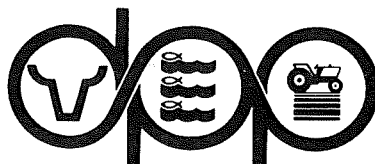


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DEPARTMENT OF PRIMARY
PRODUCTION

TIGER AND ENDEAVOUR PRAWN CLOSURE STUDY

WESTERN GULF OF CARPENTARIA
NOVEMBER 1982 — MARCH 1983



D. L. GREY and R. C. BUCKWORTH

FISHERY REPORT NO. 10
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N.T. Dept. Prim. Prod. Fishery Report No. 10

1983. 1-72

TIGER AND ENDEAVOUR PRAWN CLOSURE STUDY : WESTERN GULF OF CARPENTARIA : NOVEMBER 1982 - MARCH 1983.

D.L. Grey and R.C. Buckworth (Fisheries Research Branch, Department of Primary Production, P.O. Box 4160, DARWIN, N.T. 5794).

ABSTRACT

Systematic trawl sampling of areas within and adjacent to western Gulf of Carpentaria fishing grounds which were closed to prawn trawling was undertaken at monthly intervals between November 1982 and March 1983.

Data collected on species and size composition of tiger prawns (Penaeus esculentus and P. semisulcatus) and endeavour prawns (Metapenaeus endeavouri and M. ensis) were used to assess the effectiveness of seasonal and area closures in the Groote Eylandt and Sir Edward Pellew (Vanderlin Islands) regions.

It was concluded that the closures satisfied the objective of protecting stocks of prawns of sub-optimal size and were thus effective in increasing the net economic yield although several recommendations for slight modifications to future closures are included.

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I INTRODUCTION

Since the initial development of the Northern Prawn Fishery in the mid to late 1960's there has been a considerable increase in fishing effort on the tiger and endeavour prawn stocks, particularly since 1976. (Department of Primary Industry 1982)

The western Gulf of Carpentaria fishing grounds have provided the majority of landings for these species from the fishery in recent years and this led to requests from the industry to declare seasonal closures in the region to protect juvenile prawns and to optimize the size at first capture.

These proposals culminated in 1981 with a recommendation from the Northern Prawn Fishery Advisory Committee to close waters west and south of a defined line between Mornington Island, the Vanderlin Islands and west of Groote Eylandt to near Cape Shield (see Figure 1a & b).

This recommendation was accepted by the appropriate State, Northern Territory and Commonwealth Ministers and the closures were declared in Northern Territory, Queensland and Commonwealth waters on 31 December 1981 until 15 March 1982. (Closures designed to protect small banana prawns were declared in the eastern Gulf of Carpentaria over the same period).

During the initial discussions regarding the closures there was some disagreement about where the defined limit should be marked according to prawn sizes based on anecdotal information and only limited scientific data, and the agreed limits represented a compromise based on opinion.

In 1982 there was further debate in the light of the apparent effectiveness (or lack of it) of the 1981/82 closures and this resulted in further recommendations regarding the area and timing of these closures. Subsequently they were introduced on 1 November 1982 until 1 April 1983 over essentially the same area except for a small change south west of Groote Eylandt, and the long term closure of North West Bay (Figure 1a & b).

Recognizing the need to provide some real information on the size composition of tiger and endeavour prawns in the regions subject to closure, a programme was designed with the following objectives:

1. to determine the size composition of the principal tiger prawn species (Penaeus esculentus and P. semisulcatus) and endeavour prawn species Metapenaeus endeavouri and M. ensis) on the commercial fishing grounds subject to seasonal closure in the western Gulf of Carpentaria, and

2. to undertake these determinations at monthly intervals between October 1982 and March 1983 inclusive, using a chartered prawn trawler, and
3. to assess and report on the size composition of prawns on fishing grounds within or adjacent to the closed area with reference to the effectiveness of the closures in space and time.

In addition to the above, the opportunity was taken to gather information on other aspects of the fishery in the region including biological observations on other prawn and fish species and observations on the physical environment (much of this data will be analysed as part of ongoing studies on the fisheries in this region).

The study was undertaken by staff from the Fisheries Division, Northern Territory Department of Primary Production and funded from three sources.

A grant from the Commonwealth Fishing Industry Research Trust Account (\$90,000) was used for the charter of the commercial prawn trawler and some of this amount (approximately \$26,000) was offset by sales of product.

The Northern Territory Fishing Industry Research and Development Trust Fund provided funding for the time of the consultant scientist (R. Buckworth) and operational expenditure and salaries for the Fisheries Division staff was drawn from the Northern Territory Fisheries Division allocations.

As mentioned above, some amendments were made to the area and timing of the closures from 1981/82 to 1982/83 with the result that some modifications were made to the original proposal to enable the additional areas to be covered.

Financial and administrative constraints resulted in the decision to exclude October from the monthly sampling although this was compensated for by the addition of other data collection during the remaining surveys.

The results reported in this paper cover the tiger prawn and to a lesser extent the endeavour prawn populations, although additional data is available for other commercial species, ie banana and king prawns. It is anticipated that these will be included in the final report on the ongoing Groote Eylandt prawn fishery monitoring programme to be published subsequently.

These results were presented at the Closure Sub Committee of the Northern Fisheries Committee in June 1983 and subsequently taken into consideration in determining the recommendations to the Northern Prawn Fishery Advisory Committee and the Northern Fisheries Committee for closures for 1983/84.

II METHODS

The survey was undertaken using the 15.8 m prawn trawler F.V. "PAULWIN", towing standard double-twin rig otter trawls. Vessel and gear specifications are detailed in Appendix 1.

The areas trawled (see Fig. 2a & b) were chosen on the basis of their location within or adjacent to the closed areas, their suitability for trawling and reasonable proximity to Groote Eylandt. Priority was accorded to those areas which are most subject to commercial fishing.

A more detailed map of the survey area showing the localities mentioned in the text is attached as Appendix 2.

The basic strategy was to make one trawl within each 6 (nautical) mile by 6 mile grid in the study area and to repeat this at intervals of approximately one lunar month during the study period (dates of each cruise are presented in Table 1). Surveys were conducted from north to south, beginning in the vicinity of Cape Shield and concluding near the Sir Edward Pellew group. Remaining funds allowed further trawls in the fifth cruise, after the normal survey was completed. These were used to provide information on stocks in heavily fished grounds outside the survey area, and to supplement sample sizes within the normal study area from those grids which had yielded only small sample sizes earlier in the cruise.

Where the master of the vessel was not familiar with the trawling conditions in a particular grid, the grounds were surveyed briefly with the echo sounder before trawling.

The main operational objective of each shot was to produce a sample of at least 100 prawns of each sex of the dominant prawn species in that shot. The duration of each trawl was thus adjusted in the light of catch rates of preceding shots on that night and, for the second and later survey cruises, for previous shots in that grid. Shot duration was also varied due to operational considerations, eg bottom type, mechanical problems etc. Trawling time was limited by the amount of steaming and surveying required. For this reason, trawls conducted during the first cruise were shorter on average than for subsequent cruises. Duration of trawls was also limited when large trash catches were anticipated (for example, large catches of "sea eggs" (echinoids) caused some shots of the fourth and fifth cruises to be abbreviated). Where catch rates were low, it was often necessary to accept samples of less than optimum size, so that sufficient grids could be covered within the time available.

Data on several physical parameters was collected during each shot (the data sheet used is included as Appendix 3). The position of the vessel was fixed using radar and/or the satellite navigator, and the exact locations of start, finish, direction and any variations in course recorded. The

officer of the watch also recorded sounder depths at the start, midway and at the finish position of each shot. The mean of these depths was used for data analysis. Notes were made on wind strength and direction, sea state and general weather conditions.

A sample of the substrate was taken at the completion of most shots in Cruises 2 to 5, with the view to providing information on the relationship between bottom type (in terms of particle size composition) and prawn species and size composition.

Sea surface temperature was measured with a mercury thermometer to the nearest 0.1°C.

Sea surface salinities were also determined using a TPS salinity meter, or an Auto Lab model 602 salinity-temperature bridge.

Total by-catch (ie all non-prawn catch including commercial species such as bugs, squid, etc.) was estimated using a standard fish basket (mean weight per basket = 43.3 kg, S.D. = 1.14, n = 11). For the purposes of this survey, and within the time constraints operating, more accurate determinations were not possible.

Catch weights of principal commercial species contained in the by-catch were recorded.

The presence of all trash components was recorded, usually to family level for fish species but only to major divisions for sharks, rays and invertebrates (see Appendix 4). The principal trash taxa were ranked according to dominance, both by weight and by numbers, for subsequent analysis.

Samples of all commercial species of prawns were taken. All prawns sampled were identified, sexed, and measured. The total weight for each species, by sex, was measured to $\pm 5g$ using an Ohaus Triple Beam balance. Where the catch of a species or group exceeded the amount required for a sample, the excess was weighed (up to 10 kg) or its weight estimated from volume (greater than 10 kg). The presence of "coral" prawn genera were noted, and their weight estimated if more than about 0.5 kg. Carapace length was chosen as the easiest and most reliable measure of size, and was measured to the nearest millimetre using Helios dial calipers. All sample prawns were characterized as "hard" or "soft" shelled. Females were examined for the presence of maturing or ripe ovaries and externally obvious spermatophore implants. Males were classified as mature or immature when the petasmata were joined or unjoined respectively.

Classification and measurement of prawns was performed on board, usually immediately after catch sorting was completed and during the following shot. The delay between bringing the shot aboard and the completion of measurement of samples was usually about .1 hour (the maximum delay of 5 hours occurred when bad weather interrupted normal routines).

Length frequency data was recorded onto cassette tape, using microphone headsets with a dual input. This enabled very rapid data recording, obviated the problems of sample storage and the associated possibilities of data loss, and enabled easy communication above the noise of engines and weather. This procedure enabled the rapid processing of fresh prawns without loss in quality and hence ensured good prices for product landed. Tapes were transcribed to data sheets, usually before the next shot was completed. Data from one shot could thus be used in decisions about trawl duration etc, for following shots.

Prawn length frequency data were returned to Darwin at the completion of each cruise, and entered for data processing. This enabled preliminary analysis of the data to be carried out immediately, so that subsequent sampling strategies could be optimized.

Large samples of major prawn species (Penaeus esculentus, P. semisulcatus, P. latisulcatus and Metapenaeus endeavouri) were frozen and retained for later morphometric analyses. For the purposes of these analyses, carapace lengths were recorded to the nearest 0.1 mm and weights to the nearest 0.1 g using Helios dial calipers and a Mettler PC4000 electronic balance.

The raw data collected during the survey were in the form of carapace length frequency composition by species and sex for each of the grids sampled over the five monthly cruises. This is most appropriate for future accurate assessment of biological trends, and was most convenient for ship-board measurements. However, this information is not in the most appropriate form for assessment by industry, as the commercial measure of size composition is normally by weight in count per pound whole prawns (not per kilogramme). Thus a procedure for converting carapace-length frequencies to weight as count per pound whole was required. In order that individual weights could be predicted from given carapace lengths, a relationship between carapace length and total weight was determined, using the method of least squares. Weight frequencies were thus predicted from length frequencies. The determined weight frequency composition data was then grouped into count per pound categories according to the following commercially accepted grades : less than 10 per pound, 10 - 20, 21 - 30, more than 30 per pound (1 pound = 453.6 g).

In addition, as the industry does not differentiate between species within the major commercial groups, the data for each species were grouped accordingly ie P. esculentus and P. semisulcatus into "tiger" prawns, Metapenaeus endeavouri and M. ensis into "endeavour" prawns and Penaeus latisulcatus and P. longistylus into "king" prawns.

Thus the carapace length frequencies of samples of several species of prawns taken from a shot were converted into a size frequency composition of percentage count per pound, by major species group.

Catch rates for each shot were determined as kg per hour trawled for each major species group.

All statistical analyses were performed using the methods of Nie et al (1975).

III RESULTS

A total of 282 trawls were made in 68 different grids. An additional 7 were surveyed, but not trawled due to bad bottom conditions. 5 shots were abortive (3 due to gear damage, 2 due to excessive trash catches, where the gear could not be brought aboard).

In the five cruises a total of 81,828 prawns were sampled for species, sex and length frequency composition. Dates of cruises and the numbers of each species sampled are presented in Table 1.

A listing of details of each cruise according to grids sampled is provided in Appendix 5.

A summary of results giving size composition by grade expressed as a percentage by weight of the total catch for the principal species groups (tiger and endeavour) by grid and by month is presented as Tables 2 and 3. The data for the over 30 count per pound category for tiger prawns are graphically illustrated as Figures 3(a) to 7(b). These results provide a guide to the observed proportion of small tigers in the catches from each grid sampled per month.

Figures 8(a) and (b) illustrate a summary of the results of the surveys, by indicating those grids where at any time during the study the proportion by weight of the small tiger prawns (over 30 count) in the catch exceeds 10% of the total. The months when that occurs are indicated by letter within the grid.

While this information provides a guide to those grids which contained a relatively high proportion by weight of juveniles it is appropriate to assess this in terms of catch rates. An area with a low proportion of juveniles but a high catch rate overall could have a larger concentration of

juveniles than another area with a high proportion of juveniles but very low catch rates. In order to examine this the catch rates (in grams per hour) were determined for small prawns, namely those of over 30 count per pound, for each grid by month.

This has been carried out for both tiger and endeavour species groups and the results are illustrated in figures 9(a) to 18(b). These figures illustrate the most appropriate assessment of the abundance of juveniles within the study area in respect of geographic area and time.

IV DISCUSSION

Biological data on the western Gulf of Carpentaria tiger and endeavour prawn fisheries is as yet insufficient to provide a quantitative assessment of the net economic benefit of seasonal closures. However, closures in those areas and times where small prawns are abundant should nevertheless provide an ultimate net gain to the fishery. Assessment of the effectiveness of the 1982/83 closure must therefore include an examination of whether or not the timing and location afforded adequate "protection" to the stocks of small prawns, and yet did not significantly preclude access to significant concentrations of larger prawns.

The results of this study indicate that with respect to the above criteria, the closures declared in 1982/83 were generally effective, ie stocks of small prawns were adequately protected in most areas, and the closed period encompassed the greater part of the offshore migration of small prawns in most areas. Improvements in catch rates by the end of the study and observations made after the closure period suggest that net catch value was probably increased. Once again, further data is required before the real benefit can be assessed.

Several aspects of the results warrant further comment and consideration, especially in that they bear upon increasing the effectiveness of future closures. Discussion here is chiefly restricted to tiger prawns, as they comprised the bulk of the catch and are of primary interest to the fishery. Endeavour prawn catch rates were often so low as to have little or no bearing upon the effectiveness of the closure.

Sea-grass beds constitute nursery areas for tiger and endeavour prawns (Staples, pers. comm) and the proximity, extent and production of these beds would appear to be the dominant factors in providing high concentrations of small prawns in any area.

Two areas showed both high proportions and high catch rates of small prawns each month surveyed, namely North West Bay (grid 3765) and the West Island - North Island area (grids 5566, 5567, 5568) These areas are both relatively shallow embayments and are characterized by their immediate proximity to the sea-grass beds.

The consistently high proportions and catch rates of small prawns in these areas, reflect direct recruitment from the nursery areas, while the increasing proportions with time in nearby grids reflect subsequent growth and offshore migration.

The characterization of sea grass beds in the western Gulf region is the subject of present studies, (Poiner, Staples, pers. comm) and the relationship between recruitment and particular sea grass beds should thus be clarified.

A distinctive feature of three areas within the study is the marked increase in abundance of small prawns from December onwards. The mouth of Blue Mud Bay, the Alagna Shoal area and those grids immediately to the north of the Vanderlins (ie grids 5366 to 5370) are fairly shallow areas that are not directly adjacent to sea grass beds, although they are in reasonable proximity. The abundance of small prawns in these areas, and subsequently in areas adjacent to them, is thus dependent upon the strength over time of the offshore migration. The Blue Mud Bay area well illustrates this point; though proportions of small prawns are high in November (61% in grid 3362), catch rates are fairly low. From the December survey, the proportions were high and catch rates of small prawns increased, reflecting the increasing strength of the offshore migration of recruits.

The north Vanderlins area is separated from the West Island - North Island area by concentrations of "larger" prawns (see Figs. 3 - 8). This separation is most likely a result of the actual direction of the offshore migration and may be a result of the direction of currents or may reflect a difference in bottom type preference between the size/age groups (this will be investigated in the course of sediment analyses).

With regard to the area to the north of Groote Eylandt, grids to the east of the closure line, ie outside the 1982/83 closure area, showed high abundance of small prawns for at least part of the survey. Conversely, the Rutland Shoal - South Point area (grids 4063, 4163, 4263, 4162, 4262) was characterized by consistently low proportions of small prawns, and relatively high catch rates.

The consistently low catch rates achieved for endeavour prawns means that the results with respect to these species can only be discussed in general terms. However, there are indications of slight differences in both the timing of recruitment and location of concentrations of small prawns between the endeavour and tiger groups. Reference to catch rates for endeavour prawns (Figs. 14 - 18) suggests that recruitment may begin earlier and be more protracted for endeavour prawns than tiger prawns. It is important to note here, however, that the apparently protracted recruitment period for endeavour prawns may be an artefact resulting from lower growth rates.

Concentrations of small endeavour prawns occurred in the Southern Blue Mud Bay - Bickerton Is. region, Alagna Shoal, West Island - North Island area and, in contrast to tiger prawns, the Rutland Shoal - South Point region. The area to the north of the Vanderlins appeared less important to endeavour prawns than tiger prawns.

These differences between tiger and endeavour prawns may reflect differences in habitat preference of the recruits, or differential contributions from nursery areas.

V FUTURE CLOSURES

When applying the results of the 1982/83 Closure Study to future closures it is important to note that Conclusions as to the timing of recruitment and the position of stocks of small prawns can only be made with reference to factors in operation during that study. In particular the 1982/83 "wet" season was unusual in the delay in its onset, and the below-average rainfall received. Though the effect of rainfall or related climatological factors on recruitment of tiger and endeavour prawns has yet to be fully assessed, further fine tuning for "average" years, or particular years, may be of benefit. Most grids were trawled at intervals of approximately one lunar month, and lunar effects on size composition or catch rate could possibly render some conclusions as to the abundance of small prawns inaccurate. Fortunately, those grids re-trawled in the fifth survey cruise (at periods of 6 - 12 days after first trawling) did not show appreciable differences in catch size composition, and though catch rates were enhanced (see Figs. 13 and 18), the conclusions drawn should remain valid.

(a) Timing of Closures

Only two areas showed a high abundance of small prawns in the November trawls: North West Bay and the West Island - North Island area. Providing that these two areas are protected, there would appear to be no justification in declaring a general closure until December, thus allowing fishing access to the larger prawns present throughout the remainder of the region. North West Bay is presently closed until 30 June, 1985. The West Island - North Island area could possibly be subject to a separate seasonal closure beginning in November, although it may be avoided by fishermen in this period simply because larger prawns are available in other areas.

For the areas in general, the opening date of 1 April appears to be appropriate (although without survey results for April, it is possible that an extension might be warranted). The trend in size composition suggests that the bulk of the catch would be in the less than 30 per pound size classes by this time.

(b) Location of closures

The results indicate that the effectiveness of the seasonal closure may be enhanced in future by some slight adjustments to the positioning of the closure boundaries.

For the area north of Groote Eylandt, inclusion in future closures of those areas which showed an abundance of small prawns; yet were slightly to the east of the closure as declared in 1982/83, would be to advantage.

A northward repositioning of the closure line in the area to the north of the Vanderlins, (to include grids 5366, 5367, 5368, 5369 and 5370), so as to effectively protect the small tiger prawns in this area may be warranted although catch rates in this region were relatively low.

The Rutland Shoal - South Point area consistently produced low proportions of small tiger prawns and relatively high catch rates of large tiger prawns. Though proportions of small endeavour prawns are high, the benefit of allowing access to the large tiger prawns by adjusting the closure line westwards would ultimately be of benefit to the fishery, particularly at a time of year when catch rates are often depressed generally. Endeavour catch rates were so low that there would be no benefit in protecting the small endeavours in this region. The remaining concentrations of small endeavours would be protected by measures taken to protect small tiger prawns.

In summary: North West Bay is protected until 30 June 1985 and further seasonal closures would be appropriate after that date. It would be to advantage to close West Island - North Island from November 1 to April 1 each year and the remaining area from December 1 to April 1; the closure lines should be redefined slightly to the east in the north of Groote Eylandt, slightly to the westward in the Rutland Shoal - South Point area, and possibly slightly to the north in the Vanderlins area.

VI ACKNOWLEDGEMENTS

Our particular thanks are due to the master of the charter vessel L. (Sonny) Tye and the crew D. (Scoob) Allen, Thomas Lawley, Vicki Tye and Dave Lee for their enthusiastic and untiring efforts. Pauline Tye provided excellent shore support for the charter vessel.

Arnold Baker provided valuable support throughout the programme from administrative arrangements to field sampling and data analysis.

The field assistance of Norm Carroll, Dave Kelly and Ben Tozer was of great value.

Karen Baldwin performed an excellent task on the arduous job of data entry and Lillian Fiket typed the report.

Special thanks are due to Rex Edwards and Dick Slack-Smith for their support and encouragement throughout the programme.

The authors would also like to acknowledge the services of Bo Jensen, Kim Bowers and the staff of Kailis Groote Eylandt Fisheries.

Derek Staples and Ian Poiner provided helpful comments on the draft manuscript.

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VIII TABLES

TABLE 1 SUMMARY OF SAMPLING CRUISES - WESTERN GULF
CLOSURE STUDY

Cruise	Dates	Days Fishing	Total Trawls or surveys	Total sampled prawns
1	3.xi.82 - 17.xi.82	13	61	13,568
2	2.xii.82 - 15.xii.82	12	58	15,801
3.	31.xii.82 - 14. i .82	13	51	14,898
4.	31. i .83 - 10.ii.83	10	49	14,879
5.	26.ii.83 - 14.iii.83	16	70	22,682
TOTALS		64	289	81,828

TABLE: 2(a)	TIGER PRAWN % COMPOSITION BY WEIGHT BY GRADE : NOVEMBER 1982 - MARCH 1983																			
Month	NOVEMBER				DECEMBER				JANUARY				FEBRUARY				MARCH			
Grid\Grade	>30	21-30	10-20	<10	>30	21-30	10-20	<10	>30	21-30	10-20	<10	>30	21-30	10-20	<10	>30	21-30	10-20	<10
3165	0	0	48	52	0	1	51	48	1	4	59	36	7	3	47	21	8	16	40	35
3264	0	3	42	55	1	43	56	39	4	9	42	44	31	19	29	22	40	34	15	5
3265	0	0	36	64	1	3	40	56	5	9	52	34	33	43	20	4	26	34	26	14
3362	61	38	0	0	32	26	33	9	41	27	18	14	31	17	25	27	53	18	18	12
3363	4	4	64	28	7	9	49	35	14	16	44	26	15	16	43	27	37	36	20	7
3364	1	0	57	42	1	2	50	47	8	20	48	24	24	35	27	15	17	35	28	20
3462	8	8	39	45	24	14	35	27	35	30	19	16	13	22	33	31	32	31	26	12
3463	0	4	40	55	7	14	44	35	5	20	51	24	20	23	36	21	25	37	31	7
3464	1	14	59	26	3	19	57	21	9	19	47	26	21	47	30	9	7	42	42	9
3465																	3	22	63	12
3562	2	12	43	42	10	22	45	23	32	31	28	8	20	41	29	10	17	47	33	3
3563	1	8	42	49	12	28	45	15	8	23	52	17	16	30	42	12	22	41	36	2
3564	1	8	72	19	5	13	45	37	9	16	55	20	5	12	56	27	10	36	46	8
3565																	5	11	70	14
3663	6	31	49	14	17	32	43	8	19	29	36	16	18	20	49	13	9	29	53	8

TABLE: 2(b)	TIGER PRAWN % COMPOSITION BY WEIGHT BY GRADE : NOVEMBER 1982 - MARCH 1983																			
Month	NOVEMBER				DECEMBER				JANUARY				FEBRUARY				MARCH			
Grid\Grade	>30	21-30	10-20	<10	>30	21-30	10-20	<10	>30	21-30	10-20	<10	>30	21-30	10-20	<10	>30	21-30	10-20	<10
3664		2	51	47	1	2	47	50	4	6	60	30	3	2	63	33	1	13	67	18
3665																	0	4	70	26
3765					18	30	42	0	23	43	34		29	42	28	1	14	40	46	
3861	2	10	75	13	13	22	51	13	36	24	32	8	15	44	37	4	8	52	46	
3862	0	0	100	0																
3960	4	24	64	8	27	22	39	13	18	32	46	4	8	22	58	13	3	35	61	1
3961	1	14	67	17	16	22	53	9	11	32	53	3	2	19	70	9	2	33	62	3
3962	6	17	67	10	13	17	65	5	19	28	43	10	5	28	61	6	3	23	71	4
4060	2	18	45	35	17	25	36	21	7	32	54	8	3	27	64	7	2	18	76	4
4061	12	1	68	19	6	12	62	21	3	25	66	6	2	10	68	21	1	17	76	7
4062	1	10	77	13	21	22	51	6	12	36	48	5	5	27	62	6	1	13	77	9
4063	1	4	61	34	3	7	67	23	15	21	48	16					3	15	76	6
4160	1	17	54	27	2	9	64	25	4	14	57	24	4	19	59	19	2	18	68	13
4161	1	9	56	35	1	4	70	25	3	15	63	19	3	9	72	17	2	14	76	8
4162	1	6	65	29	4	10	58	28	3	16	57	25	1	15	68	16	1	6	66	27

TABLE: 2 (c)	TIGER PRAWN % COMPOSITION BY WEIGHT BY GRADE : NOVEMBER 1982 - MARCH 1983																			
Month	NOVEMBER				DECEMBER				JANUARY				FEBRUARY				MARCH			
Grid\Grade	>30	21-30	10-20	<10	>30	21-30	10-20	<10	>30	21-30	10-20	<10	>30	21-30	10-20	<10	>30	21-30	10-20	<10
4163	2	8	72	19	9	15	62	15	8	22	57	14	2	11	68	20	1	8	75	16
4260	2	11	52	35	19	25	43	13	22	42	34	1	13	45	37	6	5	32	57	6
4261	1	17	64	17	3	14	66	18	5	18	68	9	3	30	61	6	2	25	69	4
4262	0	3	62	35	2	1	59	38	1	4	61	33	1	7	69	23	1	17	61	21
4263	0	0	30	70	1	0	33	66	3	1	32	64		7	73	20	0	4	42	54
4360	2	5	44	50	4	5	35	56	30	24	27	19	21	48	23	8	7	18	45	31
4361	1	11	56	22	6	11	53	30	16	43	33	8	3	31	65	2	2	33	54	12
4362																	1	13	69	17
4363																	0	17	56	26
4364																	0	0	0	100
4460	1	2	47	50	9	18	49	24	3	1	42	54	13	15	44	28	13	29	48	10
4464																	0	12	63	25
4465																	2	16	38	44
4558	1	2	60	37																
4559	0	5	55	40	7	22	51	19	1	2	61	28	7	40	48	5	5	44	47	4

