Foraging distribution and behaviour of flesh-footed shearwaters (*Puffinus carneipes*) breeding on Lady Alice Island – January 2018.

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Foraging distribution and behaviour of flesh-footed shearwaters (*Puffinus carneipes*) breeding on Lady Alice Island – January 2018.

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Executive Summary

The flesh-footed shearwater breeds on islands around New Zealand and is currently in decline primarily due to fisheries by-catch. Understanding the at-sea distribution of this species is important for putting mitigation measures in place. This report covers the final part of the objective to describe the at-sea distribution of flesh-footed shearwaters breeding at Northland breeding sites carried out under Conservation Services Programme project POP2015-02. A total of 24 flesh-footed shearwaters were fitted with GPS and GLS during incubation stage in January 2018 and this yielded 13 individual tracks. Foraging trips were on average 14.7 days long and an average of 4395km was travelled. Tracks varied between individuals and some foraging areas overlapped with those recorded during chick-rearing but overall a largely different foraging range was observed. Hotspots were on the west coast of the North Island between the Kaipara and Manukau Harbours and south to the Taranaki Bight. Foraging occurred predominantly during daylight with most of the night being spent resting on the water. The difference in foraging distribution between the two breeding stages may be explained by a dual-foraging strategy. Longer foraging trips were perhaps as a result of the La Niña event experienced this season and future tracking may yield a different result.

1. Introduction

Flesh-footed shearwaters (*Puffinus carneipes*) breed on islands off the coast of New Zealand and Australia and on St Paul Island in the Indian Ocean. Populations are believed to be in decline both in New Zealand and Australia (Lavers 2015; Jamieson &Waugh 2015). Under the New Zealand threat classification, the decline of Flesh-footed shearwaters has been recognised and as such the species is now ranked as "Nationally Vulnerable" (Robertson *et al.* 2017).

The decline of flesh-footed shearwaters has been attributed primarily to bycatch in commercial and recreational fisheries. Observers on commercial fishing boats in New Zealand and Australia have indicated that flesh-footed shearwaters were one of the most commonly killed seabirds in longline and trawl fisheries (Abraham & Thompson 2011; Baker & Wise 2005). In New Zealand, it is estimated that between 1,079 and 1,769 flesh-footed shearwaters are killed annually by commercial fishermen (Richard *et al.* 2011). Looking at the causes of seabird mortality in the Bay of Plenty, Tennyson *et al.* (2012) found that all fifteen necropsied flesh-footed shearwaters had been killed in fishing-related activities. Most of these deaths were attributed to physical trauma such as broken wings, crushed skulls and stab wounds, while two of the birds contained hooks used by recreational fishermen.

In order to reduce fisheries-related mortality of flesh-footed shearwaters it is important to know the foraging distribution of the species. More information is needed to assess fine-scale movement and foraging behaviour strategies during the breeding season to understand where mitigation strategies should be targeted. Foraging distributions and strategies can be highly variable between colonies of the same species, between individuals within the same colony and within individuals depending on breeding stage (Ainley *et al.* 2004; Bearhop *et al.* 2006; Ochi *et al.* 2009).

Tracking of flesh-footed shearwaters during the incubation period has occurred on Titi Island and Ohinau Island and has been overall successful (Waugh *et al.* 2014). Tracking of birds from the Lady Alice colony was carried out as part of the same study in December 2012 but only one track was recovered from 16 devices deployed. The tracking last season during check-rearing highlighted that the Lady Alice birds were utilising different foraging areas compared to other colonies, preferring short trips north of Lady Alice mainly staying on the East Coast with some birds feeding off 90 Mile beach on the West Coast.

This research was carried out as part of the Flesh-footed Shearwater: Various Locations Population Project (POP2015-02) funded through the Department of Conservation (DOC) and its Conservation Services Programme. The key objective we were funded to complete was:

> To describe the at-sea distribution of flesh-footed shearwater breeding at Northland breeding sites.

This objective was partially completed in 2017 when we tracked birds from the same colony on Lady Alice Island during early chick-rearing (Kirk *et al.* 2017). This tracking was highly successful and yielded a total of 89 tracks. The tracking of flesh-footed shearwaters during incubation reported on here is the final part to fulfilling this objective.

2. Methods

2.1 Study Site and Dates

Lady Alice Island / Mauimua (Hen and Chickens Group, 35.89°S, 174.72°E) is a 155 ha Nature Reserve located 40km southeast of Whangarei (Figure 1). We visited Lady Alice Island between 6 January 2018 and 2 February 2018. We were conducting a study on the breeding success of flesh-footed shearwaters concurrently at the same colony.

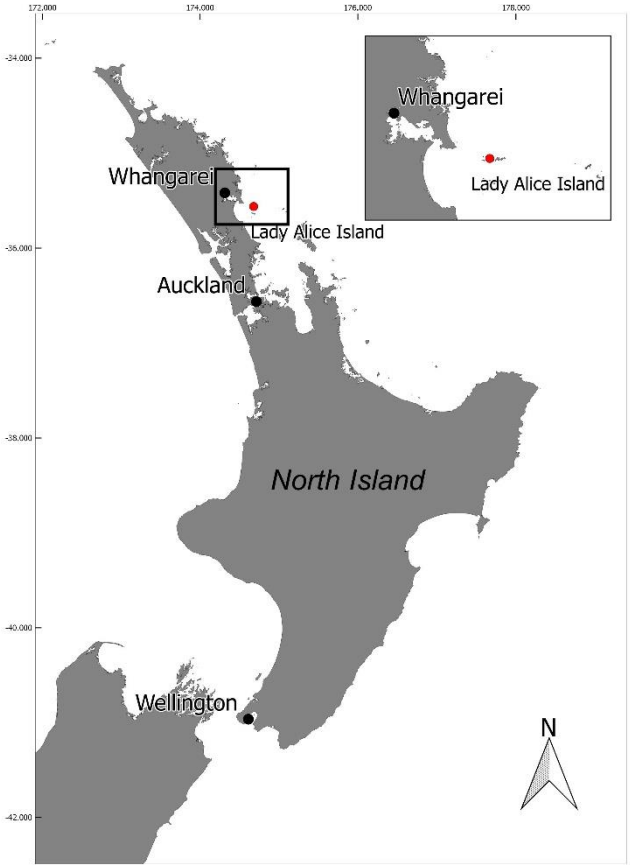

Figure 1. Location of Lady Alice Island.

2.2 Tracking methodology

Previous studies have encountered problems with attaching GPS loggers to incubating birds while still in the burrow (Waugh *et al.* 2014). If the bird does not leave the burrow within a night or two then the battery often becomes depleted and few or no tracks are obtained once the bird has departed the burrow. Thus to maximise the battery life of loggers we opted to utilise a different method of catching birds for deploying loggers. All study burrow were checked during the daytime when we first arrived on the island and all flesh-footed shearwaters found to be incubating an egg were marked on the head with correction fluid. Logger attachment then took place at night time when birds were departing the island. We focussed our effort primarily on an area known as the "take off tree". In this spot birds "funnel" down from burrows higher up into a small area where there is a worn track down to the coast where they leave the island (M. Bell, P. Crowe pers. comm.). Any birds seen with correction fluid on their head were caught, band number checked and placed in

a bird bag. That birds' corresponding burrow was then checked to ensure that a changeover had occurred and the birds' partner was now incubating. This meant we were not attaching a device to a bird that was potentially abandoning its nest and increased the chances of catching the bird again to retrieve the logger.

