

**SOUTH AUSTRALIAN
FISHERIES MANAGEMENT SERIES**

PAPER NO. 28

**MANAGEMENT PLAN FOR THE SOUTH
AUSTRALIAN NORTHERN ZONE ROCK
LOBSTER FISHERY**

William Zacharin (Editor)

**prepared by the
Northern zone Rock Lobster Fishery Management Committee
in association with
Primary Industries and Resources South Australia
South Australian Northern zone Rock Lobster Fishermen's Association**

December 1997

Foreword

Management of Marine Resources in South Australia

Marine resources in South Australia are common property resources. The role of the Government, as custodian of the marine resources on behalf of the general community, is to ensure that marine resources are used in an ecologically sustainable manner and as efficiently as possible, while yielding a reasonable return to the community. This ensures that the benefits of the use of marine resources are maximised within the community.

Experience world-wide has shown that where there is unrestricted use of marine resources, there is little incentive for individuals harvesting the resource to conserve fish stocks and competition amongst users often leads to resource depletion. Left unmanaged, the increase in fishing effort that results from competition is reflected in lower individual catches in the recreational fishing sector, and over-capitalisation and reduced financial returns in the commercial fishing industry. Loss of these resources to the community can result in significant regional economic problems in some States.

In carrying out their management of the resource, Governments have the responsibility of ensuring that the basis for the sharing of the resource among all users is clearly understood and accepted as equitable, and that the allocation of fisheries resources and their level of utilisation are consistent with the needs of present and future generations.

To provide for better decision making by Government in managing the marine resources, specific fishery management committees have been established to advise the Minister for Primary Industries, Natural Resources and Regional Development. These management committees are comprised of Government managers, research scientists, commercial and recreational fishers and fish processors, and are chaired by independent chairpersons. Appointment of members and the terms of reference of the management committees are provided for under the *Fisheries (Management Committees) Regulations 1995*.

Where scientific data or evidence on some biological parameter for a fishery is lacking and management decisions must be made in an environment of uncertainty, the Government and management committee will take a precautionary approach to the management of these resources.

Hon Rob Kerin
MINISTER FOR PRIMARY INDUSTRIES,
NATURAL RESOURCES AND REGIONAL DEVELOPMENT

/ / 1997

A LETTER FROM THE CHAIRMAN

The northern zone rock lobster fishery is a major generator of export revenue, with an estimated beach value of around \$26 million per annum. It also contributes to the State's economy with over 200 jobs generated throughout regional South Australia.

Careful planning and management by Government, in partnership with industry, has seen the many problems of unrestricted fishing overcome. Harvesting levels in the northern zone rock lobster fishery have been limited since 1966 and the catch has stabilised at around 900 tonnes per season (November to May).

The Northern Zone Rock Lobster Fishery Management Committee provides advice to the Minister for Primary Industries, Natural Resources and Regional Development on management of the fishery. The management committee is comprised of commercial and recreational fishers, a government resource manager and research scientists. In carrying out our management responsibilities, the management committee must ensure that the basis for sharing the resource among all users is clearly understood and accepted as equitable between the stakeholders. The allocation of this resource and the level of utilisation also needs to be consistent with the needs of present and future generations.

Scientific assessment of the northern zone rock lobster fishery shows that the resource is being harvested at a sustainable level. To ensure total fishing effort remains within current levels, a unique time closure system was introduced into the fishery in 1995. This flexible management approach could not have succeeded without the full support of the commercial licence holders and committee members. I am confident that the northern zone rock lobster fishery will continue to prosper and make a significant contribution to the regional economy of South Australia.

I take this opportunity to thank the industry members of the management committee, Graham Walden, Guy Manthorpe, Daryl Spencer, Alby Whittle and Bob Rigoni for their excellent work on the committee; and Roger Edwards (Executive Officer, SANZRLFA) and the past Chairman, Stephen Duncan (to 1 October 1997) in the preparation of this management plan.

Diane Myers
CHAIRMAN
NORTHERN ZONE ROCK LOBSTER
FISHERY MANAGEMENT COMMITTEE

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1 Scope of the management plan

Sustainable management of marine resources is the responsibility of Primary Industries and Resources South Australia (PIRSA) under the *Fisheries Act 1982*. The principal objectives of the Act (Section 20) are:

- (a) *ensuring, through proper conservation, preservation and fisheries management measures, that the living resources of the waters to which this Act applies are not endangered or overexploited; and*
- (b) *achieving the optimum utilisation and equitable distribution of those resources.*

This management plan provides a statement of the policy, objectives and strategies to be employed for the sustainable management of the northern zone rock lobster fishery in State waters. Fishing for all species of rock lobster in the Genus *Jasus* is controlled under this management plan.

Regulations pertaining to the management of the rock lobster fishery in South Australia are located in the *Scheme of Management (Rock Lobster Fisheries) Regulations 1991*.

This management plan shall operate for a **five** year period from 1 November 1997 subject to annual review and amendments as considered necessary by the Northern Zone Rock Lobster Fishery Management Committee and the Minister for Primary Industries, Natural Resources and Regional Development.

