

REPORT ON A GILL-NET/BOTTOM TRAWL SURVEY

OBSERVATIONS OF THE "HAI KUNG" DURING FISHING SURVEY

AND RESEARCH WORK IN THE ARAFURA SEA

6 APRIL TO 14 APRIL 1981

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FISHERY REPORT NO. 8

DEPARTMENT OF PRIMARY PRODUCTION

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FOREWORD

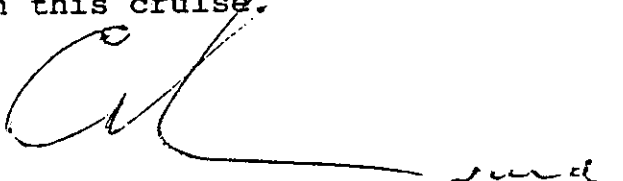
The declaration by Australia, on November 1st, 1979, of a 200 nautical mile Fishing Zone may eventually prove to be a valuable asset, earning Australian fishing operators sound financial returns.

A cautiously, optimistic approach to the future use of the fish resources in the waters adjacent to northern Australia should be adopted in recognition of the immense task, still confronting Australian fisheries authorities, of collecting information on which to base the management and development of these new resources.

Notwithstanding the complexity of the tasks involved, considerable interest has been expressed by Australian fishermen as to the types of gear and fishing methods employed by the foreign vessels currently licensed to operate in the area.

The gill-net and trawl-net operations of the Taiwanese "Hai Kung" have been published in this report as a basis for adaptation and use by Australian fishermen.

Officers of the Northern Territory Primary Production Department's Fisheries Division take this opportunity to sincerely thank Professor Liu, of the Taiwan National University, who was the cruise leader, Captain Huang and the scientists and crew of the "Hai Kung" for enabling them to accompany the vessel on this cruise.



C.H. GURD,
Secretary,
Department of Primary Production

March, 1982.

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INTRODUCTION

In August 1980, Professor Hsi-Chiang Liu, Director of the Fisheries and Marine Biology Division, Institute of Oceanography, National Taiwan University, visited Australia to negotiate a co-operative survey of the marine resources surrounding the Australian coastline.

During this visit, representations in regard to a proposed research cruise by the FRV "Hai Kung" during 1981 in waters adjacent to the Northern Territory, were made to the Northern Territory Fisheries Division by Professor Liu.

As part of the programme on the research cruise included a gill-net selectivity survey, species composition and biological data on pelagic fish resources, it was considered that Northern Territory participation in the cruise would be beneficial to our understanding of pelagic fish resources and of Taiwanese gill-net operations in northern waters.

During the cruise two principal methods of fishing were employed - gill-netting and trawl-netting. The gill-netting operation was aimed at using a range of gill-net mesh sizes to try and determine a relationship between mesh size and the length of each particular species of shark caught in the net. The trawl-net operation was undertaken to compare the species composition of sharks taken by bottom trawling in the same areas that were surveyed for shark using the gill-net method.

Primarily, this report deals with the technical specifications of the equipment and the manner in which it was used during the course of the survey. Whilst the biological data of the various catches has been included in the report, this information has not been analysed.

For Northern Territory Fisheries Division purposes, it was recommended that specific information be supplied in relation to Taiwanese gill-net selectivity, species composition and relative abundance, and detailed biological data on narrow-barred spanish mackerel and long-tail tuna.

On 25 November 1980, the Australian Government Department of Primary Industry gave approval for the FRV "Hai Kung" to carry out a specified marine resources survey and research programme in Australian waters during 1981. In relation to the cruise in waters adjacent to the Northern Territory, a licence under the Fisheries Act 1952 was issued to the research vessel "Hai Kung".

DESCRIPTION OF VESSEL

NAME : R/V "Hai Kung", International call sign - BYPJ.
 CLASS : 710 G/T Deep sea trawling and fish research vessel.
 TYPE : Steel hull, single screw with diesel engine.
 DESIGN : Principally for stern trawl research operations.
 HOME PORT : Keelung - Taiwan.
 TONNAGE : 711.58 tonnes.
 LENGTH : 56.6. metres L.O.A.
 BEAM : 9.10 metres.
 DRAUGHT : 5.6 metres.
 MAIN ENGINE : Akasaka, 2,200 BHP @ 310 RPM.
 SPEED : 13.5 knots (trial speed), 12 knots service speed.
 AUXILLIARY ENGINES : 2 Kubota 300 BHP and 1 Kubota 65 BHP.
 GENERATOR : 2 Shinko 250 KVA (AC 220v) and 1 Shinko 40 KVA
 FREEZERS : Large frozen fish holding capacity (16.26 tonnes/day)
 DECK EQUIPMENT : 2 x Net winch; Trawl winch; Windlass; Capstan; Steering gear; 6 x Cargo hoists.
 CONVEYOR BELTS : 6 x Conveyor belts.
 SURVEY EQUIPMENT : Trawl-nets; Gill-net; Nansen bottle (water sampling); Dissolved Oxygen meter; Expendable Bathythermograph; Salinity meter.
 NAVIGATION EQUIPMENT: Magnetic compass; Gyro compass and Auto pilot; 2 x Radar sets; Direction finder; Scanning Sonar; 2 x Elac Fish finders; Anemometer (wind speed).