If the partner of the caught bird was not found in the burrow then the bird was released at the spot where it was caught. If the partner was present, then the marked bird was weighed and a GPS and saltwater immersion logger were attached. We used the GiPSy-5 GPS dataloggers (Technosmart s.r.l. www.technosmart.eu) which were programmed to record one fix every 5 minutes. Loggers were sealed in heat-shrink plastic tubing and attached to feathers on the birds back using waterproof Tesa tape® and superglue. GPS loggers weighed 17g (including heat shrink and tape). On average this was 2.7% (range 2.2% - 3.1%) of the birds' body mass. All but one bird were at or below the 3% of body mass threshold suggested by Phillips *et al.* (2003) for device attachment to Procellariiform birds. When this individual returned it had increased its body mass by 25% so did not appear to be adversely affected by being marginally over the threshold.

The saltwater-immersion loggers used were Intigeo-C330 (Migrate Technology Ltd www.migratetech.co.uk) which recorded saltwater immersion every 30 seconds and then binned this data every five minutes to give a count of the number of 30 second periods that were "wet" (conductivity measured over 63, called the "wet count"). For example, if the bird stayed on the water for the entire five minutes, the wet count was 10. If the logger was wet for only 30 seconds the recorded wet count was one. The saltwater immersion loggers were affixed to the birds' metal leg band using two small cable ties. Deployment of GPS logger and saltwater immersion device took no more than 10 minutes of handling time.

Retrieving loggers was straightforward as burrows were being checked every 4-5 days as part of the concurrent demographic study of flesh-footed shearwaters (Crowe 2018). Care was taken to not disturb the burrow too often and where possible the burrow was checked using a burrowscope to check the incubating birds head for correction fluid. Some searching for tracked birds on the surface occurred, mainly in the two hours after dark when birds were arriving on the island and the two hours before dawn exodus. This was primarily aimed at getting tracked birds whose burrows had failed but may still be returning to the island and spending time on the surface rather than in a burrow.

2.3 Data analysis

Data was downloaded from both devices every time loggers were retrieved from a bird. In a few cases the GPS loggers failed or were not retrieved and these are noted in the table in Appendix 7.2. GPS points that were clearly outliers as a result of a poor satellite fix were removed. Points that were over land were clipped out. Data recorded by loggers pre-deployment and post-removal were also removed.

Each GPS location was then paired with the corresponding saltwater immersion value by using the time-date stamp on each device. The same classification method as outlined in Kirk *et al.* (2017) was used to identify locations where one of three types of behaviour (flight, forage and rest) was occurring. Flight was classified as positions with a "wet count" of less than two (mostly dry), resting positions had a "wet count" of more than nine (mostly wet) and foraging behaviour was classified as positions with an intermediate "wet count" between two and nine. This resulted in a GPS track with a fix every five minutes classified as flight, forage or rest. For situations where we did not recover the GPS, the saltwater immersion data was still categorised into a behaviour type and used in the

analysis. We used Microsoft Excel for data processing and analysis and QGIS (version 2.18.13) for plotting of maps.

3. Results

During the 28 day trip to Lady Alice Island we deployed loggers on 24 birds. These were all deployed within the first week of being on the island. One bird was placed back in its burrow and hadn't left three days later so the logger was removed. Three birds with loggers did not return during our time on the island. Of the 20 remaining birds, 13 birds returned with their loggers still attached. Nine of these had complete tracks while four loggers failed part way through the trip and only yielded partial tracks. A summary of all deployments can be seen in Appendix 7.2.

Each tracked bird was weighed before and after deployment and gained on average 74g (12%, ±71g SD, *n* = 20) of body mass. The breeding success of all tracked burrows was monitored and compared to a set of control burrows that had no tracking of birds. Tracked burrow birds had a much lower breeding success (13%, *n* = 24) than the control burrows (52%, *n* = 138) indicating that our tracking had a significant negative effect on flesh-footed shearwater breeding.

3.1 Spatial distribution

The majority of flesh-footed shearwaters tracked (9 of 13) during incubation flew north-west around Cape Reinga and foraged off the West Coast of the North Island in the Tasman Sea (Figure 2). Most of the foraging occurred inshore within 50km of the coastline. Another bird flew around Cape Reinga but then straight down to the South Island and foraged off the West Coast between Westport and Hokitika. The remaining three birds stayed off the Eastern side of the North Island. One only did a day trip to forage approximately 100km North of Lady Alice Island. Another one flew down past East Cape to off the coast from Castle Point while the last bird flew out to the far eastern edge of the Chatham Rise.

The average trip length for all tracked birds that returned was 14.7 days (± 4.5 days, *n* = 20). The shortest trip duration was 10 days (excluding the bird that left for only one day). The longest trip was 23 days, however, some birds were gone for longer than this but had not returned by the time we left the island. For birds that we were able to obtain complete tracks, the average distance travelled on each trip was 4395 km (± 2140km, *n* = 9). This works out to be an average of 354km travelled per bird per day (± 136km, *n* = 13). The average maximum range from Lady Alice Island was 740km (± 430km, *n* = 13). There was no discernible difference between males and females in distribution, duration or distance of trips.

