FISHERY ASSESSMENT REPORT

TASMANIAN GIANT CRAB FISHERY 2003/04

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This assessment of the Tasmanian giant crab resource is produced by the Tasmanian Aquaculture and Fisheries Institute (TAFI). These reports provide summaries of our current understanding of the state of the stocks rather than management recommendations.

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Giant Crab Fishery Assessment: 2003/04

Executive Summary

This report outlines giant crab fishery statistics for the 2003/2004 quota year and assesses performance against indictors defined in the Giant Crab Management Plan.

In this context, as a response to poor performance against catch rate indicators in the 02/03 quota year the TAC was been reduced to approx. 60 tonnes for 2004/2005, but remained at 103.5 tonnes for the season evaluated here.

One of the six identified trigger points was breached in the 02/03 year. Total yearly catch was 59.3 tonnes, representing 57% of the TAC, well down on the 90% trigger point.

As with all fisheries exporting into Asia, the impact of SARS and the downturn in the Asian economy impacted on the giant crab fishery during the 2003/2004 quota year. Fishers reported that low beach prices made it uneconomical to fish for several months during the year, and this was borne out in the fishery statistics. Effort for the months May to September was the lowest seen since reliable records were available (1995/96). Total effort for the 03/04 quota year was the lowest since the introduction of quota, and was 47% down on the previous year. The low reported catch appeared to be a result of low levels of effort.

Despite a 47% reduction in effort, total catch was only 17% down on the previous year, indicating a rise in CPUE from the 02/03 season. This was the first significant rise seen since reliable records have been available. Statewide, CPUE increased by 40% over the previous year. This was driven by a large increase on the west coast (78%) which masked a small decline on the east cost (-9%). The large increase on the west coast was to some degree a result of the concentration of effort in the last four months of the year, when catch rates were substantially higher than earlier months. However, CPUE for the last four months was greater than for the same period of the previous year.

The trigger point for regional declines in catch over two years was not breached if assessed on an east/west basis, with east coast catch rates down by 9%, and west coast catch rates down by 13%. However, at the level of individual assessment blocks, the trigger point was breached in three of six active regions (SE, SW and central W). This was down from four of six regions in last year's assessment. Changes in catch rates relative to five years ago remained strongly negative for all regions except the NW (area 5; up 130%).

Clearly bycatch by lobster fishers in not an issue to the fishery, with a reported catch of only 30 kg – the trigger point of five tonnes was not breached. Bycatch by trawlers remained a major issue in the fishery, but was difficult to quantify.

Trigger points relating to the size structure of the catch have not been assessed at this stage, as processor splits are not available.

Performance indicator	Trigger point		Status in 2003/04?
Statewide commercial catch rates	Declines in successive years	✔	Up 40% from 02/03
Regional commercial catch rates	Declines by 20% in 2 years	✔	East -9%, West –13%
Total yearly catch	Yearly catch < 90% of TAC	✘	57% of TAC taken
Bycatch by lobster fishers	Catch > 5 tonnes	✔	30 kg
Proportion of catch over 5 kg	Varies 30% from reference year	?	Unavailable
Proportion of catch below 3 kg	Varies 30% from reference year	?	Unavailable

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1. Introduction

This report is the fourth formal stock assessment of the Tasmanian giant crab resource and is an annual requirement of the Tasmanian giant crab management plan.

The giant crab fishery became established in the mid 1990's when stable markets were first established, but catches have declined rapidly since this time (Figure 1). An initial response to this was to introduce quota management, and in November 1999 a TACC of 103.5 tonnes was introduced. In response to further declines in CPUE in much of the fishery, and poor performance against indicators in the 2002/2003 assessment, the TACC has been further reduced to 60 tonnes for the 2004/2005 quota season.

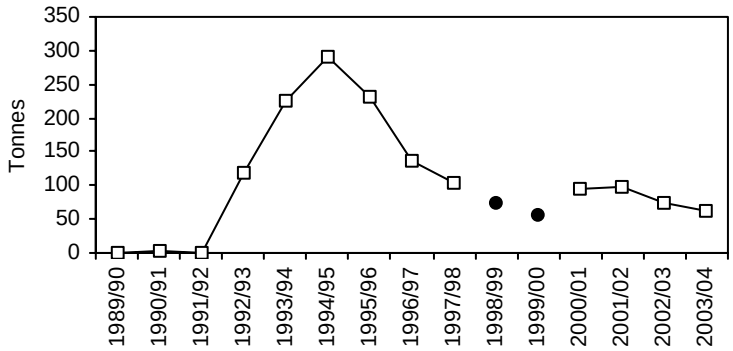

Figure 1. Historical giant crab catch in Tasmania. The Total Allowable Catch was set at 103.5 tonnes in November 1999. Catches in 1998/99 and 1999/00 (solid circles) were from partial fishing years due to an extended seasonal closure to allow revision of management arrangements.

2. Fishery Assessment

2.1 Evaluation of trigger points

2.1.1 Catch per unit effort

The giant crab management plan defines two trigger points relating to catch per unit effort (CPUE):

- When CPUE for the state declines for two consecutive years;
- When CPUE for any region declines by a total of 20% in two years.

The data used in this analysis is drawn from commercial logbooks and has changed since the start of targeted giant crab fishing in 1992. Logbook data prior to January 1995 does not include a measure of effort (as number of traps) so that data cannot be used for calculation of CPUE.

Data used for calculating catch rate has been "cleaned" for a range of factors:

- misreporting of effort appeared to be a common problem early in the fishery and records that are less reliable have been excluded from our analyses.

- Crabs are often taken incidentally to lobster fishing and catch rate under these situations is quite different to when crabs are targeted. We have restricted catch rate analyses to targeted effort. Fishers record if effort is targeted in the current logbooks although this was not the case prior to 2000. In earlier records, we have identified effort targeted to crabs on a combined basis of depth, catch of lobsters/crabs, skipper and soak patterns.

- A few experienced fishers with vessels and gear more suited to crabs take most crab catch. Fishers with a smaller quota holding tend to have much lower catch rate as most of their fishing effort is directed to lobsters. The inclusion of those fishers with small catches tends to bias catch rate data. We have presented information here for all fishers, plus data restricted to catches by fishers with an annual catch of at least two tonnes. In practice this data restriction has negligible impact on catch rates, despite much discussion of the issue in response to previous assessments.

- The soak time used by crab fishers varies with some leaving traps for extended periods. We have demonstrated previously that longer soak times leads to higher catch rates, although beyond 7 days there is little additional benefit. Effort in catch rate analyses presented here has been standardised to 24 hour pot-days up to a maximum of 7 days.

Statewide trends in CPUE

While annual catch rates have declined steadily since records became available in 1995, a moderate increase was seen in 2003/04. Clearly the trigger point requiring declines in 2 consecutive years has not been activated.

Seasonal patterns in statewide catch and effort data show that catch rates are generally higher in summer months. This was again apparent for 2003/04, although more marked than in most years. Catch rates for the months March to June were lower than for the same months in 2002/03, while catch rates November to February were considerably higher than for corresponding months in 2002/03.

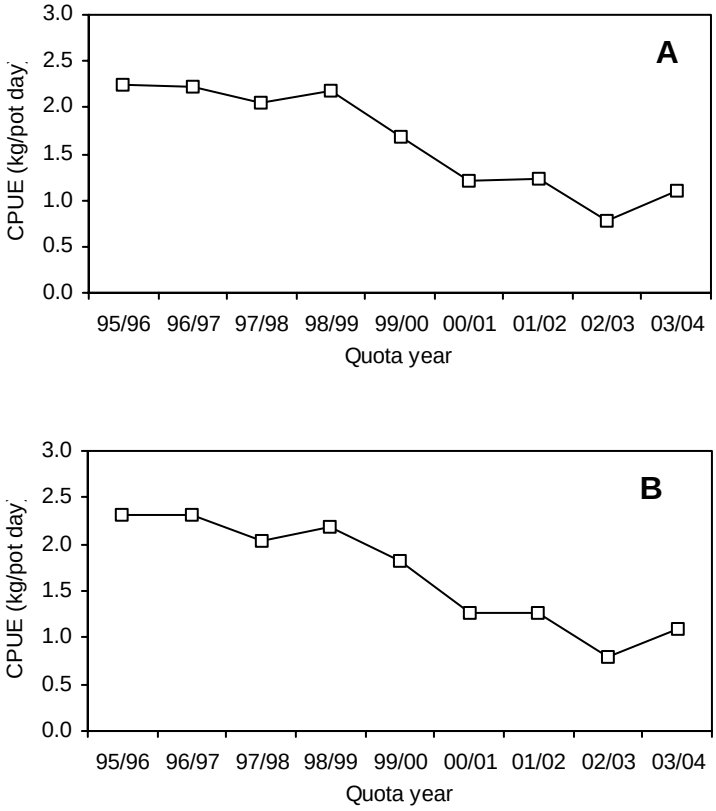

Figure 2. Trends in annual catch per unit effort statewide since 1995/96. Years are split by quota years (March –February). Effort is pot days. A- all fishers data included. B – data restricted to fishers who caught over 2000kg in at least one quota year.

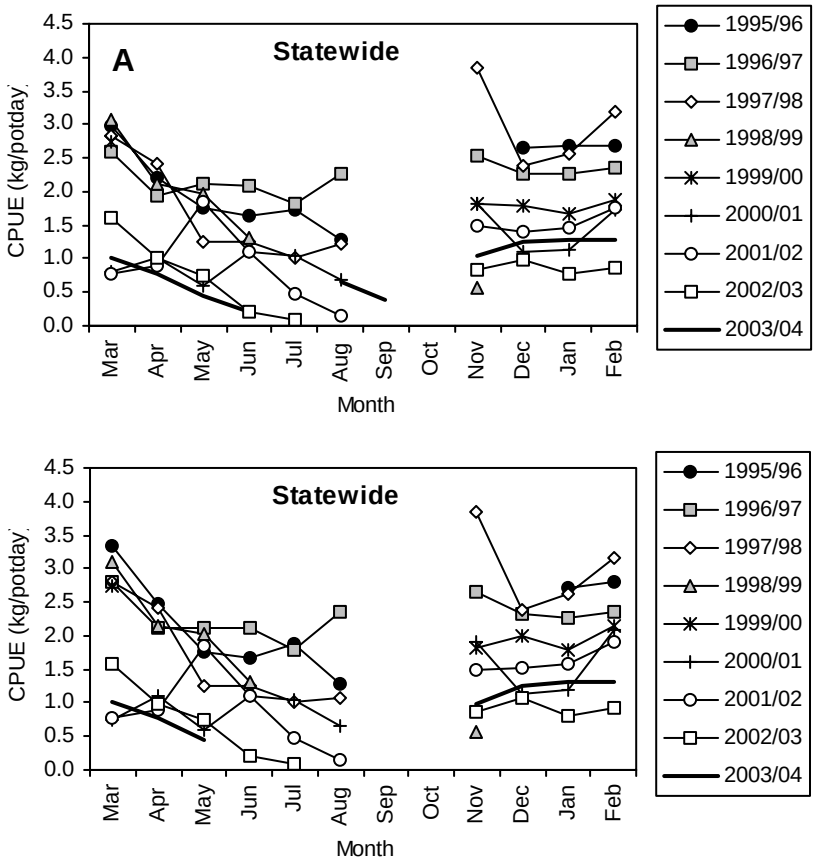

Figure 3. Statewide seasonal patterns in CPUE since 1995. **A**- all fishers data included. **B** – data restricted to fishers who caught over 2000kg in at least one quota year.

