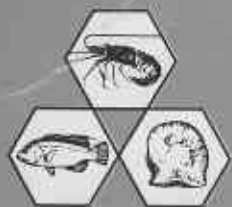


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FISHERIES DEPARTMENT  
WESTERN AUSTRALIA

# REPORT No. 79

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WESTERN AUSTRALIA

## The Western Rock Lobster Fishery 1984-1985

BY  
**R. S. BROWN**  
AND  
**E. H. BARKER**

PERTH  
WESTERN AUSTRALIA

**1987**

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# REPORT

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THE WESTERN ROCK LOBSTER FISHERY 1984/85

R.S. Brown and E.H. Barker

Western Australian Marine Research Laboratories

PO Box 20 North Beach, Western Australia 6020.

I INTRODUCTION

The fishery for the western rock lobster *Panulirus cygnus* is one of the most important single fisheries in Australia and an important export earner for the State. Western Australia produced 8,966 tonnes in 1984/85, out of a total Australian rock lobster catch (excluding New South Wales and Queensland) of 13,651 tonnes. The fishery is governed by a complex set of regulations which are designed to limit the total fishing effort to acceptable levels and to enforce a legal minimum size (Bowen 1971, Hancock 1981). Thus, it is important to monitor the state of the fishery constantly both to ensure that the fishing effort is remaining within the accepted limits and that the regulations are adequately performing their function of maintaining reasonably stable catches. Inherent in this monitoring of the fishery is a careful examination of changes in fishing practice, gear, etc. since these may lead to increases in efficiency which may not be detectable through the usual calculations of fishing effort.

This paper is the fourteenth in a series of annual reviews of the rock lobster season which will discuss fishing practice, catches, effort, mean size and various other factors. A knowledge of these will help towards a better understanding of the status of the fishery. Each review follows a standardised format to allow season to season comparisons and examination of long term trends.

## II METHODS

Catch and effort data were extracted from figures obtained from fishermen's monthly returns, supplied by the Australian Bureau of Statistics and also from rock lobster research log book data\*. Mean size information was gathered from measurements made by Departmental Research Staff aboard commercial vessels fishing from Dongara, Jurien, Lancelin and Fremantle. Information on trends in fishing practice was gathered principally by conversation with fishermen at various ports as well as from comments made in research log books.

## III RESULTS

### A. CATCH AND EFFORT DATA

The fishing season extends from 15 November to 30 June and may be subdivided into three distinct phases, viz., (i), the "whites" fishery (George, 1958) which begins abruptly in late

\* Twenty-one percent of skippers voluntarily submitted rock lobster research records during the 1984/85 season.

November (as pale-coloured newly-moulted rock lobsters leave the shallow reef areas) and finishes arbitrarily on 31 December; and (ii), the "coastal red" fishery which begins on 1 January and ends on 30 June; and, (iii), the Abrolhos Islands fishery which is restricted to the period 15 March to 30 June.

In fishing seasons prior to 1977/78 both the coastal and the Abrolhos Islands fisheries ended on 14 August. The season was shortened by six weeks in 1977/78 as a conservation measure (Hancock, 1981).

The 1984/85 season "whites" run commenced on about 18 November in Geraldton, 23 November in Jurien and 23 November in Fremantle.

Catches (kg) and fishing effort (in number of pot lifts) were as follows:

"Whites" catch	(15 Nov-31 Dec)	=	3,300,243 kg
"Whites" effort	( " " " )	=	3,013,034 pot lifts
"Coastal Reds" catch	(1 Jan-30 June)	=	4,355,724 kg
"Coastal Reds" effort	( " " " )	=	7,358,838 pot lifts
Abrolhos catch	(15 Mar-30 June)	=	1,310,498 kg
Abrolhos effort	( " " " )	=	1,226,556 pot lifts

---

Total catch = 8,966,465 kg

Total effort = 11,598,428 pot lifts

---

These figures do not include unrecorded sales (ie. rock lobsters which are sold for cash, etc. and are not recorded in the fishermens' monthly returns of catches), which totalled approximately 715,100 kg, or the total amateur catch which was estimated at approximately 200,000 kg (Norton, 1981). Figure 1 shows comparative catch, fishing effort (ie. the number of pot lifts<sup>1</sup>) and catch per fishing effort data from previous years.

Catch and effort data from various statistical blocks (Figure 2), are shown in Table 1 with catches expressed by weight in kg and fishing effort as number of pot lifts. Table 2 shows catch per pot lift data for the same statistical blocks. The total fishing effort was 11,598,428 units of fishing effort, 3.4% greater than the 1983/84 season.

## B.<sup>2</sup> EXPORTS AND GRADE CATEGORIES

Rock lobster tails processed for export are graded by weight and packed in 11.34 kg cartons. The various grades, together with the percentage of cases packed in each grade for the period November 1984 to June 1985 were as follows:

---

1. Fishing effort is measured as the number of pot lifts (pulls) recorded by fishermen in their Australian Bureau of Statistics monthly returns. In the annual reports prior to 1977/78 fishing effort was calculated as effective fishing effort by the method of Gulland (1969).

2. Section B is based on data provided by selected processing establishments from Fremantle to Geraldton.



<u>Grade</u>	<u>% of Cases</u>
A (140 - 179 grams)	32.7
B (180 - 239 grams)	39.7
C (240 - 279 grams)	11.0
D (280 - 359 grams)	7.4
E (360 - 479 grams)	4.7
F (480 - 599 grams)	2.5
G (600 -        grams)	2.0

#### C. MEAN SIZE

Samples of rock lobsters were measured aboard commercial vessels (from various ports) which used standard pots (with 54 mm escape gaps) in four depth categories. Hence, the sample would have included all commercial size rock lobsters, plus undersize which would have been reduced in number by the escape gap selection (Bowen, 1963). Mean carapace lengths of males and females taken throughout the fishing season from the various depth categories at Fremantle, Lancelin, Dongara and Jurien are compared in Table 3. The omissions in the table are due to either fishermen not fishing the area in question or to some circumstance (breakdown, etc.) which prevented the data from being collected.

