



**Progress report on
Westland Petrel projects
(POP2021-08) and
(POP2022-07)
investigating burrow
occupancy, foraging
behaviour and at-sea
movements**

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Kate and
Samhita at
Westland
petrel
colony



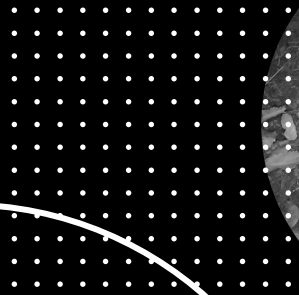
Study Objectives

1. Monitoring of study nests for burrow occupancy rates and breeding outcomes
2. Assessing onshore activity rates in this species from GLS tag data to determine time spent at-sea versus on colonies
3. Carry out multi-year tracking of adult birds using GLS tags to determine extent of time spent within the New Zealand EEZ and elsewhere in the Southern Hemisphere.
4. Detailed GPS tracking of Westland petrels in the pre-laying period and during incubation to assess overlap with NZ fisheries.
5. Investigating the diving behaviour of Westland petrels using time-depth records (TDR's) to determine their risk profile from various fisheries methods





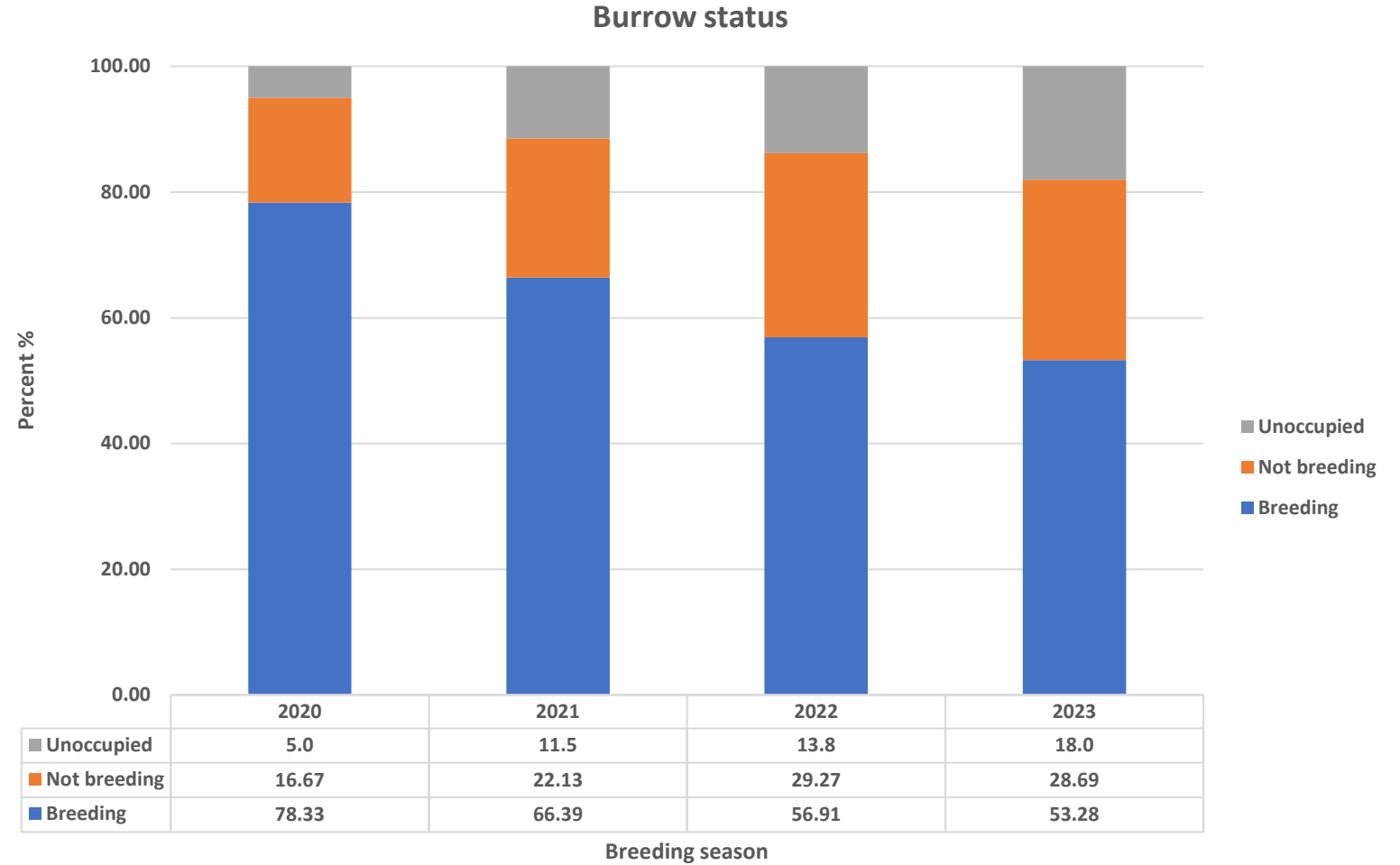
Monitoring bird behaviour and activity at burrows
with trail cameras and inspection hatches



Trail camera observations

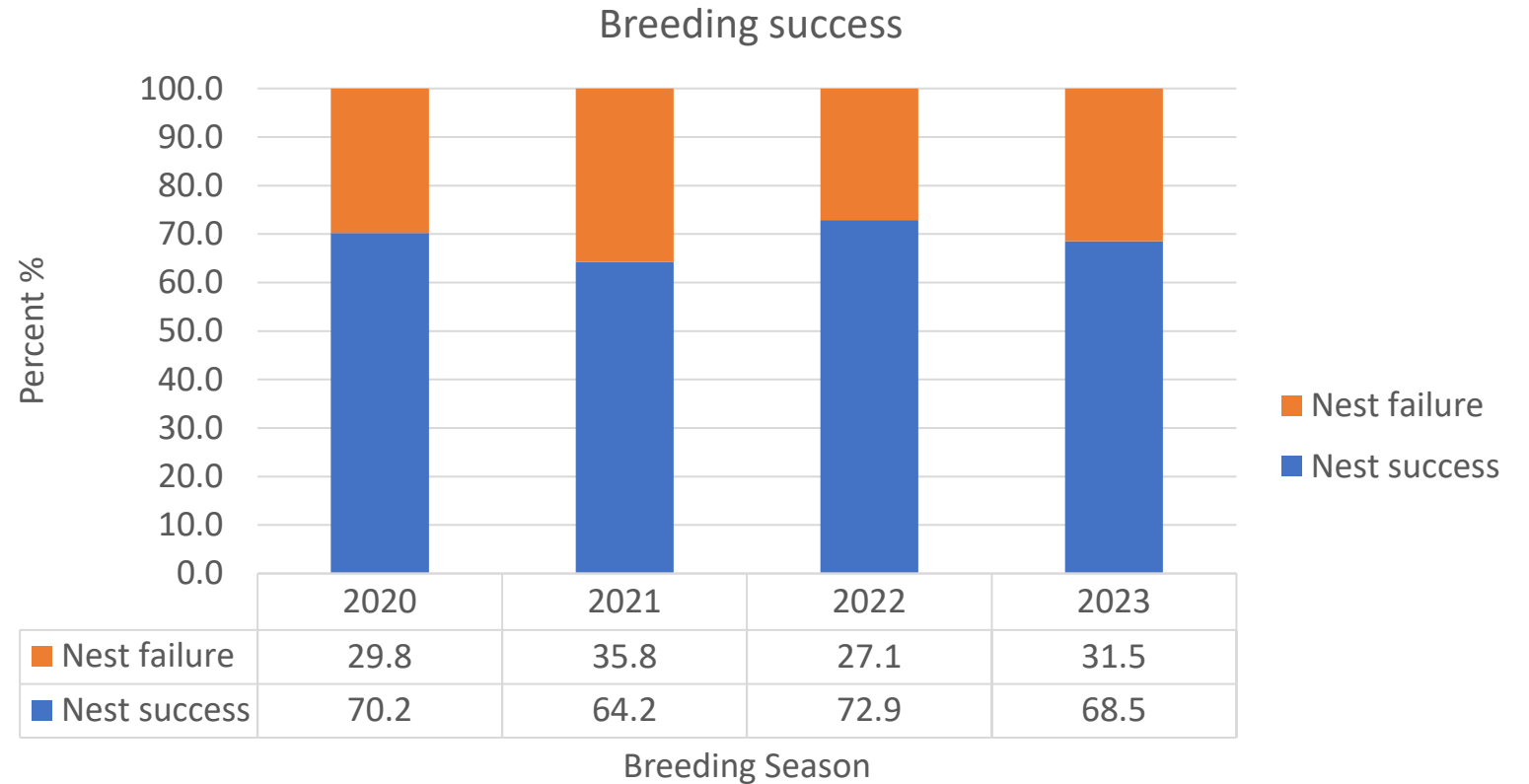
- Trail camera footage has been viewed for a sample of the nests
- There were significant levels of bird activity recorded at each nest with multiple birds present, courtship behaviour, active calling and nest building
- No evidence to suggest that birds are lacking potential partners
- Empty nests or occupied nests without eggs are more likely to be due to birds skipping breeding rather than shortage of partners
- Feral goats, ship rats and weka are common in the colony

