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The western rock lobster fishery 1999/2000 to 2000/2001

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Fish for the future

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Fisheries Research in Western Australia
The Fisheries Research Division of the Department of Fisheries is based at the Western Australian Marine Research Laboratories, PO Box 20, North Beach (Perth), Western Australia, 6920. The Marine Research Laboratories serve as the centre for fisheries research in the State of Western Australia.

Research programs conducted by the Fisheries Research Division and laboratories investigate basic fish biology, stock identity and levels, population dynamics, environmental factors, and other factors related to commercial fisheries, recreational fisheries and aquaculture. The Fisheries Research Division also maintains the State data base of catch and effort fisheries statistics.

The primary function of the Fisheries Research Division is to provide scientific advice to government in the formulation of management policies for developing and sustaining Western Australian fisheries.

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The western rock lobster fishery 1999/2000 to 2000/2001

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Abstract

Season 1999/2000 produced the highest catch in the history of the fishery of 14,500 tonnes following a high catch of about 13,000 tonnes in 1998/1999. The record season led to the highest ever catch in B & C zones of 4,500 and 8,300 tonnes respectively. The Abrolhos Islands fishery produced a catch of 1,800 tonnes, somewhat down on the previous seasons catch of 2,000 tonnes. The record catch was taken by a total of 594 vessels. Nominal fishing effort in 1999/2000 was 10,724 million pot lifts, slightly down on the previous season, which was 10,745 million pot lifts. The 2000/2001 catch fell to 11,300 million kgs, with a corresponding drop in nominal effort to 10,487 pot lifts.

Commencing in 2000/2001 the Licence Creation and Retirement initiative was introduced. This initiative allowed for a licence holder to vary the pot entitlement associated with the managed fishery licence (MFL) to below the required minimum of 63 pots (to not less than 1 pot) and having done so the MFL and associated fishing boat licence (FBL) would be considered inactive. Alternatively the initiative allowed a "fit and proper person" to accumulate the minimum number of pots from a single zone, and if holding a valid FBL, apply for a new Western Rock Lobster Managed Fishery Licence and enter the fishery in the zone where the pots originated.

In both seasons the price remained stable at an average of around $27 per kg. This was due principally to favourable exchange rates and resulted in the value of the landed catch (ex-vessel) being $392 million in 1999/2000 and $302 million in 2000/2001.

Investment in vessels was substantial in these two seasons resulting from the earlier removal of the 6 year boat replacement rule and the "7 & 10" rule (restriction on number of pots required for given length of vessel) and economic success. A total of 55 new vessels replaced existing vessels in the two seasons.

Egg production still remained high overall, being stable in C zone, however, the level of egg production in the northern coastal fishery started to decline, but was still well above 1992/1993 levels.

1.0 Introduction

The fishery for the western rock lobster, *Panulirus cygnus*, is the most important single species fishery in Australia and an important source of export income for Western Australia. During the two seasons covered by this report (1999/00 and 2000/01), Western Australia produced annual rock lobster catches of 14,500 and 11,300 tonnes. The fishery is governed by a complex management system designed to limit the exploitation rate to an acceptable level and to enforce regulations such as a legal minimum size and full protection for breeding female lobsters (Bowen 1971, Hancock 1981, Bowen and Hancock 1989, Phillips and Brown 1989). Thus, it is important to monitor the state of the fishery constantly, both to ensure that the fishing effort remains within acceptable limits and that the regulations are adequately performing their function of maintaining sustainable catches and an adequate level of egg production. Inherent in this ongoing monitoring, is careful examination of changes in fishing practice and gear modifications, because these innovations can lead to increases in efficiency which may not be detectable through the usual calculations of fishing effort and therefore affect the real level of fishing effort (Brown, Caputi and Barker 1995), but which may cause declines in egg production.

This paper is the twentieth in a series of reviews of the rock lobster seasons which discuss fishing practice, catches, fishing effort, mean size and various other factors which affect the rate of exploitation of the stock. This knowledge provides a good understanding of the status of the fishery and is documented herein to ensure historical data for the fishery are readily available. Each review follows a standardised format to allow season to season comparisons and examination of long term trends. This particular report covers the two seasons 1999/2000 and 2000/2001 and is the sixth of several reports intended to bring the series up to date. It includes, as an appendix, the Commercial Fisheries Production Bulletins issued for these two seasons.

2.0 Methods

Catch and effort data were extracted from figures obtained from fishermen's monthly returns, recorded on a 1° x 1° block basis (Fig 1a) supplied from the Department of Fisheries catch and effort statistical system (CAESS) and from voluntary rock lobster research log books. Catch composition and mean size information was gathered from measurements made by the Department of Fisheries research staff aboard commercial vessels fishing from Dongara, Jurien, Lancelin, Abrolhos, Fremantle and Kalbarri. Information on trends in fishing practice was gathered principally from interviews with fishermen at various ports as well as from comments made in research log books.

The percentage of rock lobster fishers who submitted rock lobster research records voluntarily during 1999/2000 and 2000/2001 was as follows:

Season	Percentage
1999/2000	36.0
2000/2001	34.3

3.0 Results

3.1 Catch and effort data

The fishing season extends from 15 November to 30 June following and may be subdivided into three distinct components:

(i) the "whites" fishery (George 1958) begins in late November, as pale-coloured newly-moulted rock lobsters migrate offshore from the shallow reef areas to the deeper water breeding areas, and finishes arbitrarily on 31 December;

(ii) the "coastal reds" fishery 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. These seasons were shortened by six weeks in 1977/78 as a conservation measure (Hancock 1981). During the period covered by this report, the "whites" run commenced (defined as when the initial large increases in catches of "whites" occurs) in the Fremantle, Jurien and Geraldton areas approximately at the following times:

Season	
1999/2000	The "whites" run commenced approximately on 29 November in Fremantle, 6 December in Jurien and 2 December in Geraldton
2000/2001	"White" rock lobsters were present in the catches in good quantities from the start of the season and by the 25, 26 November were being caught in large numbers in all areas.

Total catches (kg) and nominal fishing effort (number of pot lifts), recorded by fishermen in their monthly returns, were as follows:

Catch and effort	1999/2000	2000/2001
"Whites" catch (15 Nov-31 Dec)	4,118,260	4,088,356
"Whites" effort (15 Nov-31 Dec)	2,394,882	2,479,606
"Coastal reds" catch (1 Jan-30 June)	8,657,137	5,512,055
"Coastal reds" effort (1 Jan-30 June)	7,178,826	6,788,392
Abrolhos catch (15 March-30 June)	1,758,144	1,672,672
Abrolhos effort (15 March-30 June)	1,150,160	1,218,878
Total catch	**14,533,541**	**11,273,083**
Total effort	**10,723,868**	**10,486,876**

	1999/2000	2000/2001
B Zone Catch	4,522,180	3,517,728
B Zone Effort	3,878,189	3,794,595
C Zone Catch	8,253,217	6,082,682
C Zone Effort	5,695,519	5,473,403

Abrolhos catch (A Zone) figures are derived from statistical blocks 27131, 28130, 28131, 28141, 29131, 29141 and 97011 to 97015 (Figures 1a-c).

Catch figures are corrected to match the independent processor's monthly production figures, to account for any unreported catches or missing records in the monthly returns. However, since season 1992/93 (Chubb and Barker 1998) the difference between the two figures varied by less than 0.2% and therefore is considered negligible.

Not included in the above production figures are the estimated annual recreational catches listed below:

Season	Annual recreational catch (kg)[1]	Percentage of commercial catch
1999/2000	747,000	5.1%
2000/2001	564,000	5.0%

Figure 2 shows comparative commercial total catch (excluding the recreational component), nominal fishing effort (*i.e.* the number of pot lifts [pulls] not adjusted for efficiency increases) and catch per pot lift data from 1944/45 to 2000/2001. Fishing effort is calculated from the average number of pots and number of days fished recorded by fishermen in their monthly returns. In the annual reports prior to 1977/78 fishing effort was calculated as effective fishing effort by the method of Gulland (1969). Catch and effort data from various statistical blocks (Figures 1a and b), are shown in Tables 1 and 2 with catches expressed by weight in kilograms and fishing effort as number of pot lifts. Tables 3 and 4 show catch per pot lift data for the same statistical blocks. The total levels of fishing effort recorded for each of the 1999/2000 and 2000/2001 seasons were as follows:

Season	Total fishing effort	Variation on previous season
1999/2000	10,723,868	0.2% down
2000/2001	10,486,876	2.2% down

3.2 Exports and grade categories

This section is based on data provided by all processing establishments from Fremantle to Geraldton. Over the years, the export of rock lobster products has changed from predominantly frozen raw tails to a mixture of live, frozen whole cooked, frozen whole raw and tails. Thus to compare the grade composition of the catch over the years, all product lines have been changed to the equivalent in numbers of cartons of tails (11.34 kg) in each grade. The following table represents each season's total production for all grades with all product lines expressed as percentages of the total equivalent number of cartons of tails by grade.

[1] The recreational catches given in previous reports in this series, up to and including the 1994/95 season, were adjusted by a factor which estimated the illegal take of rock lobsters. This practice has been discontinued and the recreational catch is given here only as the estimated catch as actually reported by recreational fishers through research surveys. Thus, in the 1994/95 season report, the recreational catch was reported as 526 tonnes. Without the correction factor it was 308 tonnes. For more information see Melville-Smith, R. and Anderton, S.M. (2000) Western rock lobster mail surveys of licenced recreational fishers 1986/87 – 1998/99. *Fisheries WA Fisheries Research Report No. 122.*

Percentage of each grade packed

Area	Season	A % (140-179g)	B % (180-239g)	C % (240-279g)	D % (280-359g)	E % (360-479g)	F % (480-599g)	G % (600-667g)	H % (>668g)
South (Augusta to Wedge Is)	1999/2000	38.79	31.05	12.00	8.54	4.71	3.03	1.67	0.21
	2000/2001	34.11	28.66	14.19	11.62	5.78	3.08	2.52	0.04
Central (Green Islets to Green Head)	1999/2000	36.55	33.42	16.23	6.11	2.13	2.86	0.81	1.89
	2000/2001	39.16	28.70	18.49	7.56	1.90	1.71	0.83	1.64
North* (Leeman to Denham)	1999/2000	44.42	35.78	10.41	5.65	2.58	0.81	0.35	0.00
	2000/2001	46.60	32.90	11.22	5.43	2.30	0.97	0.51	0.06
Total	1999/2000	41.10	33.55	11.82	6.88	3.39	1.98	0.95	0.33
	2000/2001	40.82	30.75	13.24	8.11	3.62	1.89	1.34	0.24

***Note:** North includes the Abrolhos Islands.

3.3 Mean size

Samples of rock lobsters were measured aboard commercial vessels (from Fremantle, Lancelin, Jurien, Dongara, Kalbarri and the Abrolhos Islands) in four depth categories. The sample included all commercial size rock lobsters, plus some undersize which would have been reduced in number due to the escape gap (54 mm) selection (Bowen 1963; Brown and Caputi 1986), breeding females and females above the maximum size limit. Mean carapace lengths of males and females taken throughout the fishing season from the various depth categories at all sites, are compared in Tables 5 and 6. This shows that larger lobsters are caught in deeper waters at all locations and Fremantle has larger lobsters than other locations. The omissions in the tables are due either to fishermen not fishing the area in question or to some circumstance which prevented the data from being collected (vessel breakdown, etc.).

3.4 Number of boats and pots

The number of boats licensed to fish for rock lobster in the various zones is controlled. Provided certain conditions are met, boat/licence owners are able to transfer their pot entitlement between fishing zones A and B (off season). The zones are defined as follows:

- Zone A - see Figures 1b and c;
- Zone B - coastal fishery from 21°44' S to 30° S excluding the A zone;
- Zone C - the waters between 30° south latitude and 34°24' south latitude excluding all the waters on the south coast east of 115°8' east longitude;
- Big Bank - see Figure 1c.

The number of boats licensed in the various zones was as follows:

Zone	Total number of licensed boats 1999/2000 (as at 30/6/2000)	% Difference on previous season	2000/2001 (as at 6/7/2001)	Boats actually fishing (2000/2001)	% Difference on previous season (total licences)
A	148	0	148	146	0
B	150	0	151	147	+0.7
C	296	-0.7	295	291	-0.3
Total	594	-0.3	594	584	0

Listed below are the numbers of licensed pots by the various zones for the seasons 1999/2000 to 2000/2001:

Zone	Number of licensed pots 1999/2000 (as at 30/6/2000)	2000/2001 (as at 6/7/2001)
A	16,796	16,859
B	16,751	16,688
C	35,737	35,737
Total	69,284	69,284

Note: Under the current management arrangements only 82% of these pots were allowed to be fished.

3.5 Forecast of recruitment

The settlement of puerulus on collectors of artificial seaweed along the coast is monitored monthly on the full moon.

Annual indices of puerulus settlement to predict future recruitment were based on the mean of the number of puerulus settling per collector at Abrolhos, Seven Mile Beach and Alkimos (Caputi et al. 1995). To ensure comparisons with historical data presented in this series of reports, the total catch and average puerulus settlement from the Jurien and Seven Mile Beach sites are given in Figure 3.

Research indicates that puerulus settlement three years prior to a season provides a significant proportion of new recruits late in the reds catch for that season, while the puerulus settling four years prior to the season of catch provides the whites catch (Caputi, et al. 1995).

1999/2000

Puerulus settlements in 1995/96 (207), the highest on record, and 1996/97 (93) produced the record commercial catch of 14.5 million kg in 1999/2000.

2000/2001

Puerulus settlements in 1996/97 (93) and 1997/98 (68) produced the above average commercial catch of 11.3 million kg in 2000/2001.

3.6 Introduction of new legislation

Note: While these reports detail the legislative changes applicable to the Western Rock Lobster Fishery, it has been past policy to include legislative changes related to all rock lobster fisheries in Western Australia for information. This policy is continued herein.

1999/2000

From 12 November 1999, Clause 18 of the West Coast Rock Lobster Management Plan was amended to extend the temporary pot reduction of 18% for a further two seasons, viz. 1999/2000 and 2000/2001.

2000/2001

The West Coast Rock Lobster Fishery Management Plan Amendment 2000, published in the Government Gazette, of 29 August 2000, amended the Principle Plan to provide for licence

creation and retirement. For details of this amendment see facts sheet 'Licence Creation' and 'Retirement' initiative for the West Coast Rock Lobster Fishery Management Plan which appears in the Appendices of this report. This initiative allows for pots to be redistributed below the minimum of 63 and the MFL and associated FBL becomes inactive. It also allows persons to accumulate a valid FBL of at least 63 pots in any one zone and a valid FBL.

From 27 September 2000 the Esperance Rock Lobster Fishery Management Plan Amendment 2000 amended provisions concerning – the transfer of entitlement (pots), offences and major provisions, prohibiting fishing times, transfer of licences and the procedure to be followed before the plan could be amended.

From 15 September 2000 the Windy Harbour–Augusta Rock Lobster Fishery Management Plan Amendment 2000 allowed licence holders to pay licence fees by instalments.

From 8 September 2000 Regulation 118 was amended whereby once the pots had been transferred from the rock lobster licence, the fishing boat licence is of no effect, the vessel can no longer be used for commercial fishing.

From 8 September 2000 Regulation 61 was amended to cover the way that the exterior surfaces of any package, container or receptacle to hold rock lobsters are labeled.

The minister approved the transfer of a processors licence from Main Street Holdings Pty Ltd. (R & O Seafood Exporters) to Kailis and France Fisheries Pty Ltd. The transfer was approved on 21 December 2000.

During the 1999/2000 and 2000/2001 rock lobster seasons the following scale of licence fees and charges were introduced:

Rock lobster (managed fisheries)	**1999/2000**	**2000/2001**
West Coast	$77.00 per pot	$98.50 per pot
Windy Harbour/Augusta	$76.00 per pot	$40.80 per pot
Esperance	$46.00 per pot	$52.00 per pot
Rock lobster pot licence (for areas outside the existing managed rock lobster fisheries)	$55.00	$55.00
Fishing boat licence	$55.00	$55.00
Carrier boat licence	$55.00	$55.00
Professional fisherman's licence	$55.00	$55.00
Recreational fishing licence (rock lobster)	$25.00	$25.00
Processor's licences (land based establishments)		
Rock lobster or prawns only	$555.00	$555.00
Rock lobster and prawns only	$1,110.00	$1,110.00
Rock lobster, prawns and wetfish	$1,380.00	$1,380.00
Rock lobster or prawns and wetfish only	$825.00	$825.00
Wetfish only	$270.00	$270.00
Seagoing processing establishment	$270.00	$270.00
Transfer of processor's licence	$350.00	$350.00
Removal of processor's licence	$350.00	$350.00

3.7 Effects of New Legislation

Few legislative alterations were made in 1999/2000 and 2000/2001 seasons. The management package introduced in 1993/1994, which included an 18% pot reduction, was continued for the two seasons and maintained the status quo within the fishery.

Commencing with the 2000/2001 season, the "Licence Creation" and "Retirement" initiative came into effect. This initiative allowed for a licence holder to vary the pot entitlement associated with the managed fishery licence (MFL) to below the required minimum of 63 pots (to not less than 1 pot) and having done so the MFL and associated fishing boat licence (FBL) would be considered inactive. Alternatively the initiative allowed a "fit and proper person" to accumulate the minimum number of pots from a single zone, and if holding a valid FBL, apply for a new Western Rock Lobster Managed Fishery Licence and enter the fishery in the zone where the pots originated. In 2000/2001, 10 licences were retired. This led to a reduction in the fleet size from 594 the previous season to 584 vessels actively fishing the remaining pots in 2000/2001.

3.8 Innovations to boats and gear (including costs)

Data supplied by the then Department of Transport showed that during the years 1999 to 2001 the following number of new boats were constructed each fiscal year (1 July to 30 June).

Year	Area	Construction material			Size range (m)	Average size (m)	% Change on previous season
		Wood	Fibre-glass	Aluminium			
1999/2000	North 30° south	-	2	7	12.35-19.98	16.94	
	South 30° south	-	12	6	11.40-19.98	16.39	
	Total	-	14	13			145.5% up
2000/2001	North 30° south	-	5	8	12.28-22.55	16.67	
	South 30° south	-	9	6	15.40-22.80	17.37	
	Total	-	14	14			3.7% up

Listed below are the approximate costs of new aluminium or fibre-glass vessels (approximate size 15 to 17 metres) designed specifically for rock lobster fishing. Also listed are the approximate costs of navigational and fish finding equipment; GPS, auto-pilot, radio, radar, colour and black and white echo-sounders, etc., which must be added onto the basic vessel costs. The cost of a new vessel varied greatly, depending on design, type and number of motors, and the type and amount of equipment installed. The prices were supplied by a major builder of vessels for the rock lobster industry:

Season	Cost of vessel ($)	Approx. average size	Cost of navigational & fish finding equipment ($)
1999/2000	510,000-530,000	17-18 metres	50,000
2000/2001	570,000-720,000	15-17 metres	30,000-35,000

The approximate price paid by fishermen for boat fuel (distillate) during the two seasons is listed below. The price paid by fishermen varied greatly, depending on location (cartage)

and distributor. The prices were provided by a major distributor in the northern sector of the fishery. Fishermen are entitled to claim a diesel fuel rebate which also is listed and has not been deducted from the basic fuel price:

Season	Fuel price range (¢/litre)	Approx. average price (¢/litre)	Fuel rebate price range (¢/litre)	Approx average rebate price (¢/litre)
1999/2000	75.19-83.07	80.56	35.20-35.61	35.35
2000/2001	79.99-93.68	85.10	37.23-38.39	38.06

Note: Fuel price range and average price does not include GST.

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

Season	Area	TYPE OF POT		
		Stick & Cane Beehive	Batten	Steel Beehive
1999/2000	North 30° south	-	99%	1%
	South 30° south	5%	94%	2%
2000/2001	North 30° south	-	100%	-
	South 30° south	3%	100%	2%

Note: Total percentage greater than 100% is due to boats using a combination of pot types.

1999/2000 and 2000/2001 seasons

In recent seasons there has been an increase in the number of skippers installing differential GPS on their vessels. Differential GPS, together with greater accuracy of conventional GPS (as a result of the removal of the 'scrambling' effect of GPS), has resulted in greater accuracy of pot setting, pot location and navigation. Other increases in efficiency resulting from technology have been; greater fleet mobility as a result of better vessels and hull design, which in turn has resulted in a greater number of days spent at sea fishing; mobile phones and scramblers, which allow groups of vessels to work together targeting high densities ('hot spots') of rock lobsters, particularly during the 'whites' in deep water, thereby maximising catches; improved computer based plotters and importantly, the added experience and fishing skills gained by many skippers over time as a result of improved technology.

Also, over time and in the southern sector of the fishery, there has been an increase in the construction and use of steel bottomed stick and cane beehive pots. These pots are very efficient in catching large mature rock lobsters in the mid-water grounds, especially during the 'reds' phase of the fishery (March onwards). These pots also are quite efficient when used in deep water during the 'whites' as they do not readily move during periods of strong tides.

	PRICE OF POTS ($)			
	1999/2000		2000/2001	
	North 30° S	South 30° S	North 30° S	South 30° S
Batten[1]				
Steel Bottom	134.00	135.00	136.00-139.00	148.00
Wood Bottom	131.00	130.00	133.00	143.00
Steel Framed Batten[2]				
Steel Bottom	143.00	-	170.00	-
Stick and Cane Beehive[3]	-	90.00	-	92.00

1. Batten pots are constructed either with a steel or wooden bottom and come complete with two built-in bait baskets, plastic or wood finger neck, escape gaps, ballast and an anode (in steel bottom pots).
2. Steel framed batten pots are constructed with a removable top and side panels comprised of pine, karri or jarrah battens, depending on personal preference.
3. The price quoted for stick and cane beehive pots does not include ballast or a skid board. Skid boards were approximately $6.50 per pot.

The above prices were supplied by selected pot manufacturers, however, pot prices vary between manufacturers.

Listed below are the prices charged by a major distributor of commercial fishing gear in the southern sector of the fishery for 11 mm pot rope and 200 mm pot floats. Once again prices varied depending on the distributor and in the case of rope, the country of origin.

Season	Pot rope ($) (220 m coil)	Country of origin	Pot float ($) (each)
1999/2000	69.50	Singapore	2.65
2000/2001	74.50	Singapore	2.75

3.9 Bait

Data from research log books showed that the use of bullock hocks and pieces of cattle hide as a holding and/or catching bait north and south of 30° S took place as follows:

Season	Area	Hocks	Hide
1999/2000	North 30°S	-	51%
	South 30°S	1%	37%
2000/2001	North 30°S	-	43%
	South 30°S	2%	48%

Fishermen were able to choose from a wide range of both local and imported fish baits. These fish baits generally were used in combination with either pieces of cattle hide or, to a lesser extent, cattle hocks. During the 1999/2000 and 2000/2001 seasons the following baits were the most commonly used. Their popularity is indicated by a scale of 1-10, with 1 being the most popular.

