

Conservation of Hawaiian Avifauna

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'Apapane (*Himatione sanguinea*)



I'iwi (*Vestiaria coccinea*)



Akeke'e (*Loxops caeruleirostris*)



Akikiki (*Oreomystis bairdi*)



Anianiau (*Magumma parva*)



**Kaua'i 'Amakihi
(*Hemignathus kauaiensis*)**



**Kaua'i 'Elepaio
(*Chasiempis sclateri*)**

Extinct Species



Oahu Akialoa
Akialoa ellisiana



Kioea
Chaetoptila angustipluma



Kona Grosbeak
Chloridops kona



Hawaiian Thrush
Myadestes myadestinus

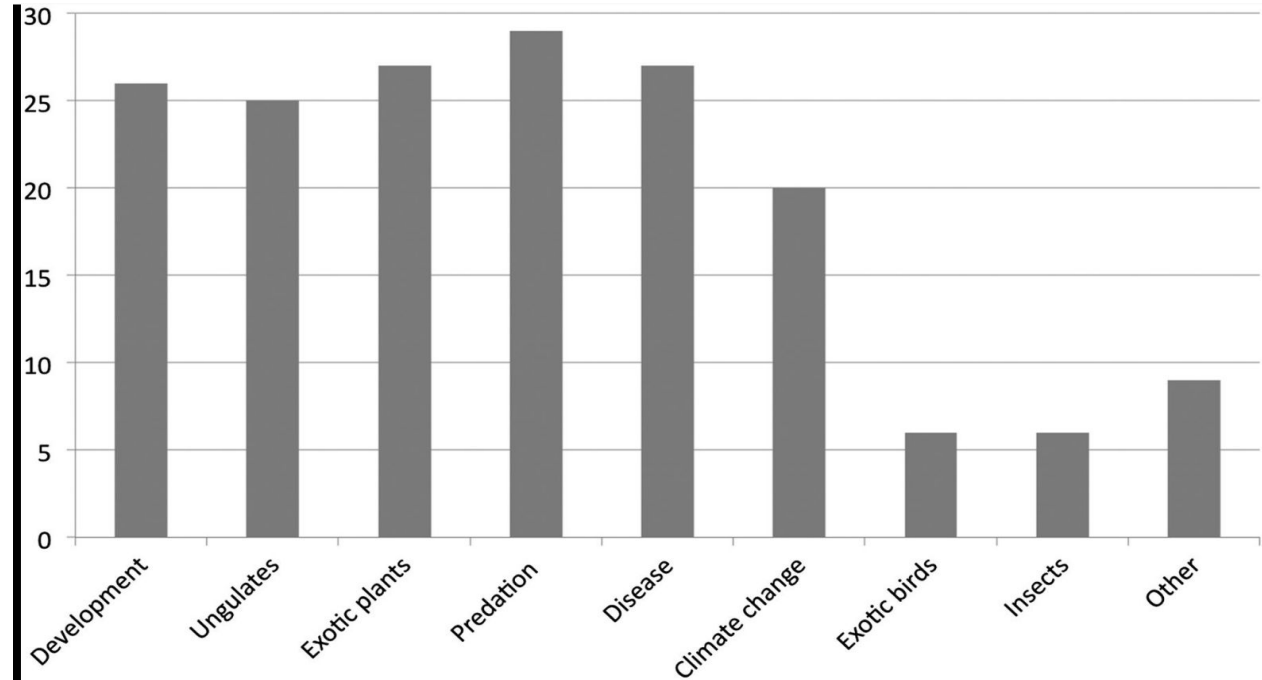
Background

- Prior to settlement
 - 142 known endemic Hawaiian bird species
- After Polynesian and European settlement
 - 95 went extinct
- Out of the 44 remaining endemic species, 33 are listed under the U.S. Endangered Species Act.
- One third of the bird species listed under the U.S. Endangered Species Act are endemic to Hawaii.

So all of us have a pretty good idea of the factors that negatively affect biodiversity. What factors do you guys think mostly affect the birds of Hawaii? And why?

