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SOUTH AUSTRALIAN FISHERIES MANAGEMENT SERIES

Ecological Assessment of the South Australian Scallop and Turbo Fisheries

Assessment Report Prepared for the Australian Government Department of Environment and
Heritage, against the *Guidelines for the Ecologically Sustainable Management of Fisheries*

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

May 2006

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

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FOREWORD

The marine, estuarine and freshwater fisheries resources of South Australia are community owned resources. The role of the Government, as custodian of these resources on behalf of the broader community and future generations, is to ensure that they are used in an ecologically sustainable and economically efficient manner, while at the same time promoting optimum utilisation and maximising returns to regional and wider South Australian communities.

Experience worldwide has demonstrated that where unrestricted access to fisheries resources is allowed, the incentive for individuals to conserve fish stocks is diminished. The resulting competition among and between user groups often leads to increased fishing effort and excess fleet capacity, which in turn reduces biological, ecological and economic productivity.

In managing fisheries resources, the South Australian Government has the primary responsibility of balancing optimum utilisation with the need to ensure long term resource sustainability. The Government must also ensure that the basis for sharing fisheries resources among all user groups 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 facilitate better decision-making in South Australia's fisheries, a number of fishery-specific stakeholder-based fishery management committees have been established to provide expertise-based advice to the Government. These committees may be comprised of Government managers, research scientists, commercial and recreational fishers, fish processors and members of the general community. An independent chairperson convenes each of these committees.

Where there are considered to be threats of serious or irreversible damage to fisheries resources, or the environment upon which they depend, a lack of full scientific certainty or insufficient information will not prevent the Government from making decisions. Where resource management decisions must be made in an environment of uncertainty, the Government, in partnership with the fisheries management committees, will take a precautionary approach to the management of South Australia's fisheries resources.

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1. PURPOSE OF THE ECOLOGICAL ASSESSMENT

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

The purpose of this report is to provide the Australian Government Department of Environment and Heritage with a detailed assessment of the management arrangements in place for the South Australian Scallop and Turbo Fisheries in accordance with the *Guidelines for the Ecologically Sustainable Management of Fisheries*, which are administrative guidelines under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

It is intended that this report serve as the first step in the process to have scallops and turbo taken from South Australian waters placed on the list of exempt native species for export, under Part 13(A) of the EPBC Act.

2. MANAGEMENT OF THE SCALLOP AND TURBO FISHERIES

2.1 Current management regime

The *Fisheries Act 1982* (the Fisheries Act) provides the broad statutory framework to ensure the ecologically sustainable management and development of South Australia's marine, estuarine and freshwater fisheries resources. In the administration of the Fisheries Act, the Minister for Agriculture, Food and Fisheries, the Director of Fisheries and all Fisheries Management Committees established under the Act, must operate in accordance with the following objectives, outlined in Section 20 of the Act:

- (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; and
- (c) insofar as this Act applies to the River Murray, seeking to further the objects of the River Murray Act 2003 and the Objectives for a Healthy River Murray under that Act; and
- (d) insofar as this Act applies to the Adelaide Dolphin Sanctuary, seeking to further the objects and objectives of the Adelaide Dolphin Sanctuary Act 2005.

It is important to note that PIRSA Fisheries is currently implementing a revised Fisheries Act, in consultation with key stakeholder groups and the broader community. This review will result in significant changes to the broad sustainability framework established for administering and managing South Australia's fisheries resources.

The regulations that govern the management of the Scallop Fishery are the *Fisheries (Scheme of Management - Miscellaneous) Regulations 2000* and the *Fisheries (General) Regulations 2000*. A set of licence conditions is listed on each Miscellaneous Fishery licence.

The regulations that govern the management of the Turbo Fishery are the *Fisheries (General) Regulations 2000*. Commercial harvesting of turbo occurs through ministerial exemptions granted under section 59 of the Fisheries Act as the fishery for this species is regarded as

‘experimental’. Exemptions are reviewed and issued on an annual basis. Commercial harvesting is conducted under strict conditions detailed in these exemptions.

The primary forum for the co-management of both the scallop and turbo fisheries is the Marine Scalefish Fisheries Management Committee (MSFMC). A Miscellaneous licence holder sits on the MSFMC as an observer, but does not hold voting rights. In 2005, a Miscellaneous Fishery Working Group (MFWG) was formed to progress the issues raised at the MSFMC and to provide a forum at which issues relating to the Miscellaneous Fishery could be dealt with more efficiently.

2.2 Review of the management regime

A detailed draft management plan is currently being prepared for the Miscellaneous Dive Fishery. The Miscellaneous Dive Fishery is a collection of fisheries that are encompassed under the *Fisheries (Scheme of Management – Miscellaneous) Regulations 2000*. The *Fisheries (Scheme of Management – Miscellaneous) Regulations 2000* relate to:

All fish other than-

- Abalone of all species (*Haliotis* spp.)
- Southern rock lobster (*Jasus edwardsii*)
- Western king prawn (*Penaeus latisulcatus*)

For the purposes of the Management Plan for the Miscellaneous Dive Fishery, only the purple sea urchin (*Haliocidaris erythrogramma*), scallops (*Pecten fumatus* and *Chlamys bifrons*), specimen shells and turbo (*Turbo undulatus*) will be included given their common method of harvest. The Management Plan will be a strategic document, containing objectives and performance criteria by which to assess the effectiveness of the management arrangements.

As a matter of policy, PIRSA Fisheries endeavours to consult with affected stakeholders and/or the broader community when significant management changes or developments are being considered. As such stakeholder consultation and input will be sought when developing the Management Plan. Furthermore, as with the production of all management plans the Management Plan will be released for public comment later in 2006. Following completion, the document will be publicly available on the PIRSA website www.pir.sa.gov.au.

PIRSA Fisheries is currently implementing a revised Fisheries Act, in consultation with key stakeholder groups and the broader community. The draft Fisheries Management Bill, which has been released by the South Australian Government, contains many of the same fundamental fisheries management tools that are contained in the Act. However it is proposed that new legislation be updated to include new offences, heavier penalties and the establishment of a new Fisheries Council to advise the Minister on fisheries issues.

The draft Fisheries Management Bill also contains provisions that allow a more ecosystem-based approach to managing fisheries. Management plans will include a risk-based assessment of ecosystem impacts and there are new legislative tools to protect fish habitat.

If necessary, the management plan will be updated to make it consistent with the requirements of the new legislation. The management plan will be reviewed periodically and updated over time, in association with key stakeholders, as advances in knowledge are made.