2 Description of the fishery

2.1 Definition of the Fishery

The area of the northern zone rock lobster fishery extends from the Murray Mouth, north and west to the Western Australian border and is defined as being those coastal waters:

“westerly of a line commencing at the point where the meridian of longitude 139°E intersects the shore of South Australia, then due south to position latitude 36°20.0S and longitude 139°E, then due west to position latitude 36°20.0S and longitude 138°40.0E, then due south to position latitude 36°40.0S and longitude 138°40.0E, then due west to position latitude 36°40.0S and longitude 138°20.0E, then due south to position latitude 37°S and longitude 138°20.0E, then due west to position latitude 37°S and longitude 138°E, then continuing due south along the meridian of longitude 138°E.” (figure 1)

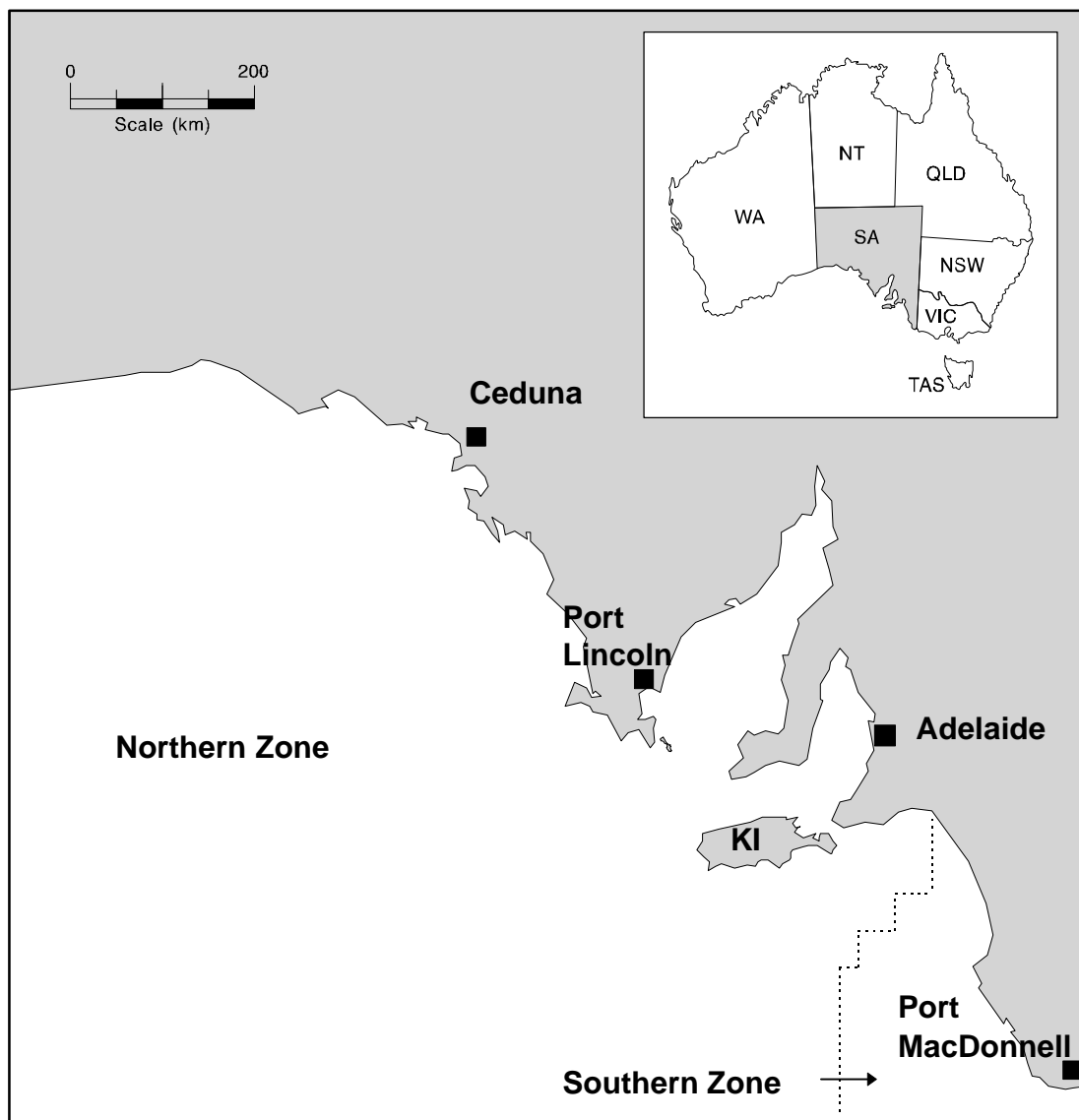


Figure 1: The Northern and Southern Zones of the South Australian rock lobster fisheries.[Refer to Appendix I for statistical fishing areas]

A number of marine protected areas have been established within the waters of the fishery, consequently not all waters in figure 1 are available to fishing.

The fishery involves the taking of rock lobster, *Jasus edwardsii*, within these waters as prescribed under the *Fisheries Act 1982* and regulations. Licensed rock lobster fishers also have access to a variety of other species within the region including salmon (*Arripis truttaceus*), mulloway (*Argyrosomus hololepidotus*), octopus (*Octopus* spp) and snapper (*Pagrus auratus*). Some fishers have unrestricted access to king (giant) crabs (*Pseudocarcinus gigas*), while other fishers are subject to a five crab bycatch per trip limit.

There are 74 licence holders in the fishery which operates between 1 November and 31 May. The fleet operates from a number of ports in South Australia between Victor Harbour and the far west coast. Vessels fish for between one and ten days per trip, with vessels on the west coast fishing further from port and therefore having longer trips.

Pots of wire mesh on steel frames or 50 x 75 mm weldmesh with moulded plastic necks, are used in the fishery. The dimensions of pots and the requirement for enabling escape of undersize rock lobster are specified in the *Scheme of Management (Rock Lobster Fisheries) Regulations 1991*. Pots are usually set overnight and hauled at first light. Hydraulic or mechanical pot haulers are used.

Vessels are restricted to 18 meters in length and a total engine capacity of 1,200 BHP. There has been a recent shift away from traditional displacement vessels to planing hulls enabling fishing over greater distances during a day. Recent technology changes have also resulted in an increasing level of capital investment by fishers and increased profit expectations.

2.2 Biological characteristics

Southern rock lobsters are distributed from Eden in New South Wales to southern Tasmania in the south and Dongara, Western Australia to the west. Rock lobster mate primarily between April and July, with females carrying eggs for four to six months. Rock lobster larvae moult through several stages before settling on a substrate as puerulus¹. The period between egg fertilisation and settlement may last up to two years and the planktonic larvae are widely dispersed.

