



REPORT NO 28

DEPARTMENT OF
FISHERIES AND WILDLIFE
WESTERN AUSTRALIA

Published by the Director of Fisheries and Wildlife, Perth,
under the authority of the Hon. Minister for Fisheries and Wildlife

The Western Rock Lobster Fishery 1974-1975

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FISHERIES & WILDLIFE
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WESTERN AUSTRALIA

BY
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AND
E. H. BARKER

PERTH
WESTERN AUSTRALIA

1977

Department of Fisheries and Wildlife
108 Adelaide Terrace
PERTH

R E P O R T

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III. RESULTS

A. CATCH AND EFFORT DATA

The fishing season for rock lobsters in the western fishery is from 1st November to 31 August and may be subdivided into three periods, viz. (i) the 'winter' period from 1st November to 31st January, (ii) the 'summer' period from 1st February to 31st May, and (iii) the 'autumn' period from 1st June to 31st August.

THE WESTERN ROCK LOBSTER FISHERY 1974-75

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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. The fishery is governed by a complex set of regulations which have been reviewed by Bowen (1971) and which are designed to limit the total effort to acceptable levels and to enforce a legal minimum size. It is thus important to constantly monitor the state of the fishery both to ensure that the 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 fishing practice, gear, etc., which may lead to increases in efficiency which may not be detectable through the usual calculated effort figures.

This paper is the fourth of a series of annual reviews of the previous rock lobster season which will discuss fishing practice, catches, effort, mean size and various other factors, a knowledge of which will help toward a better understanding of the status of the fishery.

II METHODS

Catch and effort data were extracted from figures supplied by the Australian Bureau of Statistics and also from research log book data, while 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 from 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 14 August and may be subdivided into three distinct phases, viz. (i) the "whites" fishery (George, 1958) which begins suddenly in late November (as pale-coloured newly-moulted rock lobsters leave the shallow

reef areas) and arbitrarily finishes on 31 December; (ii) the "coastal red" fishery, which begins on 1 January and ends on 14 August, and (iii) the Abrolhos Islands fishery which is open from 15 March to 14 August.

In 1974 the "whites" run commenced on about 21 November in both northern and southern areas which is about the average time, and approximately three days earlier than the previous season.

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

"Whites" catch	=	2 550 820 kg
"Whites" effort	=	2 561 362 pot lifts
"Coastal Reds" catch	=	4 401 586 kg
"Coastal Reds" effort	=	6 365 254 pot lifts
Abrolhos catch	=	1 307 608 kg
Abrolhos effort	=	1 328 864 pot lifts
Total Catch	=	8 260 014 kg
Total Effort	=	10 255 480 pot lifts

These figures do not include "cash" sales (i.e. rock lobsters which are sold for cash and are not recorded in the fisherman's monthly returns of catches) totalling 617 400 kg, or amateur catches for which estimates have so far not been obtained. Figure 1 shows comparative catch, corrected effort and catch per effort data from previous years.

Catch and effort data from various statistical blocks (Figure 2) are shown in Table 1 with catches expressed in kgs weight and effort as number of pot lifts. Table 2 shows catch per pot data for the same statistical blocks. Using the method of Gulland (1969) to calculate effective fishing intensity with each month's effort in pot lifts being weighted according to the relative catchability in the month (Morgan, 1974), the total effective fishing intensity was 8 035 419 units of effort, which was 12.7% greater than the 1973/74 season.

MEAN SIZE

Samples of rock lobsters were measured aboard commercial vessels using standard pots with 54 mm escape gaps in four depth categories at various ports. The sample would hence include all commercial size rock lobsters plus undersize which would have been reduced in number by selection by the escape gap (Bowen, 1963). Mean carapace lengths of males and females in the various depth categories at Fremantle, Lancelin, Dongara and Jurien throughout the fishing season have been compared in Table 3. The many 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.

C. NUMBER OF BOATS

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

Number of boats licensed in 1974-75	=	809
Number of boats licensed north of 30°S	=	406
Number of boats licensed south of 30°S	=	403

D. FORECAST OF 1974/75 RECRUITMENT

The increased puerulus settlement and consequent higher juvenile densities that occurred from 1970-71 onwards (B.F. Phillips, personal communication) were reflected in the increased catches in the 1974-75 season.

E. INTRODUCTION OF NEW LEGISLATION

1. As from 1 November 1974 the area closed to the taking of rock lobsters on the north, south, and west sides of Rott-nest Island was reduced from 3 200 metres to 1 600 metres for professional fishermen.
2. Commonwealth notices published on 8 April 1975 under the Fisheries Act 1952-75 closed four areas off the Western Australian coast to lobster boats unless their licences were endorsed for the rock lobster fishery in proclaimed waters between 34° 20'S and 21° 44'S. In addition the number of pots per boat has been formally controlled by notice.

