New Zealand sea lion research Auckland Islands 2016/17

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1.0 Introduction

- Presentation of report for Auckland Islands New Zealand sea lion research 2016/17 funded by CSP
- Summary of details provided in previous reports:
  - Childerhouse 2016[1]
  - Childerhouse et al. 2017[2]
- Summary to the end of the field season on 21 January 2017
- Report for CSP funded component and separate report for DOC funded research component

[1] Childerhouse S (2016) Methodology for New Zealand sea lion population monitoring 2016/17. Unpublished paper presented to the Conservation Services Programme, Department of Conservation, New Zealand. BPM document number: BPM-16-Methodology for New Zealand sea lion population monitoring 2016/17 v1.0. 9 p.
[2] Childerhouse S, Burns T, French R, Michael s, Muller C. (2017) DRAFT Report for CSP Project New Zealand sea lion monitoring at the Auckland Islands 2016/17. . Unpublished paper presented to the Conservation Services Programme, Department of Conservation, New Zealand. BPM document number: BPM-17-DRAFT-Report for CSP Project NZSL Auckland Island monitoring 2016-17 v1.0. 25 January 2017. 24 p.

1.1 Project objectives

- To estimate New Zealand sea lion pup production at Enderby, Figure of 8 and Dundas Islands
- To mark New Zealand sea lion pups at Enderby and Dundas Islands following established techniques
- Double flipper tag all the pups at Sandy Bay, 400 pups (300 female, 100 male) at Dundas Island (and determine sex and weight a sample of 100 pups at each site), and attempt to tag as many pups as possible at Figure of Eight Island
- PIT (Passive Integrated Transponder) tag all pups at Sandy Bay
- Daily counts of live and dead sea lions at Sandy Bay from arrival until the team leaves
- To collect data on pup weight, to contribute towards time series data on population dynamics
- To update the New Zealand sea lion database

1.2 Project outputs

- Completed data collection forms, photographs, and any other hard copy data
- An electronic copy of data collected in a format suitable for upload into the New Zealand sea lion database
- A technical report detailing the methods used, a summary of data collected, and estimates of New Zealand sea lion pup production at the Auckland Islands

2.0 Methodology

- As per the stated project requirements, "…*using established techniques…*" and following Childerhouse (2016)[1]
- The research outlined here follows almost the same methods as undertaken previously by DOC and as described in Chilvers (2012)[2]

[1] Childerhouse S (2016) Methodology for New Zealand sea lion population monitoring 2016/17. Unpublished paper presented to the Conservation Services Programme, Department of Conservation, New Zealand. BPM document number: BPM-16-Methodology for New Zealand sea lion population monitoring 2016/17 v1.0. 9 p.
[2] Chilvers, BL (2012) Research to assess the demographic parameters of New Zealand sea lions, Auckland Islands 2011/12 Contract Number: POP 2011/01 Final Research Report, November 2012. Report prepared for the Conservation Services Programme, Department of Conservation. 11 p.

2.1 Researchers

- Research team of :
  - Tom Burns
  - Simon Childerhouse
  - Rebecca French
  - Sarah Michael
  - Chris Muller
- Thanks to the team for their dedication, commitment and delivery of excellent results

2.2 Changes to methodology

Survey methodologies the same as 2015/16 except for:

- Field season was shorter ending on 21 January 2017 with only 8 days work in the Auckland Islands funded (e.g. 27 March end in 2015/16 n = 48d field work ; 22 February end 2014/15 n = 59d field work) to coincide with the core CSP funding period
- Figure of Eight Island was surveyed on 21 January when it is normally surveyed around 10 January. No helicopter and/or personnel were available until this date. Survey undertaken by helicopter for the first time and very successful
- No autopsy work as this was part of a separate contract
- No dedicated time was allocated for resighting effort as this was part of a separate contract