Growth rates are highly variable across the fishery. Highest growth rates for rock lobster in South Australia occur around the southern end of Yorke Peninsula (Areas 33 and 40), while the lowest growth rates occur near the mouth of the Murray River (Area 46)(refer Appendix I). Size at maturity for female rock lobster varies substantially among the fishing areas, ranging from 89 millimetres carapace length in Area 56 to 112 millimetres in Area 40 (Prescott *et al* 1997). Rock lobsters can live

¹ Puerulus are transparent larvae which resemble the lobster adult form prior to coloration and hardening of the carapace in the juvenile stage.

for at least 20 years and may grow to 230 millimetres carapace length and reach weights in excess of seven kilograms.

Major predators of rock lobster in South Australian waters include *Octopus* species, seals and groper.

2.3 History of fishery management

Fishing for rock lobster in South Australia began in the early 1900s. In August 1967, following 12 months of investigation by a Government Select Committee into the fishing industry in South Australia, the following findings were made:

- that a pot and boat limit be imposed for each of three zones in the rock lobster fishery, and
- that no new boats be allowed to operate in the south-eastern zone without the approval of the Minister (Anon. 1967).

The northern zone rock lobster fishery has progressively reduced the potential fishing effort since 1968 with adjustments to the numbers of pots and the length of the season (days). A diagram describing the management changes in the fishery since 1966 is shown in figure 2.

Currently, the northern zone rock lobster fishery is managed by input or effort controls which restrict the number of pots used by each licence holder and the number of days fished each season. This strategy is preferred instead of an output controlled fishery for a number of reasons. These include:

- the fishery operates in an environment of high recruitment variability, and consequently there is greater annual variation in stock abundance;
- the ability of scientific research to accurately predict future recruitment strengths and subsequent stock biomass in the northern zone for setting a total allowable catch is limited;
- the potential for quota evasion would be of greater compliance risk in the northern zone due to the expansive unpopulated coastline and the number of suitable landing points;
- compliance costs are relatively low using input controls; and
- demonstrated commitment by licence holders to the time management system where the number of days fished is restricted using a flexible closure strategy selected by the licensee.

Fishing effort controls will remain effective for controlling total catch provided appropriate management measures are taken to offset any increase in the fishing power of the fleet.

Current management arrangements include:

- limited entry;
- a legal minimum size of 102 millimetres (for both males and females);
- a closed season from 1 June to 31 October each year;
- a number of boat specific time closures during the season (at present representing between 19 to 24 days);
- requirements for escape gaps, or a minimum mesh diameter on pots of 50 millimetres or rectangular mesh not less than 50 x 75 millimetres;
- a maximum of 60 pots per licence;
- a maximum pot weight of 40 kilograms;
- no double pulling of pots within 24 hours;
- a prohibition on the taking of berried females; and
- restrictions on boat size (18 metres) and engine capacity (1,200 BHP).

2.4 Trends in the commercial catch

Effort increased substantially between 1985/86 and 1991/92 due to a combination of factors including the increased use of colour sounders, global positioning systems and improved boats. During the latter part of this period the catch rate also increased substantially (figure 3). The higher catch rates are also due to a number of factors including expanding fishing grounds and greater fishing power.

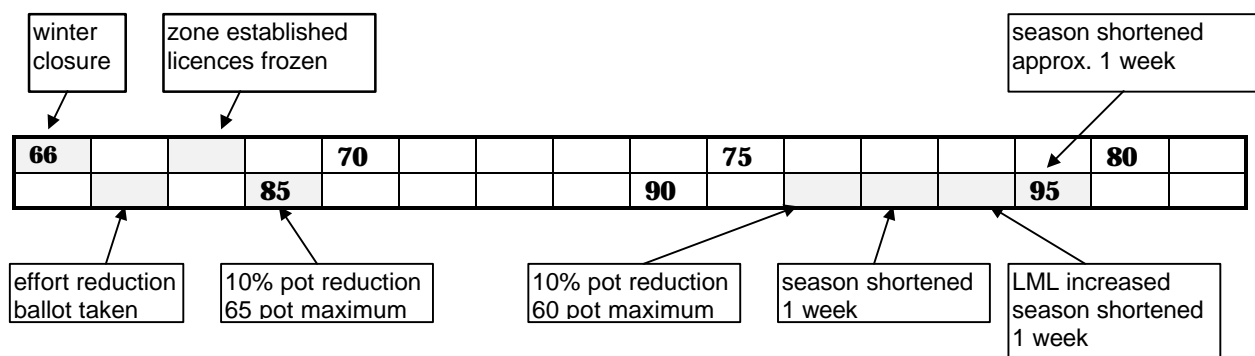


Figure 2. Timeline describing management changes in the Northern zone rock lobster fishery from 1966 to 1997.