#### D. NUMBER OF BOATS

The number of boats licensed to fish for rock lobster in Zones A, B, C, D and E is carefully controlled, though boat owners are able to nominate their choice of fishing area, viz. north or south of 30°S. As at 30 November 1984, the number of boats

licensed to fish in the various zones was as follows:

Total number of licensed boats	=	769
Number of boats licensed in Zone A	=	197
Number of boats licensed in Zone B	=	167
Number of boats licensed in Zone C	=	389
Number of boats licensed in Zone D	=	7
Number of boats licensed in Zone E	=	9

#### E. FORECAST OF 1984/85 RECRUITMENT

The 1980/81 puerulus settlement was below average and resulted in a reduced total catch for the 1984/85 season in comparison to the previous season (1983/84).

#### F. INTRODUCTION OF NEW LEGISLATION

Limited entry licence fees for the West Coast Rock Lobster limited entry fishery were amended as follows:

	Approved New Fee
Zones A, B, C and D	\$6.00 per pot
Zone E	\$4.20 per pot

As from 1 January 1985 all skippers of licensed fishing vessels were required to hold a Commonwealth Master Fishermans Licence. This new licence replaced the original "Licence to engage in fishing" i.e., Commonwealth Professional Fisherman's Licence (PFL). Deckhands who are working on a vessel skippered by the holder of a Commonwealth Master Fisherman's Licence are no

longer required to take out a Commonwealth PFL to assist in the taking of fish for sale.

As a result of the continuing trend for fishermen to increase the size of their rock lobster pots (both batten and to a lesser extent beehive pots) and hence the catching efficiency of their pots, it was decided that as from the commencement of the 1984/85 rock lobster season the following maximum dimensions (internal measurements) would apply:

#### BATTEN POTS

Length: not more than 915 mm (36.0 inches).

Height: not more than 420 mm (16.5 inches).

Width at base: not more than 800 mm (31.5 inches).

Width at top: not more than 540 mm (21.3 inches).

Volume: 0.257 of a cubic metre.

#### BEEHIVE POTS

Diameter: not more than 925 mm (36.4 inches).

Height: not more than 420 mm (16.5 inches).

Volume: 0.254 of a cubic metre.

As from 22 February 1985, Regulation 14G was amended as follows:

A boat (amateur) being used for the taking of rock lobsters, whether by means of a pot or by hand, shall not be used to hold or transport more than 16 rock lobsters over any period of 24 hours commencing at midnight unless the boat is licensed under regulation 2 and the taking of rock lobsters is authorised pursuant to section 32 or regulation 3B.

Information regarding these changes to the legislation governing the rock lobster fishery, as well as the Fisheries Department's policies on various issues, may be found in the following volumes of the Fishing Industry News Service (F.I.N.S.):

Vol. 16, No. 3 (Nov. 1983) p. 8.

Vol. 17, No. 3 (Sept. 1984) pp. 29,30.

Vol. 17, No. 4 (Nov. 1984) p. 14.

#### G. EFFECTS OF NEW LEGISLATION

A maximum size placed on the dimensions of both batten and beehive pots prevented what could have been a serious increase in fishing efficiency.

There was a change in legislation affecting amateur fishermen whereby a maximum of 16 rock lobsters can be held or transported in a boat over a period of 24 hours had the effect of bringing amateur divers into line with amateur pot fishermen.

The other changes in the legislation were of an administrative nature and, hence, could have no direct effect on levels of catch and fishing effort.

#### H. INNOVATIONS TO BOATS AND GEAR

Data supplied by the Marine and Harbours Department showed that a total of 60 boats were replaced during the period 1 July 1984 to 30 June 1985. In the northern area of the fishery a total of 34 boats were replaced, ranging in size from 7.60 metres to 17.80 metres, with an average size of 12.50 metres, whilst in the southern area a total of 26 boats were replaced ranging in size from 11.70 metres to 17.80 metres with an average size of 14.69 metres. As in the previous season the boat replacement trend was towards medium sized vessels in the northern area and medium to large sized vessels in the southern area. There was a 3.2% reduction in 1984/85 on the number of vessels replaced during the previous season. The new boat replacements were constructed as follows:

	<u>WOOD</u>	<u>FIBREGLASS</u>	<u>ALUMINIUM</u>
North 30°S	1	14	19
South 30°S	2	12	12
	<hr/>		
	3	26	31

During 1984/85 the cost of a new basic 15 metre aluminium, or fibre glass vessel, equipped with reasonable navigational aids, including radar, a colour echo sounder and ready to launch was

approximately \$190 000 to \$200 000. Naturally the price of new vessels varies greatly depending on design, equipment, type of motors, etc. The price quoted here was from a major boatbuilder in the southern sector of the fishery.

The cost of boat fuel (distillate) varies, depending on supplier and area. However, the approximate average price per litre paid by fishermen during the 1984/85 season was as follows:

NORTH 30°S

SOUTH 30°S

44.33 cents per litre

46.72 cents per litre

The prices quoted are from selected processors and fuel outlets. Fishermen were also entitled to claim a diesel fuel rebate of from 7.155 cents to 7.341 cents per litre which has not been deducted from the above prices.

Data from research log books showed the following usage of the various types of pots by fishermen north and south of 30°S:

	STICK AND CANE		STEEL
	<u>BEEHIVE</u>	<u>BATTEN</u>	<u>BEEHIVE</u>
NORTH 30°S	6%	93%	1%
SOUTH 30°S	25%	74%	1%

As at 30 November 1984 the number of pots licensed in the various zones was as follows:

ZONE	NUMBER OF POTS
A	18,764
B	15,213
C	41,126
D	813
E	689

The use of batten pots, as in the previous season, continued to increase throughout the fishery.

In conjunction with the normal stick and cane beehive pots, a small number of stick and cane beehive complete with steel bottoms were also used. These were used chiefly in the southern sector of the fishery.

The price paid by fishermen for rock lobster pots varies with type, size of pot, fittings and manufacturer. During the 1984/85 season in the southern sector of the fishery the price quoted by a major pot manufacturer for a batten pot complete with anodes, two built in bait baskets, plastic neck and ballast was \$63.00. The cost of a similar batten pot in the northern sector of the fishery was \$69.95.

Stick and cane beehive pots are mainly confined to the southern sector of the fishery; however, a small number are imported into the northern area from southern pot manufacturers, together with a few locally (Geraldton) made pots for personal use. The price of a stick and cane beehive pot complete with skid board was \$38.00.

