

Gulf St Vincent Prawn
(*Melicertus latisulcatus*)
Fishery 2006/07
Status Report

Fishery Status Report to PIRSA Fisheries

SARDI Aquatic Sciences Publication No. F2007/001074-1
SARDI Research Report Series No. 254

Roberts, S.D., Dixon, C.D. and Hooper, G.E.

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This Fishery Status Report documents the 2006/07 fishing season for the Gulf St Vincent Prawn Fishery, and is part of SARDI Aquatic Sciences ongoing assessment program for South Australia's Prawn Fisheries. Both commercial logbook data and fishery-independent survey data are documented, building on the historical information for this fishery, which was previously updated in the 2007 fishery assessment report for the 2005/06 fishing season.

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Sub-title Fishery Status Report to PIRSA Fisheries
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Approved by: Dr Tim Ward

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EXECUTIVE SUMMARY

1. The biomass on which the GSV prawn fishery is based is recovering since the lowest CPUE in 2002/03 during the contemporary catch history (1993/94 to 2006/07).
2. Annual survey catch rate increased by 45% between 2004/05 and 2006/07. During March, April and May surveys, catch rates increased annually since 2004/05.
3. Recruitment from 56 shots surveyed each May between 2004 and 2007 increased from 235 to 650 recruits/h.
4. The total commercial catch (not including survey catch) for the GSV Prawn Fishery in 2006/07 was ~209 t, a 20% increase from 2005/06 (~175 t).
5. Commercial catch during the early spawning period in 2006/07 was 26.5 t (12% of annual catch).
6. Annual (nominal) CPUE in 2006/07 was 91.4 kg/h, an increase of 27 % from 2005/06 (71.8 kg/h) and 42 % from 2004/05 (64.6 kg/h).
7. During the March 2007 harvest period, the mean prawn size harvested was 29.9 prawns/kg, which was outside of the target size of <28 prawns/kg for that period.
8. Whilst assessment of the fishery against the Performance Indicators of the Management Plan was undertaken in this report, the fishery was not operating under the Plan during 2006/07. Nevertheless, all Performance Indicators were within acceptable reference ranges except for the harvest of small prawns during March.

1. FISHERY-INDEPENDENT DATA

Fishery-independent surveys provide data for both stock assessment and to assist harvest strategy development prior to each fishing period. Contemporary fishery-independent surveys include two datasets; 1) May surveys conducted between 2003 and 2007, and 2) surveys conducted between December 2004 and May 2007. Survey shots were done at semi-fixed sites (see Appendix 7.1), with up to 71 common shots between May surveys (2003–2007) and up to 112 common shots between surveys conducted from December 2004 to May 2007. During 2006/07, interim survey reports were produced soon after each survey to provide data on the spatial distribution of catch rate and prawn size, which were used to determine subsequent harvest strategies. These reports are provided in Appendices 7.2 – 7.5.

1.1 Surveys conducted during May between 2003 and 2007

1.1.1 Inter-annual trends in total catch rate and prawn size

Mean total catch rate from up to 71 common shots surveyed during May 2003–2007 ranged from 43.1 kg/h (2005) to 78.4 kg/h (2007) (Figure 1.1). Mean prawn size was smallest during 2003 (34.5 prawns/kg) and largest during 2004 (30.7 prawns/kg). During 2006/07, mean total catch rate was almost twice that observed previously, and prawn size was similar to previous years.

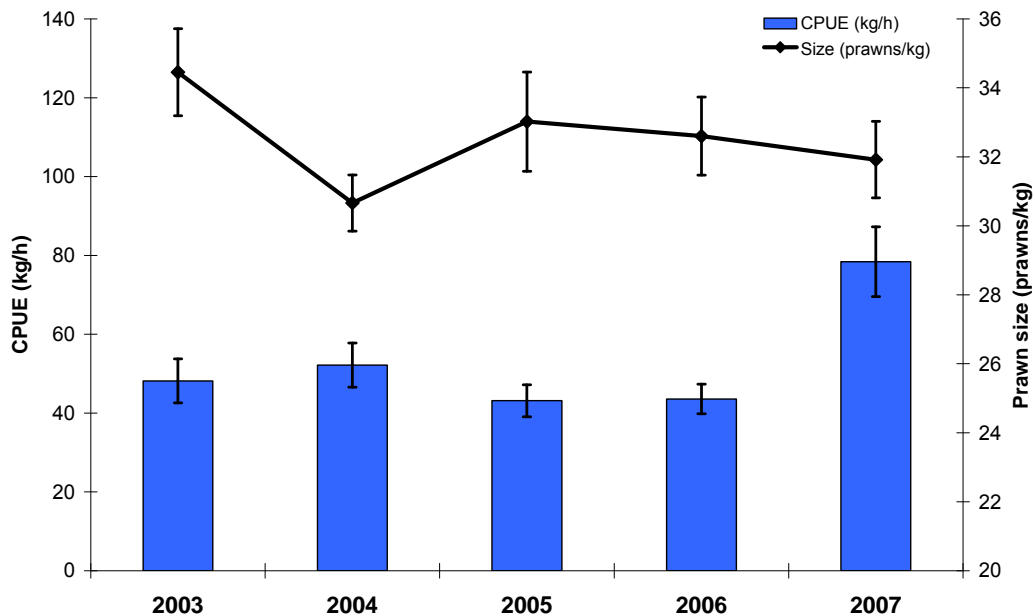


Figure 1.1 Mean (SE) catch rate (kg/h) and mean (SE) prawn size (prawns/kg) from May surveys between 2003 and 2007. Estimates compared from up to 71 trawl shots each year.

1.1.2 Inter-annual trends in catch rate of recruits

Recruits are defined as male prawns < 33 mm CL and female prawns < 35 mm CL. Mean catch rate of recruits from up to 56 common shots surveyed during May between 2003 and 2007 varied from 235 recruits/h (2004) to 650 recruits/h (2007) (Figure 1.2). Recruitment increased substantially and consecutively from 2004 to 2007. Uncertainty in the estimates of recruitment include: insufficient sample sizes for length frequency data; insufficient number of survey shots; or, errors associated with differences in gear types (e.g. square mesh cod-ends).

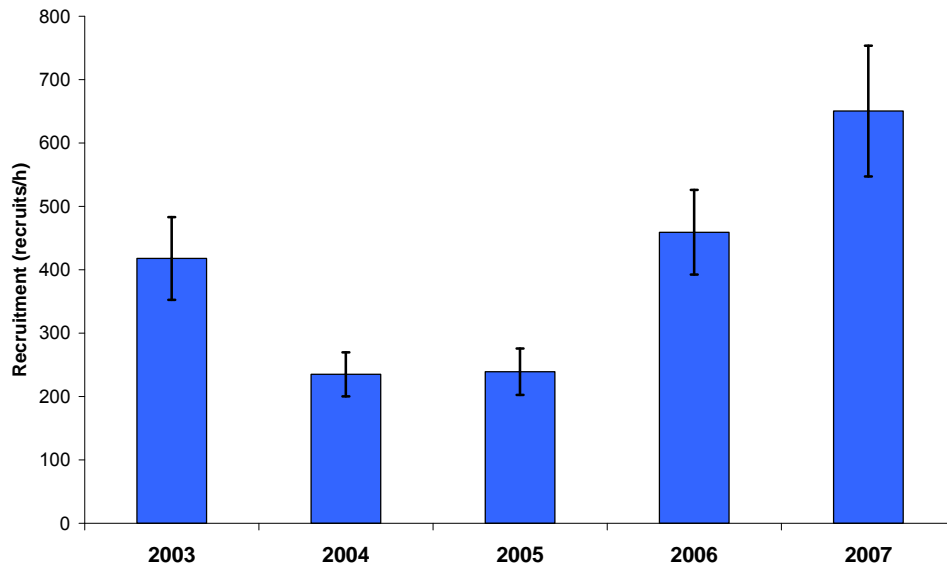


Figure 1.2 Mean (SE) number of recruits per trawl hour from May surveys between 2003 and 2007. Estimates compared from up to 56 trawl shots each year.

1.2 Surveys conducted between December 2004 and May 2007

1.2.1 Mean sea-surface temperature

Water temperature is likely to influence prawn catchability (Roberts *et. al.*, 2007) and as such, influences comparisons of catch rate between years. Mean sea-surface temperature between Nov/Dec and May was highest during 2006/07 (19.9 ± 0.3 °C) compared to 2004/05 (18.8 ± 0.5 °C) and 2005/06 (18.0 ± 0.4 °C) (Table 1.1). Mean SST during 2006/07 peaked in March (21.5 ± 0.3 °C) and remained above 17 °C through to May. Note that during May 2007, only one vessel provided SST data. During 2004/05, mean SST also remained above 17 °C through to May, which was in contrast to the substantial decrease in mean SST in May during 2005/06.

Table 1.1 Mean (SE) SST (°C) during surveys conducted in 2004/05, 2005/06 and 2006/07

Year	Nov/Dec	March	April	May	June
2004/05	18.8 (0.5)	20.1 (0.3)	17.7 (1.0)	18.2 (0.4)	16.4 (0.1)
2005/06	17.3 (0.2)	21.1 (0.3)	17.9 (0.3)	15.3 (0.3)	-
2006/07	18.2 (0.2)	21.5 (0.3)	20.4 (0.3)	17.9 (-)	-

1.2.2 Trends in catch rate

Annual mean catch rate in 2006/07 (61.4 ± 2.8 kg/h) was ~32% greater than in 2005/06 (46.6 ± 2.1 kg/h), and ~45% greater than in 2004/05 (42.5 ± 1.6 kg/h). During March, April and May, catch rates have increased consecutively each season since 2004/05. During 2006/07, increases of 13%, 34% and 76% were observed for March, April and May respectively compared to catch rates obtained in 2005/06 (Figure 1.3). During 2006/07, catch rates were 37%, 72%, and 82% greater than those observed in 2004/05 during March, April and May, respectively. Unlike the two previous seasons, monthly trends in catch rates during 2006/07 increased consecutively between fishing periods from 34.7 ± 3.8 kg/h in December to reach a peak of 81.0 ± 7.1 kg/h in May. It should be noted that water temperature during May 2005/06 was substantially lower than both 2004/05 and 2006/07 and thus catch rates in May 2005/06 are likely to be a conservative indication of relative biomass.

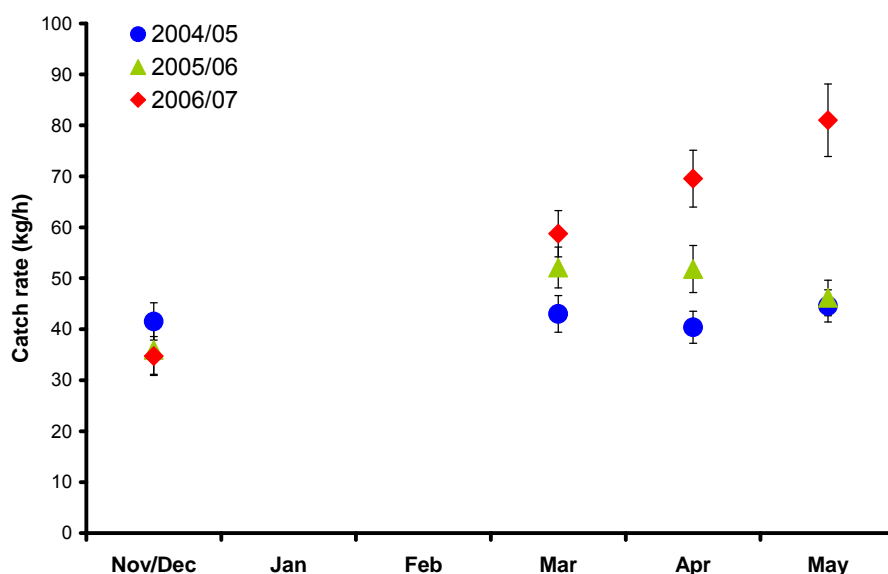


Figure 1.3 Mean (SE) catch rates (kg/h) among months during surveys conducted in 2004/05, 2005/06 and 2006/07. May surveys were conducted on a different lunar phase.

1.2.3 Trends in prawn size

The mean number of prawns/kg has consecutively increased from 2004/05 (28.9 ± 0.4 prawns/kg) to 2005/06 (30.1 ± 0.5 prawns/kg) and again in 2006/07 (31.9 ± 0.5 prawns/kg), indicating a decrease in prawn size between fishing seasons. Mean prawn size was substantially smaller in Nov/Dec (29.4 prawns/kg) during 2006/07 compared to both previous seasons, and subsequently decreased up until April when prawn size was at its smallest (35.0 prawns/kg) (Figure 1.4). The reducing mean prawn size between Nov/Dec and April likely reflects recruitment of small prawns to the fishery.

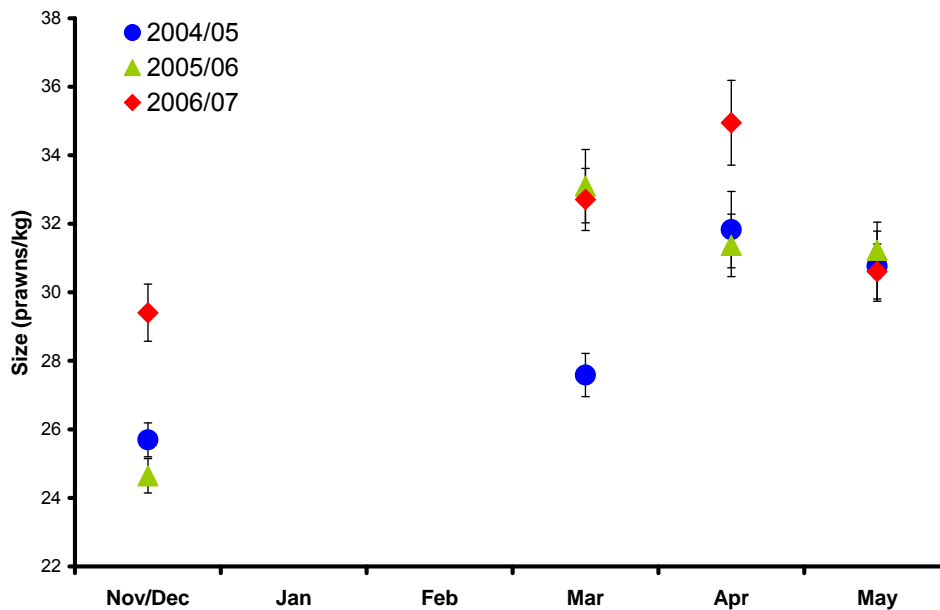


Figure 1.4 Mean (SE) number of prawns/kg among months during surveys conducted in 2004/05, 2005/06 and 2006/07. May surveys were conducted on a different lunar phase.

1.2.4 Estimates of egg production

Egg production was estimated for 2004, 2005 and 2006 from November survey data that included catch rate, weight of prawn grades and the proportion of females in the catch. These estimates reflect the potential egg production of female prawns captured during surveys. They are useful to assess the relative contribution toward egg production from female prawns of various size grades and to compare potential egg production between years.

Details of the model are provided in Roberts et al. (2007) and more detailed outputs for 2006/07 are provided in Appendix 7.6.