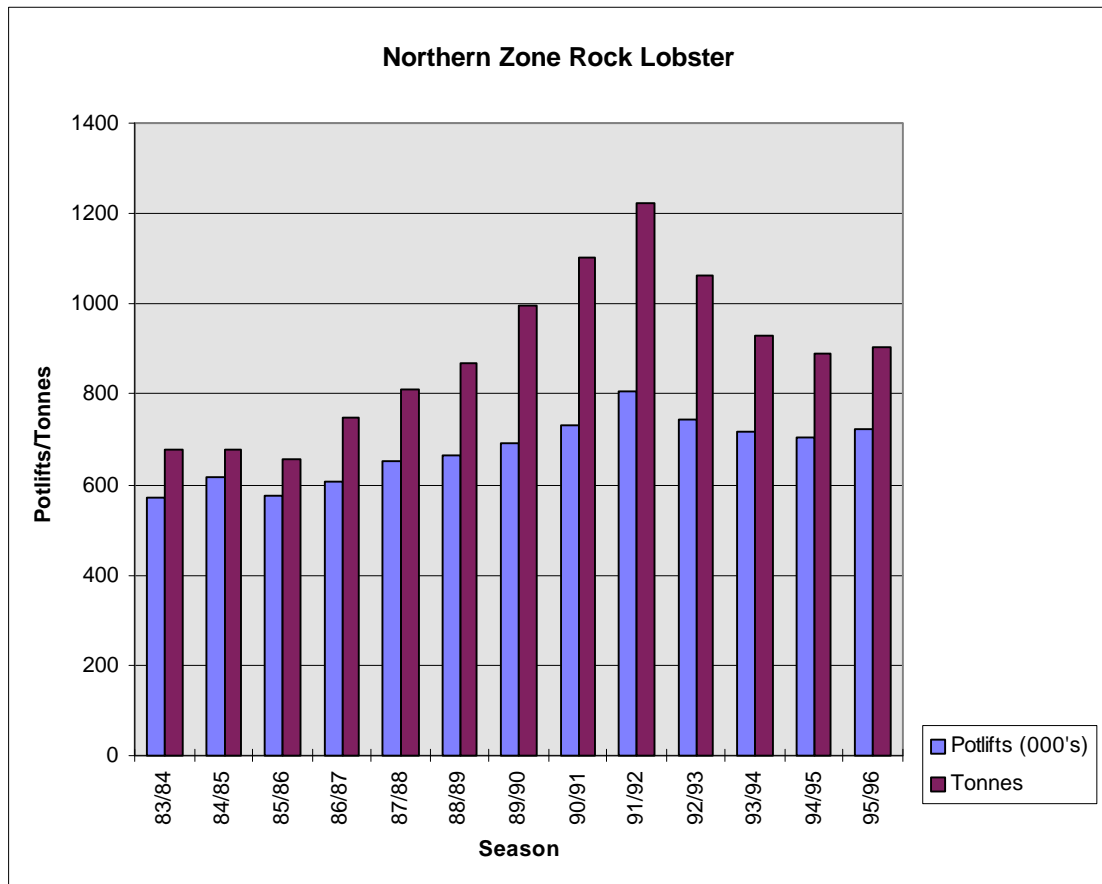


Figure 3. Catch and effort in the Northern zone rock lobster fishery from the 1967/68 season to 1995/96 (Anon. 1995, Prescott *et al* 1997).

Following the peak catches in 1991/92, the rock lobster industry recognised the need to constrain fishing effort. A review was undertaken which canvassed a number of management options. The resultant strategy was the use of time closures during the season. Each fisher is provided with approximately ten time closure option during the season for which he must nominate one option. Each option represent between 19 and 24 days during the season when no pots can be used by that licence holder.

The fishery is operating with very little latent effort following the implementation of effort reduction arrangements in terms of total days fished. The convergence of the potential and actual numbers of potlifts is shown in figure 4.

Recruitment to the fishery was better than average in 1988 and 1989. There are two sources of data that assist in determining recruitment to the fishery. Firstly, fishers reported comparatively high catches of undersize lobsters in their pots in the late 1980s. Secondly, at about the same time, the average weight of lobsters in the Northern zone was decreasing which would be expected if there was a large recruitment event in progress.

2.5 Research and stock assessment

Research needs and priorities for management of the fishery are determined by the Rock Lobster Research Sub-Committee, a joint sub-committee made up of representatives from both the northern and southern zone management committees. A five year strategic research plan has been developed by the management committees and is attached as Appendix II. Currently, the South Australian Research and Development Institute (SARDI) conducts the majority of research and monitoring programs for the rock lobster fisheries.

South Australia has established excellent long term monitoring programs collecting commercial data, pot-catch data, length frequency data, larval settlement indices and temperature records. Catch and effort data are available from 1950, however the quality of these data improved after limited entry was introduced in 1968. Comprehensive stock assessment reports has been recently prepared for the South Australian rock lobster fisheries (Prescott *et al* 1997 and McGarvey *et al* 1997). These reports indicate that there is greater variability in recruitment in the northern zone fishery and that the average size of lobster is larger than the southern zone.

A review of research requirements in the fishery was commissioned by the rock lobster industry in 1995 and was completed in February 1996. The report set out research directions for the industry for the next three years (Breen 1996). Research programs focus on catch monitoring, collection of data for yield per recruit, egg per recruit analysis and production, and modelling information.

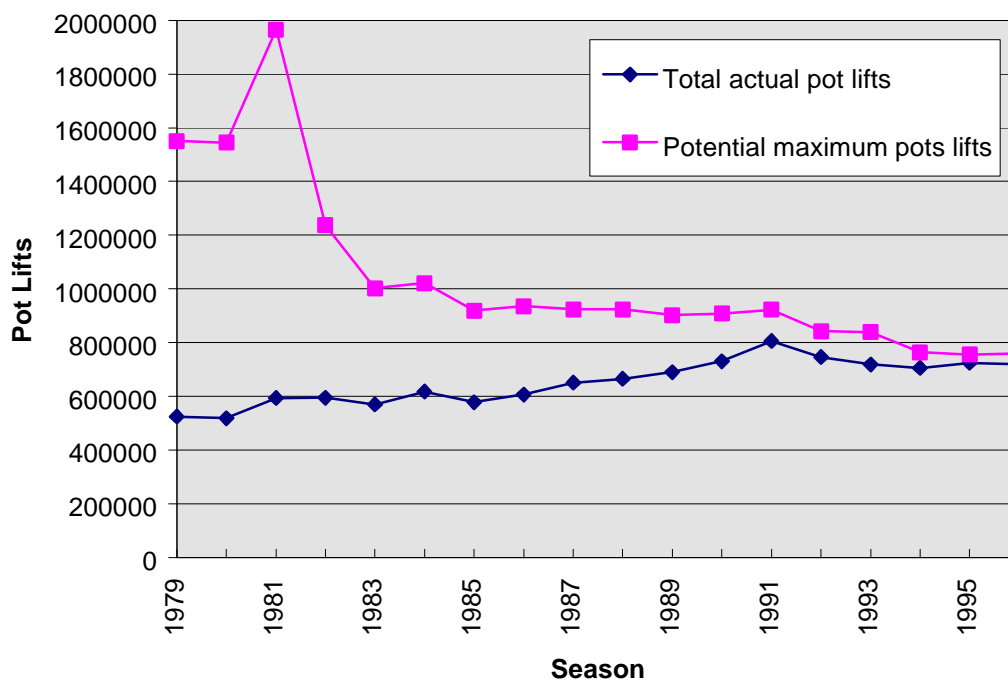


Figure 4. Potential and actual potlifts in the Northern zone rock lobster fishery between 1979/80 and 1996/97 seasons.

