

Response to SeaFIC comments on POP2011-01 New Zealand sea lion population study 2011/12.

SeaFIC Comment

Daily counts from Sandy Bay not included in report

Why three people are used in the counts, and how they do this (e.g. do they split the area between them, or each count the whole area?)

Why “up to three times each”? If less than 3x, how is this decision made? Why do the data record a single count per day, and not the (up to 9) replicates? How is the daily total derived?

Do the counts take place at the same time each day? If so when? If not, how is timing decided, and is the time of the count recorded?

Are covariates recorded (e.g. counters involved, time of count, weather, aggregation of animals)?

Do the counts also record (either precisely or generally) animal locations? If so, how are marked animals (tags, brands etc) recorded as part of this process, or separately are these data captured?

Are dead animals removed or left?

Are only pups counted? What about adults (males and females)?

Maps should be provided to show the extent of areas in which these counts are undertaken

L Chilvers Reply

Figure 3 has been added showing daily counts at Sandy Bay

As clarified in the methods “Pup production was based on the mean of a separate count conducted by three people around the entire island made on a single day on the 10th of January.” Individual counts are provided in Appendix 1.

This sentence is now not used in the report.

There is confusion here between daily counts at SB which are undertaken by one person and the one day a season count undertaken at Figure of 8 Island for which all counts are provided in Appendix 1 of the report. As stated in the methods the mean value is used.

Yes the report describes that the counts at SB are undertaken each day at 9.30am.

At SB one person counts at 9.30am. Weather conditions are logged and collected by MetService; see <http://www.metservice.com/towns-cities/enderby-island>.

No.

As clarified in text, at Sandy Bay all dead pups are removed – everywhere else they are left

At all sights all age classes are counted this has been re-emphasised in the methods section.

As clarified in text the entire sandy beach and open sward area of Sandy Bay.

How the area is counted should be described (e.g. vantage point, fixed route, varied route...)?

Single count or replicates?

Time of day and other covariates recorded?

Animal locations recorded?

Marked animals recorded?

Just pups or adults too?

Treatment of dead animals?

Is there no proposal to undertake multiple MR estimates at Dundas, given concerns over the timing of the 2010 count?

What is proposed if “weather and logistics” do not permit the counts to be made on the intended dates?

Use of all three methods at Sandy Bay is justified on the basis of allowing comparison between techniques and the assessment of any bias. Is this necessary on an ongoing basis (i.e. every year)? If so, why?

What is the approach taken to spreading marks as “evenly as possible” through the breeding area? Presumably this differs for Sandy Bay (where the daily counts give an idea of pup density and distribution) and Dundas (no knowledge until the team lands)?

Are shed disks retrieved to avoid littering?

As clarified in the methods “SEP is a small, open, rocky coastal area which is easily surveyed. All counts were conducted from the rocky beach margin, with hand tally counters and counts recorded.

As clarified in text, these are single counts undertaken by one person. Time of day differs for SEP as it will depend on other activities that need to be undertaken by the research team. Weather conditions are logged and collected by MetService; see <http://www.metservice.com/towns-cities/enderby-island>.

Animal locations are not recorded.

Yes as clarified in the report all marked animals anywhere are always recorded.

All animals – as clarified in the methods.

At Sandy Bay all dead animals are removed from the beach area when possible (large adult males are too heavy to move) and necropsied, on the sward animals are usually necropsied and left in place.

Correct, such work was not commissioned as part of this project¹

Weather and logistics allowed the mark-recapture to be undertaken on the correct dates at Dundas Island

Yes – because it is good science to show this comparison every year and how accurate these methods are and have always been.

As clarified in text, visual observation of the breeding areas are used to ensure disks are spread as evenly as possible at both locations.

When found all disks are collected and removed from the island.

¹ The proposal for such additional work was made at the CSP TWG meeting of 21 June 2011, but did not receive strong support from the group.

What time of day is marking carried out (noting that re-sights are “the following morning”)?

Given that the time between marking and re-sighting on Dundas last year was shortened, why is no work proposed to assess the effect of different intervals between marking and re-sighting on the estimates?

Are observer identities recorded consistently over time?

Does each observer count the entire area three times, or do they cooperate to provide three team replicates?

Is a record kept of the number of pups present which were excluded (due to the entire head not being visible)?

Why no tagging at Figure of Eight?

Why no PIT tagging at Dundas?

Is tagging at Sandy Bay done on a particular occasion, or throughout the trip as new pups are located?

Presumably the checking after one month is restricted to Sandy Bay?

Does one person do all the tagging? If not are the tags attributable to tagger (to ensure loss rates are not variable according to tagger skill)?

Is re-sighting combined with the direct counts, or a separate activity?

How much time is devoted to this each day? Does re-sighting effort vary temporally and spatially from day to day? Are different numbers of people involved, or the same people each day?

Exactly what data are recorded for each identified marked animal? The recording forms used should be included as part of the methodology.

