



Management Plan for the South Australian Commercial Northern Zone Rock Lobster Fishery

July 2021



Government
of South Australia

Department of Primary
Industries and Regions

Management Plan for the South Australian Commercial Northern Zone Rock Lobster Fishery (2021).

Information current as of 1 July 2021

© Government of South Australia 2021

Disclaimer

Department of Primary Industries and Regions and its employees do not warrant or make any representation regarding the use, or results of the use, of the information contained herein as regards to its correctness, accuracy, reliability and currency or otherwise. Department of Primary Industries and Regions and its employees expressly disclaim all liability or responsibility to any person using the information or advice.

All Enquiries

Department of Primary Industries and Regions
Level 14, 25 Grenfell Street
GPO Box 1671, Adelaide SA 5001
www.pir.sa.gov.au/fisheries
T (08) 8226 0900

The South Australian Fisheries Management Series Paper number 81: Management Plan for the South Australian Commercial Northern Zone Rock Lobster Fishery (2021)

ISBN: 978-0-64822-04-6-6
ISSN: 1322-8072

Contents

1. Fishery to which this plan applies	5
2. Consistency with other management plans.....	5
3. Term of the plan	5
4. Description of the fishery.....	5
4.1. Commercial Fishery	6
4.2. Recreational Fishing	9
4.3. Aboriginal traditional fishing sector.....	10
4.4. Ecosystem and habitat.....	10
4.5. Biology	10
4.6. Stock Status and export approval.....	11
4.7. Stock assessment and research	11
4.8 Strategic research plan	14
4.9 Economic characteristics	15
5. Co-management arrangements	15
6. Allocation	16
6.1. Current allocated shares of the resource.....	16
6.2 Review of allocations	18
6.3 Allocation triggers	20
7. Ecosystem impacts	21
8. Goals and objectives.....	21
9. Harvest strategy	30
9.1 Background.....	30
9.2 Performance indicators	30
9.3. Harvest Strategy decision rules.....	31
9.4. TACC decision making process	33
9.5. Additional indicators	34
9.6. Monitoring	35

9.7. Stock status classification	36
9.8. Monitoring during closure and reopening	36
9.9. Review of the harvest strategy	36
10. Compliance and monitoring	37
11. Resources required to implement the plan.....	37
12. Review of plan	37
13. References.....	38

1. Fishery to which this plan applies

This plan applies to the commercial Northern Zone Rock Lobster Fishery which is formally constituted by the *Fisheries Management (Rock Lobster Fisheries) Regulations 2017*. The regulations constitute the fishery as:

- the taking of rock lobster in the waters of the Northern Zone
- the taking of aquatic resources specified in Schedule 1 in the waters of the Northern Zone
- the taking of Razorfish (*Pinna bicolor*) in the waters of the Northern Zone for the purpose of bait.

The aquatic resources specified in Schedule 1 of the regulations are shown in Chapter 14.

The waters of the Northern Zone are described as the waters adjacent to South Australia commencing at the intersection of Mean High Water Springs and 133°53'00" East, then to position 33°42'00" South, 133°53'00" East, then to position 34°44'00" South, 134°17'00" East, then to position 35°54'00" South, 136°23'50" East, then to position 36°05'00" South, 136°30'00" East, then to position 36°30'00" South, 137°19'00" East, then to position 36°30'00" South, 138°40'00" East, then to position 36°20'00" South, 138°40'00" East, then to position 36°20'00" South, 139°00'00" East, then north along the meridian of longitude 139°00'00" East to the intersection of Mean High Water Springs, then following Mean High Water Springs in the generally west, north-westerly direction to the intersection with the point of commencement.

2. Consistency with other management plans

This management plan has been developed so that it is consistent with other fishery management plans. In particular, the provisions relating to the allocation of the Rock Lobster resource between each fishing sector in the Northern Zone are consistent with other relevant plans and the allocation of species listed in Schedule 1 of the *Fisheries Management (Rock Lobster Fisheries) Regulations 2017* are consistent with the *Management Plan for the South Australian Commercial Marine Scalefish Fishery* (PIRSA 2013).

This management plan has been developed so that it can be integrated with any future Aboriginal traditional fishing management plans that are made in the future that apply to the waters of this management plan.

3. Term of the plan

This management plan applies from 1 July 2021 for a period of 10 years. Part 5 of the *Fisheries Management Act (2007)* prescribes the requirements for replacing or extending this management plan upon expiry.

4. Description of the fishery

The South Australian Rock Lobster Fishery is primarily based on the capture of Southern Rock Lobster, *Jasus edwardsii*, although commercial licence holders are permitted to land and sell Giant Crabs (*Pseudocarcinus gigas*) and Octopus taken as by-product in rock lobster pots and currently have one of three levels of access to the South Australian Marine Scalefish Fishery, noting at the time of developing this management plan a major restructure of the Marine Scalefish Fishery was being undertaken.

Southern Rock Lobster supports important commercial and recreational fishery in Tasmania, Victoria, Western Australia and New Zealand.

In South Australia, the Rock Lobster fishery is separated into two fishing zones, known as the Southern and Northern Zones. This management plan applies to the Northern Zone Rock Lobster Fishery. The Northern Zone Rock Lobster Fishery is divided into seven Marine Fishing Areas (MFAs) but the majority of the fishing occurs in MFAs 7, 8, 15, 27, 28, 39, 40, 48, 49 and 50 (Linnane et al. 2020) (Figure 1).

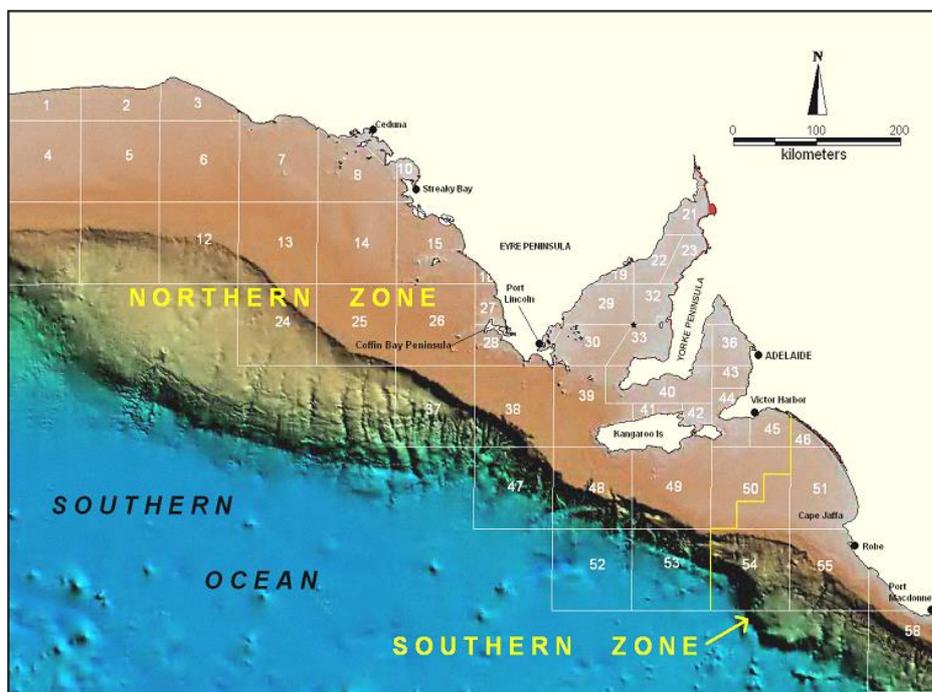


Figure 1: The Northern and Southern Zones of the South Australian Rock Lobster Fishery. The numbered boxes represent Marine Fishing Areas (MFAs). From Linnane et al. (2020).

The Northern Zone Rock Lobster Fishery stretches a coastline in excess of 3,700 km, from the River Murray mouth to the Western Australian-South Australian border in the Great Australian Bight covering an area of 207,000 km². The area of the fishery extends from the low water mark out to edge of the Australian Fishing Zone 200 nautical miles from shore¹ except in aquatic reserves, sanctuary and restricted zones of marine parks and the dedicated Rock Lobster sanctuary of Gleeson Landing Reserve near Port Annie. The coordinates of these areas can be found in the Fisheries Management (Aquatic Reserves) Regulations 2016, *Fisheries Management (General) Regulations 2017* and the *South Australian Marine Parks Act 2007*.

4.1. Commercial Fishery

Rock Lobster have been harvested in South Australian waters since the 1890s, but the commercial fishery did not develop until the late 1940s-early 1950s. Since then, a series of management arrangements have been introduced to control the catch of Rock Lobster in South Australia. These included introduction of effort controls by way of closed seasons in 1966, pot and boat limits introduced in 1967 and quota management through implementation of individual transferable quota units and setting

¹ The South Australian Government has management jurisdiction for Rock Lobster from the low water mark out to three nautical miles in all waters adjacent to South Australia. Under an Offshore Constitutional Settlement (OCS) with the Commonwealth Government of Australia, South Australia has jurisdictional control of Rock Lobster in all waters adjacent to South Australia from three nautical miles to the edge of the Australian Fishing Zone.

of annual Total Allowable Commercial Catch (TACC) in 2003. There have been various amendments to these arrangements through the years as summarised in Table 1. The first management plan for the fishery was adopted in 1997. Subsequent management plans were adopted in 2007 and 2014. A more detailed synopsis of these changes to management arrangements up to 2014 is provided in PIRSA (2014).

Since 2014, the major management changes include voluntary surrender of 7,910 Northern Zone quota units and four licences through the *Marine Parks: Commercial Fisheries Voluntary Catch/Effort Reduction Program*², to account for areas that were closed to fishing following implementation of marine park sanctuary zones in October 2014. The TACC was subsequently reduced in 2014/15 to account for the removal of these quota units.

The harvest strategy for the Northern Zone Rock Lobster Fishery incorporated in the management plan for the fishery adopted in November 2014 was reviewed in 2014/15. The revised harvest strategy implemented in 2015 set out separate TACCs for two regions (Inner and Outer Region) of the fishery. The harvest strategy also set out TACCs when fishery performance measures indicated reduced levels of stock abundance to avoid the fishery becoming overfished.