The purpose of the new notices is to implement, under the amendments to the Fisheries Act that come into force on 1 January 1975, the same measures that had been implemented prior to that date by administrative means. The entitled boats and their pot quotas have not been varied.

3. The name of a licensed fishing boat shall not be changed or altered while that vessel remains in the fishing industry. This still applies even if the vessel is sold or otherwise transferred but retains its fishing licence.

Should an owner wish to use the same name on a replacement vessel he is permitted to do so provided the figure two is used after the name on the replacement vessel.

Boats transferred or sold out of the fishing industry (and which do not retain the fishing licence) may have the name changed provided that if the boat subsequently re-enters the industry, and is licensed as a fishing boat, it must resume its former name.

4. Licensing fees for commercial fishing in Commonwealth Proclaimed Waters were increased as from 1 January 1975, to coincide with the introduction of the amended Commonwealth Fisheries Act. From 1 January a commercial fisherman's licence cost \$10 (an increase of \$9) and boat licences, which depend on overall length, have increased by approximately \$20.

The new licence fees are:

For a boat less than 15 m	\$20
For a boat of 15 m but less than 20 m	\$25
For a boat of 20 m or more	\$30
Processing boat	\$50
Carrier boat	\$40

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

Vol. 7 No. 4 (Dec 1974) pp. 65, 66; Vol. 8 No. 1 (March 1975) pp. 15, 22; Vol. 8 No. 2 (June 1975) p. 31.

F. EFFECTS OF NEW LEGISLATION

The changes in the legislation were of an administrative nature and hence had little direct effect on the fishery.

G. INNOVATIONS TO BOATS AND GEAR

Figures supplied by the Harbour and Light Department showed that a total of 16 boats were replaced during the period 1 July 1974 to 30 June 1975 and ranged in length from 5.18 m to 12.49 m. This represented a drop of 63% in the number of boats that were replaced during the same period in 1973/74 and reflected the generally depressed economy of the industry. The boat replacements were constructed of:

	<u>Wood</u>	<u>Fibre Glass</u>	<u>Aluminium</u>
Fremantle	3	5	2
Geraldton	<u>2</u>	<u>4</u>	<u>—</u>
	5	9	2
	—	—	—

In the northern area the boats replaced were on the average 10% (1.16 m) greater in length than boats replaced in the southern area.

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

	<u>Beehive</u>	<u>Batten</u>	<u>Steel Beehive</u>
North	13%	82%	6%
South	73%	20%	7%

H. BAIT

The combinations of bait used throughout the season consisted of: cattle hocks or pieces of hide together with fish heads, whole fish or pieces of fish. The range of fish baits consisted of: Western Australian salmon heads (*Arripis trutta esper*), Eastern salmon heads (*Arripis trutta marginata*), pieces of salmon flesh, Australian herring or ruff (*Arripis georgianus*), New Zealand snapper heads (*Chrysophrys auratus*), mullet (*Mugil cephalus*), Yellow-eyed mullet (*Aldrichetta forsteri*), Pilchards (*Sardinops neopilchardus*), Bony herring (*Fluvialosa vlaminghi*), Scaly mackerel (*Amblygaster postera*), Canadian salmon heads (*Oncorhynchus* sp.), Eastern States barracouta heads (*Leionura atum*), Eastern States and Western Australian tuna heads and tuna meat, blue sprats (*Spratelloides robustus*), New Zealand trevally heads (*Caranx lutescens*), New Zealand cod heads (*Pseudophycis bacchus?*), New Zealand King Snapper heads (*Trachichthodes gerrardi?*) and pieces of kangaroo (*Macropus* sp.).

Prices of the various types of bait, with the exception of hocks which generally remained stable, rose in price from the 1973/74 season, by between 9% and 31%.

Craylure, a prepared bait for lobsters was used by fishermen for the first time during the 1974/75 season.

I. DISTRIBUTION OF FISHING

The distribution of fishing 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 shallow), depending on weather and density of rock lobsters, throughout the remainder of the season.

J. AVERAGE NUMBER OF DAYS WORKED PER BOAT PER MONTH

Month	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
Days Worked	11.7	24.2	16.7	18.9	20.6	21.2	18.4	15.6	14.4	8.9

The average number of days worked per month during November and December was 1.7% up on the 1973/74 season and for the period

January to August was 4.2% up on the 1973/74 season.

The average number of days worked per month for the 1974/75 season was 17.6, which was an increase of 3.5% on the 1973/74 season.

*K. PRICE OF ROCK LOBSTERS

Price to fishermen \$2.82 - \$2.85 per kg.