TABLE: 2(b)		TIGER PRAWN % COMPOSITION BY WEIGHT BY GRADE : NOVEMBER 1982 - MARCH 1983																		
Month	NOVEMBER				DECEMBER				JANUARY				FEBRUARY				MARCH			
Grid\Grade	>30	21-30	10-20	<10	>30	21-30	10-20	<10	>30	21-30	10-20	<10	>30	21-30	10-20	<10	>30	21-30	10-20	<10
3664		2	51	47	1	2	47	50	4	6	60	30	3	2	63	33	1	13	67	18
3665																	0	4	70	26
3765					18	30	42	0	23	43	34		29	42	28	1	14	40	46	
3861	2	10	75	13	13	22	51	13	36	24	32	8	15	44	37	4	8	52	46	
3862	0	0	100	0																
3960	4	24	64	8	27	22	39	13	18	32	46	4	8	22	58	13	3	35	61	1
3961	1	14	67	17	16	22	53	9	11	32	53	3	2	19	70	9	2	33	62	3
3962	6	17	67	10	13	17	65	5	19	28	43	10	5	28	61	6	3	23	71	4
4060	2	18	45	35	17	25	36	21	7	32	54	8	3	27	64	7	2	18	76	4
4061	12	1	68	19	6	12	62	21	3	25	66	6	2	10	68	21	1	17	76	7
4062	1	10	77	13	21	22	51	6	12	36	48	5	5	27	62	6	1	13	77	9
4063	1	4	61	34	3	7	67	23	15	21	48	16					3	15	76	6
4160	1	17	54	27	2	9	64	25	4	14	57	24	4	19	59	19	2	18	68	13
4161	1	9	56	35	1	4	70	25	3	15	63	19	3	9	72	17	2	14	76	8
4162	1	6	65	29	4	10	58	28	3	16	57	25	1	15	68	16	1	6	66	27

TABLE: 2 (d)		TIGER PRAWN % COMPOSITION BY WEIGHT BY GRADE : NOVEMBER 1982 - MARCH 1983																		
Month	NOVEMBER				DECEMBER				JANUARY				FEBRUARY				MARCH			
Grid\Grade	>30	21-30	10-20	<10	>30	21-30	10-20	<10	>30	21-30	10-20	<10	>30	21-30	10-20	<10	>30	21-30	10-20	<10
4560	1	7	63	29	5	11	65	20	1	4	63	33	10	20	51	19	2	11	63	25
4659	1	14	58	27	9	24	58	9	9	43	43	5	7	33	54	7	5	38	52	6
4660	0	0	57	43	2	0	43	54												
5366	2	10	67	20	11	22	61	6												
5367	9	14	50	26	39	26	24	11	23	20	41	16	34	46	17	3	6	26	55	13
5368	9	14	51	26	58	37	5	0	50	30	12	8	20	29	38	13	5	23	63	9
5369	10	23	31	36	50	29	5	16	61	30	3	6	28	52	21	0	29	36	17	18
5370	4	5	56	34	18	10	35	37	26	14	42	18	17	16	28	39	10	11	26	53
5465	4	33	57	6	19	40	35	6	5	9	50	36								
5466	1	15	57	27	13	33	50	4												
5468	4	14	58	25	5	20	56	20	7	22	62	9	6	10	65	19	25	26	42	6
5470	2	6	60	33	14	13	47	26	10	56	41	43	5	1	44	51	8	4	39	50
5471	1	1	27	71	4	3	29	64	7	0	30	64					8	4	41	47
5566	55	35	7	4	62	23	15	0					49	32	16	4	51	39	9	1
5567	27	47	25	1	58	27	14	0	85	12	3		37	46	16	1	46	44	10	0

TABLE: 2 (e)		TIGER PRAWN % COMPOSITION BY WEIGHT BY GRADE : NOVEMBER 1982 - MARCH 1983																			
Month	NOVEMBER				DECEMBER				JANUARY				FEBRUARY				MARCH				
Grid\Grade	>30	21-30	10-20	<10	>30	21-30	10-20	<10	>30	21-30	10-20	<10	>30	21-30	10-20	<10	>30	21-30	10-20	<10	
5568	22	40	36	2	41	35	22	2	37	28	28	8	10	30	51	9	21	34	40	5	
5570	2	1	31	66	3	2	44	51	6	5	49	41	11	4	56	28	8	2	40	50	
5571	1	1	41	57	4	2	30	64	19	1	27	53	4	2	54	40	4	1	44	52	
5671	3	2	34	60	42	19	25	14	14	20	54	12	5	4	66	26	9	5	65	20	
5771	6	8	47	40	6	16	55	23	8	7	63	21	4	5	7	24	6	3	71	19	
5871	35	18	30	17																	

TABLE: 3(a)	ENDEAVOUR PRAWN % COMPOSITION BY WEIGHT BY GRADE : NOVEMBER 1982 - MARCH 1983																			
Month	NOVEMBER				DECEMBER				JANUARY				FEBRUARY				MARCH			
Grid\Grade	>30	21-30	10-20	<10	>30	21-30	10-20	<10	>30	21-30	10-20	<10	>30	21-30	10-20	<10	>30	21-30	10-20	<10
3165		8	81	11				P				P				P				P
3264			P		1	2	59	39	8	9	66	18				P				P
3265								P				P				P				P
3362			P					P				P				P				P
3363			P		4	2	62	32				P				P				P
3364			P					P				P				P				P
3462			P					P				P				P				P
3463			P					P				P				P				P
3464	1	6	85	9				P				P				P				P
3465																				P
3562			P		9	7	71	13	25	6	47	21				P				P
3563	2	11	79	8	6	10	81	3				P	13	23	49	15	20	23	55	2
3564			P					P	16	10	64	10				P				P
3565																				P
3663	6	26	65	3	3	15	75	8	14	8	67	11	16	2	52	13	11	19	63	7

P = samples where n is less than 50.

TABLE: 3 (b) ENDEAVOUR PRAWN % COMPOSITION BY WEIGHT BY GRADE : NOVEMBER 1982 - MARCH 1983																						
Month	NOVEMBER				DECEMBER				JANUARY				FEBRUARY				MARCH					
Grid\Grade	>30	21-30	10-20	<10	>30	21-30	10-20	<10	>30	21-30	10-20	<10	>30	21-30	10-20	<10	>30	21-30	10-20	<10		
3664					24	6	60	10	20	11	54	15										
3665																		17	17	63	4	
3765		P				P				P				P							P	
3861		P			16	35	49	0	50	25	24	0		P							P	
3862	40	35	26	0																		
3960		P			12	27	61	0	28	25	41	0		P							P	
3961		P				P				P				P							P	
3962		P			17	25	58	0	47	20	31	2		P				27	9	61	3	
4060		P				P			23	23	54	0	14	23	63	0		44	26	30	0	
4061	4	20	72	5	7	19	71	4		P				P							P	
4062	5	23	63	9	13	17	61	10	54	23	22	0	39	28	28	5					P	
4063	19	28	53	0		P			85	7	8	0									P	
4160		P			68	17	9	6	88	5	7	0	63	26	11	0					P	
4161		P			65	14	21		80	4	16			P							P	
4162		P				P				P				P							P	

P = samples where n is less than 50.

TABLE: 3 (c)	ENDEAVOUR PRAWN % COMPOSITION BY WEIGHT BY GRADE : NOVEMBER 1982 - MARCH 1983																					
Month	NOVEMBER				DECEMBER				JANUARY				FEBRUARY				MARCH					
Grid\Grade	>30	21-30	10-20	<10	>30	21-30	10-20	<10	>30	21-30	10-20	<10	>30	21-30	10-20	<10	>30	21-30	10-20	<10		
4163	P				P				P				P				P					
4260	3	20	75	2	P				P				72	13	15	0	71	15	14	0		
4261	P				28	15	57	0	31	13	56	0	24	5	58	13	42	7	51	0		
4262	4	15	77	4	47	14	34	4	40	1	39	12	P				54	4	26	16		
4263	2	7	89	2	5	3	74	17	P				P				P					
4360	P				P				P				P				P					
4361	P				P				P				P				P					
4362																	P					
4363																	12	2	74	11		
4364																	P					
4460	P				P				P				P				P					
4464																	1	3	87	9		
4465																	1	4	89	5		
4558	P																					
4559	P				P				P				P				P					

P = samples where n is less than 50.

TABLE:3(d)	ENDEAVOUR PRAWN % COMPOSITION BY WEIGHT BY GRADE : NOVEMBER 1982 - MARCH 1983																			
Month	NOVEMBER				DECEMBER				JANUARY				FEBRUARY				MARCH			
Grid\Grade	>30	21-30	10-20	<10	>30	21-30	10-20	<10	>30	21-30	10-20	<10	>30	21-30	10-20	<10	>30	21-30	10-20	<10
4560		P				P				P				P				P		
4659		P				P				P				P				P		
4660		P				P														
5366		P			4	6	90	0												
5367	26	4	68	3		P				P				P				P		
5368		P				P				P				P				P		
5369		P				P				P				P				P		
5370	3	8	75	13	5	5	83	7		P				P				P		
5465		P			41	30	30	0		P										
5466		P				P														
5468		P			13	6	63	18		P				P				P		
5470		P			1	1	80	18		P				P				P		
5471		P			0	2	85	12		P								P		
5566		P			74	9	12	5						P				P		
5567		P				P				P				P				P		

P = samples where n is less than 50.

TABLE:3(e)	ENDEAVOUR PRAWN % COMPOSITION BY WEIGHT BY GRADE : NOVEMBER 1982 - MARCH 1983																			
Month	NOVEMBER				DECEMBER				JANUARY				FEBRUARY				MARCH			
Grid\Grade	>30	21-30	10-20	<10	>30	21-30	10-20	<10	>30	21-30	10-20	<10	>30	21-30	10-20	<10	>30	21-30	10-20	<10
5568		P			54	22	24	0	35	11	54	0			P				P	
5570		P					P		5	5	81	9			P				P	
5571		P			3	2	82	14			P				P				P	
5671		P					P				P				P				P	
5771		P					P		5	2	88	6			P				P	
5871		P																		

P = samples where n is less than 50.

IX FIGURES

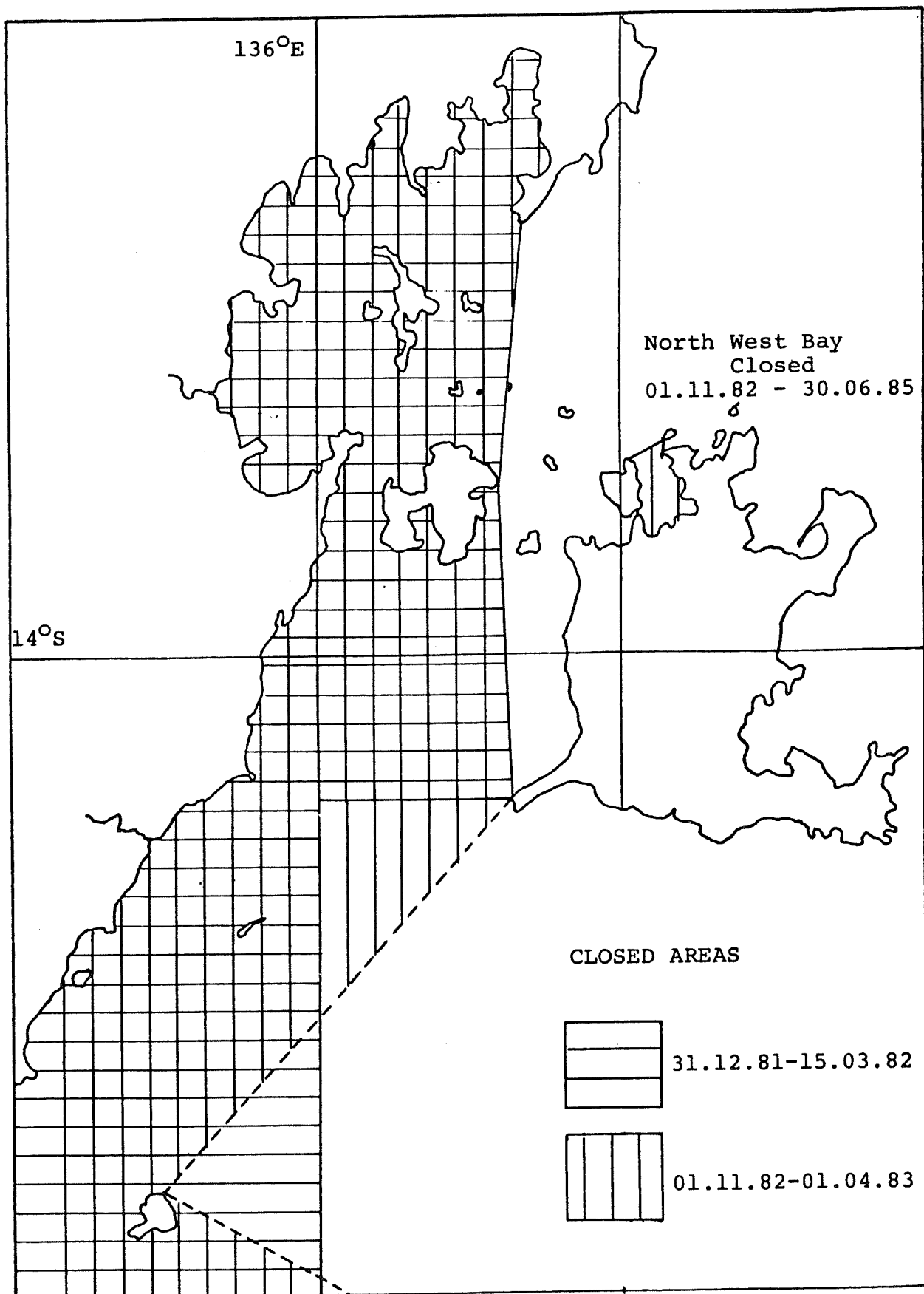


Figure 1(a) Tiger and endeavour prawn closures central western Gulf of Carpentaria 1981/82 and 1982/83.

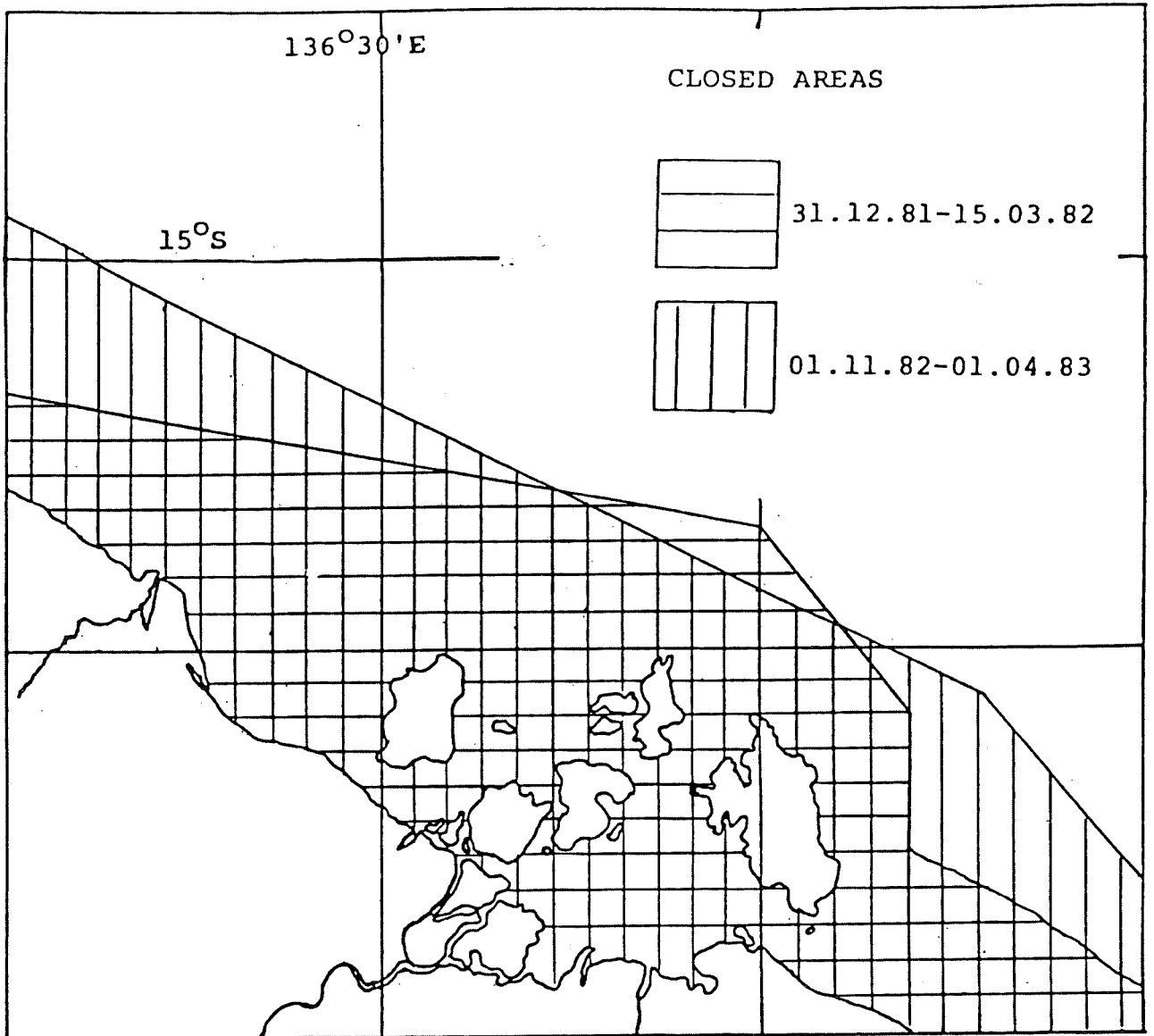


Figure 1(b) Tiger and endeavour prawn closures south western Gulf of Carpentaria 1981/82 and 1982/83.

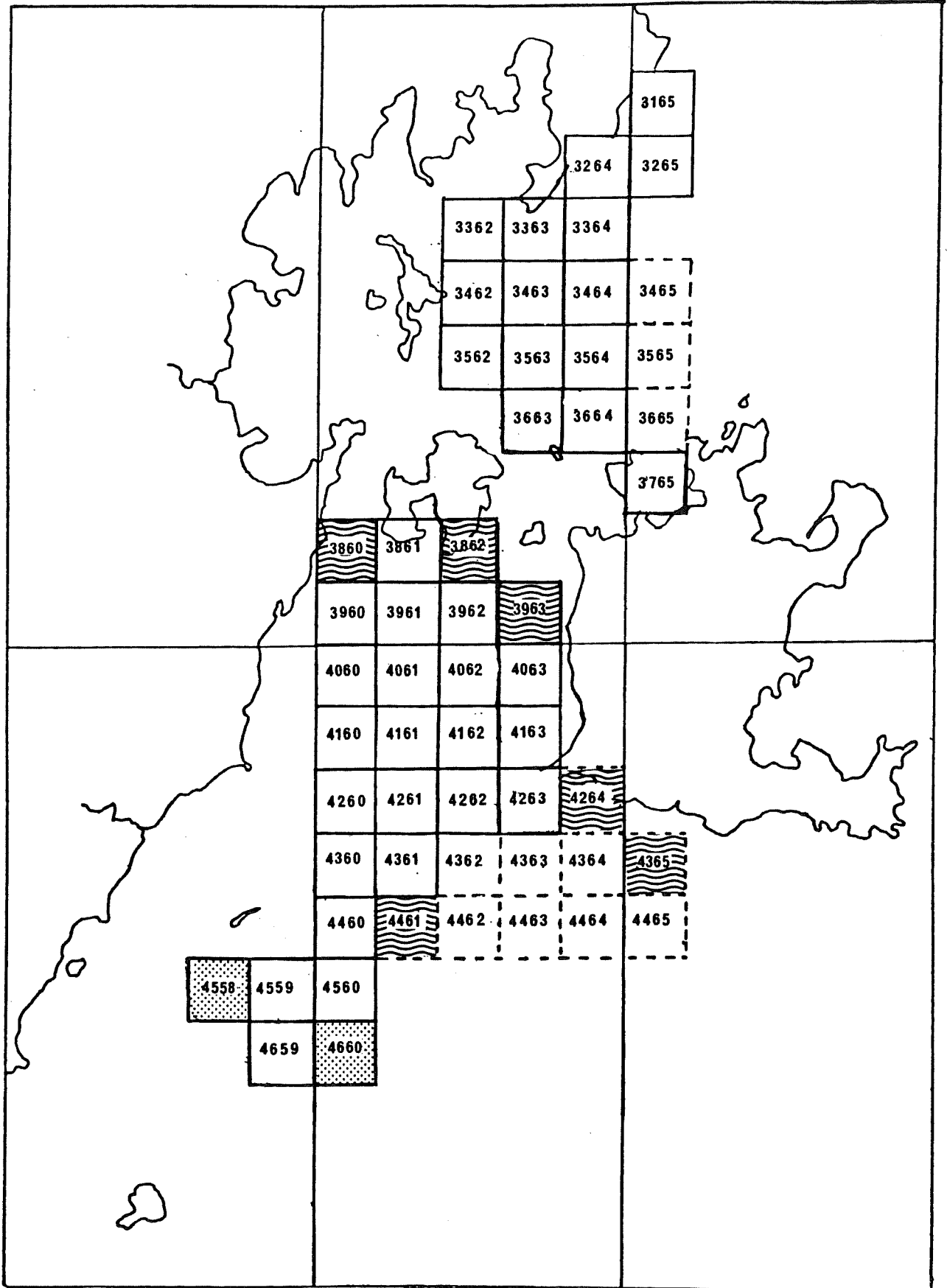


Figure 2(a) Sampling areas - central western Gulf of Carpentaria.



Grids not sampled
rough bottom



Grids not sampled
consistently due
to rough bottom



Grids surveyed or
sampled
March 1983 only

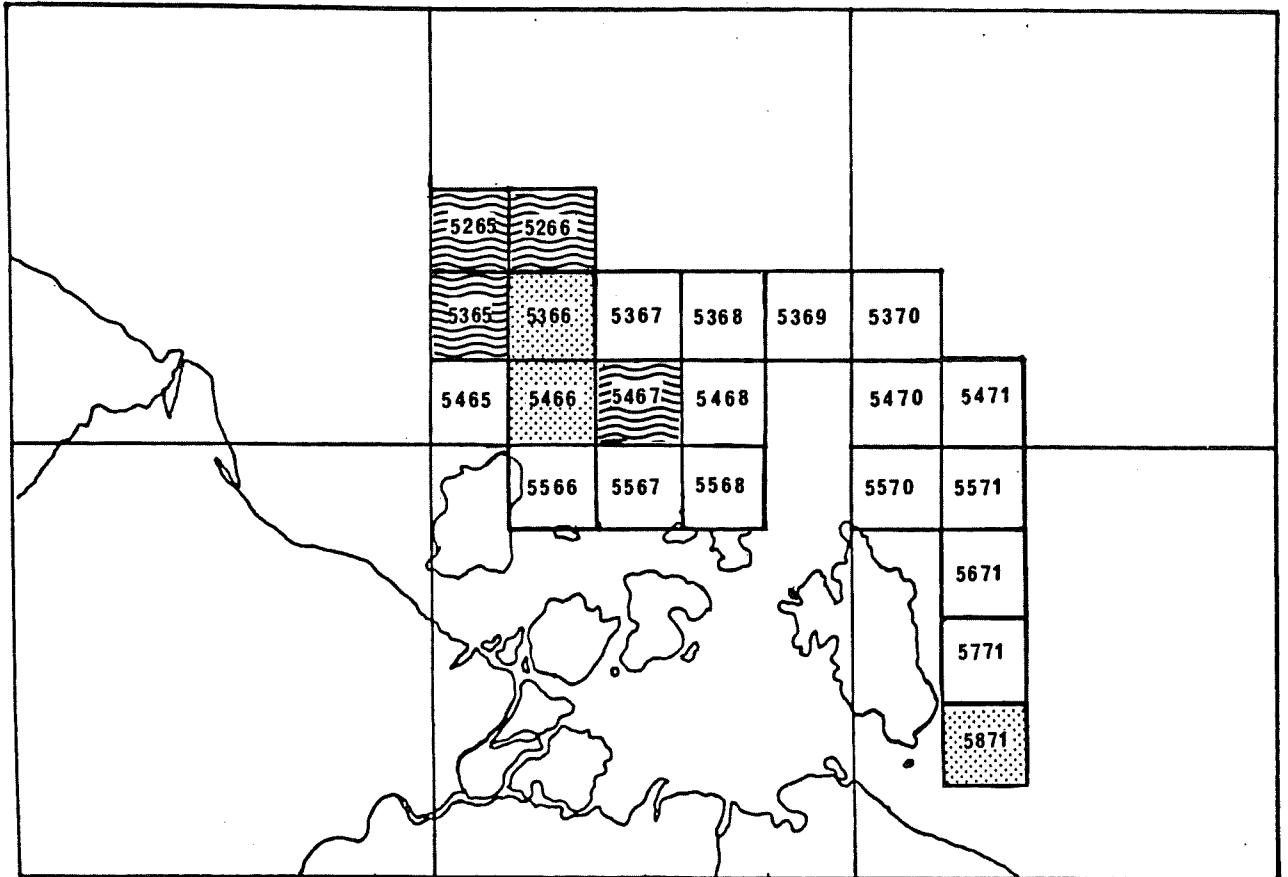


Figure 2(b) Sampling areas - south western Gulf of Carpentaria.



Grids not sampled, rough bottom



Grids not sampled consistently due to rough bottom.



Grids surveyed or sampled, March 1983 only.

