NORTHERN TERRITORY
FISHERIES

by

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State Library of the Northern Territory
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OCCASIONAL PAPERS

2. The History of the Catholic Church in the Northern Territory, by Bishop John Patrick O'Loughlin. (1986)
15. (Withdrawn)
18. They of the Never Never, by Peter Forrest. (1990)
19. Memories of Pre-War Northern Territory Towns, by Alec Fong Lim. (1990)


27. Rebuilding the Beacon: Point Smith, Port Essington, by Frank Flynn. (1992)


29. The Northern Territory Coast, by John Knight. (1992)

INTRODUCTION

This talk was delivered by Professor Jim Thomson on 28 September 1988 at the State Library in Darwin, as one of the Library's series of 'Under the Banyan Tree' lunchtime entertainments.

Professor Thomson ended a long and distinguished academic career when he retired from the Northern Territory University at the end of 1990. Before coming to Darwin as Warden of the University College of the Northern Territory in 1986 he had, in succession, held the positions of Professor of Zoology, Dean of the Science Faculty, and finally Pro-Vice-Chancellor of the University of Queensland. On the merger of the University College and the Darwin Institute of Technology in 1989, Professor Thomson assumed charge of the Myilly Point Campus as Deputy Vice-Chancellor, a position he held until his retirement in 1990.

In this talk he returns to the disciplines that first nurtured him, marine zoology, in particular the Northern Territory fishing industry, and takes a long, hard look at its future. What we have is neither the gloom and doom of the knockers, nor the rose coloured vision splendid of the optimists, but a practical, knowledgeable man's assessment of the industry's potential, placed in the perspective of the world's great fisheries.
Not long ago fisheries in the Northern Territory were negligible. Prices were such that there was no profit in sending fish south, whether by air or ship. There was a small local market and that was about all. Even this small catch faced competition from imported frozen fillets and canned fish.

For most species of fish the picture has not changed. As the Darwin population has grown sales of locally caught fish have increased; but it is not a major market. Today the commercial fish catch in the Northern Territory makes up only 2.5% of the commercial fish catch of Australia. However, this 2.5% is worth something more than $20 million.

A few species have found a wider market and there are future possibilities, some of which will only be realised when the population of the Northern Territory is larger, and others await the willingness of investors to provide the necessary capital. However, the prospect of rivalling any of the great fisheries of the world is unlikely.

Before looking at the growth of the Territory's fisheries let us look at the pattern of the world's great fisheries. The fisheries with the largest catches such as herrings, cod, haddock, etc., occur in the temperate seas of the north Atlantic and the north Pacific. The surrounding land masses have a wide continental shelf, that is, a relatively shallow gentle sloping margin to the continents to a depth of about 400m. Beyond this the ocean floor tilts to what is called the continental slope, which falls to the ocean depths.

These land masses are also the source of major rivers, which bring nutrient–rich water into the seas to provide the basic chemicals which the plant–life needs. Almost all life in the sea depends on plants as the base of their food supply, for even the carnivorous fish and crustacea feed on other fishes and animals which in turn feed on the plants. Only plants can manufacture new organic matter out of nutrient chemicals utilising the energy of sunlight.

The only other really large fisheries are in relatively small areas of the west coast of South Africa and the west coast of South America, principally off Peru. These two areas are rich because they are regions of upwelling. Upwelling results when offshore winds blow for prolonged periods. These winds force surface water away from the shoreline and deep water is pulled to the surface to replace the lost fluid. These deep waters are nutrient rich from the chemicals released from the bodies of dead animals and plants which decompose there.

There are other areas of upwelling, for example in the mid–Pacific, where deep water which has crept along the bottom all the way from near Antarctica comes to the surface. But these areas are far from land and the nutrient enrichment of river discharges.
Upwelling also occurs in certain other regions of the world, but seldom for the prolonged periods which are found off the west coasts of South Africa and South America. Around Australia upwellings occur fairly regularly off the eastern end of Bass Strait, and a little north of North West Cape in Western Australia. But these are for short-lived periods, and do not persist long enough to have a major effect.

Australia is situated too far north to enjoy the cool nutrient rich waters of South America. In fact it overlaps the latitudes of South Africa, but whereas the west coast of South Africa is washed by cool southern water, the west coast of Australia is under the influence of warm tropical water from the north.

