Evaluation of Non-Trawl Harvest Methods for Red Snapper in Northern Australia

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94/154 Evaluation of Non-Trawl Harvest Methods for Red Snapper in Northern Australia

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Objective

Evaluate the supply of saddle-tail and red snappers through non-trawl harvest methods applicable to domestic fishing operations in the Timor and Arafura Seas, and Gulf of Carpentaria.

Non-technical Summary

Project findings can be summarised as follows:

- droplines, longlines, and trotlines caught predominantly saddle-tail snapper and red snapper, while traps caught predominantly goldband snapper and red emperor;
- the distribution of schools of saddle-tail snapper and red snapper is very patchy, with schools generally occurring on small reefs and patches of hard ground; and,
- the annual return to capital for a dropliner operating from Nhulunbuy and targeting saddle-tail snapper and red snapper in the Arafura Sea ranged from -19% to 45%, depending on catch rates and market prices.

The economic analysis indicated that a dropline fishery for saddle-tail and red snappers in the Arafura Sea is not commercially viable based on information collected during the project (base case). However, it should be noted that gear trials of the type undertaken here, into new grounds, may not provide a good indication of the long-term catch rates and profitability of fishing enterprises. The distinguishing factor which makes this so, is that the fishing methods target schools of fish which tend to be found on marks which may be revisited over several trips. Building a database of locations which can be visited during fishing trips is a key part of developing a profitable enterprise in a new fishery.

Commercial quantities of saddle-tail and red snappers may be caught by non-trawl harvest methods, if they can be located regularly and reliably. Groundfish fisheries across northern Australia may develop rapidly if the relationship between snapper aggregations and bottom type, season and area, can be established. To this end, continued industry-government collaboration is required to develop detailed geographically referenced databases of bottom features and fish aggregations across northern Australia. New methods for collecting geo-referenced data should be developed to enhance our knowledge of fishing grounds, and provide essential data for the analysis of groundfish habitat preferences in the Timor and Arafura Seas.

Keywords

Lutjanus malabaricus, *Lutjanus erythropterus*, snapper, harvest methods, Arafura Sea

Background

Red snappers, a group of large tropical snappers consisting predominantly of *Lutjanus malabaricus* (saddle-tail snapper, also known locally as ruby emperor) and *Lutjanus erythropterus* (red snapper, also know as scarlet snapper), have been fished extensively by foreign and domestic trawlers in northern Australian waters for over 20 years. The main snapper fishing grounds are located over the continental shelf in the Arafura Sea and northern Gulf of Carpentaria, and catches of these target species peaked at 5400 t/year in 1989 (Ramm and Xiao, 1997 - Catch, effort and sustainable yield for Australia's Northern Trawl Fishery - *ICLARM Conference Proceedings* **48:** 298-315). Groundfish trawl surveys conducted in 1990 and 1992 by the Northern Territory Fisheries Division, partially funded by the Fisheries Research and Development Corporation (FRDC project 90/15) and the Australia Fisheries Management Authority provided new data which contributed to a revision of biomass and fishery yields for snapper stocks (eg Northern Trawl Fisheries Assessment Working Group reports 1989-92, 94). The combined annual sustainable yield for saddle-tail snapper and red snapper in northern Australian waters was estimated at about 10000 t, including 3700-6800 t in the Arafura Sea and 2900-9000 t in the Gulf of Carpentaria. A recent review, lead by Dr Carl Walters (FRDC project 96/158, Darwin, October 1996) estimated the sustainable yield for red snapper in the Arafura Sea, based on the proven production potential, around 1500 t/year.

Need

Foreign trawling in northern Australia was phased out by the former Australian Fisheries Service in 1990 following increased Australian interest in the snapper trawl fishery; 8 domestic trawlers fished in 1989. However, the development of domestic operations was slowed by (1) uncertainties in fishery management arrangements, with no new licences being issued during protracted Offshore Constitutional Settlement negotiations between the Commonwealth and the Northern Territory over jurisdiction for trawling (1993-95), (2) environmental concerns about the impact of trawling, (3) variable product quality and low prices, (4) difficulties in establishing markets, and (5) high investment costs and limited onshore infrastructure. Despite recent advances in the use of semi-pelagic trawls for harvesting snapper (Ramm, Mounsey, Xiao and Poole, 1993 - Use of a semi-pelagic trawl in a tropical demersal trawl fishery - *Fisheries Research* **15**: 301-313), most trawlers ceased operating in the fishery, and only one domestic fishing vessel, the stern trawler *Wendy*, has targeted saddle-tail snapper and red snapper in the Arafura Sea and Gulf of Carpentaria since 1992.

The Northern Territory Fishing Industry and Government propose to overcome present limitations in the domestic snapper fishery by using passive (non-trawl) harvest methods. One such method, droplines (vertical lines), has been used successfully in developing a domestic deepwater fishery (80-130 m) for goldband snapper (*Pristipomoides* spp) along the Sahul Banks in the Timor Sea, north-east of Darwin. In that region, droplines have little impact on the seabed and are easily operated from 15-20 m vessels with 3-5 crew members, thereby reducing some of the investment and operating costs associated with large stern trawlers. Further, fish caught by dropline are of high quality and fetch good market prices, and frequent small shipments of product may facilitate handling, packaging and transportation from basic onshore facilities common in the far north. The Northern Territory Government has declared a moratorium on the issue of groundfish trawl licences in waters under its jurisdiction.

Objective

The objective of this project was to evaluate the supply of saddle-tail snapper and red snapper through non-trawl harvest methods applicable to domestic fishing operations in northern waters, particularly the Arafura Sea.

Methods

The development of the project and methodology were determined by a joint Industry Government Steering Committee (SC) set up at the request of FRDC. SC membership was composed of the chairs of the Coastal Line Fishermen's Association, Deep Sea Fisheries and Timor Reef Fishermen's Association, the Executive Officer of the Northern Territory Fishing Industry Council, as well as technology, research and management staff from the Fisheries Division. The first SC meeting was held in February 1995 (Attachment 1), and the first series of field trips was carried out in May 1995 using methodology specified by the SC. A second series of field trips were planned during the SC meeting held on 18 August (Attachment 2), with field work conducted during November 1995. The SC also recommended, during the second meeting, that available trawl logbook data be examined to identify snapper 'hot spots' in the Arafura Sea that may provide some guidance during the November field work. A third SC meeting was held in December 1995 to review the work to date (Attachment 3). Finally, the SC reviewed and commented on this report.

Trawl Logbook Data

Analysis of snapper hot-spots was based on available trawl fishery logbook data from Taiwanese pair trawlers (1980-90), Thai trawlers (1985-90) and Australian trawlers (1987-94). Large snappers were reported in the logbooks under a single category consisting mainly of *L. malabaricus* (about 75% by weight), then *L. erythropterus* (10%) and *Lutjanus sebae* (red emperor, 5%), with the remainder consisting of *Lutjanus argentimaculatus* (mangrove jack) and *Lutjanus johnii* (golden snapper). Snapper hot-spots were investigated using catch and standardised effort data from Taiwanese, Thai and Australian fleets trawling in the Arafura Sea between 133-138°E and 9-11°S. Standardising the effort corrected the data for differences in fishing power due to trawler type, annual and monthly variability, and spatial variability based on a 0.5° grid system. The analysis used 78946 trawl records; results are reported in Attachment 4.

Field Trips and Gear

Field trips were conducted in the Arafura Sea in May-June 1995 and November 1995 using 5 fishing vessels under charter (Table 1, Fig. 1). Four types of gear were evaluated during these charters: droplines, longlines, traps and trotlines (Table 2).

The droplines consisted of:

- mainline of heavy monofilament operated from a hydraulic reel (fixed rig), or polyethylene rope operated from a hydraulic pot hauler (free rig);
- detachable dropper of polyethylene rope (6 mm diameter);
- 30 tuna circle hooks (size 13/0) connected to the dropper, at about 0.75 m intervals, via 0.15 m monofilament snoods (3 mm diameter) and 3-way heavy duty swivels;
- 5 kg sinker attached to the end of the mainline;
- 2 large marker floats attached to the mainline (free rig only).

