Against All Odds: Protecting Hawaii's Endangered Forest Birds from Invasive Species and Other Climate Related Impacts

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Conservation Leadership Certificate

Photo by Jack Jeffery

Organizations Protecting Hawaiian Forest Birds

- Hawaii Department of Land and Natural Resources (DLNR)
- US Fish and Wildlife Service (USFWS)
- US Geological Survey-Biological Resources Division
- Department of Hawaiian Home-Lands (DHHL)
- National Park Service (NPS)
- Friends of Hakalau Forest
- University of Hawaii, Hilo

Regulatory framework to implement genetic control of invasive mosquitoes is not yet established but will likely fall under EPA.

Hawaiian birds comprise a third of the listed bird taxa in the U.S. (*n* = 31/95 listed birds).

U.S. spending between 1996 – 2004 totaled $752,779,924.

In Hawaii, dedicated recovery expenditures was only $30,592,692 (or 4.1%) of the total spent on all listed birds.

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Hawaii's Native Forest Birds and Extinction Threats

- Climate change threatens the upward expansion of invasive mosquitoes into high-elevation habitat.

- These mosquitoes carry avian malaria, deadly to native passerine species.

- The goal is to prepare for a future with climate change where regulatory systems can implement effective interventions, resource managers can plan for conservation, and birds are resilient to changes in the forest system.

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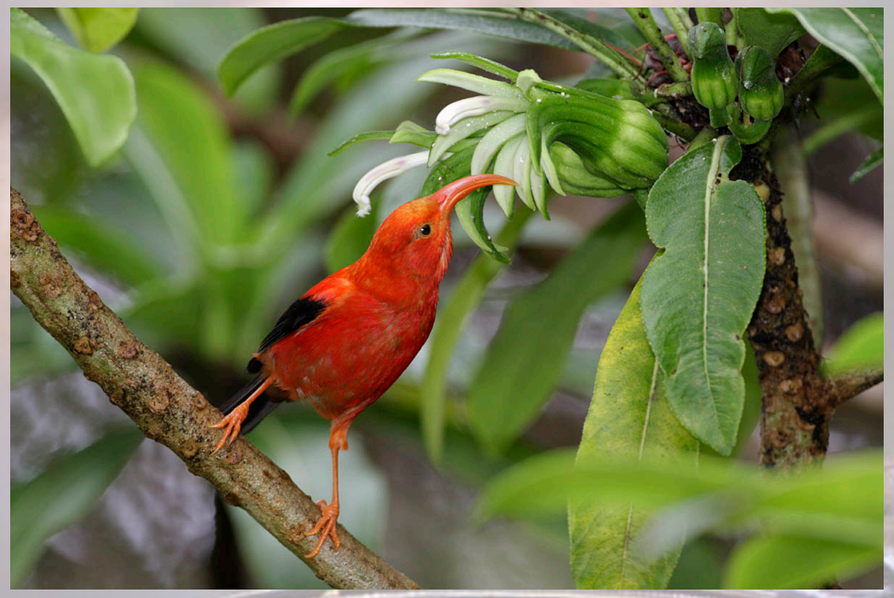
Understanding the System



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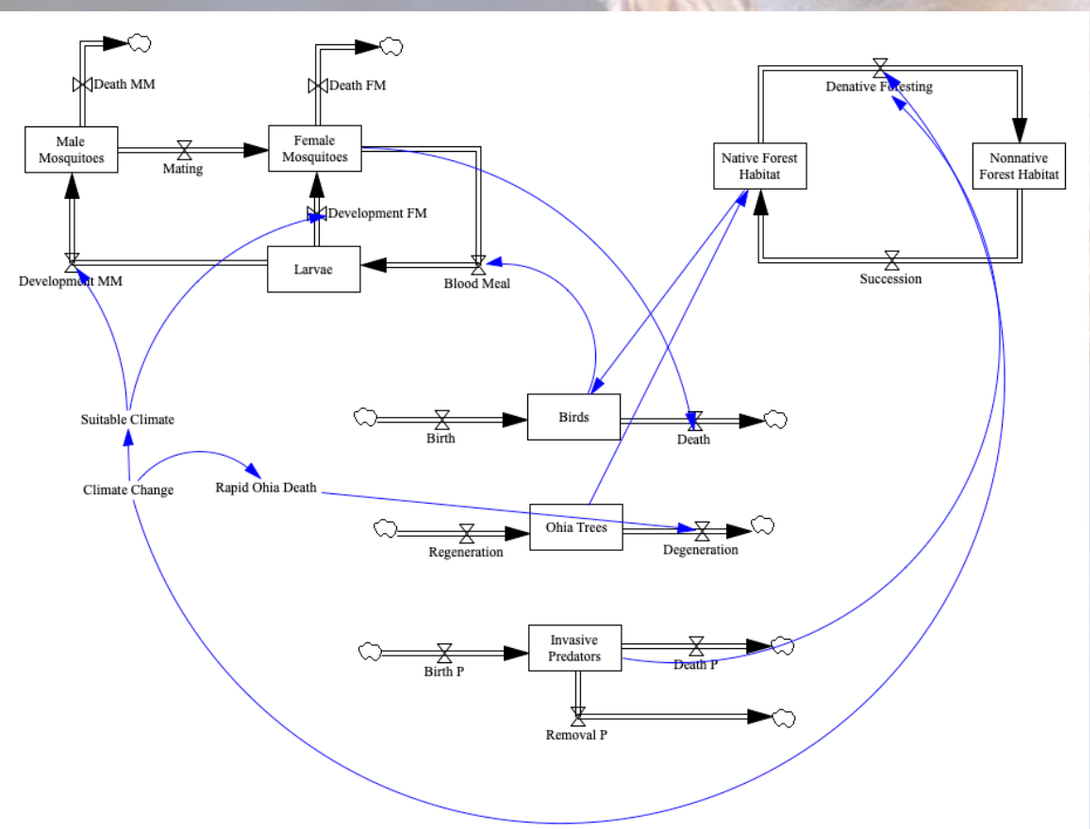