The annual winter fishing closure in the Outer Region of the fishery was removed in 2016, allowing commercial fishing in this region for 12 months of the year. These arrangements were introduced considering the outcomes from two years of research trials conducted by South Australian Research and Development Institute (SARDI) Aquatic Sciences, PIRSA and the South Australian Northern Zone Rock Lobster Fishermen's Association (SANZRLFA) in 2014 and 2015. This research indicated the abundance of female lobster in the commercial catch, levels of bycatch and undersized lobster mortality was reduced in winter months (Linnane et al. 2016) indicating there were no biological reasons to preclude commercial fishing in winter months. At this time, a mechanism for the Minister to vary or remove the annual winter fishing closure in the Inner Region for the commercial fishery, and for the recreational fishery in the Northern Zone was also introduced.

In 2017, the TACC for the Northern Zone Rock Lobster Fishery was set at levels that were inconsistent with the harvest strategy for the fishery adopted in 2015. The TACCs in 2017/18, 2018/19 and 2019/20 were set taking into consideration new fishery-specific scientific information that became available after the 2015 harvest strategy was adopted. This new information identified a regime shift in the productivity of the fishery (Linnane et al. 2020).

Due to disruption of the export market associated with the COVID-19 global pandemic in 2020 temporary management arrangements were introduced for the fishery. These arrangements included removing the normal winter fishing closure in the Inner Region of the fishery in 2020 and allowing for uncaught quota entitlements to be carried over from the 2019/20 fishing season to the following two fishing seasons. Immediately prior to the beginning of the 2020/21 fishing season on 1 November 2020, disruption to imports of Australian Rock Lobster into China significantly disrupted the market once again, and further arrangements included removing the normal winter fishing closure in the Inner Region of the fishery in 2021 and allowing for uncaught quota entitlements to be carried over from the 2020/21 fishing season to the following two fishing seasons were implemented.

Electronic reporting of commercial fishing activities including catch, effort and quota monitoring was being trialed in 2019/20 with the intention of implementing this reporting system. Electronic reporting is facilitated by use of an industry-developed app (Deckhand) and a PIRSA reporting portal (eCatch).

² Further details about the *Marine Parks: Commercial Fisheries Voluntary Catch/Effort Reduction Program* can be found at http://pir.sa.gov.au/fishing/commercial_fishing/licensing_registration/catch_effort_reduction_program

At the time of developing this management plan, PIRSA was developing a policy to provide guidance on circumstances appropriate in South Australia quoted-managed fisheries for applying quota under-catch and/or over-catch provisions. This policy would enable industry to consider whether these provisions are appropriate for a particular fishery and the levels at which the provisions could potentially be applied. On adoption of this policy, specific provisions for allowing for ongoing arrangements for carry-over of uncaught quota entitlements, or quota over-catch arrangements will be considered in the future.

Table 1: A chronology of major management milestones in the commercial Northern Zone Rock Lobster Fishery of South Australian since 1966.

Year	Major management milestones
1966	Winter closure introduced
1967	Pot and boat limit introduced
1968	South Australia Rock Lobster Fishery separated into Northern and Southern Zones and limited entry declared Compulsory commercial catch log introduced
1978	First major review of fishery undertaken
1985	10% pot reduction Upper limit of pots increased from 60 to 65
1992	10% pot reduction Upper limit of pots decreased from 65 to 60 Second major review of fishery undertaken
1993	One week time closure added
1994	Another one week time closure added Size limit increased from 98.5 mm to 102 mm
1995	Another one week time closure added
1997	First Management Plan for the fishery published (Zacharin 1997) Flexible time closure system introduced under management plan
1999	Another three days of time closure added
2000	Size limit increased from 102 mm to 105 mm
2001	7% effort reduction introduced (~14 days of further time closures)
2002	8% effort reduction introduced (~16 days of further time closures) Review of management and scientific program undertaken Upper limit of pots increased from 60 to 70
2003	Quota system introduced with a TACC of 625 tonnes vessel monitoring system (VMS), sealed bins and prior reporting introduced Escape gaps introduced
2004	TACC reduced from 625 tonnes to 520 tonnes

2005	Upper limit of pots increased from 70 to 100 Lower pot limit decreased from 25 pots to 20 pots
2007	Second Management Plan for the fishery published (Sloan and Crosthwaite 2007)
2008	TACC reduced to 470 tonnes
2009	TACC reduced to 310 tonnes
2011	Harvest strategy reviewed and implemented
2012	TACC increased to 345 tonnes consistent with the 2011 harvest strategy
2013	Introduction of sea lion exclusion devices for pots in water less than 100 m Four licences and 7,910 units surrendered through a Marine Parks: Commercial Fisheries Voluntary Catch/Effort Reduction Program
2014	Third management plan for the fishery adopted (PIRSA 2014)
2015	Revised harvest strategy introducing regionalised TACCs. TACC set at 300 tonnes Inner Region and 60 tonnes Outer Region
2016	Winter fishing closure in the Outer Region removed Mechanism for the Minister to vary/remove the winter fishing closure in the Inner Region introduced
2017	TACC set at 310 tonnes (250 tonnes in Inner Region, 60 tonnes in Outer Region)
2018	TACC set at 296 tonnes (250 tonnes in Inner Region, 46 tonnes in Outer Region)
2020	Winter fishing closure in Inner Region temporarily removed in 2020 to mitigate COVID-19 impacts on the fishery. Uncaught quota in 2019/20 fishing season carried over to following two fishing seasons.
2021	Winter fishing closure in Inner Region temporarily removed in 2021 to mitigate market impacts on the fishery related to imports of Australian Lobster into China. Provisions for uncaught quota in 2020/21 fishing season to be carried over to following two fishing seasons

4.2. Recreational Fishing

Recreational fishing contributes significantly to the well-being of many South Australians as well as State and regional economies through tourism, the purchase of fishing equipment, vessels, bait supplies and fuel. In recognition of the importance of recreational fishing to the community of South Australia, a management plan for Recreational Fishing was adopted in 2020 (PIRSA 2020a).

The first comprehensive survey of recreational catch and effort levels for Rock Lobster in South Australia was undertaken in the 1998/99 fishing season (McGlennon 1999). Subsequent surveys were carried out in 2001/02 (Venema et al. 2003); 2004/05 (Currie et al. 2006); 2007/08 (Jones 2009).

The most recent survey of recreational fishing in South Australia conducted in 2013/14 estimated the recreational take of Rock Lobster was around 75 tonnes, with one third of this catch landed in the

Northern Zone (Giri and Hall 2015). This catch corresponded to around 4.5% of the commercial catch across the whole region (PIRSA 2016).

4.3. Aboriginal traditional fishing sector

Aboriginal People have fished the coastal waters of South Australia since long before European settlement (Cann et al. 1991). While there are no known documented historical accounts of Aboriginal traditional harvest of Rock Lobster this does not preclude the traditional use of this resource by Aboriginal Peoples in the past. The State Government, Native Title parties and the commercial fishing industry are currently involved in negotiations of Indigenous Land Use Agreements (ILUAs) with a view to resolving native title claims. The future involvement in existing commercial fisheries by Aboriginal traditional fishers or communities may be considered in this process. Further information about Traditional Fishing activities and practices will be described in Aboriginal traditional fishing management plans that are made in the future that apply to the area of the Northern Zone Rock Lobster Fishery.

4.4. Ecosystem and habitat

The Northern Zone can be divided into two broad geological regions. From Gulf St Vincent to the Western Australian-South Australian border in the Great Australian Bight, the marine substrate is comprised of a vast basement of granitic rocks (Lewis 1981). Reef communities and habitats for Rock Lobsters are confined to relatively small patches where this basement of granite projects through the overlying sands. Some additional small areas of limestone reef occur off Elliston.

The remainder of the Northern Zone (i.e. from Gulf St Vincent to the River Murray mouth) is comprised of metamorphosed basement with intrusions of igneous rocks, particularly granites. These intrusive granites produce peaked reefs that provide discrete localised habitats for Rock Lobsters that are interspersed by large expanses of sand. As granite does not erode as easily as the limestone reefs in the Southern Zone, these reefs lack the numerous ledges, crevices and undercuts that provide ideal habitats for Rock Lobster. Densities of Rock Lobster on the granite reefs of the Northern Zone are generally lower than those on the limestone reefs of the Southern Zone (Sloan and Crosthwaite 2007).

In summer, the mean wind direction over the shelf from Robe to the head of the Great Australian Bight is favourable for upwelling. South-easterly winds transport warm surface water offshore and cold, nutrient rich water is upwelled from below (Middleton and Platov 2003). Known locally as the Bonney Upwelling, this results in an increase in productivity of phytoplankton, which is believed to contribute to the high densities of Rock Lobster in the Southern Zone Rock Lobster Fishery (Rochford 1977; Lewis 1981). Extrusions of this cold water can extend all the way into the Northern Zone Rock Lobster Fishery (e.g. south of Kangaroo Island).

4.5. Biology

Rock Lobster is distributed around New Zealand and the southern Australia coast from Geraldton in Western Australia to Coffs Harbor in northern New South Wales including Tasmania (Booth et al. 1990), however the bulk of the population can be found in South Australia, Victoria, and Tasmania, where they occur in depths from 1 to 200 m (Brown and Phillips 1994; cited in Linnane et al. 2009).

Mating occurs from April to July and eggs are brooded over the winter for about 3-4 months (MacDiarmid 1989). The larvae hatch in early spring, pass through a brief (10-14 days) nauplius phase into a planktonic, leaf-like phase called phyllosoma. Phyllosoma develop over 12-23 months in offshore waters before they metamorphose into the puerulus (settlement) stage near the continental shelf break (Booth et al. 1991). The puerulus actively swims inshore to settle onto reef habitat in depths from 50 m to the

intertidal zone (Booth et al. 1991). Oceanographic conditions during the long offshore phyllosoma phase are thought to play an important part in the dispersal of this species (Booth and Stewart 1992).

