FISHERIES DEPARTMENT
WESTERN AUSTRALIA

REPORT No 73

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

The Western Rock Lobster Fishery 1981-1982

BY

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AND

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PERTH
WESTERN AUSTRALIA

1986

Fisheries Department

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ISSN 0726 0733
ISBN 0 7309 0694 9

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THE WESTERN ROCK LOBSTER FISHERY 1981/82

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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. Western Australia produced 10,548 tonnes in 1981/82, out of a total Australian catch of rock lobster of 15,764 tonnes. The fishery is governed by a complex set of regulations which have been reviewed by Bowen (1971) and Hancock (1981) and which are designed to limit the total fishing 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 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 fishing practice, gear, etc. which may lead to increases in efficiency which may not be detectable through the usual calculations of fishing effort.

This paper is the twelfth 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 towards a better understanding of the status of the fishery.

II METHODS

Catch and effort data were extracted from figures obtained from fishermens' monthly returns and supplied by the Australian Bureau of Statistics and also from rock lobster 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 30 June 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; 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).

In 1981 the "whites" run commenced in Geraldton on about 18 November and in Jurien and Fremantle about 20 November.

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

"Whites" catch	(15 Nov-31 Dec)	=	3,765,526 kg
"Whites" effort	(" " ")	=	2,687,551 Pot lifts
"Coastal Reds" catch	(1 Jan-30 June)	=	5,210,467 kg
"Coastal Reds" effort	(" " ")	=	7,284,914 Pot lifts
Abrolhos catch	(15 Mar-30 June)	=	1,571,785 kg
Abrolhos effort	(" " ")	=	1,282,947 Pot lifts
Total		=	10,547,778 kg
Total effort		=	11,255,412 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 501,914 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[1] 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 in kg weight and fishing effort as number of pot lifts. Table 2 shows catch per pot data for the same statistical blocks. The total fishing effort was 11,255,412 units of fishing effort, 3.3% greater than the 1980/81 season.

B.[2] 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 1981 to June 1982 were as follows:

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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.

Grade	% of Cases
A (140 - 179 grams)	34.2
B (180 - 239 grams)	32.6
C (240 - 279 grams)	20.2
D (280 - 359 grams)	6.2
E (360 - 479 grams)	3.7
F (480 - 599 grams)	1.8
G (600 - grams)	1.3

C. 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.

D. 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. As at December 1981 (FINS Vol. 14 No. 4) the number of boats licensed to fish in the various zones was as follows:

Total number of licensed boats	=	782
Number of boats licensed in Zone A	=	200
Number of boats licensed in Zone B	=	167
Number of boats licensed in Zone C	=	400
Number of boats licensed in Zone D	=	6
Number of boats licensed in Zone E	=	9

E. FORECAST OF 1981/82 RECRUITMENT

Puerulus settlement in previous years was average to above average, resulting in good recruitment to the fishery in 1981/82 and a continuing high commercial catch.

F. INTRODUCTION OF NEW LEGISLATION

As from 1 July 1981 a special levy of 3.9 cents a kilogram was applied to all rock lobsters exported from Australia. The levy is designed to offset half the wages bill of Department of Primary Industry inspectors.

As from 29 May 1981 pot fees payable for the Limited Entry Rock Lobster Fishery were increased. The new fees became payable during the 1981/82 season and are listed below.

	Approved New Fee
Zone A, Zone B, Zone C or Zone D	$4.50 per pot
Zone E	$3.00 per pot

As from 6 November 1981 Section 24C(2) was amended to allow processing of rock lobster leg, "horn" (antennae) and "scalp" (the group of muscles under the carapace posterior to the antennae) meat by land based processing establishments which currently hold licenses to process rock lobsters into tails.

As from 4 September 1981 new regulations came into force controlling the size and design of rock lobster pots, viz.

1. Every rock lobster pot shall have only one entrance or neck which shall be positioned on the upper surface of the pot, having the mouth or entrance parallel to the base of the pot.

2. A batten rock lobster pot shall not exceed one metre in length when measured internally and parallel to the base.

3. A rock lobster pot other than a batten rock lobster pot shall not exceed one metre when measured internally along the line of greatest length on a plane parallel to the base.

As from 16 October 1981 licensing fees were altered as follows:

1. Fishing Boat Licences or Renewal of Such Licences For a boat:

(a)	not exceeding 7.5 m in length	$ 10.00
(b)	exceeding 7.5 m in length, but not exceeding 10.5 m in length	$ 15.00
(c)	exceeding 10.5 m in length, but not exceeding 16.5 m in length	$ 20.00
(d)	exceeding 16.5 m in length	$ 40.00

2.	Professional Fisherman's Licences	$ 5.00
3.	Amateur Fisherman's Licences	$ 6.00
4.	Inland Fisherman's Licences	$ 6.00
5.	Rock Lobster Pot Licences (outside limited entry fishery)	$ 12.00

6. Processor Licences

(a) Land Based Establishments:

rock lobster or prawns only	$250.00
rock lobster and prawns only	$500.00
rock lobster, prawns and wetfish	$624.00
rock lobster, and wetfish only	$375.00
prawns and wetfish only	$375.00
wetfish only	$125.00

(b)	Seagoing Processing Establishment	$125.00

7.	Transfer of Processor's Licence	$ 12.00
8.	Removal of Processor's Licence	$ 12.00
9.	Transfer of Exclusive Licences	$ 5.00

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

Vol. 14 No. 3 (September 1981) pp. 10, 25.
Vol. 14 No. 4 (December 1981) pp. 7, 22.
Vol. 15 No. 1 (March 1982) p. 28

G. EFFECTS OF NEW LEGISLATION

Because of the continuing trend throughout the fishery towards the use of large and more efficient pots it was decided to control both the size and design of pots. The result of this legislation was to arrest what would have been a serious increase in fishing effort.

