
South Australian Fisheries Management Series

Ecological Assessment of the South Australian Rock Lobster (*Jasus edwardsii*) Fishery

Reassessment Report

Prepared for the Department of Environment, Water,
Heritage, and the Arts

For the purposes of Part 13 and 13(A) of the Environment Protection and
Biodiversity Conservation Act 1999

July, 2008

**Prepared by the Fisheries Division of Primary Industries and
Resources South Australia**

**25 Grenfell Street, Adelaide
GPO Box 1625**

CONTENTS

1. PURPOSE	4
2. BACKGROUND	4
3. LEVEL OF ASSESSMENT	5
4. FISHERY	6
3.1 Northern Zone	8
3.2 Southern Zone.....	9
3.3 Recreational Fishery.....	10
5. EXTERNAL INFLUENCES	11
6. INTERACTION WITH PROTECTED SPECIES	11
7. TARGET STOCK STATUS	12
6.1 Northern Zone Rock Lobster Fishery	12
6.2 Southern Zone Rock Lobster Fishery	14
6.3 Recreational Fishery.....	17
8. BY-PRODUCT AND BY-CATCH STOCK STATUS	17
9. ADDITIONAL INFORMATION:	18
10. RECOMMENDATIONS	19
10.1. Recommendations by DEWHA, Progress Summary.....	20
10.2 Strategies and Actions.....	21
11. REFERENCES:	23
12. ATTACHMENTS:	24

LIST OF TABLES.

Table 1. Level of assessment required by the South Australian Rock Lobster Fishery

Table 2. Summary of management measures for the Commercial South Australian Rock Lobster Fishery, 2007–08

Table 3. Summary of management measures for the Recreational South Australian Rock Lobster Fishery, 2007-08.

LIST OF FIGURES

Figure 1: Northern Zone Rock Lobster Fishery Marine Fishing Areas.

Figure 2: Southern Zone Rock Lobster Fishery Marine Fishing Areas.

ATTACHMENTS

Management Plan for the South Australian Northern Zone Rock Lobster Fishery

Management Plan for the South Australian Southern Zone Rock Lobster Fishery

Southern Zone Rock Lobster (*Jasus edwardsii*) Fishery 2006/07.

Northern Zone Rock Lobster (*Jasus edwardsii*) Fishery 2006/07

1. Purpose

This report has been prepared by the Fisheries Division of the Department of Primary Industries and Resources, South Australia (PIRSA).

The purpose of this report is to provide a revised assessment of the management arrangements in place for the South Australian Southern Zone Rock Lobster Fishery and Northern Zone Rock Lobster Fishery. This report updates information provided to DEWHA in 2003 for assessment against the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). The report has been prepared in accordance with the "Guidelines for the Ecologically Sustainable Management of Fisheries" 2nd Edition, and particularly addresses the level of change that occurred in the fishery since the 2003 assessment.

2. Background

The regulations that govern the management of the South Australian Rock Lobster Fishery are the *Fisheries Management Act 2007*, the *Fisheries Management (Rock Lobster Fisheries) Regulations 2006*, the *Fisheries Management (General) Regulations 2007* and the *Fisheries Management (Fish Processor) Regulations 2006*.

The 'Management Plan for the South Australian Southern Zone Rock Lobster Fishery (2007)' and the 'Management Plan for the South Australian Southern Zone Rock Lobster Fishery (2007)' provide the broad policy framework to guide management decision-making and the harvest strategy for the fishery. The management plans cover all fishing activity related to the Rock Lobster Fishery undertaken within the South Australian waters including commercial, recreational, traditional and any illegal fishing. They provide a reference for the broader community in relation to the management measures that have been introduced to ensure the long-term sustainability of South Australia's rock lobster resources (Sloan & Crosthwaite, 2007).

The management plans operate for three years (2007-10), subject to annual review and amendments that are considered necessary by the Fisheries Council, the Director of Fisheries or the Minister for Agriculture, Food and Fisheries. Each Management Plan includes a Strategic a Research and Monitoring Plan, reviewed every two years, after which, research needs, priority and timing are revised. The two management plans can be found at PIRSA's website: www.pir.sa.gov.au

Regular dialogue exists between PIRSA Fisheries and each State jurisdiction with a responsibility for managing *J. edwardsii*, through a range of national and tri-state management and research forums (PIRSA, 2007).

3. Level of Assessment.

The South Australian Rock Lobster Fishery was assessed in 2003 and the list of exempt native specimens was amended to include southern rock lobster (*Jasus edwardsii*), taken in the South Australian Rock Lobster Fishery, for a period of five years. Since last assessment there have not been significant changes in most areas of interest as outlined in page 5 of the *Guidelines for the Ecologically Sustainable Management of Fisheries 2nd Edition, (2007)*.

Table 1: Level of assessment required by the South Australian Rock Lobster Fishery

Issue	Area of Interest	Yes	No
Fishery	Has there been any change to management arrangements, and/ or fishing practices?	X	
External Influences	Has there been any change to an environmental issue/influence outside of the fishery management agencies control?		X
Interaction with protected species	Has there been any change in the nature, scale, intensity of impact, and/or management response?		X
Ecosystem impact	Has there been any change in the nature, scale or intensity of impact, and/or subsequent management response?		X
Target Stock Status	Has there been any change in the target stock status?	X	
By-product/bycatch status.	Has there been any change in the by-product and/or bycatch stock status?		X

Considering the above, the level of submission requirement for the South Australian Rock Lobster Fishery is Standard.

