



NĀ KOA MANU
CONSERVATION



AMERICAN BIRD
CONSERVANCY



Maui Forest Bird
Recovery Project

Navigating a path to recovery for kiwikiu: a Hawaiian finch in peril

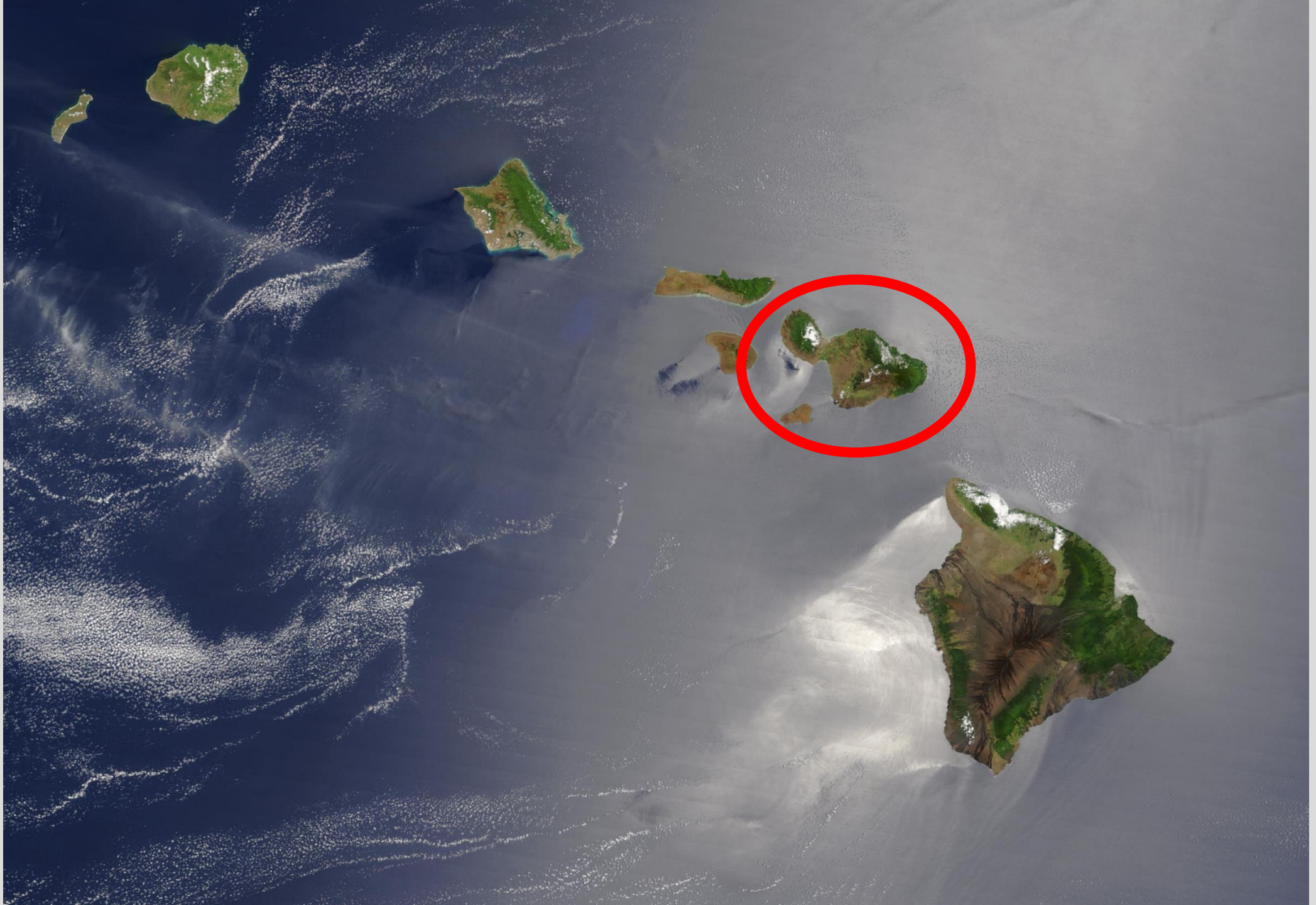
Presented by Laura Berthold
TWS Western Section
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OUTLINE

- Kiwikiu and its Threats
- Demographics Research
- Forest Restoration & Kiwikiu Translocation
- Rapid Population Assessments
- Future steps to recovery



KIWIKIU (MAUI PARROTBILL)

