POTENTIAL SOURCES OF INFORMATION TO INFORM ON THE EXTENT TO WHICH SARDINE SPAWNER BIOMASS ON THE SOUTH COAST CONTRIBUTES TO RECRUITMENT ON THE WEST COAST

D S Butterworth and J Coetzee

It is clear that the sardine resource off the west and south coasts of South Africa is neither a fully mixed single stock, nor two completely separate stocks with a division near to Cape Agulhas. There is certainly spatial structure, but what is important for specifying appropriate management measures is where on the continuum between one fully mixed and two completely separate stocks the resource lies.

To reflect this spatial structure, clearly the resource has to be modelled as two stocks, with some mixing between them. However what then becomes key is the extent of this mixing, both for the sardine of fishable size (which the parasite data are informing), and at the recruitment level. Regarding the latter, the primary quantity requiring specification is the extent to which spawner biomass on the south coast contributes to subsequent recruitment on the west coast.

The immediate need then is to identify different sources of information which potentially inform on this extent, so that this information can be assembled to aid future discussion on this point in the PWG.

To initiate this identification, we offer the following non-exclusive list:

1) Individual-based hydrodynamic models of movement of passive particles originating on the Agulhas Bank.

2) Various plots of recruitment in the west (Rw - both from surveys which cover the west only, and from population models) and November biomass from surveys both west (Bw) and east (Be) of Agulhas, and spawner biomass from population models e.g.:
   a) Rw vs Bw
   b) Rw vs $Bw/(Bw+Be)$
   c) Rw/Bw vs $Bw/(Bw+Be)$

3) In estimating stock-recruitment functions $R = f(B)$ within the assessment, investigate how the log-likelihood changes as a function of p from [0 ; 1] for formulations:
   $$Rw = f(Bw+p*Be)$$