

# Research Plan for Aerial survey of NZ sea lions, Auckland Islands Contract 4427



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# background

— only endemic NZ pinniped &  
world's rarest sea lion

— 76% of pups born Auckland Islands at  
4 sites

Sandy Bay, Enderby Island

South East Point, Enderby Island

Dundas Island

Figure of Eight Island

- sea lions have been monitored on Auckland Islands since early 1990s
- estimates derived from direct on-ground counts or use of M-R experiments
- in January 2012 we trialled alternative method to previous surveys - aerial photography
- now propose to estimate NZSL pup production at Enderby & Dundas islands in 2013 using aerial survey techniques, building on the work carried out in 2012

## 2011/12 results

- in all but one case, aerial counts underestimated the number of pups produced at both Sandy Bay and Dundas Island
- with the exception of one day, the aerial and mark-recapture counts were highly correlated and varied by less than 3%.
- for one day difference between aerial & ground count was 16%

- to deal with these problem aerial counts may need to be undertaken on more than one day to achieve counts comparable with existing longitudinal dataset. Use maximum count obtained for this purpose
- pups & pup piles are not static. Large piles that present counting difficulties one day likely to break up over a day or two
- future aerial surveys should be timed to occur as close as possible to the dates historically used for mark-recapture estimates

## proposed methods for 2012/13

- work will be confined to 2 of the 4 Auckland Island breeding sites:
  1. Sandy Bay, Enderby Island
  2. Dundas Island
- aerial platform Squirrel Helicopter
- field work 12 – 21 January 2013 concurrent with the time of ground counts
- colonies documented using Nikon digital cameras

## proposed methods for 2012/13

- photos to be taken as raw or fine scale JPEG digital files of minimum 9 MB size
- flight height 1000 ft directly over colony
- each colony to be photographed on at least 4 separate days to investigate temporal effects
- all photography carried out between 0900 - 1500 hours

# counting protocols

- photomontages constructed using Adobe Photoshop software
- paintbrush tool mark off counted pups





## data assessment

- all pups counted
- other age classes not counted
- all images counted by one observer
- repeat counts of randomly selected montages by 2 other observers will be undertaken to investigate evidence of observer bias in counting

A photograph of several New Zealand Sea Lion (NZSL) on a sandy beach. The animals are of various sizes and colors, including dark brown, light brown, and grey. They are arranged in a loose group. Labels are overlaid on the image to identify different age classes: 'Pups' points to the smallest animals, 'Cow and pup' points to a larger animal with a small pup nearby, 'Bull' points to a large, dark-colored animal, and 'Cows' points to a group of medium-sized animals.

**NZSL age classes**

**Pups**

**Cow and pup**

**Bull**

**Cows**

## ground counts

- direct counts carried out at Sandy Bay every day
- Mark-Recapture experiments:
  - Sandy Bay                      16 January
  - Dundas Island                21 January
- results of each recapture will be used to calculate a modified Petersen estimate
- dead pups added to estimates, as applicable

# photographic data storage

- photographs will be submitted to
  - DeepWater Group
  - Ministry of Primary Industries
  - Department of Conservation
- photos will be provided in one directory  
*NZ Sea lions 2013* with three sub-directories
  - *Original photos*
  - *Stitched images*
  - *Counted images*
- set of photographs also retained by Latitude 42