Work Plan Implementation
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REPORT OF WORKSHOP ON SMALL TUNA, SEERFISH AND BILLFISH IN THE INDIAN OCEAN

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INDO-PACIFIC TUNA DEVELOPMENT AND MANAGEMENT PROGRAMME

FISHERY SITUATION REPORT FOR SMALL TUNAS: AUSTRALIA

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1. Introduction

The Australian tuna fishing industry has traditionally been based on southern bluefin tuna (Thunnus maccoyii) with fishing operations concentrated off southern Australia. In recent years there has been development alternative fisheries including a fishery for yellowfin tuna (T. albacares) off the east coast.

In 1984/85 a national catch quota for southern bluefin tuna was introduced. This coupled with the development of potentially lucrative sashimi markets created short-falls of tuna for canning in Australia. In order to maintain canning operations, imports of frozen whole tuna have been necessary. There has also been interest in finding alternative supplies of tuna from within Australia. Longtail tuna (T. tonggol) have been identified as suitable for canning and markets are currently available for this species.

2. Species Accounts and Interest to Fisheries

Longtail tuna, kawakawa (Euthynnus affinis) and frigate tuna (Auxis thazard) occur throughout the shelf waters of northern Australia and into the sub-tropical waters off Western Australia, Queensland and New South Wales. Apart from work by Serventy (1942,1956) and Wilson (1981c) on longtail tuna, virtually nothing is known about the biology of these tunas in Australia. The lack of such basic information is related to the fact that they have little or no commercial value.

Longtail tuna are characteristically small off the Northern Territory, common between 50 and 65 cm fork length (2 to 4.5 kg) and rare above 75 cm fork length. Individuals of approximately 5 to 8 kg appear to be common in the southern Gulf of Carpentaria while in the waters off eastern Queensland, New South Wales and Western Australia fish of about 90 cm and larger (10 kg plus) are prevalent (Serventy 1956). Kawakawa (locally known as mackerel tuna) rarely exceed 65 cm fork length and are common between 50 and 60 cm (2 to 4 kg) in the Timor and Arafura Seas. The species is common between 4 and 7 kg off Western Australia (Robins 1975) and around 7 kg off north eastern Queensland. Frigate tuna grow to at least 43 cm fork length (1.6 kg) off northern Australia.

Surface schools of longtail tuna and kawakawa are a common sight in northern waters. This has led to speculation about the potential of a fishery based on these species. An aerial survey of surface schooling tunas off northern Australia indicated that most schools are small, probably less than 2 tonnes in size, and are often widely scattered (Lyle and Read 1985). These factors are seen as constraints to the development of a fishery targeted on tuna. West and Wilson (unpublished) noted that longtail tuna schools off Papua New Guinea are also relatively small, ranging between 1 and 10 tonnes and averaging about 4 tonnes. Large longtail tuna do not appear to form large surface aggregations but may form sub-surface schools (Wilson 1981a).

At various localities around Western Australia and Queensland, prawn fishermen report opportunistic catches of longtail tuna. Tuna are attracted to the trawlers by fish discarded from trawl catches and are caught on lines baited with small fish. There has been some limited poling for for longtail tuna in the Gulf of Carpentaria and off the east coast of Australia. Although successful in catching small quantities, poling has tended to be undertaken as an adjunct to another fishery. Incidental catches of longtail tuna (sometimes in excess of 1 tonne per set) are taken in pelagic gillnets fishing for shark and mackerel in the coastal waters of the Northern Territory and Queensland. In New South Wales the species is caught by beach seine as schools move in close to shore to feed (Serventy 1942, 1956). Trolling accounts for small catches of longtail tuna, they are caught incidentally in the narrow-barred Spanish mackerel (Scomberomorus commerson) fishery or as the target species. Incidental catches of kawakawa are made by Australian fishermen using a variety of fishing methods but they are invariably discarded or used for bait.

Longtail tuna represented most if not all of the retained tuna catch taken by Taiwanese gillnetters operating off northern Australia. The Taiwanese probably caught significant quantities of kawakawa but as the species was usually discarded no catch records are available (details of this fishery are presented below).

Canning trials reported by Serventy (1942) and more recently those conducted on behalf of the Northern Territory Fisheries Division have indicated that longtail tuna produce a highly acceptable canned product. In some parts of the world kawakawa are highly esteemed as a food fish and are eaten fresh or salted and sun-dried. The flesh is graded as 'dark meat' and is strongly flavoured. When canned the flesh is dark and coarse and thus is not acceptable for canning in Australia (Williams 1963; Wilson 1981b). Roughley (1966) has noted that while frigate tuna are common in some situations in Australian waters, they are unlikely to be of value as a canning fish because of their small size.