Each longline was of Indonesian design and construction, and consisted of:

- 200-400 m woven monofilament mainline;
- 100-200 long shank hooks (size 6/0) connected to the mainline, at 2 m intervals, via 0.10 m monofilament snoods;
- 2 large marker floats attached to each end of the mainline via a float line;
- anchor connected to each end of the mainline.

Two types of traps were used during the trials (1) collapsible traps, and (2) WA traps. The collapsible traps consisted of:

- light weight steel bar and chain wire mesh of overall rectangular dimensions of approximately 1.8 x 1.2 x 0.8 m;
- frames and entrance funnels of 12 mm diameter steel bar;
- entrance funnels bar covered with 50 mm mesh nylon codend material (60 ply).

The WA traps consisted of

- heavy duty steel bar and wire mesh of overall cylindrical dimensions of approximately 1.6 x 0.9 m;
- frames and entrance funnels of 9 mm diameter steel bar;
- panels and entrance funnels covered in 50 x 50 x 3 mm diameter steel mesh.

Each trotline consisted of:

- 1500 m mainline of polyethylene rope (8 mm diameter);
- up to 120 branchlines clipped to the mainline at 12-18 m intervals, each constructed on 4 m polyethylene rope of 6 mm diameter with a 4 m dropper of heavy monofilament line (2 mm diameter);
- 8 tuna circle hooks (size 12/0) connected to the dropper via 0.15 m monofilament snoods (2 mm diameter) and swivels (50 kg breaking strain) looked in to position by swages;
- 1 kg sinker at the end of each dropper;
- 2 large marker floats at each extremity of the mainline, and 1 small pressure float (100 mm diameter) at each point of attachment of the branchlines to the mainline;
- anchor at each extremity of the mainline.

Data Collection

Catch and effort data, including date, time, depth fished, type of bait and catch by species, were recorded for each set during the study.

Table 1. List of vessels, skippers and staff involved in field trips conducted during the project.

Vessel	LOA (m)	Port	Charter Period 1995	Skipper	Project Staff
Reef Seeker	16.8	Darwin	15-21 May	James Perry	John MacCartie
Wendy	19.5	Nhulunbuy	15-19 May	Ray Passey	Richard Mounsey
Deep Tempest	16.2	Darwin	30 May - 4 June	Mal Reid	Neville Gill
Ace of Spades	13.5	Darwin	2-15 November	Wayne Bishop	Mounsey/MacCartie
Tulach Ard	16.3	Darwin	2-15 November	Biagio Spinella	MacCartie/Mounsey

Table 2. Summary of harvest methods trialed during the project.

Vessel	Period Fished	Depth Fished (m)	Gear	Bait	Total Number	
					Sets	Hooks
Reef Seeker	16-19 May	60-118	fixed rig dropline	squid	42	1259
Wendy	16 May	69-91	collapsible trap	tuna	8	
	17-19 May	39-113	fixed rig dropline	squid	38	1140
	18-19 May	38-67	Indonesian longline	squid	6	600
Deep Tempest	1-2 June	60-80	collapsible trap	tuna	10	
Ace of Spades	4-12 Nov	37-55	free rig dropline	squid	235	7050
Tulach Ard	4-6 Nov	53-91	longline trap	tuna	35	
	4-9 Nov	51-94	trotline	squid	14	9180
	12 Nov	49-52	WA trap	tuna	16	

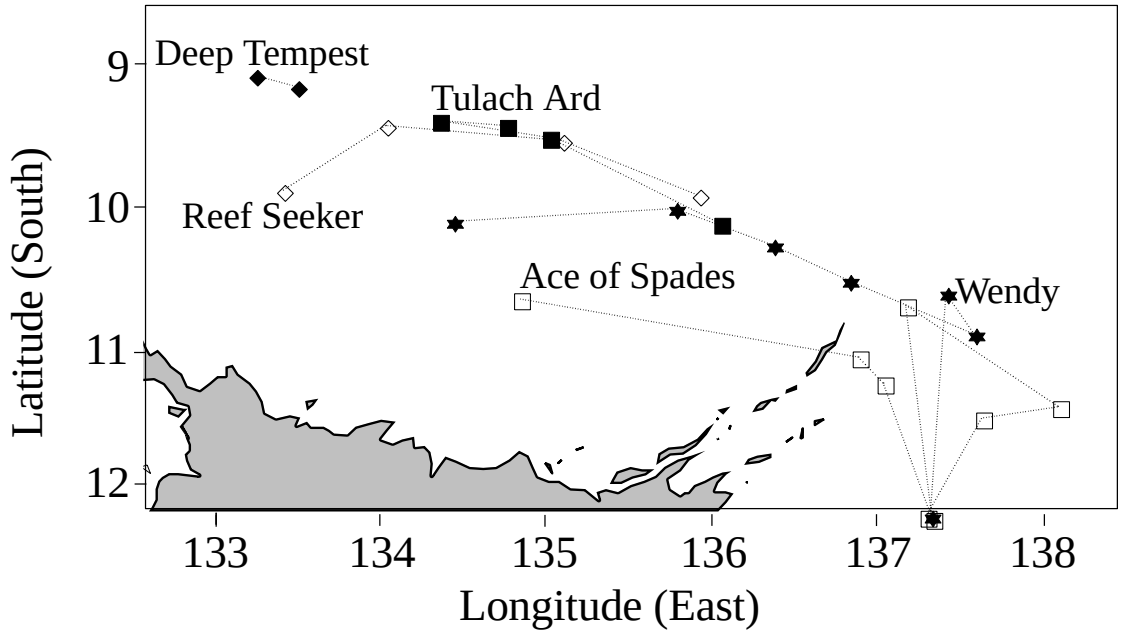

Figure 1. Mean daily positions for the 5 vessels engaged in the study: *Reef Seeker* (✧May); *Wendy* (★ May); *Deep Tempest* (◆ June); *Ace of Spades* (Nov); *Tulach Ard* (■ Nov).

Economic Analysis

The analysis was based on a spreadsheet financial model developed and applied in the Northern Territory to investigate the profitability of new fisheries and new technology (eg Buckworth and Cann, 1992 - Could trapping be a feasible additional method of fishing in Australia's Northern Prawn Fishery? - *Proceedings of the International Conference on Bycatch in the Shrimp Industry*, Lake Buena Vista, Florida, pp 125-140). In this analysis, a representative boat fishing droplines was investigated and sensitivity analysis was used to examine the effect of variation in key variables on profitability. The representative boat was based on a hypothetical dropliner, similar to *Ace of Spades*, operating out of Nhulunbuy. Assumptions used in the analysis are summarised in Table 3. The results of the analysis are reported in terms of 'annual return to capital' which is defined as profit/loss divided by capital value at the start of the period.

Table 3. 'Base case' assumptions used in the economic analysis.

Assumptions	Dropliner
Home Port	Nhulunbuy
Area of Operations	Arafura Sea or northern Gulf of Carpentaria
Boat Value	$300 000
Type of Gear Fished	droplines
Gear Value	$10 000
Number of Days Fished per Year	240 days
Duration of Average Fishing Trip	6 days
Steaming Time for Fishing Ground	12 hours
Number of Crew	4
Typical Catch Rate of Snapper	300 kg/day
Typical Snapper Price	$4.50 /kg delivered interstate
Typical Marketing Costs	$2.22 /kg

Trip Narratives

May-June 1995

Bad weather conditions and strong currents contributed to overall poor catches during these first trials which were conducted in line with recommendations from the project SC. Droplines were evaluated aboard *Reef Seeker*, while traps, droplines and longlines were fished on *Wendy*, and collapsible traps were trialed on *Deep Tempest*. The SC recommended that the trials be conducted in the Arafura Sea in a region bounded by 135°00'-136°30'E, the outer limit of the Australian Fishing Zone and 10°30'S. However, this region was extended during the charter to include grounds to the west and south of these coordinates because of poor catches recorded by the *Wendy* within the SC recommended area a few days prior to the trials. The Indonesian-style longlines were difficult to handle and easily broken and were only used on two occasions. Both collapsible and WA type traps proved effective but caused damage to some species of fish, especially goldband snapper. Very few fish were caught and it was not possible to meaningfully compare the catching characteristics of the gear used.

