EUDYPTES ECOCONSULTING

monthly REPORT

To: **Igor Debski, Conservation Services Program**
From: **Thomas Mattern, Mel Young**
Project: **Hoiho Population and tracking: POP2018-02**
Date: **20 June 2019**

Monthly report for the period 21 May 2019 – 20 June 2019

Summary

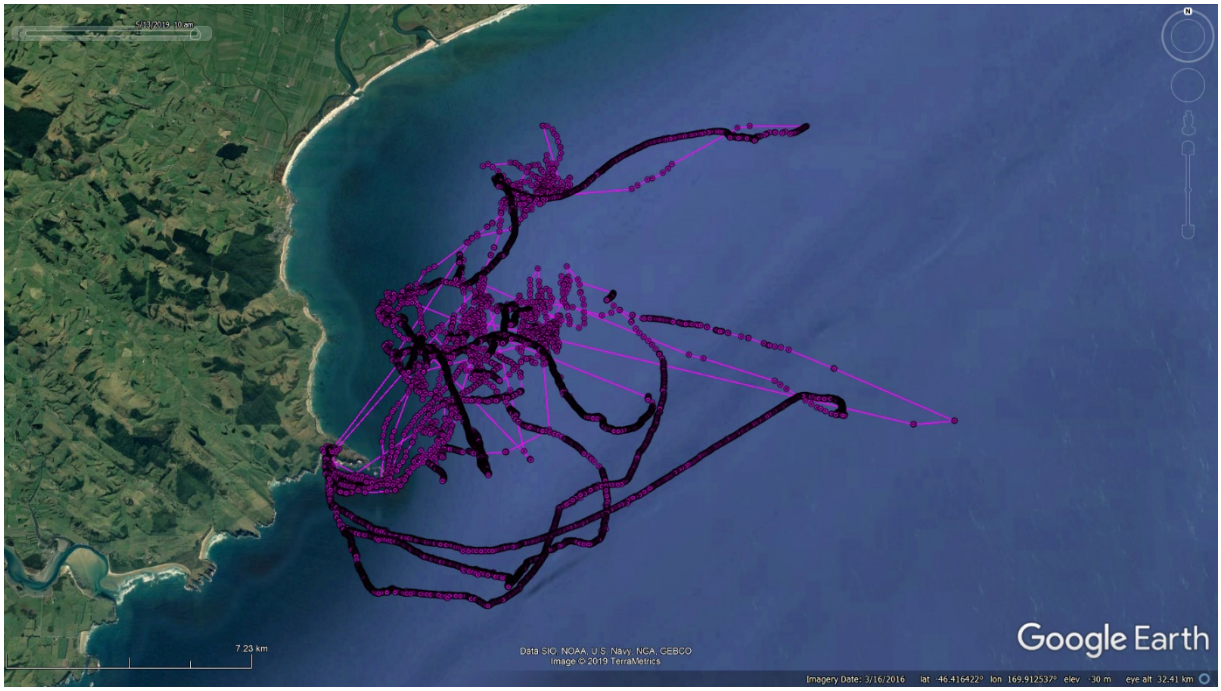
Tracking of hoiho during the winter months remains extremely difficult. Of the seven hoiho fitted with GPS dive loggers between 1 and 10 May 2019 at Nugget Point, Penguin Bay and Te Rere, four birds could be recaptured to date. Three birds have remained elusive. The greatest challenge are the unpredictable landing patterns and long foraging trips of penguins. Particularly Te Rere has proved to be very difficult to work at as hoiho at that site return as late as 1am in the morning. The ca. 200 observer-hours invested by PIs and volunteers in the past four weeks led to only 3 recaptures; on many nights no penguin movements were observed at some of the sites. We propose trialling new GPRS/GSM data loggers that transmit data through mobile phone networks to see if this is a viable option to reduce the issues we are having with traditional data loggers.

Results

Data for female 982 000405532782 fitted with logger at Nugget Point from 1-7 May 2019 were included in last month's report.