Total effort for the 2003/04 quota year was the lowest since the introduction of quota, and was 47% down on the previous year. Statewide effort for the months May to September was the lowest seen since reliable records were available (Figure 4). Notably, 70% of total effort occurred in the months of November to February, compared with an average across all years of 44% for these months. As these months also correspond with the highest CPUE, this is partially responsible for the observed rise in CPUE in 2003/04.

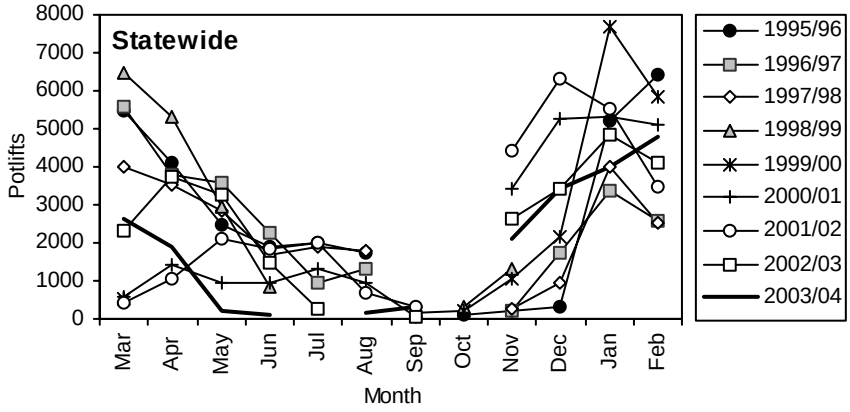

Figure 4. Statewide seasonal patterns in effort (pot days) since 1995.

Figure 5 shows the frequencies of catch rates of individual records for each year since 1995. There is a clear pattern of change in the shape of these distributions through time. The distributions have tended to shift to the left, which implies that catch rates are declining. The marked shift to the left that occurred in the 2002/03 season supports the large decline in CPUE for that year. While the sift back to the right for 2003/04 is only minor, a decreases in the percentage of 0.5 to 1.5 kg/potday records and increases in the 2.0 to 3.5 kg/potday records can be seen.

Regional catch rates

The second trigger relating to CPUE is stated as "CPUE for any region declines by a total of 20% in two years". While 6 of the 8 assessment areas (areas 2-7) established for lobster assessment have previously been used to assess this trigger point, high inter-annual variability in CPUE between areas limits the usefulness of this measure, and information on fisher behaviour and crab movement suggest that the crab fishery divides more logically into west and east coasts (Figure 6). Results for both divisions are presented here.

The stated trigger point is not activated if the east/west division is used. The recent trend of fairly stable CPUE on the east coast continued in 2003/04 (Figure 7), with a decline of 9% over 2 years (Table 1). The marked reversal in CPUE trend on the west coast has

Regional CPUE based on assessment blocks is once again highly variable, with no clear pattern between regions (Figure 8). The trigger point of a total decline in CPUE of 20% in 2 years was breached in 3 of the 6 assessment areas (Table 1). These were areas 2 (SE, -59%), 6 (central W, -26%) and 7 (SW, -29%). Notably these areas all show an increase in CPUE from the 2002/03 quota year, however in all cases this is not large enough to make up for large decrease from 2001/02 to 2002/03.

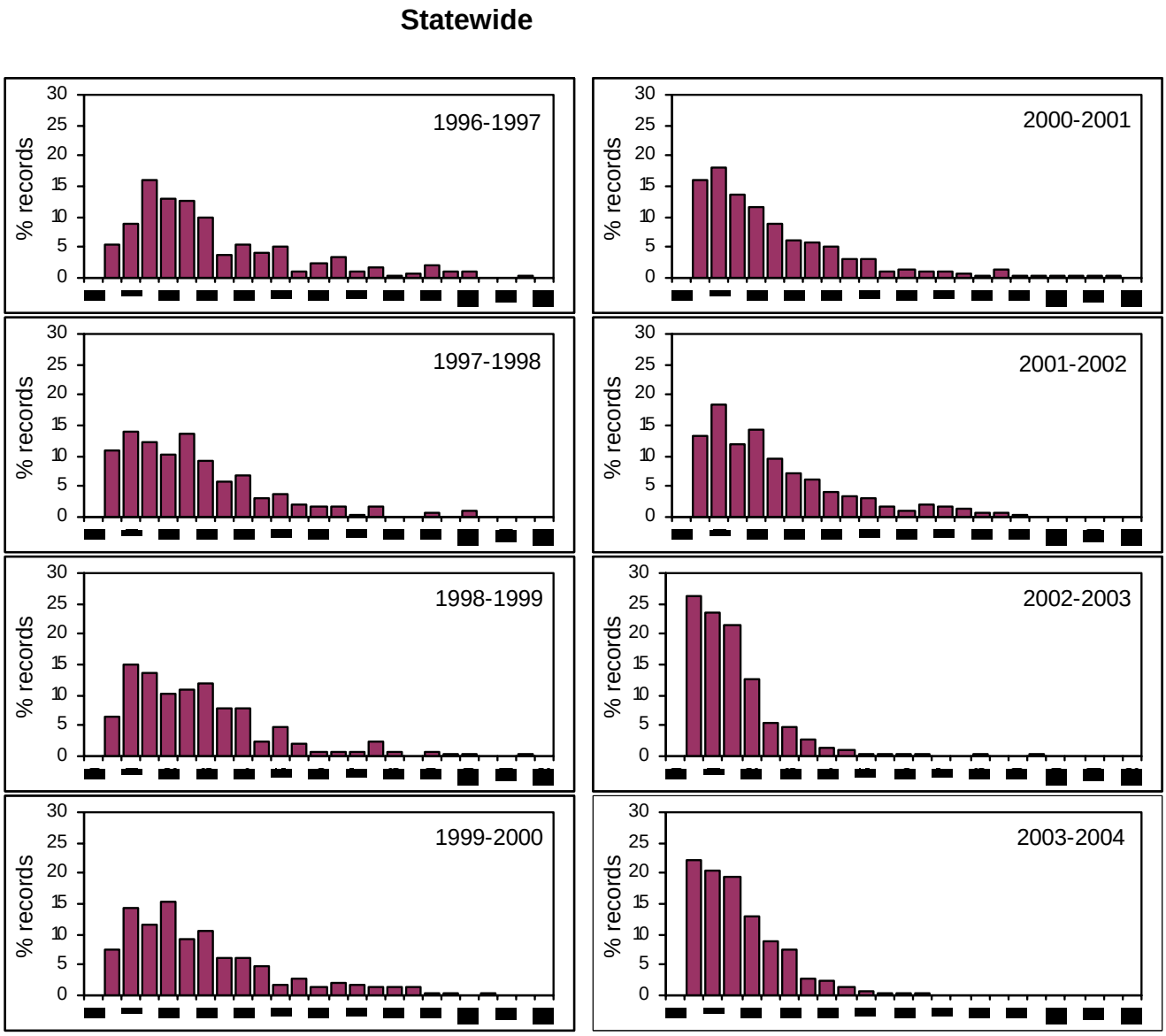

Figure 5. Frequencies of catch rate (x-axis; kg/potday) for individual records in fisher logbook returns (split by quota years) from statewide. Note that the distribution of these is not normal, which implies that the arithmetic means of catch rate will be biased. Also, note that the distributions are shifting to the left through time, which indicates a shift towards lower catch rates. Frequencies of catch rates of zero crabs per shot are excluded.

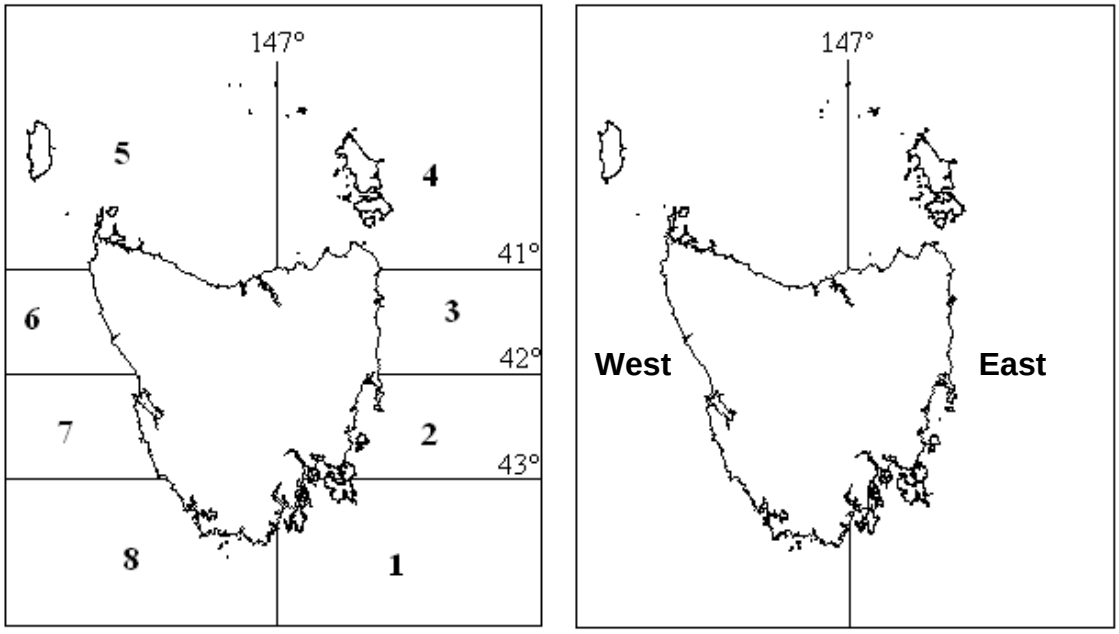

Figure 6. Regional stock assessment areas used for evaluation of regional catch rates. On the left, the state is divided into eight areas as set for the Tasmanian rock lobster fishery. On the right, the state is divided into two regions: east (Stock Assessment Areas 1-4 combined) and west (Stock Assessment Areas 5-8 combined).

Table 1. Catch per unit effort (CPUE) in each assessment area for the 2003/2004 quota year relative to CPUE 5, 2 and 1 year ago. All fisher's data included.