The widespread transport of phyllosoma in the open ocean is likely to result in the genetic mixing of Rock Lobster populations and helps explain why mitochondrial DNA analysis has failed to detect any population sub-structuring in Rock Lobster across southern Australian and New Zealand (Ovenden et al. 1992). McGarvey and Matthews (2001) have suggested that the strength of westerly winds in South Australia during late winter and early spring may play a role in the inter-annual variation in recruitment to the Rock Lobster Fishery.

Rock Lobsters grow through a cycle of moulting and thus increase their size incrementally (Musgrove 2000). Males undergoing moulting between October and November, and females during April to June. A tagging study demonstrated there was substantial variation in growth rates among locations (McGarvey et al. 1999), with a general trend of higher growth rates in the Northern Zone compared to the Southern Zone (Linnane et al. 2005) resulting in spatial variation in size of maturity (Linnane et al. 2008; 2011).

Further details on the biology of Rock Lobster in the Northern Zone can be found in Linnane et al. (2020).

4.6. Stock Status and export approval

Stock status of the Northern Zone Rock Lobster management unit is assessed regularly and reported in annual stock assessment reports³ published by SARDI. The most recent stock assessment report available at the time of developing this management plan assessed the stock in 2018/19 (Linnane 2020) and classified the fishery using the national fish stock status classification framework described in Stewardson et al. (2018).

The Commonwealth Department of Agriculture, Water and the Environment requires that all commercial fisheries that export product be assessed under the *Environment Protection and Biodiversity Conservation Act 1999*. Product from the Rock Lobster Fishery was re-assessed under this framework in 2015⁴. The fishery was assessed as being managed in an ecologically sustainable way and the fishery was granted export approval for a period of ten years to 2025. PIRSA will work with industry to continue export approval as required.

4.7. Stock assessment and research

4.7.1. Research services

PIRSA Fisheries and Aquaculture contracts research services for each fishery. SARDI Aquatic Sciences is currently the research provider for core research for the fishery.

The Commonwealth Fisheries Research and Development Corporation (FRDC) provides funding for specific research projects. In order to gain access to such funds, States currently contribute voluntarily 0.25% of the value of fisheries production (average over the preceding three years). South Australia's Northern Zone Rock Lobster Fishery's contribution for 2017/18 was around \$56,000 which was collected from licence holders as part of their license fee. Other sources of funding for research are also pursued if

³ Annual stock assessment reports for the Northern Zone Rock Lobster Fishery are available at http://www.pir.sa.gov.au/research/publications/research_reports

⁴ The reassessment report for the South Australian Rock Lobster Fishery may be found at <http://www.environment.gov.au/marine/fisheries/sa/rock-lobster>

appropriate including the Australian Research Council, AusIndustry and Australian Fisheries, Forestry and Agriculture, through Agriculture Advancing Australia.

4.7.2. Data collection

To achieve the research and monitoring needs for the fishery, a variety of data types are collected and analysed on an annual basis. These are:

- Fishery-dependent data
 - Commercial catch and effort logbook data
 - Wildlife interaction logbook data
 - At-sea voluntary catch sampling
- Fishery-independent data
 - Puerulus sampling
 - Observer catch sampling

4.7.3. Fishery-Dependent Data

4.7.3.1 Commercial logbooks

Catch per unit of effort (CPUE) of legal-sized Southern Rock Lobster is the key performance indicator used to underpin the stock assessment (i.e. assess the performance) of the Northern Zone Rock Lobster Fishery and inform the TACC. The collection of the catch and effort data used to measure CPUE is facilitated by a logbook program, which requires all commercial fishers to compulsorily record daily information on catch and effort levels and other details on daily fishing operations. Trends in CPUE are summarised and published in the annual stock status and fishery stock assessment reports.

Information collected through the logbook program is periodically reviewed to accommodate changes in the fishery and ensure data collection meets management and research needs. For instance, the logbook was modified in 1998 to include specific details about Giant Crab (*Pseudocarcinus gigas*) fishing and again in 2000 so that the recording of numbers of undersize, spawning and dead Rock Lobsters, along with numbers of octopus, became voluntary.

Logbook returns are submitted and entered into the South Australian Rock Lobster (SARL) database, which is currently maintained by SARDI Aquatic Sciences. Details currently recorded in the daily logbook include:

- the MFA and Region within which the fishing took place
- depth in which the pots were set
- number of pots set
- weight of retained legal-sized Southern Rock Lobsters – reported at the end of each trip or as a daily estimated weight
- landed number of legal-sized Southern Rock Lobsters
- number of undersized Southern Rock Lobsters caught
- number of dead Southern Rock Lobsters caught
- number of spawning Southern Rock Lobsters caught
- weight of octopus caught
- number of octopus caught
- number of Giant Crab pots
- depth of Giant Crab pots
- landed weight of Giant Crabs

- landed number of Giant Crabs
- species of Marine Scalefish retained.

4.7.3.2. Wildlife interactions logbook

PIRSA Fisheries and Aquaculture implemented a generic data recording logbook in 2007 for wildlife interactions (including threatened, endangered and protected species – TEPS) for all South Australian commercial fisheries. The TEPS logbook was implemented to ensure consistent reporting practices for interactions with TEPS and to fulfil requirements of the *Environmental Protection and Biodiversity Conservation Act 1999*. PIRSA Fisheries and Aquaculture currently contracts SARDI Aquatic Sciences to collect and archive the data from the TEPS logbooks and provide an annual summary report.

4.7.3.3. At-sea voluntary sampling

Commercial fishers and researchers have collaborated in an at-sea voluntary pot-sampling program for the Northern Zone Rock Lobster Fishery since 1991, with the main aim of providing temporal and spatial data on pre-recruit indices, length frequencies, reproductive status, sex ratios and estimates of lobster mortality. Fishers participating in the program record the number, size and reproductive condition (females only) of both undersized and legal lobsters from three pots where the escape gaps are closed.

The program is recognised as being important because the information collected is used in the stock assessment of the fishery. For this reason, participation in the program is strongly encouraged to ensure that future decisions for the fishery are based on reliable and robust data.

These data are supported by research staff who undertake trips to sea on commercial vessels to encourage more fishers to participate in the program and to demonstrate the methods to new participants.

4.7.3.4. Puerulus sampling

Rates of puerulus and post-puerulus settlement have been monitored at four main sites in the Northern Zone Rock Lobster Fishery since 1991 as an indicator of potential settlement and recruitment 4-5 years into the future. These sites are located near Port Lincoln (McClaren Point and Taylor Island) and Yorke Peninsula (Marion Bay and Stenhouse Bay), with the collectors set in groups of 10 or 12.

The annual puerulus settlement index (PSI) is calculated as the mean monthly settlement on these collectors and is used to estimate future biomass in the fishery using a 4–5 year time span between settlement and recruitment. PSI is an additional performance measure in the harvest strategy.

4.7.3.5. Observer sampling

Observers are deployed on operating vessels in the Northern Zone Rock Lobster Fishery to record the same information as that reported by participants in the at-sea voluntary sampling. This sampling program supplements and validates the fishery-dependent at-sea sampling information. Currently, observers may be SARDI research officers or other independent observers who record the number, size and reproductive condition (females only) of both undersized and legal lobsters with the escape gaps being closed on all pots.

4.7.4. Reporting

Two types of published reports are currently prepared and delivered on an annual basis for the Northern Zone Rock Lobster Fishery that provide an assessment of current stock status (and evaluation of the performance of the fishery against key performance indicators and reference points outlined in the harvest strategy). These are:

- *Stock status report* – this report documents, analyses and interprets the available catch and effort data
- *Stock assessment report* – this is a major report that is published annually and provides a comprehensive synopsis of information available for the Northern Zone Rock Lobster Fishery and to assess the current status of the resource in relation to the performance indicators provided in the management plan.

In addition, fishery statistics are presented and considered by the Rock Lobster Fishery Management Advisory Committee (RLFMAC) as part of their management advisory function during the setting of the TACC.

4.8 Strategic research plan

The RLFMAC has prepared a strategic research and development plan to guide its advice on the undertaking of research and development projects for the Northern Zone Rock Lobster Fishery. This research and development plan aims to achieve the following objectives:

- To ensure that all RLFMAC members have a clear description of the current structure for development, approval and management of Rock Lobster fishery research and research and development projects at the two key levels:
 - a) The national level, via Southern Rocklobster Limited (SRL) - funded by the voluntary FRDC 0.25% gross value production levy plus any additional contributions across South Australia, Tasmania and Victoria
 - b) The core fishery research level in South Australia - this relates to the program of fishery research conducted by SARDI Aquatic Sciences to inform fisheries management and funded directly by licence holders via the cost recovered licence fee⁵.
- To ensure research is directed towards the information needs of management (promotes effective management of the resource), stock status (including research which contributes to a better understanding of the stock and which can in turn, inform the setting of the TACC), minimising environmental impacts, people development and industry development.
- To ensure that the Northern Zone Rock Lobster Fishery continues to have robust data feeding into the Harvest Strategy Decision Rules and, in particular, to encourage increased industry engagement in programs such as routine pot sampling.
- To ensure a coordinated and collaborative approach to all Rock Lobster fishery research and development in South Australia and that the RLFMAC is kept informed of current and

⁵ This annual research program analyses data generated by, and gathered from, the following sources:

- Commercial logbook information
- Voluntary catch sampling
- Puerulus monitoring
- Fishery Models

This research delivers information to inform the fishery management decision making framework (including the harvest strategy).

proposed research of relevance to the management of the fishery, including annual Rock Lobster Fishery Status and Stock Assessment Reports, via regular reports to RLFMAC meetings.

The Strategic Research and Monitoring Plan is not intended to be a definitive list of all research needs for the fishery over the life of the plan. A review of research priorities will be undertaken regularly to assess research needs, priority and timing.

