Long-term research into Buller's Albatrosses at The Snares – 65 years, but no sign of a gold card

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Buller's albatross
Thallassarche bulleri

- Small albatross with a 2 m wingspan and a mass of 2.5-3.5 kg.

- Endemic

- Two subspecies – *bulleri* breeds on The Snares & Solander Islands; *platei* breeds on The Sisters & Forty-Fours (Chatham Islands) and Rosemary Rock (Three Kings Islands).

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Development of a long-term research project

- 1948 – Dr Lance Richdale spends 6 weeks studying courtship and laying behaviour.

- 1961-1987 – University of Canterbury undertakes several expeditions. Under the supervision of Drs Bernard Stonehouse and John Warham a number of students determine the timing of the breeding cycle and ascertain breeding frequency, adult survival and breeding behaviour. In 1972-73 Carol Horning completes the only study yet completed of one complete breeding season.

- 1992-present – NIWA & DoC undertake studies to determine any impacts of commercial fisheries.

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Demographic studies of Buller's albatrosses at The Snares

- Banding data 1948-2012 allows estimates of annual survival of adults banded as breeding birds of unknown age, plus estimates of breeding frequency & mate retention
- Counts of the total number of breeding pairs 1969-2002 allow estimates of total population and population trend.
- Monitoring of study colonies 1969-2012 allows estimates of population trend.
- Monitoring of study colonies 1992-2004 allows estimates of breeding frequency and breeding success.
- Monitoring of study colonies 1992-2012 allows estimates of survival and return and recruitment rates of known-age birds banded 1992-2004.

Breeding schedule of Buller's albatrosses at The Snares

- Birds start returning to colony from mid-Dec.
- Laying period 31 Dec-10 Mar.
- Incubation period 69 days.
- Chick rearing period about 167 days.
- Fledging period late Aug-early Oct

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Breeding frequency

- On average 88% intact pairs breed annually.
- Of those that bred successfully in year n, 91% will breed in year n+1 and 7.9% in year n+2.
- Of those that were not successfully in year n, 83.7% will breed in year n+1 and 15.6% in year n+2.

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Divorce rate

- Average divorce rate is 2.1% (range 1.1-3.5).
- Following divorce or loss of partner it takes, on average, a male 2.1 years and a female 2.6 years to obtain a new partner and breed again.
- The same goes for birds whose partner has died.

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Estimated annual survival of breeding adults 1948-2007

- 1948-1960 -1.00
- 1961-1967 – 0.95
- 1968-1977 – 0.92
- 1978-2004 – 0.97
- 2005-2007 – 0.92

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1991 birds banded as chicks near fledging in the study colonies 1992-2004

- 439 (22.2%) have been recaptured.
- Of 435 where gender estimated from measurements, 71.5% were male.
- Male bias probably, in part, reflects differences in the behaviour of the sexes.
- Pre-breeding females spend considerably less time ashore and when they are ashore they frequent colonies farther from their natal site than do males. Consequently they are less likely to be recaptured.
- Therefore, both return and recruitment rates should be considered as minimum estimates.

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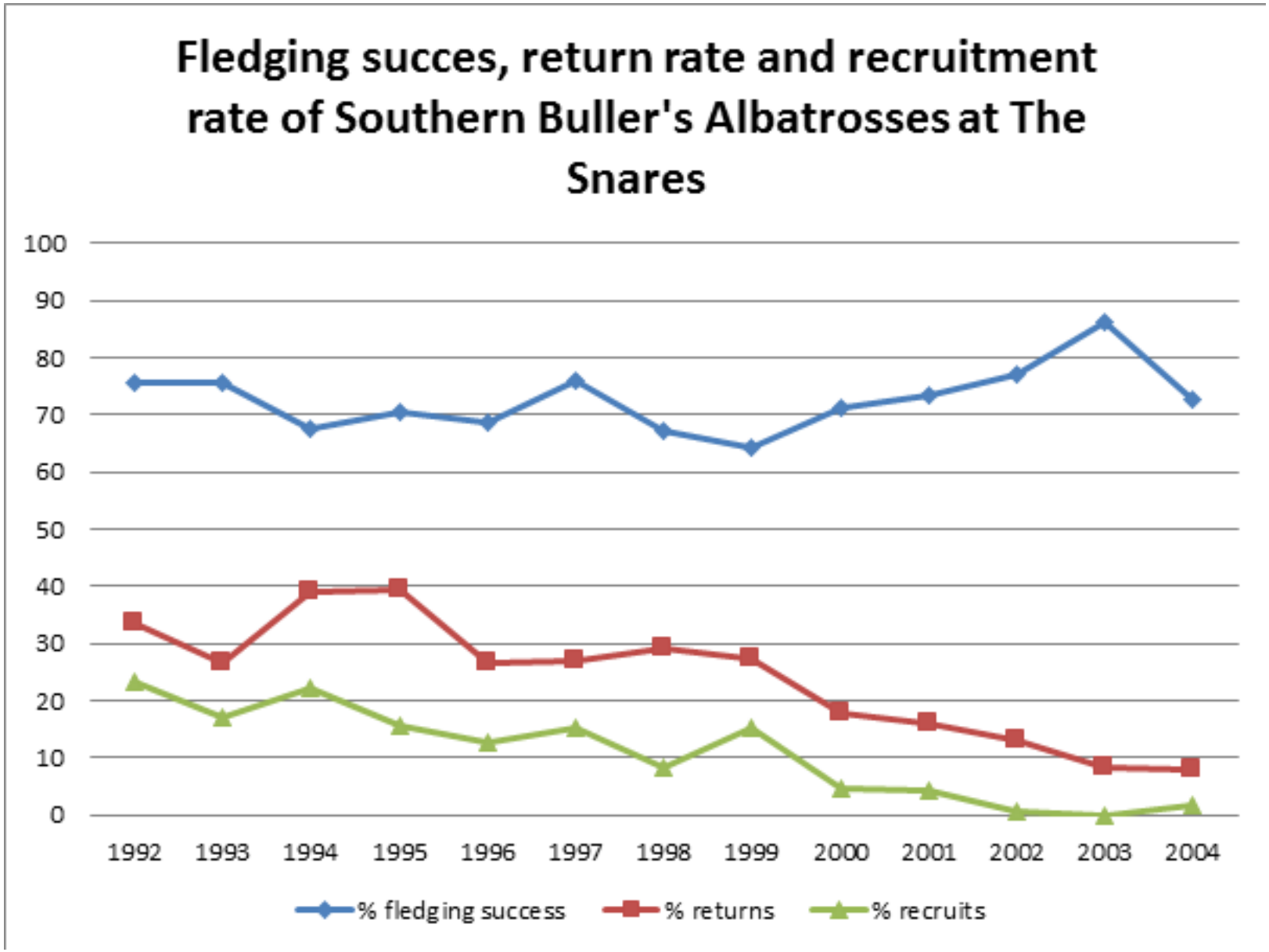
Fledging succes, return rate and recruitment rate of Southern Buller's Albatrosses at The Snares
100
90
80
70
60
50
40
30
20
10
0
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
% fledging success
% returns
% recruits

