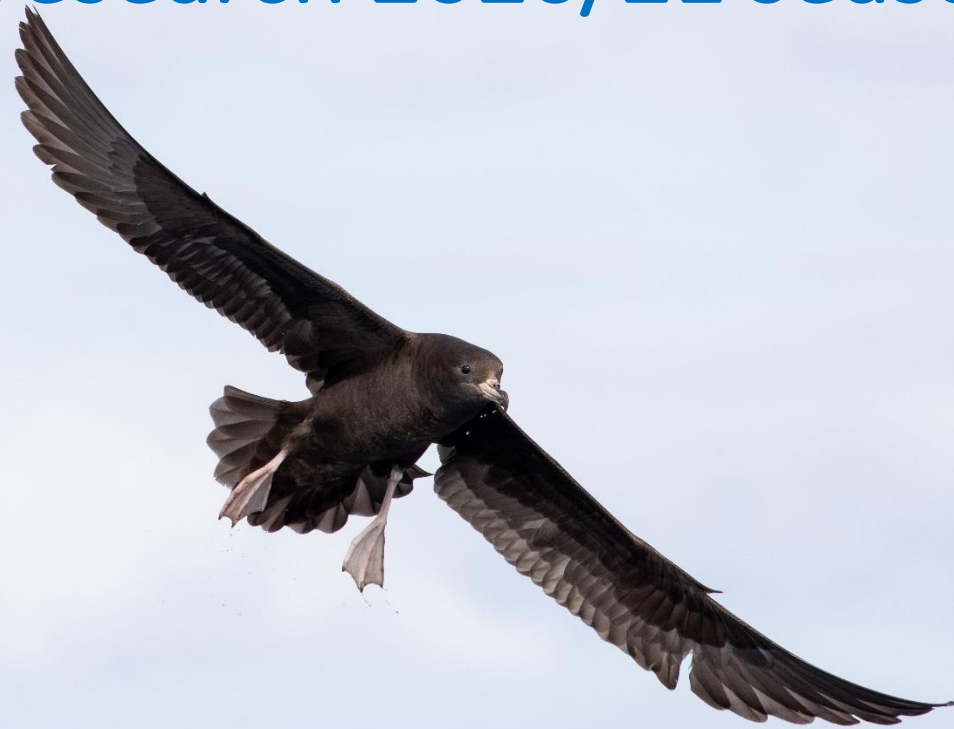


POP2018-04: flesh-footed shearwater research 2020/21 season

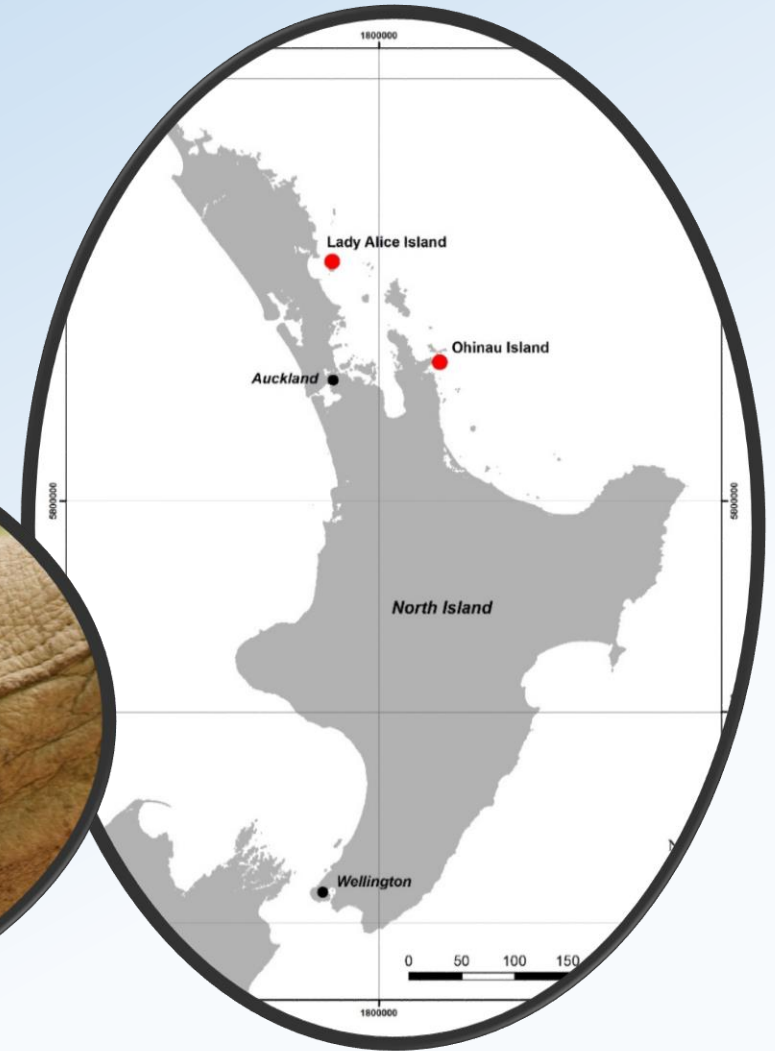


Patrick Crowe

Introduction

- Final year of three-year project
- Long-term population monitoring studies at two sites
- Update population estimates from five breeding sites
- Simultaneously tracking of breeding adults from both Ohinau and Lady Alice

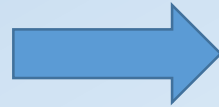
Demographic Study – Ohinau and Lady Alice



Burrows Monitored

Study Burrows Monitored

- Ohinau 270
- Lady Alice 290



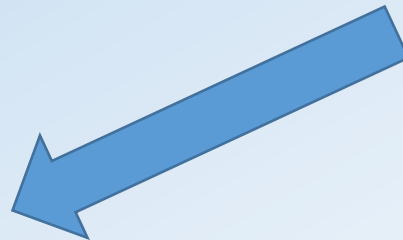
Breeding Occupancy

- Ohinau 204 (76%)
- Lady Alice 166 (57%)



Egg-laying dates

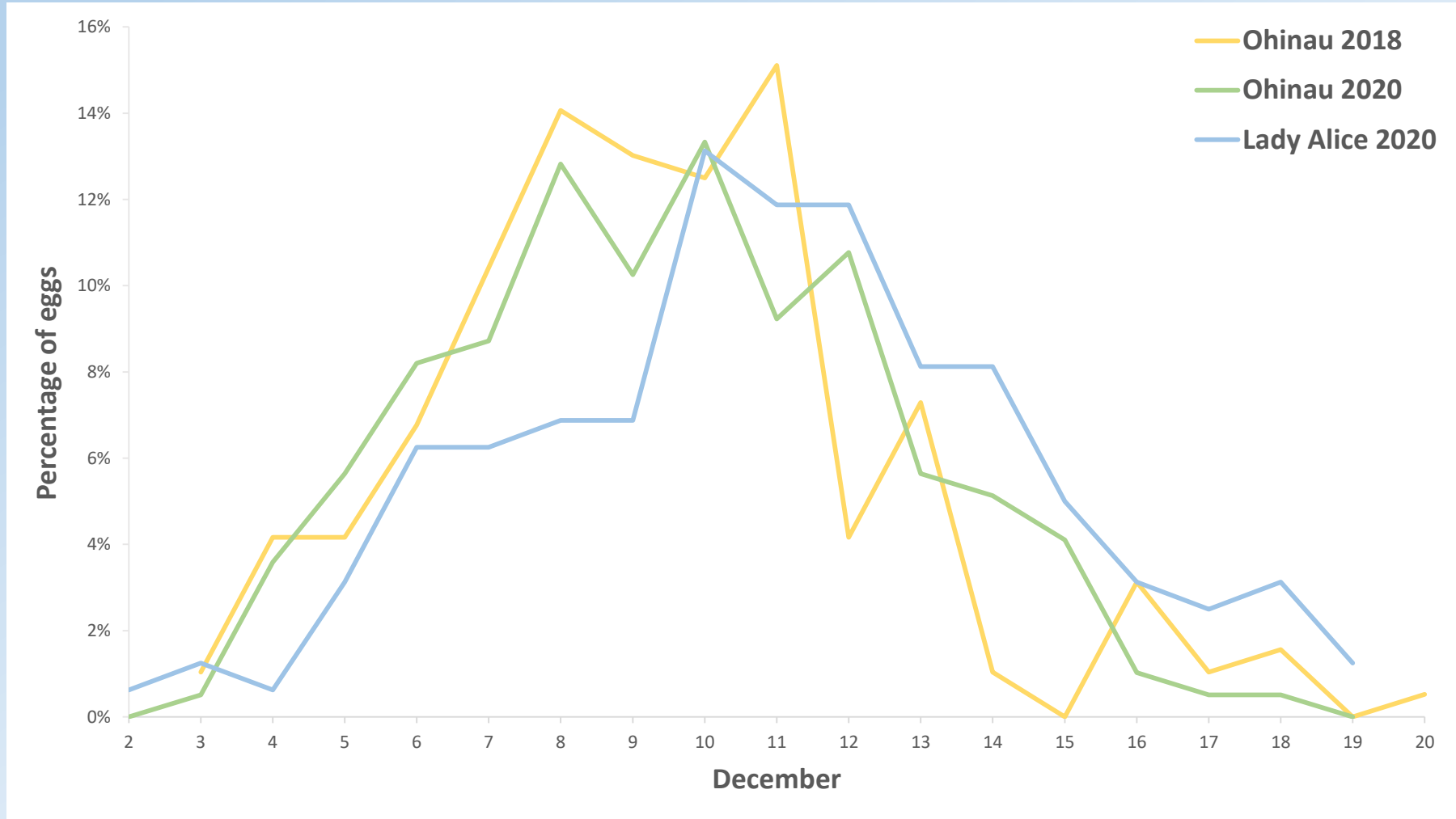
- Ohinau 195 (96%)
- Lady Alice 159 (96%)



