

the tawaki project

www.tawaki-project.org

YEAR 5
2018/19



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The Tawaki Project so far

Since 2014, the Tawaki Project has been studying the foraging behaviour, reproductive success and population developments of Fiordland penguins/tawaki across the species' breeding range. Starting in 2016, the project operated at three sites representing the penguins diverse foraging habitat: Jackson Head on the West Coast, Harrison Cove, Milford Sound/Piopiotahi in Fiordland, and Codfish Island/Whenua Hou in the Foveaux Strait.

The deployment of GPS dive loggers to record the penguins' at-sea movements painted a clear picture of a species with versatile foraging strategy allowing it to successfully breed in open ocean environments, as well as enclosed fjord systems and shallow coastal habitat to the South of New Zealand's South Island.

Penguins breeding deep within fjords appear to benefit from an ecosystem that seems to be unaffected by large-scale environmental perturbations such as El Niño ([see our 2015 report](#)). The short foraging ranges of tawaki from Whenua Hou suggest similar mechanisms. However, penguins from the West Coast seem to suffer from such occurrences where increased foraging effort goes along with reduced reproductive success.

This is surprising given that current population estimates put the exposed West Coast as core breeding area of the species. However, nest surveys conducted during the Tawaki Project indicate that penguin numbers [especially in Fiordland may represent underestimations](#).

Moreover, satellite tracking of the pre-moult dispersal of tawaki revealed that the [birds undertake remarkable journeys](#) over a relatively short span of time indicating instinctual links to the Sub-antarctic region.

Funding & Support

Field work during the breeding season was principally funded through the [Tawaki Project's Patreon campaign](#) with our top patrons being [Oliver Aughton](#), [Andrea Faris](#), [Joanna Lankester](#), [Gary Wayne](#), [Kean Maizels](#) and [Janis Russel](#).

[Birds New Zealand](#) provided funding to purchase the components required allowing us to establish an automatic wildlife monitoring system (aka "transponder gate") in Harrison Cove. Additional support from [Taronga Zoo Sydney](#) and [Wellington Zoo](#) made it possible to purchase a new batch of transponders to maintain and expand the marked population.

The [Antarctic Research Trust](#) covered the substantial costs for a follow-up satellite tracking study. This included the purchasing of 18 satellite transmitters, the associated data access fees as well as the cost of logistics for the deployment of the devices.

As in the previous years we worked hand-in-hand with the [West Coast Penguin Trust](#): Robin Long took over the team lead in Fiordland, Kerry-Jayne Wilson provided scientific feedback, and Inger Perkins helped us with access to donation money whenever needed.

In Milford Sound/Piopiotahi, [Southern Discoveries](#) once again accommodated our work in the utmost way: fully-catered cruises to Harrison Cove, boat transfers to the study site, use of their Harrison Cove facilities as our base of operation - simply the best field work conditions imaginable.

The Te Anau field office of the [Department of Conservation](#) let us stay in the Milford Sound house. [Sharon Trainor](#) and [Rory Hannan](#) of DOC Southland helped us to get to Whenua Hou even with Kakapo breeding in full swing.



Thomas Mattern on route to the tawaki breeding area on Whenua Hou, October 2018.



A female tawaki fitted with GPS dive logger attending its chick, Harrison Cove, September 2018.



“Marathon penguins” published

On 29 August 2018, the first major scientific research paper was [published in the Open Access Journal PLOS One](#). The paper reports on the results we obtained from the deployment of satellite transmitters on tawaki from Gorge River in November 2016.

We found that the penguin travelled significant distances of nearly 7,000 km over the course of 8-10 weeks; penguins targeted the Subantarctic Front, some 1,500 km South of the New Zealand mainland. This was highly unexpected given the limited time the penguins have between the end of the breeding season in December and the onset of the annual moult in February.

In the discussion of the paper, we draw the conclusion that such extreme foraging behaviour may be best understood on an instinctive level rather than an actual necessity. Oceanic productivity around the mainland reaches its peak during the tawaki pre-moult dispersal, so it seems unlikely that food limitation is the driving force of this behaviour.

We enlisted the help of [illustrator Giselle Clarkson](#) to translate our 8,700-words-long paper into a four-page comic to make it more accessible to the general public. The comic was published on social media and on Twitter alone reached close to 200,000 people.