Burrow status and occupancy rates 2020-23



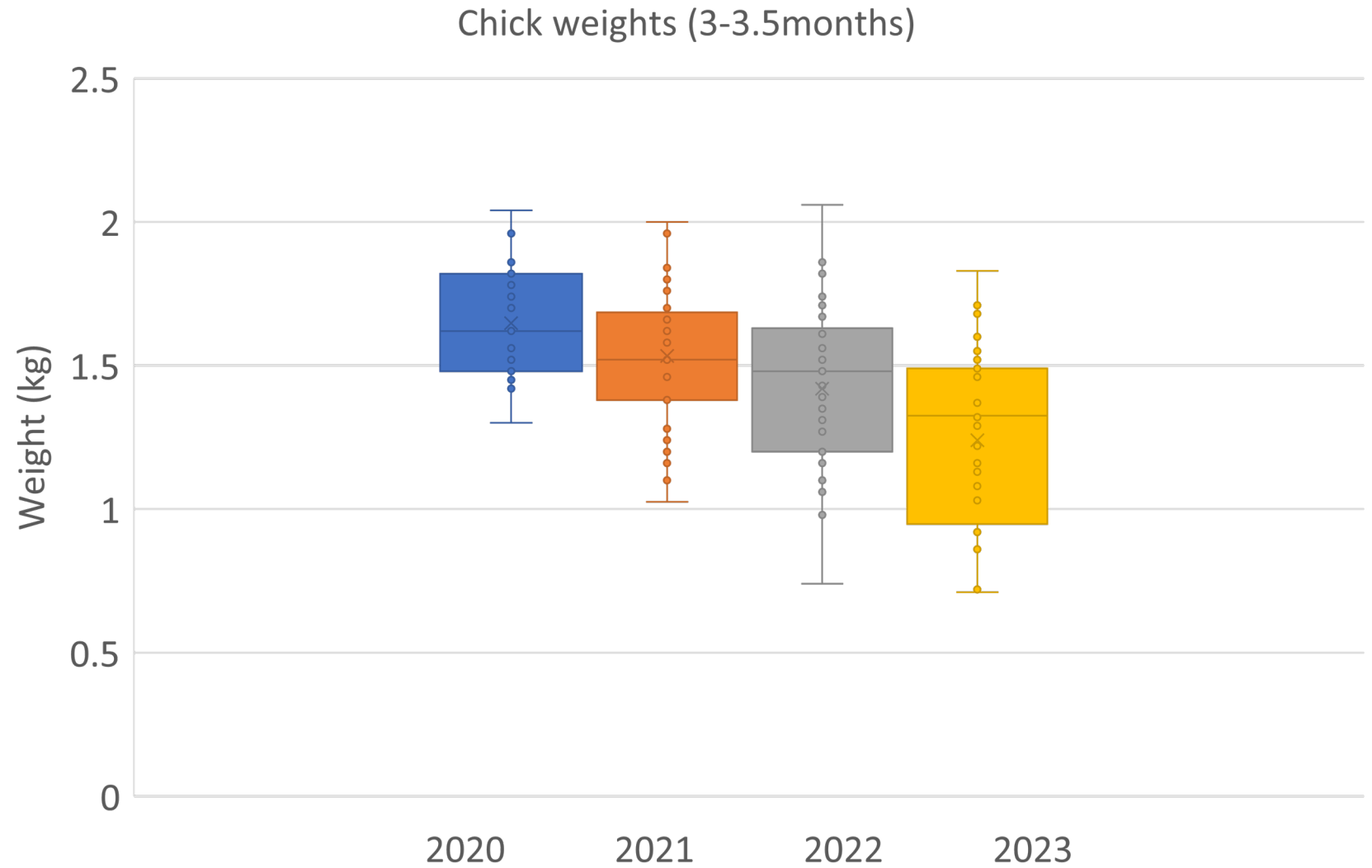
(sample size 2020 n=60; 2021 n=122; 2022 n=123; 2023 n=122)

Westland petrel breeding success 2020-23



Sample size 2020 n=47; 2021 n=81; 2022 n=70; 2023 n=73

Chick weights near fledging 2020-23



Sample size 2020 n=29; 2021 n=50; 2022 n=43; 2023 n=36

Poor
plumage
condition in
2023 chick
cohort



GLS tracking
of adult
Westland
petrels



Summary of GLS tag deployments on Westland petrels 2021-24

Year	Stage	Number deployed	Number retrieved	Retrieved %	Number of tracks Analysed	Average length of analysed tracks in days
2021	Chick rearing / Migration	50	49	98	38	344.58 (SD 81.98)
2022	Incubation	40	34	85	29	39.59 (SD 19.79)
2022	Chick rearing / Migration	52	41	78.85	39	368.95 (SD 82.41)
2023	Incubation	13	10	76.92	1	31 (SD 0)
2023	Chick rearing / Migration	16	11	68.75	8	328.25 (SD 17.24)
2024	Pre-breeding	10	9	90	9	46.11 (SD 13.55)
2024	Incubation	12	7	58.33		
Total		193	161	83.42	124	

Nest attendance patterns during incubation

Westland petrel light data									
	Tags								
Dates (NZ)	BU906 F (BR)	BU916 F (BR)	BU919 F (BR)	BU925 F (BR)	BU926 F (BR)	BU928 F (BR)	BU936 F (BR)	BU939 F (BR)	BU942 F (BR)
15/06/2022								TA - Burrow	
16/06/2022	TA - Burrow	TA - Burrow	TA - Burrow	TA - Burrow	TA - Burrow	TA - Burrow	TA - Burrow	Burrow	TA - Burrow
17/06/2022	Burrow	Burrow	Burrow	Burrow	Burrow	Burrow	Burrow	Burrow	Burrow
18/06/2022	Burrow	Burrow	Burrow	Burrow	Burrow	At sea	At sea	Burrow	Burrow
19/06/2022	Burrow	Burrow	Burrow	Burrow	Burrow	At sea	At sea	Burrow	Burrow
20/06/2022	At sea	Burrow	Burrow	Burrow	Burrow	Burrow	At sea	Burrow	Burrow
21/06/2022	At sea	Burrow	Burrow	Burrow	Burrow	Burrow	At sea	Burrow	Burrow
22/06/2022	At sea	Burrow	Burrow	Burrow	At sea	Burrow	At sea	Burrow	Burrow
23/06/2022	At sea	Burrow	Burrow	Burrow	At sea	At sea	At sea	Burrow	Burrow
24/06/2022	At sea	Burrow	At sea	Burrow	At sea	At sea	At sea	Burrow	At sea
25/06/2022	At sea	Burrow	At sea	Burrow	At sea	At sea	At sea	At sea	At sea
26/06/2022	At sea	Burrow	At sea	Burrow	At sea	At sea	At sea	At sea	At sea
27/06/2022	At sea	Burrow	At sea	Burrow	At sea	Burrow	At sea	At sea	At sea
28/06/2022	At sea	Burrow	At sea	Burrow	At sea	Burrow	At sea	At sea	At sea
29/06/2022	At sea	At sea	At sea	Burrow	At sea	Burrow	Burrow	At sea	At sea
30/06/2022	At sea	At sea	At sea	At sea	At sea	Burrow	Burrow	At sea	At sea
1/07/2022	At sea	At sea	At sea	At sea	At sea	Burrow	Burrow	At sea	At sea
2/07/2022	At sea	At sea	At sea	At sea	At sea	Burrow	Burrow	At sea	At sea
3/07/2022	At sea	At sea	Burrow	At sea	At sea	Burrow	Burrow	At sea	At sea
4/07/2022	At sea	At sea	Burrow	At sea	Burrow	Burrow	Burrow	At sea	At sea
5/07/2022	Burrow	At sea	Burrow	At sea	Burrow	Burrow	At sea	At sea	Burrow
6/07/2022	Burrow	At sea	Burrow	At sea	Burrow	Burrow	At sea	Burrow	Burrow
7/07/2022	Burrow	At sea	Burrow	At sea	Burrow	Burrow	At sea	Burrow	Burrow
8/07/2022	Burrow	At sea	Burrow	At sea	Burrow	Burrow	At sea	Burrow	Burrow
9/07/2022	At sea	At sea	Burrow	At sea	Burrow	Burrow	At sea	Burrow	Burrow
10/07/2022	At sea	At sea	Burrow	At sea	Burrow	Burrow	At sea	Burrow	Burrow
11/07/2022	Burrow	At sea	Burrow	Burrow	Burrow	Burrow	At sea	Burrow	Burrow
12/07/2022	Burrow	At sea	Burrow	Burrow	Burrow	Burrow	At sea	Burrow	Burrow
13/07/2022	Burrow	Burrow	Burrow	Burrow	Burrow	At sea	At sea	At sea	Burrow
14/07/2022	At sea	Burrow - TR	At sea	Burrow - TR	Burrow - TR	At sea	Burrow - TR	At sea	Burrow - TR
15/07/2022	Burrow - TR		At sea			Burrow		At sea	
16/07/2022			At sea			At sea		At sea	
17/07/2022			At sea			At sea		At sea	
18/07/2022			At sea			At sea		Burrow	
19/07/2022			At sea			At sea		Burrow	
20/07/2022			At sea			Burrow - TR		Burrow	
21/07/2022			Burrow - TR					Burrow - TR	



Summary data from GLS light activity sensors

- First return to colony and spend day ashore from 30 March to 2 May
- Females spend between 4-9 days ashore in the courtship period
- Males spend 16-20 days ashore in the courtship period
- Laying period is 13-26 May
- Male first shifts in May/June on the newly laid egg range from 13-21 days
- Female first shifts in June range from 6-15 days