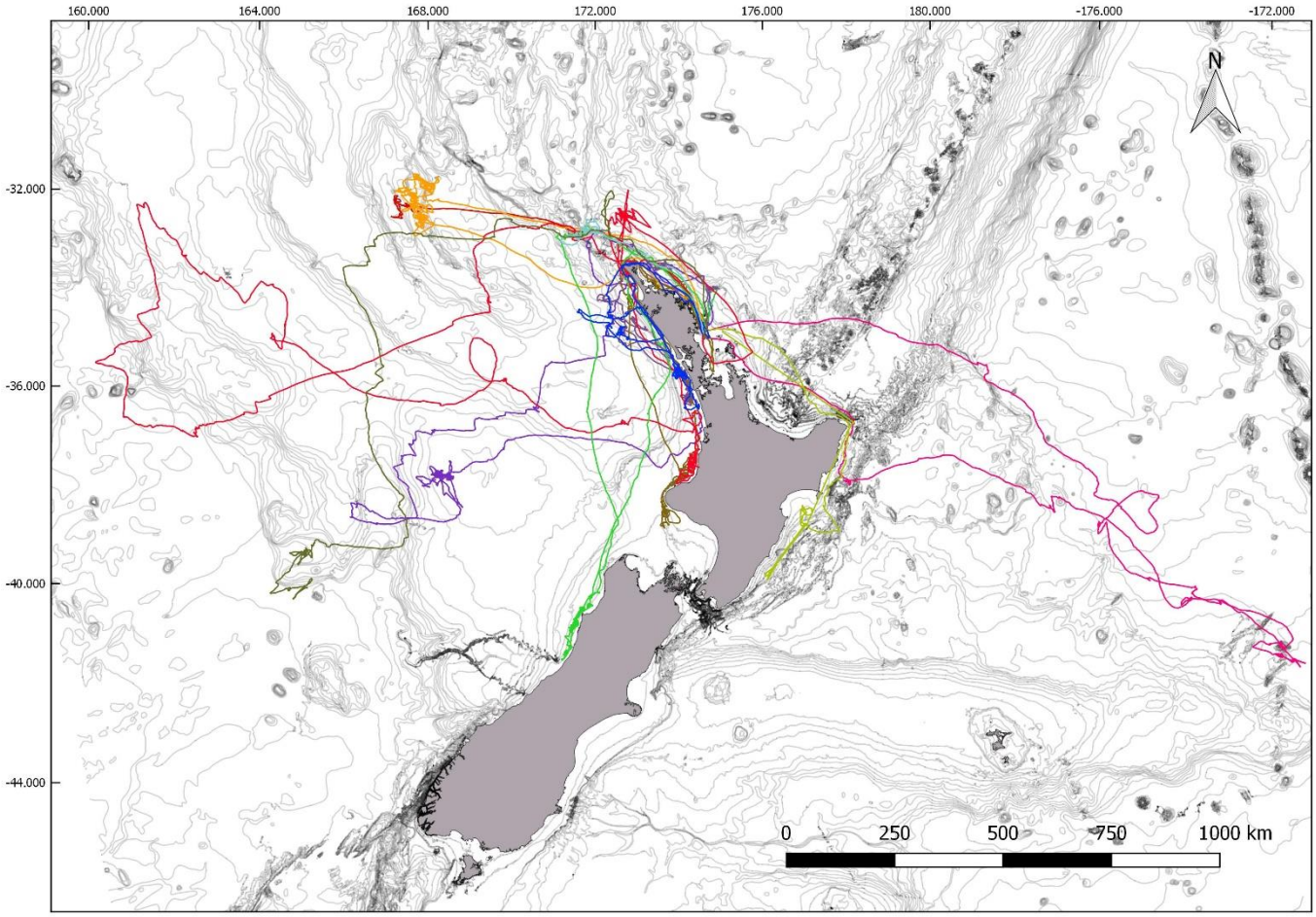

Figure 2. All foraging trips recorded during January 2017 from incubating flesh-footed shearwaters on Lady Alice Island. Each line represents a different bird and their corresponding foraging trip.

3.2 At sea behaviour during incubation period

The classification method used here to determine what behaviour is occurring at each GPS location is very simple, however, Figure 3 demonstrates that using these thresholds of saltwater immersion can effectively distinguish between flying, resting (or rafting) and foraging. When each track is broken down in this way, most birds appear to depart the island and undertake rapid flight to a specific (perhaps known) location where they then spend several days flying around at a slower pace foraging and spending time resting or rafting on the water surface.

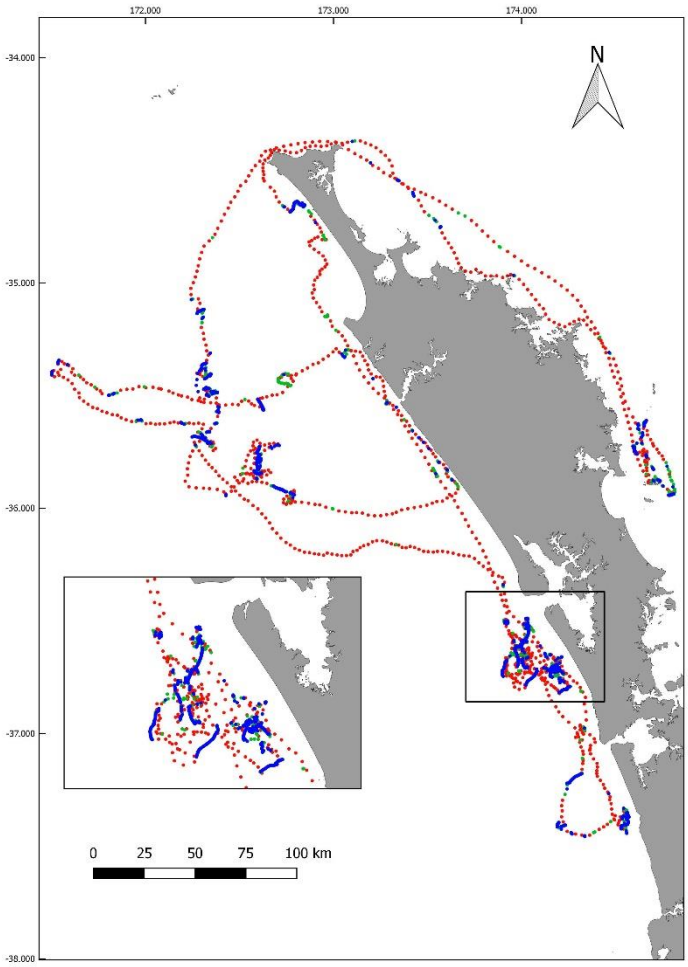

Figure 3. An example of a flesh-footed shearwater foraging trip with each GPS point classified as one of the three behaviour types: flight (red); rest (blue); or foraging (green). Note where there are clusters of points, there is some overlap of different behaviour types

Key locations for foraging are illustrated by the darkest shades of green (Figure 4B). The most occupied foraging area was between the entrance to Kaipara Harbour and just south of the entrance to Manakau Harbour. The North Taranaki Bight was also a popular foraging area. Other key foraging areas include: just north of the Hen and Chicken Islands to around Cape Reinga, northwest of the Three Kings Islands at 171.5 E, 33.8 S and along the West Norfolk Ridge at 167.6 E, 32.8 S.

