

The Namibian horse mackerel stock

-Summary of resource and management

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Biology of the stock

The horse mackerel (*Trachurus capensis*) stock is distributed from around Tomboa in Southern Angola (16°00'S) and throughout Namibia (Figure 1). The exchange of horse mackerel between Namibia and South Africa is not known but the horse mackerel stocks are considered as separate at least for management purposes. Juvenile fish is mainly found inshore of the 200 m isobath and adults mainly offshore of this. The mean size increases southwards with largest fish (>35 cm) caught south of the Luderitz upwelling cell. The biomass in this area however is low and there is very little fishing on this part of the stock. The main concentration of fish is found in the north from around 17°00'S - 20°00'S. This is also where the main fishing pressure is. The stock has seasonal differences in distribution but these are not well known.

Horse mackerel has a vertical diel migration. The stock is in midwater (juveniles) and closer to the bottom (adults) in aggregated shoals during the day. They lift from the bottom in the evening and descend up in the water column and become more dispersed at night. This is probably a reaction to feeding pattern and predator avoidance. The main part of the juveniles diet consists of zooplankton, and there is increasingly more euphausiids with increasing size. Adult also eats some myctophids and gobies.

The growth of the stock can be described by the following biological parameters:
 $L_{inf} = 51\text{cm}$, ~10 year old, $K=0.15$, $t_0 = -2.31$, $M=0.4$, 50% maturity length = 19-21cm.

Fishery

Two fisheries exploit the horse mackerel stock and produce mainly round fish, dried fish and fishmeal. The midwater trawl fishery started in 1961 (Figure 2). The fleet target adult horse mackerel. The catches increased during the 1970's and reached a peak in 1982 with more than 600 000 tonnes horse mackerel landed. Per today there is 17 active boats which is a decline from around 57 at independence in 1990. They land on average around 80% of the total horse mackerel TAC. The industry is in an ongoing process of Namibianization.

The Purse seine fishery started during the early 1950's targeting pilchard. Catches of horse mackerel in the fishery were recorded from 1971 (Figure 2). There has been a decline from 38 boats in 1990 to 10 active boats today. This is mainly due to the low biomass of pilchard the last few years. Catches of horse mackerel in this fishery is mainly dependent on marked prices of fishmeal and availability (shoaling behaviour) of the juvenile horse mackerel.

Monitoring of the stock

The stock is monitored by fishery catch statistics and acoustic assessment surveys. The total landings are recorded monthly from each fishery, and catches per boat / haul with

positions of the catch is recorded. The length frequencies are collected daily from the mid water trawlers, and at offloading for the purse seine's. The mean length has on average been 16cm for the purse seines and 24cm for the midwater trawlers the last few years. Data on fishing effort from the midwater trawlers is also collected. The effort declined on average from ~8t/h in 1992 to <6t/h after 1995 but show high seasonal variability.

The acoustic assessment surveys are conducted in January-February each year. The survey area is from around 24°00'S - 17°15'S. And comprises of an offshore coverage starting in the south and an inshore coverage. The offshore coverage covers the area from 200m isobath to end of fish distribution, or at least more than 500m bottom depth. The inshore coverage covers the area from 200m to 20m bottom depth. The survey area is divided in 6 strata with parallel transects to reduce the variance inside each strata. Acoustic data, biological data, length frequencies are collected routinely during these surveys. The acoustic data is collected using an EK 500 with 38 kHz transducer

Assessment

The catch statistics and the data from the acoustic biomass surveys go in to two assessment models. An age based VPA and acoustic biomass estimate (Figure 3). Both models have their problems, but in general correspond well with each other and are believed to give a representative picture of the state of the horse mackerel stock.