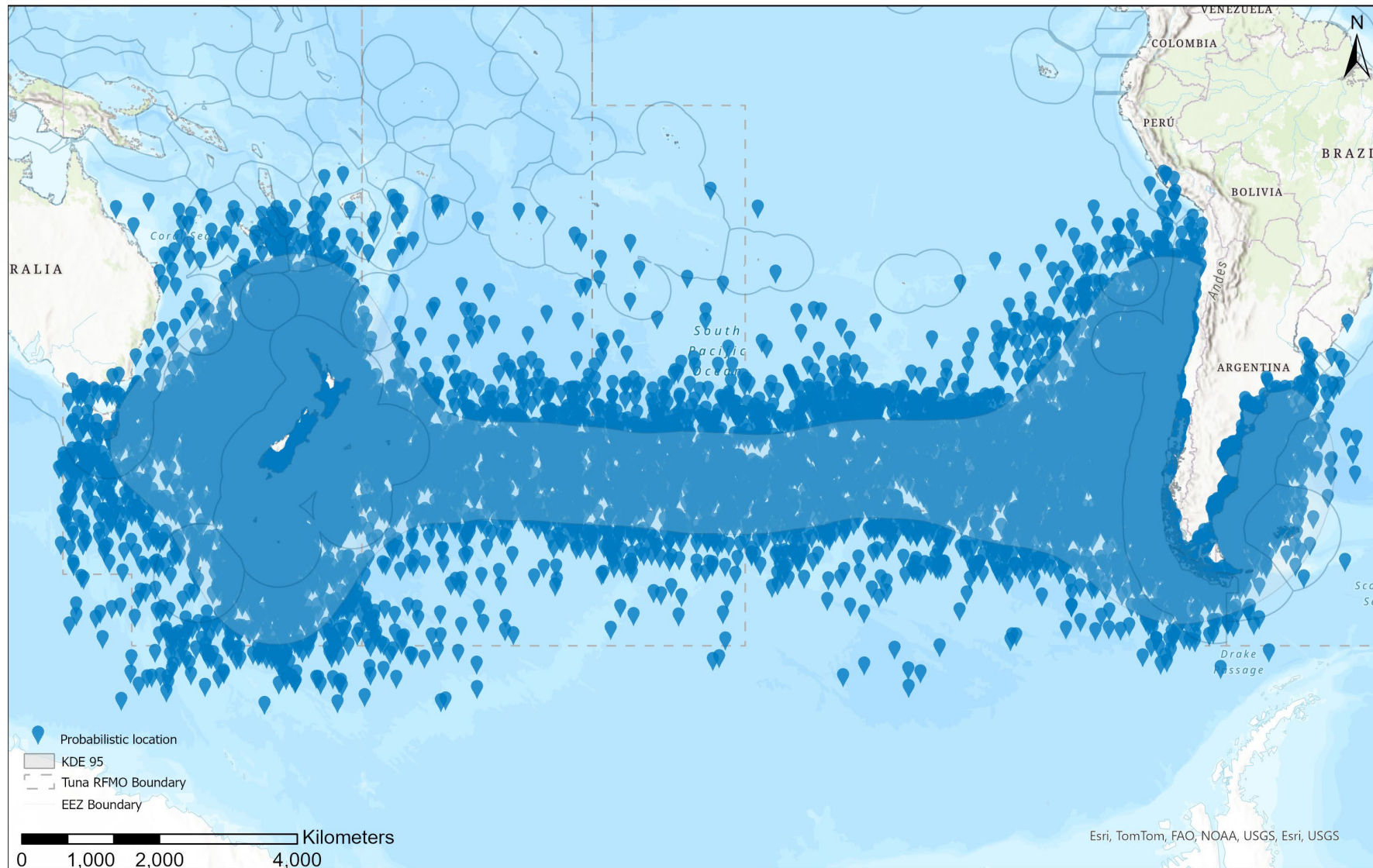


This data will be improved once a greater number of tags are analysed and annual variation will be examined

