

**Status Report  
to PIRSA Fisheries**

**Southern Zone  
Rock Lobster (*Jasus edwardsii*)  
Fishery Status Report 2007/08**

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October 2008

**SARDI Aquatic Sciences Publication No. F2007/000715-2  
SARDI Research Report Series No. 314**

Title: Southern Zone Rock Lobster (*Jasus edwardsii*) Fishery Status Report 2007/08.  
Sub-title: Status Report to PIRSA Fisheries.  
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Printed in Adelaide, October 2008.

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Approved by: Tim Ward



Signed:  
Date: October 2008  
Distribution: PIRSA Fisheries, South Australian Rock Lobster Advisory Council,  
SARDI Aquatic Sciences Library  
Circulation: Public Domain

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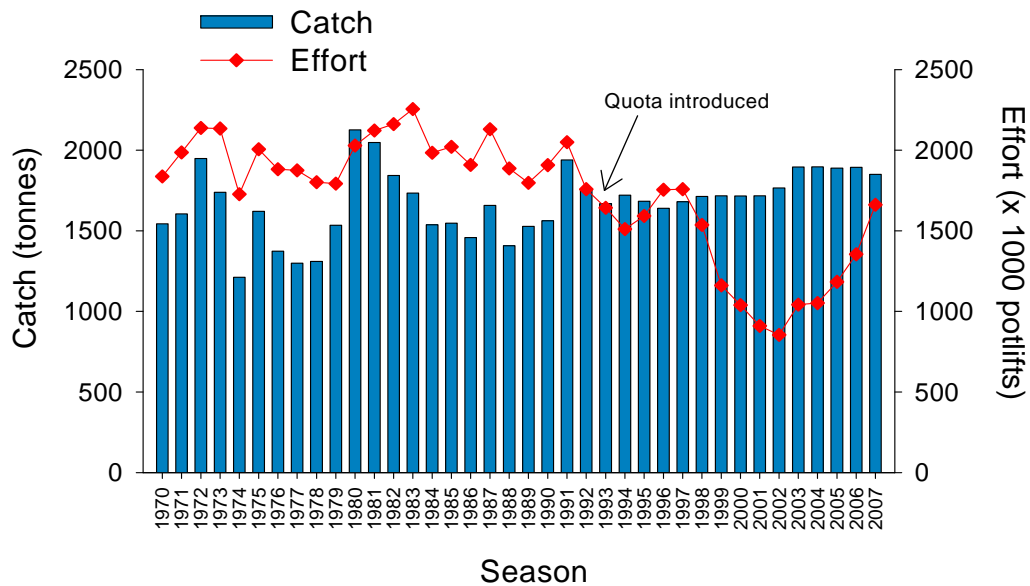
## 1 EXECUTIVE SUMMARY

- In 2007 (i.e. the 2007/08 season), the TACC in the SZRLF was 1,900 tonnes. The total reported commercial catch from logbook data was 1,849.5 tonnes. A total of 1,661,428 potlifts was required to catch the TACC, which was an increase of 22.67% from 2006 (1,354,305 potlifts).
- In 2007, a total of 99% of catch came from four MFAs in the SZRLF. The highest proportion came from MFA 55 (43%) while the lowest came from MFA 51 (5%) (refer to Figure 26). The majority of the catch (80%) continues to be taken from inshore grounds (<60 m) with evidence to suggest that this proportion may even be increasing in depths <30 m.
- For the fifth consecutive season, catch per unit effort (CPUE) decreased in the SZRLF. In 2007, it was 1.1 kg/potlift, a decrease of 21% from the 2006 estimate of 1.4 kg/potlift. Current catch rates do not take into account discard rates due to high-grading, which in 2007 were at least 76 tonnes.
- The 2007 decline in CPUE was observed in all of the four major MFAs in the SZRLF. This is the fifth season in succession in which CPUE has decreased in MFAs 56 and 58. The decrease in CPUE was also observed across all months and all depths of the fishery during the 2007 season.
- Over the last three seasons (2005 – 2007), the puerulus settlement index (PSI) in the SZRLF has been above average. In particular, the PSIs for 2005 and 2006 were the two highest since monitoring began.
- Pre-recruit index (PRI), as calculated from voluntary catch sampling, increased over the period 2003 – 2006. The estimate of 1.44 undersized/potlift in 2006 was the highest on record. However, in 2007, PRI decreased markedly and the estimate of 0.69 undersized/potlift is currently the lowest on record. PRI also decreased in all of the major regions of the SZRLF in 2007.
- Biomass, as determined by the qR fishery model, has decreased over the last five seasons and in 2007 was 4,041 tonnes. With a current catch of 1,849.5 tonnes, this represents an exploitation rate of 45.7%.
- In summary, the expected recruitment into the SZRLF from the 2002 puerulus settlement pulse was not observed during 2007 and for the fifth consecutive season CPUE decreased. In some areas at least, this decrease is likely to reflect the continued high level of exploitation within inshore grounds. In 2007, the PRI decreased notably both zonally and regionally within the SZRLF. The 2007 zonal estimate is the lowest on record. Both CPUE and PRI must trigger before a TACC adjustment is made. In 2007, CPUE was below the limit reference point (LRP) both zonally and regionally and has triggered as per the Management Plan. PRI has not triggered. However, is it now only marginally above the (LRP) zonally and in two of the regions. It has triggered in MFA 56.
- Finally, the 2007 season appears to have been an exceptional year in terms of cold water upwelling from the Bonney system. What impact this has had on recruitment, growth and subsequent catch rate in the SZRLF is currently unknown.

## 2 FISHERY STATISTICS

### 2.1 Catch, effort and CPUE

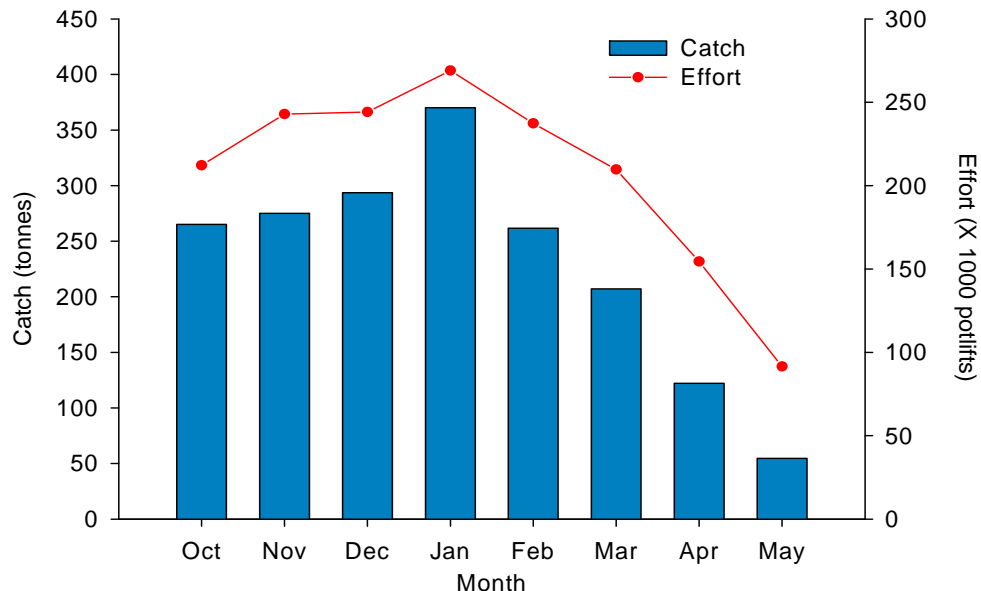
#### 2.1.1 Zonal catch and effort



**Figure 1** Inter-annual trends in catch and effort in the SZRLF from 1970 to 2007.

In 2007 (i.e. the 2007/08 season), the TACC in the SZRLF was 1,900 tonnes (Figure 1). The total reported commercial catch from logbook data was 1,849.57 tonnes. Effort in 2007 was 1,661,428 potlifts, which was an increase of 22.67% from 2006 (1,354,305 potlifts) when the TACC was also 1,900 tonnes.