Management

The management of the horse mackerel stock follows the white paper. A fishing mortality (F) of 0.3 is used for the adults and an F of 0.1 is used for the juveniles. The juveniles have a lower F to prevent recruitment over-fishing. A number of restrictions apply to the fleets. Both fleets are allowed year around fishing. The midwater fleet is restricted to waters outside of the 200 isobath while there is no area restrictions for the purse seine fleet. A net mesh of 60mm is allowed for the midwater fleet (50% retention rate of around 23,5cm) and 12,5 for the purse seine fleet. A by-catch restriction applies for catches containing hake and pilchard. The vessels are to leave the area immediately if a catch comprise of more than 5% hake (midwater trawl fleet only) or pilchard per haul. Similarly a size restrictions apply, the boats are to leave the area if a catch comprise of more than 5% horse mackerel less than 17cm per haul (Midwater fleet), or 5% horse mackerel less than 12,5cm per haul (Purse seine fleet).

State of the horse mackerel stock in 2000

The spawning biomass in 2000 was calculated to be around 1.0 - 1.1 million tonnes (Acoustic and VPA estimates). The total biomass was calculated to be 1.5 million tonnes (both Acoustic and VPA estimates). The recruitment is considered to be variable but a proper recruitment index is still lacking. The long term exploitation level is calculated to be 33% (F=0.4), and the stock is believed to be in a robust state. A reduced CPUE the last year however is of some concern, even thou it probably can be explained by warmer than normal water temperature.