CREW : Captain
 Chief Officer
 2nd Officer
 3rd Officer
 Radio Officer
 Chief Engineer
 1st Engineer
 2nd Engineer
 3rd Engineer
 11 Seamen
 2 Motormen
 Chief Cook
 Cook

SCIENTIFIC PERSONNEL: Dr Hsi-Chiang Liu - Chinese Fishery
 Biologist, Professor.
 Dr Hin-Kiu Mok - Chinese Taxonomist,
 Associate Professor.
 Mr Chien-Chung Hsu - Chinese Fishery
 Biologist, Lecturer.
 Mr Tai-Sheng Chiu - Chinese Fishery
 Biologist, Research Assistant.
 Mr Chie-Young Chen - Chinese Researcher.
 Mr Hung-Chia Yang - Chinese Fish
 Identification Biologist.

AUSTRALIAN RESEARCH
 OFFICERS (for N.T.
 Section of research
 cruise)

: Dr J. Stevens - CSIRO
 Dr T. Davis - CSIRO
 Mr A. Church - N.T. Fisheries
 Mr A. Clark - N.T. Fisheries
 Mr R. Doherty - N.T. Fisheries

SURVEY BACKGROUND

The "Hai Kung" is a Taiwanese research vessel operated by the National University of Taiwan. The vessel has conducted fishing surveys in Bass Strait, Western Australia and Northern Territory waters. Taiwanese and Australian scientists worked in close association throughout the duration of these surveys which were aimed at providing a bank of information on demersal and pelagic fish resources within the 200 mile A.F.Z. This report deals with the survey conducted in waters adjacent to the Northern Territory from the "Hai Kung" during the period 6 April to 14 April 1981.

ITINERARY

The "Hai Kung" departed Darwin at 1400 hours on April 6, 1981 and arrived on station in the Arafura Sea approximately 80 miles west of Darwin late that evening. At 2200 hours that night, 800 metres of gill-net was set and the net was pulled at 0700 hours the next morning. The area of the set and amount of net used varied from night to night. Full details of the net and catch are described later in this report. The net was set each evening at 1900 hours for the next four nights and hauled at around 0700 hours the next morning. On Saturday April 11, the gill-net was dried and stowed. The vessel was then set up for bottom trawling. Three trawls, each of 40 minutes duration, were carried out on Sunday and another two on Monday, April 13. The vessel left her last station in the Arafura Sea at 1500 hours on Monday April 13, and arrived in Darwin at 1000 hours the following morning. Figure 1 illustrates the areas fished during the survey.

CRUISE OBJECTIVESGILL-NETTING(a) Species Composition

To identify shark species and to determine the species composition of sharks in the area surveyed.

(b) Biological Information

° To collect biological information on shark species in the areas surveyed. The data collected included:-

- (i) total length/total weight frequencies;
- (ii) trunk length/trunk weight frequencies;
- (iii) sex and sexual maturity;
- (iv) stomach contents;
- (i) teeth samples.

° To collect biological information on the Long-Tailed Tuna (*Thunnus tonggol*).

(c) Net Selectivity

To use a range of gill-net mesh sizes to determine a relationship between mesh size and length of each particular species of shark.

(d) Freezer Capacities

To determine shark weight to freezer volume ratio of shark species caught by gill-nets used commercially by Taiwanese fishing vessels.

TRAWLING

- (a) To compare the species composition of sharks taken by bottom trawling in the same areas as surveyed for shark using the gill-net.
- (b) To collect biological information on any species of the Family Lutjanidae caught during the trawl survey.

GILL-NET DETAILS

The gill-net consisted of several net sections joined together. Each section contained 330 meshes along the head rope and was 110 meshes in depth. The net was attached to the head rope as illustrated in Figure 2. Each section had a hung length of 40 m and a hanging coefficient of 0.52.

The specifications are detailed below.