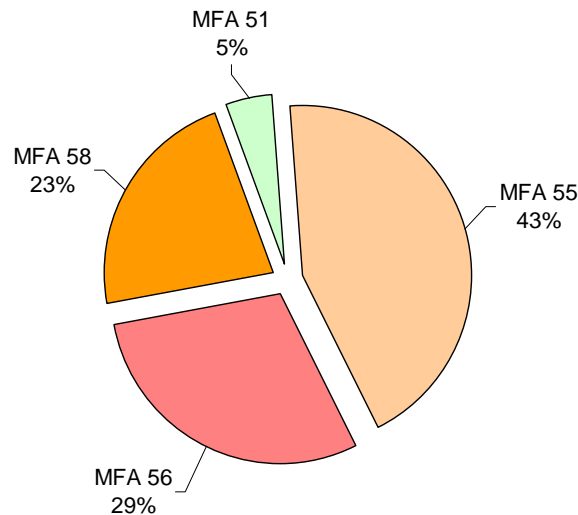
#### 2.1.2 Within season trends in catch and effort



**Figure 2** Within season trends in catch and effort in the SZRLF for the 2007 season.

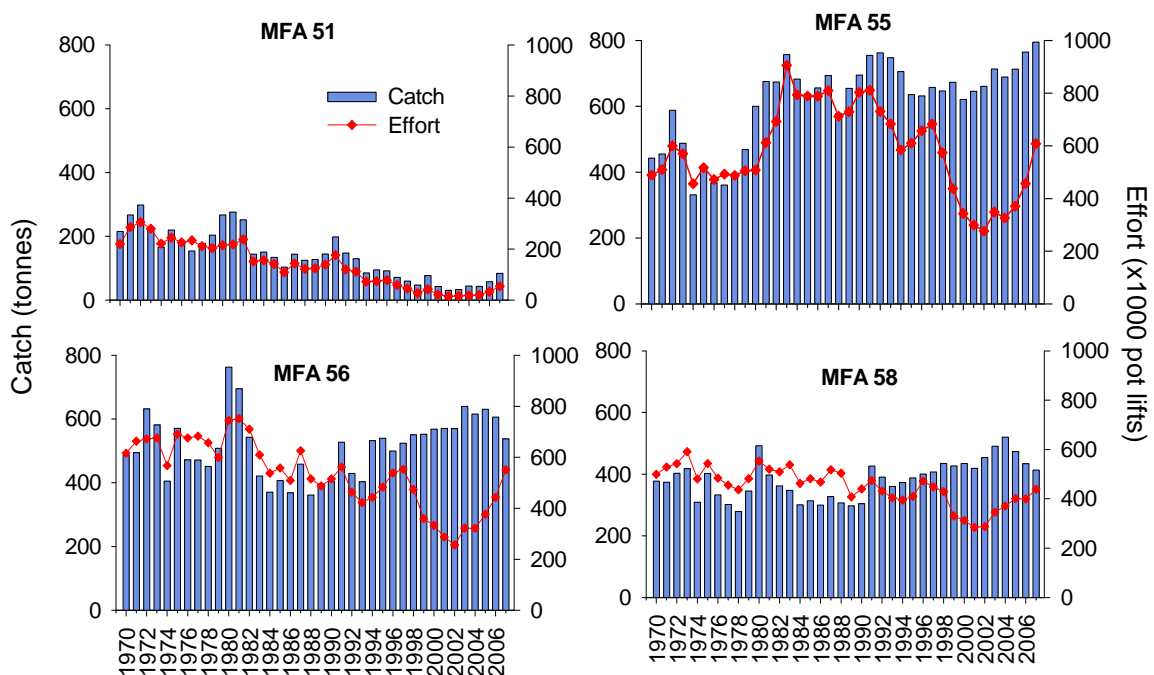
In 2007, the highest catches were taken in the first five months of the season from October to February (Figure 2). The highest catch month was January at 370.17 tonnes while the lowest was May at 54.50 tonnes. The trends in effort reflected catch levels by month.

### 2.1.3 Regional catch and effort



**Figure 3** Percentage of total catch taken in the four major MFAs (in terms of tonnage landed) of the SZRLF in 2007.

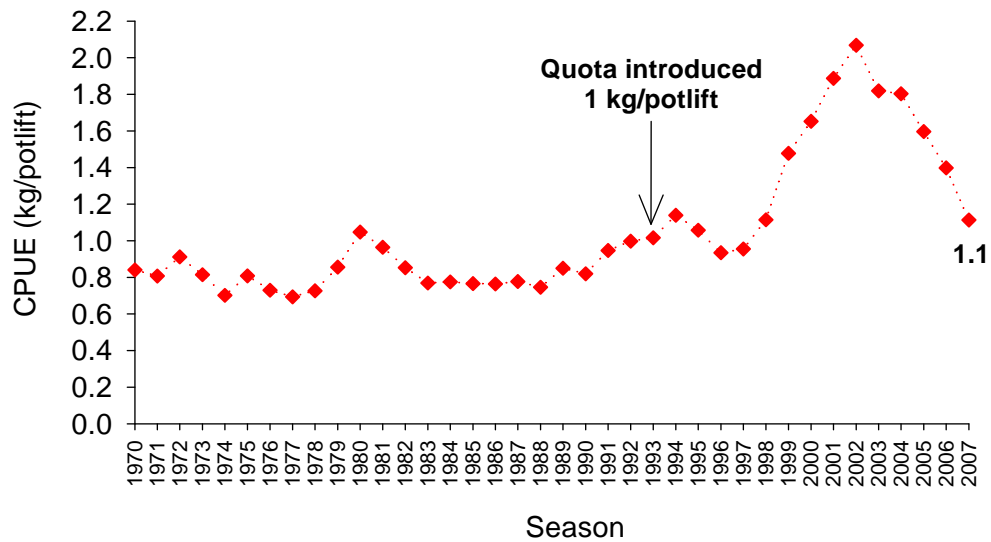
In 2007, a total of 99% of catch came from four MFAs in the SZRLF (Figure 3, refer to Figure 26). The highest proportion came from MFA 55 with 43% while only 5% of catch came from MFA 51.



**Figure 4** Inter-annual trends in catch and effort in the main Marine Fishing Areas (MFAs) of the SZRLF for the fishing seasons between 1970 and 2007 (note: alternate seasonal ticks on X-axis).

In 2007, both catch and effort increased in MFAs 51 and 55 compared to 2006 (Figure 4, refer to Figure 26). In MFAs 56 and 58, catch decreased despite an increase in effort in both regions. In total, only 83.6 tonnes were landed in MFA 51 in 2007, while 794.6, 537.9 and 413.3 tonnes were taken in MFAs 55, 56 and 58 respectively.

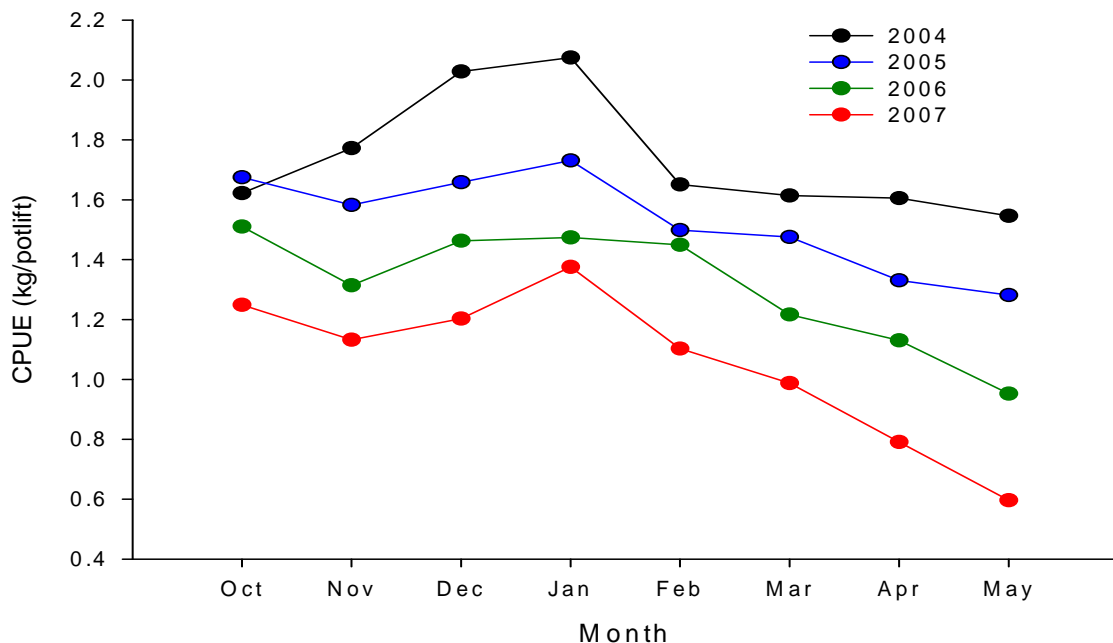
### 2.1.4 Zonal CPUE



**Figure 5** Inter-annual trends in CPUE in the SZRLF between 1970 and 2007.

Over the last five seasons CPUE in the SZRLF has decreased and in 2007 was 1.1 kg/potlift (Figure 5). This is now only marginally above the estimate of 1.0 kg/potlift from 1993 when quota was first introduced into the fishery. Current CPUE estimates do not take into account discard rates due to high-grading (see Figure 13).

