

Aquatic Protected Areas

What works best and how do we know?

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ROLE OF MARINE PROTECTED AREAS IN THE MANAGEMENT OF THE AUSTRALIAN NORTHERN PRAWN FISHERY

^ADavid Carter, ^BEddie Hegerl and ^CNeil Loneragan

^ANORMAC, c/- Australian Fisheries Management Authority, Canberra ACT 2610 Australia.

^BMarine Ecosystem Policy Advisors Pty Ltd, Redland Bay Queensland 4165 Australia.

^CCSIRO, Cleveland, Queensland 4163 Australia.

Abstract

The Northern Prawn Fishery (NPF) is Australia's most valuable Commonwealth fishery, with an average annual catch of about 8,000 tonnes, worth between AUS\$100 and \$175 million and now taken by 104 modern trawlers. The fishery survived the early history of overcapitalization/overfishing common to most prawn trawl fisheries during the 1970s and early 1980s, when up to 302 trawlers were operating. Since the mid 1980s, fishing effort has been greatly reduced through industry-funded buybacks, spatial closures to protect small prawns and their nursery habitats and severe reductions in the fishing season from the entire year to just over 4½ months. Fishers, managers, researchers and environmentalists now share the responsibility for managing the NPF through their positions on the Northern Prawn Management Advisory Committee (NORMAC). A common vision has evolved of pursuing ecologically sustainable development through ecosystem-based management.

The fishery has been highly innovative in addressing bycatch issues and also has established a large system of "fishery closure areas" to protect juvenile prawn stocks, comprising about 8.7% of the NPF-managed zone. The NPF is working with government agencies and other stakeholders to develop a system of "no-take" marine protected areas in northern Australian waters that will both ensure biodiversity conservation and protect nursery and other habitats important to the sustainability of the prawn fishery. The research program to support ecologically sustainable development in the NPF includes research on assessing the status of the target stocks, bycatch and the impacts of trawling on animals in the soft sediments. The potential benefits to the fishery from marine protected areas are summarized.

Keywords: MPAs, Northern Prawn Fishery, critical nursery habitat

THE FISHERY MANAGEMENT REGIME

Australia's Northern Prawn Fishery is based on nine commercial species of prawn (i.e. shrimp): white banana (*Fenneropenaeus merguianensis*), red legged banana (*F. indicus*), brown tiger (*Penaeus esculentus*), grooved tiger (*P. semisulcatus*), giant tiger (*P. monodon*), blue endeavour (*Metapenaeus endeavouri*), red endeavour (*M. ensis*), western king (*Melicertus latisulcatus*) and red spot king (*Mel. longistylus*). Banana and tiger prawns account for the majority of the landed catch in the fishery (banana prawns being the equivalent of 'white shrimp', and tiger prawns 'brown shrimp').

These targeted prawn species have a life span of up to two years. Juvenile prawns live in mangrove estuaries and the seagrass beds in estuaries and shallow coastal waters. After one to two months on the nursery grounds, the prawns move offshore into the fishing grounds. Whereas banana prawns reach commercial size at about six months of age, tiger prawns usually are required

to be larger for the market, reaching their best commercial size at around nine to twelve months of age.

The Northern Prawn Fishery was established as a direct result of exploratory studies carried out by marine researchers during 1963–65. Although it is now regarded as one of the pacesetters in fisheries management in Australia, this reputation was not achieved without problems and controversy. Like many of the world's commercial fisheries, rapid development led to excess effort and overcapitalization. The fishery has had to accept severe management measures and intense restructuring of the fleet.

However, the benefits of effort-reduction measures have been partially offset by significant technological advances and the increased experience of the fleet (collectively called "effort creep") leading to greater fishing efficiency. Another significant issue has been the time required to reach agreement on restructuring measures and then to go through an open public

process to legislate the changes into the management plan, which until recent administrative changes took at least 18 months.