MESH SIZE	:	230-240 mm (9-9.5") and 280-300 mm (11-12")
DEPTH	:	110 meshes
HANGING RATIO	:	2 meshes per 250 mm = ratio of 0.52
SECTION LENGTH:		330 meshes at the head rope and 40 metres hung length.
SECTIONS USED	:	The number of sections of net used varied from 20 to 40 sections.
HEAD ROPE	:	2 strands of 12 mm synthetic rope
BUOY SIZE	:	Main floats 300 mm diameter spaced 13 metres apart.
BEACON LIGHTS	:	Flasher light powered by 6 volt 3 cell wet battery (3 units in total).
LEAD LINE	:	The net is weighted by 12 mm diameter round steel rings. The rings are 230 mm diameter and spaced 9.9 m apart.

A diagrammatic illustration of the set net is shown in Figure 3.

SHOOTING THE GILL-NET

The net is stacked at the aft of the vessel close to the stern ramp. The head rope and lead line are kept separate from each other to prevent the net from tangling. The net was weighted by steel rings attached to the bottom of the net at 9.9 metre intervals and did not contain a lead line or foot rope. The radio buoy and beacon buoy are first shot away from the stern of the vessel and the net is pulled down the stern ramp by the drag of the radio buoy in the water. The vessel travels at about 4 to 5 knots during the set.

Six men positioned on the starboard side of the stern ramp connect float buoys to the net as it is shot away. The float buoys are approximately 13 m apart. The person closest to the stern of the vessel throws each float into the water as the net flows out. A man standing on the port side feeds the metal rings down the stern ramp to prevent them from tangling the net as it is being set.

As the end of the net is fed out, two beacon buoys and a dahn buoy attached to the end of the net are manually thrown over the side. The vessel stands off a distance from the net to keep the beacon lights in sight at all times throughout the night.

HAULING THE GILL-NET

The vessel is positioned down wind or down stream of the net to prevent it being fouled by the vessel during hauling. The main engine is used periodically to keep the vessel correctly aligned with the net. The net is hauled up amidships and the flag and beacon buoys are detached and stored. The body of the net is then fed over the power block and on to the deck. Fish that will not fit through the block are pulled over the gunwhale and lowered on to the deck. To do this, the net is manually removed from the block and then replaced once the fish has been released from the net. Extra large fish that cannot be lifted with the aid of the powerblock are gaffed and dragged on board through an opening close to the water line on the lower deck.

As the net and fish come off the block they are manually dragged down the side of the vessel to the forward section of the main fishing deck. Here they are removed from the net and stacked ready for biological analysis and processing. After the fish have been removed from the net it is dragged back along the fishing deck and stacked close to the stern ramp ready for the next shot. When the net is stacked care is taken to eliminate twists and tangles. The head rope is placed on the starboard side of the fishing deck and the metal rings and lower section of the net (lead line) is placed on the port side. The buoy ropes are placed systematically on slides so that they can be easily attached to the floats as the net is shot away.

Upon completion of the research work the sharks and rays are headed and gutted and fins removed before being placed in a snap freezer. Other pelagic fish are frozen whole.

All commercial fish products not required for research purposes were processed and taken back to Taiwan to help offset the cost of the research programme.

RESULTS

GILL-NETTING

(a) Species Composition

Tables 1-4 contain information on each station including the catch and number of species of shark and others for which biological data was recorded. It was not possible to record species composition for every shark caught on all shots as this was physically impossible due to the large number of sharks captured.

Total catches varied from 11 to 6 640 kg (Table 2). The largest catch (6 640 kg at Station 3) was taken in the first 37% of the net, the rest being lost due to the large weight of shark. The estimated total catch for this station was approximately 20 tonnes.

The black-tip shark *Carcharhinus limbatus* represented 53.4% of the total number of sharks sampled for the five stations with the manta ray *Mobula japonica* being the second most abundant species (13.1%).

(b) Biological Information

Full biological details as listed under Cruise Objectives were recorded and are available from the N.T. Fisheries Division upon request.

(c) Net Selectivity

Only two mesh sizes were used for gill-netting on this section of the survey. Both net sizes were quite large being 230 mm and 280-300 mm respectively. As commercial Taiwanese gill-netters use nets of around 150-175 mm mesh size, no relationship between the length of each particular species of shark caught during the survey could be established against commercial Taiwanese gill-net operations. However, all shark lengths were recorded and this information will be useful when similar tests are conducted with a wider range of mesh size gill-nets.

(d) Freezer Capacity

The shark weight to freezer volume ratio was not obtained as there was little point in calculating this ratio using nets that are not used by commercial Taiwanese gill-netters.

