Salvin's albatross drone counts

feasibility for population assessment

Graham Parker
Kalinka Rexer-Huber

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PARKER CONSERVATION
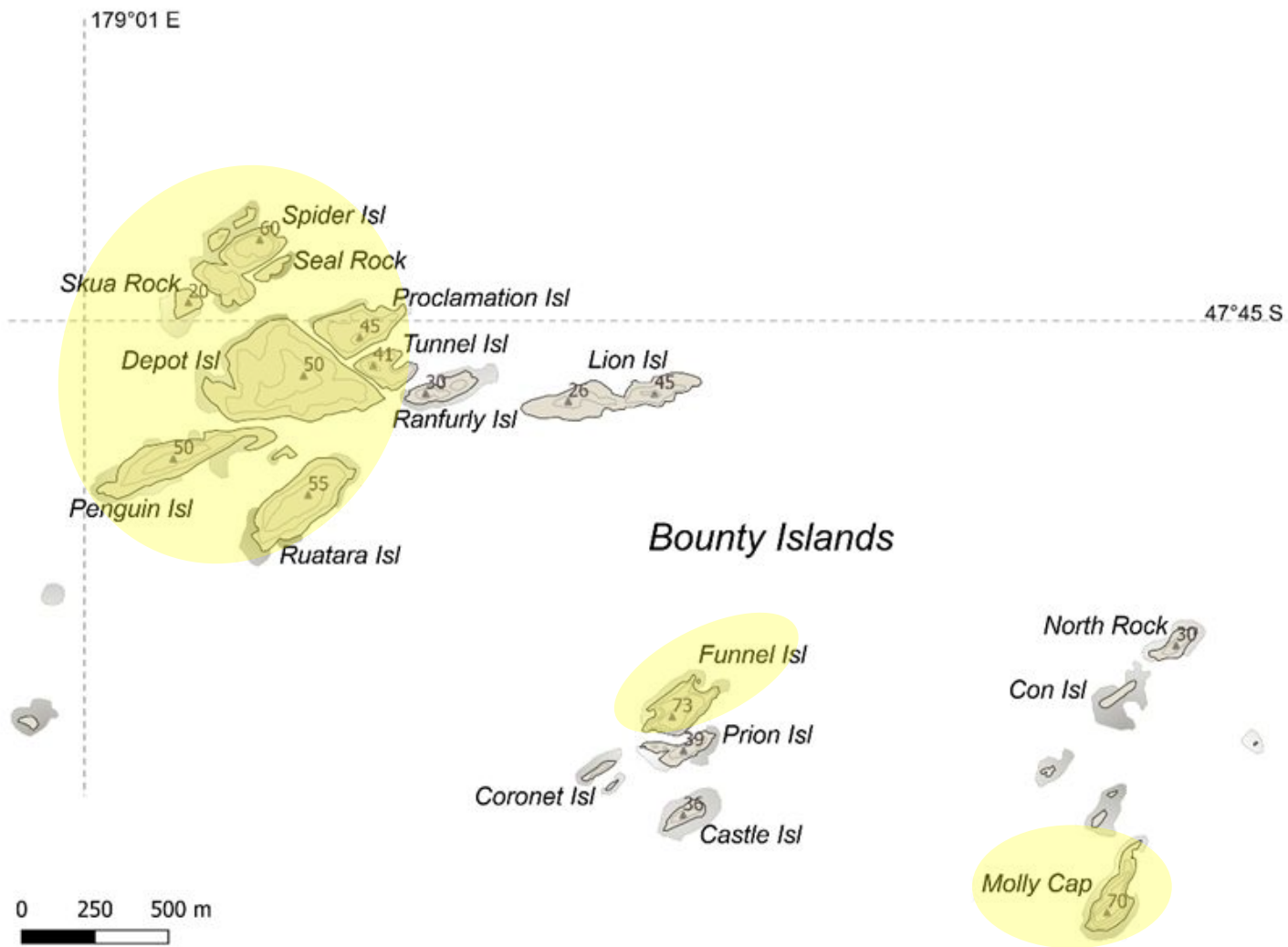
Inset map labels: Chathams, Snares, Bounties, Antipodes, Aucklands, Campbell
Inset scale: 0   400   800 km