The range of prices paid on the New York wholesale market:

Grade	\$ Aust. per kg
4 - 6 ozs (113 - 170 g.)	8.22 - 10.03
6 - 8 ozs (170 - 226 g.)	8.46 - 9.78
8 - 10 ozs (226 - 283 g.)	8.46 - 9.70
10 - 12 ozs (283 - 340 g.)	8.42 - 9.70
12 - 16 ozs (340 - 453 g.)	8.32 - 9.61
16 - 20 ozs (453 - 566 g.)	7.72 - 9.37
over 20 ozs (over 566 g.)	7.35 - 9.01

*L. MARKET TRENDS AND ECONOMIC FACTORS

In 1974/75, 99% of frozen rock lobster tails were shipped to the U.S.A.

France took 50% of whole rock lobsters in 1974/75 while 17% went to Japan and 5% to U.S.A.

Exports of frozen rock lobster tails increased by 11% while exports of whole rock lobsters declined by 30% compared to the previous year. Holdings of frozen rock lobster tails in the U.S.A. at 30 June 1975 were 2 404 tonnes, an increase of 35% over the previous year.

M. AVERAGE VALUE PER POT ON POT REDISTRIBUTION

About \$260 - \$280.

N. SEA WATER TEMPERATURES AND SALINITIES

These have relevance to the behaviour and catch rates of rock lobsters (Morgan, 1974).

* Sections K and L are based on data provided by the Australian Department of Primary Industry.

The average sea water temperature during the rock lobster season (i.e. 15 November to 14 August) at Waterman (aquarium intake temperature) was 20.3°C, with a maximum of 24.2°C on 2 February, 1975 and a minimum of 15.8°C on 27 July, 1975. The average salinity during the season at Waterman (aquarium) was 35.535‰ with a maximum of 36.490‰ on 17 March, 1975 and a minimum of 34.898‰ on 14 July, 1975.

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.

O. SPAWNING ROCK LOBSTERS

While most of the breeding females are found in the 20-30 fathom depth range, no variation has been observed in the size at 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 Jurien over 30 fathoms may be pooled to indicate the size frequency of breeding (i.e. "berried" and mated) females and this has been done in Figure 3. The mean size of breeding females was greater at Lancelin and Fremantle than at either Dongara or Jurien with the mean sizes being 92 mm for Jurien, 97 mm for Dongara, 103 mm for Fremantle and 107 mm for Lancelin. By comparison the mean sizes at first breeding (i.e. the smallest carapace length at which 50% have been mated) were found to be 96 mm at Fremantle, 95 mm at Lancelin, 86 mm at Jurien and 91 mm at Dongara.

P. SEX RATIOS

The sex ratios of rock lobsters taken by commercial pots was calculated from the information gathered from the catch monitoring programme and is shown in Table 5.

IV DISCUSSION

An improvement in the settlement of puerulus larvae from 1970/71 onwards resulted in apparently higher densities of legal size animals being available during the 1974/75 season than in the previous two seasons. This is reflected in the increased catch per unit of effort shown, for the 1974/75 season, in Table 2. These greater densities, together with a 12.7% increase in the total effective fishing intensity, resulted in a significant increase in total catch, of 21.8% when compared with the 1973/74 season. This was above the upper limit of sustainable catch suggested by Bowen and Chittleborough (1966).

The increase in the total effective fishing intensity was partly a result of a very mild winter (data supplied by the Australian Bureau of Meteorology) which led to an increase in the number of boat days worked during the season. A downturn in the economy of the industry, with cost increases for bait and fuel exceeding the small price increase

for rock lobsters, may also have contributed to the increased fishing intensity. This economic downturn was reflected in the reduced numbers of boat replacements during the season.

V ACKNOWLEDGEMENTS

A substantial part of this work was financed by a grant from the Fishing Industry Research Trust Account. Measurements aboard fishing vessels were performed by Mr R. Bell and Mr G. Lymm.

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TABLE 1

CATCH (IN KGS WEIGHT) AND EFFORT (IN POT LIFTS) FOR THE 1974/75 ROCK LOBSTER SEASON IN VARIOUS STATISTICAL BLOCKS.