Egg production per trawl hour in December 2006 (423 million/h) was lower than the previous two seasons (Figure 1.5). During 2006, U10 followed by 10/15 grade prawns contributed the greatest to egg production, while U8 followed by 10/15 grade prawns contributed the greatest during 2005. These differences were largely due to differences in mean catch rates among size grades between years (Figure 1.6). During 2006, catch rates were greater for the U10 compared to U8 grade prawns, while the catch rate of U8 grade prawns during 2006 was lower than the previous two seasons.

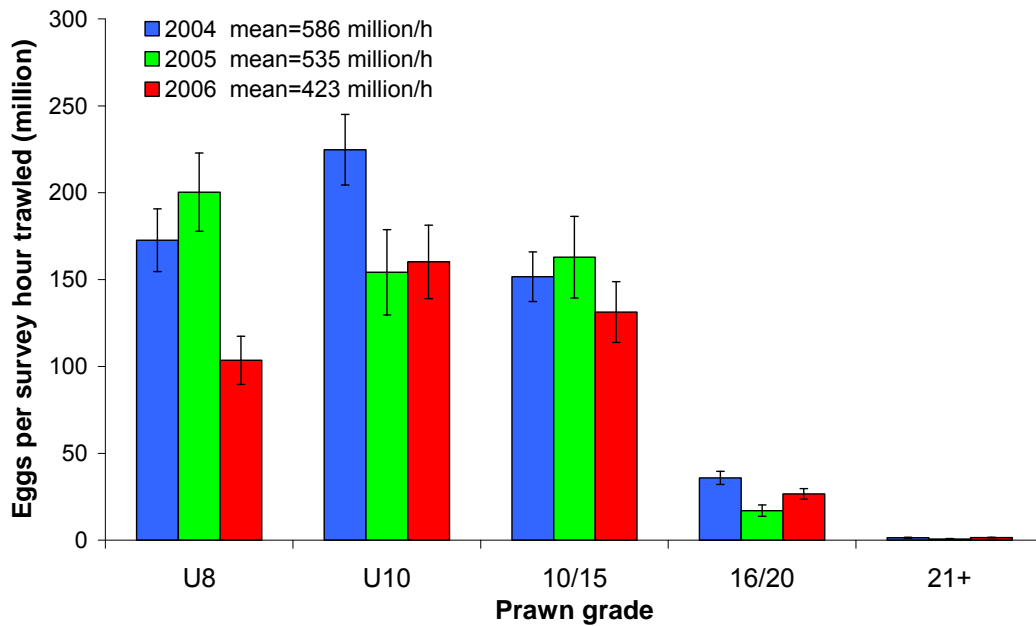


Figure 1.5 Mean (SE) number of fertilised eggs (million per trawl hour) produced by females captured during November/December surveys conducted in 2004, 2005 and 2006.

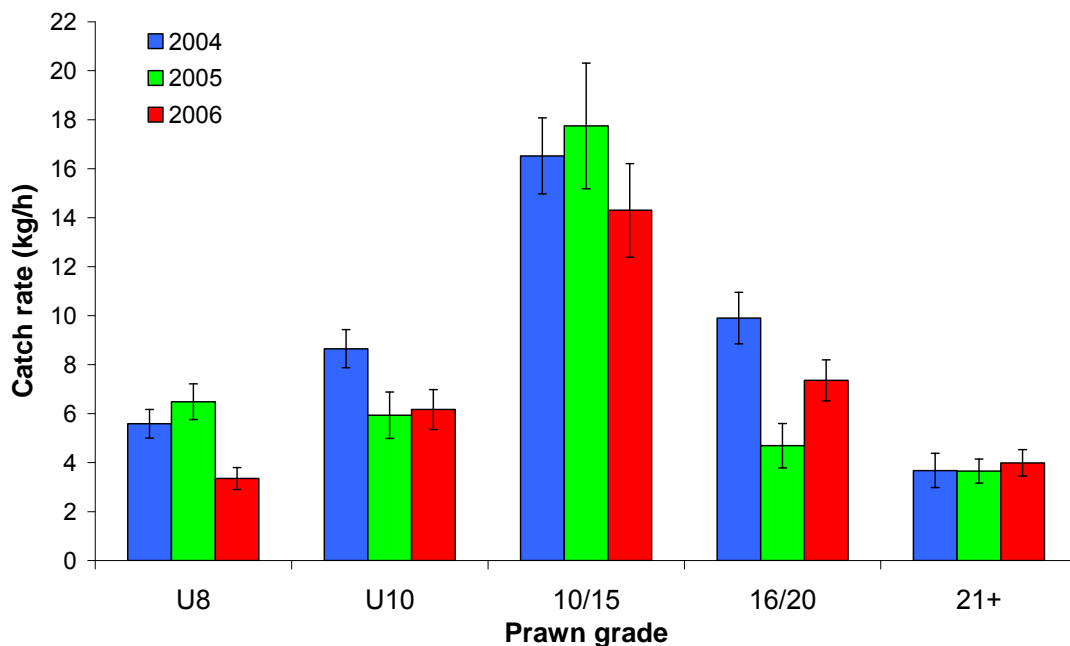


Figure 1.6 Mean (SE) graded catch (kg) per hour (males and females) during November/December surveys conducted in 2004, 2005 and 2006.

2. FISHERY STATISTICS

2.1 Catch and Effort

2.1.1 Inter-annual trends

The total production for the GSV Prawn Fishery in 2006/07 was 222 t. Of this, 12.7 t was harvested during fishery-independent surveys. Total catch during 2006/07 represented a 19% increase from 2005/06 (187 t) (Figure 2.1). Total effort in 2006/07 was 2431 h, which was a decrease of 6% from 2005/06 (2599 h).

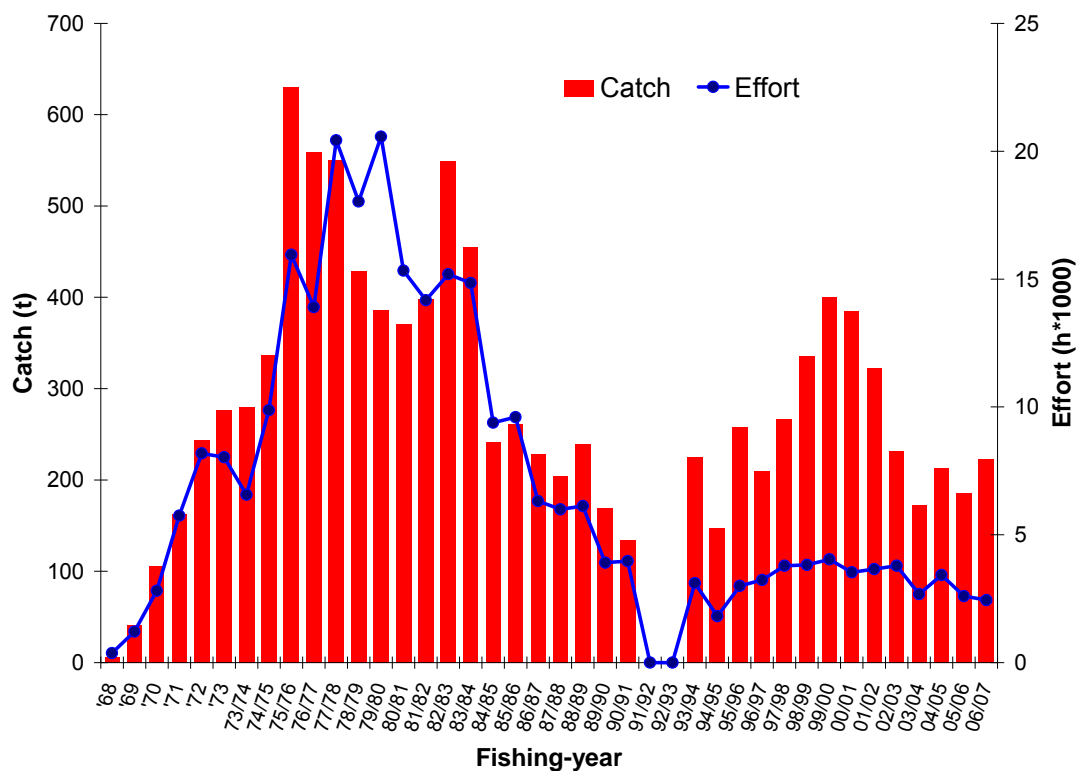


Figure 2.1 Catch (t) and effort (h) for the GSV Prawn Fishery from 1968–2006/07.

2.1.2 Catches during the spawning season

The main spawning period for *M. latisulcatus* in GSV extends from November to March. During 2006/07, fishing was undertaken in GSV in December during the early spawning period (Nov-Dec; 26.5 t, 12% of annual catch) and in March during the late spawning period (Jan-Mar; 51.5 t, 23%) (Figure 2.2).

Since 2003/04, catch during the early spawning period has ranged between 14 and 45 t (8–21 %). The recently updated Management Plan (Dixon and Sloan 2007) stipulates that annual catch during the early spawning period should not exceed 30 t for the next five years.

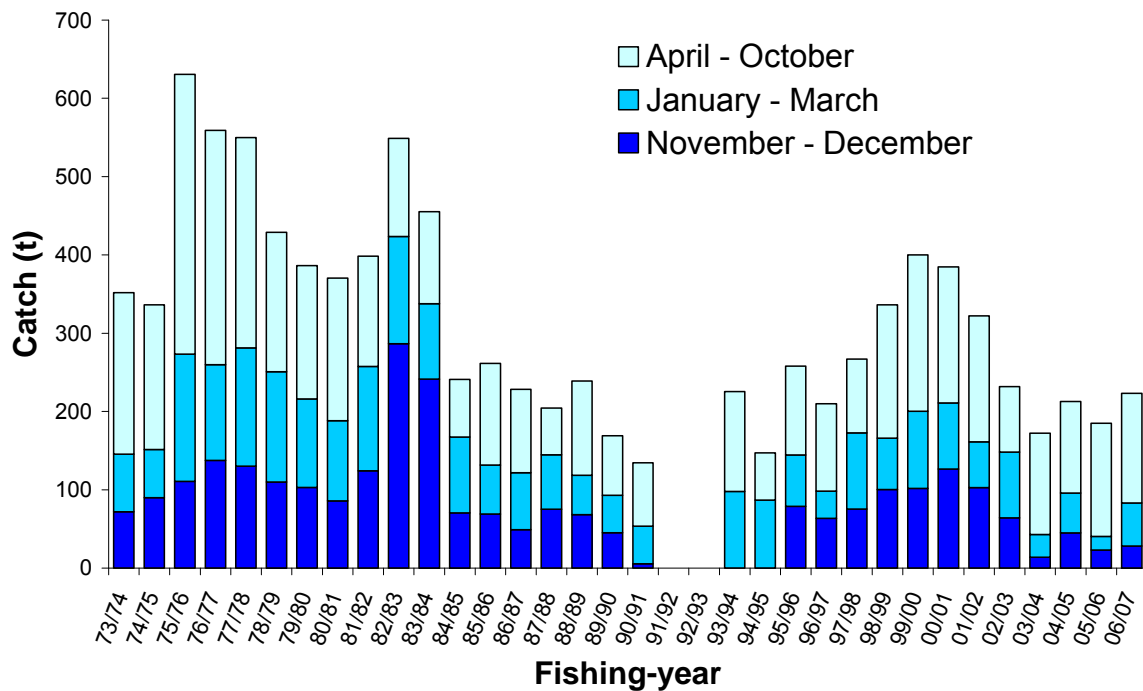


Figure 2.2 Catches from the early (November – December), late (January – March) and non-spawning (April – October) periods relative to the total annual catch from 1973/74 to 2006/07 in GSV.

2.2 Catch-Per-Unit Effort (CPUE)

Large differences in CPUE over short time scales (i.e. between years or over several consecutive years) may be indicative of changes in biomass if differences in gear types, harvest strategies and environmental conditions are minimal.

Annual (nominal) CPUE in 2006/07 was 91.4 kg/h, an increase of 27 % from 2005/06 (71.8 kg/h), and the highest since the historic peak in 2000/01 (109 kg/h) (Figure 2.3). Note this figure includes survey catch (12.7 t, 2006/07). Annual CPUE has rapidly increased over the last two consecutive fishing seasons since 2004/05 (64.6 kg/h), representing a 42 % increase during this period. Such a rapid and substantial increase is likely indicative of an increasing biomass during this period. Note, harvest strategies were changed in 2004/05 and have been developed consistently since.

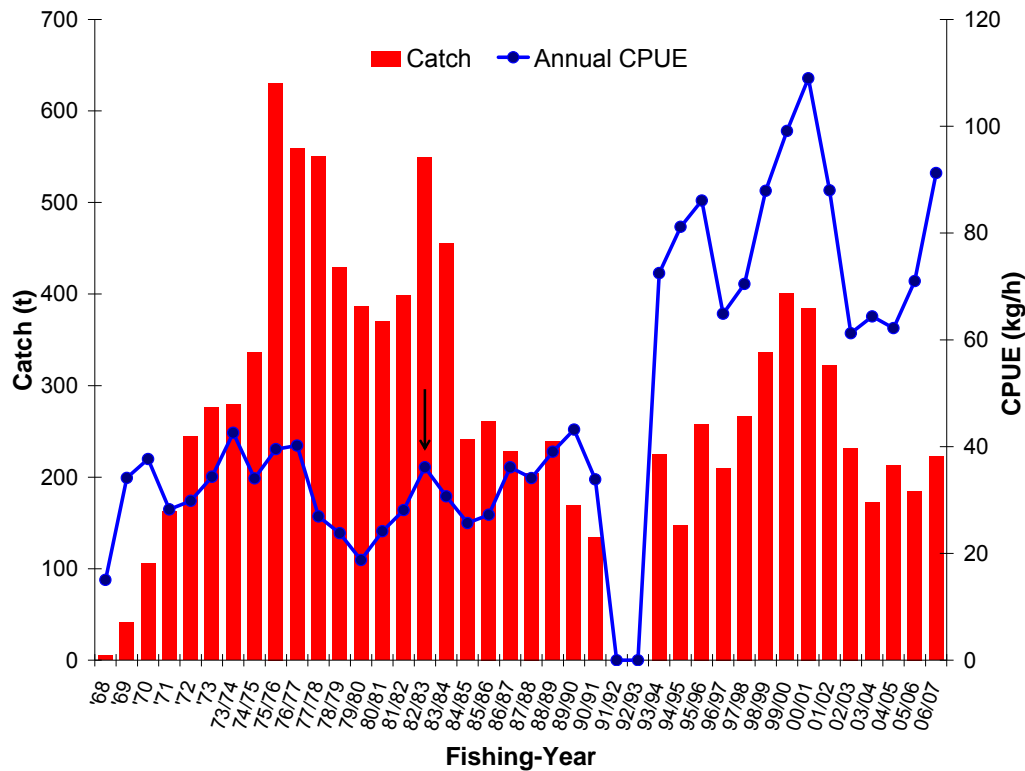


Figure 2.3 Annual catch and catch-per-unit-effort (CPUE) for GSV from 1968 to 2006/07. Data for 1968–1973 are reported as calendar year. Data for 1973/74 are from January 1974 to October 1974. From 1974/75 data are reported in fishing years. ↓ indicates introduction of triple-rig gear

2.3 Daily prawn size

The average number of prawns per kg for each vessel’s daily catch was calculated from the catch by grade data provided in commercial logbooks and the number of prawns per kg for each grade (see Roberts *et al.*, 2007). During 2006/07, reporting occurred throughout the season by five large vessels and by a sixth vessel between March and May. During the pre-Christmas (December) and March–May harvest periods, prawn size is targeted at 27–33 and <28 prawns/kg respectively as described in the Management Plan (Dixon & Sloan, 2007).