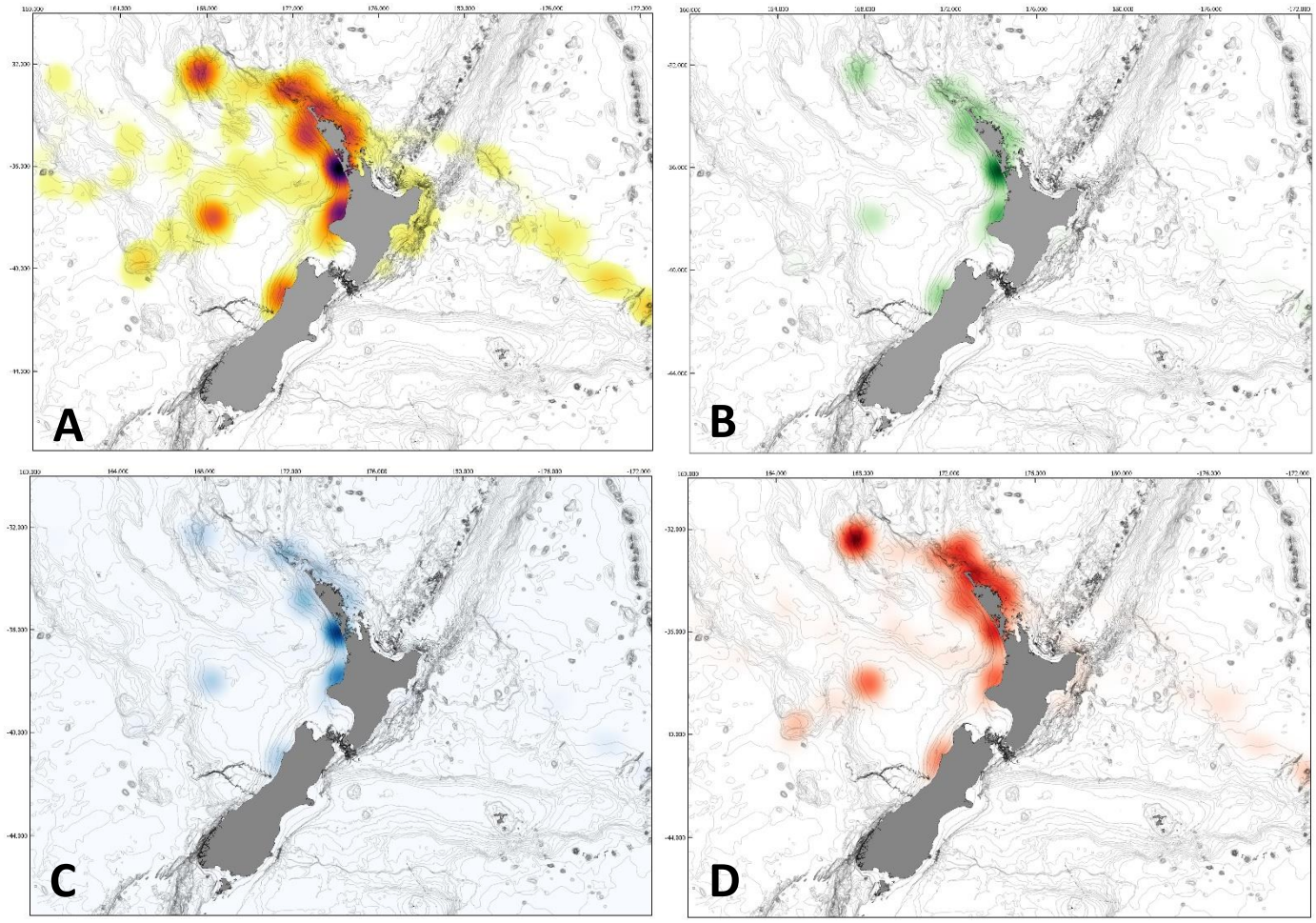

Figure 4. Heatmaps showing the behavioural distributions of flesh-footed shearwaters tracked from Lady Alice Island during the incubation period. Each behaviour type is represented by a different subset: All behaviour types combines (4A); Foraging (4B); Rest (4C) and Flight (4D). Darker colours indicate higher occupancy.

The proportion of time spent in different behaviours varied between individuals (Figure 5). Overall, the largest proportion of time was spent resting with an average of 47% (± 12%, range 23% – 77%, *n* = 20). An average of 40% (± 13%, range 17% – 65%, *n* = 20) of the time was spent flying while the remaining 13% (± 3%, range 6% – 19%, *n* = 20) of the time was spent foraging.

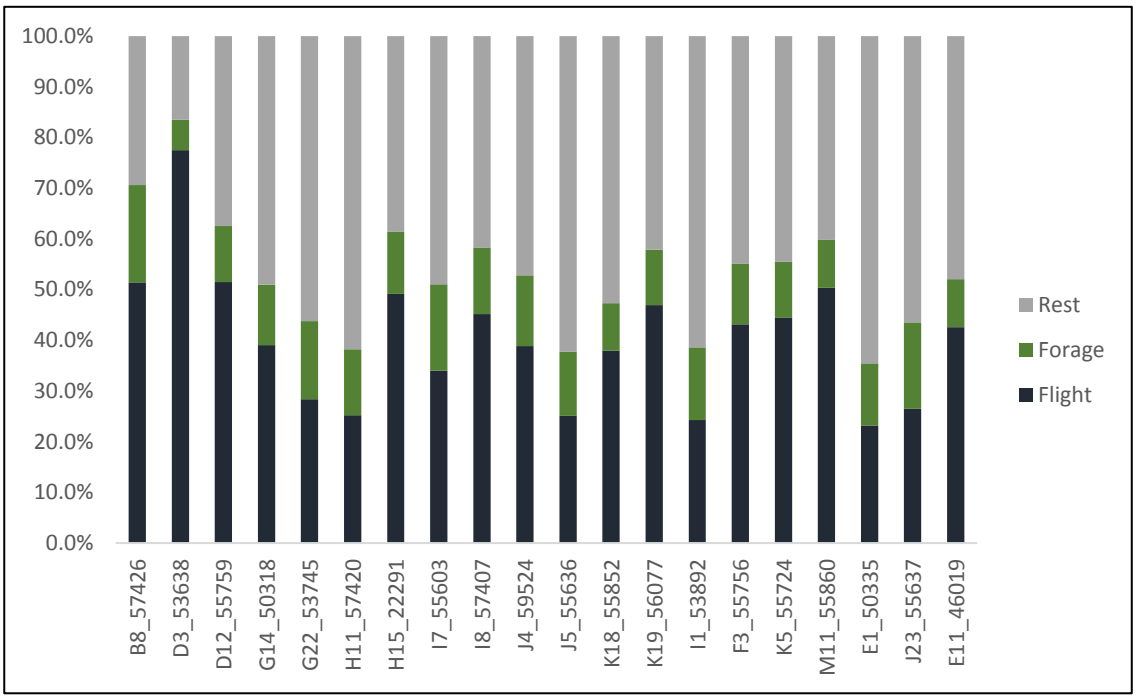

Figure 5. Bar chart showing the variation in time spent conducting each of the three behaviours for each bird.

The three different behaviour types were combined for all individuals and then plotted by time of day (Figure 6). Flesh-footed shearwaters appear to be most active (flying or foraging) between 05:00 and 21:00 i.e. during daylight hours, with a notable shift to resting behaviour between 22:00 and 04:00. 78% of all foraging activity occurs between 07:00 and 20:00 (Figure 6C).