Area	CPUE 98/99	CPUE 01/02	CPUE 02/03	CPUE 03/04	% Change 5 years	% Change 2 years	% Change 1 year
East	2.52	0.85	0.85	0.77	-69	-9	-9
West	1.68	1.53	0.75	1.33	-21	-13	+78
2	2.79	1.58	0.31	0.66	-76	-59	+111
3	2.50	0.85	0.72	0.83	-67	-2	+15
4	2.47	0.77	1.03	0.76	-69	-1	-26
5	0.75	1.38	0.75	1.72	+130	+25	+129
6	2.13	1.68	0.67	1.24	-42	-26	+84
7	2.05	1.57	0.80	1.11	-46	-29	+39

Table 2. Catch per unit effort (CPUE) in each assessment area for the 2003/2004 quota year relative to CPUE 5, 2 and 1 year ago. Data restricted to fishers who caught over 2000kg in at least one quota year.

Area	CPUE 98/99	CPUE 01/02	CPUE 02/03	CPUE 03/04	% Change 5 years	% Change 2 years	% Change 1 year
East	2.54	0.86	0.92	0.77	-70	-10	-16
West	1.69	1.55	0.73	1.34	-21	-13	+84
2	2.79	1.62	0.31	0.66	-76	-59	+111
3	2.51	0.85	0.72	0.83	-67	-2	+15
4	2.50	0.78	1.20	0.76	-70	-3	-37
5	0.74	1.41	0.75	1.77	+139	+26	+136
6	2.12	1.68	0.62	1.29	-39	-23	+109
7	2.05	1.57	0.80	1.10	-46	-30	+37

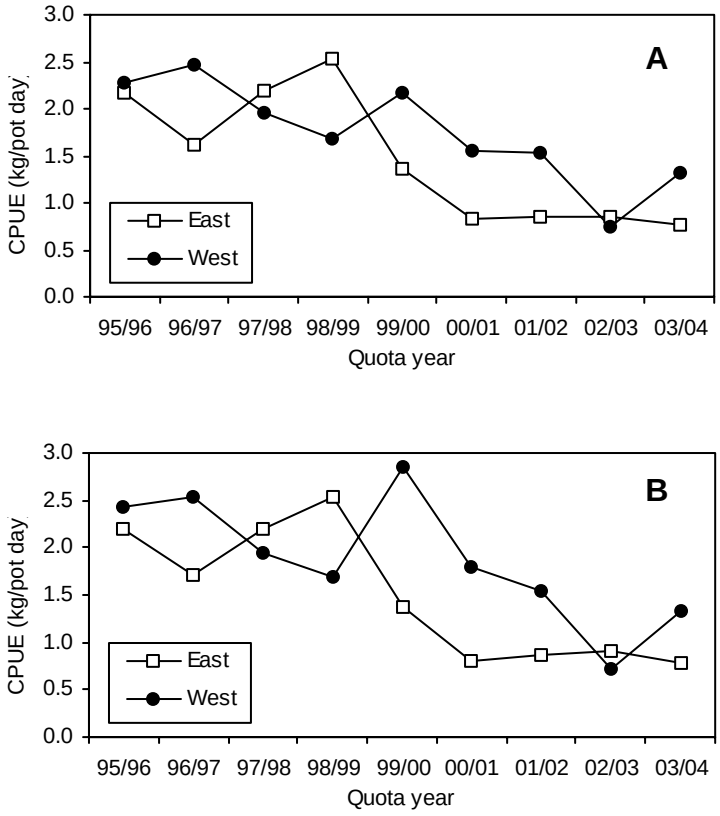

Figure 7. Trends in annual catch per unit effort for the east (Assessment Areas 1-4) and the west coasts (Assessment Areas 5-8) since 1995/96. Years are split by quota years (March –February). Effort is pot days. **A**- all fishers data included. **B** – data restricted to fishers who caught over 2000kg in at least one quota year.

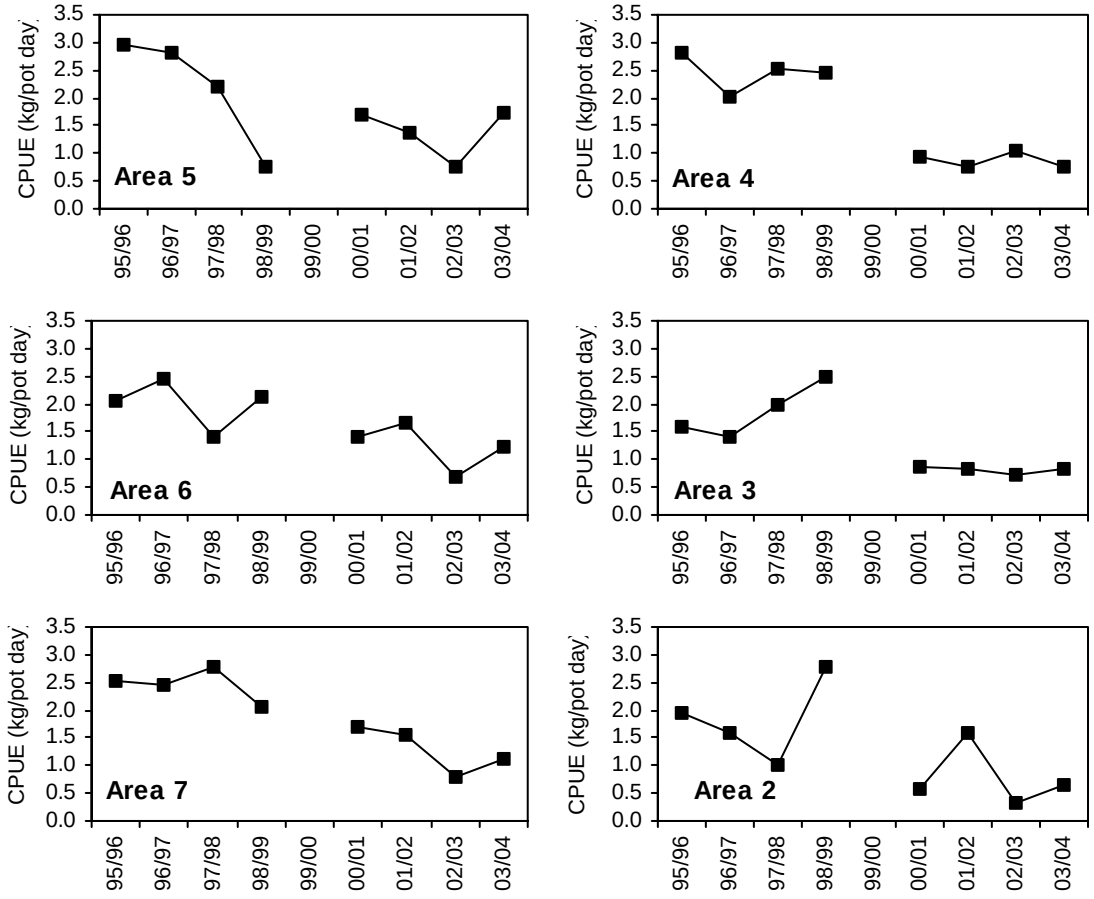

Figure 8. Trends in catch per unit effort (CPUE) using all fisher's data from each of the 6 main assessment regions. Years are split by quota years (March –February). Effort is pot days. 1999/2000 excluded as season was shorter due to closure.

Seasonal patterns of catch rates and effort varied markedly between the east and west coasts. Catch rates on the east coast (Figure 10) showed a consistent trend of rising in the summer months, and being relatively low either side of the closure. On the west coast no fishing was reported in May, June and July, however CPUE for November to February appears to be considerably higher than for the months before the closure. Differences in effort are more striking (Figure 11). Effort on the east coast was low throughout the year compared with previous years, but patterns largely followed trends in CPUE. On the west coast there was very little fishing from March to September, however effort from November to February was similar to, although slightly lower than, that in the preceding 3 years.

Frequency distributions for catch rates from individual records on the east (Figure 12) and west (Figure 13) coasts also show markedly different patterns. East coast records show a considerable increase in the frequency of 0.5-1.0 kg/potday records from 2002/03 to 2003/04, consistent with a decrease in CPUE. Conversely west coast figures show a decrease in the frequency of both the 0.5-1.0 and 1.0-1.5 kg/potday records, and an increase in the frequency of 2.5 to 5.0 kg/potday records.

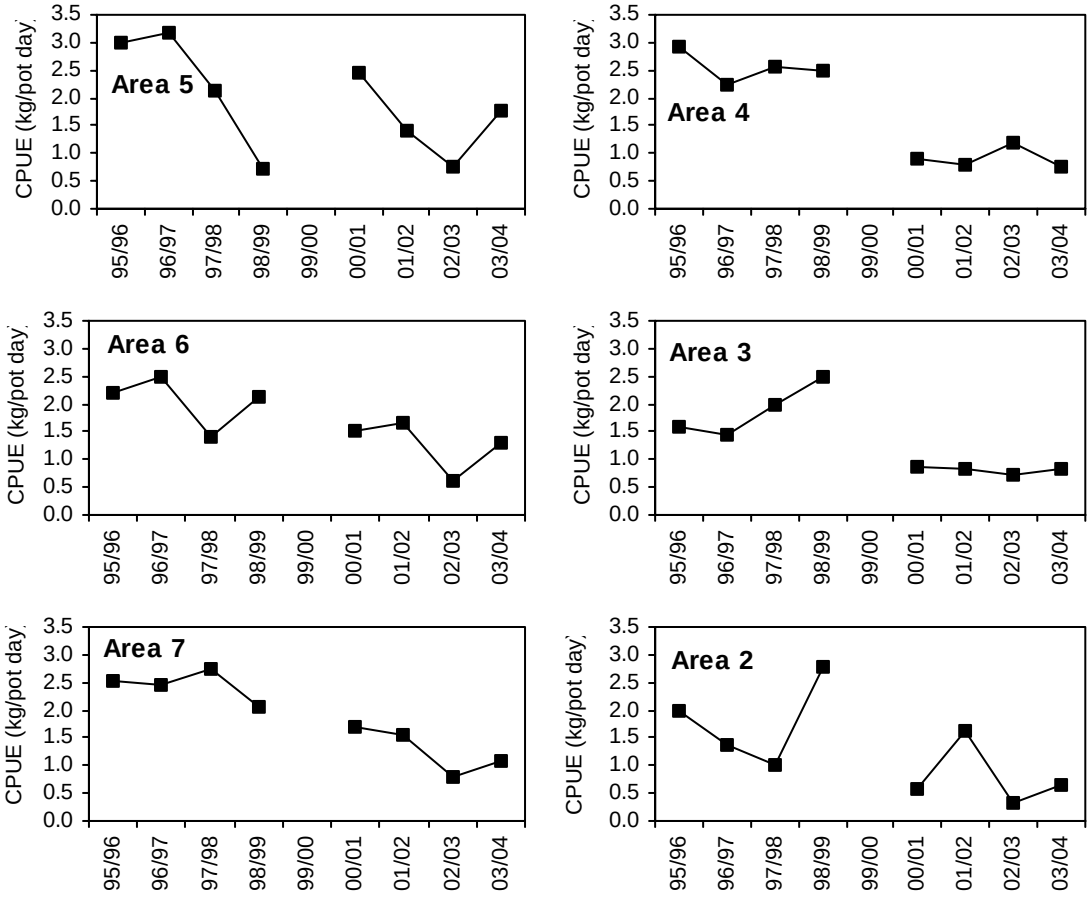

Figure 9. Trends in catch per unit effort (CPUE) from each of the 6 main assessment regions using data restricted to fishers who caught over 2000kg in at least one quota year. Years are split by quota years (March –February). Effort is pot days. 1999/2000 excluded, as season was shorter due to closure.