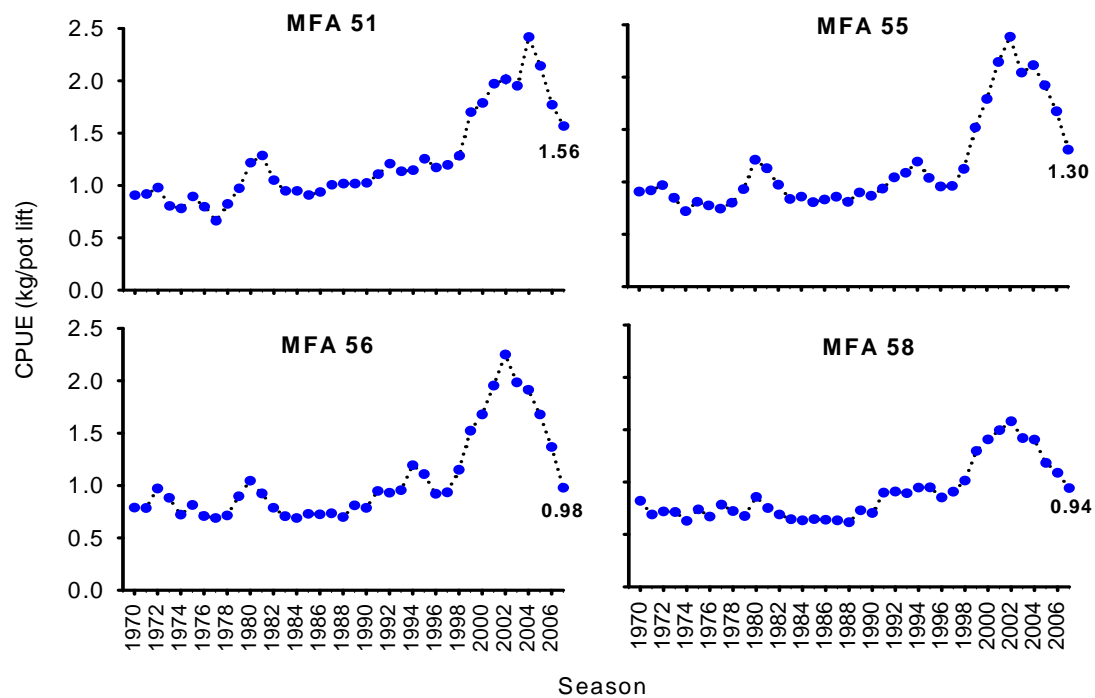
### 2.1.5 Within season trends in CPUE



**Figure 6** Within season trends in CPUE in the SZRLF over the last four seasons.

CPUE generally increases from November to January within the SZRLF before decreasing thereafter (Figure 6). Over the last number of seasons, CPUE has decreased consistently across all months of the fishery. In 2007, CPUE was highest in January at 1.37 kg/potlift and lowest in May at 0.59 kg/potlift.

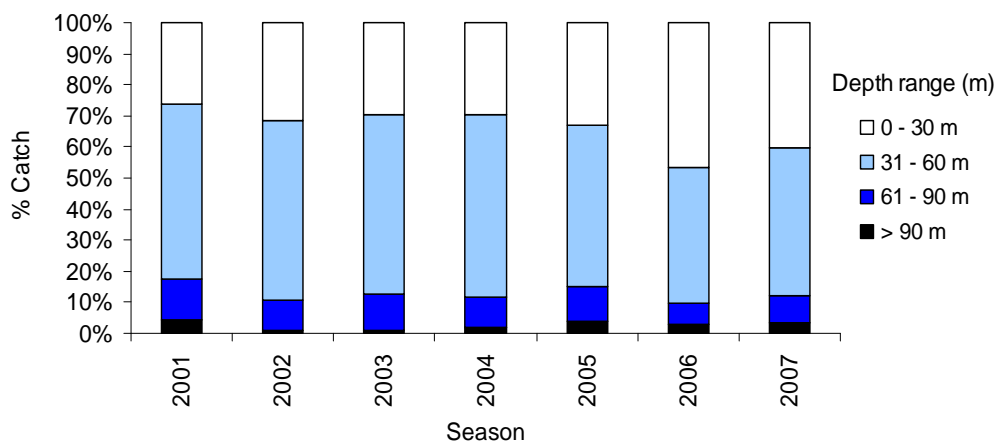
### 2.1.6 Regional CPUE



**Figure 7** Inter-annual trends in CPUE in the four main MFAs of the SZRLF between 1970 and 2007 (note: alternate annual ticks on X-axis).

Catch rates in each main MFA generally reflect zonal estimates (Figure 7). Highest catch rates were observed in MFA 51 but only 5% of the total catch came from this MFA (Figures 3 and 4). In 2007, catch rates decreased in all four MFAs. This is the fifth season in succession in which catch rates have decreased in MFAs 56 and 58.

### 2.1.7 Spatial trends in catch by depth

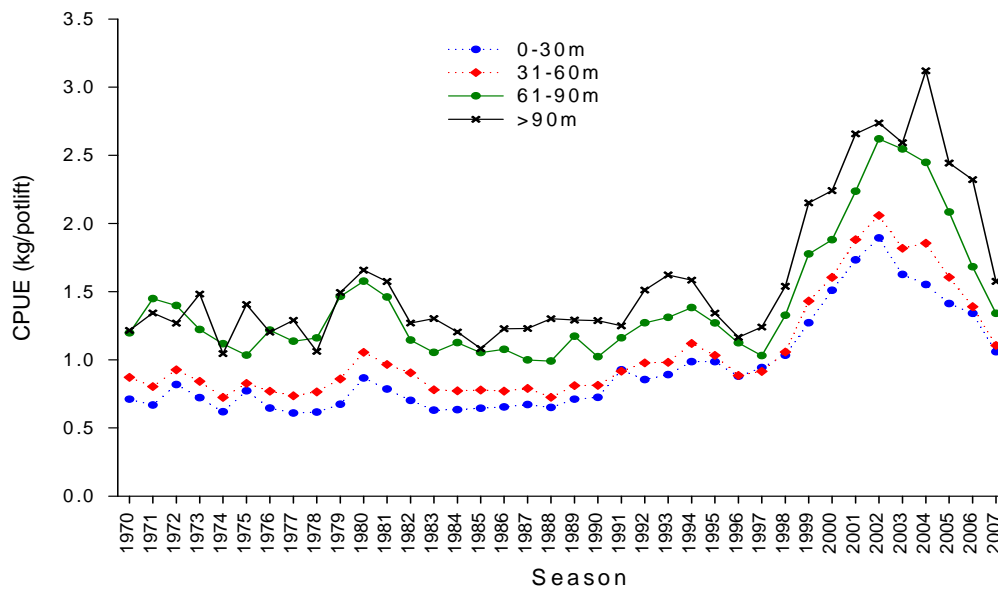


**Figure 8** Catch by depth in the SZRLF over the last seven seasons.

Over the last seven seasons >85% of the catch has been taken from depths of <60 m (Figure 8). The proportion of catch taken in depths of <30 m has been greater in recent years with 47% and 40% of catch taken within this range in 2006 and 2007 respectively. Less than 5% of catch is currently taken in depths >90 m.



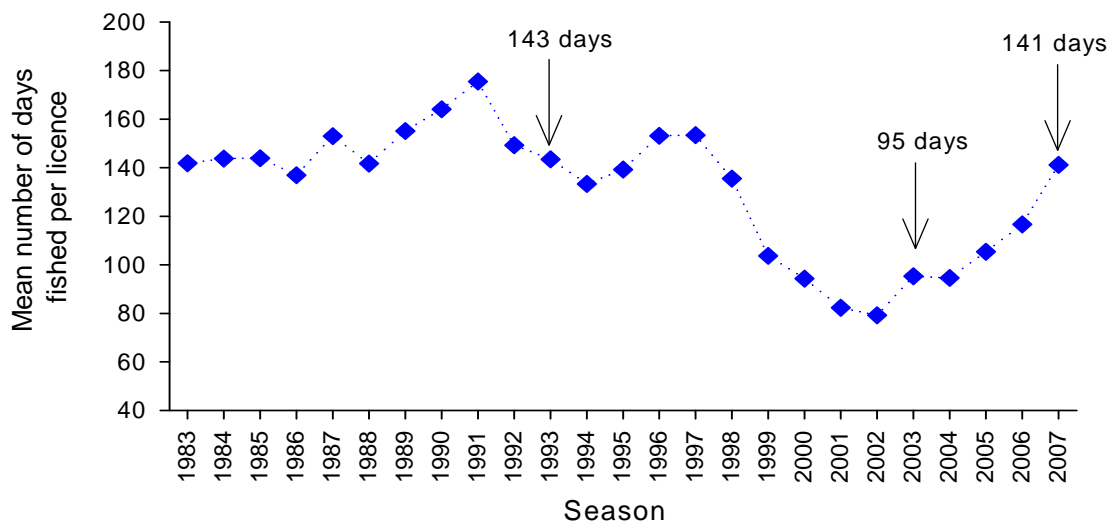
### 2.1.8 Spatial trends in CPUE by depth



**Figure 9** CPUE by depth in the SZRLF from 1970 to 2007.

Despite the fact that >85% of catch is taken from <60 m (Figure 8), catch rates in depths of 0-30 and 31-60 m are consistently lower than those in deeper waters (Figure 9). Over the last 4-5 seasons however, CPUE has generally decreased in all depth ranges and in 2007 ranged from 1.0 kg/potlift in 0-30 m to 1.5 kg/potlift in depths >90 m.