The *Wendy* departed Nhulunbuy on 13 May and was on charter during 15-19 May when she engaged in longlining, free rig droplining and trapping. Skipper Ray Passey was unable to give any reason why there were so few fish during the charter period (Attachment 5). Despite poor catches and bad weather, Ray Passey and his crew were enthusiastic about the project, and kindly agreed to tow *Reef Seeker* during part of the survey, thus saving fuel and some project costs.

The *Reef Seeker*'s charter was shortened due to deteriorating weather conditions and, consequently, the shallower regions of the Arafura Sea were not searched in a detailed manner. Mechanical problems delayed the departure of *Deep Tempest*. She finally put to sea with the intension to explore the central trawl grounds and fish towards Vosella Shoal (136°15'E, 9°50'S). However, once *Deep Tempest* rounded Cape Don, strong south easterly conditions provided skipper Mal Reid with no option but to head north or abort the mission. *Deep Tempest* spent two days in the northern most region of the Australian sector of the Arafura Sea attempting to operate traps in deteriorating weather conditions; she was unable to operate in the desired region and the mission was aborted (Attachment 6).

November 1995

This series of field trips proceeded as planned by the SC. The *Tularch Ard* and *Ace of Spades* departed Darwin Harbour on 2 November, heading for snapper hot-spots identified in the analysis of the trawl logbook data (Attachment 4). After a short time fishing at these spots, we realised that the scale at which the hot-spot information was determined was too broad (30 x 30 nautical mile grids) to be of assistance in targeting good aggregations of fish using non-trawl gear. Better catches were obtained by locating fish on small reefs using bathymetric charts and echo sounder. Patches of hard ground were found throughout the survey area, and large schools of saddle-tail snapper and red snapper occurred south of 10°30'S.

The *Tularch Ard* was rigged with two 600 hook trot lines and 30 light weight collapsible fish traps. She generally searched and fished grounds between 80 nautical miles north of the Goulburn Islands (approx 134°30'E, 9°30'S) to 70 nautical miles north of Cape Wessel, then south to a point 50 nautical miles east of Nhulunbuy (approx 137°E, 12°S). The *Ace of Spades* carried eight fully rigged free-rig droplines (throw-aways) and enough spares to build at least 10 more. She began searching and fishing in an area 80 nautical miles WNW of Cape Wessel (approx 135°30'E, 10°30'S), and proceeded south and east, fishing within 100

nautical miles of Nhulunbuy. Good quantities of fish were caught during this phase of the project; skipper reports are attached (Attachments 7, 8).

Detailed Results

Comparison of Catches

Droplines, longlines and trotlines caught predominantly saddle-tail snapper and red snapper, while traps caught predominantly goldband snapper and red emperor.

Catches during the May-June field trips were generally poor, with a total of 205 fish caught by droplines, traps and longlines (Table 4a). Good catches were taken during field trips in November, with a total of 2093 fish caught by droplines, traps and trotlines (Table 4b). Either saddle-tail snapper or red snapper, or both, were the main components of the catches taken by dropline, longline and trotline, while traps generally produced higher quantities of goldband snapper or red emperor. Longlines and trotlines also yielded relatively high catches of catfish, presently considered as having low economic value. Note that sample sizes are small, and that some differences in catch composition may reflect the time, depth and area fished rather than difference between gear type.

Table 4. Comparison of catches taken in the Arafura Sea in (a) May-June 1995 and (b) November 1995 using fixed rig droplines, various types of traps (longline, collapsible and standard), longlines and trotlines. See Table 2 for gear and fishing information, and Figure 1 for daily fishing positions.

Fish		Catch (number of fish)			
Scientific Name	Common Name	Fixed Rig Dropline	Trap (combined)	Longline	Trotline
(a) May-June 1995					
Carcharhinus spp	shark	12	1	1	
Diagramma pictum	sweetlip	0	0	0	
Epinephelus spp	cod	1	8	0	
Lethrinus lentjan	red-spot emperor	0	0	0	
Lutjanus erythropterus	red snapper	12	2	14	
Lutjanus malabaricus	saddle-tail snapper	2	8	1	
Lutjanus sebae	red emperor	2	7	3	
Pristipomoides spp	goldband snapper	15	30	1	
(8 species)	mixed	58	7	20	
	Total	**102**	**63**	**40**	
(b) November 1995					
Carcharhinus spp	shark	60	0		129
Diagramma pictum	sweetlip	5	0		16
Epinephelus spp	cod	47	26		60
Lethrinus lentjan	red-spot emperor	27	7		5
Lutjanus erythropterus	red snapper	97	10		37
Lutjanus malabaricus	saddle-tail snapper	342	30		229
Lutjanus sebae	red emperor	50	41		50
Pristipomoides spp	goldband snapper	16	7		58
(12 species)	mixed	111	13		520
	Total	**755**	**134**		**1104**

Economic Analysis

The annual return to capital for a dropliner operating from Nhulunbuy and targeting saddle-tail snapper and red snapper in the Arafura Sea ranged from -19% to 45%, depending on catch rates and market prices.

The base case assumptions (Table 3) gave an annual return to capital of -19% (loss) for the dropliner. This base case assumed a catch rate of 300 kg/day of saddle-tail and red snappers, and is well below rates which are achieved by experienced fishers in the Timor Reef Fishery and below catch rates recorded during a recent survey in the Timor Sea (FRDC project 96/156). It is apparent that there is a need to increase prices as well as catch rates for attractive profitability. The following table details the annual return to capital for a dropliner for a range of catch rates and prices (Table 5). Dropline catch rates of 400 kg/day combined with whole fish prices of $6.00/kg would be marginally profitable; so too would catch rates of 700 kg/day and prices of $4.50/kg. It would appear there is potential to increase prices via developing a consistent supply to the market and reputation for consistently high quality. It may be more difficult to increase catch rates.

Note that gear trials of the type undertaken here, into new grounds, may not provide a good indication of the long-term catch rates and profitability of fishing enterprises. The distinguishing factor which makes this so, is that the fishing methods target schools of fish which tend to be found on marks which may be revisited over several trips.

Further, the dropline scenario is based on airfreighting out of Nhulunbuy. There is limited availability from this airport which is estimated at 10 t/week, though more may be available in some weeks; allowing for a season of say 40 weeks, this equates to 400 t/year. The airfreight rate assumed for Nhulunbuy is the same as applies to Darwin; there is some doubt that such a rate will be available.

Table 5. Annual return to capital for a dropliner for a range of snapper catch rates and prices. Profitable values (ie greater than zero) are in bold.

	Price for Whole Fish ($/kg)			
Catch Rate (kg/day)	4.50	5.00	5.50	6.00
300	-19	-14	-10	-5
400	-13	-7	-1	**5**
500	-8	0	**7**	**15**
600	-2	**7**	**16**	**25**
700	**3**	**14**	**24**	**35**
800	**8**	**21**	**33**	**45**

Benefits

Project findings can be summarised as follows:

- droplines, longlines, and trotlines caught predominantly saddle-tail snapper and red snapper, while traps caught predominantly goldband snapper and red emperor;
- the distribution of schools of saddle-tail snapper and red snapper is very patchy, with schools generally occurring on small reefs and hard ground; and,
- the annual return to capital for a dropliner operating from Nhulunbuy and targeting saddle-tail snapper and red snapper in the Arafura Sea ranged from -19% to 45%, depending on catch rates and market prices.

Early project findings were reported in articles published in the Northern Territory Fishing Industry News (Attachments 9, 10).

The economic analysis indicated that a dropline fishery for saddle-tail and red snappers in the Arafura Sea is not commercially viable based on information collected during the project (base case). However, it should be noted that gear trials of the type undertaken here, into new grounds, may not provide a good indication of the long-term catch rates and profitability of fishing enterprises. The distinguishing factor which makes this so, is that the fishing methods target schools of fish which tend to be found on marks which may be revisited over several trips. Building a database of locations which can be visited during fishing trips is a key part of developing a profitable enterprise in a new fishery.