Gillnets were made of multifilament nylon with mesh sizes of

exceed 65 cm fork length and are common between 50 and 60 cm (2 to 4 kg) in the Timor and Arafura Seas. The species is

3. Taiwanese Gillnet Fishery

Taiwanese gillnetters operated in the Timor and Arafura Seas from 1974 to mid 1986 and their catches were comprised primarily of shark, tuna and mackerel. Tuna catches for the period 1974 to 1979 are reported to have ranged between 410 tonnes (1975) and about 4770 tonnes (1977). During this period, however, the region fished included areas within the Australian Fishing Zone (AFZ) that are currently closed to foreign fishing as well areas now in the Indonesian 200 mile zone (Walter 1981).

With the implementation of the AFZ in November 1979, Australia assumed management responsibility for the fish resources within the zone. Under Australian jurisdiction, Taiwanese fishing operations were restricted to specified offshore areas and a catch quota of 7000 tonnes was imposed (Branford 1984). This quota was reduced to 6000 tonnes in 1985 because of concern over declining catch rates, for shark in particular. In July 1986 the Australian Commonwealth Government passed legislation that limited pelagic gillnets and drift nets to a maximum of 2.5 kilometres in length. This measure was intended to reduce the accidental kill of dolphins in gillnets but also forced the withdrawal of the Taiwanese gillnetters from the AFZ. Taiwanese gillnetters had been using up to 20 kilometres of net prior to the introduction of this measure. The restriction rendered their operations uneconomical.

As part of licencing conditions, foreign operators are required to keep logbooks (in which set and catch information are recorded) and to provide six day catch summaries by radio. Radio reports include catch and effort details for shark, mackerel and total catch. The remainder of the catch, a figure that is derived by subtracting the shark and mackerel components from the total catch, is categorised as 'other'. Monitoring of commercial catches revealed that tuna comprise between 82 and 97% (average of 92%) of the 'other' component (Anderson and Read 1984). For the purposes of this report, the 'other' category has been assumed to refer exclusively to tuna.

3.1 Areas of Operation

The area within the AFZ authorised for foreign gillnet vessels has strict boundaries that are designed to avoid competition or conflict with Australian fishing operations. The authorised zone covers an area between outer limit of the AFZ with inner limits which vary from 12 nautical miles off the coast to lines of closure such as the Gulf of Carpentaria (Figure 1). The southern boundary is latitude 18°S and the eastern boundary is longitude 141°E. In practice, Taiwanese gillnetters restricted their operations to the area between longitudes 125° and 140°E. Fishing outside of this area was rare.

3.2 Gear and Methods

The Taiwanese gillnet fleet comprised two vessel classes: smaller, converted longline vessels (26 - 36 m in length) and larger vessels which included converted pair trawlers and modern purpose-built gillnet vessels (up to 40 m in

Gillnets were made of multifilament nylon with mesh sizes of between 15 and 17 cm. They were between 14 and 20 m in depth and ranged between about 10 and 20 km in length. Over the period 1980 to 1986 the average length of net deployed increased but catch per set remained fairly stable. Up until mid-1984, nets were buoyed using polystyrene floats attached to the headline by 2 - 3 m long float-lines. By 1985 the float-line system had been replaced with polystyrene floats attached directly to the headline. The reasons for this change are not certain but it seems that the Taiwanese had anticipated better catch rates for tuna and mackerel by surface setting.

The nets were set at dusk and allowed to drift free of the vessel for about 6 - 8 hours. Haul duration was dependent on the size of the catch and gear complications.

3.3 Fishing Strategy

While there did not appear to be an obvious pattern in the overall movement of the gillnet fleet thoughout the year, localised movements appeared to be determined by fishing success. Vessels fished over a wide area until one achieved good catch results. This information was relayed to other vessels which would converge on the productive ground. As catches dropped off, vessels dispersed and searched for new areas.

It had been initially assumed by Australian authorities that when shark catches were poor the Taiwanese would target on tuna (by shortening float-lines or surface setting). It seems more likely now that target fishing was primarily in response to market pressures, that is the comparative prices of shark, mackerel and tuna in Taiwan tended to determine the preferred species.

3.4 Tuna Catch

Longtail tuna represented the bulk of tuna caught and most if not all of the tuna retained by the Taiwanese. Length-frequency distribution for longtail tuna is strongly unimodal and presumably reflects the influence of mesh selectivity on the size composition of the catch (Figure 2). Most individuals ranged between 50 and 65 cm fork length and the average weight for the species was 3.2 kg. In general the caudal fin lobes were severed (primarily for ease of storage) and the tuna frozen whole. Little information is available from Taiwan as to how the product was utilised but presumably most was canned.