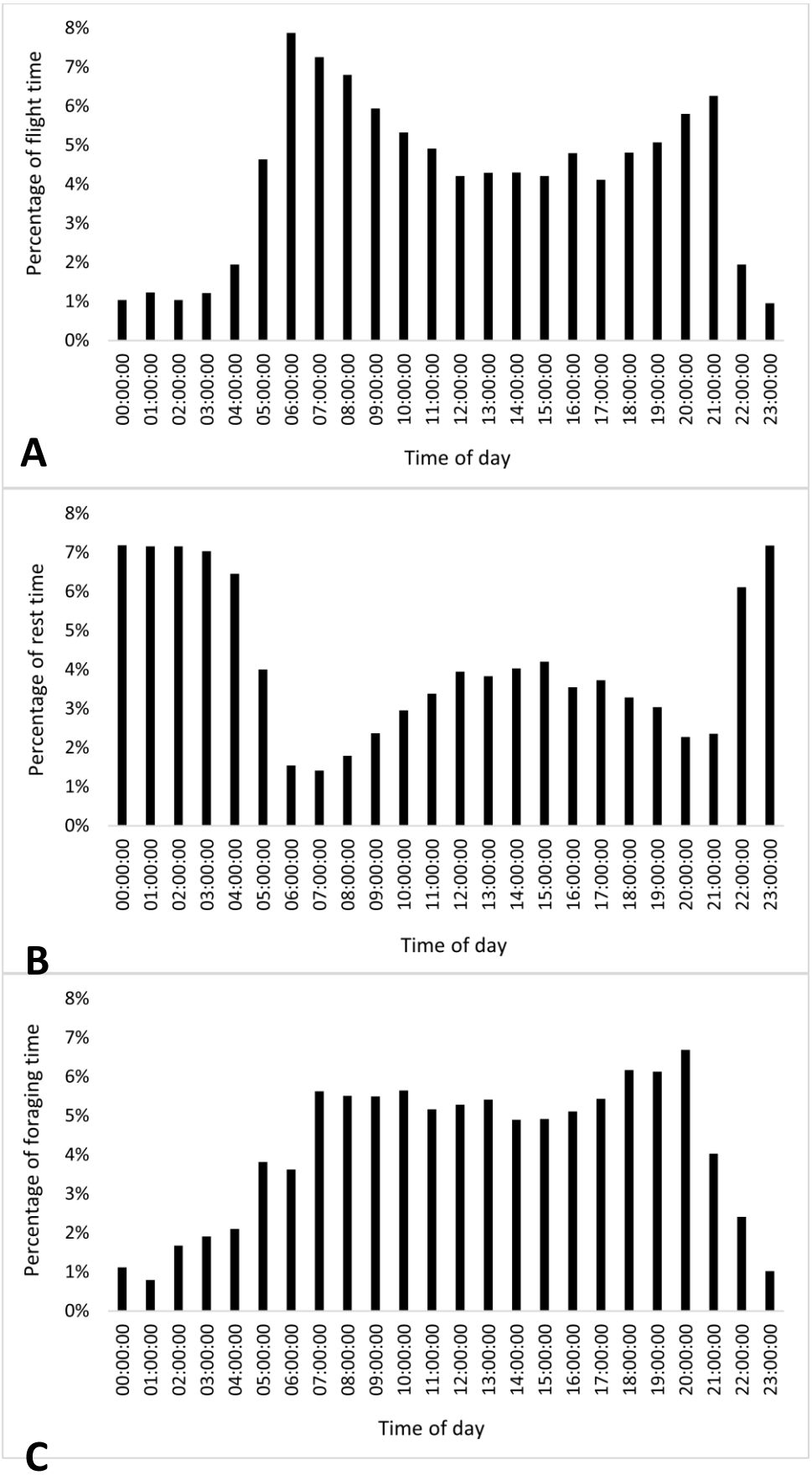

Figure 6. Bar graphs showing the percentage of time conducting each behaviour type throughout the day for all tracked individuals combined. Each behaviour is represented by a different subset: flying (6A); resting (6B) and foraging (6C).

3.3 Comparison between incubation and chick-rearing stages

Only one bird was successfully tracked in 2017 during chick-rearing and 2018 during incubation. This bird was tracked on three separate foraging trips during chick rearing and on one 12 day trip during incubation. Figure 7 shows that this individual appears to have preferred foraging areas for short trips versus longer trips. For both short trips (1 day each) this individual travelled northwest and foraged in the same location 8km east of the Cavalli Islands. For both long trips (one 5 days, one 12 days) this individual was tracked heading in a southeast direction. During chick-rearing it stopped and foraged about 70km offshore from Gisborne at 178.7 E, 38.9 S. During incubation it travelled much further to the southeast but on return to Lady Alice Island it stopped at the exact same spot off the coast of Gisborne to forage. In some spots the individual can be seen following the same flight path also.

In both tracking studies this bird had the furthest range from Lady Alice Island (761km during chick-rearing, 1579km during incubation) indicating this individual tends to range further than other individuals from the same colony. This bird spent a very similar proportion of its time conducting each behaviour type (Table 1).

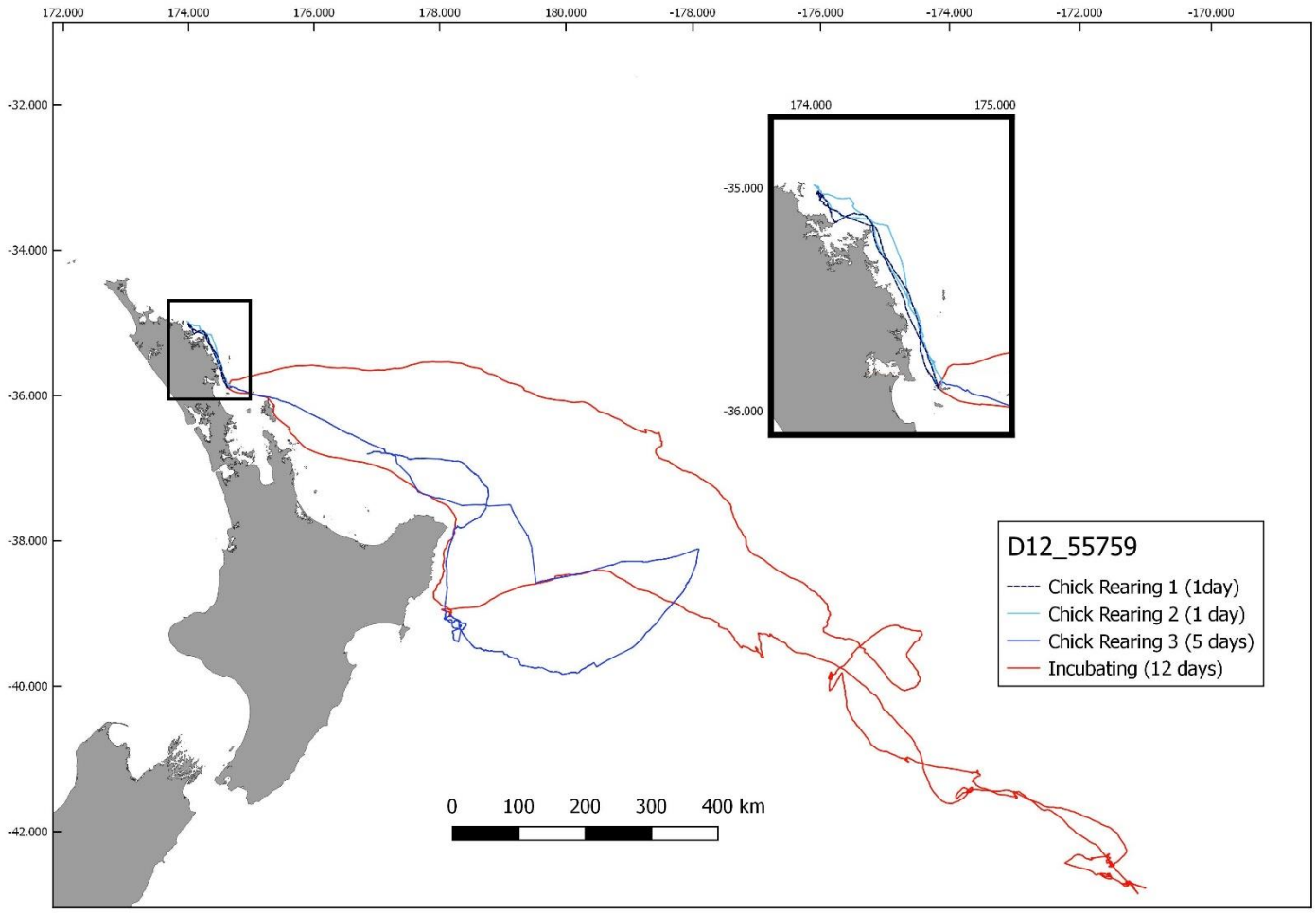

Figure 7. All tracks from the individual 55759 who was tracked on four separate trips over two seasons. Map inset shows a close up of the two short (1 day) foraging trips during chick rearing.

There were some differences in at-sea behaviours observed between the two different breeding stages (Table 2). Birds spent more time flying during incubation stage than chick-rearing stage (two-sample t-test, $t_{37} = 2.972$, $p < 0.01$). Conversely they spend less time foraging during the incubation stage than during the chick-rearing stage (two-sample t-test, $t_{52} = 5.213$, $p < 0.01$). There was no difference in time spent resting between the two breeding stages (two-sample t-test, $t_{40} = 1.272$, $p = 0.211$).

	Chick rearing (2017) *n* = 32	**Incubation (2018)** *n* = 20
Flight	**0.30** (±0.12)	**0.40** (±0.13)
Rest	**0.51** (±0.12)	**0.47** (±0.12)
Foraging	**0.19** (±0.06)	**0.13** (±0.03)

Table 1. Mean (± Standard Deviation) proportion of time spent performing each of the three behaviour types for the two different breeding stages.