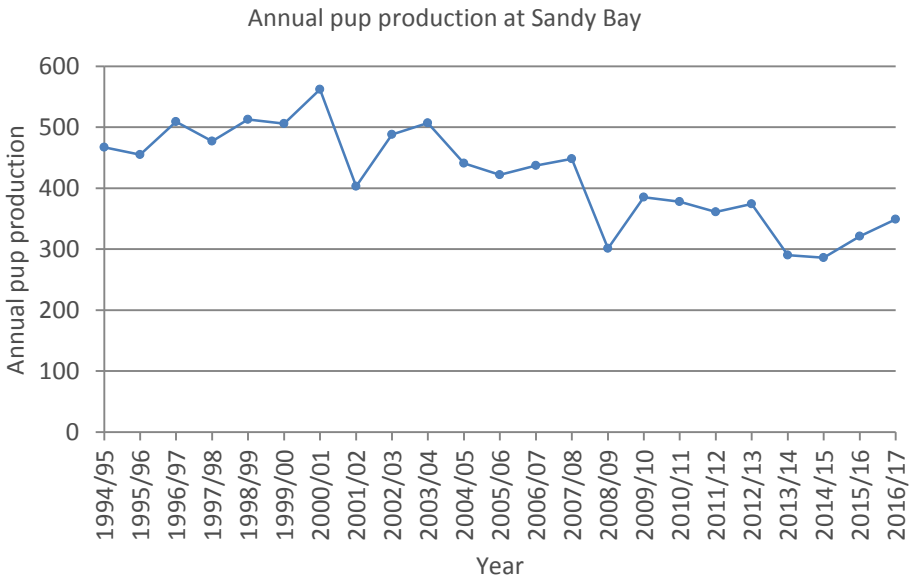
3.0 Results – timing 2016/17

- 8 January – One researcher departed Bluff aboard *RV Baltazar* for the Auckland Islands;
- 10 January – Arrived Enderby Island, Auckland Islands and joined the four other team members already on the Island;
- 14-16 January – Survey and pup marking at Sandy Bay;
- 18 January – Helicopter arrived Enderby Island
- 18-20 January – Survey and pup marking at Dundas Island;
- 21 January – Survey & pup count at Figure of Eight Island; and
- 22 February – One researcher departed Enderby Island aboard helicopter.

3.1 Pup production – Sandy Bay

Method	Date	No. counts	Start/end time	Estimate (SE)
Mean direct live count	16 Jan 2017	9	08:05/10:22	325 (3.5)
Cumulative dead count to the day of the mark-recapture	16 Jan 2017	N/A	08:05/10:22	21
Mean mark-recapture estimate	16 Jan 2017	9	08:05/10:22	324 (3.7)
Total number pups individually marked	16-17 Jan 2017	N/A	N/A	328

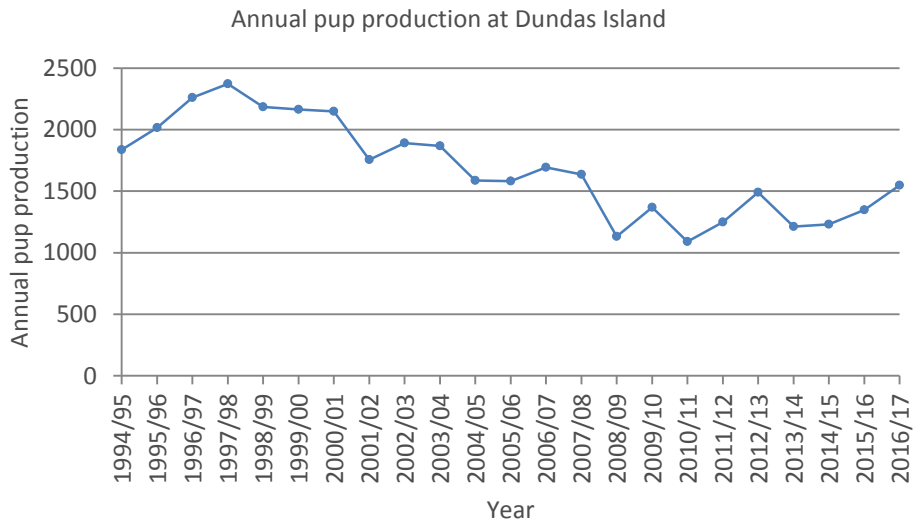
This represents the cumulative total from daily observations of dead pups from observations starting on 6 December 2016 and therefore provides a good estimation of total pup mortality



Total pup production = 328 live + 21 dead = 349 (321 2016/17)