Common names	1999/2000		2000/2001	
	North 30° S	South 30° S	North 30° S	South 30° S
North Sea herring (*Clupea harengus*)	1	4	2	3
Imported mackerel (*Scomber* spp.)	2	1	1	1
Australian salmon (*Arripis truttaceus*) and New Zealand Kahawai (*Arripis trutta*)	3	2	3	4
Australian herring (*Arripis georgianus*)	4	-	4	10
Sardinella (*Sardinella aurita*)	5	8	7	8
Orange roughy heads (*Hoplostethus atlanticus*)	6	3	5	2
Kangaroo (*Macropus* spp.)	7	-	6	-
Scaly mackerel (*Sardinella lemura*)	8	6	8	5
Mullet (*Mugil cephalus*)	9	-	-	9
Tuna heads (*Thunnus* spp.)	10	-	9	-
Pilchards (*Sardinops neopilchardus*)	-	5	-	6
Hoki heads (*Macruronus novaezelandiae*)	-	7	10	7

Listed below are the retail prices paid by fishermen both north and south of 30° S for a variety of rock lobster baits. Prices quoted here are from selected processing establishments and do vary between suppliers:

Type of Bait	1999/2000 Retail price ($)		2000/2001 Retail price ($)	
	North 30° S	South 30° S	North 30° S	South 30° S
Hocks per bag	-	19.50	-	19.50
Hides per bag	18.50-19.00	17.00	19.50-20.00	18.00
Australian salmon per kg	1.00-1.20	1.20	1.15-1.20	1.06
New Zealand salmon per kg	1.20-1.30	1.15-1.45	1.25	1.15-1.35
Australian herring per kg	1.15	1.00	1.15	1.00
Yelloweye mullet per kg	-	-	-	-
Mullet per kg	-	-	-	-
Scaly mackerel per kg	1.00	1.18	1.00	1.18
Bonito per kg	-	-	-	-
Perth or bony herring per kg	-	-	-	-
Imported mackerel per kg	1.00-1.25	1.09-1.30	1.05-1.30	1.10-1.35
Tuna heads per kg	1.00	1.05	1.05	1.05
Kangaroo per kg	0.80	0.92	0.95	0.92
Pilchards per kg	-	1.05	-	1.05
North Sea herring per kg	1.13	1.10	1.28	1.15
Orange roughy per kg	1.00	0.95	1.05	0.95
Hoki per kg	-	0.93	-	0.93
Alfonsino per kg	-	1.00	-	0.90
Sardinella per kg	1.10	-	1.20	-

3.10 Distribution of fishing

The distribution of fishing, indicated by catch and effort records in fishermen's returns, is shown in Tables 1 and 2. The pattern of fishing does not vary greatly from season to season and is dependent on the density of rock lobsters in the various depths. Throughout a season, the usual pattern is concentrated fishing in the shallows during November and early December; followed by a move to deeper water fishing during the latter part of December and early January as the "whites" migration is followed; then back to the shallows, with some fishing in the middle grounds, during February, March and April; and finally fishing

in mixed depths (mainly shallower), depending on weather and density of rock lobsters, throughout the remainder of the season.

During the period covered by this report, vessels fished for rock lobsters in the extreme northern and southern areas of the fishery, viz. in the area around South Passage in Shark Bay in the north and Augusta in the south. Although small in quantity most of the rock lobsters caught in the Augusta area (statistical blocks 3414, 3415, 3416 and 3517) were outside the West Coast Rock Lobster Managed Fishery concession area.

Prior to the 1986/87 season, a small number of vessels fished for rock lobsters in deep water north-west of Kalbarri in an area known as Big Bank (Figure 1c). From 1986/87 through to 2000/2001 up to 119 vessels fished in the above area during January and February of each season, taking large numbers of migratory rock lobsters in very deep water (70 to 100 fathoms) (Chubb, et al., 1994). Regulations controlling the timing of the commencement of fishing there have been in force since 1991.

3.11 Average number of days worked per boat per month

Listed below are the average total number of days worked per boat each month for both north and south of 30° S latitude and a total for the combined areas:

Month	North* 30° S		South 30° S		Total	
	1999/2000	2000/2001	1999/2000	2000/2001	1999/2000	2000/2001
November	13.8	15.2	11.3	14.8	12.5	15.0
December	29.6	28.4	29.7	28.7	29.6	28.5
January	16.4	13.3	25.7	23.6	21.1	18.5
February	24.7	23.6	27.6	24.9	26.1	24.3
March	26.1	25.8	30.3	29.1	28.2	27.4
April	28.0	28.9	24.2	24.2	26.1	26.6
May	25.5	26.4	23.7	21.3	24.6	23.9
June	21.2	22.1	20.7	18.4	20.9	20.2

*Note: North includes the Abrolhos Islands.

3.12 Price of rock lobsters (per kg)

The prices gained by exporters for the sale of rock lobsters are governed by a complex set of factors, e.g. demand, size of lobster, product type, exchange rate, etc. Thus this section deals only with the average price paid to fishermen (the “beach price”) selling their catch directly to licensed rock lobster processors.

1999/2000

The average price paid for the whole season was in both the northern and southern areas approximately $27.00 per kg. Using the average price per kg, the ex-vessel value of the landed catch was approximately $392 million.

2000/2001

The price varied throughout the season, however, the average price paid to fishermen for the whole season was approximately $27.00 in the northern sector and $26.50 in the south. The ex-vessel value of the landed catch was approximately $302 million.

3.13 Marketing

Each season, depending on market demand, rock lobsters were processed into various product types; frozen tails, frozen whole cooked (boiled), frozen whole raw and live. The processed rock lobsters, with the exception of a small quantity destined for the local market, were exported chiefly to Japan, Taiwan, USA and Hong Kong/China with a very small quantity marketed in France. Whole cooked, whole raw and live were marketed in Japan and Taiwan, live in Hong Kong/China, whilst the frozen tails were exported to the USA.

Average wholesale New York price for Australian rock lobster tails:

1999/2000		2000/2001	
Grade (oz)	**$US per Kg**	**Grade (oz)**	**$US per Kg**
5-6	51.70	5-6	48.62
5-7	48.40	6-8	42.17
6-7	50.23	8-10	42.39
6-8	48.64	10-12	46.71
7-8	52.14	12-16	46.20
7-14	52.80	14-16	48.40
8-10	48.18	20-24	55.00
8-16	49.50		
10-12	51.94		
12	50.60		
12-14	51.55		
12-16	50.60		
14-16	50.60		
16-20	55.64		
16-24	49.50		

Listed below are the percentages of each product type for the seasons 1999/2000 to 2000/2001 converted to landed live weight equivalents.

The production figures have been separated into three fishing/processing sectors, Augusta to Wedge Island, Green Islets to Green Head, Leeman to Denham, together with a total for the whole coast. It must be noted however, that due to transportation of some product between centres for processing, the figures are a combination of what was caught and what was processed in each area:

Area	**Season**	**PRODUCT TYPE (%)**			
		Tails	**Cooked**	**Raw**	**Live**
South	1999/2000	21.03	28.49	5.61	44.88
(Augusta to Wedge Island)	2000/2001	19.57	18.00	6.39	56.04
Central	1999/2000	34.12	42.75	8.83	14.31
(Green Islets to Green Head)	2000/2001	26.83	46.37	3.63	23.18
North	1999/2000	21.37	49.02	12.43	17.17
(Leeman to Denham)*	2000/2001	20.85	40.25	11.30	27.59
Total	**1999/2000**	**22.91**	**39.84**	**9.18**	**28.07**
	2000/2001	**21.05**	**32.23**	**8.48**	**38.25**

***Note:** Leeman to Denham includes the Abrolhos Islands.

3.14 Value per pot on pot redistribution
(i.e. market price paid for a licensed pot)

The range of market prices paid for licensed pots both north and south of 30° S latitude were:

1999/2000

Zones A and B from approximately $24,000 to approximately $25,000.
Zone C from approximately $27,500 to approximately $28,500.

2000/2001

Zones A and B from approximately $26,000 to approximately $27,000.
Zone C from approximately $28,000 to approximately $28,500.

3.15 Sea water temperatures and salinities

These environmental variables have relevance to the behaviour and catch rates of rock lobsters (Morgan 1974). The average sea water temperatures (°C) and salinities (parts per thousand) together with maximum and minimum sea water temperatures and salinities during the following rock lobster seasons (i.e. 1999/2000 to 2000/2001, 15 November to 30 June) at the Western Australian Marine Research Laboratories (aquarium header tank) were:

Season	Max. temp. (°C)	Week ending	Min. temp. (°C)	Week ending	Avg. temp. (°C) (season)	Max. salinity	Week ending	Min. salinity	Week ending	Avg. salinity (season)
1999/2000	23.8	10,17/01/2000	17.3	12/06/2000	21.3	35.70	28/02/2000	34.40	03/07/2000	35.00
2000/2001	23.9	11/03/2001	17.9	10,17/06/2001	21.2	36.70	04/03/2001	34.90	10,17/06/2001	35.72

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 (see section 2.0) and are shown in Tables 7 and 8. Information is available for the Abrolhos Islands from March to June.

3.16 Spawning rock lobsters

Monitoring on board commercial vessels provides a detailed description of the lobsters caught in commercial pots, particularly with respect to the breeding stock and undersize animals that are returned to the sea. The sex ratios between males and females in different depth categories are given in Tables 9 and 10.

Most of the breeding females are found in the 20-50 fathom (37-92 m) range with no variation in the size of first breeding observed from one depth category to another. Hence the data for December, January and February from all depths may be pooled to indicate the size frequency of breeding (i.e. “berried” and/or mated) females (Figures 4a and b). The mean sizes of breeding females from monitoring data collected during the period 1999/2000 to 2000/2001 were as follows:

Season	CARAPACE LENGTH (mm)				
	Fremantle	Lancelin	Jurien	Dongara	Kalbarri
1999/2000	104.6	96.5	84.2	89.5	78.8
2000/2001	104.8	103.4	84.3	91.7	79.4

By comparison the mean sizes at first breeding (*i.e.* the smallest carapace length at which 50% are "berried" and/or mated) were found to be:

Season	CARAPACE LENGTH (mm)				
	Fremantle	Lancelin	Jurien	Dongara	Kalbarri
1999/2000	94.2	94.6	85.7	82.4	83.0
2000/2001	91.9	89.4	84.1	83.7	82.1

4.0 Discussion

The forecast of a second successive record catch from the western rock lobster fishery was realised when 14,500 tonnes were landed in the 1999/2000 season. This surpassed the 13,600 tonnes of *Panulirus argus* landed in the Cuban fishery in 1985 and now stands as the largest single-season rock lobster catch by any country in the world. Whilst the Abrolhos catch (A zone) of 1,740 tonnes was about 11.5% below the previous season's record of 1,970 tonnes, both B and C zones had record catches. The 4,530 tonnes and 8,220 tonnes caught in B and C zones respectively eclipsed the previous highest catches of 4,450 tonnes in B zone in 1987/1988 and 6,870 tonnes landed in C zone in 1998/1999. The 2000/2001 season saw a return to slightly below average catches for A and B zones (1,670 and 3,500 t respectively) but still a very high catch of 6,100 tonnes in C zone. This was due to poorer levels of puerulus settlement in the north compared to the south three and four years prior to this season.

The record season (1999/00) commenced in a rather modest fashion with a very slow start with November catches down by about 50%. Many processors were in a position where orders could not be filled. Apart from this minor hurdle and the impact of the severe earthquake in Taiwan just prior to our season commencing, the season was an economic success. Very favourable exchange rates and stable interest rates meant orderly marketing and the maintenance of high prices throughout the season. The value of the landed catch was about $392 million ex-vessel with an estimated export income of about $500 million.

In 2000/2001 beach prices in the north remained at the 1999/2000 average of $27 per kg but were marginally lower in the south ($26.50 per kg) leading to a fishery value ex-vessel of $302 million, $90 million less than 1999/00. The beach prices were maintained by a weak Australian dollar (around 50-52 US cents during the season) and a reduced catch of around 11,300 tonnes. However, this result belies the actual market situation during the season. The live lobster market generally was stable with some pressure during the "whites" with massive catches being landed. The frozen market, on the other hand, was quite variable due to substantial inventories of unsold frozen product held by Japan, Taiwan and the USA and containers of product still in WA at the start of the season. Consequently, at times during the season sales of frozen product were virtually non-existent. Nevertheless lower volumes of product in the "reds" helped stabilise the situation. Readily available cheaper product from

Mexico and other lobster exporting nations, plus the increase in substitute products also put pressure on the prices achieved by processors. Whilst the Marine Stewardship Council certification of the fishery as ecologically sustainable gained in March 2000 generated increased interest in the European Union markets, the high tariff barriers posed a significant problem to the expansion on this market.

The initiative to allow the retiring of licences led to 10 vessels leaving the fleet in 2000/2001. Consequently the average number of pots carried rose from 93.2, 91.8 and 99.2 respectively for A, B and C zones in 1999/2000 to 94.8, 93.7 and 100.9. The average pots used has been increasing since the introduction of the 1993/1994 management package due to vessels leaving the fishery and redistributing all the pots attached to the licence, and the new initiative provide a number of fishers to lease pots during a season of lower catch and still maintain a good income.

The record catch year and the removal of the six-year boat replacement and the "7 and 10" rules (restriction on number of pots required for given length of vessel) meant there was investment by the fishers in new vessels. In both 1999/2000 and 2000/2001, 27 and 28 new vessels respectively entered the fishery. This is in marked contrast to the declining trend seen in the two previous seasons, where 18 boats were built in 1997/1998 and 11 vessels were constructed for the the 19998/1999 season. Vessel sizes did not alter greatly. Costs of fishing increased in the two seasons covered by this report with pot prices and fuel prices increasing through 1999/2000 and 2000/2001. Other costs, such as ropes and floats, and bait varying compared to previous seasons but within the same range.

The management package introduced in 1993/1994 remained in force and continued to rebuild the breeding stock. Indices in 1999/2000 saw peaks in both the north and south coastal fishery and although egg production from the south coastal breeding stock remained at a similar high level, egg production in the north fell substantially but was still well above the 1992/93 level. The independent breeding stock survey confirmed the trends in the fishery dependent data.

The recreational catch remained at about 5% of the commercial catch with catch trends imitating the commercial fishery. Voluntary logbook participation continued the trend in the two previous seasons and declined further from 37.6% in 1998/1999 to 36.0% in 1999/2000 to 34.3% in 2000/2001. The reasons for this were not clear except that complacency with good economic returns can not be ruled out.

5.0 Acknowledgments

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7.0 Tables

Table 1. Catch (in kg weight) and fishing effort (in pot lifts) for the 1999/2000 rock lobster season in various statistical blocks.

		DATE								
BLOCK		**199911**	**199912**	**200001**	**200002**	**200003**	**200004**	**200005**	**200006**	**TOTAL**
25120	Catch	-	-	-	-	-	-	2,160	-	2,160
25120	Effort	-	-	-	-	-	-	2,100	-	2,100
26120	Catch	-	-	-	1,236	4,500	6,075	-	-	11,811
26120	Effort	-	-	-	1,532	1,400	2,900	-	-	5,832
26131	Catch	-	-	146	1,054	-	13,332	4,626	-	19,158
26131	Effort	-	-	615	1,300	-	7,403	4,876	-	14,194
27120	Catch	-	-	-	400	-	-	-	-	400
27120	Effort	-	-	-	445	-	-	-	-	445
27132	Catch	2,189	11,232	12,936	177,821	55,758	54,331	18,196	4,684	337,147
27132	Effort	2,992	6,788	16,819	132,896	25,910	30,260	16,974	6,978	239,617
27140	Catch	8,418	37,175	21,016	26,441	43,059	28,766	15,838	10,404	191,117
27140	Effort	15,185	25,476	27,326	29,371	24,656	23,349	21,888	17,543	184,794
28132	Catch	-	-	444	755	2,439	-	-	-	3,638
28132	Effort	-	-	480	800	984	-	-	-	2,264
28142	Catch	70,936	339,061	69,778	177,595	235,127	113,195	67,330	69,326	1,142,348
28142	Effort	130,481	212,963	132,004	213,244	140,343	90,586	88,543	98,409	1,106,573
29132	Catch	-	6,573	-	-	-	-	-	-	6,573
29132	Effort	-	3,632	-	-	-	-	-	-	3,632
29142	Catch	89,188	1,107,883	228,533	239,153	540,766	280,475	176,386	145,444	2,807,828
29142	Effort	227,734	564,058	267,314	295,281	303,331	220,915	226,115	213,990	2,318,738
30140	Catch	13,576	448,047	220,949	118,939	326,863	201,748	103,363	68,041	1,501,526
30140	Effort	47,695	166,454	126,947	116,044	169,797	140,892	109,217	104,281	981,327
30150	Catch	14,986	270,988	99,797	64,105	160,178	102,177	48,583	36,297	797,111
30150	Effort	41,158	104,812	65,891	62,598	86,859	73,363	58,271	50,497	543,449
31140	Catch	1,240	32,352	32,522	16,041	25,777	16,685	4,989	2,463	132,069
31140	Effort	4,252	11,300	19,683	16,153	13,964	12,307	7,828	4,783	90,270
31150	Catch	70,944	1,208,641	688,419	490,449	887,637	502,670	298,576	234,876	4,382,212
31150	Effort	210,567	472,798	420,724	481,948	495,750	377,091	374,117	318,204	3,151,199
32140	Catch	-	3,502	14,479	4,717	3,596	3,877	3,659	2,599	36,429
32140	Effort	-	1,605	9,258	5,102	2,856	2,824	4,724	4,226	30,595
32150	Catch	16,162	364,734	204,531	120,469	185,907	129,707	126,878	129,911	1,278,299
32150	Effort	24,275	118,606	106,463	114,449	122,005	91,749	115,534	109,304	802,385
33140	Catch	-	-	3,657	3,530	-	8,525	9,640	937	26,289
33140	Effort	-	-	2,458	2,496	-	4,888	6,430	560	16,832
33150	Catch	143	-	7,851	4,211	-	18,791	24,426	28,998	84,420
33150	Effort	476	-	4,878	3,608	-	11,766	17,354	17,071	55,153
34141	Catch	-	-	-	1,161	2,293	-	-	-	3,454
34141	Effort	-	-	-	1,547	1,785	-	-	-	3,332
34142	Catch	-	-	47	151	261	-	-	-	459
34142	Effort	-	-	864	741	966	-	-	-	2,571
34151	Catch	-	-	1,152	3,926	2,293	-	-	-	7,371
34151	Effort	-	-	1,300	3,746	1,785	-	-	-	6,831
34152	Catch	28	262	639	198	200	959	974	318	3,578
34152	Effort	1,200	375	1,200	2,000	2,000	1,680	1,840	1,280	11,575
97011	Catch	-	-	-	-	59,558	23,446	10,883	797	94,684
97011	Effort	-	-	-	-	12,437	14,731	11,460	1,840	40,468
97012	Catch	-	-	-	-	296,013	205,044	113,447	40,370	654,874
97012	Effort	-	-	-	-	87,176	149,391	141,053	94,918	472,538
97013	Catch	-	-	-	-	218,196	159,844	71,689	30,745	480,474
97013	Effort	-	-	-	-	64,789	109,165	101,528	67,574	343,056
97014	Catch	-	-	-	-	171,647	154,177	50,941	14,673	391,438
97014	Effort	-	-	-	-	48,655	88,892	52,776	27,257	217,580
97015	Catch	-	-	-	-	54,520	56,441	21,644	4,069	136,674
97015	Effort	-	-	-	-	13,073	32,394	23,926	7,125	76,518
TOTAL	**Catch**	287,810	3,830,450	1,606,896	1,452,352	3,276,588	2,080,265	1,174,228	824,952	14,533,541
	Effort	706,015	1,688,867	1,204,224	1,485,301	1,620,521	1,486,546	1,386,554	1,145,840	10,723,868

Table 2. Catch (in kg weight) and fishing effort (in pot lifts) for the 2000/2001 rock lobster season in various statistical blocks.

		DATE								
BLOCK		**200011**	**200012**	**200101**	**200102**	**200103**	**200104**	**200105**	**200106**	**Total**
26131	Catch	-	-	296	1,912	1,850	11,758	-	-	15,816
26131	Effort	-	-	492	1,132	1,750	6,917	-	-	10,291
27132	Catch	1,922	9,428	17,270	131,386	72,373	63,377	42,055	6,512	344,322
27132	Effort	2,076	5,801	22,151	113,506	46,052	41,762	41,202	10,519	283,069
27140	Catch	7,744	52,653	11,221	10,142	22,668	30,861	16,103	10,107	161,498
27140	Effort	11,563	36,382	20,798	18,874	19,406	23,188	19,981	21,026	171,218
28132	Catch	-	-	-	-	-	2,133	2,392	-	4,525
28132	Effort	-	-	-	-	-	970	1,845	-	2,815
28142	Catch	98,632	265,095	42,384	99,239	163,020	112,727	64,134	55,492	900,722
28142	Effort	129,472	194,254	113,009	217,063	134,470	91,655	93,751	105,022	1,078,696
29132	Catch	-	2,284	-	-	-	-	-	-	2,284
29132	Effort	-	1,232	-	-	-	-	-	-	1,232
29142	Catch	287,992	793,391	84,452	124,741	309,894	238,953	139,080	110,060	2,088,562
29142	Effort	275,693	544,696	204,287	296,255	285,831	224,228	202,839	213,445	2,247,274
30140	Catch	75,328	389,145	92,579	56,781	169,996	115,983	55,122	41,922	996,857
30140	Effort	61,474	166,160	92,327	102,136	157,998	123,966	86,331	89,498	879,890
30150	Catch	53,275	230,076	62,701	34,077	96,473	87,983	33,851	24,706	623,141
30150	Effort	47,068	102,646	70,022	65,507	100,045	104,158	64,558	61,536	615,540
31140	Catch	6,490	34,229	10,873	3,672	8,592	9,990	5,960	1,087	80,892
31140	Effort	4,662	13,327	8,197	7,316	8,937	10,243	10,663	3,134	66,479
31150	Catch	352,163	987,123	380,297	260,347	432,370	347,002	208,878	124,392	3,092,572
31150	Effort	269,030	425,221	348,488	427,631	469,563	353,066	310,330	261,951	2,865,280
32140	Catch	-	5,672	4,585	190	-	-	-	1,734	12,181
32140	Effort	-	2,296	3,384	336	-	-	-	1,456	7,472
32150	Catch	65,434	354,002	218,482	70,545	99,440	99,173	92,320	62,349	1,061,745
32150	Effort	49,009	126,712	134,339	105,684	110,748	98,967	113,367	89,696	828,522
33140	Catch	-	1,546	15,582	2,361	1,032	7,286	16,151	10,655	54,612
33140	Effort	-	672	9,205	3,727	1,232	6,083	10,098	9,943	40,960
33150	Catch	1,131	12,855	30,111	10,419	1,032	13,816	33,017	22,751	125,131
33150	Effort	1,160	5,240	21,611	14,898	1,344	11,522	37,324	28,384	121,483
34141	Catch	-	-	13,919	7,024	3,203	3,989	-	-	28,135
34141	Effort	-	-	9,557	7,196	3,016	2,784	-	-	22,553
34142	Catch	-	38	332	210	644	-	-	-	1,224
34142	Effort	-	60	792	840	1,176	-	-	-	2,868
34152	Catch	272	436	268	475	514	1,892	1,253	1,085	6,194
34152	Effort	1,200	2,500	2,300	1,955	2,760	4,045	3,841	3,755	22,356
97011	Catch	-	-	-	-	61,662	33,496	26,135	687	121,979
97011	Effort	-	-	-	-	17,508	19,014	18,741	1,722	56,985
97012	Catch	-	-	-	-	264,933	207,382	119,348	48,251	639,914
97012	Effort	-	-	-	-	86,210	160,381	157,422	111,347	515,360
97013	Catch	-	-	-	-	216,853	139,842	60,992	25,633	443,319
97013	Effort	-	-	-	-	67,302	104,301	89,926	64,674	326,203
97014	Catch	-	-	-	-	137,840	129,816	54,553	13,816	336,025
97014	Effort	-	-	-	-	44,526	83,722	69,022	37,314	234,584
97015	Catch	-	-	-	-	35,809	63,651	25,935	6,040	131,435
97015	Effort	-	-	-	-	11,618	37,450	26,087	10,591	85,746
TOTAL	**Catch**	950,382	3,137,974	985,350	813,523	2,100,195	1,721,108	997,276	567,277	11,273,083
	Effort	852,407	1,627,199	1,060,959	1384,056	1,571,492	1,508,422	1,357,328	1,125,013	10,486,876

Table 3. Catch (kg) per unit of fishing effort (i.e. kilograms of rock lobster per pot lift) data for the 1999/2000 season in various statistical blocks (see figures 1a, b).