However, it is important to note that all changes and progress in the recommendations provided by DEWHA have been communicated to DEWHA through the annual reporting process.

4. Fishery

The Rock Lobster Fishery is South Australia's most valuable commercial fishery. More than 95% of the annual catch is exported, and the total revenue generated by both fisheries for the 2006-07 year was AU \$96,745,000 (Knight, *et al.*, 2007).

The Rock lobster Fishery is separated into two management zones. The Northern Zone includes a stretch of coastline in excess of 3700 Km, including all waters adjacent to South Australia west of the River Murray mouth to the Western Australian border, from the low water mark out to 200 nautical miles (Sloan & Crosthwaite, 2007b). The Southern Zone encompasses a much smaller, yet more productive, stretch of coastline of about 425km from the River Murray mouth to the Victorian border (Sloan & Crosthwaite, 2007).

Revised management plans for both the Southern Zone and Northern Zone Rock Lobster Fisheries were approved in September 2007. Copies of the plans have been provided to DEWHA. The decision rules in the harvest strategies contained in the plans were applied to set the 2007/08 Total Allowable Commercial Catch for each zone; both management plans have been attached to this report.

The most recent stock assessment reports for both the Southern Zone and Northern Zone fisheries have been completed by the South Australian Research and Development Institute (SARDI) for the 2006/07 fishing season. These reports are available from the PIRSA and SARDI websites, <http://www.pir.sa.gov.au> and <http://www.sardi.sa.gov.au>, and have also been attached to this report.

PIRSA and SARDI have met regularly with counterparts from Victoria and Tasmania, and jurisdictions have been involved in formally reviewing each others' stock assessments.

Table 2. Summary of management measures for the Commercial South Australian Rock Lobster Fishery, 2007-08.

Management tool	Northern Zone	Southern Zone
Limited entry	68	181
TACC	520 t	1,900 t
Total pot numbers	3,950	11,923
Closed season	1 June to 31 October	1 June to 30 September
Minimum size limit (carapace)	105 mm	98.5 mm

length)		
Maximum number of pots/licence	100	100
Minimum number of pots/licence	20	40
Maximum quota unit holding	Unlimited (temporary, within season only)	Limited by pot holding (100 pots)
Minimum quota unit holding	320 units	Limited by minimum pot holding (40 pots)
Spawning females	No retention	No retention
Maximum vessel length	None	None
Maximum vessel power	None	None
Closed areas	Gleeson Landing Aquatic Reserve	Aquatic Reserves: Margaret Brock Reef, Cape Jaffa and Rivoli Bay
Catch and effort data	Daily logbook, submitted monthly	Daily logbook, submitted monthly
Catch and disposal records	Daily records submitted upon landing	Daily records submitted upon landing (Electronic scales have been implemented, and reports are produced electronically)
Landing locations	Anywhere in the zone	7 Designated landing points
Landing times	Any time during the season	Core hours only
Prior landing reports to PIRSA	1 hour before landing or 1 hour before unloading into corf	1 hour before landing, permitted outside core hours
Escape gaps	Compulsory. 2 gaps per pot; 57 mm high x 280 mm wide; 180° apart; no obstructions	Optional. Minimum 50 mm mesh covering pot, or 2 gaps per pot; 55 mm high x 150 mm wide
Vessel Monitoring System (VMS)	Yes	No
Sealed bins	All bins must be sealed with a lid and an approved tag prior to lobster being unloaded from the vessel. Tags are sequentially numbered.	No

3.1 Northern Zone

Since last assessment in 2003, the following management changes to the Northern Zone Rock Lobster Fishery took place:

1. As part of the stock recovery strategy for the zone the following measures were introduced:
 - a. Introduction of a quota management system in 2003 with a TACC of 625 tonnes.
 - b. In 2004 the TACC was reduced to 520 tonnes. Recovery targets, reference points, and monitoring arrangements were developed, representative to the magnitude of the fishery and stock recovery timeframes.
 - c. A stock recovery target was introduced with the new management plan, which is aimed at achieving a spawning stock level that is greater than or equal to the spawning stock that existed in the reference year of 1993, within five years.
 - d. A research and monitoring program has been included in the new management plan, aimed at monitoring stock recovery rates.
2. As part of the quota system, a Vessel Monitoring System (VMS), a requirement for sealed bins and prior reporting were introduced in 2003.
3. Mandatory escape gaps were introduced in 2003, as an independent measure to improve sustainable operations in the fishery.
4. In 2005 the upper pot limit was increased from 70 pots to 100 pots; lower pot limit was decreased from 25 pots to 20 pots.
5. Vessel length and power restrictions were removed.

The harvest strategy in the new management plan is designed in accordance with specific goals and objectives to implement a precautionary approach to managing the fishery and to set the TACC at levels that promote stock rebuilding. The harvest strategy establishes biological performance indicators that are to be assessed at both the whole-of-fishery level and at the regional level, across four primary marine fishing areas (MFAs). Breaking the assessment down into individual regions in this way will refine management of the fishery to a finer spatial scale and ensure that greater precaution is factored into management arrangements.

The harvest strategy contains target and limit reference points and TACC decision rules, which trigger a specific response in terms of TACC increases or reductions. Additional performance measures, to supplement the key performance indicators used in the decision rules, provide supplementary information for fishery assessment. The management plan requires a specific

management response when a limit reference point for the additional performance indicators is triggered.