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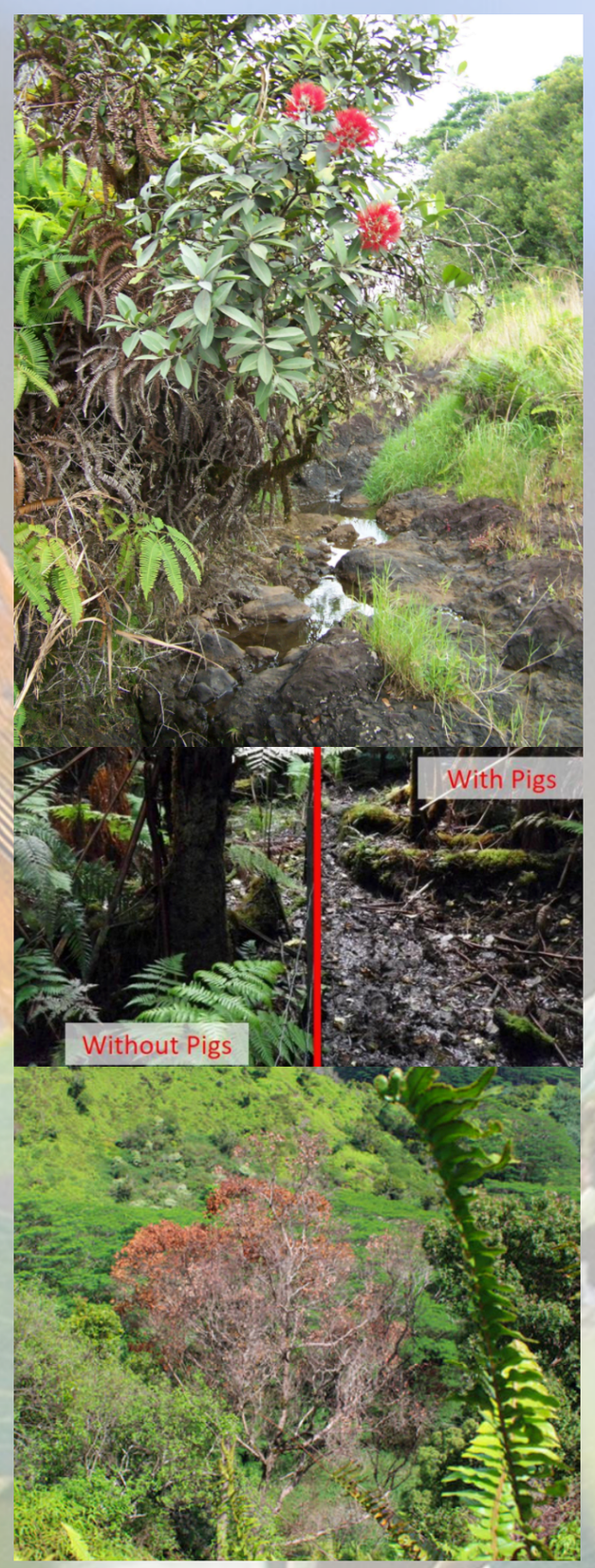
Forest System Fragilities

- Forest understory
- Tree health
- Fencing
- Genetic diversity of bird populations
- Health and vitality of birds
- Safe and disease-free bird habitat
- Bird reproduction
- Regulatory mechanisms
- Community support
- Partnerships
- Revenue generation and funding sources



