

19 June 2012

Mr R. Harding
Manager – Marine Conservation Services
Department of Conservation
P. O. Box 10-420
Wellington
via email: rharding@doc.govt.nz

Dear Russell,

CSP Technical Working Group, 28 May 2012

Thank you for the opportunity to give further written feedback on the work presented at the CSP TWG meeting on 28 May 2012. This letter provides comments on a number of the presentations.

2012 sea lion pup count report¹

Given the importance of this project and its cost, a presentation of 6 slides was completely inadequate. The report itself is also inadequate in describing methods and results (whole sections were omitted); it suffers from the lack of detail that was pointed out by SeaFIC in 2011. Eric Mellina's draft report on the 2009/2010 field trip² provides much greater insight into the work that was carried out.

Although it was proposed to conduct direct counts and daily accumulative counts, the report does not mention these and does not provide results. This work was an integral part of the proposed methodology shown to the TWG, and it **must** be fully described. Some of the missing detail would be provided by addressing these queries raised in my letter of 7 November 2011.

In the draft report:

- 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;

¹ Chilvers, B.L. 2012. Research to assess the demographic parameters of New Zealand sea lions, Auckland Islands. Contract Number: POP 2011/01. Unpublished draft report. Available on the CSP website for the 28 May 2012 meeting: <http://www.doc.govt.nz/conservation/marine-and-coastal/commercial-fishing/marine-conservation-services/meetings-and-project-updates/28-may-2012/>.

² Available to MPI AEWG members as AEWG-2011/69.

- section 3.1.2: as currently written, the report suggests that marking and re-sighting of pups were done on the same day; the report should give the full details of all methodology;
- 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 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 CL for total annual pup production ignores the variance of the dead counts; this is incorrect;
- Table 2: the total for 2012 is incorrect;
- Table 2: column for %annual change in pups born: five cells are rounded incorrectly;
- Table 2: column for %mortality, total: is incorrect for 2006;
- Table 2: column for %mortality, Sandy Bay: is incorrect for 2004;
- Table 2: all mortalities should have one decimal point precision;
- Appendix 1: the header is incorrect.

Sandy Bay vs. Dundas and the 2011 Dundas count

SeaFIC comments³ on the 2011 report, in the section dealing with the Dundas count, were:

The trends in pup counts tend to be the same at [Sandy Bay and Dundas]. Figure 2 shows the estimated pup production at these two rookeries: the correlation is 86%. Figure 3 shows the annual change for both rookeries: the correlation is 80%.

³ *seafic-comments-pop2010-01-draft-sea-lion-report.pdf*, 7 July 2011. Available on the CSP website for 21 June 2011, <http://www.doc.govt.nz/conservation/marine-and-coastal/commercial-fishing/marine-conservation-services/meetings-and-project-updates/21-june-2011/>.

Estimates at the two rookeries usually show the same trend, although there is some variation. The difference in annual change is largest for 2011. This is what one would expect if the 2011 estimate at Dundas were an under-estimate.

The table below shows the annual change for the two rookeries updated through 2012. The first two columns show the percentage change at Sandy Bay and Dundas, and the last column shows the difference in percentage change. As noted last year, 2011 showed the highest difference in the whole series: Sandy Bay decreased a small amount and Dundas apparently decreased by 20%. This year, Sandy Bay decreased by about 5% and Dundas apparently increased by about 15%; the difference between these changes is 19%, now the largest in the series.

This pattern is exactly what one would expect from an underestimated 2011 Dundas count because of the late survey and the short mixing time. The pattern stands out from the rest of the series, and it supports the suggestion that the 2011 Dundas estimate was an under-estimate. This problem causes uncertainty in the trends for pup production: there may have been a smaller decrease at Dundas between 2010 and 2011 than shown by the estimates; consequently the apparent increase between 2011 and 2012 may not be real.

