Yellow-eyed penguin at-sea distribution along the New Zealand mainland 2018-2020

Update 1

Thomas Mattern, 09. January 2019

1st logger deployment

After a late start due to the slow process of obtaining an ethics approval, we deployed the first device – a GPS dive logger in combination with a camera logger on an adult Yellow-eyed penguin at Nugget Point on 13 December 2018. When we tried to recover the devices the next day, the same bird (according to what the transponder reader told us) was back on the nest minus any of the devices we attached the night before. The bird had gained some weight suggesting that it indeed had been out at sea that day. We fitted another GPS dive logger to salvage the situation.

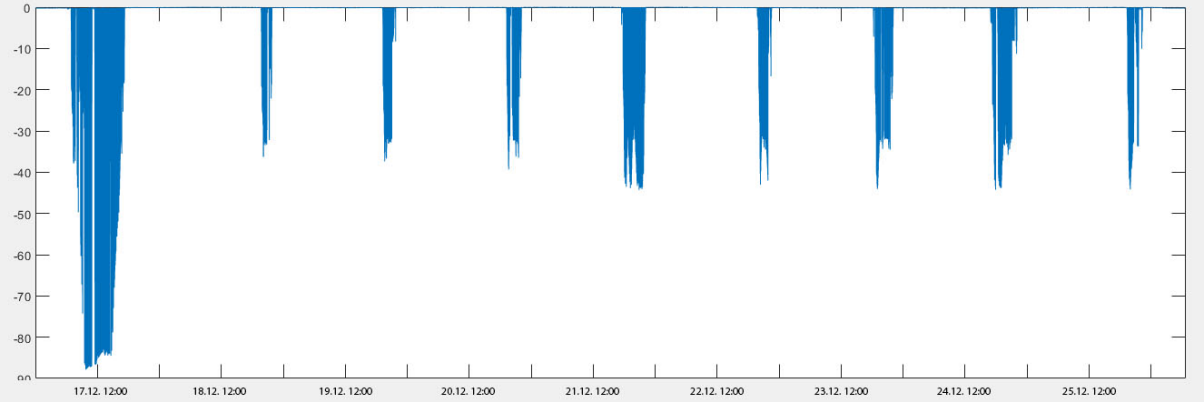
That device was recovered successfully four days later (18.12.) by Cheryl Pullar. However, once the data was downloaded it became clear that the bird had not left the nest during the entire time yielding only GPS positions at the nest. Since the chick seemed very thin it seemed as if the logger bird's mate had failed to return to the nest.

I should point out that during the first two weeks of December, the situation at sea must have been particularly bad for the penguins. According to observations made by the volunteer wardens at Nugget Point, far fewer birds returned every night starting on 6. December. The situation normalized again just before Christmas, but quite a few nests failed during this period.