The price quoted by a supplier of marine equipment in the southern sector of the fishery for a popular brand of Japanese 10 mm rock lobster pot rope was \$66.00 (cash) for a 220 metre coil. The price of pot rope varies greatly depending on country of manufacture, brand, type, supplier and quantity purchased. Eight inch (200 mm) polystyrene pot line floats sold for \$1.40 each.

#### I. BAIT

Data from research log books showed the following usage of pieces of bullock hide and bullock hocks as a holding/catching bait both north and south of 30°S.

	<u>HOCKS</u>	<u>HIDE</u>
NORTH 30°S	35%	65%
SOUTH 30°S	22%	78%

From a wide choice of baits available to fishermen some of the more popular baits, used in combination with hocks or pieces of hide are listed below: North of 30°S:- Australian herring or ruff (*Arripis georgianus*), Australian and New Zealand salmon (Kahawai) heads and pieces of salmon meat (*Arripis trutta esper*, *Arripis trutta marginata* and *Arripis trutta trutta*), scaly mackerel (*Sardinella lemura*), mullet (*Mugil cephalus*), Perth or bony herring (*Nematalosa vlaminghi*) and pieces of kangaroo (*Macropus* sp.). South of 30°S:- Australian and New Zealand Salmon (Kahawai), pilchards (*Sardinops neopilchardus*), scaly mackerel, mullet, imported whole mackerel and mackerel heads (*Scomber* sp.) and Australian herring.



Listed below are 1984/85 season prices for some of the more popular lines of rock lobster bait. The prices quoted are from selected processors:

	<u>NORTH OF 30°S</u>	<u>SOUTH OF 30°S</u>
Hocks per bag of 24	\$10.50	\$10.00
Hides per 30kg bag	\$10.50	\$11.00
Australian salmon per kg	\$0.94	\$0.90
New Zealand salmon (Kahawai) per kg	\$0.93	\$0.90
Australia herring per kg	\$1.05	\$1.10
Yellow-eyed mullet per kg	\$0.83	-
Mullet per kg	-	\$0.90
Scaly mackerel per kg	\$0.74	\$0.80
Bonito per kg	\$0.67	\$0.70
Perth or bony herring per kg	-	\$0.84
Imported mackerel heads per kg	\$0.90	\$0.85
Tuna heads per kg	\$0.50	\$0.75

Kangaroo per kg. \$0.70 -  
Chicken heads or pieces of chicken per kg \$0.70 -  
Pilchards per kg \$0.90 -

#### J. DISTRIBUTION OF FISHING

The distribution of fishing, as catches and effort, is shown in Table 1. The pattern of fishing does not vary greatly from season to season and is dependent on the density of rock lobsters in the various depth categories. Throughout the season, the usual pattern of fishing occurred, i.e. concentrated in the shallows during November and December, followed by deep water potting during the latter part of December, January and February, back to the shallows during the latter part of February, March and April and in mixed depths (mainly shallower), depending on weather and density of rock lobsters, throughout the remainder of the season.

In recent times a number of vessels have fished for rock lobsters each season from South Passage in Shark Bay and Augusta. During the 1984/85 season fishing again occurred in these areas. The rock lobsters caught in the Augusta area were outside the West Coast Rock Lobster limited entry fishery concession area.

K. AVERAGE NUMBER OF DAYS WORKED PER BOAT PER MONTH

NORTH OF 30°S

<u>MONTH</u>	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
DAYS								
<u>WORKED</u>	14.7	27.1	17.4	19.1	22.2	27.2	23.5	17.9

SOUTH OF 30°S

<u>MONTH</u>	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
DAYS								
<u>WORKED</u>	13.5	25.7	20.1	21.4	25.5	19.6	15.6	14.9

TOTAL

<u>MONTH</u>	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
DAYS								
<u>WORKED</u>	14.1	26.3	18.8	20.4	23.9	23.2	19.4	16.4

North of 30°S the average number of days worked per boat during November and December was 2.3% down on the 1983/84 season and for the period January to June was 2.9% up on the 1983/84 season. South of 30°S, the average number of days worked per boat during November and December was 2.5% down and for the period January to June was 7.6% up on the previous season. For both the northern and southern areas combined, the average number of days worked for November and December was 2.4% down and for the period January to June was 5.1% up on the previous season.

The average number of days worked per boat per month for the 1984/85 season was 20.4, which was an increase of 3.0% on the 1983/84 season.

L. PRICE OF ROCK LOBSTERS (PER KG)

Price to fishermen:

The average beach price for the season was approximately \$11.00/kg, whilst some companies paid an additional bonus of approximately \$2.00/kg on top of the beach price. The price for live rock lobsters was approximately \$1.00 above the beach price and again some companies paid an additional bonus of \$2.00/kg on the live price.

The pool price for the season was \$16.00 - \$17.00/kg.

Average wholesale New York price for Australian rock lobster tails:

<u>GRADE</u>	<u>\$US PER KG</u>
5-6 oz ( 113-170 grams)	31.85
6-8 oz ( 170-226 grams)	31.32
8-10 oz ( 226-283 grams)	31.26
10-12 oz ( 283-340 grams)	31.26
12-16 oz ( 340-453 grams)	28.61
16-20 oz ( 453-566 grams)	25.77
over 20 oz (over 566 grams)	21.67

Grades (weights) stated here are different from Western Australian grades as shown in Section B.

#### M. MARKET TRENDS AND ECONOMIC FACTORS

The prices for rock lobster tails on the United States market increased markedly in 1984, but eased slightly in the first six months of 1985. On average the wholesale New York prices for the various grades of tails in 1984/85 were around 40% higher than in 1983/84, due primarily to the decreased supply of Australian rock lobster. There was evidence, however, of consumer resistance to the high price levels in 1984/85.

The Australian dollar was slightly stronger against both the Japanese yen and the US dollar in 1984. However, the Australian dollar lost ground in the new year and by June 1985 was 20% lower in value compared to the US dollar and 18% lower in value compared to the Japanese yen than in June 1984. This devaluation allowed for higher returns for export commodities, thus assisting the Australian rock lobster export trade.