For further detailed information about the management arrangements for the Northern Zone Rock Lobster Fishery, including the harvest strategy, quota allocation mechanism, stock assessment and research, ecosystem impacts and compliance and monitoring arrangements, please refer to the 'Management Plan for the South Australian Northern Zone Rock Lobster Fishery'.

3.2 Southern Zone

Since last assessment, the following management changes have been implemented in the Southern Zone Rock Lobster fishery:

1. TACC increased to 1,900 tonnes in 2003.
2. In 2004, trial commercial and recreational fishing was undertaken in May (no extra quota allocated).
3. In 2005, dockside monitoring program ceased; video monitoring trial of catch weighing process undertaken at Robe; Fishery-independent monitoring programme trial commenced.
4. Electronic scales and video monitoring phased in at all ports in 2006.
5. FIMS, a Fishery Independent Monitoring Survey (FIMS) was developed to trial in the Southern Zone for the 2005 season. Data was used as input for fishery independent models with outputs used in the determination of a fishery independent estimate of lobster abundance. Initially the FIMS was conducted in the SZRLF only. However, once the sampling protocol and data analysis procedures are developed and refined, it is proposed that they will be applied to the North Zone. Further information is available, in the 2006-07 stock assessment (Linanne *et al.*, 2008b)

The harvest strategy in the new management plan is designed in accordance with specific goals and objectives to implement a precautionary approach to managing the fishery and to set the TACC at levels that promote stock sustainability. The harvest strategy establishes biological performance indicators that are to be assessed at both the whole-of-fishery level and at the regional level, across three primary marine fishing areas (MFAs). Breaking the assessment down into individual regions in this way will refine management of the fishery to a finer spatial scale and ensure that greater precaution is factored into management arrangements.

The harvest strategy contains target and limit reference points and TACC decision rules, which trigger a specific response in terms of TACC increases or reductions. Additional performance measures, to supplement the key

performance indicators used in the decision rules, provide supplementary information for fishery assessment. The management plan requires a specific management response when a limit reference point for the additional performance indicators is triggered.

For further detailed information about the management arrangements for the Southern Zone Rock Lobster Fishery, including the harvest strategy, stock assessment and research, ecosystem impacts and compliance and monitoring arrangements, please refer to the 'Management Plan for the South Australian Southern Zone Rock Lobster Fishery', which can be obtained from PIRSA's website www.pir.sa.gov.au.

3.3 Recreational Fishery.

Recreational fishing is permitted through the use of pots, drop net and hoop nets and by diving. The recreational catch is capped at 4.5% of the total state-wide lobster catch. Under these arrangements, if more than 4.5% is taken, the Minister and Director of Fisheries will use various management measures to ensure the average annual recreational catch remains within the established benchmark. Recreational bag and boat limits and gear restrictions also apply. Anyone over the age of 15 years may register up to two recreational rock lobster pots each season. Recreational catch and effort surveys are undertaken every three years.

Table 3. Summary of management measures for the recreational South Australian Rock Lobster Fishery, 2007-08.

Management tool	Northern Zone	Southern Zone
Recreational methods	2 pots per person, 3 drop nets or hoop nets per person, snare	2 pots per person, 3 drop nets or hoop nets per person, snare
Recreational catch limit	4.5% of total state-wide catch	4.5% of total state-wide catch
Recreational daily bag and boat limits	4 per day; 8 per boat; possession limit 15	4 per day; 8 per boat; possession limit 15
Recreational tail fan clipping	The middle tail fan must be clipped to a recognisable straight line before landing	The middle tail fan must be clipped to a recognisable straight line before landing
Size limit	10.5cm	9.85cm
Pot Dimensions	Max with, 1.5 meters, Max height 1.2mt, 2 escape gaps on opposite sides, or covered in 5c, diameter	Max with, 1.5 meters, Max height 1.2mt, 2 escape gaps on opposite sides, or covered in 5c, diameter

	mesh. Escape gaps must not be more than 11 cm from the base, and min dimensions of 15cm wide by 5.5 cm high.	mesh. Escape gaps must not be more than 11 cm from the base, and min dimensions of 15cm wide by 5.5 cm high.
Boat limit	8 per day	8 per day
Bag limit	4 lobsters per person per day.	4 lobsters per person per day.

5. External Influences

The most dominant oceanographic influence, particularly within the Southern Zone (SZ) fishery is the local annual upwelling events. In winter, the water over the continental shelf is vertically mixed. However, during summer the predominant south-easterly winds result in an upwelling of nutrient-rich, cold water (11-12°C) which intrudes onto the continental shelf (Schahinger 1987). Known locally as the Bonney Upwelling, this results in an increase in productivity of phytoplankton, which ultimately contributes to the high densities of southern rock lobster in the SZRLF (Rochford 1977; Lewis 1981). During early 2008 the Bonney Upwelling was especially long and intense. It has been suggested that this may have contributed to low catch rates during these months, although scientific information is not available to confirm this.

It has been suggested that one of the effects of climate change in south-eastern Australia is an increase in the strength and frequency of south-easterly winds. If correct, then it is reasonable to suggest that the intensity of annual upwelling events in South Australia may also increase. The overall, environmental effect of increased upwelling events on issues such as recruitment, survival or catchability within the South Australian rock lobster fishery remains largely unknown.

6. Interaction with Protected Species.

A project titled "Interactions of the South Australian Fishery for the Southern Rock Lobster with Pinnipeds" has been submitted to the Fisheries Research and Development Corporation for funding consideration. The project aims to:

1. Measure the interaction of the South Australian Rock lobster Fishery with pinnipeds;
2. Assess the risks to pinniped populations;
3. Develop and assess methods for mitigating the interaction of pinnipeds with lobster pots; and
4. To determine the importance of rock lobsters in the diets of Australian Sealions.