The story was also picked up by [news outlets in New Zealand](#) and made the [headlines of newspapers and magazines around the globe](#).



Sites & Dates

Jackson Head

18 September - 20 October 2018

Initial nest searches occurred on 19 September and deployment of GPS dive logger commenced the same day; the last penguin was fitted with a device on 6 October. Last devices were recovered on 15 October.

27-28 February 2019

Both Jackson Head West and East were searched for tawaki that had completed the moult for satellite transmitter deployment. With the exception of a single female, no penguins were encountered; there was overall little sign of moulting (i.e. no feather piles).

Harrison Cove, Milford Sound / Piopiotahi

13 September - 16 October 2018

Initial nest checks were conducted on 14 September. The same day first GPS dive loggers were deployed. Final deployments occurred on 5 October with last devices recovered on 15 October.

22 February 2019

On a one-day visit five satellite transmitters were deployed on tawaki that had just completed the moult.

Codfish Island / Whenua Hou

28 September - 10 October 2018

During our 13-day stay on the island, GPS dive loggers were deployed between 28 September and 5 October. The final device recovery occurred on 2 November by the Yellow-eyed penguin survey team.

25 February 2019

During an 8-hour visit to the island, eight tawaki were fitted with satellite transmitters.

TAWAKI, MARATHON PENGUINS

ADAPTED BY GISELLE CLARKSON FROM THE PAPER PUBLISHED IN PLoS One
(DOI: 10.1371/journal.pone.0198688)

Tawaki are one of the world's rarest penguins and also one of the least studied.

They live here.
(AND ONLY HERE!)



THIS IS A TAWAKI

ALSO KNOWN AS A FIORDLAND CRESTED PENGUIN

BADASS 'BROWS

A BEAK YOU DON'T WANT TO MESS WITH

NESTS UNDER TREE ROOTS AND OVER-HANGING ROCKS IN COASTAL RAINFOREST

Every year, between their breeding and moulting seasons, tawaki leave their homes in the bush and spend over 2 months at sea eating.

We had no idea where they were going...until now!

Scientists from the Tawaki Project put satellite tracking devices on tawaki and discovered something extraordinary.



Tawaki, like all penguins, go through what's called a catastrophic moult. This means that instead of losing and regrowing a few feathers at a time like most birds they do it all at once over three weeks.

They can't swim (and can't get food) while they moult, so they need to have lots and lots of body fat stored to make it through.



As soon as breeding season is over, the adult tawaki go out to sea for 8 to 10 weeks gorging themselves on as many fish as possible.

WHERE DO THEY GO TO FIND THEIR FOOD?

Well, we thought they would feed here. There's plenty to eat and it's close to home.



But instead they go here...



They're covering distances between 4000 - 7000km to get their meal...and we're not entirely sure why.

What's particularly weird and interesting is that tawaki that...

- leave later
 - have two weeks less time to feed
 - travel the furthest (to the sub-antarctic front)
- ...are the ones who successfully raise chicks to fledging.

But tawaki that **did not breed** or failed to breed swam shorter distances to the sub-tropical front.

That's still a really long way though!



FISH TO FLUFF CONVERSION DEVICE



Raising chicks is **exhausting**, so it's amazing they have the energy to travel such huge distances.

Because tawaki need to put on so much weight to moult, you'd think they'd conserve energy by not travelling so far.

But they do the exact opposite! They travel the greatest distances of all penguin species during that stage of their lives! Bizarre.

BUT... WHY?

We **think** this behaviour might be tawaki instinct - part of their DNA telling them to feed where their sub-antarctic ancestors went.



THE SWIM-A-REALY-LONG-WAY GENE?

I HAVE AN UNCONTROLLABLE URGE TO GO THIS WAY...



If we're right about this, it means the theory that tawaki once lived on the North Island and were driven south by humans is unlikely.



Living here would put the places tawaki want to go a long way out of their reach.

SO WHAT DO WE KNOW?

- Tawaki are swimming further than any other penguin does at this time in their life cycle.
- They wouldn't be able to do this unless they were ending their breeding season in excellent shape.
- This might be their instinct because of how they evolved.
- Tawaki are even more incredible than we previously thought!