Estimated total numbers of breeding pairs at The Snares

- 1969 – 4448
- 1992 – 7683
- 1997 – 8242
- 2002 - 8713

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Modelling population data 1948-2007: conclusions of analysis by Francis & Sagar (NZ Journal of Zoology 2012)

- There is some cause for concern in recent changes in demographic parameters – population growth has slowed and perhaps reversed, and adult survival rates are declining.

- Though this population is not in immediate danger from fishing, there is a need for continued monitoring to see whether the recent fall in survival rate persists and causes an overall decline in abundance.

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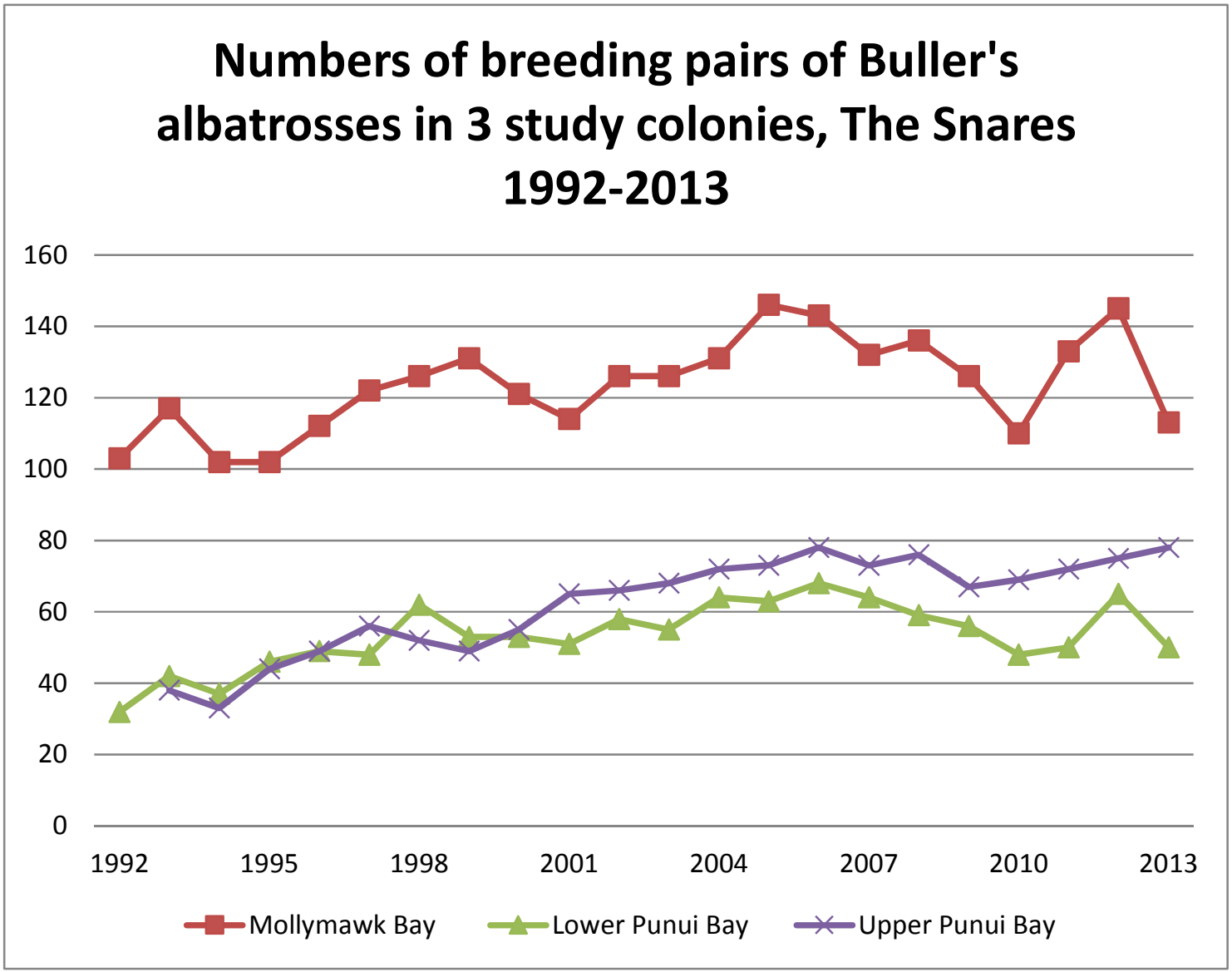
Numbers of breeding pairs of Buller's albatrosses in 3 study colonies, The Snares 1992-2013
160
140
120
100
80
60
40
20
0
1992
1995
1998
2001
2004
2007
2010
2013
Mollymawk Bay
Lower Punui Bay
Upper Punui Bay