Logger deployments 2,3 and 4

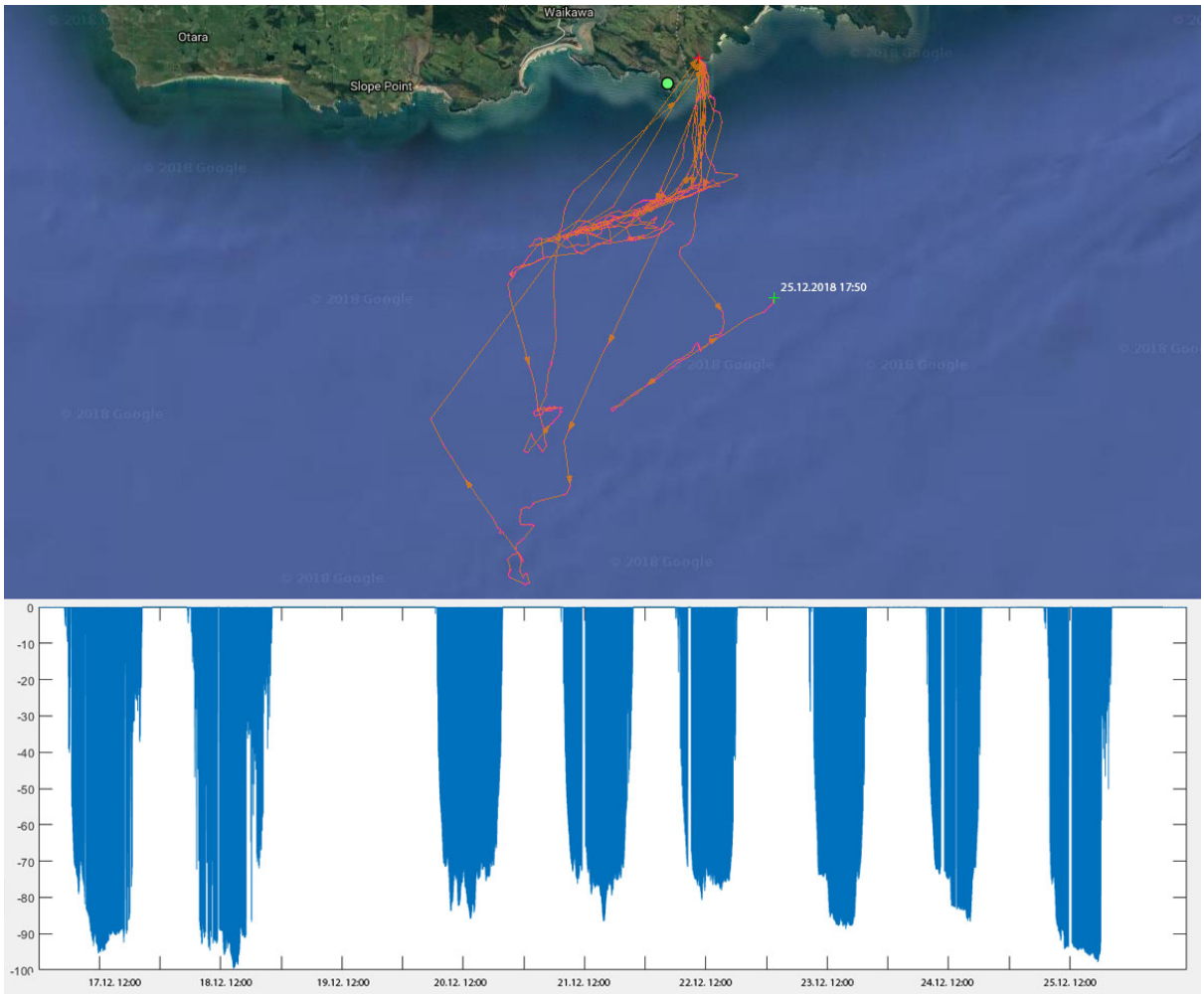
On 16 December, I travelled to Te Rere with Fergus Sutherland, where we managed to deploy GPS dive loggers on three birds attending the only remaining nests in the reserve. Fergus returned to Te Rere for maintenance work and device recovery on 25 December; I joined him the following day. On the night of the 25th, Fergus recovered two of the devices. In the early evening of the 26th we managed to recapture the third bird, but it had managed to preen off its device; the logger could not be found.

One of the recovered GPS loggers was destroyed because the bird managed to crack the device's epoxy casing drowning the electronics. No GPS data could be recovered but the dive logger was fine. From the dive data it becomes clear that with exception for the 17.12. when the bird performed a one-day trip and reached a maximum depth of 88 m, it only went out for short evening trips on the remaining days. That the bird can be on a rather leisurely foraging routine despite a presumed prey shortage is probably due to the pair having to raise only a single chick.



Dive profile of bird id 982000405532344, Te Rere, Catlins, 17.-25.12.2018

The other recovered device had full sets of GPS and dive data. The bird performed a total of eight foraging trips while fitted with the device; all trips were one-day trips. The bird foraged between 7 and 18 km offshore and on several trips clearly showed linear foraging which indicates that it foraged along furrows left by bottom trawl gear, presumably foraging for blue cod. Tracking data from the Otago Peninsula of the past 15 years suggests that this behaviour occurs predominantly in years of reduced prey availability (https://doi.org/10.1371/journal.pone.0084381).