Australia is an old country whose soils have leached over the millenia so that nutrients are not abundant in the rainwater run-off which forms the creeks and rivers. Only the wasteful method by which farmers spread superphosphate allows a reasonable level of phosphates in the river discharges, but nitrogen levels are very low by world standards.

The continental shelf around Australia is narrow, often no more than 15 miles compared with a continental shelf of 500 miles to the west of Britain. Only in the Great Australian Bight, Bass Strait and here in the north and north-west is the continental shelf wide.

The tropical seas around the world (including those of northern Australia) endure another disadvantage compared with the temperate seas. Although the total fish production may be high in tropical waters, there are no concentrations of one species, such as one finds in the north Pacific and north Atlantic. The fisheries in the tropics tend to be multispecies fisheries, and these are much more complex to manage compared to mono species fisheries.

Thus, instead of having to contend with one set of biological characteristics, such as growth rates, time to maturity, fecundity (i.e. number of eggs per female), spawning period, spawning habits, etc., a multispecies fishery has to contend with different sets of characteristics for each species, so that management measures which suit one species may result in unnecessary restrictions on the catch of another. Indeed, the theoretical basis of the management of multispecies fisheries has only been tackled in recent years and is still very unclear.

It is on these facts that I base the statement which I made at the beginning, that no great fishery is likely to develop in northern Australia.

The two fisheries which have developed in the Northern Territory are those which, although taken together with other species, occur in sufficient numbers to make the catch reasonably assured. They also happen to be species for which the market outside the Territory pays high prices – otherwise the level of catch would not be warranted.

Before looking at these however, let me remind you of an earlier history. Undoubtedly Aborigines who lived along the coasts and rivers caught fish. Rock paintings are testimony to their recognition of different species. Barramundi are obvious among them, as are Saratoga, catfish and other species. In various places, Aborigines constructed stone traps; in others they used nets, woven from native fibres. In some places hooks, made from bone or shell, were used. The Aborigines also caught, and still catch, turtles, dugong and crocodiles for food. But all this was subsistence fishing rather than commercial. More commercial was the Indonesian
fishing for beche-de-mer or trepang, which preceded the arrival of the British in Australia, and indeed went on well into the 20th century.

Apart from the subsistence fishing of early settlers at both Port Essington and Palmerston, the first fishery in the Territory was for pearl-shell. Although never as large as the famed fisheries of the Torres Straits and Broome, a not insignificant quantity of pearl-shell was fished from Territory waters.

Turning now to modern, commercial fisheries, let us look at those species which have become the target for modern fisheries, or which hold promise for the future.

Barramundi: the name Barramundi is an Aboriginal word from north Queensland. It was a name applied indiscriminately to all large fish with scales, but despite the attempts of some pedants to insist on the name Giant Perch, the name Barramundi has become too well ensconced in the trade for it to be abandoned. There are those who believe, with some sound evidence, that the fish west of Cape York are either a sub-species or separate breeding population from those on the east coast of Queensland. Nevertheless, the habits seem to be identical.

Barramundi spawn at sea but the young make their way into the rivers and pass upstream, even spreading out on the flood plains during the Wet, and so some end up in lakes, pools, and billabongs which are isolated from the rivers during the Dry Season. There they feed and mature and after two or three years descend during the Wet Season to spawn in the sea. Whether large fish which have spawned return to the rivers is still debated. It is also not certain whether the freshwater phase is obligatory. However, it must be said that aquaculture trials do seem to show that young Barramundi grow faster if maintained in freshwater than in salt.

Unhappily, the habits of Barramundi make it very susceptible to netting, especially when the nets are spread completely across the river or creek mouths. Although Barramundi is a fairly fecund fish, the females producing around 250,000 eggs, its vulnerability is such that without doubt its numbers have been seriously reduced on the Queensland coasts, and signs of such overfishing are showing up in one or two rivers in the Territory. Barramundi are favoured angling fish but it is very doubtful that angling alone would reduce the numbers markedly. The fact is that the potential catch is limited by the carrying capacity of the rivers. Both anglers and crocodiles undoubtedly contribute to the removal of Barramundi, but the efficiency of the commercial catch is the cause of the decline in numbers.