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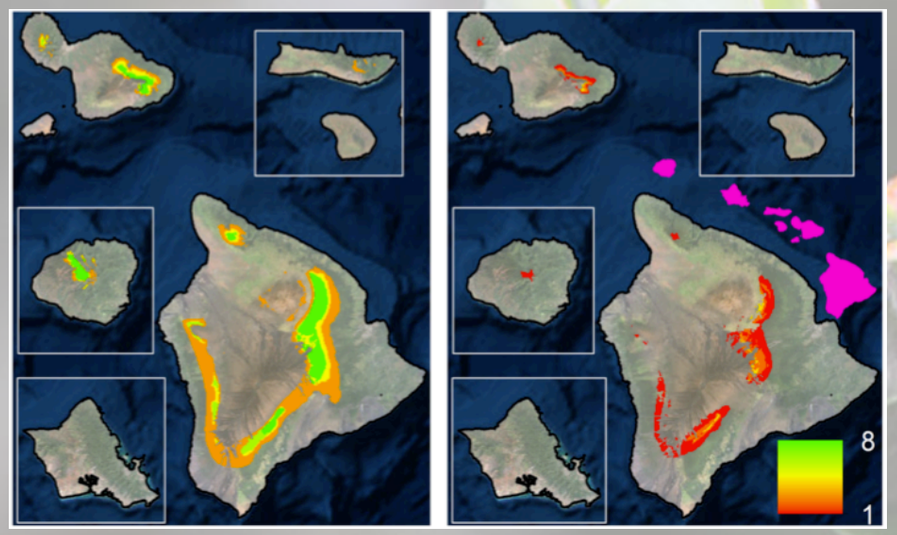
Forest System Threats

- Climate change
- Habitat loss/ change in vegetation zones at higher elevations of 11 meters per decade (Chen et al., 2011)
- Range loss – 9-10 species species projected to suffer 75% range loss (Fortini et al., 2015)
- Invasive, feral ungulates

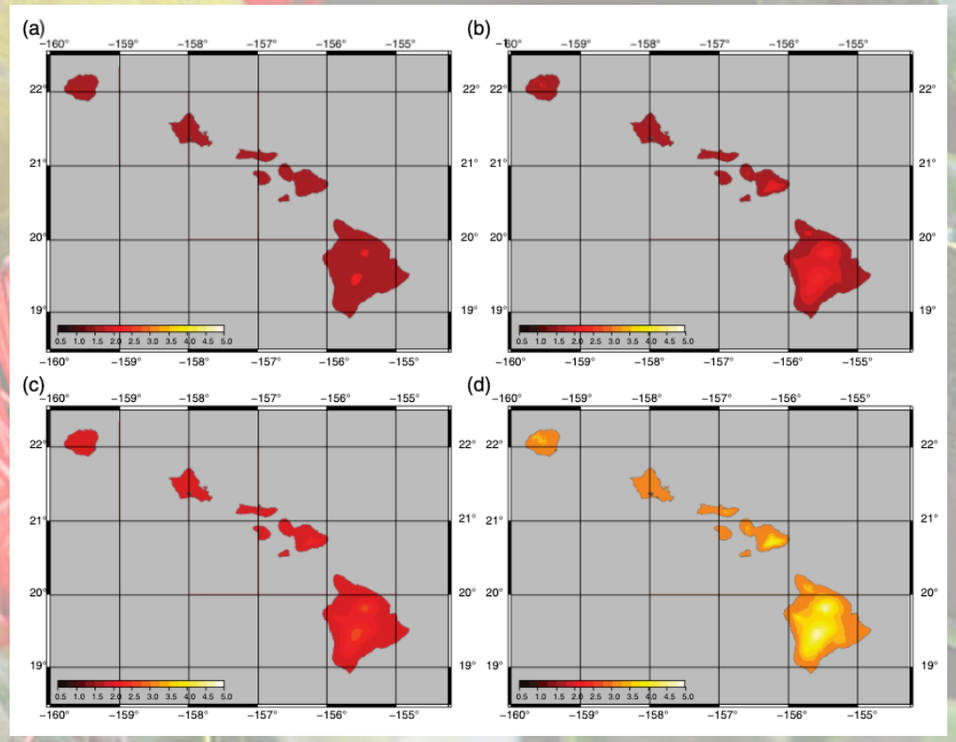
Avian disease

Tree disease

Changes in precipitation, drought, fire



(Fortini et al., 2015)



(Elison Timm 2017)

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Foresight: Possible Futures for the Forest System