Breeding birds ID'd

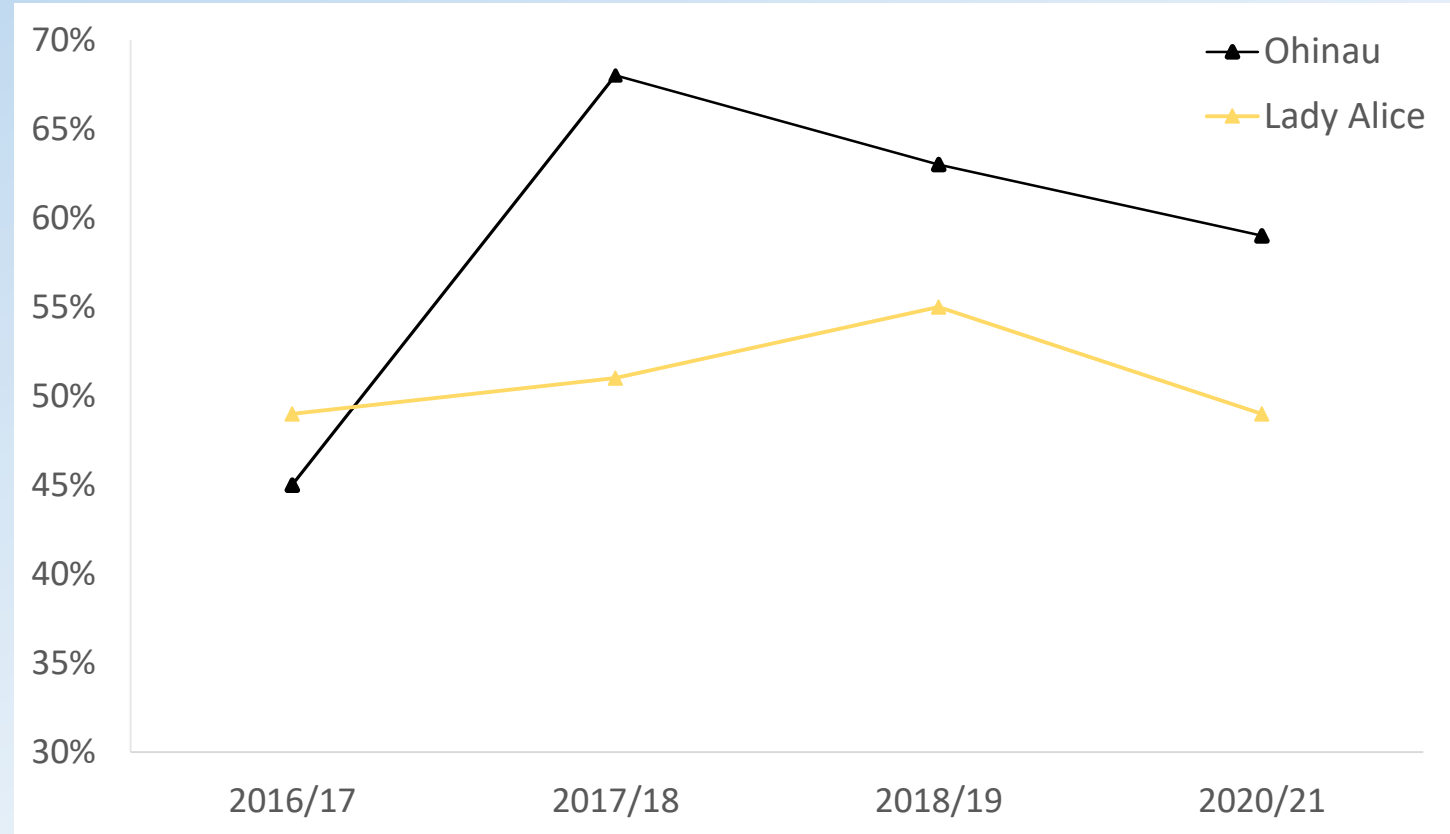
- Ohinau 80%
- Lady Alice 75%

Egg Laying



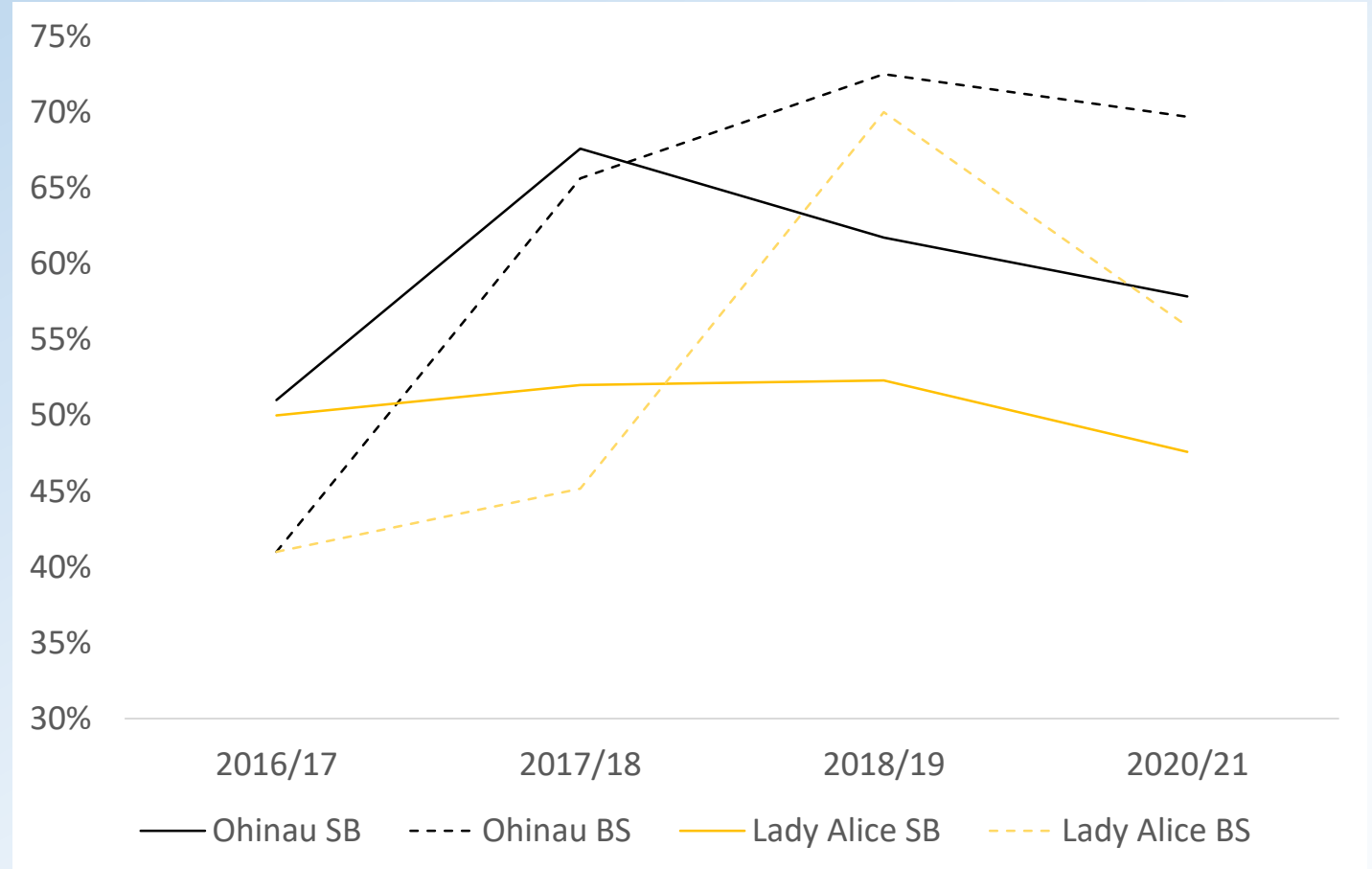
Breeding Success

- Ohinau Island 58%
- Lady Alice Island 48%



Breeding Success

- Lower in study burrows compared to control burrows for previous two seasons



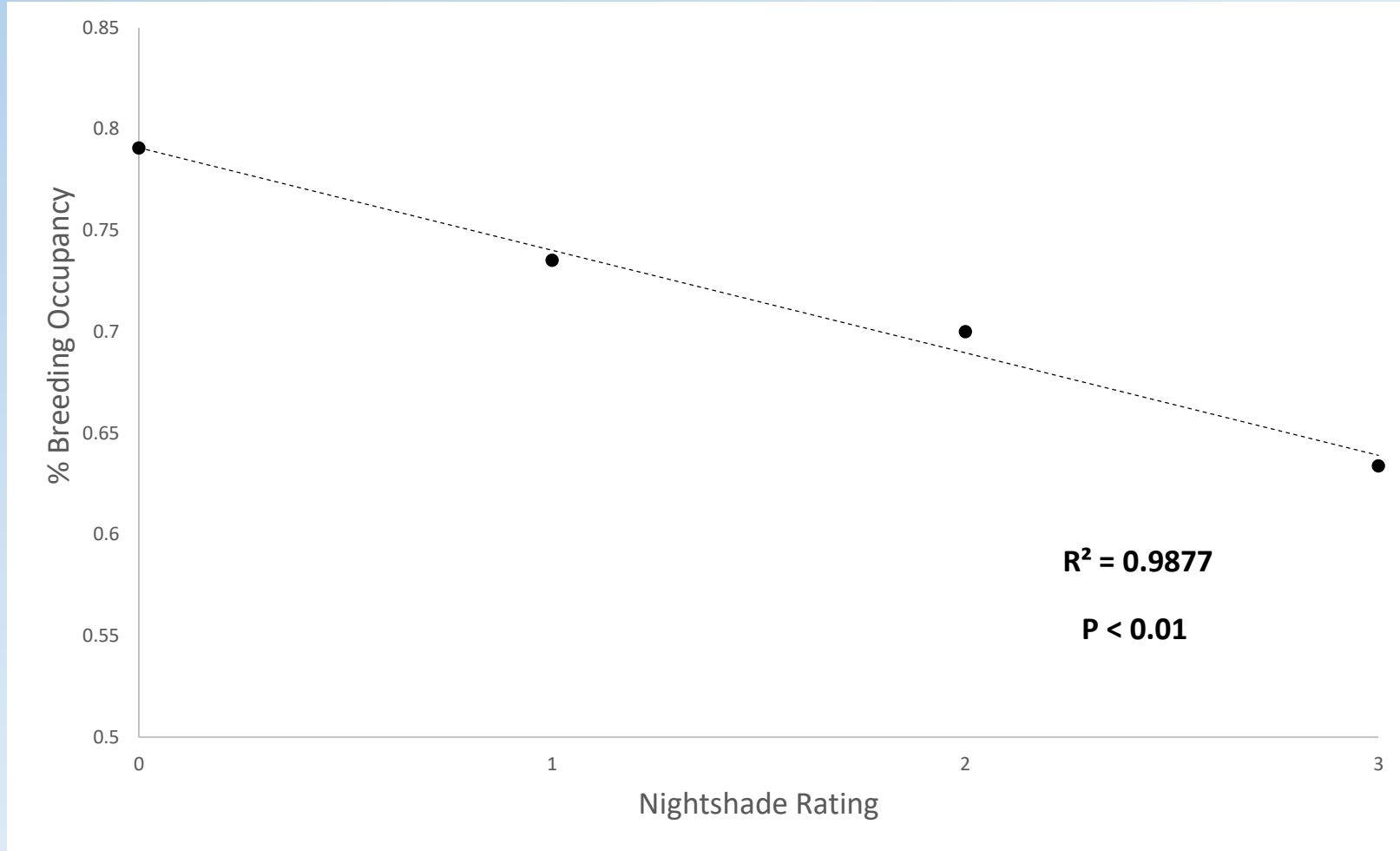
Māhoe die-off



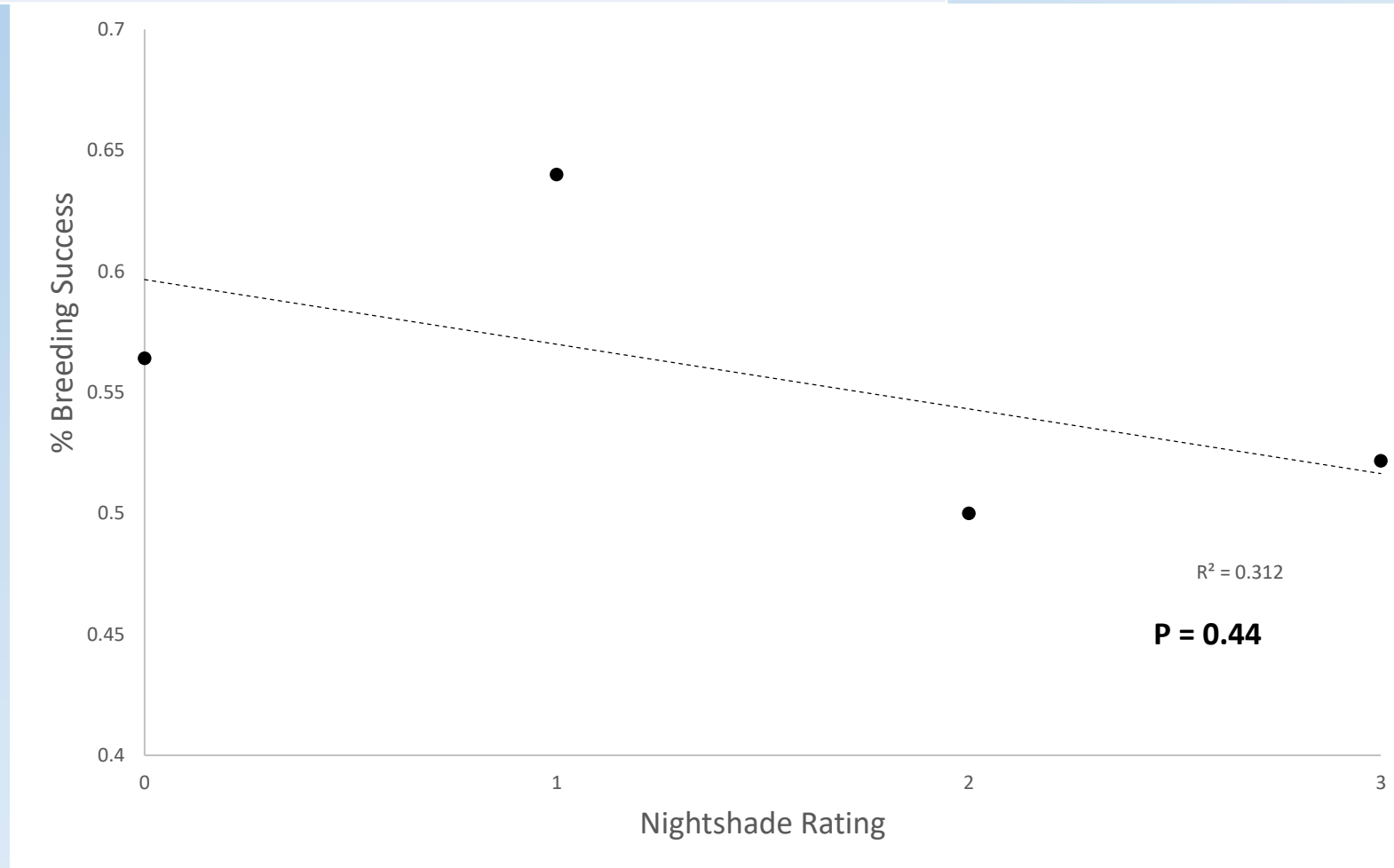




Rating	Description
0	Burrow mouth and surrounding area not affected
1	A small amount of nightshade around mouth and surrounding area
2	A moderate amount of nightshade around mouth and surrounding area
3	Burrow mouth and surrounding area completely covered with nightshade



Rating	Description
0	Burrow mouth and surrounding area not affected
1	A small amount of nightshade around mouth and surrounding area
2	A moderate amount of nightshade around mouth and surrounding area