BLOCK	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	TOTAL
2612	-	-	-	-	-	-	-	-	-	-	-
2613	-	-	-	1280 (3260)	1928 (1980)	-	31185 (2880)	17578 (2325)	1474 (1480)	-	53445 (11925)
2712	-	-	-	-	-	-	-	-	-	-	-
2713	5288 (7988)	29102 (22610)	35566 (44997)	20913 (27619)	19350 (25791)	30832 (28839)	21831 (24470)	20810 (23275)	13714 (23033)	13223 (15284)	210629 (243906)
2714	6842 (10185)	25617 (20112)	18423 (21559)	6845 (15014)	10333 (15084)	15618 (18303)	19960 (15530)	12993 (16714)	9887 (15071)	4251 (5549)	130769 (153121)
2812	-	-	-	-	3743 (2410)	2291 (2320)	906 (2512)	2241 (3787)	604 (1551)	408 (1068)	10193 (13648)
2813	563 (1911)	-	2270 (6885)	1258 (2985)	446698 (268826)	516273 (457198)	216932 (320765)	45613 (110517)	55053 (121633)	27039 (49925)	1311699 (1340645)
2814	77167 (131272)	272962 (261903)	44030 (112954)	41459 (97407)	76135 (96368)	68601 (81294)	32904 (70703)	28426 (59124)	30403 (55329)	26360 (35392)	699447 (1011746)
2912	60 (310)	786 (1701)	176 (972)	-	-	-	-	-	-	-	1022 (2983)
2913	867 (1512)	10384 (7620)	4065 (5472)	1107 (3402)	6424 (5112)	17189 (13708)	3547 (8487)	139 (420)	374 (1561)	889 (2133)	44985 (49427)
2914	147326 (249265)	538117 (470355)	129264 (223155)	127737 (235210)	205169 (233602)	159464 (199576)	96317 (172919)	79283 (131433)	73065 (28684)	35144 (56713)	1590886 (2100912)
3012	-	-	-	-	849 (1674)	818 (1395)	-	-	-	-	1667 (3069)
3013	359 (1296)	6581 (5260)	2370 (4435)	642 (2235)	1901 (4385)	1171 (2178)	-	-	-	-	13024 (19789)
3014	74360 (138417)	397111 (313410)	156456 (191829)	108393 (182658)	192056 (228534)	170146 (200629)	68225 (111803)	49564 (85135)	41707 (81865)	29883 (41706)	1287901 (1575986)
3015	18279 (26731)	71827 (65376)	49415 (56562)	45416 (56547)	57848 (61429)	45330 (55685)	14597 (29621)	11932 (21872)	8079 (16810)	4414 (10317)	327137 (400950)
3112	761 (1410)	8737 (7020)	3000 (2961)	2700 (2961)	2681 (2961)	2750 (2820)	-	-	-	-	20629 (20133)
3113	804 (1200)	2063 (2175)	-	3752 (1950)	2534 (1950)	2493 (3180)	1215 (1725)	1757 (1275)	-	-	14618 (13455)
3114	11952 (20691)	68189 (57708)	46557 (51688)	39785 (54741)	42754 (55175)	30549 (38520)	3316 (6782)	4411 (12296)	4387 (8592)	2495 (5040)	254395 (311233)
3115	121479 (199503)	509545 (416994)	243996 (322008)	248592 (365229)	292745 (383243)	186798 (287065)	89676 (176654)	73147 (153940)	53239 (104976)	22284 (42243)	1841501 (2451855)
3212	-	-	-	-	-	-	-	-	-	-	-
3213	-	-	-	-	-	-	-	-	-	-	-
3214	-	-	-	-	-	-	-	-	-	-	-
3215	17346 (25602)	121939 (86017)	49176 (64433)	55854 (74884)	50760 (72427)	36019 (55384)	31888 (45801)	26642 (38789)	21594 (27812)	10292 (14398)	421510 (505547)
3314	-	-	-	-	177 (360)	596 (1140)	-	-	-	-	773 (1500)
3315	512 (1320)	3895 (4488)	2561 (3402)	1813 (2772)	1719 (2736)	8340 (2296)	715 (1440)	1971 (2550)	1041 (792)	747 (854)	23314 (22650)
3414	-	-	470 (1000)	-	-	-	-	-	-	-	470 (1000)
TOTAL	483965 (818613)	2066855 (1742749)	787795 (1114312)	707546 (1128874)	1415804 (1460347)	1295278 (1461530)	634214 (992092)	376507 (663452)	314621 (589189)	177429 (280622)	8260014 (10255480)

TOTAL CATCH = 8260014 KGS

TOTAL EFFORT = 10255480 POT LIFTS

EFFORT FIGURES ARE SHOWN IN PARENTHESIS AND CATCH FIGURES ARE UNDERLINED.