Prawns: the other great fishing bonanza for the Territory is the prawn catch.

The prawning industry in the Northern Territory has the shortest history of any of the Australian prawn fisheries. Following the initiation of the prawn fishery in the Gulf of Carpentaria in 1963, the Minister for Territories, in November 1967, invited proposals for the development of the prawning industry in the Territory.

Approval was given six months later for three processing companies to operate in the Territory and regulations allowed owner-operators of prawn trawlers to operate in Territory waters. The catch was negligible in 1967–68. It rose to 1.13 metric tonnes in 1968–69 and 3.85 in 1969–70, an unprecedented rate of growth. Prawn fishing can be claimed to be the Territory's second most important primary industry. The Melville Island, Limmen Bight and Groote Eylandt grounds produce both Banana and Tiger prawns, with smaller quantities of Endeavour prawns. The grounds between the Territory and West Irian are prime producers of Banana prawns. A number of other species contribute to the catch but these are the principal ones.
Apart from the small amount of netting for fish such as mullet and line fishing for reef fish, almost all for the local market, the only other large fishery is that for pearl-shell. However, although the market for pearl-shell has risen somewhat after the disastrous slump following competition from plastic substitutes, the main outlet for pearl-shell is a very special one – the pearl farms. The pearl-shell beds of the Northern Territory were never as productive as those at Torres Strait and Broome, but Torres Strait was badly hit some years ago by a massive oil-spill from a grounded tanker and only in very recent years has it recovered.

What other species may prove profitable in the future? Many will, as the local market grows, but the shorter-term targets are likely to be those which are already being exploited by non-Australians. It is common knowledge that Taiwanese and Japanese have been fishing off the northern Australia coast for many years and Koreans have also from time to time, as have the Russians – the incursion of the Russian vessel Van Gogh into the Gulf of Carpentaria, resulting in shots across her bows from .303 rifles in the hands of Australian prawn fishermen, is the best known of these. In accordance with the International Law of the Sea, Australia today operates a fishing zone in which it has prior rights. But as a coastal state we also have obligations under international law, and as long as resources are not fully exploited by Australia we are obliged to allow others to fish our waters.

Taiwanese gill-netting has taken place mainly in the western Gulf and along the north coasts, though their heaviest catches appear to have been made nearer to New Guinea. The Taiwanese have been excluded from the Gulf of Carpentaria since 1978. The largest item in the Taiwanese catch are sharks, of which over 30 species are taken, though three whaler sharks predominate. In shallower waters the so-called Graceful shark (Carcharhinus amblyrhyphchoideis) makes up 33.3% of the sharks caught; but it does not appear in the catches from deeper waters. The Black-tip shark (Carcharhinus sorrah) makes up only 9.5% of inshore catches, but accounts for 62% of the sharks caught in deeper water. Generally the gill-netters work in waters shallower than 100m as catches are better there. Long-liners from Japan, Taiwan and Korea have worked in waters to the north of Australia and some trawling has taken place, mostly off north-west Australia.

As well as sharks, several species of tuna are taken, including the Northern Blue-fin, which is now called the Long-tailed tuna. Also taken are Spanish mackerels, especially the narrow-banded Spanish mackerel (Schomberomerus commersoni). Some of these fishes are regarded as game-fishes as well as food fish. As well as the Northern Blue-fin tuna or Long-tail tuna, the Yellow-fin tuna, Skipjack and Mackerel tuna at least occur in Territory waters. Also, the prized Black Marlin is taken in small numbers in Taiwanese gill-nets, especially to the west of Melville Island. Sailfish also exist in Territory waters. As well as the waters to the west of Melville Island, the areas near Cape Wessell and Nhulunbuy are known to harbour marlin and sailfish.

Undoubtedly, a game-fish industry will develop eventually. But to attract the big-spenders good facilities and above all quality boats and knowledgeable skippers are necessary. The medium size game fish are also attractive, though most of these will also supply the domestic market as the population of Darwin grows. In particular, there are the 35 species of trevallies and their relatives such as King fish and Queen fish. Fish of the trevally family make up between 4 and 11% of the catch of Taiwanese fishing boats.
Other fishes taken by the Taiwanese are the Ponyfish or Leiognatha. They are small fish and ignored as food by Australians. They are eaten in India and elsewhere in the Indo-Pacific, but although in considerable numbers they will probably only serve for fish meal, fertilizer or stock feed in Australia.