4.9 Economic characteristics

The Northern Zone Rock Lobster Fishery is an important and valuable commercial fishery in South Australia with an estimated Gross Value of Production in 2018/19 of \$25.5 million. The fishery contributes around \$45 million to the Gross State Product annually, most of this is in the Eyre Peninsula/West Coast region (Econsearch 2020). Around 355 full time equivalent jobs are generated by this fishing industry in South Australia.

Further information about the economic characteristics of the Northern Zone Rock Lobster Fishery are available in Economic Indicator reports published regularly. These reports are available at <https://www.bdo.com.au/en-au/econsearch/safisheriesreports>.

5. Co-management arrangements

Co-management is an arrangement whereby responsibilities and obligations for sustainable fisheries management are negotiated, shared and delegated between government, the commercial fishing industry, recreational fishers, Aboriginal traditional fishers and other key stakeholders such as conservation groups (Neville 2008). Co-management is recognised as a collection of positions – starting from centralised government regulation with no industry input at one end to more autonomous management by industry groups and key stakeholders at the other, where government plays more of an audit role. Co-management is designed to achieve efficient regulatory practice (among many other things) and is by no means a way of industry or other key stakeholders avoiding regulatory scrutiny and influence.

PIRSA has adopted a Policy for the Co-Management of Fisheries in South Australia to inform discussion with the wider commercial fishing industry and other stakeholder groups as to how best to promote and implement co-management arrangements. The policy proposes that implementation of a preferred co-management model should be through a phased approach through which industry and key stakeholders build their capacity over time and which allows for a government audit process to measure performance and success.

In 2015, the RLFMAC was established by the South Australian Rock Lobster Advisory Council (SARLAC) as an advisory committee, following a proposal developed in partnership with PIRSA Fisheries and Aquaculture and the commercial Rock Lobster industry. This RLFMAC took over the roles and responsibilities of the previous RLFMAC established in 2012 under the *Fisheries Management Act 2007*.

The role of the RLFMAC is to provide advice to PIRSA on the commercial Rock Lobster fisheries in relation to management of the fishery and any other matter referred to it. At the time of writing this management plan the commercial fishing industry funded the operation of RLFMAC through licence fees collected from both the Northern Zone and Southern Zone Rock Lobster fisheries.

In addition, co-management arrangements have been established between PIRSA Fisheries and Aquaculture and the SANZRLFA, the representative industry body for the Northern Zone Rock Lobster Fishery. These arrangements recognise SANZRLFA as the representative body for the industry. Through this arrangement SANZRLFA undertake co-management services on behalf of PIRSA in relation to communicating, educating and consulting with industry members on fisheries policy related to administration of the *Fisheries Management Act 2007*.

6. Allocation

6.1. Current allocated shares of the resource

The *Fisheries Management Act 2007* provides that a management plan must specify the share of the fishery to be allocated to each fishing sector under section (43(2)(h)). The Act also provides that, in determining the share of aquatic resources to be allocated to a particular fishing sector for an existing fishery, the share of aquatic resources to which that fishing sector had access at the time the Minister requested the plan (based on the most recent information available to the Minister) must be taken into account under section (43(3)). The Minister formally requested preparation of the previous management plan in 2010. Therefore, this plan took into account the share of the key target species in the Northern Zone Rock Lobster Fishery that the commercial, recreational and Aboriginal traditional fishing sectors had access to at that time. The information used to allocate the shares are described in the 2014 management plan for the fishery (PIRSA 2014).

The shares allocated to each fishing sector in the Northern Zone Rock Lobster Fishery are set out in Table 2.

Table 2: Shares of Northern Rock Lobster allocated to the commercial, recreational and Aboriginal traditional fishing sectors in the Northern Zone Rock Lobster Fishery.

Species	Commercial	Recreational	Aboriginal traditional
Southern Rock Lobster	95.5%	3.5%	1%

Commercial access to Southern Rock Lobster in the Northern Zone is restricted to licence holders in the Northern Zone Rock Lobster Fishery.

6.1.1. Recreational fishing sector

Recreational access to Northern Rock Lobster is primarily managed using minimum legal size limits and recreational daily bag and boat limits. Any catch taken by the Charter Boat Fishery is considered to be recreational catch and is allocated as part of the broader recreational fishing sector.

The most recent survey of recreational fishing in South Australia conducted in 2013/14 estimated recreational take of Rock Lobster was around 75 tonnes, with almost two thirds of this catch landed in the Southern Zone (Giri and Hall 2015). This catch corresponded to around 4.5% of the commercial catch in that year (PIRSA 2016) and within allocations.

6.1.2. Aboriginal traditional fishing sector

Access to South Australia's fisheries resources by Aboriginal communities under the *Fisheries Management Act 2007* may be provided through Aboriginal traditional fishing management plans. These plans may be developed when an Indigenous Land Use Agreement (ILUA), agreed to resolve a native title claim, is in place in relation to a native title claim area. The State is currently engaged in ILUA negotiations with native title claimants and other stakeholder groups including the fishing industry. It is also possible that agreements may be made with Aboriginal communities in relation to traditional fishing arrangements before an ILUA is finalised. The agreements arising from these negotiation processes may inform the way that access to fisheries resources by Aboriginal communities is defined and implemented. Currently, Aboriginal traditional fishing under the Act only relates to fishing agreed through the ILUA process. Aboriginal people are also recreational fishers outside of these arrangements.

There is little available information on the take of Southern Rock Lobster by the Aboriginal traditional fishing sector; however, the small number of claims with fishery-related interests and negotiations to date has informed the share that has been put aside for this purpose. A nominal share of 1% was made to the Aboriginal traditional sector in the 2014 management plan (PIRSA 2014).

If a traditional fishing related agreement is negotiated within the timeframe of this management plan, at the appropriate review of this management plan, any difference between the nominal share put aside and the actual share agreed through the agreement can be calculated. Any difference would then be re-allocated to or from the recreational sector.

6.1.3. Commercial fishing sector

Licence holders in the Northern Zone Rock Lobster Fishery are permitted to land and sell Giant Crabs and Octopus taken as by-product in Rock Lobster pots. At the time of writing this management plan, they also had one of three levels of access to the South Australian Marine Scalefish Fishery. The list of permitted fish species and fish families for the commercial Marine Scalefish Fishery is provided in Appendix 1, with over 60 species recorded as landed in logbooks annually. Not all eligible marine scalefish species will be allocated within this management plan. Only species for which there is an identified need, have been allocated. The same classifications of species described in the *Management Plan for the South Australian Commercial Marine Scalefish Fishery* (the Marine Scalefish Fishery Management Plan) (primary, secondary, tertiary and other) have been used for determining and managing sector allocations. These classifications separate the species based on:

Importance to the fishery (both commercial and recreational):

- production (total catch)
- commercial value
- level of exploitation
- inter-annual variability in catches and reliability of catch estimates.

King George Whiting, Snapper, Southern Garfish and Southern Calamary are the highest ranked commercial species of the Marine Scalefish Fishery in terms of total production and value. The allocations for these four species are set out in Table 3.

Allocations for secondary species such as Vongole, Snook, Mullet, Mulloway, and Sand Crab, as well as tertiary and other species are provided in the Marine Scalefish Fishery management plan (PIRSA 2013).

Table 3: Allocated shares of the four primary species of the Marine Scalefish Fishery for the commercial, recreational and Aboriginal traditional fishing sectors

Species	Commercial		Recreational		Aboriginal traditional
King George Whiting	Marine Scalefish	49.5%	Recreational	45.5%	1%
	SZ Rock Lobster	0.0%	Charter Boat	3.0%	
	NZ Rock Lobster	1%			
Total	50.5%		48.5%		1%
Snapper	Marine Scalefish	79%	Recreational	8%	1%
	SZ Rock Lobster	1.45%	Charter Boat	10%	
	NZ Rock Lobster	0.55%			
	Lakes and Coorong	0.03%			
Total	81%		18%		1%
Southern Garfish	Marine Scalefish	79.33%	19.5%		1%
	SZ Rock Lobster	0.13%			
	NZ Rock Lobster	0.04%			
Total	79.5%		19.5%		1%
Southern Calamary	Marine Scalefish	56%	37.4%		1%
	NZ Rock Lobster	0.45%			
	Gulf St Vincent Prawn	0.45%			
	Spencer Gulf Prawn	4.6%			
	West Coast Prawn	0.1%			
Total	61.6%		37.4%		1%

6.2 Review of allocations

Allocations between sectors may be reviewed periodically in accordance with the criteria set out in the Allocation Policy. The following scenarios may be considered during a review of allocations:

1. A review of the management plan, which will reassess the appropriateness of shares and may trigger an adjustment.

2. One or more sectors exceed their allocation of Southern Rock Lobster in Table 2 or in accordance with allocation triggers for Marine Scalefish Fishery species described in the Marine Scalefish Fishery management plan (PIRSA 2013).
3. A major change in the management of a species and or a sector that results in a shift of allocations to a sector(s).

The declaration of a marine protected area that would result in reallocation of shares may be given effect through the *Marine Parks Act 2007* and policies applying under that Act. The *Marine Parks Act 2007* requires the Government to pay fair and reasonable compensation to commercial fishers whose statutory rights are affected by marine park zoning.

6.2.1. Review process

An initial assessment of allocations may be conducted by PIRSA Fisheries and Aquaculture in consultation with relevant sectors of the fishery. Once the need for a review has been recognised an assessment committee will be established. The committee may be required to assess the need for a second-stage assessment based on consideration of the following questions:

- Has there been a shift in the access value of the fishery or is new information available that suggests a reallocation of shares would bring additional social and economic benefits to the State?
- If a trigger limit has been breached, can the breach be readily explained and justified?
- Is the potential change in shares significant and considered long term? A minor shift/anomaly may not require a full review.

A written report is to be prepared by the committee, with a recommendation to proceed to a full assessment or not. PIRSA Fisheries and Aquaculture will determine whether to move to a full assessment or may refer a recommendation to the Minister.