3	Burrow mouth and surrounding area completely covered with nightshade



Banded birds

Ohinau	2020/21	Total (2016-2021)
Adults	188	1668
Chicks	127	1111
Total	315	2779
Lady Alice		
Adults	38	706
Chicks	110	390
Total	148	1096
Total birds banded during study (2016-2021)		3875

Recaptured Birds

- 70–80% annual breeders
- 16 individuals breeding on Lady Alice 26+ years old
- Five individuals banded as chicks in 2015/16 recaptured on Ohinau last season
 - Age at first return = 4 y/o
- Two more individuals captured this season
 - Age at first return = 5 y/o

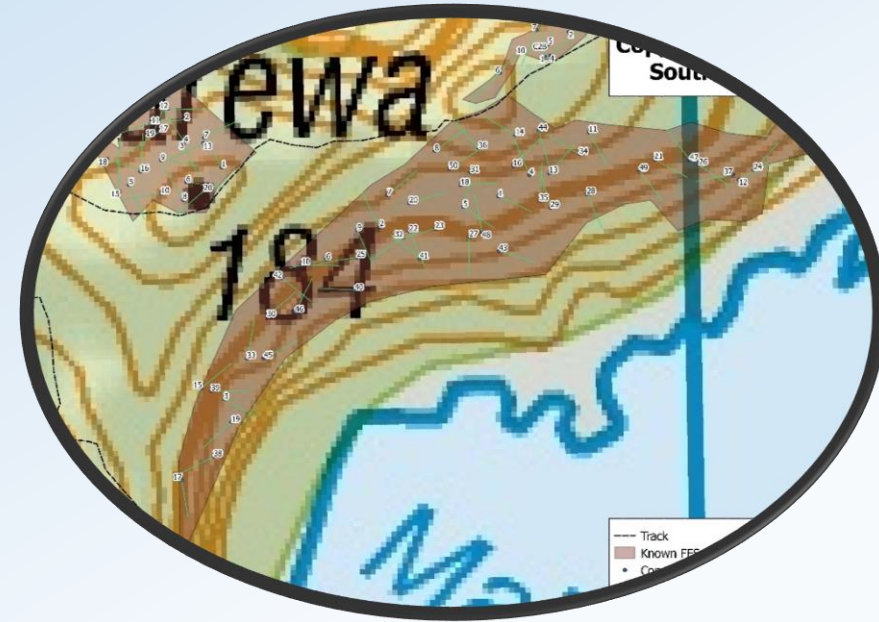


Summary



- Further monitoring to determine long-term breeding success and target recaptures for adult survival, recruitment, age at first return/breeding
- Recapture rate of adults now high enough to estimate adult survival
- Māhoe die-of/nightshade growth likely to be ongoing issue on Ohinau Island