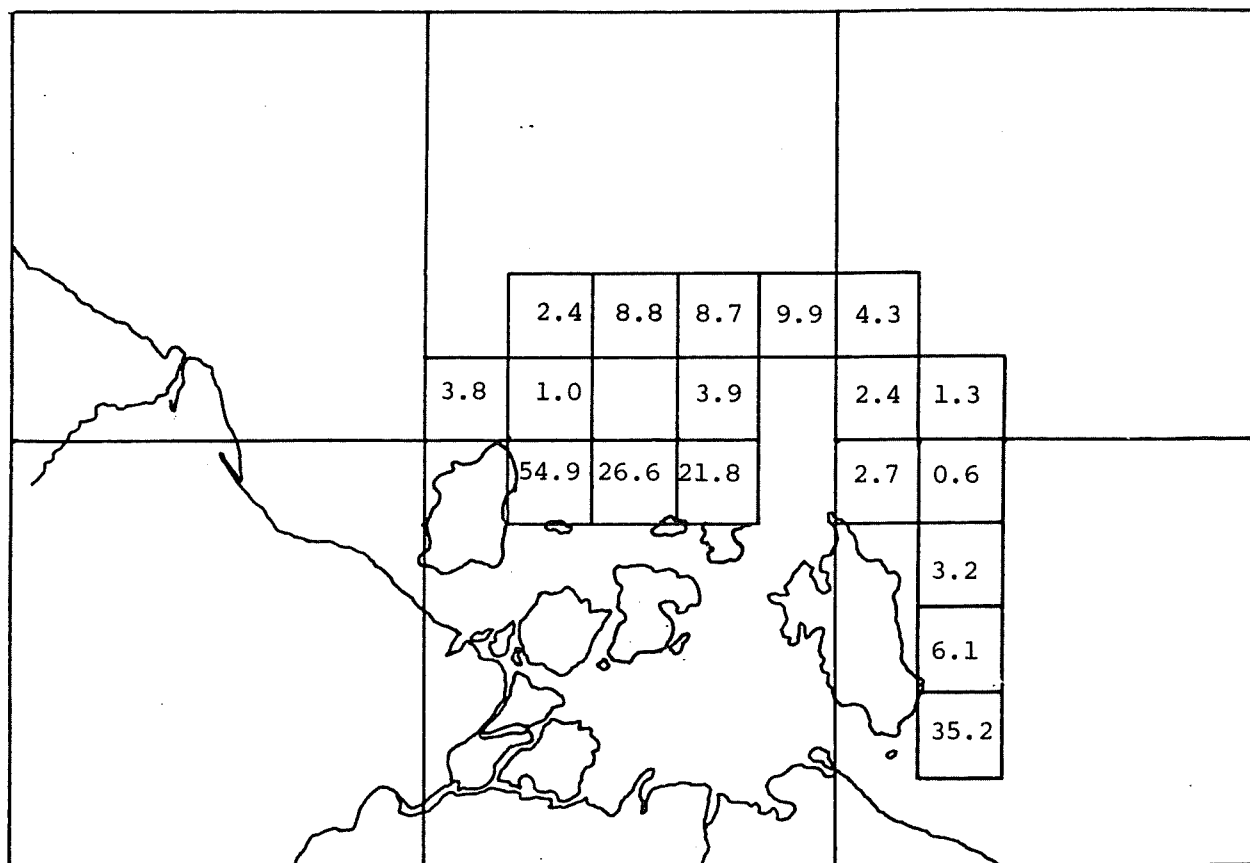


Figure 3(b) Tiger prawn size composition November 1982
 % by weight of prawns over 30 count per pound.
 - South western Gulf of Carpentaria.

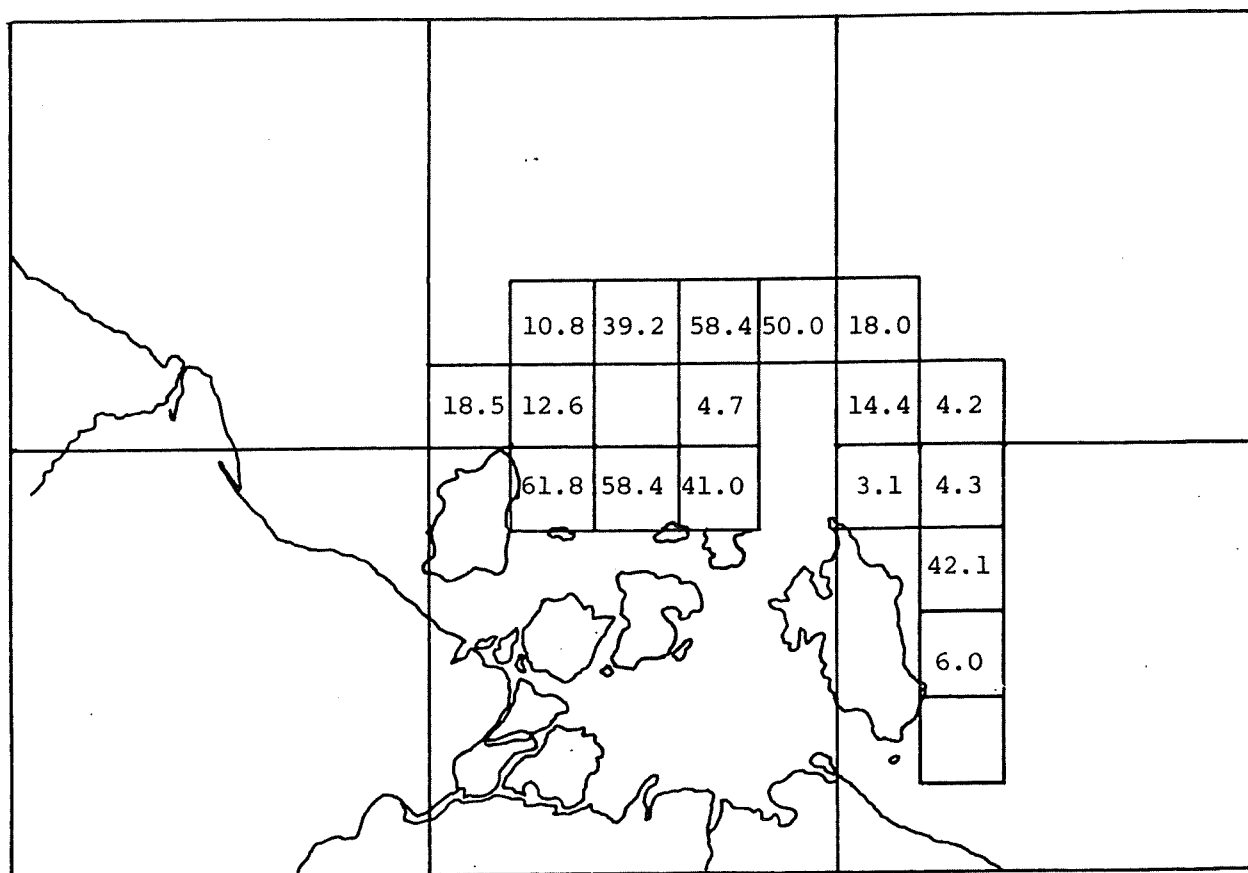


Figure 4(b) Tiger prawn size composition December 1982
 % by weight of prawns over 30 count per pound.
 - South western Gulf of Carpentaria.

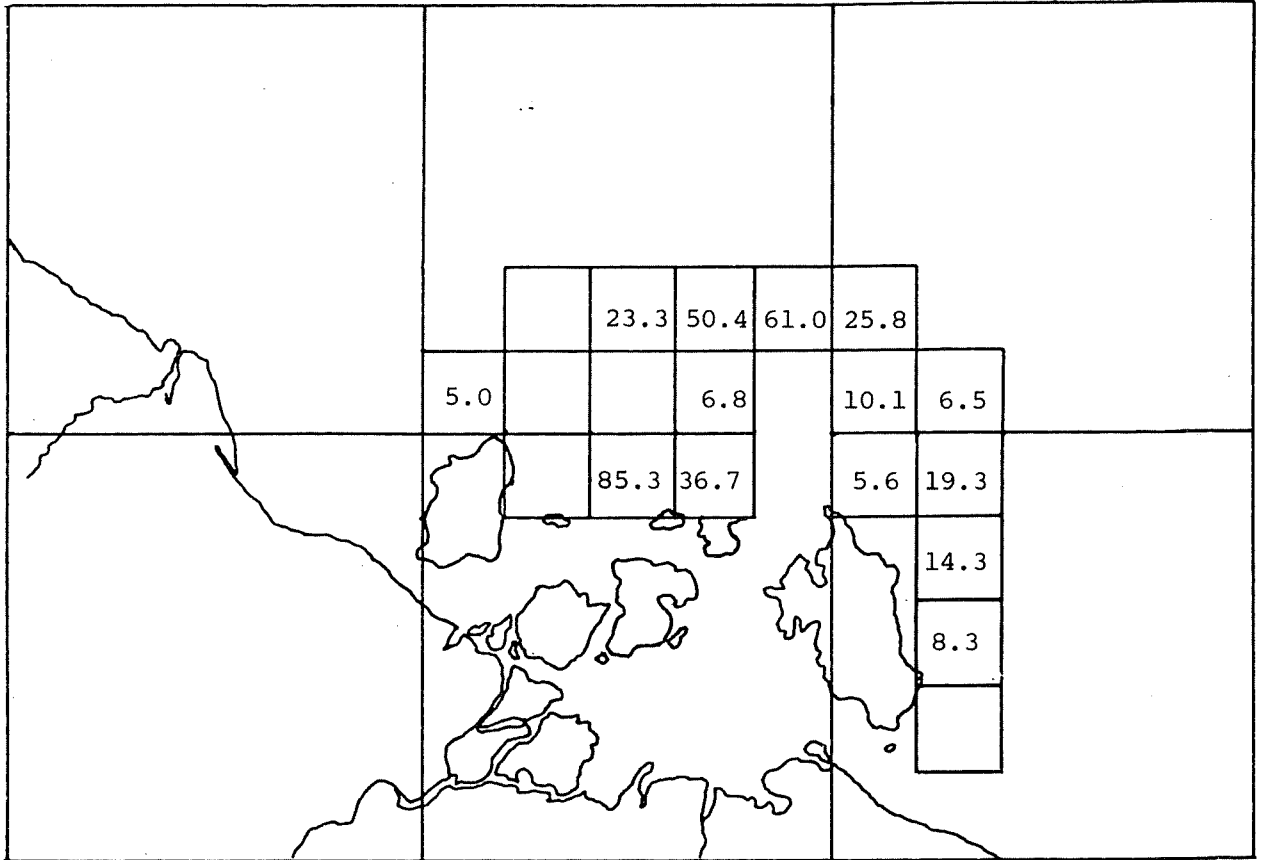


Figure 5(b) Tiger prawn size composition January 1983
 % by weight of prawns over 30 count per pound.
 - South western Gulf of Carpentaria.

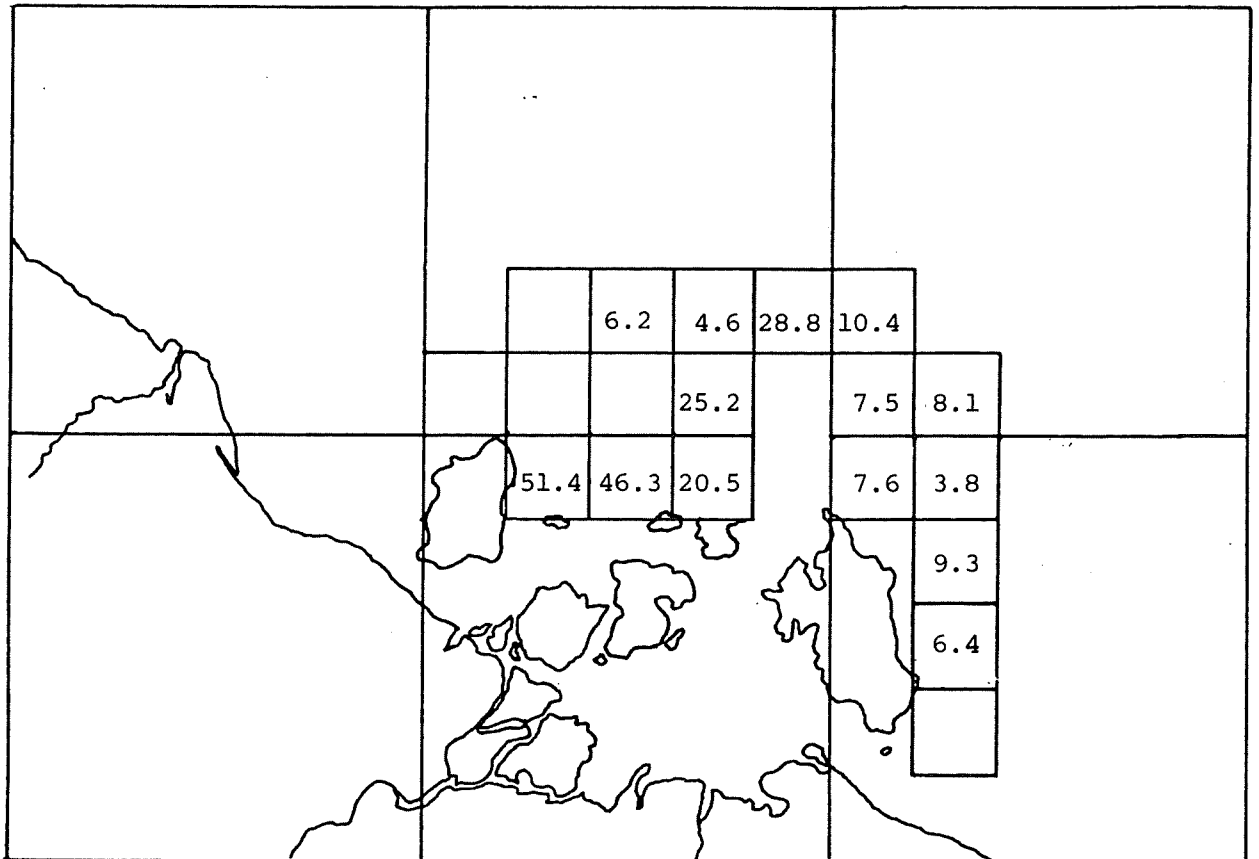


Figure 7(b) Tiger prawn size composition March 1983
 % by weight of prawns over 30 count per pound.
 - South western Gulf of Carpentaria.

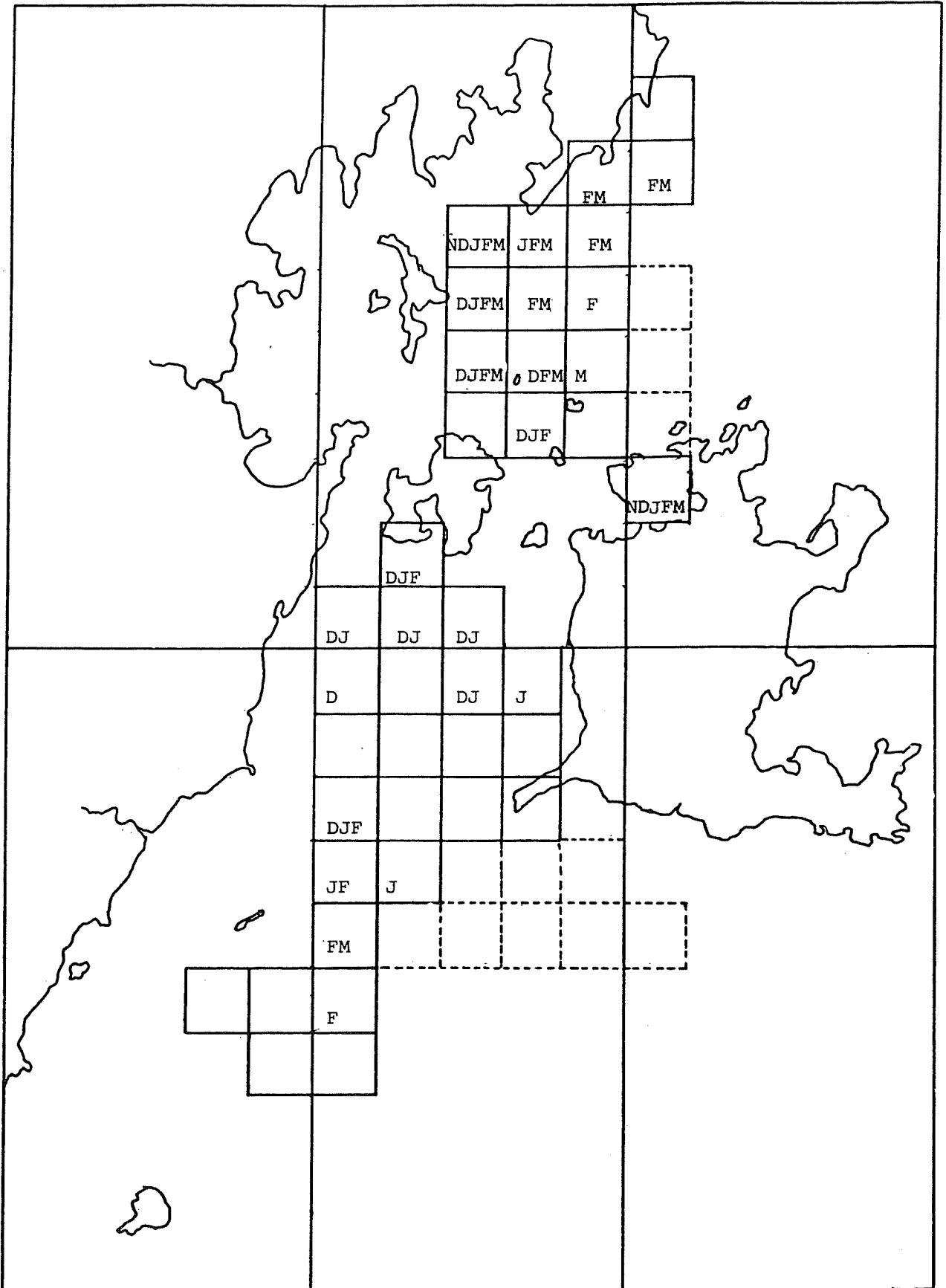


Figure 8(a) Tiger prawn size composition November 1982 - March 1983
 Grids where prawns over 30 count per pound comprised over 10% of the total weight in the months indicated.
 - Central western Gulf of Carpentaria.

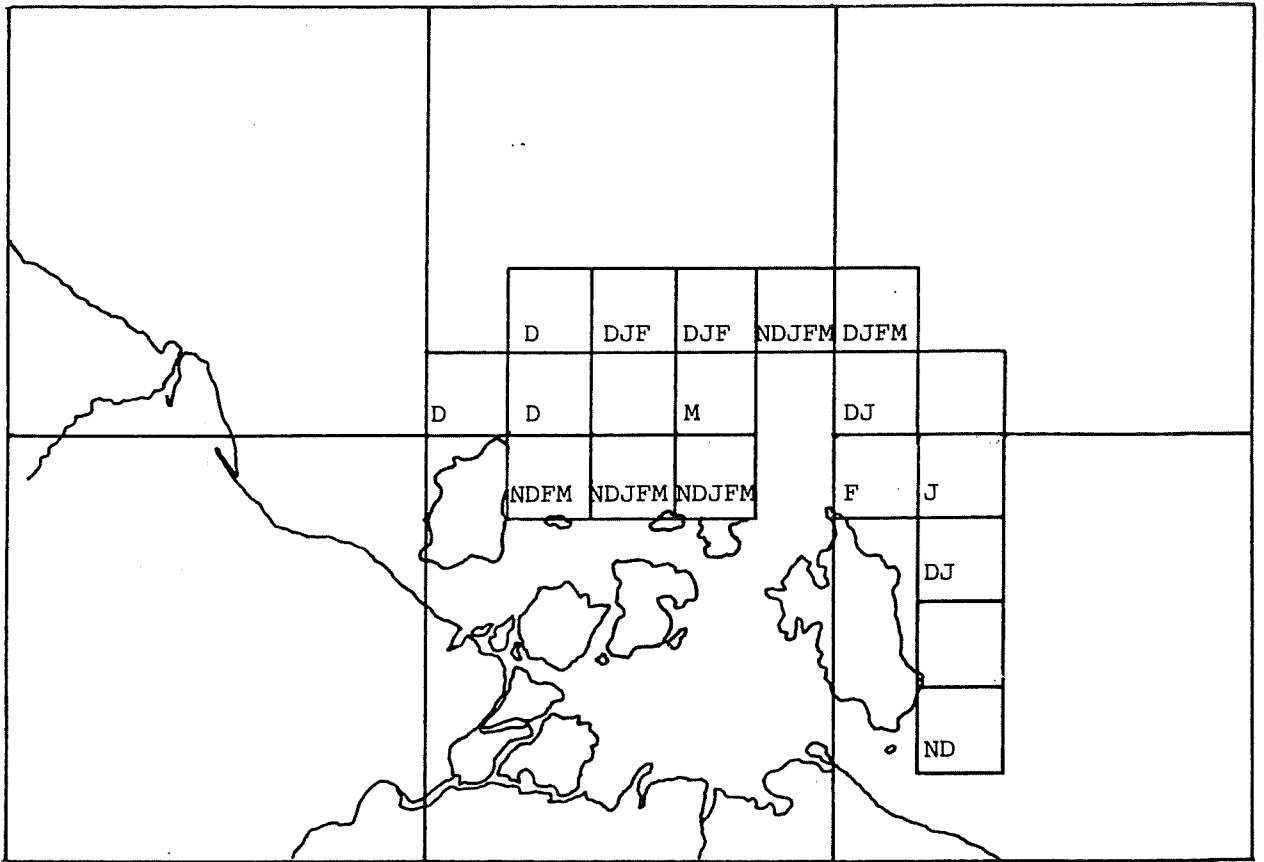


Figure 8(b) Tiger prawn size composition November 1982 - March 1983
 Grids where prawns over 30 count per pound comprised over 10% of the total weight in the months indicated.
 - South western Gulf of Carpentaria.

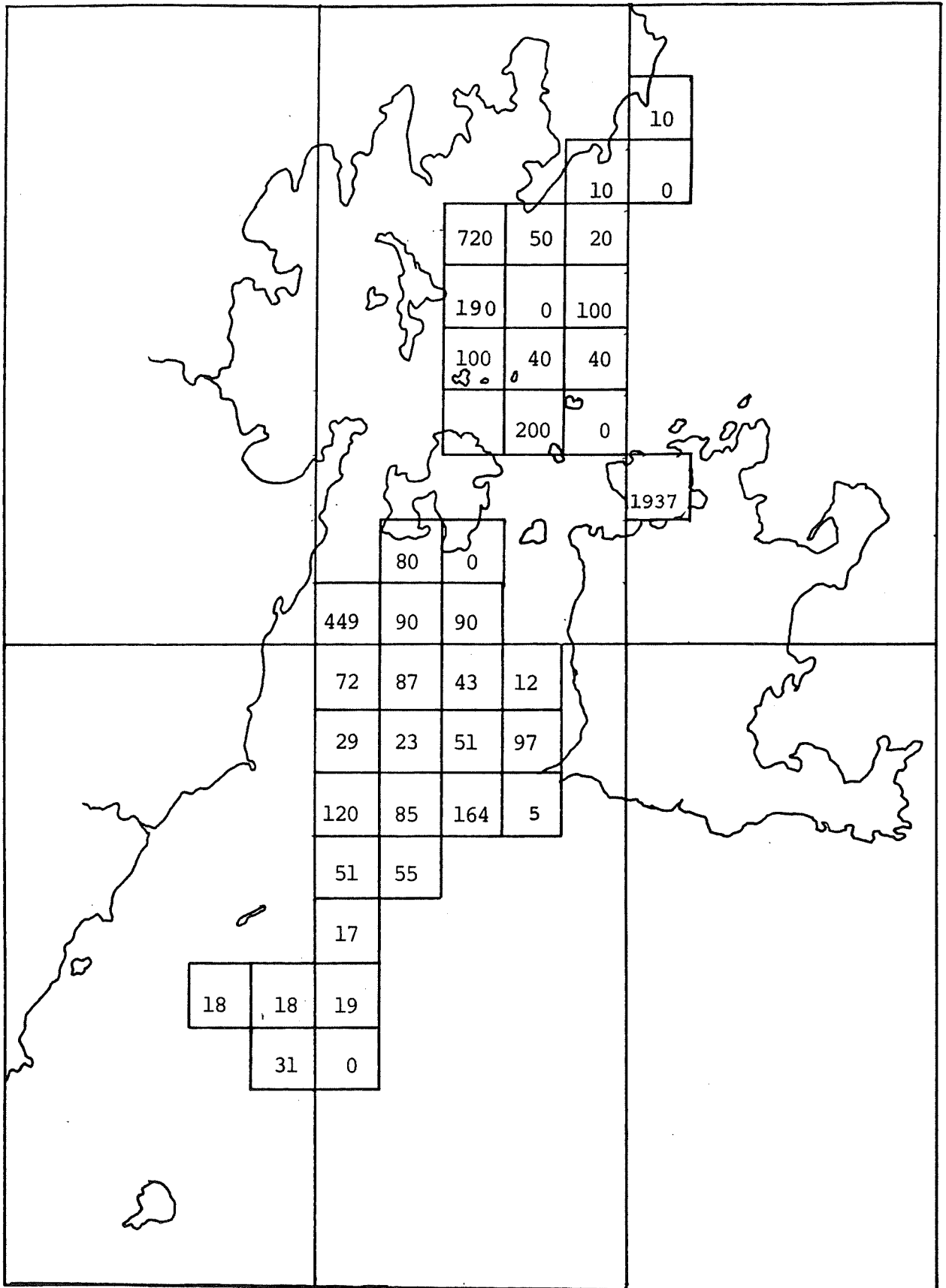


Figure 9(a) Catch rates of tiger prawns of over 30 count per pound (in grams per hour) for November 1982.
 - Central western Gulf of Carpentaria.

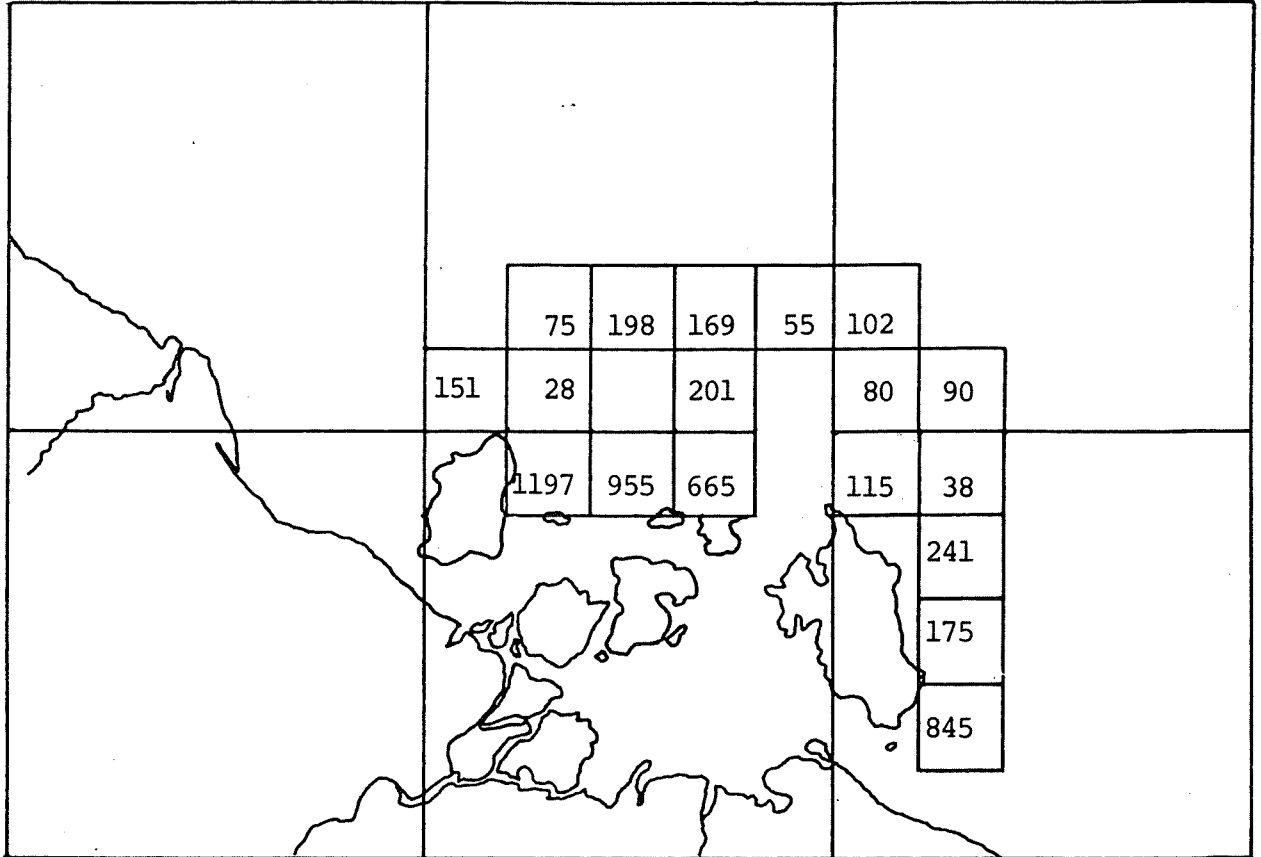


Figure 9(b) Catch rates of tiger prawns of over 30 count per pound (in grams per hour) for November 1982.
- South western Gulf of Carpentaria.