2.6 The recreational catch

Recreational fishers also participate in the fishery, though they account for only a small percentage of the total catch. They have access to the fishery by diving, drop netting and a limited number have access to the use of pots. The use of pots requires registration and the number of registered recreational pots was increased to a maximum of 12,000 in September 1997. The management of the recreational lobster fishery is currently under review in South Australia.

Rock lobsters taken by recreational divers and drop net fishers have not been estimated to-date. Data collection from these groups is made more difficult as there are no recorded contact numbers for these fishers.

The recreational lobster catch was estimated to be approximately 53 tonnes and 62 tonnes live weight during the 1990/91 and 1991/92 seasons respectively. The 17.6 percent increase in catch between the two seasons mirrors the increase in catch in the commercial fishery which was 18.5 percent over this period. This estimated recreational pot catch was approximately two percent of the total pot fishery in the State (Tyrer 1994). Even if this level of the recreational catch taken by pots was underestimated by 50 percent the catch taken would still be less than five percent of the total recreational and commercial pot catch (Appendix III).

While the overall catch by recreational fishers is small, intensive inshore fishing by recreational pots and divers can deplete rock lobster resources in localised areas. There are some areas where recreational fishing effort may exceed the commercial effort (eg areas of the lower Yorke Peninsula).

2.7 Illegal catch

No estimates for the illegal catch are available (Prescott *et al* 1997).

2.8 Processing sector and markets

There are a number of processors trading in rock lobster in the northern zone. Processors are based in the major fishing ports and the majority of these facilities have live holding capability. This reflects the market demand for live product, principally to Asian markets. There are only minor sales of frozen rock lobster tails to the United States of America. This latter product was the main market for the industry until the late 1980s when market focus shifted into Asia which offered higher prices and lower consignment costs. The globalisation of the rock lobster market over the past ten years has resulted in greater price certainty and reduced fluctuations in the market.

Western Australia is the largest supplier of rock lobster in Australia and a major competitor. Increased production in Western Australia may significantly affect domestic market prices.

2.9 Industry development

A number of industry development opportunities are currently being investigated by the rock lobster industry. Holding of rock lobster in sea cages both during and after the fishing season is undertaken on a small scale. These operations aim to take advantage of periods of higher prices with some potential for increasing the size of lobsters by holding them over a moult cycle. Some interest has also been expressed for the aquaculture of rock lobster. Similar developments are occurring in Tasmania, Western Australia and New Zealand. These developments have the potential to directly impact on management of the fishery in the future.

3 Compliance and enforcement

The annual compliance budget for the northern zone of the rock lobster fishery is about \$270,000 and accounts for costs incurred for a monitoring program focused on policing minimum size regulations, random checks on pot numbers and specifications, flexible time closures and illegal activities.

To monitor compliance with pot restrictions and to deter fishers double pulling pots within a 24 hour period, part of the compliance budget funds the operation of a fisheries patrol. There are no major compliance problems in this fishery that have been identified by the management committee or Primary Industries and Resources. The status of illegal activities by recreational fishers and unlicensed operators is not known.

An outline of compliance activities in the northern zone rock lobster fishery is described in Appendix IV.

4 Fishery management objectives and strategies

The priority for management of the northern zone rock lobster fishery is to ensure that annual harvest levels are biologically sustainable so that future generations may benefit from exploitation of the resource. Commensurate with this priority are a number of more specific biological, economic, environmental, and social objectives that have been developed by the Northern Zone Rock Lobster Fishery Management Committee to complement the broad directives of Section 20 of the *Fisheries Act 1982*.

Objective	Strategy
<i>4.1 Biological</i>	
<p>1. To maintain rock lobster populations at sustainable levels across the fishery.</p> <p>2. To harvest rock lobster at a size likely to provide for adequate levels of recruitment</p>	<p>Adopt a 'precautionary approach'² in the management of the rock lobster resource. Restrict the number of licences in the fishery to a maximum of 75.</p> <p>Control fishing effort by manipulating days fished.</p> <p>Set legal minimum size limits which assist in protecting a proportion of the adult spawning stock.</p>
<i>4.2 Economic</i>	
<p>1. To maintain the northern zone rock lobster fishery at a level which provides for fair and reasonable economic benefits to licence holders and the community through employment and export revenue.</p> <p>2. To recover an economic return from licence holders sufficient to cover attributed costs of management, research and compliance for the fishery.</p> <p>3. To provide for economic efficiency and flexibility in management arrangements by developing harvesting strategies that minimise costs.</p> <p>4. Optimise the yield from the fishery.</p>	<p>Set licence fees at a level sufficient to recover all attributed management, research and compliance costs.</p> <p>Support cost effective compliance strategies to protect the resource from illegal harvesting.</p> <p>Develop harvest strategies which minimise costs.</p> <p>Develop flexible management arrangements.</p> <p>Set minimum size limits. Assess economic benefits of alternative management strategies.</p>
<i>4.3 Environmental</i>	
<p>1. To minimise environmental impacts of rock lobster fishing and promote conservation measures in habitats worthy of higher conservation status.</p> <p>2. To minimise potential conflict with other users of the marine resources.</p>	<p>Promote environmentally sensitive fishing practices in the industry.</p> <p>Identify areas of conservation significance to the northern zone rock lobster fishery that may be worthy of conservation.</p> <p>Be proactive in dealing with conservation issues that may impact on the fishery.</p> <p>Take an ecosystem approach in considering management arrangements for the fishery.</p>

² the management committee shall be more cautious when information is uncertain, unreliable or inadequate. The absence of adequate scientific information shall not be used as a reason for postponing or failing to take conservation and management measures.