(e) Long-Tailed Tuna

Length/weight frequencies were collected for all species which belong to the Family Scombridae. Particular attention was given to the species *Thunnus tonggol* (Long-Tailed Tuna) as it is known to inhabit extensive areas throughout northern Australian waters. The extent of this resource and the life cycle and biology of this species are being monitored to determine commercial potential with respect to Australian fishermen.

2. TRAWLING

A small bottom trawl survey was undertaken as a secondary project to the gill-net survey. Brief details of the trawl-net are shown in Figure 4. Five (5) trawl shots were made and the results of these are given in Table 5. Only two (2) sharks, *Carcharhinus limbatus* and *C. hemigaleus* were caught in the 5 trawl shots. With such a small shark catch it was not possible to draw any conclusions.

Biological information was collected from a sample of 204 fish belonging to the Family Lutjanidae. The number of each particular species sampled is given in Table 6. The data collected included length/weight frequencies, otoliths, scales, gonads, sex and first vertebrae of each fish.

HANDLINE FISHING

A small amount of time was spent handline fishing which produced a total catch of 3 sharks and 4 snapper. Details are given below:

<i>Carcharhinus sealei</i>	(Black spot shark)	64.7 cm	1.25 kg
C.	"	70.8 cm	1.6 kg
C.	"	75.3 cm	2.1 kg
<i>Pristipomoides multidens</i>	(Gold band Snapper)	47.6 cm	1.8 kg
P.	"	44.2 cm	1.4 kg
P.	"	38.2 cm	1.1 kg
P.	"	32.3 cm	0.6 kg

GENERAL COMMENTS

The cruise objectives as stated above, particularly in relation to (a) species composition, and (b) biological information, form the basis of a long-term research programme to provide information for the effective management of pelagic fish resources in waters adjacent to the Northern Territory. The initial step in this accumulation of information is to determine the temporal and spatial distribution of pelagic fish resources. Previous information gathered by the Northern Territory Fisheries Division during the 1980 shark sampling programme (*) indicated that two species - *Carcharhinus limbatus* and *C. sorrah* - formed the major portion of the gill-net catch. These two species will be used as indicator species in future research cruises.

SUMMARY

The decision by the Taiwanese Government to Commission the "Hai Kung" for research programmes in waters fished by the Taiwanese commercial fleet in other parts of the world stresses the need for Australian scientists to monitor and be familiar with fish resources in the 200 mile A.F.Z. so that these resources can be properly managed.

(*) Reference: Church A.G. (1981)

Preliminary results of a shark survey in Northern Territory waters in Proc. Northern Pelagic Fish Seminar Ed. by C.J. Grant and D.G. Walter. AGPS Canberra 1981.

Although some of the cruise objectives on this stage of the survey were not achieved as only two different gill-net mesh sizes were used, the cruise was most informative. A considerable quantity of biological data was collected from the gill-net operation on shark species and long-tailed tuna *Thunnus tonggol*. Information was also collected on bottom trawl species taken in the same areas as the gill-net shots. In particular, biological data was collected on the Family Lutjanidae and catch composition was recorded for each of the trawl shots.

Sincere appreciation is expressed to Professor Liu of the Taiwan National University who was the Taiwanese cruise leader, and to Captain Huang and the scientists and crew of the "Hai Kung" who all contributed to make this cruise most successful.

TABLE 1: SUMMARY OF FISHING STATION INFORMATION FROM FRV "HAI KUNG" GILL-NET SURVEY, APRIL 1981

STN. NO.	DATE	POSITION OF SET NET		TIME OF SET (CST)		POSITION OF HAUL		TIME OF HAUL (CST)		LENGTH OF NET (Metres)	NET DRIFT DIRECTION (° from North)	DEPTH (Metres)
		LAT (S)	LONG (E)	START FINISH	LAT (S)	LONG (E)	START FINISH					
1	6-7/4/81	12°02'	129°30'	2205	2215	12°02'	129°30'	0700	1742	800	060°	67
2	7-8/4/81	11°02'	125°59'	1840	1851	11°02'	129°00'	0645	1045	1600	110°	55
3	8-9/4/81	11°00'	129°18'	1850	1900	10°59'	129°19'	0605	1008	1600	135°	66-73
4	9-10/4/81	10°27'	130°40'	1906	1912	10°26'	130°41'	0700	0812	1100	223°	95
5	10-11/4/81	10°36'	129°59'	1829	1835	10°31'	129°57'	0705	0900	1100	322°	37-40