All Commercial fishers must report any wildlife interaction to PIRSA Fisheries and the DEWHA. Interactions include: collision or capture (hooked, netted or entangled), all interaction as well as those that relate to a species actually being landed onboard a vessel during a fishing operation are required to be reported. To assist fishers in this task, PIRSA and SARDI have produced a “Wildlife interaction”, identification and logbook, widely distributed amongst all fishers.

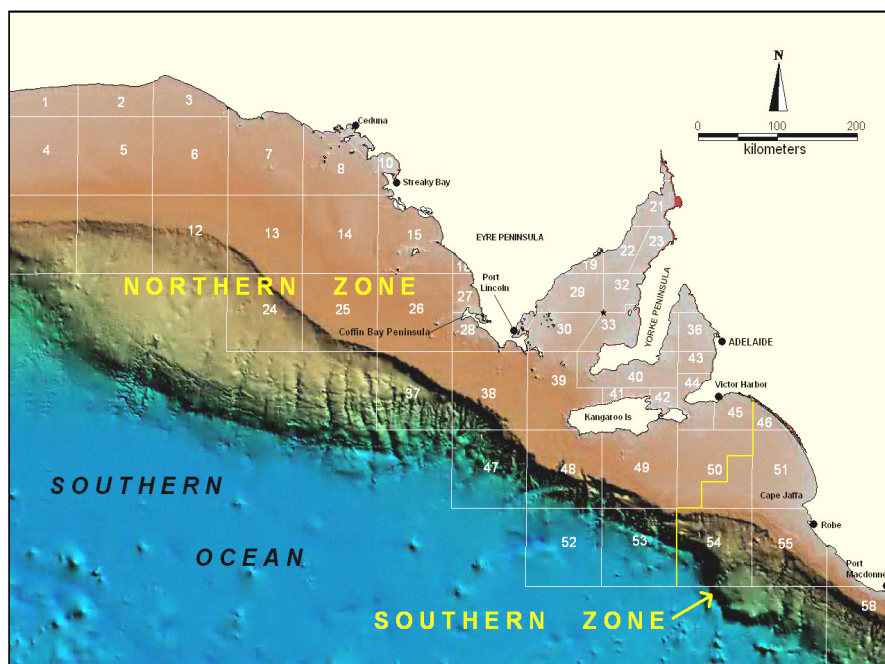
7. Target Stock Status

Current key biological performance indicators used to assess the Southern Zone and Northern Zone Rock Lobster Fisheries are catch rate (catch per unit effort) and pre-recruit index. Additional performance indicators include total biomass, mean weight, catch vs TACC, puerulus settlement index and egg production.

6.1 Northern Zone Rock Lobster Fishery

The harvest strategy for the Northern Zone Rock Lobster Fishery establishes biological performance indicators that are to be assessed at both the whole-of-fishery level and at the regional level. The relevant Marine Fishing Areas (MFAs) are identified below (Figure 1).

Figure 1: Northern Zone Rock Lobster Fishery Marine Fishing Areas.



The most recent Northern Zone Rock Lobster Fishery stock assessment report (2006/07) was published in July 2008. In addition to assessing the status of the fishery, the report also identifies both current and future research needs. The current stock assessment is considered reliable (Linanne, 2008), and the following points are worth mentioning:

1. The fishery assessment updates the 2005/06 report and assesses the current status of the Southern Zone Rock Lobster Fishery (SZRLF) against the performance indicators detailed in the new Management Plan for the resource (Sloan and Crosthwaite, 2007).
2. In 2006/07, a total of 1,354,305 potlifts was required to catch the 1,900 tonne Total Allowable Commercial Catch (TACC). This reflects an increase of 14.47% from 2005/06 (1,183,037 potlifts) and is the fourth successive season in which effort required to take the TACC has increased.
3. In 2006/07, >85% of the catch was taken in depths of <60 m. This continues the trend observed in previous seasons where the majority of the TACC is taken from inshore grounds. In 2006/07, the proportion of catch taken in depths of 0-30 m increased in all major MFAs. Currently, 67% of all catch from MFA 58 comes from this depth range.
4. In 2006/07, commercial licence holders took an average of 116 days to catch the TACC of 1,900 tonnes. This represents an increase of 10.5% from 2005/06 (105 days), and is the third season in succession in which fisher season length has increased.
5. The annual zonal catch per unit effort (CPUE) in 2006/07 was 1.4 kg/potlift, which is a decrease of 12.5% from 2005/06 (1.6 kg/potlift) and below the limit reference point (LRP) of 1.47 kg/potlift defined in the Management Plan for the resource. The 2006/07 estimate represents the fourth season in succession in which CPUE has decreased zonally. However, it should be noted that CPUE is likely to be underestimated due to the practice of high-grading in the fishery in recent seasons. In 2006/07, a minimum of 106 tonnes was discarded due to high-grading.
6. CPUE decreased in all regions in 2006/07. With the exception of 2004 (in MFA 55 only), this is the fourth successive season in which CPUE has decreased in all major MFAs. The current CPUE estimates of 1.36 kg/potlift and 1.08 kg/potlift in MFAs 56 and 58 are below the LRPs for these regions as defined in the Management Plan for the resource.
7. The zonal pre-recruit index (PRI) for 2006/07 (based on voluntary catch sampling) was 1.44 undersize/potlift representing the third season in succession in which PRI has increased. The three-year zonal PRI average (2004/05 to 2006/07 inclusive) was 1.32 undersized/potlift, which is above the zonal LRP of 1.03 undersized/potlift.