6.2.2. Full assessment

As with the initial assessment, a full assessment of allocation will be conducted by PIRSA Fisheries and Aquaculture in consultation with relevant stakeholders. An evaluation panel is to be established including independent experts as required.

The panel needs to evaluate how the value of one or more sectors is changing and the likely trends in the future. In the context of these changes, all options being considered should be evaluated against the option of maintaining the status quo and the potential flow-on effects with regard to:

- contribution to Gross State Product
- contribution to employment
- access for consumers to fresh seafood
- maintenance, growth and wellbeing of regional communities
- health impacts
- sport and recreation opportunities
- consistency with tourism policies
- other criteria relevant to the fishery.

6.2.3. Assessment outcomes

Following the full assessment, the review panel may recommend to the Minister one of two actions, either:

- a) manage each sector within the existing allocated shares
- b) proceed to adjust shares.

6.2.3.1. Managing within existing shares

If shares are to be maintained it may be necessary, depending on the circumstances, to alter the catch of one or more sectors to maintain the existing shares between all sectors. To determine the appropriate mechanism to re-establish initial allocations, the existing co-management arrangements will be used to develop a preferred option. Adjusting commercial shares may be achieved through quota units for Southern Rock Lobster and a variety of controls such as:

- seasonal and area closures
- gear restrictions
- catch limits
- size limits for the Marine Scalefish Fishery.

Recreational adjustments are likely to be made through alterations to:

- existing bag and boat limits
- seasonal closures
- size limits.

6.2.3.2. Adjusting allocations of shares

Any future adjustment of shares will be consistent with the requirements of the *Fisheries Management Act 2007*. Adjustment may be from the commercial sector to the non-commercial sector, a voluntary scheme would seek to be pursued in the first instance. If a voluntary adjustment scheme is not able to be implemented in the fishery, a second voluntary option/step may be considered, including an incentive-based scheme for share adjustment.

The adjustment of shares from the commercial sector to a non-commercial sector can be summarised by the following options:

- purchase commercial access (i.e. quota units) to the resource on the open market
- create incentives for the commercial sector to trade access to the resource
- a process of compulsory acquisition may occur (through regulations) if necessary. Any compulsory acquisition of entitlements would include compensation to the commercial sector in accordance with the provisions of the Allocation Policy. Adjustments are to be finalised within two years.

6.3 Allocation triggers

6.3.1. Rock Lobster

Where commercial sectors are allocated over 95% of the available resource, no triggers limits have been set as any shares greater than this amount are considered to be within normal fluctuation ranges.

6.3.2. Marine scalefish

Currently, catch estimates for marine scalefish are available annually for all commercial fisheries and estimates of recreational catch of the primary and secondary species of the Marine Scalefish Fishery are currently available about every five years. Sector catches may be assessed when data are available. In

order to detect a change in share value, thresholds have been determined for each sector's percentage allocation. Exceeding this allocation may trigger a review of allocations.

Triggers for a review of allocations are currently developed for primary and secondary species. The allocations, how they are calculated and the process for adjusting allocations will be consistent with the Marine Scalefish Fishery Management Plan (PIRSA 2013) or any subsequent review of the Marine Scalefish Fishery or replacement of that plan.

7. Ecosystem impacts

The *Fisheries Management Act 2007* currently specifically requires that the following ecological impacts be identified and assessed as the first step in developing a management plan:

- current known impacts of the fishery on the ecosystem
- potential impacts of the fishery on the ecosystem
- ecological factors that could have an impact on the performance of the fishery.

The ecological impacts associated with the South Australian Southern Rock Lobster Fishery were considered through a review of a previous ecologically sustainable development (ESD) risk assessment conducted in 2013. The review (and initial assessment) was guided by the *National ESD Reporting Framework for Australian Fisheries* of Fletcher et al. (2002). The ecological, economic and social factors that affect the management of the South Australian Southern Rock Lobster Fishery were prioritised by stakeholders using risk ratings from negligible to extreme. A report describing the outcomes of the review of the 2013 ESD risk assessment are available in PIRSA (2020b).

8. Goals and objectives

This management plan provides a set of management goals and objectives for the Northern Zone Rock Lobster Fishery that meet the objects prescribed in Section 7 of the *Fisheries Management Act 2007*. These goals and objectives take into account policy drivers, such as the principles of ecologically sustainable development, the precautionary principle and the guidelines for the ecologically sustainable management of fisheries set out in the *Environment Protection and Biodiversity Conservation Act 1999*. Within the framework provided by ESD, the primary consideration for this plan is Section 7(1)(a) of the *Fisheries Management Act 2007*, relating to the avoidance of over-exploitation. Economic and social objectives will be pursued to the extent possible, where stock sustainability objectives have been demonstrably achieved.

The key goals for the fishery are implemented through operational objectives and management strategies contained in this management plan. These key goals are:

1. Southern Rock Lobster stocks in South Australia are sustainable
2. Northern Zone Rock Lobster Fishery businesses operate viably
3. South Australian Rock Lobster Fishery minimises impacts on the ecosystem
4. economic and social benefits of the South Australian Rock Lobster Fishery are equitably distributed
5. management of the fishery is cost effective and participatory.

Goal 1 – Southern Rock Lobster stocks in South Australia are sustainable

Management Plan Objective	Strategies	PIs	Reference Point	Description	ESD Risk
1a: Stocks of Southern Rock Lobster are sustainable	<p>1a(i) Set the TACC annually, in accordance with the harvest strategy</p> <p>1a(ii) Ensure other input and output controls support sustainable use of the resource</p> <p>1a(iii) Management strategies for all fishing sectors limit the take of Rock Lobster to within sustainable levels and within sector allocations</p> <p>1a(iv) Adopt Precautionary Principle when robust information is lacking to make informed decisions</p>	Commercial Catch Rate (CPUE)	CPUE \geq 0.4kg/potlift	Commercial CPUE in lobster fisheries is accepted as being representative of seasonal lobster abundance and is recognised by industry and managers as a measure of fishery performance that is reliable and well-understood.	Retained Species - Rock Lobster
1b: There is reliable data and information to use the harvest strategy to guide TACC setting and to inform management decisions.	<p>1b(i) Collect fine scale fishery-dependent data through commercial reporting</p> <p>1b(ii) Maintain a voluntary pot sampling program to collect data on the size distribution of the commercial catch</p>	Commercial catch and effort is reported appropriately in logbooks adequately verified using SARDI data quality assurance processes. Voluntary pot sampling/observer program	Eg Minimum of 6000 pot lifts sampled in the voluntary pot sampling program (NZ) Harvest Strategy utilised to guide	Consistent, high quality and measureable data and information is available Where possible data and information is captured using efficient, cost-effective and usable methodologies e.g. electronic logbooks	External factors affecting performance Other

	<p>and number of undersize</p> <p>1b(iii) Assess the status of the stock using the harvest strategy and quantitative stock assessment techniques</p> <p>1b(iv) Review and update the strategic research and monitoring plan regularly</p> <p>1b(v) Monitor the catch and effort of the recreational and traditional fishing sectors across the State</p>	<p>Data is available for fishery model inputs.</p> <p>Harvest Strategy utilised to guide TACC setting</p>	<p>TACC setting each year</p>	<p>Voluntary pot sampling and observer program provides data for fishery model inputs</p>	
--	--	---	-------------------------------	---	--

Goal 2 – Northern Zone Rock Lobster Fishery businesses operate viably

Management Plan Objective	Strategies	PIs	Reference Point	Description	ESD Risk
2a: Northern Zone Rock Lobster Fishery businesses operate profitably	2a Optimise catches within ecologically sustainable limits	Commercial Catch Rate (CPUE)	CPUE \geq 0.4kg/potlift	Stock abundance is considered an important aspect in ensuring efficiency for the NZRLF. CPUE is considered in this objective as an indicator of stock abundance.	External factors affecting performance – other drives – Economic
2b: Management arrangements aim to build rock lobster stocks when fishery performance indicators indicate improving fishery performance	2b Optimise catches within ecologically sustainable limits	%Unfinished Egg Production (%UEP)	Egg production in the Northern Zone Rock Lobster Fishery increases towards a target of 20% unfinished egg production (%UEP) by 2036	The performance indicator relates to maintenance of stock abundance being accepted under fishery conditions/indicators considered to be status quo (at the time of management plan development). At times where fishery conditions/indicators improve it is accepted that stock abundance should be built upon.	Retained Species - Rock Lobster
2c: There is sufficient economic information to make informed management decisions	2c Maintain a flow of economic benefit from the fishery to the broader community	Economic performance reports Price information is available regularly Catch and effort information is available	Economic performance reports for fishery published regularly	Economic indicator reports provide economic and social information related to each zone of the fishery. The current economic indicator reports are published annually and at the time this management plan was developed this timing was considered appropriate.	External factors affecting performance – Other External factors affecting performance – Human Induced

Goal 3 - South Australian Rock Lobster Fishery minimises impacts on the ecosystem

Management Plan Objective	Strategies	PIs	Reference Point	Description	ESD Risk
3: Fishery impacts of by-catch and by-product species are monitored and managed appropriately; interactions with threatened, endangered and protected species (TEPS) are minimised and aquatic habitats, ecosystems and biodiversity are conserved.	3(i) Maintain the current cap on the total number of licences used in the commercial fishery	ESD Risk rating for by product and by-catch species	ESD Risk ratings for by product and by-catch species are medium, low or negligible	In the absence of stock assessments of all by-catch and by-product species and noting that there may be impacts external to the fishery on these species it is considered appropriate that the ESD risk rankings are a suitable as a performance indicator.	External factors affecting performance – other drives – Economic
	3(ii) Maintain escape gaps for pots to minimise by-catch of undersize and non-target species	ESD Risk rating for TEPS	Interactions with TEPS monitored		
	3(iii) Continue periodic fishery-independent surveys to collect information on by-catch	Industry approved Code Of Practices (where available)	Adherence with industry approved codes of practice if developed and required		
	3(iv) Manage take of key by-product species to ensure catches remain at precautionary levels	Interactions with TEPS monitored	ESD Risk rating for TEPS does not increase		
	3(v) Undertake ESD Risk Assessments as required				
	3(vi) Develop management measures to minimise impact of interactions with endangered, threatened and protected species should any new issues arise in the fishery.	ESD risk rating for environmental health	ESD risk ratings for broader environmental health are medium, low or negligible		