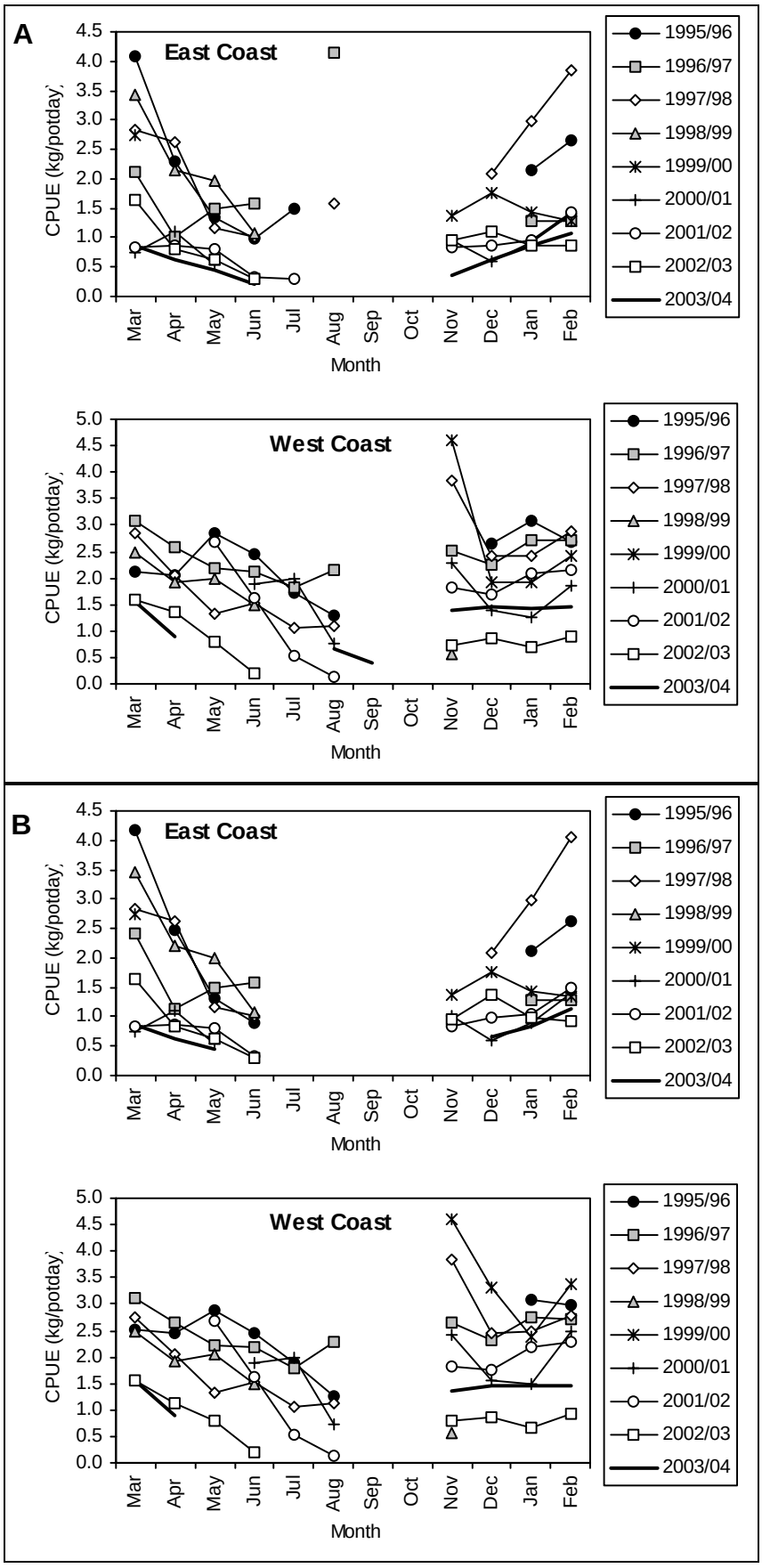

Figure 10. Seasonal patterns in CPUE (kg/potday) for the east coast (Assessment Areas 1-4) and the west coast (Assessment Areas 5-8) since 1995. **A**- all fishers data included. **B** – data restricted to fishers who caught over 2000kg in at least one quota year.

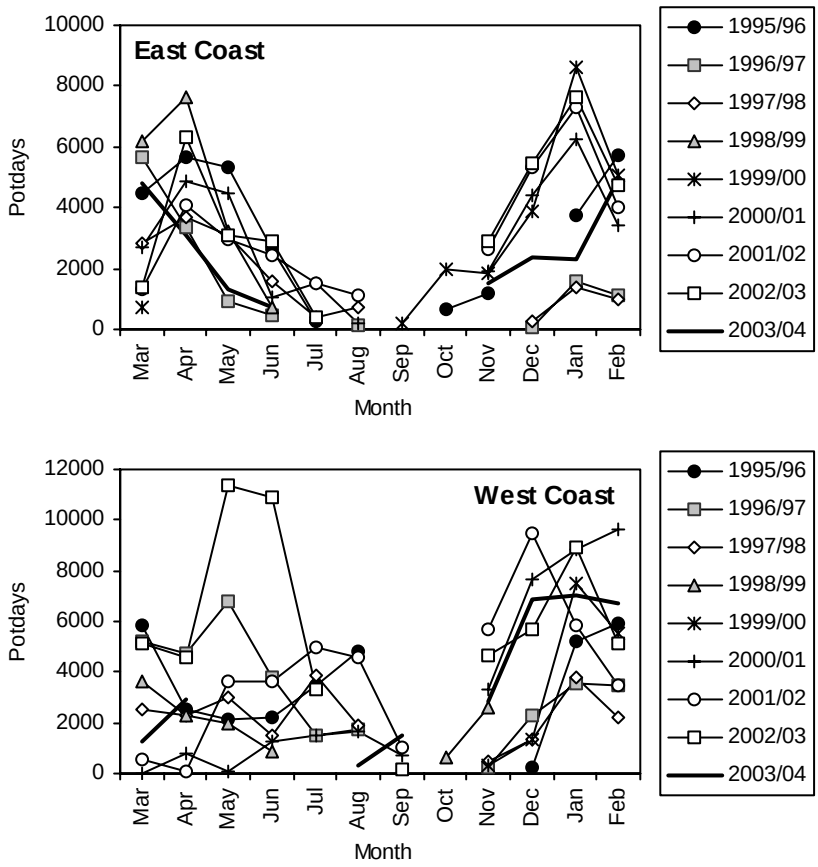

Figure 11. Seasonal patterns in effort (potdays) for the east coast (Assessment Areas 1-4) and the west coast (Assessment Areas 5-8) since 1995.

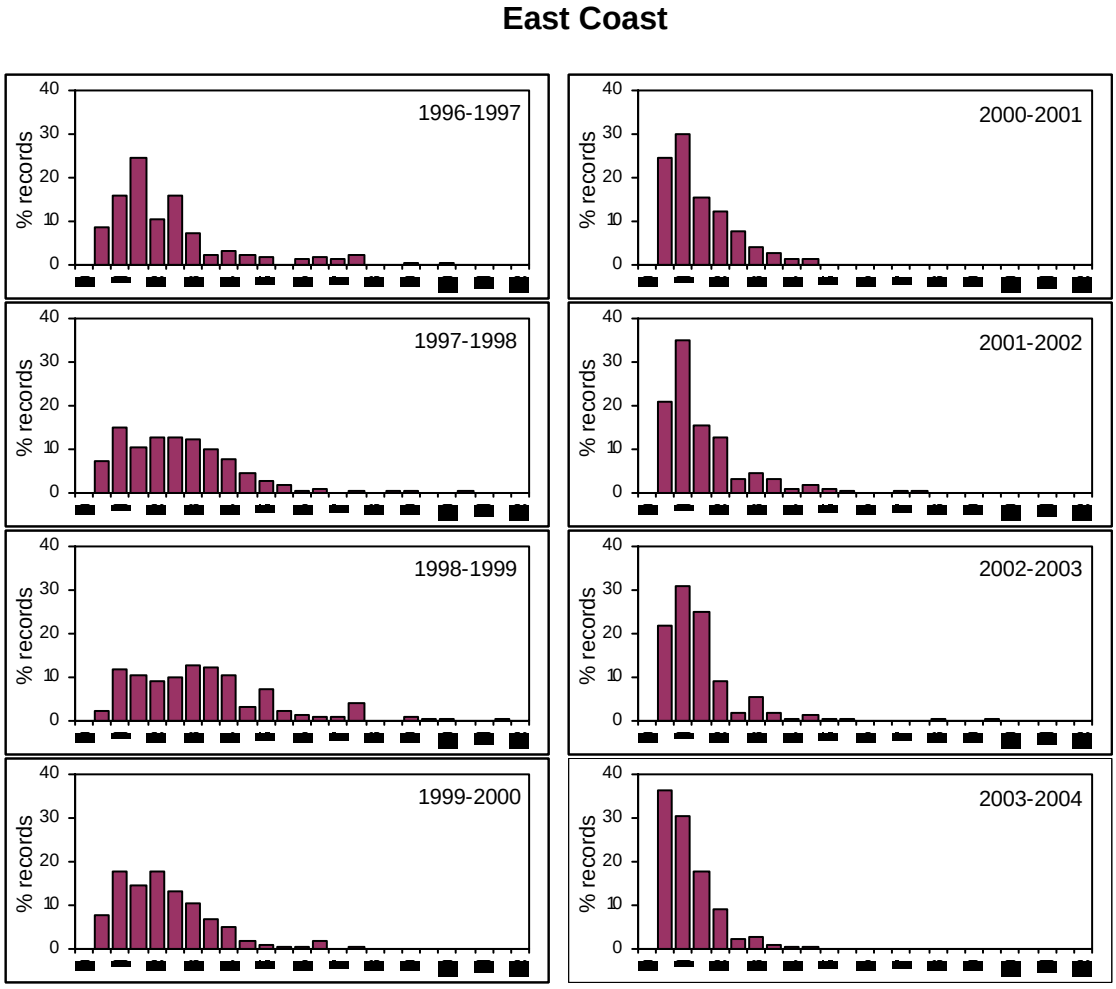

Figure 12. Frequencies of catch rate (x-axis; kg/potday) for individual records in fisher log book returns (split by quota years) for the east coast (assessment areas 1-4). Note that the distribution of these is not normal, which implies that the arithmetic means of catch rate will be biased. Also, note that the distributions are shifting to the left through time, which indicates a shift towards lower catch rates. Frequencies of catch rates of zero crabs per shot are excluded.