Catches were outside of the target criteria for prawn size during March 2007 (29.9 prawns per kg). The target prawn size was achieved in all other fishing months, with mean harvested size ranging from 26.9–27.5 prawns/kg (Table 2.1).

Table 2.1 Mean daily prawn size and total catch for each period during 2006/07. * excludes survey catch.

Year	Harvest Period	Target size (p/kg)	Mean (p/kg)	Catch* (t)
2006	Dec	27–33	27.2	26.5
2007	Mar	<28	29.9	51.5
2007	Apr	<28	27.5	86.1
2007	May	<28	26.9	45.3

3. PERFORMANCE INDICATORS

In this section, performance of the fishery is assessed against the Performance Indicators (PIs) identified in the Management Plan (Dixon and Sloan 2007). The Plan provides a set of key PIs (Table 3.1) that, if breached, evoke a management response.

Table 3.1 Summary of Performance Indicators (PI) and Limit Reference Points (LRP) for the 2005/06 and 2006/07 fishing years of the Gulf St Vincent Prawn Fishery (Dixon and Sloan 2007). Shaded cell indicates PI triggered.

PI	LRP	'05/'06	'06/'07
Recruitment index (May: recr/h)	>250	334	480
Total commercial catch (t)*	Increasing each year of Plan	175	209
Mean commercial CPUE (kg/h)*	Increasing each year of Plan	76.5	93.7
Mean prawn size	Within target criteria each harvest period	yes	no
Fishery independent surveys	4 surveys completed	yes	yes
Indices of current biomass	Decreases in 2 consecutive surveys	no	no
Indices of future biomass	Falls below limits in 2 consecutive surveys	no	no

* Total commercial catch and CPUE do not include survey catch

3.1 Recruitment index

Recruitment index is calculated as the mean number of juvenile prawns (males <33 and females <35 mm carapace length) captured per trawl hour from all shots surveyed during May. Length-frequency data were available for 107 and 102 survey shots during May 2005/06 and May 2006/07, respectively.

The recruitment indices of 334 and 480 during 2005/06 and 2006/07 were well above the Limit Reference Point (LRP) (250 rec/h).

3.2 Total commercial catch

Total commercial catch during 2006/07 (209 t) represented a 20% increase from 2005/06 (175 t).

3.3 Mean commercial CPUE

Mean commercial CPUE was higher during 2006/07 (93.7 kg/h) than 2005/06 (76.5 kg/h).

3.4 Mean prawn size

The mean size of prawns harvested for each vessel night was calculated from commercial logbook prawn grade data. Grade data was reported from March to December 2006 from five of ten vessels, and for six of ten vessels from March to May 2007. During the pre-Christmas (December) and March-May harvest periods, prawn size is targeted at 27–33 and <28 prawns/kg respectively.

During 2005/06, mean harvested prawn size was within the target prawn size during each harvested period, being 26.0, 26.2 and 26.7 prawns/kg for the March, April and May periods respectively.

During 2006/07 mean harvested prawn size was within the target prawn size during the December (27.2 prawns/kg), April (27.5 prawns/kg) and May (26.9 prawns/kg) harvest periods. During the March fishing period (29.9 prawns/kg) harvested mean prawn size was smaller than the target size for this period. Subsequently, the PI for prawn size was triggered during 2006/07.

3.5 Fishery independent surveys

A minimum of four fishery independent surveys were conducted during 2005/06 and 2006/07.

3.6 Indices of current biomass

The current biomass index is calculated as the mean total catch rate for each survey conducted in December, March, April and May. Indices of current biomass are an integral component of harvest strategy development in the Management Plan, as they affect the proportion of the stock that can be accessed during the March, April and May harvest periods. They also determine the extent of change in biomass, defined as the % difference in catch rate between years. Stock recovery is considered to be achieved for each period if the current biomass index is greater than that obtained during the same month the previous year. Failure to achieve stock recovery for two consecutive harvest strategies will trigger the PI for this measure.

Whilst the index of current biomass (mean catch rate) slightly decreased between December 2005 and 2006, it increased between years for subsequent surveys in March, April and May 2007. Therefore, the PI for indices of current biomass during 2006/07 was not triggered.

3.7 Indices of future biomass

The future biomass index is calculated as the mean catch rate of 20+ grade prawns for each survey conducted in March, April and May. In the Management Plan, the index of future biomass also affects the proportion of the stock that can be accessed during these harvest periods.

Mean catch rate of 20+ size prawns was above the reference level for March, April and May during 2006/07. As such, the PI for indices of future biomass during 2006/07 was not triggered.

4. SUMMARY OF 2006/07

During 2006/07, the mean fishery-independent survey catch rate was 61.4 kg/h, an increase of 32% from 2005/06 (Table 4.1). This increase in survey catch rates (indicative of biomass) enabled an increase of 20% in total commercial catch during 2006/07 compared to 2005/06. Mean catch rate during fishing also increased (23%) between 2005/06 and 2006/07.

Mean annual survey catch rate increased by 32% between 2005/06 and 2006/07. Survey catch rate was highest during May (81.0 kg/h) and lowest during December (34.7 kg/h). Whilst a 3% decrease in mean survey catch rate was observed during December, increases of 13%, 34% and 76% were observed in March, April and May, respectively (Table 4.1).

Total production was 222 t, which included 12.7 t harvested during survey. The commercial catch (209.4 t) was 20% greater than that harvested the previous year. The highest monthly catch was harvested during April (86.1 t, 39% of the total), followed by March (51.5 t, 23%), May (45.3 t, 20%) and then December (26.5 t, 12%). Increases in catch compared to the previous year were achieved for each month with the exception of May.

Annual commercial CPUE was 93.7 kg/h, and increase of 23% compared to 2005/06. Commercial CPUE was lowest during March (69.5 kg/h) and highest during May (143.8 kg/h). Compared to 2005/06, CPUE was slightly lower during December and March (9% and 2%, respectively), and much higher during April and May (40% and 82%).

Mean harvested prawn size (number of prawns/kg) during commercial fishing was largest during May (26.9 prawns/kg) followed by December (27.2 prawns/kg) and then April (27.5 prawns/kg). Mean harvested prawn size was substantially smaller during March (29.9 prawns/kg) compared to all other months.

Table 4.1 Summary statistics from fishery-independent surveys and commercial fishing for the Gulf St Vincent Prawn Fishery in 2006/07. Percent change (%Δ) indicates the change (↑ or ↓) from the corresponding fishing period in 2005/06.

Month	Survey			Fishing				
	Survey catch (t)	Catch rate (kg/h)	% Δ catch rate	Total catch (t)	% Δ catch	CPUE (kg/h)	% Δ CPUE	Mean size (p/kg)
Dec	1.6	34.7	↓ 3 %	26.5	↑ 25 %	84.2	↓ 9 %	27.2
March	2.9	58.8	↑ 13 %	51.5	↑ 27 %	69.5	↓ 2 %	29.9
April	3.7	69.6	↑ 34 %	86.1	↑ 50 %	100.9	↑ 40 %	27.5
May	4.5	81.0	↑ 76 %	45.3	↓ 19 %	143.8	↑ 82 %	26.9
Total	12.7	61.4	↑ 32 %	209.4	↑ 20 %	93.7	↑ 23 %	27.9

5. DISCUSSION

Fishery-independent survey data and fishery-dependent catch and effort data (2003 to 2007) provide useful information to determine the current status of the biomass on which the GSV prawn fishery is based. These data suggest that the resource is recovering since the lowest CPUE in 2002/03 during the contemporary catch history (1993/94 to 2006/07). Evidence for this conclusion includes: annual increases in catch rates from surveys conducted in March, April and May between 2004/05 and 2006/07; annual increases in survey catch rates of recruits between 2004 and 2007, and; increases in commercial catch and commercial CPUE in 2006/07.

Assessment of fishery-independent survey and commercial logbook data from 2006/07 indicate that annual increases in survey catch rates were observed for March, April and May compared with the previous year. These increases cumulatively enabled increases in annual commercial catch of 20% and annual commercial CPUE of 23% compared to 2005/06.

Whilst assessment of the fishery against the Performance Indicators of the Management Plan was undertaken in this report, the fishery was not operating under the Plan during 2006/07. Nevertheless, this assessment provides useful information for fishery management, particularly highlighting the harvest of small prawns during the March 2007 fishing period.

6. REFERENCES

Dixon C.D. and Sloan S. (2007) Management Plan for the South Australian Gulf St Vincent Prawn Fishery. The South Australian Fisheries Management Series. Paper No. 53

Roberts S.D., Dixon, CD and Hooper, GE (2007) Gulf St Vincent Prawn (*Melicertus latisulcatus*) Fishery 2005/06. Fishery Assessment report to PIRSA Fisheries. SARDI Aquatic Sciences Publication No. F2007/000782-1, Research Report Series No 253.

7. APPENDIX

7.1 GSV map

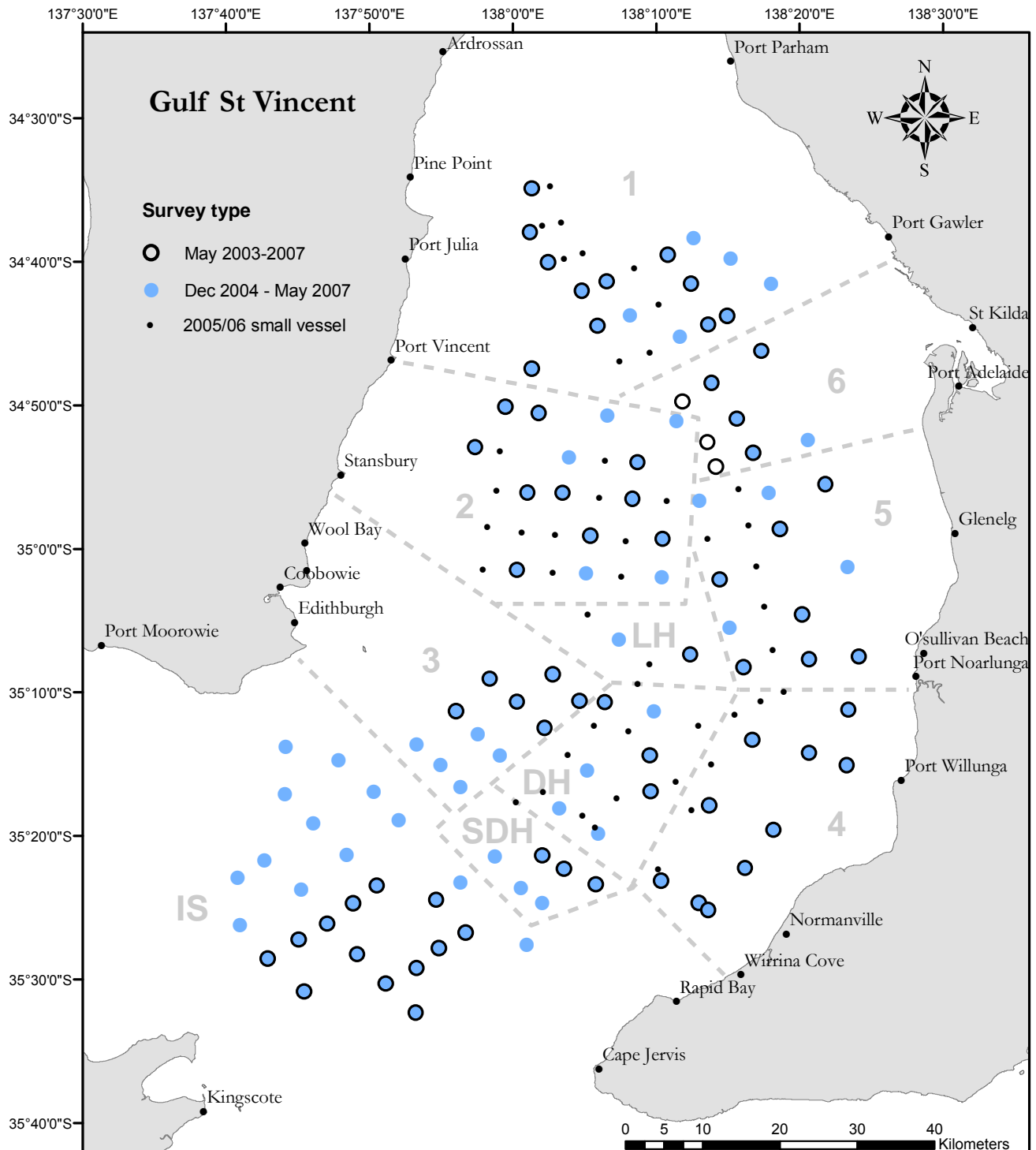


Figure 7.1 Contemporary stations and surveyed regions (defined by dashed lines) from surveys conducted in GSV between May 2003-2007, December 2004 and May 2007, and by small vessels during 2005/06.

7.2 Gulf St Vincent Prawn Fishery – Survey December 2006

Survey report to PIRSA Fisheries

Prepared by Shane Roberts SARDI Aquatic Sciences (February 2007).

Introduction

SARDI Aquatic Sciences have conducted fishery-independent surveys for stock assessment and to assist harvest strategy development prior to each fishing period since December 2004. Pre-Christmas surveys provide data on the spatial distribution of catch rate, prawn size and female reproductive activity prior to the fishing year, which are used to determine subsequent harvest strategies. This report documents the provisional results for the December 2006 survey that were presented to the GSV Prawn Fishery Management Sub-committee on Monday 18 December 2006 for harvest strategy development. Comparisons with previous survey data from the 2004/05 and 2005/06 fishing seasons are also provided. Data on egg-production and size grades will be presented in the March survey report.

Methods

The December 2006 survey was conducted over three nights, Friday 15 December to Sunday 17 December 2006 (Moon phase: last quarter on 12 December 2006) using 5 large commercial vessels. Of 112 fixed survey stations for GSV (Figure 7.1), 106 were conducted, including one station that was abandoned without data being collected. Trawl shots conducted during the survey used all nets and most were of 30 minutes in duration. Data collected during the survey included: catch by grade, catch rate, sex ratio, sex-specific size-frequency, prawn size (prawns/kg) and female reproductive stage. Mean prawn size estimated for the whole gulf is weighted by the catch per station. Catch rate and prawn size data for each station are summarised below. This report provides analyses of catch rate, prawn size (prawns/kg) and female reproductive stages 3&4 data only, while other data collected will be presented in the annual stock assessment report for the GSV prawn fishery.

Results

December 2006 survey

Catch rate and prawn size data were available for 105 stations. The mean catch rate in GSV during the December 2006 survey was 1.26 lb/min and the mean weighted prawn size was 31.1 prawns/kg.