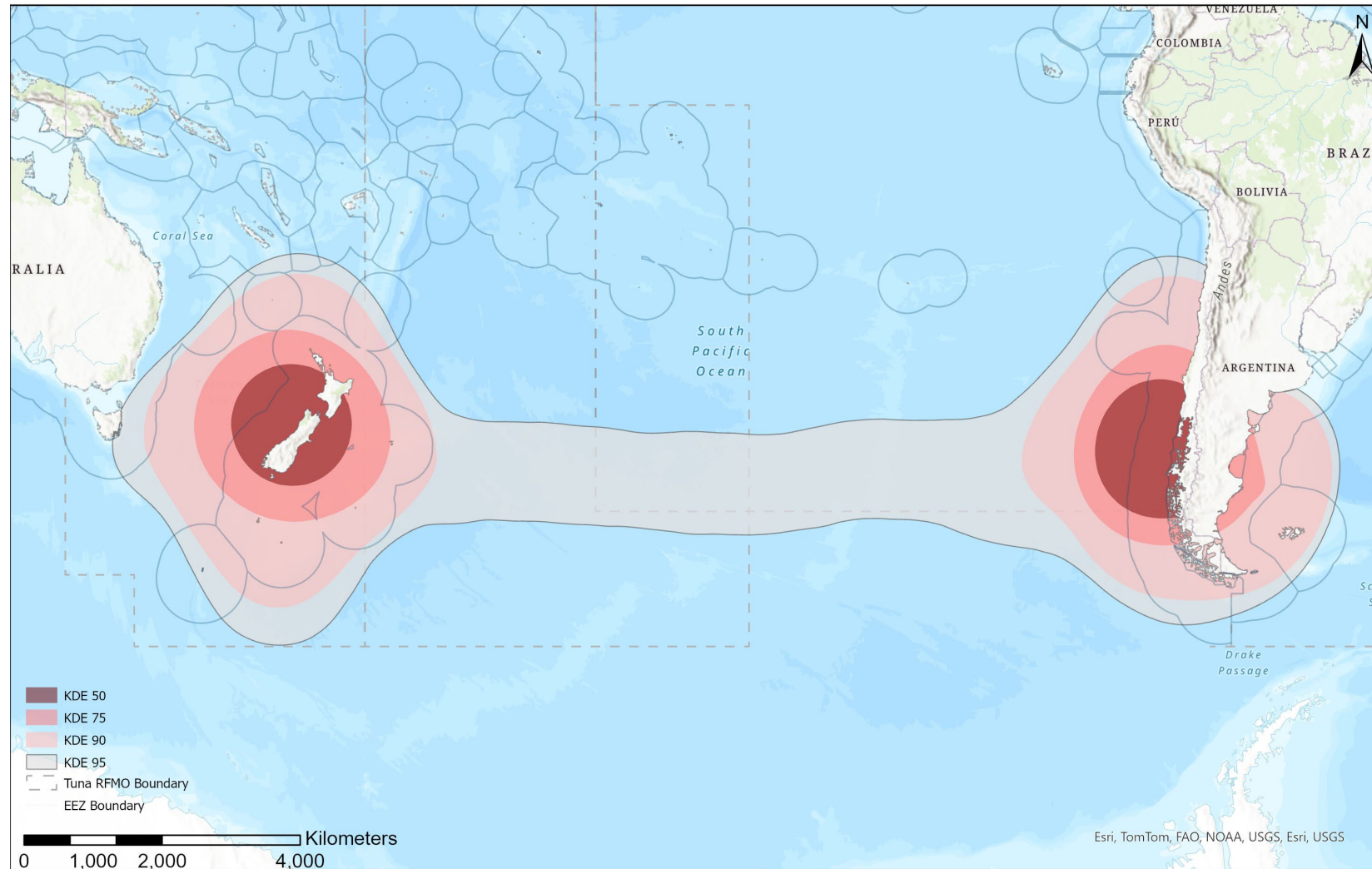
Annual
movements
of Westland
petrels



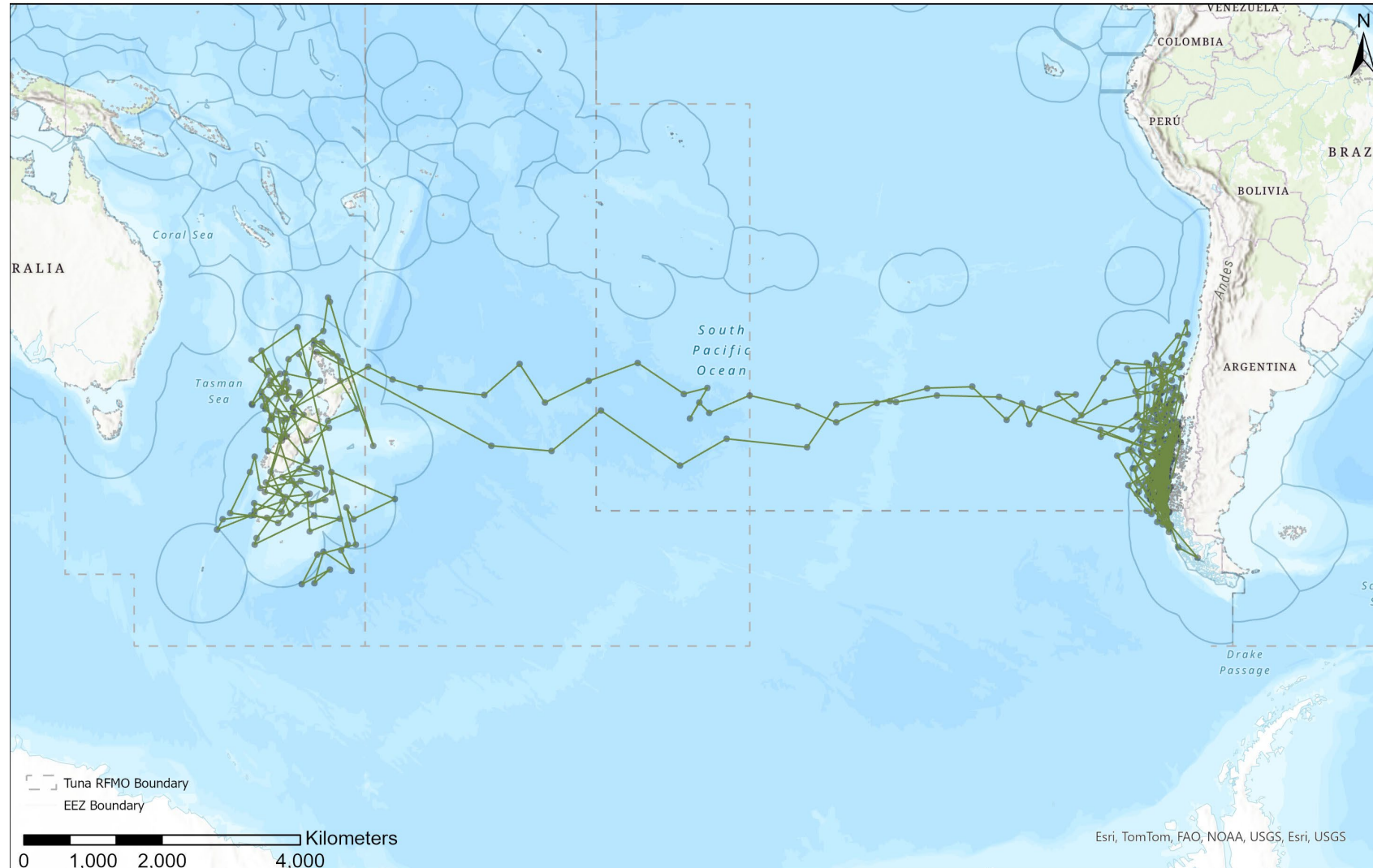
Annual movements of Westland petrels using GLS tracking: all tags



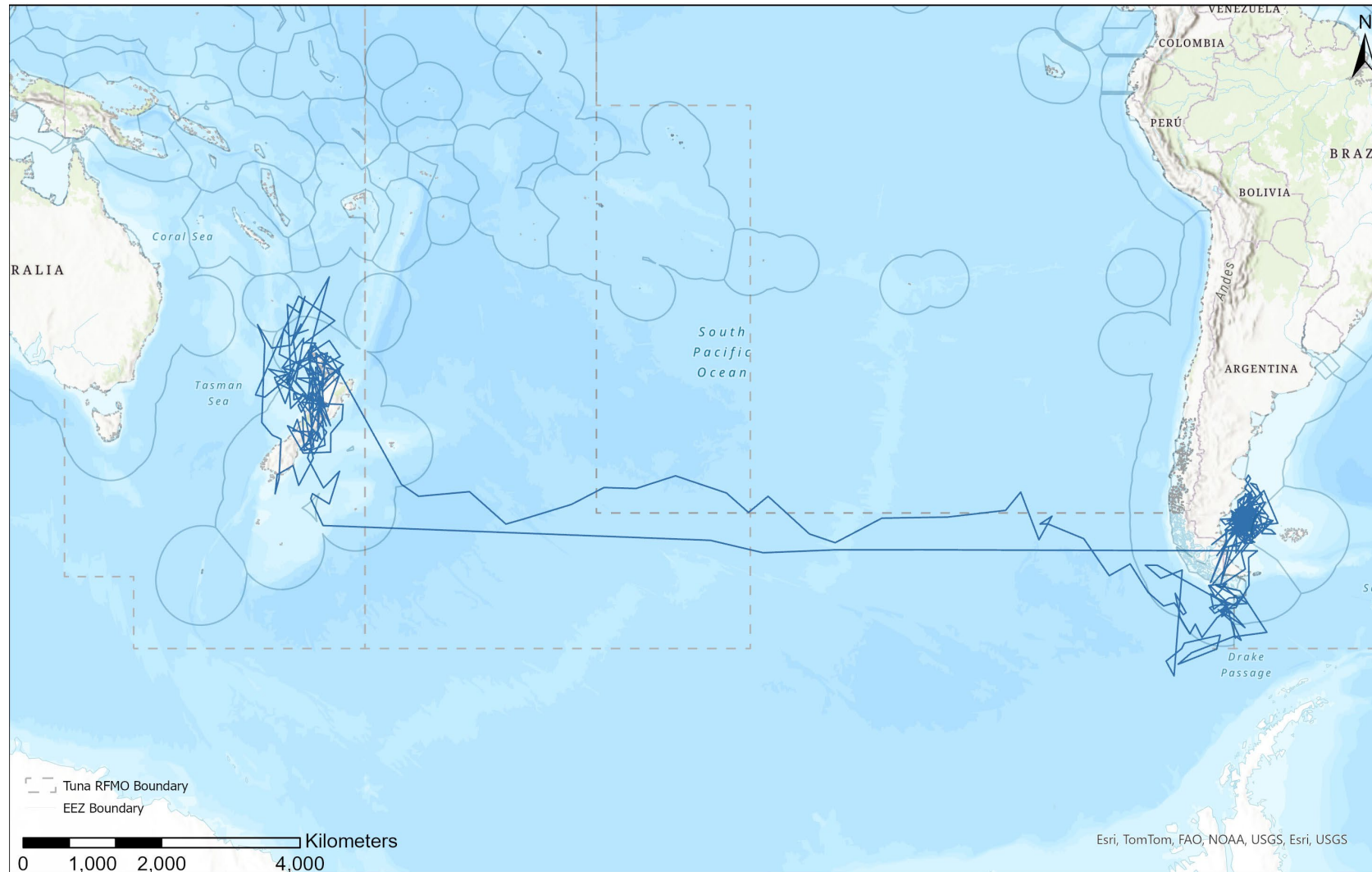
Annual movements of Westland petrels using GLS tracking: kernel density analysis of all tags



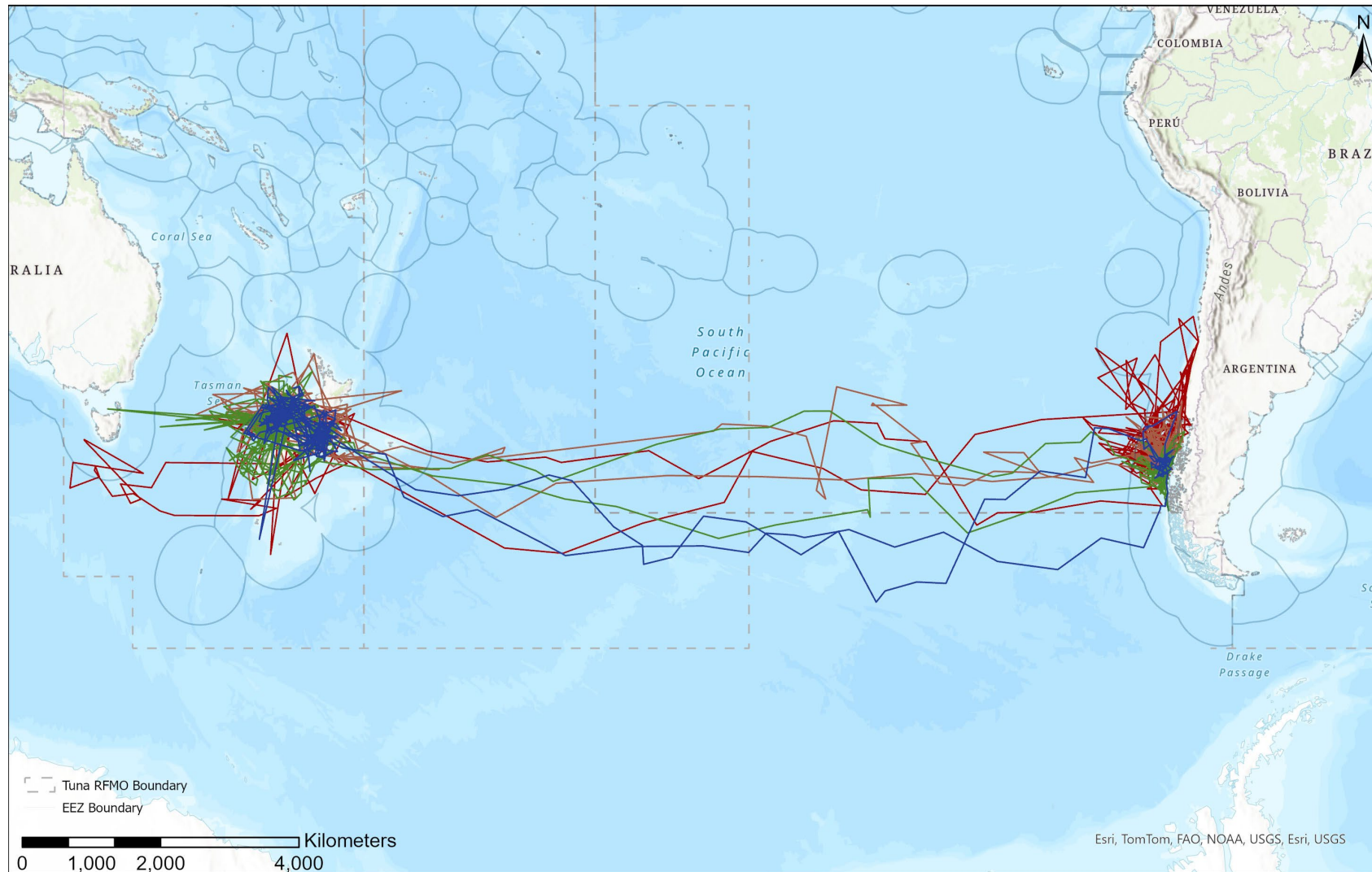
Annual movements of Westland petrels using GLS tracking – bird visiting Chilean coast