Photo: Leigh Torres

Diet of Buller's albatrosses at The Snares during chick rearing

- 106 chick regurgitations collected in May & July.
- Fish, squid and salps were the most abundant prey items.
- Fishery discards present in 70% of samples.
- There were sexual differences in discard consumption, with males taking a greater amount.
- The high proportion of discards in the diet have a beneficial effect on the population.

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At-sea distribution of Buller's albatrosses

- Long-term (1-3 years) determined using geolocation loggers.

  These are light-weight, attached to a leg band and record 2 locations a day with an accuracy of ±180 km

- Short-term (< 1 month) determined by GPS loggers.

  These are taped to the back feathers, and record a location to an accuracy of ± 5 m at time intervals set by researcher.

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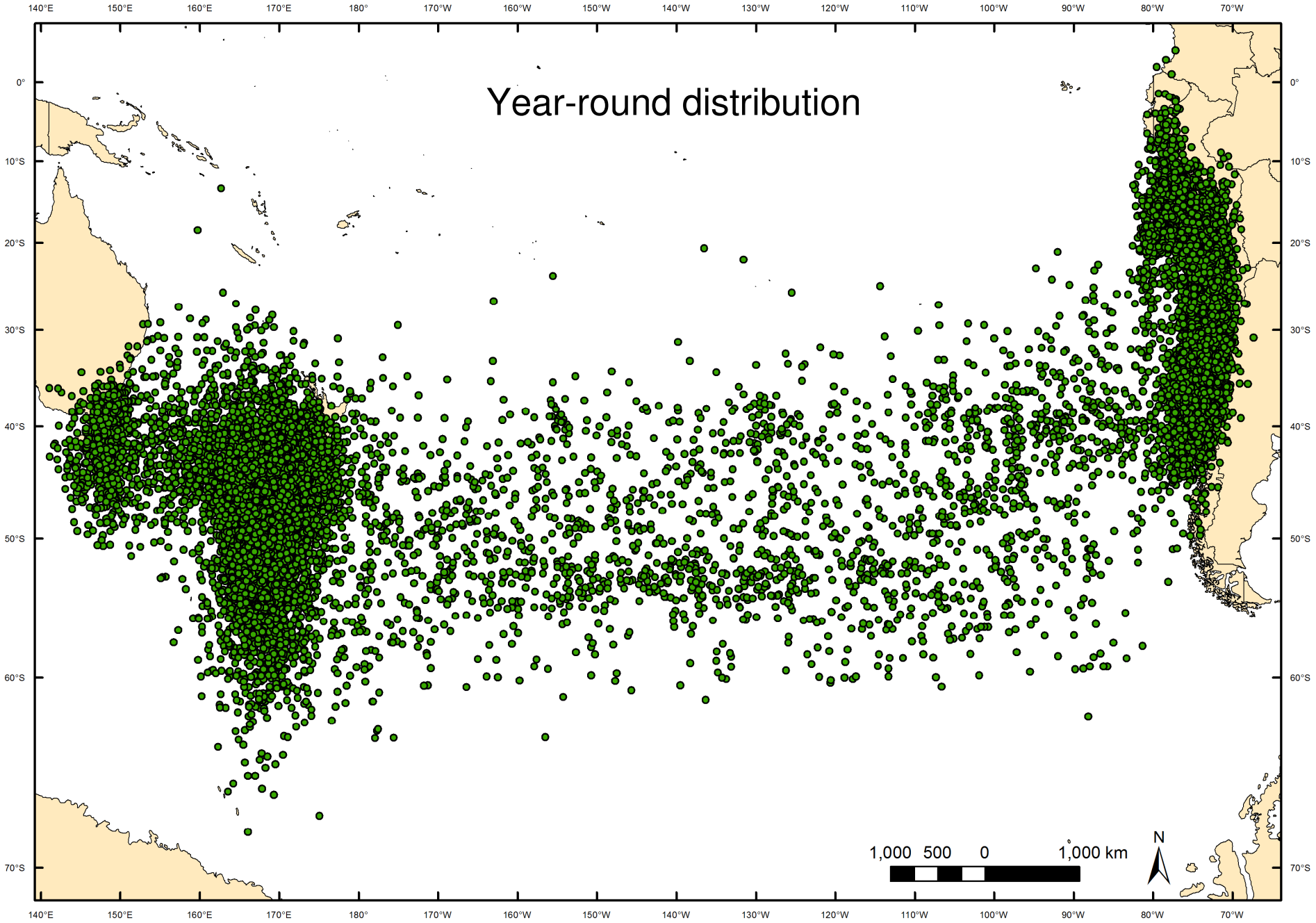
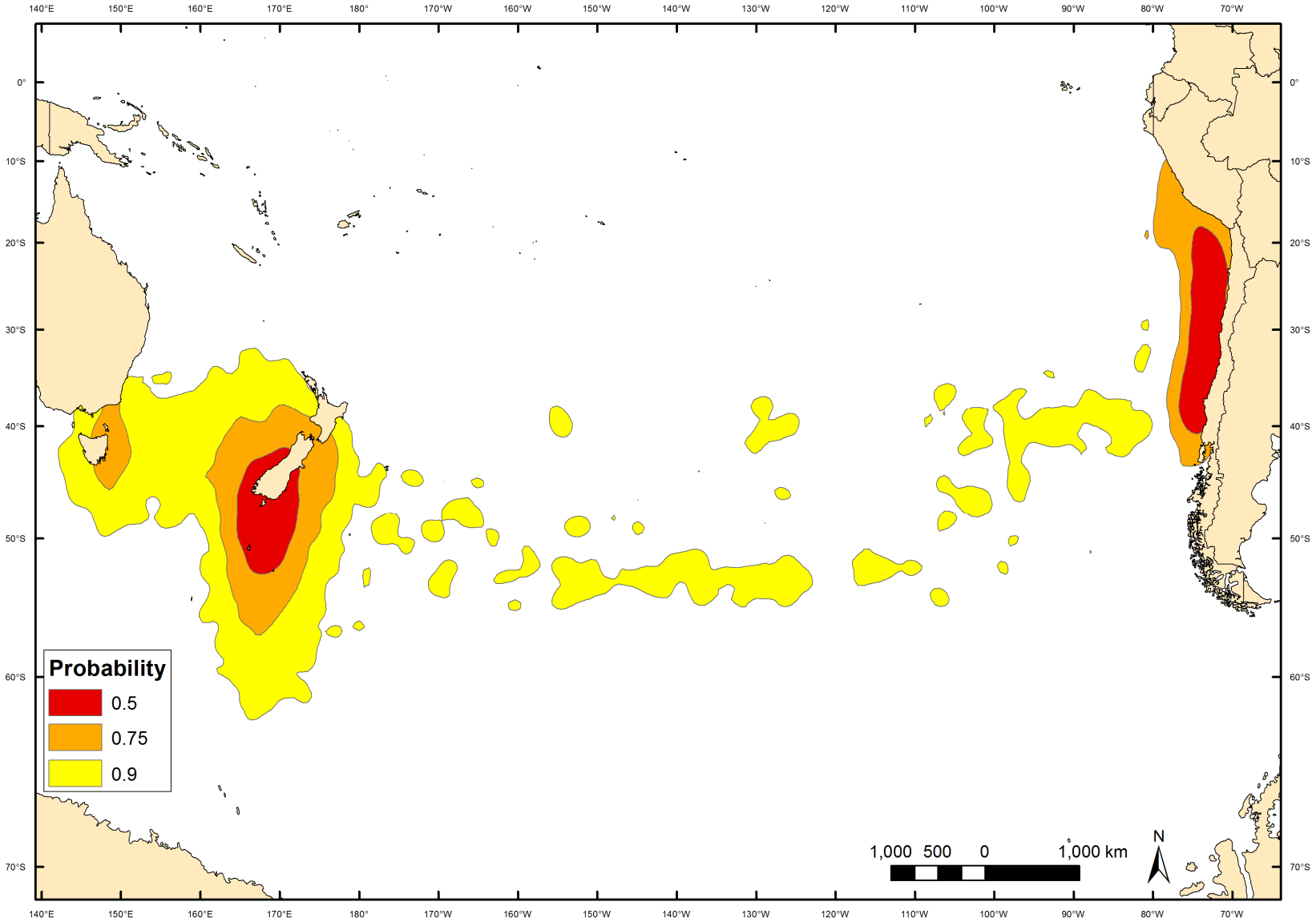
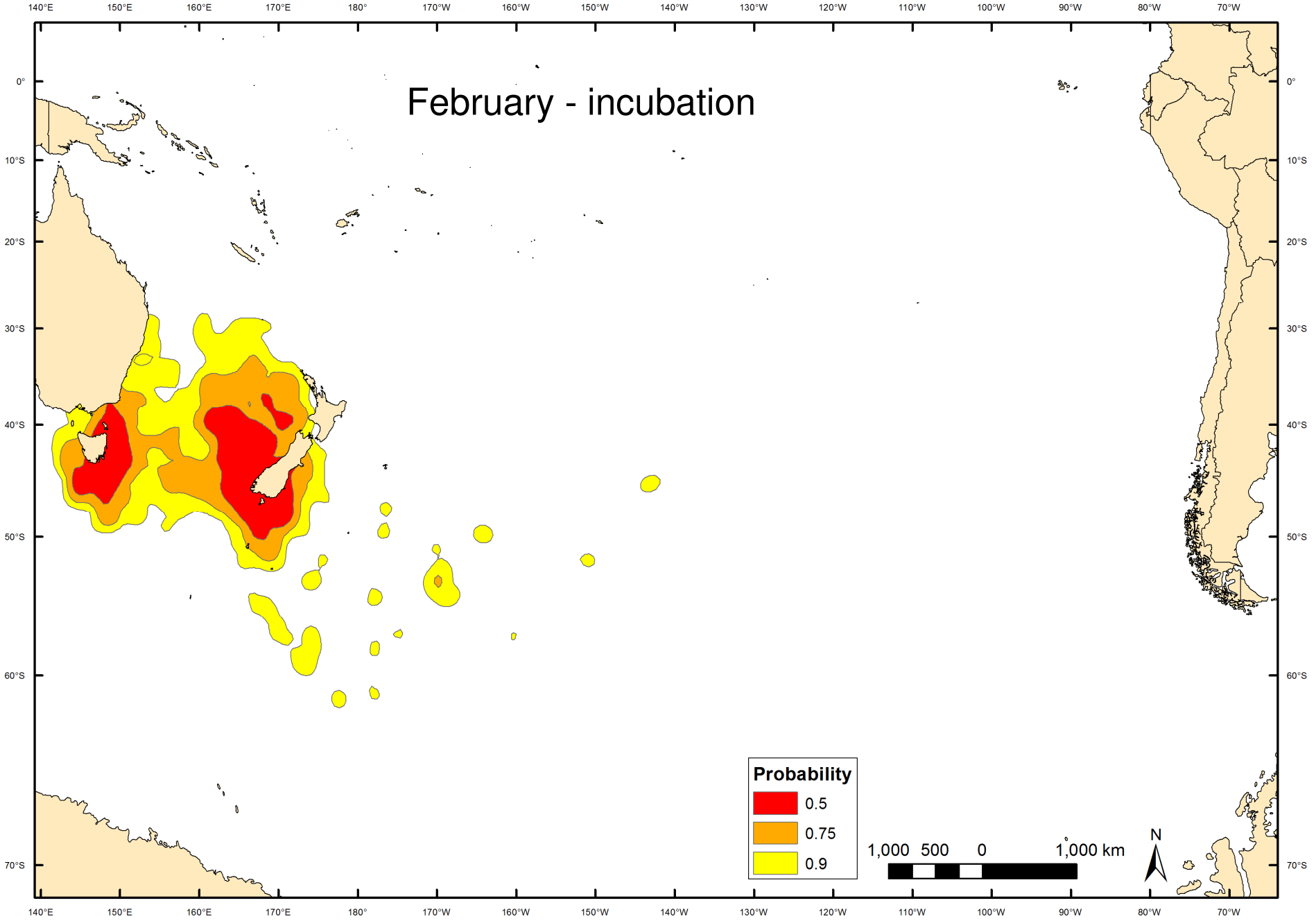
Geolocator logger attached to leg of grey petrel


