

How can science contribute to an **ecosystem approach** to the South African hake fishery?

Background

The application of the Ecosystem Approach to Marine Resources (EAMR) is a priority for the EUR-OCEANS network (see Fact Sheet 2). EAMR frameworks are adaptive, incremental and geographically specific. In this Fact Sheet we report on the implementation of the EAMR to the hake fishery off South Africa.

The EAMR requires a sound scientific base to provide the means of assessing the ecosystem effects of fishing as well as the success of the various management strategies adopted in response to identified risks and effects. Ecological Risk Assessment was adopted in South Africa as a means of identifying and prioritising problems associated with selected fisheries in the Benguela region.

To illustrate how South Africa is moving towards the EAMR from the basis of biological research, selected ecological issues raised for the demersal fishery for Cape hakes (*Merluccius capensis* and *M. paradoxus*) are examined. The indicators required to address these issues are identified and the scientific research or monitoring studies necessary to inform these indicators are proposed.

Biological or catch data are synthesised into useful indicators that enable changes and ecosystem responses to be followed in a manageable and formal way (e.g. through specific management measures). Technical management measures that may contribute to solving the issues are also suggested. This will contribute to a management strategy that optimises social and economic benefits without compromising the integrity and sustainability of the resource and its supporting ecosystem.

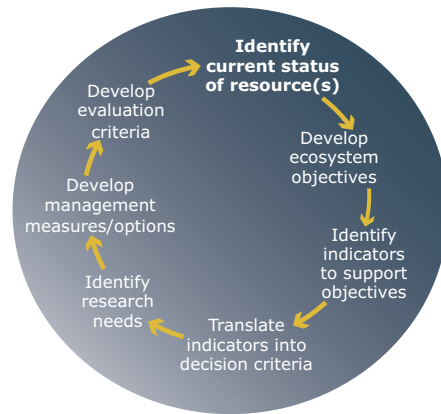


Diagram to show the different stages in the EAMR approach



Cape hake, *Merluccius capensis*.
Photograph: Rob Leslie, Marine and Coastal Management, South Africa.



Hake trawler with birds.
Photograph: Rob Leslie, Marine and Coastal Management, South Africa.

The hake fishery

Commercial trawling began off South Africa in 1899 and flourished with the discovery of the vast resource of Cape hakes off the West Coast. After WWII, improved technology and the discovery of Cape hake stocks off Namibia attracted a growing number of distant-water vessels to the southeast Atlantic, leading to a rapid escalation in the annual landings by the 1960s. South Africa declared a 200-nautical mile exclusive economic zone (EEZ) in 1977, excluded all but a small amount of foreign effort and embarked on a rebuilding strategy for the Cape hake resource through the setting of conservative annual catch limits.

The hake fishery aims to optimise the economic and social benefits of the shallow-water and deep-water Cape hake stocks without compromising the long-term biological sustainability of the hake stocks or species caught as bycatch in the hake fishery. Management of the hake fishery is via an operational management plan and aims to achieve an optimal trade-off between maximising catches and minimising the risk of resource collapse. The hake fishery is the most valuable of South African fisheries; it is estimated that the deep-sea and inshore trawl fleets account for about half the wealth generated by living marine resources in South Africa. Annual sales in 2002 amounted to approximately €195 million and the hake trawl fishery provides employment for over 8,800 people.

To address concerns over deep-water hake (*M. paradoxus*) depletion, an interim total allowable catch phase-down process was adopted in November 2005. Since 2006, the permit conditions for all fishery sectors in the hake fishery contain a specific 'Ecosystem Impacts of Fishing' section specifying conditions aimed at reducing the impacts of the fishery on the ecosystem, including for example specification of mitigation devices and limits on bycatch. Several of these conditions were previously in place, but not previously afforded sufficiently high priority.

Applying the Ecosystem Approach to the South African hake fishery

In implementing the EAMR in South Africa a range of *indicators, issues, technical management* approaches and potential for *implementation* are identified for each fishery. Each *issue* is classified and prioritised according to risk levels. The table below provides some examples of how the EAMR is being applied in the South African hake fishery. For a more detailed list of all the ecological *issues* considered in this fishery, please see: www.eur-oceans.org/KTU. Examples of the application of the EAMR to the fisheries for small pelagic fish (sardine and anchovy) and West Coast rock lobster in South Africa are also available on the website.

The Issue	Indicators	Research approaches	Technical management	Implementation
Trawling and longline fisheries have high impact on threatened, protected species of seabird	Recorded mortality of seabirds in trawls and longline fisheries	Longline: determine most suitable tori line design and weighting regime for local conditions, implement good observer programs Trawl: quantify and measure seabird mortality, develop effective mitigation devices	Longline: fishery permits include mitigation measure (e.g. observers, line weighting, offal discharge control, dead birds landed) Trawl: Test/put in place mitigation measures for trawling (e.g. offal management, Brady baffler being tested). Tori lines required after 1 July 2006 Compliance with mitigation measures in both fisheries needs improving	Fair potential for implementation of management response/ability to manage
Physical impact of trawls on benthic biota and habitat	Species composition and diversity in Marine Protected Areas (MPAs) compared with trawled areas	Incorporate available data into Geographical Information Systems (GIS) Future: identify recovered or minimally damaged areas to create MPA for use as reference site. Map habitat type data and systematic benthic distributions, comparative studies of areas subjected to range of trawling pressure	Retain regulations banning the use of destructive heavy bobbin trawl gear Encourage the implementation of future technological advances in less destructive trawl gear Aim for World Summit on Sustainable Development (WSSD) target of protecting 20% of representative habitat (also offshore) Currently no offshore grounds formally protected	Good potential for implementation of management response/ability to manage

Action points

South Africa has chosen a progressive and iterative strategy regarding the implementation of the EAMR, starting from identifying relevant issues and applying existing scientific knowledge, expertise and assessment. In its initial stage, for each important fishery the following needs are considered. These needs are common to the application of the EAMR in other areas:

- Identify the current status of the resource(s);
- Examine concerns regarding single-species, community or ecosystem based approaches (e.g. spatial issues or species interactions not taken into account in current management), and express them as ecosystem objectives;
- Identify indicators in support of these objectives;
- Translate ecosystem indicators into decision criteria (e.g. through definition of limit reference points);
- Identify research needs;
- Develop management options and measures to be taken with stakeholders participation; and
- Develop evaluation criteria for adopted management measures.

Fact Sheet composed by Lynne Shannon and Rob Leslie from Marine and Coastal Management, South Africa. This approach has been undertaken as part of the Benguela Current Large Marine Ecosystem (BCLME, see www.bclme.org) project to explore the feasibility of an Ecosystem Approach to Fishing in the Benguela region. For further information please contact: Lynne Shannon (Lshannon@deat.gov.za), or go to www.eur-oceans.org/KTU for background papers, additional case studies and in depth examination of issues raised. Other applications of the EAMR in the EUR-OCEANS region will be available in future Fact Sheets.