3.2 Pup production – Dundas Is

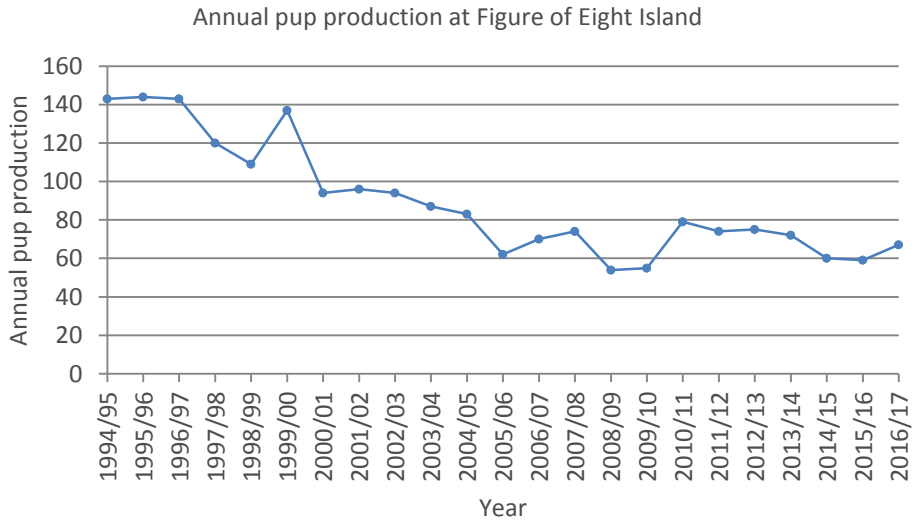
Method	Date	No. of counts	Start/end time	Estimate (SE)
Mean direct live count	18 Jan 2017	4	08:35/11:45	1274 (19.9)
Mean direct dead count	18 Jan 2017	3	08:35/11:45	134 (0)
Mean mark-recapture estimate	18 Jan 2017	9	08:35/11:45	1415 (21.7)
Total number pups tagged	18-20 Jan 2017	N/A	N/A	400 (100 male, 300 female)



Total pup production = 1415 live + 134 dead = 1549 (1347 2015/16)

3.3 Pup production – Figure of Eight Is

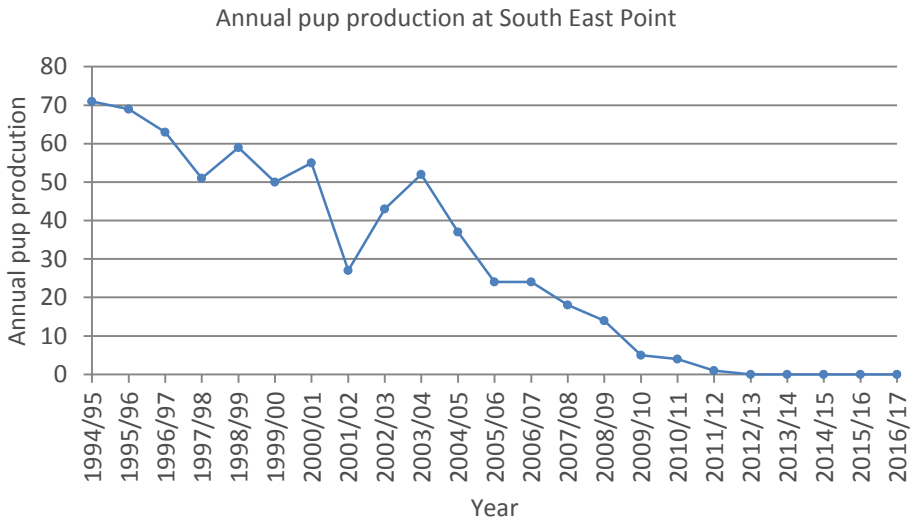
Method	Date	No. of counts	Estimate (SE)
Mean direct live count	21 Jan 2017	3	52 (0.0)
Mean direct dead count	21 Jan 2017	3	15 (0.0)
Total number pups tagged	21 Jan 2017	N/A	47



Total pup production = 52 live + 15 dead = 67 (59 2015/16)