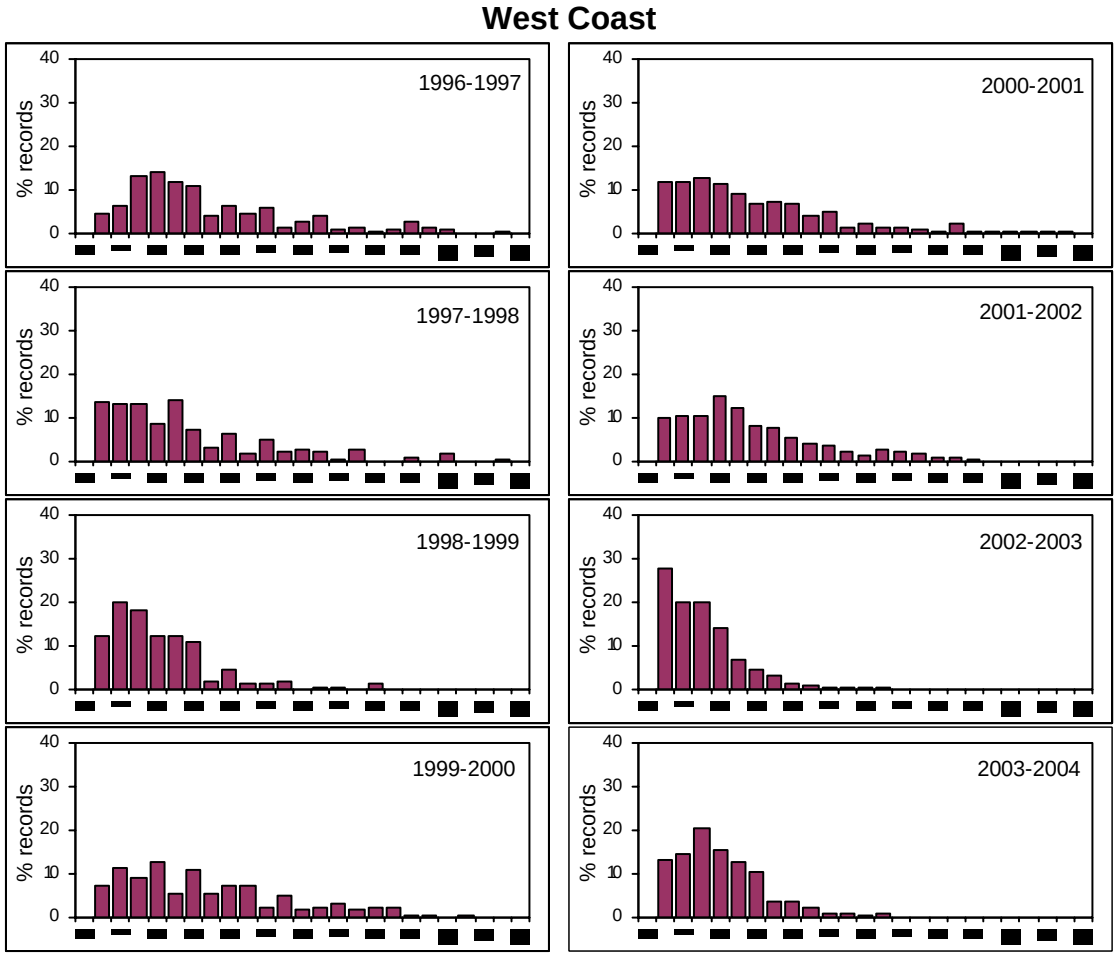

Figure 13. Frequencies of catch rate (x-axis; kg/potday) for individual records in fisher log book returns (split by quota years) for the west coast (assessment areas 5-8). Note that the distribution of these is not normal, which implies that the arithmetic means of catch rate will be biased. Also, note that the distributions are shifting to the left through time, which indicates a shift towards lower catch rates. Frequencies of catch rates of zero crabs per shot are excluded.

2.1.2 Total annual commercial catch

Two triggers are based on the total annual commercial catch:

- The total yearly catch is not less than 90% of the TAC in any year;
- The bycatch of giant crabs taken by lobster fishers does not exceed 5 tonnes in any year.

Total yearly catch

Catch weight of giant crab is recorded at several stages, at the time of capture in commercial logbooks, at the time of landing through the quota audit system. Data presented is from the quota audit system.

Total yearly catch was 59.3 tonnes, representing 57% of the TAC, well down on the 90% trigger point. Given the reported rise in CPUE on a statewide basis, this low catch rate is clearly a result of low effort.

Table 3. Total catch of giant crab for quota years since introduction of the TAC. Catches recorded by fishers through the quota monitoring system are recorded as "QMS".

Year	QMS Total catch (kg)	QMS Total N	Mean weight (kg)	Logbook weight (kg)
1999/00	53054	16394	3.24	64811
2000/01	96226	28627	3.36	86510
2001/02	98188	27268	3.60	96593
2002/03	76243	21062	3.62	78180
2003/04	59331	16689	3.56	59057

The manner in which catch for the quota year was accumulated is shown in Figure 14 and Figure 15. Accumulation in 2003/04 is clearly different from other years since the introduction of quota, and differs markedly from the previous quota year. In 2002/03 accumulation of catch was the fasted recorded for the period from March to June. In 2003/04 it was the slowest recorded for the same months. For 2003/04 this reflects the distribution of effort on the west coast, with next to no fishing over this period.

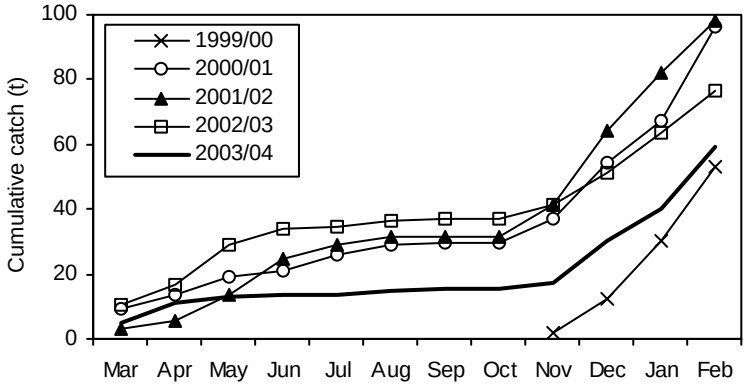

Figure 14. Cumulative catch obtained from the quota monitoring system (QMS). Cumulative catch is by month for each quota year since introduction of QMS in 1999. Note the 1999/00 season only ran from November 1999 until February 2000.

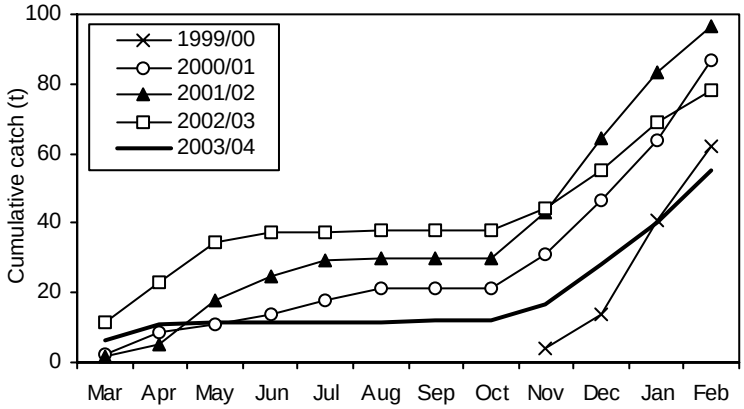

Figure 15. Cumulative catch obtained from fishers logbooks. Cumulative catch is by month for each quota year since introduction of QMS in 1999. Note the 1999/00 season only ran from November 1999 until February 2000.

Catch taken as bycatch

Giant crabs can be captured by a range of methods that fall outside the giant crab quota management system. Crabs can be captured in standard rock lobster gear, and provisions in the management plan allow for the landing of a small number of crabs as bycatch. The management plan includes a performance indicator that relates solely to bycatch taken in rock lobster pots.

Total bycatch of giant crabs taken by lobster fishers who did not hold giant crab quota is shown in Table 4, and continued the recent trend of steady decline. Only 30 kg of crab bycatch was reported by lobster fishers. Thus, the trigger of 5 tonnes has not been activated.

Table 4. Giant crab bycatch taken by lobster fishers without giant crab quota.

	Giant crab bycatch (t)	% of total landings
1999/00	0.87	1.61
2000/01	1.11	1.14
2001/02	0.65	0.66
2002/03	0.18	0.24
2003/04	0.03	0.05

In the past fishers have also reported capturing giant crabs using set nets, baited hooks and trawl. Reported giant crab catch taken by all gear types managed by the State of Tasmania are small relative to catches from crab traps with catches exceeding 100 kg only for graball nets in 1997/98 and shark nets from 1995/96 to 1997/98 (Figure 16). In 2003/04 there were no reports of giant crabs captured by these methods.

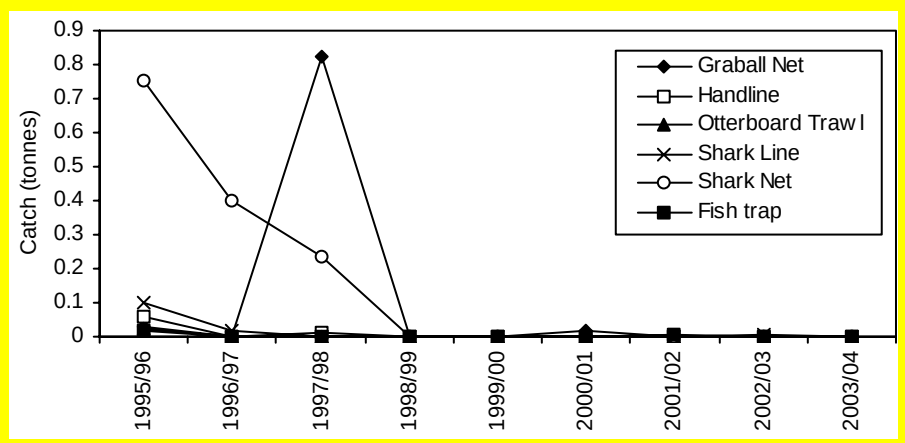

Figure 16. Giant crab catch reported through Tasmanian State managed fisheries for gear types other than giant crab traps or lobster pots.

Statistics for crab bycatch from the south east trawl fishery were not available at the time of compiling this draft report

2.1.3 Size distribution of the commercial catch

There are 2 trigger points in the current management plan relating to the size distribution of the commercial catch:

- The proportion of the catch above 5kg varies by more than 30% compared to the 1996/97 distribution;
- The proportion of the catch below 3 kg varies by more than 30% compared to the 1996/97 distribution.

The size distribution of the commercial catch provides a guide to changes to the population as a result of fishing mortality and recruitment pulses. However, these data must be interpreted with caution, as fishers are able to target fish of different size by varying the depth at which they fish. As market demand for fishes of different size changes, fishers will target sizes that provide the best returns. In recent years small crabs have been increasingly favoured.

