

---

THE EFFECTS OF TRAWLING ON THE TRADITIONAL MARINE RESOURCES  
OF THE TORRES STRAIT.

Ian R. Poiner and Aubrey Harris

---

INTRODUCTION

In northern Australia, otter trawls are normally employed by offshore vessels fishing for penaeid prawns (shrimps). Since such trawls are dragged along the bottom at speeds of around three knots they necessarily catch fish ~~plus~~ a number of other benthic animals as well as prawns. The ratio of fish to prawns averages about 6:1.

Most of the fish so caught are small, non-commercial species, but in some areas commercially important species, including those below legal size, are included. Nearly all of these fish are dead or dying due to suffocation in the cod-end of the trawl when brought on board.

In Australian waters, unless the trawler is operating close to major population centers where marketable fish above legal minimum size may be retained, they are dumped over the side after the prawns have been sorted out. Thus, in heavily fished prawn grounds, a considerable quantity of fish is destroyed during the fishing season.

Ever since prawn trawling started in Australia there have been allegations that the abundance of important fish species has been seriously affected, but reliable data are lacking, not only for Australia, but for other parts of the world. The limited information available concerns changes in the species composition and/or abundance with increasing fishing pressure in some southeast Asian and Australian demersal trawl fisheries (Tiews et al., 1967; Pauly, 1979; Pope, 1979; Poiner and Harris, 1985). At the same time, it is likely that prawn trawling has a marked effect on the ecology of trawl grounds, and research into this topic is long overdue.

In the Torres Strait, there has been a growing number of complaints by the Islander communities that trawling activities are depleting the traditional and artisanal fish catch. In particular, concern has been expressed about mackerel, lobsters and a general decline in reefal species.

More recently, the Torres Strait cultured pearl industry has complained that trawling is having a detrimental effect on the pearl shell habitats in the area. Current available information prevents an unbiased assessment of the complaints.

Potentially, prawn trawling could negatively impact the traditional/artisanal sea based fishing effort of the Torres in several ways:

## ECOLOGICAL

### Direct

Trawling is targeting on the same species either consciously, (eg. lobsters) or unconsciously, (eg. juvenile reefal finfishes 'in the trawler bycatch'). (Note that current legislation now prevents the taking of lobsters by trawlers in the Torres Strait).

### Indirect

Trawling is negatively affecting traditional target species either via trophic interactions, for instance mackerel food fishes', or by significantly altering bottom habitats;

## POLITICAL

The presence of the commercial fishery precludes or constrains future traditional/artisanal fisheries development potential. There is no evidence of this in the Torres Strait.

## PHYSICAL

The trawl and traditional fisheries are targeting different species but utilizing the same grounds and the commercial methods impinge on the traditional activities (eg. the leiognathid fishery in the Gulf of Thailand). There is no evidence of this type of interaction in the Torres Strait.

The CSIRO Division of Fisheries Research, Effects of Trawling Programme is primarily concerned with assessing the significance of the direct and some of the indirect effects of commercial prawn trawling on the traditional/artisanal fisheries of the Torres Strait. The primary aim of the programme is to ascertain whether prawn trawling has a significant effect on the fish populations of the Torres Strait, particularly as it affects those species which are used as food by Torres Strait Islanders.

## RESEARCH PROGRAMME

The programme was designed in three segments. Initially the research strategy was to compare the fish communities of an area currently being fished with those of the same area prior to the advent of commercial fishing. The lack of a pre-trawling database prevented the application of this segment of the project to the Torres Strait.

The Mornington Island portion of the Gulf of Carpentaria was chosen as the initial study 'area for the following reasons:

- there are comprehensive CSIRO data on the fish communities of this area prior to the advent of trawling; and,

- the area has supported a regular tiger prawn fishery for over ten years and therefore has some similarities with Torres Strait.

The Mornington Island segment of the programme has generated both qualitative and quantitative data on the effects of trawling on fish communities. Poiner and Harris (1985) reported a significant decrease in the total number of individuals and a significant increase in the number of fish species per hectare when comparing pre-trawling fish communities with the 1984 situation (twenty years after the commencement of commercial trawling).

They suggested the decreases in total numbers of individuals per hectare were caused by trawling but further studies were needed to clarify the cause(s) of the increase in the total number of species per hectare. Poiner and Harris (MS) report that there have also been significant changes in the relative abundance of species which is also probably due to trawling. For example, there have been significant decreases in the relative abundance of the Leiognathidae, Triacanthidae, and Nemipteridae.

The second and third segments of the programme are centred in the Torres Strait. In the second, catch statistics (traditional and artisanal) are being collected from the island community (Yorke Island) centred in the trawl grounds. This work began in November 1983 and will continue for at least two years. It is proceeding satisfactorily and is providing quantitative data on the fish species important as food for the Torres Strait Islanders.

In the third segment of the programme, eight trawling cruises (spread evenly over twenty-four months) are being undertaken in the Torres Strait using a CSIRO chartered prawn trawler. The design of the sampling is to control for proximity to islands and reefs both in areas open and closed to commercial prawn trawling. It is providing a description (spatial and temporal) of the demersal fish communities of the area as well as allowing an assessment of the level of trawling impact by comparing the results with the Mornington Island data. The trawl results are also being compared with the Yorke Island catch statistics to measure the level of overlap between the traditional and commercial trawl fishery.

The following preliminary results from a cursory analysis of the first six months of Torres Strait data (two cruises February and June and catch statistics from forty-four days) can be reported:

#### Turtles

In a total of 114 thirty-minute trawls, two flatbacks and one green turtle were captured, (all were returned alive).

#### Mackerel

Mackerel generally occur more often in trawls in the Mornington area than in Torres Strait. In the Torres Strait trawls (114) there was a total catch of four *Scomberomorus queenslandicus* (total weight = 1.3 kg). No adult or juvenile *S. commerson* have been caught. To date we have no information on mackerel prey species in the bycatch.

## Reefal fish

These generally comprised a relatively small portion of the bycatch although more abundant in March than in June. catch rates increase when trawling on hard bottoms or close to reefs but the results to date would, suggest catch rates are too low to affect traditional activities.

## FUTURE RESEARCH

I have already referred to the virtual nonexistence of data on the effects of prawn trawling on the ecology of the trawling grounds. In a mixed prawn fishery for tiger and endeavour prawns, similar to that in the Torre's Strait, the trawling strategy is to maximize both the time the nets are on the bottom and the area covered during a trawl. The long-term effects of such fishing are unknown and should be of concern to both the traditional inhabitants of the area and to the fishermen themselves. A high priority should be placed on gathering information on the spatial and temporal interaction(s) between trawling effort and benthic organisms (infauna, epifauna and flora) in a variety of bottom habitats.

## REFERENCES

- Pauly, D. 1979. Theory and management of tropical multispecies stocks; a review, with emphasis on the South-East Asian demersal fisheries. ICLARM Studies Review. 1:1-35.
- Poiner, I.R. and Harris, A.H. 1985. The effect of commercial prawn trawling on the demersal fish communities of the south eastern Gulf of Carpentaria. The Torres Strait Meeting, Commonwealth Department of Primary Industry.
- Pope, J. 1979. Stock assessment in multispecies fisheries, with general reference to the trawl fishery in the Gulf of Thailand. FAO Fisheries Technical Research, SCS/DEV/79/19, 1-106.
- Tiews R.P., Sucondharmorn, P., and Isa'rankura, A. 1967. On the changes in the abundance of demersal fish stocks in the Gulf of Thailand from 1963/64 to 1966 as a consequence of the trawl fisheries developments. Marine Fisheries Laboratory, Bangkok 8:1-39.