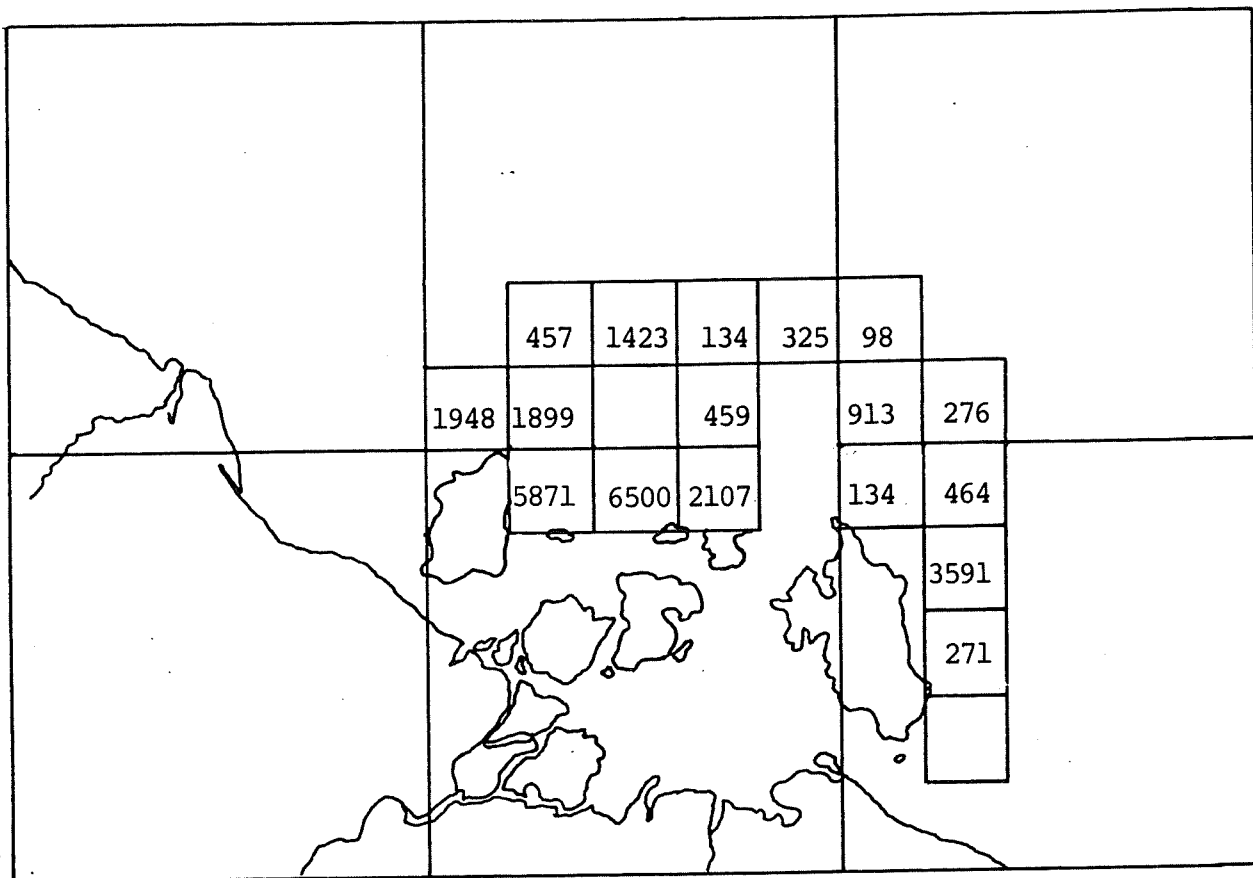


Figure 10(b) Catch rates of tiger prawns of over 30 count per pound (in grams per hour) for December 1982.
- South western Gulf of Carpentaria.

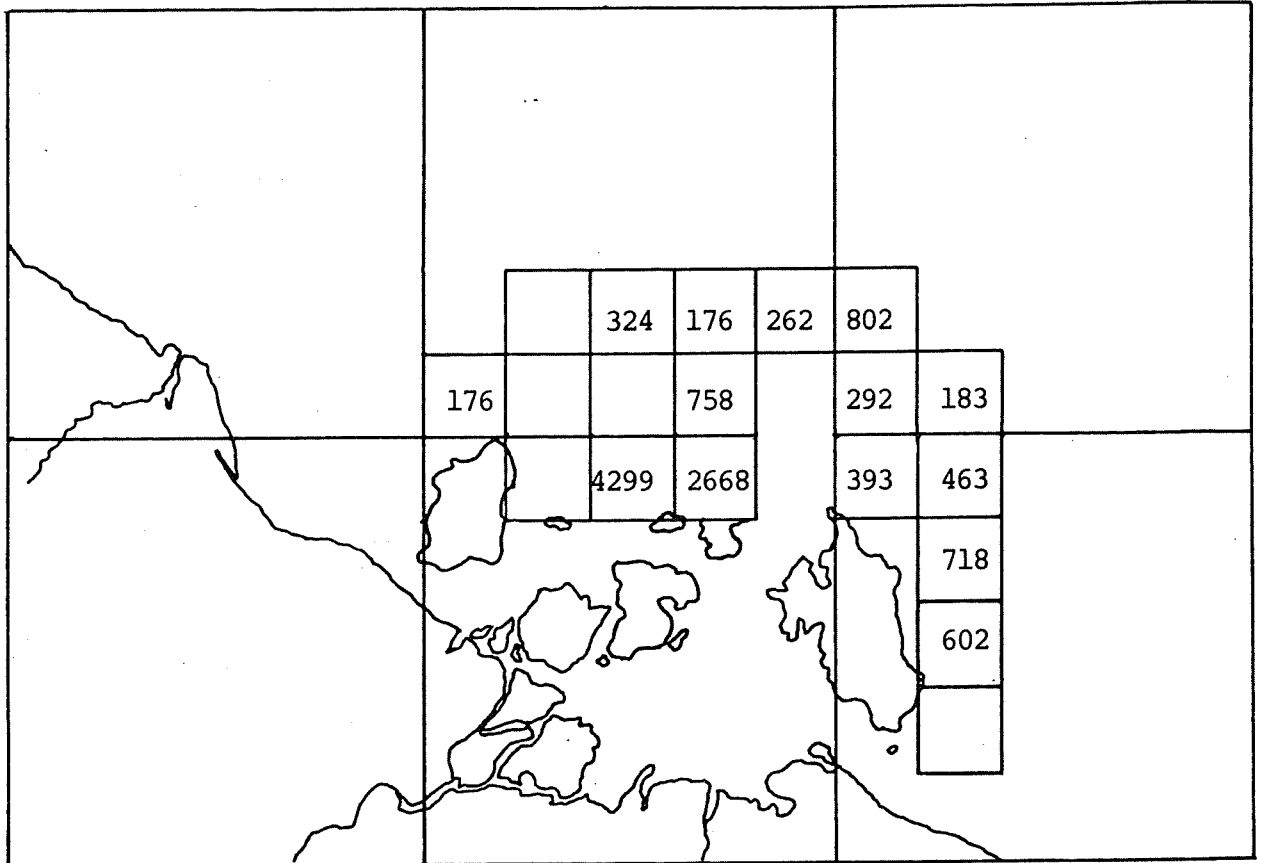


Figure 11(b) Catch rates of tiger prawns of over 30 count per pound (in grams per hour) for January 1983.
- South western Gulf of Carpentaria.

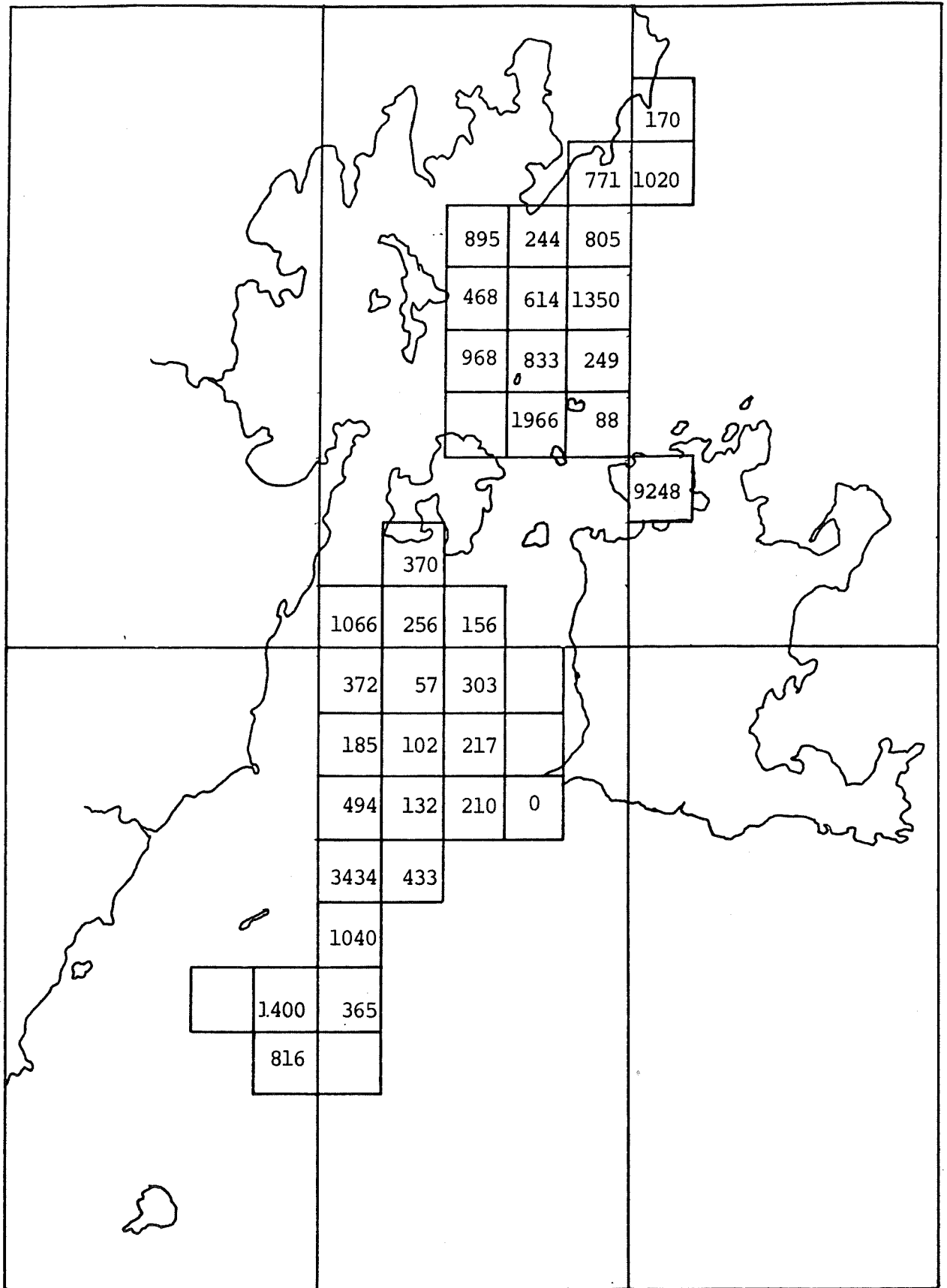


Figure 12(a) Catch rates of tiger prawns of over 30 count per pound (in grams per hour) for February 1983.
- Central western Gulf of Carpentaria.

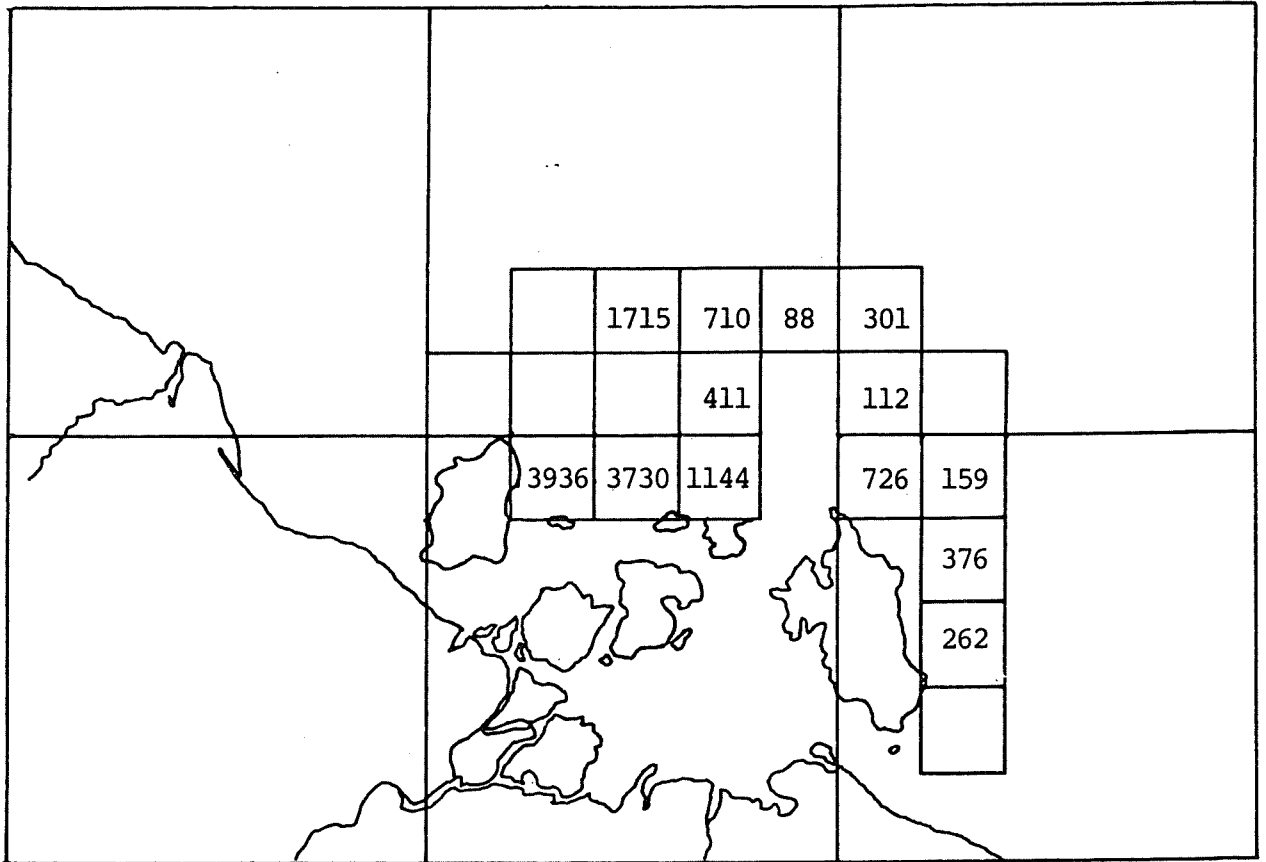


Figure 12(b) Catch rates of tiger prawns of over 30 count per pound (in grams per hour) for February 1983.
- South western Gulf of Carpentaria.

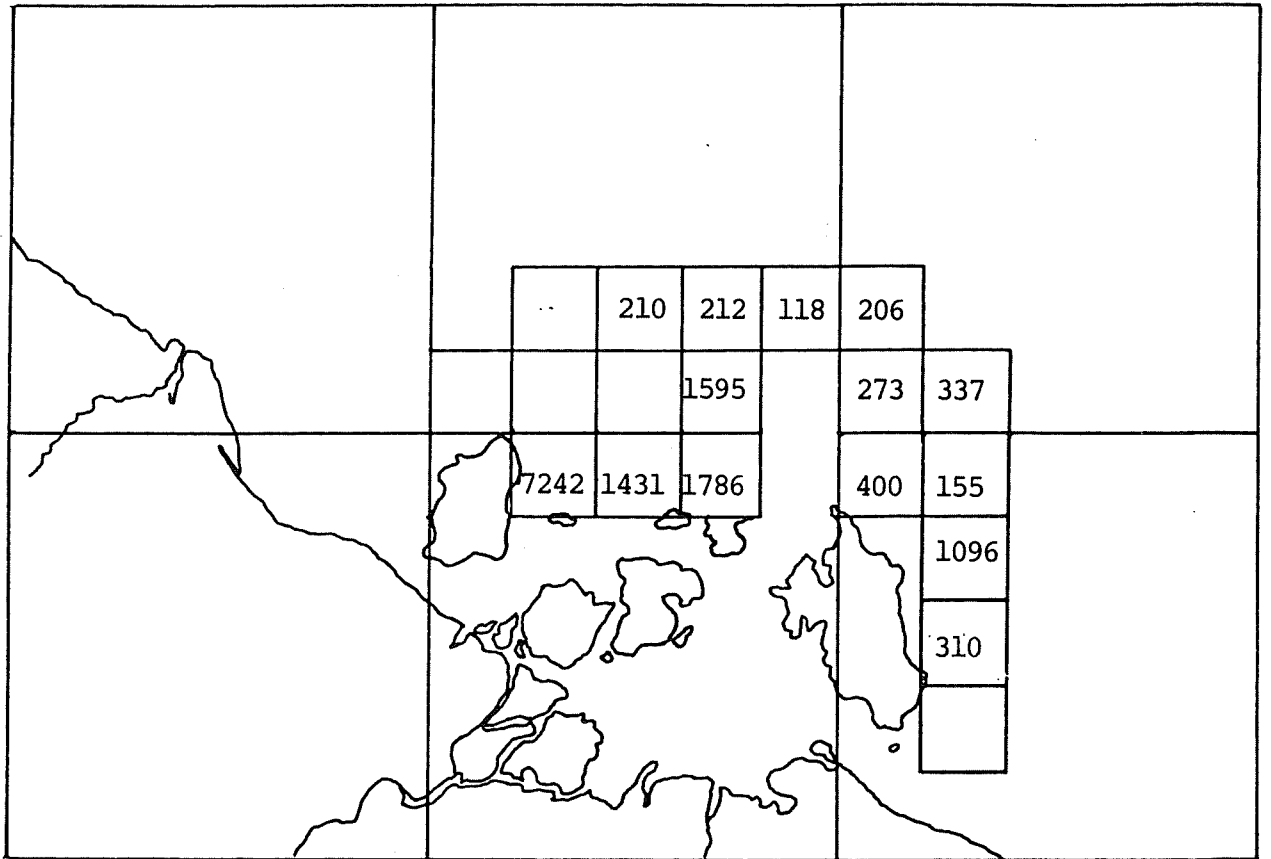


Figure 13(b) Catch rates of tiger prawns of over 30 count per pound (in grams per hour) for March 1983.
- South western Gulf of Carpentaria.

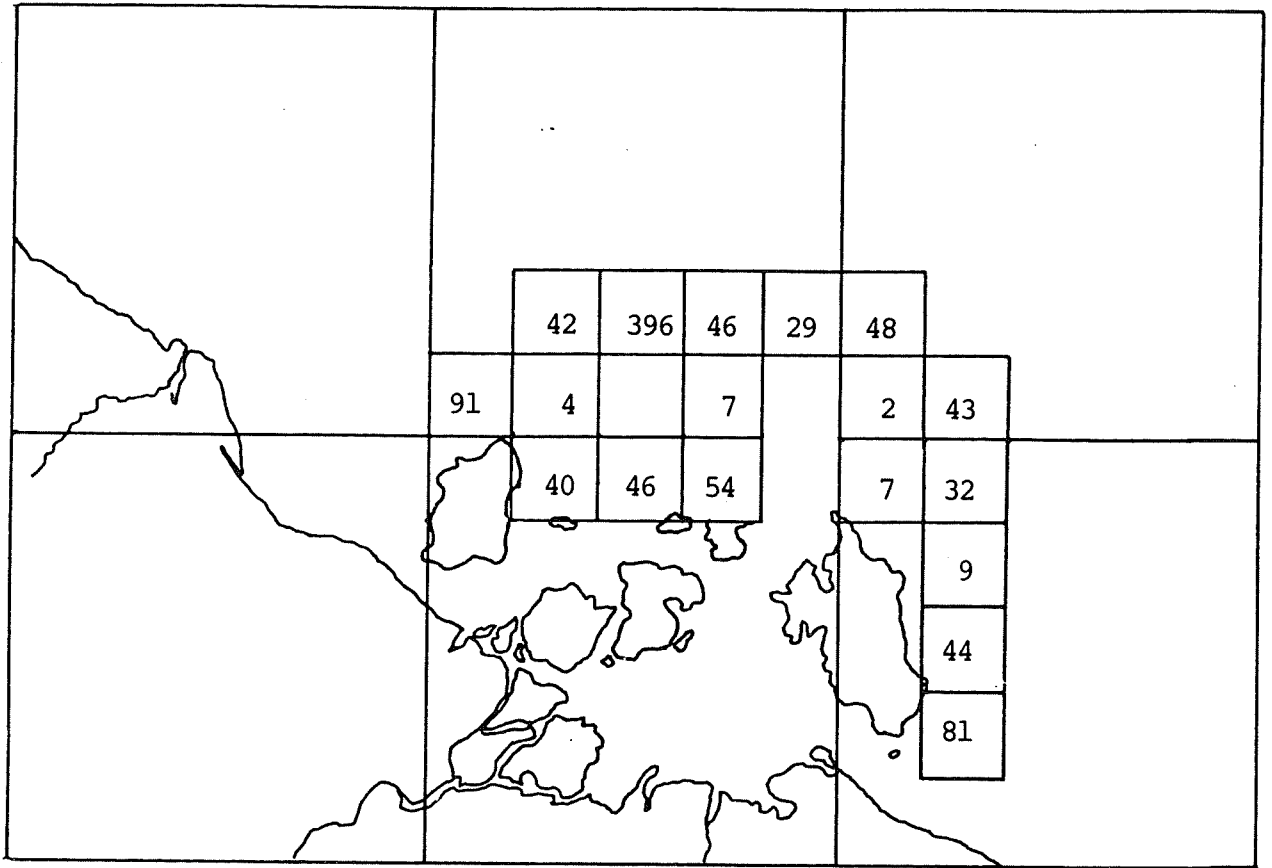


Figure 14(b) Catch rates of endeavour prawns over 30 count per pound (in grams per hour) for November 1982.
 - South western Gulf of Carpentaria.

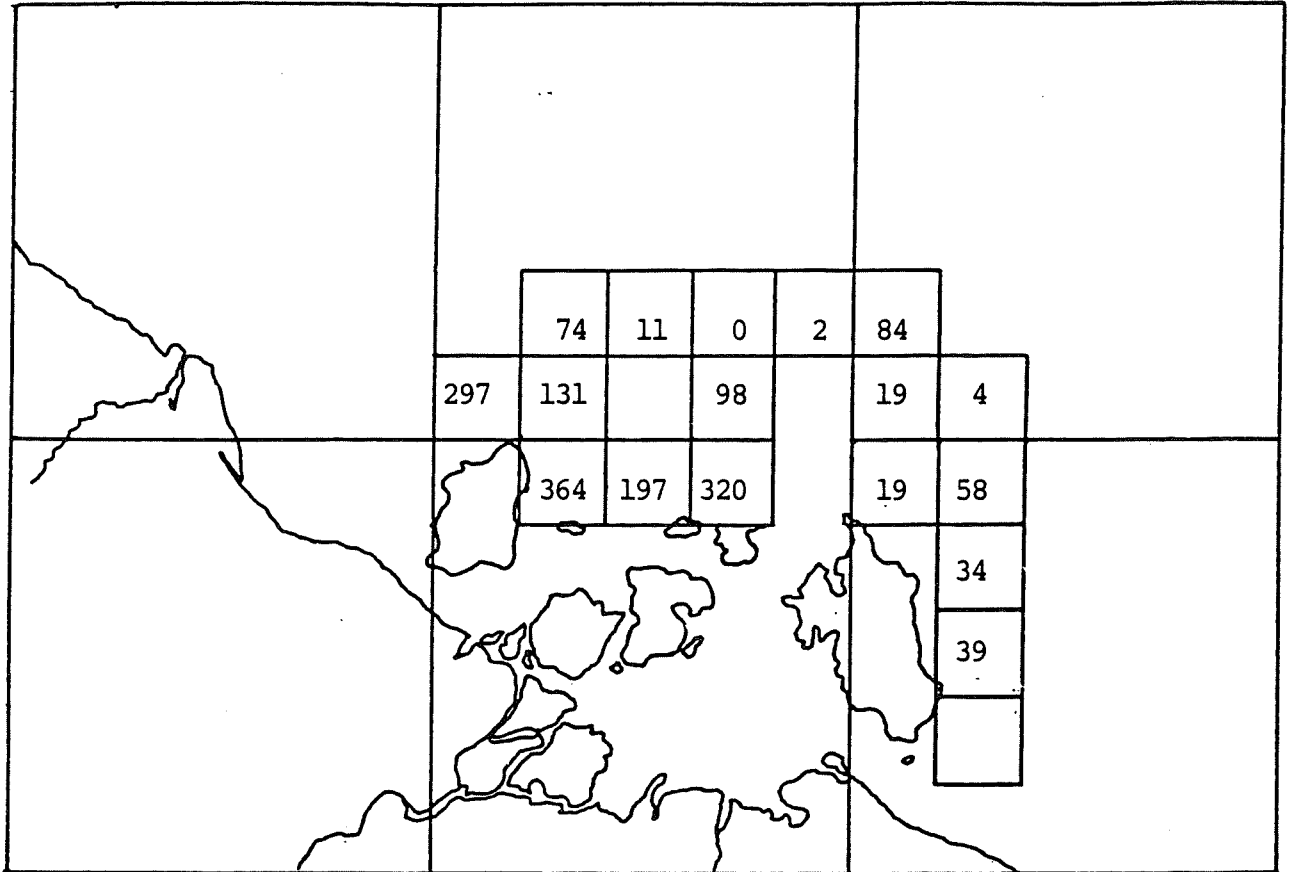


Figure 15(b) Catch rates of endeavour prawns over 30 count per pound (in grams per hour) for December 1982.
- South western Gulf of Carpentaria.