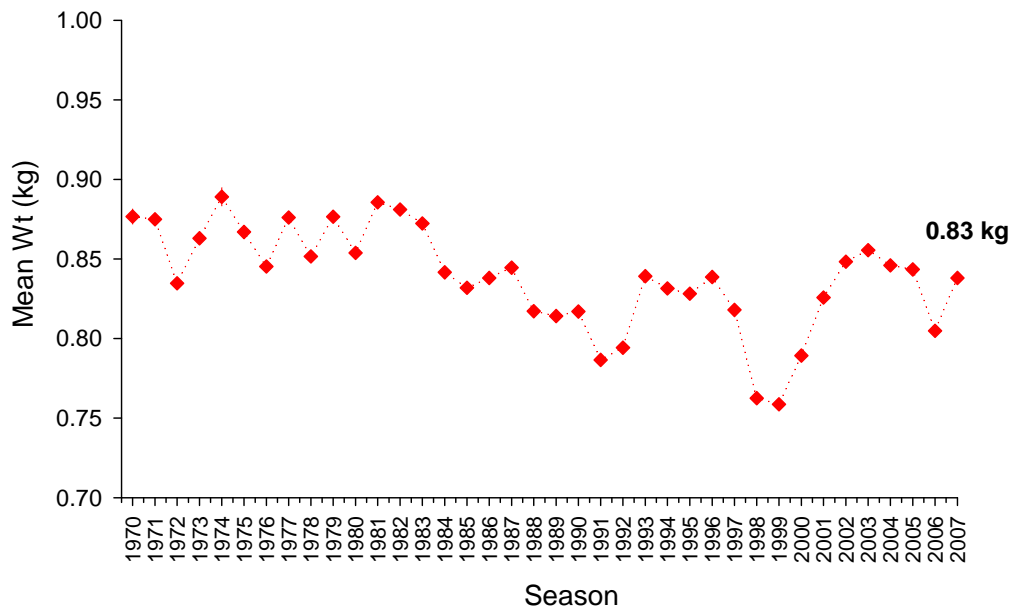
### 2.1.9 Average number of days fished



**Figure 10** Average numbers of days fished per licence holder from 1983 to 2007 in the SZRLF.

Over the last five seasons the average numbers of days fished per licence holder has increased. In 2003, when the TACC was increased from 1,770 to 1,900 tonnes, it took licence holders on average 95 days to catch their allocated quota. In 2007, the estimate was 141 days, which represents an increase of 48% from 2003. This is now only marginally below the estimate of 143 days from 1993 when quota was first introduced into the fishery.

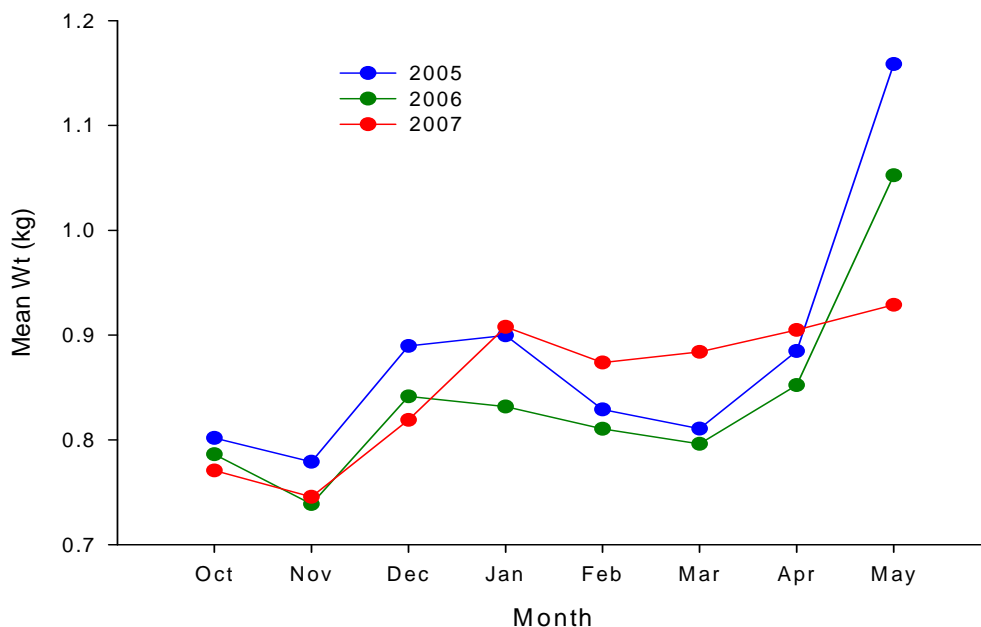
### 2.1.10 Zonal mean weight



**Figure 11** Inter-annual trends in mean lobster weight in the SZRLF from 1970 to 2007.

Mean lobster weight decreased over the period 2003 to 2006. In 2007, mean weight increased to 0.83 kg (Figure 11). As with CPUE, this estimate is affected by high-grading in the zone when smaller individuals are selected for (see Figure 13).

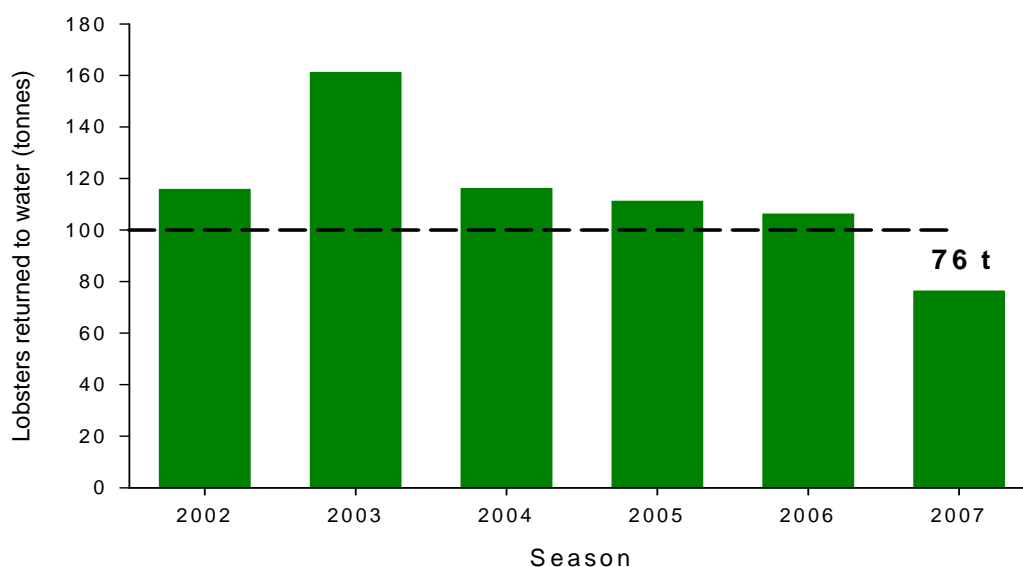
### 2.1.11 Within season trends in mean weight



**Figure 12** Within season trends in mean weight in the SZRLF over the last three seasons.

In the SZRLF, mean weight tends to generally increase as the season progresses. In 2007, mean weight was below estimates from previous seasons over the first three months of the season but with the exception of May, was highest over the period from January to April. Mean weight was lowest in November at 0.74 kg and highest in May at 0.92 kg.