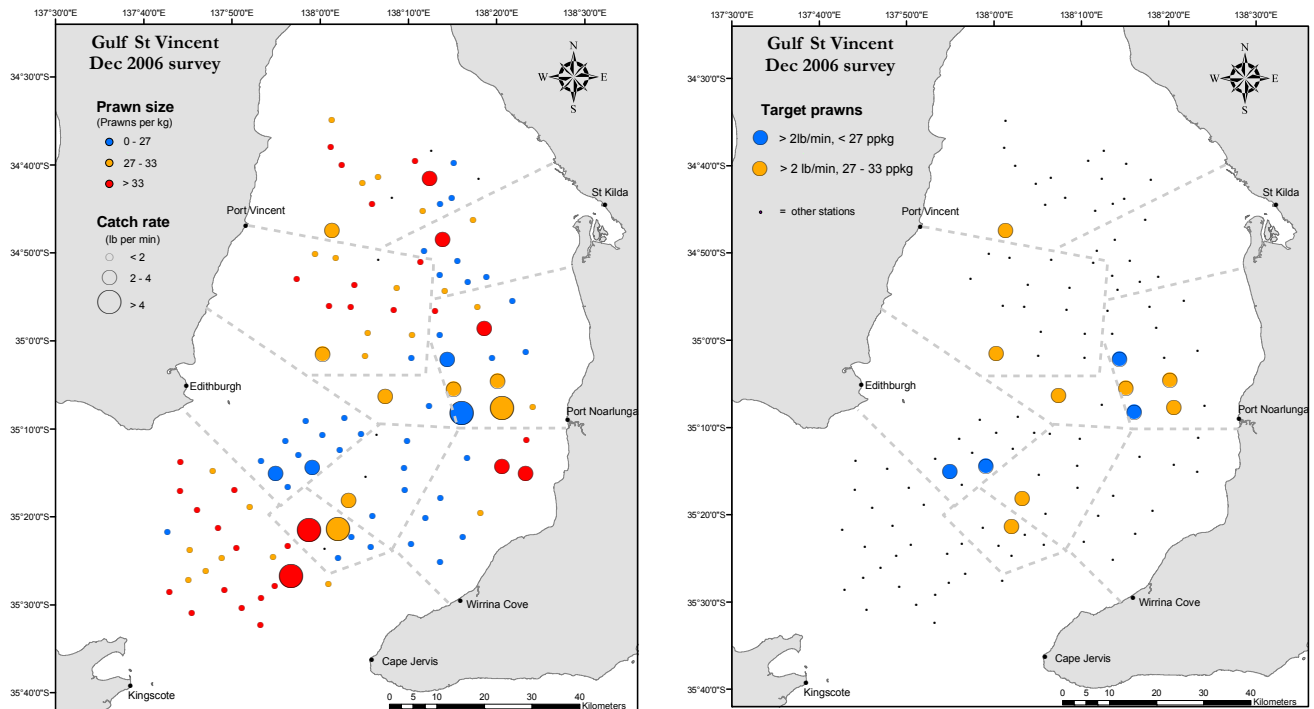


Figure 7.2. Left: Catch rate (lb/min) and prawn size (prawns/kg) for 105 (of 112) stations during the December 2006 fishery-independent survey. **Right:** Survey stations with target size prawns (<27 and 27–33 prawns/kg) and target catch rates (>2lb/min) during the December 2006 fishery-independent survey

Catch rates >2 lb/min were observed at 19 stations (18%), while catch rates >4 lb/min were observed at 5 stations (2%) in GSV (Figure 7.2). The two highest catch rates were observed in Region 5 (station 14: 10.3 lb/min) and Southern Deep Hole (station 2: 4.5 lb/min). Small (>33 prawns/kg) and medium (27–33 prawns/kg) size prawns were generally observed at stations throughout the North (Regions 1, 2, 5 and 6) and South (Investigator Straight) of the gulf. Large (<27 prawns/kg) size prawns were generally aggregated throughout the mid gulf (Regions 3, 4 and Deep Hole) and extending up the Eastern side of GSV (Regions 5 and 6).

Target catches for the pre-Christmas fishing period aim at medium to large size prawns. Twelve stations fitting the target criteria (<27 and 27–33 prawns/kg) at high catch rates (>2lb/min) were observed in GSV during the December 2006 survey (Figure 7.2). An aggregation of shots with target catches of prawns was observed in the south of Region 5.

Nine survey stations in GSV were observed with >50% of female prawns with mature ovaries, 5 of which were aggregated in Region 1 (Figure 7.3). The majority of stations spread throughout GSV (62 shots) were observed to have 25–50% of females with mature ovaries. Stations with <25% of females with mature ovaries were less frequent (27 stations) and observed in the southern and eastern regions of GSV.

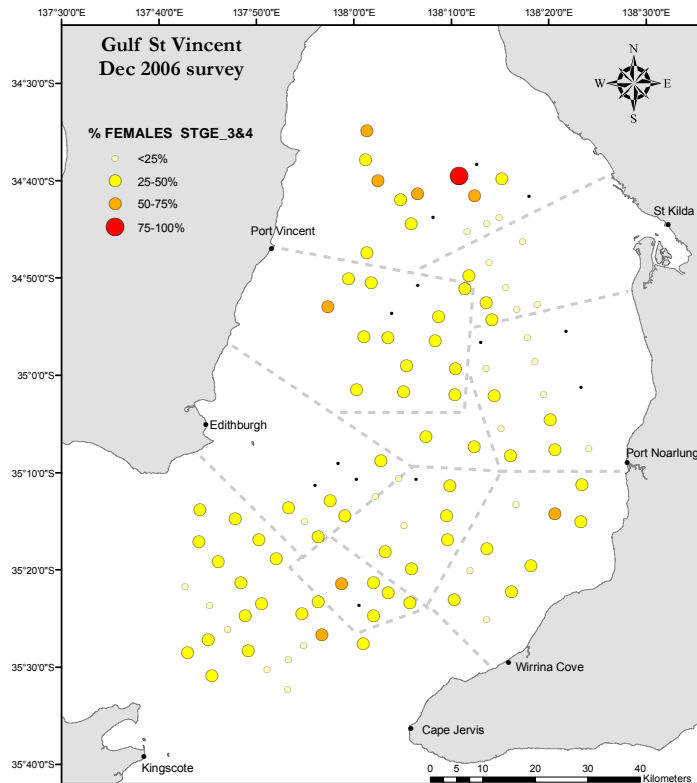


Figure 7.3. Proportion of female prawns with mature ovaries (reproductive stages 3 & 4) during the December 2006 fishery-independent survey. Stations with catch rates <math><0.1\text{ lb/min}</math> were disregarded in this map to reduce biased results.

Comparisons with previous surveys

Fishery independent surveys have been conducted over the same lunar phase pre-Christmas for the last 3 fishing seasons. The mean catch rate during the pre-Christmas 2006 survey (1.26 lb/min) was marginally greater than that in 2005 (1.24 lb/min), although less than 2004 (1.38 lb/min) (Figure 7.4). The mean weighted prawn size during the pre-Christmas 2006 survey (31.1 prawns/kg) was smaller than the previous two seasons (2005: 26.2 prawns/kg, 2004: 27.7 prawns/kg) (Figure 7.4).

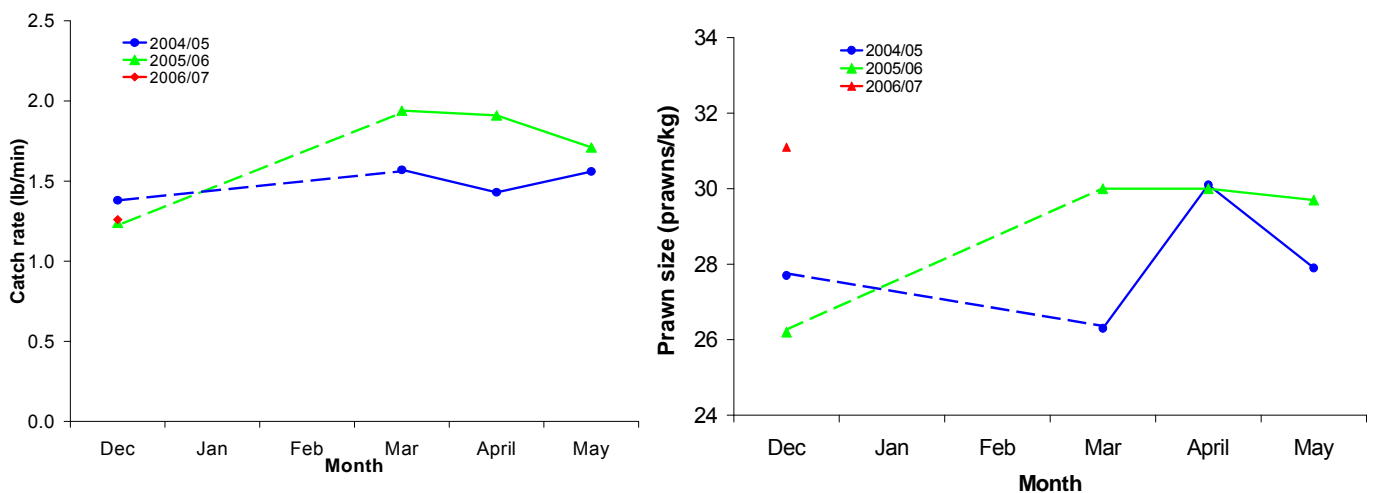


Figure 7.4. Left: Mean catch rate (lb/min) **Right:** Mean weighted prawn size (prawns per kg) from fishery-independent surveys conducted in GSV during December, March, April and May of the 2004/05, 2005/06 and 2006/07 fishing-years.

Potential fishing areas

A GSV Harvest Strategy Workshop held on 10 November 2005, determined that stock rebuilding was the highest priority for fishery for the 2005/06 fishing season. Accordingly, harvest strategy guidelines were developed that included a pre-Christmas target size of ≤ 33 prawns/kg and target catch rate of > 2 lb/min.

Data collected during the December 2006 fishery-independent survey indicated that several stations had catches matching harvest strategy targets for the pre-Christmas fishing period (≤ 33 prawns/kg and > 2 lb/min, Figure 7.2). The largest aggregation of stations with target catches was in Region 5 (5 stations). Adjacent to this aggregation were stations observed to have target size prawns in the Little Hole Region and southern Region 2. Subsequently, the harvest strategy developed by the GSV Prawn Fishery Management Sub-committee included stations 9,10 & 15 in Region 5, stations 1 & 2 in the Little Hole Region and station 35 in Region 2 (1.75–4.28 lb/min and 22.3–27.6 prawns/kg) (Figure 7.5). These 5 stations represented 13% of the survey biomass

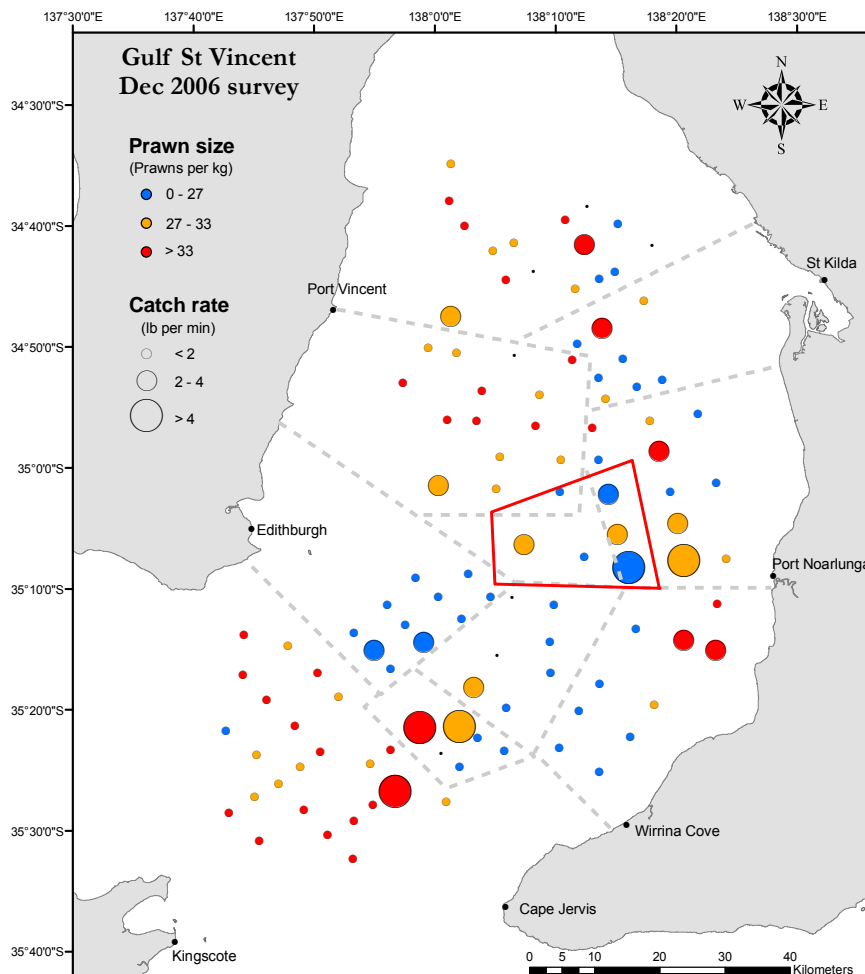


Figure 7.5. Spatial harvest strategy agreed at the GSV Prawn Fishery Management Sub-committee meeting. Polygon represents area opened to fishing at the start of the pre-Christmas fishing period 2006.

Unvalidated prawn size (ppkg) and catch rate (lb/min) data for stations surveyed in GSV during December 2006. Please note that although all due care has been taken, discrepancies may occur between these and results presented in a final stock assessment report.

Region	Station	ppkg	lb/min	Region	Station	ppkg	lb/min
1	1	25.86	0.52	5	6	27.44	0.73
1	4	37.14	1.21	5	7	23 prns	0.07
1	5	37.86	2.54	5	8	29 prns	0.11
1	6	21.88	0.23	5	9	22.30	2.10
1	7	39 prns	0.10	5	10	27.57	3.93
1	11	dumped		5	11	31.86	3.75
1	12	29.50	0.44	5	13	29.43	1.10
1	16	31 prns	0.11	5	14	32.43	10.27
1	19	31.00	0.40	5	15	26.86	4.28
1	20	36.57	0.31	6	X1	29.71	1.48
1	25	39.58	0.24	6	X10	29 prns	0.11
1	26	34.58	0.26	6	X12	48 prns	0.17
1	28	28.14	3.02	6	X5	42.43	2.17
1	1A	not done		6	X6	26.57	1.44
1	2A	25.57	0.75	6	X7	26.47	1.52
1	3A	not done		6	X8	26.53	1.43
2	2	35.57	1.65	6	X9	21.59	0.32
2	8	30.06	0.21	DH	1	22.00	1.29
2	9	30.43	0.59	DH	2	24.29	0.70
2	11	35.74	0.19	DH	3	25.00	1.38
2	14	25 prns	0.05	DH	4	not done	
2	15	35.92	0.14	DH	6	not done	
2	17	not done		DH	7	31.43	3.05
2	20	32.33	0.33	DH	8	21.43	1.54
2	21	27.73	0.32	LH	1	27.29	2.83
2	23	28.14	3.70	LH	2	23.43	1.83
2	28	33.13	0.17	SDH	1	35.29	4.34
2	29	37 prns	0.14	SDH	2	31.86	4.54
2	31	33.33	0.85	SDH	3	25.00	1.53
2	34	49 prns	0.17	SDH	4	16.60	0.44
2	35	24.09	1.75	SDH	5	not done	
3	2	6 prns	0.04	SDH	6	21.43	0.81
3	3	3 prns	0.02	IS	3	34.29	4.52
3	4	14.73	0.41	IS	4	29.71	1.14
3	5	7 prns	0.04	IS	9	42.29	1.46
3	6	20.93	0.88	IS	11	39.29	0.68
3	7	19.63	0.40	IS	12	39.14	0.56
3	8	23 prns	0.14	IS	13	36.97	0.48
3	9	20.85	2.77	IS	14	33.71	0.94
3	10	23.47	1.41	IS	16	46.46	1.44
3	11	21.13	2.96	IS	21	54.03	0.99
3	12	14.53	0.70	IS	23	30.86	0.78
4	1	41.00	2.71	IS	30	26.94	0.31
4	4	29.57	0.85	IS	31	29.20	0.56
4	6	35.43	2.41	IS	32	29.30	0.74
4	7	22.22	0.45	IS	33	40.69	1.38
4	9	22.86	1.26	IS	34	54.08	1.40
4	10	20.00	0.76	IS	35	50.71	1.55
4	11	17.14	0.64	IS	41	30.72	0.41
4	13	25.74	0.42	IS	50	42.62	1.14
4	15	16.24	0.29	IS	51	35.97	1.76
4	18	46.14	0.84	IS	90	31.50	1.32
5	1	5 prns	0.02	IS	92	34.57	1.89
5	3	7 prns	0.00	IS	94	28.12	0.25
5	4	31 prns	0.20	IS	95	34.71	1.86
5	5	35.00	2.60	IS	96	31.86	1.73

7.3 Gulf St Vincent Prawn Fishery – Survey March 2007

Survey report to PIRSA Fisheries

Prepared by Shane Roberts SARDI Aquatic Sciences (May 2007).