Year-round distribution
140°E
150°E
160°E
170°E
180°
170°W
160°W
150°W
140°W
130°W
120°W
110°W
100°W
90°W
80°W
70°W
0°
10°S
20°S
30°S
40°S
50°S
60°S
70°S
1,000 500 0 1,000 km
N

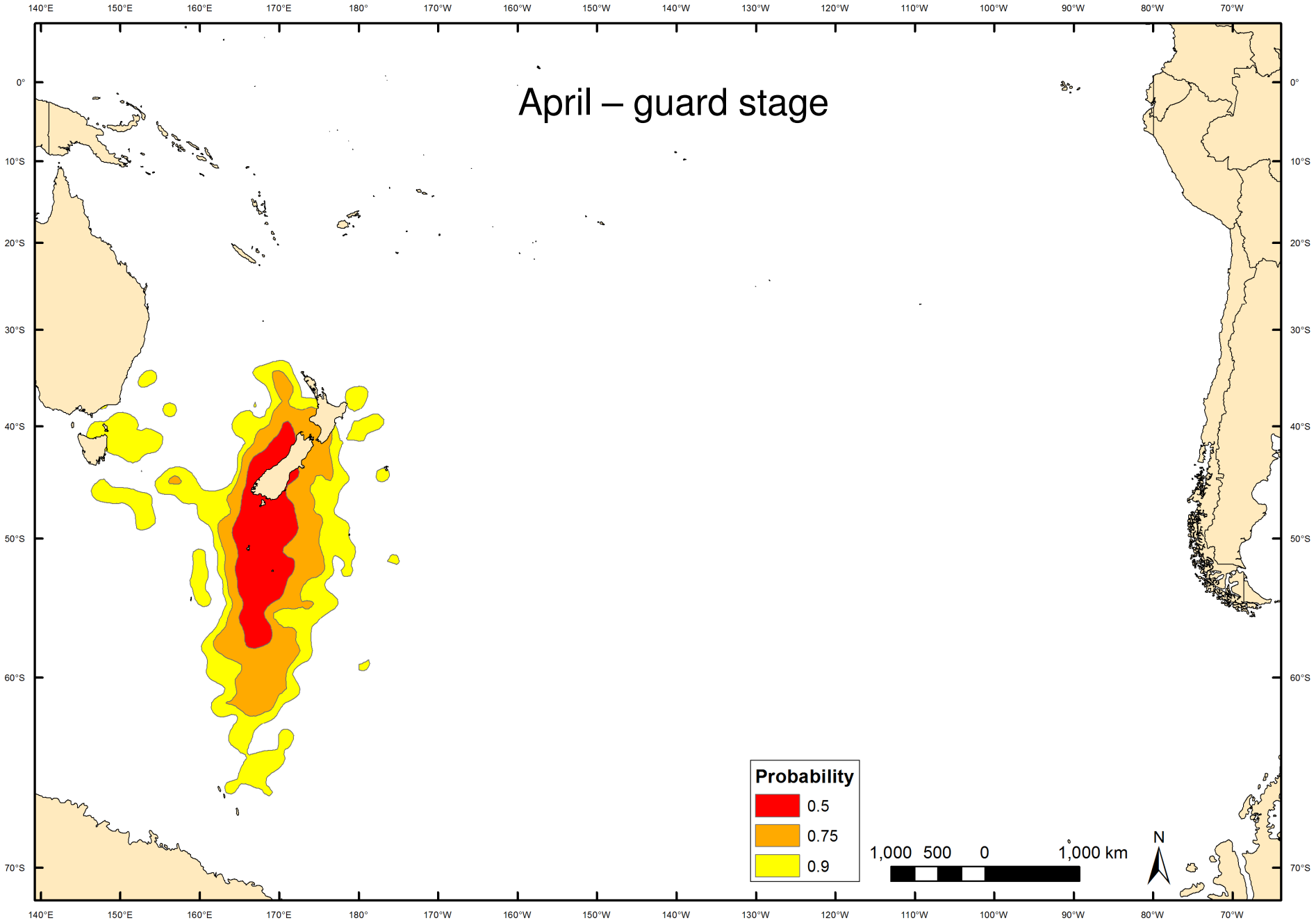
Year-round distribution – kernel densities