In previous analyses (Brian Cann, unpublished), several scenarios were considered for fishing out of Darwin, and these showed some prospect for profitable operation at catch rates of 500 kg/day and whole chilled fish prices of $6.00/kg delivered interstate. This price may be optimistic without market development for a premium product. Due to long steaming times, boats operating out of Darwin would need to do something 'different' from the existing dropline fishery in the Timor Reef Fishery unless high catch rates are achieved. Two strategies would be to extend the length of fishing trips past seven days, or to use motherships to ferry fresh fish and supplies. Successful scenarios require operating out of Nhulunbuy, and high catch rates and/or prices. High airfreight rates out of Nhulunbuy, relative to road freight from Darwin, remain an obstacle in these scenarios.

There is considerable potential for variation in the capital value of boats which may operate in the saddle-tail snapper and red snapper fishery. The values used in the analysis were based on an average boat aged 10 years or more. Newer, larger and more expensive boats would generally yield lower annual return to capital. More expensive dropliners would need to have increased fishing power via some avenue such as more droplines and crew, or better fish finding technology. As an indication of the effect of boat value on profitability, doubling the boat value (starting and salvage value) but keeping all other operating costs constant would have the following effect. For the base case, the annual return to capital would be reduced from -19% to -12% because the losses are spread over a larger capital value. For a catch rate of 700 kg/day and a fish price of $5/kg, the annual return to capital would be reduced from 14% to 5%.

Intellectual Property and Valuable Information

Intellectual property and valuable information gathered during this project are freely available to the industry and public.

Further Development

This project, and related FRDC project 96/156 conducted in 1996 in the Timor Sea, have highlighted the highly patchy distributions of saddle-tail snapper and red snapper in the Timor and Arafura Seas. Initially, this patchiness was overcome by towing conventional stern and pair trawls over wide areas of the seafloor. Recent pressure from environmentalists and the introduction of responsible fishing practices have resulted in dramatic advances in trawl operation, targeting aggregations with semi-pelagic trawls, and developments in alternative non-trawl methods. However, these new techniques, while being environmentally acceptable, require reliable target fishing for economic viability. In turn, this mode of fishing requires a good understanding of the small-scale distributions of fish on fishing grounds, and how fish abundances are related to habitat types and seasonal and annual variability.

Commercial quantities of saddle-tail and red snappers may be caught by non-trawl harvest methods, if they can be located regularly and reliably. Groundfish fisheries across northern Australia may develop rapidly if the relationship between snapper aggregations and bottom type, season and area, can be established. To this end, continued industry-government collaboration is required to develop detailed geographically referenced databases of bottom features and fish aggregations across northern Australia. New methods for collecting geo-referenced data should be developed to enhance our knowledge of fishing grounds, and provide essential data for the analysis of groundfish habitat preferences in the Timor and Arafura Seas.

Staff

Staff involved with the project are listed in Table 6.

Table 6. Departmental staff involved in the project.

Staff	Position	Project Activity		
		Field Work	Analysis	Steering Committee
Brian Cann	Senior Economist		✓	
Neville Gill	Technical Officer	✓		✓
Peter Herden	Director Fisheries Management			✓
Rosemary Lea	Senior Management Officer			✓
John MacCartie	Gear Technologist	✓		✓
Richard Mounsey	Senior Gear Technologist	✓	✓	✓
David Ramm	Research Coordinator		✓	✓
Richard Slack-Smith	Director Fisheries R&D			✓

Final Cost

The total cost of the project was estimated at $176900, including a FRDC grant of $77800. The final FRDC expenditure was $74876.

Acknowledgments

We gratefully acknowledge the guidance and assistance of industry members of the Steering Committee, Wayne Bishop Chair NT Coastal Line Fishermen's Association, Graham McMahon Chair NT Deep Sea Fisheries, Bill Passey Owner/Operator Northern Trawl Fishery, Clive Perry Chair NT Timor Reef Fishermen's Association and Iain Smith Executive Officer NT Fishing Industry Council. We wish to thank Bill and Ray Passey skippers of *Wendy*, Wayne Bishop skipper of *Ace of Spades*, James Perry skipper of *Reef Seeker*, Mal Reid skipper of *Deep Tempest* and Biagio Spinella skipper of *Tularch Ard* for their collaboration, expertise and enthusiasm.

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ATTACHMENT 1

STEERING COMMITTEE MINUTES - February 1995

Evaluation of Non-Trawl Harvest Methods for Red Snapper in Northern Australia
FRDC project 94/154

Minutes of the First Steering Committee Meeting
Fisheries R&D Branch
20 February 1995 - 0900h

Steering Committee

Wayne Bishop	Chair NT Coastal Line Fishermens Association
Neville Gill	Technical Officer
Peter Herden	Assistant Director Fisheries Management and Meeting Chair
Graham McMahon	Chair NT Deep Sea Fisheries
Richard Mounsey	Senior Gear Technologist
Bill Passey	Owner/Operator Northern Trawl Fishery
Clive Perry	Chair NT Timor Reef Fishermens Association
David Ramm	Senior Research Scientist
Richard Slack-Smith	Assistant Director Fisheries R&D
Iain Smith	Executive Officer NTFIC

Agenda

- David Ramm to explain the reasons why the Steering Committee has been formed and what funding is likely to be received from FRDC.
- Will the project be worthwhile without the Trawl component?
- What area of the Arafura Sea is to be fished?
- What types of gear will be trialed and how much funding will be allotted to gear?
- When should the gear be trialed?
- What type of boats and how many are required for the project?
- What type of arrangements with suitable vessels should be entered into (ie, full charter, partial charter, other)?
- How will gears be compared against each other?
- In what form will the data be collected and how will it be analysed.
- When will the final report be completed?

Reasons why the Steering Committee has been formed background information

David Ramm briefed the meeting on the current situation.

- The Fisheries Division submitted a proposal entitled "Evaluation of Non-Trawl Harvest Methods for Red Snapper in Northern Australia" to FRDC for funding during 1994-95. This proposal had been discussed with industry and had received strong support by NT Fisheries R&D Advisory Committee. FRDC did not support the proposal during the initial round of funding, but suggested that the proposal be revised and re-submitted for further consideration.
- A revised proposal was submitted to FRDC seeking to evaluate the supply of saddle-tail snapper and red snapper through non-trawl harvest methods applicable to domestic fishing operations in the Timor and Arafura Seas, and Gulf of Carpentaria. The performance of

three non-trawl harvest methods (droplines, longlines and traps) was to be compared with established trawl operation and practice, and evaluated in relation to baseline operational, environmental and marketing criteria. It was necessary to charter a trawler because, at the time of writing the proposal, no fish trawlers were operating in NT waters.

- FRDC agreed to fund the revised project with the exception of the proposed trawl component.
- The Fisheries Division re-emphasised to FRDC the significance of using trawling as an experimental control in the project design, but FRDC had stood by it's original decision. FRDC asked that a Steering Committee be formed to oversee the project and evaluate experimental designs which did not involve the charter of a trawler.
- This meeting was the first meeting of the steering committee.

Main Points

Project participation by Bill Passey - Bill has worked in northern waters for over 7 years, including trawling in the Arafura Sea since 1990. He has gathered a great deal of information on fish movements, trawling and droplining techniques, and charts and bottom features. His participation in the project was viewed by the committee as essential. Bill was prepared to assist 100% in the project, but required assurance that DPIF and Industry would not use the information gathered during the project to constrain his fish trawling operation by introducing, for example, new "non-trawl" management zones in the Arafura Sea and Gulf of Carpentaria. Peter Herden stated that Fisheries Division's present policy was not to draw lines on the water, and that future developments in the management of Arafura Sea fisheries would avoid the use of fishing gear exclusion zones. **Action - Peter Herden and Iain Smith to write to Bill outlining this gentlemen's agreement and the Division's and industry's commitment to the concept**.

Will the project be worthwhile without the Trawl component - The committee agreed that the project would be worthwhile without FRDC funding the trawl component. Bill Passey is now trawling in the area of interest to the project, and agreed to collaborate wherever possible, and provide relevant information on fish activities, bottom feature and comparative trawl catch data to provide indicators of relative fish abundances.