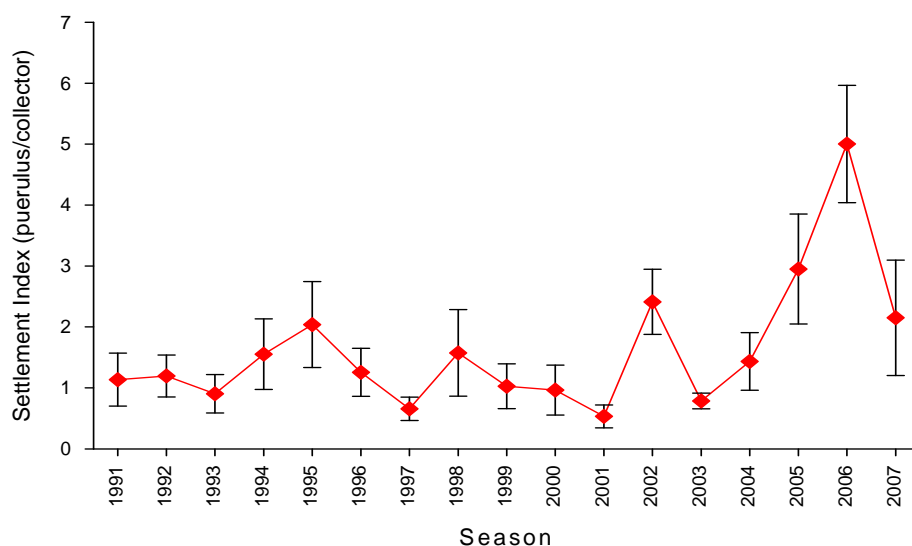
## 2.2 High-grading



**Figure 13** Estimates of tonnage returned to the water due to high-grading in the SZRLF over the last 6 seasons (2002-2007).

Estimates of high-grading (i.e. tonnage of lobsters returned to the water due to unsuitable size, colour or physical damage) exceeded 100 tonnes consecutively over the period 2002 to 2006 (Figure 13). In 2007, the estimate dropped to 76 tonnes, which is likely to reflect decreasing catch rates. As the recording of high-grades in logbooks is undertaken on a voluntary basis, this is likely to be an underestimation of true values.

## 2.3 Puerulus Settlement Index

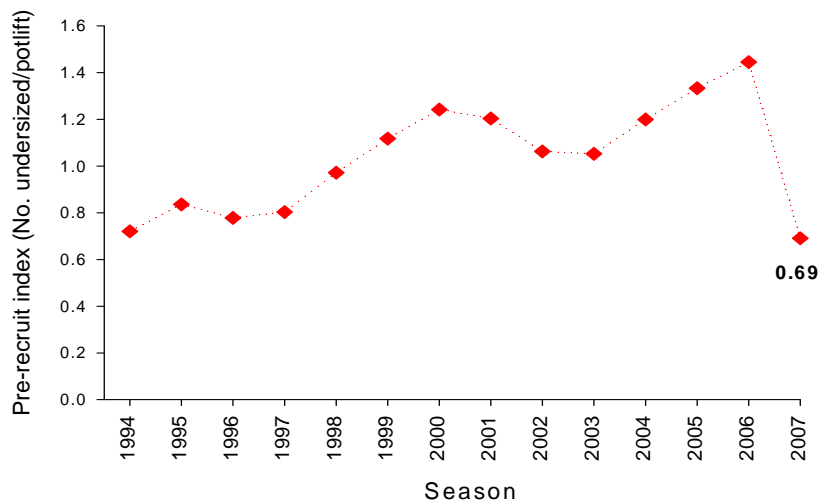


**Figure 14** Puerulus settlement Index (PSI) (+/- SE) in the SZRLF from 1991 to 2007.

Puerulus settlement in the SZRLF increased markedly over the period 2003 to 2006 with the 2006 estimate of 5.0 puerulus/collector being the highest on record since monitoring began. In 2007, the PSI decreased to 2.1 puerulus/collector. In the SZRLF, the estimated period between puerulus settlement and recruitment into the fishable biomass is 5 years.

## 2.4 Pre-recruit index

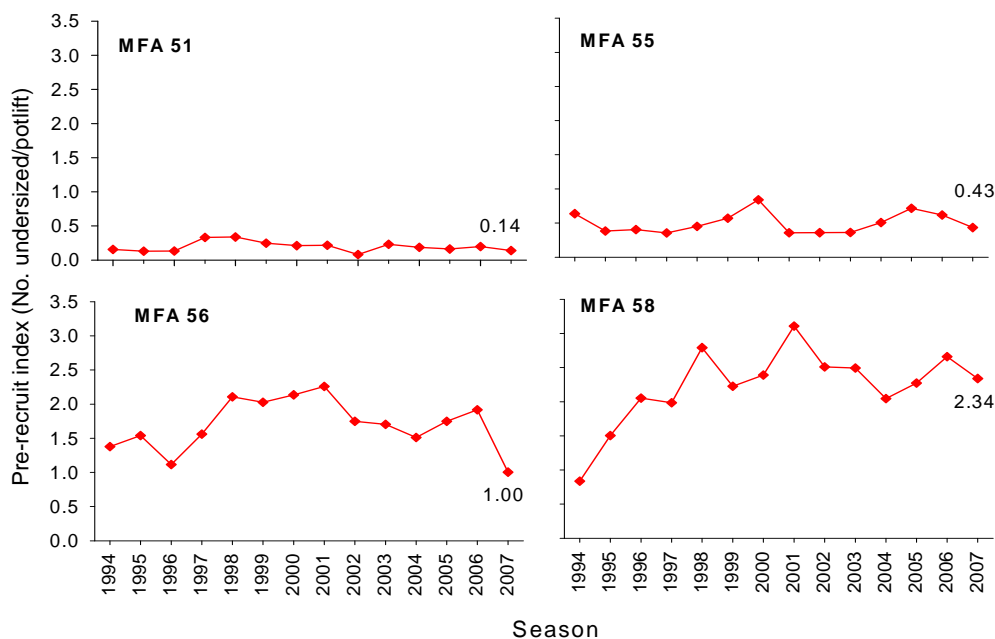
### 2.4.1 Zonal pre-recruit index



**Figure 15** Inter-annual trends in pre-recruit index (PRI) in the SZRLF from 1994 to 2007 as calculated from voluntary catch sampling.

PRI (November-March inclusive) as calculated from voluntary catch sampling indicates that PRI increased over the period 2003 to 2006 (Figure 15). In 2006, the PRI was 1.44 undersized/potlift, the highest on record since monitoring began. However, in 2007, PRI decreased markedly and the estimate of 0.69 undersized/potlift is currently the lowest on record.

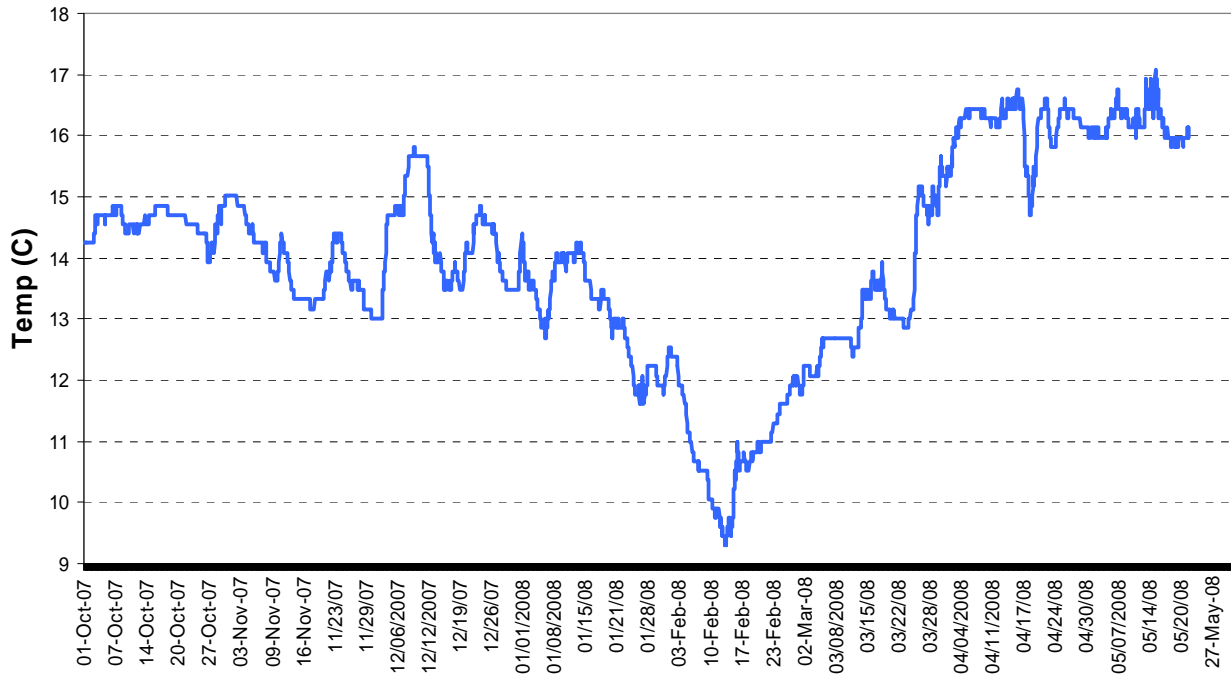
### 2.4.2 Regional pre-recruit index



**Figure 16** Interannual trends in regional PRI in the SZRLF from 1994 - 2007.

Regional estimates of PRI (Figure 16) indicate that the number of undersized/potlift is consistently lower in the northern regions of the SZRLF (i.e. MFAs 51 and 55; refer to Figure 26) compared to southern areas (i.e. MFA 56 and 58). In 2007, PRI decreased in all major regions in the SZRLF.