TABLE 2 - CATCH/EFFORT DATA FOR 1974/75 SEASON IN VARIOUS STATISTICAL BLOCKS

BLOCK	NOV	DEC	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUG	TOTAL
2612	-	-	-	-	-	-	-	-	-	-	-
2613	-	-	-	0.39	0.97	-	10.83	7.56	1.00	-	4.48
2712	-	-	-	-	-	-	-	-	-	-	-
2713	0.66	1.29	0.79	0.76	0.75	1.07	0.89	0.89	0.60	0.87	0.86
2714	0.67	1.27	0.85	0.46	0.69	0.85	1.29	0.78	0.66	0.77	0.85
2812	-	-	-	-	1.55	0.99	0.36	0.59	0.39	0.38	0.75
2813	0.29	-	0.33	0.42	1.66	1.13	0.68	0.41	0.45	0.54	0.98
2814	0.59	1.04	0.39	0.43	0.79	0.75	0.48	0.48	0.55	0.74	0.69
2912	0.19	0.46	0.18	-	-	-	-	-	-	-	0.34
2913	0.57	1.36	0.74	0.33	1.26	1.25	0.42	0.33	0.24	0.42	0.91
2914	0.59	1.14	0.58	0.54	0.88	0.80	0.56	0.60	0.57	0.62	0.76
3012	-	-	-	-	0.51	0.59	-	-	-	-	0.54
3013	0.28	1.25	0.53	0.29	0.43	0.54	-	-	-	-	0.66
3014	0.54	1.27	0.82	0.59	0.84	0.85	0.61	0.58	0.51	0.72	0.82
3015	0.68	1.10	0.87	0.80	0.94	0.81	0.49	0.55	0.48	0.43	0.82
3112	0.54	1.24	1.01	0.91	0.91	0.98	-	-	-	-	1.02
3113	0.67	0.95	-	1.92	1.30	0.78	0.70	1.38	-	-	1.09
3114	0.58	1.18	0.90	0.73	0.77	0.79	0.49	0.36	0.51	0.50	0.82
3115	0.61	1.22	0.76	0.68	0.76	0.65	0.51	0.48	0.51	0.53	0.75
3212	-	-	-	-	-	-	-	-	-	-	-
3213	-	-	-	-	-	-	-	-	-	-	-
3214	-	-	-	-	-	-	-	-	-	-	-
3215	0.68	1.42	0.76	0.75	0.70	0.65	0.70	0.69	0.78	0.71	0.83
3314	-	-	-	-	0.49	0.52	-	-	-	-	0.52
3315	0.39	0.87	0.75	0.65	0.63	3.63	0.50	0.77	1.31	0.87	1.03
3414	-	-	0.47	-	-	-	-	-	-	-	0.47
TOTAL	0.59	1.19	0.71	0.63	0.97	0.89	0.64	0.57	0.53	0.63	0.81

TOTAL CATCH 8 260 014 KGS

TOTAL EFFORT 10 255 480 POT LIFTS

TABLE 3 - MEAN CARAPACE LENGTHS (MM) OF MALE AND FEMALE ROCK LOBSTERS IN VARIOUS DEPTH CATEGORIES AT FREMANTLE, LANCELIN, JURIEN 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
74/75	Fremantle	Nov	78	75	87	83				
		Dec	77	75			91	86	93	86
		Jan	79	76	93	87	94	90		
		Feb	75	72			104	98		
		Mar	78	75						
		Apr	77	77			91	86		
		May					98	92		
		Jun	76	73						
74/75	Lancelin	Jly			88	85				
		Aug	77	74						
		Nov	73	70						
		Dec	76	75	85	80				
		Jan	71	70	108	99				
		Feb	74	72	104	97	114	105		
		Mar	76	73	99	87				
		Apr	75	73			102	94		
74/75	Jurien	May	74	72						
		Jun	74	72						
		Jly	73	73						
		Aug	75	73	103	102				
		Nov	74	73	76	75				
		Dec	78	75	77	74				
		Jan	75	73			90	84	93	87
		Feb	75	73	79	75	89	83		
74/75	Dongara	Mar	75	73	79	76				
		Apr	77	74	79	79	96	88		
		May	76	74	77	75				
		Jun	76	73	77	79				
		Jly	75	72	79	76	93	90	98	91
		Aug	76	74						
		Nov	69	68						
		Dec	80	76	79	76				
74/75	Dongara	Jan	74	72	74	72	95	89	96	93
		Feb	75	74	76	74				
		Mar	76	74	79	76			98	90
		Apr	73	73	76	74			101	89
		May	76	74	81	78	94	86	103	92
		Jun								
		Jly	71	69	79	75	90	91		
		Aug	76	74			94	87		

TABLE 4 - BOTTOM TEMPERATURE (°C), AND SURFACE SALINITY IN PARTS PER THOUSAND FOR FREMANTLE, LANCELIN, JURIEEN, AND DONGARA OF WATERS BETWEEN VARIOUS DEPTH CONTOURS FOR THE 1974/75 SEASON.

