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From: Thomas Mattern, Mel Young
Project: Hoiho Population and tracking: POP2018-02
Date: 20 November 2019

Monthly report for the period 21 October 2019 – 20 November 2019

Summary

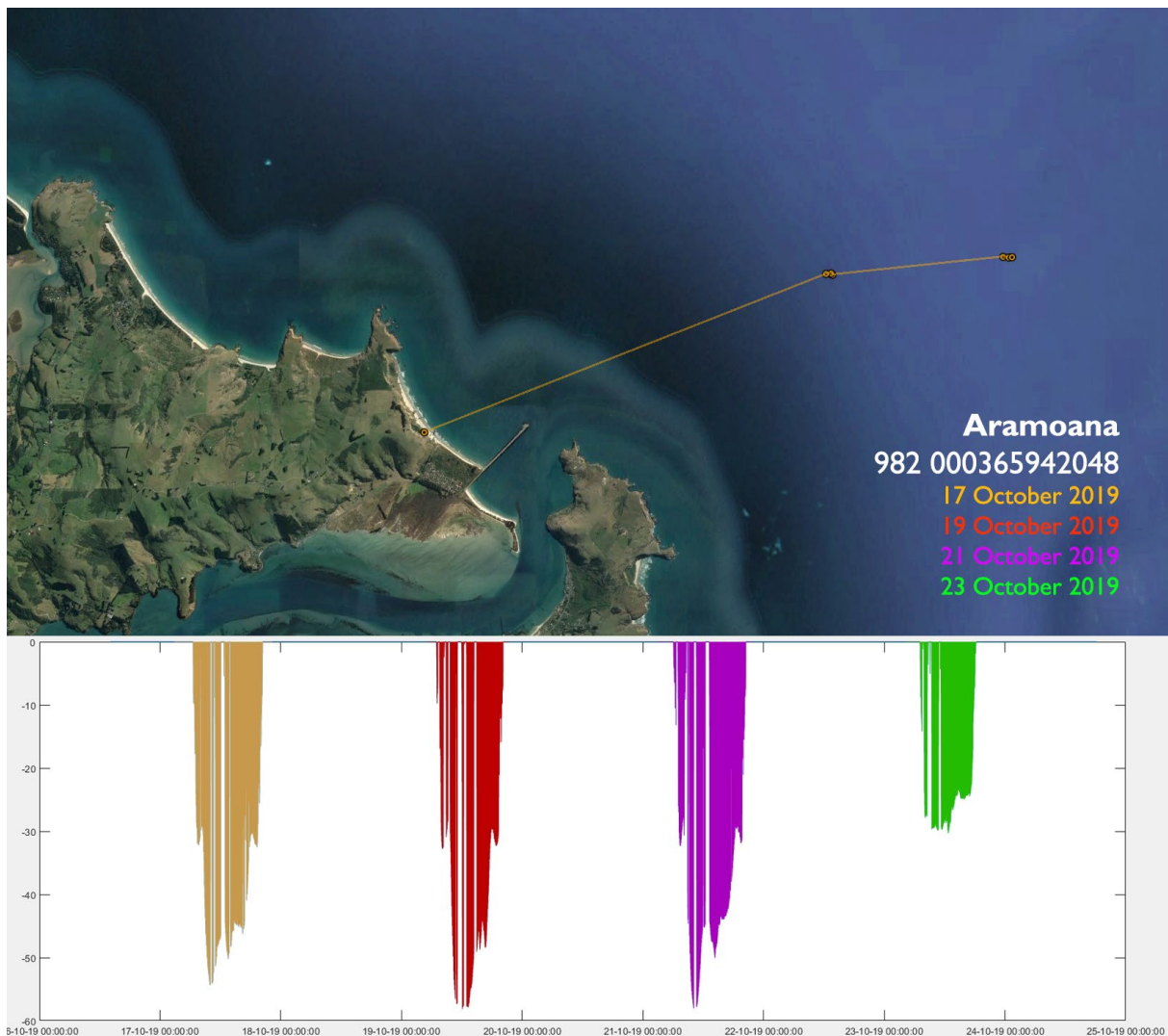
Tracking of breeding hoiho has resumed at Aramoana with deployments of GPS dive loggers on incubating birds in late October. Two penguins were fitted with AxyTrek devices on 16 and 24 October with devices recovered 8 and 6 days later, respectively. A third penguin was equipped with a new Ornitela GSM GPS dive transmitters which sends its data frequently via the mobile phone network. One AxyTrek and the Ornitela device both recorded GPS data showing that both penguins foraged within 20 km of Aramoana, reaching destinations some 15 km due east of Karitane. The second AxyTrek device failed to record GPS positions beyond the first hour of the first foraging trip undertaken; however, the bird followed a similar trajectory as the other two penguins and a full set of dive data was recorded. Tracking was paused during chick hatching. On 18 November 2019, a male hoiho guarding two healthy chicks was fitted with a camera logger and an AxyTrek. The camera was successfully recovered on 19 November 2019 containing 2.5 hours of footage recorded during the bird's active foraging period (0920 - 11.55 hrs). Preliminary analysis suggest that the penguin caught principally opalfish over sandy bottom; during the 2.5 hours of camera footage the bird caught 20+ fish indicating excellent foraging success which aligns with healthy, well nourished chicks in the bird's nest. The GPS dive logger remained on the bird and is due for recovery on 22 November 2019.