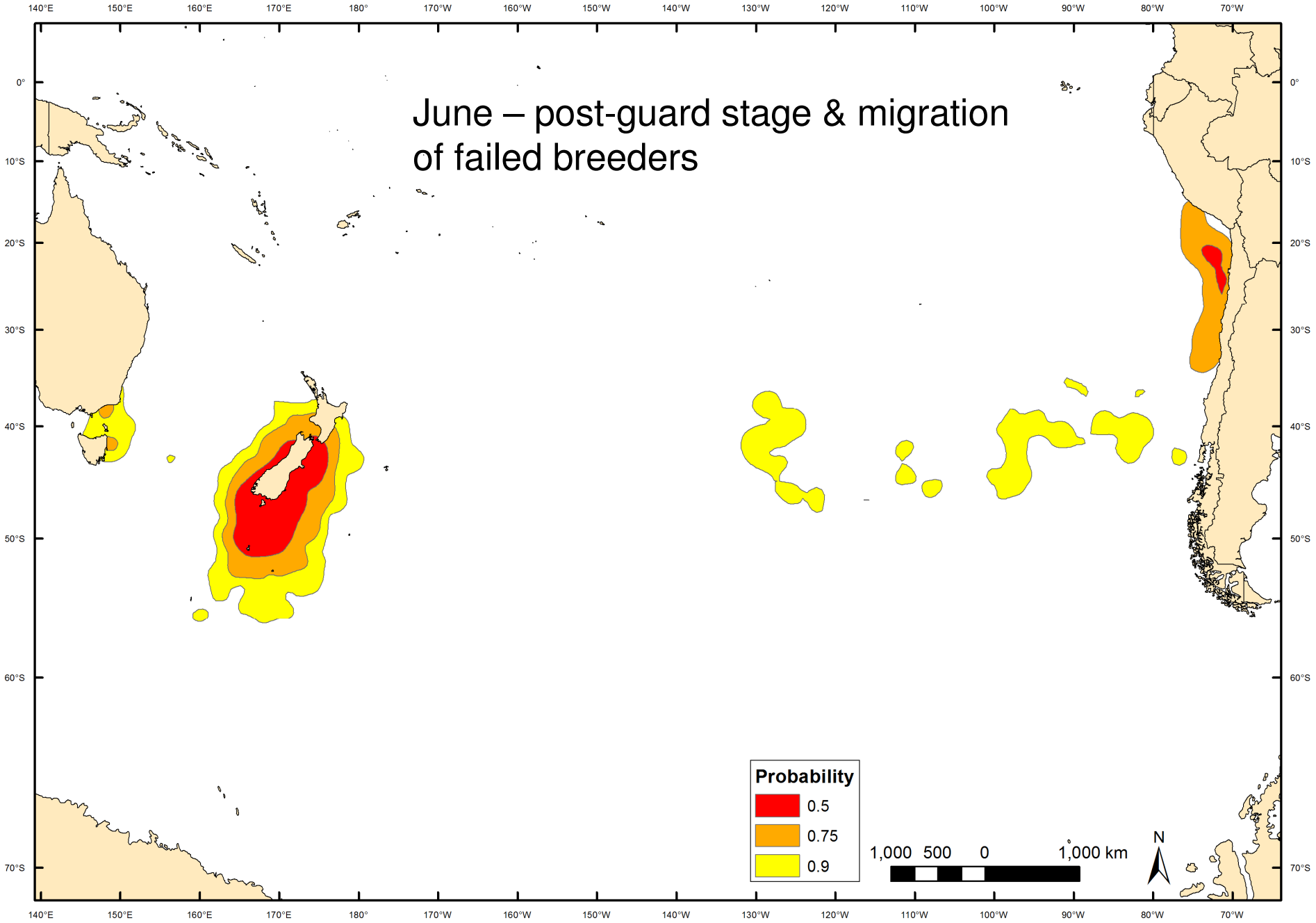
Buller’s albatross during incubation


February - incubation
140°E
150°E
160°E
170°E
180°
170°W
160°W
150°W
140°W
130°W
120°W
110°W
100°W
90°W
80°W
70°W
0°
10°S
20°S
30°S
40°S
50°S
60°S
70°S
Probability
0.5
0.75
0.9
1,000 500 0 1,000 km
N

