

## Initial simulation projection results assuming a no future catch scenario

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This document shows results from some initial simulations according to the framework of de Moor (2016a), under the assumption of no future catch (from 2017 to 2036). Samples from the posterior distributions of three assessment models (de Moor 2016c; de Moor and Butterworth 2016a,b) are used for these initial simulations. The results presented herein are PRELIMINARY as convergence of the posterior distributions has not yet been quantitatively tested. In addition, due to time constraints, the last 1000 samples from the MCMC chains after thinning were used instead of a random sample from the whole portion of the chain after burn-in.

Considering the MCMC chains “by eye”, however, suggests that the samples from the distribution of anchovy and single stock sardine OM parameters will be a relatively good match to the finalised posterior distributions. With regards to the two mixing stock hypothesis with separate stock-recruitment relationships (de Moor and Butterworth 2016a), the chains for the proportions of 1-year-olds moving from west to south in 2009, 2012 and 2014 are mixing slowly, thus having sampled only the last 1000 samples after thinning may bias projections under MoveR, but the range for the proportion moving in 2012 and 2014 is small so any bias would mostly result from random samples from 2009 only. More importantly, the chain for the spawner biomass below which median recruitment drops from the maximum for the west coast is also mixing relatively slowly. Considering the MCMC chain “by eye” suggests the last 1000 samples after thinning may bias projections towards being too optimistic, i.e. the median of the samples for the “kink point” in the stock recruitment curve for the west sub-stock may be too low.

### Results

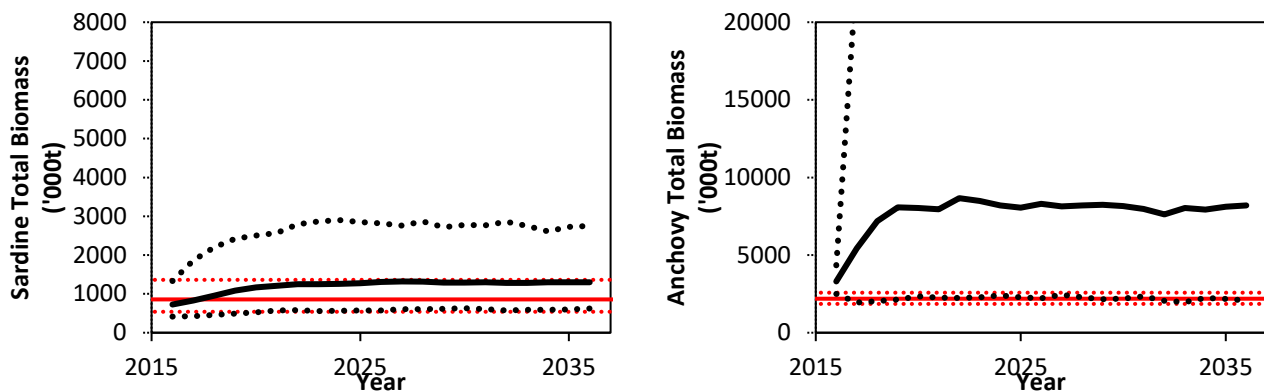
Figure 1 shows the median and 95% probability intervals for anchovy and sardine, assuming a single stock hypothesis for sardine. Figures 2 to 4 show the median and 95% probability intervals for anchovy and sardine, assuming a two mixing stock hypothesis for sardine with separate stock-recruitment relationships (i.e. no contribution of south coast spawners to west coast recruitment). The NoMove scenario assumes there is no future movement of sardine from the west to the south coast and is considered purely for information as an extreme hypothesis. The MoveB and MoveR scenarios are those currently favoured by the SPSWG.