Goal 4 – Economic and social benefits of the South Australian Rock Lobster Fishery are equitably distributed

Management Plan Objective	Strategies	PIs	Reference Point	Description	ESD Risk
4a: Economic and social benefits from the fishery flow to the broader community and are maintained	<p>4a(i) Develop and implement management arrangements that allow commercial operators to maximise operational flexibility, economic efficiency, value and returns</p> <p>4a(ii) Communicate the sustainability and economic outcomes of the fishery to the wider community.</p> <p>4a(iii) Where there is demonstrable, and measureable disruption to fishing operations that are not related to stock abundance, and fish stocks are classified as 'sustainable' that emergency arrangements for management of the fishery may be considered</p>	Economic Rent	Economic rent is > zero in 90% of years covered in this management plan	Economic rent represents a return to the value of the licences.	Community – Fishing Industry and Dependent communities
4b: Access and fishing opportunities for non-commercial users of the fishery resources is maintained	<p>4b(i) Allocate access to Rock Lobster resource to commercial, recreational and Aboriginal traditional fishing sectors, in accordance with the Fisheries Management Act 2007</p> <p>4b(ii) Develop mechanisms for adjusting shares in the future that utilise market tools, in accordance with the Fisheries Management Act 2007</p>	Recreational catch and effort Aboriginal Traditional fishing access	<p>Recreational fishing surveys conducted approximately every five years using most efficient methodology available.</p> <p>Recreational catch and effort monitored against other sectors when available Recreational</p>	Allocation policy guides monitoring of, review and adjustments to allocation shares if required.	External factors affecting performance – Human Induced – Other Fisheries (recreational)

4b(iii) Integrate traditional access prescribed in Aboriginal traditional fishing management plans with the management of other fishing sectors

fishers have access to the fishery
Aboriginal Traditional fishing access maintained

Goal 5 - Management of the fishery is cost effective and participatory

Management Plan Objective	Strategies	PIs	Reference Point	Description	ESD Risk
5a: Promote cost-effective and efficient management of the fishery, in line with government's cost-recovery policy	<p>5a(i) Develop and implement management arrangements that are effective at achieving management objectives whilst minimising costs.</p> <p>5a(ii) Determine and discuss the real costs of management, compliance and research for the fishery on an annual basis</p> <p>5a(iii) Recover licence fees from commercial licence holders, sufficient to cover the attributed management costs of management of the fishery in accordance with the Government's cost-recovery policy</p> <p>5a(iv) Explore methods for all stakeholders to share management costs</p>	Licence fee% of Gross Value of Product (GVP)	Commercial licence fees less than 10% of GVP in at least 3 years of the past five.	Economic rent represents a return to the value of the licences.	Community – Fishing Industry
5b: Management arrangements implemented in the fishery are best practice	5b(1) Influence other management processes that impact on access security	<p>Number of RLFMAC meetings</p> <p>Other consultative processes</p> <p>RLFMAC strategic plan</p>	<p>RLFMAC meet twice a year</p> <p>The RLFMAC maintains membership including Industry, Government, scientific, conservation</p>	Allocation policy guides monitoring of, review and adjustments to allocation shares if required.	External factors effecting performance of the fishery - Social Licence – Attitudes of Recreational Fishers, Relationship with local communities, NGOs

<p>5c: Co-management of the fishery promotes stewardship.</p> <p>5d Management arrangements are voluntarily complied with.</p>		<p>actively promotes best practice</p> <p>Co-management arrangements are in place and are effective</p> <p>Number of prosecutions in the fishery are monitored</p>	<p>and recreational fishing interests.</p> <p>Co-management arrangements are in place Industry participate in consultative processes such as RLFMAC and SANZRLFA meetings</p> <p>Number of prosecutions in the fishery are monitored</p>	<p>Performance indicator aim to demonstrate that co-management activities resulting in increased stewardship by industry members</p>	<p>Community – Dependent Communities</p> <p>Governance – PIRSA</p>
--	--	--	--	--	--

9. Harvest strategy

9.1 Background

This harvest strategy provides a structured framework for decision making in terms of setting Total Allowable Commercial Catch (TACC) levels that aims to meet the ecologically sustainable development object of the *Fisheries Management Act 2007*. The Minister or his/her delegate has responsibility for determining the value of a quota unit on an annual basis under the *Fisheries Management (Rock Lobster Fisheries) Regulations 2017* by dividing the TACC for the fishery by the total number of rock lobster quota units in the fishery.

At the time of developing this harvest strategy, the RLFMAC was the recognised advisory committee to PIRSA. Reference to an “established consultative group” in this harvest strategy refers to the RLFMAC unless that group is no longer fulfilling the role as the advisory committee to PIRSA.

This harvest strategy was developed following a review of a harvest strategy included in the 2013 management plan and amended in 2015. This harvest strategy was developed in 2019–20 by the RLFMAC with advice from a Harvest Strategy Review Working Group (HSRWG) and industry feedback.

This harvest strategy aims to achieve the following three broad objectives as follows:

1. optimum utilisation within ecologically sustainable limits
2. improve stock towards levels giving long-term optimum utilisation
3. avoid stock over-exploitation.

The operational objectives of this harvest strategy are:

1. increase egg production in the Inner Region of the Northern Zone Rock Lobster Fishery towards a stock improvement target of 20% unfished egg production (%UEP) by 2036; and
2. maintain zonal commercial catch rate (CPUE, November – April) at or above the long term average (2003-2018) of 0.87 kg/potlift
3. maintain Outer Region commercial catch rate (CPUE, November – May) at or above the Trigger Reference point of 0.60 kg/potlift.

9.2 Performance indicators

9.2.1. Primary indicator

Commercial CPUE in lobster fisheries is accepted as being representative of seasonal lobster abundance.

The indicator used is the nominal CPUE = legal sized lobster (kilograms) per pot lift:

- rounded to two decimal places
- calculated for each region of the Northern Zone fishery separately
- inner Region CPUE is Inclusive of all records from 1 November to 30 April
- outer Region CPUE is Inclusive of all records from 1 November to 31 May.

Catch and effort records are recorded and submitted through reporting to SARDI and PIRSA.

The reference points related to both the Inner and Outer Region CPUE are:

- Trigger Reference Point (TrRP) for CPUE = 0.60 kg/potlift

- Limit Reference Point for CPUE (LRP) = 0.40 kg/potlift.

It should be noted that standardised catch rate outputs for the Northern Zone Rock Lobster Fishery were presented in Linnane et al. (2018). These outputs were reviewed by the HSRWG, which noted the close agreement between nominal and standardised time-series. The HSRWG recommended that periodic catch rate standardisation should be continued, but that in the context of this harvest strategy, nominal catch rate would remain as the primary indicator of lobster abundance unless the results of future standardisation trigger review and amendment of the harvest strategy (see section 0).

The TrRP of 0.60 kg/potlift is the level below which exploitation rate is reduced linearly until the fishery is closed at a catch rate of 0.40 kg/potlift (the LRP).

9.2.2. Secondary indicator

Pre-recruit index (PRI) is a key performance indicator for monitoring recruitment predicted to enter the fishery in the following year/s. Decision rules related to PRI are aimed at ensuring that TACC increases in the Inner Region will only occur when recruitment levels are sufficient to support and sustain the increase.

PRI = number of undersized lobster per pot lift recorded in catch and effort records

- rounded to two decimal places
- inclusive of records from 1 November to 31 March from the current quota period
- inclusive of records from the Inner Region of the fishery only.

TrRP PRI = 0.16 undersize/potlift

The TrRP for PRI is the average PRI recorded between 2003 and 2017

9.2.3 Industry input

Performance indicators occasionally require interpretation as a measure of fishery performance due to the influences of various external factors that may not necessarily be related to stock abundance. Industry will be given an opportunity to provide factual and credible evidence to support the impacts of these external factors on performance indicators each year in the decision making process.

Annual estimates of high grading will be monitored to assess potential impact of this operating practice on commercial catch rate. The RLFMAC will consider annual estimates of high grading each year in recommending a TACC.

9.3. Harvest Strategy decision rules

9.3.1. Inner Region

TACCs are recommended for ranges of CPUE as described in Table 4.

Table 4: Decision rules for TACC for the Inner Region

Inner region CPUE (kg/potlift)	TACC (t)
<0.40	0

0.4-0.44	17
0.45-0.49	52
0.5-0.54	90
0.55-0.59	129
0.6-0.64	150
0.65-0.69	170
0.7-0.75	215
0.76-0.79	235
0.8-1.19	250
1.2-1.99	275
≥2.0	300

Meta Rules

1. PRI rule – A TACC increase will be considered when a CPUE trigger reference point has been reached and PRI is at or above the trigger reference point.
2. One-step rule – TACC can increase by only one TACC level in any year regardless of the absolute CPUE estimate.
3. Consecutive year rule – A TACC increase under meta rule 1 will only be considered if there was no TACC increase in the previous season.
4. TACC in the Inner region will be no higher than 250 tonnes until CPUE exceeds 1.2 kg/potlift and the PRI rule is satisfied for three consecutive seasons. This meta rule would only be applied once in the life of the harvest strategy and only to the CPUE band of 0.8 – 1.19 kg/potlift.

9.3.2. Outer Region

TACCs are recommended for ranges of CPUE as described in Table 5.

Table 5: Decision rule table for TACC for the Outer Region

Outer region CPUE (kg/potlift)	TACC (t)
<0.40	0
0.4-0.44	3
0.45-0.49	10
0.5-0.54	19
0.55-0.59	29

0.6-0.69	38
0.7-0.79	44
≥0.8	46

Meta Rules

1. One-step rule – TACC can increase by only one level in any year regardless of the absolute CPUE estimate.
2. Consecutive year rule – A TACC increase will only be considered if there was no TACC increase in the previous season.