The fishery is managed by the Australian Fisheries Management Authority (AFMA), which is the national fisheries management agency, under the Northern Prawn Fishery Management Plan 1995 through a combination of input controls. These include limited entry, temporal, seasonal and permanent area closures, restricted seasons, gear restrictions and operational controls. There are currently 104 boats active in the fishery. Fishing is permitted during two periods each year. In 2002, the fishery opened 1 April to 13 May and 1 September to 1 December, a period of only 135 days. These dates have been selected to minimize fishing effort on spawning stocks of the target prawn species, which spawn at different times of the year.

A notable feature of AFMA-managed fisheries is the recognition that a partnership approach is needed to achieve successful fisheries management. A Management Advisory Committee (MAC) is established for each fishery to provide a forum where issues are discussed, problems identified and possible solutions developed. MACs are expertise based and advisory in nature, and make recommendations on management and operational issues. Where AFMA believes that a MAC is performing well, it may delegate substantial responsibility for management planning for the fishery to the MAC, although it retains the power to ensure that MACs operate within the ecologically sustainable development (ESD) policy framework determined by AFMA.

This has allowed the Northern Prawn Management Advisory Committee (NORMAC) to develop as a direction-setting team that has moved away from the traditional sector-based approach to fisheries management and begun implementing ecosystem-based management of the fishery. There have been two key factors in this major paradigm shift. Firstly, for some years there has been an effective mix of experience and expertise in the membership of NORMAC, which includes fishing industry leaders, managers, scientists and environmentalists. Secondly, the willingness of NORMAC to rapidly translate the results of the latest research into improved fishery management measures has accustomed the industry to accepting changes in the management regime when they are needed.

PROTECTING CRITICAL NURSERY HABITAT

Currently, all known critical nursery seagrass areas for juvenile prawns in the NPF are protected from trawling under the NPF Management Plan

in what are called Fishery Closure Areas. Continuous video monitoring satellite surveillance ensures that the closures are protected from trawling. There is 15,830 sq km of juvenile prawn habitat that mostly could be fished but is now protected within permanent closure areas, and a further 51,470 sq km protected within seasonal closure areas. These amount to 2% and 6.7 % of the NPF-managed area respectively. It is to the NPF industry's credit that such extensive areas of prawn habitat are protected from NPF fishing, but these areas are not protected from other human activities, including other forms of fishing.

Although most of the northern Australian coastline is only sparsely settled there are a number of land uses that can affect marine ecosystems adversely, and even severely. These include the construction of dams across coastal rivers, small-scale but extensive alterations to natural drainage to improve pasture ('ponded pasture'), bunding of tidal areas to prevent tidal inundation and thus create non-tidal pasture, and direct clearing of tidal wetlands (particularly tidal marshes and mangrove forests) in order to provide port-associated facilities or other dry-land uses. Substantial mineral development is planned or underway in the catchments of northern Australia and this could result in the release of contaminants into waterways.

In the marine environment, other users include oil and gas exploration and production, port developments, at-sea loading of minerals, recreational and other commercial fishers and indigenous communities. Proposals for future large-scale mining of the seabed for diamonds are of concern, as well as the potential for the introduction of marine pest species into the nursery grounds.

At present, the extensive mangrove forests, which provide critical nursery habitat for the NPF banana prawn fishery, are not protected within reserves.

NORMAC has attempted to establish a dialogue with other interests who may directly or indirectly affect the marine environment within the NPF-managed area and to provide scientific expertise to help the NPF minimize the impact of its activities. The NPF also hopes to contribute to the regional marine planning effort for northern waters foreshadowed in Australia's Oceans Policy, as well as assist Environment Australia in its investigations of the value of establishing marine protected areas for the extensive seagrass beds of the Gulf of Carpentaria.

The NPF has recognized that "No Take" marine protected areas are an important management

tool that can benefit the fishing industry by providing greater protection to critical nursery habitat than can be provided by NPF legislation, as well as providing refugia for many of the benthic and bycatch species affected by NPF trawling.

The NPF now has a significant research effort underway to identify benthic species assemblages, model the performance of existing spatial closures, and identify different reserve configurations that can fully achieve biodiversity conservation objectives, while at the same time maximizing the value of the commercial fishery.