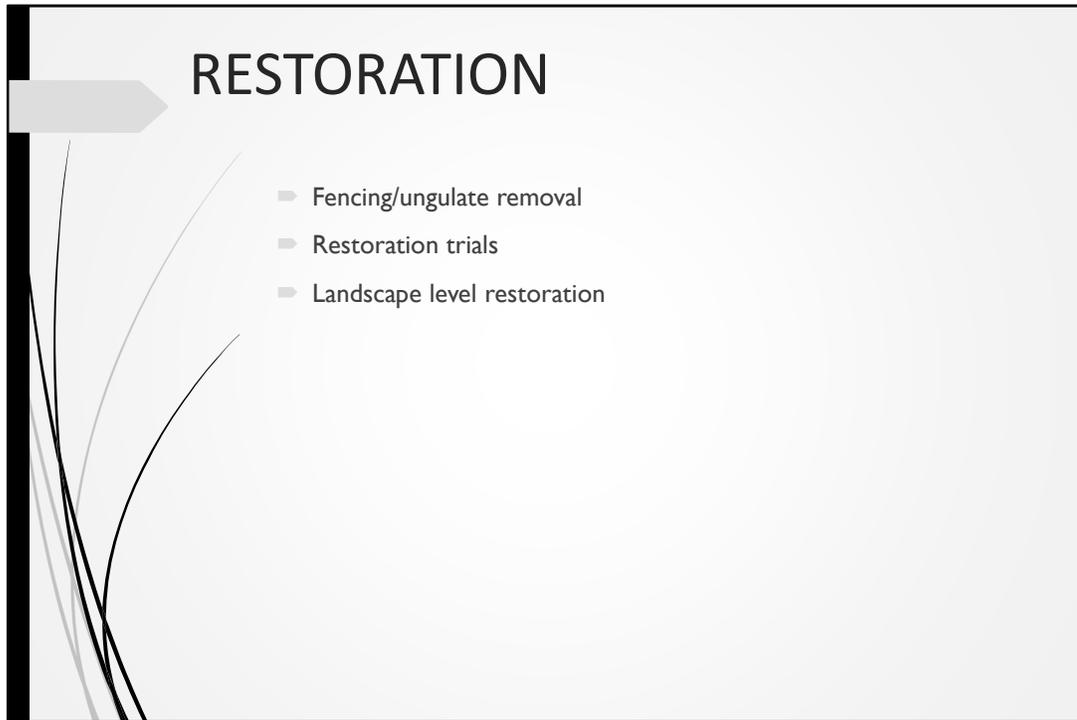


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Nakula Natural Area Reserve (NAR) on leeward east Maui was selected as the most suitable site to establish a new population. This area was degraded from a history of heavy introduced ungulate pressure. Historical forest bird densities in this area are unknown, but Kiwikiu were once found here.

Before we could think about moving any birds there was a lot of restoration work to do.



Given the severity of the decline in the current population, recovery actions must be implemented now despite imperfect information in regards to current or future risks. Nakula Natural Area Reserve, the site selected for the first experimental releases, exists in a deteriorated state as a result of a century of browsing and grazing damage from non-native ungulates.

Following fencing and eradication of ungulates, the forest in this area has begun to recover through natural regeneration and conservation restoration efforts guided by results of five years of experimental restoration trials in the release area.

This was a multi-step process which started with fencing and ungulate removal. After fencing, **restoration trials were initiated to assess the most efficient and effective methods for forest recovery. Restoration trials indicated that natural regeneration could be stimulated by removal of non-native grasses but was limited to a few native plant species.**

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RESTORATION



- Fencing/ungulate removal
 - Restoration trials
 - Landscape level restoration
-
- Outplanting was very successful; 82% two-year survivorship.
 - Nakula is returning to a **primarily forested habitat** through widespread natural regeneration and broad-scale plantings.
 - **> 250,000 seedlings** of 16 native tree and shrub species have been planted on leeward slopes with plans for more restoration across the region.
 - Future challenges will be in **restoring woody plant diversity** to the site, which may be critical to long-term success for Kiwikiu.

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REINTRODUCTION

Completed tasks prior to reintroduction include:

- **Reintroduction Plan** finalized.
- Funding secured.
- Disease, mosquito, prey, and predator abundance surveys conducted.
- Nakula forest bird community monitored through repeated annual census.
- **Threat reduction** for cats, mongooses, and rats ongoing.
- **Release aviaries** constructed.
- Supplemental feeders designed.



So where we are today...

Completed tasks prior to reintroduction include:

- **Reintroduction Plan** finalized by Maui Forest Bird Working Group.
- Full plan can be accessed at

mauiforestbirds.org.

- Funding secured.
- Disease, mosquito, prey, and predator abundance surveys conducted.
- Nakula forest bird community monitored through repeated annual census.
- **Threat reduction** for cats, mongooses, and rats ongoing. Predator reduction grid with GoodNature™ A24s, DOC250s, and elevated and ground-based body grip traps.
- **Release aviaries** constructed

approximately 150m apart to facilitate birds being able to hear one another without territorial conflicts.

- Filming underway for **community outreach** productions and materials.



Looking at the timeline moving forward... Although the forest is far from recovered, we are losing bird in their current range every year. The first releases of captive and wild Kiwikiu into Nakula are proposed to begin in October 2019.

REINTRODUCTION

- Cohort for translocation and release will consist of 12 wild and 8 conservation breeding birds individuals.