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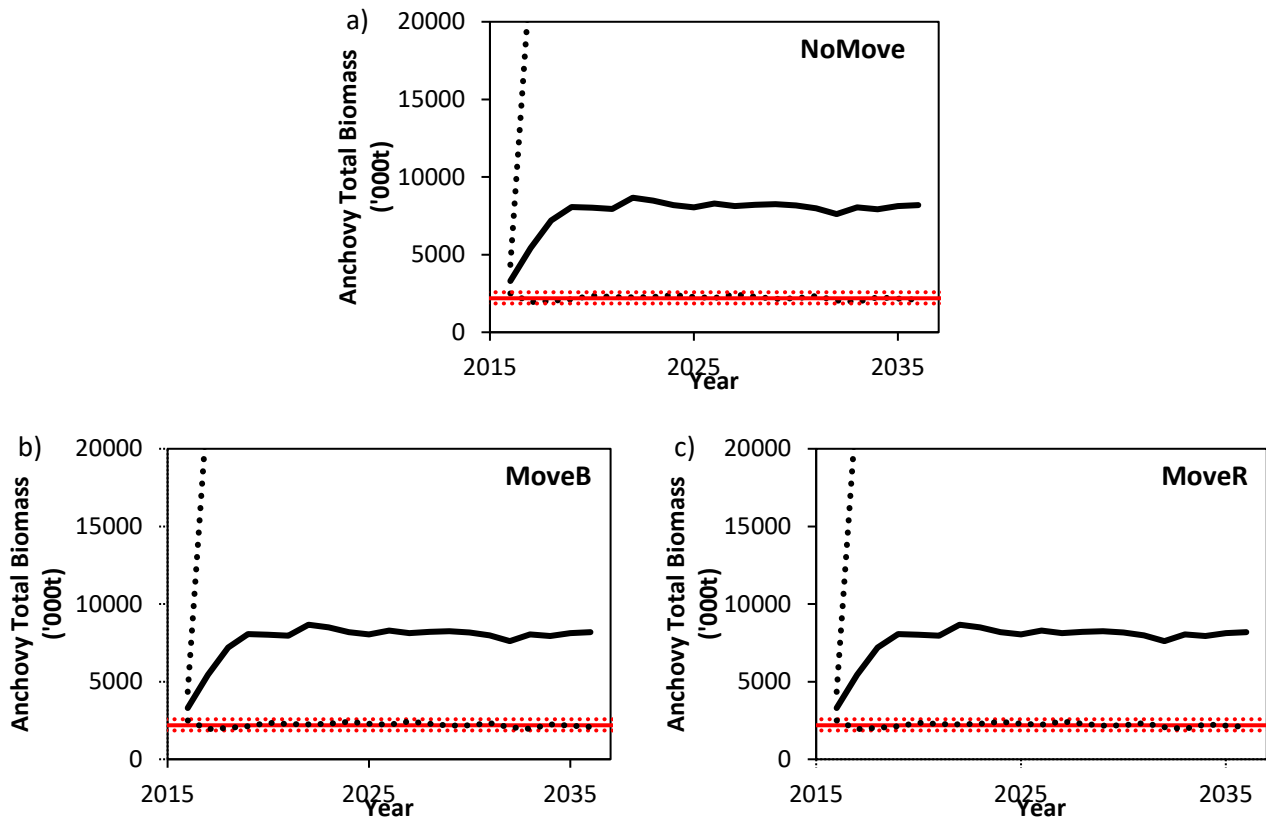
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## References

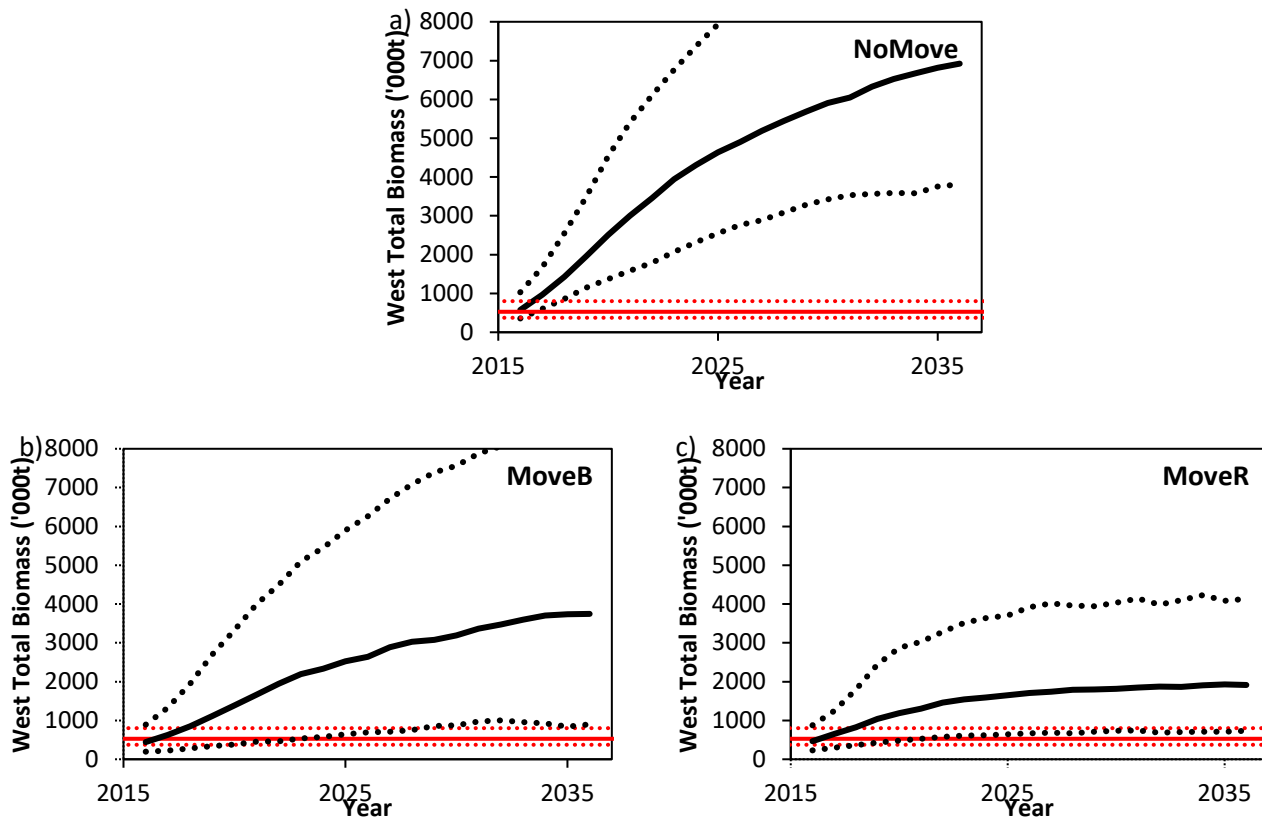
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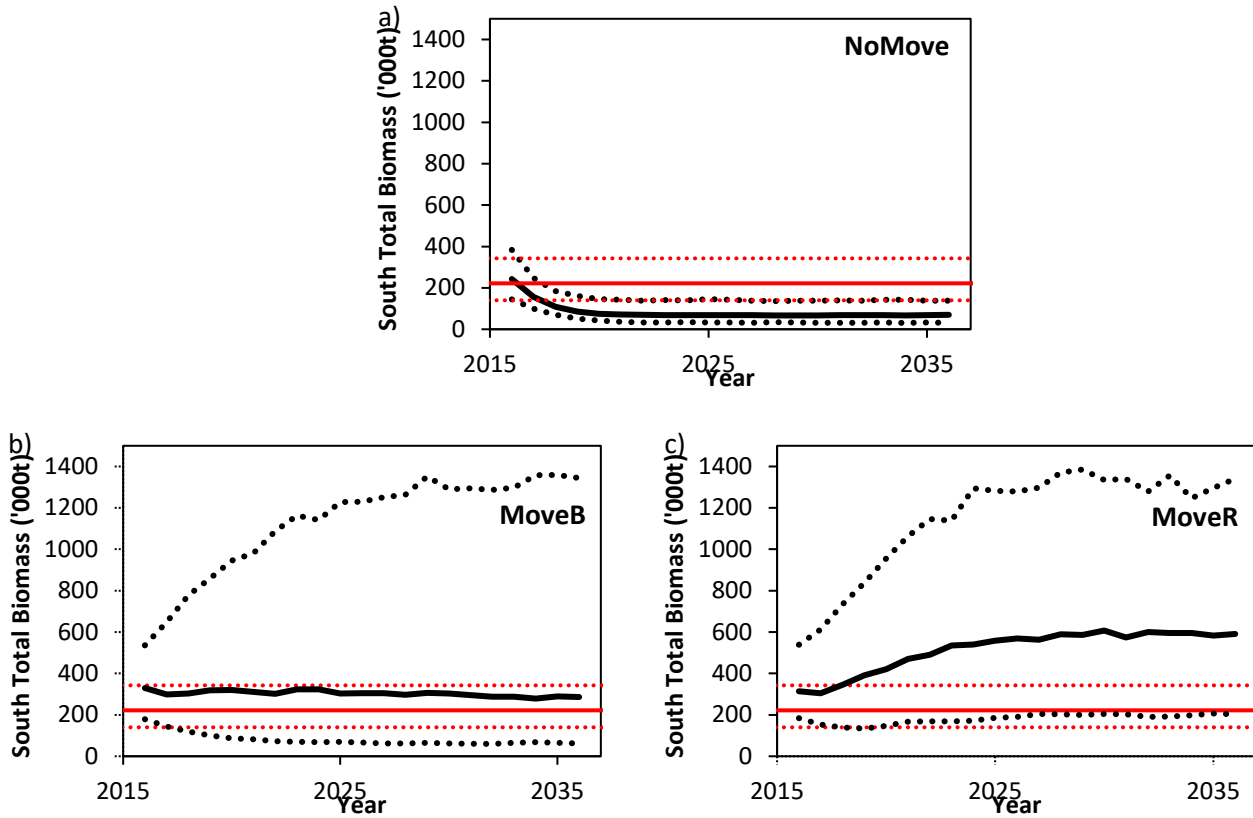
**Figure 1.** The median and 95% probability intervals of anchovy and sardine total biomass under a single stock hypothesis for sardine. The red lines denote the median and 95% probability intervals of the average sardine 1991-1994 November biomass and 10% of the average 1984 to 1999 anchovy November biomass, which were the risk thresholds used to tune OMP-13.



**Figure 2.** The median and 95% probability intervals of anchovy total biomass under the three hypotheses for sardine movement considered. The red lines denote the median and 95% probability intervals of 10% of the average 1984 to 1999 anchovy November biomass, which was the anchovy risk threshold used to tune OMP-13.



**Figure 3.** The median and 95% probability intervals of sardine west coast sub-stock total biomass under the three hypotheses for sardine movement considered. The red lines denote the median and 95% probability intervals of the average sardine 1991-1994 November biomass, which corresponds to the total sardine risk threshold used to tune OMP-13.



**Figure 4.** The median and 95% probability intervals of sardine south coast sub-stock total biomass under the three hypotheses for sardine movement considered. The red lines denote the median and 95% probability intervals of the average sardine 1991-1994 November biomass, which corresponds to the total sardine risk threshold used to tune OMP-13.

