Measuring success: lessons learned from the Puaiohi


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Background

Puaiohi • Small Kauai Thrush • *Myadestes palmeri*

The Puaiohi: rare and hard to find

1970's	Believed to be on the brink of extinction when surveys turned up few to no individuals[1].
1990-1996	Puaiohi discovered to have survived catastrophic hurricanes. Population is thought to number in the dozens.
1995	Captive breeding program begins.
1995-2005	Species discovered to be closely tied to stream corridors, targeted surveys yielded population estimate of ~275 territories.
Present	Total population estimated at 200-800 individuals.

Conservation status and trends[2]

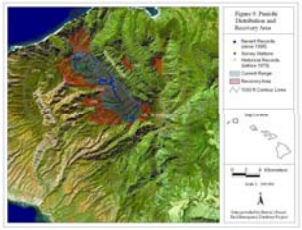
- Federally endangered, single-island endemic.
- Native to Kauai, Hawaii
- Range area <25 square km.
- Trend: roughly stable.

Major threats

- Mosquito-borne disease restricts range to cool high-elevation areas where mosquitoes cannot breed.
- Introduced mammalian predators.
- Habitat change by invasive plants and climate change.

Geographic range

Figure 1. Current range, species recovery areas and historical records of Puaiohi[2].



- Subfossil remains have been found at sea level[3].
- Suggests range much larger prehistorically.

Captive breeding and release

Captive breeding facilities
Maui Bird Conservation Center (Maui)
Keauhou Bird Conservation Center (Hawaii island)

Initial goals
1) Provide insurance in case of extinction in the wild.
2) Release birds to bolster the wild population.
3) Repopulate empty habitat.

Nine years of releases

Releases to date

- 10 releases.
- 153 captive-bred Puaiohi released
- 25-100% short-term survival (to 7-8 weeks)
- When releases at NW site resumed in 2007, entire area occupied by just a single wild pair (data not shown).

Table 1. Numbers of male and female Puaiohi released from a captive population into the Alakai Wilderness Preserve of Kauai since the start of the release program. The 'Central' release location was used only once for a semi-hard release, all releases at the Northwest (NW) and Southeast (SE) sites were soft releases.

			# Puaiohi released	
Year	Release site	Season	Male	Female
1999	NW	Spring	6	8
2000	NW	Spring	1	4
2001	NW	Spring	6	9
2002	SE	Spring	3	5
2003	SE	Spring	6	12
2004	SE	Spring	8	9
2005	SE	Spring	10	7
2006	SE	Spring	5	5
2006	Central	Spring	4	5
2007	NW	Spring	8	11
2007	NW	Fall	15	6
10 releases	*2 sites*	*2 seasons*	*72*	*81*

Dispersal

Figure 2. Median dispersal distance (km) of released Puaiohi showed a non-significant increase with each consecutive release at a given site (Spearman's rho = 0.15, P = 0.13, N = 150).

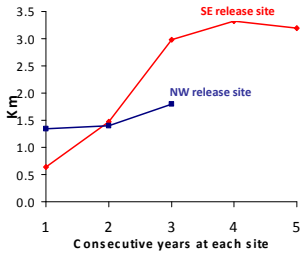
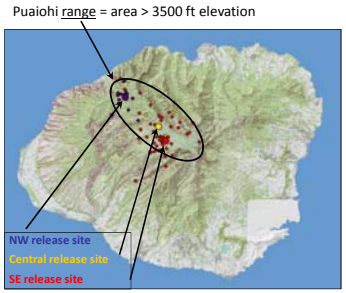


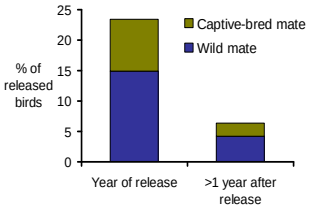
Figure 3. Released birds dispersed to locations throughout the species' range.



Breeding by released birds

- Some released birds attempted to breed immediately after release, but few are known to have survived and attempted to breed in subsequent years.
- Released birds bred in captivity paired with both wild and other captive-bred individuals.

Figure 4. Percentage of released Puaiohi that were observed breeding and the identity of their mate(s).







Conclusions

Dispersal

- While most released birds move relatively short distances, many disperse out of target drainages, and this pattern may become stronger with each consecutive release.
- Because many released birds disperse widely, logistical issues can be taken into account when choosing release sites. The exact location targeted for repopulation need not be the only factor considered.
- Releases near the center of the range may be most effective in maximizing the integration of released individuals with the wild population.

Breeding

- Releases at the NW site (1999-2001) were ineffective at establishing a new (larger) population with long-term persistence.
- This suggests reproduction by released birds could not convert this site to a population source. Site may be low quality habitat.
- Captive-bred birds can pair and breed with wild individuals, indicating that releases may be able to address two different management goals:
  1) increasing pairing rates and reproductive output of wild birds
  2) establishing new populations from scratch (in high-quality habitat).

Conservation implications & the future

- Long-term effectiveness of releases unclear.
- To assess this, we plan to collect more data on long-term survival and reproduction by released Puaiohi.
- Reproduction may not be limiting: investigate alternative factors and management options.

Literature cited

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Acknowledgements

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