The other changes in the legislation were of an administrative nature and hence had little 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 44 boats was replaced during the period 1 July 1981 to 30 June 1982. In the northern sector of the fishery a total of 24 boats was replaced, these ranged in size from 9.10 metres to 18.30 metres with an average size of 12.50 metres, whilst in the southern sector a total of 20 boats was replaced ranging in size from 9.90 metres to 18.60 metres and averaging 15.00 metres in length. The replacement vessels in the northern area were small to medium in size and medium in size in the southern area. During this period there was a reduction of 30% in the number of boats replaced during the 1980/81 season. The replacement vessels were constructed as follows:

	WOOD	FIBREGLASS	ALUMINIUM
FREMANTLE	6	10	4
GERALDTON	0	10	14
	6	20	18

Data from research log books[3] showed the following usage of various types of pots by fishermen north and south of 30°S:

3. Twenty-three percent of skippers voluntarily submitted rock lobster research records during the 1981/82 season.

	STICK AND CANE BEEHIVE	BATTEN	STEEL BEEHIVE
NORTH 30°S	14%	83%	3%
SOUTH 30°S	66%	30%	4%

The large wire covered steel pots with side entrances constructed of trawl mesh which became very popular during the previous season were banned from the beginning of the 1981/82 season.

The usage of oversized batten pots, many with built in bait containers and plastic necks increased. Smaller numbers of oversized beehive pots also continued to be used.

The Geraldton designed and made mechanical rope coiler (Mansom) gained in popularity and was fitted to many boats throughout the fishery.

I. BAIT

Data from research log books showed the following usage of bullock hocks and pieces of cattle hide as holding bait in both northern and southern areas:

	HOCKS	HIDES
NORTH 30°S	40%	60%
SOUTH 30°S	33%	67%

North of 30°S the most popular lines of fish baits, used in combination with either bullock hocks or pieces of cattle hide, were Australian herring or ruff (*Arripis georgianus*), mullet (*Mugil cephalus*), scaly mackerel (*Sardinella lemura*), Australian and New Zealand salmon pieces and heads (*Arripis trutta esper, Arripis trutta marginata* and *Arripis trutta trutta*) and imported mackerel and mackerel heads (*Scomber sp.*). South of 30°S the most popular fish baits, also used in combination with hocks and hides were, Australian and New Zealand salmon pieces and heads, mullet, pilchards (*Sardinops neopilchardus*), scaly mackerel and tuna pieces and heads (*Thunnus sp.*). Many more fish baits were available and were used throughout the 1981/82 season.

J. 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, 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.

During 1982 a number of vessels again fished for rock lobsters from South Passage in Shark Bay. The number of vessels that

fished from this anchorage during 1982 increased on the previous season.

During the 1979/80 and 1980/81 seasons good catches of rock lobsters were taken from very deep water (80-90 fathoms) west of Garden Island to west of Mandurah in the months of January and early February. Vessels again fished this area in the 1981/82 season, however, the large catches experienced in the previous two seasons did not materialise.

A number of vessels, as in the previous season, fished for western rock lobsters from Augusta. The catches taken by these boats were outside the W.A. rock lobster limited entry fishery concession area.

K. AVERAGE NUMBER OF DAYS WORKED PER BOAT PER MONTH

NORTH OF 30°S

MONTH	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
DAYS WORKED	14.7	25.6	14.9	17.5	21.1	27.1	23.4	17.6

SOUTH OF 30°S

MONTH	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
DAYS WORKED	12.0	24.4	20.3	21.2	26.1	22.9	17.0	12.2

TOTAL

MONTH	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
DAYS WORKED	13.3	24.9	17.8	19.6	23.7	24.9	20.2	15.1

North of 30°S the average number of days worked per boat during November and December was 5.4% down on the 1980/81 season and for the period January to June was 3.5% up on the 1980/81 season, whilst south of 30°S the average number of days worked per boat during November and December was 3.4% up and for the period January to June was 11.4% up on the previous season. For both the northern and southern areas combined, the average number of days worked for November and December was 1.6% down and for the period January to June was 7.3% up on the previous season. The average number of days worked per boat per month for the 1981/82 season was 20.1%, which was an increase of 5.2% on the 1980/81 season.

L. PRICE OF ROCK LOBSTERS

Price to fishermen:

In the early part of the season fishermen were receiving $7.30 per kg landed for processing and $7.80 per kg for live export lobsters. After January 1982 the price dropped to $6.50 per kg landed for processing and $7.00 per kg for live export lobsters.