Information on size distribution is obtained from several sources including:

- voluntary measuring of catch (including undersize) by commercial fishers;
- mean weights from estimated catch and number data in commercial log books;
- mean weights from measured weight and number in quota audit data; and
- weights of crabs sold into different price category splits.

Trigger points are assessed against the last of these only, and these data were not available at the time of writing this preliminary report.

Although no trigger point relates directly to data on the mean size of landed crabs collected through the quota audit process, these are useful for observing patterns in the size distribution of the population. Figure 17 shows the mean monthly weight of landed crabs since the introduction of QMS in 1999. No trend is apparent, which would suggest stability in size structure of the landed catch. The considerable rise in the September for the 2002/03 and 2003/04 mean monthly weight is of no concern as it is based on a small amount of catch.

Catches are composed mainly of legal size crabs so there is less power in logbook data to detect trends in undersize crabs (Figure 18). Nonetheless, it appears that undersize catch rates on both east and west coasts are fairly stable, with a notable upward trend on the west coast parallelling an increase in legal sized catch.

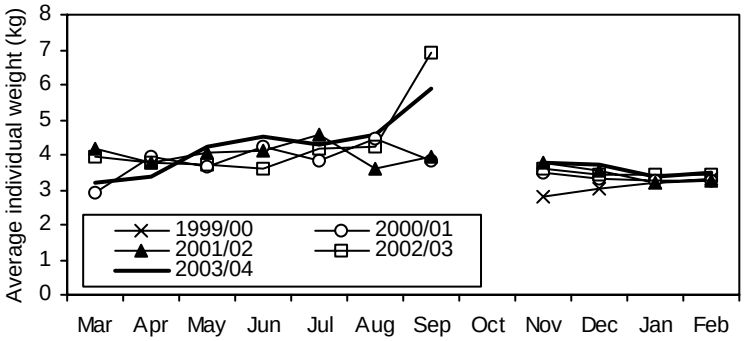

Figure 17. Average weight of crabs landed by month for each year since the introduction of quota management. These data are drawn from numbers and weights reported through the quota audit process.

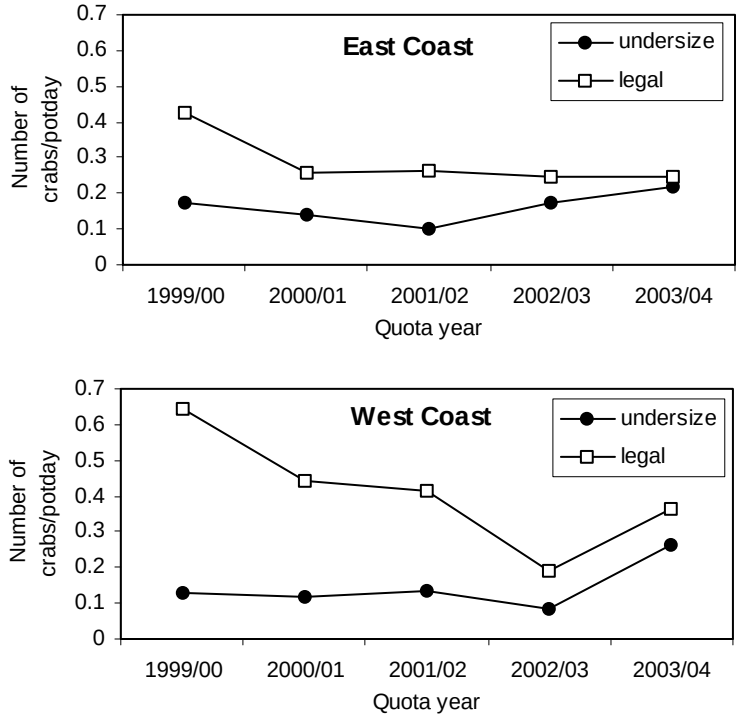

Figure 18. Changes in catch per unit effort (number of crabs per potday) between the legal and undersized proportion of the total catch for both the east and west coasts.

2.2 Other analyses

2.2.1 Bycatch of other species in the crab fishery

No additional bycatch data have become available since 2001/02, when this information was collected as part of an FRDC project aimed at improving giant crab assessment techniques. The most common species, in order of abundance were the antlered crab *Paromola petterdi*, hermits crabs (*Strigipagurus strigimanus* and *Dardanus arrosor*) and pink ling *Genypterus blacodes*.

2.2.2 Byproduct

Byproduct differs from bycatch in that it is retained for sale. Information on byproduct is collected through the general fish logbook and can be traced back to giant crab fishing where the fisher specifies their gear type as “crab traps” or “lobster pots”. This byproduct catch from crustacean traps is included in the fisheries assessment for those species. As in previous years octopus formed the bulk of byproduct from lobster pots in 2003/04.

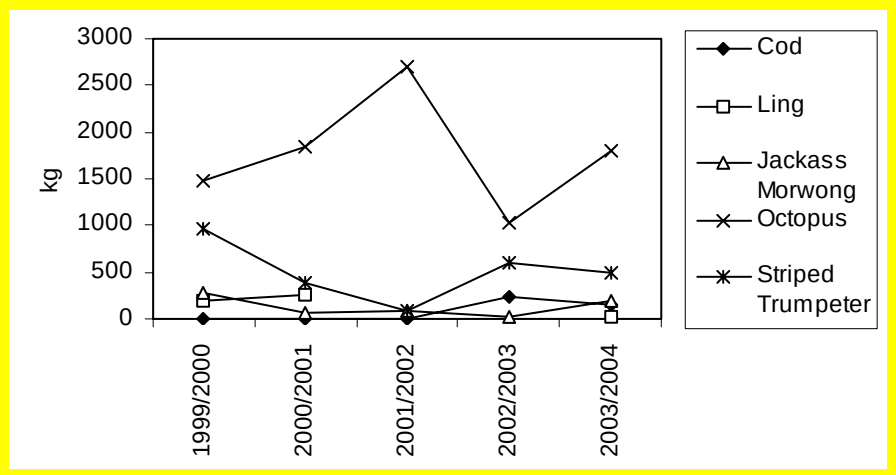

Figure 19. Byproduct reported from fishers using "crab traps" or "lobster pots" excluding inshore species such as wrasse or species where less than 100 kg of catch has been reported. The distinction between "crab trap" and "lobster pot" gear types is ambiguous so these gear types are combined. .

2.2.3 Protected species interactions

No interactions between fishers and protected species were reported over the last year, although this information is currently collected only in an ad-hoc manner by encouraging fishers to report interactions. To assist with data collection on this issue, a revised logbook will soon be introduced which includes a component on protected species.

2.2.4 Ecosystem impacts and interactions

A collaborative project between CSIRO and TAFI addressing issues of habitat structure and fishery interactions in the shelf-break zone (180-400 m) is entering its second year. Objectives of this project are:

- Evaluate the vulnerability of shelf-edge habitat to damage by trawl and trap fishing gears.
- Detail the distribution of exploited shelf-edge species in relation to habitat features.
- Define and map key habitats on the shelf edge (~80-180 fm) at key locations around Tasmania where fisheries using different gear types interact.
- Evaluate ecosystem links within habitats, specifically trophic, temperature and current-flow links.
- Evaluate our ability to use video to obtain fishery independent stock assessment information such as abundance, sex ratio, condition and size of target species.

These objectives are being addressed through comprehensive surveys of areas of interest using acoustic (swath) mapping, video transects and biological sampling.

In October 2004 a review meeting was held involving stakeholders, project staff, and scientists with expertise in the fields of habitat assessment and assessing the effects of fishing. The

purpose of this meeting was to maximize the value of the project for all interests through refining methodology and sampling regime. The main outcome of this review was a modification of survey design through further analysis of spatial distribution of trawl and crab effort and crab abundance. From this process 41 areas of interest on the west coast of Tasmania were identified. These points were chosen to cover a full range of crab distribution (from no crabs through to 'hotspots' for crab catch), areas of varying effort ranging from high crab effort - no trawl to high trawl effort – no crab, and hotspots for interaction between the fisheries. 'Hotsposts' for undersize crabs (Figure 20) and male and female crabs will also be targeted. Video sampling design for each point of interest was also refined (Figure 21)

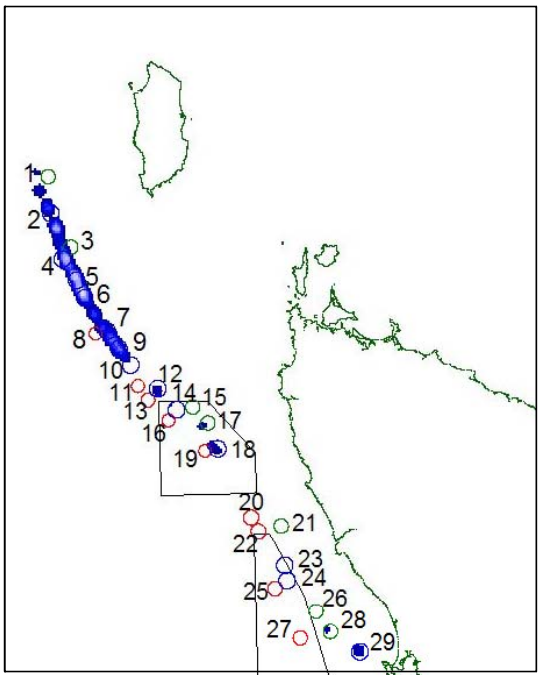

Figure 20. Circles show points of interest identified in the north west for a range of reasons mentioned in the text. On this map data identifying undersize crab 'hotspots' are shown

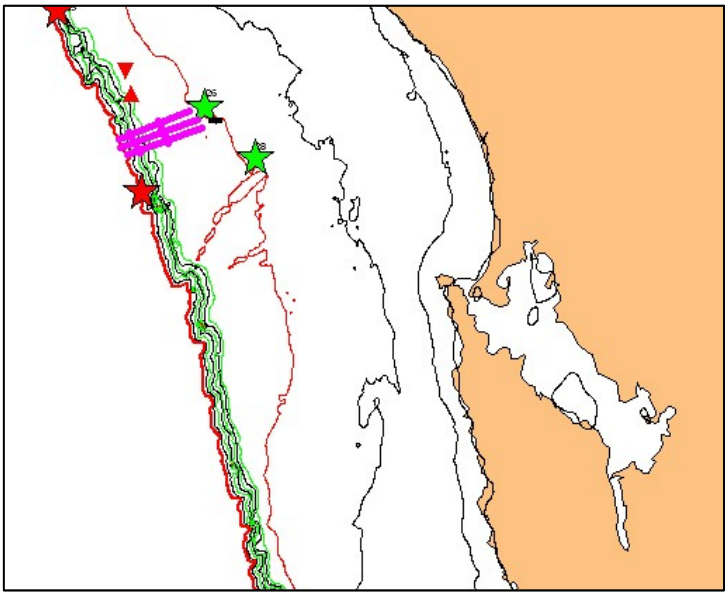

Figure 21. Pink lines show video transect sampling for a point of interest off Macquarie Harbour. Other marks identify spots where biological samples (dredge or grab) have been taken.