Population Estimates – Coppermine, Whatupuke and Taranga



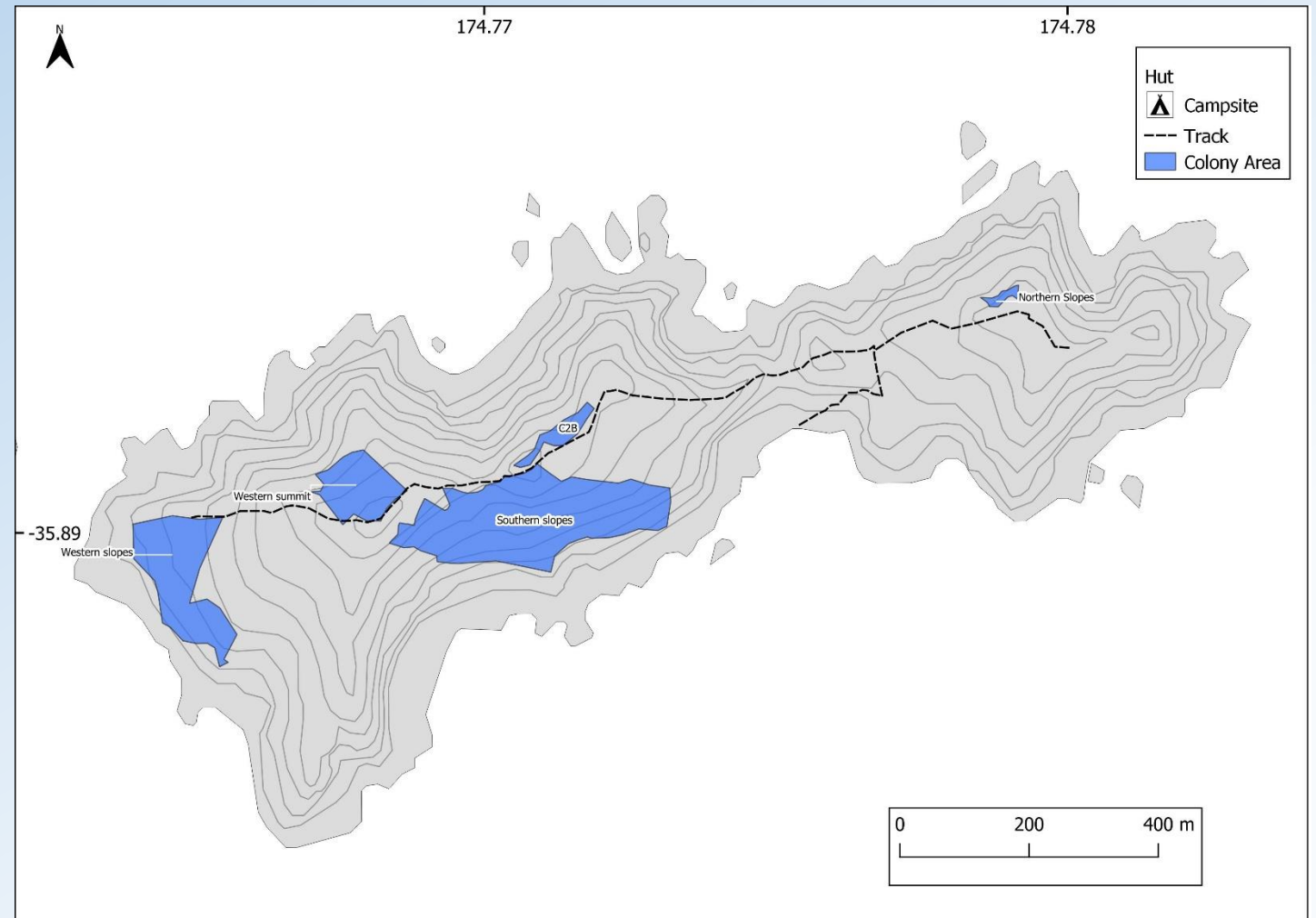
Population Estimates - Methods

- Randomised transects within known colonies
- Burrowscoping burrows on transects to determine occupancy
- Early-mid January trip
 - After egg-laying finished but before hatching
- Mapping colony boundaries to calculate 3D surface area of each colony



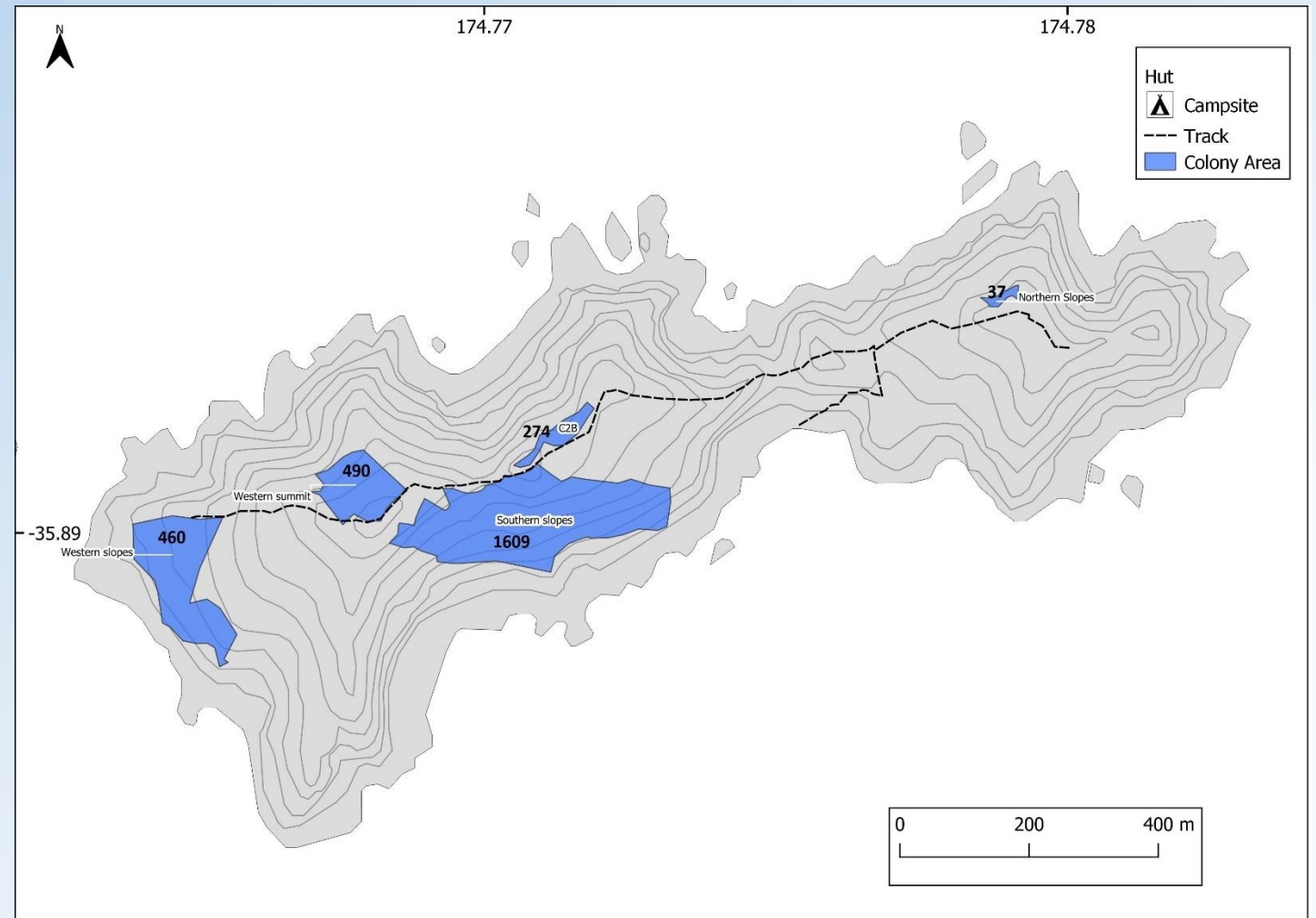
Population Estimates – Coppermine Island

- 99x 30m (60m²) transects
- Five Colonies
 - One new colony
- 6000m² sampled
- 439 burrows counted
- 180 burrowscoped