Wholesale New York price for "tails":

GRADE		$US PER KG
5-6 oz	(113-170 grams)	24.46
6-8 oz	(170-226 grams)	24.09
8-10 oz	(226-283 grams)	24.02
10-12 oz	(283-340 grams)	22.55
12-16 oz	(340-453 grams)	21.60
16-20 oz	(453-566 grams)	20.35
over 20 oz	(over 566 grams)	18.73

M. MARKET TRENDS AND ECONOMIC FACTORS

The U.S. market for W.A. rock lobster tails gained from severe downturns in the North American catches of snow and king crabs in 1981, resulting in record prices for rock lobster tails in December 1981 of US$26 per kg. The supply shortfalls of U.S. crab forced crab prices up and made rock lobster prices more competitive. In 1982, prices trended downward, with the greater fall in prices for intermediate sizes, due to reduced consumer demand and high interest rates.

The lower wholesale prices were offset by exchange rate movements, with the U.S. dollar strengthening 11.0% on the Australian dollar throughout the first six months of 1982. This enabled ex-vessel prices to be maintained.

N. AVERAGE VALUE PER POT ON POT RE-DISTRIBUTION

From approximately $1,800 to $1,900.

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 (ie. 15 November to 30 June) at Waterman (aquarium header tank) was 19.9°C, with a maximum of 22.9°C in the week commencing 31 January 1982 and a minimum of 16.1°C in the week commencing 27 June 1982. The average salinity during the season at Waterman (aquarium) was 35.33‰ with a maximum of 35.91‰ during week commencing 28 March 1982 and a minimum of 34.74‰ during week commencing 1 November 1981.

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 (Section C) 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 Jurien over 30 fathoms may be pooled to indicate the size frequency of breeding (ie. "berried" and mated) females and this has been done in Figure 3. The mean size of breeding females was greater at Fremantle and Lancelin than at either Jurien or Dongara, with the mean sizes being 91.8 mm for Dongara, 94.4 mm for Jurien, 101.9 mm for Lancelin

and 103.1 mm for Fremantle. By comparison the mean sizes at first breeding (ie. the smallest carapace length at which 50% have been mated) were found to be 102.7 mm at Fremantle, 95.1 mm at Lancelin, 90.8 mm at Jurien and 93.3 mm at Dongara.

IV DISCUSSION

The 1981/82 rock lobster catch increased by almost 6.0% on the previous season to 10,547,778 kg. This increase in catch was a direct result of above average puerulus settlement in earlier years resulting in good recruitment to the commercial fishery. Probably as a result of higher densities of rock lobsters on the grounds fishermen fished harder which resulted in the fishing effort (number of pot lifts) increasing by 3.3% on the 1980/81 season to 11,255,412 pot lifts. This was also reflected in the average number of days worked per boat per month which increased by 5.2% on the previous season.

Favourable conditions on the U.S. market for W.A. rock lobster tails, together with a strengthening of the U.S. dollar, resulted in a high price being paid to fishermen for their catch. However, this was somewhat offset by steep increases in the price of fuel and the more popular lines of bait. New boat replacements actually fell by 30.0% on the previous season.

V ACKNOWLEDGEMENTS

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

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TABLE 1: CATCH (IN KG WEIGHT) AND FISHING EFFORT (IN POT LIFTS) FOR THE 1981/82 ROCK LOBSTER SEASON IN VARIOUS STATISTICAL BLOCKS.