## 2.5 Water temperature data

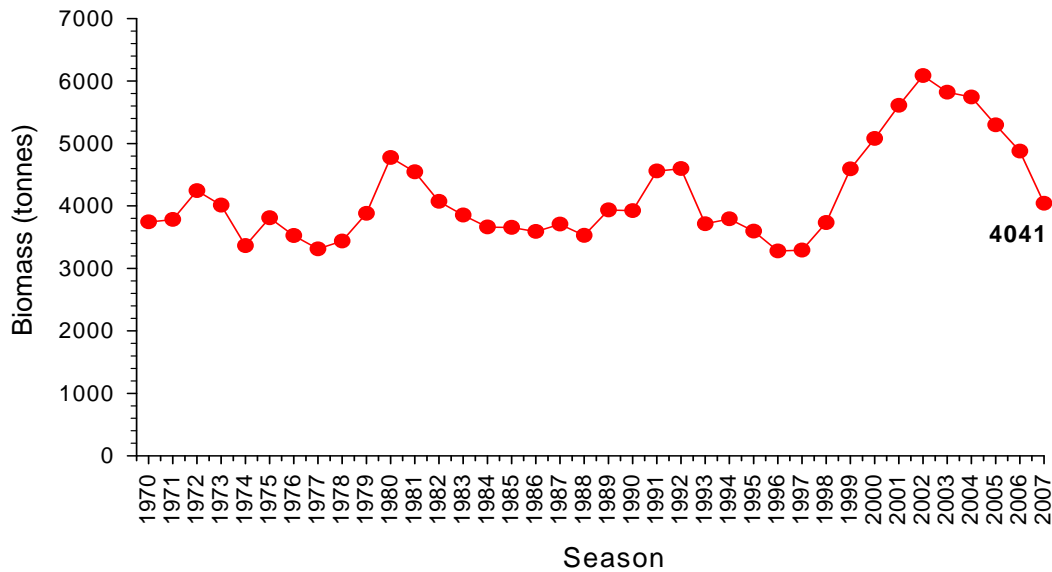


**Figure 17** Profile of water temperature taken at 60 m depth off Southend during the 2007 SZRLF season.

Temperature data taken off Southend in the SZRLF during the course of the season indicates low bottom temperatures during February and March 2008 due to the Bonney Upwelling. Over the period December 14<sup>th</sup> 2007 to February 14<sup>th</sup>, 2008 the temperature dropped from 15.8 C to 9.2 C (Figure 17) before increasing thereafter. Unpublished data suggests that temperatures rarely drop below 11 C during upwelling events in the SZRLF. However, the overall impact of low water temperatures observed during the 2007 season on factors such as growth or catchability remains largely unknown.

### 3 qR MODEL OUTPUTS

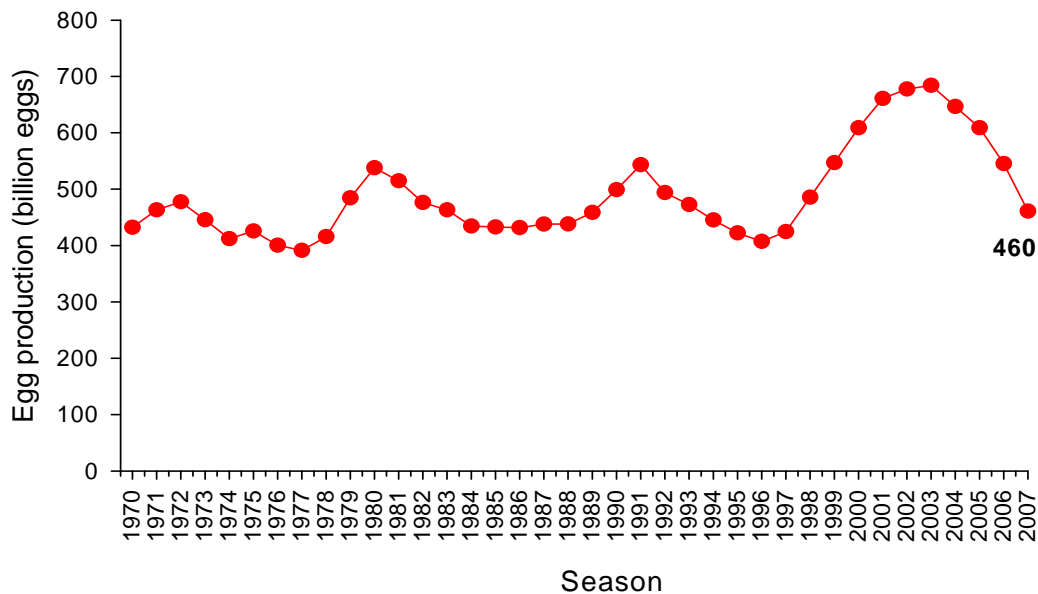
#### 3.1 Biomass



**Figure 18** Estimates of exploitable biomass (1970-2007) for the SZRLF obtained from the qR fishery model.

Biomass, as determined by the qR model, increased from 1996, peaking at 6,085 tonnes in 2002 (Figure 18). However, over the last five seasons, biomass estimates have decreased and in 2007 was 4,041 tonnes. Current estimates of biomass do not take into account the effects of high-grading (Figure 13) within the zone.

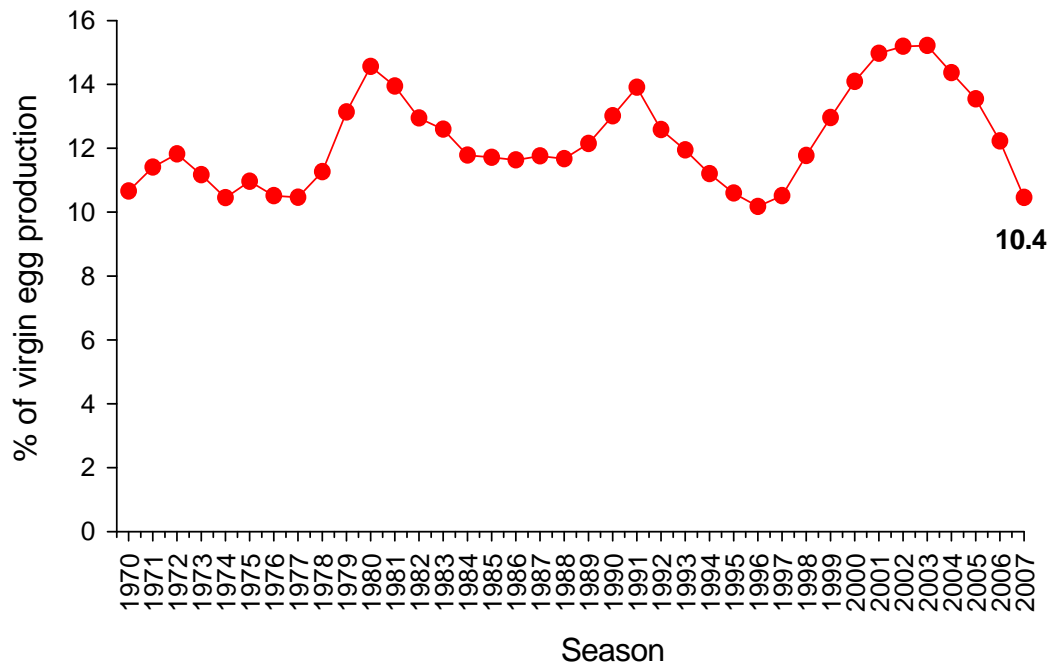
#### 3.2 Egg production



**Figure 19** Estimates of egg production (1970-2007) for the SZRLF obtained from the qR fishery model.

Egg production in the SZRLF increased from 407 billion eggs in 1996 to 684 billion eggs in 2003 (Figure 19). Over the last four seasons, egg production has decreased and in 2007 was 460 billion.