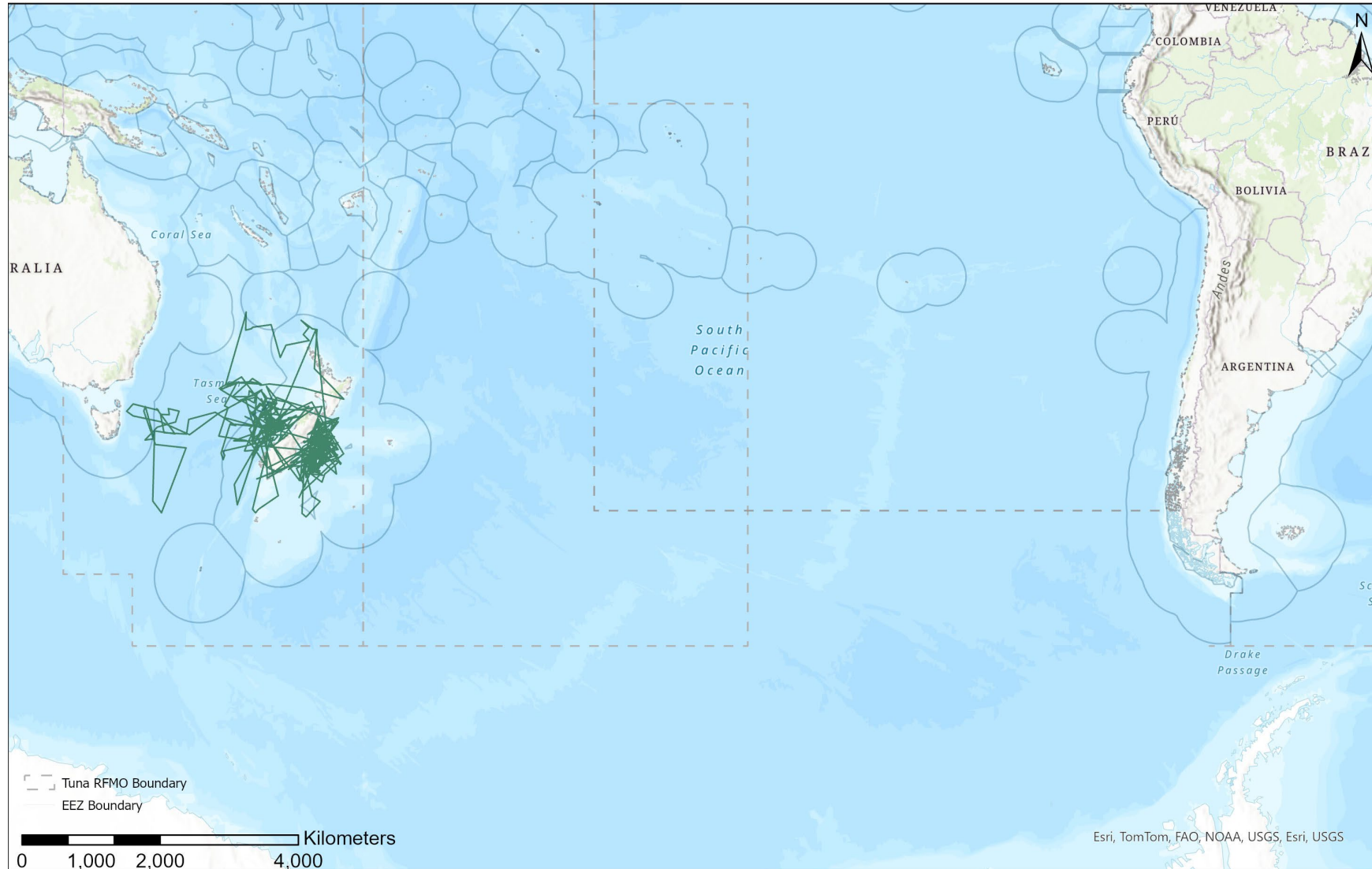
Annual movements of Westland petrels using GLS tracking – bird visiting Argentina EEZ



Annual movements of Westland petrels using GLS tracking: multi-year tracks to Chile and a visit to Australian EEZ



Annual movements of Westland petrels using GLS tracking: no migration to South America!