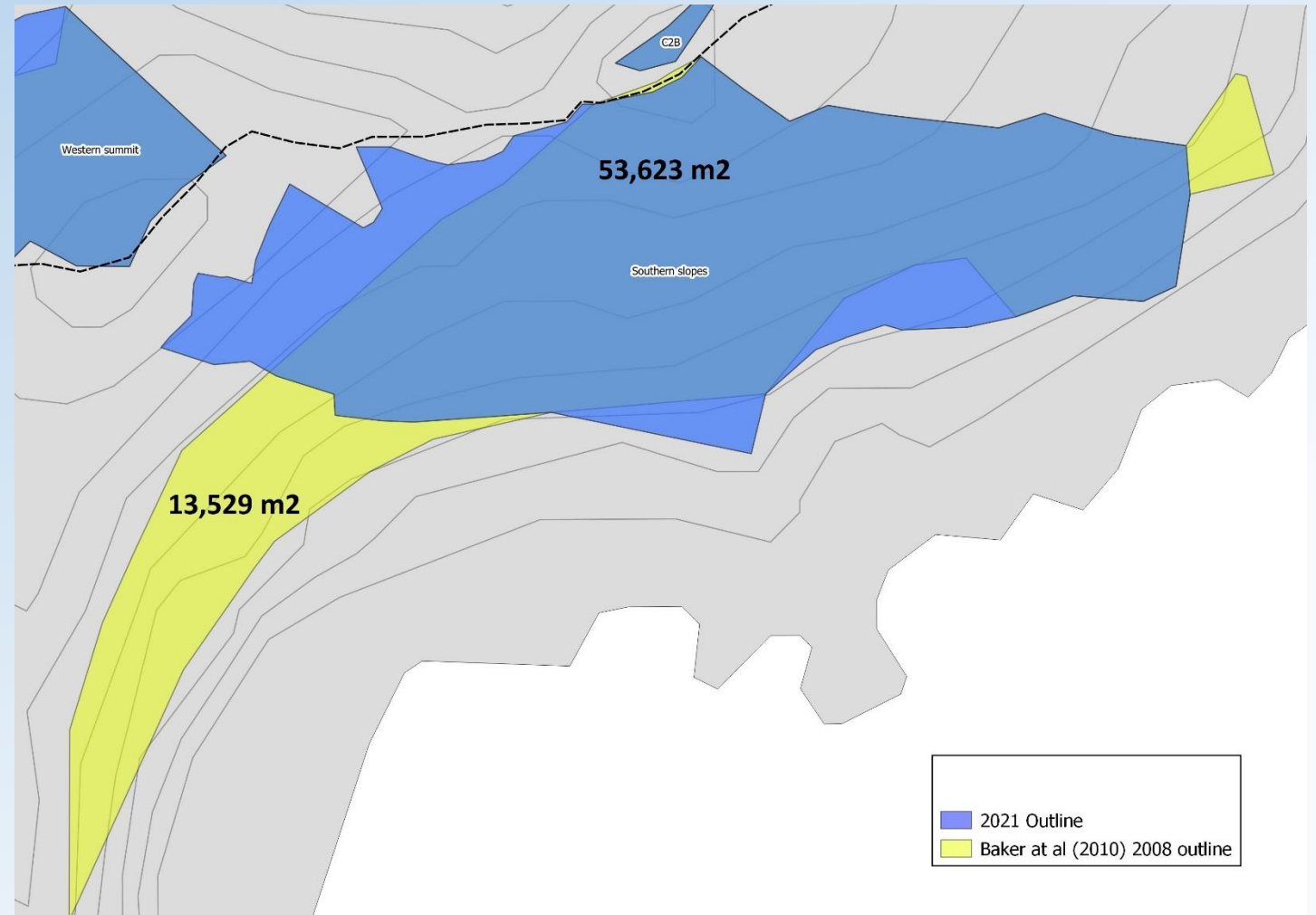
Population Estimates – Coppermine Island

- Burrow density varied between colonies
- Relatively high occupancy across all colonies
- 2,869 (2,142 – 3,597, 95% CI) occupied burrows



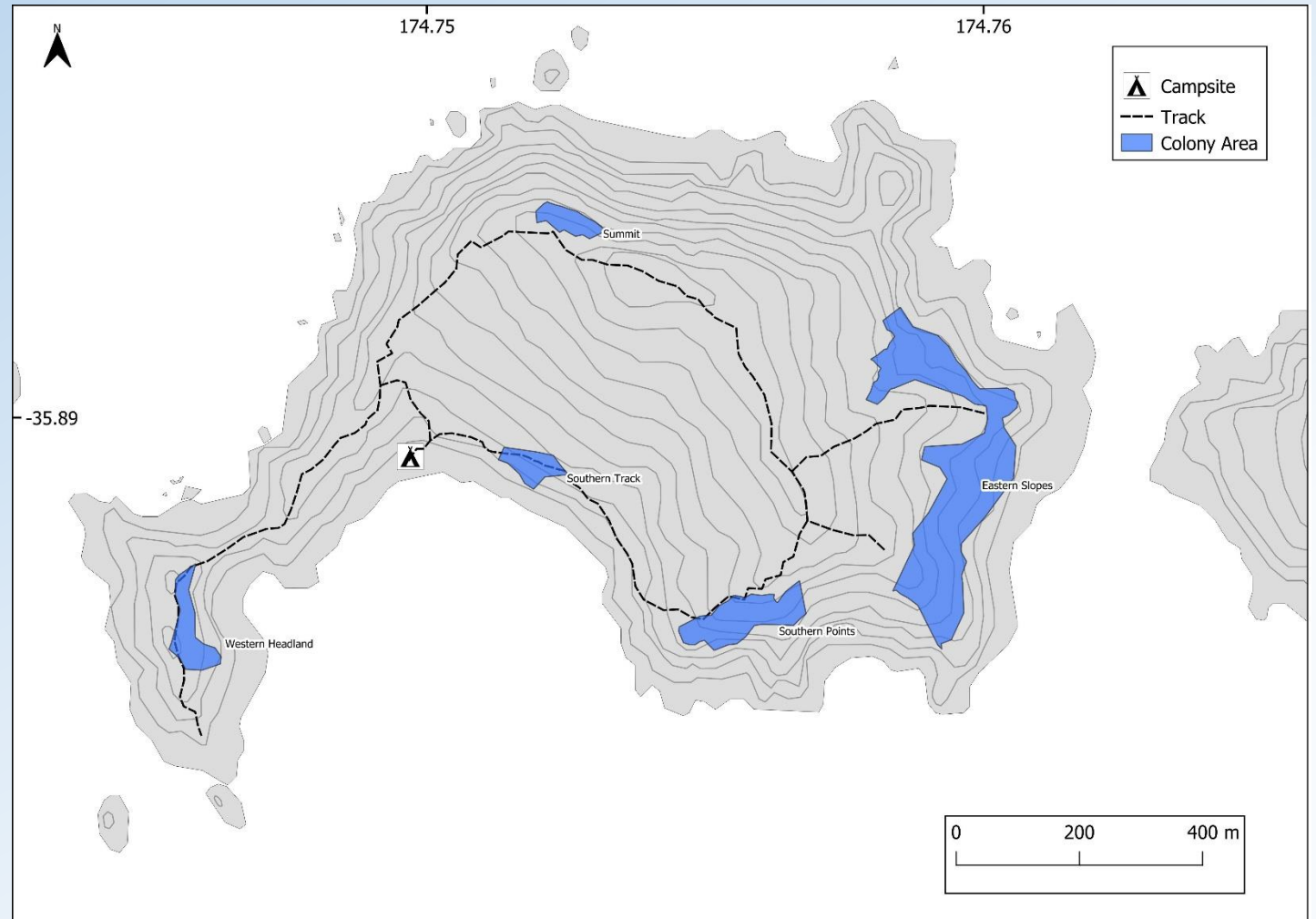
Population Estimates – Coppermine Island

- Twice as high as Baker *et al.* (2010) estimate
 - 2,869 vs 1,425
- Burrow density and occupancy relatively similar
- Calculated colony areas vastly different



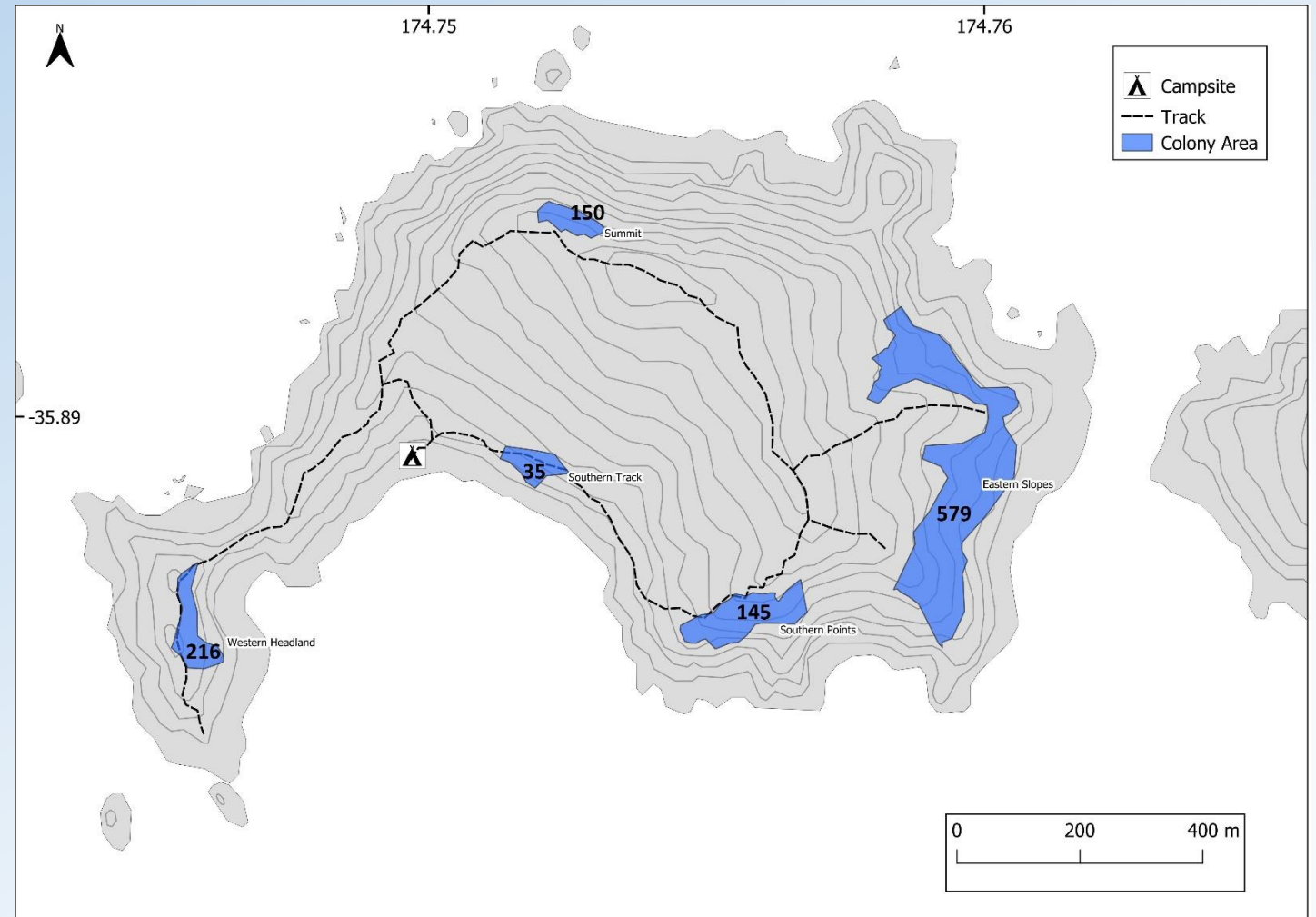
Population Estimates – Whatupuke Island

- 120 x 30m (60m²) transects
- Five Colonies
 - Two new colonies
- 6000m² sampled
- 299 burrows counted
- 287 burrowscoped