What area of the Arafura Sea is to be fished - The committee agreed with Bill Passey's recommendation that the project should be conducted in the northern region of the Arafura Sea between approximately 135-136.5°E, and the AFZ and 10.5°S.

What types of gear will be trialed and how much funding will be allotted to gear - The committee agreed that four general types of gear should be investigated: individual traps, lines of 5-6 traps, droplines, and (short) longlines of 100-200 hooks. It was agreed to keep the experimental design simple so as to maximise the ability to make comparisons between gear types. The initial project budget allowed $42000 for charter (excluding charter of a trawler) and $20400 for the purchase and/or construction of fishing gear. The committee recommended that, wherever feasible and cost efficient, suitable gear should be hired for the duration of the project. Saving in gear construction could then be channelled into further charter time. A trammel net may be used to obtain independent indices of abundance.

When should the gear be trialed - The committee agreed that two evaluation trips be conducted, one in May/June 1995, the other in October 1995.

What type of boats and how many are required for the project and what type of arrangements with suitable vessels should be entered into (ie, full charter, partial charter, other) - The committee decided that use of partial charters was desirable and

maximised both shiptime for the project and industry participation. Expressions of interest will be sought for conducting various gear trials during May/June; up to 4 boats may be used for this component of the project. Field work in October would proceed is a similar way using industry participation and assistance wherever feasible. **Action: Iain Smith, David Ramm and Richard Mounsey to arrange publicity about the project, including article in NT Fishing Industry News, seek expressions of interest, and select suitable vessels.**

How will gears be compared against each other and in what form will the data be collected and analysed - The committee agreed that gears should be compared through production data such as catch per day and fishing effort per day. Bill Passey agreed to supply comparative trawl data. Gear types would be fished by various boats over a set time period. Options for standardising gear were discussed, and the final strategy used will depend somewhat of the experience of skippers and types of vessels available for the work.

When will the final report be completed - Richard Mounsey stated that a report would be written after each trip, and a final project report would be provided to FRDC as required. **Action: Richard Mounsey to write and release reports on completion of each field trip, and Iain Smith to coordinate information dissemination via the NT Fishing Industry News**

Next meeting

A second meeting will be convened prior to the first field trip so as to finalise the project design and brief skippers participating in the field work.

The meeting closed at 1100h.

Dr David Ramm
Senior Research Scientist

21 February 1995

ATTACHMENT 2

STEERING COMMITTEE MINUTES - August 1995

Evaluation of Non-Trawl Harvest Methods for Red Snapper in Northern Australia
FRDC project 94/154

Minutes of the Second Steering Committee Meeting
Fisheries R&D Branch
18 August 1995 - 0900h

Steering Committee

Wayne Bishop	Chair NT Coastal Line Fishermen's Association
Graham McMahon	Chair NT Deep Sea Fisheries
Iain Smith	Executive Officer NTFIC
Bill Passey	not present - apologies
Clive Perry	Chair NT Timor Reef Fishermen's Association
Richard Slack-Smith	Assistant Director Fisheries R&D Meeting Chair
David Ramm	Senior Research Scientist
Richard Mounsey	Senior Gear Technologist
Rosemary Lea	Acting Assistant Director Fisheries Management and
John MacCartie	Gear Technologist

Agenda

- Minutes from 1st meeting
- Cruise report May/June
- Financial statement
- Plans for next field trip
- Extension of gear trial project
- New project to identify fishing areas in demersal fishery

Minutes from 1st meeting

Accepted, although Graham McMahon expressed some concern over the final decision about the use of a trammel net for obtaining independent indices of abundance during the project. David Ramm explained that we knew very little about the effectiveness of trammel nets in catching snapper, and that this type of gear could not replace trawling in this project without extensive work to understand catchability etc. Richard Mounsey stated while trammel nets were planned for use during the first field trip, they were not deployed because of bad weather, and because charter boats did not have appropriate winches or deck space.

Cruise report May/June

Richard Mounsey presented the results of the first field trip - the cruise report had been sent to the steering committee members before this meeting. As agreed at the first meeting, field work took place in the Arafura Sea between approximately 135-136.5°E, and the AFZ and 10.5°S, in an area where FV 'Wendy' was currently trawling and taking good catches. This area was within historical fishing grounds trawled by Taiwanese and Thai vessels up to 1990.

Financial statement

Richard Mounsey tabled the financial statement. There is currently about $42000 left in the project, of which about $40000 is available for the second field trip (about 2 x $18000 for vessel charter plus $4000 for equipment and supplies).

Plans for next field trip

The next field trip is planned for November. The following approach was outlined by the Committee:

- second field trip must focus on snapper on historical trawl 'hot-spots';
- need to summarise historical trawl data to produce 'hot-spots' map for saddle-tail snapper and red snapper during November;
- evaluation of non-trawl methods must be compared directly with trawl data because 'hot-spots' data is at least 5 years out of date, and a large trawl fishery has developed in the Indonesian sector since 1992 casting doubt on predicted estimates of abundance;
- approach FRDC about reverting to the original project design which included trawling as an experimental control, and seek top-up funding of $14K to ensure that FV "Wendy" is available to trawl alongside non-trawl gear;
- conduct field work wherever FV "Wendy" is getting good catches in October-November (ie just before the 2nd trip), probably east of the Wessel Islands;
- if field work is conducted east of the Wessels, then charter boats will steam to Nhulunbuy for refuelling, before beginning field trials;
- test two types of lines (1: droplines - can be both fixed and free rig; 2: trot lines), and two types of traps (1: single traps - can include WA type and collapsibles; 2: trap lines);
- charter two boats for the 2nd trip (a hook boat and a trap boat).

Action

- Richard M to contact Bill Passey about feasibility and cost of making FV "Wendy" available to comparisons in November;
- David R to contact FRDC about top-up funding;
- David R to summarise trawl data and produce 'hot-spots' map;
- Richard M to begin call for tender process;
- Committee to reconvene in a few weeks to assess progress, FRDC's decision and finalise trip plan.

Extension of gear trial project
New project to identify fishing areas in demersal fishery

These items were considered together. The Committee discussed needs and options for future R&D. It was agreed that the overall objectives of future R&D is this area is to establish a non-trawl fishery for saddle-tail snapper and red snapper in northern Australia. The following approach was outlined: complete current project and evaluate feasibility of using non-trawl methods for harvesting saddle-tail snapper and red snapper. If some of the methods are feasible, then industry and the Division should develop a multi project strategy, which should include: further gear development; detailed maps of snapper 'hot-spots' in the Arafura Sea based on historical trawl data; marketing projects. Funding for some of these projects should be discussed with FRDC. The point was made that we need to look at areas inside the 15 nm limit as well as those further offshore so as to develop the demersal fishery.

Next meeting

The next meeting will be convened within a month so as to finalise the last field trip, and discuss future R&D.

The meeting closed at about 1100h.

Dr David Ramm
Senior Research Scientist
21 August 1995

ATTACHMENT 3

STEERING COMMITTEE MINUTES - December 1995

Evaluation of Non-Trawl Harvest Methods for Red Snapper in Northern Australia
FRDC project 94/154

Minutes of the Third Steering Committee Meeting
Fisheries Division
Harbour View Plaza
6 December 1995 - 1300h

Minutes: Steering Committee Meeting
Harbour View Plaza - 6 December 1995

Participants: RJ Slack-Smith (Chair), JB MacCartie (minutes), I Smith, W Bishop, C Perry, W (Bill) Passey, R Pyne, D Ramm, R Mounsey, N Gill

(1) Minutes of last meeting - accepted.

(2) W Bishop/RJ Slack-Smith thanked Bill Passey for all of his efforts in assisting the project despite being dropped from it at the last moment. An official letter of thanks to be written by RJ Slack-Smith. This received unanimous support.

RJ Slack-Smith gave a brief rundown on events leading up to the requested additional funding not being available from FRDC and the subsequent dropping of the *Wendy* from the project. Options such as alternative funding and the dropping of the project altogether were discussed at unofficial meetings. Reactions to options such as loss of face in the eyes of the industry (W Bishop) were mentioned.

Bill Passey remarked that the "best" day of the trip was when the *Wendy* and the *Ace of Spades* fished together.