9.4. TACC decision making process

The decision making process for setting TACC will be undertaken each year prior to the start of the fishing season including consultation through a recognised consultative process:

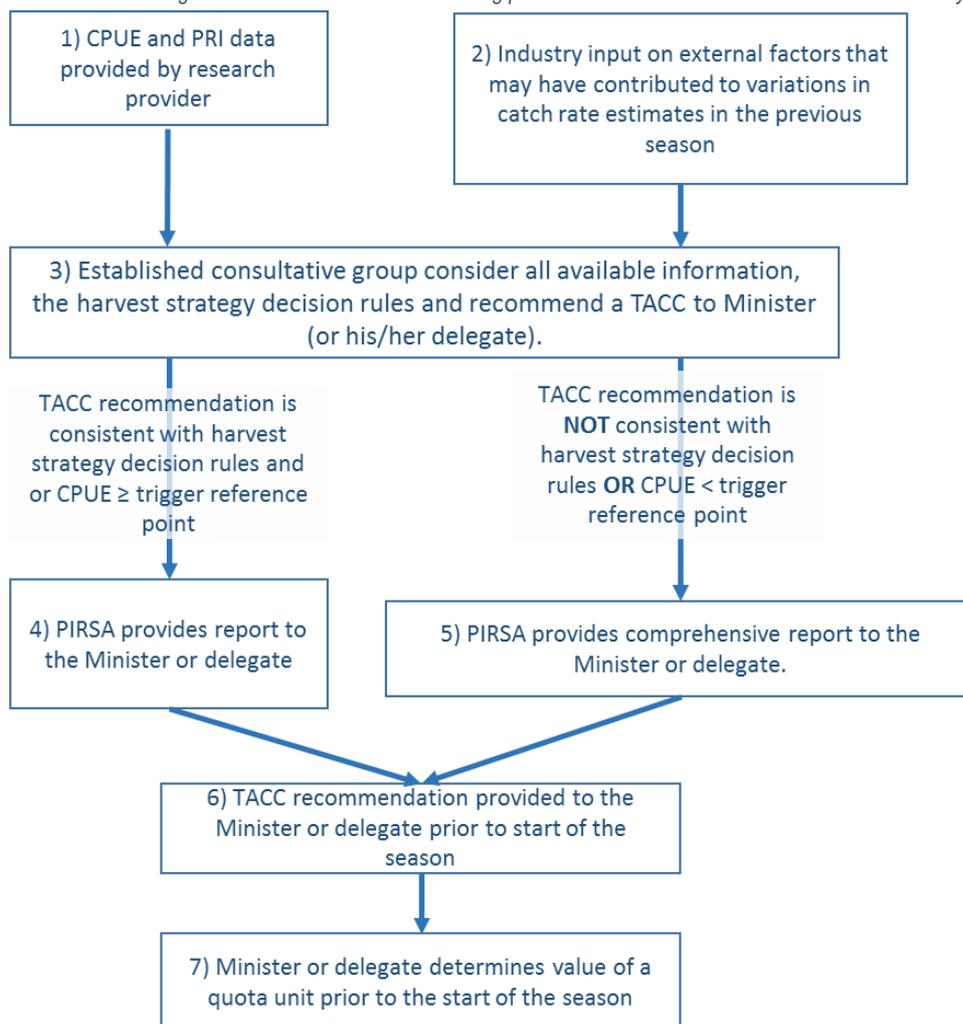
1. Performance indicators for the fishery for the current fishing season will be presented by SARDI and provided to members of the established consultative group prior to a formal meeting of that group.
2. The representative industry association will be invited to provide direct input on external factors that may have contributed to variations in catch rate estimates in the current fishing season. This information will be provided to the established consultative group responsible for providing advice to PIRSA on management of the Northern Zone Rock Lobster Fishery.
3. The established consultative group will hold a formal meeting before 31 July in each year and recommend a TACC to PIRSA for the Northern Zone Rock Lobster Fishery guided by the harvest strategy decision rules following consideration of the following information:
 - a) The most up-to-date status for fishery and/or provisional CPUE and PRI
 - b) Industry input on external factors affecting the indicators.

If the TACC recommended through the established consultative processes is not consistent with the decision rules in this harvest strategy, the recommending consultative body will provide a comprehensive report describing the information that has driven the recommendation.

4. PIRSA will consider the recommended TACC. If the TACC recommendation is consistent with the decision rules in this harvest strategy and CPUE is at or above the trigger reference point, a report will be provided to the Minister (or his/her delegate) recommending the TACC.
5. If the TACC recommendation is inconsistent with the decision rules in this harvest strategy, or CPUE is below the trigger reference point, a detailed review of performance indicators and a comprehensive report justifying the recommendations will be provided by the RLFMAC for consideration by PIRSA. PIRSA will provide a comprehensive report to the Minister or his/her delegate describing the information that has driven the recommendation.
6. A TACC recommendation will be provided to the Minister (or his/her delegate) prior to the commencement of the upcoming fishing season.
7. The Minister (or his/her delegate) will consider the TACC recommendation and make a decision on the TACC by way of setting a quota unit value as soon as practicable prior to the commencement of the new season.

All endeavours to provide a TACC decision as early as possible before the commencement of the fishing season will be undertaken, pending timely delivery of the requirements set out in this process (Figure 2).

Figure 2: Decision making framework for annual TACC setting process for the Northern Zone Rock Lobster Fishery.



9.5. Additional indicators

Other data and performance measures will be used to assess the fishery but do not trigger explicit TACC adjustments. These include:

- % Unfished Egg Production (%UEP)
- Puerulus Settlement Index (PSI)
- exploitable biomass
- levels of exploitation
- model estimated recruitment index
- length-frequency data collated from voluntary pot sampling and observer program.

Percentage of unfished egg production

%UEP = current egg production as a percentage of unfished egg production.

- Estimated using the qR model (McGarvey and Matthews 2001).

9.6. Monitoring

Monitoring of performance of the harvest strategy will be assessed against the objectives of the harvest strategy, including %UEP in the Inner Region. Reference levels for annual lowest satisfactory rebuilding trajectory are based on fishery and recruitment information available at the time this harvest strategy was developed are described in section 9.9 for guiding this monitoring. Monitoring the performance of the harvest strategy may trigger a review of the harvest strategy as described in section 0 of this harvest strategy.

The lowest satisfactory rebuilding trajectory is the estimated %UEP in each year at 20% below a trajectory line between %UEP estimated in 2018 and 22% UEP in 2036.

Table 6: Annual lowest satisfactory rebuilding trajectory

Season	Lowest satisfactory rebuilding trajectory
2021–22	8.9%
2022–23	9.5%
2023–24	10.1%
2024–25	10.7%
2025–26	11.2%
2026–27	11.8%
2027–28	12.4%
2028–29	13%
2029–30	13.5%
2030–31	14.1%
2031–32	14.7%
2032–33	15.3%
2033–2034	15.9%
2034–35	16.4%
2035–36	17%
2036–37	17.6%

9.7. Stock status classification

The primary performance indicator used in the harvest strategy, nominal zonal CPUE, will also be utilised for determining the stock status as described in Table 7. For determining stock status across the extent of the Northern Zone, zonal CPUE will be calculated from 1 November to 30 April.

Table 7: Stock status classification	
Zonal Commercial Catch Rate	Status
≥ 0.6 kg/potlift	Sustainable
< 0.6 kg/potlift	Depleting or Recovering
≤ 0.4 kg/potlift	Depleted

9.8. Monitoring during closure and reopening

If the fishery is closed the following set of rules will apply for monitoring the fishery during the closure, and for reopening the fishery.

- Monitoring will be conducted in collaboration with the SANZRLFA, SARDI and PIRSA Fisheries and Aquaculture.
- Monitoring will be by way of three commercial fishing vessels conducting structured fishing for a total of 120 days across the high catch MFAs of 28, 39 and 48 with 10 days surveyed in each MFA during November, December January and February. Any vessels conducting the surveys may use a maximum of 75 pots at any time.
- If catch rates from these surveys are >0.6 kg/potlift for 7 out of the 10 survey days averaged across the surveyed MFA's, the RLFMAC may consider recommending to reopen fishery with a TACC level corresponding to one CPUE range lower than the survey level would allow for in the adopted harvest strategy.

The costs of surveys undertaken in the event that the fishery would be closed would be cost-recovered from the industry.

9.9. Review of the harvest strategy

A review of this harvest strategy will consider the performance of the harvest strategy in regard to meeting the operational objectives of this harvest strategy and meeting lowest acceptable rebuilding trajectory as described in Table 6. The management plan including this harvest strategy may be reviewed at any time to incorporate such measures into the management framework of the fishery if appropriate.

A review of the harvest strategy will be considered if %UEP is below the lowest satisfactory rebuilding trajectory (described in Table 6) for two consecutive years.

During the life of this harvest strategy annual estimates of CPUE may be standardised to account for changes in fishing behaviour that significantly influence the annual catch rates estimates. If this standardisation is completed, PIRSA with advice of the established consultative group, may recommend amendments to the Harvest Strategy under section 46 of the *Fisheries Management Act 2007* with updated reference levels and CPUE ranges consistent with the standardisation.

Section 12 of this management plan outlines the process for reviewing a management plan, including the harvest strategy.

10. Compliance and monitoring

PIRSA Fisheries and Aquaculture runs a compliance program that has dual objectives:

- to maximise voluntary compliance with fisheries rules⁶
- to create effective deterrence to breaching fisheries rules.

These objectives are consistent with the 'National Fisheries Compliance Policy'.

Voluntary compliance is maximised through ensuring that fishers are aware of the rules that apply to their fishing activities, understand the rules and the purpose of those rules and operate in a culture of compliance.

Effective deterrence is created through the presence of Fisheries Officers and awareness of compliance operations, as well as through detection and prosecution of illegal activity⁷.