179°01 E

47°45 S

Spider Isl
60
Seal Rock
Skua Rock
20
Proclamation Isl
45
Depot Isl
50
Tunnel Isl
41
Lion Isl
30
26   45
Ranfurly Isl
50
Penguin Isl
55
Ruatara Isl

Bounty Islands

Funnel Isl
73
North Rock
30
Con Isl
Prion Isl
39
Coronet Isl
36
Castle Isl
Molly Cap
70

0   250   500 m
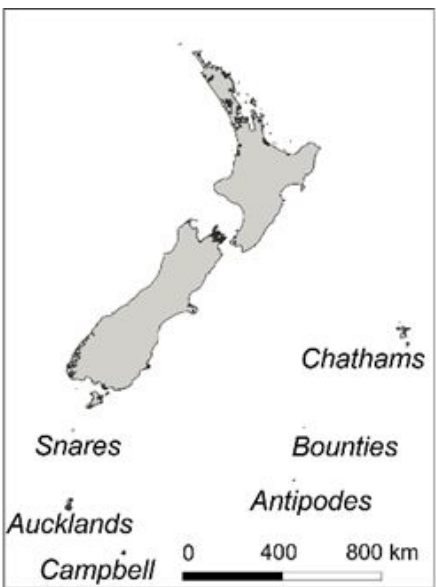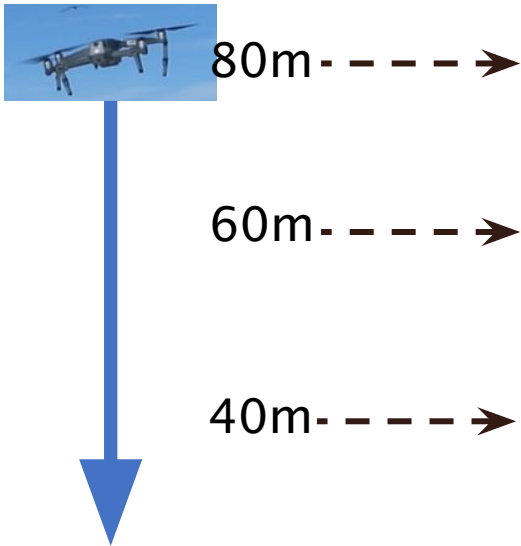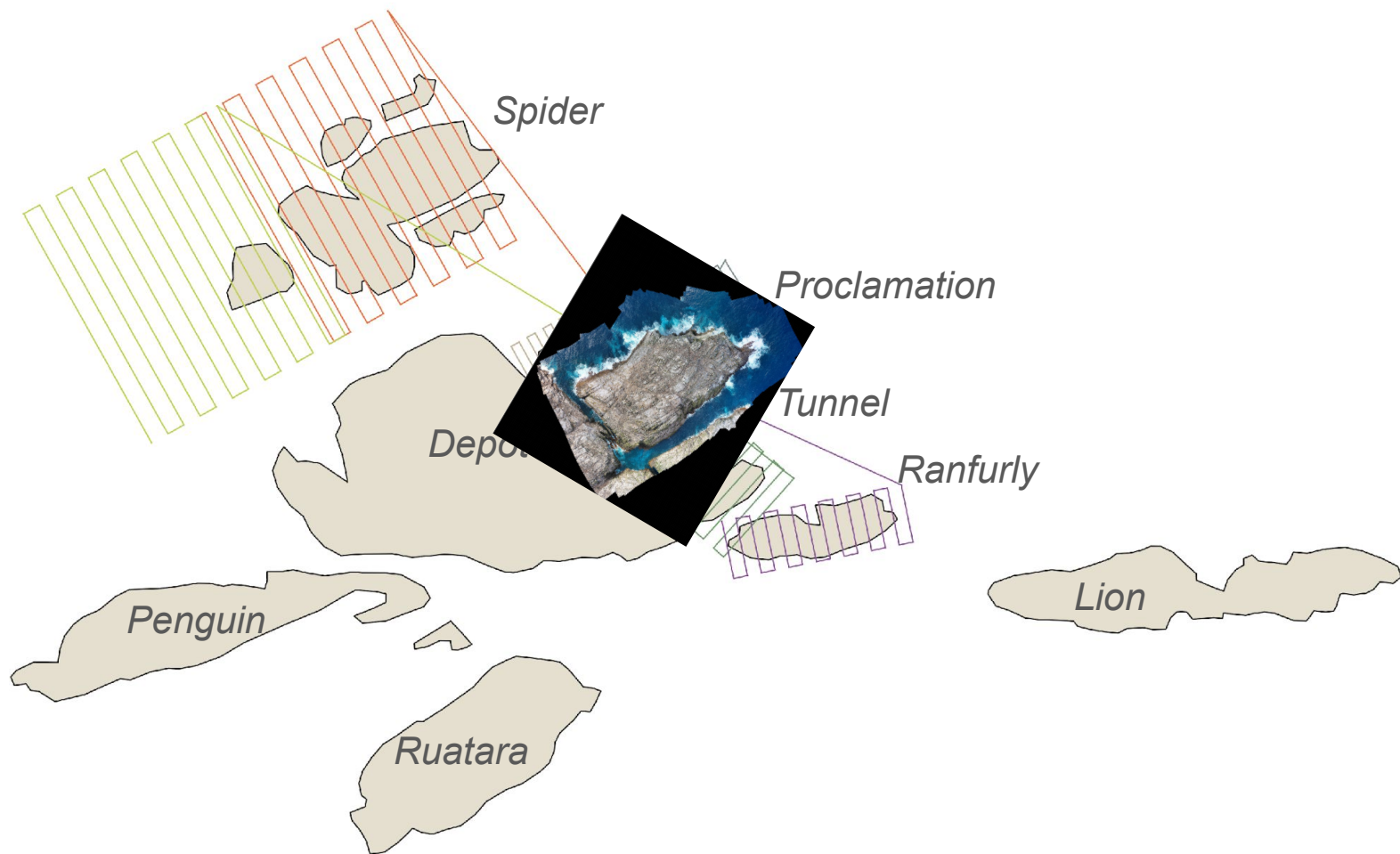
Scope