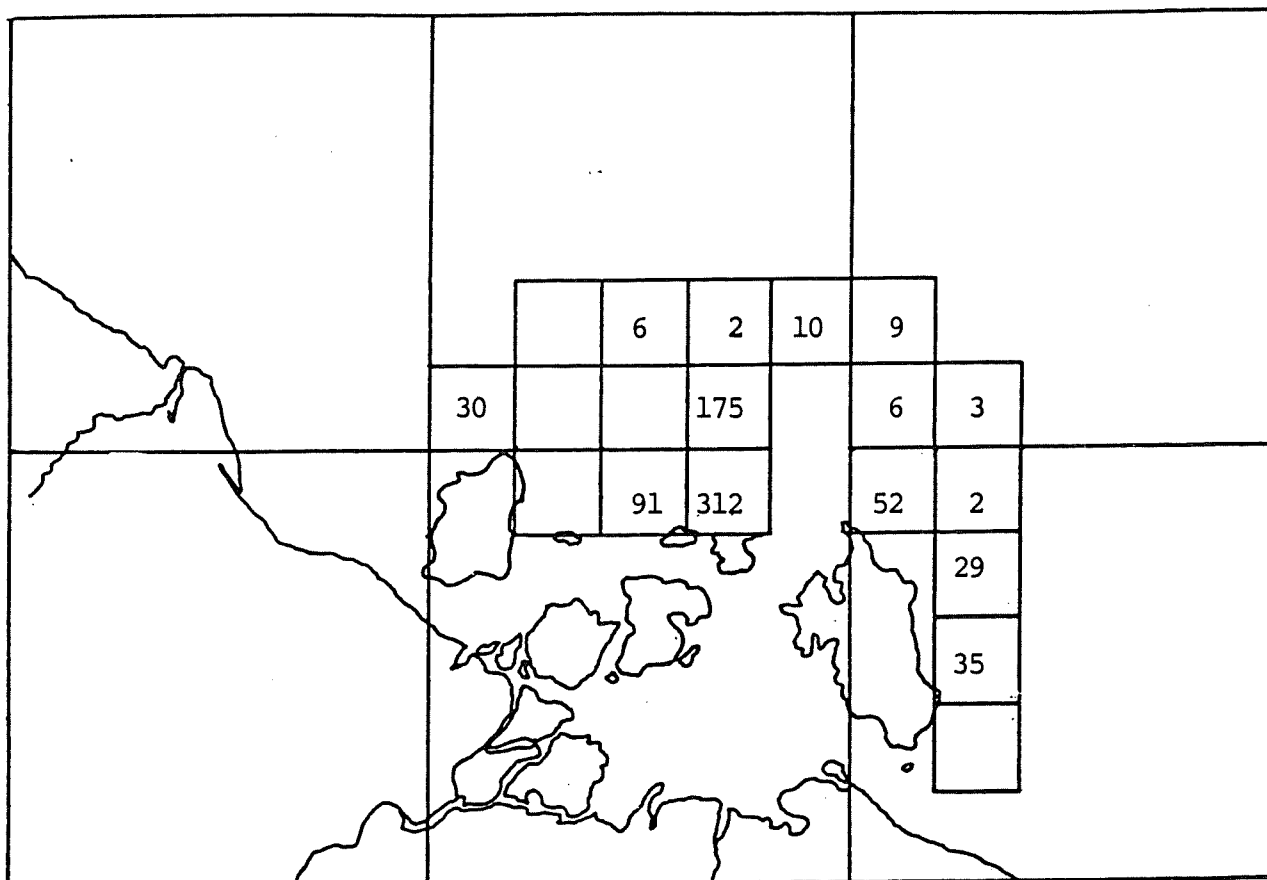


Figure 16(b) Catch rates of endeavour prawns over 30 count per pound (in grams per hour) for January 1983.
- South western Gulf of Carpentaria.

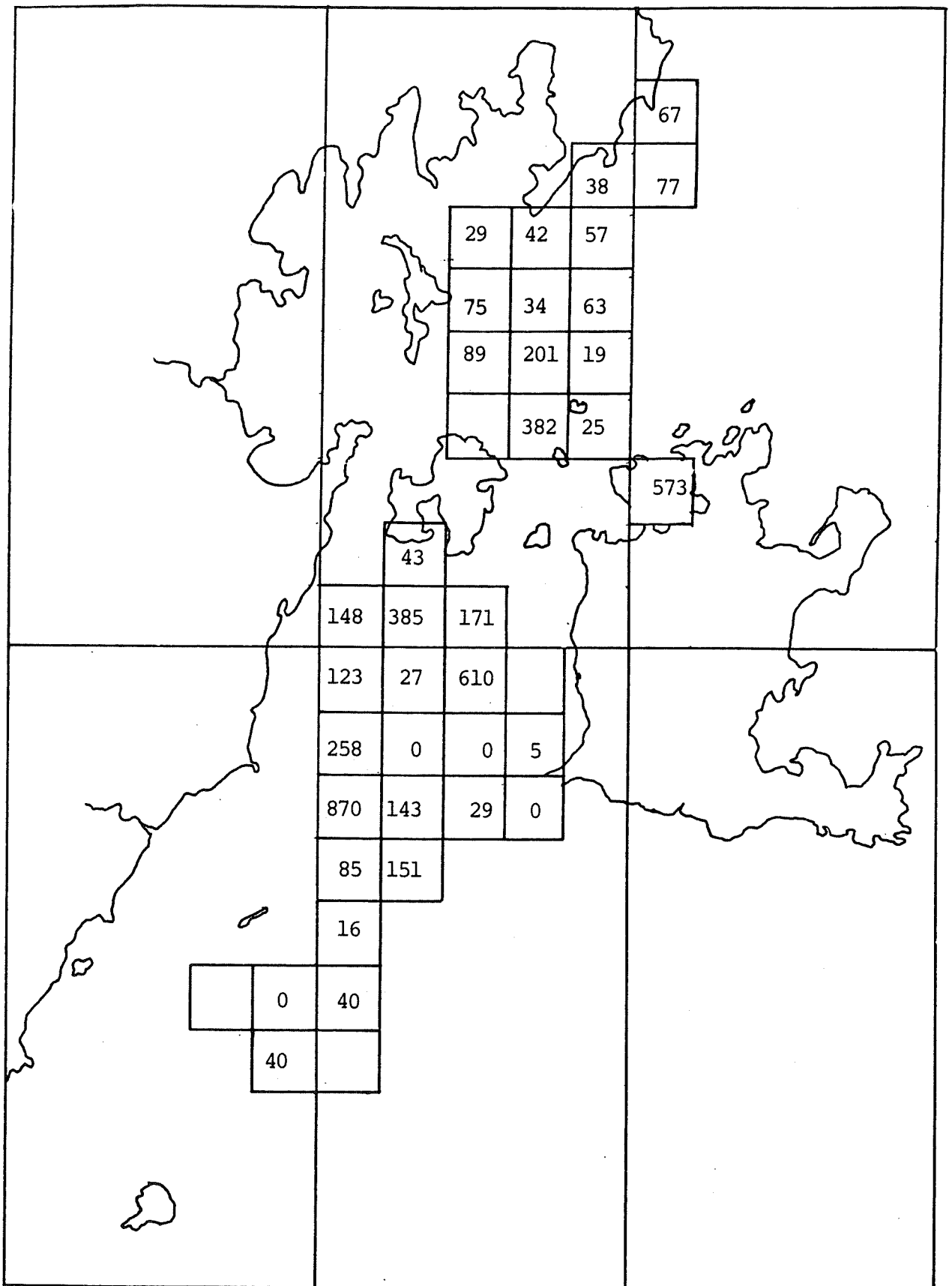


Figure 17.(a) Catch rates of endeavour prawns over 30 count per pound (in grams per hour) for February 1983.
- Central western Gulf of Carpentaria.

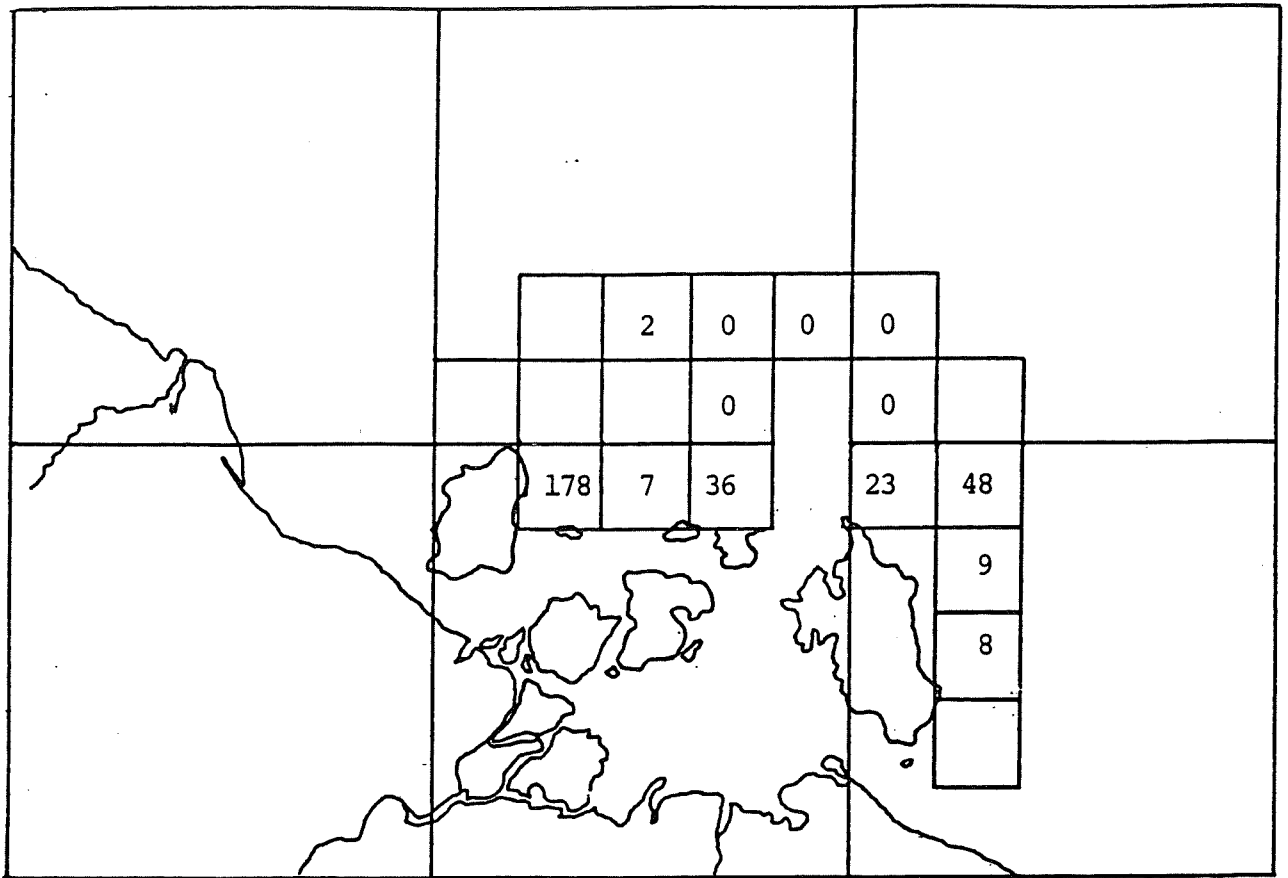


Figure 17(b) Catch rates of endeavour prawns over 30 count per pound (in grams per hour) for February 1983.
- South western Gulf of Carpentaria.

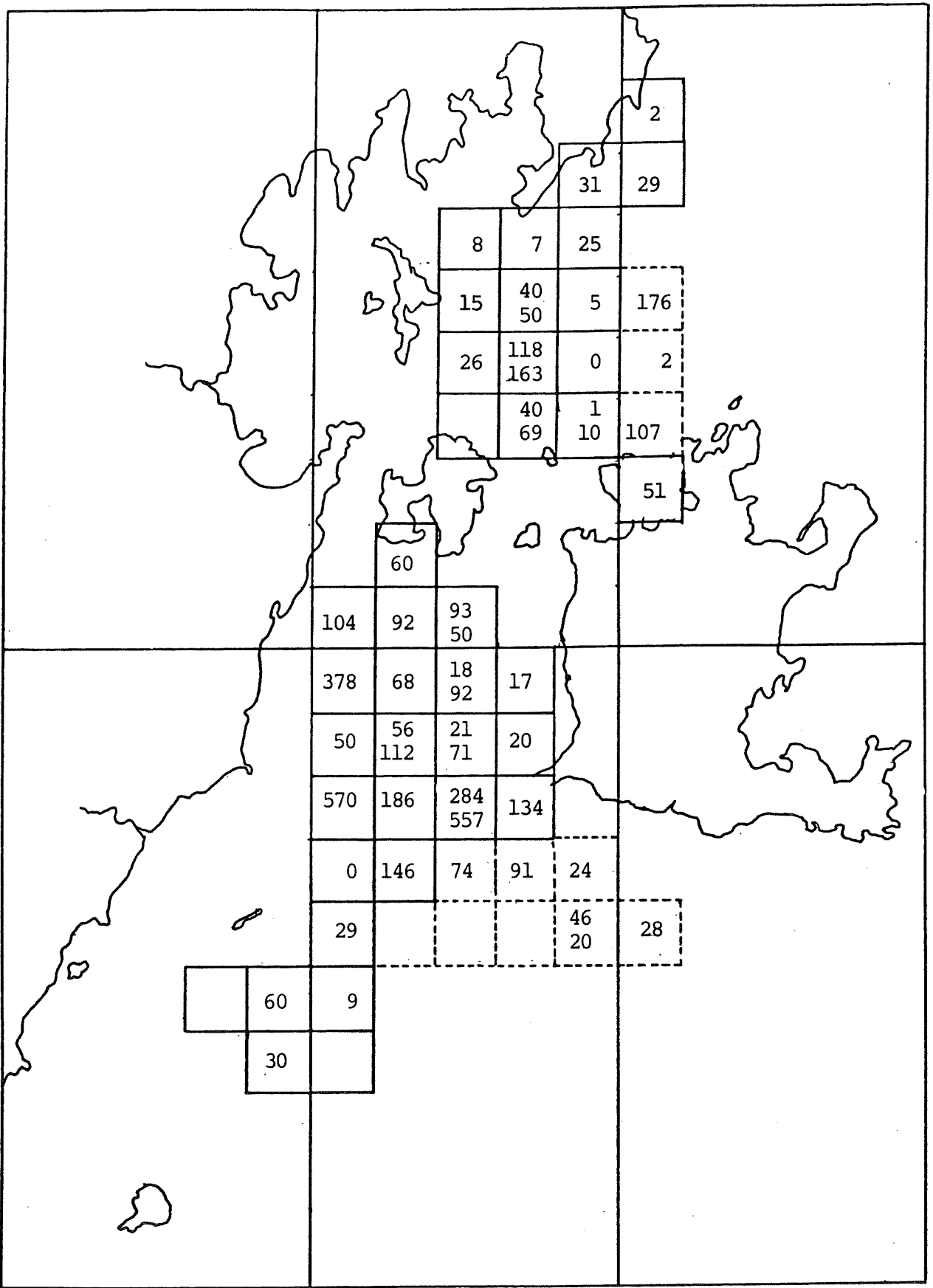


Figure 18(a) Catch rates of endeavour prawns over 30 count per pound (in grams per hour) for March 1983.
 - Central western Gulf of Carpentaria.

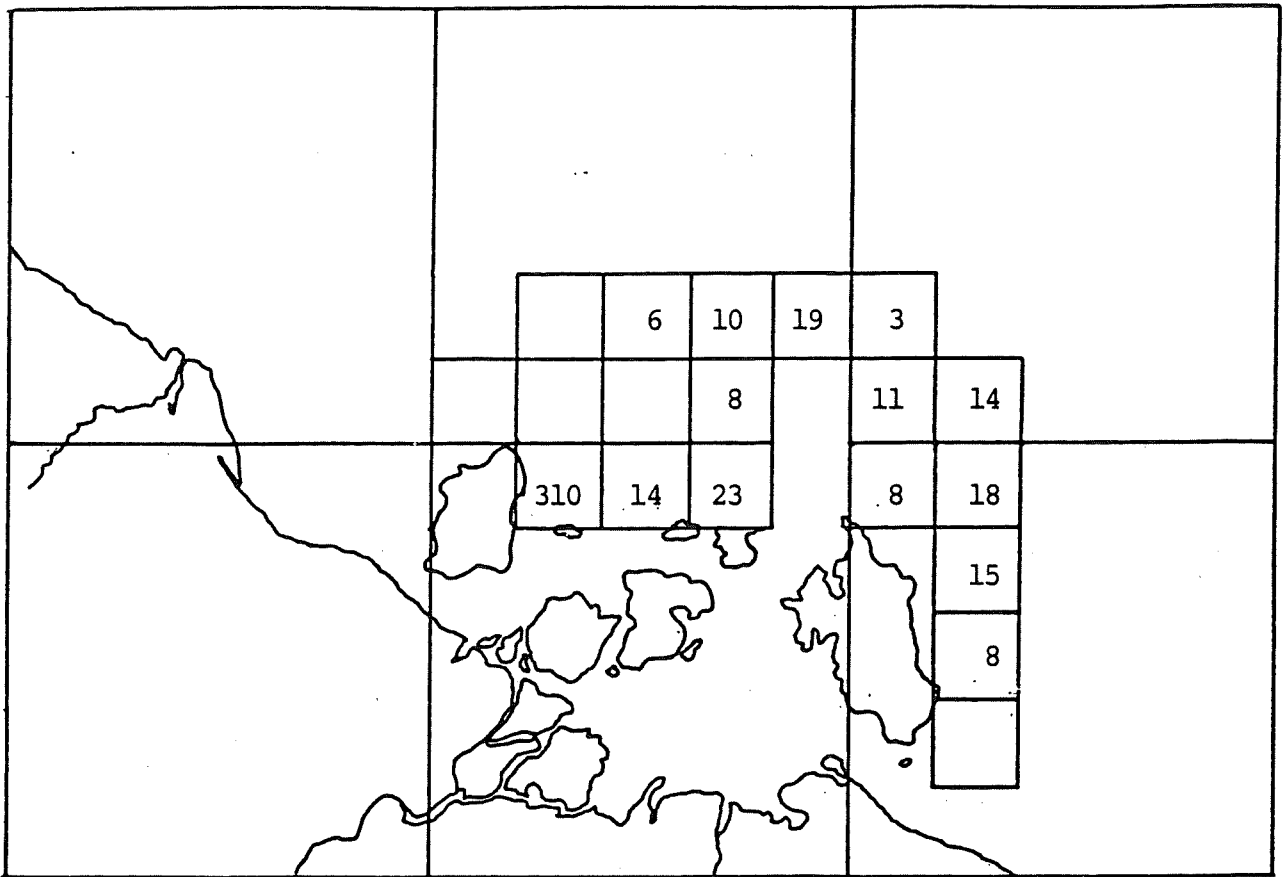


Figure 18(b) Catch rates of endeavour prawns over 30 count per pound (in grams per hour) for March 1983.
- South western Gulf of Carpentaria.

X APPENDICES

APPENDIX 1VESSEL SPECIFICATIONS

Name: "PAULWIN"

Reg. No.: FNZZ

Overall length: 15.84 m

Beam 5.3 m

Gross Displacement: 33.56 tonnes

Draught 2.74 m

Motor: Detroit Diesel, 871 rated at 179.04 Kw

Auxiliary: Detroit Diesel, 353

Dry freezer: 7,000 kg

Brine: 2,000 kg (IQF)

Main Gear: 4x4½ fathom (8.1 m) (Sandikans) nets

4 x 1.8m x 0.75m otter boards, 2 skids

Try gear: 2 fathom (3.6m) nets;

boards: 1.8m x 0.45m

Mesh size 5 cm.

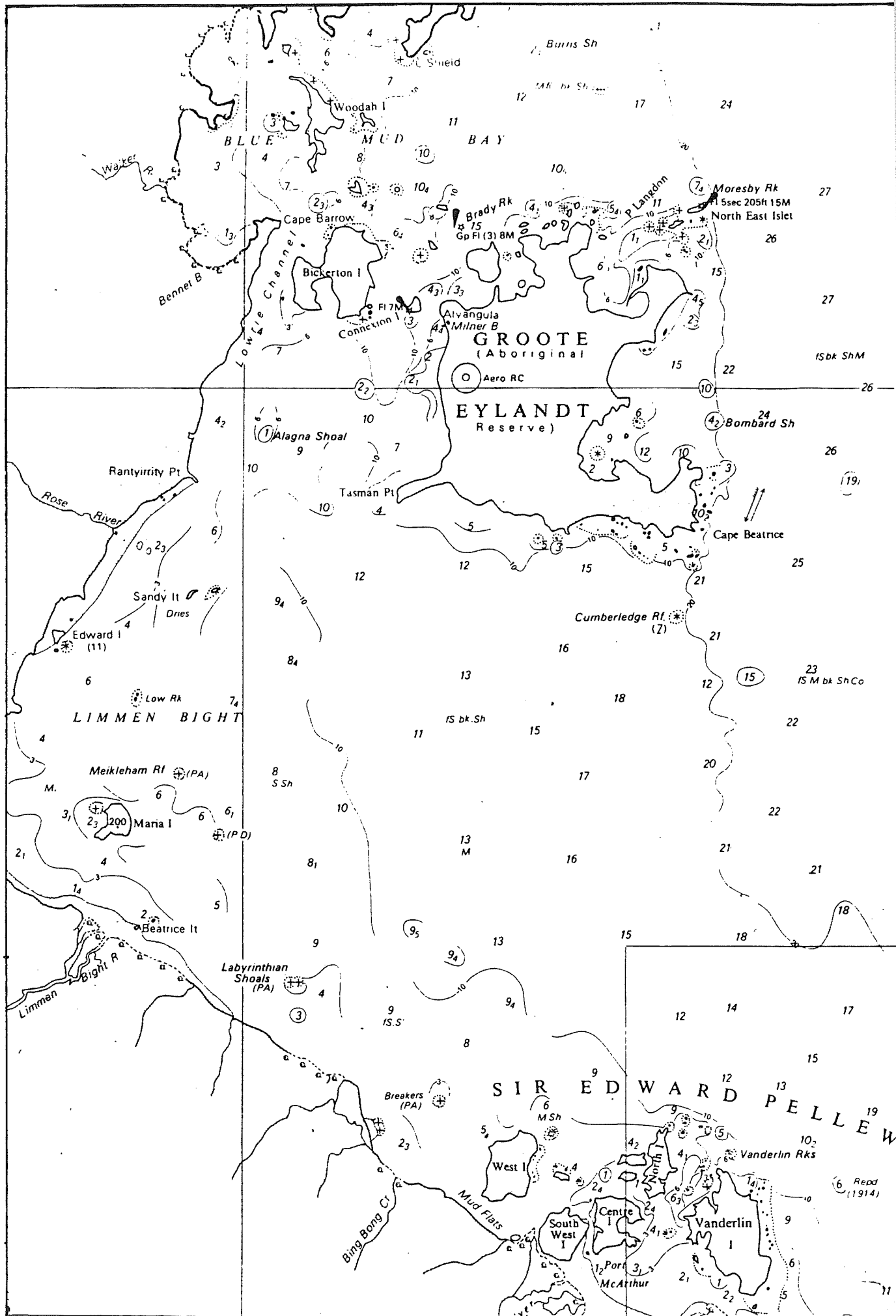
Sounders: Koden CVS 886 MK2 Colour video

Furuno FG-200 MkIII, dry paper

Radar: JRC JMA 310-6

Range: 64 nautical miles.

Satellite Navigator: Shipmate Rs 5000 DS.



APPENDIX 3SHOT DATA

VESSEL NAME:.....

SHOT NO:	DATE:	TIME:	to	Hrs.	PERIOD:	Hrs.
START POS.:						
TO:						
FINISH POS.:						
LENGTH OF TRAWL LINE:		N.M.		BEARING: 1st		2nd
DEPTH: 1	m.	2	m.	3	m.	GRID: TRAWL SPEED:
WEATHER CONDITIONS:			WIND -		CLOUD/CLEAR	
SEA COND.:		SWELL -		OPACITY		COLOUR - GREEN/BLUE
SURFACE WATER TEMP: -			°C		SALINITY -	
SIZE OF NETS:			TYPE OF NETS:			
MUD SAMPLE: COLOUR		: Coze, Mud, Sand, Shell, Gravel				
	TIGERS	ENDEAVOURS	BANANAS	OTHERS	TOTAL	
CATCH (kg)						
CATCH RATE (kg/hrs)						
CORAL PRAWN CATCH:		kg.				
COMMENT (PRAWN SIZE/CONDITION):						
BY PRODUCTS:						
BUGS			SCALLOPS			
SQUID			REEF FISH			
NUMBER OF VESSELS IN AREA:						
NAME OF VESSELS IN AREA:						
COMMENTS:						

CRUISE NO:

DATE:	SHOT:	TRAWL:	TIME:	TO:	GRID:	DEPTH:	m		
CATCH COMPOSITION BY NUMBERS									
SPECIES	> ¹ / ₂	> ¹ / ₄	> ¹ / ₈	< ¹ / ₈	SPECIES	> ¹ / ₂	> ¹ / ₄	> ¹ / ₈	< ¹ / ₈
POMADASYIDAE:Javelinfish					SIGANIDAE:Rabbitfish				
THERAPONIDAE:Therapon,Grunters					CENTRISCIDAE:Razorfish				
NEMIPTERIADAE:Threadfin Bream					PLECTORHYNCHIDAE:Swetlips				
SCOLOPSIDAE:Monocle Bream					OSTRACIIDAE:Boxfish				
ALUTERIDAE:Leather Jackets					LABRIDAE:Tuskfish				
AOGONIDAE:Cardinalfish					Eels				
TETRADONTIDAE:Pufferfish					FISTULARIIDAE:Flutemouths				
<i>Psettodes erumei</i> :Old Halibut					GERRIDAE:Silver-Biddies				
BOTHIDAL:L/H Flounder					CHAETODONTIDAE:Coralfish				
PLEURONECTIDAE:R/H Flounder					POMACANTHIDAE:Angelfish				
CYNOGLOSSIDAE:L/H Sole					CALLIONYMIDAE:Dragonets				
SOLEIDAE:R/H Sole					PEGASIDAE:Dragonfish				
<i>Saurida</i> Spp:Lizardfish,Grinners					PLATACIDAE:Batfish				
CARANGIDAE:Trevally etc.					SCOMBRIDAE:Mackerel etc				
LEIIONGNATHIDAE:Ponyfish					SPHYRAENIDAE:Barracudas				
CLUPEIDAE:Herrings					Crayfish/Lobsters				
ENGRAULIDAE:Anchovies					Portunus. Crabs				
MULLIDAE:Goatfish					Charybdis. Crabs				
MUGILLIDAE:Mullet					Squilla:Prawn Killers				
TRIACANTHIDAE:Tripodfish					Bugs				
SHARKS/RAYS					Scallops				
TACHYSURIDAE:Catfish					Other Shellfish				
PLOOSIDAE:Eeltail Catfish					Squid				
GOBIIDAE:Gobies					Cuttlefish				
ELEOTRIDAE:Gudgeons					Octopus				
BLENNIIDAE:Blennies					Echinoderms Sea Slugs				
PLATYCEPHALIDAE:Flathead					Eggs				
SCORPAENIDAE:Scorpionfish					Stars				
PRIACANTHIDAE:Bullseyes					Sponges				
<i>Sillago</i> Spp:Whiting					Hard Coral				
POLYNEMIDAE:Salmons					Soft Coral				
LUTJANIDAE:Perch					Gorgonian Coral				
SCIAENIDAE:Jewfish					Ascidians				
LETHRINIDAE:Emperors					Hydroids				
SERRANIDAE:Cods					Medusas - Blubber				
TOTAL TRASH: APPROXIMATE BASKETS									
TRASH DOMINANCE BY MASS								1.	
COMMENTS:								2.	
								3.	
								4.	
TOTAL CATCH OF PRAWNS								5.	
COMMENTS:									

APPENDIX 5

GRIDS TRAWLED OR SURVEYED

GRID NO.	C R U I S E N O.				
	1	2	3	4	5
3165	*	*	*	*	*
3264	*	*	*	*	*
3265	*	*	*	*	*
3262	*	*	*	*	*
3363	*	*	*	*	*
3364	*	*	*	*	*
3462	*	*	*	*	*
3463	*	*	*	*	**
3464	*	*	*	*	*
3465					*
3562	*	*	*	*	*
3563	*	*	*	*	**
3564	*	*	*	*	*
3565					*
3663	*	*	*	*	**
3664	*	*	*	*	**
3665					*
3765	*	*	*	*	*
3860	#				
3861	*	*	*	*	*
3862	*				
3960	*	*	*	*	*
3961	*	*	*	*	*
3962	*	*	*	*	**
3963	#				
4060	*	*	*	*	*
4061	*	*	*	*	*
4062	*	*	*	*	**
4063	*	*	*		*
4160	*	*	*	*	*
4161	*	*	*	*	**
4162	*	*	*	*	**
4163	*	*	*	*	*
4260	*	*	*	*	*
4261	*	*	*	*	*
4262	*	*	*	*	**
4263	*	*	*	*	*
4264					#
4360	*	*	*	*	*
4361	*	*	*	*	*
4362					*
4363					*
4364					*
4365					#
4460	*	*	*	*	*
4461					#
4462					*

GRID NO.	C R U I S E N O.				
	1	2	3	4	5
4463					*
4464					**
4465					*
4558	*				
4559	*	*	*	*	*
4560	*	*	*	*	*
4659	*	*	*	*	*
4660	*O	*O			
5265		#			
5266		#			
5365		#			
5366	*	*			
5367	*	*	*	*	*
5368	*	*	*	*	*
5369	*	*	*	*	*
5370	*	*	*	*	*
5465	*	*	*O	*	
5466	*	*			
5467	#				
5468	*	*	*	*	*
5470	*	*	*	*	*
5471	*	*	*	#	*
5566	*	*	*	*	*
5567	*	*	*	*	*
5568	*	*	*	*	*
5570	*	*	*	*	*
5571	*	*	*	*	*
5671	*	*	*	*	*
5771	*	*	*	*	*
5871	*				

* - trawled

- surveyed, not trawled

O - hooked up/ripped out (severe gear damage)

** - trawls duplicated

CLOSURE STUDY 1982/83

FOR INFORMATION

CRUISE C1
DATES: 3 November 1982.
FV "PAULWIN"

NT DPP

Tiger & Endeavour Prawn
closure study

Personnel

Fisheries Officers - Rik Buckworth
- Norm Carroll

Crew: Skipper - Leonard (Sonny) Tye
Mate - Duncan Robert (Scoob) Allen
Cook - Thomas Lawley

Vessel Details

Name: Paulwin
Reg. No. FNZZ

Overall length: 15.84 m Beam 5.33 m
Gross tonnage: 33.56 Draught: 2.74 m
Motor: Detroit Diesel, 871; 179.04 Kw
Auxiliary: Detroit Diesel, 353
Dry freezer: 7 000 kg
Brine: 2 000 kg (IQF)

Gear: 4x4 fathom (sanikans) nets
4x(6'x2'6") boards, 2 skeds, try net : 2 fathom,
boards 2'6"xl'6".