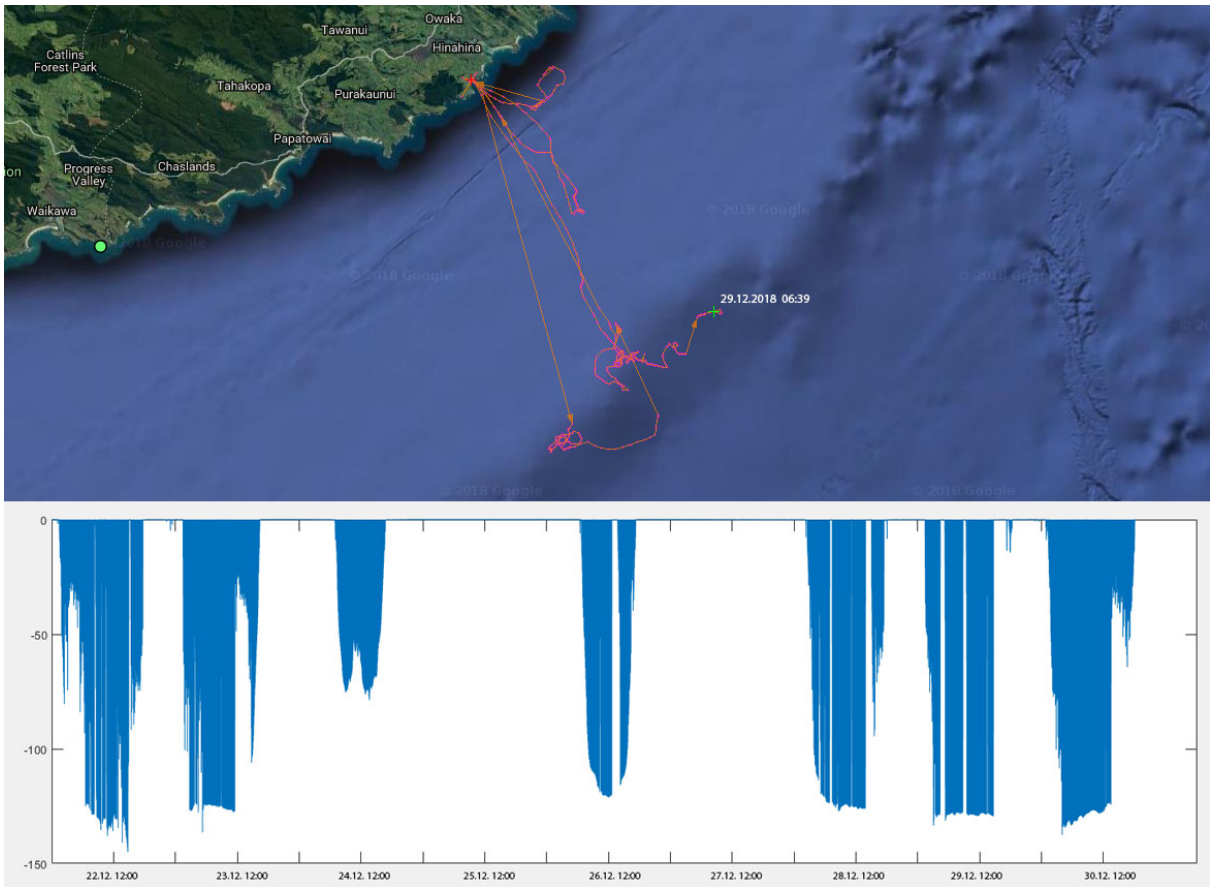


GPS tracks and dive profile of bird id 982000405533506, Te Rere, Catlins, 17.-25.12.2018

Logger deployments 5, 6 and 7

The next round of logger deployments occurred on 22 December 2018 at Nugget Point and Penguin Bay. Although we had hoped to deploy five birds, we only managed to find three breeding adults, one at Penguin Bay, and two at Nugget Point. While the PB bird could be captured at the nest for deployment around 7.30pm, both birds at Nugget Point only returned to their nests late at night and were fitted with devices between 11pm and midnight.

Recovery for the devices was scheduled from 27 December 2018 onwards. At Penguin Bay, the bird was recaptured, and the device recovered at the nest around 12.30pm on New Year's Eve. During the 10 days of deployment, the bird performed four foraging trips during which it stayed at sea for two days (22-23.12.), followed by two one-day trips (24.12. & 26.12.), and finally a three-days trip (28.-30.12.). During the long trips, the bird foraged over the shelf-edge some 30-40 km away from the coast foraging at or close to the seafloor at depths of 130-145 meters.



GPS tracks and dive profile of bird id 982000365999998, Penguin Bay, Catlins, 22.-31.12.2018

One of the penguins from Roaring bay, Nugget Point were encountered at the nest around midnight on 30 December 2018 but managed to slip away into the bush preventing a recapture and recovery of the device. Despite long hours of monitoring during the following days, the bird was only seen again January at the nest in the early hours of 4 January 2019 – without the device. Intensive searches of the surrounding bush the next day were fruitless. Another device lost.

The second logger bird has its nest on the other side of Nugget Point (Kaimataitai) could not be recaptured at all. Motion triggered trail camera footage showed that both penguins from the logger returned on 2 January 2019, one bird at 9.45pm, the other one at 12.30am. None of them were wearing a logger. We still made attempts to recover the logger bird until 5 January, but gave up as

no birds were observed landing before darkness and spot checks until 1.30am found no adult birds at the nest.

Poor recovery rates

The poor device recovery rates are attributable to the unusually unpredictable nest attendance patterns of penguins. This was particularly apparent at Nugget Point where penguins returned very late at night and even in the early morning hours eluding recapture for up to a week. This increased the chance of device loss as devices were merely taped to the feathers without using glue to prevent damage to the plumage. This unpredictability may be a result of unusual foraging conditions but could also be related to the Nugget Point penguin's exposure to human activity (e.g. people on the beach) at Nugget Point.

In two instances, birds managed to preen off the devices. The tenacity to remove the units depends on to bird's personality with bolder birds often more prone to removing devices. The low number of nests probably indicative of poor feeding conditions this season, may have favoured bold penguins resulting in increased device removals.

Next steps

In the second half of January we will resume our tracking work at Penguin Bay, Hinahina Cove, Papatowai and Te Rere. We will not resume attempts to track birds at Nugget Point at this stage. Besides GPS dive logger deployments, we will attempt another camera logger deployment, this time at Te Rere to investigate whether penguins still follow bottom trawl marks.