Introduction

SARDI Aquatic Sciences have conducted fishery-independent surveys for stock assessment and to assist harvest strategy development prior to each fishing period since December 2004. March surveys provide data on the spatial distribution of catch rate, prawn size and female reproductive activity, which are used to determine subsequent harvest strategies. This report documents the provisional results for the March 2007 survey that were presented to the GSV Prawn Fishery Management Sub-committee on Saturday 17 March 2007 for harvest strategy development. Results are compared with previous surveys in 2004/05 and 2005/06. Prawn size data from December 2004 to December 2006 surveys are also presented in this report.

Methods

The March 2007 survey was conducted over three nights, Wednesday 14 March to Friday 16 March 2007 (Moon phase: last quarter on 12 March 2007) using 5 commercial vessels. Of 112 fixed survey stations for GSV (Figure 7.1), 109 were sampled, including one station that was abandoned without data being collected. Trawl shots conducted during the survey used all nets and most were of 30 minutes in duration. Data collected during the survey included: catch rate, prawn size (prawns/kg), female reproductive stage, catch by grade, sex ratio and sex-specific size-frequency. Mean prawn size estimated for the whole gulf is weighted by the catch per station. Catch rate and prawn size data for each station are summarised below. This report provides analyses of catch rate, prawn size (prawns/kg) and female reproductive stages 3&4 data only, while other data, including egg production estimates, will be presented in the annual stock assessment report for the GSV prawn fishery.

Results

March 2007 survey

Catch rate and prawn size data were available for 108 stations. The mean catch rate in GSV during the March 2007 survey was 2.15 lb/min and the mean weighted prawn size was 32.2 prawns/kg.

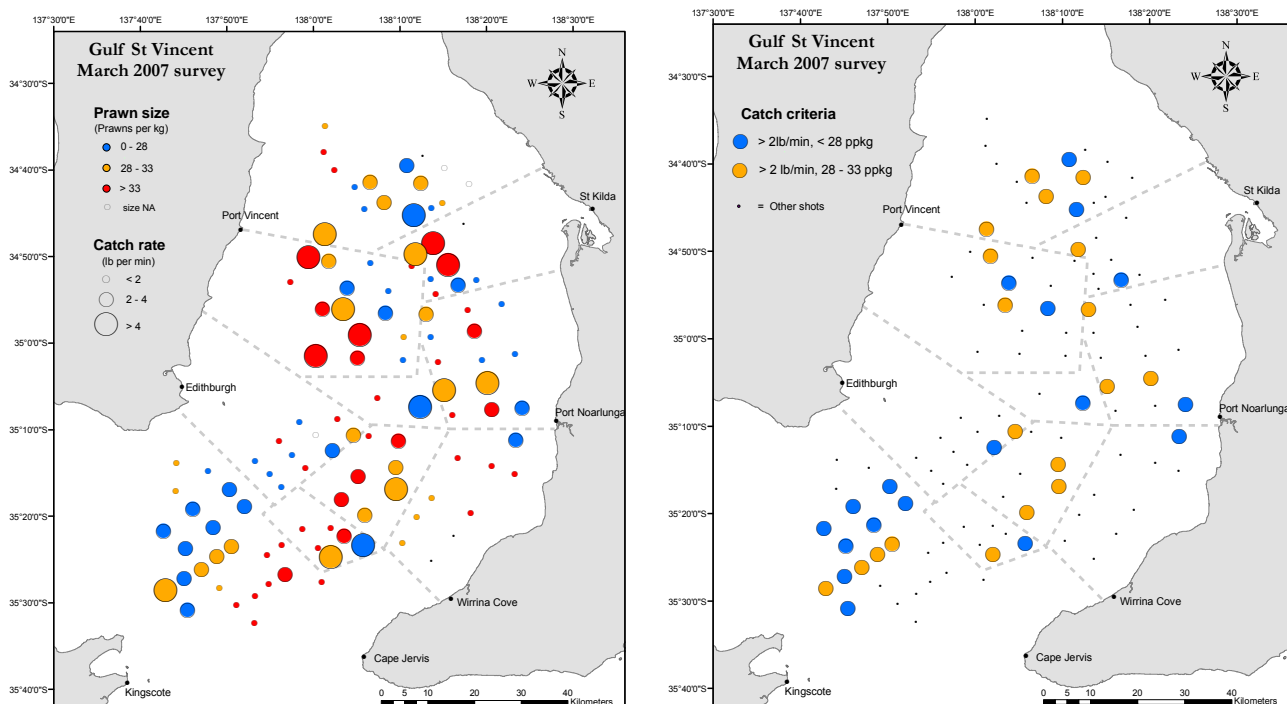


Figure 7.6. Left: Catch rate (lb/min) and prawn size (prawns/kg) for 108 (of 112) stations during the March 2007 fishery-independent survey. **Right:** Survey stations with large and medium size prawns (<28 and 28–33 prawns/kg) at high catch rates (>2lb/min) during the March 2007 fishery-independent survey.

Of 108 stations surveyed during March 2007, catch rates >2 lb/min were observed at 51 stations (47%), while catch rates >4 lb/min were observed at 16 stations (15%) in GSV (Figure 7.6). The two highest catch rates were observed in Southern Deep Hole (station 4: 7.4 lb/min) and Region 2 (station 20: 6.7 lb/min). Small (>33 prawns/kg) and medium (28–33 prawns/kg) size prawns were observed throughout the gulf, particularly on the western side of Region 2, through the hole Regions (LH, DH, SDH) extending into eastern Investigator Strait and Regions 4 and 5. Large (<28 prawns/kg) size prawns were also observed throughout the gulf, with notable aggregations observed in north-eastern Region 2 and western Investigator Strait extending into Region 3.

Target catches for the March–June fishing periods aim at large size prawns (<28 prawns/kg). Eighteen stations fitting the target criteria (<28 prawns/kg) at high catch rates (>2lb/min) were observed in GSV during the March 2007 survey (Figure 7.6). The largest aggregation of stations with target catches was observed in the western Investigator Strait Region, where 4 stations were also observed with medium size prawns at high catch rates.

One survey station in GSV was observed with medium (50–75% females stage 3&4) reproductive activity, while 41 stations were observed to have low (25–50%) reproductive activity (Figure 7.7). Stations with low reproductive activity were distinctly aggregated in the north and south of the gulf, while stations with very low (<25%) reproductive activity were concentrated around the middle of the gulf.

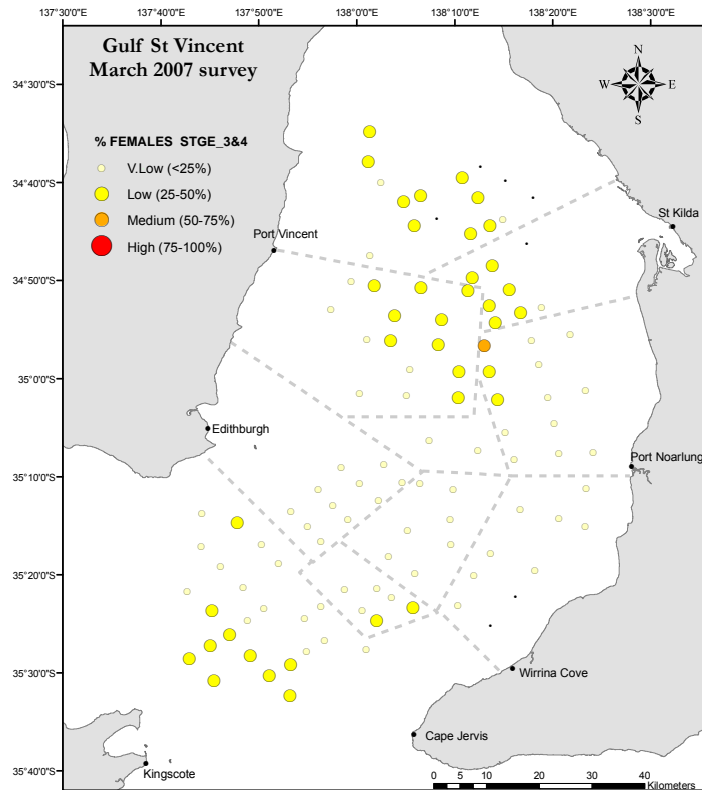


Figure 7.7. Proportion of female prawns with mature ovaries (reproductive stages 3 & 4) during the March 2007 fishery-independent survey. Stations with catch rates <0.1 lb/min were disregarded in this map to reduce biased results.

Comparisons with previous surveys - Mean catch rate and prawn size

Fishery independent surveys have been conducted over the same lunar phase during March surveys for the last 3 fishing seasons. The mean catch rate during the March 2007 survey (2.15 lb/min) was greater than that in 2006 (1.94 lb/min) and 2005 (1.57 lb/min) (Figure 7.8). The mean weighted prawn size during the March 2007 survey (32.2 prawns/kg) was smaller than the previous two seasons (2006: 30.0 prawns/kg, 2005: 26.3 prawns/kg) (Figure 7.8).

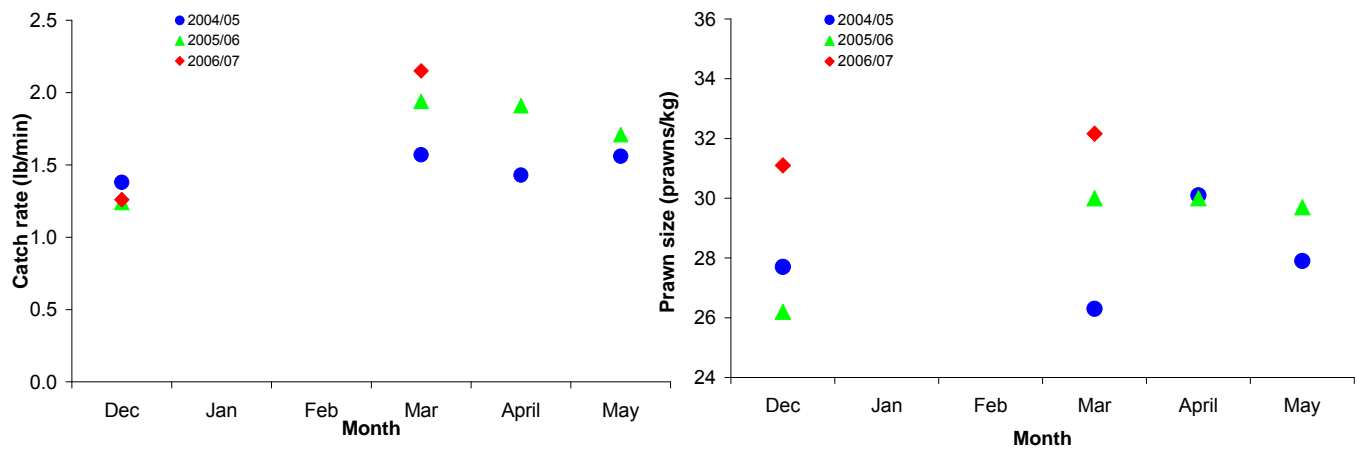


Figure 7.8. Left: Mean catch rate (lb/min) and **Right:** Mean weighted prawn size (prawns per kg) from fishery-independent surveys conducted in GSV during December, March, April and May of the 2004/05, 2005/06 and 2006/07 fishing-years.

Prawn size grades during December surveys

Mean catch rates during December 2006 were less than that of December 2004 and 2005 for larger prawn size grades (10-15, U10 & U8) (Figure 7.9). During December 2005, catch rates of 20+ and 16-20 prawn grades were less than those observed during December 2004 and 2006. Note that differences in catch rates between size grades and years were not statistically tested for this survey report.

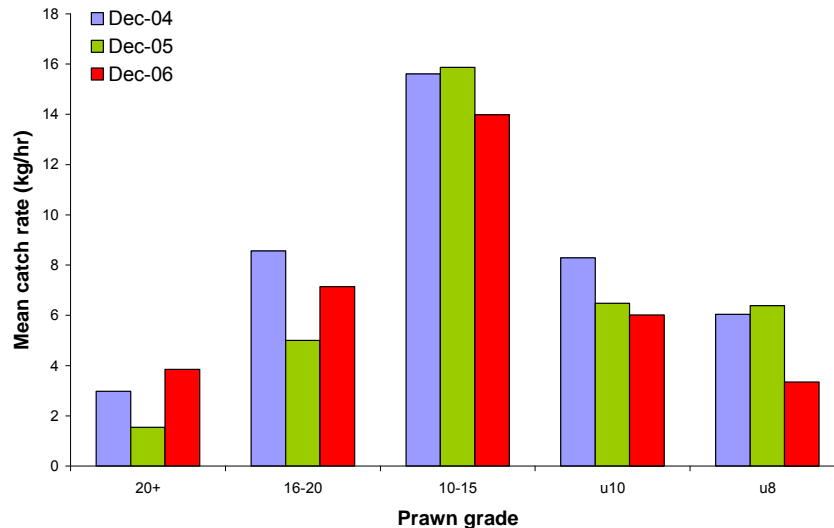


Figure 7.9. Mean catch rate of prawn size grades during December surveys for 2004/05, 2005/06 and 2006/07.

Potential fishing areas

A GSV Harvest Strategy Workshop held on 10 November 2005 determined that stock rebuilding was the highest priority for harvest strategy determination for successive fishing periods. Accordingly, harvest strategy guidelines have been developed in the draft Management Plan that define a target size of <28 prawns/kg for fishing periods from March–June.

Data collected during the March 2007 fishery-independent survey indicated that 18 stations had catches matching the target size at catch rates >2lb/min for the March fishing period (Figure 7.6). The largest aggregation of these stations was in Investigator Strait (8 stations), while smaller aggregations were identified in Region 2 and adjacent to Pt Noarlunga. Subsequently, the harvest strategy developed by the GSV Prawn Fishery Management Sub-committee included all three aggregations as potential fishing areas. The three areas included stations 14,15,17,28,&29 in Region 2, stations 9,11,12,13, 30,31,41,50,51,94,95&96 in Investigator Strait, and stations 13 (Region 5) and 18 (Region 4) adjacent to Pt Noarlunga (0.63–4.06 lb/min and 19.6–31.7 prawns/kg) (Figure 7.10). These 19 stations represented 21% of the survey biomass.