4. Discussion

Our method used here of catching birds at night time prior to their exodus and attaching loggers was effective and should be utilised for future tracking studies during incubation. We believe this method is more effective than attempting to predict when a changeover will occur and attaching loggers on to departing birds. Using our method means birds are departing the island with loggers that have full batteries and as a result all of our loggers still had battery power remaining when they were retrieved. There is also no need to check burrows frequently and/or change loggers on birds that have not departed. This results in lower disturbance to burrows and birds. Unfortunately, this method is limited to study locations where large numbers of birds can be targeted over a relatively small area.

The reason for a third of tracked individuals returning without their GPS devices is probably due to the aggressive nature of flesh-footed shearwaters and some individuals managing to pull the devices off. For comparison, in a tracking study on black petrels (*Procellaria parkinsoni*) we used the same devices with the same attachment method. All 43 black petrels that were fitted with loggers and were recaptured had their loggers still attached. Some of these birds were doing similarly long trips of 20+ days and one device was even still intact 48 days after being attached to the bird (P. Crowe pers. comm.). Black petrels are relatively calm in nature compared to flesh-footed shearwaters.

The attachment of devices in this study did appear to alter the behaviour of some individuals. On average, each individual had gained 12% of body weight upon retrieval of the device. This is only about half the expected weight gain for a bird returning to begin an incubation shift. At Bethells beach, returned birds are typically 25% heavier than departing birds on average (G. Taylor pers. comm.). Tracked birds spent longer at sea and then many returned underweight with only five of our twenty returned birds having gained at least 25% body weight. Longer trips and lower body weight increase the chance of the partner having to abandon the nest and also would make it hard for the tracked birds to complete a full incubation shift. This would explain our observed 40% lower breeding success of tracked burrows. This was an unexpected result as tracking during chick-rearing in 2017 did not appear to have any significant impact on body condition or breeding success.

Any future tracking of flesh-footed shearwaters, particularly during incubation stage, should consider using devices with a smaller battery and thus lower weight. While this will result in fewer fixes and lower quality tracks, it would ideally result in less impacts on the birds' behaviour.

4.1 Spatial distribution

The results here show a foraging distribution pattern of breeding flesh-footed shearwaters that was not previously known. Flesh-footed shearwaters tracked in this study showed a more westerly tendency, utilising inshore areas off the west coast of the North Island. While this area was identified as a hotspot, it should be noted that there was a large amount of variation between individuals.

Flesh-footed shearwaters from Lady Alice Island have their own discrete foraging areas but do also overlap with other colonies. Two individuals (I7_55603 and D12_55759) had very similar foraging distributions to those birds tracked from the Ohinau Island colony (Waugh *et al.* 2014). J4_59524 overlapped in its foraging distribution with birds from the Titi Island Colony (Waugh *et al.* 2014). Although there has been no tracking of the flesh-footed shearwater population on the Sugarloaf Islands, it is likely that H11_57420 strongly overlapped with birds from that colony. I8_57407 overlapped in areas with birds tracked from the breeding population on Lorde Howe Island, Australia (Reid 2010). With a certain degree of overlapped foraging areas between colonies, care should be taken when a bird shows up in fisheries bycatch to assume it is from a particular colony.

The foraging location around 167.6 E, 32.8 S on the Norfolk Ridge was identified as a hotspot for foraging in the previous seasons' tracking and was again for this season. This area lies just outside the New Zealand exclusive economic zone (EEZ) and is frequented by many fishing boats (Global Fishing Watch 2018).

4.2 At sea behaviour during incubation period

Trip durations varied between individuals but overall mean foraging trip lengths during incubation were much longer than we expected and longer than the 1-8 days reported for flesh-footed shearwaters in some other literature (Powell 2004). Longer trips resulted in fewer devices being retrieved as the attachment method used here with devices being taped to feathers is designed for short foraging trips (Wilson *et al.* 1997). The foraging trip lengths observed here are closing in on those of grey-faced petrels who have average incubation shifts of 17 days (range: 13 – 21+) and are recognised as having some of the longest incubation shifts of any Procellariiformes (Marchant & Higgins 1990, Johnstone & Davis 1990). This may not however be "normal" for flesh-footed shearwaters as 2017/18 was a La Niña season and sea surface temperatures (SST) were between 2°C and 4°C above average this season with some areas off the west coast of New Zealand that were 6-7°C above average (Niwa 2018). Deep oceanic water is colder and more nutrient rich. Higher SST and calmer weather associated with La Niña events means that this cool, nutrient-rich water does not mix with the warmer surface layers and marine productivity is affected. This can then have a bottom-up effect on the food chain and result in negative impacts on seabird population dynamics (Oro 2014). The next set of tracking should aim to be conducted during a "normal" season, however, it is still important to have information on "poor" La Nina years as the El Nino-Southern Oscillation is a naturally occurring cycle.

The average distance travelled per day for each bird on Lady Alice Island (354km) was very similar to that measured by Waugh *et al.* (2016) for birds from Titi Island and Ohinau Island (340km). This suggests that on a day-by-day basis the birds on Lady Alice are not putting in more effort but

foraging trips as a whole were much longer in duration and therefore distance travelled. This is backed up by the behaviour analysis where it was found birds were spending on average 40% of their time flying.

4.3 Comparison between incubation and chick-rearing stages

More time was spent foraging during the chick rearing stage than during the incubation stage. During incubation the birds have to convert food into fat reserves to use during their next stint ashore. They digest food during resting and flight and so less time can be spent foraging. By contrast during chick rearing, birds don't gain significant body weight but just maintain their body condition. But they need to store food either as fresh food for chicks or as stomach oil. Hence they are feeding for two birds and need to be foraging more intensely.

The tracking data from Lady Alice during chick-rearing last season indicated flesh-footed shearwaters were mostly using areas of ocean north of Lady Alice Island off the east coast. During the incubation stage, birds seem to utilise these areas to a lesser extent and instead travel further north and around Cape Reinga to forage off the west-coast of the North Island particularly between the Kaipara and Manukau harbours.

Different foraging areas for different breeding stages could be explained by a dual foraging strategy. Birds are making shorter trips during chick rearing to nearby but less productive foraging areas in order to provision their chick often at the expense of their own body condition. During incubation, the bird has been sitting in a burrow for a long period depleting its body reserves and their weight has dropped significantly. Therefore, longer trips are made to further away but more productive foraging areas to give the bird greater opportunity to restore its body condition and regain any lost weight ready for its next incubation shift.

We cannot be sure whether the observed difference in foraging areas during incubation and chick rearing is due to a change in behaviour during different breeding stages or is a result of abnormal behaviour resulting from the La Niña conditions.

