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STATUS AND MANAGEMENT OF THE SOUTH AFRICAN HAKE TRAWL FISHERY– 2017

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The South African hake trawl fishery, 2017

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The hake trawl fishery has been re-certified under the Marine Stewardship Council (MSC) for another 5-year period. The independent assessors report stated that "*Hake (Merluccius capensis and M. paradoxus) stocks remain well monitored and managed, with very few weaknesses*" (Andrews et al, 2016), and reflects the hard work of the industry and fishery managers in maintaining sustainable exploitation levels of hake and other demersal resources.

Current stock status of hake

The most recent assessment of the overall hake stocks indicated that there was a downward trend in the stock biomass for *M. paradoxus,* and a continued upward trend for *M. capensis*, well above Maximum Sustainable Yield (MSY) (Figure 1). The results for the spawning biomass however showed a slightly different picture in that both species were trending downwards (Figure 2), which had already been realized for *M. paradoxus* but is now also the case for *M. capensis*. This is thought to be due to poor recruitment into the fishery in recent years, particularly for *M. capensis.*

On a more optimistic note, the stock rebuilding strategy in the Operational Management Procedure (OMP), which is designed to return or maintain the stocks at a sustainable reference point (B_{MSY}) or greater, is proving successful and *M. paradoxus* should reach B_{MSY} by the year 2023 (Figure 1). The long term strategy for *M. paradoxus* remains to achieve a median level of 19% above the MSY target by 2034 (Rademeyer and Butterworth, 2017).

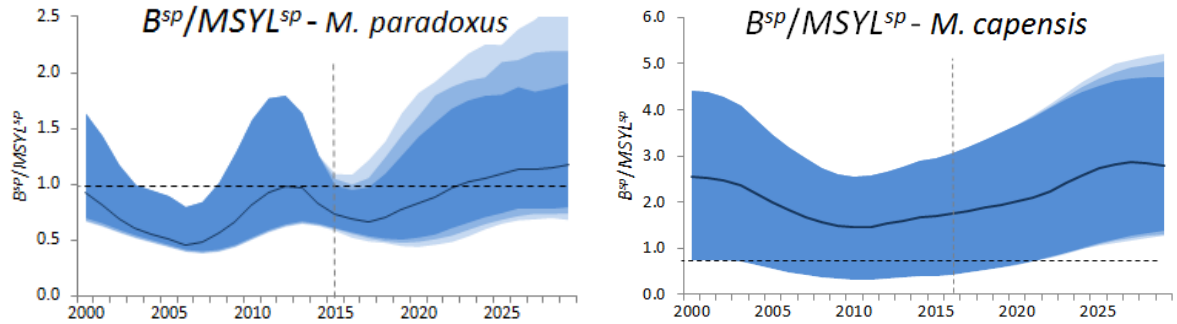

Figure 1. Projection results for *M. paradoxus* and *M. capensis* under OMP-2014 (Rademeyer and Butterworth, May 2017). Note, this figure is an uncertainty envelope for 11 assessment models and the colours denote the 80, 90 and 95% confidence intervals. The solid dark line is the median estimate.

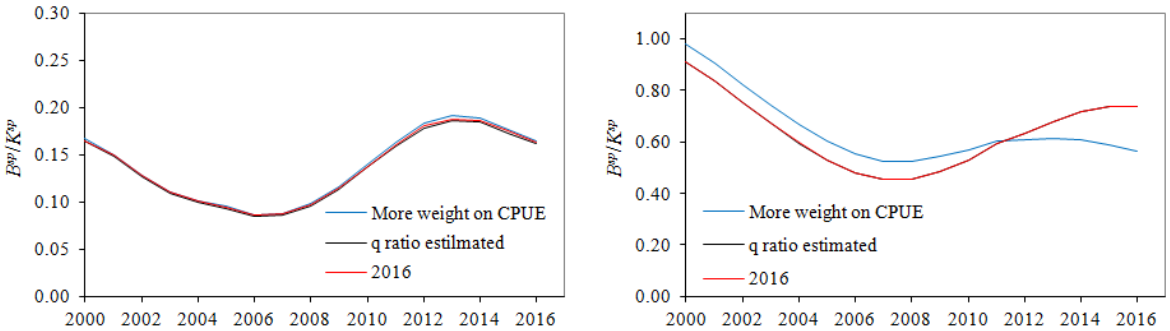

Figure 2. Spawning biomass trajectories for *M. paradoxus* (LHS) and *M. capensis* (RHS) (Source: Rademeyer and Butterworth, May 2016)

