

ECOSYSTEM RESTORATION

The collapse of many of the world's coastal ecosystems and fisheries (Jackson et al. 2001, Watson & Pauly 2001) means that in the shift towards EBM, fisheries managers must consider how to incorporate objectives for ecosystem restoration into their fishery management systems. While fisheries are only partly responsible for the failures of coastal management, the effects of fishing have played an important part in the collapse of coastal ecosystems (Jackson et al. 2001), and fisheries management and the fishing industry must now collectively begin the painstaking process of assisting to rehabilitate ecosystems. This is not only for the ecological values, but also for the long-term sustainability of the social and economic values derived from these ecosystems.

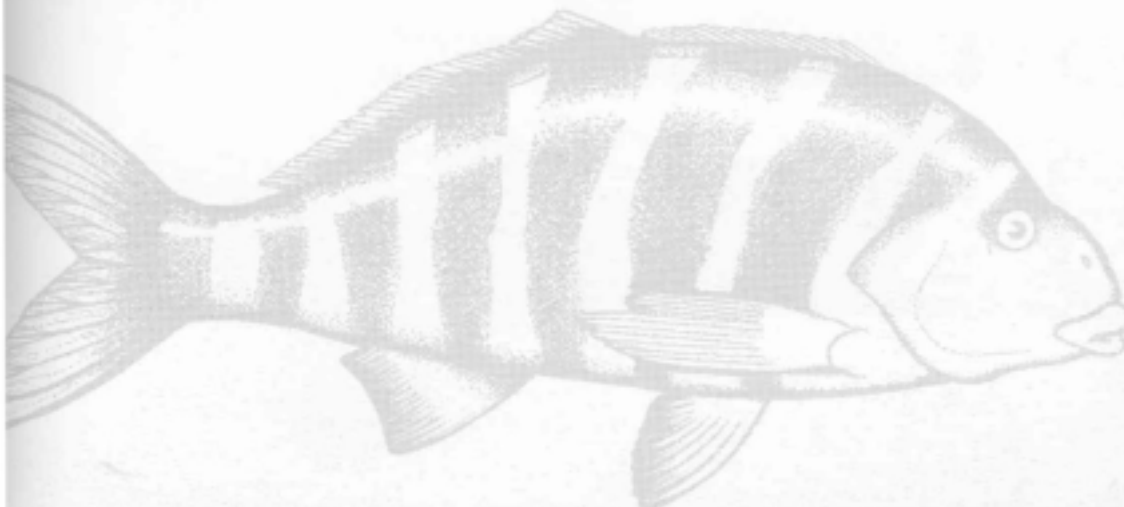
Back to the Future

Specific processes and procedures that can be implemented in fisheries management to achieve ecosystem restoration are unclear. The ecological processes leading to fishery-induced changes in ecology seem to be ratchet-like, and difficult to reverse (Pitcher 2001). But scientists and others now suggest that rebuilding ecosystems to a past healthy state, rather than attempting only to achieve sustainability of the harvested stock, should be the proper goal of fishery management (e.g. Pitcher & Pauly, 1998). To achieve this, a 'Back to the Future' (BTF) approach has been developed. The BTF approach captures the social, economic and cultural aspects of fishing and, at the same time, comprehends the role and 'services' provided by non-exploited as well as 'commercial' elements of marine ecosystems (Pitcher & Pauly 1998). The intention is to optimise the ecological, social and economic benefits from restoring ecosystems.

The BTF approach combines multi-species, ecosystem-based modelling with economic evaluation to develop rebuilding and management strategies. The key element of this approach is the ready availability of modelling tools to construct snap-shots of specific ecosystem attributes and explore modelled scenarios at various points in time. With a range of ecosystem modelling tools and suitable data, this approach permits various options for achieving desired ecosystem goals to be explored. Model robustness is ultimately tested by comparison with data provided by the fishery information system, and 'ground-truthing' by support studies.

With appropriate modelling tools, marine ecosystems of the past can be simulated by combining information from local and traditional knowledge, historical archives, the oral history of fishing communities, archaeological records, and published and unpublished literature. A wide range of fishery stakeholders can be involved. Past marine ecosystem models can be compared with the present-day ecosystem and the ecological and economic benefits from restoration can be quantified. Effects of different management policies for ecosystem restoration on biodiversity and resource abundance can be simulated and the different ecological, economic and social benefits of different courses of action compared. The results can help formulate fishery management plans that work towards achieving common conservation and restoration goals.

An approach similar to the BTF project may also be appropriate to design objectives and targets to achieve broader ecosystem restoration objectives in fisheries. These could include habitat integrity, species diversity and function, and specific targets for key non-harvested species such as threatened and endangered species. With this approach, fisheries can make an important contribution to setting ecosystem goals and objectives both within a fishery and more broadly for activities designed to help ecosystems recover from the impacts of other human uses. The ecosystem modelling requirements are complex, and at present only simple models can be implemented, but even simple representations of ecosystems can assist to resolve these issues.



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