Pups are marked late afternoon on the 15th and 20th January each season (when weather and logistics allows) as clarified in the methods
The proposal for such additional work was made at the CSP TWG meeting of 21 June 2011, but did not receive strong support from the group

No

As clarified in the methods “Recaptures involved three observers moving systematically through the entire sea lion pupping area counting pups, with each observer conducting three replicate counts.”

No

As clarified in the results tagging did occur at Figure of 8 Island “Thirty pups were tagged on Figure of Eight Island with Green coffin shaped Dalton ‘Jumbo’ tags.”

PIT tagging is expensive relative to flipper tagging and it was decided that as the greater amount of resight effort is put into Sandy Bay, it was more effectual to concentrate PIT tagging at Sandy Bay.

All pups born at Sandy Bay are born on the beach and are known, therefore they are all tagged over a time period of 2 to 3 days directly after the mark- recapture is completed.

Yes

Everyone tags, everyone is taught to tag and as the tag loss rate is very low it is likely that loss rate relative to tagger is negligible. Tags are not attributed to tagger.

Separate activity

As clarified in the methods “Daily resighting took 2 to 6 people, typically five hours a day to complete.”

This information has been added to the report as Appendix 2. Section 3.2.2 lists all attribute recorded for each animal.

Does “location” mean the location of tags, or location of the animal?
If an animal is recorded as having one tag, does the recording make clear whether the other tag was determined to be missing, or was uncheckable?

Are all visible marks recorded, or just sufficient to identify the animal?
For untagged animals, are unsuccessful PIT tag reading attempts recorded? Or only those that result in an identity?
If a tag is present, but unreadable, is this recorded?

PIT tag reading should presumably also be attempted on animals with tags, to allow the success rate of PIT tag reading to be determined

How is breeding status determined and recorded?

Is the verification of data completed daily “soon after return from the field” or annually (after the return from the entire trip)?

How are data consistency problems resolved?

The methodology mentions tagged and branded animals – what about the bleach-marked animals noted by Eric Mellina?
section 3.1.1 states “up to 3 people” on a single day of counting at Figure of Eight: actual numbers of people involved should be provided – if this varies then the effect of the variable methodology should be addressed
section 3.1.2: as currently written, the report suggests that marking and resighting of pups were done on the same day; the report should give the full details of all methodology;

Location of the animals – animals are only tagging in the flipper
Yes as outlined in methods and Appendix 2.

Tag information only.
Only those that result in identity

Only if a chipped animal has unreadable tags and the chip is read. In this instance the presence of unreadable tags will be recorded in the comments field.

As clarified in the report “All animals, whether they have tags or not are checked for PIT tags by passing the PIT reader over the hind quarters of a sleeping or otherwise distracted animal.”

As clarified in the text, breeding status of males is determined by location in harem, breeding status for females is recorded in the form of whether they are with pup or not.

Most often daily.

They are assessed by L Chilvers in relation to current database.
Bleaching did not occur this year.

As clarified above this year “Pup production was based on the mean of a separate count conducted by three people around the entire island made on a single day on the 10th of January.” Appendix 1.

As clarified in the report “A single M-R experiment was conducted at Sandy Bay on the 16th January 2012 and at Dundas Island on the 21st January 2012. Pups were marked with circular, 5 cm-diameter, flexible vinyl discs that were glued to the crown of their heads with a fast-setting cyanoacrylic glue (Loctite 454). Pups are marked late afternoon on the 15th and 20th January each season (when weather and logistics allows).”

page 3: equations should all be numbered; the fourth unnumbered equation is incorrect;
section 3.3: it is not clear what is actually entered into the database at the end of the verification process;

section 4.1: the standard errors of the live pup estimates at Sandy Bay and Dundas are presented as the standard errors of the total pup production: this is incorrect;
Table 1: presents the CLs for rookery totals that are actually the CLs for the live pups only;
Table 2: the CL for total annual pup production ignores the variance of the dead counts
Table 1: it is not clear why CLs are not presented for the earlier (before 2008) mark-recapture estimates from Sandy Bay and Dundas
Figure 2: should start at 1995;

Table 2: the total for 2012 is incorrect; column for %annual change in pups born: rounded incorrectly; column for %mortality, total: is incorrect for 2006; column for %mortality, Sandy Bay: is incorrect for 2004;
Appendix 1: the header is incorrect.
Sandy Bay vs. Dundas and the 2011 Dundas count: the apparent increase between 2011 and 2012 may not be real, as the new data support the suggestion that the 2011 Dundas estimate was an under-estimate.

All equations are now numbered. Equation #4 bracketed and is now correct.
It is clearly outline in the NZ sea lion database documentation and is attached as Appendix 2.

For Sandy Bay, dead pups are an absolute known number – there is no error on this therefore the s.e. for live pups is the total s.e. Similarly for Dundas Is although the dead pup count is not an absolute the number of dead and the s.e. is so low (this year 0 as the two counts were both 59) that again the total s.e. is equal to the live pup s.e.

Analysis of historical data is out of the scope of this project.

Changed.

All Correction to table 2 made and Appendix 1 header changed.

No additional work was undertaken to be able to help determine this.