

2022 O‘ahu ‘Ua‘u kani Long-term Monitoring Project

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Introduction

Members and volunteers of Dr. Melissa Price's Wildlife Ecology and Management Lab (Price Lab) at the University of Hawai'i at Mānoa banded 'Ua'u kani (Wedge-tailed Shearwaters, *Ardenna pacifica*) at multiple sites across O'ahu in Fall 2022, part of a long-term banding project that began in 2018. This year we collaborated with DLNR and Hawai'i Marine Animal Response for banding and handling endeavors. Banding birds is the process of catching an individual, recording relevant observations, and then outfitting the bird with an individual number code to allow tracking of individuals throughout their life. 'Ua'u kani are the most abundant seabird species in the Hawaiian Islands, with multiple colonies both on the main islands and offshore islets. 'Ua'u kani are most abundant at sites with predator eradication efforts such as offshore islets or within predator proof fences. Banding large numbers of 'Ua'u kani illuminates trends in fallout, dispersal, bycatch, survival, reproduction, and disturbance, and thus provides insights not only into this thriving species, but also into less abundant endangered species impacted by similar threats. The objectives of this long-term study are to (1) determine which colonies are most affected by lights, (2) identify fallout hotspots, (3) determine the distance juveniles travel before experiencing fallout, and (4) estimate incidence rates of pests, disturbances, and diseases within nesting colonies including: ants; hippoboscids; avian pox; deformities; predators; and human disturbances.

Methods

Prior to this year, the Hawai'i Wildlife Ecology Lab has banded a total of 3,987 individuals across the 2018-2022 nesting seasons (823-1,273 per year). This year's objective was to band similar numbers of 'Ua'u kani chicks at the same colonies: SE O'ahu offshore islets (Mānana, Mokulua Nui, Mokulua Iki, Popoia, Kāohikaipu); Kailua Beach Park; Ka'ena Point NAR, and Marine Corps Base Hawaii - Kaneohe Bay (MCBH-KB).

Banding efforts occurred later in the nesting season this year, in late October and early November compared to previous years (mid-October), based on partner organizations' observations of delayed growth this season. Between five and eight hours were spent conducting chick extractions at each site. Chicks were extracted using standard practices, by reaching into a burrow, allowing the chick to bite the hand, and then gently pulling the chick out of the burrow by its bill. Chicks were held by one person, and banded by another; ensuring handling time was reduced to minimize stress. U.S. Geological Survey (USGS), size 4A, stainless steel bands were distributed to Master Bander, Dr. Javier Cotín, by the Bird Banding Laboratory (BBL) were placed on each chick's right leg; any adults that were extracted were banded on their left leg. The presence of ants, hippoboscids, predators, avian pox, deformities, and human disturbances were noted for all banded individuals. Each burrow was inspected for signs of a possible depredation event (digging, carcasses, predator feces, etc). Each extracted individual was scanned for deformities, with primary focus on the face and feet as these areas are most affected by avian pox. All band information was submitted to the USGS BBL database. At least one permitted bander was present to ensure safe handling and banding activities at all banding events. After each banding period (October-November) each year, the Hawai'i Wildlife Ecology Lab followed up with intake centers and recovery organizations to identify recovery records of 'Ua'u kani that were banded.