#### N. AVERAGE VALUE PER POT ON POT RE-DISTRIBUTION

From less than \$2 650 to approximately \$3 500.

#### O. SEA WATER TEMPERATURES AND SALINITIES

These have relevance to the behaviour and catch rates of rock lobsters (Morgan, 1974). The average sea water temperature during the rock lobster season (i.e. 15 November to 30 June) at Waterman (aquarium header tank) was 20.6°C, with a maximum of 23.2°C on the week commencing 24 February 1985 and a minimum of 17.4°C on the week commencing 2 June 1985. The average

salinity during the season at Waterman (aquarium) was 35.800% with a maximum of 36.470% on the week commencing 24 March 1985 and a minimum of 35.324% on the week commencing 11 November 1984.

Bottom temperatures and surface salinities in waters of various depths in the Fremantle, Lancelin, Jurien and Dongara areas were collected as part of the monitoring of rock lobster catches (Item B) and are shown in Table 4. Other records are maintained by CSIRO.

#### P. SPAWNING ROCK LOBSTERS

While most of the breeding females are found in the 20-30 fathom range, no variation has been observed in the size of first breeding from one depth category to another, except at Jurien over 30 fathoms (Chittleborough, pers. comm.). Hence the data for December, January and February from all depths with the exception of that at Jurien from over 30 fathoms, may be pooled to indicate the size frequency of breeding (ie., "berried" and mated) females (Figure 4.). The mean size of breeding females at various locations was, 109.3 mm at Fremantle, 99.9 mm at Lancelin, 85.4 mm at Jurien and 90.7 mm at Dongara. By comparison, the mean sizes at first breeding (i.e. carapace length at which 50% have been mated) were found to be 95.8 mm at Fremantle, 92.9 mm at Lancelin, 89.2 mm at Jurien and 87.5 mm at Dongara.

As a result of below average puerulus settlement during 1980/81 and subsequent reduced recruitment of legal sized rock lobsters into the commercial fishery, the 1984/85 catch fell by 15.2% from the previous season's (1983/84) catch of 10 575 731 kg to 8 966 465 kg. This fall in catch was also accompanied by a reduction in the catch per unit of effort (catch in kg per pot lift) from 0.943 kg per pot lift in 1983/84 to 0.773 kg per pot lift in 1984/85. As a result of lower densities of rock lobsters on the grounds, fishermen fished harder in an endeavour to maintain their share of the catch, resulting in an increase (3.4%) in the total fishing effort (total pot lifts) from 11 214 423 pot lifts in 1983/84 to 11 598 428 pots lifts in 1984/85. Again, this increase in fishing effort was also accompanied by an increase (3.0%) in the average number of days worked per boat per month from 19.8 days in 1983/84 to 20.4 days in 1984/85.

The demand, partially as a result of decreased supplies for rock lobsters on the traditional overseas markets, was high. This demand, together with the low standing of the Australian dollar, thereby assisting exporters, made for very high returns to fishermen. The high prices that fishermen received for their catches were slightly offset by marginal increases in two major items of expenditure, namely boat fuel (distillate) and rock lobster bait. Economically the industry was in a buoyant state which was reflected in a high level of new boat replacements, although, some of the new boat replacements were no doubt the result of fishermen taking advantage of, and ordering new vessels prior to, 30 June 1984 when the Federal Government Investment Allowance was discontinued.

## V ACKNOWLEDGEMENTS

Measurements on board fishing vessels were performed by Mr M. Rossbach and Mr G. Davis. The information on Market Trends and Economic Factors was provided by Mr M. Grasby of the Fisheries Department.



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TABLE 1: CATCH (IN KG WEIGHT) AND FISHING EFFORT (IN POT LIFTS) FOR THE 1984/85 ROCK LOBSTER SEASON IN VARIOUS STATISTICAL BLOCKS.