8. In 2006/07, the three-year regional PRI average was above the LRP in MFAs 55 and 58 but below it in MFA 56.
9. Outputs from both the qR and the length structured LenMod model indicate that biomass in the SZRLF increased substantially from 1996/97, peaking at 5,500-6,200 tonnes in 2002/03. However, over the last 3-4 seasons both models indicate that biomass has decreased and in 2006/07 it was estimated to be ~4,600–5,000 tonnes. Despite this decrease, current biomass estimates remain ~30% higher than estimates from 1993/94 (~3,700 tonnes) when quota was introduced into the fishery.
10. The current Management Plan for the SZRLF requires that both legal-sized catch rate and pre-recruit index performance indicator must trigger before a management response is taken. In 2006/07, catch rate triggered but pre-recruit index did not and therefore the TACC of 1900 remained unchanged for the 2007/08 season. Should the current level of pre-recruit index not translate into increased levels of recruitment into the fishable biomass, management action may be required if localised reductions in lobster abundance is to be avoided. Close monitoring of both legal-sized catch rate and pre-recruit index at both zonal and regional levels are therefore a key priority for the 2007/08 season.
11. Finally, given the observed dynamics of the fishery, where inshore grounds are specifically targeted, the need for improved spatial modelling that incorporates both fishery dependent and independent data is a priority. Future outputs for the 2007/08 season aim to utilise fishery independent and movement data to provide estimates of biomass from both inshore and offshore regions with the aim of further improving overall spatial assessment of the SZRLF resource.

More detailed information on stock status is provided in stock assessment reports prepared by the South Australian Research and Development Institute (SARDI), Aquatic Sciences. All completed stock assessment reports are available on both the Primary Industries and Resources South Australia (PIRSA) Fisheries website at www.pir.sa.gov.au/fisheries or the SARDI Aquatic Sciences website at www.sardi.sa.gov.au.

Please Note: The most recent stock assessment reports are attached to this assessment.

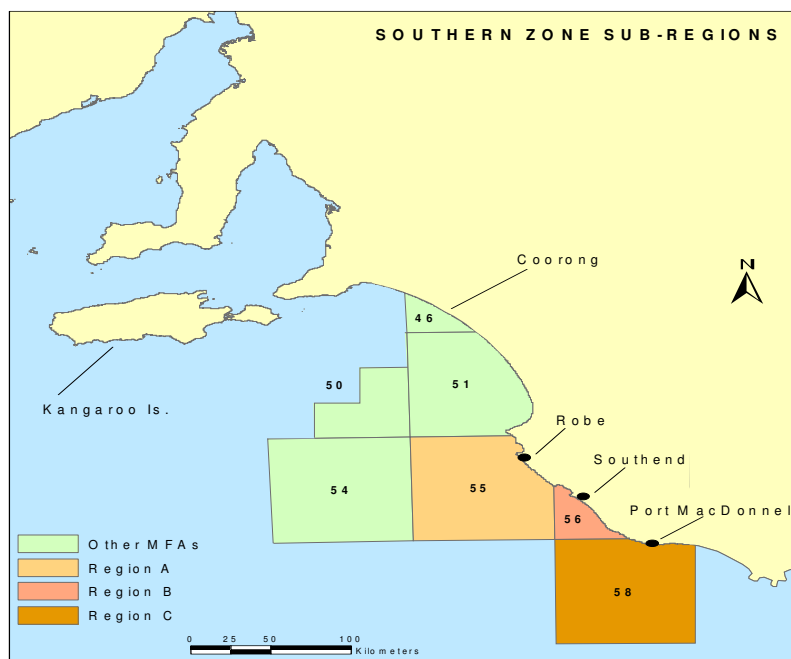
6.2 Southern Zone Rock Lobster Fishery

The harvest strategy for the Southern Zone Rock Lobster Fishery establishes biological performance indicators that are to be assessed at both the whole-of-fishery level and at the regional level. The relevant regions are the three primary marine fishing areas (MFAs) identified below (Figure 2).

Breaking the assessment down into individual regions in this way will refine management of the fishery to a finer spatial scale and ensure that greater precaution is factored into management arrangements. Improved spatial management will ensure that one region of the fishery is not propping up another region, particularly during periods of low recruitment. Similarly, if the overall fishery is performing strongly, a downturn in one area may not necessarily lead to a TACC reduction for the whole fishery.

The three primary MFAs are 55, 56, and 58. MFA 51 has been excluded from the TACC decision-making process because it does not contribute significantly to the overall performance of the fishery. It is considered more precautionary to use the three main MFAs to guide the TACC setting process. If effort shifts within the fishery, the harvest strategy may need to be reviewed to incorporate different MFAs

Figure 2: Southern Zone Rock Lobster Fishery Marine Fishing Areas.



The most recent Southern Zone Rock Lobster Fishery stock assessment report (2006/07) was published in June, 2008. The current stock assessment is considered reliable, and the can be summarized as follows:

1. The fishery assessment updates the 2005/06 report and assesses the current status of the Southern Zone Rock Lobster Fishery (SZRLF) against

the performance indicators detailed in the new Management Plan for the resource (Sloan and Crosthwaite 2007).