Area	Depth (Fath)	NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH		APRIL		MAY		JUNE		JULY		AUGUST			
		Temp	Sal	Temp	Sal	Temp	Sal	Temp	Sal	Temp	Sal	Temp	Sal	Temp	Sal	Temp	Sal	Temp	Sal	Temp	Sal		
FREMANTLE	0-10	18.8	35.66	19.6		22.6	35.77	22.4	36.26	22.7	36.07	20.7	35.61			19.1	35.32			20.0	35.17	16.0	35.16
	10-20	19.4		20.1	35.63	21.0	35.68					20.4											
	20-30			20.4	35.59	35.57	35.68	21.4	35.68						35.40								
	30+																						
LANCELIN	0-10	19.9	35.45	20.6	35.40	22.1	36.30	23.0	36.23	21.5	35.91	22.2	35.55	21.0	35.34	19.6	35.15			18.2	35.16	17.4	35.11
	10-20			20.2	35.46			22.3	35.90	21.8	35.51											18.9	35.18
	20-30					21.2	35.87	22.8	35.62			21.5	35.38										
	30+																						
JURIEEN	0-10	19.6	35.74	20.2	35.58	21.8	36.13	22.9	35.99	22.8	36.38	35.69	35.51	20.6	35.51	18.6	35.29			33.66	35.28	18.6	35.14
	10-20	19.5	35.62	20.0	35.68			23.6		21.8	35.71			20.2	35.88					17.7	35.28		
	20-30					21.1	35.66	22.6	35.77			35.53								20.1	35.15		
	30+					21.1	35.68																
DONGARA	0-10	20.8	35.68	20.7		21.9	35.63	24.8	35.87	22.6	35.88	36.38	36.38	19.1	35.75					18.7	34.60	18.6	35.14
	10-20			20.4				24.1	35.85	22.2	35.83			36.00	35.65								
	20-30					21.2	35.66													20.6	35.10	18.8	35.35
	30+					21.4	35.45			23.2	35.43	35.17	35.37										

Temperatures were taken using an unprotected reversing thermometer and surface water samples were taken and later analysed to determine salinity.