	DATE								
BLOCK	**199911**	**199912**	**200001**	**200002**	**200003**	**200004**	**200005**	**200006**	**Total**
25120	-	-	-	-	-	-	1.029	-	1.029
26120	-	-	-	0.807	3.214	2.095	-	-	2.025
26131	-	-	0.237	0.811	-	1.801	0.949	-	1.350
27120	-	-	-	0.899	-	-	-	-	0.899
27132	0.732	1.655	0.769	1.338	2.152	1.795	1.072	0.671	1.407
27140	0.554	1.459	0.769	0.900	1.746	1.232	0.724	0.593	1.034
28132	-	-	0.925	0.944	2.479	-	-	-	1.607
28142	0.544	1.592	0.529	0.833	1.675	1.250	0.748	0.704	1.031
29132	-	1.810	-	-	-	-	-	-	1.810
29142	0.392	1.964	0.855	0.810	1.783	1.270	0.780	0.680	1.211
30140	0.285	2.692	1.740	1.025	1.925	1.432	0.946	0.652	1.530
30150	0.364	2.585	1.515	1.024	1.844	1.393	0.834	0.719	1.467
31140	0.292	2.863	1.652	0.993	1.846	1.356	0.637	0.515	1.463
31150	0.337	2.556	1.636	1.018	1.791	1.333	0.794	0.738	1.390
32140	-	2.182	1.564	0.925	1.259	1.373	0.775	0.615	1.191
32150	0.666	3.075	1.921	1.053	1.524	1.414	1.098	1.189	1.593
33140	-	-	1.488	1.414	-	1.744	1.499	1.673	1.562
33150	0.300	-	1.609	1.167	-	1.597	1.408	1.699	1.531
34141	-	-	-	0.750	1.285	-	-	-	1.037
34142	-	-	0.054	0.204	0.270	-	-	-	0.179
34151	-	-	0.886	1.048	1.285	-	-	-	1.079
34152	0.023	0.699	0.533	0.099	0.100	0.571	0.529	0.248	0.309
97011	-	-	-	-	4.789	1.592	0.950	0.433	2.340
97012	-	-	-	-	3.396	1.373	0.804	0.425	1.386
97013	-	-	-	-	3.368	1.464	0.706	0.455	1.401
97014	-	-	-	-	3.528	1.734	0.965	0.538	1.799
97015	-	-	-	-	4.170	1.742	0.905	0.571	1.786
TOTAL	**0.408**	**2.268**	**1.334**	**0.978**	**2.022**	**1.399**	**0.845**	**0.720**	**1.355**

Total catch = 14,533,541 kg
Total effort = 10,723,868 pot lifts

Table 4. Catch (kg) per unit of fishing effort (i.e. kilograms of rock lobster per pot lift) data for the 2000/2001 season in various statistical blocks (see figures 1a, b).

	DATE								
BLOCK	**200011**	**200012**	**200101**	**200102**	**200103**	**200104**	**200105**	**200106**	**Total**
26131	-	-	0.602	1.689	1.057	1.700	-	-	1.537
27132	0.926	1.625	0.780	1.157	1.571	1.517	1.021	0.619	1.216
27140	0.670	1.447	0.539	0.537	1.168	1.331	0.806	0.481	0.943
28132	-	-	-	-	-	2.199	1.296	-	1.607
28142	0.762	1.365	0.375	0.457	1.201	1.230	0.684	0.528	0.834
29132	-	1.854	-	-	-	-	-	-	1.854
29142	1.045	1.456	0.413	0.421	1.084	1.066	0.686	0.516	0.929
30140	1.225	2.342	1.003	0.556	1.076	0.936	0.638	0.468	1.133
30150	1.132	2.241	0.895	0.520	0.964	0.845	0.524	0.401	1.012
31140	1.392	2.568	1.326	0.502	0.961	0.975	0.559	0.347	1.217
31150	1.309	2.321	1.091	0.609	0.921	0.983	0.673	0.475	1.079
32140	-	2.470	1.355	0.566	-	-	-	1.191	1.630
32150	1.335	2.794	1.626	0.667	0.898	1.002	0.812	0.700	1.282
33140	-	2.301	1.693	0.633	0.837	1.198	1.599	1.072	1.333
33150	0.975	2.453	1.393	0.699	0.767	1.199	0.885	0.823	1.036
34141	-	-	1.456	0.976	1.062	1.433	-	-	1.247
34142	-	0.634	0.419	0.250	0.548	-	-	-	0.427
34152	0.227	0.174	0.117	0.243	0.186	0.468	0.326	0.289	0.277
97011	-	-	-	-	3.522	1.761	1.394	0.399	2.140
97012	-	-	-	-	3.073	1.293	0.758	0.433	1.242
97013	-	-	-	-	3.222	1.341	0.678	0.396	1.359
97014	-	-	-	-	3.095	1.550	0.790	0.370	1.432
97015	-	-	-	-	3.082	1.700	0.994	0.570	1.533
TOTAL	**1.115**	**1.928**	**0.929**	**0.588**	**1.335**	**1.141**	**0.735**	**0.505**	**1.075**

Total catch = 11,273,083 kg
Total effort = 10,486,876 pot lifts

Table 5. Mean carapace lengths (mm) of male and female rock lobsters in various depth categories at Fremantle, Lancelin, Jurien, Dongara, Kalbarri and Abrolhos Islands throughout the 1999/2000 fishing season.

		0-10 Fathoms		10-20 Fathoms		20-30 Fathoms		30+ Fathoms	
Location	**Month**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
Kalbarri	Nov	78	76	-	-	-	-	-	-
	Dec	78	77	79	78	81	78	-	-
	Jan	77	76	-	-	79	79	-	-
	Feb	77	76	76	76	-	-	-	-
	Mar	77	76	77	77	80	80	-	-
	Apr	76	76	76	76	79	78	77	77
	May	77	76	77	76	82	79	-	-
	Jun	78	75	77	76	-	-	-	-
Abrolhos	Mar	80	75	80	75	80	76	83	78
	Apr	77	74	75	74	76	74	81	78
	May	77	75	78	75	80	76	82	79
	Jun	80	75	79	75	78	75	-	-
Dongara	Nov	74	69	-	-	-	-	-	-
	Dec	78	74	77	75	78	77	-	-
	Jan	72	68	75	74	82	84	81	80
	Feb	75	73	76	74	81	84	-	-
	Mar	76	75	77	75	84	84	-	-
	Apr	76	74	77	75	85	89	-	-
	May	77	75	78	75	-	-	-	-
	Jun	77	75	78	76	89	85	-	-
Jurien Bay	Nov	77	75	-	-	-	-	-	-
	Dec	78	75	78	75	76	76	85	84
	Jan	-	-	-	-	81	79	78	76
	Feb	75	74	78	76	85	79	-	-
	Mar	78	76	82	78	84	79	-	-
	Apr	76	74	78	75	79	77	-	-
	May	78	74	78	75	82	81	-	-
	Jun	76	74	77	75	85	78	-	-
Lancelin	Nov	76	75	88	95	-	-	-	-
	Dec	76	75	80	77	86	88	92	89
	Jan	77	75	84	78	83	80	86	81
	Feb	77	75	82	80	86	82	-	-
	Mar	77	75	83	82	84	85	92	93
	Apr	77	74	94	98	86	92	-	-
	May	77	75	83	79	89	87	-	-
	Jun	77	74	90	82	-	-	-	-
Fremantle	Nov	79	77	-	-	-	-	-	-
	Dec	81	78	83	79	90	83	92	86
	Jan	75	75	80	82	87	91	90	82
	Feb	79	76	-	-	92	102	-	-
	Mar	79	77	-	-	89	96	-	-
	Apr	81	77	92	88	90	92	-	-
	May	90	81	92	82	95	96	-	-
	Jun	78	76	93	84	100	87	-	-

Table 6. Mean carapace lengths (mm) of male and female rock lobsters in various depth categories at Fremantle, Lancelin, Jurien, Dongara, Kalbarri and Abrolhos Islands throughout the 2000/2001 fishing season.

		0-10 Fathoms		10-20 Fathoms		20-30 Fathoms		30+ Fathoms	
Location	**Month**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
Kalbarri	Nov	78	77	78	77	-	-	-	-
	Dec	78	77	78	78	80	80	-	-
	Jan	77	76	76	76	77	76	-	-
	Feb	77	77	78	77	77	77	-	-
	Mar	75	76	76	76	85	84	-	-
	Apr	76	75	78	77	84	82	87	86
	May	76	76	77	77	92	85	-	-
	Jun	77	76	78	76				
Abrolhos	Mar	79	76	78	76	80	78	81	77
	Apr	77	75	78	75	77	75	-	-
	May	75	75	76	74	-	-	-	-
	Jun	74	74	75	75	77	76	-	-
Dongara	Nov	79	76	79	76				
	Dec	78	75	79	76	82	77	-	-
	Jan	76	75	77	75	85	87	75	74
	Feb	74	73	79	76	84	86	-	-
	Mar	77	75	78	76	84	79	82	81
	Apr	77	75	78	75	86	87	81	79
	May	77	74	76	73	85	87	80	78
	Jun	77	75	80	77	86	79	-	-
Jurien Bay	Nov	79	75	79	75	78	76	-	-
	Dec	78	76	78	75	79	75	83	80
	Jan	-	-	76	76	82	80	-	-
	Feb	76	73	76	73	84	84	-	-
	Mar	75	72	79	76	85	81	84	82
	Apr	77	74	82	78	84	82	83	81
	May	74	71	80	77	80	77	-	-
	Jun	77	74	78	75	89	80	-	-
Lancelin	Nov	77	75	78	75	-	-	-	-
	Dec	78	75	87	84	88	86	83	80
	Feb	76	75	94	104	90	85		
	Mar	76	75	89	94	90	93	89	86
	Apr	75	74	90	96	89	88	84	84
	May	77	75	94	91	90	86	-	-
	Jun	77	75	87	81	86	75	-	-
Fremantle	Nov	78	76	82	77				
	Dec	84	79	90	86	92	100	91	85
	Jan	80	77	86	86	106	100	-	-
	Feb	78	76	83	80	93	100	-	-
	Mar	79	77	86	90	90	89	-	-
	Apr	81	78	90	83	90	91	-	-
	May	83	81	95	87	94	93	-	-
	Jun	78	77	85	79	95	82	-	-

Table 7. Bottom temperature (°C) and surface salinity (in parts per thousand) in various depth categories in waters out from Fremantle, Lancelin, Jurien and Dongara throughout the 1999/2000 fishing season, and from the Abrolhos Islands in March.

	Depth	November		December		January		February		March		April		May		June	
Location	(fathoms)	Temp	Sal	Temp	Sal	Temp	Sal	Temp	Sal	Temp	Sal	Temp	Sal	Temp	Sal	Temp	Sal
Kalbarri	0-10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	10-20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	20-30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	30+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Abrolhos	0-10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	10-20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	20-30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	30+	-	-	-	-	-	-	-	-	24.80	-	-	-	-	-	-	-
Dongara	0-10	22.50	36.00	21.90	35.70	23.50	35.70	24.90	35.70	23.60	-	22.80	35.80	20.00	35.50	19.80	35.20
	10-20	-	-	-	-	-	-	24.40	35.70	23.80	-	23.50	35.80	19.80	35.30	-	-
	20-30	-	-	21.40	35.80	-	-	24.10	35.40	23.70	-	23.80	35.10	-	-	20.80	-
	30+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Jurien Bay	0-10	20.70	35.70	-	35.70	-	-	23.90	35.80	24.00	-	21.30	35.60	20.40	35.40	20.70	35.10
	10-20	-	-	21.80	35.40	-	-	21.10	35.70	-	-	22.20	35.50	21.10	-	21.20	35.10
	20-30	-	-	21.20	-	23.40	35.20	23.90	35.30	22.70	-	22.20	35.50	-	35.70	-	-
	30+	-	-	22.80	35.20	-	-	-	-	-	-	-	-	-	-	-	-
Lancelin	0-10	21.80	35.50	22.00	35.70	24.10	35.80	24.30	36.00	-	36.10	22.20	35.90	20.40	35.20	20.10	35.40
	10-20	21.50	35.30	21.80	-	23.90	35.70	23.50	35.90	23.70	35.90	22.00	35.30	-	35.30	21.60	35.20
	20-30	-	-	22.00	35.70	-	35.30	23.50	35.40	22.90	35.50	22.90	35.20	22.90	35.20	-	-
	30+	-	-	22.00	35.50	24.10	35.30	-	-	-	-	-	-	-	-	-	-
Fremantle	0-10	21.25	35.30	21.00	35.50	22.80	35.60	23.40	35.80			21.90	35.40	20.80	35.15	18.10	35.40
	10-20	-	-	20.80	35.50	-	-	-	-	-	-	21.50	35.40	21.50	35.30	-	35.10
	20-30	-	-	-	-	22.40	35.40	23.20	-	-	-	22.90	35.50	21.70	35.10	19.40	35.10
	30+	-	-	-	35.35	-	-	-	-	-	-	-	-	-	-	-	-

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

Table 8. Bottom temperature (°C) and surface salinity (in parts per thousand) in various depth categories in waters out from Fremantle, Lancelin, Jurien and Dongara throughout the 2000/2001 fishing season, and from the Abrolhos Islands in March.

	Depth	November		December		January		February		March		April		May		June	
Location	(fathoms)	Temp	Sal	Temp	Sal	Temp	Sal	Temp	Sal	Temp	Sal	Temp	Sal	Temp	Sal	Temp	Sal
Kalbarri	0-10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	10-20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	20-30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	30+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Abrolhos	0-10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	10-20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	20-30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	30+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dongara	0-10	-	35.70	20.20	35.50	22.10	35.70	23.10	36.10	22.20	35.90	21.60	36.00	20.50	-	20.20	34.80
	10-20	-	35.80	20.10	35.80	22.20	35.70	22.60	35.80	-	-	22.30	35.90	21.90	-	20.50	34.80
	20-30	-	-	19.90	-	21.70	35.70	22.40	35.40	22.30	35.40	22.30	35.50	23.60	-	19.90	34.80
	30+	-	-	-	-	22.10	35.40	-	-	-	-	22.70	35.10	22.60	-	-	-
Jurien Bay	0-10	-	35.70	20.30	35.80	-	-	20.50	36.20	21.00	36.00	20.80	36.20	20.80	-	20.50	34.90
	10-20	-	36.00	19.10	36.20	21.80	-	-	-	-	-	21.50	35.80	-	34.90	19.90	34.80
	20-30	-	35.60	19.10	35.90	21.40	35.30	21.70	35.40	21.80	35.60	-	-	23.20	34.60	20.60	34.80
	30+	-	-	19.20	-	-	-	-	-	22.30	35.50	22.10	35.50	-	-	-	-
Lancelin	0-10	21.70	35.60	21.10	35.50	-	-	-	36.30	22.20	36.30	21.70	36.00	20.80	35.10	19.60	35.10
	10-20	21.20	35.60	19.90	35.60	-	-	21.70	35.80	22.20	35.70	22.20	35.50	21.40	35.10	21.40	35.10
	20-30	-	-	19.40	35.60	-	-	-	35.80		35.50	22.60	35.40	22.10	35.10	22.10	35.10
	30+	-	-	20.70	35.70	-	-	-	-	22.40	35.50	-	-	-	-	-	-
Fremantle	0-10	-	-	20.90	35.40	21.80	35.80	21.50	36.15	-	35.10	21.70	35.50	19.70	35.50	19.40	35.20
	10-20	20.50	35.50	20.20	35.40	-	35.80	-	-	22.30	36.00	-	-	-	-	20.90	35.10
	20-30	-	-	-	35.40	20.00	35.70	21.10	35.70	22.20	35.80	22.20	35.40	22.40	35.30	20.20	35.10
	30+	-	-	20.20	35.50	-	-	-	-	-	-	-	-	-	-	-	-

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

Table 9. 1999/2000 sex ratio by location, depth category and month. Figures are the percentage of female rock lobster in the total sampled catch.

Location	Depth (fathoms)	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Kalbarri	0-10	55	49	39	54	59	63	60	51
	10-20	-	52	-	48	58	58	56	50
	20-30	-	64	55	-	53	63	54	-
	30+	-	-	-	-	-	43	-	-
Abrolhos	0-10	-	-	-	-	54	48	61	47
	10-20	-	-	-	-	55	47	60	39
	20-30	-	-	-	-	54	47	66	44
	30+	-	-	-	-	55	52	61	-
Dongara	0-10	46	58	44	55	61	57	61	60
	10-20	-	64	63	51	62	71	59	60
	20-30	-	69	83	79	71	83	-	64
	30+	-	-	83	-	-	-	-	-
Jurien Bay	0-10	37	55	-	46	52	56	52	49
	10-20	-	58	-	55	66	64	58	60
	20-30	-	61	57	62	66	65	42	46
	30+	-	57	69	-	-	-	-	-
Lancelin	0-10	53	53	54	50	58	60	59	57
	10-20	66	67	58	63	69	75	60	43
	20-30	-	57	65	62	66	69	78	-
	30+	-	61	66	-	67	-	-	-
Fremantle	0-10	57	60	51	45	57	58	54	54
	10-20	-	59	68	-	-	62	65	46
	20-30	-	56	55	83	74	63	69	46
	30+	-	59	60	-	-	-	-	-

Table 10. 2000/2001 sex ratio by location, depth category and month. Figures are the percentage of female rock lobsters in the total sampled catch.

Location	Depth (Fathoms)	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Kalbarri	0-10	64	59	59	61	55	53	65	60
	10-20	60	68	65	62	55	63	64	56
	20-30	-	56	61	60	55	61	79	-
	30+	-	-	-	-	-	69	-	-
Abrolhos	0-10	-	-	-	-	44	55	-	53
	10-20	-	-	-	-	41	51	61	57
	20-30	-	-	-	-	55	61	-	60
	30+	-	-	-	-	40	-	-	-
Dongara	0-10	61	54	49	57	63	63	58	61
	10-20	64	53	69	62	73	65	71	61
	20-30	-	66	88	86	77	84	74	58
	30+	-	-	78	-	79	75	67	-
Jurien Bay	0-10	54	53	-	48	57	54	53	43
	10-20	62	61	56	55	65	58	54	57
	20-30	57	61	65	73	68	69	52	45
	30+	-	63	-	-	66	67	-	-
Lancelin	0-10	64	61	-	60	68	64	67	72
	10-20	65	73	-	89	76	84	70	61
	20-30	-	66	-	63	72	75	67	45
	30+	-	60	-	-	74	81	-	-
Fremantle	0-10	63	60	54	53	63	61	53	53
	10-20	63	51	59	67	75	55	50	62
	20-30	-	73	43	77	69	72	58	44
	30+	-	55	-	-	-	-	-	-

8.0 Figures

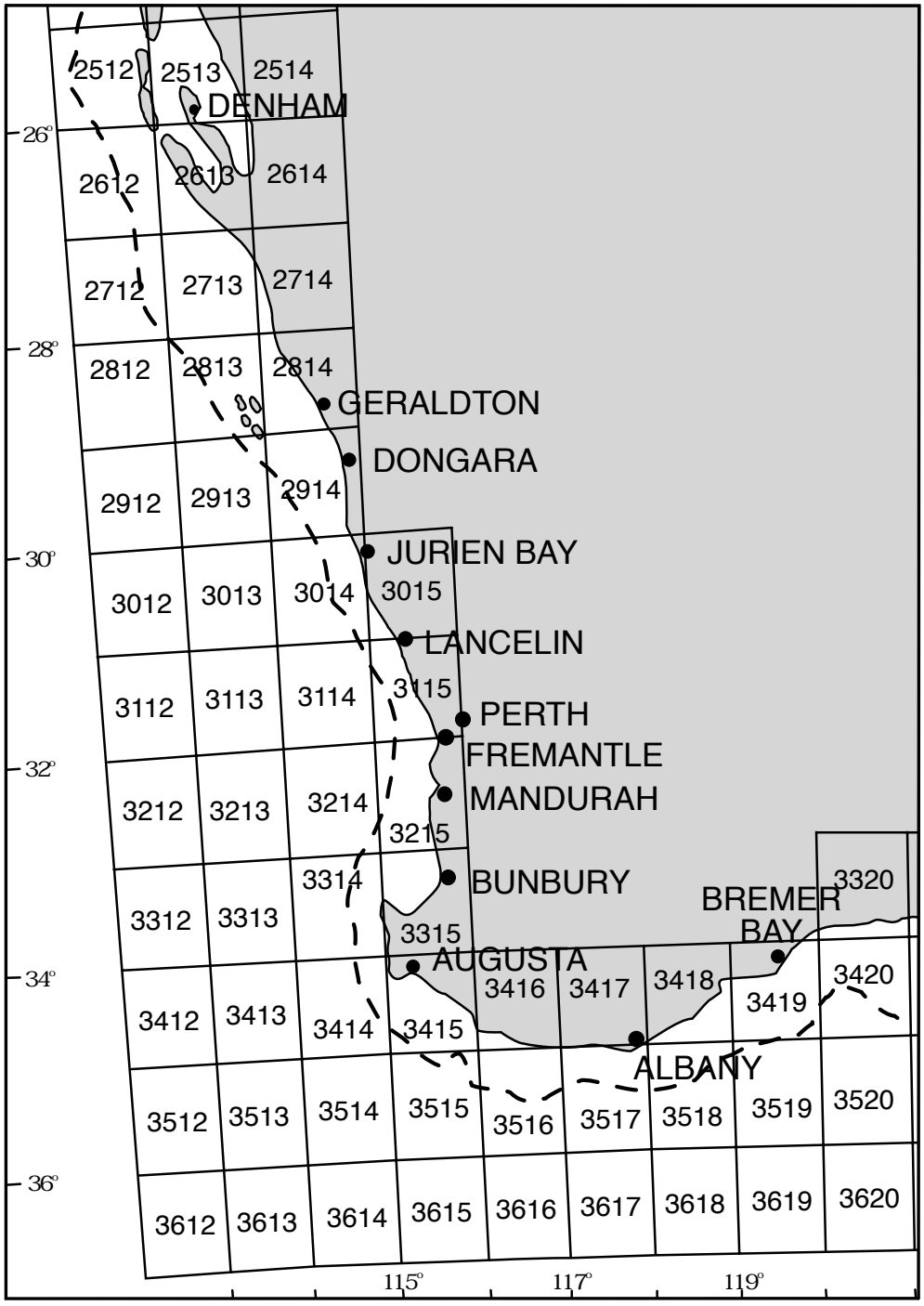

Figure 1a. Rock lobster fishing areas.