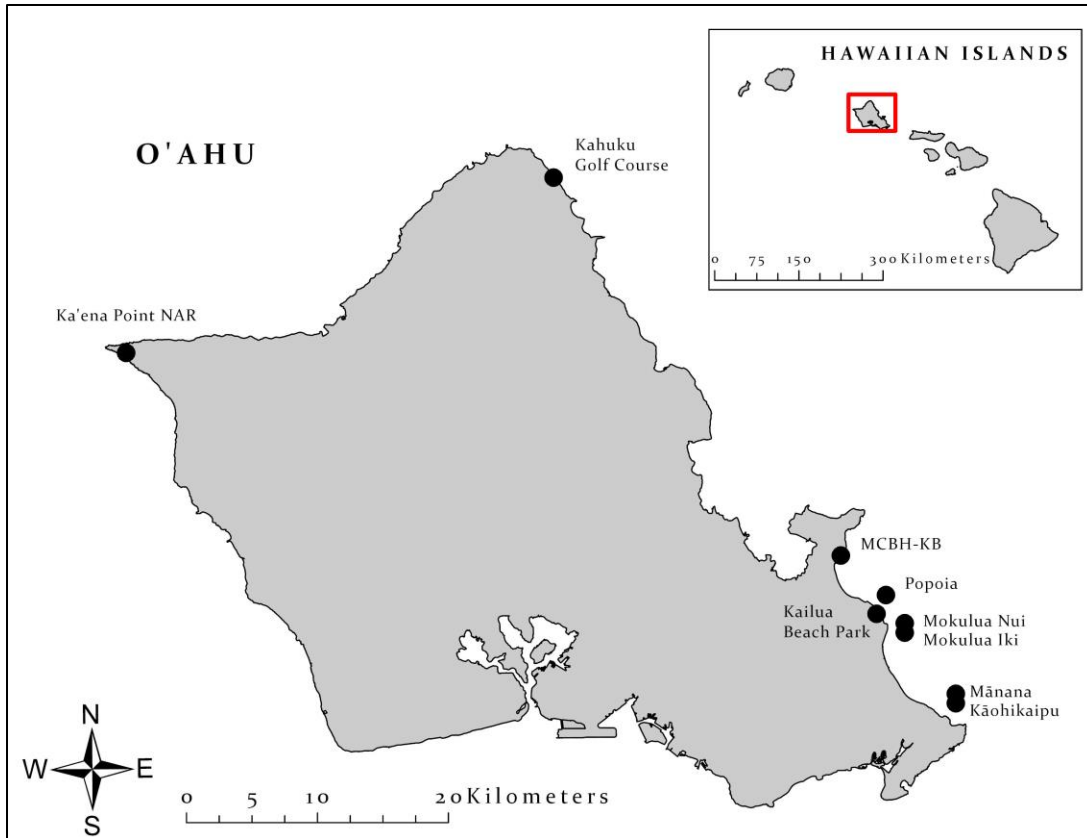


Figure 1. Locations of nine 'Ua'u kani nesting sites across O'ahu where banding efforts were conducted in 2018-2021.

Results

We banded a total of 685 'Ua'u kani across the island of O'ahu and its offshore islets in the 2022 breeding season. We extracted seven adults during the banding process, and none of the extracted adults had a band already on them, resulting in zero recaptures. Therefore, we banded 678 chicks and seven adults. We banded only a subset of each colony, except for Kailua Beach Park, in which we banded every detected individual. There were less chicks present at Kailua Beach Park compared to the last three years (12 this year, 20-25 in previous years). We were unable to survey Kāohikaipu, Mānana, Mokulua Iki, and Ka'ena Point NAR due to logistical constraints.

Incidence of hippoboscid flies and ants was low, at about 2% and 1% across nesting sites, respectively. Instances of severe deformities were also low, at less than 1% of the individuals banded, and included afflictions such as severely damaged feet due to pox. We encountered one chick with a severe bill deformity at the Kahuku Golf Course, with its upper and lower mandibles off center and curling away from each other. This sort of deformity was likely caused by early trauma that improperly healed (Figure 2).

This year there were no recorded observations of damage or disturbance to nests due to humans at any site. There were several carcasses suspected to have died due to cat predation found at MCBH-KB, and MCBH-KB environmental staff were in the process of attempting to capture the predator(s). We are still in the process of finalizing the band recovery list, however, so far, six banded 'Ua'u kani were recovered from fallout on O'ahu in 2022, with some falling out on the opposite side of the island from their natal colony (Table 2).

Figure 2. 'Ua'u kani chick with a severely deformed bill extracted form a nest at the Kahuku Golf Course colony on 11/5/2022. The chick was transported by HMAR staff to Feather and Fur to be euthanized.



Table 1. Total number of 'Ua'u kani chicks banded at each site in the 2022 nesting season, with incidence rates of hippoboscid flies, ants, avian pox, and deformities. Incidence rates are written as: raw number of chicks with pest/affliction, (percent of chicks banded at specific site with pest/affliction, %). Total banded individuals and across-site incidence rates are included.

Site	Date	Chicks Band	Adults Band	Hippo. Flies	Ants	Avian pox	Deformities
Kahuku Golf Course	11/5/2022	178	0	1, (<1%)	1 (<1%)	0, (0%)	1, (<1%)
Kailua Beach Park	10/26/2022	12	0	0, (0%)	0, (0%)	0, (0%)	0, (0%)
MCBH-KB	11/4/2022	216	4	2, (<1%)	1, (<1%)	2, (<1%)	1, (<1%)
Mokulua Nui	11/9/2022	160	1	4, (2%)	1, (<1%)	2, (1%)	2, (<1%)
Popoia	10/27/202	112	2	6, (5%)	0, (0%)	0, (0%)	1, (<1%)
Totals	-	678	7	13, (2%)	3, (<1%)	4, (<1%)	5, (1%)

Table 2. Location found, source colony, and band number of recovered individuals banded in the 2022 breeding season that experienced fallout. The date of recovery, institution of record, and outcome for each individual was included when known. Institutions: FAF = Feather and Fur.

Location found	Date	Band Number	Outcome	Source Colony	Institution
MCBH-KB Hangar 105	11/12/2022	954-49623	Released	Kahuku	FAF
91-325 Komohana St, Kapolei	11/15/2022	954-49106	Released	Popoia	FAF
JBPHH Hangar (near flight line)	11/15/2022	954-49388	Released	MCBH-KB	FAF
HNL in-bound Norwegian cruise ship	11/25/2022	1164-00465	Released	Hāwea (Maui)	FAF
MCBH-KB Hangar 104	11/25/2022	954-49224	Released	MCBH-KB	FAF
Walmart Garden Center - Kunia	12/8/2022	954-49534	Released	Mokulua Nui	FAF

Discussion

Our results and observations suggest that all the nesting sites included in this study were healthy and productive. It should be noted that the proportion of banded individuals of the total estimated population size for each site varied. Therefore, confidence in incidence rates for avian pox, *hippoboscids* flies, ants, and deformities will also vary.

With typically low incidences of disease, pests, human disturbance, and post-predation observations at these sites, fallout appears to be a significant threat to ‘Ua‘u kani currently. Depredation of eggs and chicks is the number one threat to this species while nesting in the Hawaiian Islands, evidenced by the large impact even just one predator could inflict, such as the multiple chick carcasses found at MCBH, thought to be due to one or possibly multiple cats hunting in the area. We state fallout to be the next biggest threat based on our observations from the last 5 years. Depredation is a critical factor to monitor and control, but the lack of signs of depredation events at many of these sites is a good indication that current predator control methods are easing the negative impact of predators, and additional strategies to reduce fallout instances are necessary.

While it was previously thought that colonies near lights and power lines were likely most impacted by fallout (Friswold et al., 2020), new research suggests that all lights, regardless of proximity to nesting colony, pose a threat to fledging seabirds (Friswold et al., under review). This is based on records of fledging birds traveling great distances, sometimes across islands or between islands, to the location in which they experienced fallout and were recovered (Table 2). Our team will continue to track banded individuals that experience fallout through communication with recovery organizations and alerts from the USGS Bird Banding Laboratory (BBL) in order to determine which nesting sites are most impacted by fallout, and where fallout is occurring. The Hawai‘i Wildlife Ecology Lab intends to repeat this effort again next year in the 2023 nesting season to increase the likelihood of detecting banded ‘Ua‘u kani during fallout events and to see pest and disease incidence trends across several years.

References

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