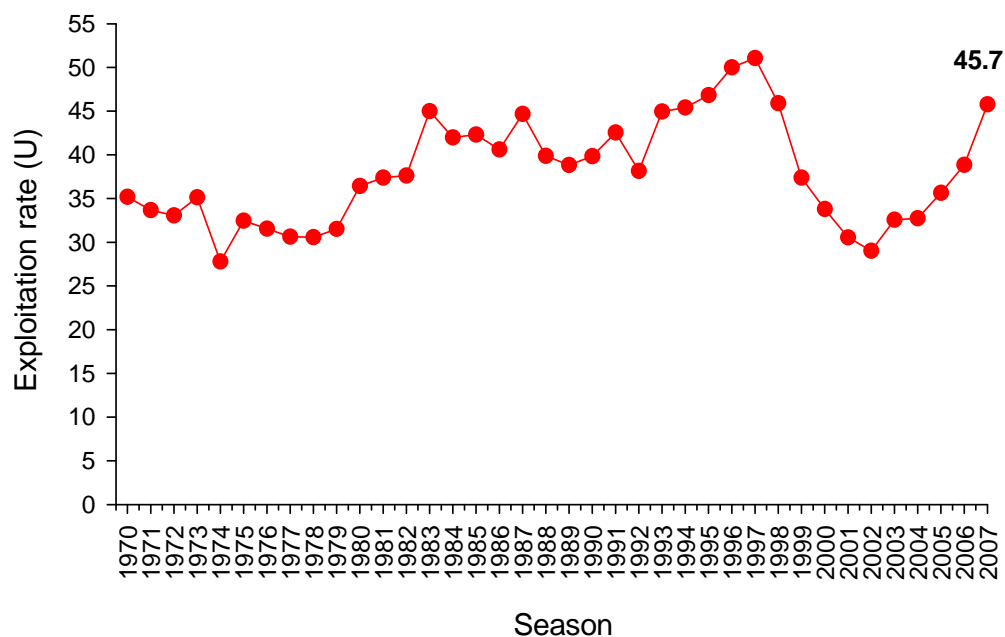
### 3.3 Percent of virgin egg production



**Figure 20** Estimates of % of virgin egg production for the SZRLF as obtained from the qR fishery model.

Model outputs for the 2007 season suggest that egg production equated to 10.4% of virgin (Figure 20).

### 3.4 Exploitation rate



**Figure 21** Estimates of exploitation for the SZRLF as obtained from the 2007 qR model.

Exploitation rate in the SZRLF decreased between 1997 and 2002. Over the last five seasons, however, it has increased and in 2007 was estimated to be 45.7% (Figure 21).

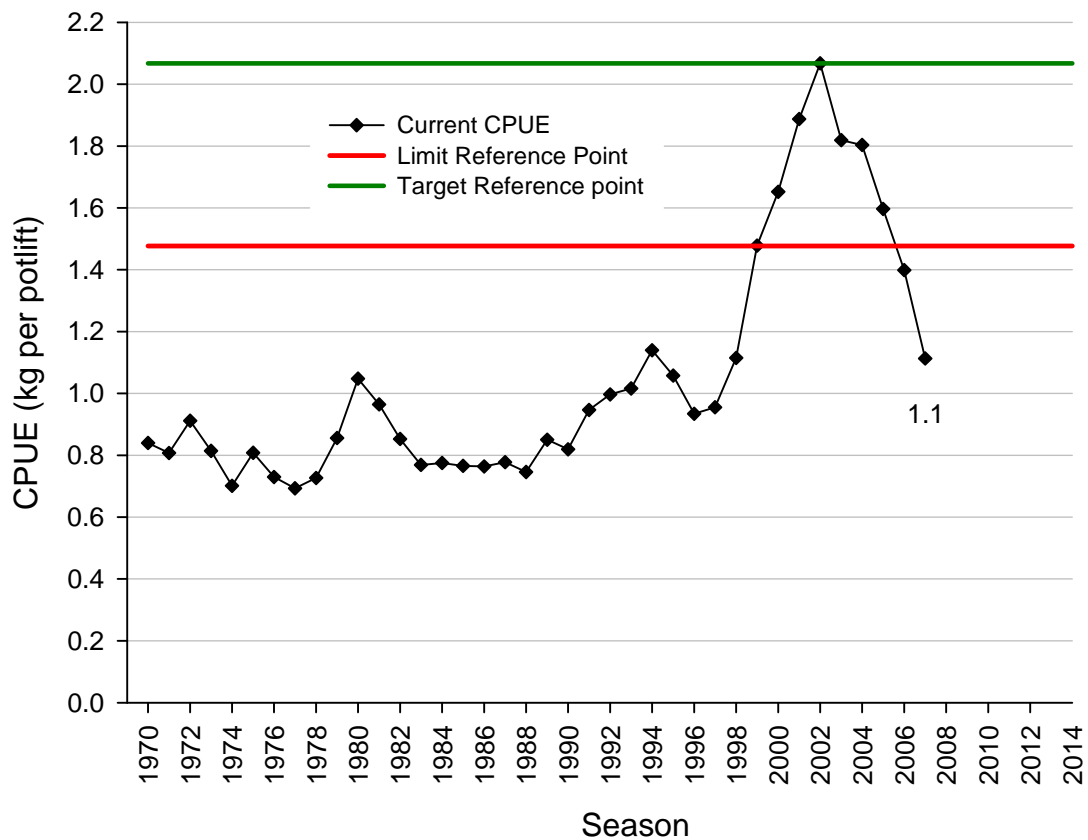
## 4 BIOLOGICAL PERFORMANCE INDICATORS

### 4.1 Reference points

**Table 1** Target and limit reference points for both catch rate and pre-recruit index in the SZRLF (refer to Sloan and Crosthwaite 2007).

Region	Catch rate (kg/potlift)	Catch rate (kg/potlift)	Pre-recruit index (Pot sampling data)
	Limit	Target	Limit
Southern Zone	1.47	2.07	1.03
MFA 55	1.60	2.38	0.46
MFA 56	1.54	2.25	1.77
MFA 58	1.23	1.58	2.31

### 4.2 Zonal catch rate

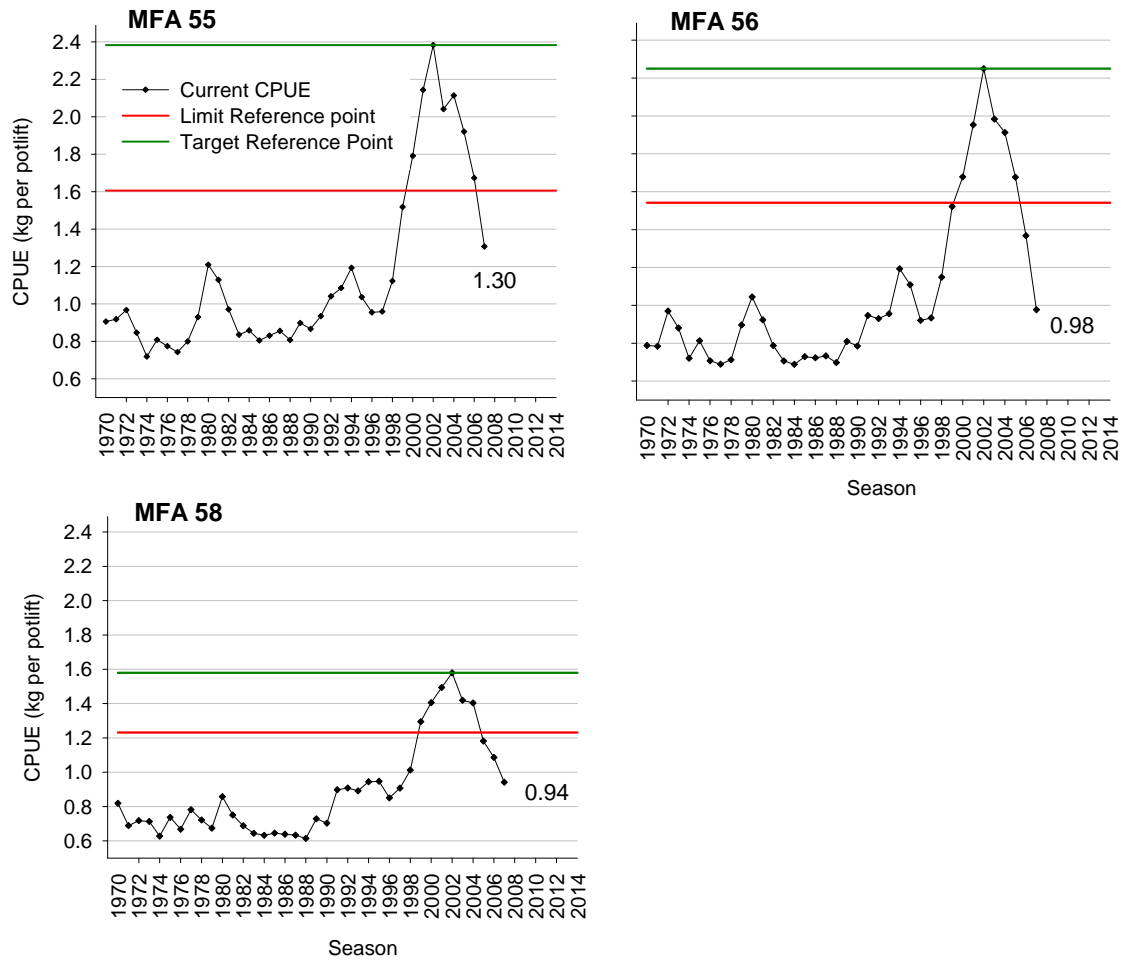


**Figure 22** Zonal limit and target reference points for CPUE in the SZRLF including current estimates from the 2007 season.