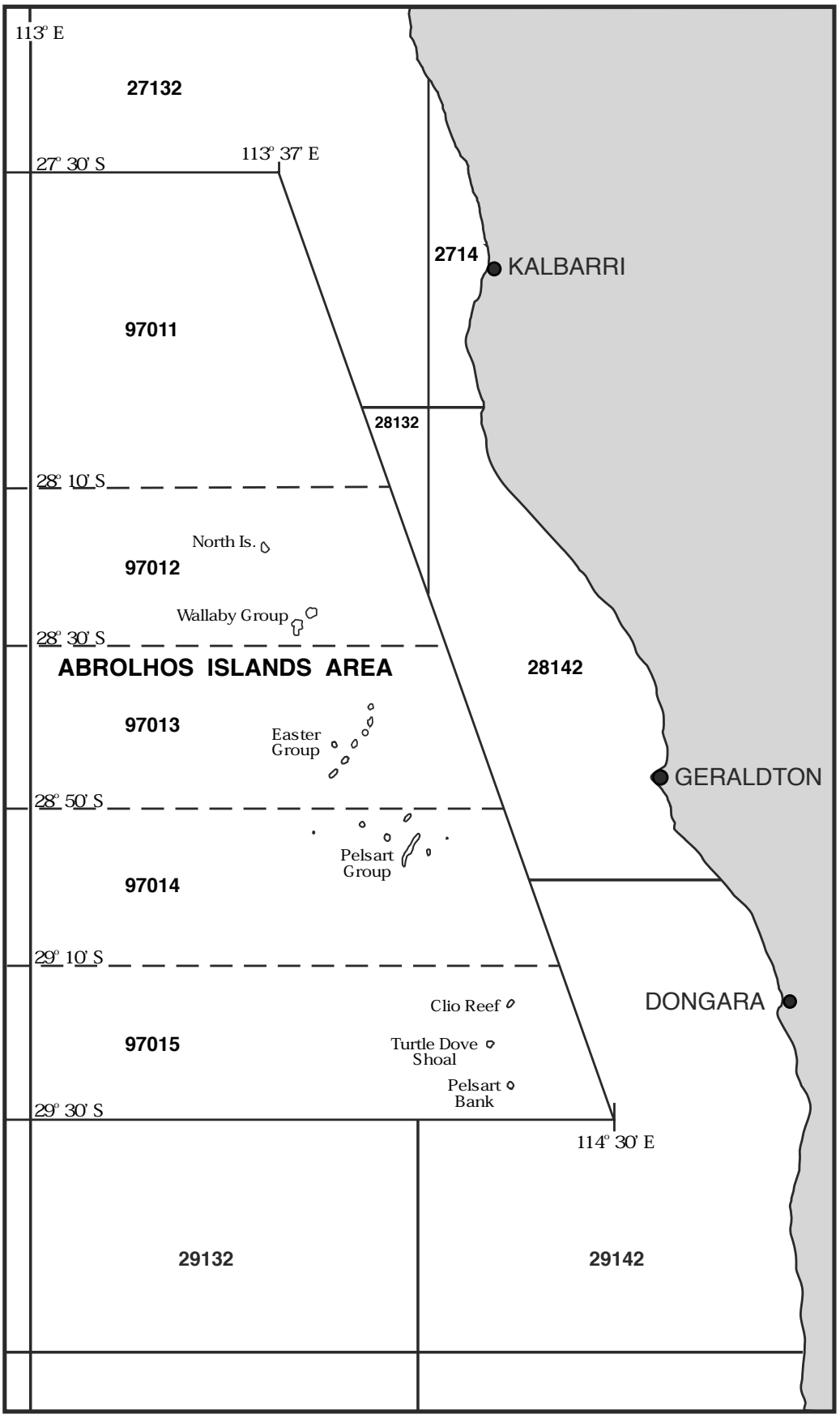

Figure 1b. Rock lobster fishing areas. (The new series of Abrolhos Island statistical blocks were introduced at the commencement of the 1989/90 season).

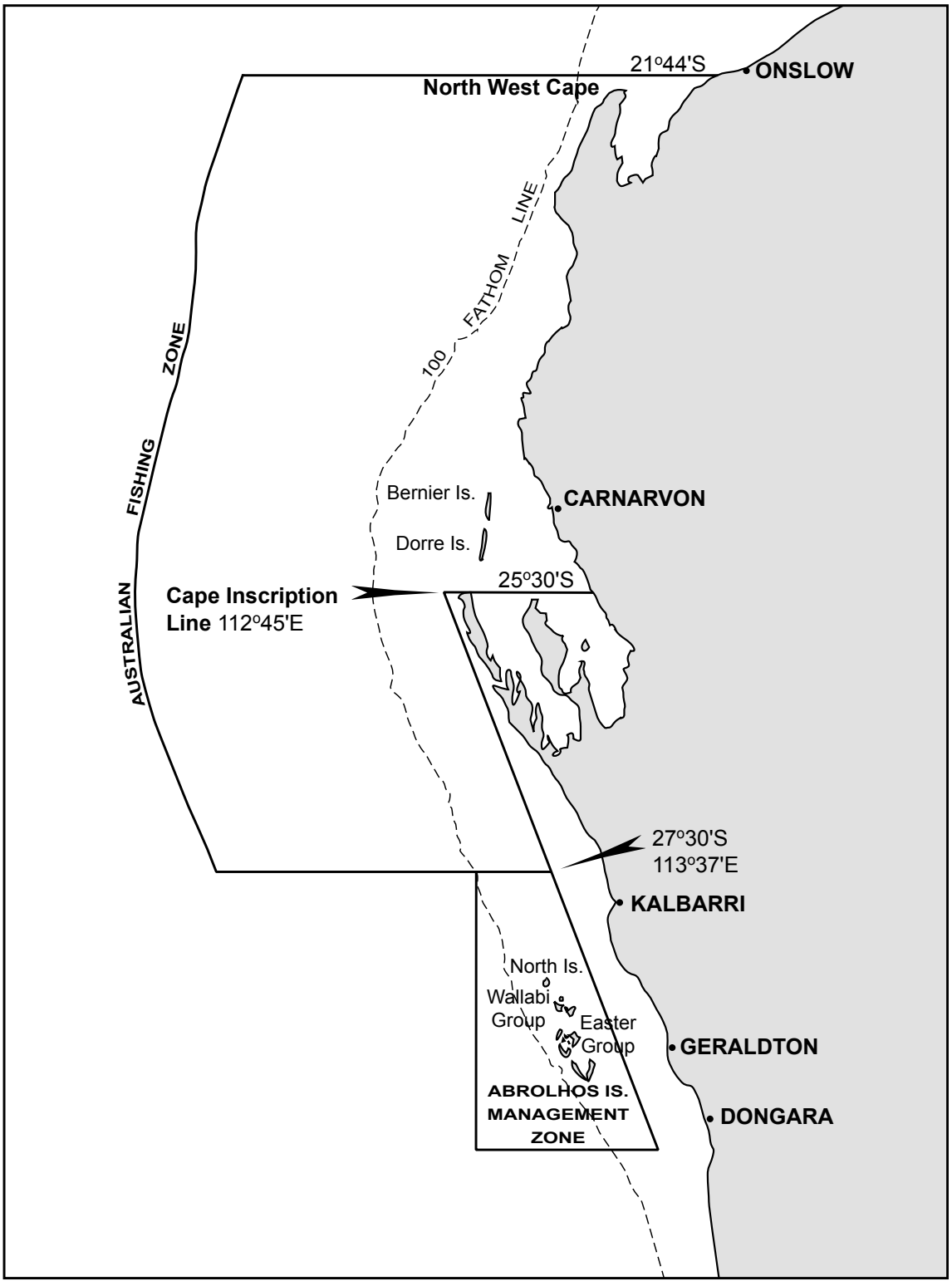

Figure 1c. Big Bank fishing area (adapted from Chubb et al. 1994).

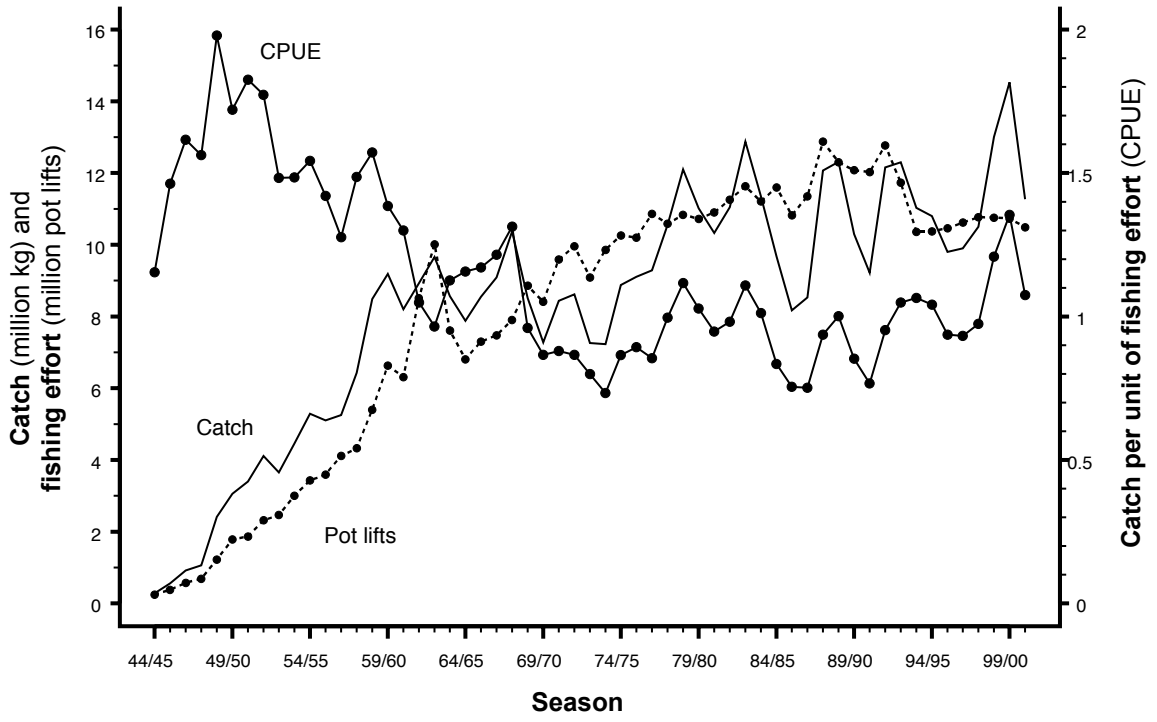

Figure 2. Rock lobster catch (kg), fishing effort (pot lifts) and catch per unit of fishing effort (kg/pot lift) data.

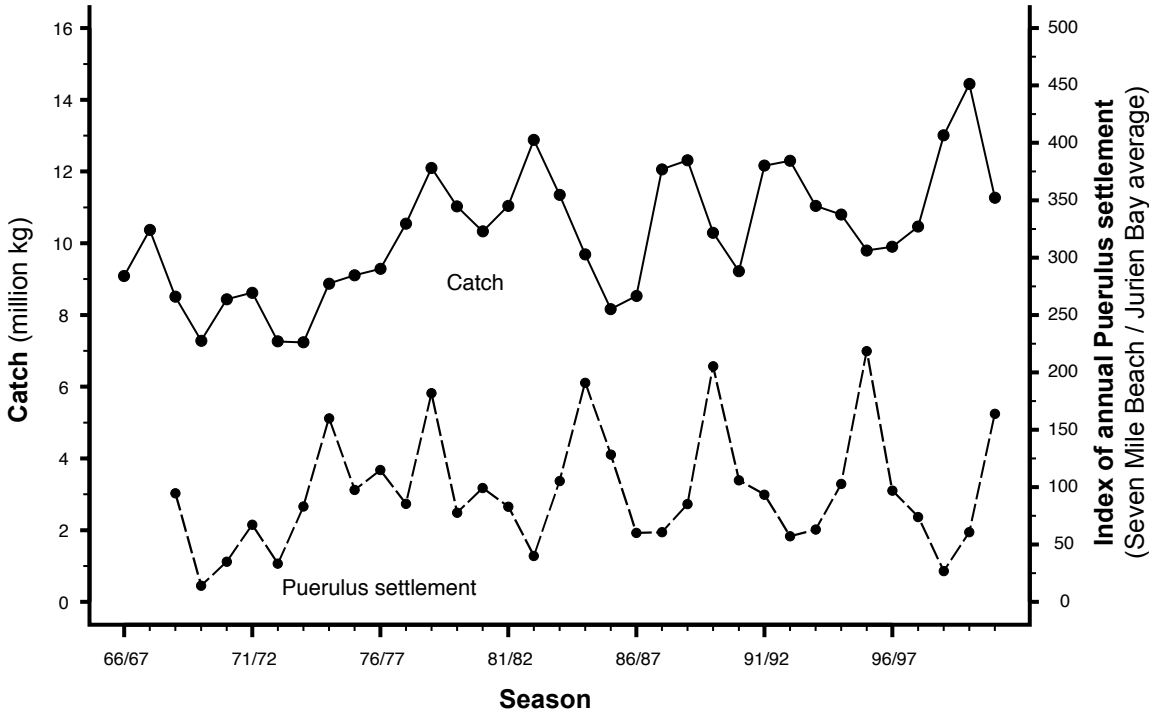

Figure 3. Rock lobster catch and index of annual puerulus settlement (puerulus take three to four years to grow to legal size).

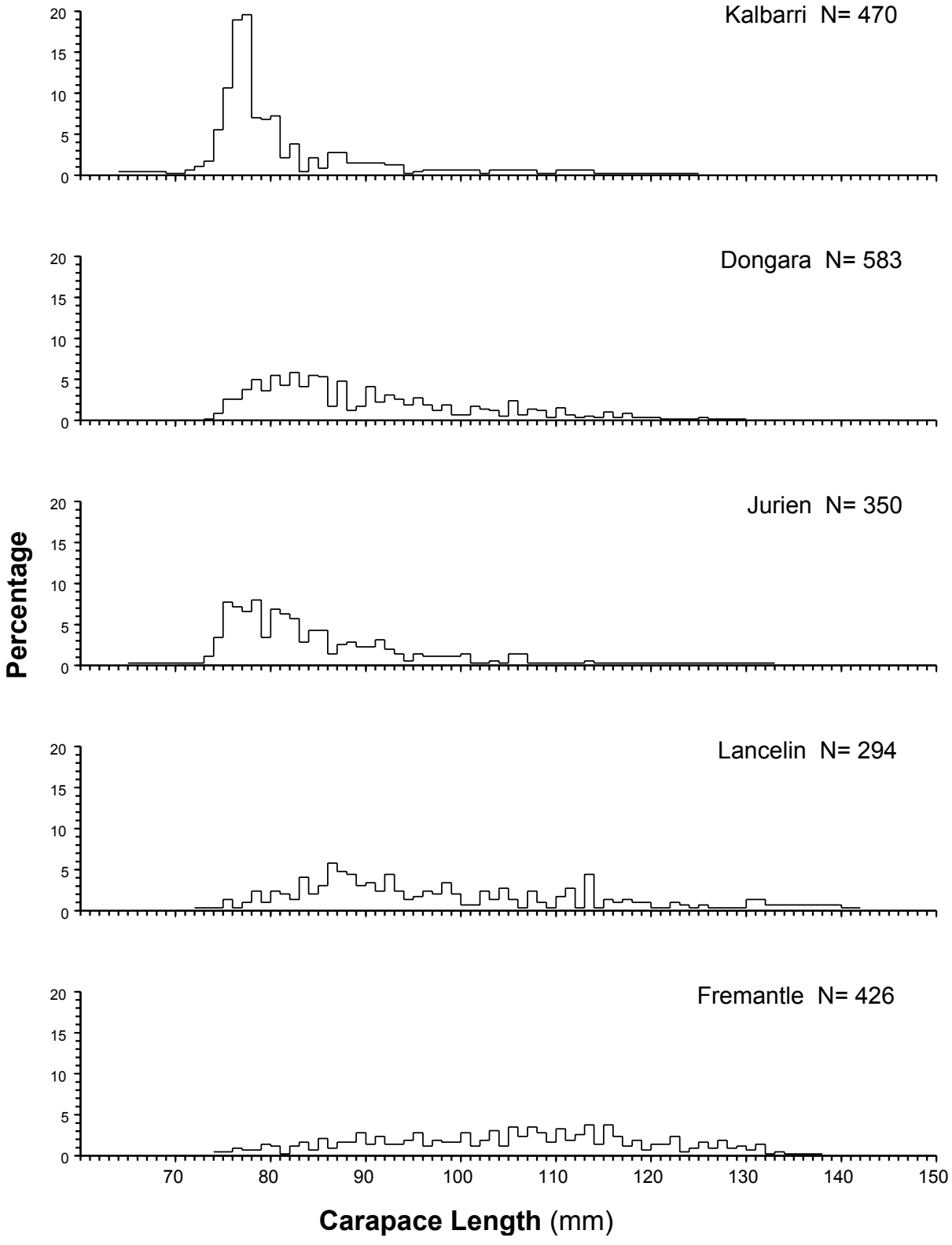

Figure 4a. Length frequency of breeding female rock lobsters (berried and/or mated) taken from December 1999 to February 2000.

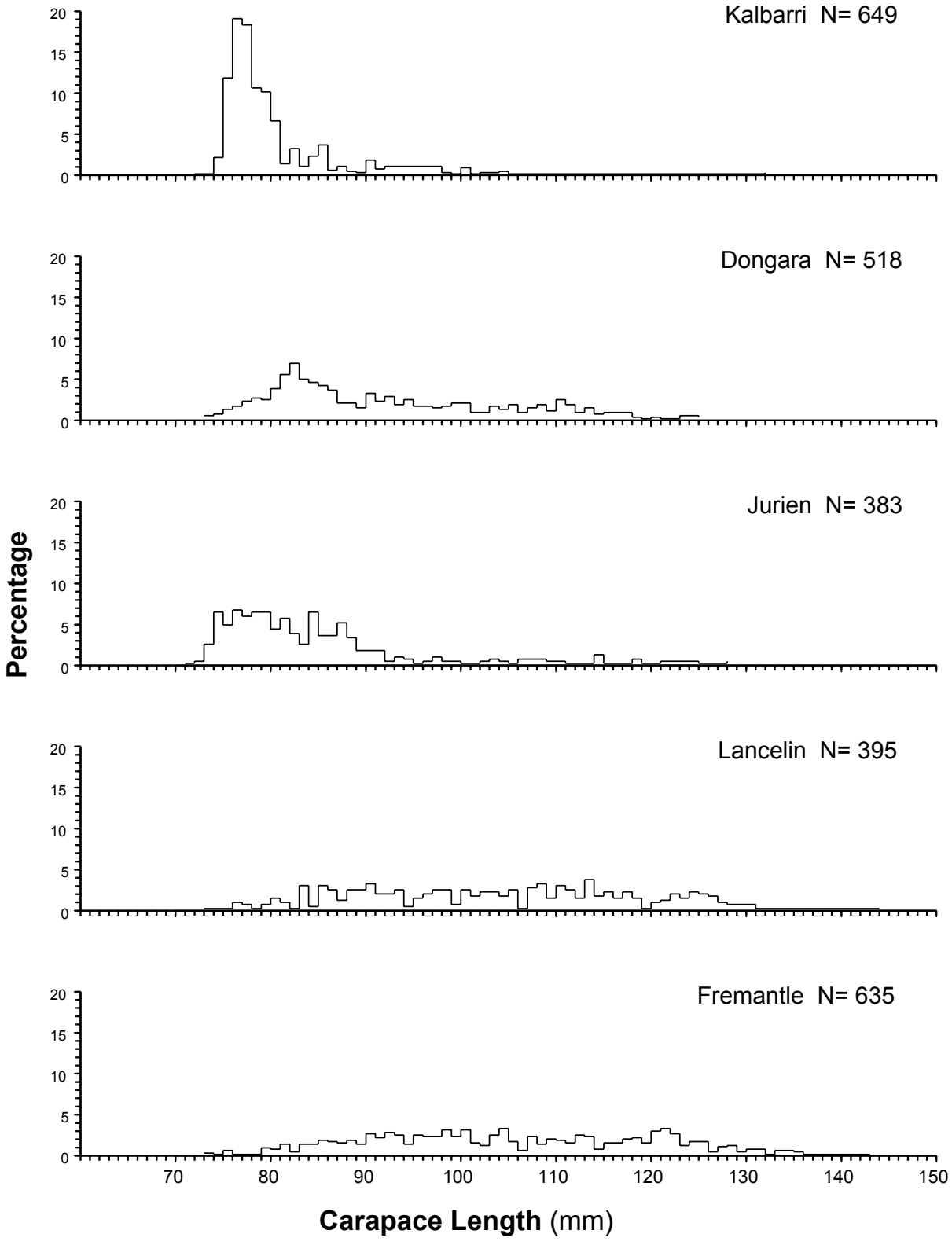

Figure 4b. Length frequency of breeding female rock lobsters (berried and/or mated) taken from December 2000 to February 2001.

9.0 Appendices

FACTS SHEET

"LICENCE CREATION" AND "RETIREMENT" INITIATIVE FOR THE WEST COAST ROCK LOBSTER FISHERY MANAGEMENT PLAN

FISHERIES
WESTERN AUSTRALIA

Prerequisites for "Licence Creation"

Applicants for a new Managed Fishery Licence (MFL) will need to apply for an MFL, nominating the zone required. They will also have to supply the following:

- Valid applications to transfer at least the minimum number of pots on to the new MFL. (These pots should be exclusively from one zone in the fishery and that zone must also be the zone nominated in their MFL application).
- Evidence that they hold, in the applicant's name, a valid Fishing Boat Licence (FBL) to which the MFL will be associated, **or** a valid application to transfer an FBL into the applicant's name. (Note: Only one West Coast Rock Lobster MFL can be associated with any one FBL).
- Full application fees for all applications.

New Managed Fishery Licences (MFLs)

Before a new MFL is issued, licensing officers will:

- Seek a report from Regional Services Prosecution Section confirming that:

a) the applicant is considered "fit and proper" to hold a West Coast Rock Lobster MFL, **or**

b) the application is not likely to be deliberately or incidentally associated with confounding existing or proposed prosecution action by Fisheries WA, **or**

c) the application is not likely to be deliberately or incidentally associated with avoiding or reducing the impact of the "black marks provisions" of *Section 224* of the *Fish Resources Management Act 1994*.

- Ensure all related fees have been paid.
- Ensure the applicant has supplied the appropriate application forms to transfer 63 or more pots exclusively from one zone of the fishery on to the licence.
- Ensure the Executive Director of Fisheries WA, or an officer delegated with authority by the ED, has approved the application and the issue of the new MFL.
- Ensure, as relevant, all those who have registered an interest on the Agency's licensing system are advised of proposed transfers.
- Complete all transfers and variations associated with an MFL application.