Three field-sampling trips have now been completed for this project. The first, reported in the previous assessment report, was a pilot survey investigating the utility of proposed methods for achieving the project objectives. Centered on the northeast, this cruise yielded some excellent habitat footage and confirmed that our methodology was appropriate.

A second cruise on the national facility vessel FRV Southern Surveyor completed biological sampling and swath mapping of much of the shelf-bread zone on the west coast of Tasmania, as well as some sites in the northeast. Video footage of some points of interest on the west coast was also obtained on this cruise.

The third voyage, on FRV Challenger was partially complete at the time of writing. The objective of this cruise was to complete video transects at five points of interest on the west coast.

Camera work from all cruises has provided excellent footage of giant crabs in situ, providing the first insights into habitat use by this species (Figure 22)

Figure 22. Deep water video system used for collecting images of giant crab habitat and a male giant crab encountered on the first survey at around 300 m.

2.2.5 Spatial distribution of effort and catch

When compared with the previous year some redistribution of effort towards areas 4 (NE) and 7 (SW) was seen in 2003/04 (Figure 23). Proportion of effort in area 4 returned to levels seen in 2001/02, while proportion of effort in area 7 has increased steadily since 2001/02. Proportion of effort in all other areas showed decreases of varying magnitude over the previous year, the greatest decrease being in area 6 (W).

While proportion of effort in area 5 (NW) has remained fairly stable, the proportion of catch taken from this area in 2003/04 increased markedly (Figure 24) reflecting a large increase in CPUE for this area (Figure 8). Conversely, the proportion of effort in area 4 increased, while the proportion of catch taken in this area decreased, reflecting a decline in CPUE (Figure 8).

When these statistics area condensed down to east and west coast (Figure 25), considerable shifts from the previous quota season can be seen. Proportion of effort on the east coast was up marginally, while proportion of catch was down; the converse was true for the west coast. This change represents a 'correction' back to patterns seen since 1999/00 after an anomalous year in 2002/03.

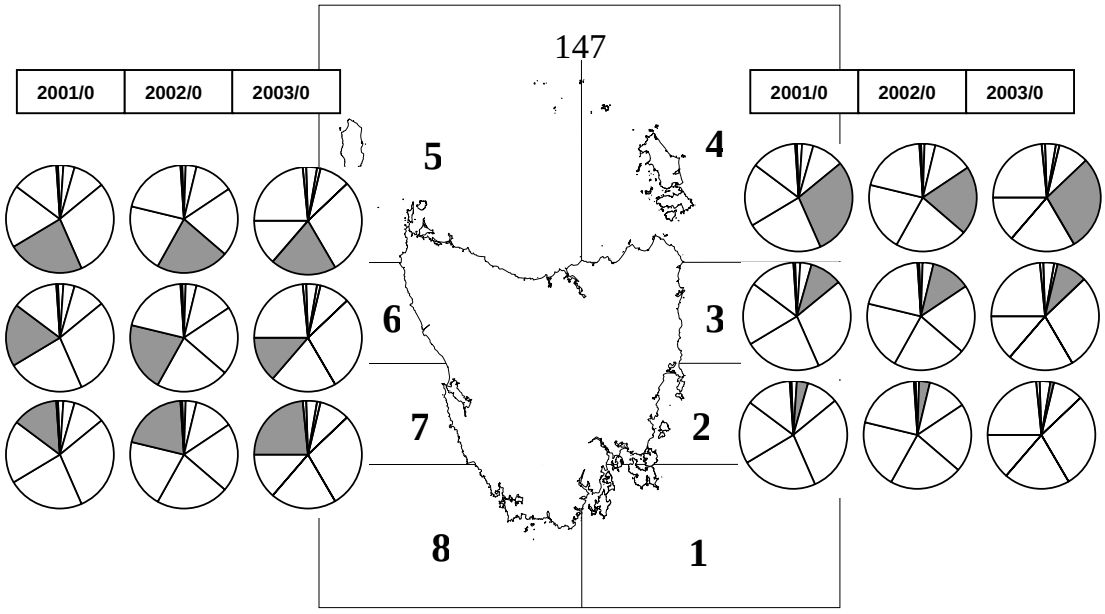

Figure 23. Distribution of effort of fishers targeting crabs from each assessment areas (as percentage of total number of potdays undertaken around the State). Effort from Areas 1 and 8 represent less than 3% of total effort.

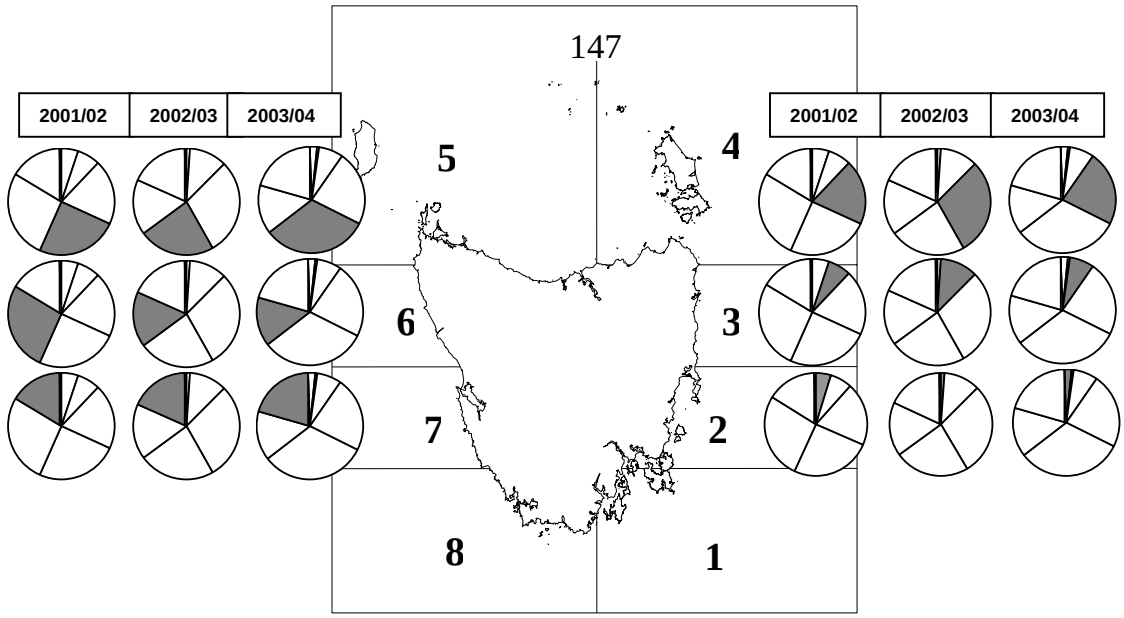

Figure 24. Distribution of legal-sized, retained catch between assessment areas (as percentage of total number of animals taken around the State). Catch from Areas 1 and 8 represent less than 1% of total catch.

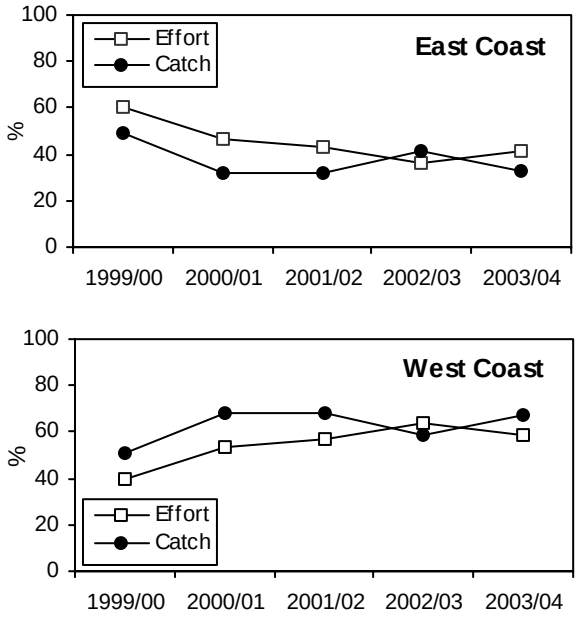

Figure 25. The percentage of catch (legal-sized retained) and effort (potdays) of the statewide total for both the east coast (assessment areas 1-4) and the west coast (assessment areas 5-8).

2.2.6 Structure of catches: proportion undersize, female/male, and discarded

Fishers provide details of the structure of their catch in terms of the number of males and females retained, the number of undersize crabs discarded, and the number of animals discarded for other reasons (eg oversize, damaged or berried). This information is a valuable guide to changes in the fishery and will assist in interpreting changes in catch rate. Note that the Nov 1999 – February 2000 season was incomplete due to closures for the introduction of quota.

Seasonal patterns

We noted in Section 2.1.1 that catch per unit effort varies seasonally, and that the usual pattern of highest effort in November to March was more extreme in 2003/04 than seen previously. This period corresponds to those months where a large proportion of the retained catch is female (approximately 2-3 females for each male retained; Figure 26). The proportion of females in the retained catch declines in autumn, as females become ovigerous or berried and must be released (see fishery rules – Appendix 1).

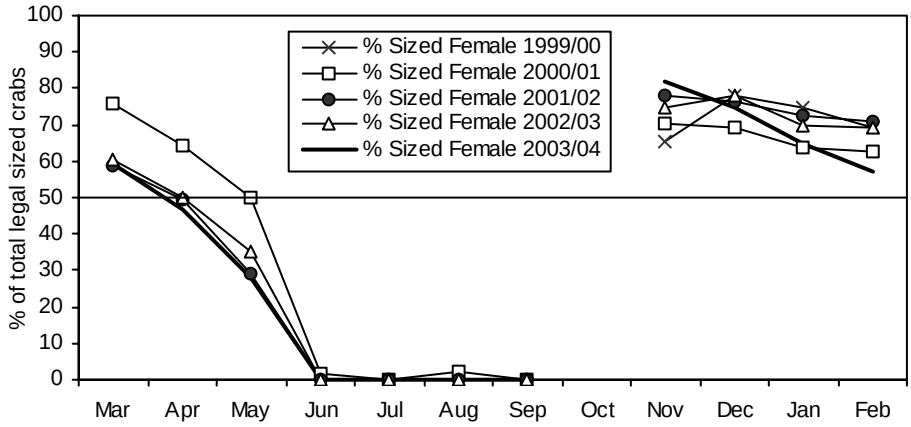

Figure 26. The proportion of retained giant crabs that were female for each month since November 1999. Note these proportions are based on number of individuals, not weight, and that a proportion of 0.75 equates to catch comprised of three females for every male. The horizontal line at 50% represents the proportion where equal numbers of males and females were taken.