Two fishes which are highly regarded elsewhere in the Indo-Pacific but are seldom seen in fish shops here, although they are on our coasts, are the Milkfish and the Indian or Oily Mackerel. There is some uncertainty whether they occur in as great numbers here as they do elsewhere, but that may only reflect our lack of survey data.

Finally, there are the small schooling fish such as Anchovies and Herrings. 700kg of Anchovies were trawled in half an hour during trials in the Arafura Sea; but there has been no seasonal study to find out whether they are on our coasts all year. Such fish will probably play only a minor role on the fresh fish market.

Their exploitation and the exploitation of many other fishes such as Whiting and Flathead must await the day when someone is willing to put in a fish–treatment plant to fillet and/or freeze or to turn fish into fish meal and fertilizer. The economics are against this at present but the day will come. Meanwhile, the other great hope for the Territory is aquaculture. It is a shame that early experiments have not encouraged further developments. I believe that poor choice of site has been to blame for the poor start of farming prawns. Experts from overseas did not realise the extent of the Dry Season in the Territory. Ponds became too saline as evaporation went on and this militated against survival. Future prawn farms will have to be placed where freshwater is available during the Dry Season to keep salinities in the ponds at an acceptable level. This is only one factor but it is a very important one. We would be kidding ourselves if we thought that all we had to do was introduce some prawn larvae into a pond and sit back for 9–12 months to reap the harvest. After 4 000 years of agriculture farm crops and farm animals still have problems of disease and nutrition, so we must expect to have to face similar problems in aquaculture. Also, there are very few fish pathologists in Australia and those that do exist have only limited experience.

Such is the case with Barramundi also. But there is a company operating to the south of Cairns which is breeding Barramundi. They induce breeding by injection of hormones and are already marketing plate–size Barramundi on the Melbourne market after 9–12 months growth. Their procedures could be duplicated here. However, freshwater must be available for best results. It is claimed in Thailand that a period in salt water is necessary to produce the best Barramundi flavour, but I know of no tasting trials to test this belief.

In my opinion the only species which need management at present are the Barramundi and possibly pearl–shell. I know that some people would add prawns, but I disagree. Every time there is a drop in catch of any species there is always a cry of depletion or overfishing. But there are other reasons for a drop in catch. It may be fishermen turning their attention elsewhere, but it is more often due to natural fluctuations. As a one–year crop – that is one year to maturity and then a high death rate – prawns are very liable to huge swings in numbers. Prawns are very dependent on the environment, especially Banana prawns. I believe that the apparent decline is due to our succession of poor Wets, and I predict that, when rains increase, the prawn catch will go up. Such correlations between rainfall and prawn catch have been demonstrated on the east coast of Australia and in the Gulf of Mexico.
I believe that Australian fisheries are over managed. Controls on catches without proof that controls are needed result in resources being wasted. Too many bureaucrats play safe by imposing restrictions without good evidence that they are required. The old gut-feeling that every fish should spawn once before being caught still sways many an administrator despite the hundreds of studies which show no correlation between the number of spawners and the numbers in the next generation, except for species of very low fecundity such as whales and sharks. There is no other explanation for many of the regulations in all states of Australia.

So, in summary, what is the future for Territory fisheries? Only the high-priced species such as prawns and Barramundi can sustain large fisheries because the local market is not big enough to absorb the possible catch. For this same reason many potentially available species will not grow into considerable species until the population of the Territory increases to provide a local market. Prices bar their exploitation for interstate purposes though some species of reef fish such as coral trout and red emperor could find a market if consistent supplies could be assured.

Other species will only be marketable if a treatment plant is built. Aquaculture will have a great future for prawns and Barramundi, and possibly other species, certainly mullet, if economics allow.

It is not easy to do research on fish. As we cannot see them to put them through a counting race like horses, sheep or cows, we can only sample fish stocks and infer what we can. We have no system of monitoring and until we have that we shall never really know what fluctuations up or down really mean.