BLOCK		NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
2412	CATCH	-	-	-	-	-	-	-	-	-
	EFFORT	-	-	-	-	-	-	-	-	-
2413	CATCH	-	-	4,060	1,025	-	-	-	-	5,085
	EFFORT	-	-	(4,772)	(1,128)	-	-	-	-	(5,900)
2512	CATCH	-	-	1,328	1,435	5,303	-	-	744	8,810
	EFFORT	-	-	(2,640)	(4,960)	(2,560)	-	-	(2,400)	(12,560)
2612	CATCH	-	-	15,238	17,428	4,690	2,761	4,003	-	44,120
	EFFORT	-	-	(15,729)	(20,041)	(5,712)	(2,560)	(6,370)	-	(50,412)
2613	CATCH	-	-	3,405	4,757	-	-	-	1,926	10,088
	EFFORT	-	-	(6,948)	(8,694)	-	-	-	(2,560)	(18,202)
2712	CATCH	-	-	3,231	4,630	-	-	-	-	7,861
	EFFORT	-	-	(3,780)	(4,540)	-	-	-	-	(8,320)
2713	CATCH	19,661	67,557	44,284	41,573	62,015	58,104	54,961	31,949	380,104
	EFFORT	(18,354)	(31,800)	(51,400)	(37,825)	(51,533)	(53,789)	(51,981)	(38,607)	(335,289)
2714	CATCH	6,772	46,886	10,621	6,904	18,402	15,957	14,888	8,437	128,867
	EFFORT	(6,862)	(27,384)	(14,808)	(11,454)	(15,596)	(12,994)	(18,283)	(15,407)	(122,788)
2812	CATCH	-	-	94	-	-	-	-	-	94
	EFFORT	-	-	(720)	-	-	-	-	-	(720)
2813	CATCH	2,103	7,749	2,097	2,929	586,764	602,734	301,654	80,633	1,586,663
	EFFORT	(2,625)	(6,694)	(4,370)	(8,448)	(280,751)	(468,814)	(369,610)	(163,772)	(1,305,084)
2814	CATCH	166,904	216,417	62,708	62,411	91,705	91,759	65,756	58,568	816,228
	EFFORT	(134,748)	(150,302)	(118,250)	(125,834)	(87,503)	(93,421)	(97,944)	(82,944)	(890,946)
2912	CATCH	-	-	-	-	-	-	-	-	-
	EFFORT	-	-	-	-	-	-	-	-	-
2913	CATCH	-	32,396	1,332	2,688	5,869	12,556	6,779	853	62,473
	EFFORT	-	(17,110)	(1,350)	(3,786)	(4,767)	(11,541)	(8,026)	(1,693)	(48,273)
2914	CATCH	413,132	609,573	143,585	143,693	287,376	275,441	122,255	89,632	2,084,687
	EFFORT	(329,401)	(381,171)	(267,565)	(272,462)	(283,333)	(283,416)	(212,531)	(158,272)	(2,188,151)
3012	CATCH	-	-	-	-	-	-	-	-	-
	EFFORT	-	-	-	-	-	-	-	-	-
3013	CATCH	-	-	-	-	-	-	-	-	-
	EFFORT	-	-	-	-	-	-	-	-	-
3014	CATCH	179,206	670,513	179,017	123,402	259,637	221,405	83,947	39,416	1,756,543
	EFFORT	(170,863)	332,215)	(243,237)	(218,821)	(302,766)	(279,769)	(181,503)	(88,001)	(1,187,175)
3015	CATCH	61,311	(157,621	43,852	38,177	79,832	43,948	12,807	4,341	441,889
	EFFORT	(41,465)	(82,161)	(50,071)	(61,551)	(67,233)	(56,211)	(26,973)	(12,528)	(398,193)
3112	CATCH	2,208	6,364	-	-	3,227	1,276	-	-	13,075
	EFFORT	(1,872)	(4,176)	-	-	(3,600)	(2,016)	-	-	(11,664)
3113	CATCH	-	-	-	1,240	-	-	-	-	1,240
	EFFORT	-	-	-	(2,496)	-	-	-	-	(2,496)
3114	CATCH	9,526	55,430	40,017	32,685	41,502	25,549	2,850	377	207,936
	EFFORT	(10,188)	(35,464)	(45,085)	(37,022)	(53,075)	(35,214)	(8,741)	(1,305)	(226,094)
3115	CATCH	203,482	560,325	278,185	233,186	337,739	242,886	100,161	51,007	2,006,971
	EFFORT	(215,934)	(397,040)	(352,090)	(375,555)	(434,539)	(382,389)	(258,171)	(113,368)	(2,529,086)
3212	CATCH	-	-	-	-	-	-	-	-	-
	EFFORT	-	-	-	-	-	-	-	-	-
3213	CATCH	-	-	-	-	-	-	-	-	-
	EFFORT	-	-	-	-	-	-	-	-	-
3214	CATCH	1,365	12,069	7,636	9,694	7,846	5,972	3,751	-	48,333
	EFFORT	(1,080)	(10,893)	(6,131)	(11,989)	(10,036)	(12,266)	(4,970)	-	(57,365)
3215	CATCH	32,207	216,306	125,527	109,847	155,982	94,499	50,240	34,131	818,739
	EFFORT	(64,358)	(198,020)	(154,235)	(164,246)	(190,931)	(159,946)	(106,785)	(67,925)	(1,106,446)
3314	CATCH	111	572	16,527	14,218	20,822	5,937	2,527	657	61,371
	EFFORT	(1,080)	(1,440)	(13,660)	(13,523)	(15,875)	(7,894)	(3,120)	(1,512)	(58,104)
3315	CATCH	389	7,371	2,870	5,055	2,795	3,505	8,835	11,601	42,421
	EFFORT	(1,813)	(11,038)	(1,577)	(3,401)	(1,743)	(3,896)	(9,074)	(10,304)	(42,846)
3414	CATCH	-	-	737	1,766	2,518	1,593	1,900	805	9,319
	EFFORT	-	-	(1,430)	(1,725)	(2,109)	(1,408)	(2,340)	(768)	(9,780)
3415	CATCH	-	-	-	-	1,619	927	765	850	4,161
	EFFORT	-	-	-	-	(700)	(3,262)	(2,600)	(2,116)	(8,678)
3416	CATCH	-	-	-	700	-	-	-	-	700
	EFFORT	-	-	-	(840)	-	-	-	-	(840)
3515	CATCH	-	-	-	-	-	-	-	-	-
	EFFORT	-	-	-	-	-	-	-	-	-
TOTAL	CATCH	1,098,377	2,667,149	986,351	859,443	1,975,643	1,706,809	838,079	415,927	10,547,778
	EFFORT	(1,000,643)	(1,686,908)	(1,359,848)	(1,390,341)	(1,814,362)	(1,870,806)	(1,369,022)	(763,482)	(11,255,412)

TOTAL CATCH = 10,547,778 KG
TOTAL EFFORT = 11,255,412 POT LIFTS

EFFORT FIGURES ARE SHOWN IN PARENTHESIS AND CATCH FIGURES ARE UNDERLINED.
NOT INCLUDED IN THESE CATCH FIGURES ARE 3417 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. KILOGRAM OF ROCK LOBSTERS PER POT LIFT) DATA FOR 1981/82 SEASON IN VARIOUS STATISTICAL BLOCKS (SEE FIGURE 2).