<i>4.4 Social</i>	
1. To maintain and provide for reasonable levels of access to the rock lobster resource for recreational fishers.	Monitor and regulate participation and catch by the recreational sector in the fishery.
2. To ensure a high level of awareness of occupational health, safety and welfare issues for skippers and crew.	Promote occupational health and safety issues within the industry.
3. To inform and educate the community about the management of the rock lobster resource in the Northern zone.	Develop educational and awareness packages for distribution to the wider community.
4. To maintain the current nature of the rock lobster fishery and provide for regional employment in the fishery.	Consider regional employment in the development of management arrangements for the fishery.

5 Reference points and performance indicators

Reference points are agreed quantitative measures used to assess performance of the fishery based on clearly defined management objectives.

Reference points begin as conceptual criteria which capture in broad terms the management objectives for the fishery. To implement fishery management it must be possible to convert the conceptual reference point into a technical reference point, which can be calculated or quantified on the basis of biological or economic characteristics of the fishery (Caddy and Mahon 1995).

5.1 Biological reference points

Considering the stated biological objectives for the fishery, the following reference points may be used to assess the stock status of the northern zone rock lobster fishery:

- exploitation rate - indicates the level of available lobsters taken by the fishery.
- catch rates - directly relative to current stock abundance.
- egg production - reflects reproductive capacity of the fishery.
- abundance of pre-recruits - provides a forecasting tool on future stock abundance.
- mean size of rock lobster - indicates changes in stock structure.

Historical data available from commercial catch returns, catch sampling programs and a stock assessment model for the fishery are shown in table 1. The data reference points in table 1 will be reviewed at the end of each season as part of the annual stock assessment report for the fishery.

Table 1: Historical data available for use in assessing appropriate biological reference points for the northern zone rock lobster fishery.

CATCH (tonnes)	1,064	929	891	903	902
REFERENCE POINT	1992/93	1993/94	1994/95	1995/96	1996/97
Exploitation rate (%) *	0.304	0.270	0.262	0.262	0.271
Egg production (billions) #	643	620	625	625	625
Pre-recruit abundance ^	0.206	0.180	0.245	0.245	0.302
Catch rates (kg/pot lift)	1.43	1.29	1.26	1.25	1.25
Mean size + (kg)	1.07	1.12	1.10	1.13	1.06

* The exploitation rate is the fraction of the population harvested annually, determined from the dynamic qR method employing annual catches by weight and number.

Total egg production (including only legal sized females) has been derived from the qR stock assessment model (McGarvey *et al* 1997).

^ The pre-recruit index is undersize catch per unit of effort (CPUE) reported in commercial catch data summed over the months of November to March (inclusive).

+ mean size of rock lobster landed across the fishery.

Management action on reaching a reference point outside the historical range for the fishery

When one or more of the reference points described above are reached or exceeded, the management committee will undertake the following actions:

1. notify the Minister for Primary Industries, Natural Resources and Regional Development and participants in the fishery as appropriate,
2. undertake an examination of the causes and implications of ‘triggering’ a reference point,
3. consult with the northern zone rock lobster industry and PIRSA on the need for alternative management strategies or actions, which may include:
 - changes to the fishing season,
 - changes to the minimum size limit, or
 - changes to the current pot restrictions; and
4. provide a report to the Minister and industry, within three months of the initial notification, on the outcomes of a review of the effect of triggering a performance indicator.

Marine park effects on management of the fishery

The establishment of the Great Australian Bight Marine Park in State waters and the intent to extend the park into Commonwealth waters has resulted in the loss of fishing grounds to the rock lobster fishery.

The management committee may support future declarations of marine reserves if it can be demonstrated that the reserves are essential for the proper conservation of the marine resource and after full consultation has occurred with the committee and the wider fishing industry.

Declaration of any marine park which has an impact on the sustainable operation of the fishery must be accompanied by adequate funding to provide for continued sustainability of that fishery.

5.2 Economic performance indicators

Considering the stated economic objectives for the fishery, the following performance indicators are used to assess the economic status of the northern zone rock lobster fishery:

- Gross Value of Product (GVP)
- cost of management programs compared with GVP
- Return on Investment (ROI)
- determination of any major operating cost increases (eg possible future loss of fuel rebate)

5.3 Management committee performance indicators

The primary responsibility for ecologically sustainable development of the northern zone rock lobster resource rests with the Minister for Primary Industries, Natural Resources and Regional Development. However, to assess the effectiveness and efficiency of the Northern Zone Rock Lobster Fishery Management Committee in managing the resource, and to provide for transparency in the management process and improve accountability, performance indicators are required.

The primary performance indicator used to assess the effectiveness and efficiency of the management committee is the acceptance of advice from the committee by the Minister for Primary Industries, Natural Resources and Regional Development, and the quality of the information which the committee supplies to the Minister. Further information on the strategic direction of the management committee and key performance measures can be found in the Northern Zone Rock Lobster Fishery Management Committee Strategic and Business Plan.

5.4 Compliance performance indicators

Compliance costs for the northern zone rock lobster fishery are a significant part of the overall management costs for the fishery. The effectiveness and efficiency of compliance protocols and programs needs to be assessed annually to ensure effectiveness in service delivery and that costs are minimised where possible without raising the level of compliance risk.

The following performance indicators are used to assess the effectiveness and efficiency of the compliance and audit operations for the northern zone rock lobster fishery:

- reduction in illegal activity determined by number of reports for offences,
- cost effective compliance programs,
- the number of offences detected against the number of checks performed, and
- greater support from stakeholders for Fishwatch.

Biological reference points and performance indicators will be reviewed on an annual basis. Changes may occur to biological reference points as more scientific information on the stock status of the northern zone rock lobster fishery is provided from the strategic research program. Other performance indicators may also change to ensure the management of the fishery is subject to a continuous improvement program.