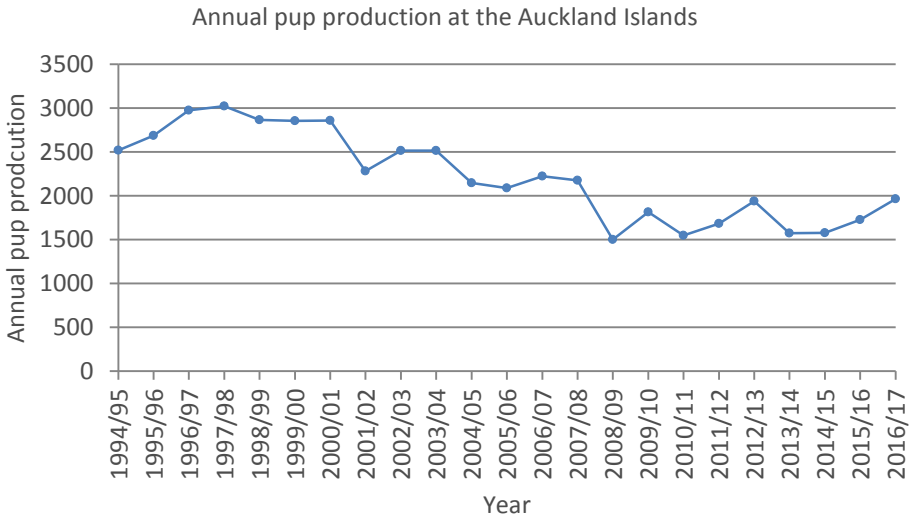
3.4 Pup production – South-East Pt

- 2 visits to South-East Point
- No live or dead pups observed but some adult females observed there in December



3.5 Pup production – Auckland Is

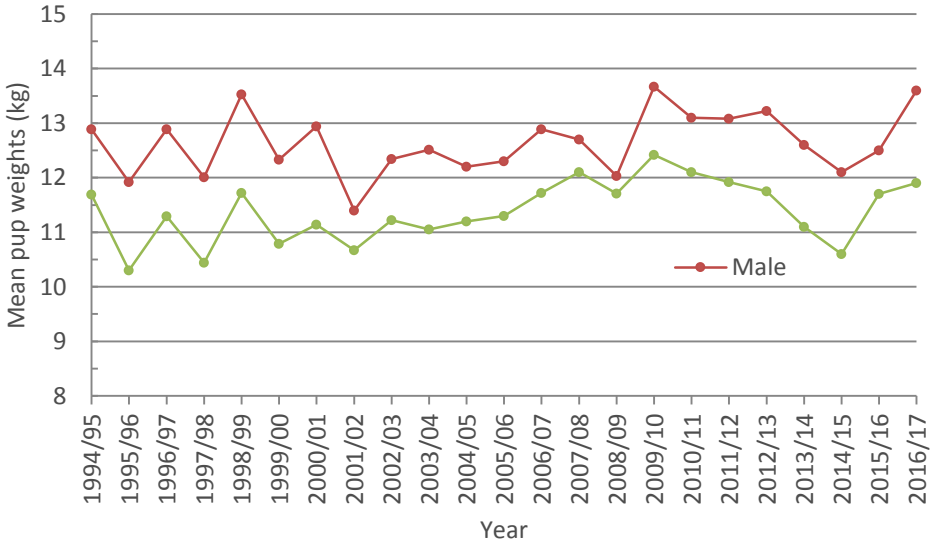
Location	Pup production	No live	No dead
Sandy Bay	349	328	21
Dundas Island	1549	1415	134
Figure of Eight Island	67	52	15
South East Point	0	0	0
Total Auckland Islands	1965	1795	170