BLOCK	NOVEMBER	DECEMBER	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	TOTAL
2412	-	-	-	-	-	-	-	-	-
2413	724 (1 080)	-	-	-	-	-	-	-	724 (1 080)
2512	-	-	2 286 (2 240)	-	-	-	-	-	2 286 (2 240)
2612	-	-	-	808 (1 470)	-	-	-	-	808 (1 470)
2613	-	-	3 543 (3 165)	4 989 (5 510)	-	2 800 (2 000)	-	-	11 332 (10 675)
2712	-	-	-	2 329 (2 700)	-	-	-	-	2 329 (2 700)
2713	4 179 (6 154)	28 304 (15 370)	31 650 (43 520)	16 040 (22 337)	22 712 (25 438)	21 312 (23 078)	17 928 (23 169)	7 804 (12 813)	149 929 (171 879)
2714	6 420 (9 790)	67 802 (38 042)	15 043 (24 434)	13 305 (24 045)	24 306 (25 152)	54 499 (24 520)	15 942 (20 516)	10 191 (15 385)	207 508 (181 884)
2812	-	-	-	-	3 500 (1 859)	3 000 (3 575)	2 427 (2 860)	1 142 (1 430)	10 069 (9 724)
2813	1 074 (1 312)	-	-	26 (168)	556 127 (262 133)	485 018 (448 982)	208 387 (347 773)	60 966 (167 668)	1 311 598 (1 228 036)
2814	114 888 (155 710)	396 167 (290 376)	77 711 (190 418)	82 207 (187 628)	101 679 (106 615)	92 136 (104 345)	58 782 (109 321)	56 975 (105 785)	980 545 (1 250 198)
2912	-	-	-	-	-	-	-	-	-
2913	930 (1 215)	4 991 (4 256)	-	1 013 (2 236)	15 894 (9 528)	7 702 (5 978)	3 701 (8 010)	636 (1 352)	34 867 (32 575)
2914	263 887 (307 732)	737 992 (558 020)	146 223 (301 118)	160 661 (329 943)	317 072 (323 058)	269 268 (292 118)	118 140 (234 209)	107 547 (174 598)	2 120 800 (2 520 796)
3012	-	-	-	-	-	-	-	-	-
3013	-	-	-	-	-	-	-	-	-
3014	111 404 (170 113)	553 375 (350 268)	156 746 (220 588)	124 931 (236 961)	226 236 (316 757)	200 571 (297 950)	84 594 (211 142)	56 634 (137 825)	1 514 491 (1 941 604)
3015	38 224 (48 868)	112 559 (74 146)	36 901 (49 854)	30 661 (56 687)	49 569 (75 719)	26 795 (48 891)	15 050 (40 814)	9 323 (25 202)	319 082 (420 181)
3112	-	4 735 (4 176)	-	-	-	-	-	-	4 735 (4 176)
3113	-	3 894 (2 850)	-	-	1 966 (3 640)	927 (1 300)	-	653 (2 200)	7 440 (9 990)
3114	6 839 (13 062)	50 975 (37 953)	34 317 (42 793)	26 357 (36 920)	27 949 (44 270)	10 973 (22 124)	10 879 (17 362)	8 309 (9 267)	176 598 (223 751)
3115	128 538 (250 246)	454 489 (429 908)	221 275 (362 891)	208 340 (386 121)	233 949 (444 562)	134 866 (334 480)	71 349 (239 514)	73 079 (201 912)	1 525 885 (2 649 634)
3212	-	-	-	-	-	-	-	-	-
3213	-	-	-	-	-	-	-	-	-
3214	410 (864)	10 977 (9 494)	8 320 (9 714)	5 960 (12 911)	3 849 (7 344)	2 596 (5 414)	884 (4 533)	193 (1 639)	33 189 (51 913)
3215	29 774 (60 258)	155 280 (149 192)	64 194 (106 430)	60 672 (112 293)	55 685 (118 871)	30 813 (76 450)	19 090 (59 921)	19 250 (47 472)	434 758 (730 887)
3314	-	3 613 (4 008)	5 707 (8 719)	11 319 (9 612)	14 514 (12 333)	7 807 (5 946)	10 913 (9 013)	9 224 (6 895)	63 097 (56 526)
3315	2 036 (5 193)	5 089 (9 342)	4 006 (7 830)	3 390 (4 040)	4 323 (6 685)	2 384 (3 650)	5 287 (4 115)	3 726 (5 812)	30 241 (46 667)
3414	73 (696)	256 (1 740)	-	2 907 (4 086)	4 670 (5 140)	3 581 (5 156)	1 145 (2 252)	-	12 632 (19 070)
3415	85 (325)	260 (1 275)	1 625 (4 365)	2 714 (7 581)	3 895 (7 332)	1 719 (5 708)	989 (3 536)	235 (650)	11 522 (30 772)
3416	-	-	-	-	-	-	-	-	-
3515	-	-	-	-	-	-	-	-	-
TOTAL	709 485 (1 032 618)	2 590 758 (1 980 416)	809 557 (1 378 079)	758 629 (1 443 249)	1 667 895 (1 796 436)	1 358 767 (1 711 665)	645 487 (1 338 060)	425 887 (917 905)	8 966 465 (11 598 428)

TOTAL CATCH = 8 966 465 kg  
 TOTAL EFFORT = 11 598 428 pot lifts

CATCH FIGURES ARE UNDERLINED AND EFFORT FIGURES ARE SHOWN IN PARENTHESIS. NOT INCLUDED IN THESE CATCH FIGURES ARE 6997 KG OF ROCK LOBSTERS TAKEN BY DIVING.

THESE FIGURES ARE DERIVED FROM DATA KINDLY PROVIDED BY THE AUSTRALIAN BUREAU OF STATISTICS AND REFLECT SLIGHTLY MORE INTENSIVE EDITING BY THE DATA PROCESSING SECTION OF THE FISHERIES DEPARTMENT.

TABLE 2: CATCH (KG) PER UNIT OF FISHING EFFORT  
 (IE. KILOGRAMS OF ROCK LOBSTERS PER POT  
 LIFT) DATA FOR THE 1984/85 SEASON IN VARIOUS  
 STATISTICAL BLOCKS (SEE FIGURE 2).

BLOCK	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
2412	*	-	-	-	-	-	-	-	-
2413	0.67	-	-	-	-	-	-	-	0.67
2512	-	-	1.02	-	-	-	-	-	1.02
2612	-	-	-	0.55	-	-	-	-	0.55
2613	-	-	1.12	0.91	-	1.40	-	-	1.06
2712	-	-	-	0.86	-	-	-	-	0.86
2713	0.68	1.84	0.73	0.72	0.89	0.92	0.77	0.61	0.87
2714	0.66	1.78	0.62	0.55	0.97	2.22	0.78	0.66	1.14
2812	-	-	-	-	1.88	0.84	0.85	0.80	1.04
2813	0.82	-	-	0.15	2.12	1.08	0.60	0.36	1.07
2814	0.74	1.36	0.41	0.44	0.95	0.88	0.54	0.54	0.78
2912	-	-	-	-	-	-	-	-	-
2913	0.77	1.17	-	0.45	1.67	1.29	0.46	0.47	1.07
2914	0.86	1.32	0.49	0.49	0.98	0.92	0.50	0.62	0.84
3012	-	-	-	-	-	-	-	-	-
3013	-	-	-	-	-	-	-	-	-
3014	0.65	1.58	0.71	0.53	0.71	0.67	0.40	0.41	0.78
3015	0.78	1.52	0.74	0.54	0.65	0.55	0.37	0.37	0.76
3112	-	1.13	-	-	-	-	-	-	1.13
3113	-	1.37	-	-	0.54	0.71	-	0.30	0.74
3114	0.52	1.34	0.80	0.71	0.63	0.50	0.63	0.90	0.79
3115	0.51	1.06	0.61	0.54	0.53	0.40	0.30	0.36	0.58
3212	-	-	-	-	-	-	-	-	-
3213	-	-	-	-	-	-	-	-	-
3214	0.47	1.16	0.86	0.46	0.52	0.48	0.20	0.12	0.64
3215	0.49	1.04	0.60	0.54	0.47	0.40	0.32	0.41	0.59
3314	-	0.90	0.65	1.18	1.18	1.31	1.21	1.34	1.12
3315	0.39	0.54	0.51	0.84	0.65	0.65	1.28	0.64	0.65
3414	0.10	0.15	-	0.71	0.91	0.69	0.51	-	0.66
3415	0.26	0.20	0.37	0.36	0.53	0.30	0.28	0.36	0.37
3416	-	-	-	-	-	-	-	-	-
3515	-	-	-	-	-	-	-	-	-
TOTAL	0.69	1.31	0.59	0.53	0.93	0.79	0.48	0.46	0.77

\* - = NO RECORD OF FISHING

TOTAL CATCH = 8,966,465 KG  
 TOTAL EFFORT = 11,598,428 POT LIFTS

TABLE 3: MEAN CARAPACE LENGTHS (MM) OF MALE AND FEMALE ROCK LOBSTERS IN VARIOUS DEPTH CATEGORIES AT FREMANTLE, LANCELIN, JURIEEN AND DONGARA THROUGHOUT THE FISHING SEASON.

