

# How can science contribute to an ecosystem approach to the South African West Coast lobster 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 West Coast rock lobster 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 effectiveness of the various management strategies adopted in response to identified risks or 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 toward an EAMR from the basis of biological research, selected ecological and socio-economic issues raised for the West Coast rock lobster (*Jasus lalandii*) fishery 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 optimizes social and economic benefits without compromising the integrity and sustainability of the resource and its supporting ecosystem.

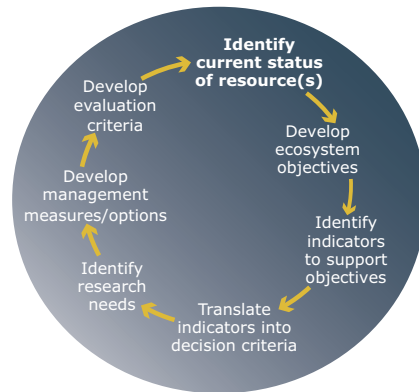


Diagram to show the different stages in the EAMR approach



West Coast rock lobster, *Jasus lalandii*.  
Photograph: Stephen Brouwer,  
Marine and Coastal Management, South Africa.

## The West Coast lobster fishery

Currently, West Coast rock lobsters are exploited both commercially and recreationally. The commercial fishery, which started in the late 19th century, now consists of offshore (> 30m depth) and nearshore sectors (<30m depth). Fishing is mainly by traps, deployed from vessels in water >30m, or by hoopnets in shallow water (<30m), deployed from dinghies. Participation in the recreational fishery is by permit only (about 65 000 permits sold annually), and lobsters must be caught between mid-November and April by diving without artificial breathing apparatus or by hoopnets from shore or small vessels. The fishery is currently valued in excess of €32.5 million per annum and provides seasonal employment for approximately of 4 000 people.

The fishery is subdivided into different areas that are managed by an annual total allowable catch (TAC) set using an operational management procedure, minimum size limit, closed fishing season and fishing zones. Management aims to optimise the economic and social benefits of the West Coast rock lobster resource without compromising the long-term biological sustainability of the exploited stock. A management strategy aimed at achieving a 20% increase in resource biomass (>75mm carapace length) between 1996 and 2006 has

been adopted. The most recent assessments (2003) suggest that the biomass level is currently about 10% above the 1996 level. From 2006 onwards, the West Coast rock lobster TAC recommendation includes a state of the environment / ecosystem report, to highlight important environmental issues or concerns.

A sharp decline in somatic (body) growth rates at the end of the 1980s resulted in reduced recruitment to the fishery, although the cause of the decline is still not clearly understood. As a result of poor catches of lobster of legal size and concerns regarding increased discard mortality owing to increased handling of undersized lobsters, the minimum size limit was reduced in the early 1990s and has remained unchanged since. During that period, the total allowable catch was decreased and following a recovery of the stock, has since been increased.

## Applying the Ecosystem Approach to the South African West Coast lobster 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 West Coast rock lobster fishery. For a detailed list of all the ecological issues considered in this fishery, please see: [www.eur-oceans.org/KTU](http://www.eur-oceans.org/KTU). Examples of the application of the EAMR to the fisheries for small pelagic fish (sardine and anchovy) and the South African hake fishery are also available on the website.

The Issue	Indicators	Research approaches	Technical management	Implementation
<b>Trophic influences (interactions with urchins and abalone) of large-scale movements of West Coast rock lobster (hereafter referred to as lobster)</b>	Spawner-biomass estimates for lobster and abalone; indicators of trophic interaction between urchins, abalone and lobster; benthic community structure	Independent assessments and optimal parameter values (OMPs) for both lobster and abalone; benthic community surveys have been initiated; continue annual fishery-independent abalone and lobster surveys  <b>Future:</b> research processes involved in interactions between lobsters and benthic organisms, particularly urchins, abalone and octopus; model trophic interactions and benthic community dynamics; intensify benthic surveys; investigate the driving forces of the lobster population shift	Manage the lobster resource to retain potential for fisheries of impacted species such as abalone  <b>Future:</b> develop joint management procedure for lobster and abalone east of Cape Hangklip; take into account trophic interactions and models in management; maintain or achieve 25% spawner-biomass threshold limit for both lobster and abalone (threshold abalone abundance required to stimulate spawning and ensure reproductive success); curtail poaching of both lobster and abalone	Fair potential for implementation of management response/ability to manage
<b>Fisheries and management implications of southward and eastward shifts in lobster distribution (caused by long-term climate change)</b>	Measures of abundance per area, within accepted statistical threshold (abundance, growth, size-structure, sex structure); cpue	Continue annual offshore and inshore Fishery Independent Monitoring Survey (FIMS); continue monitoring of commercial catches  <b>Future:</b> investigate factors and mechanisms causing distributional shift in lobster	Marine Protected Areas (MPAs) are in place and efficacy has been evaluated; re-evaluate the MPAs and possibly reposition if necessary  Assess feasibility of moving to a spatially disaggregated model for the optimal parameter values	Fair potential for implementation of management response/ability to manage
<b>Damage caused to benthic biota (hard corals, bryozoans, sea fans) by lobster fishing gear</b>	Benthic community composition; species diversity; visible damage	<b>Future:</b> undertake experiments and monitoring (compare fished and unfished areas) to assess damage by fishing gear to benthic biota. If damage is caused, investigate alternative trap designs	Implement alternative trap designs and closed areas to minimise damage	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, Stephen Brouwer and Andrew Cockcroft 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](http://www.bclme.org)) project to explore the feasibility of an Ecosystem Approach to Marine Resources in the Benguela region. For further information please contact: Lynne Shannon ([Lshannon@deat.gov.za](mailto:Lshannon@deat.gov.za)), or go to [www.eur-oceans.org/KTU](http://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.