3. DESCRIPTION OF THE FISHERY

3.1 Introduction

The South Australian scallop and turbo fisheries are small scale and low volume fisheries. The scallop fishery is based on two species, the king scallop (*Pecten fumatus*) (also known as the commercial or southern scallop) and the queen scallop (*Chlamys bifrons*). The fishery has been in operation since the 1970's with varying catch levels during its development. In comparison, the turbo fishery (*Turbo undulatus*) is a much younger fishery with ministerial exemptions being granted for its exploitation since 1998. Initial trials were conducted in the late 1980's under ministerial exemptions, however no commercial opportunity was identified at this time and the exemptions were discontinued. Both fisheries are dive-only fisheries, however two (2) operators were dredging in the early years of the scallop fishery.

The scallop fishery has been operating as a limited entry fishery since 1984. Turbo's are currently managed under ministerial exemptions to the Fisheries Act, however PIRSA is currently developing a Management Plan for the Miscellaneous Dive Fishery of which turbo will be a target species.

The scallop and turbo fisheries are licensed to operate in all coastal waters of South Australia including gulfs, bays and estuaries (excluding the Coorong estuary and Coffin Bay (for scallops only)), from the Western Australian border (129°E longitude) to the Victorian border (141°E longitude).

3.2 Historical Context

Scallops

King scallops are distributed throughout southern Australia from Tuncurry on the New South Wales coast, south through the Bass Strait along the southern, eastern and northern coasts of Tasmania to South Australia, across the south coast and along the west coast of Western Australia to Shark Bay. Like other scallop species king scallops are found in discrete beds to depths of at least 120 metres, over bare, soft sand or mud (Kailola *et. Al.*, 1993). The major fishery for this species in Australian waters is a dredge fishery, which operates in Bass Strait and coastal waters of Victoria and northern Tasmania. This fishery is jointly managed by the Commonwealth and State bodies under an Offshore Constitutional Settlement (OCS) and has undergone huge fluctuations in annual landings and periods of total closures due to overfishing and poor recruitment. In comparison the South Australian scallop fishery is significantly smaller and annual landings in South Australia have remained relatively low since its establishment.

The scallop fishery has developed slowly since the 1970's when a very small commercial dredge fishery involving two boats persisted for several years in Boston Bay and Coffin Bay, in addition to scallop diving by the recreational sector.

A formal fishery wasn't operational until 1985 when six (6) experimental licences were issued following a tender process outlined in the *Miscellaneous Fishery Regulations (1984)*. Fishers were allowed to take scallops, turbo and sea urchins, by diving, in three zones. Within three years, three of these fishers voluntarily left the fishery. The first fishery review was conducted in June 1989. The review committee recommended that, another three (3) licences be issued. In addition to this recommendation, six hydrographic zones were introduced simultaneously.

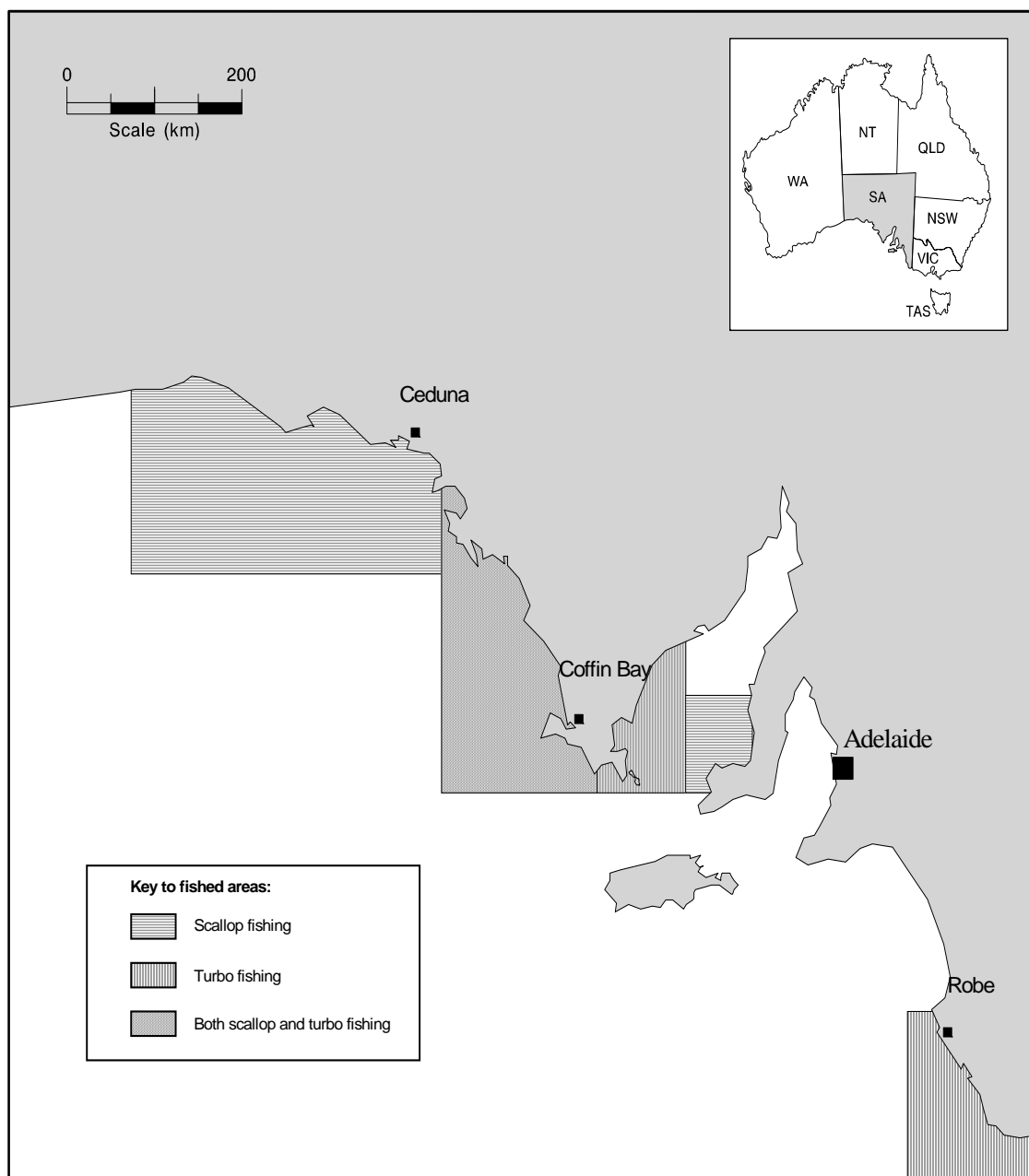


Figure 1. Current fished areas for scallop and turbo

In 1991, a minimum legal size of 65 mm was introduced for both commercial and recreational fishers as a precautionary measure. A recreational bag limit of 200 scallops per person per day was recommended and was brought into legislation in 1994.