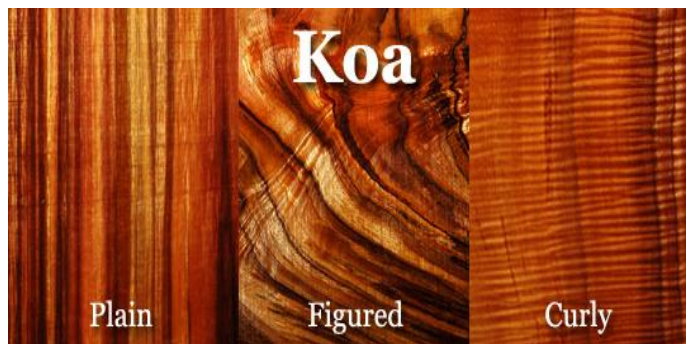
Anthropogenic Threats to Hawaiian Bird Species or Subspecies

- Habitat loss
- Invasive Animals
- Invasive Plants
- Disease
- Climate Change



Habitat Loss and Degradation

- Development
- Agriculture
- Ranching
- Loss of wetlands
- Logging



What weird invasive species is a major threat to these Hawaiian birds?

Invasive Animals

- Rodents
- Ungulates
- Feral Cats



Invasive Plants

- Difficult to know specific number of plants that have been introduced to Hawaii
- Nest depredation
- Causes loss of suitable habitat and reduction of range
- Prevent growth of native plants



Miconia calvenscens (velvet tree)



Psidium cattleianum (strawberry guava)

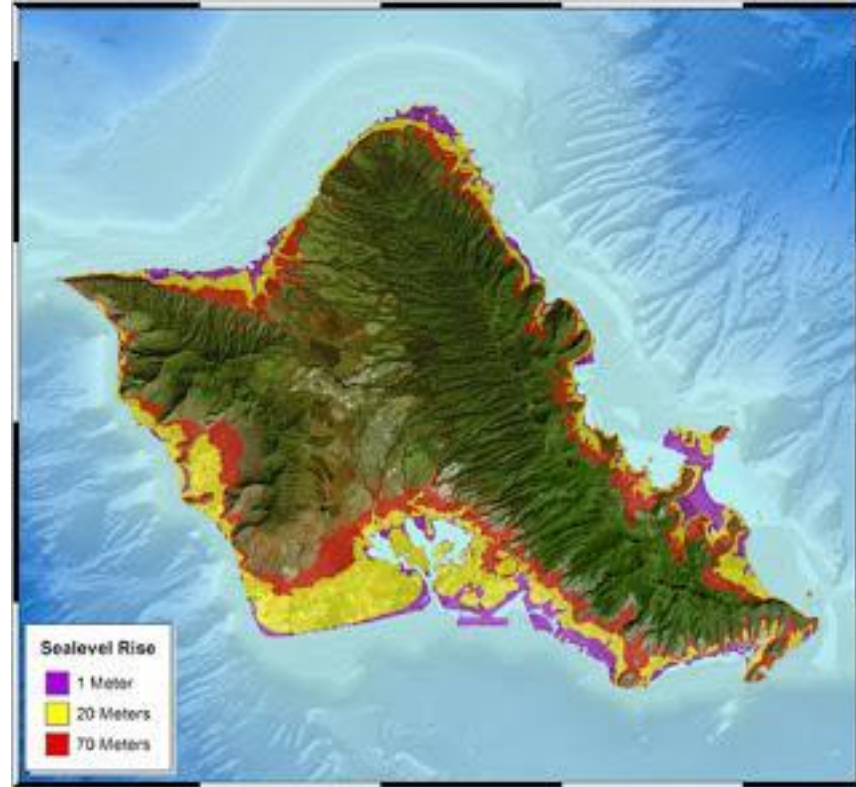
Disease

- Avian malaria
 - parasitic disease
- Avian pox
 - infectious disease of birds caused by a poxvirus
- Threat comes from mosquitos



Climate Change

- Increase mosquito range
 - Caused by rising higher elevation temperatures
 - Resulting in avian malaria spread
- Sea Level rise
- Loss of coastal wetlands



Island of O'ahu

Rapid collapse of Kaua'i island avifauna community

- Documentation of native avifauna in correlation to climate change and diseases
- Typically, higher elevations are “disease-free”
 - Mosquitos can't live in temperatures under 17 degrees celsius
- The island of Kaua'i is considered an “indicator island”
 - Example of what could happen on main land Hawaii