Rex Pyne gave a rundown on the likely procedure that FRDC Committee followed in evaluating our petition for top-up funds. It was suggested that these anomalies should be brought to the attention of the FRDC.

Iain Smith commented on shortcomings of FRDC's procedures in evaluating funding applications.

Richard Mounsey gave a brief rundown on the last field trip and subsequent report. He mentioned that two publications are likely (NTFIC newsletter and NT Tenderboard). All agreed that it was a positive report and was endorsed by the Committee.

Bill Passey commended R Mounsey, J MacCartie and all others concerned in carrying out the project despite the difficulties on board the *Tulach Ard*. This was supported by the Committee

There was then general discussion on the disappointing nature of the problems associated with the *Tulach Ard* and its reflection on the industry. There was debate on whether the problems should be discussed at this meeting. It was decided that discussions should be held at a later date.

(3) Richard Mounsey reviewed the budget which was on track. There may be a small amount remaining which could be used for data entry (D Ramm). I Smith made the comment that external auditing was an unnecessary financial imposition.

General discussion occurred on the confidential nature of the report. It was agreed that the report had been in circulation too long to ensure its full confidentiality. It was agreed that the overview should be made available to all demersal licence holders.

Also general discussion on charter contracts. It was agreed that the contracts were/are adequate.

(4) Dave Ramm to write and submit final report assisted by Richard Mounsey. Deadline - 30 June 1996. FRDC will forward balance of funds on acceptance of report. Dave expects report to be done February/March.

(5) Future directions discussed included:

- subsidies for airfreight/ice out of Gove;
- the need for marketing work;
- the need for further proving of grounds outside of those explored; and
- the need for further work with traps.

There was general discussion as to whether enough work had been done to defend the area against trawling.

The comment was made that fishers would be reluctant to develop a non trawl fishery as long as the re-introduction of trawlers was possible. It was also noted that the lack of Government policy on trawling could/does hinder development from non-trawl fishers.

I Smith stated that there needed to be two or three more surveys in the area. It was agreed that further survey should include areas closer to (thus serviceable from) Darwin and areas further east of Gove. The Committee also agreed that money needed to be spent on market development.

(6) R Mounsey discussed the problem of sharks in the area suggesting that the possibility of demersal licence holders keeping shark be looked into.

I Smith pointed out that the imposition on a particular fishery was not to poach other fisheries fish.

The Committee agreed to develop proposals to explore areas outside those thus far looked at. It also agreed to meet and look at the draft report for FRDC. The date proposed was the 28 February 1996.

Meeting closed approximately 1400 hours.

JB MacCARTIE
7 December 1995

ATTACHMENT 4

Hot-Spot Analysis of Snapper Trawl Data

Based on available trawl data, the best time and place to catch saddle-tail snapper in the Arafura Sea is in July, between 136°30'-137°00'E and 10°30'-11°00'S, at a depth of 61 m.

Taiwanese trawl catch rates for large red snappers (mostly *L. malabaricus*) are summarised by 1° grids in Figure 4.1. Mean snapper catch rates in the Arafura Sea exceeded 120 kg/h in 3 adjacent grids between 133-136°E and 10-11°S. The preferred depth range (50% of the catches) for saddle-tail snapper and red snapper (combined data) was 49-73 m, with a mid-point at 61 m. This depth range occurs extensively in the Arafura Sea, and includes most of the area within grids between 135-137°E and 9-10°S, and 133-138°E and 10-11°S.

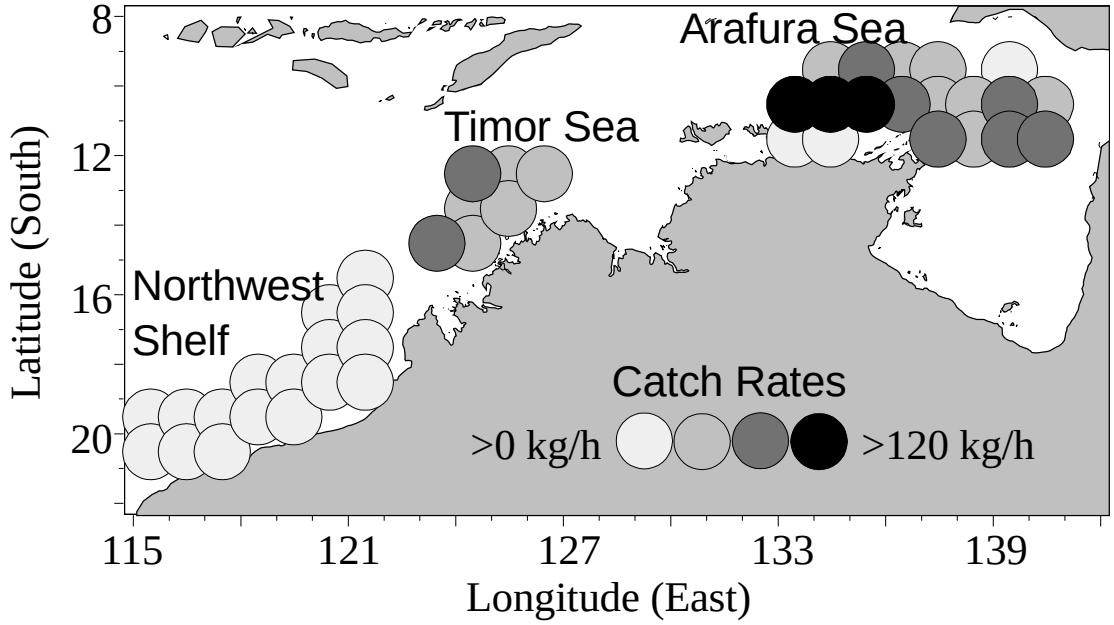


Figure 4.1. Mean catch rates (kg/h/grid) for large snapper (mostly *Lutjanus malabaricus*) caught by Taiwanese pair trawlers operating in the northern sector of the Australian Fishing Zone during 1980-90.

Most of the fishing effort in the Arafura Sea was exerted between 133-138°E and 9-11°S, thus the search for hot-spots was confined to that area. High mean snapper catch rates for the Taiwanese fleet (>150 kg/h) occurred most frequently between 133-134°E and 10-11°S, while mean catch rates commonly exceeded 100 kg/h in grids between 136-137°E and 9-10°S, and 133-137°E and 10-11°S. Mean catch rates for Thai and Australian fleets were lower, reflecting differences in fishing power between pair trawlers and stern trawlers. High mean catch rates for Thai trawlers (>50 kg/h) were common between 135-137°E and 9-10°S, and 133-137°E and 10-11°S. Fishing patterns for Australian trawlers were patchy and high mean catch rates (>150 kg/h) occurred between 133-136°E and 10-11°S, and 137-138°E and 10-11°S.

Snapper hot-spots were located using catch and standardised effort data from trawlers fishing between 133-138°E and 9-11°S. The standardisation corrected for differences in fishing power

due to trawler type, annual and monthly variability, and spatial variability. Results of this analysis indicated that fishing power coefficients were low for both Thai and Australian fleets, compared with pair trawlers, due to smaller vessels and trawl nets. Fishing power for Australian trawlers was confounded by a lack of comparative Taiwanese data during 1991-94 and dramatic changes in trawl practice. Annual variability was small during 1980-90; highest catch rates within this period were recorded in 1984 and 1985. The annual coefficient increased sharply after 1990 and may be attributed to a large increase in the fishing power of Australian vessels over this period, possibly due to a rapid change in trawling practices and targeting for saddle-tail snapper and red snapper (Bill Passey, pers. comm. October 1996). Catch rates also varied monthly with a maximum rate recorded in July, and a minimum in February; catch rates were relatively low in October and November.

Catch rates varied spatially and the value of the spatial coefficient peaked in grid 136°30'-137°00'E and 10°30'-11°00S (Fig. 4.2). This hot-spot grid is located due north of Cape Wessel. The second and third highest coefficient values occurred in grids bounded by 134°00'-134°30'E and 9°30'-10°00'S, and 137°00'-137°30' and 10°30'-11°00'S, respectively (Fig. 4.2). Statistical differences between these 3 grids, and others, were not determined. Based on this analysis, the best time and place to catch saddle-tail snapper in the Arafura Sea is in July, between 136°30'-137°00'E and 10°30'-11°00'S, and at a depth of 61 m.

