

Restoring Native Insects to Their Historic Range: A Case Study Using *Hylaeus* Bees

Karl Magnacca, O‘ahu Army Natural Resources Program, Schofield Barracks, HI

Hylaeus anthracinus, an endangered native coastal bee



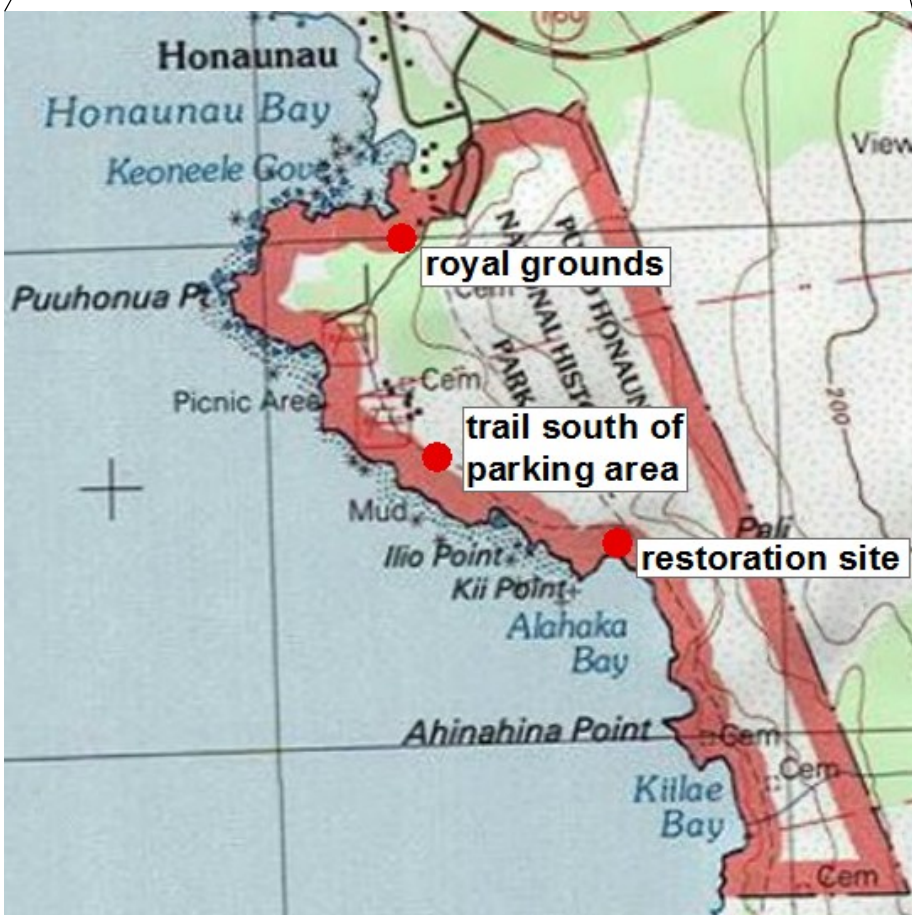
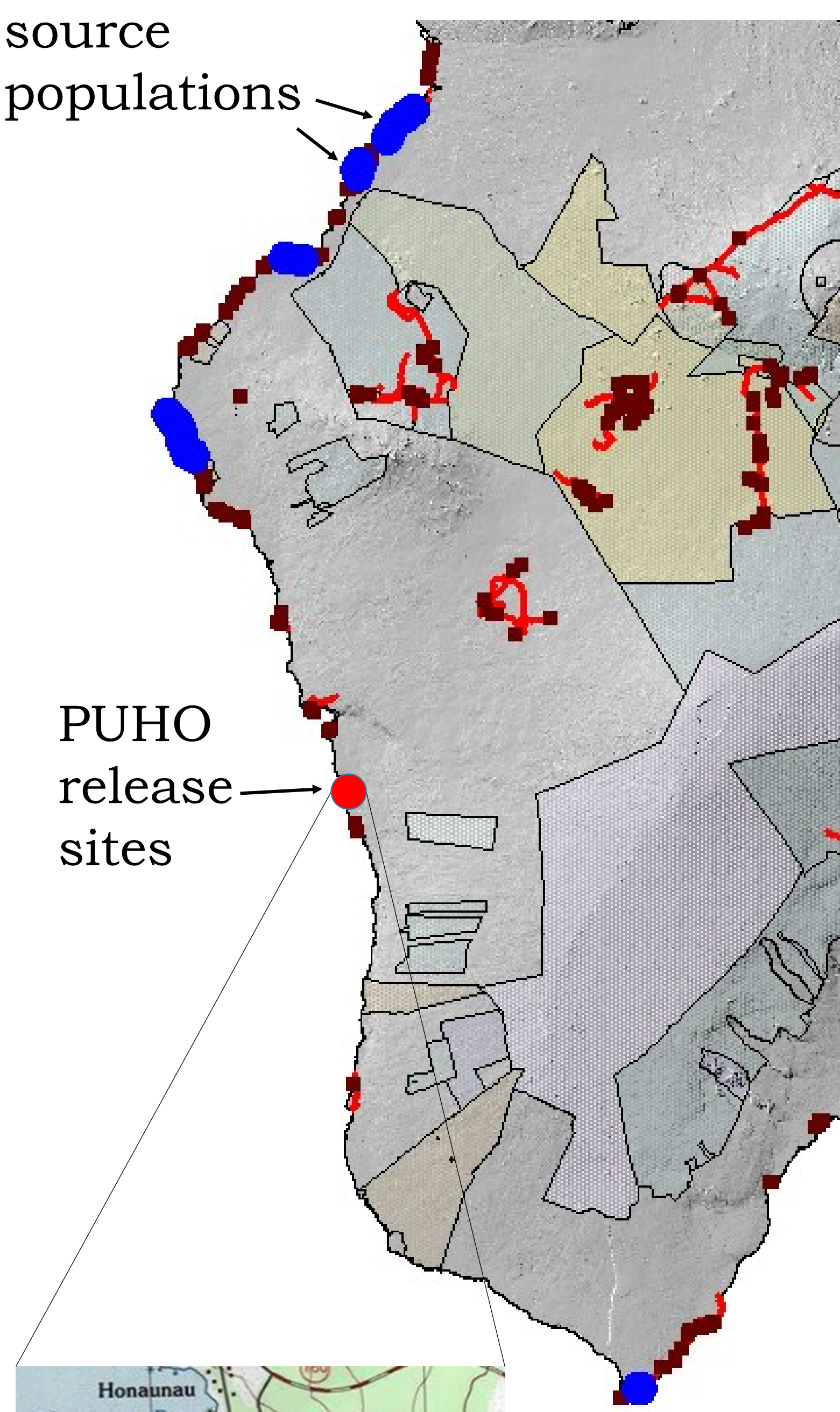
The most abundant of the candidate endangered *Hylaeus*, it is extremely rare on O‘ahu, Moloka‘i, Kaho‘olawe, and Maui. The genetically distinct Hawai‘i population is geographically restricted but high densities occur along the coast in South Kohala and North Kona (blue dots on map). The disjunct South Point population is extremely small, and 100 years ago it occurred widely along the Kona coast in between. Recent extensive surveys have found no surviving populations in South Kona and only a few suitable sites.