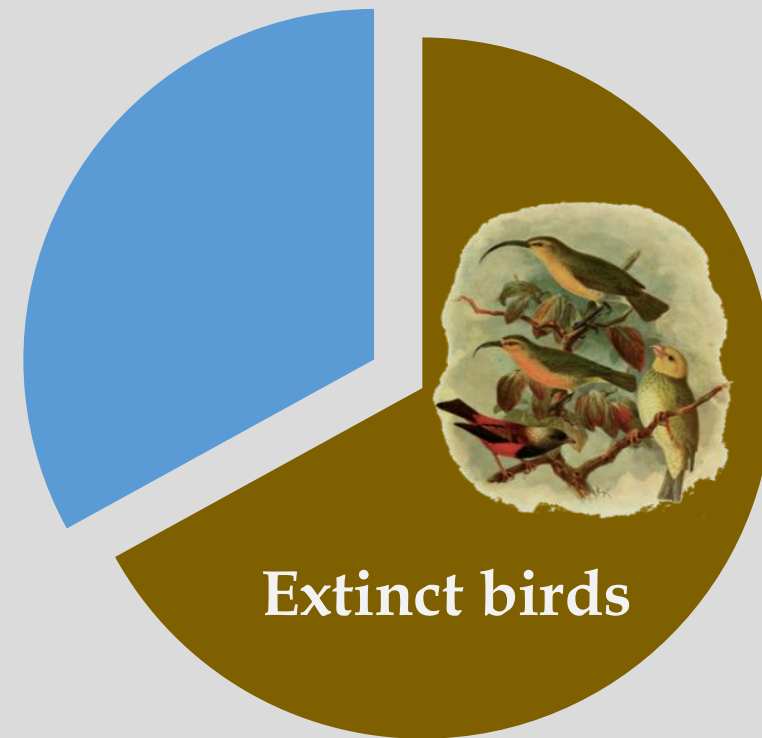
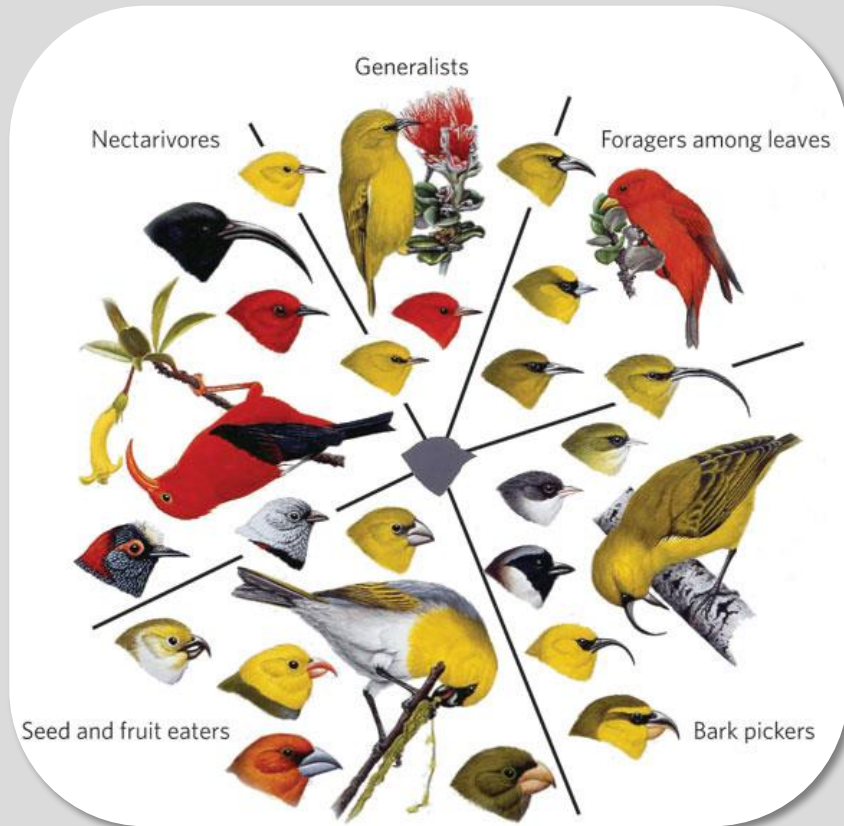
(*PSEUDONESTOR XANTHOPHRYS*)

- Endemic to Maui
- **Endangered** Hawaiian Finch
- Insectivorous specialist
- Slow population growth
 - Single egg clutch
 - ~1 offspring/year