Results

Aramoana, male, bird id: 982 000365942048, AxyTrek, 16 October – 24 October 2019

The penguin was captured on the nest containing eggs and the device was fitted in the late afternoon of 16 October 2019; weight: 5100 g. The penguin remained on the nest the following day and left on its first foraging trip. The GPS unit ceased recording when the bird was about 9 km northeast of Aramoana. Dive sensors continued to operate until the device was recovered on 24 October.

The dive data shows that the bird conducted four foraging trips during the deployment period. Dive profiles and maximum dive depths recorded are similar to the other penguins (see below) suggesting that the first three trips were further afield while the bird remained closer to Aramoana on its last trip.



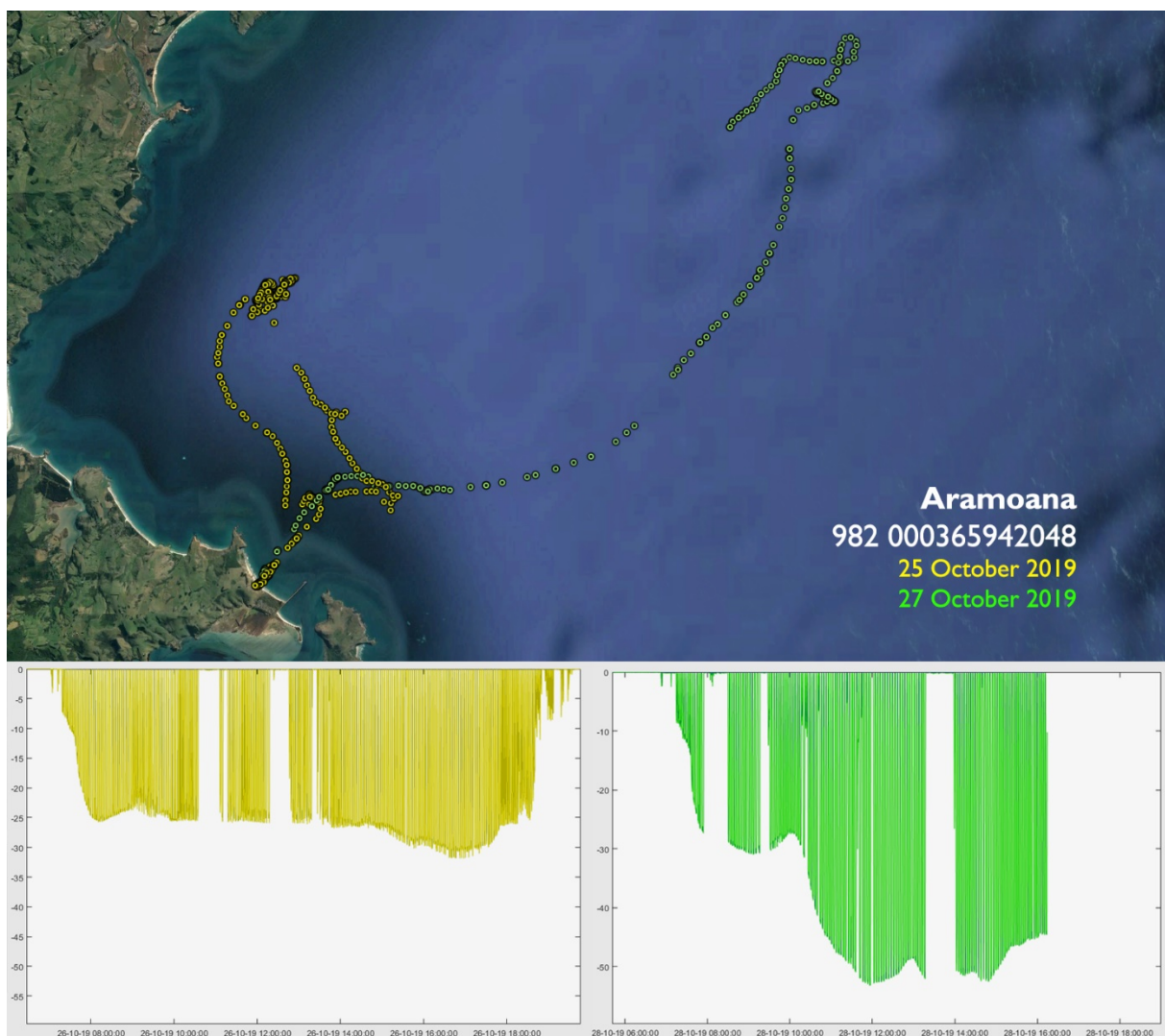
Foraging tracks of male 982 000365942048 recorded between 16 and 24 October 2019.