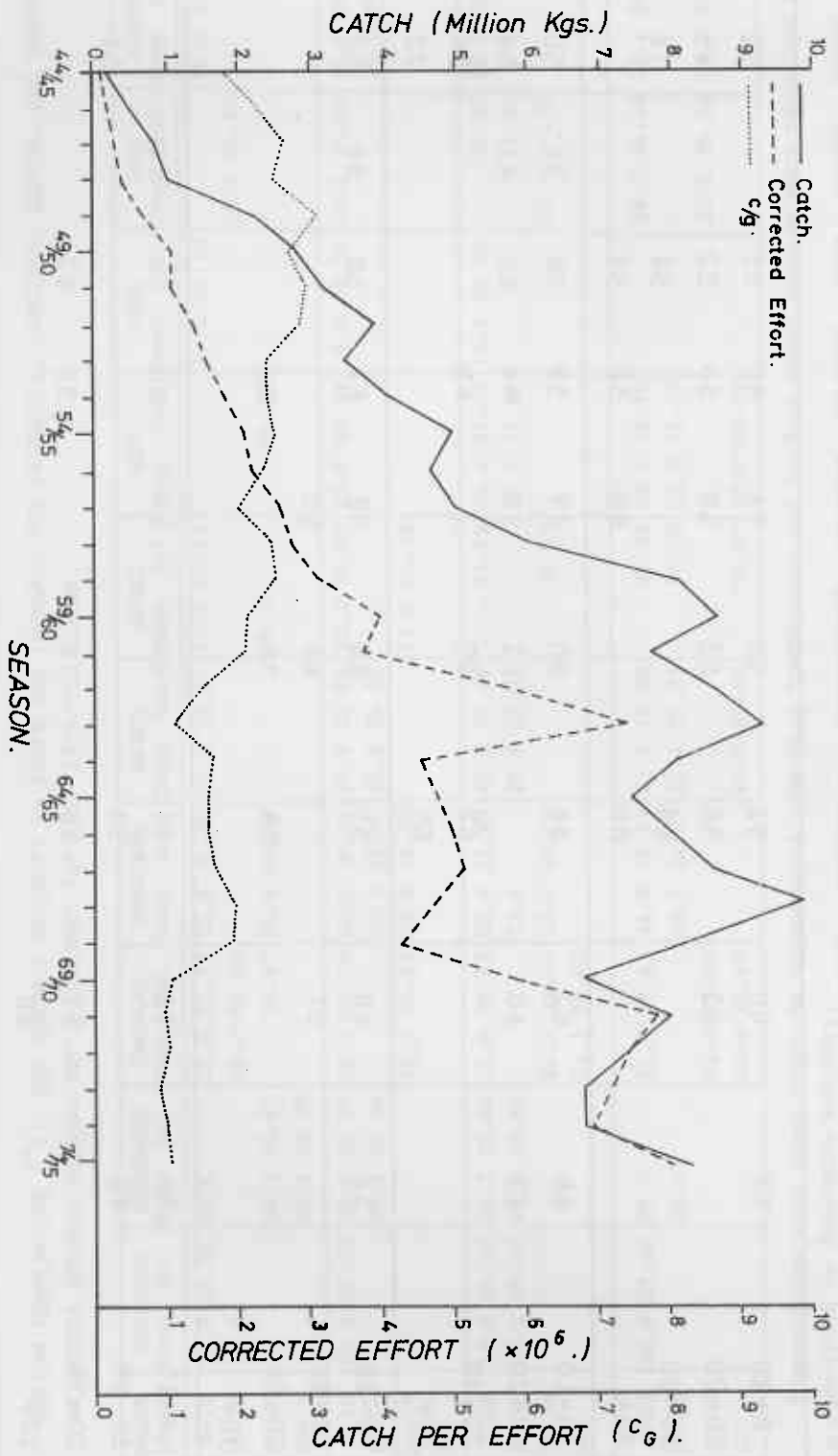


FIGURE 1. Rock Lobster Catch, Corrected Effort and Catch per Unit of Effort Data.

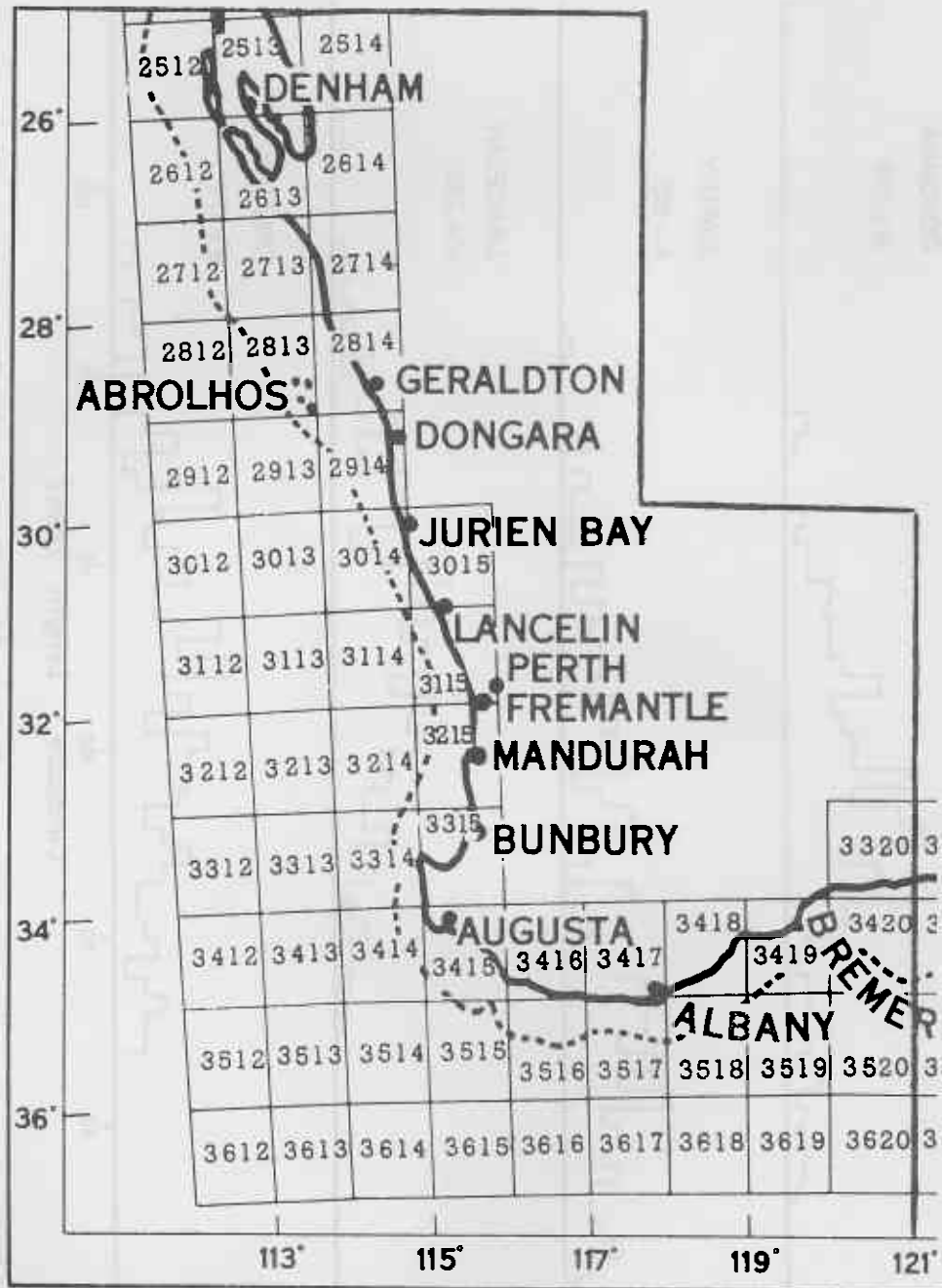


FIGURE 2. Rock Lobster Fishing Areas

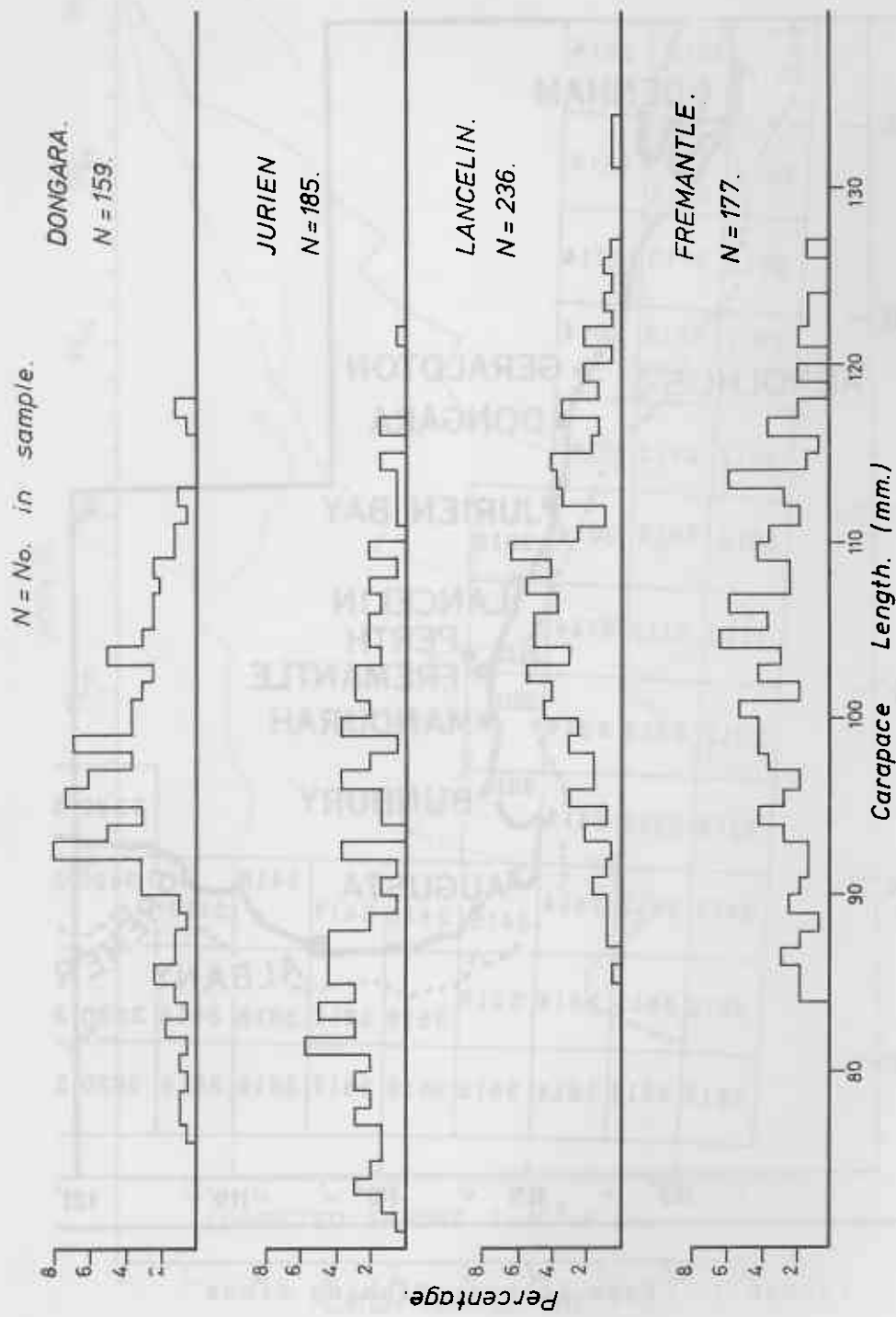


FIGURE 3. Length Frequency of Breeding Female Rock Lobsters Taken From December 1974 to February 1975.