ADAPTIVE RADIATION- UNIQUE SPECIES

- 1 Species → Over 50 Species

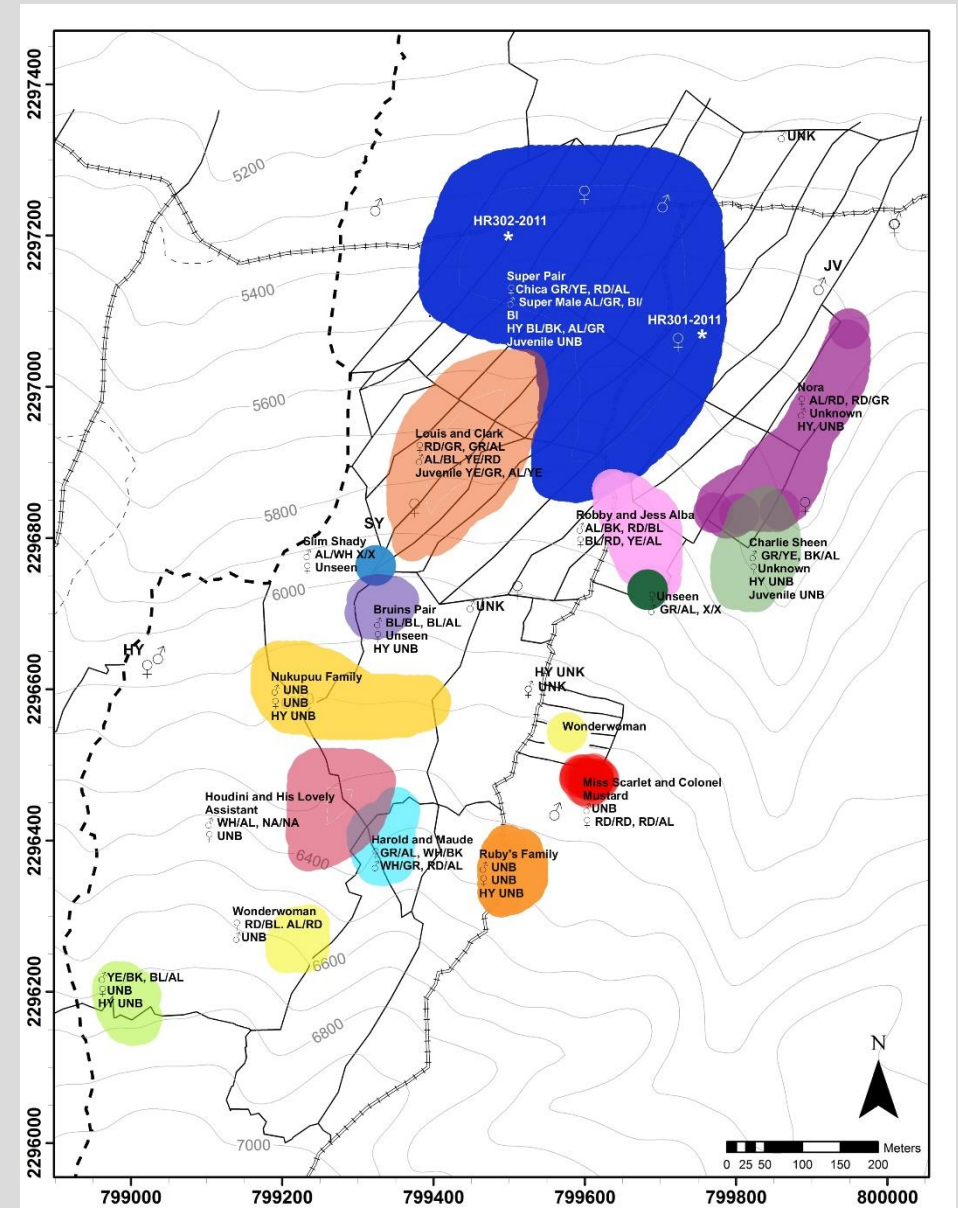


THREATS

- Habitat degradation/loss
- Non-native predators
 - Cat, rats, mongooses
- Introduced mosquitoes and avian disease
- Climate change
- Small range



A person wearing a teal rain jacket is in the foreground, holding a long black pole and reaching upwards into a dense forest. The forest is filled with lush green ferns and other vegetation. In the background, another person wearing a blue jacket is visible, also reaching into the canopy. The scene is set in a tropical or subtropical environment with a high density of plants.



DEMOGRAPHICS RESULTS

- Long-lived (15+ years)
- Long juvenile dependency (5-18 months)
- Nest success- 46%
- High adult & Low juvenile survival
- Large home ranges- 12 ha

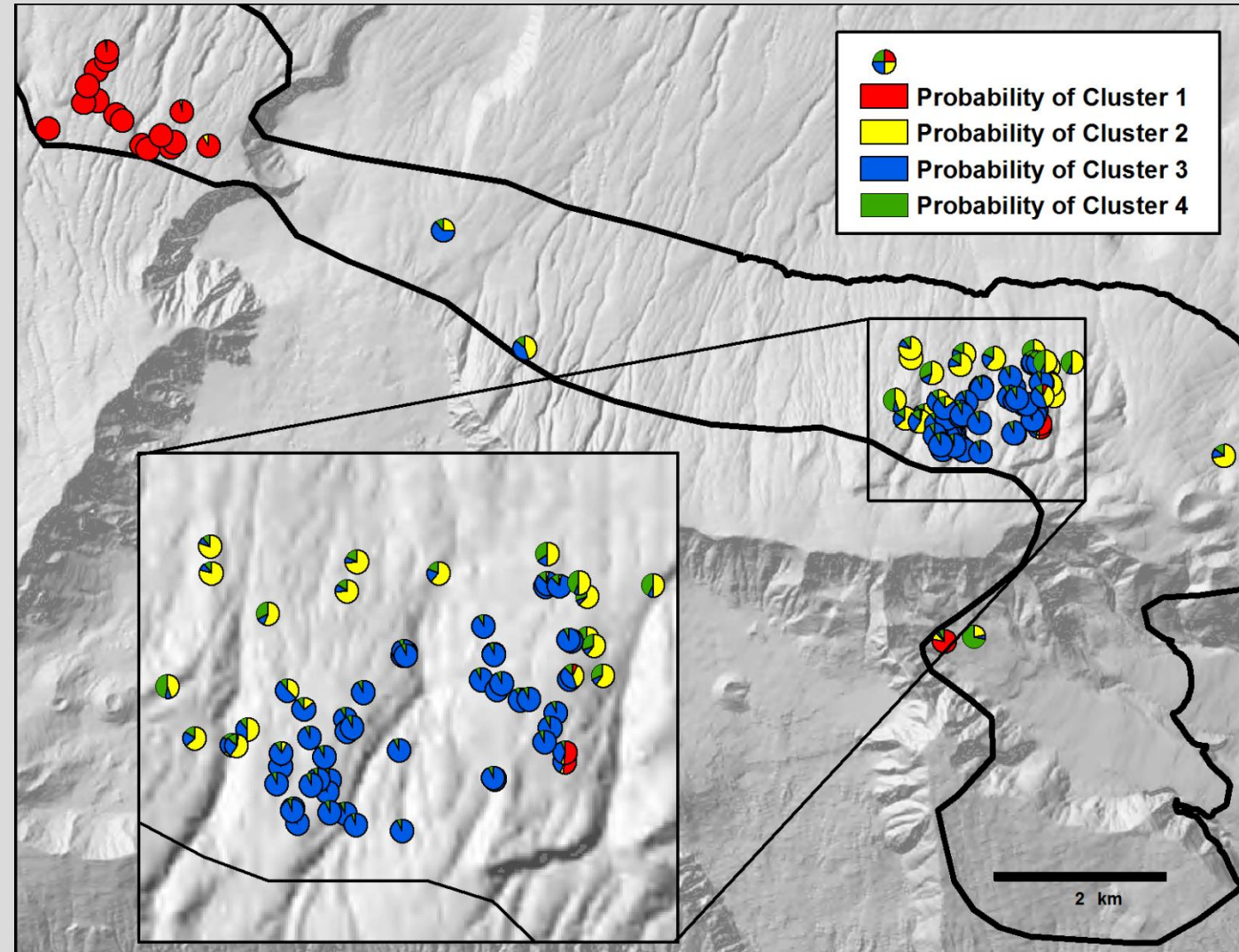


Adult Male Survival	0.82 ± 0.03
Adult Female Survival	0.72 ± 0.04
Average	0.78 ± 0.02
Juvenile Survival (n=10)	0.17 ± 0.15

Becker et al. 2010, Mounce et al. 2013, Mounce et al. 2014, Warren et al. 2015, Vetter et al. 2012