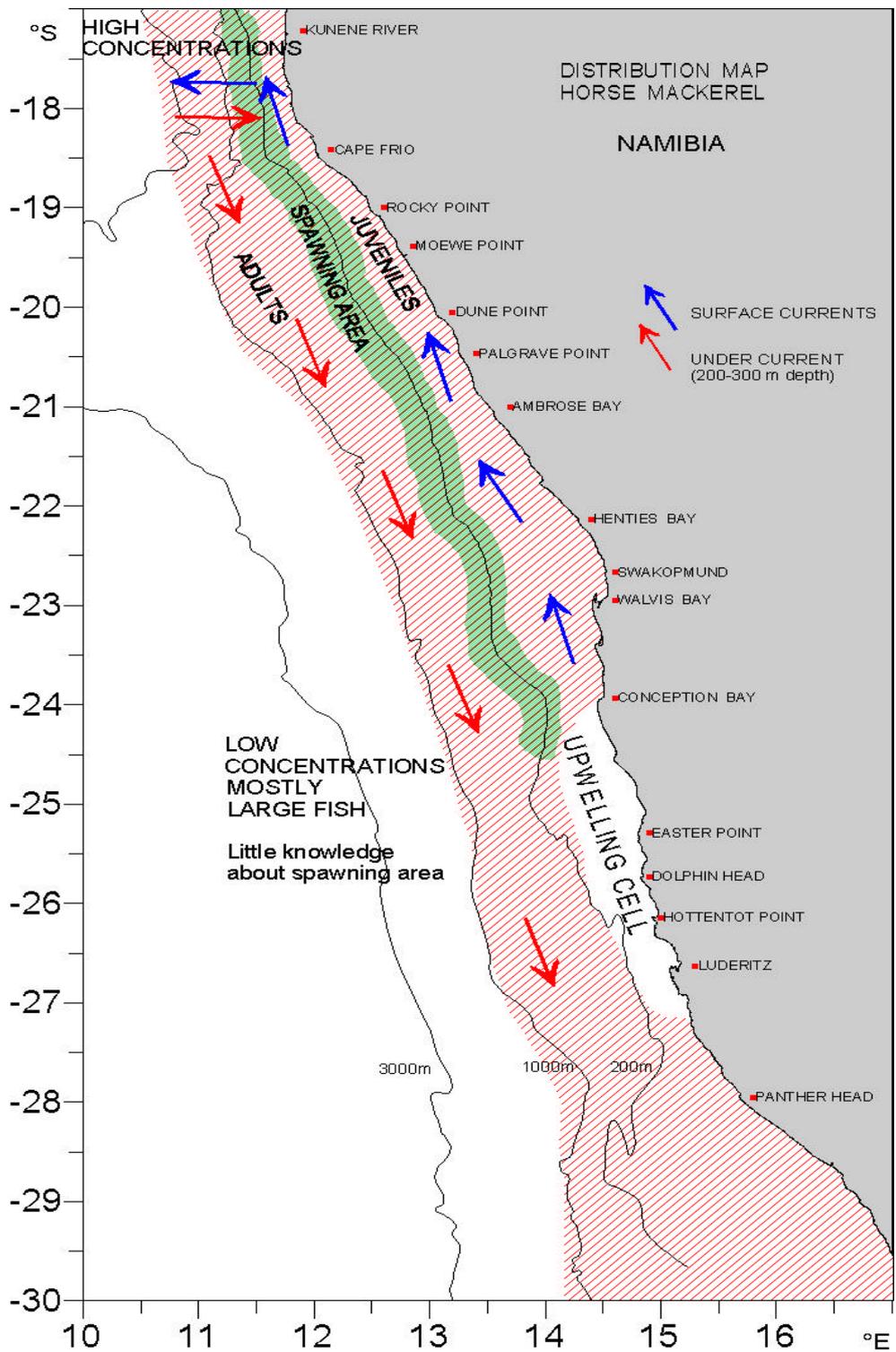


Figure 1. Distribution of horse mackerel in Namibian waters

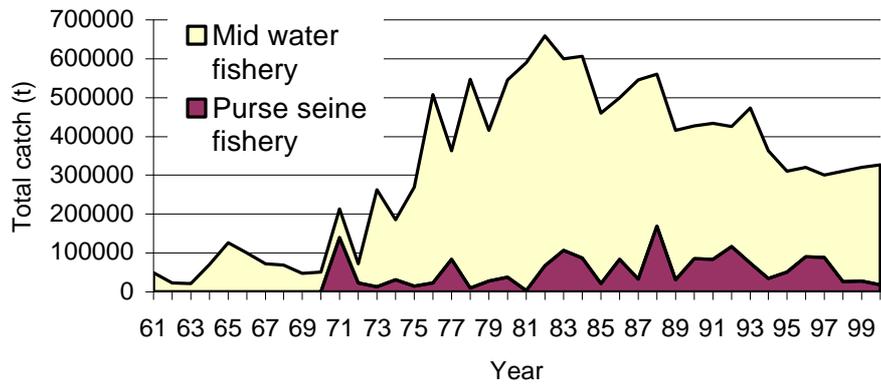


Figure 2. Namibian catches of horse mackerel

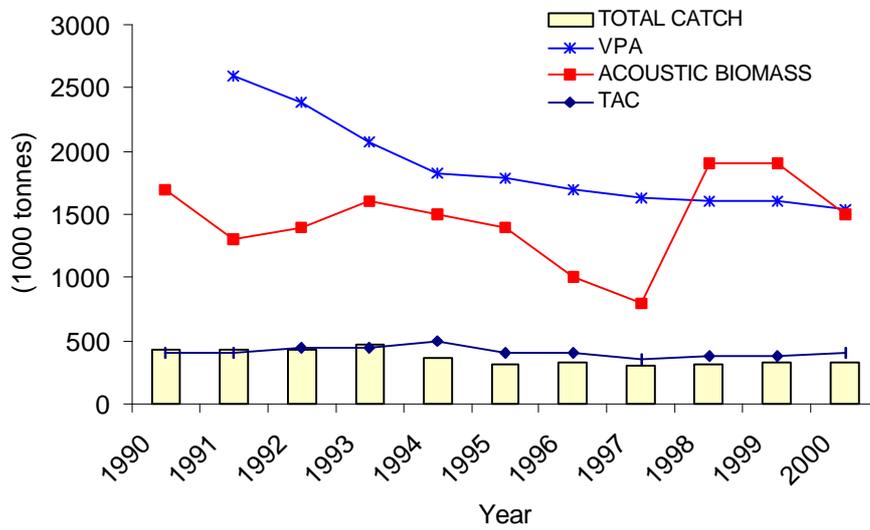


Figure 3. VPA and Acoustic biomass estimates of horse mackerel