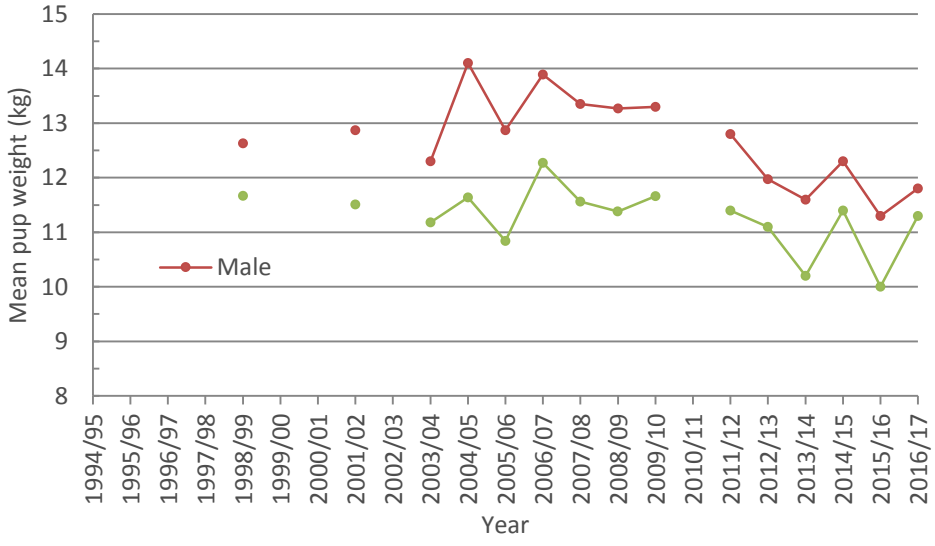


Total pup production = 1795 live + 170 dead = 1965 (1727 2015/16)

3.7 Pup weights

Location	Mean female weight			Mean male weight		
	n	Kg (SE)	Change from 2015/16	n	kg (SE)	Change from 2015/16
Sandy Bay	50	11.9 (0.3)	+2%	50	13.6 (0.3)	+9%
Dundas Island	50	11.3 (0.3)	+13%	50	11.8 (0.3)	+4%
Figure of Eight Island	28	12.1 (0.4)	+19%	19	13.3 (0.7)	+20%