Kawakawa were also commonly caught but apart from some larger specimens which tended to be retained for consumption by the crew, they were almost invariably discarded. Kawakawa are generally smaller than longtail tuna and were common between 47 and 56 cm fork length (Figure 2). Individuals over about 60 cm were rare. Anderson and Read (1984) recorded that kawakawa comprised between 64 and 95% of the discarded fish component in the catches and that the ratio of longtail tuna to kawakawa was about 5:1 by weight. It was noted, however, that the quantity of kawakawa caught was probably underestimated because of difficulties in recording all discarded fish. Frigate tuna were less frequently caught though on occasions large numbers were taken. They were not retained.

Annual tuna catches, based on radio reports, ranged between 683 tonnes (1985/86) and 2673 tonnes (1983/84) (Table 1). While total catches were constrained by catch quotas the relative contribution of the tuna component increased over the period 1980/81 and 1984/85. Between 1980/81 and 1981/82 tuna represented less than 17% of the total catch compared with over 32% between 1982/83 and 1984/85 (maximum of 40% in 1983/84). Declining catch rates for shark appear to have been offset by increased catches of tuna.

4. Catches of Small Tunas by Australians

There is only limited fishing targeted on longtail tuna in Australia, most of the catch of small tunas tends to be taken incidentally or on an opportunistic basis. The reported catch is doubtlessly underestimated, small tunas are either not recorded by fishermen or are grouped together with other species in catch returns.

Reported landings of small tunas for the Northern Territory and Western Australia are presented in Table 1. Landing statistics for Queensland and New South Wales do not distinguish longtail tuna so it is not possible to accurately estimate catches in these States. New South Wales is undertaking a review of their catch return forms and will be coding longtail tuna separately in the future.

Northern Territory figures refer to longtail tuna (kawakawa are not considered commercial) that are taken by pelagic gillnets along with shark (Carcharhinus spp.) and mackerel (Scomberomorus spp.). Longtail tuna command a comparatively poor price and as a consequence fishermen have been reluctant to retain them. This has resulted in only small quantities being landed (about 10 tonnes maximum). The actual catch of longtail tuna is likely to be in the order of 20 - 40 tonnes per annum (based on the operation of 5 gillnetters).

Catches in Western Australia peaked at around 130 tonnes in 1983/84 but have usually been in the range 50 - 70 tonnes (Table 1). Except for a small quantity of kawakawa (1.9 tonnes) that was landed in 1982/83, these catches refer to longtail tuna. Over 90% of this State's catch is taken from Shark Bay with small quantities taken in Exmouth Gulf and from the Abrolhos Islands region. The main fishing method is handlining from prawn trawlers.

Longtail tuna are caught by handlines from trawlers in the Gulf of Carpentaria, Princess Charlotte Bay and Moreton Bay off Queensland. Small quantities are also caught in pelagic gill nets, by poling and by trolling. At least some of longtail tuna caught in Moreton Bay are believed to be sold as pet food and probably do not appear on any catch returns. Longtail tuna are caught by beach seine off northern New South Wales during the summer months. Retained catches of longtail tuna are probably in the order of 50 tonnes for the east coast of Australia and 30 tonnes for the Gulf of Carpentaria. Wilson (1981a) estimated that the total commercial catch of longtail tuna taken by Australians may be about 250 tonnes per annum. Given under-reporting and coding problems with catch returns it seems that Wilson's estimate is reasonable.

While the stocks of small tunas off northern Australia are undoubtedly under-exploited, Australian fishermen continue to show little interest in fishing for these species. Prior to any substantial development of a fishery it will be necessary to evaluate appropriate fishing methods and determine whether such a fishery could be economically viable. Any future fishery development by Australians will clearly require a significant commitment from both the fishing industry and government.

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TABLE 1: Annual catches (tonnes) of small tunas for the Australian region.

Source	Fiscal year 80/81	81/82	82/83	83/84	84/85	85/86	86/87
Taiwanese gillnet[a] (Timor & Arafura Seas)	1084	962	2397	2673	1840	683	-
Northern Territory[b]	0	0	0	0	11	10	.3
Western Australia[c]	52	66	48	131	48	58	N/A