YEAR	AREA	MONTH	0-10 FMS		10-20 FMS		20-30 FMS		30+ FMS	
			MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
84/85	FREMANTLE	NOV	77	75						
		DEC	88	84	87	81	96	95		
		JAN	78	74	99	103	101	97	101	105
		FEB	83	79						
		MAR	76	74			103	96		
		APR	83	80			100	93		
84/85	LANCELIN	MAY	82	79			105	95		
		JUN	84	79	98	88				
		NOV	76	74						
		DEC	73	71	90	83	89	82	91	85
		JAN	71	71			97	96		
		FEB	74	72	97	89	96	84		
84/85	JURIEEN	MAR	74	72	82	78	97	89		
		APR	74	73	97	87	104	94	104	96
		MAY	75	73						
		JUN	74	72			97	88	106	94
		NOV	72	71						
		DEC	77	74	80	75	82	76	81	77
84/85	DONGARA	JAN	74	71			86	81		
		FEB	76	72	73	72	91	85	95	85
		MAR	74	73	75	73	88	83	98	89
		APR	75	73			89	82	84	78
		MAY	76	73			85	79		
		JUN	74	72						
84/85	DONGARA	NOV	74	71	74	73				
		DEC	78	74	76	73	84	80		
		JAN	73	71	74	73	87	86	81	76
		FEB	75	72	73	73	93	84		
		MAR	76	74	76	74	83	80	94	84
		APR	73	71	75	74	90	85	101	89
84/85		MAY	73	71	74	73	89	80		
84/85		JUN	73	71						

TABLE 4: BOTTOM TEMPERATURE (°C) AND SURFACE SALINITY (IN PARTS PER THOUSAND) OBTAINED FROM FREMANTLE, LANCELIN, JURIEEN AND DONGARA IN WATERS BETWEEN VARIOUS DEPTH CONTOURS FOR THE 1984/85 SEASON.

AREA	DEPTH FMS	NOV		DEC		JAN		FEB		MAR		APR		MAY		JUN	
		TEMP	SAL	TEMP	SAL	TEMP	SAL	TEMP	SAL	TEMP	SAL	TEMP	SAL	TEMP	SAL	TEMP	SAL
FREMANTLE	0-10	20.2	36.00	-	36.14	21.2	35.98	22.9	36.24	23.0	36.39	20.40	36.48	19.0	35.80	19.0	35.58
	10-20	-	-	-	36.26	20.3	-	-	-	-	-	-	-	-	-	18.9	35.66
	20-30	-	-	-	36.11	20.3	36.10	21.8	36.99	20.87	35.90	21.7	35.64	-	-	-	-
	30+	-	-	-	35.84	20.4	35.84	-	-	-	-	-	-	-	-	-	-
LANCELIN	0-10	20.4	36.14	-	-	22.2	36.51	22.4	36.26	22.4	35.71	22.4	35.76	20.1	35.64	20.3	35.46
	10-20	-	-	-	35.93	21.3	36.13	21.3	36.13	22.8	36.10	22.3	35.71	-	-	21.4	35.50
	20-30	-	-	-	35.98	20.5	36.16	23.0	35.74	23.0	35.73	23.4	35.73	-	-	22.2	35.48
	30+	-	-	-	-	-	-	-	-	23.3	35.70	23.3	35.70	-	-	-	-
JURIEEN	0-10	20.5	35.86	21.0	36.13	20.8	36.00	24.2	36.52	23.2	35.92	21.7	35.89	19.6	35.86	20.5	35.40
	10-20	-	-	20.6	36.20	-	-	22.8	35.68	22.8	35.68	-	-	-	-	-	-
	20-30	-	-	20.4	35.92	20.9	36.22	23.4	-	23.3	35.68	22.1	36.38	22.7	-	-	-
	30+	-	-	20.8	35.88	-	-	-	-	23.7	35.55	23.7	35.55	-	-	-	-
DONGARA	0-10	21.2	35.88	20.3	36.10	22.2	36.08	24.6	36.22	22.7	35.94	20.4	36.16	20.5	35.89	18.8	35.55
	10-20	-	-	-	36.26	21.9	-	22.2	36.20	22.7	36.05	21.4	36.07	20.4	35.95	-	-
	20-30	-	-	20.6	35.95	21.1	35.99	23.0	36.03	23.1	35.90	22.3	36.19	23.0	35.41	-	-
	30+	-	-	-	-	21.2	35.90	23.3	35.57	-	-	-	-	-	-	-	-

TEMPERATURES WERE TAKEN USING A PROTECTED REVERSING THERMOMETER AND SURFACE WATER SAMPLES WERE TAKEN AND LATER ANALYSED TO DETERMINE SALINITY.

TABLE 5: 1984/85 SEX RATIO BY MONTH AND DEPTH CATEGORY,  
 FIGURES ARE % OF FEMALES IN THE TOTAL SAMPLED CATCH.