The legal minimum size limit for giant crabs is 150mm carapace length, with a maximum of 215mm. There are no consistent seasonal patterns in the proportion of undersize giant crabs in the catch (Figure 27). Variability between months was far higher in 2003/04 than in previous years due to high numbers of undersize crabs reported in May and June. These relate to months with very low catch, where no fishing occurred on the west coast and effort in the east was also low. For the months from November to March when most effort was expended, catch of undersized crabs in 2003/04 appears to continue a trend of increasing annually.

Similarly, the proportion of legal sized crabs discarded was highly variable for the same months in 2003/04. Number of discards rose sharply in August and September (Figure 28), as females become ovigerous. Once again a small sample size may be part of the reason for the differences from previous years. Some fishers reported releasing large legal-sized undamaged crabs in 2003/04 as at times there was no market for large animals.

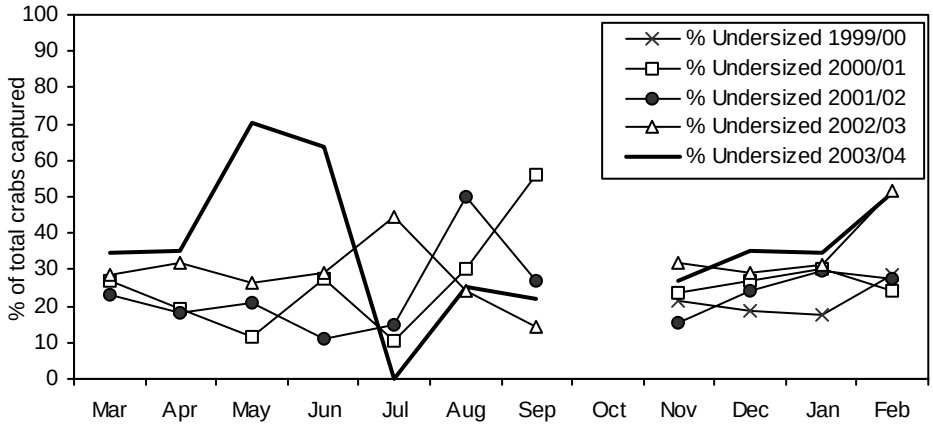

Figure 27. The proportion of giant crab catch that was undersize for each month since November 1999. Note these proportions are based on the number of individuals, not weight.

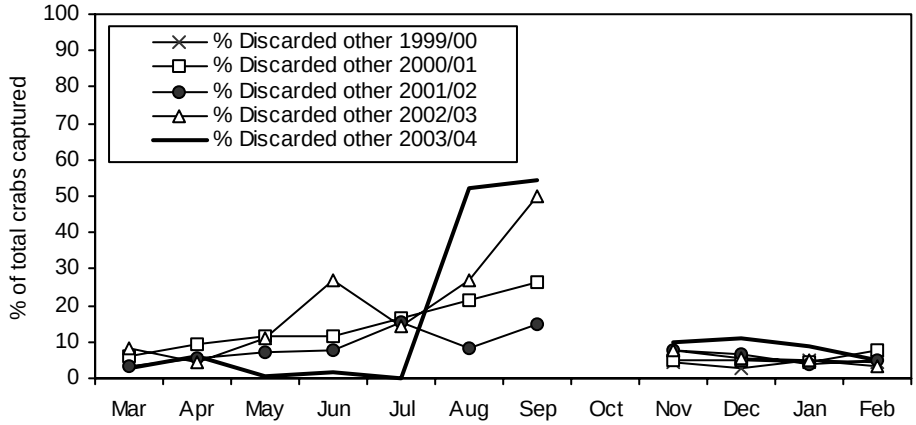

Figure 28. The proportion of giant crab catch that was discarded, but not undersize, for each month since November 1999. Crabs in this category include berried females, males larger than the maximum legal size of 216 mm, and animals with only one claw, which are usually discarded due to their low market value. Note these proportions are based on the number of individuals, not weight.

Interannular patterns

Information on the change in the proportion of females and undersize crabs in catches will be of value for future monitoring of annual changes in giant crab stocks. Data collected since November 1999 is presented here, although as noted earlier, data is available for only three full years.

The proportion of females in the retained catch and the mean weight appear stable since 2000/01, while the proportion of undersize crabs in catches appears to have been increasing steadily since 1999/00 (Figure 29).

Regional patterns are shown in Figure 30. The most notable change in 2003/04 was the increase in number of females retained from area 2, and the corresponding substantial decrease in the mean weight of crabs taken from this area. Catches on the east coast tend to include a higher proportion of females than those from the west. This is supported when the assessment areas are pooled for both the east and west coasts (Figure 31). Also of note is the statewide trend of increasing proportion of undersized crabs in catches is consistent for both regions.

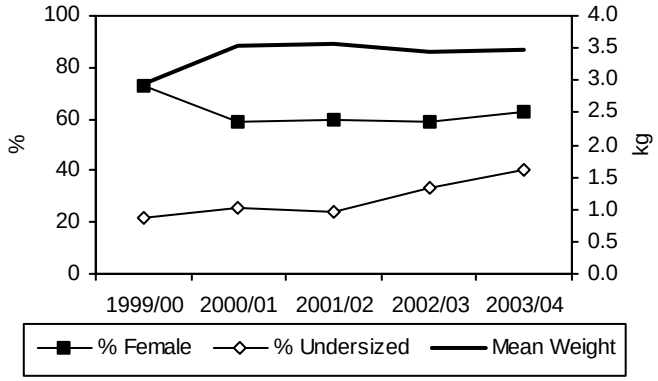

Figure 29. Statewide, interannual trends in the proportion of retained catch that was female, proportion of undersize in catch, and the mean weight of retained crabs.

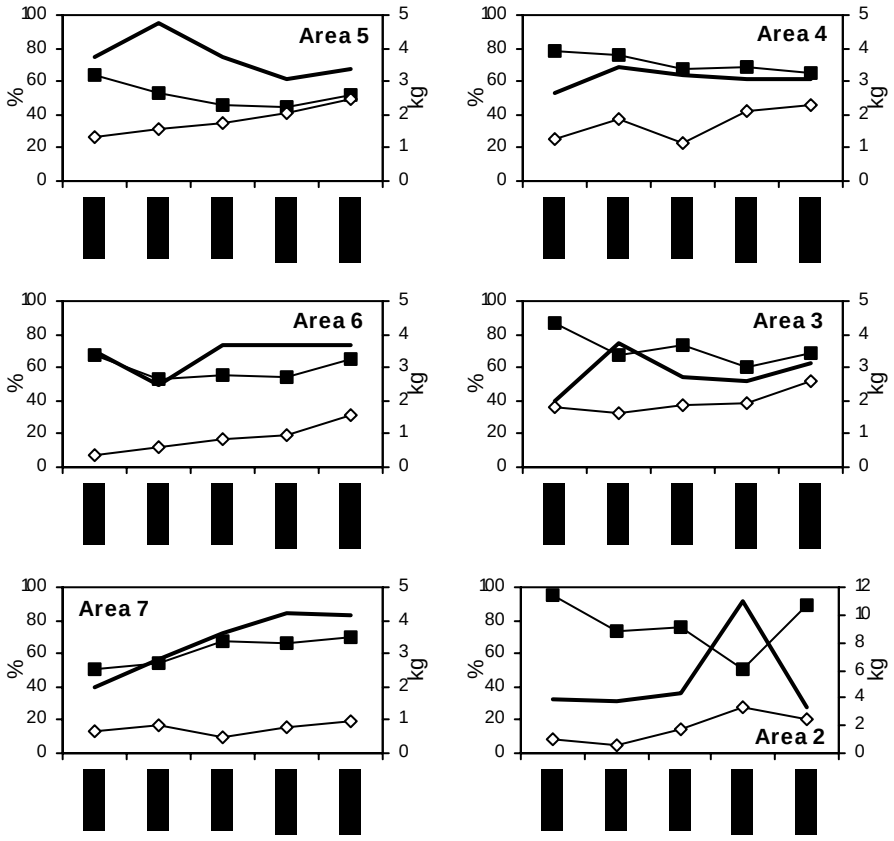

Figure 30. Interannual change in the proportion (based on numbers of individuals) of females in retained catch (solid squares), proportion of undersize in catch (hollow diamonds), and mean weight (heavy line) for each assessment area. Areas 1 and 8 are omitted due to low catches.

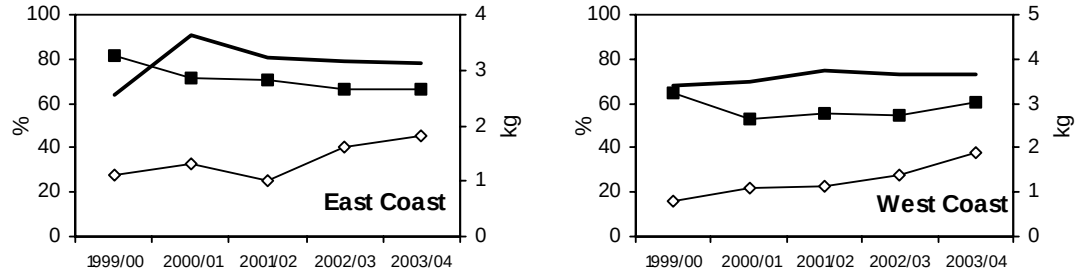

Figure 31. Interannual change in the proportion (based on numbers of individuals) of females in retained catch (solid squares), proportion of undersize in catch (hollow diamonds), and mean weight (heavy line) for both the east coast (Assessment Areas 1-4) and west coast (Assessment Areas 5-8).

3. Appendix 1. Summary of rules for the Tasmanian Giant Crab Fishery

Table 5. Summary of rules for the Tasmanian Giant Crab Fishery for the 2002/03 season.

COMMERCIAL	
Management zone	one management zone for the State (since January 1997)
Limited entry	106 licences (approximately 1/3 of the rock lobster licences in the state).
Limited seasons	Open season: 1st March -30th September, 11 November – 23rd February (both sexes).
Limits of pots on vessels	minimum of 15 pots, maximum of 50 pots
Quota	Total allowable catch of 103.5 tonnes (reduced following this assessment period).
Restrictions on setting pots	pots cannot be set for more than 48 hours in less than 120m depth
Restrictions on pot size	maximum size of 1250 mm x 1250 mm x 750 mm.
Escape gaps	one escape gap at least 57 mm high and 400 mm wide and not more than 150 mm from the inside lower edge of the pot, or two escape gaps at least 57 mm high and 200 mm wide and not more than 150 mm from the inside lower edge of the pot (as per rock lobster pot)
Size limits	minimum of 150 mm CL and maximum of 215 mm CL for both sexes
Berried females	taking of berried females prohibited

RECREATIONAL	
License requirements	rock lobster potting licence (recreational) - 1 recreational pot per person,
Daily limit	1 per recreational license holder
Limited seasons	as per rock lobster, same seasons for both sexes
Restrictions on setting pots	as per commercial fishers
Restrictions on gear	as per commercial fishers
Escape gaps	as per commercial fishers
Size limits	as per commercial fishers
Berried females	as per commercial fishers
Sale or barter of lobsters	prohibited