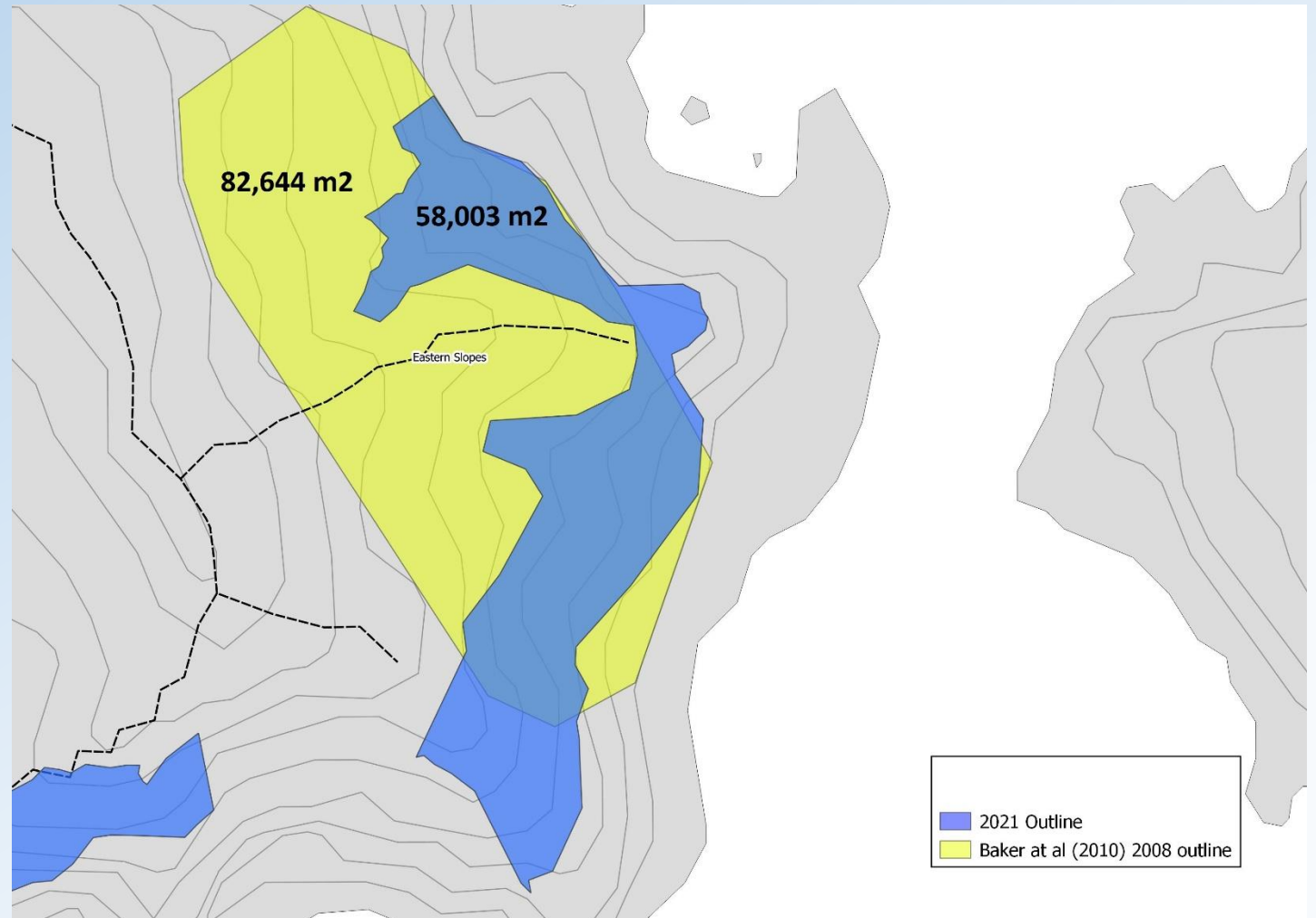
Population Estimates – Whatupuke Island

- Burrow density consistent between colonies
- Occupancy varied across island
 - High at Summit and Western Headland
 - Low elsewhere
- 1,125 (647– 1,603, 95% CI) occupied burrows



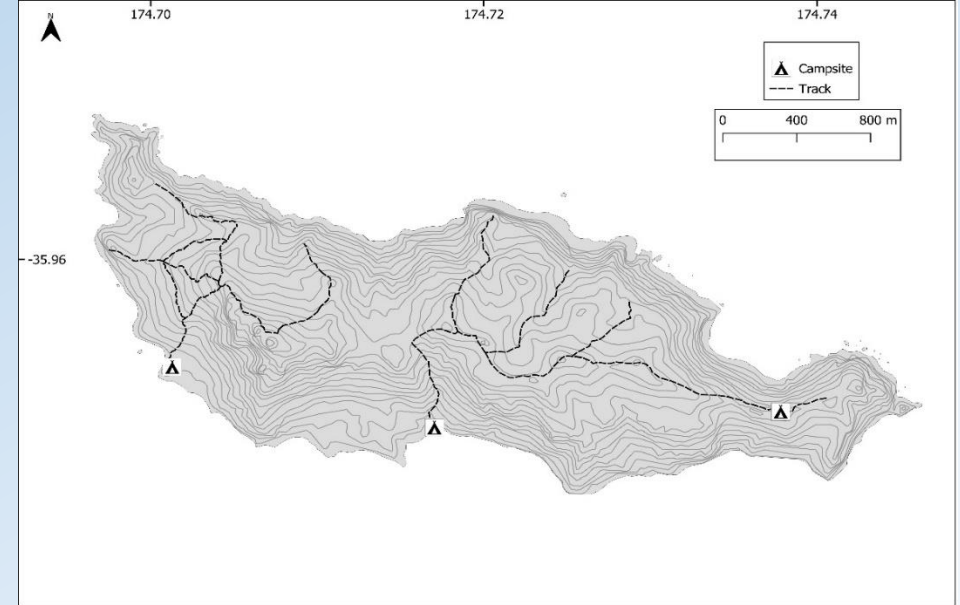
Population Estimates – Whatupuke Island

- Slightly lower than Baker *et al.* (2010) estimate
 - 1,125 vs 1,210
- Primarily due to difference in eastern slopes colony
 - 579 vs 1,012
 - Rest of colonies same or higher
- Baker *et al.* (2010) much less time spent on Whatupuke