DISCLAIMER:
This leaflet is for guidance only. Copies of the relevant legislation can be obtained from Fisheries WA offices or from the Fisheries WA web site: http://www.wa.gov.au/westfish

Fish for the future

FACTS SHEET (cont'd)

Prerequisites for "Licence Retirement"

To sit on an inactive FBL and MFL package with one or more pot entitlements, fishers will need to submit:

- A valid transfer application that will reduce their pot entitlement to less than 63 but not less than 1. (Note: Applicants need to be aware that the impact of reducing the total pot entitlement on an MFL to less than 63 is that the associated FBL will become "of no effect" and cannot be used for fishing.)
- Evidence that two or more FBLs are held if applicants intend using their rock lobster boat in another fishery, **or** valid applications to vary licences so there will be both a valid FBL pending against the West Coast Rock Lobster MFL and a valid FBL to use the rock lobster boat in another fishery (including wet-lining).
- Valid applications to transfer pots
- Full fees for all the above applications.

For more information contact:
Ross Gould, Fisheries WA,
3rd Floor SGIO Atrium,
168-170 St George's Terrace, Perth, WA, 6000.
Ph: 9482 7333 Fax: 9482 7389
Web site: *http://www.wa.gov.au/westfish*

Application to "Retire" an MFL

Before approval is given to allow the pot entitlement to be reduced below 63 and the associated FBL and MFL to become inactive, licensing officers will:

- Seek a report from Regional Services Prosecution Section confirming that:
  a) The applicant is considered "fit and proper" to hold a West Coast Rock Lobster MFL, **or**
  b) the application is not likely to be deliberately or incidentally associated with confounding existing or proposed prosecution action by Fisheries WA, **or**
  c) the application is not likely to be deliberately or incidentally associated with avoiding or reducing the impact of the "black marks provisions" or *Section 224* of the *Fish Resources Management Act 1994*.
- Ensure all related fees have been paid.
- Ensure the Executive Director of Fisheries WA, or an officer delegated by the ED, has approved the application and the issue of the new MFL.
- Ensure all those who have registered an interest on the Agency's licensing system are advised of both proposed transfers and applications to make the associated FBL and MFL inactive.
- Complete all transfers and variations associated with MFL application.
- Check that the letter of approval emphasises that initial and ongoing approval is subject to the completion of monthly "nil" catch returns against the MFL, and that an inactive or pending FBL is held against the MFL.
- Undertake any other action they consider necessary for the purposes of meeting the objects of the *Fish Resources Management Act 1994*.

8 September 2000

Fish for the future

Bulletin No 19 16 December 1999

FISHERIES WESTERN AUSTRALIA

Commercial Fisheries Production Bulletin

WESTERN ROCK LOBSTER FISHERY

1998/99 & 1999/2000 SEASONS

THE COASTAL FISHERY 1998/99

The 596 commercial vessels licensed to operate in the western rock lobster fishery caught a total of 13,000 tonnes of lobster (preliminary total from processors returns) from 15 November 1998 to 30 June 1999. This is approximately 25% higher than the 10,373 tonnes caught the previous season and 20% greater than the past 10 year average of 10,823 tonnes (Table 1).

While the whites catches commenced slowly, they soon improved and good catches were landed throughout the fishery. Towards the end of January, deep-water fishing had ended with only a few boats remaining offshore. All along the coast most of the fleet had returned to the mid-water and inshore grounds. In some areas, such as Kalbarri, many fishermen had brought their gear ashore in mid-January, preferring to wait for the February 1 change in the size limit and anticipated better catches. Catches throughout the fishery were generally poor in late January and early February. This period is the time for a major moult in the western rock lobster population. By the end of January catches for the whites period were just over 5% better than the average over the previous 10 years, but compared to the whites catch the previous season, catches were 38.8% up at Fremantle, 21.2% up at Jurien, 10.8% up at Geraldton and overall up 24.1%. These increases were in line with the forecasts for the whites (see Predictions below).

In early February most vessels were inshore but with the first flush of newly moulted lobsters in mid-February catches improved. By early March a number of boats had moved into the middle grounds while landings continued to increase. During this time it was reported that catches in C zone were good from Lancelin south and poorer to the north. As a result, the mid-coastal fleet moved south and led to large numbers of vessels operating from Two Rocks, Mindarie and Hillarys. As the landings improved, after about the first week of March, vessels again became re-distributed throughout the fishery and throughout all depths except very deep water.

Catches through March and April were consistently very good with large numbers of lobsters being caught all along the coast. In late April very calm sea conditions combined with the presence of the full moon to lower lobster catchability and reduce catches. May and June saw good catches in mostly inshore waters along the coast with the exception of the central area (Cervantes/Jurien) and Kalbarri where landings were poor. As a result some boats moved south again to the Two Rocks to Hillarys region to take advantage of the consistently good catches from Seabird south.

In summary A and C zones had record catches of 1970t and 6870t respectively (previous highest A zone 1900t in 1995/96 and C zone 6670t in 1982/83). While B zone did not reach the highest catch of 4450t landed in 1987/88, the catch of 4160t was nevertheless the 5th highest ever landed. A, B and C zone catches were respectively 14%, 6% and 33% higher than the average landings over the previous 10 years (Figure 1).

Table 1. ***Preliminary rock lobster production figures.***

Production (t) to end of June 1999

Fremantle	Jurien	Geraldton	Total
5122	1762	6118	13002

Production (t) to end of June 1998

Fremantle	Jurien	Geraldton	Total
3586	1362	5425	10373

Difference (t) and percentage difference

Fremantle	Jurien	Geraldton	Total
+1536	+400	+693	+2629
42.8% up	29.4% up	12.8% up	25.4% up

10 yr. cumulative average to end of June 1998	***= 10823 t***
Production to end of June 1999	***= 13002 t***
Difference	***= 2179 t***
% Difference	***=20.1% up***

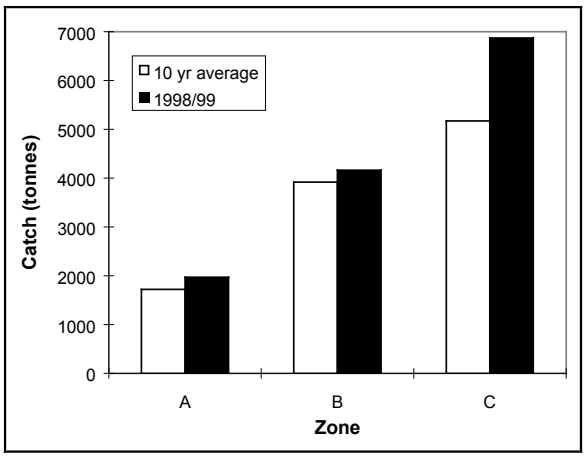

Figure 1. ***Catches by zone in 1998/99 compared to the average over the previous ten years (preliminary data).***

This Bulletin is produced by the Research Division of Fisheries Western Australia

Over the season, industry reported large numbers of setose rock lobsters throughout the fishery but particularly in the Safety Bay/Mandurah area. Of interest were the numbers of setose female lobsters seen in the inshore areas. These observations clearly show the impact of the current management package in rebuilding the breeding stock. Also reported late in the season were large numbers of under-sized lobsters which obviously augured well for season 1999/2000.

THE 1998/99 ABROLHOS ISLANDS SEASON

A preliminary catch of 1,970 tonnes from the Abrolhos Islands in season 1998/99 was a record and approximately 10% higher than the previous season's catch of 1790t.

This Islands' season was exceptional with generally good catches throughout the season until the early part of May when catches began to decline, probably in part a result of the calm sea conditions experienced then.

Deep water fishing at the Islands was good in patches. For example, good catches were taken by a number of vessels over a two week period on the eastern side of Southern Group and in late April-early May a few large boats achieved good catches between 55 and 75 fathoms north of North Island. However, such catches were not widespread or a general feature of deeper water in the Abrolhos zone. Nevertheless, fishermen reported good numbers of oversize females and catches from areas previously regarded as non-productive.

The effect of the strong Leeuwin Current was seen as sea surface temperatures and tides remained higher than normal throughout the season. The higher temperatures probably maintained a higher catchability of the lobsters, which no doubt would have contributed to the record catch reported from the Abrolhos in 1998/99.

THE COASTAL FISHERY 1999/2000

The 1999/2000 season commenced slowly with catches restricted to reds in shallow water throughout November. Many skippers pulled their gear intermittently at this time. Kalbarri had some good catches of reds right at the season's beginning, but the boats soon moved south. Cold southerly winds, low water temperatures, a full moon on the 23rd November and calm, clear water over the full moon apparently caused the whites catches to be delayed slightly. By late November the first whites were being caught and in the first two weeks in December reasonably steady catches of between 200 and 350kg for a one day pull were fairly common throughout the fishery. The fleet at this time was scattered from the nearshore grounds out to 10-12 fathoms. While catches from Lancelin south in C zone have been good whereas they have been poor to date in the northern part of C zone. In B zone catches increased in the first week of December. By mid-December the whites season was fully underway all along the coast with the fleet still scattered out to about 20 fathoms. Good catches were still being landed from the nearshore grounds. Fishers have commented on the "huge numbers" of under-sized whites in the shallows.

Preliminary estimates of the landings to the end of November indicate about 270 tonnes were caught fishery wide. This is about 40% below the catch of about 440 tonnes for November 1998.

PUERULUS SETTLEMENT

1998/99

Puerulus settlement in the 1998/99 declined to below average levels at all locations in the western rock lobster fishery (Figures 2 & 3). While the Leeuwin Current ran strongly at the time, the puerulus settlement failed to meet expectations, perhaps due to the later change over from El Nino to La Nina conditions. It is hypothesised that this timing might be important in terms of larval survival and/or transport back to the coast prior to their metamorphosis into pueruli. This has yet to be investigated.

1999/2000

Settlement for 1999/2000 is well underway and to the end of November 1999, numbers settling in the northern locations are below average while those from Jurien south are experiencing above average settlement except Cape Mentelle where settlement is about average (Figure 4). The percentages in Figure 3 indicate the proportion of settlement that occurs on average to the end of November. So in the Abrolhos, for example, the current settlement index is below 20 pueruli per collector with 50% of puerulus having settled. At Alkimos the settlement is three times the average with 13% (on average) of settlement still to occur.

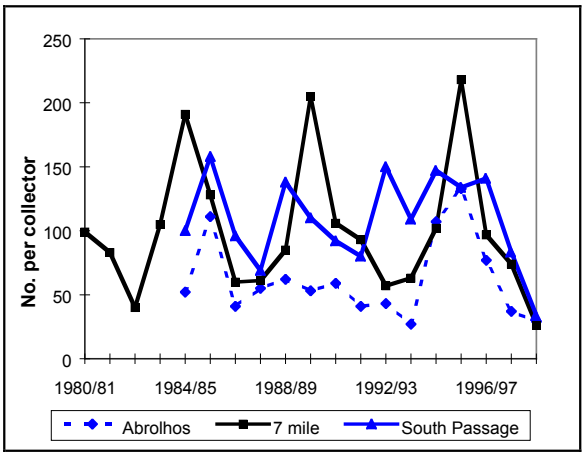

Figure 2. ***The annual time series of puerulus settlement for the Abrolhos (Easter Group), Seven Mile Beach (Dongara) and South Passage (Shark Bay) since 1980/81.***

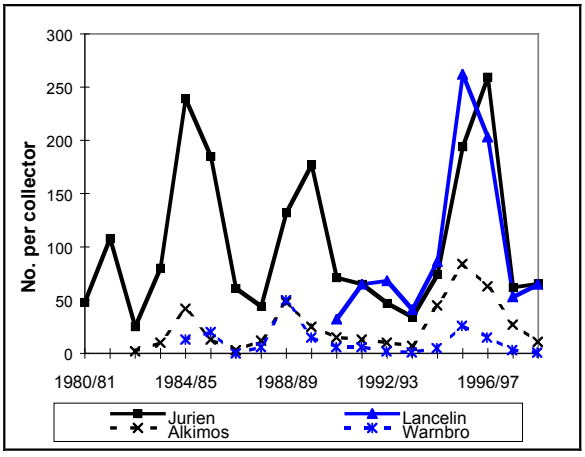

Figure 3. ***The annual time series of puerulus settlement for Jurien, Lancelin, Alkimos (north of Perth and Warnbro Sound (south of Fremantle) since 1980/81.***

Interestingly, while puerulus settlement has improved this season, particularly in C zone, the trend of relatively poorer numbers of pueruli in the northern locations compared to the numbers settling in C zone has persisted for the second year in succession (compare the averages in Figure 4). It is true that river flow from the Irwin River deposited silt on the collectors perhaps for a time impacting puerulus settlement. What is not clear is whether the settlement on the Seven Mile Beach collectors truly reflects settlement on the reefs at these times.

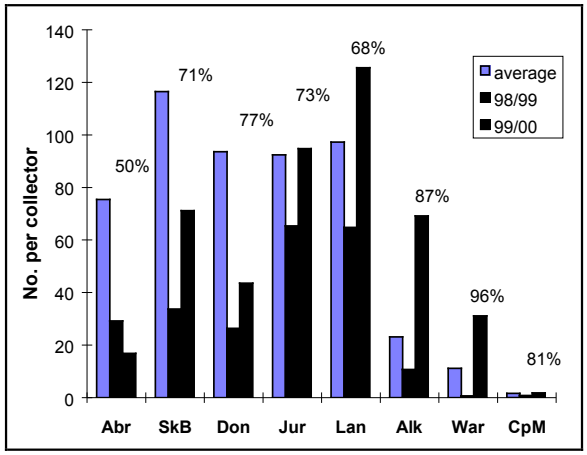

Figure 4. ***Puerulus settlement from May to November in 1999/2000 compared to the annual figures for both 1998/99 and the long term average for the Abrolhos (Abr), Shark Bay (SkB), Dongara (Don), Jurien (Jur), Lancelin (Lan), Alkimos (Alk), Warnbro Sound (War) and Cape Mentelle (CpM) near Margaret River. The percentages indicate the long-term average proportion of settlement that occurs to the end of November (see text for further information).***

Nevertheless, two pieces of evidence support the idea that the settlement probably does reflect the numbers settling on the inshore reefs. Firstly, the puerulus data in this region are continuous since 1968 and many "wet" years have been experienced before, yet the predictions of catch from the puerulus at Seven Mile Beach have been remarkably accurate throughout the period where forecasts have been made. Secondly, the low level of pueruli settling is consistent throughout the northern sectors of the fishery possibly indicating a general low availability of pueruli to settle, in spite of a strong Leeuwin Current.

Some are suggesting that the very strong Leeuwin Current being experienced over the past year or two is actually transporting late stage phyllosoma (lobster larvae) and pueruli further south where large numbers are settling. Certainly this is consistent with the pattern of settlement but unable to be confirmed since no research is being conducted in the regions of the outer continental shelf where the current flows.

Moderately strong La Nina conditions, virtually identical to last year, persist in the Pacific (Klaus Wolter, Colorado, USA, personal communication) with model predictions suggesting little change for the next few months. This should auger well for future puerulus settlement.

PREDICTIONS

Forecasts for A, B and C zones are based on settlement of puerulus at sites in those zones three and four years previous. Because of the vagaries of the environment and their effects on catchability and the uncertainty inherent in the estimation procedure, forecasts have always been a little less precise for shorter periods in the fishery, such as the whites and reds, than for the whole fishery. Nonetheless, the forecasts have a proven track record and are valued highly by industry and managers.

The catch predictions for C zone, in the past, have been based on settlement at the Alkimos site alone. Now a suitable time series of data are available from other sites established in the mid 1980s in C zone, comparisons are being made between predictions based on Alkimos and forecasts based on a combination of C zone puerulus settlement sites. This will identify which index provides the most accurate catch estimate. The predictions from the two indices seem to vary only if the Alkimos settlement is out of phase relative to the other C zones sites. An example would be average settlement at all C zone sites except Alkimos which had very good settlement. In this case, using Alkimos alone might overestimate the catch that could be expected from C zone.

Comparison of 1998/99 predictions and actual catches

In the comparison of the 1998/99 whites and reds catches with the forecasts (Table 2), we have included predictions for C zone from both the Alkimos alone and from all sites combined. The total catch for 1998/99 was 13,000t compared to the forecast of 14,250t (using C zone Alkimos prediction) or 13,200t (from combined C zone puerulus settlement).

Table 2. ***Predicted and preliminary actual whites and reds catches for the 1998/99 season * based upon Alkimos settlement; ** based upon settlement from a combination of C zone sites.***

Whites	B zone	C zone
Predicted	1900t	3900t *
		3300t**
Actual	1740t	2900t

Reds	A zone	B zone	C zone
Predicted	1950t	2650t	3750t *
			3400t**
Actual	1970t	2430t	3970t

Predictions for 1999/2000

Season 1999/2000 is forecast to eclipse last season's all time record catch. A total catch of around 14,000t is expected with the increase predominantly to be landed from C zone. The Abrolhos, B zone and C zone catches are predicted to be 1,900t, 4250t and around 8,000t respectively.

The B zone whites catch should be around 2,000t a slight increase on the 1998/99 actual whites catch, while the reds are expected to decline slightly to about 2,250t. In C zone, the forecast is for a very large whites catch of about 4,400t followed by an equally large reds catch of 3,450 to 3,800t. The reds catch being anticipated as being slightly below that which was actually landed last season.

As a result of declining levels of puerulus settlement, the following seasons will see reductions in forecast catches to 11,000-12,000t in 2000/01 and 9,500-10,500t in 2001/02. The outlook for season 2002/03, based upon the settlement for 1998/99 and 1999/2000, is for a poor whites for B and C zones, a poor reds for the northern sectors of the fishery and a reasonably good reds for C zone.

WRLDA MARKETING NEWS*

General

With the slow start to the 1999/2000 season and some estimates of receivals into processing plants down by 50% for November, processors are faced with the awkward position of not being able to fill early good orders on time. This situation could result in some cancellations of orders.

The predicted extra 1.000 tonnes of catch will ensure that all processors/marketers will be kept very much on their toes!!!

Japan

Due to a combination of the low commencing prices paid for our lobsters last season and the steady overall improvement in the Japanese economy during the season, Japanese importers enjoyed a profitable year and consequently found themselves trading strongly in the market. This combined with lower production from other lobster producing suppliers, low stocks in cold stores in Japan and a favourable Yen/US$ rate have all contributed to well priced orders being received for this season's western rock lobster.

Providing we do not seek to increase prices to the extent that our lobsters become too expensive and are removed from menus in Japan, we should see steadily increasing prices received for our product. The note of caution is that whilst the Japanese economy is certainly recovering, banks are still taking a "hard-nosed" approach on lines of credit to the small to medium sized companies. Nevertheless, the overall situation in Japan is encouraging.

Taiwan

The severe earthquake in central Taiwan in September was devastating and brought considerable hardship for many people. As one might expect, it also had the effect of slowing sales of luxury items such as lobster, however, overall consumption in Taiwan now is on the rise again.

Initial sales have been good, however, again the slow start to season 1999/2000 may have some minor impact on orders. It is anticipated that the strong demand for western rock lobster will continue through until Chinese New Year on 5th February. After this event, it is possible we may see some downturn in demand due to the anticipated volume of sales into the country. However, in general the outlook is optimistic.

United States

Concern recently has been expressed that escalating asking prices in the US tail market have been pushed too high resulting in buyer resistance. A classic supply and demand situation prevails in this market where low volumes are sold at high prices and vice versa. With the forecast added production we will see an increase in the output of tails and the US tail market will be extremely fragile when large quantities of western rock lobster are pushed into it.

European Union/Domestic Sales

While there is fairly strong demand for the Christmas/Millennium celebrations, processors are finding it difficult to meet all orders due to the slow start. There simply has not been enough product caught to satisfy all buyers, noting, of course, that some of these buyers only enter the market for short periods of each season.

The favourable exchange rate currently being experienced is certainly a 'bonus'!

VOLUNTARY RESEARCH LOG-BOOK PROGRAMME

The 1999/2000 season is predicted to be the highest catch in the history of the "world's largest rock lobster fishery" and we, fishers and researchers, need to document fully the catch through the voluntary log-book programme. The participation rate in the programme during the 1998/99 season was 37.5%, slightly lower than the previous season's record of 38.5%, but still a fantastic response by industry.

We express our sincere thanks to all those skippers, deckies and wives/partners who have contributed to the knowledge base of your fishery through the log-book programme. We sincerely appreciate your contributions as part of the research team and look forward to your continued association with the log-book programme.

However, it is anticipated that, for whatever reason, some fishers will cease to provide log-book records to the Rock Lobster Research team during 1999/2000. Given we wish to maintain the participation rate at the current high level, we would like to request that if you want to become part of the research team by filling in a research log book, then please contact Eric Barker at the Western Australian Marine Research Laboratories on (08) 9246 8444.

The Rock Lobster Research Team would like to thank all who offered assistance and guidance in 1999 and wishes everybody a very Merry Christmas and a very exciting and prosperous year 2000.

L to R: Dr Chris Chubb and Eric Barker with the field staff of Tony Paust, David Murphy, James Murray, Jason Mant and Jim Christianopoulos (Zorba). (Absent: Dr Roy Melville-Smith and Sonia Anderton).

* This information was provided by the Western Rock Lobster Development Association (Inc.),
Suite 6, 41 Walters Drive, Osborne Park WA 6017. Chairman Mr Tony Gibson ph: (08) 9244 2933 fax: (08) 9244 2934.

Except where acknowledged, the information in this bulletin has been supplied by the FISHERIES RESEARCH DIVISION of FISHERIES W.A. Contact Dr Chris Chubb or Mr Eric Barker ph: (08) 9246 8444 fax: (08) 9447 3062.

Bulletin No 20 3 April 2000

FISHERIES
WESTERN AUSTRALIA

Commercial Fisheries Production Bulletin

WESTERN ROCK LOBSTER FISHERY

1999/2000 SEASON

THE COASTAL FISHERY 1999/2000

The 595 commercial vessels licensed to operate in the western rock lobster fishery caught a total of 7,089 tonnes of lobster (latest available total from processors returns) from 15 November 1999 to 29 February 2000. This is approximately 22% higher than the 5,811 tonnes caught over the same period the previous season and almost 33% greater than the past 10 year average (Nov-Feb) of 5,347 tonnes (Table 1).

Table 1. ***Preliminary rock lobster production figures.***

Production (t) to end of February 2000

Fremantle	Jurien	Geraldton	Total
3311	1155	2623	7089

Production (t) to end of February 1999

Fremantle	Jurien	Geraldton	Total
2702	856	2253	5811

Difference (t) and percentage difference

Fremantle	Jurien	Geraldton	Total
+609	+299	+370	+1278
22.5% up	34.9% up	16.4% up	22.0% up

10 yr. cumulative average to end of February 1999	***= 5347 t***
Production to end of February 2000	***= 7089 t***
Difference	***= 1742 t***
% Difference	***=32.6% up***

Following a very slow start to the 1999/2000 season, the "whites" fishery was well under way the entire length of the coast by the middle of December. However, it was an unusual "whites" season with the bulk of the very good catch being taken from the shallow and mid-water grounds and a slow movement of vessels to deep water. Although a few boats caught very well in deep water, many vessels moved backwards and forwards between the deep and mid water grounds. In essence the deep water "whites" was patchy but with some very good catches. As one fisher succinctly put it, "It was too good inside to leave to go to deep water!". Following the "whites", catches picked up again in February and the first half of March, assisted by some good swells.