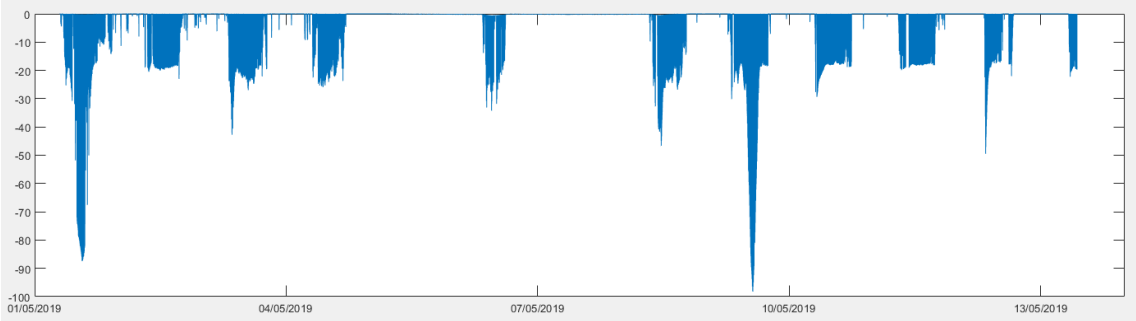
Nugget Point, bird id*:* 982 000405533363, 30 April – 3 June 2019

The device was attached to the female for a total of 34 days before the bird could be recaptured and the device recovered. The device's battery was depleted in the morning of 12 May 2019 so that data comprises 11 days' worth of foraging. The penguin performed one four-day trip and seven one day trips during the device's operating time. It foraged predominately to the northeast of Nugget Point staying within a 20 km radius from its breeding colony. It visited ocean regions of varying water depths and visited deeper regions on 1st of May (mean water depth 40m) and 8th May (~60m) but remained in shallower regions (<30 m) on all other days.



Foraging tracks of female 982 000405533363 between 20 April-12 May 2019

A total 3,276 dive events were recorded, with average dive times per trip ranging between 54 and 112 seconds. Short dive times correlated with shallow diving during which the bird reached average dive depths of 11-25 m. Dive behaviour varied greatly between trips with the bird performing primarily benthic dives on four trips (70-100% of all dives to the seafloor) while on the other four trips pelagic foraging dominated the bird's behaviour (only 8-33% of all dives benthic).

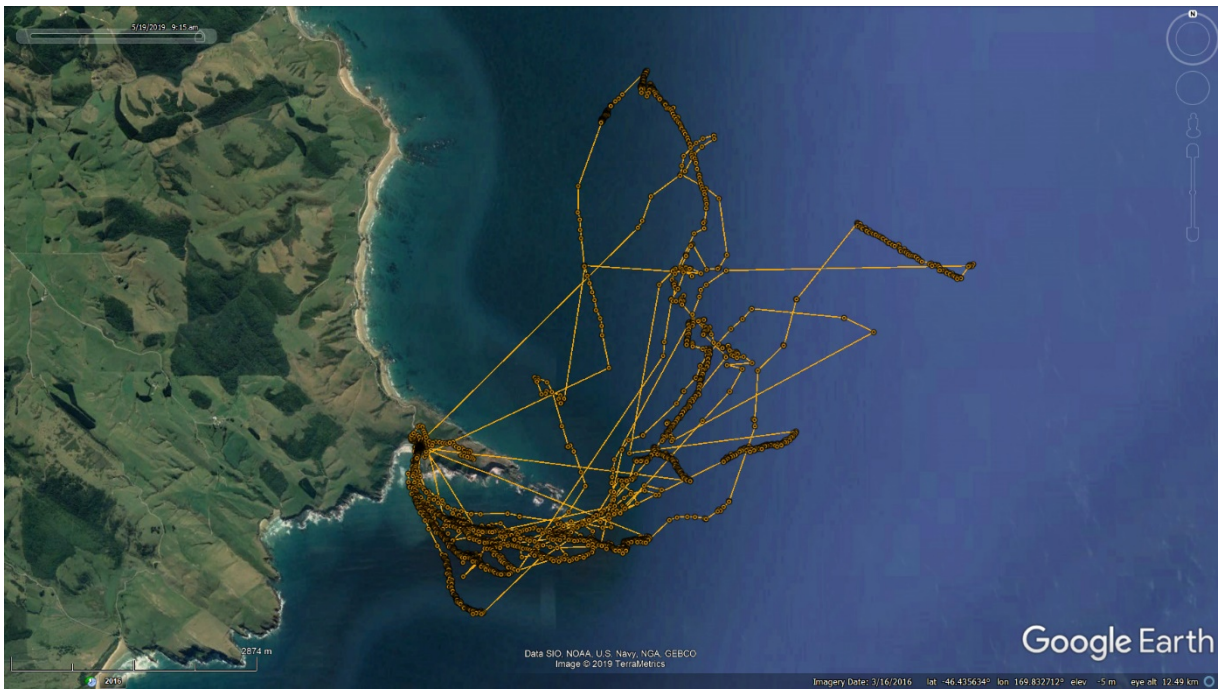


Dive profiles of female 982 000405533363 recorded between 30 April and 12 May 2019

Note: While the devices' battery was long drained by the time the bird could be recaptured, the logger was still firmly attached to the bird. As such, it does seem likely that birds that could not be recovered so far are still carrying their devices.

