

Eastern Canada – Ecosystem approach to fisheries in DFO Maritimes Region

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Prompted by proclamation of Canada's Ocean Act in 1997, the Department of Fisheries and Oceans (DFO) initiated a pilot project on the Eastern Scotian Shelf as a "laboratory" to test implementation approaches for integrated management (IM). Since its inception, the Eastern Scotian Shelf Integrated Management (ESSIM) project has explored both governance frameworks (Rutherford *et al.*, 2005) and the development of conceptual and operational ecosystem objectives. ESSIM evolved before national policy and guidelines were available; now ESSIM is retracing some of its steps to be compliant with these. In addition, since 2004, collaboration with the U.S. National Marine Fisheries Service (NMFS) is leading to another IM experiment in the Gulf of Maine area (GOMA).

The boundaries of the ESSIM area illustrate some of the pragmatic decisions being made. While the desire is for ESSIM to encompass the inshore zone, given the governance complexities in this area, efforts have so far been restricted to the offshore. In addition, with the dialogue on an ecosystem approach to fisheries (EAF) in the Gulf of Maine, there has been recent discussion on the possibility of moving the current western boundary farther south. While it might be a better reflection of administrative jurisdiction, it would not be as optimal as the current one for reflecting shelf-wide ecosystem differences (DFO, 2004a).

The ESSIM planning hierarchy (overarching ecosystem objectives, conceptual and operational objectives, and ocean sector operational objectives) is not dissimilar from that used elsewhere (*e.g.*, Australia). The overarching ecosystem objectives were developed in 2001 as national policy. The planning area conceptual objectives, released in draft form in fall 2005, were based upon conservation issues, impacted ecosystem components, and threats identified with the input of stakeholders (O'Boyle *et al.*, 2005;

O'Boyle and Jamieson, 2006). These will be updated once ecologically and biologically significant species and areas, and depleted species and areas have been identified (DFO, 2004b). Thus far, a formal risk analysis is not part of the process to determine priority issues and objectives, which is seen as a requirement.

A science working group had developed a work plan to associate indicators and reference points/directions with the ESSIM draft objectives but this has been put on hold until the latter are updated. At the same time, another science group had been collaborating with NMFS on the monitoring requirements of an EAF in the Gulf of Maine, relying on earlier ESSIM work. An opportunity was thus afforded to compare and contrast progress to date in ESSIM and GOMA, engage and educate DFO staff on EAF, and develop a generic set of operational objectives that could be discussed with the fisheries sector (DFO, 2005). These generic objectives highlight not only the need to keep fishing mortality at a moderate level, but also to control incidental mortality and impacts on the benthic habitat. The latter is an issue across a number of ocean industries and has been the focus of a three-phase program led by DFO science to classify the benthic communities of the Scotian Shelf and to manage human impacts. The draft suite of operational objectives has received the support of the fishing industry, and regional fisheries management plans are being evaluated to see how they comply with these objectives. A number of the objectives have been completed for Georges Bank (groundfish, herring, scallop, lobster and crab), which highlight the need to address discarding and benthic impacts of fishing in these plans.

In addition to the identification of management performance indicators, over 60 contextual indicators, although not associated directly with management actions, have been useful in

furthering understanding of ecosystem processes and detecting regime shifts. The latter are related to overall system productivity and thus influence the population-specific performance indicator reference points. In 2003, the first Ecosystem Status Report for the Eastern Scotian Shelf (DFO, 2003) described a shift in this ecosystem from predominantly groundfish in the 1970s–80s to predominantly pelagics and invertebrates in the 1990–2000s. Three hypotheses were suggested to explain this shift: (1) top-down control, (2) increased stratification, and (3) cooling – although it was not possible to determine which of these was most plausible. An ecosystem status report is being considered for GOMA, which would take into consideration the ecosystem objectives that are being discussed for this ecosystem.

The linkage between regime shifts and reference points is illustrated by changes in the performance indicator reference points of the 4TVW haddock fishery (DFO, 2002) which are associated with bottom water temperature fluctuations. The suite of operational objectives and contextual objectives at the planning area level could form the basis of future reports of ecosystem health.

Lessons for the PICES/NPRB Indicators workshop

- There is a need to develop a common understanding of the high-level ecosystem objectives for the Bering Sea amongst the various institutions with responsibilities and interests in the area;
- There is a need to develop a suite of contextual objectives that report on ecosystem processes and which could be used to inform the performance indicator reference points;
- It will be useful to keep the PICES North Pacific Ecosystem Status report rather general in its approach but to consider ecosystem

objectives in its structure to increase its utility in a management context;

- Rather than striving for a small subset of indicators, as understanding is limited, the suite of indicators should be maintained, perhaps emphasising which indicators are most pertinent to monitoring ecosystem change.

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