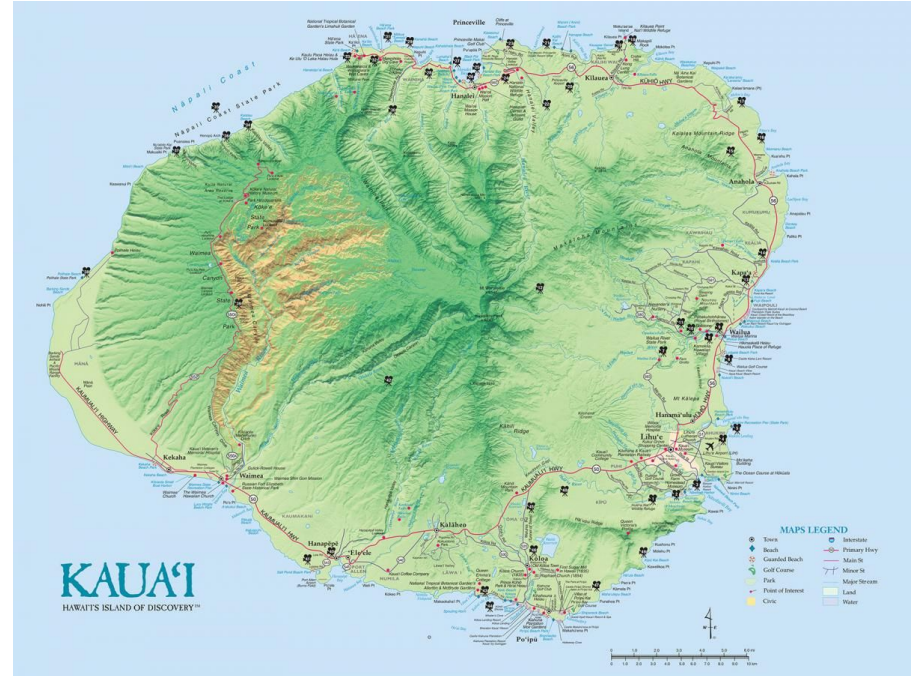


Table 1. Estimates of 2012 population density and abundance and trend for seven native species of forest birds and the five most common non-native species on Kauaʻi. Trends (the average change in density over a 25-year period) are presented for both the interior (core area of most species' range, 1981–2012 and 2000–2012) and exterior areas of the Alakaʻi Plateau (2000–2012). Trends were not calculated for species with few or no detections for one or more survey periods in a given area. Species abundances marked by an asterisk denote species that occur outside the survey area (<900 m), and abundance estimates do not include estimates from the unsurveyed area.

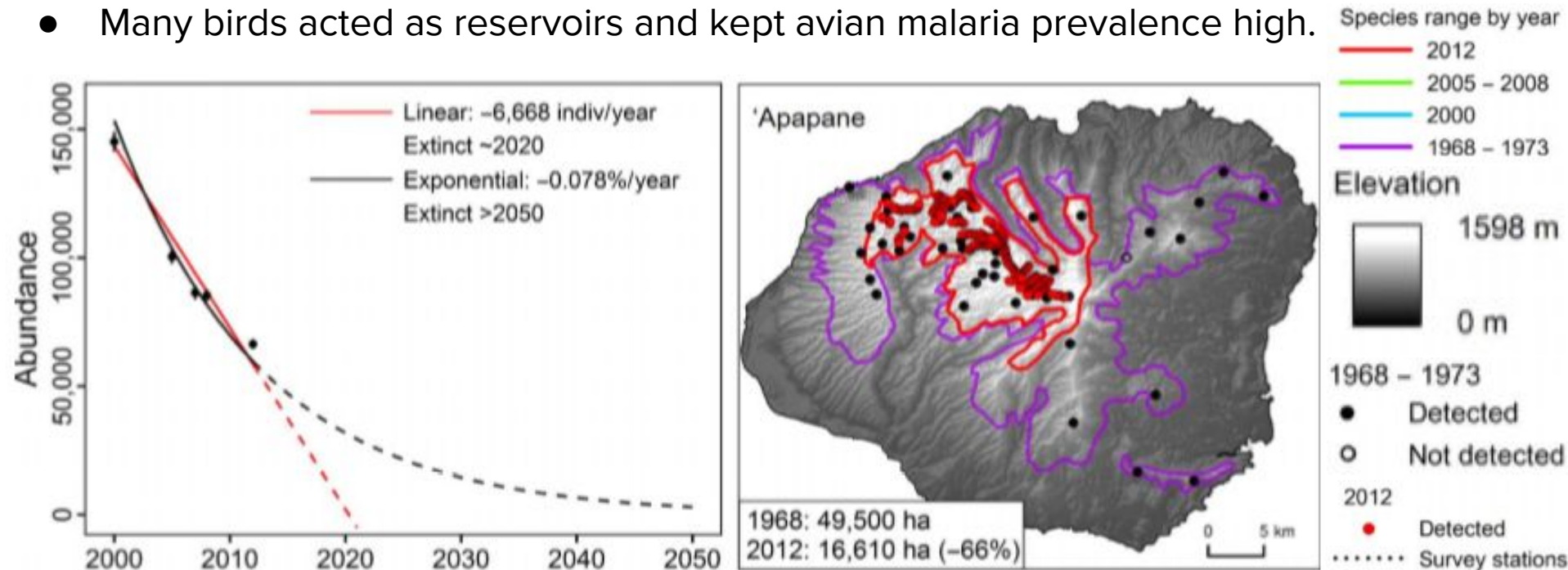
Species	2012 density (birds/ha)		2012 abundance		Trend (25 years)		
	Mean	95% CI	Mean	95% CI	Interior (1981–2012)	Interior (2000–2012)	Exterior (2000–2012)
Native							
'Akeke'e	0.212	(0.201–0.223)	945	(460–1,547)	–48%	–98%	—
'Akikiki	0.088	(0.082–0.096)	468	(231–916)	–71%	–7%	—
'Anianiau	1.657	(1.584–1.733)	10,787	(8,396–13,434)	–17%	–57%	–91%
'I'iwi	0.477	(0.328–0.645)	2,603	(1,789–3,520)	–63%	–86%	–97%
'Apapane	8.489	(8.313–8.670)	98,506*	(62,863–117,435)	–27%	–67%	–89%
Kauaʻi 'amakihi	0.611	(0.581–0.642)	6,519*	(4,844–8,495)	–16%	–91%	–98%
Kauaʻi 'Elepaio	7.141	(6.716–7.592)	82,437*	(60,973–107,155)	41%	88%	–64%