In 1997, a review of the scallop fishery was initiated with a discussion paper released for public comment in September 1998. The new management arrangements were finalised in 1999 and included:

- the waters of Coffin Bay be reserved for recreational fishing only (thus the one commercial fisher in the area was not permitted to fish those waters, but did have access to the remainder of State waters);
- all scallop dredging to be prohibited in State waters under regulation; and

- that another two Miscellaneous Fishery licences be allocated through a tender process.

The allocation of another two Miscellaneous Fishery licences was later reviewed and it was decided to offer only one (1) additional licence under tender. In addition, a change was made to the licence condition allowing a second master to fish the licence without the licence-holder present.

In March 1995, a toxic algal bloom led to the mortality of many scallops in the Coffin Bay area and the fishery was closed to commercial and recreational fishing in July. Scallop populations were last surveyed in this area in February 1997 and the fishery was subsequently re-opened.

The second review (in 1998) of the fishery recommended the establishment of a sub-committee within the Marine Scalefish Fishery Management Committee (MSFMC) to manage those issues relating to the miscellaneous fishers. At this time PIRSA recommended through a draft discussion paper that the daily limit (per recreational fisher) of scallops be reduced to 100 and for the first time proposed a recreational boat limit of 300 (for 3 or more persons) in recognition of the continuing expansion of diving activity in the recreational sector.

In 2001, a section 43 notice was issued under the Fisheries Act to prohibit the use of scallop dredges in South Australian waters, effective 31 May 2001. The use of scallop dredges is now prohibited through regulation.

Annual landings have decreased recently, correlating with high production levels from the Bass Strait fishery and the resulting poor prices for king scallops. Given the lower quantity and higher production costs in South Australia, fishermen find it hard to compete in such a market. The queen scallops however, being harvested by diving rather than dredging, and are received favourably in Sydney markets.

Turbo

There is very little information available for the turbo fishery. It is a new fishery currently being developed in both South Australia and Tasmania. The fish is sold live to processors who then export the product to both interstate and overseas markets.

Whilst turbo was a permitted species under the original miscellaneous licences granted for scallops in 1985, there has been no recorded harvest by these fishers. This endorsement was soon removed as scallop fishers perceived the potential of the fishery to be low, given a small average size of the turbo in their local (pers comm., Mark Johnson).

There has been considerable interest in developing and expanding the turbo fishery throughout coastal South Australia. Since 1998 three (3) ministerial exemptions have been granted for the harvesting of turbo. These exemptions have come with conditions limiting the total allowable catch per fisher over a given time period and the holder must provide detailed catch and effort data on a regular basis.

A draft Management Plan for the South Australian Miscellaneous Dive Fishery is currently being developed by PIRSA Fisheries, which will aim to address issues relating to licensing arrangements for the turbo fishery. Until such time no further access will be granted.

3.3 Biology of Key Species

The biology of scallop and turbo species from around the world has been investigated over the past few decades. However, information available on the status of these fisheries in South Australia, and their role in the surrounding marine ecosystems is very limited and almost non-existent for the turbo fishery.

Scallops

Scallops are filter-feeding, bivalve molluscs that lie unattached on the seabed. They can swim actively but adults are generally sedentary. King scallop distribution in Australia is from Tuncurry on the New South Wales coast, south through the Bass Strait, along the east and north coasts of Tasmania to South Australia, across the south coast and along the west coast of Western Australia to Shark Bay. Like other scallop species, king scallops are found in discrete beds to depths of at least 120m, over bare, soft sand or mud (Kailola *et. al.*, 1993).

Spawning occurs from late June to September (Shepherd, 1988). Although information has been provided indicating that spawning times vary depending on the species, their location and the year of harvest as those species occurring in Coffin Bay and the West Coast tend to spawn in November (pers comm. Mark Johnson). Annual reproductive cycles are well known for many species of scallop worldwide (Styan and Butler 2003). The major difference between *Pecten* and *Chlamys* species is that the former genus is hermaphroditic and the latter dioecious.

Spawning is thought to be initiated by a sudden rise in water temperature and occurs over an extended period during winter and spring, with peaks in activity varying between locations. King scallops are hermaphrodites and broadcast spawners with up to one million eggs produced by an individual. Fertilisation is external (Kailola *et. al.*, 1993) and the larvae remain planktonic for 2-4 weeks depending on species and settle onto algae or shell. The deposition of silt on otherwise suitable settlement surfaces may inhibit settlement (Minchin, 1992). Due to the annual variation in intensity of spawning and in oceanographic events, spatfall is highly variable in time and place and causes large fluctuations in annual catches (Shepherd, 1988).

Reports from Victoria suggest scallops grow to marketable size in approximately 18 months, but may take longer in offshore locations in Bass Strait (Victorian Department of Primary Industries, 2005). A study of Tasmanian scallop beds estimated the life span of *P. fumatus* to be up to 16 years, with the majority of the population between 5 to 12 years old (Fairbridge, 1953).

Scallops are preyed upon by a number of species including starfish, whelk and octopus (Kailola *et. al.*, 1993). In a scallop study in the D'Entrecastreaux Channel, southern Tasmania, starfish were reputedly responsible for the death of as much as 80% of the population over a four year period (Victorian Department of Primary Industries, 2005).

Turbo

Turbo species are gastropod snails inhabiting rocky reefs and boulder habitat in Australia's southern temperate waters. *Turbo undulatus* is distributed from New South Wales, south to Tasmania and west to Hopetown in Western Australia (Kailola *et. al.*, 1993). Turbo are associated with various algal species including the kelp *Eklonia radiata* (Clarkson & Shepherd, 1985) and the foliose coralline alga *Corallina officinalis* (Underwood & Chapman, 1995). Studies by Worthington and Fairweather (1989) show that *T. undulatus* not only utilise *C. officinalis* as a food source but that it also provides important habitat.