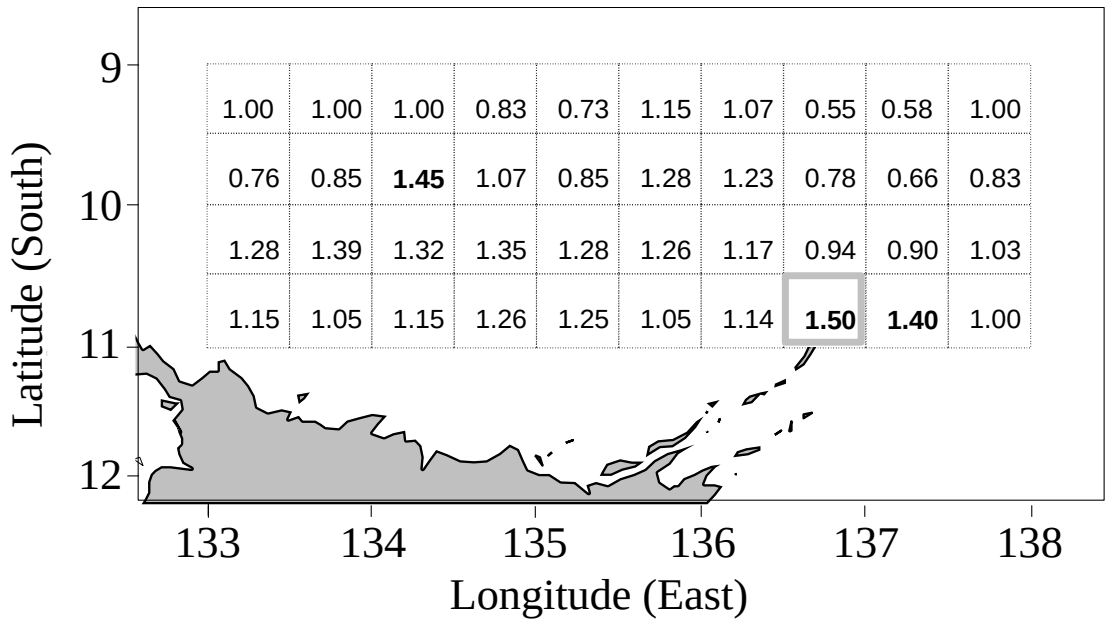


Figure 4.2. Standardised spatial coefficients of variability for trawl caught large snapper (mostly *Lutjanus malabaricus*) in the Arafura Sea. High values (eg ≥ 1.40) indicate snapper 'hot spots'.

ATTACHMENT 5

Report from Ray Passey - skipper of *Wendy*

AUSTRALIA BAY SEAFOODS PTY LTD

A.C.N. 054 535 492

W. & J. PASSEY
616 PINJARRA ROAD.
BARRAGUP, W.A.. 6210
PHONE: (09) 535 7732
FAX: (09) 535 7011
MOBILE: 018 893 476

Mr Richard Mounsey
Fisheries Research &
Development
PO Box 990
DARWIN NT 0801

20 MAY 1995

Dear Richard

Just a short note with some observations and comments from the recent Arafura Sea gear trials.

The Wendy was involved in these trials from Saturday 13th May - Saturday the 20th May 1995. During that week we did some trawling, around 80 Dropline shots and several trap and Longline shots.
In addition to this fishing, we spent approximately 140hrs, searching the best part of 1,000 nautical miles over fishing grounds.
While fishing during this time was poor, there is no doubt these are viable grounds.

Catches taken by the Wendy in recent times while droplining these same grounds have proven that to me. I expect that a vessel with a large number of traps will have better results.

I am keen to see a Fishery developed in this area and I support the approach taken by D.P.I.F.

During the week of the trials we fished in very strong tides, this made accurate targeting difficult.

If further exploration is planned, and I hope it is, I will fully support it.

A trip during the build-up period 1st October - November, would be the best time to try again.

Yours faithfully

Ray Passey

ATTACHMENT 6

Report from Mal Reid - skipper of *Deep Tempest*

OCEAN EXPRESS
P.O. Box 46
NIGHTCLIFF
NT. 0810

Dept of D.P.I.
FISHERIES RESEARCH.

Dear Sir,

Due to poor weather conditions the survey on the Arafura Sea could not be completed infact only two days of the six day spent at sea were fished.

The area fished was that of the "Trees Banks" position

On a few hauls searching this area we came across some signs of fish and placed two traps on the marks. Results were poor and only Goldband Cod were caught. As a comparison we tried a Drop line and results were much better.

On the same night we set four traps of which three caught fish again with poor results.

We then tried to steam toward the eastern grounds but weather conditions worsened. We then tried heading South to look at shallow waters for signs of fish grounds but no signs appeared. We then decided to abort the survey.

In my opinion the exercise will have to be tried again in more suitable weather conditions

The results of the fish that were trapped showed that trapping methods will have to be improved to obtain QUALITY FISH for the fresh market. as poor quality will result in poor prices. However if the markets improve for frozen fillets then this method of fishing may be viable.

I also believe that the distance required to travel to these areas of the Arafura Sea will increase cost with regard to both fuel a loss of time fished. taking into account the the port of Gove has limited cargo abilities and Darwin is the preffered port to work from.

If you require further information please do not hesitate to call.

Yours Sincerely

Malcolm Reid

Jeff Reid.

ATTACHMENT 7

Report from Wayne Bishop - skipper of *Ace of Spades*

SEAWIND FISHERIES

(ALASKA PTY LTD ACN 009 613 898)

PO Box 40861
Casuarina NT 0811

Phone: (089) 455355
Fax: (089) 455355
A/Hours: (089) 278467
Mobile: 015 612743

20 November 1995

Mr Richard Mounsey
Senior Fishing Gear Technologist
Department of Primary Industry and Fisheries
GPO Box 990
DARWIN NT 0801

Dear Richard

I am writing to voice my opinion regarding the grounds fished in the Arafura Sea during the recent survey conducted on my vessel.

The amount of grounds we found holding fish was encouraging, especially considering the lack of knowledge we had of the area. Although the areas of hard and broken bottom were small, the fish stocks over them were quite large in comparison. I feel confident, that with more work, larger prolific grounds will be found. I believe that with further research and the establishment of support infrastructure in Gove, an enormous potential exists for a future dropline fishery in the area.

I would also like to take the opportunity to congratulate you on the efficient manner in which the survey was conducted on my vessel and look forward to having you and your fellow officers on board again.

Yours sincerely

WAYNE BISHOP
Skipper/owner
FV *Ace of Spades*

ATTACHMENT 8

Report from Biagio Spinella - skipper of *Tularch Ard*

NON-TRAWL HARVEST METHODS PROJECT

My vessel the *Tulloch Ard* was chartered to fish the Arafura Sea from 2 November to 15 November 1995, using lines and traps.

My overall impression was that the Arafura Sea has patches of fish holding ground, between large areas of mud. These grounds appear very fragile with large mud banks incroaching on them and will likely only sustain passive fishing methods in the future.

Most species caught, except the saddletail, were very small.

The trot-line when on good grounds performed well, but it was difficult to find enough ground to set 600 hooks (ie 1,400 metres). The traps on lines had a similar problem.

There appears to be a potential fishing industry for snappers in the Arafura Sea and with future assistance from the government a new fishery from Gove will develop.

B Spinella

BIAGIO SPINELLA
Skipper Fishing Vessel - *Tulloch Ard*

14 November 1995

ATTACHMENT 9

Article Published In Northern Territory Fishing Industry News - April-June 1995

Non Trawl methods of harvesting Demersal fish being studied

Non Trawl methods of harvesting reef fish in the Arafura Sea will be trialed in May/June of this year.

The research project is being funded by the Fisheries Research and Development Corporation (FRDC) and is being conducted by NT Fisheries Division researchers Dr David Ramm and Richard Mounsey.