Sounders: Koden CVS 886 MK2 Colour video
Furuno FG-200 MkIII, dry paper

Radar: JRC JMA 310-6, 64 naut. mile.

Satellite Navigator: Shipmate RS 5000 DS.

GENERAL

As the first cruise of the 1982/83 closure study, this cruise had as its aim, the general objectives of the study: to look at size and species composition of commercial prawns in and adjacent to those commercial grounds subject to the 1982/83 closure, and where possible relate this to both biotic and abiotic factors. The first cruise is the initial point in observation of changes in species and size composition in time. Also as this was the first cruise, an additional objective was to test the methodology of the field programme and to assess if some proposed areas were actually trawlable.

The cruise satisfied most objectives. A total of 58 grids were trawled. Of the original 62 grids planned, 3 were not trawled for logistic reasons (discussed below), 4 were not trawled because either sounder traces or the skipper's previous experience indicated that the ground was not trawlable. An extra 4 grids were included, as it was considered that these particular spots were relevant to the study.

Trawling time in each grid varied. The aim was to obtain 100 prawns of each sex of the principal species, so anticipated catch rates was the primary factor in deciding trawl time. This was modified by logistic considerations. It was found that 2 hours provided sufficient numbers for the dusk and dawn shots, where 1½ hours was often insufficient. For the other shots, 1¼ to 1½ hours was quite sufficient, though 1 hour was found on some occasions to be insufficient. Of course, where prawn abundance was very low, no length of trawling time would have been sufficient.

The method of recording data onto tape was successful, though there are some drawbacks - the use of electrical equipment in wet and salty conditions, and the need for a large supply of batteries and/or recharging facilities. It is most advantageous where time is limiting, as it allows the data to be obtained and recorded in permanent form very quickly, and the data can be transcribed later (this of course requires that sufficient tape be available. Where

time is not limiting, it becomes a matter of individual preference and direct recording onto data sheets may be either slightly faster or slower, depending upon actual measuring speed etc, and individual preference and comfort.

Measurements of trash volume were recorded as fractions of a fish basket. Any more precise measure was considered impossible, and this was a very convenient method. Trash composition was treated in 3 distinct ways - numerical dominance was assessed by

- 1) Ranking the 5 most common groups; and
- 2) by assigning a numerical proportion at each group ($> \frac{1}{2}$, $> \frac{1}{4}$, $> \frac{1}{8}$, $< \frac{1}{8}$).

Mass dominance was assessed by ranking (on visual assessment) the 5 "most massive" groups.

This is fairly rapid, but it is essential that the data is recorded immediately sorting is completed.

The Smith-MacIntyre grab was inoperable throughout the trip, and despite various modifications, repairs and incantations, and several attempts at its use, one bottom sample was obtained.

From this it was obvious that in terms of time and convenience it is much better to freeze the sample intact, and leave the particle size and benthos subsampling until the return to Bartalumba Bay. Particularly with very fine, compacted sediment, it may be better to take cores when the sample is partially frozen.

Salinity and temperature measurements were taken each shot (usually about $\frac{1}{2}$ way through the shot, though for various reasons were occasionally early or late). These showed very little variation. The TPS salinity meter requires (at least) daily calibration against a known standard, and has to be kept fully charged. It also requires a minute or so of "warm-up" time, depending upon the state of its batteries. A considerable improvement was noticed when the original Ni Cad batteries were replaced.

The crew of the Paulwin were most co-operative, assisting whenever possible. Positions and depths were recorded on the chart and deck logs by the officer of the watch. This was very convenient and gave good accuracy.

Daily Notes

3 November

Grids trawled: 3165, 3265, 3264, 3364.

Departed Bartalumba Bay approximately 1330 hours. Large amounts of "coral spawn" (an algal bloom common at this time of year) floated at the entrance to the Bay. We began working at the most northerly grids. In future, we will do these in reverse order - leaving the most hazardous till last in the evening. Tiger prawns were of very good size and condition, mostly *Penaeus semisulcatus*, few parasitized. Very few endeavours, except grid 3165, where a fair sample was obtained. Both species of endeavour were present, also very tiny proportions of *P. latisulcatus*. Huge numbers of sharks were hanging around the boat, causing quite a lot of damage to the nets.

There were some difficulties with the governor of the auxiliary and we spent much of the night on 24V power. Could not get the grab to work.

4 November

Grids trawled: 3362, 3363, 3464, 3664.

Spent the day on the pick in the small bay around from Nicol Is. A fairly strong tide was running in this spot. Sonny and Scoob spent the whole morning working on the auxiliary - completely overhauling the motor, but were unable to correct the fault in the governor.

Grids 3464 and 3564 produced good samples of *P. esculentus*, Grid 3362 produced a sample of bananas, but few prawns of the other species *P. semisulcatus* were never in sufficient numbers, but were good sized, and had a heavy incidence of parasites. Both species of endeavours and *P. latisulcatus* present.

Norm Carroll spent a couple of hours working on the grab in the afternoon, but it was still unsuccessful - we came to the conclusion that the sediment was too fine to trigger the mechanism.

5 November

No grids trawled.

We decided to return to Bartalumba Bay to have the governor repaired, arriving approximately 0800 hours. Sony and Scoob spent most of the day working on the auxiliary, or chasing around town with Norm looking for the diesel repairman. Norm spent several hours modifying the grab.

The repairs could not be carried out this day, and due to the general exhaustion of all concerned it was decided to "have the night off".

6 November

Grids trawled: 3663, 3563, 3463, 3462, 3562.

Repairs to the governor were eventually effected, and we got away about 1800 hours.

P. esculentus was the dominant tiger species, whites were chiefly *Metapenaeus endeavouri*, though *M. ensis*, *P. merguiensis* and *P. latisulcatus* were all present.

7 November

Grids trawled: 3862, 3861, 3960, 3961, 3962.

Spent the day anchored up off Woodah Is., a fairly calm day, but getting breezy by dusk. Once again, a fair tide running.

First shot was delayed, as we did not steam to the "west of Groote" grounds till after dusk.

Grid 3862 produced only 2 tiger prawns, but a reasonable sample of endeavours, and heaps of fish for the larder. The very rough bottom, the amount of coral, sponge and reef fish indicated fairly clearly that we had trawled over mostly reef. Many of the endeavours were associated with lumps of sponge. This grid should be deleted from further surveys.

Other grids produced reasonable samples (except 3962, where the trawl time was insufficient). Tigers were chiefly *P. esculentus*. Whites were mostly *M. endeavouri*, with some *P. latisulcatus* and *P. longistylus* present.

Grid 3860 was deleted as being too shallow and 3963 as being too rough.

8 November

Grids trawled: 4063, 4062, 4061, 4060, 4160.

Spent the day on the pick at Milner Bay as we had to drop Sonny off to fly to his daughter's wedding.

Most grids this night seemed to be over fairly hard bottom, producing sea eggs, reef fish, sponges etc. Tigers were almost exclusively *P. esculentus*. Whites almost exclusively *M. endeavouri*, with some *P. latisulcatus*.

9 November

Grids trawled: 4260, 4261, 4161, 4162, *4163.

Spent the day in the position of the last grid last night - 4160. Norm spent quite a bit of time working on the grab, and removed one spring to reduce tension on the triggering mechanism. The grab worked while we were on the pick, in calm water, so we have an example from this spot. The grab was used after each shot, without success, and to the constant amusement of the crew and general frustration of the Fisheries officers. Tigers almost exclusively *P. esculentus*, of the few whites for the night, most were *M. endeavouri*, with some *P. latisulcatus*.

* Extra grid to original plans.

10 November

Grids trawled: *4263, 4262, 4361, 4360, 4460.

Spent day anchored up near South Pt. Tigers were all good size, chiefly brown tigers. Reasonable samples of *M. endeavouri* were also taken. Both *P. latisulcatus* and *P. longistylus* were present in small number. Weather getting a bit rough towards the end of the night.

* Extra grid.

11 November

Grids trawled: *4558, 4559, 4560, 4659, 4660.

Spent the day anchored up at Low Rock. Decided to trawl the extra grid*, as we would have had to steam through it anyway. This produced few prawns and lots of hassles and masses of coral and sponge, snapped the starboard lazy line - we had to spill one bag to get it aboard. Should delete this grid next trip.

Good samples of *P. esculentus*, *P. latisulcatus* and *M. endeavouri*. Grid 4660 had a bad hookup - sample there was too small.

12 November

Grids trawled: 5465, 5466, *5566, 5567, 5568.

Spent the day near West Is. (Vanderlins). These grids produced good samples of brown tigers and kings. Endeavours and grooved tigers present but negligible. Many newly recruited.

* Extra grid.

13 November

Grids trawled: 5468, 5368, 5369, 5370, 5470.

Spent day anchored up in Paradise Bay. A green barra/mackerel boat also there, many dinghys on the shore.

Most tigers were *P. esculentus*. Whites were dominated by *P. latisulcatus*, with *M. endeavouri*, *P. merguensis* and *P. longistylus* also present.

14 November

Grids trawled: 5871, 5771, 5671, 5571, 5471, 5570.

This was very much the same as the previous night in terms of species composition, but average sizes tended to be smaller on the whole. 5871 very rocky - potential hook-ups.

15 November

Grids trawled: 5367, 5366.

Both trawls produced good samples of fairly small *P. esculentus* and some *P. latisulcatus* and *M. endeavouri*. Hooked up very badly just as we were about to winch up the second shot - this took 3½ hours to free, in very heavy swell. The nets were totally ruined.

Steamed for South Pt., where the nets were changed, then steamed for North West Bay.

Grids 5265, 5266 and 5365 had to be missed. 5467 is foul ground.

16 November

Grids trawled: 3765.

This shot produced samples of *P. esculentus*, *P. semisulcatus* and some *M. endeavouri* and *M. ensis*. No leaders or kings were present.

Made Port about 0900 on 17 November 1982.

General conclusions

Except for a few spots (notably fairly shallow areas), the mean size of prawns was fairly high. In most areas, there were distinct modes of recruits moving in, though these were as yet not a large fraction, by weight or numbers.

Kings comprised a larger proportion of the catch than would be expected from logbook records. This might be something that needs looking into.

CLOSURE STUDY 1982/83

CRUISE C2

DATES 2 - 15 DECEMBER 1982.

VESSEL: F.V. "PAULWIN"

Personnel

Fisheries Officers - Rik Buckworth
- A. Baker

Crew

Skipper - Duncan R. (Scoob) Allen
Cook & Deck. - Thomas Lawley

Vessel Details: As for Cruise Report C1.

GENERAL

This cruise proved to be very successful, with the methodology developed in cruise 1 again being applicable. Data gathered in the first cruise reduced the time necessary for searching for suitable runs, and allowed more trawling time in those areas where samples had been of insufficient size. A significant contributing factor, as well as the experience gained in the first trip, was the good demeanour and willingness to cooperate, wherever possible, by the crew of the vessel.

Some extra goals were fulfilled this cruise. These were to gather specimens of trash dominant species, for identification, and to take representative photographs of our operations. A paravane mud scoop was used in lieu of the Smith MacIntyre grab. Though this will provide less quantitative data, it was deemed preferable on the grounds that it is easy to operate and will give good indications of particle size composition against species and size composition.

As the salinity meters used for C1 have been shown to require calibration, it was decided to take salinity samples and measure these with an S-T meter on return to Bartalumba Bay.

A total of 55 grids were fished. Of these, grid 4660 should be deleted next trip, as we have hooked up here both cruises, and the sounder trace indicated consistently rough bottoms. Another 3 grids were surveyed, 5365, 5265 and 5266, but time did not permit trawling. These should be included next cruise.

Once again, it was not always possible to obtain samples of approximately 200 prawns of the dominant species, except where catch rates were very low, a good indication of size composition was gained.

Penaeus esculentus dominated most tiger prawn catches, with *P. semisulcatus* being dominant in a few grids in the northern survey area only. The latter species was usually present in catches, but was typically $< 1\%$ of the *P. esculentus* catch (in terms of numbers).

White prawns were seldom dominant. *Metapenaeus endeavouri* were the chief species of these. *P. latisulcatus* was again quite common in catches to the south of Groote Eylandt, and in particular, in the Vanderlin's region.

Though this should be tested statistically, it seemed that a greater proportion of all species were small.

The mud sampler provided a good indication of the substrate type in all areas trawled. It can be stated that to the north of Groote Eylandt, fine silts and ooze comprise a large fraction of the sediment. Coarse sand and a large proportion of shell composed the samples from the south and west of the island. In the Vanderlin's area, the substrate is mostly sand, with a lower proportion of shell than in the Groote area.

Greater attention was given to trash composition this trip, due to the mutual interest of the fisheries officers. The ranking method used in the first cruise was maintained. Efforts were made to identify many of the less conspicuous elements, which nevertheless contribute to diversity. Specimens were taken of many of the major species.

SUMMARY OF GRIDS TRAWLED

<u>Date</u>	<u>Grids</u>
<u>2 Dec.</u>	(1) 3464; (2) 3364; (3) 3265; (4) 3165; (5) 3264.
<u>3 Dec.</u>	(6) 3363; (7) 3362; (8) 3462; (9) 3463; (10) 3562.
<u>4 Dec.</u>	(11) 3663; (12) 3563; (13) 3564; (14) 3664; (15) 3765.
<u>5 Dec.</u>	(16) 3861; (17) 3960; (18) 4060; (19) 4061; (20) 3961.
<u>6 Dec.</u>	(21) 3962; (22) 4062; (23) 4063; (24) 4163; (25) 4162.
<u>7 Dec.</u>	(26) 4263; (27) 4262; (28) 4261; (29) 4161; (30) 4160.
<u>8 Dec.</u>	(31) 4260; (32) 4361; (33) 4360; (34) 4460; (35) 4560.
<u>9 Dec.</u>	(36) 4559; (37) 4659; (38) 4660.
<u>10 Dec.</u>	NOT FISHED - NET REPAIRS.
<u>11 Dec.</u>	(39) 5566; (40) 5567; (41) 5568; (42) 5468; (43) 5367.
<u>12 Dec.</u>	(44) 5368; (45) 5369; (46) 5370; (47) 5470; (48) 5471.
<u>13 Dec.</u>	(49) 5771; (50) 5671; (51) 5571; (52) 5570.
<u>14 Dec.</u>	(53) 5466; (54) 5465; (55) 5366.

DAILY SUMMARIES

2 December

Departed Bartalumba Bay 1430 hrs, steamed directly to grid 3464, where we were to begin. After changing a filter on the main, we shot away at 1830 hrs.

All shots were fairly clean (excepting the shovel-nosed rays and saw shark caught in the last shot).

The paravane mud dredge proved very easy to use. We had it rigged to the try gear winch which made it very rapid and convenient to operate. One sample was taken each shot.

Prawn catches in all grids were dominated by *P. semisulcatus*, which were of excellent quality and size. Most females were ovigerous. *P. esculentus* were usually present in small quantities. Proportions were lower than the previous cruise; average size was still fairly small. Endeavours of both species were caught, typically larger. *Metapenaeopsis* and *Trachypenaeus* were present most shots. *Solenocera* present last shot.

Trash was dominated, as in the C1 by *Pomadasys* - sharks and rays being the mass dominants frequently.

3 December

Spent day in small bay near Cape Arrowsmith. Nights fishing a little disappointing, with only the last shot producing the desired sample of 100 prawns of each sex for the dominant species. However, the others did produce sufficient prawns to give an adequate indication of size and species composition. The depressed catch rates occurred in these grids on the last cruise.

Most shots were dominated by *Penaeus esculentus* - these were typically small - while the *P. semisulcatus* were always present to some extent, and were usually large and excellent quality. Endeavours were present in small concentrations, and were usually of good quality.

Grids 3362, 3462, 3562 all produced some very small mature animals. Coral prawns were of negligible proportions to the composition by weight or number - *Trachypenaeus*, *Metapenaeopsis*, *Solenocera* and *Atypopenaeus* all present during the night.

Pomadasys was again the dominant (numerically) element of the trash. Mass dominance was typically by sharks and rays. Cardinals, jewfish, grinders were all fairly important.

4 December

Anchored up near Hawksnest Is. (Grid 3664). Try winch motor packed-in during third haul, thus only 3 mud samples this night. These seemed to be sandier in composition than previously (fine, blue mud). In each of the grids covered, *P. esculentus* dominated, with only N.W. Bay producing a decent sample of *P. semisulcatus*.

Except for N.W. Bay, javelin fish were again the numerical dominant, and sharks/rays the mass dominant. N.W. Bay once again had mobs of diamond crabs, gudgeous and ascidians dominating. Catch rates were an improvement on previous night. N.B. also that there were some other vessels around (outside the closures).

5 December

Spent day on pick at Milner Bay. "Scoob" dismantled try winch but the motor was burnt out. Will try to replace tomorrow. This was first night's fishing in Bickerton - Sth.Pt. area. This was the most tiring night so far - the 'changeover' from diurnal to nocturnal really making itself felt.

Catches were dominated by *P. esculentus* in all cases. *P. semisulcatus* was typically represented by 1 or 2 specimens, if any. All but the 4th shot (grid 4061) provided good samples. The 4th shot, though the numbers were slightly dominant was still sufficient to give a reasonable estimate of mean size. Though some shots contained very large prawns, all showed significant numbers of new recruits. Endeavour catches were poor, though they were sufficient to indicate, again, that the populations comprise both large prawns and newer recruits. No *M. ensis* and very few *P. latisulcatus* were taken.

Mud samples were taken at each grid, using a hauling rope and capston instead of the try winch. This proved slightly more tedious, but worked well enough. Samples were sandy/gritty in composition, rather than the finer muds to the north of Groote.

Trash composition was dominated by hard bottom/reef fauna. Much less domination by rays and sharks etc.

6 December

Spent day on pick at Milner Bay again. Were met by Dave Kelly. "Scoob" spent the day in search of a new motor for the try winch, and managed a little partying as well. Arnold and Tommy remained on board. Rik went to Bartalumba Bay to check mail etc.

This night we fished the grids in shore on the western side of Groote.

Tiger catches were almost completely *P. esculentus* (*P. semisulcatus* absent or $< 1\%$). Catch rates were poor in grids 3962, 4062 and 4063 (W, S and S.W. of Rutland Pt.), but samples were sufficient to give good indications of size composition. The other grids produced better catch rates and thus better samples. Endeavour samples were completely *M. endeavouri*. These were typically composed of 2 modes, though the small samples render this suspect. A very few *P. latisulcatus* were caught.

Mud samples showed a sand/shell grid composition, with some in grids 4063 and 4162.

Trash was more a "hard bottom" fauna than in the northern grids. *Nemipterus* was probably the most conspicuous element, with sharks and rays, *Euthera*, scallops and eeltails were fairly important elements.

7 December

Spent day anchored at South Pt. Kathy B and Tubridgi-K were anchored here, but left at about 0900 hrs to steam to Vanderlins. Later received a radio report from Tubridgi that it had blown up a main motor.

Grids 4263 and 4262 produced low catch rates of tigers, and thus smaller samples than desired, but were indicative of size composition. The other grids produced better samples. All were mostly *P. esculentus* (*P. semisulcatus* < 1%), of medium to large size, but with clear waves of recruits. Four shots produced good samples of endeavours, with large numbers of small, soft recruits. *P. latisulcatus* usually large, were incidental to most shots, 1 x *P. longistylus* was caught in grid 4261.

Trash for the night was dominated by large "vagrant" elements, turtles twice rays and sponge. More common elements were the *Nemipterus*, *Pomadasys* and *Eutheraapon* elements of the previous nights.

Mud samples comprised grey clays, shell, sand and in grid 4161, some laterite.

8 December

Spent day at anchor in position for the first shot, at grid 4260. The weather blew up badly during the day, with 30 kt winds and a 4 m swell at about midday. Fortunately this dropped towards dusk and by the end of the first shot it had grown relatively calm.

Good samples of *P. esculentus* were taken in all grids except 4460, with fairly large prawns (though some obvious recruits were present always). *P. semisulcatus*, if present, were < 1% of tigers. Only small catches of whites were taken, approximately even numbers of *M. endeavouri* and *P. latisulcatus* (a larger proportion than previous nights). The endeavours and kings were of medium size. No *M. ensis*, *P. longistylus* or *P. merguiensis* were present in any sample.

Paramonacanthus was a very dominant element in all shots, usually by weight as well as number. Large sharks/rays were mass dominant in two shots. *Pomadasys*, *Eutheraapon* & *Nemipterus* were important both numerically and by mass in all shots. Goatfish were also abundant.

Mud samples were brown/grey sand, usually fairly coarse.

9 December

Spent day on pick in position for first trawl, in grid 4559. The three grids fished this night are typified by fairly hard bottoms. We hooked up third shot, grid 4660, and ripped out which ended the night's fishing. As we hooked up in this grid during cruise C1, and as the sounder trace showed a consistently hard, rough bottom throughout the grid, we should delete this grid from future surveys.

The only good sample of tigers came from grid 4559. These were all *P. esculentus* (no *P. semisulcatus* were taken this night) and encompassed a wide size range. The shots in grids 4659 and 4660 produced very few prawns at all, but these were large. Very few endeavours were caught. The second shot produced a $\frac{1}{2}$ sample of *P. latisulcatus*, which were mostly of good size. No *M. ensis*, *P. longistylus* or *P. merguiensis* were caught.

Trash was again dominated by *Pomadasyds*, *Eutherapon*, *Nemipterus* and others of the Lutjanid group (especially shot 3). Shot 3 also produced rays and whiting.

Substrate samples were mostly sand and grit - no mud - with the third grid (4660) producing a fine gravel.

As noted above, we hooked up and ripped out after trawling for one hour in grid 4660. Fortunately, this was the last grid planned for this night. We also lost the port stabilizer, at some time unknown.

We steamed for the Vanderlins immediately the mud sample was taken, arriving about 0700.

10 December

Spent day on pick at the bay on the west of Watron Is. (grid 5567). Scoob and Tommy spent all day and most of the night repairing the nets - were thus unable to fish this night.

11 December

This proved to be a very difficult night's work. The sea became progressively rougher, and the product was typically small - thus more difficult to sort and measure.

The grids trawled this night were fairly shallow, and mostly produced large no's of very small *P. esculentus*. *P. semisulcatus* was present in small proportions ($< 1\%$), individuals were small also.

Though a fairly low proportion of the catch, *M. endeavouri* and *P. latisulcatus* were of sufficient numbers to give the clear indication that this area is also a "nursery ground" for this species. A few individuals of *P. merguensis* were caught, on the whole of medium size, but were too few to be able to say anything very valid about size in this species.

Trash was fairly variable, but *Eutherapon*, *Nemipterids*, *Pomadasys* and whiting were important both numerically and by mass. Rays were mass dominants in one shot.

Substrates comprised mostly sands, with some grey clays associated.

12 December

Only 2 shots (grids 5470 and 5471) produced good samples of *P. esculentus* except grid 5471. (*P. semisulcatus* typically less than 1%, N.B. also there were large individuals): *P. latisulcatus* were dominant in 2 grids 5368, 5369. *M. endeavouri* were always present in small numbers.

Kings were mostly large. Other species were bimodal (particularly clear in the endeavours), but small prawns are definitely numerically dominant in this area.

"Reef" elements were dominant in the by-catch - sponge, emperors, *Lutjanus* and the ubiquitous *Nemipterids* being most important.

Substrate samples were typically coarse, brown sand.

13 December

Spent the day on the pick in position for the first shot (grid 5771). This was again a difficult night - the lack of stabilizers in the rough seas made measurement etc. that much more difficult.