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GPS/TDR deployments

To monitor the penguins' foraging movements and diving behaviour, we used a combination of GPS loggers and Time Depth Recorders/accelerometers. Devices were attached with cloth tape to feathers on the birds' lower backs (see image on page 5).

Jackson Head

On the West Coast, **11 chick-rearing females (mean weight: 2.8 ± 0.2 kg) were fitted with GPS/TDR loggers**. Birds fitted with devices were recaptured on the beach as they returned from the sea on average **7 days (range 5-10 days) after deployment**. Two birds could not be recaptured despite extended surveillance; it is likely devices fell off.

Harrison Cove

In Milford Sound/Piopiotahi, **9 GPS devices were attached female tawaki (2.7 ± 0.4 kg) attending nests**. **Loggers stayed on the birds for 4-10 days (mean: 8.4 days)**. Two devices could not be recovered as the penguins managed to remove units before they were recaptured. A third bird lost its device but the unit was later found lying on the forest floor.



Whenua Hou

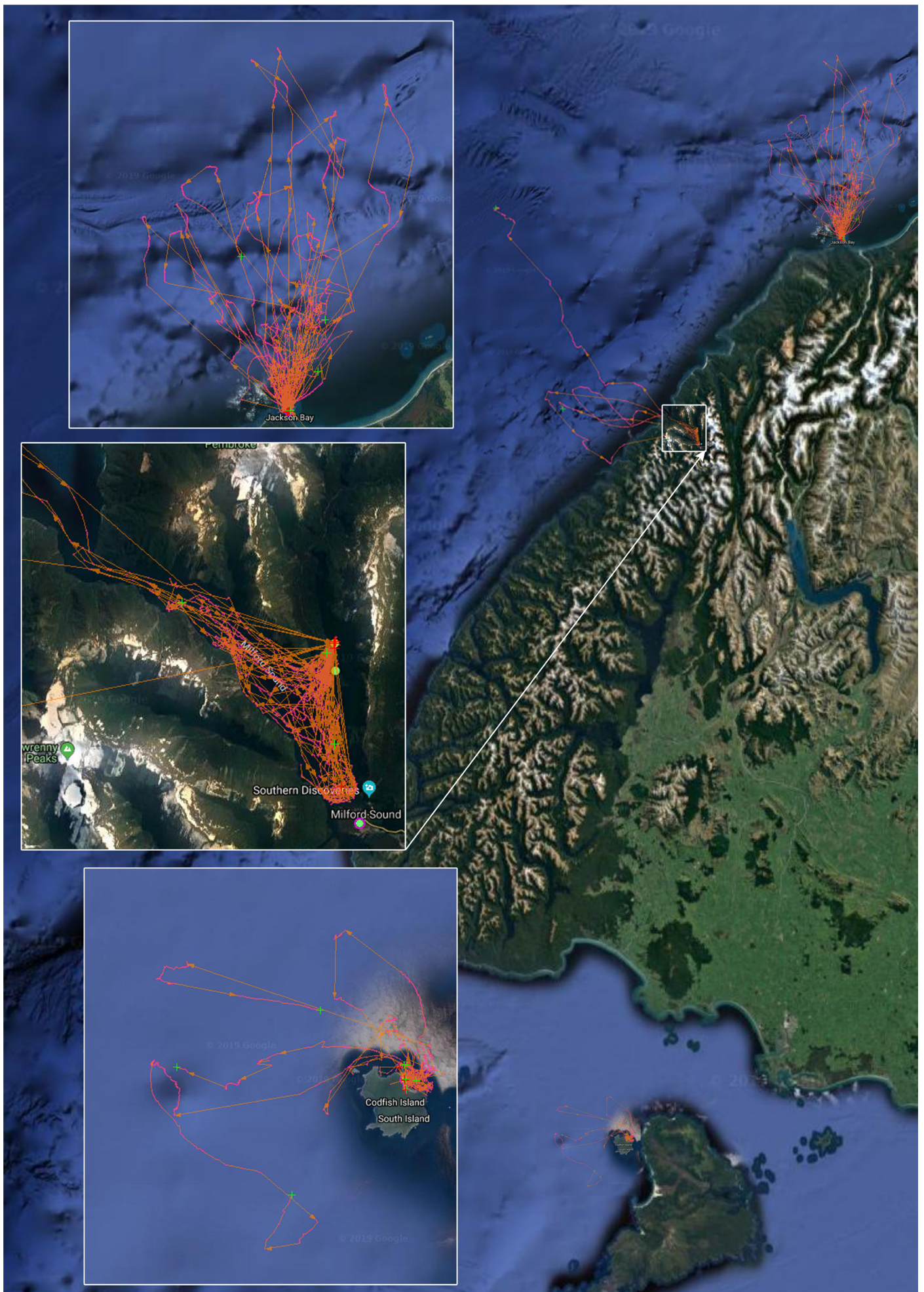
13 female tawaki (2.5 ± 0.1 kg) were fitted with GPS dive loggers for an average 3.6 days (range: 2-28 days). One bird could not be recaptured. The device of another bird was recovered on 2 November 2019, 28 days after deployment; the TDR was still recording data.