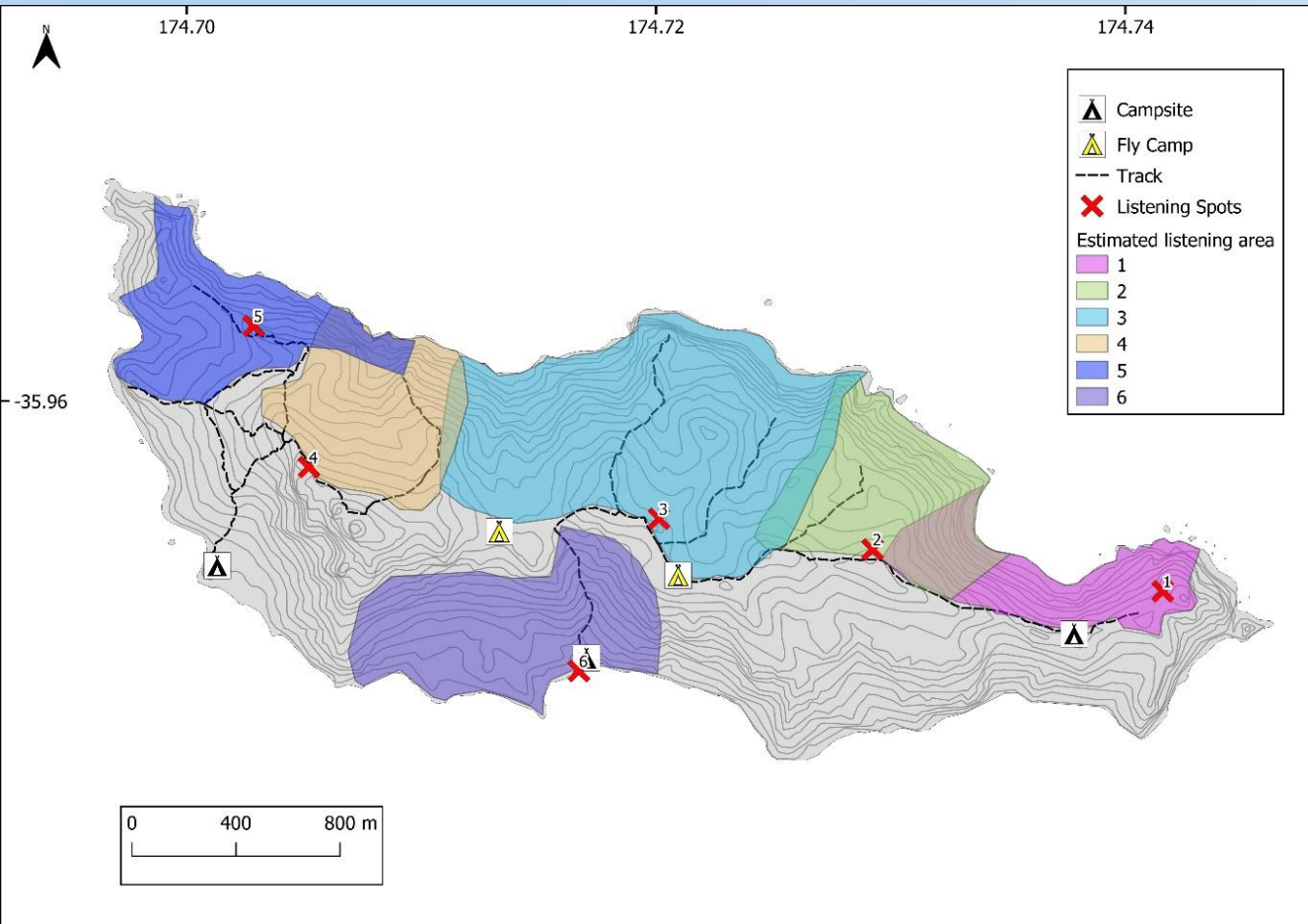


Population Estimates – Taranga

- No known flesh-footed shearwater colonies
- Mid-Late January Trip
 - Night listening for birds
 - Daytime ground searches
- Focussed mainly on east and north sides of island



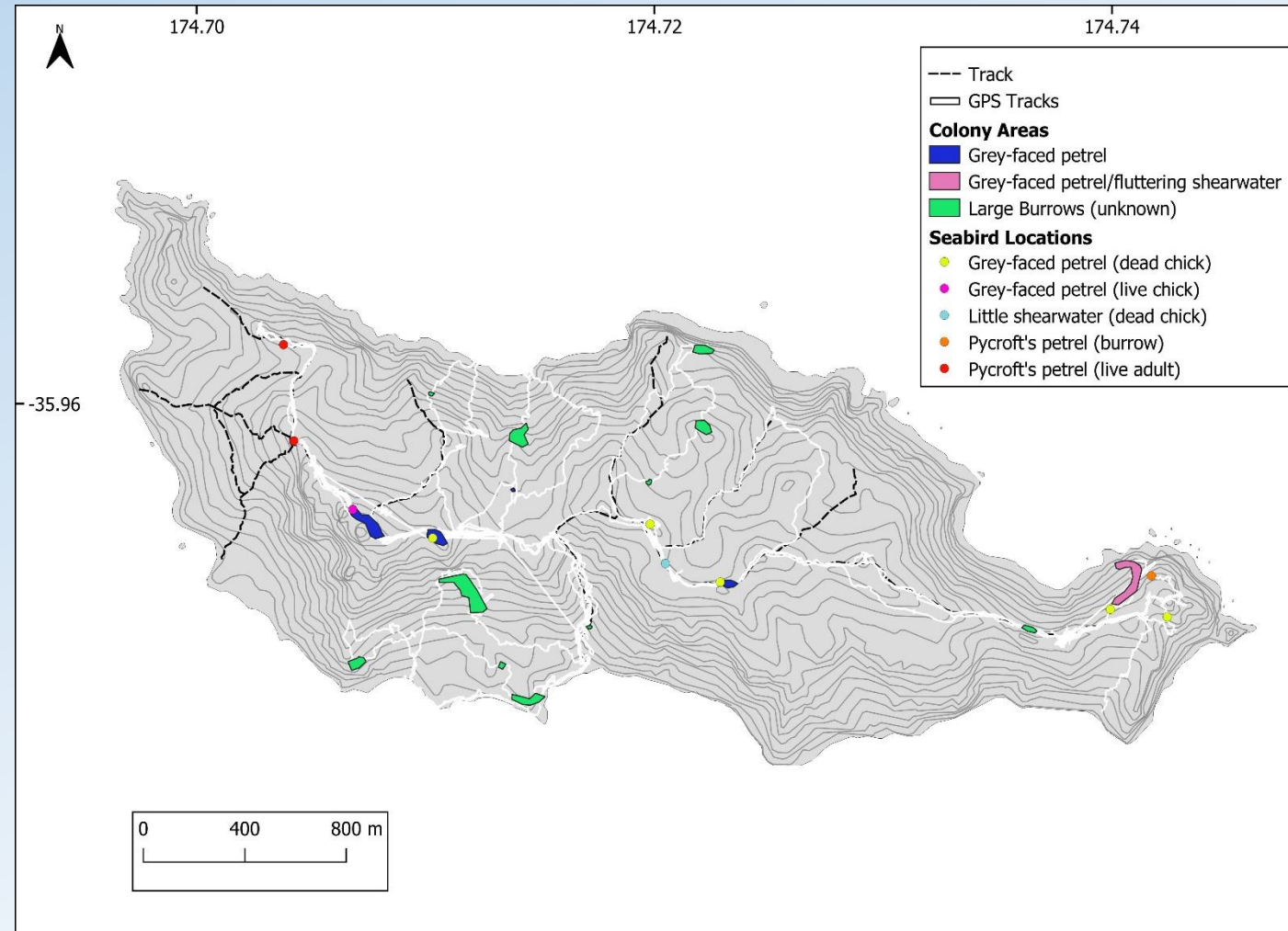
Population Estimates – Taranga



Listening Spot	Date	Flesh-footed shearwater	Pycroft's Petrel	Fluttering Shearwater
1	22/01/2021	0	1	0
2	23/01/2021	0	2	0
3	24/01/2021	0	2	1
4	25/01/2021	0	3	1
5	26/01/2021	0	3	0
6	27/01/2021	0	4	1

Population Estimates – Taranga

- Daytime ground searches for burrowed areas
- Several small burrowed areas found but no flesh-footed shearwaters
 - Most empty
 - Some evidence of grey-faced petrel and fluttering shearwater
 - Few Pycroft's petrel



Population Estimates - Conclusions

- No flesh-footed shearwaters on Taranga
- Difficult to say whether Coppermine and Whatupuke populations are trending up or down
 - Possibility to reanalyse Baker *et al.* (2010) transect data with better colony area calculations

Summary – Population Estimates

Island Group	Island	Current Estimate			Previous Estimate			Difference
		Year	Estimated Occupied Burrows	95% Confidence Interval	Year	Estimated Occupied Burrows	95% Confidence Interval	
<i>Mercury Islands</i>	Middle Island	2017	5822	2400 - 9244	2003	3000	N/A	2822
	Ohinau Island	2018	4007	3044 - 4791	2009	2071	943 - 3200	1936
<i>Sugarloaf Islands</i>	Motumahanga Island	2019	562	N/A	1989	100	N/A	462
<i>Hen & Chicken Islands</i>	Lady Alice Island	2019	3217	2180 - 4255	2007-09	921	237 - 1605	2296
	Whatupuke Island	2021	1125	647 - 1603	2008	1210	36 - 2384	-124
	Coppermine Island	2021	2869	2142 - 3597	2008-09	1425	1059 - 1791	1444
	Taranga/Hen Island	2021	0	N/A	1991	0	N/A	0

Recommendations Moving forward...

- Continue demographic study on Ohinau and Lady Alice Islands
 - Large number of birds banded to aid
- Continue to update population estimates
 - Titi Island (Marlborough Sounds)
 - Green Island (Mercury Islands)
 - Mautaha and other small Chicken group islands



Acknowledgements

This project was funded by the Conservation Services Programme, Department of Conservation project POP2018-04, partially through a levy on the quota owners of the relevant commercial fish stocks. **Special thanks to:**