6 Review of the management plan

The Northern Zone Rock Lobster Fishery Management Committee is required under the *Fisheries (Management Committee) Regulations 1995* to provide the Minister for Primary Industries, Natural Resources and Regional Development on or before the 30 November each year a report on the operations of the management committee during the preceding financial year. This report will include a report on any target or limit reference points which were reached during the reporting period and any actions that resulted. The performance of the management committee and fishery operations will also be rated against the stated objectives.

This management plan is a dynamic document which reflects current understanding of the northern zone rock lobster fishery and as such may change over time. No radical departure from the stated management arrangements, biological reference points or performance indicators will occur unless the management committee is otherwise directed by the Minister for Primary Industries, Natural Resources and Regional Development during the life of this plan.

Six months before the end of the five year period (1 May 2002) this management plan will undergo a major review.

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Appendix I

FISHERY LOGBOOK STATISTICAL AREAS

Appendix II

FIVE YEAR STRATEGIC RESEARCH PLAN FOR THE SOUTH AUSTRALIAN NORTHERN ZONE ROCK LOBSTER FISHERY

Principles

- linked to explicit quantifiable management objectives
- provide defensible values of the performance indicators to evaluate stock status
- annual stock assessment reports in uniform format
- cost-effective delivery of information

Guidelines

The development of a five year strategic plan for South Australian rock lobster reflects a need of the industry and managers for reliable, cost-effective, performance indicators of the status of the rock lobster resource. These performance indicators are quantitative indices which can be updated annually and can be used to reliably assess the effectiveness of current management of rock lobster stocks in South Australia.

The plan also takes into account the conduct and transfer of information of a major biological study of rock lobsters done between 1993 and 1996. This study produced a valuable information resource and an operational dynamic model of the South Australian rock lobster fishery. The research plan addresses the transition from a study of the fisheries biology of lobsters to an annual assessment of the two stocks (southern and northern zones). The latter assessment is noted to be the core research necessary above all to ensure that management decisions are based on defensible, robust, information. Such core research has been identified as part of an independent review of research needs for the South Australian rock lobster fishery (Breen 1996). The review identified priorities for research and resources necessary to deliver prioritised research programs.

Further to the core research programs, funded through licence-fee contributions, are discrete research projects which, although not directly related to stock assessment, have demonstrable value in providing additional information to the rock lobster industry. In the plan, such projects are promoted through the fisheries management committee for external funding (eg FRDC). Relevant research projects already considered include:

- condition indices and methods for non-destructive determination of growth;
- identification of methods to reduce incidental predation of rock lobsters in pots; and

- ecological effects of rock lobster fishing.

Assessing stocks of rock lobster: core research programs 1997–2002

1. Performance indicators

The research has been designed to deliver the following performance indicators annually:

- catch rate
- exploitation rate
- total egg production
- abundance of pre-recruits
- mean size of rock lobster

These performance indicators are described below:

catch rates

Catch rates are used as indicators of the relative biomass of lobsters. Catch rate data will be derived from compulsory catch log data and from independent catch sampling aboard commercial vessels.

exploitation rate

This is the proportion of the stock removed by fishing. This indicator will be derived from several methods the main ones being: consideration of catches (weights and numbers of lobsters), analysis of length frequency methods. As the exploitation rate is a derived index it is estimated with error. Uncertainty in the estimate will be explicitly stated.

total egg production

An estimate of the total number of eggs produced as a function of lobsters remaining in each stock after fishing. The estimate will be derived from the catch-sampling program and application of biological parameters available from the completed population dynamics study.

abundance of pre-recruits

An index of potential recruitment to the fishery. Expressed in two ways:

- the relative abundance of pueruli on collectors at selected sites in the southern and northern zones
- the abundance of under-size lobsters retained in pots (from the catch-sampling program).

mean size

The size (weight) of rock lobster landed across the fishery by statistical area.

2. Sources of data

The following will be used as inputs to the derivation of performance indicators:

- catch and effort data (from monthly returns);
- seasonal information on abundance and size composition by sex of lobsters sampled aboard commercial vessels in selected areas and depth zones (pot sampling);
- estimates of growth, movement, size at maturity, and length/weight relationship by statistical fishing area derived from the population dynamics study; and
- seasonal information on abundance of pueruli settling on collectors placed at coastal sites in the southern and northern zones.

Other projects

Other projects of potential benefit to the South Australia are summarised below:

Rock lobster condition

A project to assess sources of variation in growth and condition of lobsters. Important outcomes include:

- reliable prediction of rock lobster condition and market potential
- non-destructive method for the estimation of growth rate of lobsters

start: 1996 **finish:** 1998

funding: FRDC

Reducing incidental predation on rock lobsters

A project to examine potential mechanisms for reducing the incidental predation of rock lobsters in pots. Important predators include octopus, leather jackets, and seals.

start: 1998 **finish:** 2000

funding: industry funds

South Australian Rock Lobster – five year research plan

Research activity	1997/98	1998/99	1999/20	2000/01	2001/02
complete publication of the population dynamics study	#				
design catch sampling program	#				
update rock lobster model	#			#	
commercial catch sampling					
produce stock assessment report for southern zone	by May 31	by May 31	by May 31	by May 31	by May 31
produce stock assessment report for Northern zone	by June 30	by June 30	by June 30	by June 30	by June 30
summarise catch and effort information	May and November	May and November	May and November	May and November	May and November
rock lobster condition/growth *		#			
incidental predation *				#	
# = final report; * = externally funded					

Appendix III

Recreational Catch of Rock Lobster in South Australia

Table 1. The estimated recreational catch (kilograms) of lobsters taken by pots in South Australia per month for 1990/91 and 1991/92 (Tyner 1994). The area codes are FLE Fleurieu Peninsula, KIS Kangaroo Island South, LEP Lower Eyre Peninsula, LSE Lower South East, USE Upper South East, WEC West Coast and YOP Yorke Peninsula.

