

Response to written comments received from Paul Breen, NIWA.

Comment:

My previous comment wrt McKenzie's report was: start quote if this were a fisheries stock assessment, the working group would demand to see the equations used to make predictions, and the likelihood functions, and the prior functions; would want to see the fits and the diagnostics from the fit, and the diagnostics from the traces. end quote

In response to this Darryl has shown two traces. They look OK but they're not "diagnostics from the traces", and there has been no attempt to show the likelihoods or the model fits to the data or their diagnostics. This is not acceptable.

Response:

This is not a fisheries stock assessment and I imagine the type of data being considered here is quite different to that typically used in stock assessments. Fisheries modellers represent just a fraction There are alternative, and completely valid, ways of analysing data and presenting models than what is done in fisheries modelling. Prior distributions for parameters have always been defined in the text of the report.

Comment:

Louise should comment on the resighting probabilities for branded females: they are suspiciously low.

Response:

These are daily resighting probabilities, and are the product of the probability that a female is in a position that she could be resighted on a given day (e.g., not out foraging), and probability of resighting her given she is in a position to be observed. Given foraging trips can last multiple days, a resight probability of approximately 0.33 for branded females seems reasonable. Have received no comment from Louise that she suspect the value to be low.

Comment:

Figure 25 shows a probability of breeding for four-year-olds who bred in the previous year. but there are no 3-year-old breeders, so how can that be? Figure 24 shows a positive probability of breeding for 3-year-olds: how can that be?

Response:

In Eqn 2 it was defined that breeding in year t depends upon age in year $t-1$. This probability relates to a female that bred as a 4 year old. I've attempted to clarify the text, figure and table captions on this point.

Comment:

There is no attempt to explore whether these population parameters would allow the population to replace itself; I suspect they would not. Does the TWG think that sea lions are becoming extinct even without fishing?

Response:

There is no structure in the model to attempt to separate fishing from other sources of mortality. The demographic parameter estimates apply to the population during the 1998-2008 period, given the level of commercial fishing pressures on the sea lion population, climatic conditions, density of the population, etc. during this period. I do not believe there is anything in this report that suggests these estimates are supposed to apply to a population

with no impact from commercial fishing, so am unsure where Paul has got this notion from. The only way these estimates could be used to assess whether the population is replacing itself is by assuming a stable population structure and extracting the eigenvalues from a population projection matrix (or a similar approach via simulation). The assumption of a stable population structure is a fairly strong one, and this type of approach may be sensitive to any permanent emigration away the main study areas as it results in underestimates of survival. While any permanent emigration is rare, it may still be frequent enough to have some influence especially given that the study design does not allow for adult females that may immigrate to the study areas to be tagged. If we truly wish to know whether the population is in decline then appropriate data should be collected that allows population size to be estimated directly.