Starting Small: Population size and distribution of the Puaiohi, an endangered Kauai endemic

Lisa "Cali" Crampton, Pauline K. Roberts and Lucas A. Behnke Kauai Forest Bird Recovery Project

Puaiohi

Threats











Range Contraction





Challenges to estimating # Puaiohi

•Stream specialist

- Usually nests on vertical faces
- Poor detection in most (ridge top) surveys

•Straight-line transects not practical

•Estimates don't apply to/not made for range



Puaiohi Survey Methods

- Single observer walks stream
- 30 m per min, record all birds
 Did not record absence
- Stop every 50-100 m for point count
- IF Puaiohi detected or looks good, then gets multi-day survey
 - 4 to 7 days repeated



Study areas and distribution



Our approach

- Determine # territories in sub-sample of streams → # territories/km in study area
- Estimate how many individuals/territory (pairing frequency) and multiply by that

 \rightarrow # individuals/km in study area

Then multiply by area of potential habitat

birds=# terr/km * # indiv/terr * # km habitat

Survey Results: # Territories

	Km	Territories	Av. Terr/km
1-day surveys	43.5 km	0	0
Multi-day surveys	32.6 km	169	5.2
Total surveyed	76.1 km	169	2.2 (mean)
		7	
	Min. # adult	S	Ranged from
			1.3 to 15.8

In other words, at least 169 <u>territories</u>, without accounting for unsurveyed area and pairing!

Now account for pairing:

- Pair data from 2003 surveys (most intensive yr)
 - 104 territories

61 % paired

39 % no pair detected







Survey Results: # Individuals





Low index of population of <u>study</u> <u>area</u>. Higher than any estimate to date

How accurate are pairing estimates?

- Test at HPK site
 - Population surveys in 2003-2005
 - Intensive observations in 2007-2009
- Estimates of pairing success at HPK: Survey 2003: 71% (N = 24)
 Survey 2005: 33% (N = 27)

Intensive 2007:89% (N = 19)Intensive 2008:89% (N = 18)Intensive 2009:96% (N = 27)



Population <u>surveys</u> may substantially underestimate pairing success! 61% is conservative.

Extrapolate to likely habitat

At 61% paired, low (1.3) territory density: = 272 Surveyed: 169 terr * 1.61 adults/terr = 272 Unsurveyed: 1.3 terr/km * 1.61 adults/terr * 160.3 km = 336 =607 adults

At 61% paired, mean (2.2) territory density: = 272 Surveyed: 169 terr * 1.61 adults/terr = 272 Unsurveyed: 2.2 terr/km * 1.61 adults/terr * 160.3 km = <u>573</u> =845 adults

In summary...

Calculation	# Adults	Comment
Survey	169	Min. For Sure!
Low index for		
study area	272	Based on 61%
Low-med index		Based on 61% and low
for range	607	terr. density
Med-high index		Based on 61% and mean
for range	845	terr. density



What about trends?

 HPK area surveyed 2003-2005, intensive study 2007-2009.

	Territories	% paired
Survey 2003	24	71
Survey 2004	24	?
Survey 2005	27	33
Intensive 2007	19	89
Intensive 2008	18	89
Intensive 2009	27	96

No dramatic trend at HPK

More thoughts on trends

- Reynolds et al. (1997) surveyed similar set of streams in 1995-1996
 - Estimate of 145 <u>+</u> 19 adults
- Our index: 272 adults (min. 169 adults) from same general area in 2003-2005
- \rightarrow No dramatic trend



Conclusions

- Puaiohi population size:
 - 169 known
 - 272 low-moderate index
 - 607 moderate-high index
- Pairing success probably high
- Probably not crashing



What's next?

To improve estimates of population size:

- 1. Refine pairing success estimate
 - Variation among stream sections surveyed
- 2. Evaluate habitat quality in unsurveyed areas

- Can we match Puaiohi found on surveys with physiographic predictors?

- Elevation, slope, aspect
- Rainfall?
- 3. Determine detection probability
 - Existing data
 - New surveys



Mahalo

- USGS
- HI Div of Forestry and Wildlife
- USFWS
- Early KFBRP team members, especially Tom Savre