- Soft release technique
- Food Supplementation
- Post-release monitoring
- Continued forest restoration



Cohort for translocation and release will consist of 12 wild and 8 conservation breeding birds individuals.

- Conservation breeding efforts for Kiwikiu began in the late 1990s, but there has been

limited and inconsistent success.

- These eight birds constitute the remaining breeding flock.
- Captive birds consist of seven males and one female making a 50:50 sex ratio a heavy take on wild females: a release cohort of more males than females is very likely.

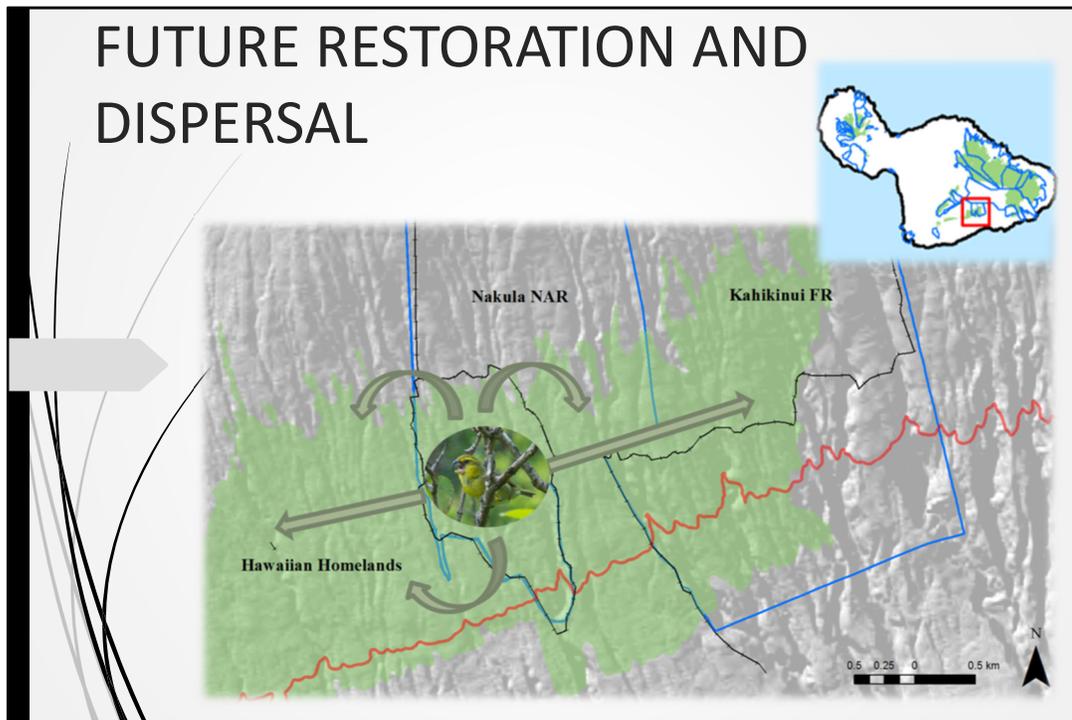
SOFT RELEASE TECHNIQUE

All 20 birds will be held in paired aviaries at 10 sites. Captive birds will be held for ~2-3 weeks. The releases will be conducted incrementally to

help anchor birds on the site.

Food supplementation will be provided in the release aviaries and after the birds are released. This will consist of both live food and commercial food supplements.

Post-release monitoring will use radio transmitters and color-band resighting. Telemetry protocols will be trialed on a more common honeycreeper in the area prior to releases.



This reintroduction effort is the first step in a slope wide restoration visions.....

PARTNERSHIPS

► *The Kiwikiu Reintroduction Plan has been drafted and reviewed by the **Maui Forest Bird Working Group** including: American Bird Conservancy, Haleakalā National Park, Leeward Haleakalā Watershed Restoration Partnership, Maui Forest Bird Recovery Project, National Park Service Inventory & Monitoring, Pacific Bird Conservation, Pacific Cooperative Studies Unit, San Diego Zoo Global, State of Hawai'i Department of Land & Natural Resources – Forestry & Wildlife, State of Hawai'i Department of Land & Natural Resources – Native Ecosystems Protection & Management, The Nature Conservancy of Hawai'i, US Fish & Wildlife Service, and US Geological Survey - Biological Resources Division.*

► *These Kiwikiu recovery efforts have been funded by the State of Hawai'i Department of Land & Natural Resources, US Fish & Wildlife Service, American Bird Conservancy, National Fish and Wildlife Foundation, Disney Conservation Fund, San Diego Zoo Global, Mohamed bin Zayed Species Conservation Fund, Patagonia, Doolin Foundation for Biodiversity, Hawaiian Airlines, Nā Koa Manu Conservation, Inc. and many private individuals and organizations.*

This work has been and continues to be made possible through the partnership within Hawaii and beyond.

The Kiwikiu Reintroduction Plan was drafted and reviewed by the Maui Forest Bird Working Group which is made up of state, federal, and private organizations.

The funding for the research and recovery efforts of this species has also been diverse including state, federal, and private funders.

PEOPLE



Beyond the partnerships, this work has been made possible by hundreds of hard working field staff and volunteers over the years. Working on these species is challenging physically and mentally we have a dedicated team not only championing the recovery efforts but also a constant stream of new and returning volunteers that work right along side our biologists



MAHALO

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