BLOCK	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
2412	* -	-	-	-	-	-	-	-	-
2413	-	-	0.85	0.91	-	-	-	-	0.86
2512	-	-	0.50	0.29	2.07	-	-	0.31	0.70
2612	-	-	0.97	0.87	0.82	1.08	0.63	-	0.88
2613	-	-	0.49	0.55	-	-	-	0.75	0.55
2712	-	-	0.85	1.02	-	-	-	-	0.94
2713	1.07	2.12	0.86	1.10	1.20	1.08	1.06	0.83	1.13
2714	0.99	1.71	0.72	0.60	1.18	1.23	0.81	0.55	1.05
2812	-	-	0.13	-	-	-	-	-	0.13
2813	0.80	1.16	0.48	0.35	2.09	1.29	0.82	0.49	1.22
2814	1.24	1.44	0.53	0.50	1.05	0.98	0.67	0.71	0.92
2912	-	-	-	-	-	-	-	-	-
2913	-	1.89	0.99	0.71	1.23	1.09	0.84	0.50	1.29
2914	1.25	1.60	0.54	0.53	1.01	0.97	0.58	0.57	0.95
3012	-	-	-	-	-	-	-	-	-
3013	-	-	-	-	-	-	-	-	-
3014	1.05	2.02	0.74	0.56	0.86	0.79	0.46	0.45	0.97
3015	1.48	1.92	0.88	0.62	1.19	0.78	0.47	0.35	1.11
3112	1.18	1.52	-	-	0.90	0.63	-	-	1.12
3113	-	-	-	0.50	-	-	-	-	0.50
3114	0.94	1.56	0.89	0.88	0.78	0.73	0.33	0.29	0.92
3115	0.94	1.41	0.79	0.62	0.78	0.64	0.39	0.45	0.79
3212	-	-	-	-	-	-	-	-	-
3213	-	-	-	-	-	-	-	-	-
3214	1.26	1.11	1.25	0.81	0.78	0.49	0.75	-	0.84
3215	0.50	1.09	0.81	0.67	0.82	0.59	0.47	0.50	0.74
3314	0.10	0.40	1.21	1.05	1.31	0.75	0.81	0.43	1.06
3315	0.21	0.67	1.82	1.49	1.60	0.90	0.97	1.13	0.99
3414	-	-	0.52	1.02	1.19	1.13	0.81	1.05	0.95
3415	-	-	-	-	2.31	0.28	0.29	0.40	0.48
3416	-	-	-	0.83	-	-	-	-	0.83
3515	-	-	-	-	-	-	-	-	-
TOTAL	1.10	1.58	0.73	0.62	1.09	0.91	0.61	0.54	0.94

* - = NO RECORD OF FISHING

TOTAL CATCH = 10,547,778 KG
TOTAL EFFORT = 11,255,412 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
81/82	FREMANTLE	NOV	78	75	-	-	-	-	-	-
		DEC	74	71	-	-	-	-	90	83
		JAN	73	71	79	75	86	84	-	-
		FEB	74	71	80	77	-	-	-	-
		MAR	76	73	80	77	-	-	-	-
		APR	76	73	-	-	97	86	-	-
		MAY	73	71	-	-	85	84	-	-
		JUN	74	71	-	-	-	-	-	-
81/82	LANCELIN	NOV	-	-	79	75	-	-	-	-
		DEC	73	71	-	-	-	-	87	83
		JAN	72	71	87	95	-	-	-	-
		FEB	72	67	78	76	-	-	-	-
		MAR	74	71	-	-	89	90	100	92
		APR	74	72	-	-	94	92	-	-
		MAY	73	72	-	-	-	-	-	-
		JUN	73	72	-	-	-	-	-	-
81/82	JURIEN	NOV	74	72	77	75	-	-	-	-
		DEC	77	74	80	74	78	74	81	78
		JAN	73	70	73	70	84	81	-	-
		FEB	72	70	73	71	83	81	84	82
		MAR	74	72	80	77	-	-	86	84
		APR	73	71	75	73	84	82	83	81
		MAY	74	72	75	73	-	-	-	-
		JUN	72	70	-	-	-	-	-	-
81/82	DONGARA	NOV	77	74	79	76	-	-	-	-
		DEC	75	71	76	74	84	81	82	78
		JAN	73	71	70	70	-	-	89	87
		FEB	71	69	77	74	-	-	89	83
		MAR	72	72	81	79	-	-	93	86
		APR	74	73	81	77	87	88	99	89
		MAY	75	74	-	-	-	-	115	93
		JUN	72	70	76	74	-	-	-	-

TABLE 4: BOTTOM TEMPERATURE (°C) AND SURFACE SALINITY IN PARTS PER THOUSAND FOR FREMANTLE, LANCELIN, JURIEN AND DONGARA OF WATERS BETWEEN VARIOUS DEPTH CONTOURS FOR THE 1981/82 SEASON.