Preliminary results

At **Jackson Head, 36 foraging trips** were recorded on **9 different birds**. Penguins foraged within **60 km from the colony** although the majority of positions were recorded **within 30 km**. In comparison with previous years, foraging ranges were shorter. **12 trips were overnight trips** of 2-3 days length. Consistent with previous years, the penguins foraged north of Jackson Head. The **penguins reached depths of up to 96 m** although the **majority of dives went no deeper than 40 m**.

At **Harrison Cove, 21 foraging trips** performed by **7 birds** were recorded. Although most birds **foraged within the fjord during the guard stage** (mean range: 4 km), two post-guard penguins left the fjord. One female travelled **more than 100 km away from the coast** and only returned after 4 days at sea. The other penguin foraged about 30 km due west of the fjord entrance on two consecutive overnight trips. **Dive depths in the fjord seldom exceeded 30 m (max: 84 m)**.

Of **13 penguins** from **Whenua Hou** fitted with GPS dive loggers, only 12 could be recovered. One bird eluded recapture within the brief field work stint, but could be recovered by the Yellow-eyed penguin survey team in early November. As in previous years, penguins either foraged very close inshore presumably utilizing the kelp forest along the northern coastlines of the island. **Some individuals travelled 20-30 km away from the island** and foraged closer to the shelf edge to the West of the island. Dive depths were dictated by the bathymetry. Penguins that foraged **close to the island remained within the top 20 m of the water column**. Birds that ventured further away dived to depths of 30 and 50 m depths which brought them close to the sea floor. However, dive profiles suggest pelagic foraging.



Tawaki foraging tracks at Jackson Head, Milford Sound / Piopiotahi, and Whenua Hou in September and October 2018



GLS logger recoveries

At the end of the 2017/18 season, we fitted 48 penguins with tiny GLS loggers to track their dispersal when not breeding. During the 2018 field season, we managed to recover 29 of these devices (60%). We hope to recover further devices in the coming field seasons; the battery life of the devices is estimated to be around 2-3 years so that these recoveries will yield valuable data.

PIT tagging, blood & feather sampling

Jackson Head

Eight penguins were marked with subcutaneous transponders ("microchips"). Seven of these were marked during the breeding season when handled for logger attachment. The eighth bird was marked when it was fitted with a satellite transmitter in February 2019. **Feather and blood samples were obtained from 22 and 16 birds, respectively.**

Harrison Cove

In Milford Sound/Piopiotahi, **25 birds were microchipped** between September 2018 and February 2019. **Feathers were collected from 15 birds, 13 penguins were blood sampled.**

Whenua Hou

On Whenua Hou, **13 birds were marked with PIT tags** during deployments of GPS loggers and satellite transmitters. **We collected 17 feather and 16 blood samples.**

Oamaru Blue Penguin Colony

Two birds that underwent moult at the Oamaru Blue Penguin Colony were marked with transponders. Both birds were also fitted with satellite transmitters (see page 12).

Installation of transponder gate

Harrison Cove

After five field seasons, many of the penguins at the Tawaki Project's study sites are marked with subcutaneous transponders providing us with a unique opportunity to deploy automated monitoring systems that are already being used in other countries to monitor difficult to survey penguin populations.