Total Allowable Catch (TAC) and catch rates

Because of the species' spatial overlap and the fact that the two species are not accurately differentiated in the catches, the management system sets a single TAC for "hake", which applies to both species and is based on a sophisticated stock model that ensures that the TAC is compatible with the status of the weaker species' stock (which has been *M. paradoxus* in recent years). There is a good level of cooperation between the South African fishing industry and government departments, which has ensured that adequate data are gathered from the industry to inform the annual stock assessments.

The TAC recommendations are drawn from the OMP, which calculates an increase or decrease of the TAC depending on recent catch rates and survey abundance estimates. Under the current OMP-2014, the maximum allowable annual increase in the hake TAC is 10%, and the maximum allowable decrease is 5%, unless the *M. paradoxus* average biomass index falls too low (which is currently not the case but if it were, the maximum permissible TAC reduction that is contemplated in any one year is 25%). Thus, the TAC for 2017 is set at 140 125 tonnes (5% decrease since last year), which is split between different fishing sectors. A small proportion of the hake TAC is also allocated to the horse mackerel fishery as a bycatch, and the remaining direct catch of hake is allocated to the handline fishery (1.8%), longline fishery (6.6%), inshore trawl fishery (6.2%) and the offshore trawl fishery (83.9%). A further 1.5% is allocated to subsistence fishers.

Catch and landing data for the two hake species combined are submitted by the industry, and these data are disaggregated to the species level using a species-split algorithm based on the relationship of species ratios to fishing depth and fish size as recorded during the research surveys. The species-specific CPUE time-series are standardised using General Linear Modelling (GLM) techniques to account for differences in factors such as depth, area, and vessel power (Glazer and Fairweather, 2016). This time-series is then used in the assessment to provide additional estimates of resource abundance and trends (Figure 3). The results in Figure 3 show that catch rates for *M. paradoxus* are increasing on the West Coast but declining on the South Coast and that catch rates for *M. capensis* remain the same on the West Coast but are declining on the South Coast (Figure 3).