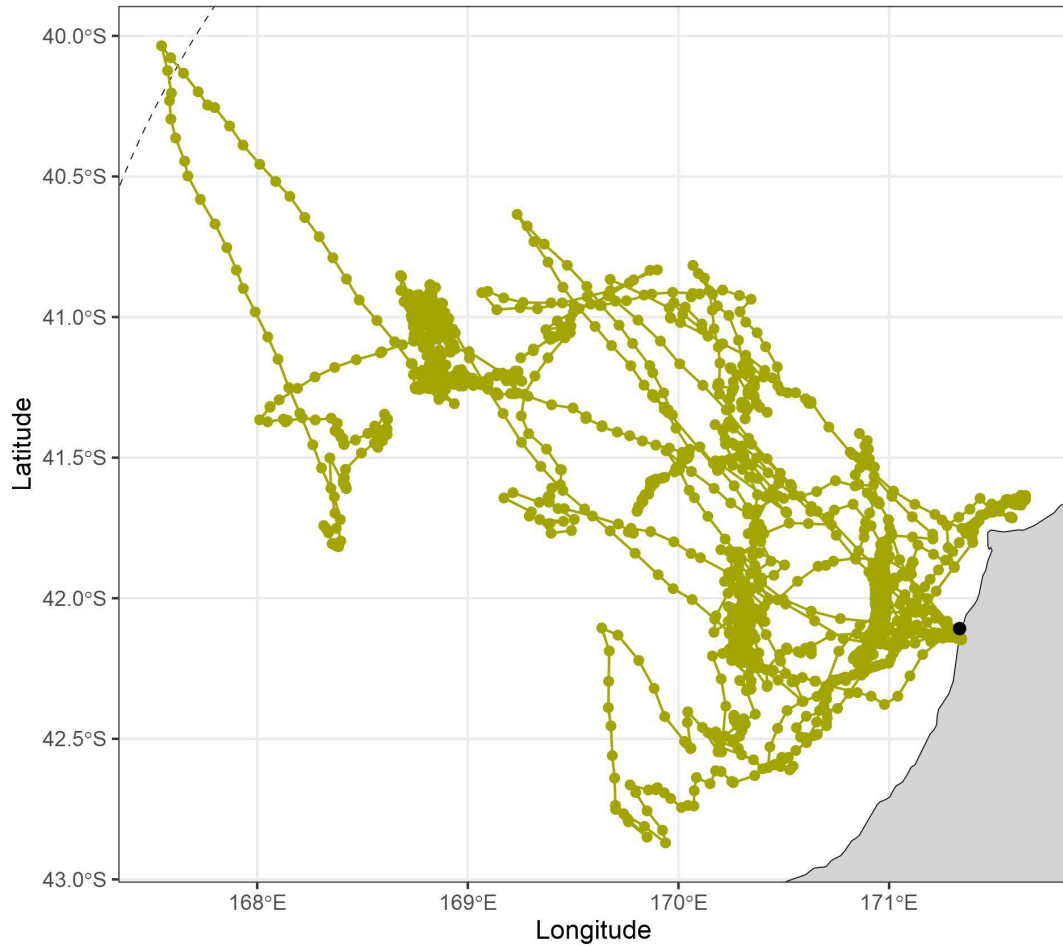


Tracking
Westland
petrels with
GPS tags in
April-June 2024

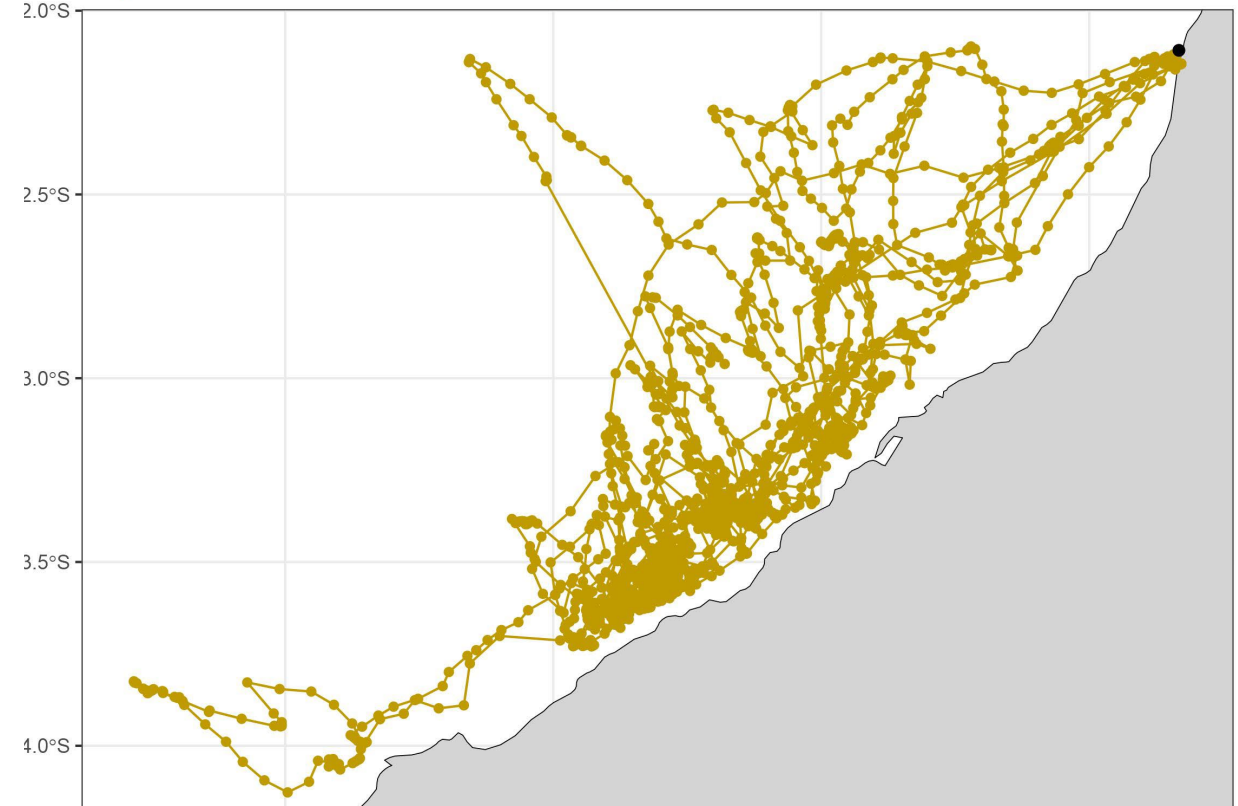


Westland petrel GPS tracking (April-June 2024) - local West Coast movements

Tag ID 0B87: start 2024-04-30 10:01:36, end 2024-06-05 18:57:54

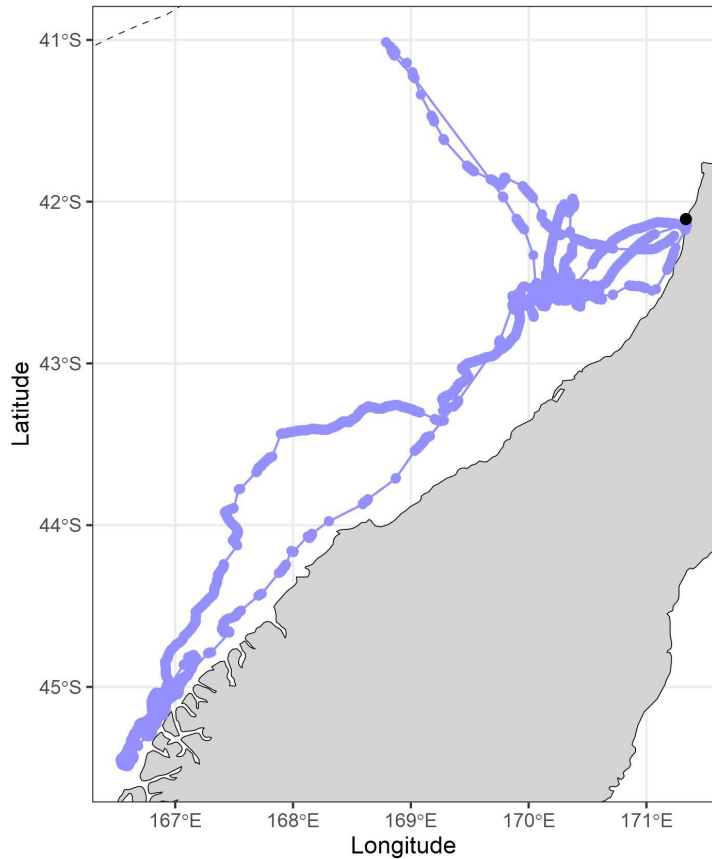


Tag ID 0B81: start 2024-04-30 17:24:48, end 2024-05-31 05:34:42

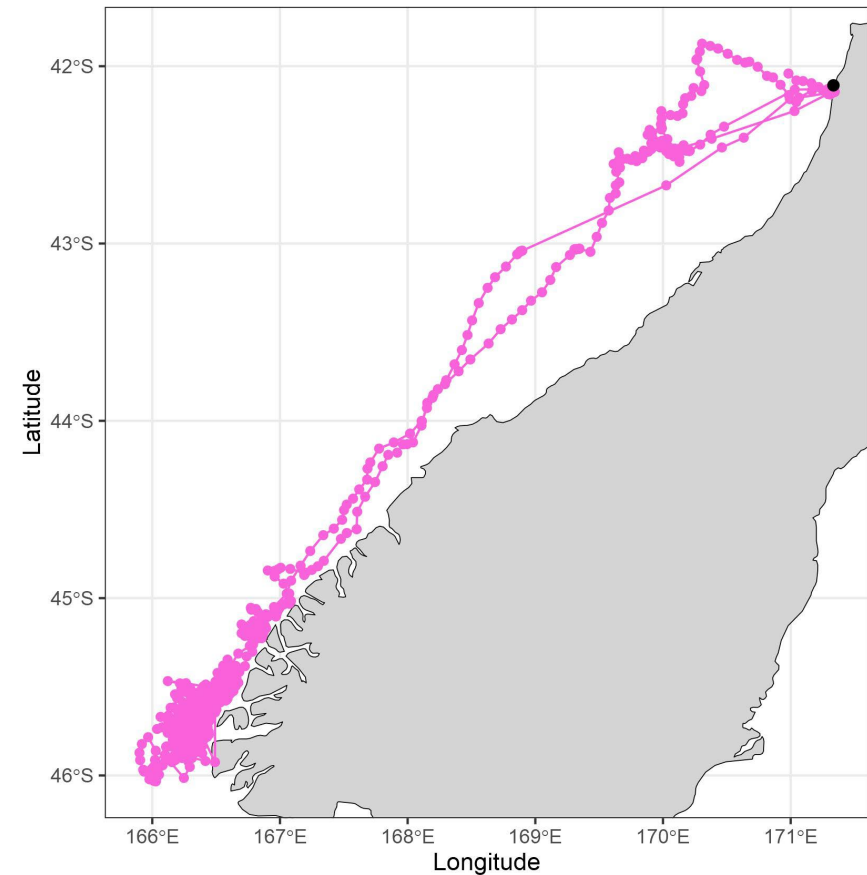


Westland petrel GPS tracking (April-June 2024) - Fiordland movements

Tag ID 0C45: start 2024-06-04 23:45:53, end 2024-06-20 05:57:41

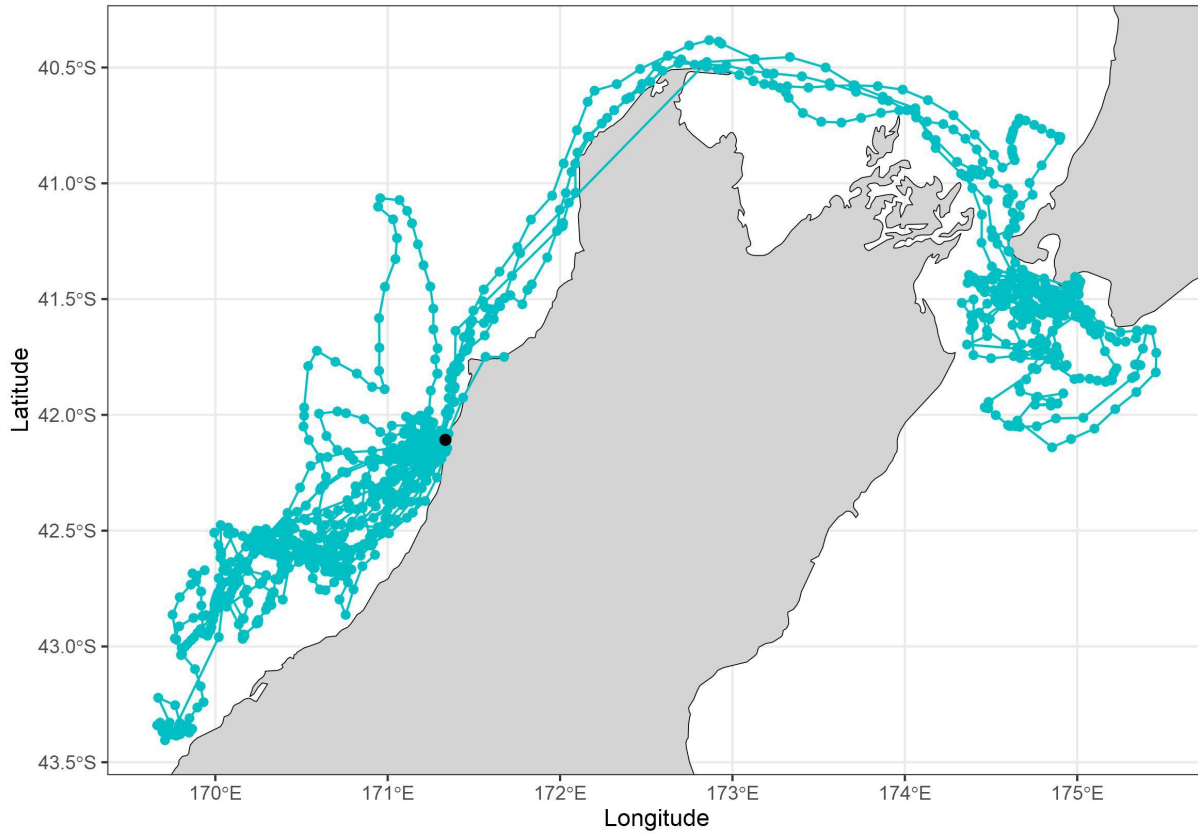


Tag ID 0CA5: start 2024-04-30 13:04:09, end 2024-05-26 20:47:09

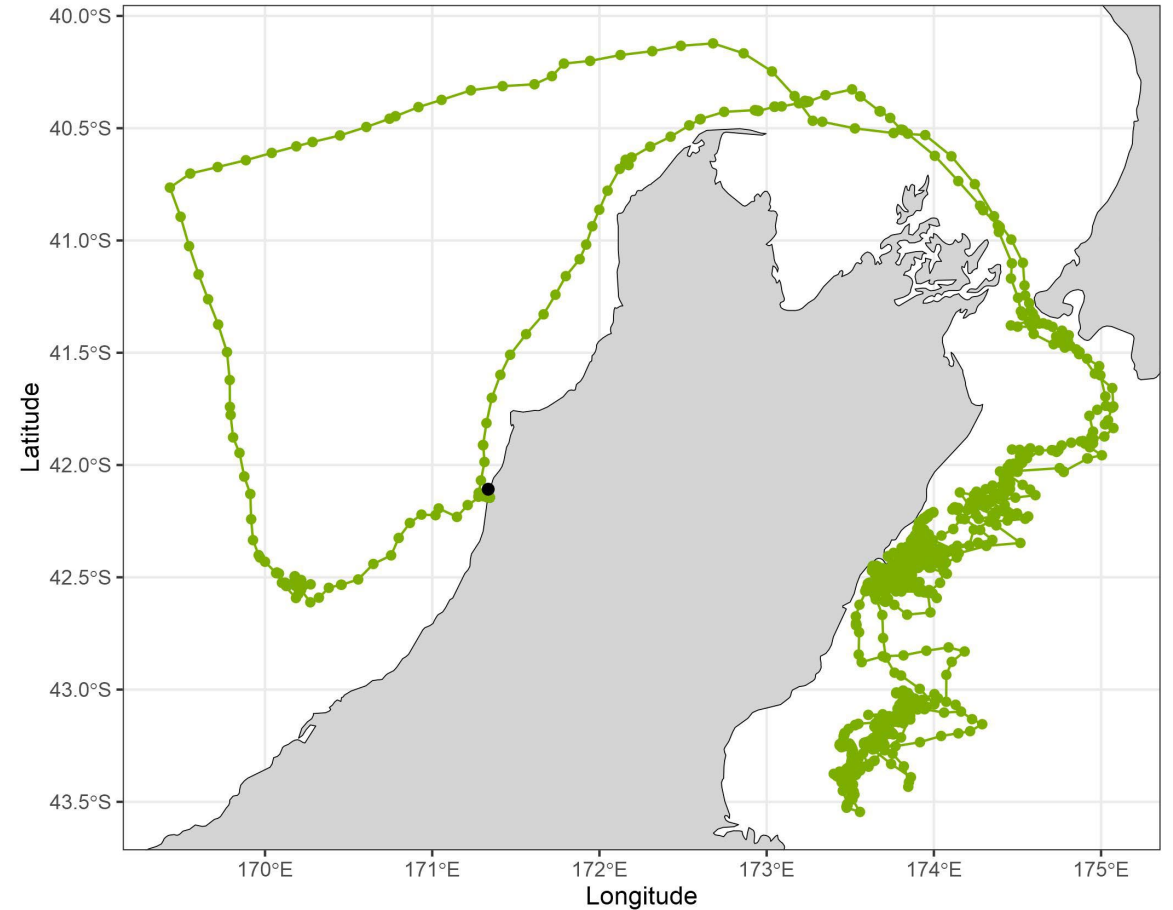


Westland petrel GPS tracking (April-June 2024) - Cook Strait movements

Tag ID 0C33: start 2024-04-30 19:31:37, end 2024-06-05 05:04:19