This combination of large-scale declines and extirpation from historic sites with continued high numbers in some areas makes *H. anthracinus* ideal for testing translocation as a conservation tactic. While commonly used to reestablish native plants, it has not been tried with Hawaiian insects before.

Acknowledgements

Thanks to Adam Johnson, Shane Rumsey, MaryAnne Maigret, and Malia Hayes of Pu‘uhonua O Hōnaunau NHP for their support of this project. This work was conducted as part of the O‘ahu Army Natural Resources Program, U.S. Army Garrison-Hawaii.

Methods



Alahaka Bay restoration site

250 bees were collected alive from Puakō and Waikōloa. Bees were transported in cooler bags and released the same day at three sites in Pu‘uhonua O Hōnaunau National Historic Park in January 2015: Alahaka Bay restoration area, start of coastal trail, and royal grounds. These provide a mix of native vegetation quality levels and alien ant presence, allowing for testing of which factors are more important.

Site	Bees	Veg quality	Ants
Alahaka	100	high	mix, relatively few
coast trail	85	medium	<i>Pheidole</i> , many
royal grounds	50	low	<i>Pheidole</i> , many

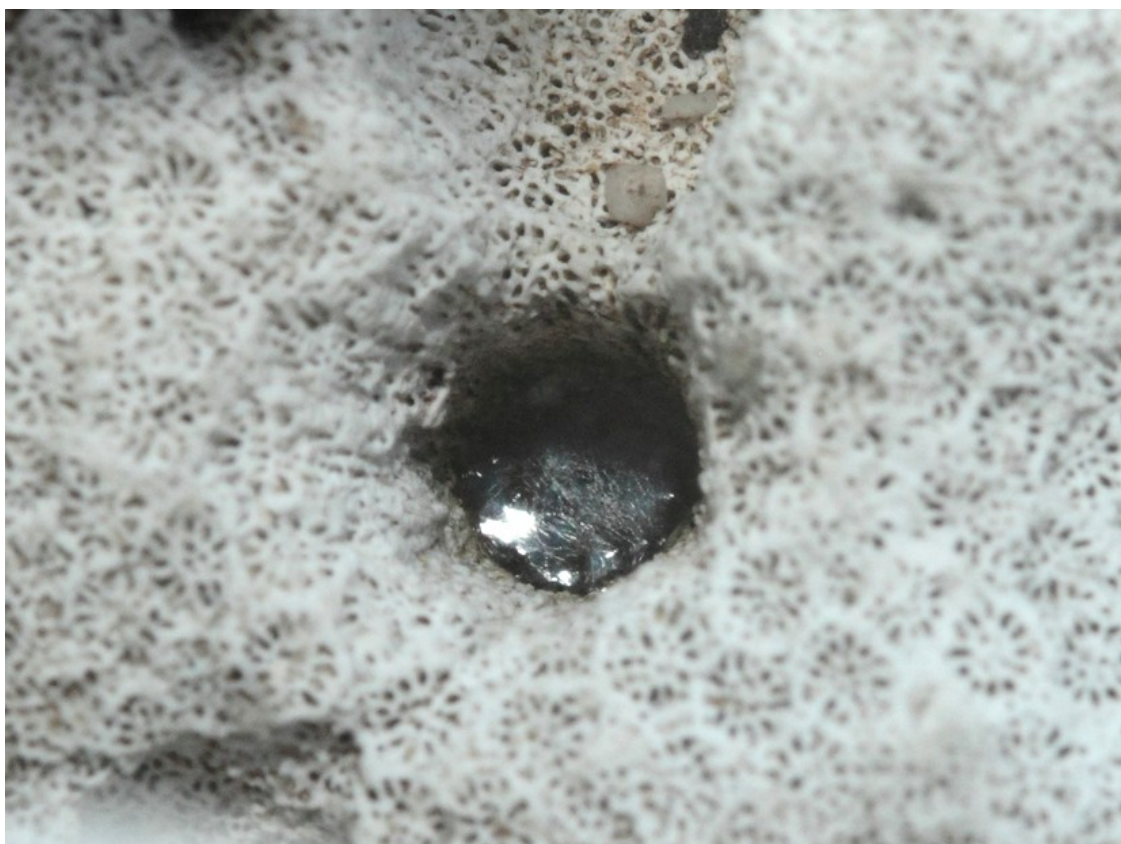
Results

After six months, *Hylaeus anthracinus* are established at Alahaka Bay from a single introduction. Nesting has been observed in coral rocks.

Bees were not able to establish at the other two sites even after a second, larger release in April 2015. This suggests that the presence of large numbers of aggressive ants is the biggest barrier to their existence in their historic range. Ants were observed attacking cold-slowed bees immediately after release.



Hylaeus anthracinus on ‘ilima flower at Alahaka Bay.



Characteristic cellophane-like material covering a *Hylaeus* nest in a coral rock at Alahaka Bay.



Big-headed ants (*Pheidole megacephala*) attacking a *Hylaeus* bee shortly after release at the royal grounds site.

Conclusions

Translocation was successful in establishing a new population of *H. anthracinus*. This method may serve as a model for taxa with moderately large but restricted populations that are vulnerable to stochastic events, or where numbers suitable for release (>100) can be reared in captivity.