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Feral honey bees cause abandonment of endangered Hawaiian Petrel burrow on Kaua'i André F. Raine and Brooke McFarland

H'PA

The Hawaiian Petrel (Pterodroma sandwichensis) is an endangered seabird endemic to the Hawaiian island chain. The species is currently known to breed on five islands on Hawai'i,

including Kaua'i, with a population estimate of between 3,750 and 4,500 breeding pairs (Spear et al. 1995). Recent work has shown genetic, morphometric and foraging divergence between colonies of the petrel on Kaua'i and Big Island, highlighting the importance of the conservation of individual island populations (Wiley et al. 2012; Judge, Hu and Bailey 2014). Threats to the species include predation by introduced species such as cats, feral pigs, Barn Owl (Tyto alba) and rats (particularly black rats [Rattus

rattus]), collision with power lines, changes in habitat and light attraction (Harrison 1990; Hodges 1994; Ainley et al. 1997; Raine and McFarland 2014a,b).

On Kaua'i, the Kauai Endangered Seabird Recovery Project (KESRP) has been undertaking standardized auditory surveys throughout the island since 2006 to locate breeding colonies of this and other endangered seabirds. One of the largest known Hawaiian Petrel colonies is at North Bog, which is located within the Hono O Nā Pali Natural Area Reserve. To date, a total of 70 Hawaiian Petrel burrows have been located at this site, and they are actively monitored throughout the breeding season to assess fledging success rates in relation to on-going active seabird management at the site.

In 2013, a sub-set of these burrows were monitored using Reconyx Hyperfire PC900 cameras. Cameras were deployed at active petrel burrows and were placed 5-10 ft from the burrow entrance. The 'Aggressive' setting was used for the cameras as this has the shortest interval between photos (two frames/second) and takes five pictures per trigger event. Batteries and SD cards of each unit were changed once a month in an attempt to ensure continuous coverage over the season.

This short note relates to an interaction between feral honey bees (Apis mellifera), introduced to Hawai'i in 1857 (Tsutstumi and Oishi 2011), and a breeding Hawaiian Petrel pair in 2013 as

recorded on a camera monitoring burrow RED95. RED95 is an established burrow that was known to have successfully fledged a chick in 2012. In 2013 the camera was deployed on RED95 on 17^{th}

April, and next visited on 28^{th} May. The photographs were then viewed in the field on a handheld camera, and the following timeline of events was discovered.

At 03:09 on 18th April an adult bird was first recorded, emerging from its burrow. Over the next nine days the camera recorded multiple bouts of burrow maintenance by at least one adult, with vegetation being collected and taken into the burrow interior in behavior consistent with preparations for breeding.

Early in the morning of 26th April an adult was recorded re-entering the burrow for the day. At 14:25 a small number of honey bees were recorded flying into the

burrow, with further sporadic arrivals of bees until 17:27. At 20:47 the adult was recorded re-emerging from the burrow. It did not appear to be stressed or negatively affected by the arrival of the bees, and continued with burrow maintenance throughout the night – emerging and re-entering the burrow multiple times. At 03:24 on 27^{th} April the adult re-entered the burrow for the day.

At 08:57 on 27th April an extremely large swarm of bees was recorded flying into the burrow and massing along the ground at the burrow entrance. The majority of bees entered the burrow within two minutes and then for the rest of the day the camera recorded sporadic activity of moderate numbers of bees entering and exiting the petrel burrow. The last bees were recorded at 17:34.

At 19:38 the Hawaiian Petrel adult re-emerged from the burrow. At least seven bees were clearly seen on the bird's back and the bird displayed agitated behavior (see Figure 1). Bees could also be seen walking around the burrow entrance after the bird emerged. The bird tried to re-enter the burrow twice, but only managed to get its head in before having to retreat. In both instances bees could again be seen clinging to the bird's back, presumably stinging the bird. At 19:47 the adult departed.