Is a drone suitable for quantifying Salvin's albatross population size at the Bounty Isl?

- Suitability of drone imagery

- Comparison with previous counts

- Recommendations

Imaging trials

80m - - - →

60m - - - →

40m - - - →

Spider

Proclamation

Tunnel

Ranfurly

Depot

Lion

Penguin

Ruatara

Flight height effects
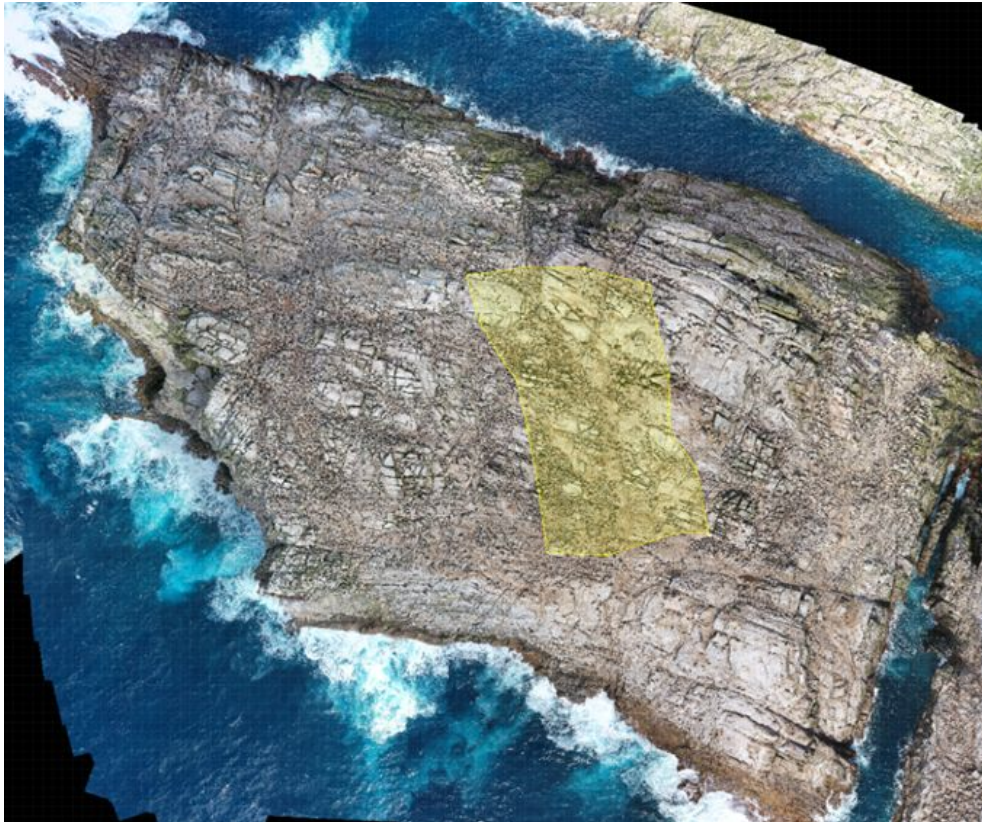
Status categories
AON/loaf/uncertain

Identification uncertain

Height effects

Increasing flight height affects albatross counts

	40m	60m	80m
Quality: GSD (cm/pixel)	0.94	1.4	1.87
Count time (min)	64	66	64
Albatross status unclear	370	579	617
AON	223	87	35
Loaf	30	7	3
Likely-albatross	7	42	38
All definite albatrosses	623	673	655
Quality: ID confidence	0.989	0.941	0.945
Quality: status uncertainty	0.594	0.860	0.942

Drone suitability

- Little disturbance, with due caution

- Excellent imagery for counting albatrosses (40m)

- Faster at 60 and 80m but resolution lower
    - Harder to assign status
    - Greater ID uncertainty

- Nest detection unlikely better at lower flight

Drone pros and cons

- Fuel
- Animal effects
- Weather
- Repeatability

0:00:50

Breeding pair estimates

	Spider group	Ranfurly	Tunnel	Proclamation
Flight altitude (m)	80	60	60	40
Albatrosses (raw count)	3862	0	3595	5227
Breeding pairs estimate (range)	1815 (1583–2008)	0	1690 (1474–1869)	2457 (2143–2718)

Photo: P. Sagar

Numbers compared

Whole-island counts of nesting Salvin's albatrosses over time

		Proclamation	Tunnel	Spider	timing	source
1997	Ground	3062	-	-	12–16 Nov	(Clark et al. 1998)
2004	Ground	2634	-	-	15–23 Nov	(Amey and Sagar 2013)
2010	Aerial plane	1762[a]	1442[a]	2318[a]	12 Oct	(Baker et al. 2012)
2013	Aerial plane	4880[b]	3435[b]	3446[b]	23 Oct	(Baker et al. 2014)
2018	Aerial plane	3150[c]	2394[c]	2499[c]	25 Oct	(Baker and Jensz 2019)
2019	Aerial drone	2457[c]	1690[c]	1815[c]	28–29 Oct	This study

Status correction applied from [a] 2011; [b] 2013; [c] 2018

Albatross numbers

Timings coincide with similar trends in Antipodeans, Gibson's

Proclamation representative?

Counts provisional
- need ground truthing for detectability

Population estimate

Expand coverage across islands
- Power, boat-based
- 40m, overcast

Accuracy and precision estimates
- Detectability, status assessment
- Count precision

Acknowledgements

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