	DEPTH	NOV		DEC		JAN		FEB		MAR		APR		MAY		JUN	
AREA	FATH	TEMP	SAL	TEMP	SAL	TEMP	SAL	TEMP	SAL	TEMP	SAL	TEMP	SAL	TEMP	SAL	TEMP	SAL
FREMANTLE	0-10			20.5	35.75	-	35.85	21.3	35.87	21.6	36.12	19.5	36.22	20.8	35.55		
	10-20					21.3	36.07	19.3	35.73	21.0	35.75						
	20-30					21.0	35.90					20.4	35.80	-	35.50		
	30+			19.4	35.69												
LANCELIN	0-10			21.8	35.85	22.2	35.70	21.6	36.17	20.2	36.11	21.0	35.95	20.3	35.55	18.8	35.45
	10-20	20.2	35.89			21.4	35.83	20.1	35.92								
	20-30									21.7	35.65	21.5	35.61				
	30+			21.2	-					22.2	-						
JURIEN	0-10	20.0	36.08			22.7	36.11			22.5	35.24	19.8	36.05	19.4	35.66	18.3	-
	10-20	20.0	35.08			-	35.99	-	35.96	21.6	35.89	20.8	-	20.1	35.76		
	20-30			-	35.64	21.5	35.62	21.5	-			21.5	35.60				
	30+			20.2	35.61					-	35.73	20.8	-				
DONGARA	0-10			21.2	35.70	22.7	35.94	20.6	35.80	21.4	35.93	20.6	35.60	20.9	35.69	18.7	35.36
	10-20	21.5	35.98	20.9	35.70	22.2	-	20.6	-			20.7	35.78				
	20-30	21.3	35.98	20.5	35.64							21.4	35.68				
	30+			20.2	35.60	-	35.55	21.7	35.63	22.1	35.66	21.4	34.59	22.8	35.56		

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

TABLE 5: 1981/82 SEX RATIO BY MONTH AND DEPTH CATEGORY, FIGURES ARE % OF FEMALES IN THE TOTAL SAMPLED CATCH.

AREA	DEPTH RANGE FATH.	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
DONGARA	0-10	53	49	57	53	51	52	58	58
	10-20	64	52	58	63	62	63		65
	20-30		67				61		
	30+		70	69	73	74	61	28	
JURIEN	0-10	62	47	48	53	61	51	67	57
	10-20	63	49	55	56	60	58	65	
	20-30		70	68	62		66		
	30+		60		65	74	75		
LANCELIN	0-10		58	61	63	61	64	60	62
	10-20	57		73	60				
	20-30					69	58		
	30+		53			72			
FREMANTLE	0-10	50	58	56	54	46	55	59	79
	10-20			61	73	55			
	20-30			62			51	49	
	30+		67						