GENETIC STUDIES

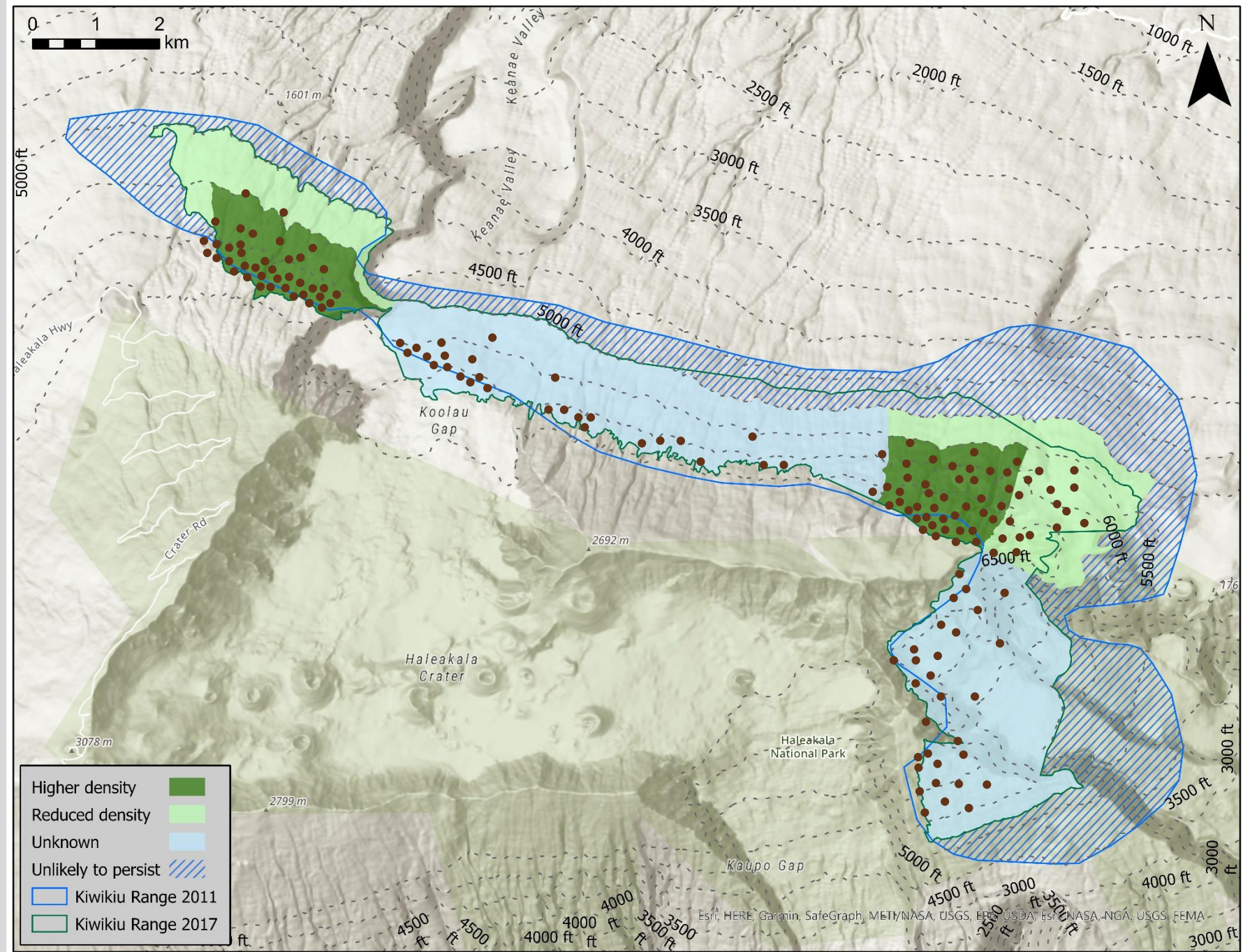
- Blood samples across range-historical & contemporary
- Genetically disjunct Eastern and Western populations
 - Topographic barrier



Mounce et al. 2015. Spatial genetic architecture of the critically-endangered Maui Parrotbill (*Psuedonestor xanthophrys*)... Conservation Genetics 16. 1.