Buller’s albatross at guard stage


April – guard stage
140°E
150°E
160°E
170°E
180°
170°W
160°W
150°W
140°W
130°W
120°W
110°W
100°W
90°W
80°W
70°W
0°
10°S
20°S
30°S
40°S
50°S
60°S
70°S
Probability
0.5
0.75
0.9
1,000 500 0 1,000 km
N

Buller’s albatross chick at post-guard stage


June – post-guard stage & migration of failed breeders
140°E
150°E
160°E
170°E
180°
170°W
160°W
150°W
140°W
130°W
120°W
110°W
100°W
90°W
80°W
70°W
0°
10°S
20°S
30°S
40°S
50°S
60°S
70°S
Probability
0.5
0.75
0.9
1,000 500 0 1,000 km
N

Summary of annual distribution of Buller's albatrosses

- Oct-Nov - off Chile & Peru, none in NZ EEZ.
- Dec-Jan - depart South America & occupy Australasian waters.
- Feb-Mar – Chatham Rise, Snares-Stewart Shelf, Tasman Sea & eastern Bass Strait.
- Apr-Jun – primarily Chatham Rise, Snares-Stewart Shelf, presumed failed breeders return to S. America.
- Jul – presumed failed breeders in S American waters, successful breeders Snares-Stewart Shelf.
- Aug-Sep – successful breeders return to S America

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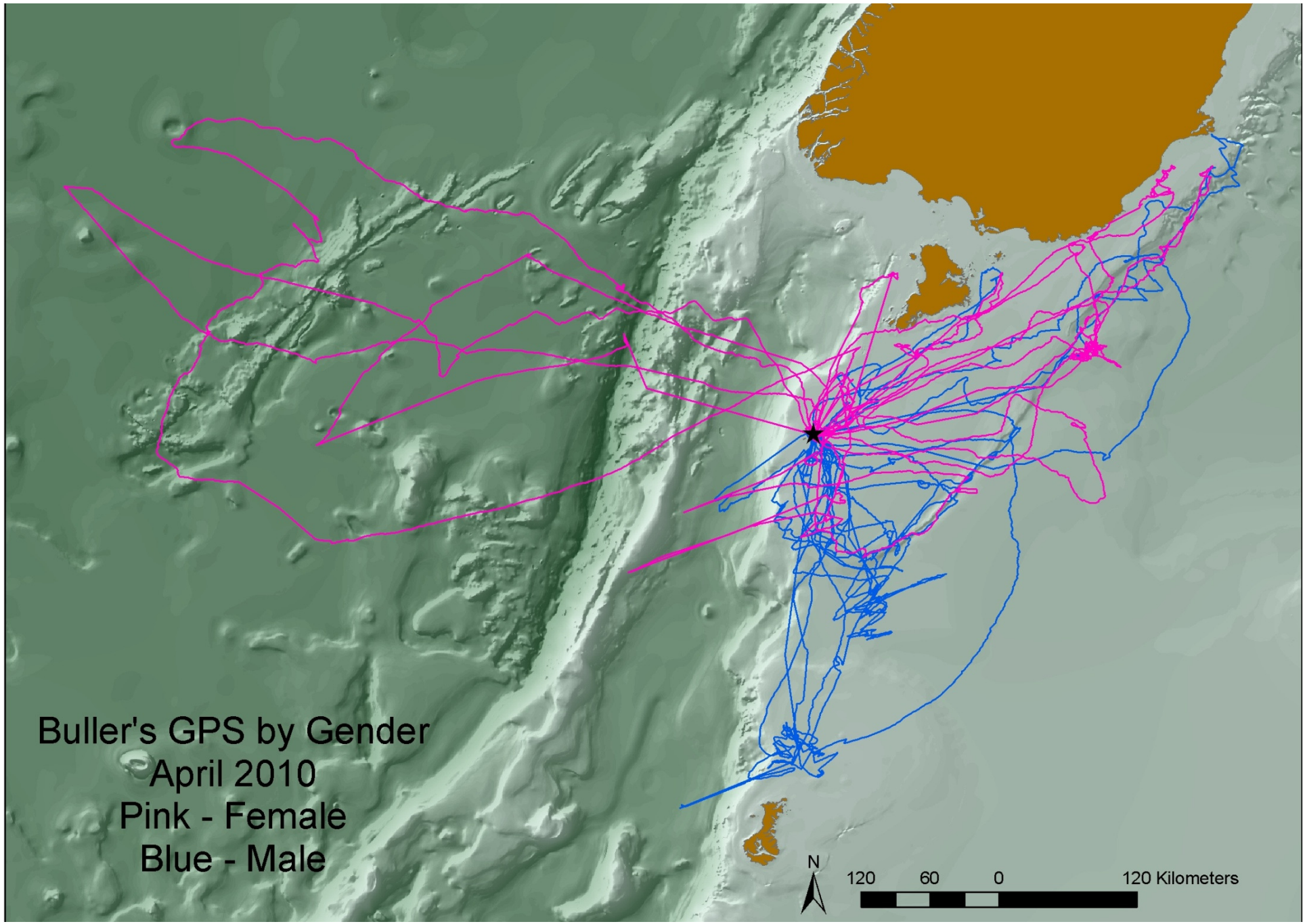
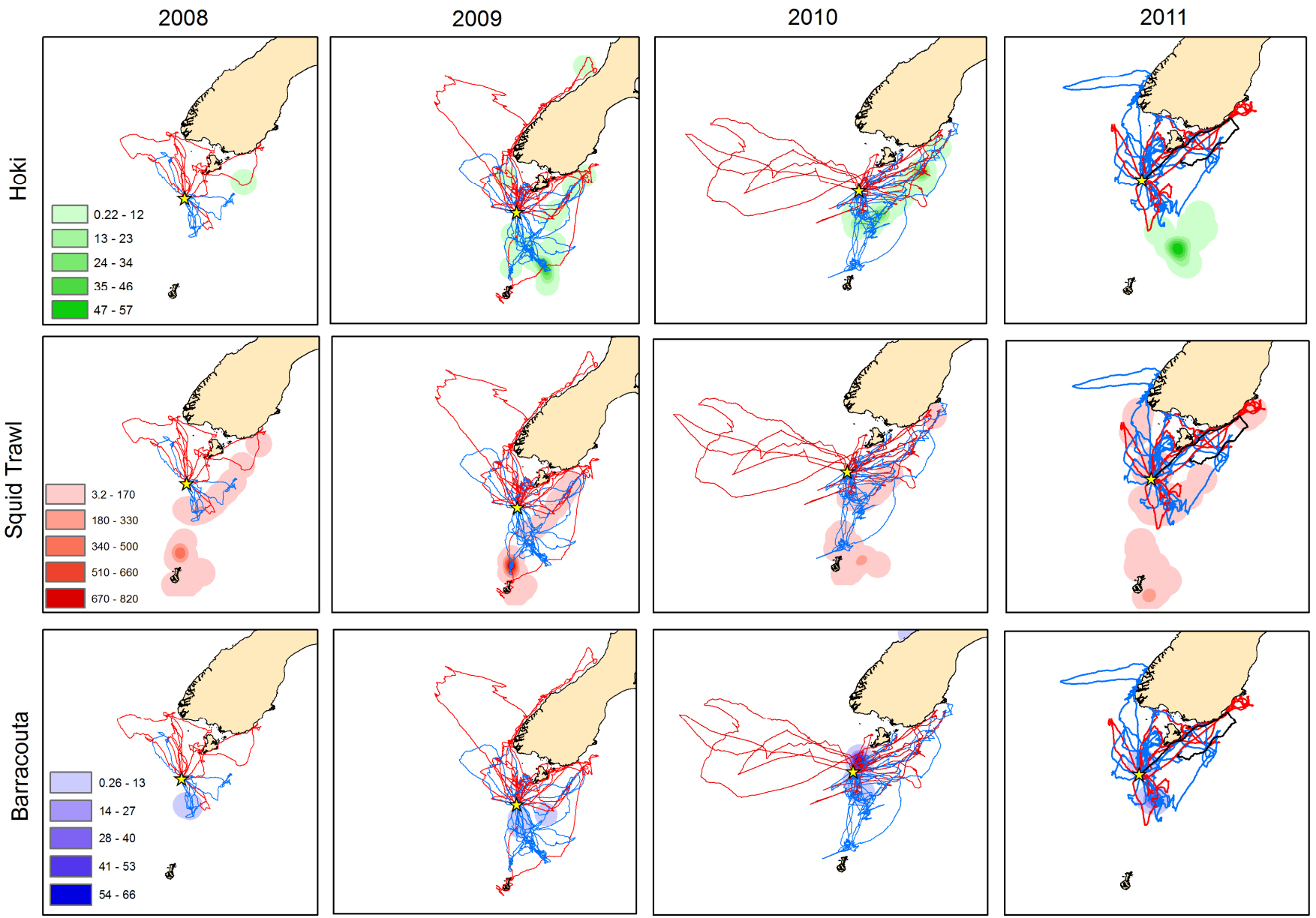
GPS tracking at the guard stage in April 2008-2013