In 2007, the zonal estimate of 1.1 kg/potlift was below the limit reference point (LRP) of 1.47 kg/potlift (Figure 22) as per the Management Plan for the resource (Sloan and Crosthwaite 2007).



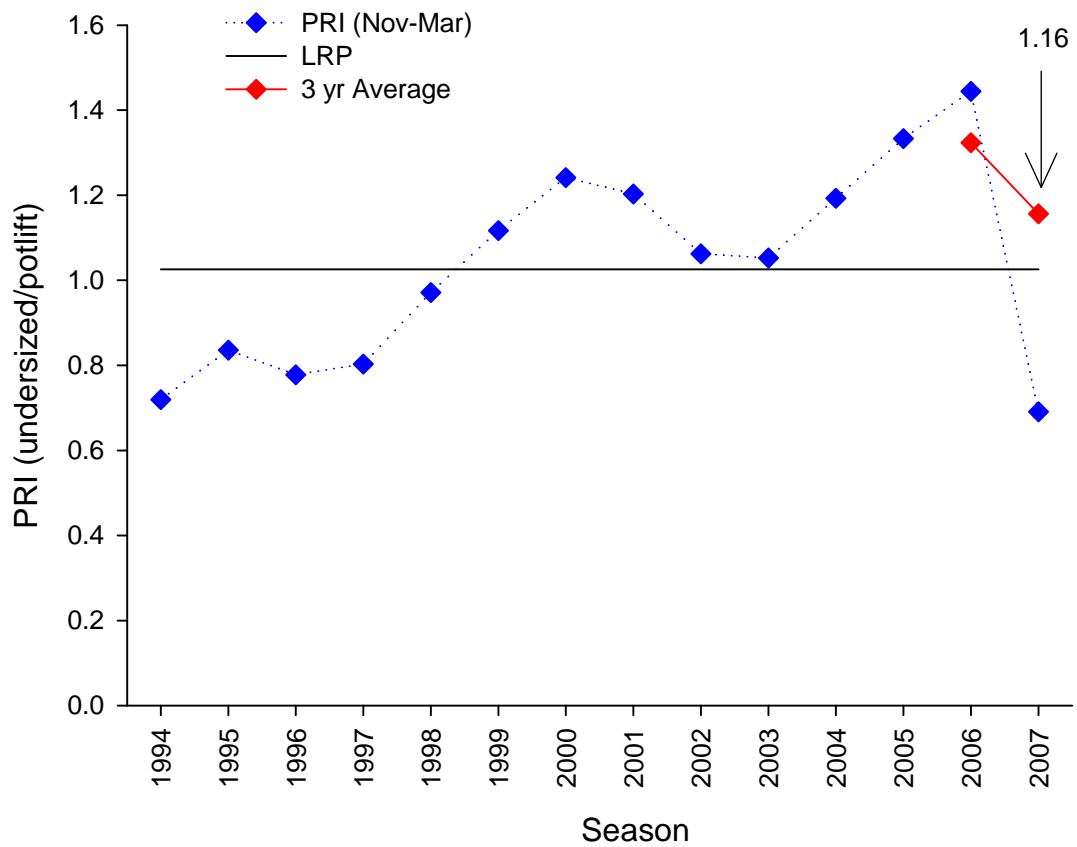
### 4.3 Regional catch rate



**Figure 23** Regional limit and target reference points for CPUE in the SZRLF including current estimates from the 2007 season.

In 2007, the current regional CPUE was below the LRP in all of the major MFAs within the SZRLF (Figure 23).

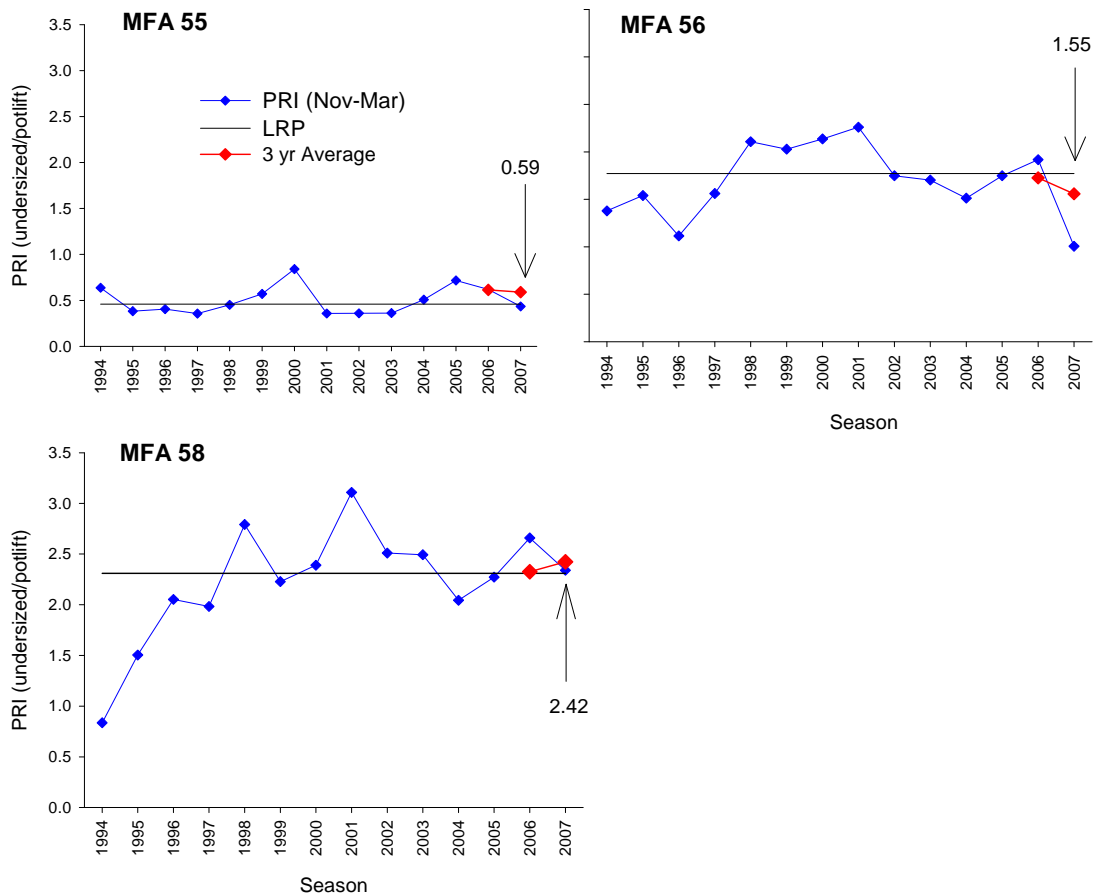
#### 4.4 Zonal pre-recruit index



**Figure 24** Zonal pre-recruit indices (PRI) (1994-2007) with Limit Reference Point (LRP) and current 3-year average.

In 2007, the 3-year average PRI (2005-2007) was 1.16 undersized/potlift, which is above the long-term LRP for the SZRLF (Figure 24).

## 4.5 Regional pre-recruit index



**Figure 25** Regional pre-recruit indices (PRI) (1994-2007) with Limit Reference Points (LRPs) and current 3-year average.

In 2007, the 3-year average PRI (2005-2007) was above the LRP in MFA 55 and 58 and below it in MFA 56 (Figure 25).

## 5 SUMMARY

In summary, the expected recruitment into the SZRLF from the 2002 puerulus settlement pulse was not observed during 2007 and for the fifth consecutive season, CPUE decreased. In some areas at least, this decrease is also likely to reflect the continued high level of exploitation within inshore grounds. In 2007, the PRI decreased significantly both zonally and regionally within the SZRLF. The 2007 zonal estimate is the lowest on record. Both CPUE and PRI must trigger before a TACC adjustment is made. In 2007, CPUE was below the limit reference point both zonally and regionally and has triggered as per the Management Plan. PRI has not triggered. However, is it now only marginally above the limit reference point zonally and in two of the regions. It has triggered in MFA 56. Finally, the 2007 season appears to have been an exceptional year environmentally in terms of cold water upwelling from the Bonney system, but what impact this has had on recruitment, growth and subsequent catch rate is currently unknown.

### References

Sloan, S. & Crosthwaite, K., 2007. Management Plan for the South Australian Southern Zone Rock Lobster Fishery. South Australian Fisheries Management Series Paper No.52. Primary Industries and Resources South Australia. Adelaide, 73pp.



Figure 26 Northern and Southern Zones and Marine Fishing Areas in the South Australian Rock Lobster Fishery.