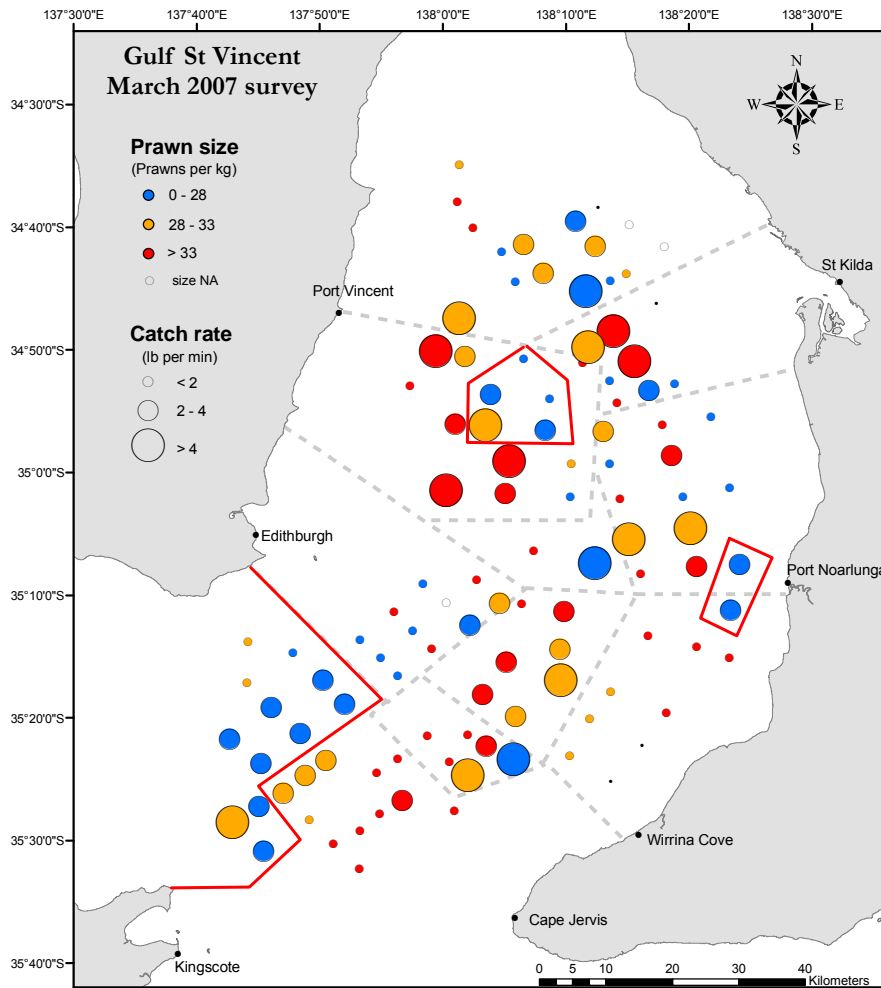


Figure 7.10. Spatial harvest strategy agreed at the GSV Prawn Fishery Management Sub-committee meeting. Polygons and west of the line in Investigator Strait represent areas to be considered for fishing during the March fishing period 2007.

Unvalidated prawn size (ppkg) and catch rate (lb/min) data for stations surveyed in GSV during March 2007. Please note that although all due care has been taken, discrepancies may occur between these and results presented in a final stock assessment report.

Region	Station	ppkg	lb/min	Region	Station	ppkg	lb/min
1	1	31.60	0.34	5	6	42.57	0.93
1	4	24.20	2.49	5	7	29.71	2.17
1	5	32.80	2.07	5	8	17.43	0.32
1	6	26.10	0.43	5	9	39 prwns	0.09
1	7	26.40	4.86	5	10	29.43	4.77
1	11	31.40	3.12	5	11	30.71	6.54
1	12	32.10	2.91	5	13	19.86	2.83
1	16	28.70	0.10	5	14	33.29	2.22
1	19	26.40	0.59	5	15	33.71	1.00
1	20	27.50	0.37	6	X1	not done	
1	25	37.10	0.23	6	X10	18.70	0.66
1	26	38.60	0.89	6	X12	34.71	1.33
1	28	31.43	4.93	6	X5	42.00	5.24
1	1A	NA	0.00	6	X6	33.43	6.25
1	2A	2 prwns	0.00	6	X7	27.71	0.56
1	3A	hooked up		6	X8	32.86	4.27
2	2	41.00	1.58	6	X9	25.86	3.62
2	8	37.86	4.56	DH	1	28.43	6.60
2	9	28.14	2.41	DH	2	29.57	2.75
2	11	34.00	2.68	DH	3	33.14	2.20
2	14	27.00	2.01	DH	4	57.14	1.15
2	15	28.00	4.06	DH	6	42.10	2.06
2	17	24.86	0.63	DH	7	48.60	2.24
2	20	45.86	6.73	DH	8	30.10	3.84
2	21	47.29	2.58	IS	3	35.86	3.33
2	23	44.43	4.92	IS	4	38.00	1.33
2	28	27.14	2.88	IS	9	31.71	0.91
2	29	27.43	1.00	IS	11	29.04	1.99
2	31	36.43	1.88	IS	12	25.86	2.39
2	34	30.14	0.85	IS	13	24.43	3.65
2	35	22.86	0.43	IS	14	29.29	3.49
3	2	23.57	1.33	IS	16	44.57	0.56
3	3	47.00	0.27	IS	21	42.14	0.96
3	4	25.71	0.85	IS	23	29.86	3.78
3	5	NA	0.00	IS	30	26.43	3.90
3	6	41.43	1.08	IS	31	26.14	3.61
3	7	29.00	3.61	IS	32	31.71	2.23
3	8	24.29	2.08	IS	33	29.57	0.74
3	9	57.86	0.81	IS	34	40.71	0.95
3	10	24.57	1.76	IS	35	37.50	0.50
3	11	22.86	1.69	IS	41	26.86	3.20
3	12	20.98	0.42	IS	50	29.14	4.06
4	1	48.14	0.72	IS	51	25.71	2.69
4	4	38.00	1.44	IS	90	45.00	1.64
4	6	64.86	0.99	IS	92	50.70	1.37
4	7	37.57	1.74	IS	94	26.71	2.75
4	9	30.33	0.34	IS	95	27.14	2.80
4	10	29.50	0.24	IS	96	23.14	1.09
4	11	28.86	1.10	LH	1	33.86	1.65
4	13	not done		LH	2	27.43	5.50
4	15	not done		SDH	1	47.10	0.84
4	18	19.57	2.14	SDH	2	62.80	1.99
5	1	24.30	0.16	SDH	3	52.80	2.64
5	3	6 prwns	0.02	SDH	4	23.60	7.42
5	4	45 prwns	0.20	SDH	5	47.10	1.61
5	5	34.71	3.50	SDH	6	29.30	4.33

7.4 Gulf St Vincent Prawn Fishery – Survey April 2007

Survey report to PIRSA Fisheries

Prepared by Shane Roberts and Cameron Dixon SARDI Aquatic Sciences (June 2007).

Introduction

SARDI Aquatic Sciences have conducted fishery-independent surveys for stock assessment and to assist harvest strategy development prior to each fishing period since December 2004. April surveys provide data on the spatial distribution of catch rate and prawn size, which are used to determine subsequent harvest strategies. This report aims to document the provisional results for the April 2007 survey that were presented to the GSV Prawn Fishery Management Sub-committee on Monday 16 April 2007 for the development of harvest strategy. Results are compared with previous surveys in 2004/05 and 2005/06.

Methods

The April 2007 survey was conducted over two nights, Friday 13 April to Saturday 14 April 2007 (Moon phase: last quarter on 11 April 2007) using 5 commercial vessels. Of 112 fixed survey stations for GSV (Figure 7.1), 110 were completed. Trawl shots conducted during the survey used all nets and most were of 30 minutes in duration. Data collected during the survey included: catch rate, prawn size (prawns/kg), catch by grade, sex ratio and sex-specific size-frequency. Mean prawn size estimated for the whole gulf is weighted by the catch per station. Catch rate and prawn size data for each station are summarised below. This report provides analyses of catch rate and prawn size (prawns/kg) data only, while other data will be presented in the annual stock assessment report for the GSV prawn fishery.

Catch rates <2 lb/min are defined as low, catch rates 2–4 lb/min are defined as moderate and catch rates >4 lb/min are defined as high. Stations with a mean prawn size <28 prawns per kg are defined as large sized prawns, stations with a mean prawn size 28–33 prawns per kg as medium sized prawns and stations with a mean prawn size >33 prawns per kg are defined as small sized prawns. Note that statistics regarding catch rates and prawn sizes presented in this report are mean values only to enable the development of harvest strategies following the Management Plan. This survey report does not present tests for statistically significant differences in catch rate or prawn size.

Results

April 2007 survey

Catch rate and prawn size data were available for 110 stations. The mean catch rate in GSV during the April 2007 survey was 2.55 lb/min and the mean weighted prawn size was 32.7 prawns/kg. Total prawn catch during the survey was estimated at ~ 3.7 t (wet weight).

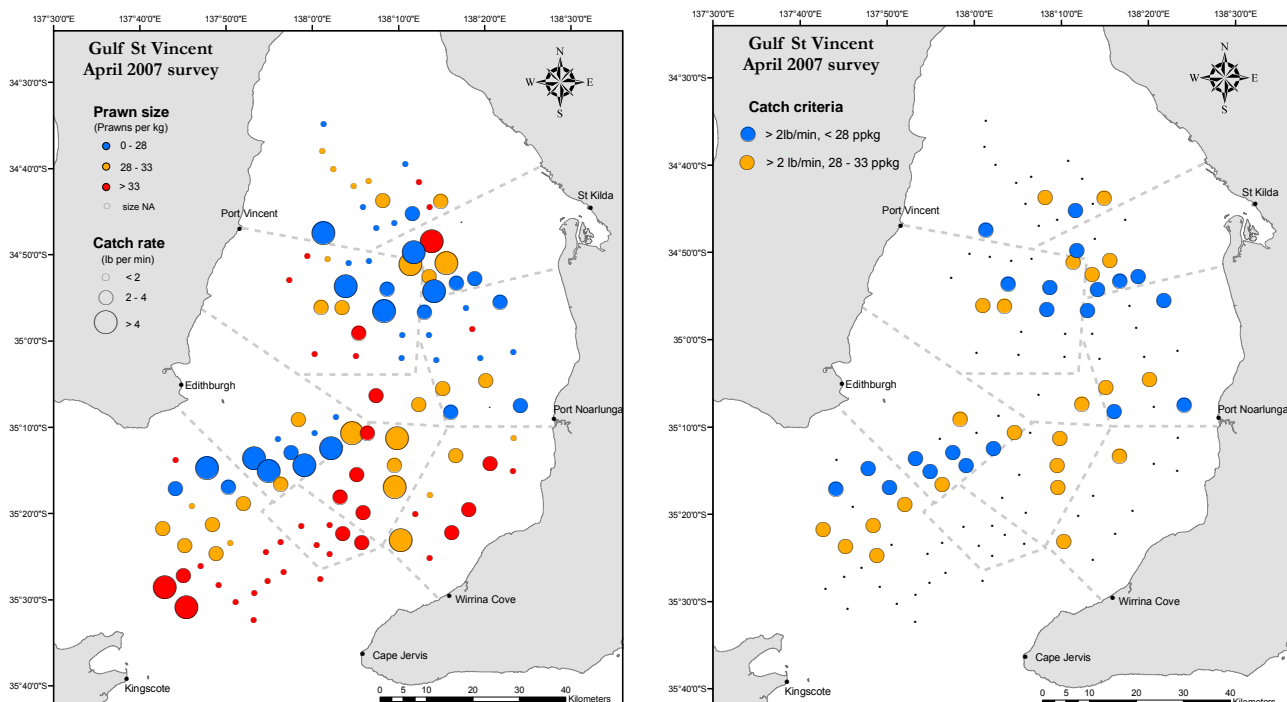


Figure 7.11. Left: Catch rate (lb/min) and prawn size (prawns/kg) for 110 (of 112) stations during the April 2007 fishery-independent survey. **Right:** Survey stations with large and medium size prawns (<28 and 28–33 prawns/kg) at high catch rates (>2lb/min) during the April 2007 fishery-independent survey.

Of 110 stations surveyed during April 2007, moderate catch rates were observed at 59 stations (54%), while high catch rates were observed at 19 stations (17%) in GSV (Figure 7.11). The two highest catch rates were observed in region 1 (station 28: 13.1 lb/min) and Region 3 (station 11: 12.0 lb/min). Small and medium sized prawns were observed throughout the gulf, particularly on the western side of Region 2, through the hole Regions (LH, DH, SDH) extending into eastern and southern Investigator Strait (IS) and Region 4. Large sized prawns were observed throughout northern GSV extending into Region 3 and western Investigator Strait.

Target catches for the March–June fishing periods aim at large size prawns at moderate and high catch rates. Twenty-one stations fitting the target criteria were observed in GSV during the April 2007 survey (Figure 7.11). Aggregations of stations of target criteria were observed in Region 3 extending into IS, and at the junction of Regions 2, 5 and 6.

Comparisons with previous surveys - Mean catch rate and prawn size

Fishery independent surveys have been conducted over the same lunar phase during April for the last 3 fishing seasons. The mean catch rate during the April 2007 survey (2.55 lb/min) was greater than that in 2006 (1.91 lb/min) and 2005 (1.43 lb/min) (Figure 7.12). The mean weighted prawn size during the April 2007 survey (32.7 prawns/kg) was smaller than the previous two seasons (2006: 30.0 prawns/kg, 2005: 30.1 prawns/kg) (Figure 7.12).

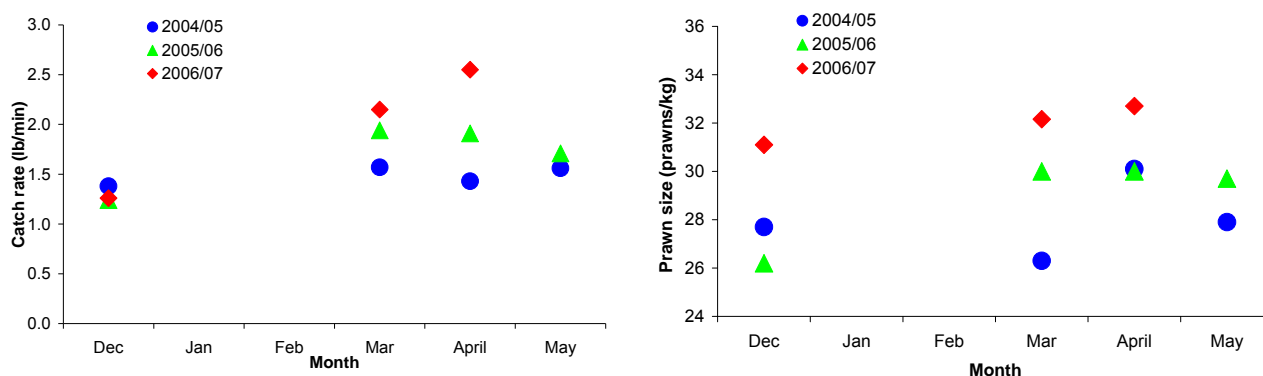


Figure 7.12. Left: Mean catch rate (lb/min) and **Right:** Mean weighted prawn size (prawns per kg) from fishery-independent surveys conducted in GSV during December, March, April and May of the 2004/05, 2005/06 and 2006/07 fishing-years.