Whilst biological information on turbo is scarce, data available from NSW suggest spawning occurs from October through to March. They are broadcast spawners, and it is assumed their eggs are lecithotrophic. According to Shepherd (pers comm.) it is expected that larval life is about five days with pelagic trocophore and veliger, as for other species in this group.

The main predators of turbo are wrasse species (including blue groper). Wrasses only take juveniles but groper can take larger specimens.

Commercial fishery

Scallops

There are five miscellaneous licence holders who have access to harvest scallops by diving. Marine Scalefish licence holders (and those with marine scalefish access) are not permitted to harvest scallops by diving, however scallops are listed as a permitted species under Schedule 1 of the *Fisheries (Scheme of Management – Marine Scalefish Fisheries) Regulations 1991*. Catch returns indicate that no fishers have harvested scallops in the last five years. Data collected from the miscellaneous fishers who harvest scallops indicates that a total weight of 175, 785kg has been harvested (both king and queen scallops) between 1st July 2001 and 30th June 2005.

Miscellaneous licenses are not transferable, and four of the five scallop licence holders are subject to the following conditions:

- allow them to take scallops (family Pectinidae) and sea urchins (*Heliocidaris erythrogramma*);
- use only a maximum of two persons to engage in fishing activities from the registered boat at any one time and these two people are to be a combination of the licence holder, a registered master other than the licence holder, and an agent of the licence holder;
- no scallops are permitted to be taken from the waters of Coffin Bay southerly of the parallel of latitude 34° 30.3'S;
- the licence holder may only use one registered boat at any one time; and
- fish may only be taken by hand and only by diving from the registered boat.

The fifth licence holder is permitted to harvest scallops from the waters of Coffin Bay under the following conditions:

- The license holder may only take scallops from the waters of Coffin Bay in the period between 1 April and 30 November in any year
- The license holder must not take scallops in Coffin Bay that are less than 80 mm in size, measured in accordance with the defined method of measurement set out in Clause 8 of Schedule 6 of the *Fisheries (General) Regulations 2000*.
- The license holder must not take more than 500 kilograms of scallops whole weight from the waters of Coffin Bay in a day
- The license holder must not take scallops from the waters of Coffin Bay for more than 2 days in any week
- In these conditions
"Coffin Bay" means the waters of Coffin Bay southerly of the parallel of latitude 34.30.3' S.
"day" means a 24 hour period commencing at 0000 hrs, and
"week" means 7 consecutive days starting on a Monday and ending on a Sunday

The *Fisheries (General) Regulations 2000* prohibit the commercial use of scallop dredges to take scallops in South Australian waters.

The state's commercial scallop harvest is concentrated between May and November in the Coffin Bay region, between May and October on the west coast and between September and March (depending on spawning) in eastern Spencer Gulf.

It should be noted that whilst the five Miscellaneous (Scallop) license holders are permitted to take sea urchin, no sea urchin have been landed by these fishers since July 2001. The development of a Miscellaneous Dive Management Plan will aid PIRSA fisheries to actively manage and monitor any changes to these current circumstances.

All information collected in catch returns is entered and stored with SARDI. Currently, there are no annual stock assessments or reports produced by SARDI for scallops. This information is available to PIRSA Fisheries on request and is reviewed periodically to ensure compliance with licence conditions. The development of the Management Plan is an opportunity to formalise this process.

Turbo

There are currently three (3) ministerial exemptions issued for the harvesting of turbo in South Australian waters. Landings have been steady with a total landed weight of 25,860kg between 1st July 2001 and 30th June 2005. Ministerial exemptions are issued on an annual basis at the discretion of the Minister or his delegate and have been in place since 1998. The conditions of these exemptions are or relate to:

- may only take turbo (*Turbo undulatus*) by diving and by collection by hand;
- a total allowable catch over a specified time period (differs for each fisher);
- completion of catch and effort data in form of a daily log as provided by the Director;
- various conditions relating to reporting and notification of fishing activity.

Given confidentiality agreements, individual catch limits have not been reported. However if all exemption holders fished their total allowable catch, the maximum annual catch would be less than 34,000kg.

Turbo are currently harvested all year round, but as they are taken by diving, weather conditions greatly influence harvesting operations and will affect the fishers' ability to reach the specified total allowable catch.

All information collected in catch returns is entered and stored with PIRSA. Currently, there are no annual stock assessments or reports produced by PIRSA for turbo. This information is reviewed periodically to ensure compliance with licence conditions. The development of the Management Plan is an opportunity to formalise this process.

3.4 Export markets

There have only been local and domestic markets for South Australian scallops with occasional export enquiries from local and overseas processors (pers comm. Mark Johnson). Export enquiries were received in 2006 by at least one processor on the West Coast for fresh half shell product. This enquiry could not be followed through with a sample of product for assessment, as spawning had already commenced and scallops with spent roes have no commercial value. Recently, AQIS have been seeking collection of scallop samples for chemical assessment to be provided to European Union (EU) authorities in order to facilitate export opportunities.

There is potential for the development of a niche market for dive-caught scallops, given the environmental impacts associated with dredge fisheries are far greater than that of dive

fisheries. The majority of scallops worldwide are dredge-caught. Currently the market does not distinguish between methods of harvest and is subject to large fluctuations due to supply.

Supply of South Australian turbo to various markets has fluctuated. Currently, most of the harvested product is sold live to the Sydney and Melbourne fish markets with prices averaging between \$3 - \$6 a kilogram. Overseas markets, particularly in the Asian region, are being investigated by at least one exemption holder. There is still quite a considerable amount of work required to identify optimum transportation methods for shipping turbo overseas, and this is an area that at least one exemption holder is researching further.

3.5 Recreational fishery

The recreational fishery for scallops (*Pecten fumatus* and *Chlamys bifrons*) is managed using a minimum legal length of 6.5cm, bag limit of 100 and boat limit of 300. According to Jones and Doonan (2005), the estimated recreational harvest of scallops in South Australian waters in 2000/01 was 59,321 scallops ($\pm 21,874$) or 5,469 kg, live weight.

It is unclear whether recreational fishers are actively targeting turbo and if they are what the catch levels are. Given the low demand for turbo products on the local domestic market, any fishing pressure from the recreational fishing sector is considered to be low.

A review of South Australia's recreational marine and freshwater fishing regulations (size and bag limits) is currently underway and due for public release in 2006.