AREA	DEPTH		NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
	RANGE	FMS .								
DONGARA	0-10		47	61	50	53	57	65	56	52
	10-20		55	66	58	63	55	67	60	
	20-30			60	74	77	59	78	65	
	30+				76		73	61		
JURIEN	0-10		52	62	57	57	60	60	53	55
	10-20			63		61	59			
	20-30			66	67	64	66	79	75	
	30+			74		38	58	79		
LANCELIN	0-10		65	55	63	55	65	65	62	63
	10-20			57		70	60	66		
	20-30			63	66	40	73	67		
	30+			61			70			
FREMANTLE	0-10		60	60	58	49	62	58	48	51
	10-20				62	70				
	20-30			60	45		68	63	51	
	30+				59					

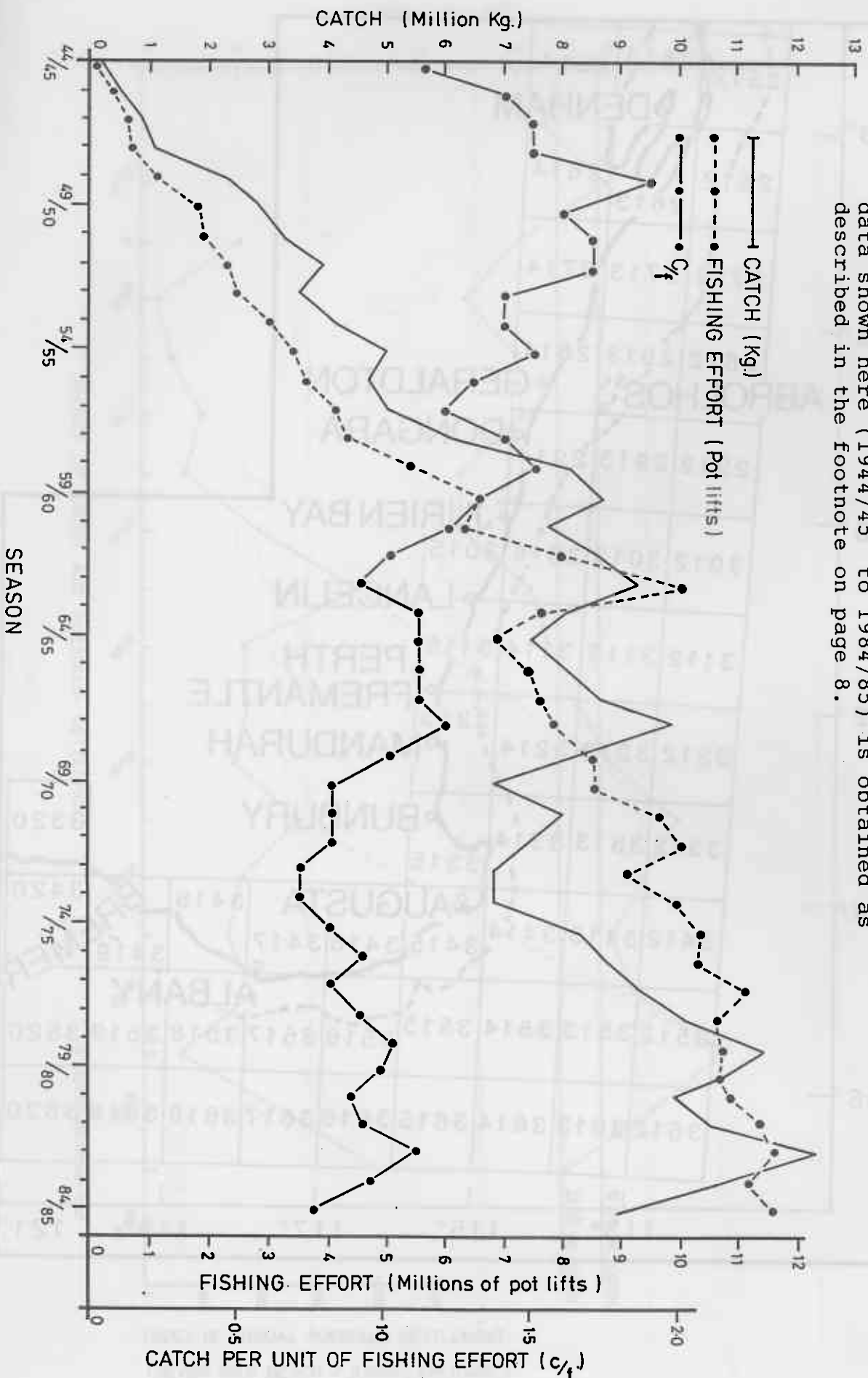


FIGURE 1 Rock Lobster catch (kg), fishing effort (pot lifts)\* and catch per unit of fishing effort (c/f) data.  
 \*Prior to the 1977/78 season, fishing effort was calculated as effective fishing effort by the method of Gulland (1969). The complete set of fishing effort data shown here (1944/45 to 1984/85) is obtained as described in the footnote on page 8.