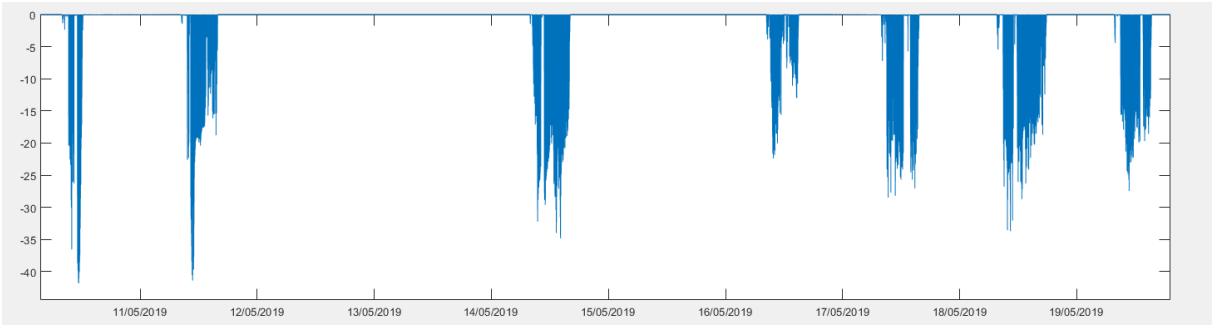
Nugget Point, bird id*:* 982 000402100750, 7-21 May 2019

The female penguin performed seven one-day foraging trips during the 14 days it was fitted with GPS dive loggers. Trip lengths ranged from 4.2 to 10.1 hrs; the bird did not stay at sea overnight. Consistent with foraging patterns observed in the weeks prior at Nugget Point, the penguin stayed relatively close to its breeding colony and foraged predominately in Molyneux Bay no further than 10 km to the east of Nugget Point in the western ranges of Molyneux Bay. On its trips the penguin remained in shallow regions with average water depths not exceeding 20m.



Foraging track of female 982 000402100750 between 10-20 May 2019

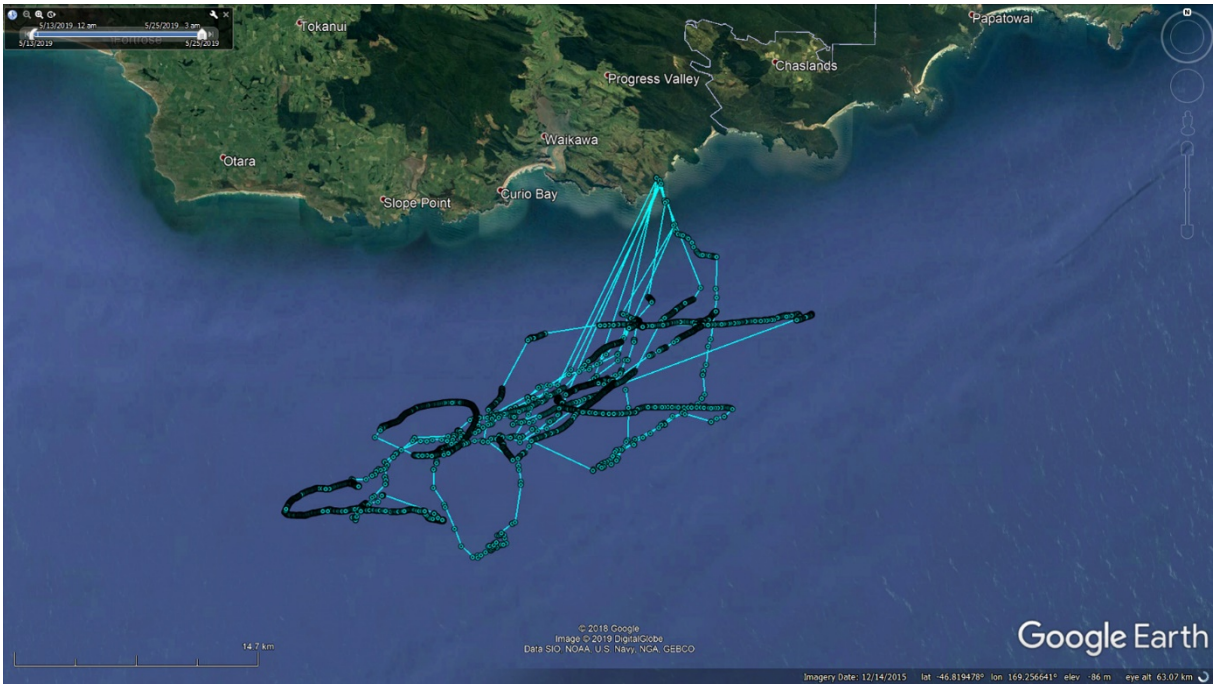
A total 1,966 dive events were registered with dive events per trip ranging between 72 and 433 dives (mean: 281 dives) and were short generally lasting only around 1 minute (mean: 57±13 seconds). The penguin foraged predominantly pelagically and on only a mean 41% of all dives went to the seafloor. Maximum dive depths averaged around 12 m.