2. In 2006/07, a total of 1,354,305 potlifts was required to catch the 1,900 tonne Total Allowable Commercial Catch (TACC). This reflects an increase of 14.47% from 2005/06 (1,183,037 potlifts) and is the fourth successive season in which effort required to take the TACC has increased.
3. In 2006/07, >85% of the catch was taken in depths of <60 m. This continues the trend observed in previous seasons where the majority of the TACC is taken from inshore grounds. In 2006/07, the proportion of catch taken in depths of 0-30 m increased in all major MFAs. Currently, 67% of all catch from MFA 58 comes from this depth range.
4. In 2006/07, commercial licence holders took an average of 116 days to catch the TACC of 1,900 tonnes. This represents an increase of 10.5% from 2005/06 (105 days), and is the third season in succession in which fisher season length has increased.
5. The annual zonal catch per unit effort (CPUE) in 2006/07 was 1.4 kg/potlift, which is a decrease of 12.5% from 2005/06 (1.6 kg/potlift) and below the limit reference point (LRP) of 1.47 kg/potlift defined in the Management Plan for the resource. The 2006/07 estimate represents the fourth season in succession in which CPUE has decreased zonally. However, it should be noted that CPUE is likely to be underestimated due to the practice of high-grading in the fishery in recent seasons. In 2006/07, a minimum of 106 tonnes was discarded due to high-grading.
6. CPUE decreased in all regions in 2006/07. With the exception of 2004 (in MFA 55 only), this is the fourth successive season in which CPUE has decreased in all major MFAs. The current CPUE estimates of 1.36 kg/potlift and 1.08 kg/potlift in MFAs 56 and 58 are below the LRPs for these regions as defined in the Management Plan for the resource.
7. The zonal pre-recruit index (PRI) for 2006/07 (based on voluntary catch sampling) was 1.44 undersize/potlift representing the third season in succession in which PRI has increased. The three-year zonal PRI average (2004/05 to 2006/07 inclusive) was 1.32 undersized/potlift, which is above the zonal LRP of 1.03 undersized/potlift.
8. In 2006/07, the three-year regional PRI average was above the LRP in MFAs 55 and 58 but below it in MFA 56.
9. Outputs from both the qR and the length structured LenMod model indicate that biomass in the SZRLF increased substantially from 1996/97, peaking at 5,500-6,200 tonnes in 2002/03. However, over the last 3-4 seasons both models indicate that biomass has decreased and in 2006/07 it was estimated to be ~4,600-5,000 tonnes. Despite this decrease, current

biomass estimates remain ~30% higher than estimates from 1993/94 (~3,700 tonnes) when quota was introduced into the fishery.

10. The current Management Plan for the SZRLF requires that both legal-sized catch rate and pre-recruit index performance indicator must trigger before a management response is taken. In 2006/07, catch rate triggered but pre-recruit index did not and therefore the TACC of 1900 remained unchanged for the 2007/08 season. Should the current level of pre-recruit index not translate into increased levels of recruitment into the fishable biomass, management action may be required if localised reductions in lobster abundance is to be avoided. Close monitoring of both legal-sized catch rate and pre-recruit index at both zonal and regional levels are therefore a key priority for the 2007/08 season.
11. Finally, given the observed dynamics of the fishery, where inshore grounds are specifically targeted, the need for improved spatial modelling that incorporates both fishery dependent and independent data is a priority. Future outputs for the 2007/08 season aim to utilise fishery independent and movement data to provide estimates of biomass from both inshore and offshore regions with the aim of further improving overall spatial assessment of the SZRLF resource.

6.3 Recreational Fishery

Since the last assessment, a Survey of Recreational Rock Lobster Fishing in South Australia has been completed and published (Currie *et al.*, 2006). All recreational catch estimates have been included in the annual stock assessment.

Based on data from registered pot fishers, the estimated State recreational catch in the 2004/05 season was 83.17 tonnes of which 74.6 came from the Southern Zone and 8.56 from the Northern Zone.

A recreational fishing survey is also being conducted in South Australia and rock lobster catch will be estimated through that survey. The survey period is September 2007 to September 2008 and results are expected to be published in early 2009. This survey seeks to collect information in relation to diving and drop netting for rock lobster, in addition to pot fishing.

8. By-product and by-catch stock status

A risk assessment of by-catch species associated with the *J. edwardsii* was undertaken in 2006. The study suggests that by-catch levels are low, and provide a form of validation for the estimates calculated from by-catch from the sampling programs (Brock *et al.*, 2004).

The by-catch sampling program provides an accurate picture of by-catch diversity and reasonable estimates of by-catch catch rates, however, it appears it can be susceptible to biases introduced by uneven distribution of the fishers especially in the NZ where fewer fishers participated in the sampling. Results from by-catch monitoring indicate that over the last four seasons, by-catch has been dominated by crustaceans (mainly velvet and hermit crabs) and temperate reef finfish namely leatherjacket (dominated by the horseshoe leatherjacket *Meuschenia hippocrepis*) and wrasse species (dominated by the blue throat wrasse *Notolabrus tetricus*) the remainder of by-catch was composed of slimy cod, and other sp (McGarvey *et al.*, 1999).

This research is one of the few studies that provide detailed study of by-catch from a commercial lobster pot fishery. Given the large numbers of pot-lifts in these fisheries there is potential for significant levels of by -catch, however the results of this study show that by-catch levels in the SARLF are relatively low compared to other commercial fisheries. For more detailed information the complete report: “Species composition and spatio-temporal trends in by-catch from the South Australian commercial rock lobster (*Jasus edwardsii*) fishery as estimated using two monitoring options” which can be obtained at www.sardi.sa.gov.au

The results of the study have been incorporated into a tri-state by-catch Risk Assessment Strategy in collaboration with Victorian and Tasmanian rock lobster fisheries.

