How are TACs set for the South Coast Rock Lobster fishery?

The South Coast rock lobster fishery is a deep water fishery targeting the species *Palinurus glichristi*. These lobsters are found on rocky bottoms at 50-200m depth along the southern coast of South Africa between Cape Point and East London.

Like most lobster species, the South Coast rock lobster is very slow growing. A 70mm carapace length male lobster grows only between 2-4mm each year during the annual moult.

Commercial exploitation by local and foreign vessels began in 1974. In 1977 foreign vessels withdrew when South Africa declared a 200 nm EEZ.

The Current South Coast Rock Lobster OMP

Two alternate assessment models have been developed for the South Coast lobster fishery. Both models allow for fishing selectivity to change over time, but in different ways, and these suggest different levels for sustainable catches. The OMP formulae were tested to ensure that a series of appropriate TACs and TAEs would be set as time proceeds, whichever of these and related models spanning the range of the major scientific uncertainties is closest to the underlying reality.

The data from the fishery input to the OMP are the catch and CPUE from the three areas. The average trend in CPUE data over the five most recent years is fed into the formulae each year.

The CPUE is treated as an index of resource abundance. The rationale underlying the OMP is that if the CPUE trend is going up, then the TAC can be adjusted upwards, and vice versa.

Considering the CPUE trend over the five most recent years, rather than just the last two seasons, ensures that the OMP does not respond wildly to year-to-year CPUE fluctuations, but instead to the actual underlying trend in resource abundance.

A further feature of the OMP is that if CPUE falls below its average over 2003-2005, the TAC is reduced further to offset further resource decline and to enhance recovery to earlier levels.

Part of the OMP is also the calculation of a TAE. Effort is controlled by the allocation of a number of fishing days for each season to each of the fishing companies.

A Concern

The primary management target of the current OMP is for the average anticipated spawning biomass to recover 20 percent over a 20 year period, i.e. spawning biomass in 2025 must be 20 percent greater than the level in 2006.

Past spawning biomass trends are shown for the two alternative models in Fig. 3 A concern is that recent levels are low and evidence a continued decline.

The implementation of the OMP is a step in the right direction, as it seeks to turn this trend around, resulting in not only in larger and safer abundance levels, but also in associated improved catch rates and later

The management of the rock lobster fishery is divided into four periods:

1974-1983

During this period high initial catches dropped but then grew again as effort later increased. There are some doubts about the reliability of catch data from these early stages of the fishery.

1984-1999

In 1984 a Total Allowable Catch (TAC) management strategy was introduced in order to control the increasing trend in effort and catches. The TACs recommended intended to hold the resource at its then current abundance, as calculated using stock assessment models.

However this approach failed to control effort which continued to rise. Catch rates (catch-per-unit effort, or CPUE) fell during this period, but there was a debate as to whether this reflected reduction in abundance or effort saturation. The latter is a situation where placing additional traps in an area does not lead to greater catches because the existing traps are already catching all the lobsters available in that vicinity.

2000-2007

By 2000 the drop in CPUE had become too large to ignore, and a new management approach was introduced. The initial plan was to reduce the annual catch by 100 MT in a phased approach over four years.

In addition, in an attempt to address the fundamental issue of excess effort in the fishery, an input control (Total Allowable Effort – TAE) was introduced to supplement the output (TAC) control. This was effected by limiting the number of seadays. The introduction of the TAE control also had the intention of limiting opportunity for catching illegally in excess of allocations.

Vessel efficiencies, the division of the TAC amongst companies, and the then current CPUE values were incorporated in the formula developed to calculate the number of seadays allocated to each company. These were then reduced by 25 percent to achieve the desired minimum reduction in fishing effort sought for the fishery.

During its implementation this new approach assisted in achieving several management objectives, for example:

It contributed to the reduction of systematic under-reporting of catches, and led to the withdrawal of rights to the Hout Bay Fishing company for malpractices. The company is estimated to have caught between 200 and 330 MT more than it had been allocated over the period from 1996-2000. Fishing effort decreased and CPUE started to rise.

Over-capacity of vessels and other infrastructure was addressed, with the number of vessels in the fishery dropping from 13 to 9.

However the reasons for the improvement in CPUE remained unclear. Was it because an effort saturation effect had been eliminated, or because real catches had been reduced through more effective compliance?

Furthermore the scientists' stock assessment models were finding it increasing difficult to replicate the increasing CPUE

catches for the fishery. Its success in achieving this will be kept under review.