With support from the [Birds NZ Research Fund](#), we installed a transponder gate in Harrison Cove, Milford Sound/Piopiotahi. The gate is located at the main penguin access path to the colony. When walking through this gate, marked penguins will be automatically scanned for transponders, their movement direction and timestamp are recorded by an autonomous data logger.

The gate is powered by a solar panel and will operate continuously for the coming weeks, months and hopefully years providing us with detailed information about the number of penguins – and their identities – that commute between colony and ocean daily.

Milford Sound with its extreme weather events and limited sunlight makes this pilot project a stress test. If successful, similar systems can be deployed elsewhere to gain a better understanding of tawaki population dynamics.



Table 1a. *Tawaki tagged with subcutaneous transponders at Jackson Head & Harrison Cove*

Tag ID	Date	Location	Sex	Age	Weight	Tagger
982 0000021 19393	27.09.2017	Harrison Cove	F	adult	2650	Mattern
982 0003659 41901	22.09.2018	Harrison Cove	M	adult	-	Mattern
982 0004055 32335	05.10.2018	Harrison Cove	M	adult	3000	Mattern
982 0004055 32718	05.10.2018	Harrison Cove	M	adult	2600	Mattern
982 0000021 17718	10.10.2018	Harrison Cove	F	adult	2600	White
982 0003659 41944	10.10.2018	Harrison Cove	F	adult	3300	White
982 0000021 19418	10.10.2018	Harrison Cove	F	adult	2800	White
982 0003659 41897	10.10.2018	Harrison Cove	F	adult	2600	White
982 0003659 99908	10.10.2018	Harrison Cove	F	adult	3100	White
982 0004021 00915	10.10.2018	Harrison Cove	F	adult	-	White
982 0004021 00859	10.10.2018	Harrison Cove	F	adult	3250	White
982 0000021 17213	10.10.2018	Harrison Cove	F	adult	3450	White
982 0000021 17214	10.10.2018	Harrison Cove	F	adult	2850	White
982 0000021 17200	10.10.2018	Harrison Cove	F	adult	2850	White
982 0003659 41767	10.10.2018	Harrison Cove	F	adult	2900	White
982 0003659 41901	02.11.2018	Harrison Cove	M	adult	-	Mattern
982 0004055 33072	02.11.2018	Harrison Cove	M	adult	2800	Mattern
982 0004055 32559	02.11.2018	Harrison Cove	M	adult	3400	Mattern
982 0004055 32483	02.11.2018	Harrison Cove	M	adult	2900	Mattern
982 0004055 32321	05.11.2018	Harrison Cove	F	adult	2600	Mattern
982 0002102 15478	13.11.2018	Harrison Cove	F	adult	-	Mattern
982 0002102 14761	22.02.2019	Harrison Cove	M	adult	3600	Mattern
982 0002102 14844	22.02.2019	Harrison Cove	F	adult	3100	Mattern
982 0002102 15793	22.02.2019	Harrison Cove	M	adult	3600	Mattern
982 0004055 32821	19.09.2018	Jackson Head	F	adult	3100	Mattern
982 0004055 32927	19.09.2018	Jackson Head	F	adult	2800	Mattern
982 0004055 33065	20.09.2018	Jackson Head	M	adult	-	Mattern
982 0004055 32719	20.09.2018	Jackson Head	F	adult	2750	Mattern
982 0000636 45213	10.10.2018	Jackson Head	F	adult	3250	Young
982 0000636 44166	10.10.2018	Jackson Head	F	adult	3100	Young
982 0000636 44832	10.10.2018	Jackson Head	F	adult	2500	Young
982 0002102 15961	27.02.2019	Jackson Head	F	adult	2400	Mattern



Satellite transmitter deployments

In the 2017/18 season, we attempted to track the winter dispersal of tawaki from our main study sites. The study was intended as a follow up of our successful pre-moult study (see pages 6 & 7) but was compromised by the manufacturer of the satellite transmitters shipping the wrong units unbeknownst to us (see last year's report).

With continued support from the [Antarctic Research Trust](#) we initiated a repeat of the study, this time using satellite transmitters from a different manufacturer which proved to be a very successful decision.