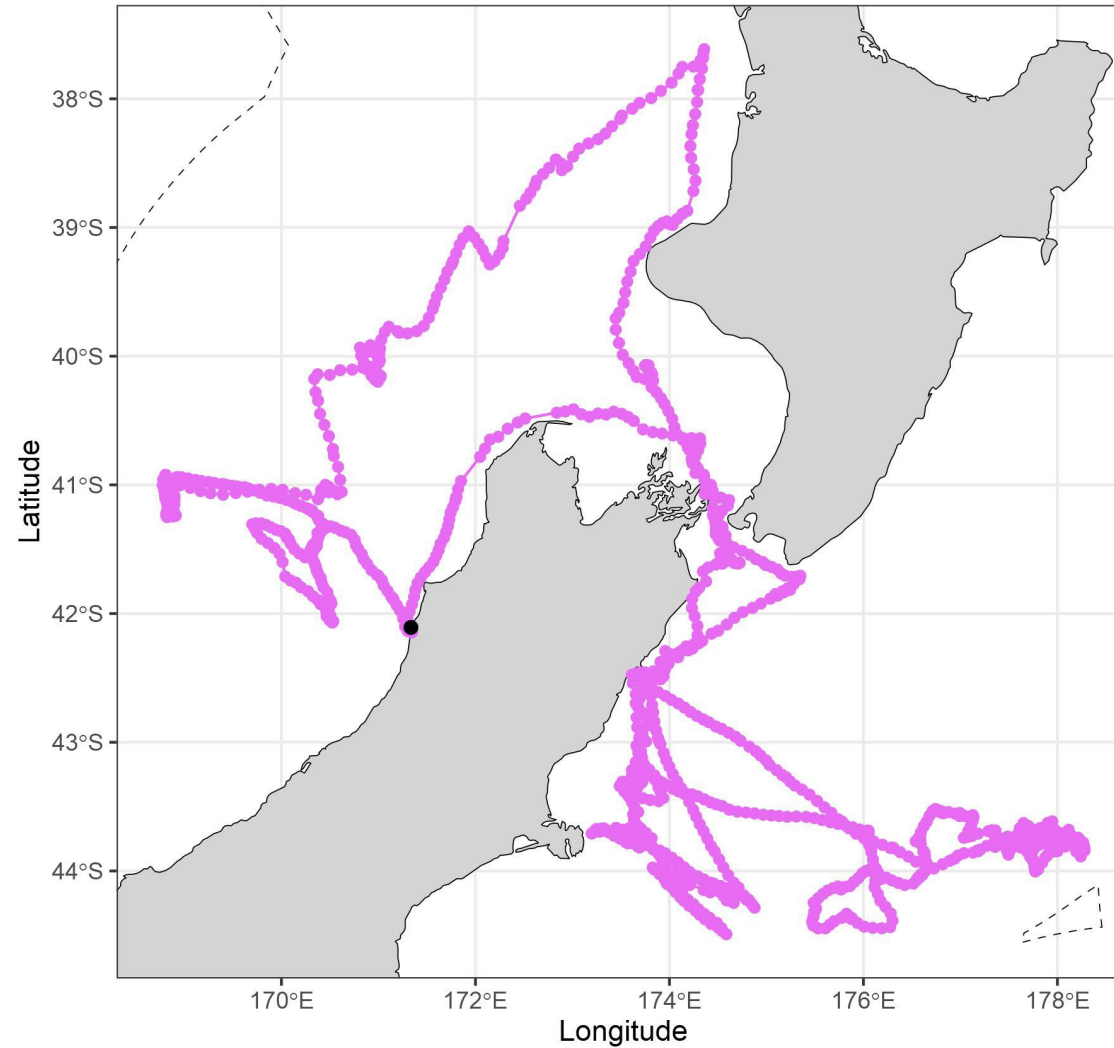


Tag ID 0BAA: start 2024-05-02 17:24:27, end 2024-05-21 11:15:23



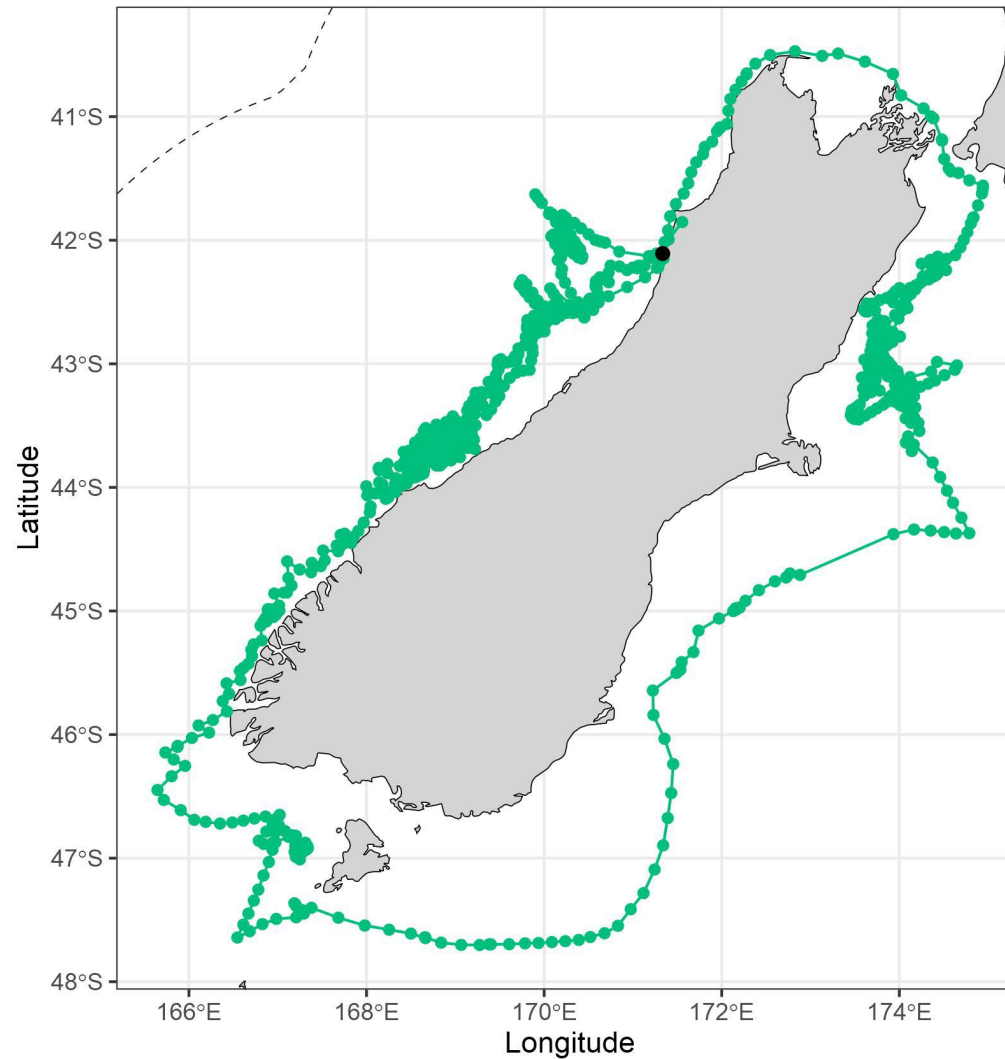
Westland petrel GPS tracking (May-June 2024) - northern and eastern movements

Tag ID OCA3: start 2024-06-06 22:42:57, end 2024-06-24 16:15:56



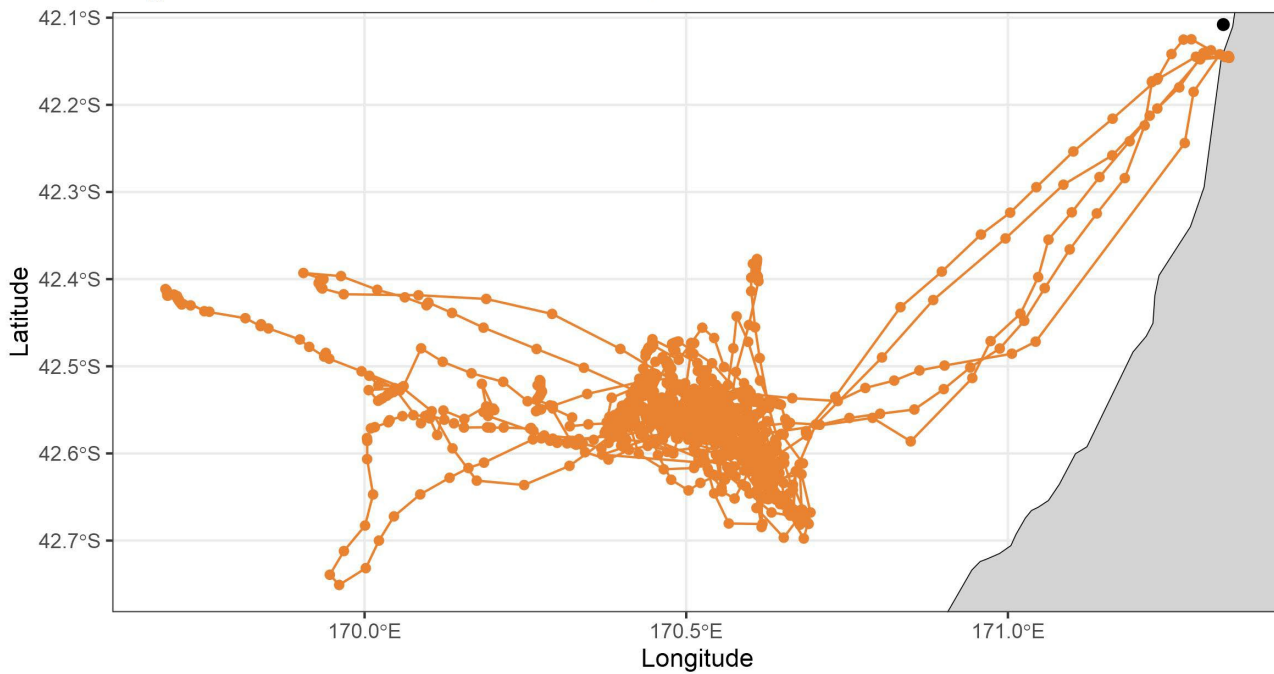
Westland petrel GPS tracking (May-June 2024) - South Island circumnavigation

Tag ID 0C04: start 2024-05-02 18:57:02, end 2024-06-05 04:34:50

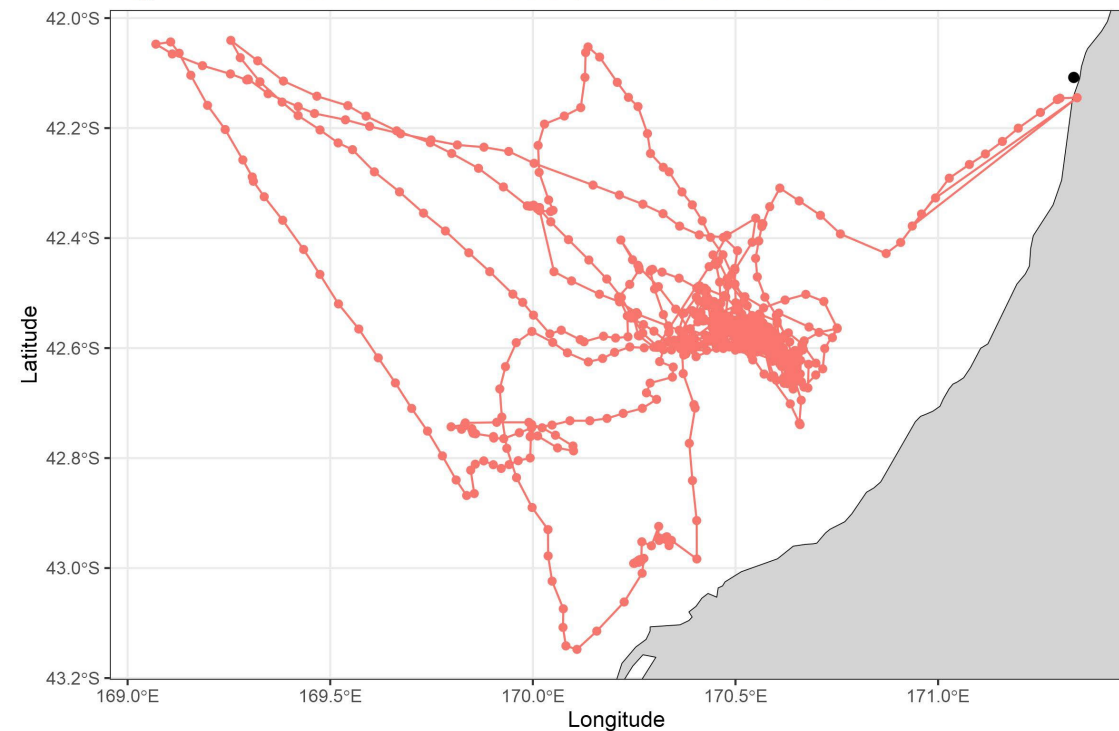


Westland petrel GPS tracking (June 2024) - Incubation period

Tag ID 0810: start 2024-06-06 23:11:09, end 2024-06-27 22:02:21



Tag ID 072B: start 2024-06-06 23:39:55, end 2024-06-17 01:07:29



Key findings

Westland petrel burrow occupancy rates are higher than previous estimates but have been declining over the past 4 seasons

Nest monitoring has shown evidence of declining chick condition and weights

Adults return mainly in April and males spend significantly longer ashore than females in both courtship and incubation periods

GLS tracking confirms the annual adult migration to South America to the seas off Chile and Argentina but some birds don't migrate!

GPS tracking has revealed extensive use of the seas around the South Island, but especially western areas out to the EEZ boundary and also the Cook Strait region



Time Depth Recorders (TDR's)
on Westland petrels

- will be presented by Maria

Acknowledgements

- Special thanks to Matt Charteris for putting in long days and nights attaching tags and retrieving tags from adults feeding chicks
- Thanks to the NZ Fishing Industry for contributing funds to support this research into Westland petrels
- Thanks to nzbirdsonline for supplying some of the images