[a] Based on radio reports
[b] Live weight
[c] Landed weight

N/A not available

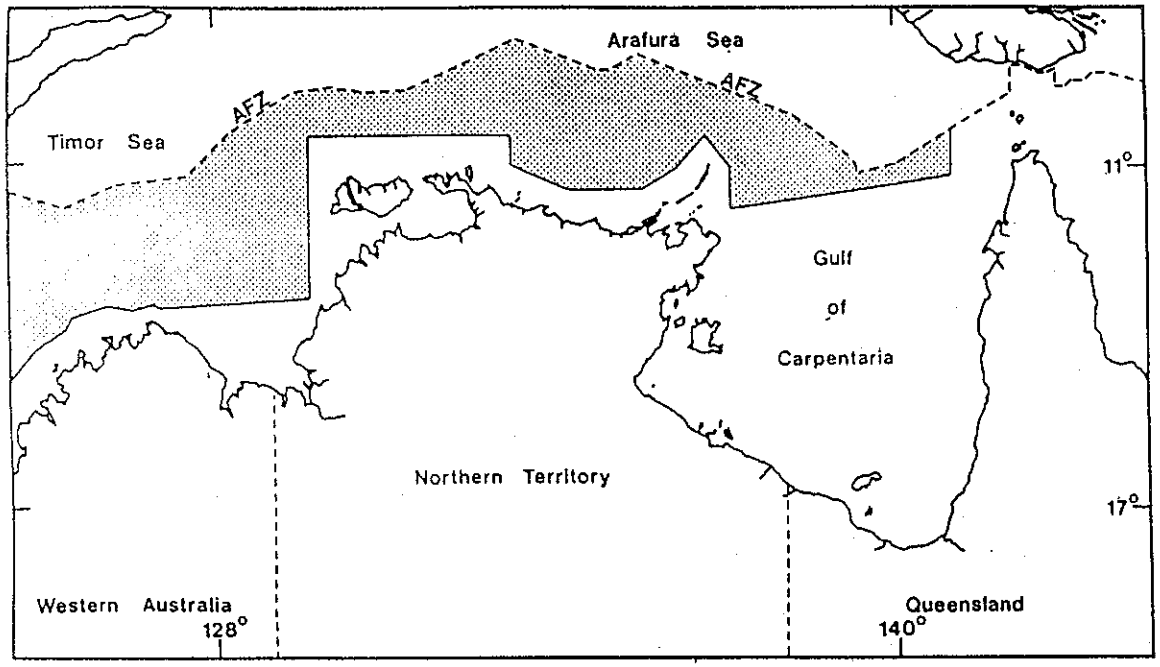

Figure 1.
Authorised foreign fishing area (shaded) off northern Australia.

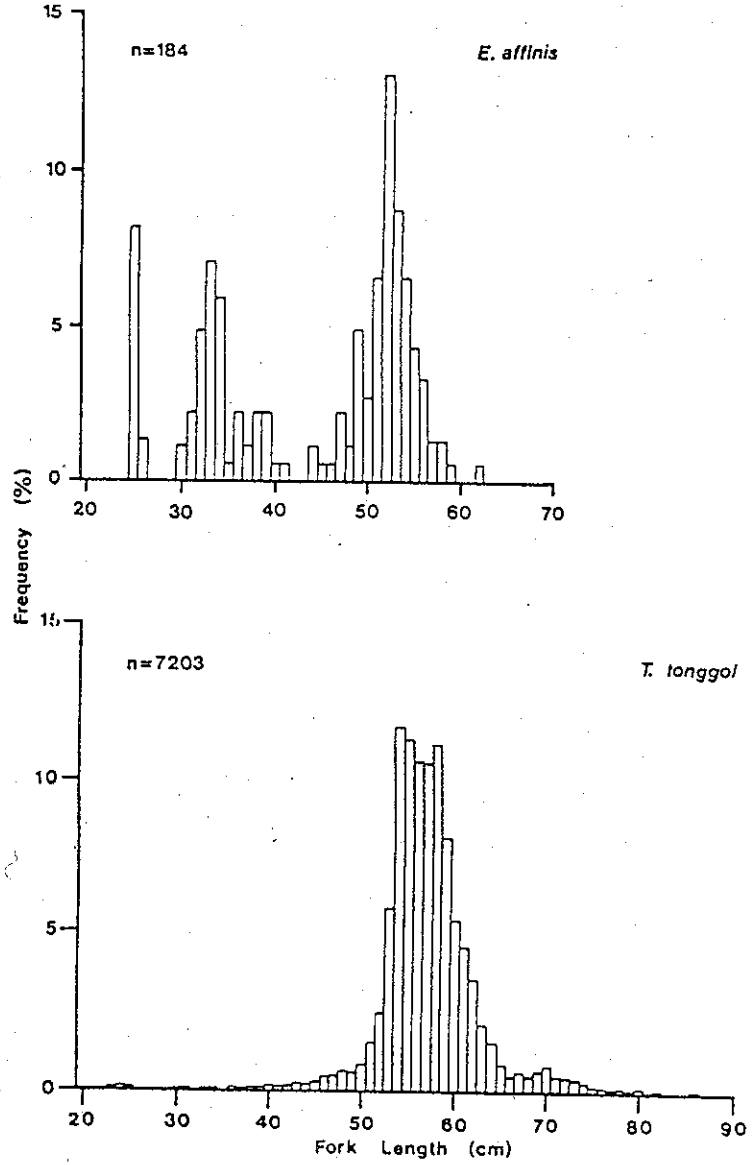

Figure 2.
Length — frequency distribution of longtail tuna (*T. tonggol*) and mackerel tuna (*E. affinis*) from Taiwanese gillnet catches.