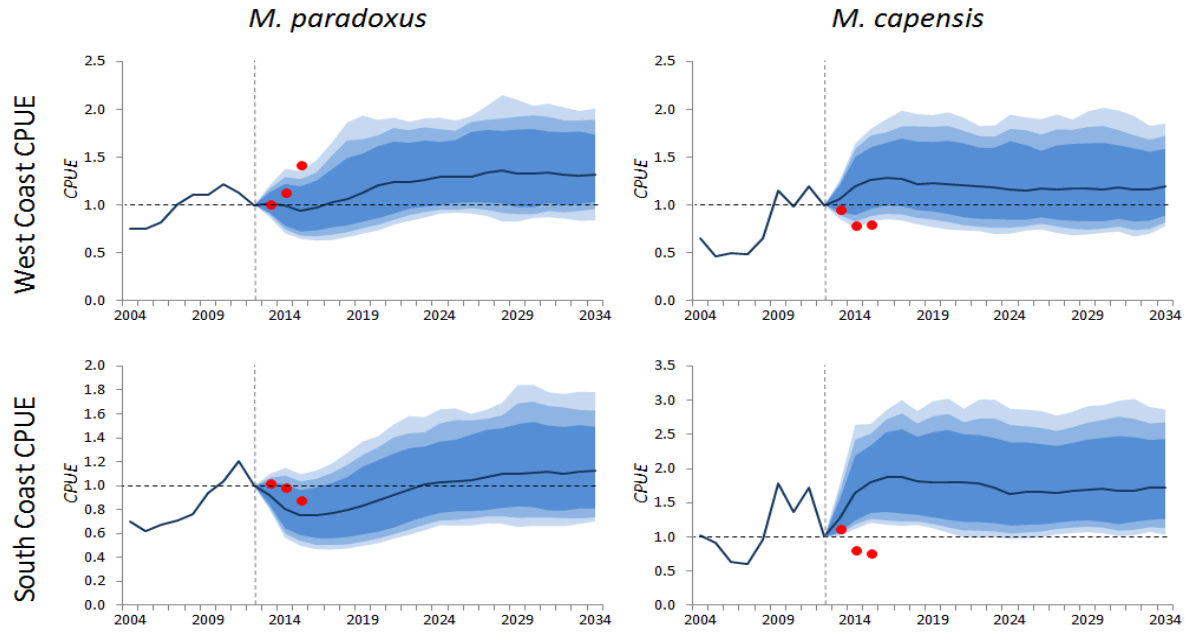

Figure 3. Projections (95%, 90% and 80% PI and medians) for the Reference Set under OMP-2014 compared with the most recent resource abundance index data. The dots show the newest data points. (Rademeyer and Butterworth, May 2016.)

Hake cannibalism

Estimating the current level of depletion of the *M. paradoxus* resource continues to be an area of active research. Predator-prey interactions form an integral part of marine community structure (also called trophic or feeding relationships). This information helps to better understand the overall population dynamics of hake that then supports decision-making when applying fisheries management decisions and conservation strategies (Figure 4). For this reason estimating the current level of cannibalism of South African hake has been prioritised. In 2012 the deep sea trawling industry (SADSTIA) submitted the results of a study (undertaken by OLRAC), which incorporated both inter-specific (between the two hake types) and intra-specific (between hake of the same species) predation into hake stock assessments. The results of this study have been well received by the scientific community and its continued development holds promise when compared to some of the contemporary models being used for hake. The results of cannibalism studies may for example, change perceptions of stock trajectories for the two hake species - in particular that for *M. paradoxus*, which is subject to predation by *M. capensis* as well as cannibalism (Figure 4).

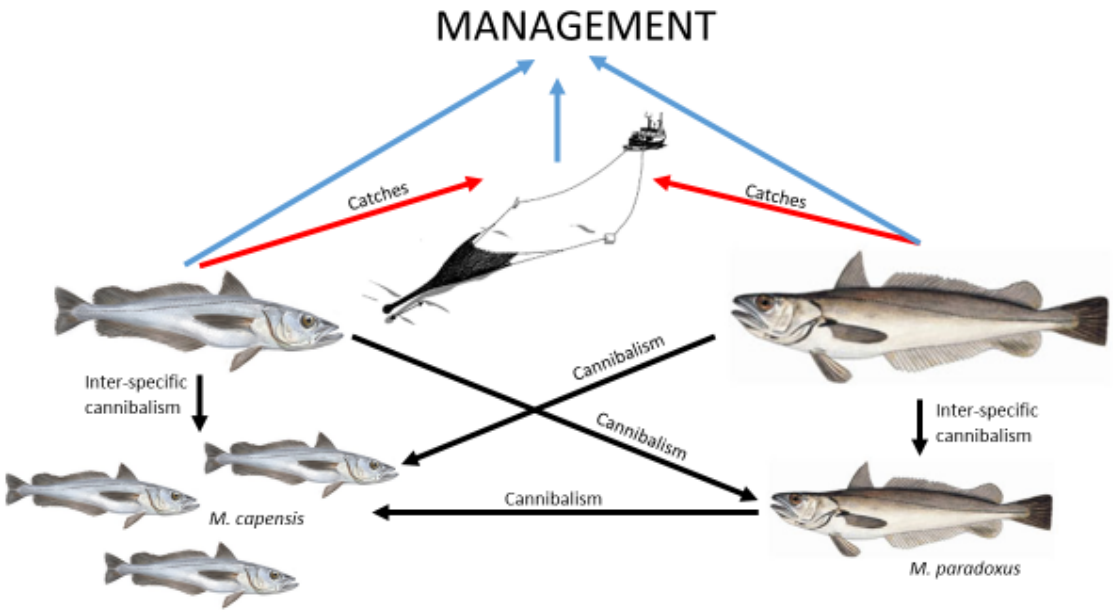

Figure 4. Schematic showing the linkages between inter- and intra-specific hake predation and fisheries management.

References

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