Forest Bird Populations and Vegetation Structure: Baseline Assessment Pre-installation of the Alaka`i Protective Fence

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Objectives

Relative to nearby unprotected forest, does ungulate exclusion/eradication:

- Lead to changes in forest structure and composition?
- Lead to changes in forest bird abundance and richness?

And

• Are these changes correlated?

How will we know the fence helped?

or

 Possible directions for native bird and plant densities (cover, etc.):









Forest Birds

- 8 of 13 native species remaining
- 6 endemic species
- 3 federally endangered





Forest Birds

Habitat Contraction on Kaua`i

Historic Range

Current Range





Forest Birds

Threats to birds (and plants)

- Non-native
 - Ungulates (pigs, goats)
 - Disease (avian malaria and pox)
 - Predators
 - Plants







Fence Projects in Hawai`i

- Complete eradication impossible (physical terrain and social climate)
- EAPF first project to document before-after changes



East Alaka'i Fence

- Effort led by Kaua`i Watershed Alliance (KWA) and The Nature Conservancy (TNC)
- Goal to protect major watersheds



East Alaka`i Fence

- 2,000 acres protected
- Ungulate-proof fence completed in summer 2011



Island of Kaua'i, area of detail





D 350 700 1,400 Meters

Study Design

Before-After-Control-Treatment •



Point Count Stations for EAFP

- Alakai Fenceline
- Survey Stations



1.220 Meters 610 305 1

Point Counts

- 163 stations (76 in, 87 out)
- Stations surveyed 1-5 times throughout study period
- Densities generated in Program Distance



Vegetation Surveys

- 66 plots (36 in, 30 out)
- 100m² circular plots
- Measurements: ground, canopy and shrub cover; moss cover on trees; DBH; tree density, seedling density



Bird Richness & the Fence

Native Species	IN	OUT
`Apapane	Х	Х
`Elepaio	Х	Х
`Anianiau	Х	Х
Kaua`i `Amakihi	Х	Х
`l`iwi	Х	Х
`Akikiki	Х	Х
`Akeke`e	Х	Х
Puaiohi	Х	X

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Non-Native Species	IN	OUT
Japanese White-eye	Х	Х
Melodious Laughing- thrush	Х	Х
White- Rumped Shama	Х	Х
Japanese Bush- Warbler	Х	Х
Spotted Dove		Х

Bird Density & the Fence



- More natives than non-natives
- More natives outside fence than in (no difference for non-natives)

Vegetation

Tree Measurements

- Used simple logistic or negative binomial regression
- * means P < 0.10

	IN	OUT
Mean DBH	18.4 cm ± 0.6	19.4 cm ± 2.4
Mean Moss Cover on Trees	63.1% ± 3.0	64.1% ± 4.3
Mean Canopy Cover*	76.8% ± 3.0	67.9% ± 3.8
Mean Tree Density	7.6 ± 0.65	6.2 ± 0.78
Mean Seedling Density	7.9 ± 1.7	11.4 ± 1.9

Vegetation

Ground and Shrub Measurements

	IN	OUT
Mean Shrub Cover	57.6% ± 2.9	61.3% ± 3.8
Mean Ground Cover	40.8% ± 3.8	44.8% ± 4.8
Mean Native Ground Cover	89.7% ± 3.1	90.4% ± 3.3
Mean Alien Ground Cover	17.6% ± 6.8	19.3% ± 6.4

Few baseline differences - makes assessment of fence effects easier!

Invasive Species

- Used chi-square test
- * means P < 0.10

	IN	OUT
Plots with mammal sign*	41.6%	19.3%
Plots with invasive plants	55.5%	41.9%



Relationships between Vegetation, Invasives, and Birds

• In general, no significant correlations, with one weak exception:



Summary of Results

- Higher density of natives than non-natives
- Higher density of natives outside fence than inside
- No significant differences in vegetation across the fence line
- No significant correlations between birds and vegetation

But we have variation in bird density and we have a fence effect --> Why?

 Possibly other factors we haven't analyzed or measured

The Future



- Finish collecting pre veg data in fall 2011
- Finish analyzing pre data: 2011 point counts, veg composition
- Collect post veg data: 2012 ?
- Collect post bird data: 2015 ?

Mahalo



PCSU