What is an OMP?

An OMP is essentially a pre-agreed set of rules (often in the form of mathematical formulae) which are used to provide a management recommendation, such as a TAC, for the fishery each year. The OMP uses pre-specified sets of input data collected from the fishery in order to calculate this recommendation.

Because of scientific uncertainties, there are a number of scenarios for the resource that can be argued from the data available. The OMP must also be shown by computer simulation to achieve management goals for all of these scenarios, not only the one considered to be the most likely to apply.

One of the main objectives of the OMP approach has been to increase the transparency of the management process and to allow stakeholders to be more involved through participation in the development of the OMP. The idea is that the "rules" of the game are agreed by all before the "game" is played, rather than having annual arguments that amount to changing these "rules" from year to year.

OMPs have been used in South Africa to recommend TACs for a number of the major fisheries, e.g. hake (since 1991), pilchard and anchovy (since 1994), and west coast rock lobster (since 1997).

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trend observed. These models used both CPUE and size composition data to assess stock status and trends, but these two different sources of data seemed to be telling different stories, with the latter suggesting lower levels for sustainable catch.

Late in this period, scientists started realising that allowing for changes in fishing selectivity patterns over time could reconcile the CPUE and length composition data.

This means that the typical lobster sizes on which fishing concentrated changed over time, and the models used to provide TAC advice were modified to take account of this.

2008+

The resource models were further refined to distinguish both the two sexes and three different areas in an attempt to account explicitly for some of the fishing selectivity changes.

Furthermore, in 2008 an OMP (Operation Management Procedure) was agreed to provide the basis to set annual TACs and TAEs, subject to review and possible revision in 2010.

Third research vessel on order for India

Wärtsilä has signed a contract to design and supervise the construction of a modern oceanographic research vessel for the marine wing of the Geological Survey of India (GSI). The order was received in October last year bringing to three the vessels of this kind that Wärtsilä is designing for India.

In addition to design and supervising the construction process, Wärtsilä will be involved in selecting the onboard scientific instruments, and in arranging training for GSI scientists to ensure that the vessel's capabilities are fully utilized.

"The new vessel is the third of its kind that Wärtsilä is designing for India," says Mr Arne Stenersen, Managing Director, Wärtsilä Ship Design in Norway. "The first one, Sagar Nidhi, is already in service and being operated by the National Institute of Ocean Technology. She is expected to support research work in the Indian Ocean and the Antarctic. Sindhu Sadhana, the second vessel, is under construction."

Science involves different needs

"Our designers will take full account of the scientists' needs," says Egil Sandvik, Sales Manager, Wärtsilä Ship Design. "Good facilities for handling equipment, laboratories and workshops, ample space for living quarters and meetings, the correct positioning of transducers and last but not least, good levels of comfort."

A high-speed LAN and internet connections will link the vessel's control rooms, laboratories and accommodation to the outside world. The vessel designers have to reproduce the working conditions enjoyed by scientists ashore. "Wärtsilä has a good understanding of this, as inputs to the design process will be coming from people who have sailed as scientists on research vessels for many years," says Sandvik.

A completely new approach

A new set of rules apply to the design of this research vessel. The focus is on how the scientific tools perform and on the vessel's ability to adapt to what she will be expected to explore in the future.

"It's an interesting design challenge," says Sandvik. "She has to be capable of carrying out complicated operations such as handling ROVs (Remotely Operated Vehicles), supporting manned underwater submersibles and controlling autonomous drills that can drill up to 150 metres below the seabed at depths of a thousand metres - not to mention the collection of seismic data and simple operations such as water and soil sampling. The demands and requirements associated with future tasks always have to be kept in mind."

The new vessel will have accommodation for 69 people. With an overall length of 95 metres, breadth of 19 metres, maximum draught of 6 metres and speed of 14 knots, it will have an endurance of 45 days. Completion of the project is scheduled for the first quarter of 2012.

India's economic progress depends on new resources

Established in 1851, GSI is India's second-oldest survey company. Right from the beginning, it has been probing new territory, including regional-level exploration for mineral resources, inputs for engineering projects, and geotechnical, geo-environment, seismotectonics, natural hazards and glaciology investigations.

An ocean-going research vessel and two GSI coastal vessels have been carrying out seabed surveys within the Exclusive Economic Zone (EEZ), India's territorial waters and in international waters. GSI's mandate is to quantify the country's existing resources and identify new ones.