Interior = 6 transects in southeastern Alakaʻi or core area of most species' range

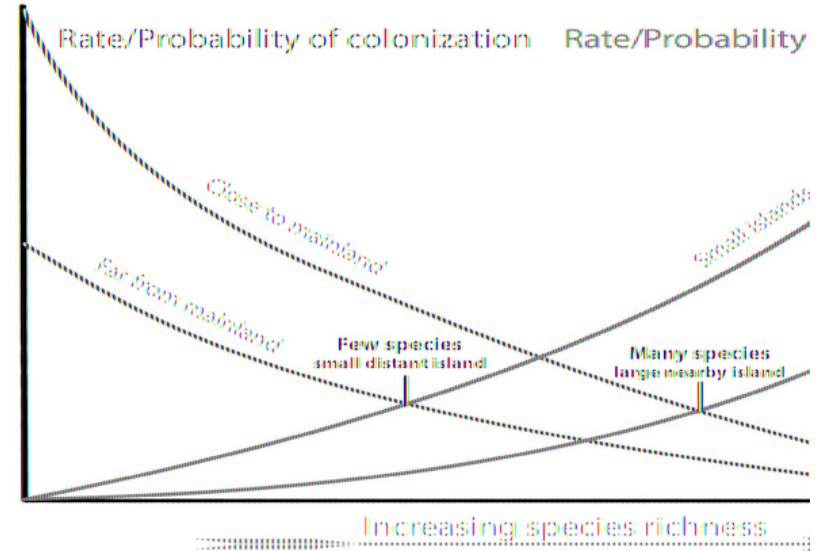
Exterior = 26 transects in northern, southwestern and western Alakaʻi

Results

- All of the native bird species experienced range contractions in the last 4 decades.
- If the native species decline at a linear rate similar to the last few decades, there will be multiple extinction events in the next decade.
- Many birds acted as reservoirs and kept avian malaria prevalence high.



Thinking back to the concept of the Island Biogeography, how does this explain why Kaua'i is seeing more conservation issues?



What are some other non anthropogenic causes for the decline and extinction of hawaiian avifauna?

Natural Disaster

- **Tsunamis**
- Hurricanes
- Wildfires
- Seismic Activity
- Volcanic Activity



What can be done to prevent such drastic consequences from happening?

Other Possible Factors that can lead to Extinction

- **Larger body size**
- **Nest type and behavior**
- Flight ability
- Dietary guild
- Endemism
- Birds of prey
- Increase competition
- Breeding grounds



Frigate Bird



White-Rumped Shama



Hawaiian Hawk

Conservation Efforts

- Fencing
- Translocation
- Captive Breeding
- Invasive species removal



Important Bird Areas

Important Bird Areas

Hawaii



Several experts have designated several areas amongst the Hawaiian islands that are of more significance.

- Unique habitat destruction
- Specialists
- Re-establish some lost habitats
- Sensitive species

Hawaii bird Conservation



Split into groups and pitch why your conservation effort should be implemented.

Fencing, Translocation, Captive Breeding and Invasive species removal.

Questions?

References

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