FIGURE 2

Rock Lobster Fishing Areas

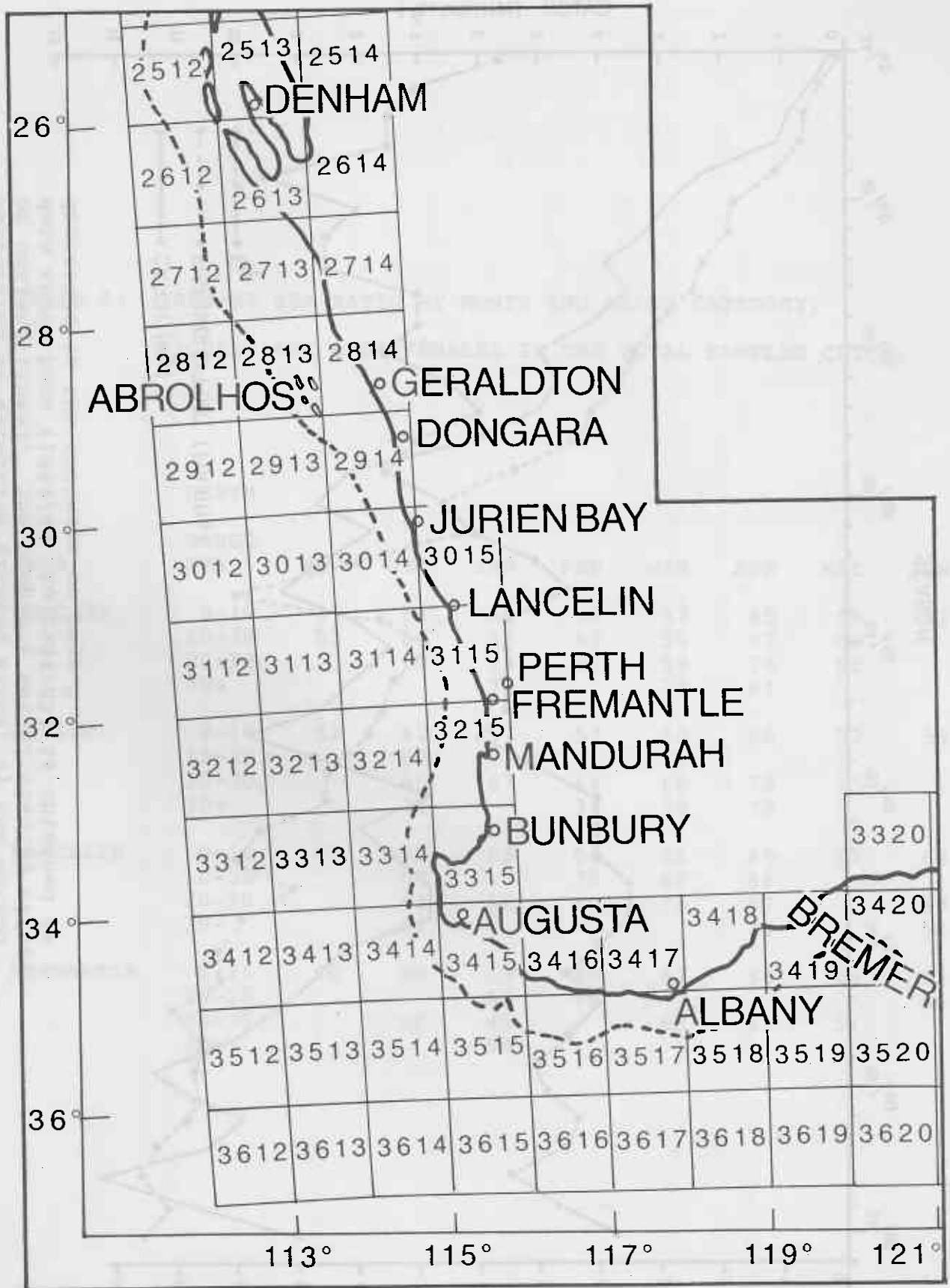




FIGURE 3  
 Rock Lobster catch and index of Annual Puerulus Settlement (Puerulus take approximately four years to grow to legal size).

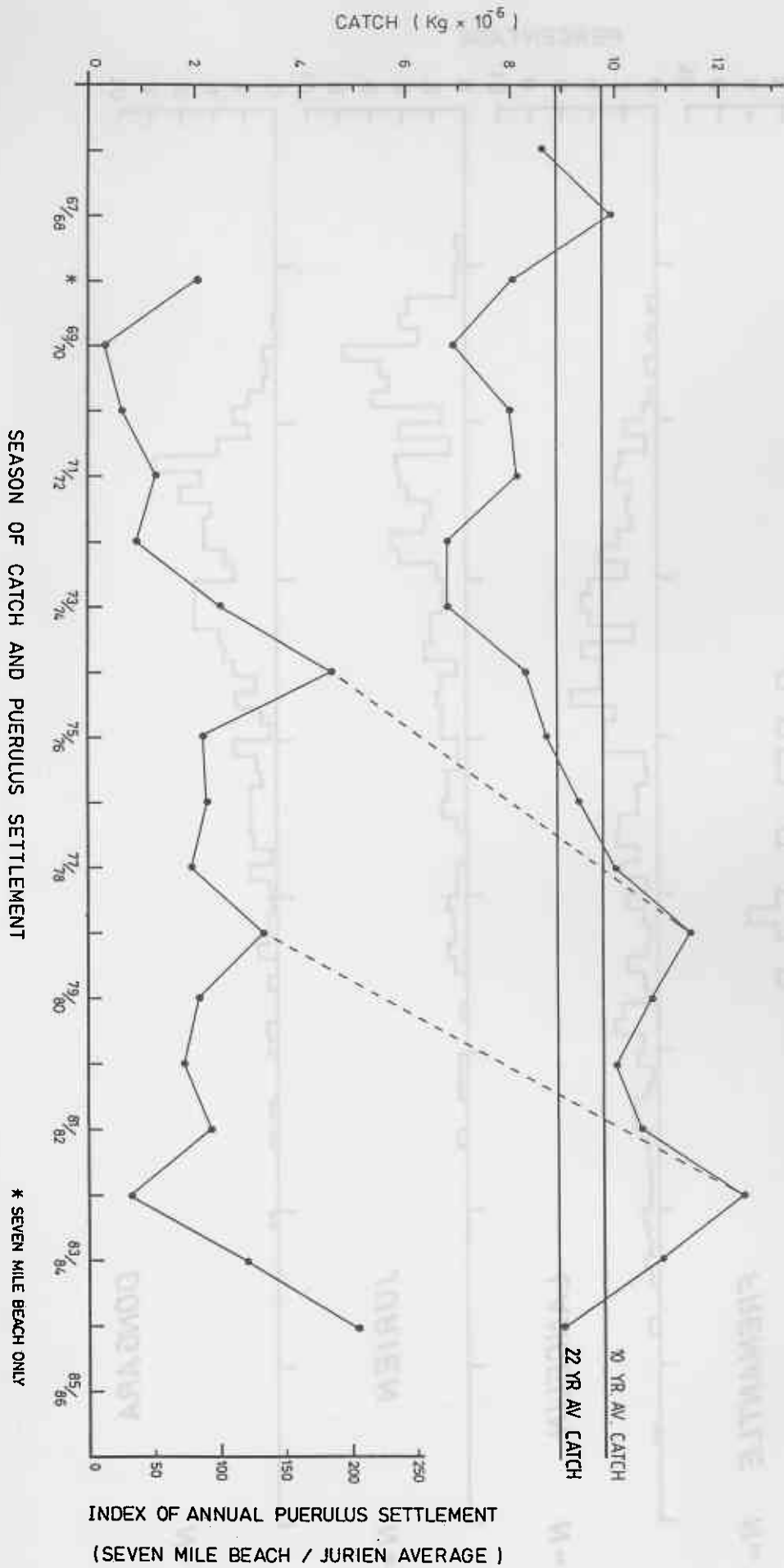


FIGURE 4 Length frequency of breeding female Rock Lobsters taken from December 1984 to February 1985.