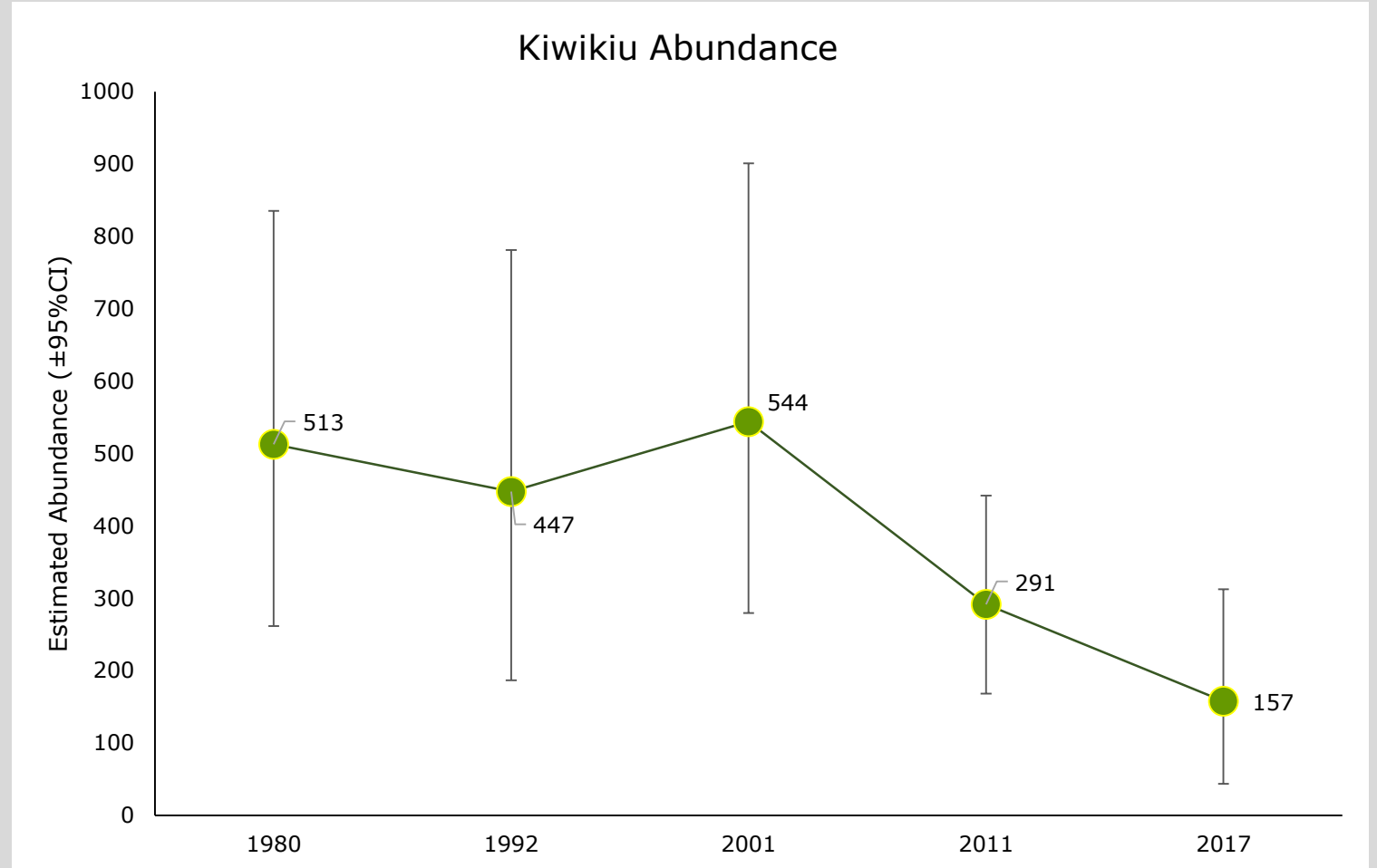
POPULATION ESTIMATES

- Range updated
- 157 ± 67 individuals
(Judge et al. 2019)
- Declining

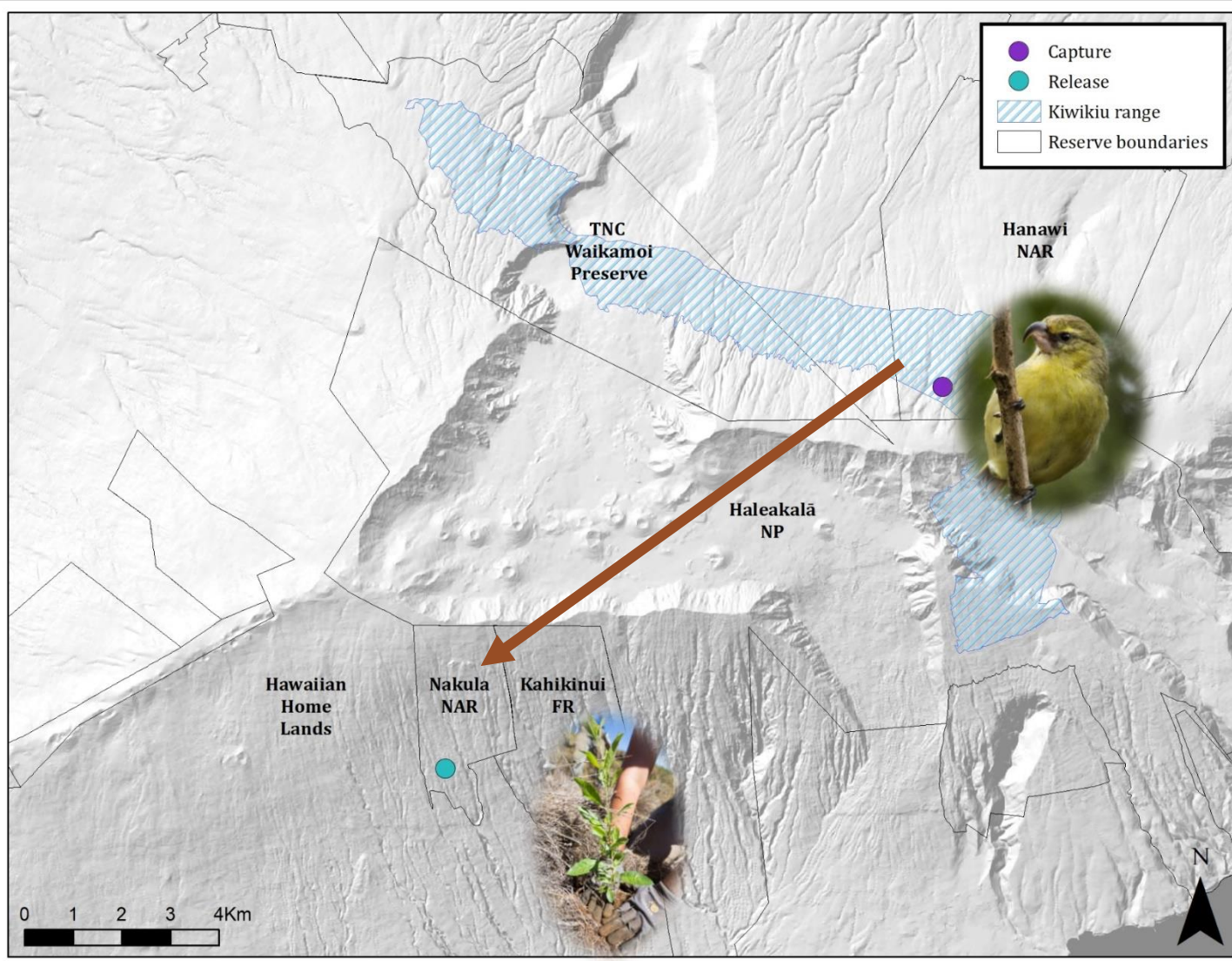


POPULATION ESTIMATES

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(Judge et al. 2019)
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RECOVERY ACTION: TRANSLOCATION



- High priority to safeguard population
- Location: South slope
 - Previously found there
 - Remnant high elevation forest