9. Additional Information:

South Australian Wild Fisheries Information and Statistics Report, May 2007: Provides an estimate of catch, effort and landed beach price of the commercial fish catch in South Australian waters up to the financial year ending June 2006. It also provides a statistical overview highlighting key information and points of interest.

Southern Zone Rock Lobster Fishery Status Report: Produced annually by SARDI

Northern Zone Rock Lobster Fishery Status Report: Produced annually by SARDI

Northern Zone Rock Lobster (*Jasus edwardsii*) Fishery Stock Assessment Report 2005/06: Provides a comprehensive synopsis of information available for the NZRLF, and to assess the current stock of the fishery, including the results derived from: fishery dependent data, fishery independent data, puerulus monitoring programme, and estimates using the qR model.

Southern Zone Rock Lobster (*Jasus edwardsii*) Fishery Stock Assessment Report 2005/06: It assesses the current status of the fishery based on fishery dependent and fishery independent data. It also provides estimates using the qR model.

South Australian Fisheries Resources, Current Status and Recent Trends, 2006: It brings together all the available information of key fish stocks managed by the South Australian Government. It provides detail on the biological status of the major fish stocks in South Australian waters and describes the management measures in place to ensure their long term sustainability (published every three years).

Species composition and spatio-temporal trends in by-catch from the South Australian commercial rock lobster (*Jasus edwardsii*) fishery as estimated using two monitoring options: It identifies the species composition, estimate levels and spatio-temporal trends in by-catch caught in pots in the South Australian Rock Lobster Fishery.

Survey of Recreational Rock Lobster Fishing in South Australia during 2004/05: This survey includes catch and effort data recorded in previous surveys, it also contains important information relative to the sex of the lobsters harvested and released, and thus provides increased levels of precision in the quantity and composition of the resource.

10. Recommendations

PIRSA Fisheries in conjunction with the South Australian Rock Lobster Advisory Council and the respective Southern Zone and Northern Zone industry associations, SARDI and other stakeholders have completely implemented six recommendations (highlighted in green) and made substantial progress on another four.

Contact Officer: Kelly Crosthwaite

Phone: (08) 82260219

Email: crosthwaite.kelly@saugov.sa.gov.au

10.1. Recommendations by DEWHA, Progress Summary.

No	Recommendation	Progress	Target
1*	PIRSA to inform the Department of the Environment and Heritage of any significant changes to the management regime of the SA Rock Lobster Fishery.		Ongoing
2	The current review of SA's Fisheries Act 1982 should provide for the inclusion of general community members on the two fisheries management committees. Greater efforts should also be made to increase conservation and general community involvement in stock assessments and research priority setting processes.	Substantial	June 2010
3	PIRSA to pursue complementary management arrangements with other Aust. jurisdictions responsible for managing southern rock lobster fisheries to ensure that all removals and other relevant impacts on the stock are properly accounted for in stock assessments.	Complete	Ongoing
4*	PIRSA to continue to improve assessment of all components of non-commercial catch in the fishery to be factored into the annual stock assessment process and management of the fishery. This will include further periodic surveys or other data collection and analysis measures to enhance the assessments of recreational and indigenous catch in the fishery. .	Complete	June 2010
5	PIRSA, within 18 months, to review the monitoring requirements for both zones, including options for independent monitoring appropriate to the scale of fishing and status of stocks in the main fishing areas, to identify monitoring measures necessary to confirm the status of stocks and support stock recovery strategies. PIRSA to progressively implement priority actions identified in the review.	Complete	June 2006
6	PIRSA and the SA industry to work with their Victorian counterparts to investigate and adopt appropriate measures to address quota avoidance, misreporting of catches and other illegal activities in waters near the SA-Victoria border. These measures should be built into SA's compliance strategies.	Complete	ONGOING
7	Performance measures and targets for the main by-product species to be included in the revised management plans for both zones, and the catches of the main by-product species should be reviewed as part of the annual stock assessment process.	Substantial	December 2006
8	PIRSA to develop within 18 months a conservative harvest strategy for the Northern Zone fishery, including a TAC to commence on 1 November 2003, that includes recovery targets and reference points, and monitoring arrangements, representative of the scale of fishing in the Zone, and stock recovery timeframes.	Complete	June 2006
9	Priority should be given to early implementation of escape gaps in the NZ, and should be mandatory in both zones by October 2004. Decisions on the dimensions of escape gaps in both zones to be based on the requirement to minimise impacts on all bycatch species.	Substantial	June 2006
10*	PIRSA within 18 months to introduce mandatory structured reporting of all interactions between the rock lobster fishery and endangered, threatened or protected species.	Complete	June 2006

11	PIRSA and industry to continue to monitor the extent of interactions between rock lobster fishery and fur seals and sea lions, and develop appropriate mitigation measures, including establishment within 2 years of preliminary trigger and reference points, to minimise these interactions.	Substantial	June 2006
12	PIRSA within 12 months to conduct a qualitative risk assessment of the interactions between the rock lobster fishery and protected species off SA and use the outcomes of this assessment to implement further protected species mitigation measures as required.	Complete	June 2006
13	PIRSA to develop measures to assess ecosystem impacts of the fishery. Consideration should be given to the appropriateness of reference areas that would allow comparison between fished and unfished areas.	Moderate	June 2010