TABLE 2: SUMMARY OF CATCH DETAILS FROM FRV "HAI KUNG" GILL-NET SURVEY, APRIL 1981

STATION	SHARK CATCH (IN KGS)			OTHER	TOTAL CATCH (KGS)	REMARKS
	SMALL	MEDIUM	LARGE			
1	5	5	-	1	11	
2	-	105	1285	237	1627	
3	14	3088	3458	80	6640	63.1% of net lost due to large quantity of shark. Estimated total catch approximately 20 tonne.
4	-	14	212	2	228	
5	19	442	1221	2512	419	

TABLE 3: SPECIES ENCOUNTERED DURING THE FRV "HAI KUNG"
GILL-NET SURVEY APRIL 1981

GROUP	COMMON NAME	SPECIES	SPECIES CODE
<u>SHARK:</u>	Black-tip shark	<i>Carcharhinus limbatus</i>	LIM
	" " "	" <i>sorrah</i>	SOR
	" " "	" <i>brevipinna</i>	BREV
	" " "	" <i>amboinensis</i>	AMB
	" " "	" <i>plumbeus</i>	PLUM
	" " "	" <i>obscurus</i>	OBS
	Hammer-head shark	<i>Sphyrna lewini</i>	LEW
	" " "	" <i>mokarran</i>	MOK
	Tiger shark	<i>Galeocerda cuvieri</i>	CUV
	Lemon shark	<i>Negaprion queenslandicus</i>	NEQ
-	<i>Hemipristis elongatus</i>	HEM	
<u>RAY:</u>	-	<i>Rhinoptera javanica</i>	RIJ
	Devil Ray	<i>Mobula japonica</i>	RAY
<u>TELEOST:</u>	Indian mackerel	<i>Rastrelliger kanagurta</i>	RAK
	Long-tail tuna	<i>Thunnus tonggol</i>	SKK
	Eastern little tuna/bonito	<i>Euthynnus affinis</i>	SEA
	Narrow-barred Spanish mackerel	<i>Scomberomorus commerson</i>	SMK
	Frigate mackerel	<i>Auxis thazard</i>	SAT
	Black marlin	<i>Makaira indica</i>	SWF
	Finny Scad	<i>Megalaspis cordyla</i>	MEC
	Black king fish/cobia	<i>Rachycentron canadus</i>	KIF
	Dolphin fish	<i>Coryphaena hippurus</i>	DON
<u>MAMMAL:</u>	Dolphin		DOL

TABLE 4: - SUMMARY OF SPECIES COMPOSITION FROM FRV "HAI KUNG" GILL-NET SURVEY,

APRIL 1981

STN.	SPECIES COMPOSITION (No. of species sampled per station - see species code Table 3)																							
NO.	LIM	SOR	BREV	AMB	PLUM	OBS	LEW	MOK	CUV	SKK	SAT	SEA	KIF	DOL	SMK	SWF	RAY	MEC	DON	NEQ	RAK	HEM	RIJ	
DATE																								
1.	6-7/4/81	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2.	7-8/4/81	17	3	6	4	1	1	1	-	1	-	2	1	-	1	1	3	-	4	1	1	1	1	1
3.	8-9/4/81	100	-	1	1	2	-	1	-	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-
4.	9-10/4/81	2	-	-	-	-	-	3	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5.	10-11/4/81	51	4	-	4	14	-	-	-	7	17	10	-	-	-	-	39	6	-	-	-	-	-	-
TOTAL		171	8	7	9	17	1	5	1	3	7	18	12	1	1	1	42	6	4	1	1	1	1	1
% by species of total sample		53.4	2.5	2.2	2.8	5.3	0.3	1.6	0.3	0.9	2.2	5.6	3.8	0.3	0.3	0.3	13.1	1.9	1.3	0.3	0.3	0.3	0.3	0.3

NOTE: Only individuals on which full biological information was collected are included in this table.

TABLE 5: SUMMARY OF TRAWL STATION AND CATCH INFORMATION FROM FRV "HAI KUNG" TRAWL SURVEY.