RESTORATION OF HABITAT

- >250,000 plants / >16 native species outplanted
- Arthropod abundance compared to occupied range (Peck et al. 2015)
- Disease sampling and mosquito surveys (Warren et al. 2019)
- Predator & Mosquito control



TRANSLOCATION

- 7 wild from Hanawi and 7 from San Diego Zoo Wildlife Alliance on Maui
- Soft release: birds in aviaries in Nakula for 1-2 weeks then released
- Food Supplementation
- Post-release monitoring:
Transmitters



TRANSLOCATION RESULTS

- All but 3 died from avian malaria
 - One alive in captivity
 - One unknown
 - One possibly still alive in Nakula
- Average Survivorship:
~20 days
 - Wild>Captive



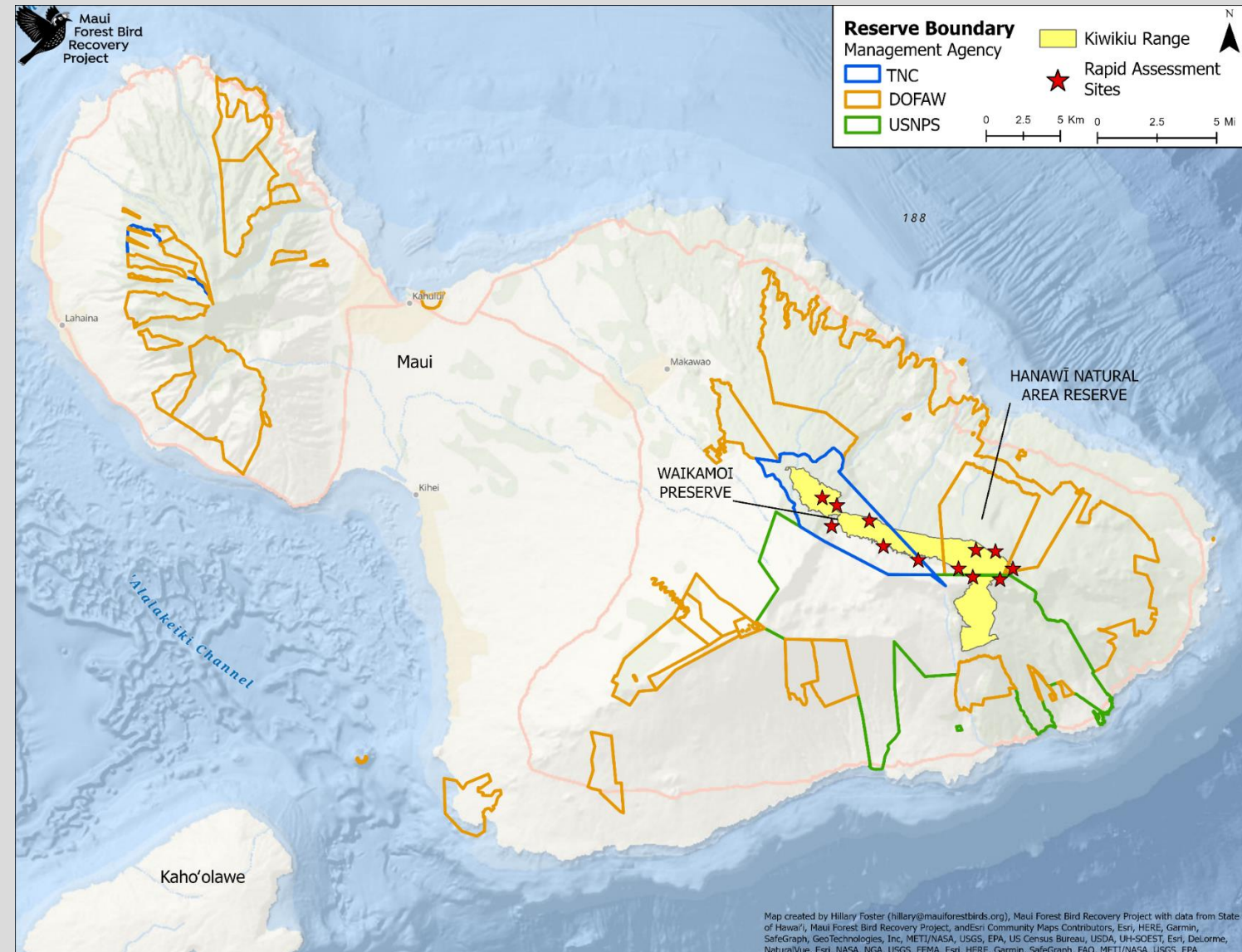
TRANSLOCATION LESSONS

- Mosquitoes 28x greater even w/ larvicide
- Prey Available
- Successful at caring for and transporting wild individuals
- Disease level >previously thought



RAPID ASSESSMENTS 2020-PRESENT

- Searches for kiwikiu
- Observed in 7/12 sites
 - Females: 24
 - Males: 40
 - Juveniles: 13
 - **Total: 77**
- Further range contraction
 - Not detected in lower east or within the Ko'olau Gap
 - Mosquitoes moving up