Overall, large numbers of setose and under-size lobsters were seen and high sea surface temperatures together with a very strong Leeuwin Current were reported. The maintenance of the high beach prices and the very good catches have produced excellent returns to the fishers.

In B Zone while a very good catch of 2,000 tonnes (forecast 2,000 tonnes) was taken in the "whites" (Nov-Jan), the area from north of Geraldton to Kalbarri and south around Leeman did not fare particularly well. In February, Kalbarri south yielded average catches which further picked up in March. Leeman catches remained relatively low. The area from Geraldton south was very good with the highlight being Dongara where exceptional catches were landed from depths of up to about 50 fathoms. As catches declined in January, much of the fleet tied up and removed their pots from the water. A few larger boats, awaiting the Big Bank opening, remained fishing in deep water but had mixed catches. Catches began to improve again in February and in the first half of March. Excellent catches were taken from the mid and shallow grounds particularly in Geraldton, Dongara and south to, but not including, Leeman.

In C Zone, the "whites" catch (Nov-Jan) was about 3,700 tonnes (forecast 4,400 tonnes). During the early part of the "whites" the area north of Wedge Island to Cervantes did not fare well, whereas from Lancelin South the catches were very good, with excellent catches taken in the Safety Bay/Mandurah area. The fleet remained essentially in shallower waters so that by the end of December the fleet had not moved deeper than about 30 fathoms anywhere along the coast. As in B Zone the deep water catches in C Zone were, for the most part, not spectacular, and therefore many vessels fished the shallows and mid-water grounds. The catches from Safety Bay to Mandurah at this time were excellent. January saw catches declining and the few boats left in deep water move to multiple day pulls with the some good catches. Mid January also saw the arrival in Two Rocks of the mid-coastal fleet that moves there for a short period each season. During February a few vessels ventured south to explore the southern region of C Zone from Hamelin Bay to Bunkers Bay. Catches again picked up in February and the first half of March with very good catches throughout C zone in predominantly the mid water grounds.

THE ABROLHOS ISLANDS SEASON

Preliminary processors production figures (second week of Islands season) indicate that the Abrolhos catch was approximately 10% down on the same time last season.

The lower catches so far this season probably can be attributed to continuous swells since the start of the season thereby preventing extensive reef fishing, and also a full moon on March 20.

This Bulletin is produced by the Research Division of Fisheries Western Australia

Reports to date indicate that there have been some short-lived deep water catches, however, some excellent catches have been taken by a few large boats in deep water north of North Island.

THE BIG BANK SEASON

The 1999/2000 Big Bank season was one of anticipated good catches given the prediction for the fishery as a whole. However, processors production figures indicate that 184 tonnes of rock lobsters were taken in the Big Bank region of the fishery during February 2000. This season's catch was 14% down on the previous season's 214 tonnes. A total of 90 vessels fished the region, an 8.4% increase over the 83 in 1999, which resulted in an average catch per boat of 2 tonnes, down 23% on 1999's 2.6 tonnes per boat (Fig. 1).

Much of the catch of migratory lobsters was taken adjacent to the northern Abrolhos Islands line in very deep water (80-110 fathoms), with scattered catches to the north to a maximum distance of approximately thirty nautical miles.

Following somewhat disappointing catches of migratory lobsters, most of the fleet moved onto the shallower bank area of the region and targeted resident lobsters.

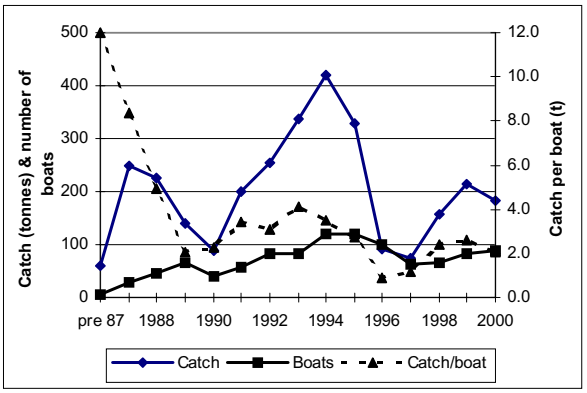

Figure 1. ***Historical Big Bank catches, numbers of vessels and average catch (tonnes) per boat.***

PUERULUS SETTLEMENT

The puerulus settlement season is taken as May to the following April inclusive. While the April collection still has to be undertaken, historically there has been very little, if any, settlement occurring at that time. Thus the values shown below (Fig. 2) for May 1999 to March 2000 are preliminary estimates of the annual settlement for this season.

Settlement in the north is a little below the long term average but much better than in 1998/99. Rock Lobster Research is looking at the possible effects of river flow and siltation from the Irwin River affecting puerulus numbers at Dongara, however, the lower than average settlement is a consistent feature throughout the northern regions (Fig. 2).

On the other hand, and in contrast to last season's below average totals, the numbers of pueruli settling in C zone have been exceptionally high. This rather large variation between north and south possibly may be attributed to the very strong Leeuwin Current that has been running along the WA coastline over the past 12 to18 months. One hypothesis is that many of the pueruli destined to settle in the north have been transported southwards by the current which has led to much greater numbers settling throughout C zone. Other factors may account for this unusual pattern of settlement.

Nevertheless, the implications of the 1998/99 and 1999/2000 settlements are for the north an expectation of a below average "whites" and reds for season 2002/03 and a below average "whites" for 2003/04; whereas for the south, 2002/03 should see a below average "whites" followed by a good reds and a very good "whites" in 2003/04. The actual predictions will not be available until the puerulus settlement figures are finalised.

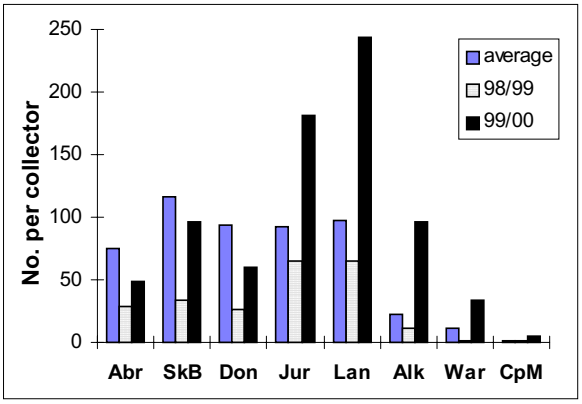

Figure 2. ***Puerulus settlement from May to March in 1999/2000 compared to the annual figures for both 1998/99 and the long term average for the Abrolhos (Abr), Shark Bay (SkB), Dongara (Don), Jurien (Jur), Lancelin (Lan), Alkimos (Alk), Warnbro Sound (War) and Cape Mentelle (CpM) near Margaret River.***

The forecasts from models predicting El Nino events are suggesting a continuation of the current La Nina with a weakening of these conditions towards the end of the year. This should mean the continued presence of the Leeuwin Current through winter and hence "good" puerulus settlement next year.

WRLDA MARKETING NEWS*

General

All parties involved in marketing have achieved a remarkable selling result by maintaining a constant raw material purchase price (beach price) since the start of the season. It is a reflection of a job well done noting production is up by 22% at the end of February. Clearly this result has been aided by the foreign exchange situation and a weaker Australian dollar (around the 61US cent mark), the level being contrary to most pre-season predictions by a factor of at least 10%. However the uncertainty of foreign exchange predictions will always be present in the global trading.

Japan

The Japanese market has been stronger this season compared with last year. The price structure this year, generated by a favourable exchange rate, appears to have encouraged importers/restaurants and hotels to have more lobster on their menus. Thus, the volume of sales has increased this year and prices, assisted by the weaker Australian dollar, have remained fairly firm.

Taiwan

The Taiwanese live market has been problematical with a fairly wide range of prices on offer., However, the demand for frozen lobster has been strong resulting in increased volumes of sales at relatively good prices, again assisted by the favourable exchange rate.

An element of uncertainty exists in the Taiwanese market due to the recent election of the ex-Mayor of Taipei as the President of the country with Taiwan nervously awaiting developments in its relationship with mainland China.

United States

Production sold to the United States as frozen tails is significantly higher than last year, although large volumes of sales have not been witnessed. This market continues to display some uncertainty in the knowledge that production in Western Australia will be higher than last season. Prices achieved so far have been reasonable, however, this can be attributed to the exchange rate, the variations in which continue to highlight the fragility of international commodity trading.

European Union

Sales into France have been sporadic, probably due to the opportunistic pattern of purchasing which has existed in that country for some time.

Recently, WRDLA members and other Western Australian rock lobster processors received accreditation from the Marine Stewardship Council to use their eco-label indicating sustainable management of the fishery. Since gaining this accreditation, interest from the United Kingdom in western rock lobster products has increased. In addition, interesting potential new buyers such as international cruise operators are emerging. Only time and effort will tell if worthwhile results can be realised from these new markets.

VOLUNTARY RESEARCH LOG-BOOK PROGRAMME

Currently, 32% of skippers/deckies have returned this season's research data to the laboratories at Waterman. So our sincere thanks goes to all those fishers from the rock lobster research team. Unfortunately, the participation rate this season is somewhat down on last season's 37.6%, which is of concern to us as we would like to maintain the higher rate which results in a more complete coverage of the fishery. However, it is still early days and hopefully the late return of log book information will boost the number of participants active in the research programme.

If you keep your own personal fishing records, for example, in an exercise book, etc, and are prepared to transfer those records into a research log book, please contact Eric Barker at the Laboratories on 9246 8444 and a log book will be sent to you promptly.

The western rock lobster fishery is a fantastic one and the most valuable contribution that fishers can make to the world's largest and best spiny lobster fishery is by way of accurately kept research records of catches and observations throughout the season via the log book programme. We invite your participation and look forward to your involvement as part of the research team. So please consider!

TAGGED ROCK LOBSTER RECAPTURES

Just a reminder to all fishers that Rock Lobster Research still encourages the return of information from any tagged lobster recaptured by fishers.

For all tagged lobsters caught, please provide the tag number, date, location (GPS latitude and longitude), depth, sex and accurate carapace length. ***Estimates of size should not be given, so please do not guess. Use a good pair of steel vernier calipers to measure the lobsters accurately.***

Remember also to include your name and boat details to ensure reward for this information. Recapture information labels are available from your local receival depot and Fisheries Office, or details can be called through directly to Rock Lobster Research on 9246 8481.

The research team sincerely thanks all those who participate in the return of recapture information. We really appreciate your commitment to your industry and urge you to continue to provide the data! The information helps to ensure that the best possible research advice is provided to the industry and fishery managers.

NEW RESEARCH INITIATIVE FLEET CATCH SAMPLING PROGRAMME

The Rock Lobster Research Unit's commercial-monitoring (catch-sampling) programme has been conducted on board commercial vessels since 1971/72; and many thanks to all those skippers who have graciously consented to have research personnel accompany them during fishing operations. The monitoring programme has provided data that have been used in the various stock assessments of the western rock lobster fishery.

The complex modelling now being undertaken by Research, in part, is reliant upon having representative length data from the fishery. However, the modelling has shown some inadequacies in the data; for example a lack of samples in the large sizes of lobsters. "Missing" data such as this tend to bias model results, although not alter the general conclusions. From the cost-recovery perspective, research programmes also need to be made more cost-effective where possible. Given, the successes in commercial monitoring by fishers themselves in New Zealand and South Australia, it was decided to conduct a pilot programme in the western rock lobster fishery.

A few commercial operators in each of the areas of Fremantle, Lancelin, Jurien, Dongara and the Abrolhos have consented to measure the lobsters from up to 10 pots (depending upon catch levels) each day of fishing from March to June 2000. Normal commercial monitoring by the research team will be conducted in these areas over the same period. The results from the pilot fleet catch sampling programme will enable comparisons between size-frequency distributions, the biological parameters and catch rates derived from both data sets. The relative cost effectiveness of both methods of data collection will be assessed following the statistical analyses of the biological data. The results of the pilot programme will be reported to industry in due course.

* This information was provided by the Western Rock Lobster Development Association (Inc.),
Suite 6, 41 Walters Drive, Osborne Park WA 6017. Chairman Mr Tony Gibson ph: (08) 9244 2933 fax: (08) 9244 2934.

Except where acknowledged, the information in this bulletin has been supplied by the FISHERIES RESEARCH DIVISION of FISHERIES W.A. Contact Dr Chris Chubb or Mr Eric Barker ph: (08) 9246 8444 fax: (08) 9447 3062.

Bulletin No 21 18 August 2000

FISHERIES WESTERN AUSTRALIA

Commercial Fisheries Production Bulletin

WESTERN ROCK LOBSTER FISHERY

1999/2000 SEASON

THE COASTAL FISHERY 1999/2000

Season 1999/2000 witnessed a second consecutive record commercial western rock lobster catch. A total of 14,448 tonnes (preliminary figure) were landed, eclipsing the 13,600 tonnes of *Panulirus argus* caught in Cuba in 1985, and now standing as the largest ever catch of a single species of rock lobster by any country in the world. Beach prices of between $25 and $28 per kilogramme on offer throughout the season resulted in approximately $380 million being paid to fishermen for their catches.

The 595 Western Australian commercial rock lobster vessels in 1999/2000 landed 1,448 tonnes more than the previous season (an increase of 11.1%) and a massive 3,556 tonnes (32.6%) more than the average catch of 10,892 tonnes over the past ten seasons (Table 1).

Table 1. ***Preliminary rock lobster production figures.***

Production (t) to end of June 2000

Fremantle	Jurien	Geraldton	Total
6068	2151	6229	14448

Production (t) to end of June 1999

Fremantle	Jurien	Geraldton	Total
5122	1762	6118	13002

Difference (t) and percentage difference

Fremantle	Jurien	Geraldton	Total
+946	+389	+111	+1446
18.5% up	22.1% up	1.8% up	11.1% up

10 yr. cumulative average to end of June 1999	***= 10892 t***
Production to end of June 2000	***= 14448 t***
Difference	***= 3556 t***
% Difference	***=32.6% up***

Table 2. ***Preliminary actual catches (tonnes) of "whites", "reds", Big Bank and Abrolhos Islands.***

Zone	"Whites"	"Reds"	Big Bank	Total
A		1736		1736
B	1999	2310	184	4493
C	3659	4560		8219
Totals	5658	8606	184	14448

As predicted, the increase in catch really was mainly due to C Zone landings which jumped 19.4%, on the 6,884 tonnes caught in 1998/99, to a record 8,200 tonnes. Catches north of 30° south latitude increased by only 1.8%. Even allowing for the decline in A Zone catches (see later), B Zone landings still only improved by 1.8%.

The C Zone record catch of 8,200 tonnes was considerably larger than the previous record of 6,900 tonnes in 1998/99, the 6,700 tonnes in 1982/83 and the 6,600 tonnes landed in 1978/79 and 1992/93. Fishers in the Mandurah and Bunbury areas had an exceptionally good season, with good catches maintained throughout 1999/2000 in all depths with the shallow grounds being particularly good. During April and May there was a movement of boats to Mandurah and Bunbury to capitalise on the high catches being experienced in those regions.

Zone C had an exceptionally good "reds", with the fleet scattered opportunistically from the shallows out to the mid-water grounds with some even deeper. Excellent catches were taken in all depths in March and April. During part of May and June, probably as a result of the very calm weather and sea conditions, catches declined generally throughout C Zone. The exception to this were the Mandurah and Bunbury regions where catches were maintained.

Following a good "whites", B Zone generally had an excellent "reds" with about 2,500 tonnes landed from the fleet scattered opportunistically from the shallows out to the mid-water grounds and slightly deeper but not in very deep water. Towards the end of March, catches started to decline and by mid-April had dropped even further. Coastal catches continued at this lower but relatively good level until June when catches declined further towards the end of the season. Good catches were taken in deep water during March and April north of the northern Abrolhos line in the region of Big Bank and elsewhere in the area. Again the long spell of very calm weather and seas during May and June probably affected the catch rates.

The Kalbarri region, with the exception of March, had poor catches all season, to the extent that many boats left the area and fished elsewhere for long periods. Kalbarri fishers were further inconvenienced when exceptionally heavy rains caused the Murchison River to flood during the third week of March, and a bar formed across the river mouth forcing the fleet to vacate the river and anchor at sea. Fortunately, the flooding appeared to have no impact on the catches.

This Bulletin is produced by the Research Division of Fisheries Western Australia

THE ABROLHOS ISLANDS SEASON

Preliminary processors production figures indicate that a total of 1,736 tonnes of rock lobsters where caught at the Abrolhos Islands during the past season. This was in contrast to the 1,990 tonnes landed the previous season, a decline of 12.5%. The figure of 1,736 tonnes matched the average Abrolhos catch over the past 10 years of 1,737 tonnes.

The very high catch of 1999 most likely was the direct result of high catchability of rock lobsters due to the very favourable environmental conditions, (eg. warm sea temperatures due to an exceptionally strong Leeuwin Current) and better deep water catches. Environmental conditions were favourable in 2000 as well but deep-water catches were patchy and short lived, although good catches were taken in deep water on the northern Abrolhos line at the commencement of the season. Thus, this season's catch of 1,736 tonnes should be viewed as more realistic and not seen as a serious decline on the previous season.

Toward the end of May and throughout June, a number of A Zone fishers ceased fishing and returned to the mainland. The catches of those that remained were poor.

PUERULUS SETTLEMENT

Numbers of pueruli settling on collectors during the 1999/2000 settlement period were below average in the north and well above average in the south (Figs 1&2). South Passage (Shark Bay) and Seven Mile Beach near Dongara recorded settlement that was respectively 11% and 42% below the average over the past 10 years. Recruitment to the Abrolhos Islands also was reduced by 19% compared with the past 10 year average. By contrast settlement in the southern region was extraordinarily good with record settlement at Alkimos where puerulus numbers were three times the average of the past 10 years. Jurien settlement was almost twice the average, and numbers at Lancelin and Cape Mentelle (near Margaret River) two and a half times and four times the average respectively. The effect of these levels of recruitment will be seen in the catches of 2002/03 and 2003/04 (see Catch Forecasts).

There was some suggestion that river flow from the Irwin River might have impacted puerulus settlement there, however, a study of the times and volumes of fresh water discharge from the river failed to show any correlation with puerulus numbers. In addition, although the collectors at Seven Mile Beach were surrounded by silty river run-off, the salinity at the collection site did not drop below 34.5 parts per thousand (ppt), very close to the average salinity for sea water of about 35 ppt. The settlement at Seven Mile Beach was consistent with that seen throughout the northern regions (Fig. 1). As mentioned in a previous Bulletin, one hypothesis is that many of the pueruli destined to settle in the north were transported southwards by the very strong Leeuwin Current which led to much greater numbers settling throughout C zone.

Indicators of El Niño/La Niña events in the Pacific have returned to normal levels and the US Climate Prediction Centre ENSO forecast is that near-normal conditions are expected in the tropical Pacific through early 2001. The recent relaxation of La Niña towards neutral conditions remains about as fast as has been recorded during typical transitions towards El Niño. Although a return of El Niño is not guaranteed, a resurrection of full-blown La Niña conditions within the next six months would be unprecedented in the Multivariate ENSO Index record since at least 1950 (NOAA-CIRES Climate Diagnostics Center, Colorado - *www.cdc.noaa.gov/index.shtml*).

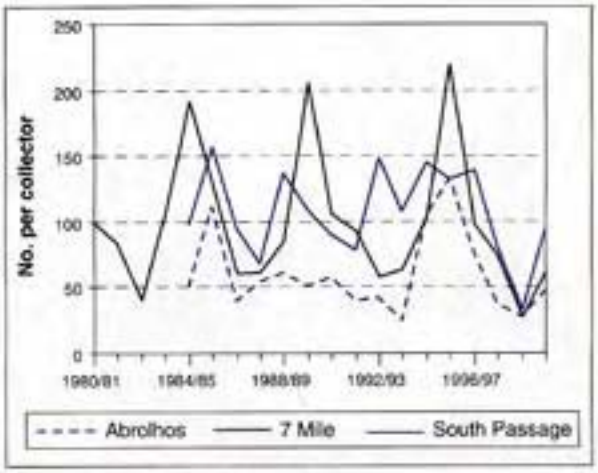

Figure 1. ***Time series of annual puerulus settlement indices for the northern sites of South Passage (Shark Bay), the Abrolhos Islands and Seven Mile Beach (near Dongara) from 1980/81 to the present.***

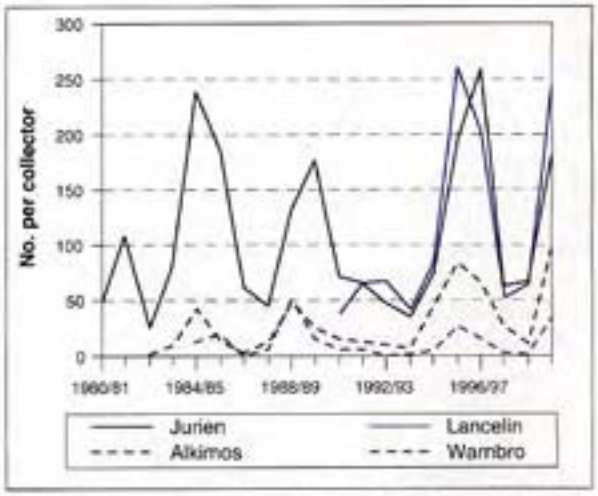

Figure 2. ***Time series of annual puerulus settlement indices for the southern sites of Jurien, Lancelin, Alkimos (near Mindarie) and Warnbro Sound from 1980/81 to the present.***

CATCH FORECASTS

The rock lobster catch predictions for next season indicate a return to an average to slightly above average catch, of between 11,000 to 12,000 tonnes, for the fishery as a whole (Table 3).

Table 3. ***Catch predictions (tonnes) for A, B and C Zones for 2000/01 based on puerulus settlement 3 and 4 years before. C Zone predictions are made using settlement at Alkimos alone (*) or a combination of C Zone puerulus settlement sites (**).***

Zone	"Whites"	"Reds"	Big Bank	Total
A		1850		1850
B	1650	1950	150	3700
C*	3350	3350		6700
C**	2950	2450		5400
Total*	5000	7150	150	12300
Total**	4600	6250	150	11000

While the Abrolhos catch is predicted to be within the range of the past two seasons (1,750-1,950 t) in 2000/01, B Zone can expect a decline of around 350 tonnes in both "whites" and "reds" compared to last season's actual catches of 2,000 and 2,310 tonnes respectively (Table 2, preliminary figures). C Zone is forecast to be around 500 tonnes below last season's "whites" catch of about 3,700 tonnes and 1,000 to 2,000 tonnes less than the 1998/99 "reds" catch of 4,560 tonnes (Table 2, preliminary figures). Nevertheless the expected total catch of between 5,750 and 6,700 tonnes will be amongst the highest recorded.

The prediction for 2001/02 is for a below average catch of 9,000 to 10,000 tonnes, followed by an average catch in 2002/03 (Table 4). The 1999/2000 puerulus settlement will contribute to the "reds" catch in 2002/03 and the whites catch in 2003/04. The below average settlement seen in northern sites is likely to produce poor "whites" catch in B Zone in 2003/04. In contrast the exceptional settlement in the south will lead to a very good "whites" catch in the same season.