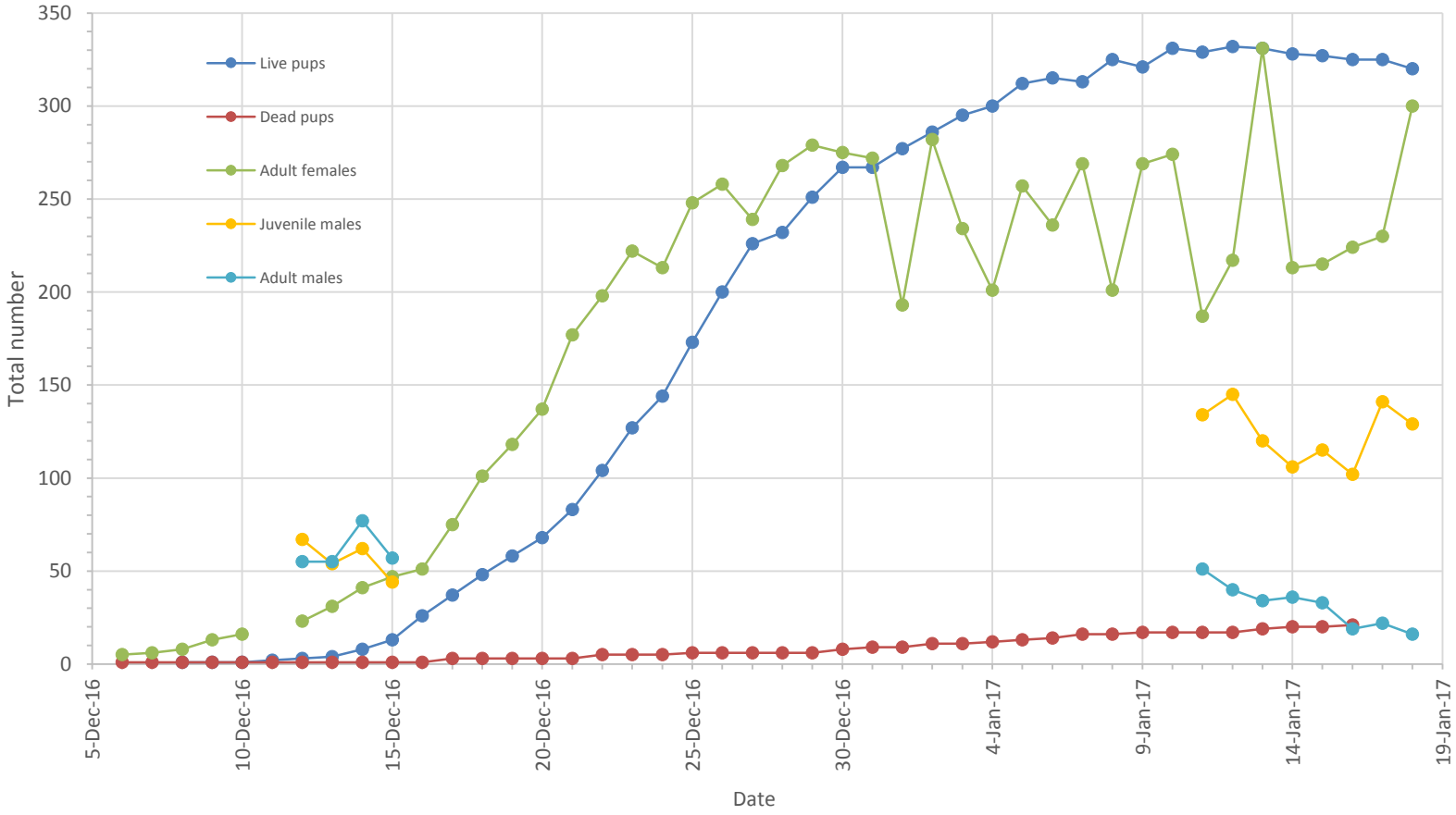




3.8 Pup tagging

Location	Pups tagged only	Pups tagged & microchipped	Pups microchipped only
Sandy Bay	0	328	0
Dundas Island	400		
Figure of Eight Island	47		
South-East Point	0		
Total for Auckland Islands	**447**	**328**	**0**

3.9 Counts at Sandy Bay



3.10 Resighting

- Very few resights and this was only tasked when time allowed and with only 8 days programmed we were busy with other core tasks (e.g. DD 3d, SB 2d, F8 1d)
- This will be reported separately by DOC funded field team
- No resights at Dundas or Figure of Eight Island due to lack of time

3.11 Pup mortality

- There was early field season monitoring for the second time since 2011/12
- Total estimated pup mortality at Sandy Bay was 6% up until 16 January 2017
- Average pup mortality to 16 January at Sandy Bay potentially negatively biased by shorter field seasons:
  - full season monitoring (i.e. Dec onwards) 7%
  - partial season monitoring (i.e. 9 Jan onwards) 3%
- Cause of death will be reported separately

3.15 Tagging data management

- Recording of flipper tags, micro-chips and brands
- All tagging and resighting data entered into excel spreadsheets and then imported into the database
- Useful for searching and checking individual records
- All data will be entered and available in publicly accessible version of NZSL database maintained by Dragonfly at:

  https://data.dragonfly.co.nz/nzsl-demographics

3.16 Pup mortality in holes

- Issues with pups dying in holes in previous years
- Exploration of mortality in holes and mitigation options
- Previous mitigation work funded by WWF, DOC, and Deepwater Group
- Continuation of maintenance of ramps by DOC funded field team after this project and will be reported separately

4.0 Conclusions

- Core field component of the work 10 to 21 January 2017 which was significantly shorter than previous CSP projects but is being supplemented by additional DOC funded projects
- Pup production was estimated for New Zealand sea lion colonies at:
  - Sandy Bay (n=349), Dundas Island (n=1549), Figure of Eight Island (n=67), South East Point (n=0)
  - Total pup production for the Auckland Islands in 2016/17 estimated as **1965**
  - 238 (14%) pup increase from 2014/15
  - 31% higher than lowest count in 2008/09

4.1 Conclusions

- 775 pups marked: Sandy Bay (n=328 tagged & chipped), Dundas Island (n=400), Figure of Eight Island (n=47), South-East Point (n=0)
- Very few tags resights were collected as this was not a part of the core work for this project
- Helicopter worked well for transport to Dundas Island and was used for transport to Figure of Eight island for the first time which was very successful
- Added pup length to standard weight measurements
- Overall, very successful trip

6.0 Acknowledgements

- Andy Whittaker, master of the *RV Baltazar*, and his crew were extremely professional and accommodating and the *vessel* was an excellent vessel for the work
- DOC staff including Ian Angus, Paul Crozier, Katie Clemens-Seely, Jo Hiscock, Kris Ramm, Sharon Trainor, Joseph Roberts
- The Auckland Islands helicopter team of Barry Baker (Latitude 42) and Mark Hayes (Southern Lakes Helicopters) for excellent company and support
- Members of the CSP Technical Working Group who provided useful feedback on this project
- Deepwater Group for funding the core project