3.6 Indigenous fishery

Aboriginal communities fished the coastal waters of South Australia for at least 6,000 years before European settlement (Nance & Speight, 1986). Archaeological evidence collected from campsites on the Yorke Peninsula suggests that a variety of gastropods were collected including turbo, periwinkles and abalone (<http://www.yorke.sa.gov.au>). Cann et al., (1991) also documents the gathering of turbo and mud cockles. The current level of indigenous fishing is unknown, but is thought to be quite low.

Scallops are not likely to have been taken by indigenous communities due to the depth range of the animals. It is probable that the harvest was opportunistic rather than targeted.

4. ECOLOGICAL ASSESSMENT

The *Guidelines for the Ecologically Sustainable Management of Fisheries* (the Guidelines) consist of two overarching principles and a series of objectives. They require that data collection, assessment and management of responses in place for target species, by-product, bycatch and the broader environment are adequate to demonstrate that a commercial fishery is managed in an ecologically sustainable manner. The Guidelines are addressed below in relation to the scallop and turbo fisheries.

4.1 Principle 1

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| <p>Principle 1: A fishery must be conducted in a manner that does not lead to over-fishing, or for those stocks that are overfished, the fishery must be conducted such that there is a high degree of probability the stock(s) will recover.</p> |
|--|

4.1.1 Objective 1

The fishery shall be conducted at catch levels that maintain ecologically viable stock levels at an agreed point or range, with acceptable levels of probability.

Information requirements

Guideline 1.1.1:

There is a reliable information collection system in place appropriate to the scale of the fishery. The level of data collection should be based upon an appropriate mix of fishery independent and dependent research and monitoring.

Fishery dependent information

Section 46 of the Fisheries Act requires the five scallop harvesters, operating under a Miscellaneous Licence and the three exemption holders harvesting turbo to submit monthly catch and effort return information. The scallop harvesters submit this information to SARDI Aquatic Sciences while the turbo harvesters submit the catch returns to Executive Director, Fisheries. The following information is requested from the licence holder:

- The date the fishing activity took place;
- The main port the fisher operates from;
- The statistical area fished;
- The species targeted;
- The numbers and total weight of each species taken;
- Searching and diving time fishing for species;
- Dive Location in GPS co-ordinates to three decimal places;
- The fish processor(s) harvest sold to; and
- Any other comments

A copy of the monthly log form to be completed by turbo permit holders is at Appendix 1 and the monthly log for scallop Miscellaneous licence holders is at Appendix 2.

Fishery dependent information must be submitted every month of the duration of the licence/permit. If the scallop Miscellaneous Fishery licence holder fails to submit monthly catch and effort information, the Director of Fisheries may recommend the imposition of a substantial fine or term of imprisonment under Section 46 of the Fisheries Act. This information is available to PIRSA Fisheries on request, for the monitoring of commercial harvest levels. Currently, there are no annual stock assessments or reports produced by SARDI for scallops or turbo.

Fishery independent information

Currently, there is no ongoing independent monitoring of either the turbo or the scallop fishery. The turbo fishery is regarded as being at an experimental phase of development.

The Management Plan for the Miscellaneous Dive Fishery is currently being developed, and a strategic research and monitoring plan will be developed as part of the management plan.

Assessment

Guideline 1.1.2:

There is a robust assessment of the dynamics and status of the species/fishery and periodic review of the process and the data collected. Assessment should include a process to identify any reduction in biological diversity and/or reproductive capacity. Review should take place at regular intervals but at least every three years.¹

There is currently no research basis from which to determine ecologically sustainable scallop or turbo fishing effort. There are also limited historical records of catch and effort data for the fishery due to its infancy and, in the case of turbo its experimental nature. Given the lack of quantitative scientific data from which to establish a sustainable harvest level, there are good commercial and conservation motives for adopting a precautionary and structured approach to harvesting scallops and turbo. PIRSA Fisheries considers it appropriate to avoid a rapid development of the turbo fishery before the wider and more long-term impacts of this activity on dependent coastal ecosystem processes have received some scientific attention.

Guideline 1.1.3:

The distribution and spatial structure of the stock(s) has been established and factored into management responses.

Given the small scale and short existence of both scallop and (particularly) turbo fisheries, detailed information on the distribution and spatial structure of the stocks have not been conducted.

Guideline 1.1.4:

There are reliable estimates of all removals, including commercial (landings and discards), recreational and indigenous, from the fished stock. These estimates have been factored into stock assessments and target species catch levels.

Commercial harvest

Accurate commercial catch reporting has been in place for the scallop and turbo fisheries since 2000, as part of the licence and exemption conditions. Given the highly selective nature of the harvesting method, there is little or no discarding in the fisheries. There is no current estimate of the numbers of fish taken and subsequently returned (due to size limits or other reasons), however it is thought to be quite low. Any animals returned are returned either underwater or within close proximity to the dive site.

There have been no studies undertaken to quantify the amount of scallop and turbo biomass available to harvest in South Australia. As a result it is felt that the most appropriate approach is to apply a precautionary principle and ensure the harvest is contained at a conservative level until there is sufficient evidence to support a sustainable increase in harvest. On this basis, the management approach to regulating the fishery is through the use of input controls, such as limiting the number of entrants to the fishery, their harvesting operations and to some degree the area they can fish. One of the objectives of proposed monitoring programs is that a database be established to determine an ecologically sustainable turbo harvest.

Illegal harvest

The levels of illegal harvest of both scallops and turbo, if this is in fact occurring, are unknown. The compliance of all fisheries regulations is monitored by PIRSA FISHWATCH.

¹ Review should be undertaken by the relevant management authority in a transparent way

The strategic aim of PIRSA FISHWATCH is “to achieve optimal levels of compliance by all fishers”. To achieve the strategic aim, optimal compliance has two goals:

- Goal 1 – Improved voluntary compliance
Voluntary compliance means encouraging fishers to voluntarily adopt and support fisheries laws for moral and ethical reasons.
- Goal 2 – Effective deterrence
Effective deterrence means ensuring the penalties resulting from illegal activity outweigh any benefits gained from that activity.

PIRSA FISHWATCH provide PIRSA Fisheries with all information relating to offences and compliance issues as they arise. Furthermore FISHWATCH provides all FMC’s with quarterly reports summarizing the activities associated with that particular fishery. This process ensures PIRSA Fisheries are informed regarding compliance issues across the fishery. Appendix C outlines the risk profile for the Miscellaneous Fishery.