APRIL 1981

TRAWL DATE STN. NO.	TIME AT COMMENCEMENT OF TRAWL (CST)	POSITION AT COMMENCEMENT OF TRAIL	TIME AT COMPLETION OF TRAWL (CST)	POSITION AT COMPLETION OF TRAWL	DEPTH (METRES)	SPEED (KNOTS)	TOTAL TRASH CATCH (KGS)	FISH RETAINED (KGS)			
									LAT (S)	LONG (E)	LAT (S)
1	12.4.81 0748	10°24'	130°23'	1831	10°25'	130°21'	96-97	3	260	30	230
2	12.4.81 0945	10°26'	130°20'	1031	10°26'	130°24'	88-100	"	340	10	330
3	12.4.81 1343	10°26'	130°21'	1430	10°23'	130°23'	91-92	"	1400	60	1340
4	13.4.81 0842	10°27'	130°22'	0925	10°29'	130°17'	91-92	"	390	50	340
5	13.4.81 1002	10°29'	130°17'	1200	10°25'	130°22'	93-96	"	690	70	620

TABLE 6: SUMMARY OF SPECIES SAMPLED DURING THE FRV "HAI KUNG"

TRAWL SURVEY, APRIL 1981.

COMMON NAME	SPECIES	TRAWL STATION NO.					TOTAL
		1	2	3	4	5	
RED EMPEROR	<i>Lutjanus sebae</i>	-	-	3	2	2	7
SADDLE TAIL SEA PERCH	" <i>malabaricus</i>	12	10	9	13	-	44
MALABAR SEA PERCH	" <i>erythropterus</i>	-	-	28	12	-	40
MANGROVE JACK	" <i>argenteimaculatus</i>	-	-	12	-	1	13
GOLDBAND SNAPPER	" <i>multidens</i>	9	5	6	15	6	41
SHARPTOOTH SNAPPER	" <i>typus</i>	5	8	21	-	12	46
MOSES PERCH/RUSSEL'S SNAPPER	" <i>rusSELLi</i>	9	-	-	-	4	13
TOTAL		35	23	79	42	25	204