Only 4 shots were made. Tigers were dominated by *P. esculentus*. These samples showed clear recruitment modes (though the proportions of large/small prawns varied grid to grid). *P. semisulcatus* was usually present in minimal proportions. Whites were in small proportion, with *P. latisulcatus* and *M. endeavouri* dominating in separate shots. Seems a slight correlation between *M. endeavouri* and "reefy/spongy" trash, the kings were so with the sand/clear bottoms. This may only be an impression and not borne out by the analysis.

The trash in the first 2 shots (grids 5771 and 5671) was dominated by the *Pomadasys*, *Eutherapon*, *Polynemid* groups. These were less important in grids 5571 and 5570, where the "reef" elements came to the fore, with Emperors, other reef fish, sponge etc. gaining some dominance. Grid 5570 was perhaps composed of both elements. The substrate sampling programme was less successful this night. The first two shots provided samples of a grey mud/sand composition. No samples were taken in shots 3 and 4, as the mud bag burst, and the sea was too rough to allow replacement.

By the end of the fourth shot, it had become very rough, and we had to place the prawns in the chiller immediately after sorting, it was too rough to even dip them. They were measured when we reached anchorage, by which time they were in a fairly poor state, and it was decided to condemn them rather than risk devaluing the whole catch.

14 December

Anchored at a point near West Is. (grid 5566).

All three shots made good catches of *P. esculentus*, which were typically small; *P. semisulcatus* were small also, but were in very small proportions. No full samples of *M. endeavouri* were taken. However, in grids 5465 and 5366 they were adequate to give a good indication of sizes. Grid 5465 had mostly small animals, with suggestions of 2 modes. Larger specimens dominated the sample from grid 5366.

P. latisulcatus were caught each shot but were in negligible proportions, and of wide size range. 2 only *P. merguensis* were caught in grid 5466, and this species was absent in subsequent shots.

Trash was very much composed of the "reef element" with gorgonian corals, sponge reef fish and (most irritatingly) many hydroids in each shot. Sharks and rays dominated the mass in shots 1 and 3; numbers were dominated by *Eutherapons*, *whittings*, *Nemipterus*, *Pomadasys* and emperors and Lutjanids.

Mud samples were taken each shot. These comprised mostly grey sands.

Only 3 shots were possible this night, as it was necessary to examine each grid on the sounder for clear trawling ground. Grids 5365, 5265 and 5266 were examined for suitable trawling runs for the next survey, though time did not permit fishing them this cruise.

15 December

We made very good time from the Vanderlins to Bartalumba Bay, (c. 0530 - 2000). This was facilitated by calm weather, a strong following current and no stabilizers. Returned to Bartalumba Bay office approximately 2230 hrs.

16 December

Unloaded gear from "Paulwin", and transferred catch to N.R. Shoal.

CLOSURE STUDY 1982/83

CRUISE C3

31 DECEMBER 1982 - 14 JANUARY 1983

F.V. "PAULWIN"

PERSONNEL: NT Fisheries Officers:

Mr A. Baker
Mr N. Carroll

CREW: Mr L. ("Sonny") Tye (Skipper)
Mr Tom Lawley (Decky)
Miss V. Tye (Cook)

VESSEL DETAILS:

Name: "PAULWIN"
Reg. No: FNZZ
Overall length: 15.84 m Beam: 5.33 m
Gross Tonnage: 33.56 Draught: 2.74 m
Motor: Detroit Diesel, 871, 179.04 Kw
Auxiliary: Detroit Diesel, 353
Dry Freezer: 7,000kg Brine: 2,000 kg (IQF)
Gear: 4x4 fathom (sanikans) nets
4x(6' x 2'6") boards, 2 skeds, try net :
2 fathom boards 2'6" x 1'6".
Sounders: Kodak CVS 886 MK2 Colour video
Furuno GF-200 Mk III, dry paper
Radar: JRC JMA 310-6, 64 naut. mile
Satelite
Navigator: Shipmate RS 5000 DS

SUMMARY OF GRIDS TRAWLED

31.12.82: (1) 3165 (2) 3265
01.01.83: (3) 3264 (4) 3364 (5) 3363 (6) 3362 (7) 3462
02.01.83: (8) 3562 (9) 3463 (10) 3464 (11) 3563 (12) 3663
03.01.83: (13) 3564 (14) 3664 (15) 3765
04.01.83: (16) 3861 (17) 3960 (18) 4060 (19) 4061 (20) 3961
05.01.83: (21) 3962 (22) 4062 (23) 4063 (24) 4163 (25) 4162
06.01.83: (26) 4263 (27) 4262
07.01.83: (28) 4261 (29) 4161 (30) 4160 (31) 4260 (32) 4361
08.01.83: (33) 4360 (34) 4460 (35) 4560 (36) 4559 (37) 4659
09.01.83: (38) 5465
10.01.83: (39) 5567 (40) 5568 (41) 5468 (42) 5367 (43) 5368
11.01.83: (44) 5369 (45) 5370 (46) 5470 (47) 5471 (48) 5571
12.01.83: (49) 5771 (50) 5671 (51) 5570
13.01.83: Steaming to Groote.
14.01.83: Arrived Bartalumba Bay.

DAILY SUMMARY

31 December 1982

Departed Bartalumba Bay at 1600 hrs. Late departure was due to some "early" New Year drinks. Power problems were experienced due to two inoperative alternators. Two shots were completed tonight, the two northern most grids ie 3165, 3265.

SHOT 1 (3165)

P. semisulcatus was the most predominant species but the numbers were small at only 111 prawns. *P. esculentus*, *P. latisulcatus* and *M. endeavouri* were also present in small numbers. This was a two hour shot. Port gear did not seem to be fishing correctly.

SHOT 2 (3265)

This shot was for 1½ hours, catch rate was very poor. The port gear had a nil catch. The major species was again *P. semisulcatus* but only 40 prawns. Due to the steaming distance to the next shot,

poor catch rates which would have resulted in only a one hour trawl time for the next shot, it was decided to cancel any further shots for the night. *P. esculentus*, *P. latisulcatus* and *M. endeavouri* were present in very small numbers.

1 January 1983

No problems were experienced tonight although limited power was only available due to the R/S alternators. This resulted in no colour sounder, auto-pilot and limited use of the radar.

SHOT 1 (3264)

Predominant species was *P. semisulcatus* but only 118 individuals. *P. esculentus*, *P. latisulcatus*, *P. longistylus* and *M. endeavouri* were all present. Four kgs of *Trachypena* spp were also present. Cardinalfish formed the major part of the trash.

SHOT 2 (3364)

P. semisulcatus was again the major species sampled, 216 individuals. A good sample of *P. esculentus* was also measured, *M. endeavouri* and *M. ensis* were also present. The major trash fish were Javelinfish (*Pomadasyidae*). A mud sample was taken, as for the previous shots it consisted of blue/grey ooze.

SHOT 3 (3363)

P. semisulcatus was again the dominate species measured but the numbers of all species was low ie less than 100 measured. Javelinfish was again the major trash fish, a substrate sample was again taken, it did not appear to have changed in composition to the previous shots.

SHOT 4 (3362)

Approximately 150 prawns of both *P. esculentus* and *P. semisulcatus* were measured. *M. endeavouri* and *P. merguensis* were present in small numbers. Trash consisted of Javelinfish, Grunters, Ponyfish and Salmons. Approximately 3½ baskets altogether. Substrate sample was again taken. Size of the tigers was smaller, being in the 20 mm to 30 mm C.L. range.

SHOT 5 (3462)

Two good samples of tigers were measured, *P. esculentus* was the major species (255 prawns measured). Mean size about 23 mm to 25 mm carapace length. Approximately 50 *P. merguensis* were also measured, *M. endeavouri* were also present. Major trash was composed of Javelinfish, Rays and Grunters.

2 January 1983

SHOT 1 (3562)

A good sample of each tiger species was again measured, mean C.L. was about 25 mm. Approximately 100 *M. endeavouri* were measured and a few *P. merguensis*. Crabs (*Charybdis*) formed the major portion of the trash followed by Javelinfish, and Cardinalfish, approximately $3\frac{3}{4}$ baskets.

SHOT 2 (3463)

A good sample of each tiger species was obtained, *P. esculentus* measured numbered 214 and were of reasonable size ie male modes was about 30 mm C.L. Approximately 3 baskets of trash composed of Javelinfish, Grunters and Bream.

SHOT 3 (3464)

A good sample of *P. esculentus* was measured, about 190 prawns. A smaller sample of *P. semisulcatus* was measured together with some *P. latisulcatus* and *M. endeavouri*. Trash remained the same as previous shot, as did the substrate sample.

SHOT 4 (3563)

P. esculentus was the major species with 218 prawns measured compared to only 9 *P. semisulcatus*. Male C.L. mode would have been about 30 mm, females were anywhere from 22 mm to 46 mm. *P. latisulcatus* and *M. endeavouri* were present in small numbers.

SHOT 5 (3663)

P. esculentus was the predominate species, 303 prawns were measured. The majority of these were in the 20 - 30 mm range. Only 2 *P. semisulcatus* were measured, 5 *P. latisulcatus* and 118 *M. endeavouri*. Four baskets of trash composed mainly Javelinfish,

Grunters, Grinners and Scallops. Substrate sample was again taken, it was composed of grey silt mud and possibly some sand.

3 January 1983

During the day "Sonny" (skipper) attacked the engine room with vigor and discovered a fault in the electrical system. Both alternators are now operating. Three shots were completed tonight, this finished the area north of Groote including North West Bay.

SHOT 1 (3564)

P. esculentus was the predominant prawn species, approximately 12 kg of tiger and 4 kg of *M. endeavouri* composed the total catch. Less than 1% of the tiger catch was *P. semisulcatus*. Approximately two baskets of trash was sorted from the catch, it was again mainly Javelinfish, Therapon, Grunters and Bream.

SHOT 2 (3664)

P. esculentus was again the dominant species followed by *M. endeavouri*, *P. semisulcatus* and *P. latisulcatus* were also present but in very small numbers. The water temperature has remained constant at around 30 - 31°C while the salinity has been 34 - 36‰.

SHOT 3 (3765)

This shot was in North West Bay and resulted in the highest catch rate so far, approximately 37 kg of tigers for the one and half hours trawled. Approximately 60% (by numbers) of the tigers was *P. semisulcatus* and 40% *P. esculentus*. Male C.L. mode was approximately 25 - 27 mm with the majority of the prawns in the 20 - 30 mm range. A very small number of *M. endeavouri*, *M. ensis* and *P. latisulcatus* were present. As usual, majority of the trash was crabs (*Charybdis*) followed by Ponyfish and Gobies. One green turtle was unfortunately caught and drowned during this shot.

We steamed from North West Bay to Milner Bay and anchored at about 0600 hrs. During the day "Sonny" tried to organise a new clutch and bell housing for the auxillary motor. We have limited freezing capacity as the main compresor is driven from this motor. This may result in a sub-standard product, thus lower prices.

Arnold Baker required dental treatment urgently, this was not available on Groote and resulted in a charter flight to Gove for treatment. The cost of this flight should be met by the Health Department, as another patient was taken to Gove under supervision of the Medical Centre on Groote. Mr Baker arrived back at approximately 1700 hours.

4 January 1983

SHOT 1 (3861)

Five shots were completed tonight, substrate samples were again taken on all shots, as was temperature and salinity reading. *P. esculentus* was the predominate species with approximately 4% *P. semisulcatus*. The catch totalled 3.5 kg tigers which was low due to one port cod end not being tied correctly. Some *Trachypenaeus* and *Metapenaeopsis* were present, the major component in the trash was scallops.

SHOT 2 (3960)

Approximately 24 kg of *P. esculentus* and 2 kg of *M. endeavouri* for the 1½ hours trawled. Over 300 *P. esculentus* were measured and all the *M. endeavouri*, a very clean shot with only 1½ baskets of trash.

SHOT 3 (4060)

Very similar to shot 2 only the total catch was approximately 7 kg tigers and 2 kg *M. endeavouri*. The entire catch was measured, 1½ baskets of trash mainly scallops.

SHOT 4 (4061)

Very similar to previous shots, total of 9 kg of tigers (all *P. esculentus*) and 0.3 kg of *M. endeavouri*. Substrate samples for all shots tonight consisted of the usual grey clay but with various amounts of shellgrit.

SHOT 5 (3961)

Approximately 15 kgs of tigers (all *P. esculentus*) and 0.3 kg of *M. endeavouri* for the 1½ hours trawled. Of interest was the fact

that about 16% of the catch of *P. esculentus* were soft ovigerous females. The C.L. mode for all shots tonight was very similar ie males 27 - 28 mm and females in the 30 - 34 mm range.

5 January 1983

SHOT 1 (3962)

A sample of 7.6 kg of *P. esculentus* (314 prawns) and 2.1 kg of *M. endeavouri* (155 prawns) were measured. Male *P. esculentus* mode appeared to be around 27 - 28 mm with possible modes for the females at 26 mm and 33 mm. *M. endeavouri* modes were in the 20 to 25 mm range. Less than 1% of the catch was composed of *P. semisulcatus* and *P. latisulcatus*.

Five shots were completed tonight, the other four were in grids 4062, 4063, 4163 and 4162. All shots were similar to shot one in species composition, size range and carapace lengths.

6 January 1983

SHOT 1 (4263)

We shot away at 1700 hrs and trawled for two hours. This was a very poor shot resulting in only 1.5 kg of tigers (*P. esculentus*) and 0.5 kg of mixed *P. latisulcatus*, *P. longistylus* and *M. endeavouri*. By products included 3.2 kgs of squid. Substrate sample consisted of grey clay, sand and small stones.

SHOT 2 (4262)

A good sample of *P. esculentus* and *M. endeavouri* were measured, 30 kg of tigers and 4 kg of endeavours resulted from the 1½ hours trawled. Not only did the catch rate increase but the carapace length also. Male mode appeared to be 32 - 33 mm for *P. esculentus*.

Only two shots were completed tonight. The "Paulwin" steamed to South Pt to obtain a new clutch and bell housing assembly, off the F.V. "Cape Cleveland". These parts were urgently required if the main compressor was to become operative. Unfortunately the correct adaptor plate was not included thus the housing could not be fitted.

The prawns in the main freezer were thawed and beginning to show signs of "black spot". These were unloaded to the "Cape Cleveland" and placed in the blast freezer. Twenty-one cartons of tigers, three cartons of endeavours and one carton of bug tails were unloaded.

7 January 1983

SHOT 1 (4261)

This first shot of two hours duration produced approximately 47 kgs tigers (all *P. esculentus*) and 2.8 kgs of *M. endeavouri*. This would be the best shot of the survey so far, prawns were of good quality but on the smallish side. Carapace length for the male mode would be in the 27 - 29 mm range, while for the females 32 - 33 mm range. Trash totalled five baskets, which was composed of a high proportion of "sea eggs". *P. latisulcatus* was also present.

SHOT 2 (4161)

P. esculentus was the predominate from species (8.8 kg was measured totalling 306 prawns), male C.L. mode appeared to be 31 - 32 mm and females 34 - 35 mm., 95 *M. endeavouri* were measured, *P. semisulcatus* (less than 1%), *P. longistylus* and *P. latisulcatus* were present and represented about 2% of the catch.

SHOT 3 (4160)

Samples of *P. esculentus* and *M. endeavouri* were again measured. *P. semisulcatus* and *P. latisulcatus* were present but composed less than 1% of the catch. Trash consisted of mainly reef fish, 6 kg of "bugs" were also taken.

SHOT 4 (4260)

Large sample of *P. esculentus* was measured (352 prawns weighing 6.77 kgs). Majority of the sample were in the 20 - 30 mm range, *P. latisulcatus* and *M. endeavouri* were again present in small quantities.

SHOT 5 (4361)

This shot was very similar to previous shots but with a few more *P. latisulcatus* present. Substrate sample has consisted of fine silt and clay for most shots during the night. Temperature was around 30°C and salinity 34.4 - 34.8‰.

8 January 1983

SHOT 1 (4360)

A very good sample of *P. esculentus* was measured (7.4 kgs), majority of the prawns were in the 20 - 30 mm range, male C.L. mode 24 - 25 mm while the female mode appeared to be around 25 mm. Small samples of *M. endeavouri* and *P. latisulcatus* were measured.

SHOT 2 (4460)

Total catch was 2.9 kg of tigers, sample was not very informative. Only 10 *M. endeavouri* were measured. Shot duration for one and half hours.

SHOT 3 (4560)

Tigers were much larger this shot, male C.L. about 35 mm, 6.5 kgs was measured. Only a handful of *M. endeavouri* and *P. latisulcatus* were present.

SHOT 4 (4559)

Very similar to previous shot, trash during the night has been mainly *Aluteridae* (small leather jackets).

SHOT 5 (4659)

P. esculentus was, again the dominant prawn species present, male mode about 28 mm females 30 mm. A very good sample of *P. latisulcatus* was measured (4.8 kgs), male mode was around 32 mm females 37 mm. At the end of this shot the "PAULWIN" steamed for the Vanderlin Island fishing grounds. The vessel is still experiencing refrigeration problems, we are presently working "on brine". We unloaded to the "Cape Grenville", while on route to the Vanderlins, 118 kgs of tigers (10 cartons) and 16.5 kgs of kings (2 cartons). These are to snap frozen and sold to Pen Pak in Cairns, "wet prices" may apply.

9 January 1983

SHOT 1 (5465)

Shot away at 1930 hrs, picked up at 1950 hrs. Two nets completely destroyed the other two were extensively damaged. No further trawling took place tonight. Sounder showed very hard bottom but no actual hook-ups, nets contained hard coral and hydroids. Approximately 1 kg of *P. esculentus* was salvaged from the trash - mainly large ovigerous females. Nets were repaired during the night and the following day.

10 January 1983

SHOT 1 (5567)

Two hours trawling yielded 10 kg of *P. esculentus* and 3 kg *P. latisulcatus*, a large sample of each species was measured, most prawns were in the 20 - 30 mm range. *P. semisulcatus* and *M. endeavouri* were present in small numbers.

SHOT 2 (5568)

Very similar to the previous shot.

SHOT 3 (5468)

One and half hour shot yielded 16 kg of *P. esculentus*, male mode was around 30 mm C.L. female about 35 mm. *P. semisulcatus* and *M. endeavouri* were present in small numbers. Three and half kg of bugs were also present, *Pomadasyidae* formed the bulk of the two baskets of trash.

SHOT 4 (5367)

Only 2 kg of *P. esculentus* were caught this shot, most were in the 20 - 30 mm range. Small quantities of *P. semisulcatus*, *P. latisulcatus* and *M. endeavouri* were present.

SHOT 5 (5368)

Again a very poor shot, a sample of 3 kg of *P. latisulcatus* was measured but only 0.6 kg of *P. esculentus* were caught.

11 January 1983

SHOT 1 (5369)

All of the previous mentioned species were present but in quantities of less than 1 kg. Only 1½ baskets of trash.

SHOT 2 (5370)

A good sample of *P. esculentus* was measured, modes appeared to be in the 20 - 25 mm range but with a very wide spread (females up to 49 mm C.L.). Small numbers of the previous mentioned species were present, all were measured as usual. A substrate sample was not taken as the sampler would not go to the bottom due to swells, tide and a depth of 26 m.

SHOT 3 (5470)

All species were again present, a 3.6 kg sample of *P. esculentus* was measured, size ranged from 20 - 40 mm with no mode readily visible. Substrate samples in this area are composed of shell and sand.

SHOT 4 (5471)

Total of 5 kg of all species for the 1½ hours shot resulted from this trawl. Trawl ground appeared to be reef and coral. The number of prawns available was too small for accurate indication of modal lengths.

SHOT 5 (5571)

Similar to previous shot with small numbers of each species measured with the exception of *P. esculentus*. Two male modes were apparent from the 196 prawns measured, one in the low 22 mm area and the other in the 37 - 39 mm area.

12 January 1983

SHOT 1 (5771)

P. esculentus was the dominant species measured, approximately 5% of the catch was *P. semisulcatus*. Majority of the prawns were in the 30 mm - 40 mm range. Seven baskets of trash resulted, six of these being small leather jackets (*Aluteridae*).

SHOT 2 (Grid 5671) and SHOT 3 (Grid 5570) were very similar to shot one.

Only three shots were completed tonight, the vessel departed the Vandérlin Islands area at about 0300 hrs on 13 January 1983. Approximately 20 hours steaming was required to reach Groote, the "Paulwin" punched a 2 - 3 m swell all the way to South Point.

A final unload to the "Cape Grenville" (Pen - Pak Ocean Products P/L) on the evening of the 13 January 1983, total receipts were received for 416.6 kg of tigers, 61.9 kg of kings (endeavours) and 10 kgs of "bugs". The majority of the product was not in good condition ie "loose-head" was the main problem, this was caused by excessive movement in the brine tank while steaming in rough seas.

GENERAL

The "Paulwin" experienced mechanical failure on several occasions during this cruise. The skipper and crew deserve credit for keeping the vessel working for the duration of the cruise, this required many extra hours work in the engine room during the day.

Procedures adopted on the previous two cruise were maintained. The use of the S/T meter onboard the vessel proved most efficient. Substrate samples were taken in all but one grid, particle size composition was similar to that described in the previous cruise.

N. Cornwall

CLOSURE STUDY

CRUISE: C4
DATE: 30 January 1983
VESSEL: FV "PAULWIN"

PERSONNEL: Fisheries Officers: Dave Kelly
Ben Tozer

Crew:

Duncan Robert (Scoob) Allen, Skipper
Thomas Lawley, Deckie/cook.

VESSEL DETAILS

Reg. No. FNZZ
L.O.A.: 15.85 m Beam: 5.33 m
Gross tonnage: 33.56 Draught: 2.74 m
Main Eng.: Detroit Diesel, 871 at 179.04 KW.
Aux. eng.: Detroit Diesel, 353.
Dry freezer: 7,000 kg
Bryne: 2,000 kg (I,Q.F)

FISHING GEAR

4x4 fathom (sanikans) nets.
4xboards, 2 skeds, try net - 2 fathom.

SOUNDERS

Koden CUS 886 MKII Colour video
Furuno FG 200 MKIII dry paper

RADAR

JRC JMA 310-6, 64 n.m.

SATELLITE NAVIGATION

Shipmate RS 5000 D.S.

GENERAL

This was the fourth consecutive cruise in the on going series covering the study of the closure of the Groote Eylandt and Vanderlin prawn trawling grounds.

This cruise covered the period of 31st of January to the 10th February 1983.

In this cruise forty-nine grids were covered. This was one grid less than planned due to the deletion of a grid by the skipper of the "Paulwin", who, at that stage was lacking previous charts, deleted grids from memory.

The operation of the cruise was very smooth, with only one hour lost during trawling time, due to a rip-out of the starboard net.

The trawled areas covered are listed below in Table 1 which describes the order of grids and the day each was trawled.

TABLE 1

Trawl number in brackets.

<u>Date</u>	<u>G r i d s</u>		<u>C o v e r e d</u>	
30.1.83.	(1)	3363,	(2)	3364
30/31.1.83.	(3)	3264.		
31.1.83.	(4)	3265,	(5)	3165, (6) 3464, (7) 3463.
31.1/1.2.83.	(8)	3362.		
1.2.83.	(9)	3462,	(10)	3562, (11) 3663, (12) 3563.
1/2.2.83.	(13)	3564.		
2.2.83.	(14)	3664,	(15)	3765, (16) 3861, (17) 3960.
2/3.2. 83.	(18)	4060.		
3.2.83.	(19)	4061,	(20)	3961, (21) 3962, (22) 4062.
3/4.2.83.	(23)	4163.		
4.2.83.	(24)	4162,	(25)	4161, (26) 4160, (27) 4260.

cont'd next page

Table 1 - cont'd

<u>Date</u>	<u>G r i d s</u>	<u>C o v e r e d</u>
4/5.2.83.	(28) 4261.	
5.2.83.	(29) 4262,	(30) 4263, (31) 4361, (32) 4360.
5/6.2.83.	(33) 4460.	
6.2.83.	(34) 4560,	(35) 4559, (36) 4659.
7.2.83.	(37) 5566,	(38) 5567.
7/8.2.83.	(39) 5568.	
8.2.83.	(40) 5468,	(41) 5367, (42) 5368, (43) 5369.
8/9.2.83.	(44) 5370.	
9.2.83.	(45) 5470,	(46) 5570, (47) 5771, (48) 5671.
9/10.2.83.	(49) 5571.	

Almost every shot showed higher prawn catch rate than previous cruises in the series.

P. semisulcatus was predominant in all grids trawled north of Groote Eylandt, while *P. esculentus* dominated all grids east and south of Groote Eylandt.

M. endeavouri dominated all shots containing endeavour prawns. No shot produced enough *M. ensis* for a valid sample.

Twenty-nine shots produced *P. latisulcatus* and one shot brought up *P. longistylus*.

Four shots showed *P. merguiensis*. Only three types of coral prawns were apparent, *Trachypenaeus* spp., *Metapenaeopsis* spp. and *Solenocera* spp.

Trachypenaeus spp. occurred in almost all shots, *Metapenaeopsis* spp. about half and *Solenocera* in the third shot only.

CHRONOLOGICAL SUMMARY

29 January 1983

All the gear was prepared and checked. Four hours were spent covering the system of assessing trash with Rik Buckworth.

30 January 1983

The "Paulwin" was loaded with all the equipment with help from the crew and was set up ready for covering trawls. At 1600 hrs we departed Groote and headed for the selected grounds north of Groote. At 1930 hrs trawling commenced.

The first five shots were predominantly *P. semisulcatus* (<10% *P. esculentus*) and *M. endeavouri* (<10% *M. ensis*). There was a few *P. latisulcatus* and no banana prawns. Trash was dominated by POMADASYDAE, NEMIPTERIDAE and *Portunus* spp. The only large creature was a turtle and *Solenocera* spp. dominated coral prawns.

31 January 1983

The second night's trawling was similar to the first. In this, shots 6 and 10 produced a valid *P. esculentus* sample. *M. endeavouri* dominated endeavours for all trawls but no valid samples were landed. Only one *M. ensis* found all night. Seven only *P. merguensis* were landed in three shots (7, 8, 10). *M. etapenoepsis* and *Trachypenaepsis* spp. were present in most shots. POMADASYDAE, whiting and bream dominated trash. One large ray was landed in shot 8.

1 February 1983

The night's fishing showed a departure in composition to the previous shots. *P. esculentus* dominated the first four shots (11, 12, 13, 14) less than 10% *P. semisulcatus*. Only one shot (11) produced a valid sample of *M. endeavouri*. No *M. ensis* sighted in any shot and five only *P. latisulcatus* were caught for all shots that night. The last shot (15), of the night, was in North West Bay which produced a high catch rate, (~33 kg/hr), almost all tiger prawns. Tigers were of a small size and were about equal

numbers of *P. esculentus* to *P. semisulcatus*, only 27 *M. endeavouri* found in this shot, no other commercial prawns were landed. A few *Metapenaeopsis* spp. were found. Trash in shot 15 was dominated by LEIOGNATHIDAE and *Portunus* spp., no large creatures.

2 February 1983

We steamed from North West Bay to Bartalumba Bay, to pick up a few forgotten items and to rest. About 1600 hrs we steamed to the grounds west of Groote and continued sampling. All the shots show a marked drop in *P. semisulcatus* numbers, with none being found in the last three shots (18, 19, 20). A few *M. endeavouri* were found in all shots but typically less than 50 only prawns. Twelve *P. latisulcatus* were found in the last three shots (18, 19, 20). *Metapenaeopsis* spp. and *Trachypenaeopsis* spp. were present in most shots. Trash was dominated by THERAPONIDAE, SCOLOPSIDAE, Scallops, Rays (by mass) and sponge (by mass).