Determining the mean catch rate from stations within each size category enables a crude comparison of the size distribution of prawns over time. The mean catch rate during the April 2007 survey was greater than that in 2006 and 2005 for large, medium and small sized prawns (Figure 7.13).

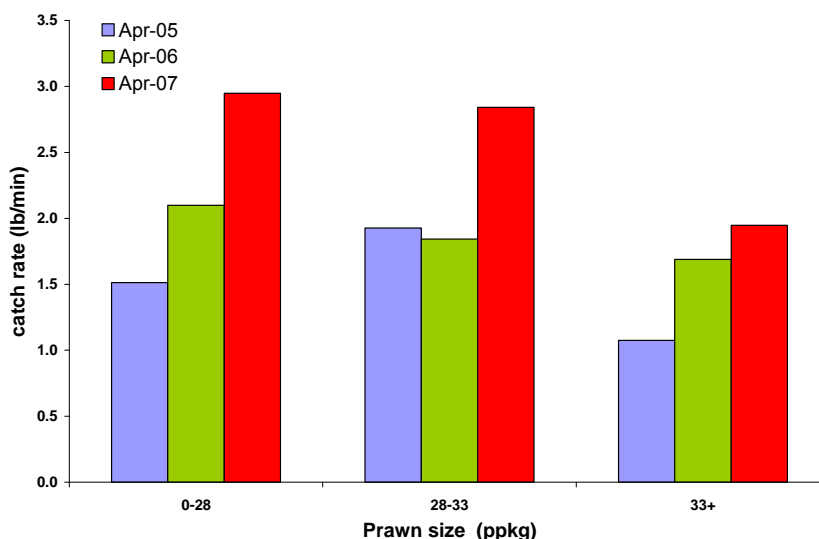


Figure 7.13. Mean catch rate (lb/min) for three prawn size categories from surveys in GSV conducted during April 2005, 2006 and 2007.

Potential fishing areas

Harvest strategy guidelines in the draft Management Plan define the target size of <28 prawns/kg for fishing during March to June.

Results from the April 2007 fishery-independent survey indicated that 21 stations had catches matching the target criteria (Figure 7.11). Aggregations of these stations were observed in two main areas in the gulf; Region 3 extending into Investigator Strait, and in the middle of the gulf including Regions 2, 5 and 6. Subsequently, the harvest strategy developed by the GSV Prawn Fishery Management Sub-committee included both aggregations as potential fishing areas.

Two priority areas were identified that included stations X9,X10&X12 in Region 6, stations 1,6,&7 in Region 5, and stations 3,4,9,11,&12 in Region3 (0.68–11.95 lb/min and 20.0–27.3 prawns/kg) (Figure 7.14, areas enclosed within solid red lines). These 11 stations represented 15.0% of the survey biomass. Two additional areas were identified for the April fishing period. These areas included stations 28&29 in Region 2, and stations 95&96 in Investigator Strait, (2.51–5.06 lb/min and 25.0–27.7 prawns/kg) (Figure 7.14, areas enclosed within dotted red lines). Each of these areas represented <3% of the survey biomass. It was determined that only one of these areas may be considered for fishing during the April period. Selection of the area would depend upon weather conditions and the results of fishing with the priority areas.

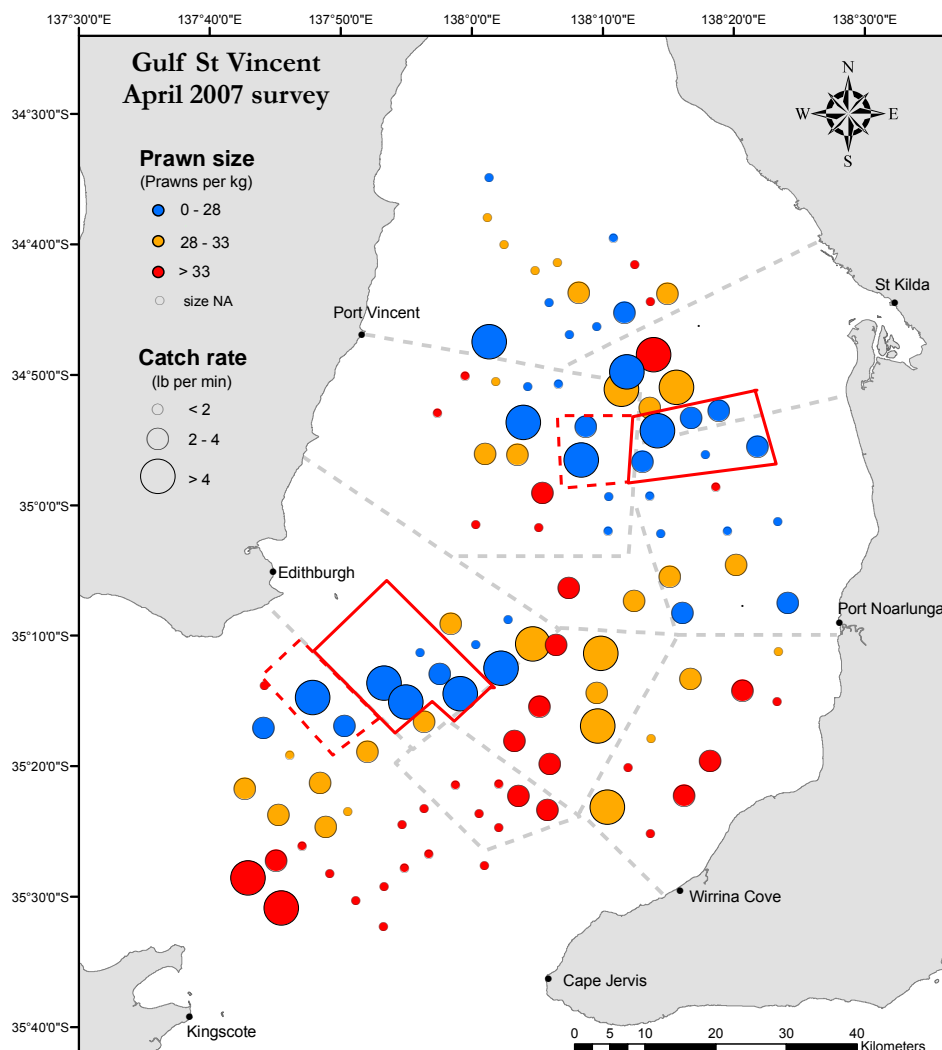


Figure 7.14. Spatial harvest strategy agreed at the GSV Prawn Fishery Management Sub-committee meeting. Polygons with full lines represent priority areas to be considered for fishing during the April fishing period 2007. Polygons with dotted lines represent additional areas to be considered for fishing during the April fishing period 2007.

Unvalidated prawn size (ppkg) and catch rate (lb/min) data for stations surveyed in GSV during April 2007. Please note that although all due care has been taken, discrepancies may occur between these and results presented in a final stock assessment report.

Region	Station	ppkg	lb/min	Region	Station	ppkg	lb/min
1	1	30.71	2.70	5	6	20.00	0.68
1	4	27.90	1.48	5	7	25.57	2.36
1	5	33.66	1.39	5	8	22.46	0.31
1	6	37.31	0.15	5	9	23.29	0.63
1	7	25.57	3.41	5	10	29.14	2.47
1	10	22.84	1.78	5	11	29.14	3.57
1	11	28.35	3.12	5	13	26.43	2.30
1	12	30.68	0.52	5	14	not done	
1	16	27.68	0.15	5	15	24.29	2.33
1	19	28.14	0.90	6	X1	not done	
1	20	25.21	0.24	6	X10	24.57	3.08
1	21	22.73	0.17	6	X12	27.29	4.74
1	25	30.50	0.06	6	X5	36.43	4.38
1	26	29.79	0.06	6	X6	28.57	6.71
1	28	27.43	13.13	6	X7	28.14	3.87
2	2	44.86	0.86	6	X8	27.29	6.25
2	8	38.57	1.05	6	X9	23.29	3.77
2	9	29.71	0.56	DH	1	30.57	6.57
2	11	29.00	2.06	DH	2	31.86	3.81
2	13	27.00	0.22	DH	3	32.00	4.44
2	14	26.43	5.94	DH	4	34.00	2.93
2	15	31.86	3.08	DH	6	45.29	3.42
2	17	23.17	0.18	DH	7	53.57	3.30
2	20	36.00	2.13	DH	8	35.00	3.08
2	21	38.86	0.78	IS	3	76.40	0.98
2	23	42.14	0.53	IS	4	51.40	1.26
2	28	27.71	5.06	IS	9	33.50	1.48
2	29	26.43	2.51	IS	11	26.50	3.43
2	31	28.14	4.66	IS	12	28.50	1.29
2	34	22.00	1.41	IS	13	29.20	2.91
2	35	24.71	1.96	IS	14	31.40	1.50
3	2	29.29	2.27	IS	16	79.40	0.81
3	3	24.71	1.05	IS	21	69.50	0.66
3	4	24.29	3.62	IS	23	29.20	2.08
3	5	23.29	1.76	IS	30	30.71	2.54
3	6	24.86	0.87	IS	31	28.57	2.31
3	7	31.57	5.72	IS	32	38.57	1.69
3	8	27.71	6.17	IS	33	52.86	1.77
3	9	23.43	4.66	IS	34	67.86	0.69
3	10	30.43	2.23	IS	35	65.71	1.28
3	11	24.00	11.95	IS	41	37.57	2.16
3	12	24.71	4.08	IS	50	37.14	5.40
4	1	52.86	1.63	IS	51	40.00	4.11
4	4	57.14	2.90	IS	90	55.71	0.90
4	6	54.86	3.18	IS	92	52.43	0.86
4	7	32.00	2.10	IS	94	32.10	3.36
4	9	30.00	1.78	IS	95	27.10	3.69
4	10	42.29	1.33	IS	96	25.00	4.22
4	11	30.29	6.04	LH	1	35.43	3.56
4	13	55.71	2.72	LH	2	28.00	3.94
4	15	50.29	1.97	SDH	1	53.57	1.69
4	18	32.14	1.69	SDH	2	60.43	1.61
5	1	23.71	2.09	SDH	3	50.00	2.94
5	3	18.72	0.03	SDH	4	36.57	2.52
5	4	19.01	0.36	SDH	5	67.86	1.25
5	5	43.00	1.19	SDH	6	47.29	1.31

7.5 Gulf St Vincent Prawn Fishery – Survey May 2007

Survey report to PIRSA Fisheries

Prepared by Shane Roberts and Cameron Dixon SARDI Aquatic Sciences (June 2007).

Introduction

SARDI Aquatic Sciences have conducted fishery-independent surveys for stock assessment and to assist harvest strategy development prior to each fishing period since December 2004. May surveys provide data on the spatial distribution of catch rate and prawn size, which are used to determine subsequent harvest strategies. This report aims to document the provisional results for the May 2007 survey that were presented to the GSV Prawn Fishery Management Sub-committee on Friday 18 May 2007 for the development of harvest strategy. Results are compared with previous surveys in 2004/05 and 2005/06.

Methods

The May 2007 survey was conducted over one night, Thursday 17 May 2007 (new moon) using 10 commercial vessels. Of 112 fixed survey stations for GSV (Figure 7.1), 112 were conducted. Trawl shots conducted during the survey used all nets and most were of 30 minutes in duration. Data collected during the survey included: catch rate, prawn size (prawns/kg), catch by grade, sex ratio and sex-specific size-frequency. Mean prawn size estimated for the whole gulf is weighted by the catch per station. Catch rate and prawn size data for each station are summarised below. This report provides analyses of catch rate and prawn size (prawns/kg) data only, while other data will be presented in the annual stock assessment report for the GSV prawn fishery.

At a meeting of the GSV Prawn Management and Research Sub-Committee on 10 April 2007, it was determined that for the development of harvest strategy from survey results, stations with prawn sizes <27 prawns/kg would be targeted where possible. Fishing would continue to harvest prawns of a size <28 prawns/kg.

Thus, stations with a mean prawn size <27 prawns per kg are defined as large sized prawns, stations with a mean prawn size 27–33 prawns per kg as medium sized prawns and stations with a mean prawn size >33 prawns per kg are defined as small sized prawns. Catch rates <2 lb/min are defined as low, catch rates 2–4 lb/min are defined as moderate and catch rates >4 lb/min are defined as high. Note that statistics regarding catch rates and prawn sizes presented in this report are mean values only to enable the development of harvest strategies following the Management Plan. This survey report does not present tests for statistically significant differences in catch rate or prawn size.

Results

May 2007 survey

Catch rate data were available for 112 stations, while prawn size data were available for 105 stations only due to zero catches or no catch weights recorded for 7 stations. The mean catch rate in GSV during the May 2007 survey was 2.97 lb/min and the mean weighted prawn size was 28.7 prawns/kg. Total prawn catch during the survey was estimated at ~ 4.6 t (wet weight).

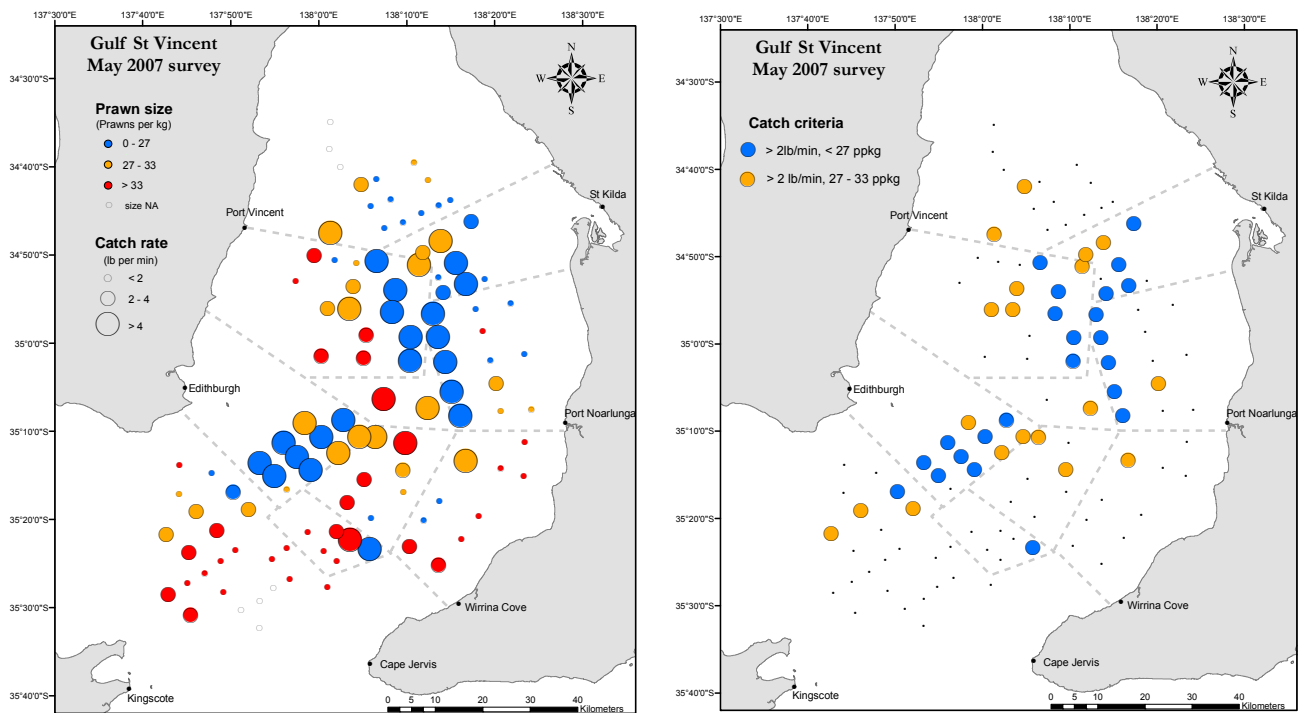


Figure 7.15. Left: Catch rate (lb/min) and prawn size (prawns/kg) for 112 stations during the May 2007 fishery-independent survey. **Right:** Stations with large and medium size prawns (<27 and 27–33 prawns/kg) at moderate (2–4 lb/min) and high catch rates (>4 lb/min) during the May 2007 survey

Of 112 stations surveyed during May 2007, moderate catch rates were observed at 21 stations (18%), while high catch rates were observed at 33 stations (30%, Figure 7.15). The two highest catch rates were observed in Region 3 (station 8: 15.7 lb/min; station 9: 12.0 lb/min). Small sized prawns were observed throughout the gulf, particularly on the western side of Region 2, through the hole Regions (LH, DH, SDH) extending into eastern and southern Investigator Strait and Region 4. Medium and large sized prawns were observed throughout northern GSV extending into Region 3 and western Investigator Strait.