Between 22 and 28 February 2019, 14 tawaki from the project's main study sites were equipped with Wildlife Computers SPOT satellite transmitters. Although initially planned to deploy equal numbers of satellite tags at the Tawaki Project's three main study sites, the 2019 moult commenced 2-3 weeks earlier than last year. Only five penguins could be satellite tagged in Milford Sound. Access to Whenua Hou/Codfish Island was limited by a busy Kakapo breeding season so that we only were permitted to land on the island for a few hours on 25 February 2019. Nevertheless, we managed to fit eight penguins with transmitters.



A female tawaki equipped with a satellite transmitter, Jackson Head, 27 February 2019. The bird is represented by the blue track in the graph on page 13.

At Jackson Head, only a single bird could be captured and fitted with a transmitter despite searching tawaki for two days on 27 and 28 February at Jackson Head.

To compensate for the lack of birds particularly at Jackson Head and after consultation with DOC, we reached out to rehabilitation facilities along the Otago coast to fit remaining transmitters to tawaki that were taken into care because birds started to moult in public places. **In early March, two tawaki at the Oamaru Blue Penguin Colony were fitted with satellite transmitters.**

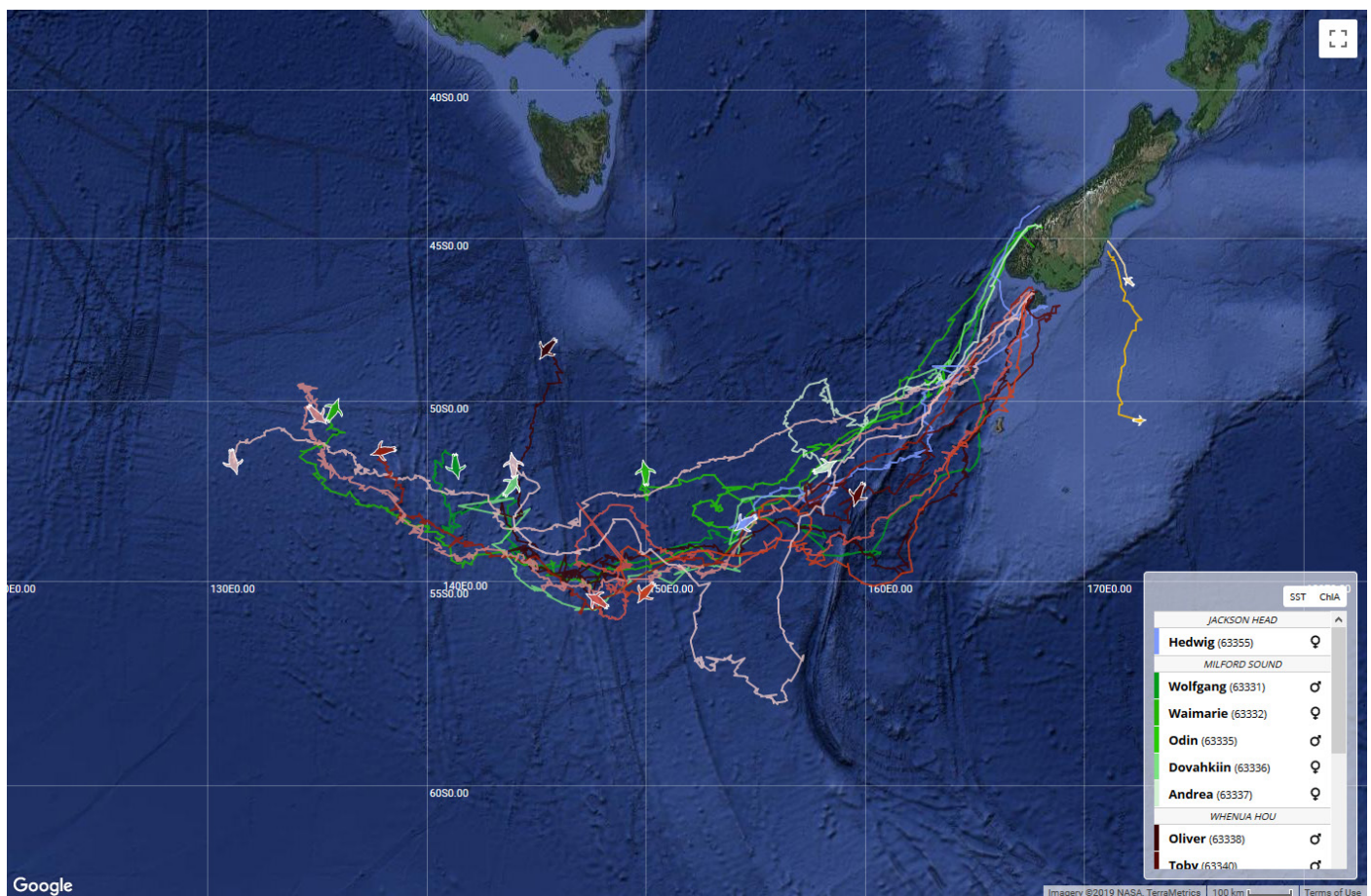
Preliminary Results

Tawaki from the western colonies all showed highly consistent travel trajectories towards the Southwest (i.e. matching the patterns observed in initial GLS data representing the previous season) generally following the Macquarie Ridge, an underwater mountain range crossing the Subantarctic region south of New Zealand. Most birds travelled towards the Subantarctic and Polar Fronts and have since exhibited more westerly movements (see graph page 13).

Both penguins released in Oamaru ceased transmitting within the first three weeks. Trajectories of both penguins were notably different from those observed on "wild" penguins. They moved in a south-eastern direction towards the central Subantarctic waters, a region known for its low oceanic productivity. The fact that both rehabilitated birds stopped transmitting not long after release warrants an investigation into the survival probabilities of tawaki moulting along Otago and Canterbury coasts as well as after having received rehabilitation treatments.