*Recommendation addressed in All of Fisheries, section 4

10.2 Strategies and Actions

No	Proposed Strategies	Actions	Target
2	<ul style="list-style-type: none"> Develop new co-management framework for greater stakeholder involvement. 	A Co-management Council has been established under the <i>Fisheries Management Act 2007</i> . The Fisheries Council had its first meeting October 2007. It includes conservation and community members.	June 2010
7	<ul style="list-style-type: none"> PIRSA to incorporate by-product species performance measures in the revised Management Plans for both zones. SARDI to undertake by-catch study. SARDI to review catch levels of octopus as part of the annual stock assessment process. SARDI to provide a stock assessment for the giant crab fishery. 	<p>SARDI have finalised by-catch study report.</p> <p>SARDI have incorporated octopus catch in the annual stock assessment.</p> <p>SARDI have completed a giant crab stock assessment that addresses the rock lobster fishery impacts.</p> <p>The management plan for the fishery sets out a process for undertaking an ecological risk assessment..</p>	December 2008
9	<ul style="list-style-type: none"> Review SARDI research results to determine appropriate escape gap sizes for both fishing zones. Implement escape gaps in all pots the NZRLF. Implement escape gaps in all pots used in the SZRLF. Implement escape gaps in all pots used in the recreational sector. 	<p>Northern zone – implemented in 2003.</p> <p>Southern zone – process underway to address industry concerns and implement.</p> <p>Recreational sector (SARFAC) have supported implementation.</p>	June 2006

No	Proposed Strategies	Actions	Target
11	<ul style="list-style-type: none"> • Promote the use of seal exclusion devices as part of the industry 'clean green' programme. • Develop a research proposal to address seal interactions in the lobster fisheries. • Explore the development of trigger points for interactions, to be incorporated in the revised Management Plans. • Incorporate seal interactions in the new wildlife interaction section of the logbook – this is being developed under recommendation 10 (see all of fisheries section 1.1) 	<p>FRDC project currently underway to assess existing mitigation methods.</p> <p>The industry has adopted the 'clean green' programme with 73% of the SZ fleet and 38% of the NZ fleet trained thus far.</p>	June 2006
13	<ul style="list-style-type: none"> • SARDI to undertake comparative analysis of fished and unfished areas. • Develop research proposal to identify performance measurement system for ecosystem impacts of rock lobster fishing. 	<p>SARDI has completed the project entitled "Assessing the impact of proposed MPAs on SA rock lobster catches" (McGarvey 2003). This report provides a basis for an assessment of fished and unfished areas.</p> <p>SARDI has developed a research proposal to assess the ecosystem impacts of rock lobster fishing, which has been submitted to FRDC.</p> <p>Received FRDC funding on RL translocation, a component of which addresses the impacts of fishing from deep water habitats and from increased lobster density on inshore temperate reef ecosystems.</p> <p>FIMS providing data in relation to unfished areas.</p>	June 2006

11. References:

- Australian Government, Department of the Environment and Heritage. (2003). Assessment of the South Australian Rock Lobster Fishery.
- Currie, D.R., Sorokin, S.J. and Ward, T.M. (2006). Survey of Recreational Rock Lobster Fishing in South Australia during 2004/05. Report to PIRSA Fisheries. SARDI Aquatic Sciences Publication No RD04/228-2.
- Knight M.A., Doonan A.M. and Tsolos A.. (2007). South Australian Wild Fisheries Information and Statistics Report. . Report to PIRSA Fisheries. SARDI Aquatic Sciences, Publication No. F2007/000571-1. SARDI Research Report Series No. 200.
- Lewis, R. K. (1981). Seasonal upwelling along the south-eastern coastline of South Australia. Aust. J. Mar. Freshw. Res. 32, 843-54.
- Linnane A., McGarvey R. and Feenstra J. (2007). Southern Zone Rock Lobster (*Jasus edwardsii*) Final Stock Assessment Report to PIRSA Fisheries. SARDI Aquatic Sciences, Publication No. F2007/000320-2.
- Linnane A., McGarvey R. and Feenstra J. (2007). Northern Zone Rock Lobster (*Jasus edwardsii*) Final Stock Assessment Report to PIRSA Fisheries. SARDI Aquatic Sciences, Publication No. F2007/000320-2.
- McGarvey, R., Ferguson, G.J., and J.H. Prescott. (1999). Spatial variation in mean growth rates at size of southern rock lobster, (*Jasus edwardsii*), in South Australian waters., Marine and Freshwater Research 50: 333-342.
- Primary Industries and Resources South Australian. (2003). Ecological Assessment of the South Australian Rock Lobster (*Jasus edwardsii*) Fishery. South Australian Fisheries Management Series.
- Primary Industries and Resources South Australian (2007). South Australian Fisheries Resources. Current Status and Recent Trends 2006. South Australian Fisheries Management Series Pape No. 49.
- Primary Industries and Resources South Australian. (2007). Ecological Assessment of South Australia's Fisheries for the purposes of export approval under Part 13 and 13A of the Commonwealth Environment Protection and Biodiversity Act 1999. Annual Progress Report to the Commonwealth Department of Environment, Water, Heritage and the Arts.

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.

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

Schahinger, R. B. (1987). Structure of coastal upwelling events observed off the south-east coast of South Australia during February 1983-April 1984. Australian Journal of Marine and Freshwater Research 38, 439-59.

Rochford, D. J. (1977). A review of a possible upwelling situation off Port MacDonnell S.A. CSIRO Aust. Div. Fish. Oceanogr. Rep. No. 81.

12. Attachments: