Further projections using the environmental movement scenario

C.L. de Moor*

Correspondence email: *carryn.demoor@uct.ac.za*

Figure 1 shows the median and 90% probability intervals of future projections of movement under the hypothesis that future movement "switches" between increasing or decreasing towards an equilibrium proportion, based on whether a favourable or unfavourable environment exists on the south coast (*MoveE*) from 2012 to 2032 assuming no future catch, together with the model estimated median and 90% probability intervals of historic annual movement.

The equations used are:

$$move_y = \frac{\exp\left\{\ln\left(\frac{move^*_y}{1-move^*_y}\right)+\xi_y\right\}}{1+\exp\left\{\ln\left(\frac{move^*_y}{1-move^*_y}\right)+\xi_y\right\}}, \text{ where } \xi_y \sim N(0,0.57^2).$$

$$move^*_y = 0.9051 move^*_{y-1} + 1.000\times(1-0.9051) \quad \text{during an increasing regime}$$

$$move^*_y = 0.9051 move^*_{y-1} + 0.076\times(1-0.9051) \quad \text{during a decreasing regime}$$

Figure 2 extends Figure 1 for a further 100 years. The median of the last 10 peaks/troughs of the projection are 0.58, 0.49, 0.58, 0.47, 0.56, 0.49, 0.57, 0.50, 0.57, 0.50.

Figures 3 and 4 show the impact of longer periods between "switches" (10-12 and 15-17 rather than the baseline of 5-7 years).

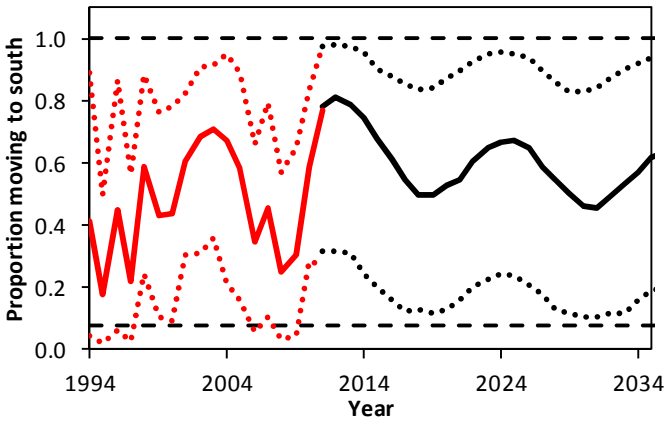

Figure 1. The median and 90% probability interval of model estimated proportions of "west" stock recruits moving to the "south" stock (red) and the median and 90% probability interval of future projected proportions moving under a no catch scenario, assuming *MoveE* (black). The horizontal dashed lines indicate the equilibrium values of 1.000 and 0.076.

* MARAM (Marine Resource Assessment and Management Group), Department of Mathematics and Applied Mathematics, University of Cape Town, Rondebosch, 7701, South Africa.

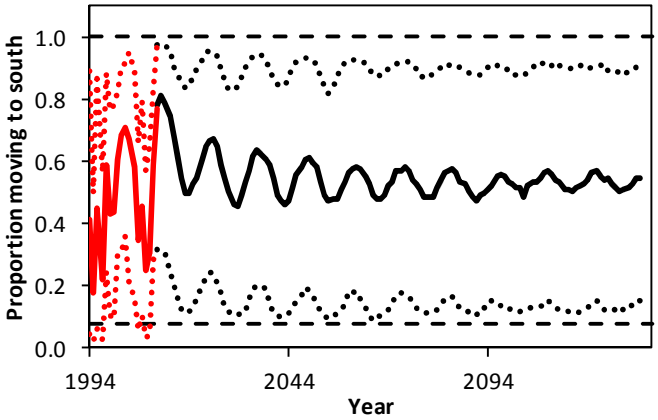

Figure 2. A repeat of Figure 1, but extended for a further 100 years.

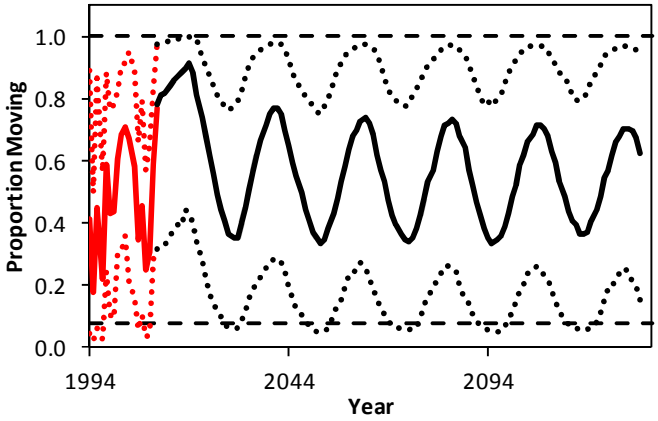

Figure 3. A repeat of Figure 2, but where the period between the environmental "switches" is 10-12 years instead of 5-7 years.

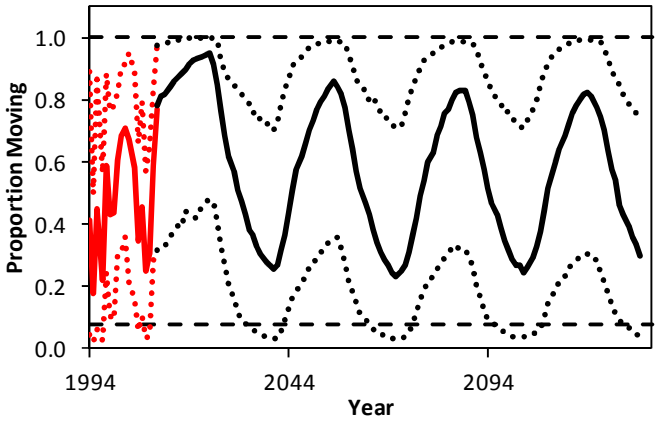

Figure 4. A repeat of Figure 2, but where the period between the environmental "switches" is 15-17 years instead of 5-7 years.