Table 1b. Tawaki tagged with subcutaneous transponders on Whenua Hou & Oamaru Blue Penguin Colony

Tag ID	Date	Location	Sex	Age	Weight	Tagger
982 0002102 14329	28.09.2018	Whenua Hou	M	adult	3650	Mattern
982 0003659 99876	29.09.2018	Whenua Hou	F	adult	-	Mattern
982 0002102 14431	29.09.2018	Whenua Hou	F	adult	2400	Mattern
982 0002102 15492	04.10.2018	Whenua Hou	F	adult	-	Mattern
982 0002102 14911	04.10.2018	Whenua Hou	F	adult	2850	Mattern
982 0002102 15223	04.10.2018	Whenua Hou	F	adult	2400	Mattern
982 0002102 14236	05.10.2018	Whenua Hou	F	adult	2450	Mattern
982 0002102 15426	25.02.2019	Whenua Hou	F	adult	2650	Ellenberg
982 0002102 14143	25.02.2019	Whenua Hou	M	adult	3100	Mattern
982 0004055 32832	25.02.2019	Whenua Hou	F	adult	2650	Mattern
982 0002102 14751	25.02.2019	Whenua Hou	M	adult	3600	Ellenberg
982 0004055 34035	25.02.2019	Whenua Hou	M	adult	3500	Ellenberg
982 0004055 32496	25.02.2019	Whenua Hou	M	adult	3300	Ellenberg
982 0003659 99688	01.03.2019	Oamaru Blue Penguin Colony	F	adult	2300	Mattern
982 0002102 15212	06.03.2019	Oamaru Blue Penguin Colony	M	adult	2900	Agnew



Satellite tracks of tawaki fitted with transmitters as of 3 May 2019. Screenshot of the interactive map published online for sponsors. Track colours indicate penguin origins: Jackson Head (blue), Milford Sound/Piopirotahi (green), Codfish Island/Whenua Hou (red) and the Oamaru Blue Penguin Colony (yellow).



Outlook 2019-2024

With the completion of the fifth consecutive field season, the first phase of the Tawaki Project has been completed. The data obtained since 2014 suggest that Fiordland may be the most important habitat for tawaki as fjord ecosystems seem to provide very stable foraging habitat for the species.

In this light, population numbers reported for Fiordland seem surprisingly low. On one hand, nest surveys suggest that true numbers of tawaki in Fiordland may be substantially underestimated. On the other hand, observations made in Harrison Cove also may not be representative for Fiordland in general.

We need a better understanding how the penguins utilize fjords during the breeding season. Are short foraging ranges a choice or a necessity? Is foraging inside the fjord always more beneficial than pelagic foraging outside?