5. Acknowledgements

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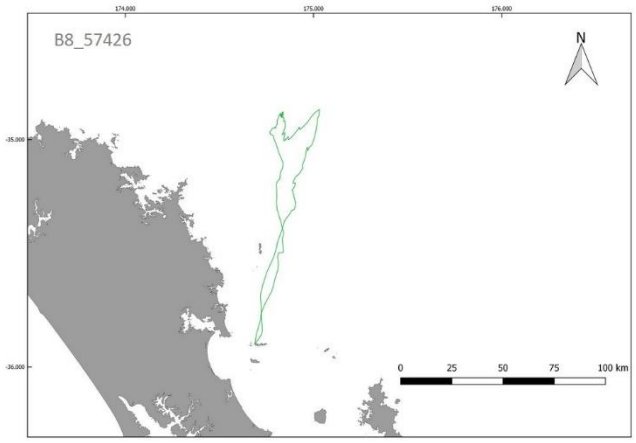
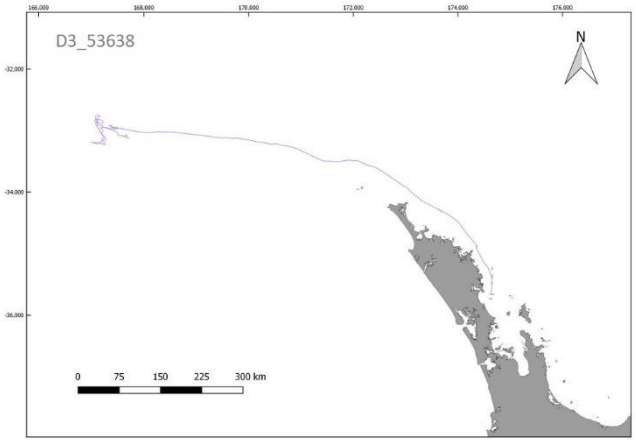
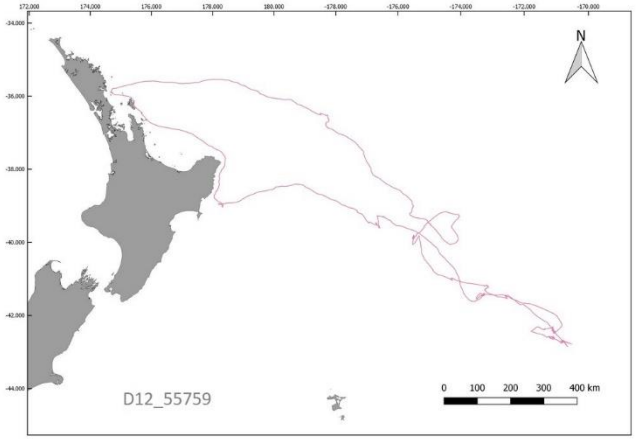
7. Appendices

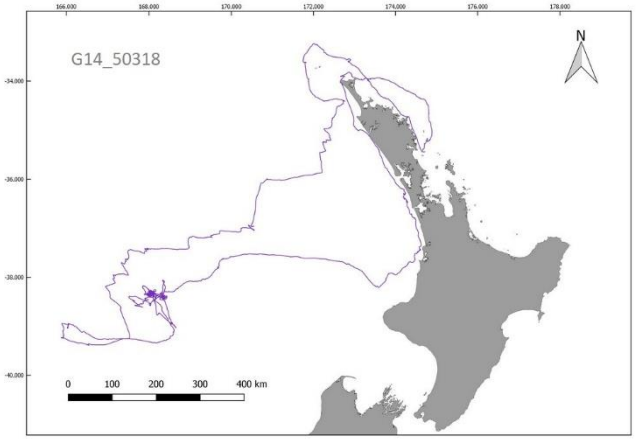
7.1 Individual GPS Tracks

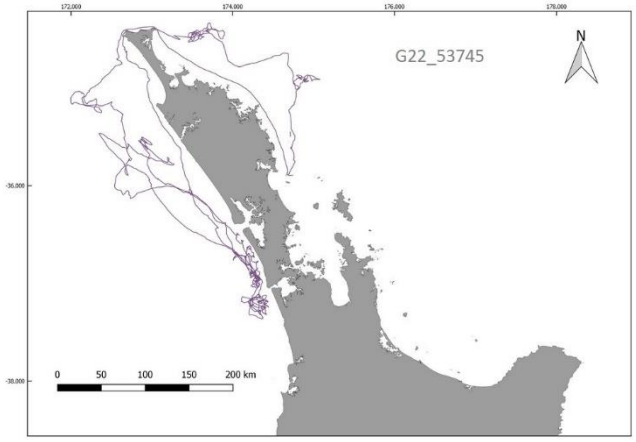
Note the scale bars differ for some figures.