Aramoana, female, bird id: 982 000402100727, AxyTrek, 25 October – 31 October 2019

The bird, weighing 5100 g, was incubating eggs when fitted with an AxyTrek GPS dive logger in the afternoon of 24 October 2019. She left on her first foraging trip at 0600 hrs the next morning and returned to her nest almost exactly 12 hours later. The penguin stayed within a 10 km radius of Aramoana and foraged predominantly in a 0.6km² large area due north of her nest site.

The bird remained on the nest the following day (26 October) and performed a second foraging trip on 27 October, leaving the nest at 0550 hrs. By midday she had reached a position 20 km northeast of Aramoana and 15 due East of Karitane; the GPS unit stopped recording locations around 1500 hrs while the bird in the same area. Dive data dropped out after 1600 hrs indicating that the device's battery was drained (we are in touch with the device manufacturer to enquire about the unit's poor performance).

Throughout both trips, the penguin foraged principally along the seafloor, with dive depths on the 25th not exceeding 30 metres and on the 27th dives seldom went deeper than 50 metres.

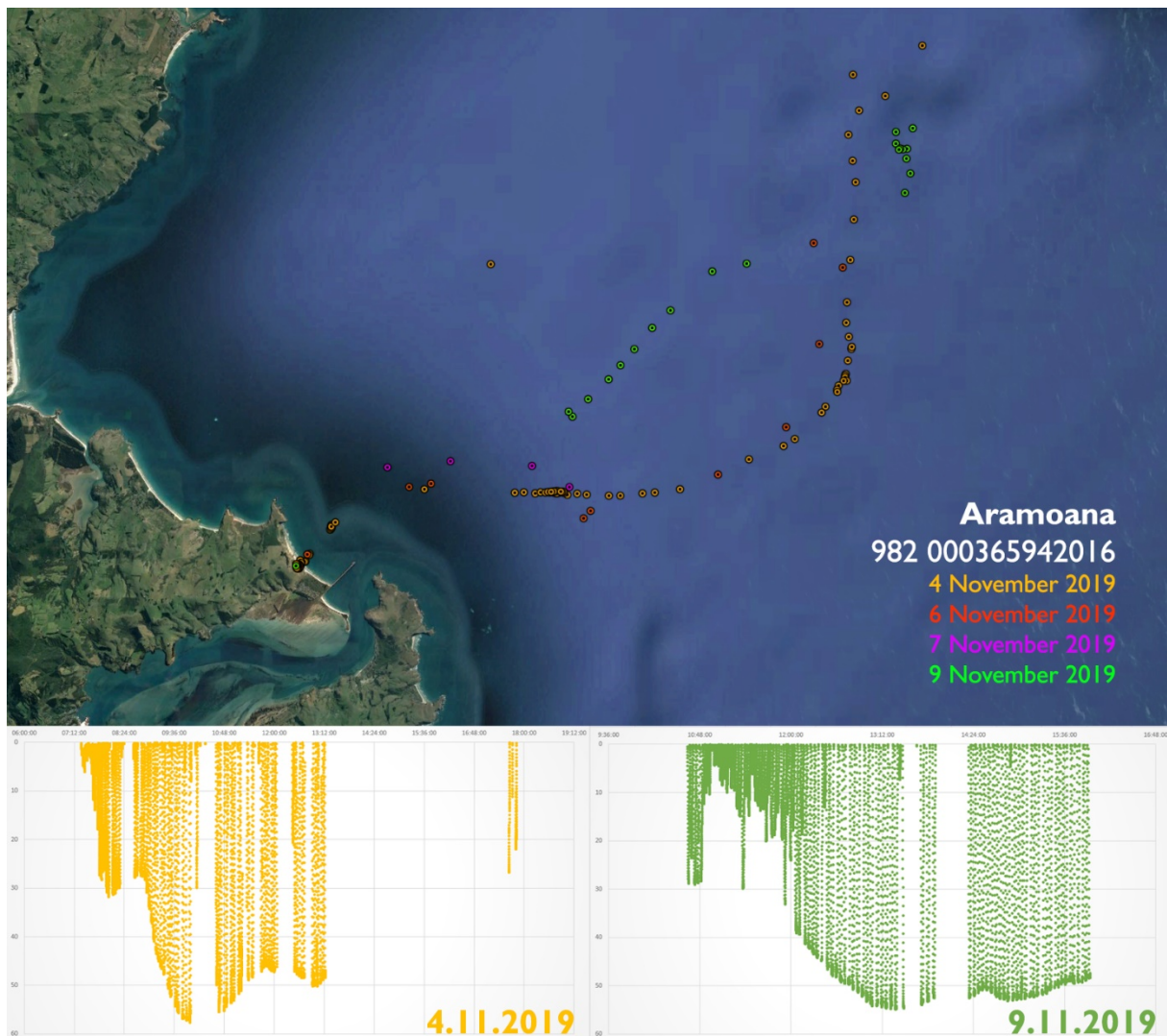


Foraging tracks of female 982 000402100727 recorded between 25 and 27 October 2019. Note: GPS and dive data for the second trip are incomplete due to a drained battery.

Aramoana, male, bird id: 982 000365942016, Ornitela, 25 October – 9 November 2019

Ornitela GPS GSM transmitters have never been used on penguins before. Two units were purchased in response to the difficulties with recovery data loggers from hoiho in the past few months. The devices are powered by solar panels and frequently connect to the internet via the mobile phone network. This means that data can be accessed while the device is still deployed. This also makes recovery of the units easier as time and place of a penguin making landfall are known.

We deployed one Ornitela device on a non-breeding male weighing 5700 g on 25 October 2019. After deployment the bird remained in and around the breeding area for seven days only leaving for a very brief, half hour-long trip to the sea in the evening of 1 November 2019. On 3 November, the bird finally undertook its first foraging trip, leaving the colony at 0720 hrs. It reached its furthest position 22 km northeast of Aramoana around midday and returned to the colony at 1950 hrs on the same day. The device also recorded dive depths at 1 second intervals although there are some data gaps as the device stopped sensor readings when the battery levels dropped below 25% of full charge. From the available dive data, it is apparent that the bird engaged primarily in benthic foraging with pelagic dives only occurring in the late morning of 9 November when the penguin travelled to its previously visited foraging areas in the northeast of Aramoana.