FIGURE 2 - TAIWANESE DRIFT GILL-NET - HANGING METHOD

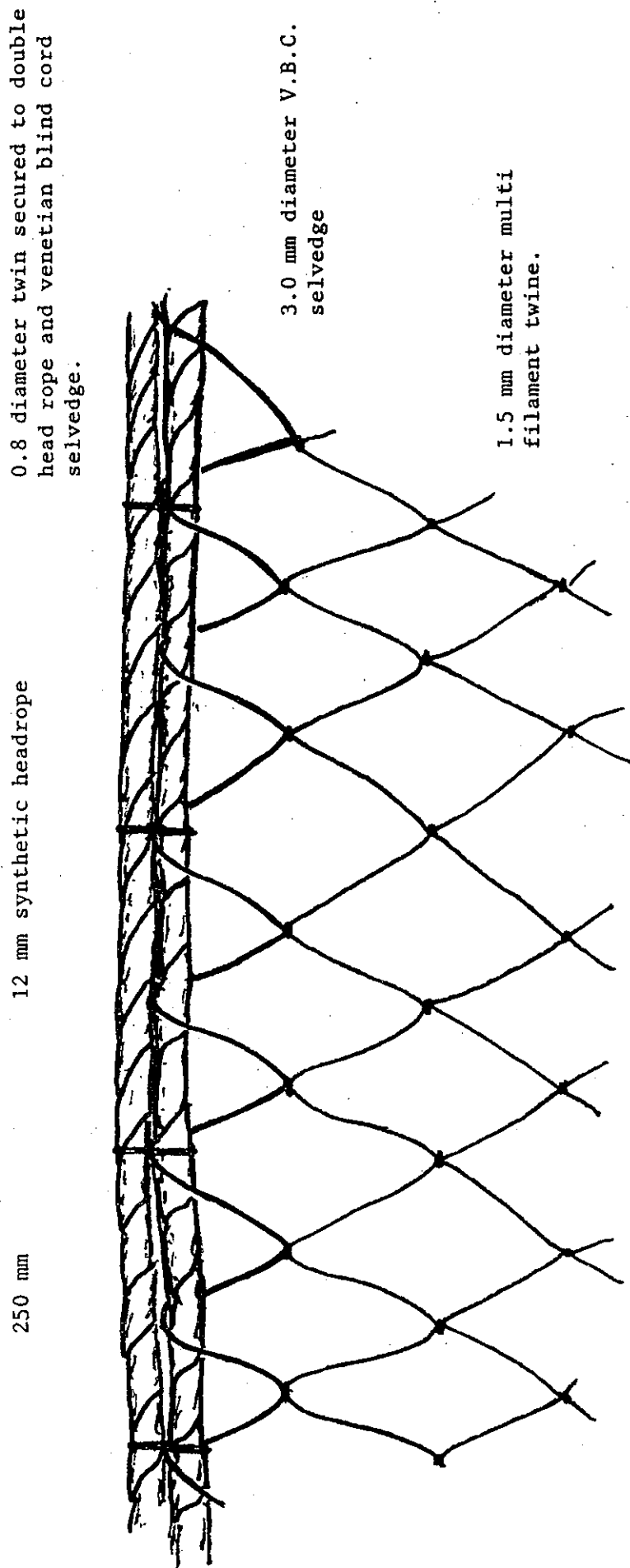
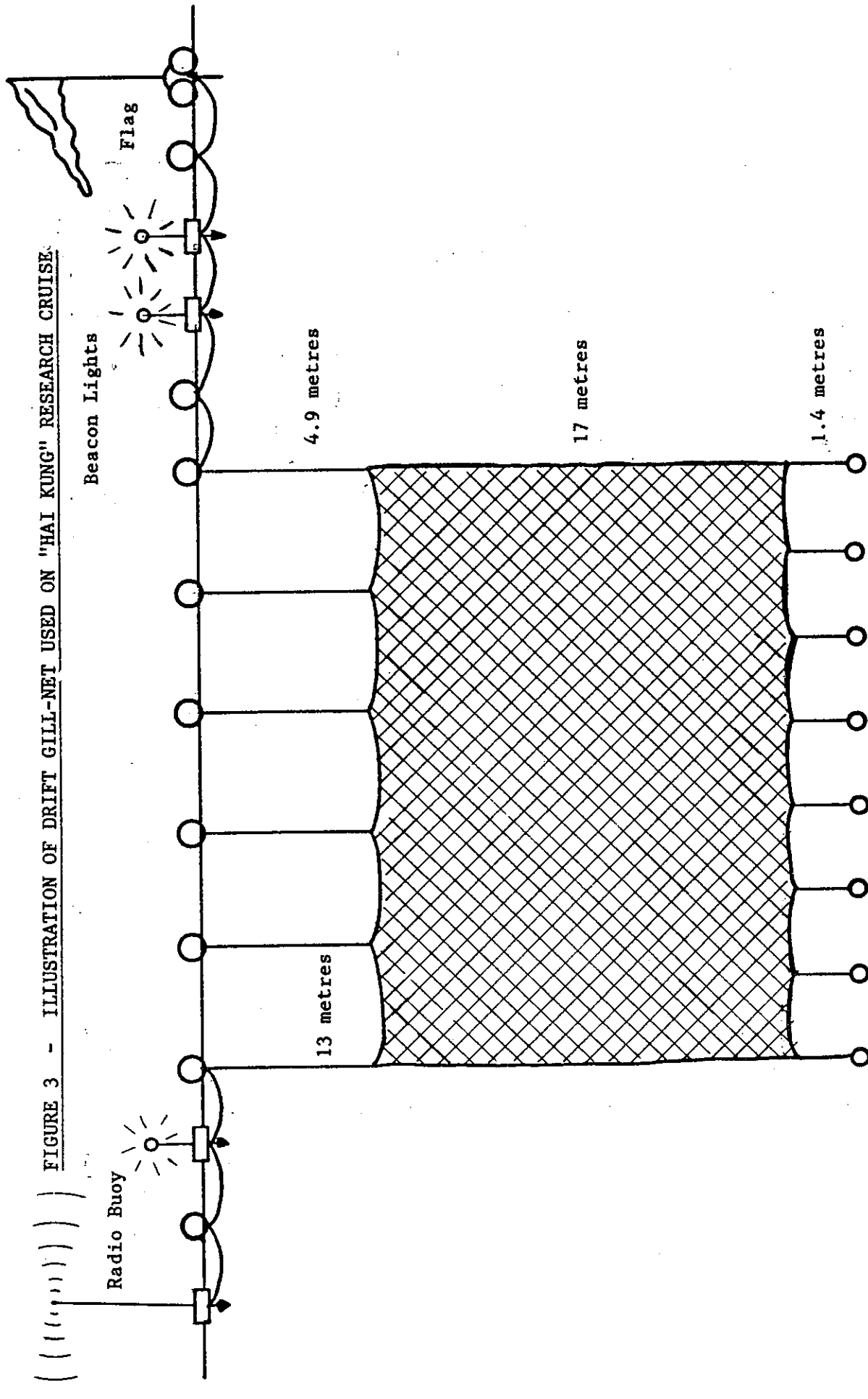