Table 4. ***Forecast catches (tonnes) for A, B and C Zones (* Alkimos alone; ** combination of C Zone settlement sites) and Big Bank for seasons 2001/02 and 2002/03.***

Season	A Zone	B Zone	Big Bank	C Zone	Total
2001/02	1750	3100	100	5300*	10250
				4400**	9350
2002/03	1800	3100	100	5750*	10750
				6700**	11700

WRLDA MARKETING NEWS*

Rather than analyse each of the pack styles and the various markets, readers should be aware that the "Gods were smiling" during season 1999/2000 when we consider currency exchange rates. Much has been said about exchange rates, but the truth of the matter is that the value of the Australian dollar against foreign currencies, in particular the US dollar, determines the monetary success of our export oriented industry. Another factor, which assisted the industry, were relatively stable interest rates that allowed product to be held and marketed in a planned and orderly fashion.

Whilst not all of the catch has been sold, providing the Australian dollar is not significantly revalued and inventories are all sold at reasonable levels, it is possible that the Gross Export Value of the catch will be very close to $500 million which is a remarkable achievement. This export income makes a highly significant contribution to Australia's Balance of Payments.

Congratulations to anyone and everyone who played some part in this remarkable achievement, from the scientists, managers, administrators, fishers and their crews, to depot staff, truck drivers, processing staff and those involved in the marketing and sale of the finished product who were able to maintain extremely high prices throughout the season.

VOLUNTARY RESEARCH LOG-BOOK PROGRAMME

There is no doubt that the western rock lobster fishery is a fantastic one, achieving the status of the world's largest and best managed spiny lobster fishery through the collection of good data sets, good consultation with industry and industry collaboration with Fisheries WA's Research, Management and Regional Services teams.

The most valuable contribution to Rock Lobster Research that fishers can make is by way of accurately kept records of catches and observations throughout the season via the log book programme. In 1999/2000, skippers and deckies from 36% of the fleet (37.6% in 1998/99) returned confidential log book data to the Western Australian Marine Research Laboratories at Waterman. Our sincere thanks goes to all of those fishers from the Rock Lobster Research team. We're always looking for new participants so check out the back page and consider our invitation to become involved in the log book programme and become part of the research team.

NEW RESEARCH INITIATIVES GROWTH OF LARGE ROCK LOBSTERS

Over the years a number of lobsters have been tagged and recaptures made by Researchers and the commercial fleet alike. The information from these returns has enabled a study of growth and migration in the western rock lobster. These data, growth in particular, have been a vital component of the stock assessment models produced by Research Division. Unfortunately, a very large number of tag returns have been from small to medium sized rock lobsters with little information available for the bigger lobsters (eg. "jumbos") which has proved to be somewhat of a problem in the models. This has led the Rock Lobster Research Unit to undertake a biological tagging programme of the large lobsters during season 2000/01.

Commencing with the Breeding Stock Survey in October, the research team will be inserting biological tags (small pieces of tail fan tissue) in the tails of large rock lobsters and identifying them with a spaghetti tag inserted under the tail as per normal. However, a different coloured spaghetti tag (orange not the usual yellow one) will be used. The piece of tissue in the tail actually is encapsulated by a new layer of cuticle every time the lobster moults. On recapture, we can surgically remove the biological tag, section it and stain it to reveal how many times the lobster moulted between the time it was tagged and the time it was recaptured. Over a period of time it will be possible for the research team to piece together the moult frequency and growth increment per moult (how much it grows in length each time it moults) for the large lobsters. We can then adjust our growth curves in the models with the new data and eliminate another piece of the jig-saw puzzle. There will be an awareness campaign to keep industry informed of the research team's activities in this project.

TAGGED ROCK LOBSTER RECAPTURES

Just a reminder to all fishers that Rock Lobster Research still encourages the return of information from any tagged lobster recaptured by fishers.

For all tagged lobsters caught, please provide the tag number, date, location (GPS latitude and longitude), depth, sex and accurate carapace length. ***Estimates of size should not be given, so please do not guess. Use a good pair of steel vernier calipers to measure the lobsters accurately.***

Remember also to include your name and boat details to ensure reward for this information. Recapture information labels are available from your local receival depot and Fisheries Office, or details can be called through directly to Rock Lobster Research on 9246 8481.

Each season over 30 per cent of skippers in the rock lobster industry supply detailed records of their fishing activities and catches to the Fisheries Research Division.

This confidential information is used to help estimate the size of the rock lobster spawning stock, assist with catch predictions, and provide a clear picture of fishing and catches in the various zones of the fishery.

Ultimately, the information provided by fishermen in research log books helps guarantee the future of the industry.

IF YOU ARE NOT ALREADY INVOLVED IN THE PROGRAM, we cordially invite you to become part of the research team and contribute to the future of your fishery by filling in a research log book this coming season.

At regular intervals throughout the fishing season Commercial Fisheries Production Bulletins will be forwarded to you and at the completion of the season a personal summary of your catches, by month and depth together with the average catch for the zone in which you fish will also be forwarded to you. A skipper, vessel and crew from which log book information is received is effectively part of the research team.

Just fill in the coupon, detach it, and return it to Fisheries Western Australia with your Managed Fishery licence fee, and a research log book will be posted to your address before the start of the 2000/2001 season.

Log books are also available from Fisheries WA District Offices or direct from the Fisheries Research Division at WAMRL PO Box 20, North Beach 6020. Contact Eric Barker collect on (08) 9246 8407 if you have any questions about the program.

Yours sincerely

Eric Barker and Chris Chubb Rock Lobster Research Unit, Fisheries Research Division

It you are not interested, perhaps your deckie would be?

* This information was provided by the Western Rock Lobster Development Association (Inc.), Suite 6, 41 Walters Drive, Osborne Park WA 6017. Chairman Mr Tony Gibson ph: (08) 9244 2933 fax: (08) 9244 2934.

Except where acknowledged, the information in this bulletin has been supplied by the FISHERIES RESEARCH DIVISION of FISHERIES W.A. Contact Dr Chris Chubb or Mr Eric Barker ph: (08) 9246 8444 fax: (08) 9447 3062.

Bulletin No 22 15 January 2001

Commercial Fisheries Production Bulletin

WESTERN ROCK LOBSTER FISHERY

2000/2001 SEASON

THE COASTAL FISHERY (Nov-early Jan)

The 2000/2001 season started very early with freshly moulted light coloured animals being present in the catch from day one. This early start was due to an early moult, resulting from warm sea temperatures during the pre-moult period, and the full moon on November 12 ensuring increasingly darker conditions for the first two weeks of the season.

The November 2000 catch of 1,001 tonnes was one of the highest November landings in the history of the fishery, the record being in November 1982 when 1,660 tonnes were caught.

Some sectors of the fishery had better catches than others and of course day to day variations caused by swell and other environmental influences were evident, but in general, catches increased daily from the start of the season. By the end of November, the "whites" were well and truly under way with the fleet essentially still in the inside grounds and out to the "teens". By the beginning of December, the fleet had started moving into the mid-water grounds.

During early December, the mid-coastal fleet, which had been fishing from the Two Rocks area, returned to anchorages at Cervantes, Jurien and Green Head. At the same time many boats throughout the fishery were moving between the mid-water grounds and shallows in an effort to maximise their catches. By mid-December, some vessels had moved into deep water, however, generally the fleet was scattered from the inshore grounds out to the mid-water grounds. Good catches, albeit patchy, were being taken in all depths, however, good deep-water catches were particularly sporadic.

By the third week of December, much of the fleet was in deep water, although catches in these depths still were characterised by their patchiness with some boats doing well and others not so well. The remainder of the fleet was scattered to the inshore grounds where boats achieved consistent catches.

During early January, many of those vessels in deep water were on multiple day pulls in the face of declining catches. By the beginning of January in B Zone, catches had declined to a point where skippers were ceasing fishing and bringing their gear ashore.

Kalbarri had a particularly poor start to the season. One fisher called it "the worst in 30 years". As is normally the case, the Kalbarri fleet quickly moved south for the "whites", however, so poor were the catches in this region that the traditional port of Port Gregory was bypassed by many vessels that headed further south to Dongara to fish. Those few vessels that were operated from Gregory fared poorly. The fleet returned to Kalbarri during mid-December when catches in that area picked up, albeit only for a short period.

As an anecdotal aside, many fishers have commented on the unusual number of very strong south-south westerlies being experienced in the first 6-8 weeks of the season making working conditions on board vessels very unpleasant.

The preliminary production figures to the end of December 2000 indicate that rock lobster catches were 8.4% up in the Fremantle region, 4.5% down in the Jurien region and 9.2% down in B Zone compared to the same period in the 1999/2000 season (Table 1). These figures are consistent with the 1650 tonnes for B Zone and the 2950-3350 tonnes for C Zone, predicted to have been landed by the end of January 2001 (see last Bulletin - CFPB No. 21). Overall landings for the fishery in November and December 2000 were only 0.9% lower than last season but still 19.5% above the average of the past ten seasons (Table 1).

Table 1. ***Preliminary rock lobster production figures.***

Production (t) to end of December 2000

Fremantle	Jurien	Geraldton	Total
1928	704	1509	4141

Production (t) to end of December 1999

Fremantle	Jurien	Geraldton	Total
1778	737	1663	4178

Difference (t) and percentage difference

Fremantle	Jurien	Geraldton	Total
+150	-33	-154	-37
8.4% up	4.5% down	9.2% down	0.9% down

10 yr. cumulative average to end of December 1999	***= 3466 t***
Production to end of December 2000	***= 4141 t***
Difference	***= 675 t***
% Difference	***=19.5% up***

PUERULUS SETTLEMENT

The puerulus settlement year is taken as May of one year to April of the next, with the majority of pueruli settling between August or September to about February. Numbers of pueruli settling on collectors during the 1999/2000 settlement period were below average in the north and well above average in the south (Fig. 1). The indications from the numbers settling this season, from May to November 2000 are that settlement at South Passage (Shark Bay) and the Abrolhos is below average

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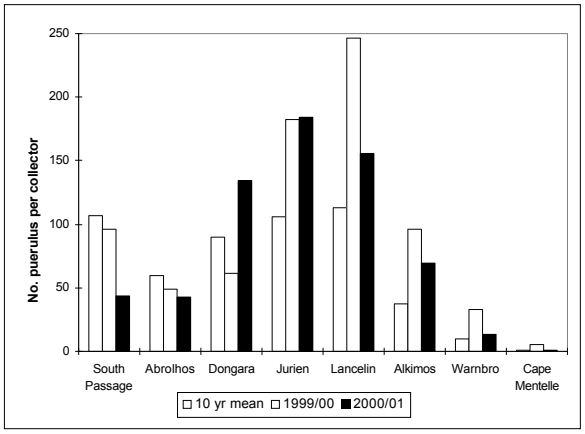
at this time. Nevertheless, pueruli settle consistently through December, January and February at the Abrolhos which should lead to slightly above average numbers for the season at this location. It is likely that South Passage also will have about average settlement given that, due to storm damage of the collectors, no counts were obtained in one month where good settlement was likely, so the 2000/01 count for South Passage in Fig. 1 is underestimated slightly.

Coastal puerulus settlement, on the other hand, is well above average at all sites from Dongara to Alkimos while Warnbro and Cape Mentelle, near Margaret River have received just slightly above average settlement. Pueruli should continue to settle through December, January and February and so should continue to boost puerulus numbers throughout most of the fishery. These post-larval lobsters will start to recruit to the fishery in the "reds" of 2003/2004 and the "whites" of 2004/2005.

Figure 1. ***The average annual indices of puerulus settlement for the ten seasons to 1999/2000 (hatched), the annual indices for the 1999/2000 season (white) and the total settlement so far in the 2000/01 settlement year (ie May-Nov 2000) in black.***



WRLDA MARKETING NEWS*

In the wake of the 1999/2000 record catch, exporters were faced with substantial inventories of unsold product heading into season 2000/01 in the key markets of Japan and Taiwan and in the tail market in the USA. On the November 15 estimates of unsold product in overseas cold stores were placed as high as 150 full container lots. This situation created problems for exporters as well as importers who had paid top prices for last season's product which remained unsold.

It is important to appreciate that overseas buyers of western rock lobster faced the additional problem of their own currency weakening against the US Dollar at the commencement of the new season. Western Australian exporters were asking similar high prices to last year and thus it would have cost importers more (in their own currency) to pay the same US dollar price asked by Australian exporters. Couple this with substantial unsold holdings of last year's product and it's not difficult to understand why importers were only prepared to buy at a lower US dollar price. Not unexpectedly, there was considerable buyer resistance to the very high catches in November, particularly in the southern sector of the fishery. A near record volume was landed which was not "normal" and, with December catches pending, exporters were very keen to move the larger than average volumes being landed early in the season. The opening 'beach price' reflected the early season live market, however, given the increased landings and at the same time, very little to no demand for frozen product (see above), this price deteriorated very quickly.

The unstable political situation between Taiwan and mainland China is generating some concern about sales in the marketplace. In addition, the growing demand for cheaper and readily available Mexican lobster, together with very large volumes of Chilean king crab as a cheaper substitute for western rock lobster, all contribute to a less than optimistic outlook for the season. Exporters will face a very volatile and difficult market in the months ahead if current market conditions persist.

WRLDA members presently are addressing a number of matters which will form the basis of a longer term strategy in the global lobster marketplace. Research and development for a market strategy for the future, in some aspects, will incur substantial costs. These costs should be put in their proper perspective, and seen by all participants in the fishery as being necessary R & D costs for the industry to maintain its position as one of the leading world suppliers of lobster. It is vitally important to remember we are not the only lobster supplier in the world, and both the gap between the quality of other exporters' products and western rock lobster, and the price advantage we have enjoyed so far, have narrowed considerably.

As suppliers to the world of an expensive luxury consumable, we are fighting a constant battle to maintain our position in a dynamic and highly competitive market (evidenced by the recent turn in Taiwan to Chilean king crab). WRLDA is determined to maintain it's members' profile as producers of the "world's finest lobster", and forward planning is vital to achieve this objective.

GROWTH OF LARGE ROCK LOBSTERS

Large lobsters were tagged in the October breeding stock survey and more will be tagged in February from RV "Flinders" fishing around Rottnest and west of Garden Island. Lobsters are being tagged with **ORANGE** tags (as distinct from the normal yellow) which signifies they also contain **"BIOLOGICAL TAGS"** that will tell us how many times these large lobsters moult in a season. So, whilst some of these will be recaptured by the commercial fleet and legally able to be landed, researchers from the Rock Lobster team are requesting that **ALL** orange tagged lobsters be **RETURNED TO THE WATER** for this season only. Data from these large animals is vital to improve the way lobster growth is represented in the computer models we use to provide advice to the managers. This is particularly important in the southern sector of the fishery, so we would welcome your assistance to provide the best advice possible by allowing these large lobsters to live through another year.

* This information was provided by the Western Rock Lobster Development Association (Inc.),
Suite 6, 41 Walters Drive, Osborne Park WA 6017. Chairman Mr Tony Gibson ph: (08) 9244 2933 fax: (08) 9244 2934.

Except where acknowledged, the information in this bulletin has been supplied by the FISHERIES RESEARCH DIVISION of FISHERIES W.A. Contact Dr Chris Chubb or Mr Eric Barker ph: (08) 9246 8444 fax: (08) 9447 3062.

Bulletin No 23 30 May 2001

Commercial Fisheries Production Bulletin

WESTERN ROCK LOBSTER FISHERY

2000/2001 SEASON

THE COASTAL FISHERY TO DATE

The whites catch of 5180 tonnes for season 2000/01 (Nov-Jan) was very good. It was 18% above the average over the last 10 years and only 8.4% below the whites catch from the record 1999/2000 season. This reduction in catch was felt most in B zone with 17% less landed than the season before. In C zone, the Jurien region landings were down 7.5% whilst Fremantle's catch was reduced by only 2.3% compared to 1999/2000.

The whites catch for B zone was forecast accurately at 1650 tonnes with 1660 tonnes landed. The C zone predictions however, were less precise with 2900-3350 tonnes forecast (respectively based on puerulus from all C zone sites and from Alkimos site only) and 3520 tonnes landed. It is true that the predictions for reds and whites catches are not as accurate as the forecast for total catch, but, environmental conditions affecting the catchability of lobsters over the shorter time periods often affect what is landed, particularly during the whites. The total whites catch for the fishery in 2000/01 was 5180 tonnes compared to the upper prediction of 5000 tonnes.

Catches during February and March were very poor. At the end of March the total catch was 5% above the average over the past 10 seasons Fishing was marginally better in April and catches improved slightly but the total catch was only 2.8% above the 10 year average for the same period (Table 1). However, across the board catches to the end of April were down by around 20% on last season (Table 1). The cumulative catch in February, March and April of 2001 amounted to 4620 tonnes, 10.2% below the average of 5145 tonnes over the past 10 seasons.

The poor catches during these months can be attributed to a combination of factors. The first is a lower recruitment of lobsters to the fishery this season resulting from lower puerulus settlement three and four years ago (Fig. 2). This has lead to lower densities of legal-sized rock lobsters on the grounds. Another factor was the poor catching (environmental) conditions experienced by the fleet this year. For much of 2001, very calm, clear sea conditions have prevailed leading to a lower catchability of the lobsters. To illustrate this point there was a short period of increased swell during the third week of March and catches improved along the entire coast for that time.

In general it was a difficult three months for fishers who have had to work really hard for their catches. The consensus has been that there was a need for pots to be set "right on the spot" otherwise empty pots were pulled. As a result, much of the fleet was on the move constantly fishing in all depths, even very deep water, opportunistically searching for good catches. Despite fishers' best efforts, success was sporadic. Nowhere was this more apparent than in the Kalbarri region where catches not only have been poor all season and much worse than last year, but also have been plagued by large and aggressive octopus (see Leeuwin Current Pushes Octopus South? over the page). Throughout the rest of the fishery and throughout the whole season, there have been numerous complaints about the large quantities of octopus (the ususal species) being caught in the pots.

Movement of the fleet in C zone during February saw a large number of boats fishing from Two Rocks, but some of these vessels returned north during March. In April, vessels from Mandurah and Fremantle to as far north as Lancelin moved south to Bunbury to fish and met with mixed success. Many are still there.

Of interest, is the reds moult, which appeared to occur over a protracted period from February through to April. This protracted moult seems to be associated with this year's environmental conditions. Catches of freshly moulted rock lobsters also were reported in early May. These tended to be larger animals in deeper water. Continued reports of large quantities of setose lobsters are indicative of the good levels of breeding stock we have in the fishery.

Table 1. ***Preliminary rock lobster production figures.***

Production (t) to end of April 2001

Fremantle	Jurien	Geraldton	Total
4029	1449	4322	9800

Production (t) to end of April 2000

Fremantle	Jurien	Geraldton	Total
5180	1915	5370	12465

Difference (t) and percentage difference

Fremantle	Jurien	Geraldton	Total
-1151	-466	-1048	-2665
22.2% down	24.4% down	19.5% down	21.4% down

10 yr. cumulative average to end of April 2000	***= 9535 t***
Production to end of April 2001	***= 9800 t***
Difference	***= 265 t***
% Difference	***= 2.8% up***

THE BIG BANK REGION

The Big Bank catch for February 2001 was 119 tonnes, 35% lower than the previous year's landings of 183 tonnes. Fifty five boats nominated to fish the area in 2001, which resulted in an average catch per boat of 2.2 tonnes compared to an average catch per boat of 2.0 tonnes the previous season (Fig. 1).

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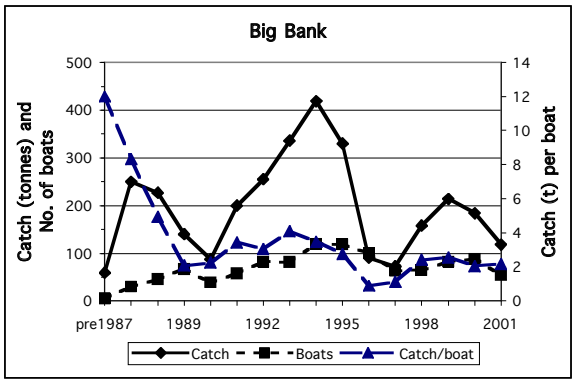
Catches during the first few days were very quiet and some of the fleet travelled a substantial distance north of the line for very little return. Approximately the middle of February, rock lobsters commenced their movement across the northern Abrolhos line and catches increased considerably. From all accounts, this year saw fishing effort become highly competitive and focussed in 90 to 100 fathoms right on the Abrolhos line. Very little was caught north of the line.

Figure 1. ***The historical time series of catch in tonnes (solid black), number of boats (dotted black) and catch (tonnes) per boat (blue dotted) for the Big Bank region.***



THE ABROLHOS ISLANDS SEASON

The opening of the Islands season was very quiet for the first couple of days, but then picked up. The reasons for this probably were the very calm quiet conditions at the start of the season and the proximity of opening day to the full moon on March 10. In addition, the lack of catch partly may be attributable to a protracted or late moult, as occurred on the coast. Evidence for this was the number of freshly moulted lobsters received at depots at the start. One processor commented that many of the lobsters received were not suitable for live or cooked and so were processed for the tail market.

Some of the larger vessels caught reasonably well at the commencement of the season in deep water, north of North Island. However, catches were not as good as the previous season and soon declined. Relatively good catches also were taken by these vessels in deep water to the east of Southern Group, however, these catches were not as substantial as two seasons ago. Skippers of these vessels were reporting low densities across the deep-water grounds and had to keep moving gear to maintain catches.

Data from processors has shown that Abrolhos catches to the end of March and end of April respectively were 9.8% lower and 7.8% lower than for the same periods in 1999/2000. Assuming the whole Abrolhos catch will be down by about 8% and given last years catch was a little over 1700 tonnes, this seasons landings are likely to be of the order of 1600 tonnes. The average Islands catch for the period 92/93 to 99/00 (8 years) has been about 1,770 tonnes.

PUERULUS SETTLEMENT

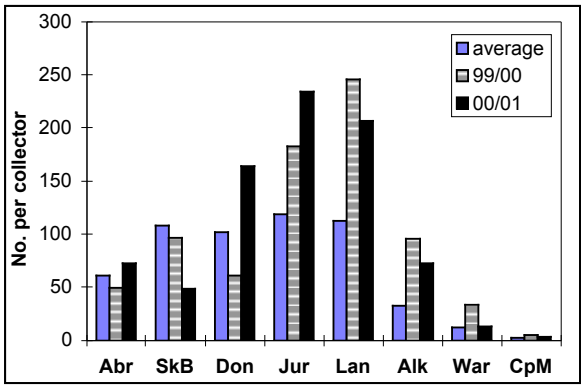
The 2000/01 puerulus settlement was average to extremely high throughout the fishery with the exception of Shark Bay where numbers of pueruli were 55% below the average of the last 16 years (Fig. 2). The central part of the fishery from Dongara south to Alkimos (near Mindarie) received settlement that was between 61% and 125% above the average. Warnbro and Cape Mentelle (near Margaret River) recorded numbers of puerli that were 2% and 10% above the 16 year average respectively. The Abrolhos Islands also received 19% greater than average settlement.