At least one adult Hawaiian Petrel was recorded returning to the burrow on two more occasions – on 29^{th} April and 7^{th} May. In both



Figure 1. Adult Hawaiian Petrel



Figure 2. Adult Hawaiian Petrel emerging from its burrow with feral honey bees on its back (bees highlighted with arrows).

instances multiple burrow entrances were attempted, but the bird was forced to retreat with bees clearly seen on its back, head and chest. In each case the bird clearly reacted to the attack, flapping its wings, waving its head and preening its belly and back. The last record of an adult at the burrow was on 7th May at 20:48. After this, no Hawaiian Petrel was recorded. The camera was removed on 4th July. The burrow was visually inspected at monthly intervals for the rest of the season, but there was no sign that the birds returned – despite the fact that the hive was destroyed on the 28th May (immediately after the card was viewed and the interactions with the bees noted by fieldworkers). This therefore caused the complete failure of the burrow in the 2013 season. In 2014, with the hive destroyed, at least one Hawaiian Petrel returned to the burrow and the burrow was active during the first half of the breeding season. However the burrow eventually failed so it is not clear whether both adults returned and were unsuccessful or only one returned and breeding was never initiated.

To the best of our knowledge there has not been a record of feral honey bees causing the abandonment of an active Hawaiian Petrel burrow. However feral honey bees have been recorded causing nest failure in other threatened cavity-nesting species, such as Carnaby's Black Cockatoo (Calyptorhynchus latirostris) in Australia (Groom 2010). Feral honey bees are naturalized throughout the Hawaiian Islands after being introduced in 1857 (Tsutstumi and Oishi 2011) and are recorded occasionally in the upper montane areas of Kaua'i. While it is unlikely that the events described in this Short Note are a common occurrence, those working on seabird colonies should look out for the presence of feral honey bees in the vicinity of active ground-nesting seabird burrows and should act immediately to remove them if there is the possibility that they are prospecting within a burrow. Other introduced insect species on Hawai'i, such as big-headed ant (Pheidole megacephala), yellow crazy ant (Anopholepis gracilipes) and tropical fire ants (Solenopsis geminate), can cause serious damage and even death to ground-nesting seabirds in particular (Plentovich, Hebshi and Conant 2009).

Acknowledgements

We would like to thank Lindsay Young and Paul Krushelnycky who identified specimens of the bees for us. We would also like to thank the many field technicians who worked for KESRP over the 2013 field season (and especially Deirdre O'Connell and Elizabeth Ames who found the bee hive) and the Natural Area Reserves staff who conduct management activities within the North Bog area. The KESRP is a State of Hawai'i Division of Forestry and Wildlife Project administered by the Pacific Cooperative Studies Unit of the University of Hawai'i. Funding for the Reconyx cameras was provided by the Kaua'i Island Utility Cooperative (KIUC) under the KIUC Short-term Habitat Conservation Plan.

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Remembering David Bremer

Leah Bremer

Resting on the top of the Palikea Trail on a typically windy and rainy day of the Waipio Christmas Count, we marveled at an I 'iwi perched on an 'Ohia tree just in front of us. This was the first I 'iwi my dad, David Bremer, had seen in his

35 years coordinating the Waipio Christmas Bird Count. The group also included Lance Tanino, who took over the count last year, and an Alaskan





Photo Nick Hajdukovich: I'iwi on the Waipio CBC January 2013

the trail listening the characteristic calls of the 'Elepaio. My dad went on to spend the afternoon counting birds in suburban central O'ahu, as he had thirty four times before. Among his favorite birds to see in his Mililani rounds were the Pacific Golden Plover or Kolea who valiantly guarded their territories in the midst of flocks of Common Mynahs, Doves, and Saffron Finches.



Photo Lance Tanino: Palikea Trail Waipio CBC January 2013 That special day was the last Christmas bird count for my Dad, but his love and curiosity for birds continued through his year battling cancer. A long time bike commuter

from Mililani to Tripler hospital, he enjoyed riding or walking around the neighborhood noting the territories and habits of the local Kolea. He embarked on his Kolea mapping project where he photographed, mapped, and named each of them - 'Cart' for the Kolea living near a woman who often walked around with her shopping cart, 'Ihu' and 'Anu' for the two living on our street, Ihuanu place, and 'Aggie' for the one living near the agricultural fields. For a few months he diligently tracked the Kolea, noting when they left and returned for their 50-hour migration to Alaska. We often received texts notifying of us of Ihu or Aggie's return, habits, or whereabouts. I think his reason for tracking the Kolea in Mililani were the same as his reasons for coordinating the Waipio CBC for 35 years. He enjoyed being active and outside, the birds fascinated him and connected him to the place he lived, and he wanted to contribute to knowledge and understanding that would that would help aid their protection.



Map of David Bremers' Plovers in Mililani A full size version of the map will be made available on our website.

David Bremer Memorial Fund

Friends of the family are in the process of establishing a memorial fund in David Bremer's name. Details will be publicized when they are made final.



Ode to the Plover David Bremer

Quite amazing, the Pacific Golden Plover, Unfazed by this urbanized, once pristine island, On lawn or street, lays claim to a territory, Long-legged shorebird, beautiful plumage, When chased, takes flight with a piercing call, Returns always to own turf, until April migration.

Three thousand mile trans-oceanic migration, Male built tundra nests attract female (p)lovers, Raise two chicks, then Hawaii calls. In August adults fly back to the island, Arrive still sporting breeding plumage, October brings youthful flight for territory.

One chose our yard as his territory, Returns every August when migrates. Molts to winter's subdued plumage Patrols alone, a solitary plover, As if stranded on his own island. At night I hear his mournful call.

Over the years, he's had s ome close calls, One stealthy cat hangs out near his territory, Native bird adapted to a now crowded island Some survive two decades of migration, I hope the same for my homeboy plover But worry again as he dons breeding plumage.

What cues stimulate change in plumage? Will warming climate confound nature's calls? How to sustain the success of the plovers, Ensure their perennial gracing of territories, Keeping intact whatever drives the migration From arctic breeding grounds back to this island.

There is no clear threat to the bird on this island, No one has reported altered timing or plumage. Flocks gather as usual for spring migration, Departures, arrivals are marked by shrill calls. All seem content in customary territories. Long live the Pacific Golden Plover,

So as long as they migrate with their highpitched calls,

Leaving this island in full breeding plumage. We'll know this is the territory of the Pacific Golden Plover.



Photo David Bremer: 'Ihu' the Kolea who roams Ihuanu place.

First Predator-proof Fence on Kaua'i Completed at Kīlauea Point National Wildlife Refuge

Threatened Birds to be Protected from Predators

MEDIA RELEASE

Robert Johns, American Bird Conservancy Jennifer Waipa, U.S. Fish and Wildlife Service Megan Nagel, U.S. Fish and Wildlife Service

(Washington, D.C., December 1, 2014) Rare native plant and animal communities that have inhabited a roughly eight-acre area at the Kīlauea Point National Wildlife Refuge—including imperiled bird species found nowhere else on earth—will be protected from predators thanks to the completed installation of a predator-proof fence that stretches almost a half-mile in length.



The effort is a collaboration that includes the U.S. Fish and Wildlife Service's Kaua'i National Wildlife Refuge Complex,

The predator-proof fence stretches almost a half-mile in length and will help protect rare native species that inhabit the Kīlauea Point National Wildlife Refuge. American Bird Conservancy, Pacific Rim Conservation, and the Kaua'i Endangered Seabird Recovery Project (a Hawai'i Department of Land and Natural Resources Division of Forestry and Wildlife/Pacific Cooperative Studies Unit project). The National Fish and Wildlife Foundation provided critical funding support.

The state-of-the-art fence took about three months to construct and will keep introduced mammalian predators, including cats, dogs, rats, and mice, out of the area so that native species such as the endangered Nēnē (Hawaiian Goose), the Mōlī (Laysan Albatross), and rare plants can flourish again in a protected environment. In addition, the absence of introduced predators make this restored site an appropriate translocation site for the threatened 'A'o (Newell's Shearwater) and for the reintroduction of rare native plants.

This type of fencing has been used with great success in New Zealand and on the island of O'ahu at Ka'ena Point, where predator exclusion resulted in record numbers of seabird chicks fledging in the year immediately following the project's completion, as well as natural colonization by Black Noddy, a seabird species not previously recorded breeding on Continued on page 5 O'ahu, in its third year. It is hoped that similar outcomes will be achieved on Kaua'i.

The planned translocation of Newell's Shearwater is a particularly important aspect of the project. "We have seen a dramatic decline in the population of Newell's Shearwater in recent years due to a range of issues, with an estimated 75 percent decline in the last 15 years," said Dr. André Raine of the Kaua'i Endangered Seabird Recovery Project. "The establishment of a new colony using predator-proof fences is an important management tool to help reverse this decline."

Stretching for about .45 miles, the fence is approximately 6.5 feet tall and encloses an area of 7.8 acres. It is built entirely of stainless steel to resist the harsh marine environment. The main panels of the fence are made with mesh so fine that even mammals as small as a two-day-old mouse cannot enter. The top of the fence has an arched hood that extends outward to prevent animals from climbing over. It was constructed by Honolulu-based JBH, Ltd., the contractor that also built the Ka'ena Point fence.

Now that the fence is in place, work can begin to

humanely remove non-native predators from the enclosure and restore native plant communities. Nēnē and Laysan Albatrosses that previously nested in the now-fenced area will immediately benefit from protection from predators, and their numbers are likely to increase over time. The team plans to use recorded calls and translocation to bring threatened and endangered seabirds, including Newell's Shearwater, to the site beginning in 2015.



The new fence will keep introduced mammalian predators out of the area so that native species such as the endangered Nēnē (Hawaiian Goose) can flourish again in a protected environment.

Recent Bird Observations By Lance Tanino

14 OCT - Brambling (Flock of 12), First Hawaiian Islands record were observed at Kure Atoll State Wildlife Area (Adam Fox and Kure Atoll Conservancy).

14 OCT - Mottled Petrel (1) at Keokea Beach Park, Niulii, North Kohala, Big Island (Lance Tanino)

19 OCT - Mottled Petrel (1) and Sooty Shearwater (3,223) at Keokea Beach Park, Big Island (LT and Cheshta Buckley).

21 OCT - Cookilaria (petrel) sp. (54) at Keokea Beach Park, Big Island (LT and CB).

25 OCT - Buller's Shearwater (4) and Sooty Shearwater (216) at Keokea Beach Park, Big Island (LT)

28 OCT - An adult White-fronted Goose was observed at a settling pond along Hansen Road, Pu'unene, Maui (LT and Sonny Gamponia).

28 OCT - A Gray-tailed Tattler was observed at Kanaha Pond State Wildlife Sanctuary, Kahului, Maui (LT, SG, and Keith Burnett).

28 OCT - White-faced Ibis (2) at Kealia Pond National Wildlife Refuge, North Kihei, Maui (many observers).

30 OCT - Mottled Petrel (2), Black-winged Petrel (1), Cook's Petrel (4), Cookilaria sp. (30), Buller's Shearwater (2), Sooty Shearwater (127) at Keokea Beach Park, Big Island (LT).

31 OCT - Cook's Petrel (3), Cookilaria sp. (9), Sooty Shearwater (1539) at Keokea Beach Park, Big Island (LT).

05 NOV - Cook's Petrel (6), Cookilaria sp. (24), and Sooty Shearwater (1506) at Keokea Beach Park, Big Island (LT, CB, and Sherman Wing).

07 NOV - SPOTTED REDSHANK (1 juvenile), First Hawaiian Islands record at Kealakehe WWTP, Kailua-Kona, Big Island (Jeremy Gatten, LT, Jean Campbell, and many others). It was continued to be seen into early December.

14 NOV - White-necked Petrel and Juan Fernandez Petrel off Kona Coast (Cascadia Research Collective).

24 Nov A BLACK TURNSTONE (first state record) was photographed circling a marine mammal research vessel about 23 miles off the coast of Kailua-Kona (Cascadia Research Collective)

25 Nov One or possible three TUFTED DUCKS were photographed at Ka'elepulu Pond in Kailua, O'ahu (Satoko Lincoln)

26 NOV - Western Sandpiper and a likely SHORT-BILLED DOWITCHER were seen at Kanuimanu Ponds of Kealia Pond NWR, Maui (LT).

13 Dec One adult KILLDEER was observed along Kaunakakai Stream, Mokoka'i (Arleone Dibben-Young)

Freeman Seabird Preserve 2015 Fieldwork Season

Seeking Volunteers for Habitat Restoration!

Held 9 am to Noon Every Saturday Morning from January beginning the 3rd through March 2015

In November and early December, Wedgetailed Shearwater adult birds and chicks leave the Freeman Seabird Preserve at Black Point to forage at sea for several months before returning in the latter part of March to nest.

Volunteers are needed for fieldwork at the site on Saturday mornings from 9 am to noon beginning January 3rd. Activities will include maintenance of native plants and man-made landscape features, along with removal of invasive plants, trash and debris. Other dates and times can be arranged for groups wishing to contribute their time in an effort to preserve rare Hawaiian coastal vegetation and seabird nesting habitat.



Please contact the Hawaii Audubon Society office by phone at (808) 528-1432 or e-mail at hiaudsoc@pixi.com in advance if you would like to participate. We will meet each Saturday at Triangle Park near Diamond Head at 8:45am to carpool to the site. Plan on bringing drinking water, sun and rain protection, gloves, weeding tools, clippers and loppers.

Upcoming Field Trips, Volunteer Opportunities & Events

Kawainui Marsh Restoration

Saturday, January 3rd from 9 am – noon Saturday, February 7th from 9am – noon Volunteer at the monthly Kawainui Volunteer Day led by DLNR/DOFAW. Support some of Hawaii's most endangered waterbirds and contribute to the success of the new restoration ponds behind Castle Medical Center in Kailua (at the end of Ulukahiki St.) *Please note: this workday is not led by Hawai'i Audubon Society, but by DLNR/DOFAW.

Ka'ena Point Hike

Saturday, January 10th 9am -3pm

We will depart from parking lot at the end of paved portion of Farrington Hwy and walk approximately two miles along a dirt road to Ka'ena Point NAR. We should see many native plants, including several endangered species, Laysan albatross, Hawaiian monk seals, and humpback whales. We will return to our vehicles by 3:00.Please bring: water (2L), lunch, appropriate footwear, protection from sun and/or rain (hat, sunscreen, etc.), camera, binoculars, etc.RSVP hiaudsoc@pixi.com or call (808)528-1432

Moku'auia Service Project

Saturday, January 31st 9am – 2pm

All participants must be able to swim. Please ask before signing up minors. Space is limited. Send an email to amarisa@hawaii.edu to RSVP and further details. *Please Note: this workday is led by DLNR Forestry and Wildlife

Nature Hike to Kahuku Point and Wetlands at Turtle Bay

Saturday, February 7; Meet outside the Helipad @ 8:45am Be prepared to see Hawaiian monk seals, turtle nest sites, endangered and endemic plants, rare Hawaiian bee nesting areas, shore birds, sea birds, endangered water birds, possibly nene and who knows what else. Folks can either join us for the 2 mile walk to Kahuku Point (4 miles total) 1.5 hours or do the 5 mile loop which would include seeing the waterbirds, 3 hours. Kids welcome. Some kind of backpack carrier for little ones recommended. 80% of the terrain is dirt path, the rest is beach. Bring sunscreen, water, cameras, binoculars and wear a swimsuit under your clothes for a dip in the Keiki Cove on the way back if you fancy doing that.

Bathrooms are adjacent to Ola Restaurant.

RSVP <u>ahuntemer@aol.com</u> or 808-224-3101 with the number in your party and cell phone numbers. More details emailed a few days before the 7th.

Wally Johnson Talk in March 2015 More information to come

Office, Outreach, & Education Volunteers and Interns

We have long-term and short-term opportunities for all interests and backgrounds. Please email Amy at hiaudsoc@pixi.com for details.

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Ron Walker at James Campbell National Wildlife Refuge. Photo courtesy of Michael D. Silbernagle.

Donate to the Ron Walker Memorial Fund

A generous donation was has been received by the Society for the purpose of establishing the Ron Walker Memorial Fund in support of HAS activities and educational programs. If you would like to contribute to the Ron Walker Memorial Fund please send a check or cash to:

Hawaii Audubon Society 850 Richards St. Suite 505 Honolulu, HI 96813

Donations of \$50 or more receive a 5x7 or 8x10 matted print of your choice of one of Ron's six drawings below.





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RETURN SERVICE REQUESTED

Calendar of Events

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Every Saturday, January through March, 9am to Noon Habitat Restoration at Freeman Seabird Preserve

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Ka'ena Point Hike Saturday, January 10th, 9:00am-3:00pm

Moku'auia Service Project Saturday, January 31st, 9:00am – 2:00pm

Nature Hike to Kahuku Point and Wetlands at Turtle Bay Saturday, February 7th 8:45am

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