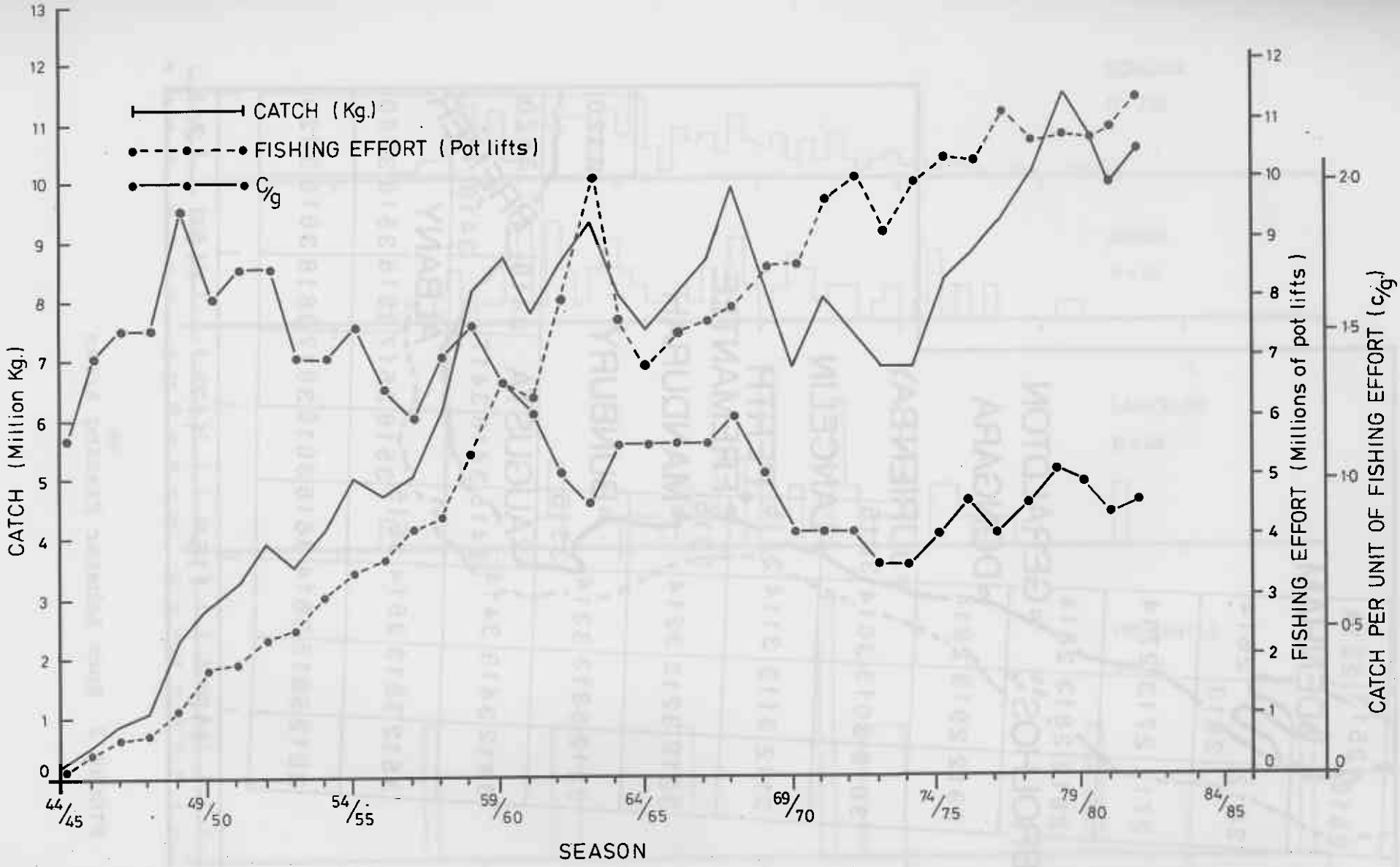

FIGURE 1 Rock Lobster Catch (kg), Fishing Effort (pot lifts)* and Catch per Unit of Fishing Effort (c/g Data.

* 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 1981/82) is obtained as described in the footnote on page 2.