Dive profiles of female 982 000402100750 recorded between 10-20 May 2019

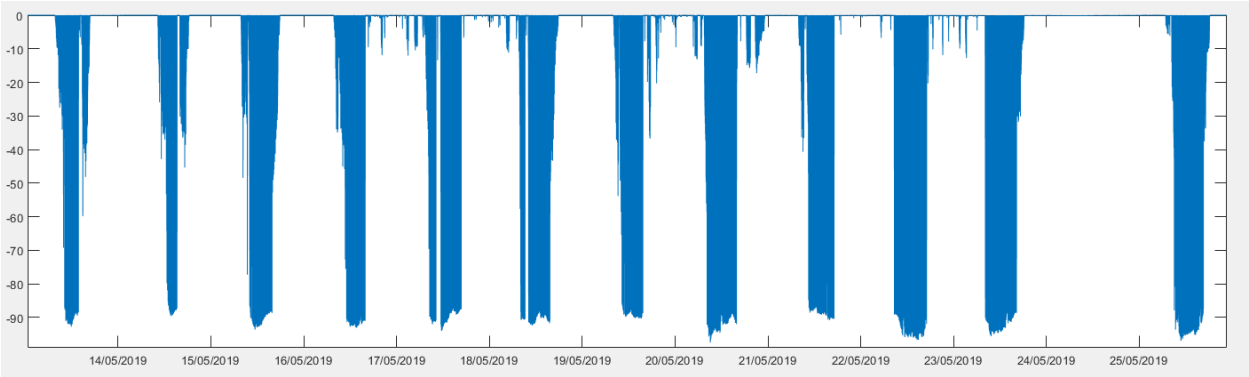
Te Rere, bird id*:* 982 000407011612, 10-25 May 2019

The male penguin performed seven foraging trips, three of which were overnight trips of 2-3 days duration. The bird went south and southeast of Te Rere between 10 and 20 km from the Catlins coast. It foraged in the same general area that was utilized by chick rearing penguins in December 2018 and January 2019 (see corresponding monthly reports). Water depths in the region range between 65 and 85 m.



Foraging track of male 982 000407011612 between 10-25 May 2019

The penguin performed 2,696 dive events, which corresponds to 198-632 dives per trip (mean: 385 dives) and an average 25±8 dives per hour. Average maximum depth of all dives was 41 m and of 18-59% went to the seafloor. However, most of the non-benthic dives occurred at the beginning and/or end of the respective foraging trips and therefore are likely associated with travelling rather than foraging behaviour.



Dive profiles of male 982 000407011612 recorded between 13-25 May 2019

Likelihood of recovery of remaining logger birds

There are still three birds missing that were fitted with devices in early May. At this stage, the batteries of the devices are long depleted and won't record anymore data. But if the devices can be recovered, they should still contain several weeks' worth of data.

Colony attendance patterns at all three sites are monitored with motion-activated trail cameras. Both cameras at Nugget Point and Penguin Bay have so far not recorded any of the penguins equipped with devices. There are three possible explanations for this:

1. *The birds make landfall outside of the range of the trail camera*
   This explanation seems most likely as both Roaring Bay and Penguin Bay offer several sites for the penguins to come ashore.

2. *The penguins have lost the devices and cannot be visually identified on camera footage*
   While this has previously occurred, it seems less likely in this instance. All devices were secured with cable ties. Moreover, in all birds that were recovered so far, the devices were still attached tightly to the plumage and, in fact, not easy to remove.

