Generic MPs for Data-Poor Fisheries: Southern Hemisphere Collaboration

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Introduction

The focus of the Southern Hemisphere Collaboration amongst Australia, New Zealand and South Africa is the Management Procedure approach, also known as Management Strategy Evaluation (MSE), as a better basis to manage fisheries. The primary aim of the Collaboration is basic research into the design, development and evaluation of a set of generic Management Procedures (MPs) for data-poor fisheries, for which fishery-specific MPs would be too costly and time-consuming to develop, so as to set the management of such fisheries on a sounder and sustainable basis.

Problem identification

Management Procedures (MPs) for fish stocks have been adopted successfully for a few exclusively high-value data-rich marine stocks worldwide (e.g. in South Africa for hake, rock lobster and the small pelagic fisheries) in order to manage these fisheries sustainably, while taking due cognisance of uncertainties to be consistent with the precautionary principle.

To date, this approach has not been applied to the vast number of low-value data-poor (or information-poor) fisheries in South Africa or internationally, as any one particular such fishery does not warrant the expertise, time and funds required for the computer simulation testing and evaluation required for the MP approach. However, if one considers the number of fisheries that are currently considered low-value and data-poor, and are currently not managed in terms of any formal scientific assessment or MP, their combined value is substantial, as is their value to coastal communities.

MPs for fish stocks termed data-poor or information-poor are currently lacking. Furthermore, most classical quantitative assessment techniques cannot be implemented for data-poor fisheries as there is simply not enough information available to apply them. Thus, due to lack of information, there is often no way of

knowing whether these data-poor stocks are under- or over-exploited. However, the MP approach offers an attractive way of dealing with high levels of uncertainty inherent in fisheries in a manner that is scientifically defensible (eg Brandao and Butterworth 2009).

To address the need for MPs for data-poor fisheries where both information and the amount of funding are limited, the concept of a Southern Hemisphere Collaboration between leading researchers in the field from South Africa, Australia and New Zealand was developed at the "Management of Data-Poor Fisheries Workshop" in Berkeley, California in 2008, with a subsequent workshop being held at the CSIRO Hobart Laboratories in October 2009 to discuss potential activities and benefits of such a Collaboration.

The basic approach is rather than to attempt to design a case-specific MP for each different fishery (which would be unrealistic), instead to develop generic MPs that could be applied in the management of fish stocks that share certain characteristics, both locally and globally. The Collaboration will keep South Africa at the global cutting edge of fisheries assessment and management.

Research objectives

Central to the research project would be the design and development a set of MPs that are robust to a selection of key uncertainties and are computer simulation tested to ensure adequate performance for a class of fisheries that share key characteristics. Thus different sets of generic MPs would be designed for different classes of fisheries. The process would entail the design and development of software for a range of resource population models and MPs to test on the aforementioned models.

To ensure the success of the research project, involvement in an international working group to develop an MP methodology framework is essential. In this respect, the "Southern Hemisphere Collaboration" initiative has been established for the development of a generalised MP framework so as to avoid re-invention, and reduce the costs and time associated with developing and applying management procedures to specific fisheries. An additional benefit of this Collaboration would be the creation of a database drawn from international sources containing typical biological and other fishery parameters with their associated statistical properties for a wide range of marine resources, so that these could be used in the development of operating models for testing generic MPs. Furthermore, criteria would need to be developed to group different fish stocks together according to biological and fishery data and characteristics. In consultation and collaboration with DAFF Branch Fisheries (formally MCM) and other stakeholders (such as the fishing industry), a set of criteria will be developed to determine the appropriate management action based on the level of uncertainty and precaution required, which will also depend on the estimated status of the resource.

Work Plan

A review-develop-test cycle is proposed that would be repeated at least twice:

1. International Working Group: Development of methodological guidelines for the management procedure approach to promote a consistent use of methods and techniques employed in the design of MPs at an international level.
2. Development of software for the operating models (OMs) that describe the underlying population dynamics, which are typically complex programs, and generic management procedures (MPs) that implement the generalised harvest control rules employed to manage the fisheries under focus, where the latter are tested on the aforementioned OMs to ensure robustness and effectiveness.
3. MARAM/DAFF Branch Fisheries (formerly MCM) Working Group: The selection of case studies for testing of generic procedures by a stakeholder committee consisting of DAFF staff responsible for the fishery management (in particular data poor stocks), relevant members of industry, and scientists from MARAM (possibly also with input from scientists from Australia, and New Zealand).
4. Testing the performance of generic MPs on test cases selected by the stakeholder committee. In particular looking at robustness of MPs across a range of key uncertainties in underlying population model as well as data, which is increasingly important when dealing with data-poor applications. Performance of MPs across different stocks is also important as the objective is to design generic MPs that would be effective across a range of fisheries.
5. Overall Review Workshop: International scientific meeting to review progress at the end of a three year period. This would provide independent oversight, input and guidance from the wider international scientific community, in contrast to the annual events amongst Collaboration members proposed below.

Associated with this sequence, a database drawn from international sources containing typical biological and other fishery parameters with their associated statistical properties for a wide range of marine resources will be developed, so that these could be used in the development of operating models for testing generic MPs.

The progress of these exercises would be facilitated by likely annual workshops held amongst Collaboration members, which would rotate venue amongst Australia, New Zealand and South Africa. In particular, methods and techniques employed would be investigated, OM and MP software compared and validated, results examined and future work identified by members of the Southern Hemisphere Collaboration.

Reference:

Brandao, A. and Butterworth, D.S. 2009. A proposed management procedure for the toothfish (*dissostichus eleginoides*) resource in the Prince Edward Islands vicinity. CCAMLR Science 16:33-69.