The very low numbers of pueruli at South Passage, Shark Bay, compared to the rest of the coast probably are a result of the absence of sampling in September 2000 and the loss of collectors, due to storm events, in several of the other months. The September sampling covered the August new moon, which is usually a period when good numbers of post larvae settle during high settlement seasons. The lack of data in this month most likely has lowered the Shark Bay index relative to the real settlement and care should be exercised when using this index to gauge future catches.

While settlement was low in A and B zones during 1999/2000 it improved substantially this season. C zone settlement in 2000/01 follows a similar pattern to the previous season where exceptionally good numbers of pueruli settled on the nursery reefs. The post-larval lobsters settling in 2000/01 will recruit to the fishery in the "reds" of 2003/2004 and the "whites" of 2004/2005.

Events in the Pacific Ocean still favour La Nina conditions and are forecast to shift gradually towards neutral conditions in the next 6 months or so. With the strong Leeuwin Current flowing at the present time and a continuation of favourable Leeuwin Current conditions for a few months yet, it appears highly likely that next season's puerulus settlement will be better than average.

Figure 2. ***The average annual indices of puerulus settlement from 1984/85 to 1999/2000 (blue), the annual indices for the 1999/2000 season (hatched) and the total settlement for the 2000/01 settlement year in black.***



LEEUWIN CURRENT PUSHES OCTOPUS SOUTH?

Octopus have been prevalent this season with many being caught throughout the fishery. While the common octopus is seen in most places, an invasion of sorts by another species has been seen over the past two to three years north of Kalbarri. The octopus has not been identified positively yet, but it occurs in depths of 1-16 fathoms (occasionally deeper), is spotted, much larger than the normal octopus and very aggressive. Individuals can be up to 2 metres long and weigh as much as 5-6 kg. Reports suggest that once in the pots, these creatures kill most of the lobsters. Kalbarri fishers call it the Shark Bay or "Jimbo"octopus.

Normally this species is not common south of Whitefoot (about 20 miles south of Steep Point), but recently very large numbers have been caught particularly near Womerangee Hill. Here, at the "Occy Patch", where the common species seems to have been displaced, 2 to 3 Shark Bay octopus are caught in each pot with seemingly endless numbers available to enter the gear. According to fishers it is usual to catch 20-30 in a day.

Approximately 2 years ago, 136 kg of the Shark Bay octopus were caught in a single day and, only recently, a fisher netted 3 wheat bags (each 3/4 full) of these animals in a day or two!

The suggestion is that these octopus have extended their range by moving south. Their general abundance also may have increased. It is possible that the La Nina conditions in the Pacific Ocean, and the resulting strong Leeuwin Currents that have persisted over the past few years, have led to suitable environmental conditions for this species being maintained further south than normal. If this is the case, we might expect to see a reduction in numbers of Shark Bay octopus in the Kalbarri region when the next El Nino event occurs. An ENSO event is unlikely in the next 6 to 12 months according to model predictions from scientists working on ENSO phenomena.

VOLUNTARY RESEARCH LOG BOOKS

Your Fishery Floats On Good Research

Currently skippers or deckies on 32% of the 594 vessels licensed to operate in the fishery have forwarded detailed research data to the Western Australian Marine Research Laboratories at Waterman. Hopefully, all those fishers who have participated in the log-book programme in the last couple of years will provide data again this season as we would like to maintain the coverage at last year's level of 36% of the fleet. We would like to take this opportunity to point out the voluntary log book data is research's "bread and butter" and is a vital ingredient in the advice Fisheries Research provides to the rock lobster industry, it's managers and the general public. So even though, the fishery is in great shape and the prognosis is more of the same, there is a real need to combat complacency and continue to collect this important information, data that only you, the fishers, can provide.

It is very important that the continuity and quality of the data set is maintained. This simply means that we need good data from all seasons, no matter what the catch and we need it on a continuous basis with no gaps. You must remember that the western rock lobster fishery is the envy of the world because of the various long-term data sets we have, and our ability to model accurately the fishery is in no small part due to the existence of the log-book data. So, if you have any personal records and are prepared to transfer that information into a research log book, we would love to have it! Even just daily catch and pots used by the depth fished would suffice.

If you wish to become part of the rock lobster research team and make a positive contribution to ensuring the sustainability of this wonderful fishery, then give Eric Barker a call on 9246 8444. Finally, sincere thanks to all those fishers who have participated in the research log book program so far this season, your fishery is great shape because of your efforts and those of previous participants in the voluntary log-book programme.

Icon species and maximum size females

The voluntary log book this year contains a column to record the accidental capture (entangled or in pots) of species such as seal/sealion pups, turtles, cormorants etc, so Fisheries Research can build a data base to assess accurately how the rock lobster fishery is impacting on the ecology of such species. This is part of a requirement we now have through Commonwealth legislation and the Marine Stewardship Accreditation to assess the ecological risks involved in rock lobster fishing We recognise the impact on the so called icon species is minimal but we need accurate data to demonstrate to others that this indeed is the case. The provision of inaccurate data by fishers simply will be counter-productive and lead to a lack of credibility for industry.

Most of you will be aware of the alteration to the management regulations for season 2001/02 when it will be legal to land oversize female lobsters provided they are non-setose. The research log book will not be changed and Rock Lobster Research is asking log book participants to continue to estimate those numbers of females and enter the daily totals in the log book. This again is to provide continuity of data and to assess the accuracy of our estimate of the impact of the change on the catch and egg production. Your continued assistance in providing these data is anticipated and we thank you for caring about your fishery.

WRLDA MARKETING NEWS*

Japan

Live market

Following the massive landings during the whites, lower volumes of product have had a stabilising influence on the Japanese live market. This has been reflected in a positive way through the prices on offer by the importers.

Frozen market

The Japanese frozen market has been very depressed with large inventories of last season's catch held by importers for most of this season. This drastically reduced demand in Japan for frozen product. However, it now appears that, at long last, the bulk of last season's stocks finally have been moved. Nevertheless, importers are very wary of again being caught holding volumes of any significance purchased at relatively high prices.

Taiwan

Live market

The Taiwanese live market basically remains stable with little increase in demand and hence there is no room for price increases. As a result product usually earmarked for Taiwan has been re directed to Hong Kong and Chinese importers.

Frozen market

Taiwanese importers have been buying frozen product sporadically (ie. moving in and out of the market) but in summary this market can be described best as 'business as usual'.

USA

Tails

The majority of last season's shipments to the United States tail market have been sold and with pressure from Western Australian exporters to maintain the highest achievable price, sales have been fairly constant. With a constant sales pattern, there should not be too much of carry-over of stock into the next season. Prices have been reasonable in this market.

European Union

The Western Australian push into the EU is a priority for a few WA processors. There is a small but growing demand for specialist packs in certain markets and exports have risen by about 250 tonnes over the past three years. However, expansion in this market is hampered by the 14% tariff barrier applied to our lobster products entering the EU.

Currency

Whilst the Australian dollar (AUD) continues to hover around the low USD$0.50 cent level there does not appear to be any 'gains' particularly noting the negative movement of the Japanese Yen against the US Dollar. Of particular concern, however, are recent adverse movements of the Taiwanese currency against other major currencies.

General Comments

While the information given above suggests that the markets appear stable, even positive in outlook, the situation a month ago was quite different. Even though the AUD was very weak

against the USD, a position usually in our favour, sales of either boiled or raw frozen product were virtually non-existent. This was due to a number of factors. The 14.5 million kg record catch from 1999/2000 sold at high prices led to large stocks of last season's product remaining in Japanese cold stores and containers of product still in WA at the start of this season. Sales to consumers have been weak in Japan given record unemployment and a drop in consumer spending and confidence underpinning the fragile nature of the Japanese economy.

At the same time the live market declined and the US tail market seemed to be the only option. This decline is significant because it heralds two things. The first is that the other lobster producing nations of the world now are exporting very high quality product, comparable to ours, and are prepared to accept lower prices to gain market share. The second issue, is that the lower prices on offer by other producing nations have reduced the prices importers are prepared to pay for our product. So supply and demand and competition are increasingly important considerations in the market place irrespective of exchange rate, where any significant strengthening of the AUD against the USD will see a drop in beach prices. The question is, now that the rest of the world is rapidly catching up, where to in the next five to ten years?

GROWTH OF LARGE ROCK LOBSTERS

As noted in the last Production Bulletin (No. 22). large lobsters were tagged in the October 2000 breeding stock survey and in February 2001 from RV "Flinders" fishing around Rottnest and west of Garden Island. Lobsters were tagged with **ORANGE** tags (as distinct from the normal yellow ones) which signifies the lobsters also contain **"BIOLOGICAL TAGS"** that will tell us how many times these large lobsters moult in a season. The Rock Lobster Research team is requesting that **ALL** lobsters with **ORANGE**, ventral tags continue to be **RETURNED TO THE WATER** until next season. This will ensure the best return of research data for the cost of the research. If you can't bring yourself to return to the water any of these lobsters caught in the remaining month of the season, then please provide Rock Lobster Research with the **WHOLE ANIMAL** so the biological tag can be removed.

DO YOU REMEMBER WHEN??

* This information was provided by the Western Rock Lobster Development Association (Inc.),
Suite 6, 41 Walters Drive, Osborne Park WA 6017. Chairman Mr Tony Gibson ph: (08) 9244 2933 fax: (08) 9244 2934.

Except where acknowledged, the information in this bulletin has been supplied by the FISHERIES RESEARCH DIVISION of FISHERIES W.A. Contact Dr Chris Chubb or Mr Eric Barker ph: (08) 9246 8444 fax: (08) 9447 3062.

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Commercial Fisheries Production Bulletin

WESTERN ROCK LOBSTER FISHERY

2000/2001 SEASON

THE COASTAL FISHERY

The total catch for season 2000/01 was 11,270 tonnes. It was 22% below the record catch (14,448 t) of the previous season but only 0.3% below the average of 11,306 tonnes caught over the previous ten seasons. The reduction in catch was felt across the coastal fishery, with the Jurien region landings almost 30% below the 1999/00 season and the Fremantle area (south of Wedge Island) recording a 24% drop in landings (Table 1). Catch from the north coastal fishery (north of 30°S latitude) fell by 22% (Table 2).

The "whites" catch for the fishery was generally very good, 9.8% below the previous season, however, fishing in the "reds" (Feb-Jun) tended to yield fairly poor catches with landings almost 30% lower than 1999/00. Whilst the reduction in catch was forecast from the lower puerulus settlements three and fours years ago and densities of lobsters on the grounds were lower, other factors contributed to the poorer landings. Very calm, clear sea conditions prevailed throughout the "reds" due to a lack of swell and this reduced the lobster's "catchability". This meant that skippers throughout the coastal fishery had to fish hard and smart for what catch they did take. Some skippers even reported the bait in their pots was not being touched. On the odd occasion when a good swell arrived for a day or two, catches along the coast improved.

Opportunistically throughout the "reds" the fleet was scattered from inshore to the middle grounds and beyond. Generally the results were poor, but a few very good catches were taken from multiple day pulls, particularly in isolated areas that had not been hit hard or fished for some time. Nevertheless, the consensus was that even the "reliable" spots were not all that productive last season. Much of the C zone fleet moved south so that Two Rocks, Mandurah and Bunbury harboured many boats up till the end of May. Early in June boats being fished from Bunbury had started to return to their own ports and by mid June most of the fleet had vacated the area. Although catches were not exceptional, some boats caught quite well. At the other end of the fishery, Kalbarri had a poor season all round for the second year in a row.

Mid June also saw catches decline to very low levels, with the exception of some periods when swell increased, and skippers started to bring gear ashore. For most it was a particularly uninspiring end to season 2000/01. Probably the most notable thing about season 2000/01 was the continued presence of large numbers of setose rock lobsters and fairly large numbers of very small undersize lobsters. These undersize, most likely, are the vanguard for the recruitment due in the very high catch season forecast for 2003/04.

Table 1. ***Preliminary rock lobster production figures. Note: Geraldton = A zone plus B zones catches. See Table 2 for breakdown of north coastal and Abrolhos figures.***

Production (t) to end of June 2001

Fremantle	Jurien	Geraldton	Total
4610	1520	5140	11270

Production (t) to end of June 2000

Fremantle	Jurien	Geraldton	Total
6068	2151	6229	14448

Difference (t) and percentage difference

Fremantle	Jurien	Geraldton	Total
-1458	-630	-1089	-3178
24.0% down	29.3% down	17.5% down	22.0% down

10 yr. cumulative average to end of June 2000	***= 11306 t***
Production to end of June 2001	***= 11270 t***
Difference	***= 36 t***
% Difference	***= 0.3% down***

Table 2. ***Preliminary north coastal (Geraldton) and Abrolhos rock lobster production figures.***

Production (t) to end of June 2001

Geraldton	Abrolhos	Total
3546	1594	5140

Production (t) to end of June 2000

Geraldton	Abrolhos	Total
4544	1685	6229

Difference (t) and percentage difference

Geraldton	Abrolhos	Total
-998	-91	-1089
22.0% down	5.4% down	17.5% down

THE ABROLHOS ISLANDS SEASON

Catches at the Abrolhos never vary a great deal and have ranged between about 1,600 and 1,900 tonnes in the past decade. Season 2000/01 saw landings of 1594 tonnes (processors' figures), 5.4% lower than 1999/00 (Table 2). The opening of the season was slow, probably due to quiet calm sea conditions, an almost full moon and a protracted moult such that by the end of April catches were about 8% below those in the same period in 1999/00. Nevertheless, good catches of lobsters were maintained

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throughout May. One fisher reported that his deep water catches at the Abrolhos were better than the year before. These catches led to a total for the Abrolhos concession holders that was only 91 tonnes below the previous season's landings. Towards the end of May a few fishers ceased fishing and returned to the mainland and by mid June, vessels were returning daily and ending their season.

PUERULUS SETTLEMENT

The 2000/01 puerulus settlement was reported in the last CFPB (no. 23) and is not reviewed here except to mention that some gear difficulties at Shark Bay resulted in what is considered to be an artificially low settlement at South Passage. Readers are reminded to exercise caution when using this site index to gauge future catches. The time series of puerulus settlement data (1971/72 – 2000/01) for the Abrolhos, Seven-mile Beach near Dongara and Alkimos near Perth (Figure 1) shows the declining settlement in the late 1990s which will contribute to the poorer catches in the next two seasons. However the puerulus numbers in 2000/01 were very good throughout the fishery, augering well for catches in 2003 and 2004.

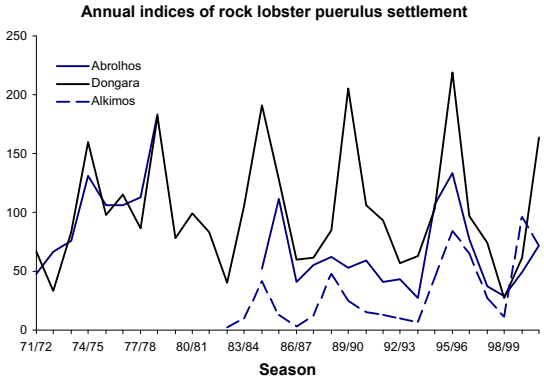

Figure 1. ***The time series of annual indices of puerulus settlement for Abrolhos (blue solid), Alkimos (blue dash) and Seven-mile Beach (black).***

For most of this year, generally neutral conditions have prevailed in the La Nina/El Nino oscillation but a good Leeuwin Current has flowed so far through 2001 (but weaker than the past two seasons). This would suggest a reasonable settlement in the 2001/02 settlement season which recently commenced. After the September full moon puerulus numbers for the early part of the season were average or above average for South Passage (Shark Bay), Jurien, Lancelin and Alkimos but well below average for Port Gregory, Seven-mile Beach, the Abrolhos, Warnbro and Cape Mentelle (Margaret River). Thus settlement in C zone to Fremantle has been good but in the rest of the fishery relatively small numbers of pueruli have recruited. Nevertheless, it is still too early in the settlement period to make judgements about the overall strength of puerulus settlement.

The Climate Prediction Center (NOAA) in Colorado is suggesting that weak to moderate warming in the Pacific Ocean (El Nino) will occur in the remainder of 2001 and into the first half of 2002. This should not have any significant effect on settlement for this season and would appear to suggest that puerulus settlement conditions might not be too adversely affected through 2002.

CATCH PREDICTIONS

Catches are forecast to be below average for the forthcoming season except the Abrolhos where annual catches do not fluctuate much and an average season is predicted. Landings from the A zone are predicted to be about 1,500 tonnes. For the coast B zone (not including Big Bank) is expected to land 3,150 tonnes while C zone should catch between 4,550 and 5,350 tonnes. Although the "whites" and "reds" predictions are a little less accurate than the total, C zone fishers can expect between 2,000 and 2,500 tonnes of "whites" and about 2,500 tonnes of "reds". B zone, on the other hand, should land about 1,400 tonnes and 1,750 tonnes of "whites" and "reds" respectively. In 2002/03 catches remain the same in A zone and B zone but improve in C zone for an average fishery total catch. However, catches will climb in 2003/04 and will contribute to the well above average catch forecast for that season.

WRLDA MARKETING NEWS*

Last Season's Review.

Following the record year in 1999/00, the processing/marketing sector was faced with high inventories of unsold frozen lobster stocks at the start of last season (2000/01). This was particularly evident in Japan with inventories at levels never previously experienced. However, last season's stocks, particularly of live product, were placed at reasonable prices. The story for frozen whole boiled lobster was not as good with inventories in cold stores in Japan at a fairly high level and Japanese buyers reluctant to commit to buy at the prices being asked for by Western Australian packers.

The exchange rate between the Australian and US dollars hovering around US$1 = A$0.50-0.52 throughout the season was kind to exporters. However, it must be noted that any movement in the exchange rate can have a fairly dramatic impact on the Australian dollars received after sales made in US dollars are converted to Australian currency.

Season 2001/02.

The market outlook for season 2001/02 is bleak to say the least! The economic fallout from the events of September 11th are being felt worldwide and are affecting our ability to sell western rock lobster overseas. Economic forecasters widely have been predicting a further slowing of the Japanese economy. An article in a leading Hong Kong newspaper last week forecast that up to 1,000 restaurants would close between October and Christmas. The Taiwanese economy generally mirrors what occurs in Japan and accordingly the market is very nervous at this time. All Western Australian processors anxiously await details of the first sales levels for all pack-styles and grades.

After the terrorist attacks in the USA on September 11, leaders are pleading for US citizens to lead their normal lives. Understandably the reality is that citizens remain extremely anxious about the future. This will affect consumption of lobster tails in the USA. We export a luxury consumable commodity, which is not consumed on an everyday basis by affluent consumers. Rather it is reserved for those celebrating special occasions and every international economic report of recent times has suggested that there will be a global "tightening of the belts" in relation to consumer spending.

WRLDA members are continuing to attempt to develop other markets, however, the cost of this developmental work is extremely high and very time consuming. The European market does offer some new opportunities and we continue to press for tariff reductions there. We are hopeful and will know within a few months if our efforts have been successful.

Tough times have been experienced before in the international trade arena and processors have continued to achieve the highest level of selling prices that were available. Exporters will continue to strive to maintain this same situation in the season ahead. It is fortuitous that this season will produce a lower than average catch in the face of a weakening global economy.

VOLUNTARY RESEARCH LOG BOOKS

Your Fishery Floats On Good Research

First and foremost we would like to sincerely thank all those skippers and deckies that have volunteered to be part of the research log-book system and have forwarded detailed research data to the Western Australian Marine Research Laboratories at Waterman. Hopefully, all of you who have participated in the log-book programme in the last couple of years will provide data again this season.

Over 38% of the fleet completed log books in 1997/98 and since then the coverage has declined to 34% last season. A number of fishers have expressed the view that since everything is going well, there is no need to continue to provide the data. Nothing could be further from the truth! The voluntary log-book data is research's "bread and butter" and is a vital ingredient in the advice Fisheries Research provides to the rock lobster industry, it's managers and the general public. It is very important that the continuity and quality of the data set is maintained through "thick and thin". This simply means that we need good data from all seasons, no matter what the catch and we need it on a continuous basis with no gaps. You must remember that the western rock lobster fishery is the envy of the world because of the various long-term data sets we have, and our ability to model accurately the fishery is in no small part due to the existence of the log-book data.

We realise that keeping the biological data on breeding females is a lot of work, however, it will be very important, particularly this coming season to record that information. Fishers will be allowed to keep non-setose females above the maximum size and we will need to know how many of these lobsters are taken so we can assess the real impact of the management change. Thanks once again for your efforts. The log-book information is data that only you, the fishers, can provide.

This season please record, in remarks column of voluntary log book, the accidental capture (entangled or in pots) of species such as seal/sea-lion pups, turtles, cormorants etc, so Fisheries Research can build a data base to assess accurately how the rock lobster fishery is impacting on the ecology of such species. This is part of a requirement we now have through Commonwealth legislation and the Marine Stewardship Accreditation to assess the ecological risks involved in rock lobster fishing. We recognise the impact on the so-called icon species is minimal but we need accurate data to demonstrate to others that this indeed is the case.

If you wish to become part of the rock lobster research team and make a positive contribution to ensuring the sustainability of this wonderful fishery, then call Eric Barker on 9246 8444.

GROWTH OF LARGE ROCK LOBSTERS

As noted in the last Production Bulletin (No. 23). large lobsters were tagged in the October 2000 breeding stock survey and in February 2001 from RV "Flinders" fishing around Rottnest and west of Garden Island. Lobsters were tagged with **ORANGE** tags (as distinct from the normal yellow ones) which signifies the lobsters also contain **"BIOLOGICAL TAGS"** that will tell us how many times these large lobsters moult in a season. The Rock Lobster Research team is requesting that any fisher catching lobsters with **ORANGE**, ventral tags should **RETURN ALL SUCH LOBSTERS WHOLE TO ROCK LOBSTER RESEARCH AS SOON AS IS PRACTICABLY POSSIBLE**. We need the whole animal so the biological tag can be removed and we need the animal fresh or on ice so the biological tag is not affected by freezing. If you catch one of these lobsters let us know as soon as you can on 9246 8444, we will pay market price for any legal lobsters.

SPINY CRABS WANTED

A Fisheries Research and Development Corporation (Commonwealth) funded joint research project between Fisheries Research and Murdoch University is examining the life history and population biology of the deep sea crab commonly called the spiny crab. It is now marketed under the name champagne crab. Although some research fishing has been conducted and crabs have been tagged, berried females were hard to find and so information on the crab's reproductive biology is scarce. The future of the research project now lies with the assistance of rock lobster fishers. If you catch any tagged or berried female crabs they need to be returned whole (either fresh or frozen) to Kim Smith at Murdoch University. He can be contacted during business hours on 9360 2256, or at home on 9419 4274, and will arrange to collect the specimens. For more information see the latest edition of WAFIC's PROWEST-magazine.

* This information was provided by the Western Rock Lobster Development Association (Inc.),
Suite 6, 41 Walters Drive, Osborne Park WA 6017. Chairman Mr Tony Gibson ph: (08) 9244 2933 fax: (08) 9244 2934.

Except where acknowledged, the information in this bulletin has been supplied by the FISHERIES RESEARCH DIVISION of the DEPARTMENT OF FISHERIES (WA). Contact Dr Chris Chubb or Mr Eric Barker ph: (08) 9246 8444 fax: (08) 9447 3062.

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