3. *The penguins have perished at sea*
   This could be an explanation for our failure to recover the second penguin from Te Rere despite substantial effort with nightly observations of the penguins landing from 4pm to 9pm or even midnight. Unlike at the other two sites, both logger birds were recorded frequently on the trail camera until 22 May. After the recovery of one bird on 25 May, no penguin with device was detected on the camera footage. Moreover, transponder identification of arriving birds showed that none of them were the missing bird. So we can be fairly certain that the penguin still carrying a device has not returned to Te Rere in 3-4 weeks.

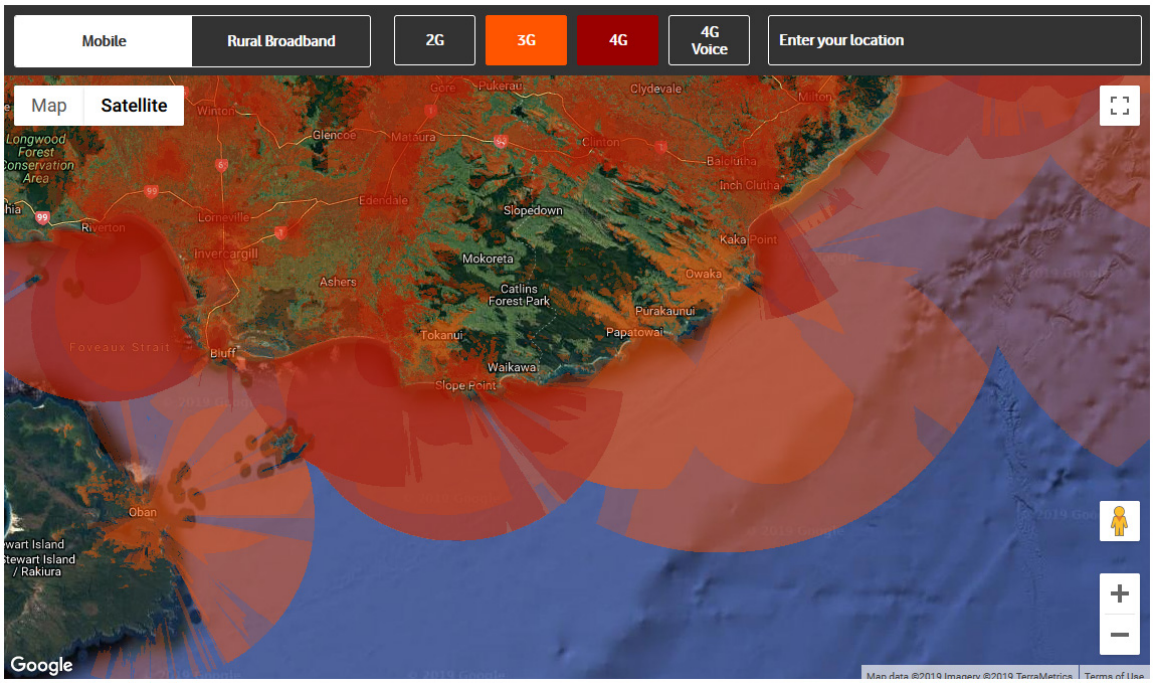
Overall, there may still be a chance to recover the devices later. The penguins will start socializing in preparation for the next breeding season in July and August and likely return to the breeding colonies more often. We continue maintaining the trail cameras and check camera data once or twice per week. If there is any indication that penguins carrying data loggers return more frequently, we will resume nightly stakeouts.

Change of tracking strategy

The past weeks have shown, that the deployment of data loggers is currently not a viable method. The effort required to recover devices combined with the low number of penguins at each site and the low recovery likelihood at this stage speak against a continuation of this method.

In the short term, we propose to switch to the use of satellite transmitters in combination with time-depth recorders. That way it is possible to follow the birds' movements remotely through Argos satellites and provide considerably improved predictability of return times.

We furthermore recommend obtaining trial devices from Ornitela which produced archival tags that transmit data through GPRS/GSM mobile phone networks (https://www.ornitela.com/25g-transmitter). The units can be ordered with an integrated depth sensor so that dive data will be recorded as well. The devices depend on adequate coverage of mobile data, which may be an issue in the colonies. However, coverage out at sea is generally good off Otago and Southland (see graphic below). So that data transmissions should be possible, especially if penguins stay at sea overnight. We have contacted Ornitela to enquire about availability and delivery times of such devices.



GPRS/GSM coverage of the Vodafone network around the Otago and Southland coastlines