Photo: Leigh Torres


Buller's GPS by Gender
April 2010
Pink - Female
Blue - Male
N
120
60
0
120 Kilometers


2008
2009
2010
2011
Hoki
0.22 - 12
13 - 23
24 - 34
35 - 46
47 - 57
Squid Trawl
3.2 - 170
180 - 330
340 - 500
510 - 660
670 - 820
Barracouta
0.26 - 13
14 - 27
28 - 40
41 - 53
54 - 66

Influence of gender and commercial fishing activity on foraging patterns of Buller's albatrosses during April guard-stage

- Consistent gender differences with males having similar distributions to fishing vessels and higher overlap rates than females in all 5 years.

- Foraging while overlapping a fishing vessel and natural foraging rates varied by year for both genders and was attributed to shifts both in albatross and vessel distributions.

- Albatrosses foraged independently of fishing vessels half the time that they were within 10 km of a vessel

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What are the main unknowns still to be discovered?

- What are the effects of changing climate & oceanographic conditions on population trends?
- How does fine-scale distribution of foraging birds overlap with fisheries at various stages of the breeding cycle?
- What are the relative contributions of bycatch from within and outside the New Zealand EEZ to population trends?

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Acknowledgements

- This work was funded by the Ministry of Science & Innovation, Marine Conservation Services (DoC) and NIWA.
- This study would not have been possible without the commitment of many people over the years, particularly Jean-Claude Stahl, Janice Molloy, Sue Lake, and Donald Geddes.
- Thanks to Mfish (MPI) for fishing vessel and CPUE data.
- Thanks to Henk Haazen and crew of the *RV Tiama* for their expertise in transporting us safely to and from The Snares.
- I could not have continued this study without the support and understanding of my family.

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