Foraging tracks of non-breeding male 982 000365942016 recorded between 4 and 9 November 2019. Note: Dive data was truncated by when battery level dropped below 25%.

Aramoana, male, bird id: 982 000365942048, Camera logger & AxyTrek, since 18 November 2019
Encountered at the nest around lunchtime of 18 November, the penguin was guarding two healthy, good sized and active chicks on its nest. The adult was very calm so that the deployment of both a camera logger and AxyTrek were quickly completed. The bird weighed 5400 g. The camera logger was programmed to start recording 3 hours after the bird entered the water.

The bird was back at the nest around 0600 hrs on 19 November and the camera logger was recovered as its battery charge only last for a single day. The AxyTrek remained on the bird and will be recovered on 22 November 2019.

The camera recorded almost exactly 2.5 hours of footage while the penguin was foraging. A first viewthrough of the footage indicates a high foraging success with the bird capturing fish frequently. The main species seem to be either opalfish (*Hemerocoetes monoptygius*) or sand fish (*Gonorynchus fosteri*), both species that do not require much capture and ingestion effort and presumably provide excellent food for small chicks. Throughout the recording the bird remained reasonably close to Aramoana as inferred from the coastline that often is visible. It foraged primarily over fine sand that featured what looks like sea lettuce and other algae that fish appear to be using to hide under. Of note was that the bird spent a considerable period foraging under a large school (100+ individuals) of dog fish.



Screen captures of the 2.5 hrs of video footage recorded on 19 November 2019. The benthic foraging habitat off Aramoana.



Capture of a sand fish.



The penguin ascending through a swarm of Munida gregaria.



Ascending through a school of dog fish.

Next steps

Beginning this week, we will start to track chick rearing penguins throughout the southern Catlins and potentially at Bobby's Head/Tavora; we will expand our activities to Stewart Island next week. We plan to deploy camera loggers in conjunction with GPS dive loggers. The results of the camera logger deployment demonstrated that the footage recorded provides valuable information about prey composition and foraging conditions for the penguins. Getting data from penguins tending chicks with diphtheritic stomatitis will allow us to assess whether diet differences are apparent when compared to birds that raise healthy chicks, like the ones at Aramoana.