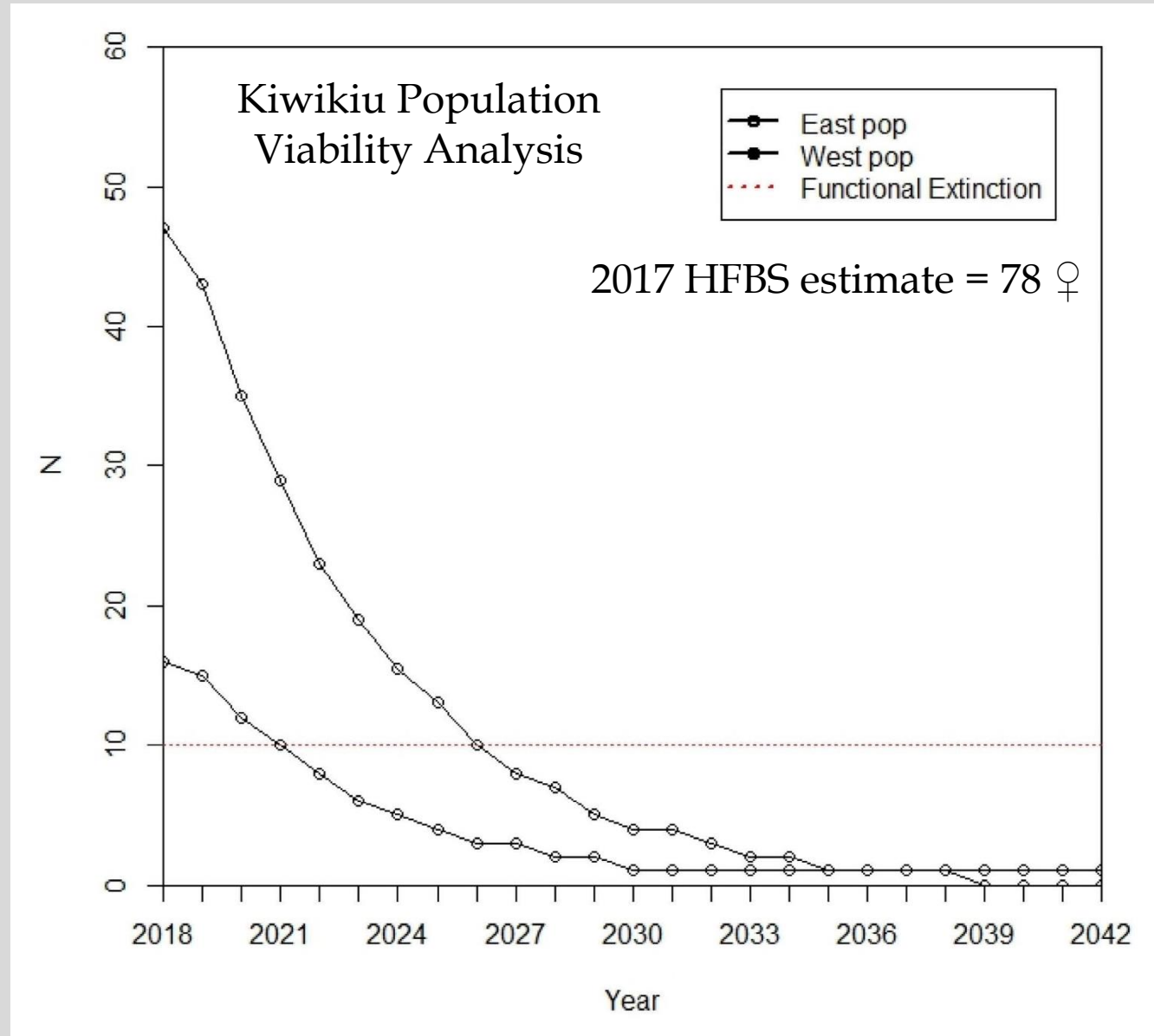
RAPID ASSESSMENTS-DISEASE

- Since 2019, 9 tested positive for malaria
 - 0% to 33% of captures



EXTINCTION ESTIMATES

- PVA: <5 years
(Mounce et al. 2018/
Unpublished MFBRP)
- Expert elicitation:
4 years
(Paxton et al. 2022)



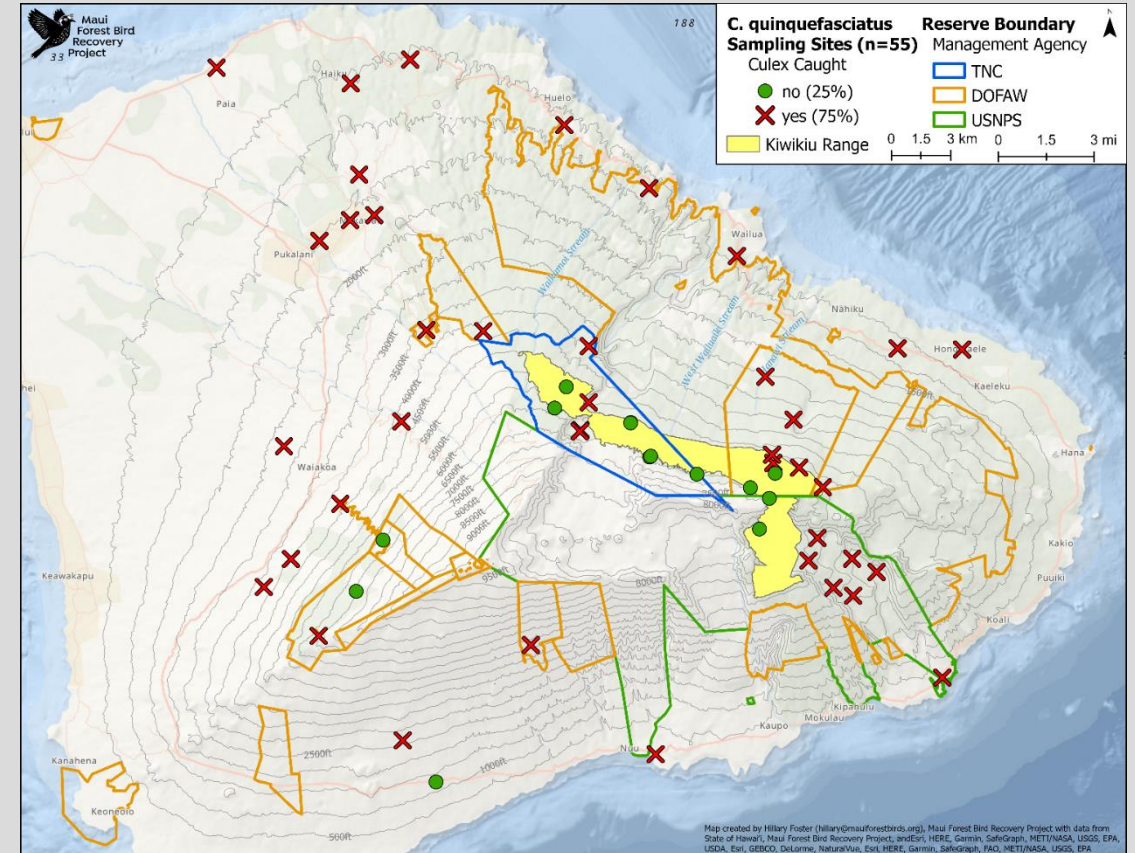
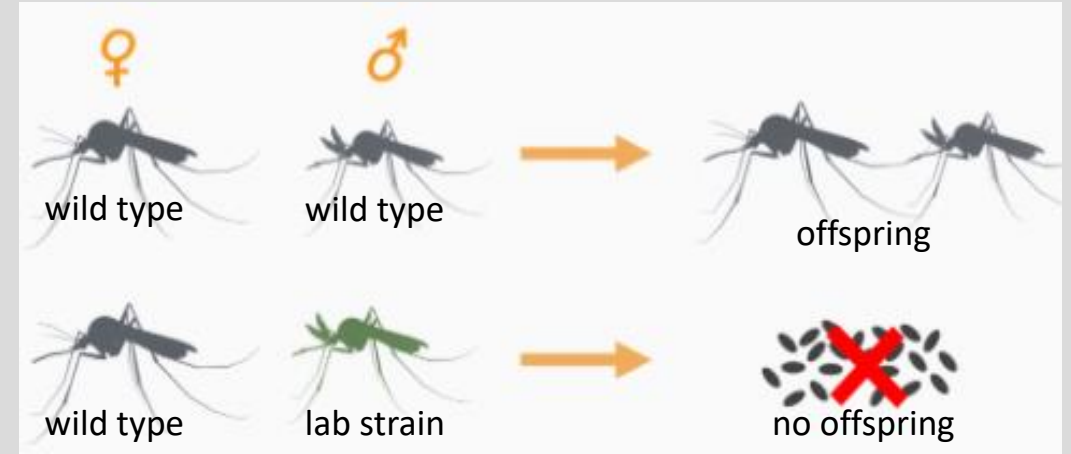
NEXT STEPS