- “What-if future” #1 – Failure to curb carbon emissions and develop regulatory mechanisms to implement interventions.
  - *Loss native Hawaiian bird species*
  - *Dramatic reduction in native Hawaiian forest*
  - *Loss in connection to Native Hawaiian culture*

- ”What-if future” #2 – Business as usual and traditional approach to conservation.
  - *Incomplete and slow slow response to changing environmental conditions.*
  - *Loss of most native bird species (`Akeke`e, `Akikiki and Puaiohi)*
  - *Loss of 90% forest bird habitat range.*

- “What-if future” #3 – Achieving success through coordinated regulatory success and creative conservation interventions.
  - *Forest birds can survive if sound, strategic interventions are effectively implemented and managed.*

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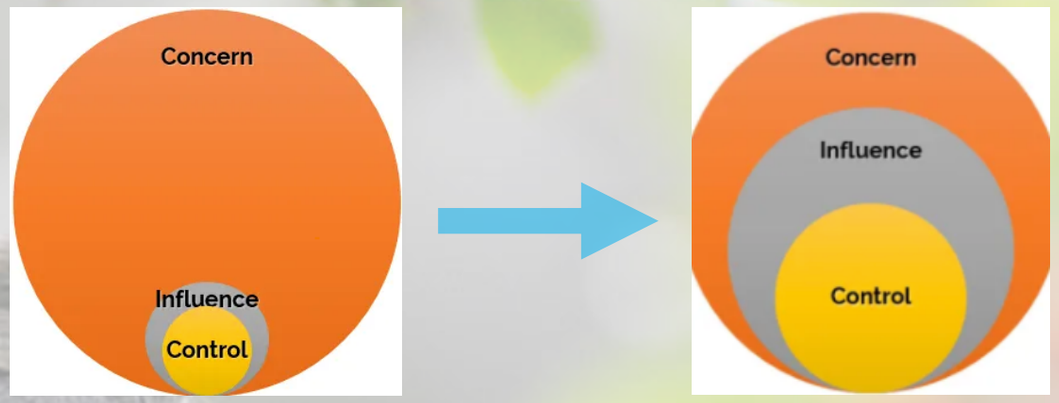
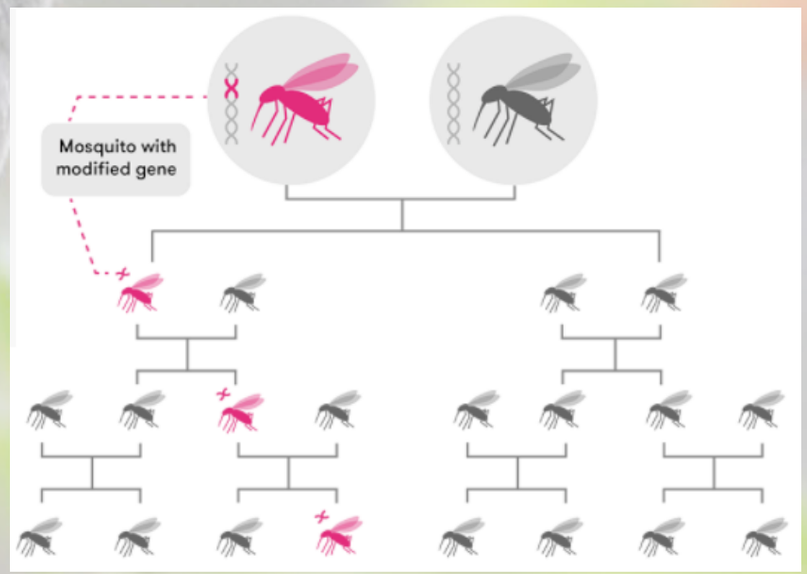
Interventions to Affect Change

- Adapt to climate change through development of novel regulatory frameworks.



- Eliminate vectors of avian disease.
  - Sterile Insect Technique
  - Gene Drive



- Maintaining native forests and addressing ROD and other tree disease.

- Raise public awareness, promote community education/involvement, develop creative funding streams.

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Recommendations:

- Develop innovative regulatory pathways that allow for easy implementation of conservation interventions.
- Implement new and emerging technologies, including Sterile Insect Technique (SIT) and gene drive.
- Initiate a community awareness campaign that links native Hawaiian language with native Hawaiian bird song to generate connection and appreciation for these native species and their imminent extinction.
- Form partnerships between native Hawaiian advancement groups and native Hawaiian species protection groups to advance the causes of both organizations simultaneously (learn from civil/racial/gender rights campaigns to begin a collective “Native Hawaiian” movement).
- Share best practices for conservation with a wider public audience to promote successes and encourage likeminded activists in their own communities.

Without any intervention, the birds will likely go extinct.

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