Indigenous and Recreational harvest

The recreational and indigenous harvest of turbo for human consumption in South Australia is currently not studied and there is no size, bag or boat limits set for any species of turbo. It is considered to be quite low however, due to the low demand for turbo products on the local domestic market with a corresponding low interest in recreational harvest.

Scallops are most probably the least popular of the species dived for recreationally but they are still taken by recreational divers. The recreational fishery for scallops (*Pecten fumatus* and *Chlamys bifrons*) is regulated using a minimum legal length of 6.5cm, bag limit of 100 and boat limit of 300.

According to Jones and Doonan (2005), the estimated recreational harvest of scallops in South Australian waters in 2000/01 was 59,321 scallops ($\pm 21,874$) or 5,469 kg, live weight.

Guideline 1.1.5:

There is a sound estimate of the potential productivity of the fished stock/s and the proportion that could be harvested.

In light of the difficulties in quantifying the amount of turbo and scallops available to harvest, it is felt that the most appropriate approach is to apply the precautionary principle and ensure the level of harvest is contained by limiting the numbers of entitlements to the fishery and restricting the harvest through input (and output controls in the case of turbo). As PIRSA Fisheries moves the management of the turbo fishery toward a miscellaneous licence, there will be greater scope to actively manage the fishery. The management plan currently being developed will explore research strategies and develop means to assess the fishery in terms of its productivity, and sustainable harvest strategies and other biological factors.

Guideline 1.1.6:

There are reference points (target and/or limit, that trigger management actions including a biological bottom line and/or a catch or effort upper limit beyond which the stock should not be taken.²

² Reference points can allow for seasonal fluctuations in stock recruitment and other areas of uncertainty

Currently there are no formal reference points to trigger management actions for both scallop and turbo fisheries. Management arrangements to date have incorporated a precautionary approach through limiting access to the fishery and in the case of turbo, incorporating catch limits for individual fishers.

Each scallop fisher, in accordance with their licence conditions, currently records and submits regular, detailed catch and effort data. Historically scallop landings have been relatively low, sporadic and inversely related to production levels in the Bass Strait fishery. The dramatic increase in supply when this fishery is operational results in a substantial reduction in market value. Given the small number of fishers, the method of harvest and the strong influence of price on fishing effort, PIRSA Fisheries is confident that current and past fishing effort has not reached a point where the stock should not be taken. Historically, management has responded to environmental factors that have impacted upon the fish stocks. The algal bloom in Coffin Bay in March 1995 resulted in the closure of the fishery until February 1997, when stocks were deemed to have recovered.

Each turbo fisher in accordance with their exemption conditions currently records and submits regular, detailed catch and effort data. This fishery is still going through a developmental phase and as such no structured management arrangements have been developed since the fishery first opened. Current licensing arrangements and catch limits are deemed adequate to ensure that past and current fishing effort has not reached a point where the stock should not be taken.

These management arrangements will continue until sufficient information is obtained through monitoring of fisheries dependent data, and the collection of fisheries independent data is available to make an informed decision on the fisheries future and management regime.

Guideline 1.1.7:

There are management strategies in place capable of controlling the level of take.

Fishing effort in the scallop fishery is primarily regulated through input controls, limited entry being the primary management tool. PIRSA Fisheries is confident that at the current levels of harvest the fishery is being conducted in a sustainable manner. Whilst localised and serial depletion is recognised as a potential problem in the fishery, given current harvest strategies and the spatial structure of the fishery, it is not considered to be significant at present.

As well as limited entry, the turbo fishery also incorporates an individual quota for each of the three fishers. This quota has been set at a precautionary level given the absence of sound scientific data relating to this species. When granting ministerial exemptions geographical locations were taken into consideration to ensure the development of the fishery statewide and to reduce the potential for localised depletion.

Furthermore PIRSA Fisheries have in the past acted to control the level of take within the Coffin Bay area following the mortalities associated with the algal bloom of March 1995. This commitment and ability to act in such circumstances is still in place today.

Guideline 1.1.8:

Fishing is conducted in a manner that does not threaten stocks of by-product species. (Guidelines 1.1.1 to 1.1.7 should be applied to by-product species to an appropriate level).

Each licence and exemption permit contains specific regulations outlining the methods of harvesting allowed (type and number of items of harvesting apparatus, exclusion zones). The

South Australian turbo and scallop fisheries are target-specific (i.e., hand selected harvesting), with no retention of by-product. Therefore PIRSA believes current fishing activities do not threaten any stocks of by-product species.

Guideline 1.1.9:

The management response, considering uncertainties in the assessment and precautionary management actions, has a high chance of achieving the objective.

Continued monitoring and assessment as the scallop and turbo fisheries develop and continued use of management controls including input controls supported by licensing and exemptions, will ensure that these fisheries remain sustainable in the long-term. However, uncertainties in the biomass available for harvesting give reason to be particularly cautious at this early stage of development. Thus, PIRSA will continue to adopt a 'precautionary approach' to the harvesting of scallops and turbo by maintaining current exemption conditions until sufficient evidence is available to determine the future of the fishery and its management regime, or until catch and effort levels alter considerably, raising concerns of over exploitation of the fishery.

Under the proposed new *Fisheries Management Bill 2006* (which will replace the Fisheries Act), a permit system for experimental and developing fisheries will allow some costs to be recovered for research into the viability of experimental fishing. It is anticipated that the fishery will be assessed under the new Bill as to whether exemption holders will be issued with a Miscellaneous Fishery licence.

Ongoing monitoring and assessment of the scallop fishery and continued use of management controls including input controls supported by licence conditions will ensure the long-term sustainability of this fishery. The development of a formal Miscellaneous Dive Fishery Management Plan will help provide a strategic research direction for scallops and provide a framework to develop performance indicators for them. This draft plan is scheduled for public release for consultation by the end of May 2006. In the meantime, PIRSA will continue to adopt a 'precautionary approach' to the harvesting of scallops by maintaining current licence conditions.

4.1.2 Objective 2:

Where the fished stock(s) are below a defined reference point, the fishery will be managed to promote recovery to ecologically viable stock levels within nominated timeframes.

Management responses

Guideline 1.2.1:

A precautionary recovery strategy is in place specifying management actions, or staged management responses, which are linked to reference points. The recovery strategy should apply until the stock recovers, and should aim for recovery within a specific time period appropriate to the biology of the stock.³

A precautionary recovery strategy has not been developed for the South Australian turbo and scallop fisheries given that they are in the early stages of development and are not deemed to be over-exploited.