year	change SB	change Dundas	difference
1995	10.1%	-1.8%	-11.9%
1996	-2.6%	9.8%	12.4%
1997	11.9%	12.0%	0.2%
1998	-6.3%	5.0%	11.3%
1999	7.5%	-7.9%	-15.4%
2000	-1.4%	-1.1%	0.3%
2001	11.1%	-0.7%	-11.8%
2002	-28.3%	-18.2%	10.0%
2003	21.3%	7.7%	-13.7%
2004	3.7%	-1.2%	-4.8%
2005	-13.0%	-15.1%	-2.1%
2006	-4.3%	-0.4%	3.9%
2007	3.6%	7.1%	3.5%
2008	2.5%	-3.4%	-5.9%
2009	-32.8%	-30.8%	2.0%
2010	27.9%	20.9%	-7.0%
2011	-1.8%	-20.5%	-18.6%
2012	-4.5%	14.6%	19.1%

Aerial survey of sea lion pups⁴

At Sandy Bay the dead pups are removed from the beach as soon as they are found whereas at Dundas they are not. The comparisons of aerial counts with ground work at Sandy Bay should therefore take this into account. The aerial counts at Sandy Bay can be compared directly with the daily counts. Each aerial count should also be compared with the mark-recapture estimate of live pups that has been corrected for animals that died between the date of aerial survey and the date of mark-recapture estimation.

The 11 January count, when corrected in this way, will exceed the mark-recapture estimate: this should be discussed. Is there scope for the aerial counts to be an over-estimate? If not, then the mark-recapture estimate is an under-estimate.

The potential utility of this method should be discussed further in the report.

Sea lion database⁵

This appears to be a useful start on collating all the data in a properly organised form.

It is not clear where the sightings of pups associated with tagged animals will be stored; this did not arise in the meeting but is an important component of the mark-recapture program because it allows estimation of pupping rate by age and cohort. The database must make some appropriate provision for this. At present it appears that field staff make a judgement on whether a pup was observed with a tagged female, whether a pup was possibly observed and whether a pup was not observed (exactly what is done at present is not documented, and must be): the database should contain the actual sightings.

It is not acceptable that the mark-recapture data extend back only to 2004, when the estimation began at its current level of reliability in 1995. Given the tremendous importance of these data for understanding sea lion population trends, it is **imperative** that DOC find and provide the data from 1995 onwards, as suggested by SeaFIC two years ago. It is unacceptable to continue to report the results of calculations with no supporting data.

Inshore bottom longline mitigation⁶

We note that this was a progress report only and that further design and testing will be reported. Appropriate use of flume tank testing in the development of gear technology is laudable.

⁴ Baker, B., K. Jenz & L. Chilvers. 2012. Aerial survey of New Zealand sea lions – Auckland Islands. DOC DM-872849. Report prepared for Ministry of Agriculture & Forestry, Deepwater Group Limited & Department of Conservation. Undated. 10 pp. Available on the CSP website for 28 May.

⁵ no document

⁶ no document

Protected species bycatch newsletter⁷

The newsletter appears to be well designed and written (although a concern was noted over the name), but the crucial test is whether it is uniquely providing appropriate information to the intended audience. With respect to the survey of its readership, SeaFIC notes that the response rate was quite low, which raises the possibility that the newsletter is not penetrating its target audience. Alternative survey approaches should be used to explore this. Excluding the CSO, NGOs and Crown groups who receive the newsletter, it appears only 370 newsletters are distributed to the commercial fishers, primarily those associated with the larger companies. Discussions should be held with SeaFIC and perhaps other industry organisations to see if delivery could be combined with alternatives such as Seafood New Zealand and other industry information-disseminating platforms.

Yellow-eyed penguin: review of population information⁸

This appears to be a thorough and authoritative document with respect to the species' biology and population trends. However, the report appears less authoritative when it discusses possible mortality factors. Some (by no means exhaustive) examples:

page 24: *Darby (2003) suggested apart from the potential impact of feral cat predation on chicks and adults that other factors such as "habitat degradation by grazing mammals, accidental capture of birds in fishing nets, disease, and changes in the marine environment" may be limiting yellow-eyed penguins on Stewart Island.*

It's not clear in this report whether Darby had some basis for choosing these factors (data, observations, some kind of evidence) or whether they are simple speculations.

page 24: *Degradation of the marine foraging habitat due to oyster dredging in the Foveaux Strait appears to affect prey availability and quality (Browne 2007; Mattern et al. 2007; Mattern 2008, Browne et al. 2011). Fisheries bycatch may also play a role (Rowe 2009, 2010; Ramm 2010; Rose Grindley, Dave Houston pers. comm.).*