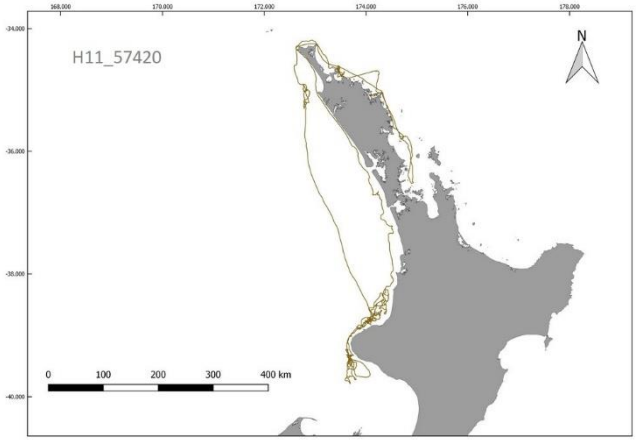


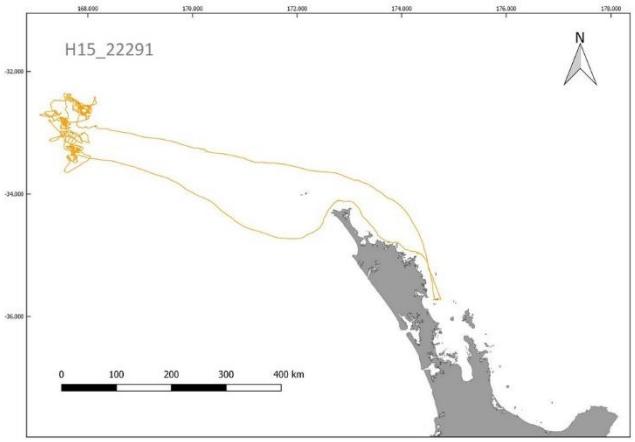








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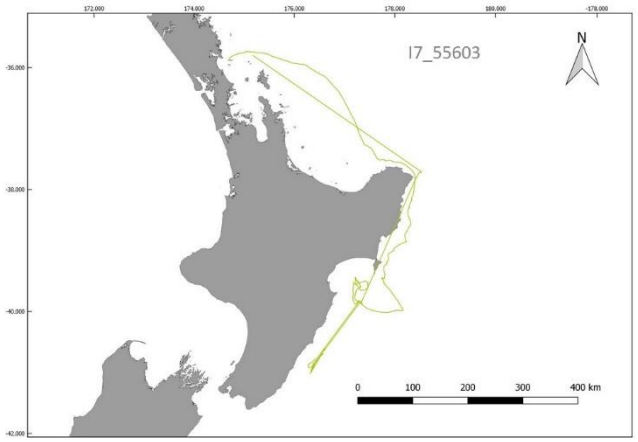
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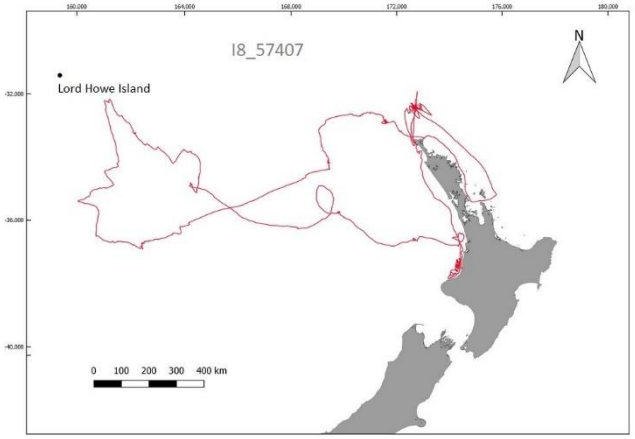
N
0 100 200 300 400 km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Lord Howe Island
N
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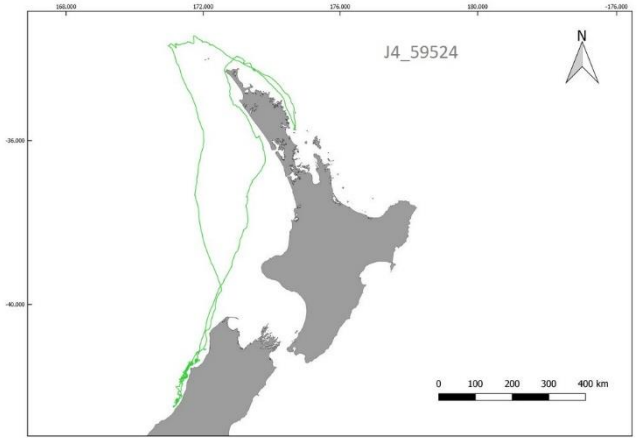
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N
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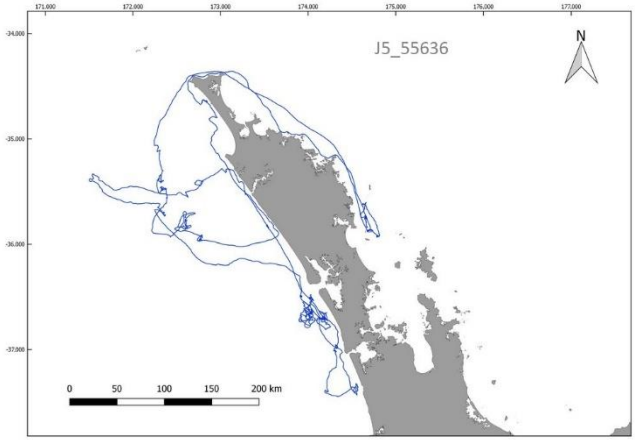
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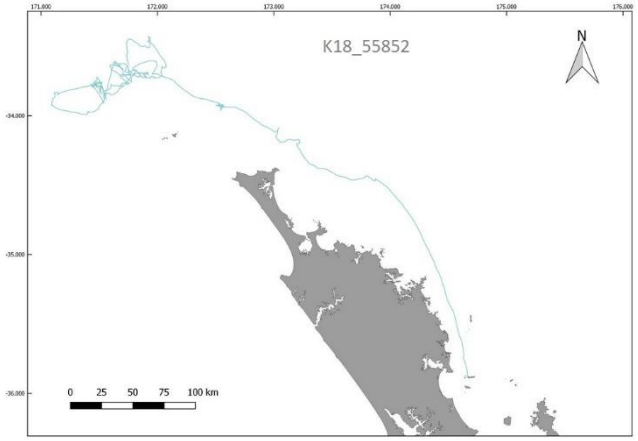
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N
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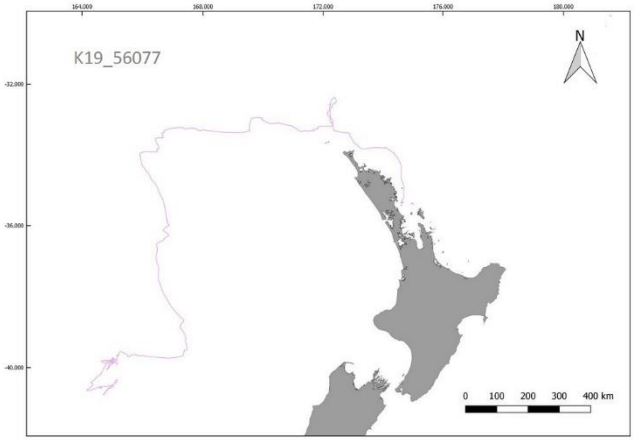
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7.2 GPS deployment metadata

Burrow#_ Band#	Trip Length (days)	GPS Track (days)	Complete Track	Trip Distance (km)	Max Range from Lady Alice	Flight	Rest	Forage	Weight pre (g)	Weight post (g)	Δ Weight (g)	Δ Body Mass (%)	Burrow Result	Notes
A1_57297	0	0	N	0	0	N/A	N/A	N/A	590	550	-40	-7%	Egg (broken)	Bird never left burrow
J21_55649	25+	0	N	N/A	N/A	N/A	N/A	N/A	610	N/A	N/A	N/A	Failed (unknown)	
G2_55622	24+	0	N	N/A	N/A	N/A	N/A	N/A	600	N/A	N/A	N/A	Failed (unknown)	
I10_57408	23+	0	N	N/A	N/A	N/A	N/A	N/A	630	N/A	N/A	N/A	Failed (unknown)	
B8_57426	1	1	Y	326	119	0.51	0.29	0.19	680	620	-60	-9%	Egg (broken)	Returned after one day at sea
D3_53638	10	3	N	1273	788	0.77	0.17	0.06	640	600	-40	-6%	Egg (broken)	Track Incomplete
D12_55759	12	12	Y	5068	1579	0.51	0.37	0.11	590	710	120	20%	Egg (broken)	
G14_50318	18	18	Y	5661	924	0.39	0.49	0.12	630	640	10	2%	Failed (unknown)	
G22_53745	16	16	Y	3884	263	0.28	0.56	0.15	670	760	90	13%	Egg (abandoned)	
H11_57420	17	17	Y	3920	459	0.25	0.62	0.13	620	790	170	27%	Chick (banded)	
H15_22291	12	12	Y	4467	794	0.49	0.39	0.12	655	765	110	17%	Egg (broken)	
I7_55603	15	3	N	2155	590	0.34	0.49	0.17	645	690	45	7%	Chick (banded)	Track Incomplete
I8_57407	23	23	Y	8933	1409	0.45	0.42	0.13	570	700	130	23%	Egg (abandoned)	
J4_59524	13	13	Y	4094	826	0.39	0.47	0.14	550	690	140	25%	Egg (broken)	
J5_55636	15	15	Y	3204	299	0.25	0.62	0.13	760	740	-20	-3%	Egg (broken)	
K18_55852	11	7	N	1190	401	0.38	0.53	0.09	600	750	150	25%	Chick (banded)	Track Incomplete
K19_56077	15	7	N	3257	1171	0.47	0.42	0.11	585	680	95	16%	Failed (unknown)	Track Incomplete
I1_53892	12	0	N	N/A	N/A	0.24	0.61	0.14	635	805	170	27%	Egg (broken)	GPS Lost
F3_55756	15	0	N	N/A	N/A	0.43	0.45	0.12	595	760	165	28%	Egg (abandoned)	GPS Lost
K5_55724	21	0	N	N/A	N/A	0.44	0.45	0.11	675	700	25	4%	Egg (broken)	GPS Lost
M11_55860	18	0	N	N/A	N/A	0.50	0.40	0.10	615	660	45	7%	Egg (broken)	GPS Lost
E1_50335	18	0	N	N/A	N/A	0.23	0.65	0.12	640	710	70	11%	Egg (broken)	GPS Lost
J23_55637	18	0	N	N/A	N/A	0.27	0.56	0.17	700	680	-20	-3%	Egg (broken)	GPS Lost
E11_46019	14	0	N	N/A	N/A	0.43	0.48	0.10	650	740	90	14%	Egg (broken)	GPS Lost