³ Strategies require that recovery should take place within specified times with certain degrees of probability

Guideline 1.2.2:

If the stock is estimated as being at or below the biological and / or effort bottom line, management responses such as a zero targeted catch, temporary fishery closure or a 'whole of fishery' effort or quota reduction are implemented.

Management responses such as those outlined above are not applicable at this time due to the relatively short time frame and sporadic harvest effort of the turbo and scallop fisheries.

4.2 Principle 2

Principle 2: Fishing operations should be managed to minimise their impact on the structure, productivity, function and biological diversity of the ecosystem.⁴

4.2.1 Objective 1:

The fishery is conducted in a manner that does not threaten bycatch species.

Information requirements

Guideline 2.1.1:

Reliable information, appropriate to the scale of the fishery, is collected on the composition and abundance of bycatch.

The South Australian scallop and turbo fisheries are target-specific, selective fisheries. Both fisheries are conducted by divers hand collecting individual target species; as a result no bycatch is taken.

As in abalone fisheries, there is likely to be the unavoidable removal of encrusting and boring organisms, inquilines and commensal species with harvested animals (Tasmanian Department of Primary Industries, Water and Environment, 2001). However this is unlikely to significantly impact or threaten such species.

Assessments

Guideline 2.1.2:

There is a risk analysis of the bycatch with respect to its vulnerability to fishing.⁵

A risk assessment has not been conducted to determine the vulnerability of bycatch species to the fishery given there is little or no bycatch and the small scale of the current fishery.

Management responses

Guideline 2.1.3:

Measures are in place to avoid capture and mortality of bycatch species unless it is determined that the level of catch is sustainable (except in relation to endangered, threatened or protected species). Steps must be taken to develop suitable technology if none is available.

⁴ The issues addressed under the principle are those that define components of ecosystem integrity

⁵ The vulnerability of a bycatch species may be its vulnerability to fishing technology (eg its catchability), or its vulnerability in terms of ecological impact (eg loss of predators or prey)

At present licence and exemption conditions limit the collection of both scallops and turbo to hand-only whilst diving. Under the *Fisheries (General) Regulations 2000*, the use of scallop dredges is prohibited in South Australian waters. Given these arrangements, PIRSA is confident that measures are in place to avoid the capture and mortality of bycatch species.

Guideline 2.1.4:

An indicator group of bycatch species is monitored.

Given the nature of the fishery, PIRSA Fisheries has not considered it necessary to monitor an indicator group of bycatch species.

Guideline 2.1.5:

There are decision rules that trigger additional management measures when there are significant perturbations in the indicator species numbers.

Given the nature of the fishery, PIRSA Fisheries has not considered it necessary to monitor an indicator group of bycatch species or to develop corresponding decision rules.

Guideline 2.1.6:

The management response, considering uncertainties in the assessment and precautionary management actions, has a high chance of achieving the objective.

The South Australian scallop and turbo fisheries are target-specific, selective fisheries. Both fisheries are conducted by divers, hand collecting individual target species; as a result no bycatch is taken. Given current arrangements, PIRSA Fisheries is confident that the fisheries are conducted in a manner that does not threaten bycatch species.

4.2.2 Objective 2:

The fishery is conducted in a manner that avoids mortality of, or injuries to, endangered, threatened or protected species and avoids or minimises impacts on threatened ecological communities.⁶

Information requirements

Guideline 2.2.1:

Reliable information is collected on the interaction with endangered, threatened or protected species and threatened ecological communities.

The South Australian scallop and turbo fisheries have no apparent direct effects on any threatened or protected species or threatened ecological communities and no known indirect effects. There is minimal direct disturbance to the substrate as this is a highly selective fishery. There is a limited risk of interactions between vessels or divers and cetaceans.

PIRSA Fisheries is not aware of any information that has been collected on the interaction between commercial turbo and scallop fishing and its effects on endangered, threatened or protected species and threatened ecological communities.

PIRSA Fisheries is currently developing wildlife returns that will be incorporated into the catch and effort logbooks of all South Australian managed fisheries.

⁶ “Protected” species are those which warrant a higher degree of conservation and for which explicit legislative or other mechanisms exist, eg they may be categorised under separate legislation as “endangered”, “threatened”, “protected”

Assessments

Guideline 2.2.2:

There is an assessment of the impact of the fishery on endangered, threatened or protected species.

A risk assessment has not been conducted and there is no current monitoring to determine the susceptibility of endangered, threatened or protected species to the fishery.

Guideline 2.2.3:

There is an assessment of the impact of the fishery on threatened ecological communities.

No assessment has been conducted and there is no current monitoring to determine the susceptibility of threatened ecological communities to the fishery.

Management responses

Guideline 2.2.4:

There are measures in place to avoid capture and/or mortality of endangered, threatened or protected species.

At present licence and exemption conditions limit the collection of both scallops and turbo to hand-only whilst diving. Under the *Fisheries (General) Regulations 2000*, the use of scallop dredges is prohibited in South Australian waters. Given these arrangements, PIRSA is confident that measures are in place to avoid the capture and mortality of endangered, threatened or protected species.

Guideline 2.2.5:

There are measures in place to avoid impact on threatened ecological communities.

At present licence and exemption conditions limit the collection of both scallops and turbo to hand-only whilst diving. Under the *Fisheries (General) Regulations 2000*, the use of scallop dredges is prohibited in South Australian waters. Given these arrangements, PIRSA is confident that measures are in place to avoid impact on threatened ecological communities.

Guideline 2.2.6:

The management response, considering uncertainties in the assessment and precautionary management actions, has a high chance of achieving the objective.

PIRSA Fisheries considers that the risks of the turbo and scallop fisheries causing mortality of, or injury to endangered, threatened or protected species or having impacts on threatened ecological communities are minimal. This is taking into account the low levels of effort in the fisheries and their sporadic nature and that both species are harvested by diving and hand collection from small boats. Hand collection is a target-specific and low-impact activity.

4.2.3 Objective 3:

The fishery is conducted in a manner that minimises the impact of fishing operations on the ecosystem generally.

Information requirements

Guideline 2.3.1:

Information appropriate for the analysis in 2.3.2 is collated and/or collected covering the fisheries impact on the ecosystem and environment generally.

The South Australian scallop and turbo fisheries are selective fisheries; hand-collecting the target species.

PIRSA Fisheries considers that the potential impacts of the turbo and scallop fisheries on the ecosystem are likely to be minimal. This is taking into account:

- the low levels of effort in the fisheries and their sporadic nature;
- historical records indicating catch and effort have not been specifically localised; and
- both species are harvested by diving and hand collection from small boats.

