Methodology for CSP Project 4426 New Zealand sea lion ground component 2012/13

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1.0 Introduction

- Presentation of methodology for CSP 4426 New Zealand sea lion ground component 2012/13
- Summary of details provided in CSP Report of the same name

1.1 Blue Planet Marine

- Simon Childerhouse
  - >20 years as Marine Mammal Scientist
  - 11 years as DOC Marine Mammal Scientist
  - 4 years at Australian Marine Mammal Centre
  - PhD ‘Conservation biology of NZ sea lions’
  - More than 15 expeditions to Auckland Islands
- BPM
  - Australian-based marine environmental consultancy and research organisation with a focus on marine megafauna in Australasia
  - www.blueplanetmarine.com

1.2 Project requirements

- To conduct ground-based estimates of New Zealand sea lion pup production at Enderby and Dundas Islands using established techniques, timed in such a way as to ground truth aerial-based methods deployed in relation to CSP Project 4427
- To conduct a ground-based estimate of New Zealand sea lion pup production at Figure of 8 Island using established techniques
- To mark New Zealand sea lion pups at the Auckland Islands following established techniques, and conduct a three to five week period of resighting previously marked animals at Enderby Island

1.3 Project outputs

- A technical report (or reports) detailing:
  - the methods used and a summary of data collected
  - estimates of New Zealand sea lion pup production at the Auckland Islands based on ground methods
- Data collected, in an electronic format suitable for upload into the New Zealand sea lion database

2.0 Methodology

- As per the stated project requirements, "…using established techniques"
- The research outlined here will follow exactly the same methods as undertaken previously by DOC and as described in Chilvers (2012)[1] and with reference to the aerial survey methods in Baker et al. (2012) [2]

1. 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. Baker B, Jensz K, Chilvers BL (2012) Aerial survey of New Zealand sea lions – Auckland Islands. DOCDM-872849. Report prepared for Ministry of Agriculture & Forestry, Deepwater Group Limited & Department of Conservation. 11 p.

2.1 Area of operation

- Auckland Islands (50°S, 166°E), New Zealand
  - Enderby Island (21 days)
    - Sandy Bay
    - South East Point
  - Dundas Island (up to 3 days)
  - Figure of Eight Islands (1 day)

2.2 Research timing

- Key research dates:
  - 10 January – pup count at Figure of Eight Island
  - 16 January – mark-recapture at Sandy Bay, Enderby Island
  - 21 January – mark-recapture at Dundas Island
- Field work dates:
  - 7 January – Depart Bluff for the Auckland Islands
  - 1 February – Depart Auckland Islands for return to Bluff around 3 February
- Considerably less research time than previous programmes (1 month from 2.5-3 months)

2.3 Breeding colonies

- Enderby Island
  - Sandy Bay (361 ± 9 pups)
  - South East Point (1 pup)
- Dundas Island (1248 ± 13 pups)
- Figure of Eight Islands (74 ± 0 pups)
- The nature of each colony and logistics means that different colonies require different survey methodology

2.4 Assessment methods

- Live
  - One-off direct counts (multiple counters)
  - Daily direct counts (single counter)
  - Mark-recapture estimates (multiple counters)
- Dead
  - Direct dead counts (single counter)

2.5 Figure of Eight Island

- Single survey on 10th January 2013
- Estimate of live pups
  - One-off direct count
    - Three people count independently
- Estimate of dead pups
  - One-off direct count
    - Single person counts dead pups while whole team searches
- Tagging and tag resighting
  - As time allows

2.6.1 Sandy Bay, Enderby Island

- Timing
  - Daily counts and tag resighting of pups, adult males and females from 11 January to 1 February
  - Mark-recapture on 15 (marking) and 16 (recapture) January
- Estimate of live pups (3 methods)
  - Daily direct live counts
    - Single person counts pups, adult males and females once at or as close to 09:30 am as possible

2.6.2 Sandy Bay, Enderby Island

- Estimate of live pups
  - One-off direct live counts
    - 16 January to coincide with mark-recapture
    - Three people count three times each independently
  - Mark-recapture
    - Marking on 15 January with 150 (40%) pups marked with caps with recapture on 16 January
    - Three people count three times each independently
    - Estimates and standard errors will be developed using Peterson-Lincoln index for a closed population (Chapman 1952)[3] as per previous work by Chilvers (2012).

3. Chapman DG (1952) Inverse, multiple, and sequential sample censuses. Biometrics 8: 286–306.

2.6.3 Sandy Bay, Enderby Island

- Estimate of dead pups
  - Daily direct count
    - Single person counts dead pups every day
    - Pups removed from colony and placed in hole to avoid double counting
    - Possible modification is to not remove pups to allow helicopter work to count ‘pristine’ (i.e. with dead pups present) site
- Tagging
  - All live pups double flipper tagged and micro-chipped on 16 January and subsequent days

2.6.4 Sandy Bay, Enderby Island

- Tag resighting
  - Tag, brand and micro-chip resighting every day at Sandy Bay
  - Resightings around the rest of Enderby Island as frequently as possible, ideally every 2-3 days

2.7.1 Dundas Island

- Timing
  - Mark-recapture on 20 (marking) and 21 (recapture) January
- Estimate of live pups (2 methods)
  - One-off direct live counts
    - 21 January to coincide with mark-recapture
    - Three people count three times each independently
  - Mark-recapture
    - Marking on 20 January with 400 (30%) pups marked with caps and recapture on 21 January
    - Three people count three times each independently
    - Estimates and standard errors as per Sandy Bay

2.7.2 Dundas Island

- Estimate of dead pups
  - Direct count
    - Two counts by single person while whole team searches
- Tagging
  - 400 pups double flipper tagged on 20 and 21 January
  - Possible modification is to add extra day (19 January) on Dundas to allow for 3 days tagging subject to schedule of aerial survey team
- Tag resighting
  - Tag, brand and micro-chip resighting as time permits

2.8.1 South East Point, Enderby Island

- Estimate of live pups
  - Daily direct live counts
    - Single person counts pups, adult males and females once at or as close to 09:30 am as possible
- Estimate of dead pups
  - Direct counts every 2-3 days
    - Single person counts dead pups every 2-3 days
    - Pups removed from colony and placed in hole to avoid double counting
- Tagging
  - All live pups double flipper tagged

2.8.2 South East Point, Enderby Island

- Tag resighting
  - Tag, brand and micro-chip resighting every 2-3 days

2.9 Changes from previous years

- Survey methodologies the same but
  - Reduced team size (6 to 4)
  - Reduced field season (2.5-3 to 1 month)
  - Helicopter transport for Dundas survey
- Implications are
  - Reduced monitoring ability
    - Shorter season
    - No ancillary data (e.g. autopsy, foraging, disease monitoring)
  - Reduced resighting effort
    - No other sites around Auckland Islands

3. Tag resighting

- As per previous survey work by Chilvers (2012)
- Resighting of tags, brands and micro-chips

4. Management of tag data

- Data are collected in an accurate and robust fashion and furthermore that these data are provided in an electronic format suitable for upload into the New Zealand sea lion database
- As per previous survey work by Chilvers (2012)
- Supporting Dragonfly to develop a new version of the New Zealand sea lion database for use this season

5. Comments?

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- Thanks to
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