11. Resources required to implement the plan

South Australia's fisheries resources are managed in accordance with the *Fisheries Management Act 2007* established to protect, manage and develop the aquatic resources of the State in a manner that is consistent with ecologically sustainable development to the benefit of the community, and management should occur in an efficient and cost effective manner with targets set for the recovery of management costs.

The recovery of costs associated with the management of the commercial fisheries as required by the *Fisheries Management Act 2007* has been intended to ensure specific industry sectors fund the government products and services required as a direct result of their commercial activities derived from access to the State's community-owned aquatic resources. The cost for the provision of these services is recovered by PIRSA Fisheries and Aquaculture through the administration of annual fees applied to regulated licences, or fee for service work applied on a per-transaction basis if required.

The fundamental principle applied to cost recovery of management costs is that the main beneficiaries of the services (commercial licence holders) are required to bear the cost of delivering the services required to manage their activities.

In determining the level of cost recovered from industry, PIRSA is guided by relevant cost recovery policies and reviews.

12. Review of plan

A review of this management plan may be conducted at any time and a full review of this management plan will be conducted prior to the expiry of this plan or following the fifth anniversary of its implementation, whichever is sooner.

Section 49 of the *Fisheries Management Act 2007* outlines the process of reviewing a management plan. Amendments to this management plan may also be considered under section 46 of the Act.

⁶ Rules include regulations, licence conditions, closure notices or any other enforceable instrument under the *Fisheries Management Act 2007*.

⁷ Prosecution may include the issuing of a formal caution or an expiation notice, in addition to prosecution through the courts.

13. References

- Booth, J.D. and Stewart, R.A. (1992) Distribution of phyllosoma larvae of the red rock lobster *Jasus edwardsii* off the east coast of New Zealand in relation to the oceanography. Australian Society for Fish Biology workshop on larval biology. Australian Government Publishing Service.
- Booth, J.D., Street, R.J. & Smith, P.J. (1990) Systematic status of the rock lobsters *Jasus edwardsii* from New Zealand and *J. novaeollandae* from Australia. *New Zealand Journal of Marine and Freshwater Research* 24: 239-249.
- Booth, J.D., Carruthers, A.D., Bolt, C.D. & Stewart, R.A (1991) Measuring the depth of settlement in the red rock lobster, *Jasus edwardsii*. *New Zealand Journal of Marine and Freshwater Research* 25: 123-132.
- Brown, R. S. & Phillips, B. F. (1994) The current status of Australia's Rock Lobster Fisheries. Spiny Lobster Management. B. F. Phillips, J. S. Cobb and J. Kittaka. Melbourne, Blackwell Scientific Publications Ltd. p33-63.
- Cann, J. H., De Deckker, P. & Murray-Wallace, C. V. (1991). Coastal aboriginal middens and their palaeo environmental significance, Robe Range, South Australia. *Transactions of the Royal Society of South Australia* 105, 161-176.
- Currie, D.R., Sorokin S.J. & 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. RD04/0228-2.
- Econsearch (2020). Economic Indicators for the SA Southern Zone Rock Lobster Fishery 2018/19. Report prepared for Primary Industries and Resources South Australia.
- Fletcher, W.J., Chesson, J., Fisher, M., Sainsbury, K.J., Hundloe, T., Smith, A.D.M. and Whitworth, B. (2002) National ESD reporting framework for Australian fisheries: the 'how to' guide for wild capture fisheries, FRDC Project 2000/145, Fisheries Research and Development Corporation, Canberra.
- Giri K and Hall K (2015) South Australian Recreational Fishing Survey. Fisheries Victoria Internal Report Series No. 62.
- Jones, K. (2009) 2007/08 South Australian Recreational Fishing Survey. South Australian Fisheries Management Series No. 55, PIRSA Fisheries, Adelaide. 84pp.
- Lewis, R.K. (1981) Southern Rock Lobster *Jasus novaehollandae*: Zone N Review South Australian Department of Fisheries.
- Linnane, A., Dimmlich, W.F. & Ward, T.M. (2005) Movement patterns of the southern rock lobster, *Jasus edwardsii*, off South Australia. *New Zealand Journal of Marine and Freshwater Research*, 39: 335-346.
- Linnane, A., Penny, S., & Ward, T.M. (2008). Contrasting fecundity, size at maturity and reproductive potential of southern rock lobster *Jasus edwardsii* in two South Australian fishing regions. *Journal of the Marine Biological Association of the United Kingdom*, 88:583-589.
- Linnane, A, McGarvey, R & Feenstra, J (2009). Northern Zone Rock Lobster (*Jasus edwardsii*) Fishery 2007/08. Fishery Assessment Report to PIRSA Fisheries. (PDF 1.8 MB). SARDI Aquatic Sciences Publication No.F2007/000320-3. SARDI Research Report Series No. 379. July 2009.
- Linnane, A., Penny, S., Hoare, M. and Hawthorne, P. (2011). Assessing the effectiveness of size limits and escape gaps as management tools in a commercial rock lobster (*Jasus edwardsii*) fishery. *Fisheries Research* 111: 1–7.
- Linnane, A., McGarvey, R., Matthews, J., Feenstra, J., Jones, A. and Toumazos, K. (2016). Informing spatial and temporal management of the South Australian Northern Zone Southern Rock Lobster (*Jasus edwardsii*) fishery. Final Report to the Fisheries Research and Development Corporation. Adelaide, March.
- Linnane, A., McGarvey, R., Feenstra, J. and Graske, D. (2018). Northern Zone Rock Lobster (*Jasus edwardsii*) Fishery 2016/17. Fishery Assessment Report to PIRSA Fisheries and Aquaculture.

- South Australian Research and Development Institute (Aquatic Sciences), Adelaide. SARDI Publication No. F2007/000320-12. SARDI Research Report Series No. 989. 82pp.
- Linnane, A., McGarvey, R., Feenstra, J. and Graske, D. (2020). Northern Zone Rock Lobster (*Jasus edwardsii*) Fishery 2018/19. Fishery Assessment Report to PIRSA Fisheries and Aquaculture. South Australian Research and Development Institute (Aquatic Sciences), Adelaide. SARDI Publication No. F2007/000320-14. SARDI Research Report Series No. 1064. 64pp.
- McGarvey, R. & Matthews, J.M. (2001) Incorporating numbers harvested in dynamic estimation of yearly recruitment: onshore wind in interannual variation of South Australian rock lobster (*Jasus edwardsii*). *Journal of the International Council for the Exploration of the Sea* 58: 1092-1099.
- McGarvey, R., Ferguson, G.J. & Prescott, J.H. (1999) Spatial variation in mean growth rates of rock lobster, *Jasus edwardsii*, in South Australian waters. *Marine and Freshwater Research* 50: 333-342.
- MacDiarmid, A.B. (1989) Moulting and reproduction in the spiny lobster *Jasus edwardsii* (Decapoda:Plinuridae) in northern New Zealand. *Marine Biology* 103:303-10
- McGlennon, D. (1999) Rock Lobster: Survey of the licensed recreational rock lobster fishery in South Australia. 1998/99. Final Report. SARDI Int. Rept. No. 113, 13pp.
- Middleton, J.F., & Platov, G. (2003) The mean summertime circulation along Australia's southern shelves: A numerical study. *Journal of Physical Oceanography* 33, 2270-87.
- Musgrove, R.J.B. (2000) Molt staging in the southern rock lobster *Jasus edwardsii*. *Journal of Crustacean Biology* 20: 44-53.
- Neville, P. (2008) Co-management: Managing Australia's fisheries through partnership and delegation. Report of the Fisheries Research and Development Corporation's national working group on the fisheries co-management initiative — project no. 2006/068.
- Ovenden, J.R., Brasher, D.J. & White, R.W.G. (1992) Mitochondrial DNA analyses of red rock lobster, *Jasus edwardsii*, supports an apparent absence of population subdivision throughout Australasia. *Marine Biology*. 112: 319-326.
- PIRSA (2013) Management Plan for the South Australian Commercial Marine Scalefish Fishery. The South Australian Fisheries Management Series. Paper number 59
- PIRSA (2014) Management Plan for the South Australian Commercial Northern Zone Rock Lobster Fishery. The South Australian Fisheries Management Series. Paper number 71
- PIRSA (2016) Review of size, bag and boat limits in South Australia's recreational fishing sector, marine and freshwater.
http://www.pir.sa.gov.au/data/assets/pdf_file/0005/269411/Review_of_Recreational_Size_Boat_and_Bag_Limits.pdf
- PIRSA (2020a) Management Plan for Recreational Fishing in South Australia.
- PIRSA (2020b) Revised Ecologically Sustainable Development (ESD) risk assessment of the South Australian Commercial Rock Lobster Fishery. PIRSA Fisheries and Aquaculture, Adelaide SA.
- Rochford, D.J. (1977) A review of a possible upwelling situation off Port MacDonnell S.A. 81 CSIRO Australian. Division of Fisheries Oceanography.
- Sloan, S. and Crosthwaite, K. (2007) Management Plan for the South Australian Rock Northern Zone Rock Lobster Fishery. The South Australian Fishery Management Series. PIRSA Fisheries publication Adelaide South Australia.
- Stewardson, C., Andrews, J., Ashby, C., Haddon, M., Hartmann, K., Hone, P., Horvat, P., Klemke, J. Mayfield, S., Roelofs, A., Sainsbury, K., Saunders, T., Stewart, J., Nicol, S. and Wise, B. (eds) (2018), Status of Australian fish stocks reports 2018, Fisheries Research and Development Corporation, Canberra.
- Venema, S., Boxall, V. & Ward, T.M. (2003) Survey of Recreational Rock Lobster Fishing in South Australia during 2001/02 South Australian Research and Development Institute, Adelaide, 1-42
- Zacharin, W. (1997) Management Plan for the South Australian Northern Zone Rock Lobster Fishery. Primary Industries and Resources South Australia. Adelaide pp. 24



**Government
of South Australia**

Department of Primary
Industries and Regions