Potential negative impacts could include physical damage to the benthos or other habitat from anchoring of vessels and localised trophic impacts through the removal of turbo and scallops from an area. It is possible that this in turn could decrease the biodiversity of the surrounding area.

A potential risk to water quality from scallop and turbo harvesting could be spillage of fuel and oil from vessels.

Assessment

Guideline 2.3.2:

Information is collected and a risk analysis, appropriate to the scale of the fishery and its potential impacts, is conducted into the susceptibility of each of the following ecosystem components to the fishery.

1. Impacts on ecological communities

- *Benthic communities*
- *Ecologically related, associated or dependent species*
- *Water column communities*

2. Impacts on food chains

- *Structure*
- *Productivity/flows*

3. Impacts on the physical environment

- *Physical habitat*
- *Water quality*

Given the scale and potential impacts of the scallop and turbo fisheries a risk assessment has not been conducted and there is no current monitoring to determine the susceptibility of these ecosystem components to the fishery.

The direct impact of scallop and turbo harvesting is the removal of these organisms. Since these fisheries are target-specific, no other organisms are removed.

Management responses

Guideline 2.3.3:

Management actions are in place to ensure significant damage to ecosystems does not arise from the impacts described in 2.3.1.

A management plan for the South Australian Miscellaneous Dive Fishery is being drafted. It will include specific management strategies to minimise any adverse impacts of scallop and turbo fishing operations on the broader ecosystem.

Guideline 2.3.4:

There are decision rules that trigger further management responses when monitoring detects impacts on selected ecosystem indicators beyond a predetermined level, or where action is indicated by application of the precautionary approach.

The nature and infancy of these fisheries as well as the scarcity of biological and ecological information has meant that the development of ecosystem indicators has not occurred. As the fishery develops and biological information becomes available, a formalisation of management responses when impacts are detected can be developed. Management response will utilise the precautionary approach in such circumstances.

In the past, PIRSA Fisheries have acted to control the level of take within the Coffin Bay area following the mortalities associated with the algal bloom of March 1995. This commitment and ability to act in such circumstances is still in place today.

Guideline 2.3.5:

The management response, considering uncertainties in the assessment and precautionary management actions, has a high chance of achieving the objective.

The precautionary nature of the existing input controls and level of access granted to the scallop and turbo fisheries aim to prevent development of both fisheries beyond sustainable limits and any potential serious ecological impacts.

The draft management plan and management responses will be structured such that there is a low risk of the fishery overexploiting scallop and turbo stocks and causing any serious negative impacts to the broader ecosystem. The extent to which the management plan achieves the range of established management objectives will be assessed using a combination of performance indicators, designed to measure the performance of the fishery, the status of individual key species and the impacts of the fishery on the ecosystem.

5. LIST OF ACRONYMS

| | |
|------------------------|---|
| <i>AFMA</i> | Australian Fisheries Management Authority |
| <i>CPUE</i> | Catch Per Unit Effort |
| <i>CRC</i> | Cooperative Research Centre |
| <i>CSIRO</i> | Commonwealth Scientific Industry Research Organisation |
| <i>DEH</i> | Department of Environment and Heritage |
| <i>EPBC Act</i> | Environment Protection and Biodiversity Conservation Act 1999 |
| <i>EEZ</i> | Exclusive Economic Zone |
| <i>ESD</i> | Ecologically Sustainable Development |
| <i>FMC</i> | Fisheries Management Committee |
| <i>FRDC</i> | Fisheries Research and Development Corporation |
| <i>ITQ</i> | Individually Transferable Quota |
| <i>MPA</i> | Marine Protected Area |
| <i>MSF</i> | Marine Scalefish Fishery |
| <i>MEY</i> | Maximum Economic Yield |
| <i>MSY</i> | Maximum Sustainable Yield |
| <i>NRIFS</i> | National Recreational and Indigenous Fishing Survey |
| <i>NZRLF</i> | Northern Zone Rock Lobster Fishery |
| <i>PIRSA</i> | Department of Primary Industries and Resources, South Australia |
| <i>RLF</i> | Rock Lobster Fisheries |
| <i>SAFIC</i> | South Australian Fishing Industry Council |
| <i>SARDI</i> | South Australian Research and Development Institute |
| <i>SARFAC</i> | South Australian Recreational Fishing Advisory Council |
| <i>SASQAP</i> | South Australian Shellfish Quality Assurance Program |
| <i>SZRLF</i> | Southern Zone Rock Lobster Fishery |
| <i>TAC</i> | Total Allowable Catch |
| <i>TACC</i> | Total Allowable Commercial Catch |

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APPENDIX C:

Compliance Risk Assessment – Miscellaneous Fishery 2006/07

Note that the following risk profile was developed for the 2006/07 fishing season. It will be audited and updated annually.

| Fishery sector | What can happen (risks) | Priority | Possible actions (mitigating strategies) |
|-----------------------|---------------------------------|-----------------|--|
| Commercial | Fish in closed areas / periods | High | <ul style="list-style-type: none"> • Conduct awareness program - talking to fishers about closures • Conduct random overt patrols • Conduct intel driven investigations / operations • Follow-up and investigate possible illegal activity |
| | Take non-permitted species | Moderate | <ul style="list-style-type: none"> • Conduct targeted inspections • Conduct intel driven investigations / operations • Conduct random processor checks • Follow-up and investigate possible illegal activity |
| | Contravene exemption conditions | low | <ul style="list-style-type: none"> • Conduct awareness program - talking to fishers about permit conditions • Conduct random inspections to determine compliance with exemption conditions • Follow-up and investigate possible illegal activity |
| Non-Commercial | Illegal sales | Low | <ul style="list-style-type: none"> • Conduct intel driven investigations • Follow-up and investigate possible illegal activity |
| Processor | Purchase rec fish | Moderate | <ul style="list-style-type: none"> • Liaison and networking with processor sector (eg bait suppliers) • Conduct random processor checks. • Conduct targeted investigations • Follow-up and investigate possible illegal activity |
| | Take over bag and boat limit | Moderate | <ul style="list-style-type: none"> • Conduct awareness campaign on size and bag limits • Liaise with Fishcare volunteers • Provide awareness talks to schools and groups • Conduct covert and overt operations / investigations • Use Fishwatch to target priorities • Follow-up and investigate possible illegal activity |