Again, it's not clear to the reader, short of chasing down the cited publications, what the evidence from oyster dredging was. The problem with invoking oyster dredging is that the fishery is more than 100 years old, so that dredging effects are long-standing now and wouldn't be easily implicated in current population declines. Another problem is that oyster dredging is highly confined spatially, with the current exploitation rate (roughly equal to the proportion of bottom dredged) being extremely low.

page 25: *We now have a reasonable idea about the terrestrial drivers of reproductive success, survival and recruitment on the New Zealand mainland (such as introduced predators, human disturbance, disease, terrestrial habitat quality etc.) and appropriate management measures. However, we know very little about sea-based factors affecting*

⁷ Johanna Pierre Environmental Consulting. 2012. MIT2011-05 Protected Species Bycatch Newsletter: The Ocean Guardian. Unpublished report. Undated. 18 pp. Available on the CSP website for 28 May 2012

⁸ Ellenberg, U., A. Stein & T. Mattern. 2012. Yellow-eyed penguin - review of population information. Contract 4350 POP2011-08. Unpublished draft report, May 2012. 88 pp. Available on the CSP website for 28 May 2012

population parameters, such as oceanographic conditions and food supply or fisheries interaction and bycatch.

On reading the preceding section, it's not very clear that we do have a reasonable idea about terrestrial drivers. The document should either discuss this more fully or withdraw from the idea.

page 46: *Reasons for the increased juvenile mortality are unclear. Starvation i.e. inexperience to find food is thought to be the main cause of juvenile mortality. Hence, factors affecting the availability and quality of yellow-eyed penguin prey need to be analysed. This includes benthic habitat degradation as a result of anthropogenic factors, such as commercial bottom fisheries (e.g. bottom trawls, oyster dredging) or increased sedimentation. It is difficult to assess to which extent fisheries bycatch might contribute to the increase in juvenile mortality as the independent observer programme currently does not distinguish between juvenile and adult birds.*

The evidence presented above this to support the *Starvation i.e. inexperience to find food* idea is very thin indeed, even contradictory.

page 60: *It appears that penguins breeding along the Anglem Coast do not forage in areas that are commercially dredged for oysters; hence suitable foraging grounds of these birds have become spatially very limited.*

This doesn't follow. Oyster dredging is now concentrated in the central Strait; there are huge areas not affected by current dredging; it's not even clear whether birds ever foraged in the areas currently dredged.

"In this light, it seems likely that the degradation of the benthic habitat associated with dredging is limiting viable foraging habitat and prey diversity for Stewart Island penguins. Since yellow-eyed penguins are at the top of the benthic food web, their rapid decline in the past few years suggest that far more is at stake than the fate of a single species of penguin. The unique biogenic reefs of Foveaux Strait off Stewart Island must also be disappearing at an alarming rate" (Mattern 2008).

The credibility of this otherwise apparently well-done report suffers greatly from the inclusion of absurd speculation such as this. The decline in penguins is a real cause for concern, but the undisciplined identification of likely causes is also a cause for concern.

The report would be improved if the information and discussion on terrestrial, bycatch and other possible anthropogenic effects were centralised instead of being distributed throughout the various sections, and of course if the discussion were appropriately well-documented and authoritative. Speculation about mortality factors is fine so long as it is identified as such.

Recommendations focus on observer programs and collecting detailed spatial data from the fishery. As suggested in the meeting, other avenues might be fruitful, particularly gathering information directly from fishermen.

Results on shag-potting interactions at the Chatham Islands⁹

The study was mostly based on interviews with 22 fishermen. The design of obtaining interviewees should be discussed. Because some of the fishermen were retired, the study should state what percentage of currently active fishermen was interviewed.

The report does not append the questionnaire, as it promises to do. It is thus not clear what information was gained. For instance, the report shows the locations of shag captures but does not discuss, except by gross statistical area, the relative fishing effort by location. Given a questionnaire design, one would expect to see a more detailed analysis of the information.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'David Middleton', with a stylized flourish extending to the right.

Dr. David A.J. Middleton

⁹ Bell, M. 2012. Shag interactions with commercial rock lobster pot and trap fishing methods in the Chatham Islands. Unpublished report, May 2012. 22 pp. Available on the CSP website for 28 May 2012