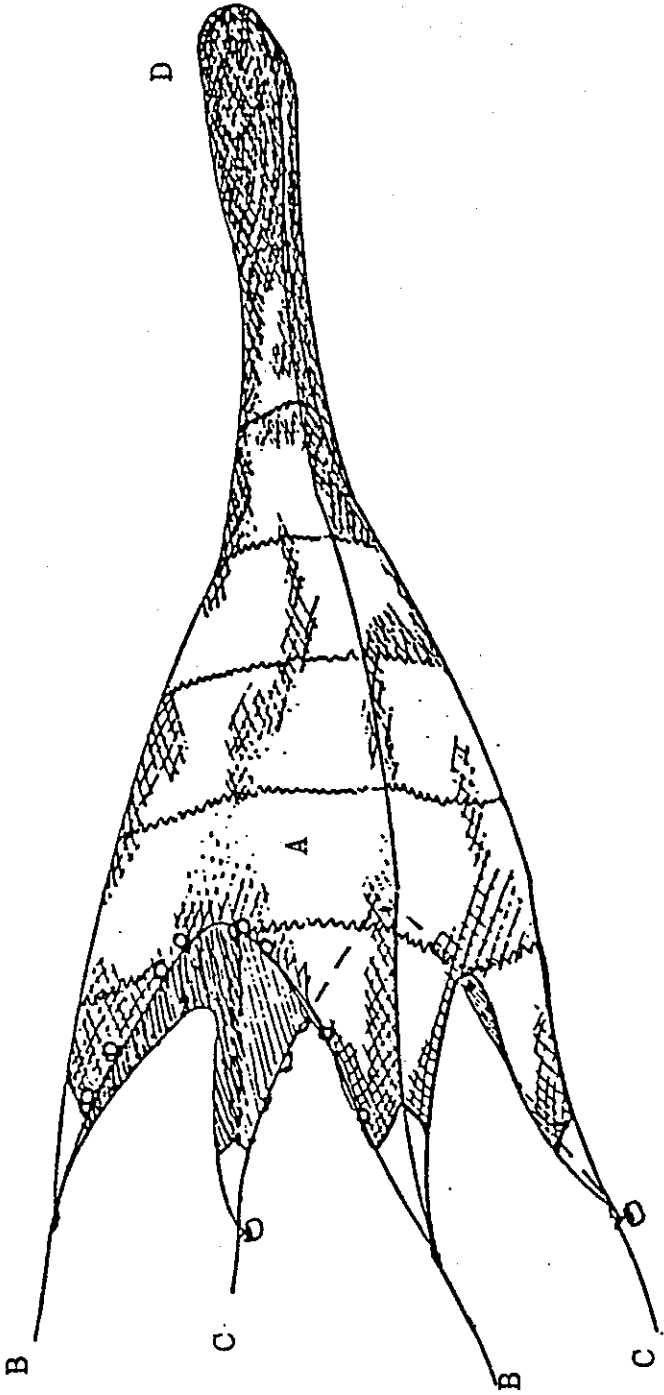
FIGURE 3 - ILLUSTRATION OF DRIFT GILL-NET USED ON "HAI KUNG" RESEARCH CRUISE



Metal ring weights
230 mm diameter
600 gm weight
12 mm round steel

9.9 metres

FIGURE 4 - TRAWL-NET DETAILS



MESHES "C"	FOOTROPE "A" (mm)	HEADROPE "B" (m)	FOOTROPE "C" (m)	CODEND MESH SIZE 'D' (mm)
412	120	56	63	50

OTHER FISHERIES PUBLICATIONS

- | | | |
|---|---|--|
| Fishery Report No. 1
March 1979 | - | A Review of the Northern Territory Barramundi Fishery |
| Fishery Report No. 2
July 1979 | - | The Fog Bay Banana Prawn Fishery 1978 |
| Fishery Report No. 3
August 1979 | - | A Review of the Northern Territory Mackerel and Reef Fisheries |
| Fishery Report No. 4
July 1981 | - | Northern Territory Mackerel Fishing Programme 1980/81 |
| Fishery Report No. 5
August 1981 | - | Barramundi Review - limited edition reprint of Technical Bulletin No. 49 |
| Fishery Report No. 6
October 1981 | - | Report on a Dropline Fishing Operation of the "Takuryo Maru No. 11 during Feasibility Fishing Operations in the Australian Fishing Zone. |
| Fishery Report No. 7
November 1981 | - | Report of Public Meeting to discuss future Management of the Northern Territory Barramundi Fishery |
| Fishery Report No. 8
March 1982 | - | Report on a Gill-Net/Bottom Trawl Survey. Observations of the "Hai Kung" during a Fishing Survey and Research work in the Arafura Sea. |
| Technical Report No. 1
October 1979 | - | Barramundi
Lates calcarifer |
| Technical Bulletin No.49
August 1981 | - | Northern Territory Barramundi Fishery Review of Management - Situation Paper. |