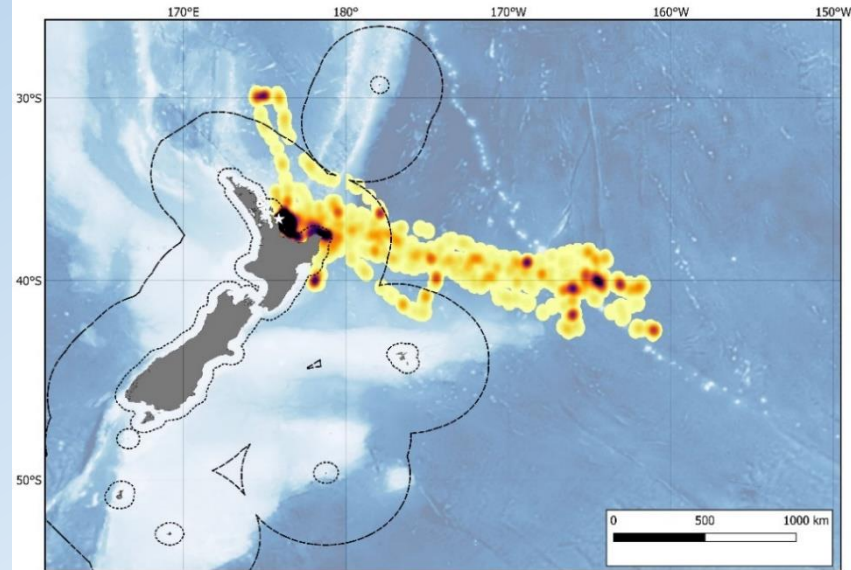
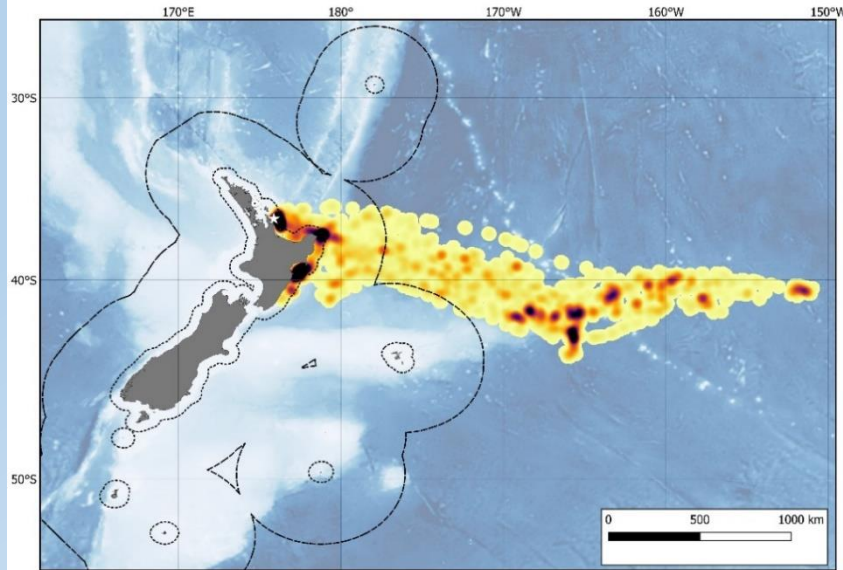
- Dan Burgin, Samantha Ray, Hinewai Bell, Baylee Connor-McClean, Keegan Miskimmin and Ayla Wiles **for assisting with fieldwork this season**
- Graeme Taylor, Evan Davies and James Blackmore all from **DOC for their various support**
- Ngatiwai and Ngati Hei **for granting access to the Islands**



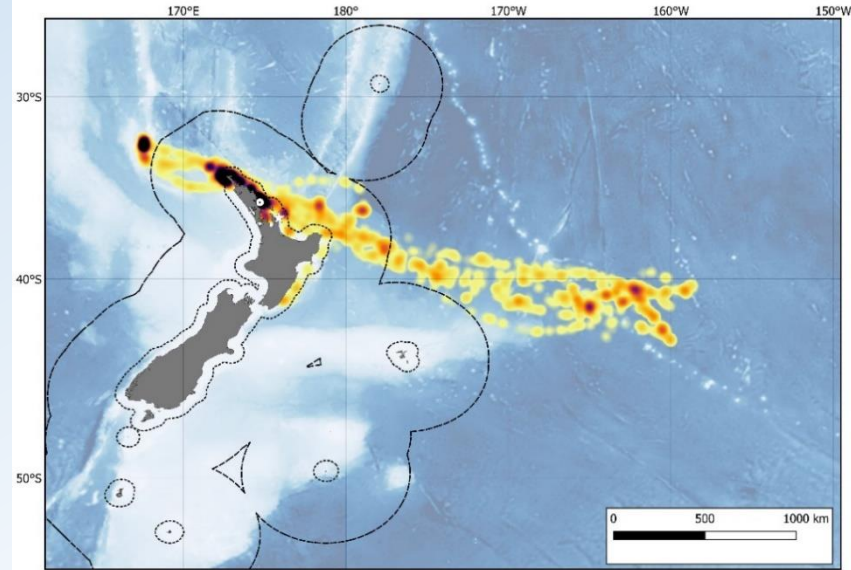
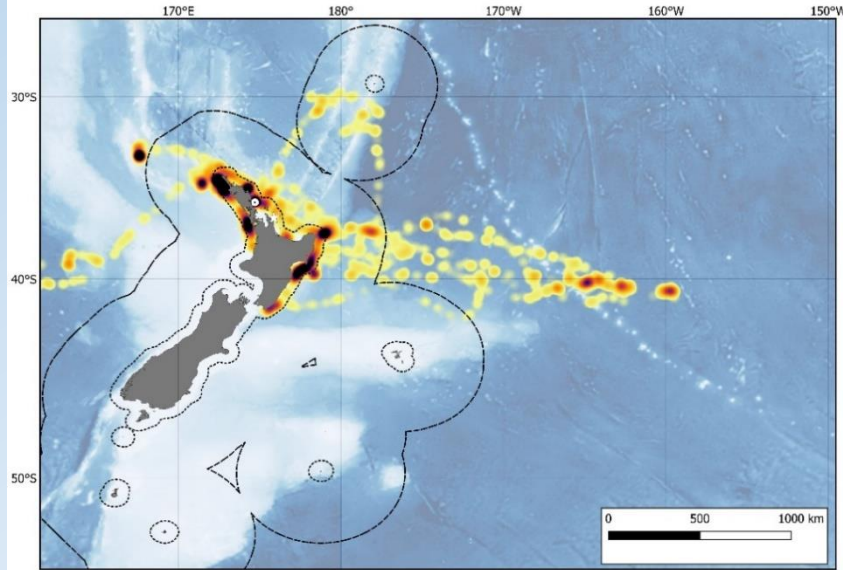
Incubation

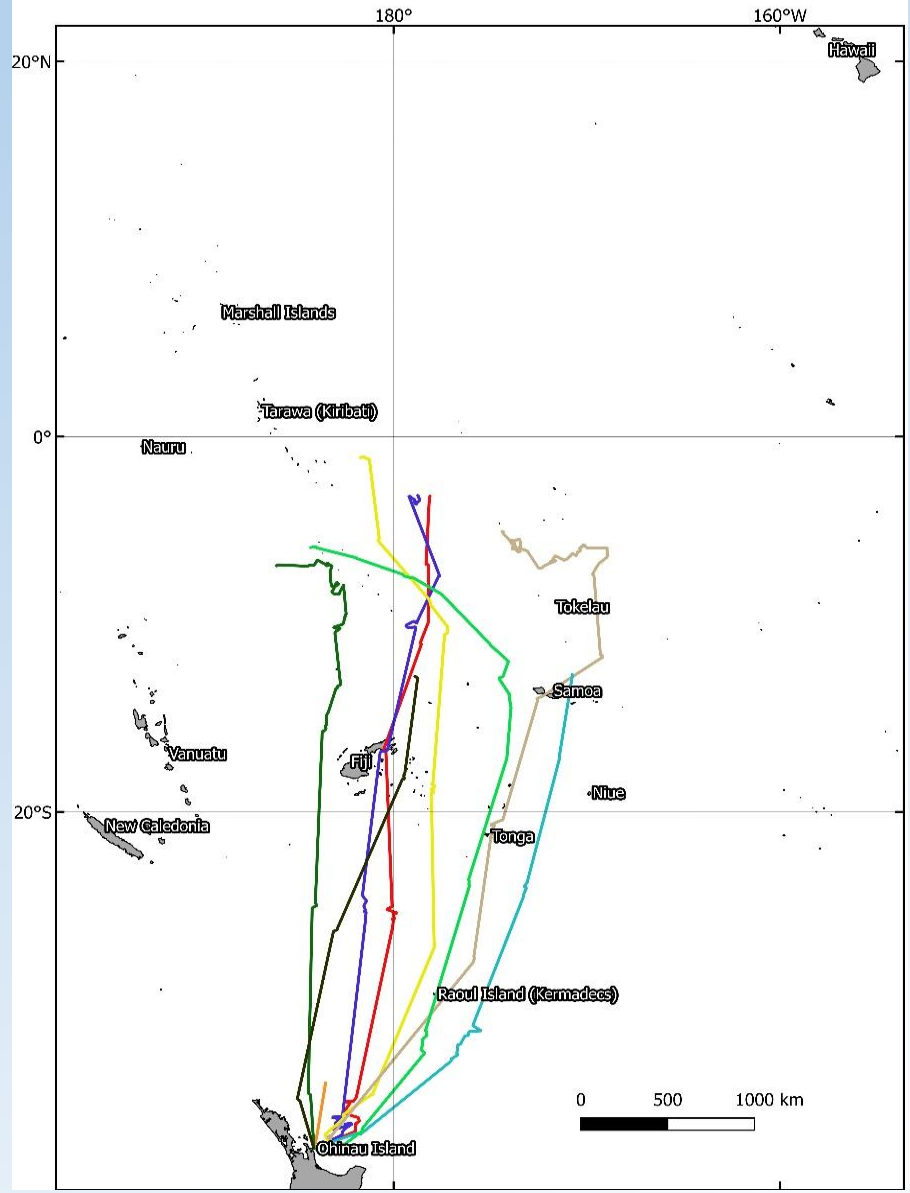
Chick-rearing

Ohinau Island



Lady Alice Island





Ohinau	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	Total
Adult	90	528	182	210	470	188	1668
Chick	267	133	131	453	0*	127	1111
Total	357	661	313	663	470	315	2779

Lady Alice	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	Total
Adult	0	285	163	102	118	38	706
Chick	0	94	83	103	0*	110	390
Total	0	379	246	205	118	148	1096

****No April/May trip to band chicks prior to fledging due to COVID-19***

Total birds banded during study							3875
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