A Steering Committee which includes industry representatives has been established to oversee the project and evaluate experimental designs. Committee members are:-

Peter Herden - Chair, Assistant Director Fisheries Management; Graham McMahon - Chairman Deep Sea Fisheries; Clive Perry - Chairman Timor Reef Fishermens Association; Wayne Bishop - Chairman Coastal Line Fishermens Association; Dick Slack-Smith - Assistant Director Fisheries R & D; David Ramm - Senior Research Scientist; Richard Mounsey - Senior Gear Technologist; Neville Gill - Technical Officer; Bill Passey - Demersal & Northern Fish Trawl Licencee; Iain Smith - Executive Officer - NTFIC.

At its first meeting in late February the Steering Committee agreed that an area of the Northern Region of the Arafura Sea should be the site of the trial. The four general types of gear to be investigated are individual fish traps, lines of 5-6 traps, droplines and (short) longlines of 100-200 hooks.

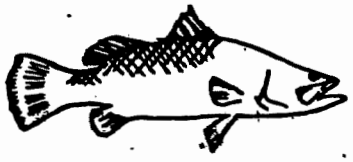
The committee agreed that two evaluation trips be conducted, one in May/June and the other in October this year. It was also agreed that the use of partial charters was desirable as this strategy maximises both shiptime for the project and industry participation.

Advertisements seeking expressions of interest in these partial charters were placed in the NT News in late February.

The whole purpose of the FRDC funded project is to evaluate the relative merits of the different gear types in the viable harvesting of saddletail snapper in the Demersal fishery.

The comparisons will be through production data such as catch per day and fishing effort per day.

It is expected that the report on the May/June trials will be available in July for dissemination to industry.



HAVE YOUR SAY!

NTFIC invites you to have a say on any of the issues raised in the Northern Territory Fishing Industry News or any other subject which you may want to comment on. In fact, we would like to hear from you on any topic.

This is your newsletter.

Make it work for you.

Send or fax your letters to NTFIC,
PO BOX 618,
DARWIN.

FAX 81 5063.

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ATTACHMENT 10

Article Published In Northern Territory Fishing Industry News - Jan-Mar 1996

RESEARCH

DEMERSAL FISHERY'S FUTURE LOOKS RUBY

Spades were trumps and the Ace was the decider for many unfortunate red fish in a recent survey in the Arafura Sea.

Fourteen or 15 ruby emperor (saddletail snapper), red emperor or red snapper per line was not uncommon aboard Wayne Bishop's boat the Ace of Spades! Wayne was participating in the recent Non-Trawl Harvest Methods of Red Snapper survey, conducted by the Fisheries Division.

The final leg of the project was completed in November. The vessels Tulloch Ard and Ace of Spades were chartered to survey and compare fishing gear. Tulloch Ard trialed trotlines and traps, while the Ace of Spades pin pointed targets with droplines (throw-aways) in the eastern Arafura Sea and the north west Gulf of Carpentaria.

Nearly three tonnes of quality fish were landed. Ruby Emperor (Lutjanus malabaricus) dominated the catch. Catch rates between 50 and 100 kgs per hour were regularly recorded using droplines. Seventy-five GPS coordinates of fish and hard ground around the 30 fathom mark were documented.

The latest survey started approximately 80 miles east of the Wessel Islands and swept in an arc between the Volsella Shoals and Cape Wessel to a position about 50 miles east of Cape Wessel, then down towards Gove.

Schools of ruby emperor were located mainly south of 10° 30' on both hard and soft bottom. However, the schools associated with hard ground were easier to catch. Wayne Bishop, the skipper of the Ace of Spades said, "The amount of grounds we found holding fish was encouraging, especially considering the lack of knowledge we had of the area. Although the areas of hard and broken bottom were small, the fish stocks over them were quite large in comparison. I feel confident, that with more work, larger, more prolific grounds will be found. I believe that with further research and the establishment of support infrastructure in Gove, an enormous potential exists for a future dropline fishery in the area."

None of the ruby emperor, red emperor or red snapper were pressure affected. In fact they looked beautiful. The few goldband snapper caught were the only exception.

The dropline gear regularly caught commercial quantities of the prime species. The trotline gear also caught many high quality species when set on hard ground. The problem was that very few patches of hard ground were large enough to set a mile or so of gear in a straight line. This resulted in numerous catfish, sharks and other non-target species being taken in the surrounding mud. Biagio Spinella, the skipper of the Tulloch Ard said "The trotline when set on good grounds performed well, but it was difficult to find enough ground to set 600 hooks."

The collapsible fish traps were non productive when set on longlines. However, the traps did show promise towards the end of the survey when individually set on hard lumps. Hauls of up to 45 kgs per trap were achieved. The catches were dominated by large red emperor.

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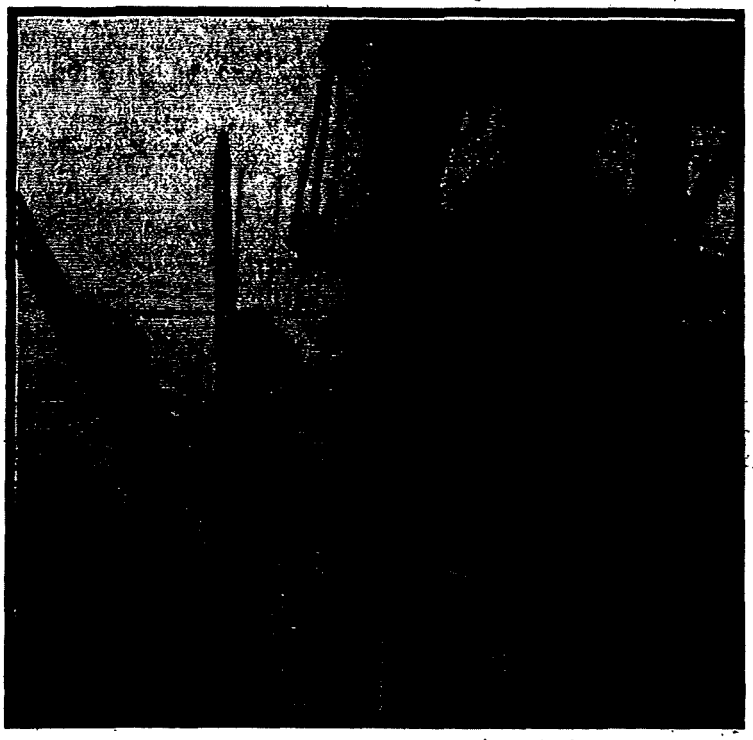
Sharks were a problem in the area. The Ace of Spades lost $168 worth of dropline gear due mainly to sharks while the Tulloch Ard reported a loss of around $250 worth of trot-line gear. Traps fitted with prawn mesh funnels and no steel bars to deflect sharks also fell victim.

The new bathometric charts were worth their weight in gold. Not the front of the chart but all the depth soundings on the back. A change of depth, three metres or more, normally indicated hard ground and fish life. Bill Passey, the owner/skipper of the trawler Wendy operating out of Gove was extremely helpful in locating fish for us. The Wendy had been dropped from the charter at the last minute due to an unexpected shortfall in funding. Instead of turning his back on the project, Bill went out of his way to assist it.

The vast majority of grounds can be reached within a 12 hour steam from Gove (ie: travelling at six to seven knots). Biagio Spinella said "there appears to be a potential fishery for snappers in the Arafura Sea and with future assistance from the government a new fishery from Gove will develop."

The total catch of approximately 2,000 fish consisted of roughly 600 ruby emperor, 220 red snapper, 150 red emperor, 150 cods and 80 goldband snapper.



Wayne Bishop aboard the Ace of Spades

The remaining 800 fish consisted of mainly small reef fish, sharks, trevally and catfish.

It should be noted that this was a survey. The object was not to fill the boat but to acquire data on catch rates and species compositions from the region. On many occasions it could have been possible to fill the Ace of Spades with ruby emperor if she had remained fishing in a particular area for a couple of days.

Detailed reports of this latest cruise have been submitted to the Non-Trawl Harvest Methods steering committee and further information on actual catch rates and positions is available from the Department of Primary Industry and Fisheries Gear Technology Section.