3 February 1983

That night produced valid samples of *P. esculentus* in all shots but typically less than 1% *P. semisulcatus*. Only one shot (22) produced more than 100 *M. endeavouri*. 24 *P. latisulcatus* were sighted and no *M. ensis*, *P. merquiensis* or *P. longistilus*. Coral prawns were only found in the first two shots (21, 22), mainly *Metapenaeopsis* spp. and a couple *Trachypenaeopsis* spp. in shot 22. Larger fish dominated most shots mainly sharks and rays followed by bream, scallops and echinoderms (seaeggs).

4 February 1983

That night, trawls landed a lot of prawns (~ 240 kg) which represented almost half the product taken for the entire cruise. *P. esculentus* was the main species caught (> 95%). Only 5 *P. semisulcatus* sighted. Shot 2 produced 165 *M. endeavouri* (291 for all the night's shots /-26 to 30/). There was a total of 39 *P. latisulcatus* and no *M. ensis* or banana prawns that night. Only *Metapenaeopsis* spp. corals were landed, averaging 1 or 2 a shot. Trash was dominated by ALUTERIDAE and Echinoderms (seaeggs). (The seaeggs make a lot of trouble sorting and cause bad

irritations to arms, legs and any part of the body they come in touch with. In these shots it became apparent that gloves and arm protection should be used).

Tiger prawns were of medium size and mostly firm and good product. The last shot of the night produced 8 prawns which contrasted to the rest of the shots.

5 February 1983

The first three shots (31, 32, 33) were very similar. *P. esculentus* was dominant with *P. latisulcatus* and *M. endeavouri* in small numbers (<150 maximum for both species for all the nights shots). Shots 31, 32 and 33 had trash dominated by ALUTERIDAE, LEIOGNATHUS Portunus and sea eggs. Shots 34 and 35 had ALUTERIDAE dominant with a fairly large mass of sponges. There were some very large TETRADONTIDAE in these two shots. The last shot showed no endeavours at all, and from the first to the last shot of the night their numbers dropped significantly. No corals were found all night but lots of bugs were in each shot and 1.5 cartons were packed up as product. At dawn we dropped the anchor on the edge of the last Groote area grid #4659 (shot 36). At 0800 hrs was breakfast and packaging of the night's product.

6 February 1983

We had dinner and commenced shot 36. The shot was of a similar constitution to the last five. We landed about 18 kg of prawn with *P. esculentus* > *P. latisulcatus* > *M. endeavouri*, the latter two in small numbers. Trash was mainly ALUTERIDAE with a significant amount of SCORPAENIDAE and SIGANIDAE. No corals were found and only 3 bug tails taken. A large number of the *P. esculentus* in that shot were ovigerous, with a small proportion of male prawns. On winch up of that shot gear was streamed to clear the nets as we steamed to the Vanderlin's trawl grounds. The data collected is sorted, tidied and checked. We arrived at 0600 hrs on 7 February 1983 and anchored at Paradise Bay to wait for the evening.

7 February 1983

Shot 37 produced some *P. mergiensis* (53 total). There was an almost even number of *P. esculentus* and *P. semisulcatus*. The

P. semisulcatus were very small and the small size persisted for the whole night with the numbers dropping off as the night wore on. POMADASYIDAE were the main trash and lots of bugs were present but only ~20 tails of reasonable size. The rest of the shots contained no *P. mergiensis* and only shots 38, 39 and 41 contained *P. latisulcatus*. In these shots THERAPONIDAE, Sponges and Scallops (mostly small). Some rocks were picked up in shot 41 with some minor damage to the nets. We pulled up for the day and rested.

8 February 1983

Shots 42 to 46 inclusive. Shot 42 was very clean producing a sample of *P. esculentus* and some kings, only 1 *M. endeavouri* and 11 *P. semisulcatus*. In these, a large shovelnose ray and seaeggs were predominant in the biota. Bugs and scallops were significant but mostly too small. Shot 43 showed only a few prawns (26 *P. esculentus*, 6 *P. semisulcatus*, 17 *P. latisulcatus* and only 4 *M. endeavouri*). NEMIPYRIDAE were dominant. Rocks and large sponges were caught in the starboard net. Shot 44 was a mess with the cod end of the inner net on portside hanging by a few strands. That caused us to pause for three quarters of an hour while temporary repairs were made to the net. With this shot only a small quantity of prawns were landed. A large component of LUTJANIDAE and a coral trout resulted. That was the only shot of the entire cruise to land *P. longistilus* (12 only) (red spot king prawn), but the prawn composition domination was *P. esculentus* with *P. semisulcatus* (5 only) and *M. endeavouri* (9 only). Shot 45 gave less prawn than shot 44. There was no sign of *P. longistilus* and only one *P. latisulcatus*. Dominance was *P. esc.* > *P. semi.* > *M. end.* > *P. lat.* Trash was dominated by THERAPONIDAE in numbers and by sponge and coral by mass. Shot 46 was interrupted by rough bottom but prawn catch was more plentiful than previous shots. *P. esculentus* : *P. semisulcatus* ratio was about 2 : 1. 13 *M. endeavouri*, 1 *M. ensi* were landed but no kings or banana prawns. Bream dominated numerical trash composition and sponges and corals dominated the overall mass. The tape equipment showed signs of wear with the out-put sockets making poor connections.

9 February 1983

Boat anchored for the day, and at 1930 hrs we started the last of the shots for this cruise. Shots 47 and 48 produced large quantities of ALUTERIDAE which made up greater than half the mass of the biota. *P.esc.* > *P.lat.* > *M.end.* > *P.semi.* in prawn numbers. Some coral prawns, *Trachypenaeopsis* spp. were caught along with some small bugs and scallops.

Shot 49 was very different to the previous two with quite a few reef fish, cods and emperors. However, numbers were still dominated by ALUTERIDAE, and mass by sponges. This was the last shot of the night and the last of the cruise. Grid 5471 was deleted due to rough ground and grid 4063 was omitted by error.

The time steaming back was spent checking data and equipment, packing up and cleaning the work deck. The "Paulwin" arrived back at Bartalumba Bay at 1930 hrs on the 10th February 1983. This ended the fourth cruise in the closure study of the Groote Eylandt and Vanderlin areas.

DAVID KELLY,
TA II - Prawn Research

23 February, 1983.

WESTERN GULF CLOSURE STUDY

Cruise: C5

Dates: 26 February - 14 March 1983

Personnel: Fisheries Officers -
R. Buckworth
D. Kelly

Crew -
D. (Scoob) Allan - skipper
D. (Dave) Lee - cook/deckie

Vessel
Details: As for previous cruises.

Departure: 1600 hrs, 26 February 1983
ex Bartalumba Bay

Return: 1215 hrs, 14 March 1983.

GENERAL

The goals of this cruise were those of the study in general: size and species composition of commercial prawns in and adjacent waters to the closed areas of the western Gulf of Carpentaria, and the relation of these data to physical and biotic parameters.

As the last cruise in this study, a very important goal was to "tie up loose ends" - gathering of trash specimens, photographs of procedures and particularly, to supplement samples in those grids which had yielded good samples in all previous surveys. Where possible sample sizes were increased over the 100 prawns/sex of the dominant species, so that some analyses in greater depth could be undertaken.

The experience of previous cruises enabled a more efficient operation, so that with extra time from this and previous cruises, we were able to examine some of the heavily fished grounds outside the closed area. These "supplementary shots" are described in the daily summaries (nights of 9 - 13 March 1983).

A total of 70 shots were made. One of these was abortive (Grids 4462/63, which were trawled in one shot). One grid was trawled twice (in consecutive shots; the first of these was exploratory). Seven shots were made in grids not previously trawled in the Closure Study (4462/63, 4464 (twice), 4465, 3665, 3565, 3465). Nine grids were re-trawled to supplement samples (particularly for *Metapenaeus endeavouri*) that had been taken earlier in the cruise (Grids 4262, 4161, 4162, 4062, 3962, 3463, 3563, 3663, 3664).

Three grids were surveyed with the sounder (4462, 4364 and 4365), and found to be unsuitable for trawling.

Numbers of prawns of each species sampled, for each shot and nightly and grand totals are given in the "summary of catch no's" attached.

The methodology developed in the previous cruises was again successful, though some minor problems occurred with the tape recorders (presumably due to exposure to salt and moisture).

As in previous cruises, a great deal of the success of this cruise was due to the skill, initiative and general willingness to assist, in any way, of the crew.

OBSERVATIONS

Catch weights and numbers for tiger prawns were similar to Cruise C4, and generally better than cruises C1 - C3.

Catch rates for endeavour and king prawns were lower than previous cruises. Numbers of king prawns, particularly, were lower than could be expected from previous results.

As usual, *Penaeus esculentus* was the dominant tiger species in all but the most northerly grids and North West Bay, where *P. semisulcatus* dominated. In other areas, *P. semisulcatus* was a very minor component of the tiger prawn catches.

Good samples of small *P. merguensis* were taken in Blue Mud Bay (grid 3362) and close inshore at the Vanderlins (grids 5566 and 5567).

Prawn size was generally larger than on previous cruises, though some areas still exhibit large proportions of "adolescent" prawns.

DAILY SUMMARIES

26 February 1983

Grids 3363, 3364, 3264, 3265, 3165.

As in previous cruises, grooved tigers were dominant in these grids. Sample sizes of this species were good, except for grid 3165. Individuals were typically small, but with some evidence of a mode of larger animals becoming more apparent with distance from Blue Mud Bay proper. Brown tiger catches were very disappointing, with sample sizes too small to draw many conclusions. The individuals were on average slightly larger than those of *Penaeus semisulcatus*.

Endeavour samples were also very small, animals mostly good sized. These included a total of 6 *Metapenaeus ensis* which were of good size. *M. endeavouri* included some very small ones.

No bananas or kings were taken. Nemipterids, Pomadasyids, *Saurida*, Cardinals, dominated the trash in most catches. Grab samples were of fine, stiky mud.

27 February 1983

Grids 3464, 3463, 3362, 3462, 3562.

Spent day on the pick at Burns Shoal. Scoob and Dave Lee caught several good fish after breakfast.

Penaeus esculentus and *P. semisulcatus* were present in similar no's on the whole, though there was quite a bit of between grid variation. Individuals in both species were typically small, though the grooved tigers showed some evidence of a mode of larger animals (often parasitized).

Bananas were present in 2 shots (grids 3362 (good sample) and 3462). These were also small, in clearly defined modes in each sex. It is possible that they were slightly larger in the deeper 3462, but the small sample size makes this difficult to test. Endeavour catches were again very poor, in which 2 of the total 56 were *M. ensis*. The *M. endeavouri* covered a wide size range.

This was a night of monsters with rays or shark/rays being mass dominants in all grids but 3562. Mud samples comprised sticky, blue-grey, ooze/mud mix. These were a lot of trouble to get due to strong current in a couple of spots.

28 February 1983

Grids 3565, 3663, 3564, 3664, 3765.

Spent day on pick about 1½ miles E. Woodah Island.

All catches except that in North West Bay (Grid 3765) were dominated by *P. esculentus*. With the exception of 3664, samples were of good size for this species. Only 3563 and 3765 produced good samples of *P. semisulcatus*. Tigers of both species were fairly small (especially in North West Bay), with occasional large individuals.

Endeavours were mostly good sized, with the exception of North West Bay's sample.

No *M. ensis* or kings were taken (though a few very small *Metapenaeus* sp were taken in N.W. Bay; these were kept for later identification, as was one "*P. monodon*" with unusual colouring). Only one banana prawn was caught, in North West Bay. Mud samples were all blue/grey in colour, and seemed to be fine mud/sand mixtures.

Trash was mostly dominated in numbers and weight by Nemipterids, Pomadasyids, Portunid crabs and in North West Bay there were large numbers of Leiognathids, and a large sleepy shark as the mass dominant.

1 March 1983

Grids 3962, 3960, 3861, 3961.

Spent day in Bartalumba Bay. Start of night's fishing was delayed by steaming time - fierce tides and heavy swell made going much slower than anticipated, though it was much better in the lee of Bickerton Is. for the first shot. Many squalls on radar, but we were fortunate to miss all but their minor effects.

The nights catches were dominated by *P. esculentus* with good catches in 3960 and 3961. The other grids were poor. Tigers were medium sized in 3962, mostly small in the other grids. *P. semisulcatus* were a more presence. Endeavour catches again disappointing, with the best sample (n = 78) from grid 3962. Individuals were fairly small, though there were some of larger size in 3960.

Nemipterids, scallops and scolopsids were usually numerically dominant, and important in mass. Vagrant monsters (bull rays, a turtle etc) were mass dominants in 3962 and 3961. Mud samples were typically a grey mud/sand mixture.

2 March 1983

Grids 4060, 4061, 4062, 4063, 4163.

Spent day on pick, grid 4060.

All grids produced fairly good to excellent samples of *P. esculentus*. All grids produced similar size composition medium size. *P. semisulcatus* were present in very small proportions in grid 4061 and 4062. Endeavours were also in small proportions only, though grid 4060 produced a sample of 121 individuals. They were of mixed size composition. There was again a "spot" presence of *P. latisulcatus*. No *M. ensis* or *P. longistylus* were taken this night.

Scallops, Nemipteridae, Scolopsidae, Theraponidae were numerically and mass important, though mass dominance was again taken by large sharks or rays in grids 4061, 4062 and 4063. Substrate was again the grey mud/sand mixture.

3 March 1983

Grids 4263, 4262, 4162, 4161, 4160.

All grids produced fair to good samples of *P. esculentus* (as usual 4263 was a bit deficient). These were a fairly similar size composition - medium prawns, with a suggestion of both very small and large modes. *P. semisulcatus* was usually present in very small numbers only, so no statement can be made about their size. Endeavour catches were again very disappointing. Rather than re-trawling these grids immediately to supplement their sample sizes, it was decided to do them on the way back from the Vanderlins, with the hope of increased endeavour catch rates.

P. latisulcatus was again present all shots, but except for grid 4263 (n = 84) they were an insignificant proportion. *P. longistylus* were present in grids 4263 and 4262.

Sea eggs, nemipterids, scallops, Aluterids, scolopsids and Theraponids were numerically important, and also in the mass. The mass was usually dominated by a sharks and/or rays and yet another night of monsters. Substrate showed a higher proportion of sand and shell than previous night's samples.

4 March 1983

Grids 4260, 4261, 4361, 4360.

Catches were again dominated by *P. esculentus*, with all grids producing excellent samples of medium/good sized individuals. *P. semisulcatus* were present, but typically insignificant (absent from grid 4360). Endeavours comprised a small proportion of the catch, though grid 4260 produced a good sample of this species. They were usually small/medium sized, though some samples indicated a mode of large animals. *P. latisulcatus* also comprised a small proportion of the catch in all grids trawled. They were mostly medium/good sized. No *P. longistylus*, bananas or *M. ensis* were in this night's catches.

Aluterids, nemipterids, sea eggs, Theraponids were typical numerical dominants and mass dominants (especially sea eggs!). A bull ray was dominant in the last shot (grid 4360). Mud and sand were the main substrate components in grids 4260 and 4261, with sand and shell comprising the samples from 4361 and 4360.

We had trouble with the lazy line winches at the 3rd shot - too many big bags had stretched the drive chain and forced the motor out of line. This forced us to abbreviate the 4th shot (to 1½ hr) and postpone the 5th shot till next night.

5 March 1983

Grids 4460, 4560, 4559, 4659.

Scoob and Dave Lee spent quite a few hours in the morning repairing the winches and the myriad small holes in the nets.

Again, good samples of brown tigers in all grids (individuals mostly medium, with a suggestion of bimodality). Grooved tigers always present, but of insignificant proportions. Endeavours were in very small proportions, usually small. Similarly, *P. latisulcatus* were in small proportion (though 45/4659 showed a significant number) and were of medium size. *P. longistylus* were present in grid 4659. No *M. ensis*, nor bananas were taken this night.

Pigfish (Aluteridae) were by far the numerical (and usually mass) dominants each shot, with nemipterids, theraponids and scolopsids also consistently important. Mass dominance was similar, though

a bull ray and a turtle were important in the grids 4560 and 4559 respectively. "Mud" samples were mostly sand and shell, and of lighter colour than previous. Steamed for Vanderlins after last shot.

6 March 1983

Grids 5566, 5567, 5568, 5468.

This night produced good samples of both spp. of tigers in all shots, good samples of *P. merguiensis* in grids 5566 and 5567, and a good sample of kings in grid 5567. Catch rates were so good, and catches of so many species in abundance that we had difficulty in handling it all, and had to delay the 4th shot. The large numbers in the different species created some handling problems. This was exacerbated by the fact that we ran out of crates (we did not expect such good catches!) and liners. Individuals were mostly of medium size - though some *P. semisulcatus* were fairly small, and *P. latisulcatus* tended to be a bit larger.

Leiognathids, nemipterids and theraponids were typical number dominants, though other species were important in different shots. Monsters again important in mass. Mud and sand were chief components of the substrate samples, with shell a large component in grid 5566.

7 March 1983

Grids 5367, 5368, 5369, 5370, 5470.

This night was almost a direct contrast to the previous, in terms of catch rates, numbers of species and sample sizes. Good sample sizes were achieved for *P. esculentus* only, and only in grids 5367, 5368 and 5570. Individual in this species were usually of medium size, though in 5370 and 5570 they were of very good size. These were the most "reefy" of shots. *P. semisulcatus* taken were, on the whole, small but there was a suggestion of bimodality that could only be verified by larger sample sizes. *M. endeavouri* samples were disappointingly small. The sizes of individuals in these grids was typically good, as were *P. latisulcatus*. Sample sizes of this species were about one quarter of the optimum sufficient to give only a rough indication of size composition. *P. longistylus* were caught in grid 5370. No *M. ensis* or *P. merguiensis* were taken.

By-catch species were dominated by Nemipterids, scallops and whiting (numerically and by mass) though grids 5370 and 5570 produced a lot of reef associated specimens (sponge, corals, lethrinids and Lutjanids). Substrate samples comprised a large proportion of shell than for previous nights, though mud and sand were still important fractions.

8 March 1983

Grids 5771, 5671, 5571, 5570, 5471.

Prawn species and size composition was fairly similar to the previous night's samples, though there was a suggestion of a mode of recruits in the tiger and endeavour species in grids 5571, 5570 and 5471. *P. latisulcatus* were mostly smaller than on previous nights.

Aluterids (pigfish) were very important in the by-catch of the first three grids (as typical for those fish, both numerically and by mass) and the more ubiquitous nemipterids, polynemids, pomadasyids, whiting and scolopsids. Once again, substrate samples comprised a mixture of mud, sand and shell.

9 March 1983

Grids (4462 & 4463), 4464 (twice) and 4465.

The object of this night's fishing was to investigate those commercially fished grounds immediately to the south of Groote Eylandt and adjacent to the closed area.

After steaming north from the Vanderlins, and before commencing trawling for the night, Scoob surveyed grids 4461 and 4462 for suitable trawl ground. The first of these was deemed too rough, as was a substantial portion of the latter. The first shot thus covered the trawlable part of 4462 and grid 4463. This unfortunately produced enormous bags of sea eggs, which were too big to be brought aboard. Though they were spilled over the side, it was possible to note a very low catch of large *P. esculentus*.

The second shot was exploratory, and cautiously limited to half an hour. Despite the obvious damage to the nets from the first shot a reasonable catch rate (with relatively few sea eggs) was produced. It was therefore decided to supplement this exploratory shot with another, longer shot (of one hour). This produced larger samples, though less than expected.

The fourth shot (grid 4465) produced very low catch rates for tigers, though the endeavour sample (n = 127) was one of the best achieved in the survey.

In general, *P. esculentus* were of medium size this night (slightly smaller in grid 4465), as were *P. semisulcatus* (again 4465 was a bit different, producing both large and small specimens). Endeavours were mostly good size. Only 3 kings were taken (grid 4464), of medium size. Grid 4465 also produced two large *M. ensis* and one *P. monodon*. By catch was dominated, numerically and by mass, by sea eggs (particularly in the first shot!), Theraponidae and Nemipteridae. Grid 4465 showed a particular reef association. Substrate samples were again chiefly mud and sand, with a fair fraction of shell. It was decided to end the night's fishing at four shots. Scoob was particularly concerned at the state of the gear (damage from the first shot in particular, but progressive as the night went on), and was also very tired from steaming all day.

10 March 1983

Grids 4364, 4363, 4362, 4262, 4162.

Spent the day on the pick at South Pt. Here a brief session of line fishing produced good catches of emperor and chinaman fish. This night's goals were again to examine commercial grounds adjacent to the closed area, and also to supplement our samples from our survey area.

4264

Scoob was able to survey grids 4365 and (4364) on the way into anchor and found them unsuitable for trawling (he characterized them as "full of reef pinnacles"). After a brief sleep when we dropped anchor, he spent most of the day repairing the holes in the nets.

The night's fishing was again bedevilled by sea eggs and rocks. Large amounts of sea eggs were taken in grids 4363, 4362 and 4262, with only an estimated $\frac{1}{4}$ of the catch brought aboard in grid 4363. 4364 produced a net full of coral lumps and sponge ("very risky" was Scoob's comment), and produced negligible numbers of all but king prawns (mostly *P. latisulcatus*, but some *P. longistylus*). The remaining grids produced reasonable to good samples of *P. esculentus* which were prawns of medium to good size. *P. semisulcatus* were in very low proportions (absent grid 4262) and usually small (there were some large individuals in grid 4363). Endeavours were usually 10 - 50% of the catch, usually small but with an apparent mode of large animals. As hoped, the sample in grid 4262 provided a good supplement ($n = 109$), and was a fair improvement on the sample from the night of 3 March. Except for the first shot, *P. latisulcatus* was a very minor component of the catch. Individuals were of medium/large size. *P. longistylus* were taken in grids 4364 and 4162. No specimens of *M. ensis* were taken. Substrate samples showed a distinct dichotomy. Grids 4262 and 4162 samples comprised mostly mud and sand, while those grids further to the south of South Point produced samples with a large shell component. Sea eggs (particularly in shots 3 - 5) were very important numerically and volumetrically; also of importance were nemipterids, whiting, javelin fish (Pomadasyidae) scolopids, ponyfish and pigfish (Aluteridae).

11 March 1983

Grids 4161, 4062, 3962.

The primary objective this night was to supplement *P. esculentus* sample size for grid 3962 and *M. endeavouri* sample size for the other grids.

Catch rates for *P. esculentus* were good in all grids (the rate in 3962 was much improved on the poor sample of 1 March). *P. semisulcatus* were of a very minor proportion. *M. endeavouri* catches were disappointing with only minor improvements in 4161 and 4062, and quite a decrease in 3962. *P. latisulcatus* were again a very minor fraction of the catch. No *M. ensis* or *P. longistylus* were found in any sample.

The following table summarizes size composition, as the grids covered are fairly different.

Species	Shots: <u>1</u>	<u>2</u>	<u>3</u>
<i>P. esculentus</i>	medium	good	small/med.
<i>P. semisulcatus</i>	small	bimodal	small
<i>M. endeavouri</i>	bimodal	bimodal	mixed
<i>P. latisulcatus</i>	medium	good	good

Numerical and mass dominance lay chiefly with nemipterids, scallops and theraponids. Grid 3962 was again a bit different in producing a large catch of sea eggs and a bull ray. Substrate samples were again a grey mud/sand mixture.

12 March 1983

Grids 3665, 3565, 3465.

The objective for this night was again to examine commercial grids adjacent to our established survey area. Five shots were planned but problems restricted the night's fishing to three trawls only. In the first shot a gigantic (8'+ across) bull ray was taken in one net, a large turtle in another. The weight of the bull ray tore the lazy line from the cod end, and both the ray and the turtle produced several holes, causing a delay of 1 and 3/4 hours. Fuel problems with the main motor after the 3rd shot took over an hour to rectify. Time lost thus restricted us to three shots.

Catch rates were rather poor (especially grid 3565) with no samples achieving the optimum size of 200 individuals, though those for *P. esculentus* were fairly indicative of size composition. *P. semisulcatus* were a minor component, as were *P. latisulcatus*. *M. endeavouri* comprised approximately 50% (by number) of the catch in grid 3665, but were relatively minor in the other grids.

Size composition is summarised below.

Species	Shots: <u>1</u>	<u>2</u>	<u>3</u>
<i>P. esculentus</i>	medium/good	medium	medium
<i>P. semisulcatus</i>	medium	bimodal	bimodal
<i>M. endeavouri</i>	mostly good	medium	small/med.
<i>P. latisulcatus</i>	medium/good	good(1 only)	medium

No *M. ensis*, *P. merguiensis* or *P. longistylus* were taken. Nemipterids, bull eyes, theraponids, scallops, leiognathids, cardinals and grinnners were all numerically important, and important by mass. Mass dominance in the first shot was overwhelmingly taken by the bull ray. Substrate samples were all sticky blue/grey ooze/mud, considerably finer than those from the west and south of Groote.

13 March 1983

Grids 3463, 3563, 3663, 3664.

Again, the purpose of trawling these grids was to supplement our previous samples. Grids 3563 and 3663 have provided the most consistently good sample sizes for tigers and endeavours throughout our survey period, so the very depressed catch rates for endeavours in these grids on 28 February were disappointing. Though for short of our hopes, sample sizes for the combined data should be adequate for at least descriptive purposes.

P. esculentus were the dominant species in all but grid 3463. *P. semisulcatus* were a major fraction of the tigers in 3463 and 3663 but were of the order of 5% of catches in the last two grids. *M. endeavouri* were a significant proportion in most grids (10 - 20% by number). *P. latisulcatus*, *P. merguiensis* and *M. ensis* were always much less than 1% (by number or weight). No *P. longistylus* were taken. Sizes are summarized below. Pomadasyids, nemipterids, scallops, leiognathids, *Saurida* and carangids were all important numerically and by mass.

Sharks and rays (shot 2), a bull ray (shot 3) and small sharks, (shot 4) were important by mass, as were portunid crabs (all shots; they were typically of fairly good size). Substrate samples comprised the typical blue/grey ooze/mud of this region.

Off-loaded saleable product to Cape Kimberly (Pen-Pak) at Hawksnest Is.

Returned to Bartalumba Bay, docked and unloaded gear at approximately 1215 hours.

Tiger and Endeavour Prawn Closure Study - Western Gulf of
Carpentaria (1982/55)

Objective

To determine, on a monthly basis between October 1982 and March 1983, the size composition of the principal tiger prawn species (Penaeus esculentus and P. semisulcatus) and endeavour prawn species (Metapenaeus endeavouri and M. ensis) on the commercial fishing grounds subject to seasonal closure in the western Gulf of Carpentaria. The results will enable the assessment of the effectiveness of the closure.

Organisation:

NT Department of Primary Production

Supervisor:

Mr R.J. Slack-Smith,
Director,
Fisheries Division,
Department of Primary Production,
PO Box 4160,
DARWIN NT 5794

Grant:

1982/83	Total
\$90,000	\$90,000