Stations with large prawns at moderate and high catch rates are targeted where possible for fishing. Twenty-three stations fitted these criteria in GSV during the May 2007 survey (Figure 7.15). Aggregations of these stations were observed in Region 3 extending into Investigator Strait, and at the junction of Regions 2, 5 and 6.

Comparisons with previous surveys

Mean catch rate and prawn size

More than 100 stations have been surveyed on the dark of the moon in May during the last three years. The mean catch rate during the May 2007 survey (2.97 lb/min) was greater than that in 2006 (1.71 lb/min) and 2005 (1.56 lb/min) (Figure 7.16). Mean weighted prawn size during May over the last 3 fishing seasons has been similar (2007: 28.7 prawns/kg; 2006: 29.7 prawns/kg; 2005: 27.9 prawns/kg) (Figure 7.16).

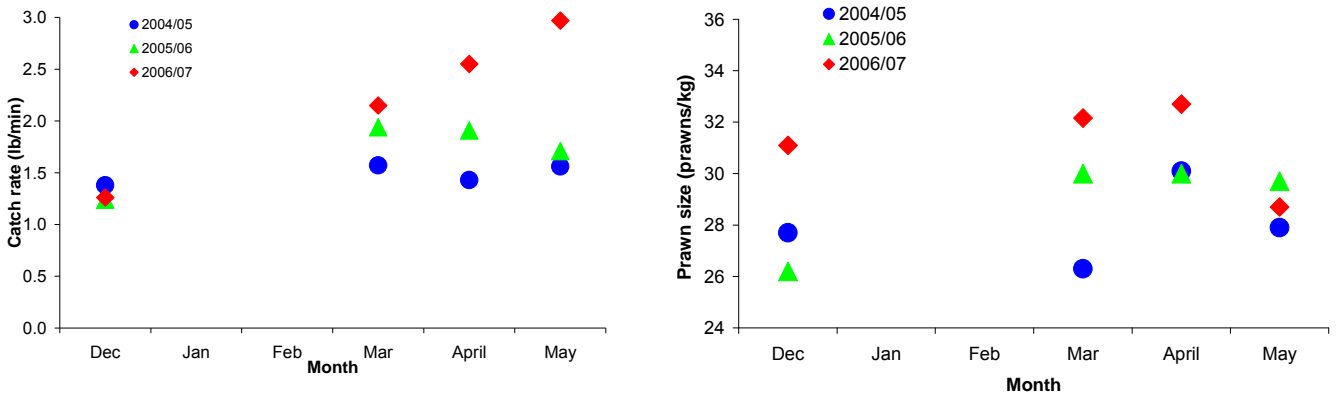


Figure 7.16. Left: Mean catch rate (lb/min) and Right: Mean weighted prawn size (prawns per kg) from fishery-independent surveys conducted in GSV during December, March, April and May of the 2004/05, 2005/06 and 2006/07 fishing-years.

Separating survey catch rates into prawn size classes allows annual trends to be further explored. The mean catch rate during the May 2007 survey was greater than that in 2006 and 2005 for large, medium and small sized prawns (Figure 7.17). Note that differences in catch rates between size classes and years were not statistically tested for this report.

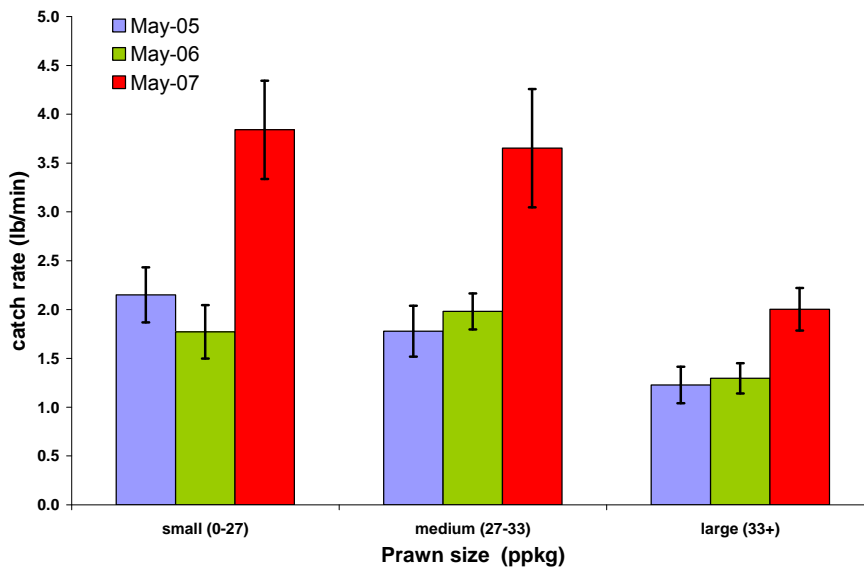


Figure 7.17. Mean (\pm standard error) catch rate (lb/min) for three prawn size classes from fishery-independent surveys in GSV conducted during May 2005, 2006 and 2007.

Potential fishing areas

Harvest strategy guidelines in the draft Management Plan define the target size of <28 prawns/kg for fishing during March to June. At a meeting of the GSV Prawn Management and Research Sub-Committee on 10 April 2007, it was determined that for the development of harvest strategy from survey results, stations with prawn sizes <27 prawns/kg would be targeted where possible during May 2007.

Data collected during the May 2007 survey indicated that 23 stations had catches matching the target size at catch rates >2lb/min (Figure 7.15). Aggregations of these stations were observed in Region 3 and in the middle of the gulf including Regions 2, 5 & 6. Subsequently, the harvest strategy developed by the GSV Prawn Fishery Management Sub-committee included both aggregations as potential fishing areas. For the May fishing period, three potential fishing areas were identified that included stations 28, 29, 34 & 35 in Region 2 and stations 3, 4, 11 & 12 in Region 3 (5–12 lb/min and 22.1–25.4 prawns/kg) (Figure 7.18). These 8 stations represented 19.4% of the survey biomass.

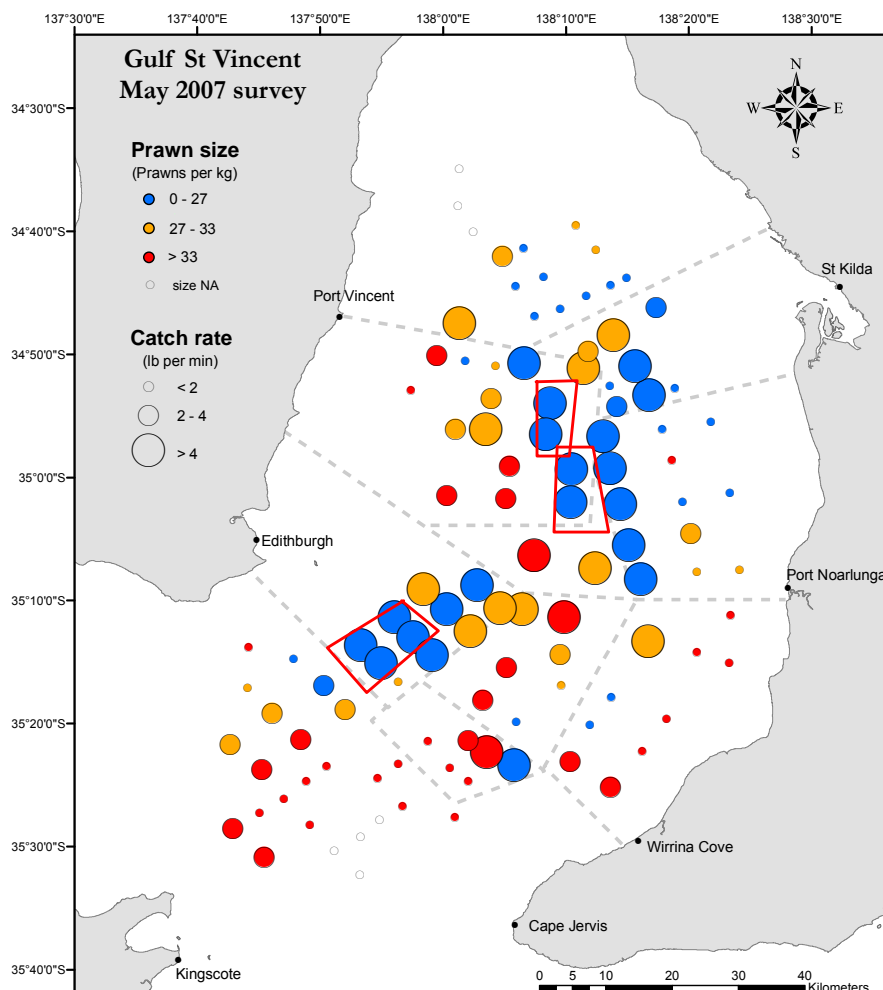


Figure 7.18. Spatial harvest strategy agreed at the GSV Prawn Fishery Management Sub-committee meeting. Polygons represent areas to be considered for fishing during the post-survey May fishing period 2007.

Unvalidated prawn size (ppkg) and catch rate (lb/min) data for stations surveyed in GSV during May 2007. Please note that although all due care has been taken, discrepancies may occur between these and results presented in a final stock assessment report.

Region	Station	ppkg	lb/min	Region	Station	ppkg	lb/min
1	1	24.57	0.51	5	6	23.57	1.76
1	4	31.43	1.10	5	7	22.86	5.13
1	5	30.00	0.29	5	8	21.57	4.91
1	6	25.36	0.51	5	9	21.86	4.03
1	7	21.18	0.50	5	10	26.86	4.30
1	10	23.57	1.10	5	11	29.14	2.28
1	11	23.57	1.61	5	13	30.26	1.99
1	12	23.57	1.10	5	14	30.86	1.04
1	16	21 prns	0.07	5	15	23.00	8.20
1	19	27.14	2.35	6	X1	24.29	2.57
1	20	23.57	1.61	6	X10	20.00	1.25
1	21	17.67	0.44	6	X12	22.86	3.15
1	25	64 prns	0.15	6	X5	31.43	4.11
1	26	74 prns	0.15	6	X6	25.00	5.13
1	28	29.00	7.19	6	X7	23.86	1.25
2	2	51.43	1.76	6	X8	29.14	2.86
2	8	40.71	3.08	6	X9	21.43	4.62
2	9	26.43	1.54	DH	1	28.14	1.80
2	11	27.14	3.08	DH	2	28.57	3.90
2	13	32.14	0.73	DH	3	33.71	4.80
2	14	27.14	2.05	DH	4	32.54	4.65
2	15	30.71	4.11	DH	6	35.78	3.22
2	17	20.71	4.62	DH	7	41.67	3.06
2	20	33.57	3.23	DH	8	24.82	1.33
2	21	36.43	3.08	IS	3	56.12	0.30
2	23	37.14	2.57	IS	4	37.54	0.40
2	28	23.57	5.72	IS	9	36.29	1.00
2	29	22.43	4.99	IS	11	27.91	1.50
2	31	27.29	5.13	IS	12	28.43	2.30
2	34	22.14	5.72	IS	13	34.00	2.10
2	35	24.29	10.12	IS	14	39.71	1.30
3	2	28.71	5.48	IS	16	NA	0.00
3	3	24.49	9.54	IS	21	NA	0.00
3	4	25.43	7.53	IS	23	43.43	1.30
3	5	23.29	5.38	IS	30	32.00	2.50
3	6	21.43	4.56	IS	31	40.00	2.50
3	7	32.94	8.55	IS	32	49.01	0.50
3	8	27.83	15.67	IS	33	57.14	0.40
3	9	25.73	12.02	IS	34	NA	0.00
3	10	32.00	1.47	IS	35	NA	0.00
3	11	24.43	11.94	IS	41	52.29	1.00
3	12	22.86	8.87	IS	50	49.14	3.30
4	1	50.08	0.82	IS	51	42.32	3.30
4	4	44.33	1.10	IS	90	37.76	1.03
4	6	47.38	0.81	IS	92	40.79	0.88
4	7	29.57	4.10	IS	94	32.06	2.00
4	9	26.29	1.10	IS	95	26.71	2.60
4	10	24.86	1.40	IS	96	24.00	1.70
4	11	35.71	3.10	LH	1	33.86	5.00
4	13	43.57	0.89	LH	2	30.71	6.40
4	15	38.22	3.14	SDH	1	39.94	1.58
4	18	35.42	1.24	SDH	2	40.12	3.08
5	1	21.43	1.25	SDH	3	34.38	4.13
5	3	18.57	0.05	SDH	4	21.10	5.31
5	4	16.28	0.32	SDH	5	34.51	0.53
5	5	35.00	1.03	SDH	6	35.81	1.56

7.6 2006/07 egg production

Table 7.1 Model parameters and the egg production estimate for the 2006/07 fishing season determined from the December 2006 survey.

Prawn grade	U8	U10	10-15	16-20	21+
Mean individual weight (g)	62.5	50.0	37.0	26.3	16.7
Mean CL (mm)	51.5	47.3	42.3	37.2	31.3
Eggs per female	668900	500303	338534	216987	119745
% mature	98.1%	95.3%	84.9%	57.5%	23.7%
Spawning frequency	3	3	3	3	3
Fertilisation success	99.0%	98.0%	90.0%	85.0%	40.0%
Mean catch rate (kg/h)	6.5 (0.7)	5.9 (0.9)	17.7 (2.6)	4.7 (0.9)	3.7 (0.5)
Prawns per hour	103.8 (11.7)	118.7 (18.9)	479.2 (69.2)	178.3 (34.4)	219.3 (29.3)
% females	99.08%	92.62%	43.78%	29.93%	18.85%
Females per hour	102.8 (11.5)	110.0 (17.5)	209.8 (30.3)	53.3 (10.3)	41.3 (5.5)
Eggs (million per hour)	103.5 (13.9)	160.2 (21.1)	131.3 (17.5)	26.7 (3.0)	1.5 (0.2)