1990-1991 SEASON									
AREA	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	AREA
FLE		870	2621	3138	1565	739	86	33	9052
KIS		485	1512	1883	442	370	25	18	4735
LEP		19	174	128	18	7	4	0	350
LSE	664	1273	1943	5492	3133	1510	916	0	14931
USE	270	289	1326	3369	1678	812	397	0	8141
WEC		788	1739	1489	637	257	288	13	5211
YOP		883	1940	4965	2072	329	196	80	10465
MONTH TOTAL	934	4607	11255	20464	9545	4024	1912	144	52885

1991-1992 SEASON									
AREA	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	AREA
FLE		1007	1879	2690	1361	596	139	6	7678
KIS		280	1235	1365	282	160	114	0	3436
LEP		98	193	356	177	126	69	18	1037
LSE	870	1713	4952	7482	5053	2853	1461	0	24384
USE	382	574	2040	3443	2363	961	1068	0	10831
WEC		754	1536	1727	884	461	177	39	5578
YOP		868	2054	3837	1658	581	238	39	9275
MONTH TOTAL	1252	5294	13889	20900	11778	5738	3266	102	62219

Appendix IV

COMPLIANCE PROTOCOLS

PROTOCOL	STRATEGY	PERFORMANCE INDICATOR
Reduction in illegal activity	<ol style="list-style-type: none"> 1. Promote "1800" for reporting suspected illegal activity to encourage greater participation in resource protection by stakeholders. 2. Investigate reports of illegal activity received from "1800" and other sources. 	<ol style="list-style-type: none"> 1. Increased number of reports received by "1800" regarding suspected illegal activity in the fishery. 2. Completed investigation of reports and outcomes. 3. Review of sources of reports to indicate stakeholder interest.
Compliance of rock lobster pots with legislation (marking, escape gaps, construction etc)	Random inspection of rock lobster pots used in zone.	Numbers of rock lobster pots checked during pot counts, random checks in port and during patrols at sea.
Compliance with licence conditions regarding pot limitations.	Random checks of vessels engaged in rock lobster fishing.	At sea inspection of fishing operations including counts of rock lobster pots in use.
Compliance with minimum size restrictions for rock lobster taken.	Random inspection of catches at point of landing and processing facilities.	Numbers of catches inspected and recording of any undersize rock lobsters detected.
Compliance with legislation preventing the taking of berried female rock lobsters.	Random inspection of catches landed and rock lobsters on board vessels during period of high incidence of rock lobsters carrying spawn.	Numbers of catches inspected and illegal rock lobsters detected.
Compliance with boat specific closures during the season.	Establish reporting protocol for vessels and random inspections at nominated port upon arrival and departure.	<ol style="list-style-type: none"> 1. All vessels complying with reporting protocol. 2. Numbers of vessels inspected at nominated port.
Compliance with licence conditions applying to nominated masters.	Random checks of licences on board vessels during rock lobster fishing activities.	Numbers of licences checked and breaches detected.
Compliance with legislation by recreational participants in fishery.	Random checks of non commercial activity including catches and equipment within the fishery.	Numbers of non commercial participants catches and equipment inspected.
Review compliance operations during the season to determine effectiveness.	Monitor compliance operational procedures monthly.	Review inspections and investigations completed and establish priorities for programmed operations.

Appendix V

MEMBERSHIP OF THE MANAGEMENT COMMITTEE

Independent chairperson

4 members representing each of the major ports (Port Lincoln (2), Kangaroo Island, Yorke Peninsula)

1 general member

fishery manager (PIRSA) (non voting)

research scientist (currently SARDI) (non voting)

South Australian Fishing Industry Council representative (non voting)

South Australian Recreational Fishing Advisory Committee representative (non voting)

SOUTH AUSTRALIAN FISHERIES MANAGEMENT SERIES

Paper No.	Title	Issue Date
1	A draft management plan for the blue crab fishery in South Australia	August 1994
2	A discussion paper on the management options for the South Australian recreational rock lobster fishery	September 1994
3	South Australian Shellfish Quality Assurance Program Report no. 1	November 1994
4	A review of net fishing in South Australia	November 1994
5	A review of the management arrangements for the Southern Zone Rock Lobster fishery	September 1995
6	Options for the management of the White Shark in South Australia	May 1995
7	Cost recovery in South Australia's commercial fisheries	October 1995
8	The role of management committees, peak industry bodies and government in fisheries management decision making	October 1995
9	A review of the management and prioritisation of fisheries research	November 1995
10	A management proposal for the Northern Zone Rock Lobster Fishery's 1995/96 season and an assessment of the effort reduction package implemented during the 1994/95 season	October 1995
11	Management plan for the South Australian abalone fishery	February 1996
12	Assessment, management and research support for the Gulf St Vincent prawn fishery	November 1995
13	A management plan for the experimental Pilchard Fishery	November 1995
14	South Australian Shellfish Quality Assurance Program Report No. 2	November 1995
15	A draft plan for the management of the specimen shell fishery in South Australia	March 1996
16	A discussion paper on issues relating to the development of rock lobster aquaculture and rock lobster holding systems at sea in South Australia	March 1996
17	A draft plan for structural adjustment in the South Australian River Fishery	April 1996
18	Economic analysis of management options for the Gulf St Vincent Prawn Fishery	April 1996
19	The roles and structure of fisheries management committees and the responsibilities of chairpersons and members	October 1996
20	Review of research and management of the Spencer Gulf prawn fishery	October 1996
21	South Australian Shellfish Quality Assurance program Report No. 3	November 1996
22	The cost recovery process for 1996/97	November 1996
23	A discussion paper on the management and development of recreational fishing in South Australia	May 1997
24	Development of at-sea rock lobster holding systems in South Australia	May 1997
25	South Australian recreational fishing survey 1997	May 1997
26	Fishcare South Australia - fish for the future	June 1997
27	Management plan for the South Australian abalone fishery	September 1997
28	Management plan for the South Australian northern zone rock lobster fishery	December 1997