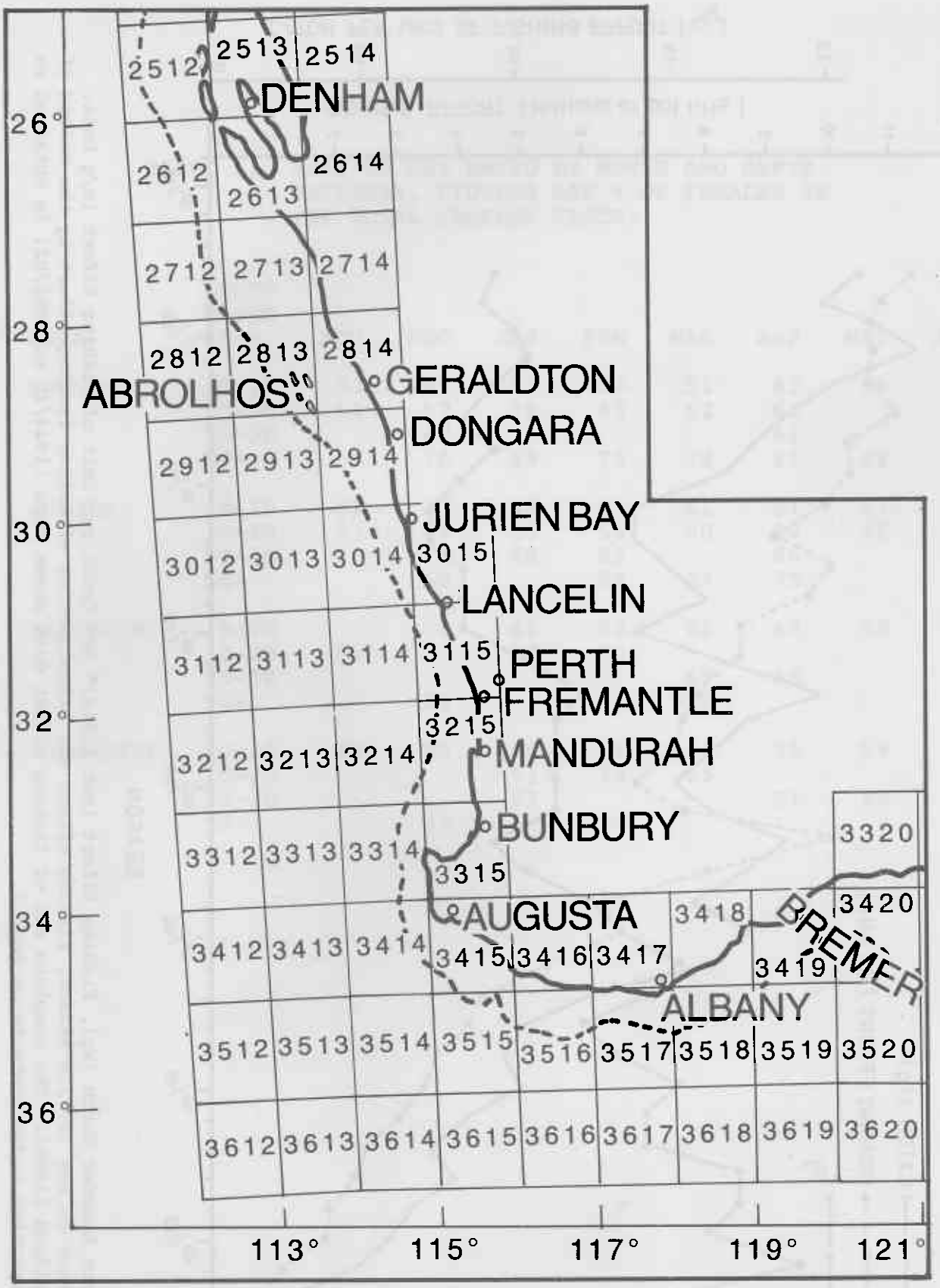

FIGURE 2 Rock Lobster Fishing Areas

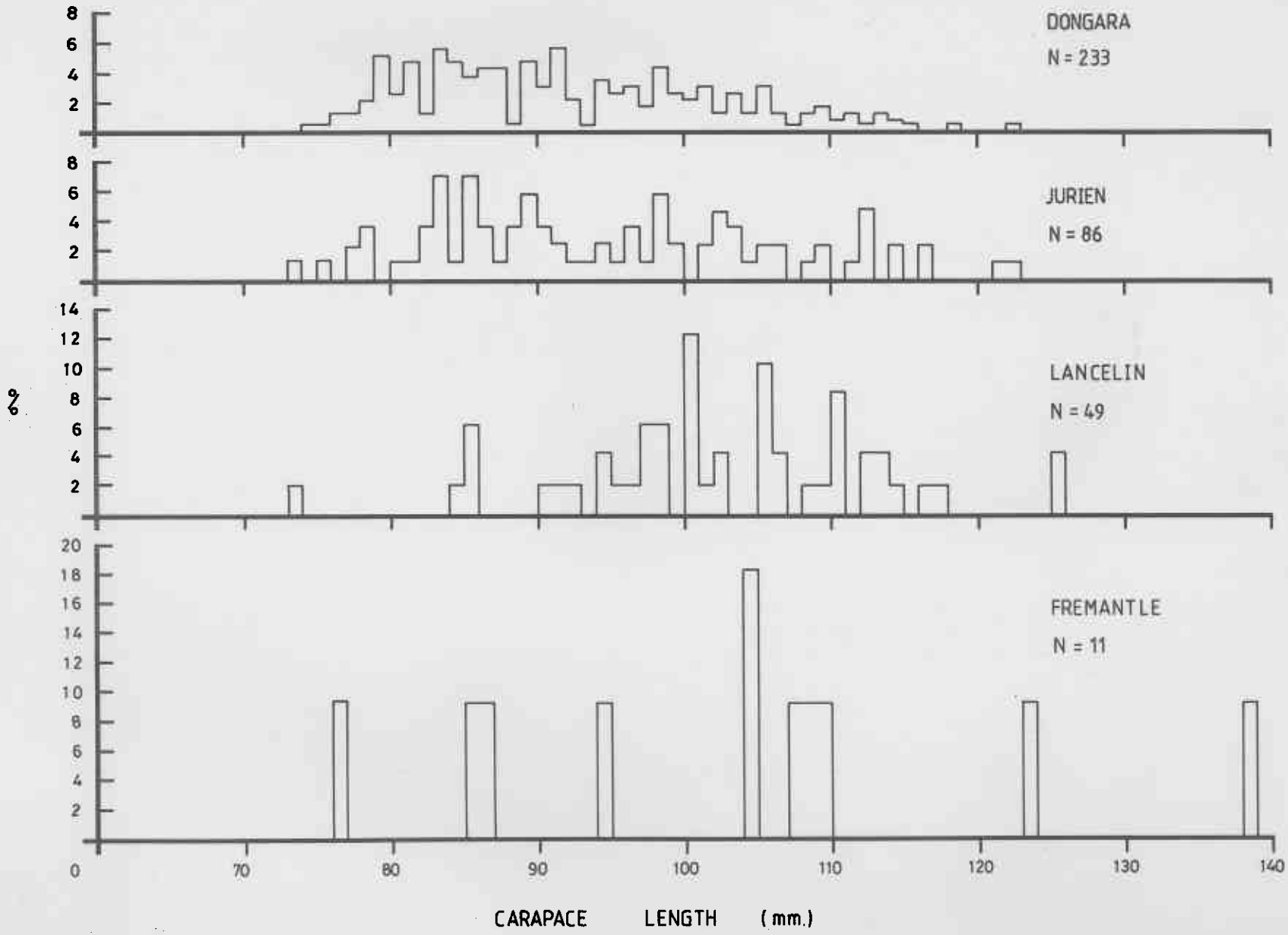

FIGURE 3 Length Frequency of Breeding Female Rock Lobsters taken from December 1981 to February 1982