1. Landscape-scale mosquito control
2. Safe-guard species in captivity
3. Management in the wild
4. Protection and restoration of high elevation native forests
5. Investigate a translocation to another high elevation island



MOSQUITO CONTROL

- Landscape-level mosquito control via Wolbachia incompatibility
- Collect avian blood samples and mosquitoes for disease prevalence/distribution and genomics



SAFEGUARD SPECIES IN CAPTIVITY

- Bring 20 pairs into captive care
 - Begin with lower elevation and less dense areas
- Limits to captive care but species may not last until mosquito control
- Release back into the wild (once mosquitoes control is successful)



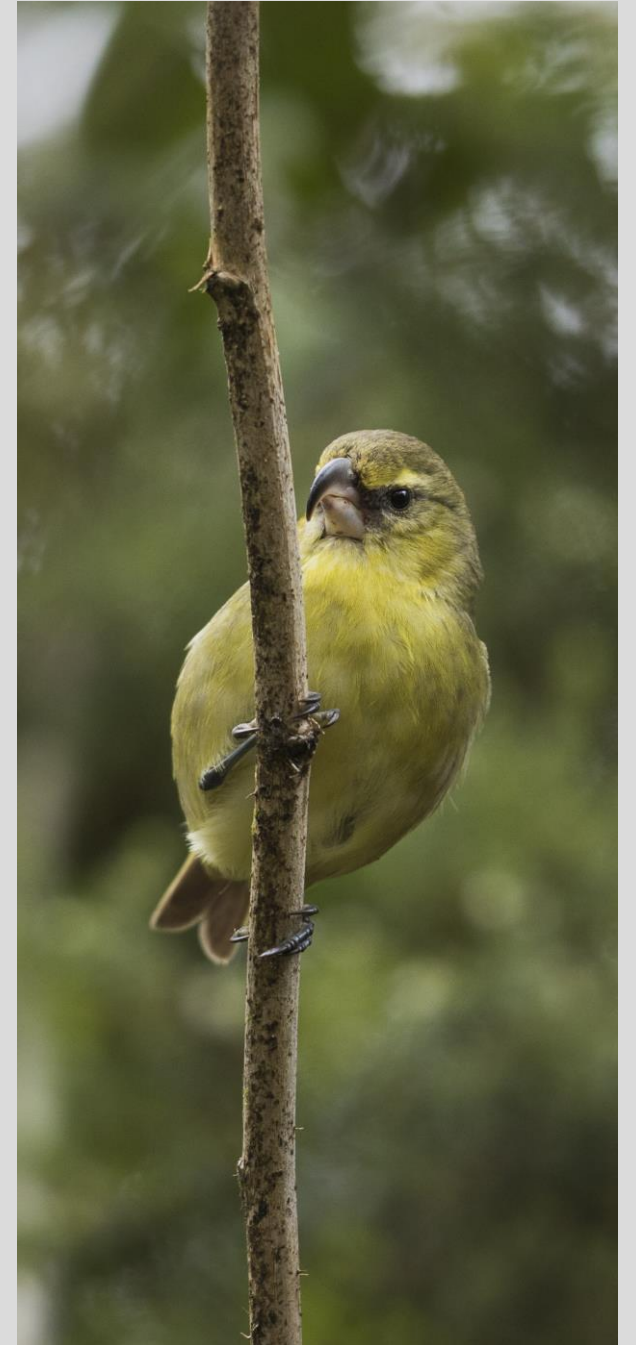
MANAGEMENT

- Management in the Wild
 - Predator control
 - Population monitoring
- Protecting and restoring high-elevation forests
 - Increasing ungulate-free areas, invasive species control, and outplanting



TRANSLOCATION?

- Investigate translocation to another high elevation island
 - Island of Hawai‘i (Big Island)
 - Assess sites for habitat suitability and species interactions



ACKNOWLEDGEMENTS

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Hawai'i has the most threatened and endangered species in the U.S. and per landmass in the WORLD.



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