In phase 2 of the Tawaki Project we will try to gain a better understanding how the species utilizes fjords. We will compare foraging behaviour of penguins breeding deep within fjords with that of birds nesting close to fjord entrances. We plan to conduct these studies in different fjords to examine how local conditions affect foraging behaviour.

Over the course of the next years, we furthermore plan comprehensive surveys of all fjords to establish where tawaki colonies are located, and to estimate their approximate size. We will continue our mark-recapture programme in Harrison Cove to reliably establish demographic parameters and assess tawaki population developments.

Furthermore we plan to examine winter dispersal and survival probabilities of penguins moulting and rehabilitated on the South Island's east-coast.

Sites

GPS tracking work is proposed for three sites:

- **Milford Sound/Piopiotahi**

Four years of tracking data from Harrison Cove have provided us with a good baseline of tawaki foraging behaviour during breeding. We plan to add the penguin colony at Moraine to our tracking work. Birds from Moraine have direct access to the open ocean so that we can assess their foraging preferences (inside or outside the fjord) and how environmental conditions may trigger this.

- **Doubtful Sound/Patea**

With 40 km, this is one of the longest fjords with tawaki breeding on islands at the very entrance as well as all the way at the end of the fjord. These extremes provide an ideal set-up to examine how the species utilizes fjord ecosystems.

- **Long Sound**

The fjord is one of the southernmost and would allow us to cover the full range of Fiordland. However, logistics may be to be challenging.

Satellite tracking should take place in February/March 2020. We propose to track three groups of tawaki:

- **Tawaki moulting unassisted along the East coast**
- **Tawaki moulting in rehabilitation**
- **Tawaki from one of the Fiordland sites (control group)**

Population surveys will be conducted over the course of several years; our aim is to cover the entire internal fjord coastline to establish the breeding distribution and estimate population size of tawaki in Fiordland.





Acknowledgments

We could not realize the Tawaki Project without tremendous help from a great number of people and organizations.

The success of the field work was based on the dedication of our co-investigators and field helpers. **Dave Houston (DOC)** had to endure **Thomas Mattern** (NZ Penguin Research & Conservation) for 13 days on Whenua Hou / Codfish Island. At the same time in Milford Sound / Piopiotahi, **Robin Long** (West Coast Penguin Trust) and **Jeff White** (Marshall University, USA) took care of tawaki tracking business. **Junishi Sugishita** (Dunedin City Council) and **Fatima Jorge** (University of Otago) finished the job. At Jackson Head, **Mel Young** (University of Otago) and **Julia Reid** (DOC Otago) had the questionable pleasure of hiking across treacherous rocky coastlines to deploy and recover GPS loggers. Robin, Jeff helped by **Ursula Ellenberg** and **Hannah Mattern** took over the Jackson Head site for a few days in October.

By now, our Milford Sound team has been well and truly adopted by the staff of the Southern Discoveries Underwater Observatory. **Andrea Faris and her team** got their feet wet to help us with some of our field work.

The 2019 tawaki moult saw a return of **Klemens Pütz** (Antarctic Research Trust) to the New Zealand rain forest. Together with Thomas he took he ensured that tawaki from Milford Sound and Jackson Head received their precious satellite packages. The two then teamed up with Mel and Ursula for a day of tag deployments on Whenua Hou.

Philippa Agnew, Research manager of the Oamaru Blue Penguin Colony, helped us to put satellite transmitters on the two birds that moulted in their rehabilitation centre.

Ingrid Hutzler and the **scientific committee from Birds New Zealand** made it possible for us to establish New Zealand's first transponder gate in the "wild".

A huge shout-out to the fantastic **Giselle Clarkson** (www.giselledraws.com) who helped get word out about the amazing tawaki migrations with her hilarious comic adaptation of our dry, scientific paper.

Our [supporters on Patreon](https://www.patreon.com/TawakiProject) covered the bulk of this year's field work expenses. We could not have done it without you! We should not forget the people who donated through our website (or purchased Tawaki Project t-shirts (<https://shop.spreadshirt.com.au/tawakiproject/>)).

Tawaki from Jackson Head, Harrison Cove, and Whenua Hou... your collaboration (even if it was often involuntarily) has helped us to learn so much about your fascinating life-style and gave us many pointers what we humans can do better to ensure that you remain on top of your game and one of the coolest penguin species!



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